ADDENDUM #1

November 11th, 2024

WTP Upgrades

Village of Rhinebeck

Dutchess County, New York

Bid Date

December 19, 2024, 1:00 PM

Clarifications

1) The bid date and time are unchanged.
2) The water treatment plant's current and preferred SCADA vendor is Aqualogics Systems, Inc.
3) There is no installation detail for replacing the existing wooden baffles of the flocculator tanks with the proposed FRP baffles. The tracks for inserting the baffle wall boards are already in place. Per Drawing C-201, the FRP baffle boards are to be 12'x10"x2". The baffle wall heights will be 12' each. There are (3) three baffle walls per flocculator tank.
4) The proposed material for replacement of the existing baffle walls in the settling tanks shown on Drawings C-002 and C-104 has been changed from wood to FRP. The revised Drawings have been attached to this addendum.
5) All piping bolts, threaded rods, and nuts shall be 316 stainless steel.
6) All bolts, threaded rods, and nuts that are not stainless steel shall be coated in accordance with the following schedule.
    A. Primer: Zinc-rich epoxy primer, 3-5 mils
    B. Intermediate Coat: High-build epoxy, 6-8 mils
    C. Top Coat: Polyurethane, 2-3 mils
7) Regarding the highlift pumps, based on record Drawings, the overall sump depth is 16'-0", the concrete equipment pad is 1'-0", and the centerline height of the discharge flange from the concrete pad to the discharge flange is 7". These measurements shall be verified in the filed by the General Contractor prior to the placement of any fabrications orders.
8) The Bid Item Table for Contract 1G has been updated.
9) Specification Section 011010 – Summary of Work Contract 1G has been updated.
    A. Furnish and installation of the VFDs for the raw water pumps has been removed from the "Raw Water Pump Station Upgrades" Bid Item. These VFDs shall be furnished and installed under the "SCADA" bid item.
    B. Bid Item BA1, "Backwash Pump VFD Upgrades", has been eliminated. These VFDs shall be furnished and installed under the SCADA bid item.
    C. The numbering of the Bid Alternate Items has been changed due to the elimination of item BA1.

10) Specification Section 074113 – Metal Roof Panels has been removed from the Project Manual.
11) Specification Section 074200 – Formed Metal Wall has been removed from the Project Manual.
12) Specification Section 074116 – Insulated Metal Roof Panels has been added to the Project Manual.
13) Specification Section 074213.19 - Insulated Metal Wall Panels has been added to the Project Manual.
14) Specification Section 077253 – Snow Guards has been added to the Project Manual.
15) Specification Section 133419 – Metal Building Systems has been added to the Project Manual.
16) Specification Section 2622146 – Transformers, Dry Type Under 600V has been added to the Project Manual.
17) Specification Section 262417 – Circuit Breakers for Existing Panelboards has been added to the Project Manual.
18) Specification Section 263214 – Automatic Transfer Switch has been added to the Project Manual.
19) Specification Section 265119 - LED Fixtures has been updated.
20) Specification Section 406000 – SCADA has been updated.
21) Specification Section 461000 - High Lift Distribution Pumps has been updated to include a third distribution pump.
22) Drawings C-002, C-101, C-201, and C-202 have been updated to include the demo of existing and provision of a new third highlift pump.
23) Drawings C-201 and C-204 have been revised to include specifications for the proposed catch basin of the new treatment building and to add an additional trench drain.
24) Drawing C-204 has been revised
25) Architectural Drawings A-001, A-003, A-100, A-101, A-102, A-102, and A-200 have been updated. See Drawing revcoulds.
26) Structural Drawings S-001, S-002, S-003, S-100, S-101, S-300, S-301, S-540, and S-701 have been updated. See Drawing revcoulds.
27) Drawing E-003 has been updated to include third 100-HP high lift pump.
28) Drawing E-004 has been updated to reflect changes to the conduit and cable schedule to upsize power feeds to the third 100 HP high lift pump which was previously 50 HP.
29) Drawing E-104 has been updated to include third 100-HP high lift pump.
30) Drawing H-101 has been added to the Drawing set.

Attachments

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Bid Item Table – Contract 1G

Section 011010 – Summary of Work Contract 1G

Section 074116 – Insulated Metal Roof Panels

Section 074213.19 - Insulated Metal Wall Panels

Section 077253 – Snow Guards

Section 133419 – Metal Building Systems

Section 2622146 – Transformers, Dry Type Under 600V

Section 262417 – Circuit Breakers for Existing Panelboards

Section 263214 – Automatic Transfer Switch

Section 265119 - LED Fixtures

Section 406000 – SCADA

Section 461000 - High Lift Distribution Pumps

Drawing C-002

Drawing C-101

Drawing C-104

Drawing C-201

Drawing C-202

Drawing C-204

Drawing A-001

Drawing A-003

Drawing A-100

Drawing A-101

Drawing A-102

Drawing A-102

Drawing A-200

Drawing S-001

Drawing S-002

Drawing S-003

Drawing S-100

Drawing S-101

Drawing S-300

Drawing S-301

Drawing S-540

Drawing S-701

Drawing E-003

Drawing E-004

Drawing E-104

Drawing H-101

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Village of Rhinebeck

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NOTE

This Addendum is being distributed through usinglesspaper.com to everyone on the plan holders list. Should there be an issue with the system, please contact Robert Flores, PE at rflores@delawareengineering.com or 518-452-1290.

ATTENTION

PLEASE SIGN BELOW AND email to rflores@delawareengineering.com FAX TO DELAWARE ENGINEERING, DPC AT (518) 452-1335 to verify receipt of this Addendum.

RECEIVED BY: _____

Company Name: _____

WATER TREATMENT PLANT UPGRADES
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY
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TECHNICAL SPECIFICATIONS

DIVISION 01 GENERAL REQUIREMENTS

DIVISION 02 EXISTING CONDITIONS

DIVISION 03 CONCRETE

DIVISION 05 METALS

DIVISION 07 THERMAL AND MOISTURE PROTECTION

WATER TREATMENT PLANT UPGRADES - CONTRACT 1G

	BASE BID ITEMS	QUANTITY	UNITS	WRITE OUT THE UNIT PRICE /	FIGURES	ITEM BID PRICE
1	Mobilization and General Construction	1	LS			
2	General Sedimentation and Erosion Control	1	LS			
3	Buried Utility Locating	1	LS			
4	Site Excavation, Backfill, and Grading	1	LS			
5	Site Yard Improvements	1	LS			
6	Site Paving and Walkways	1	LS			
7	Site Demolition and Abatement Work	1	LS			
8	Flocculator Baffles	1	LS			
9	Rehabilitation of Existing Trident Units	1	LS			
10	Rehabilitation of Conventional Filtration Units	1	LS			
11	Rehabilitation of Existing Settling Tanks	1	LS			
12	Raw Water Pump Station Upgrades	1	LS			
13	Potassium Permanganate Station Upgrades	1	LS			
14	High Lift Pumps	1	LS			
15	Process Piping	1	LS			
16	New Building for Clarification Units - Structural Concrete	1	LS			
17	New Building for Clarification Units - Building	1	LS			
18	New Trident Clarification Units	1	LS			
19	UV Disinfection Units	1	LS			
20	Post-filter Chlorination Feed	1	LS			
21	Instrumentation	1	LS			
22	Supervisory Control and Data Acquisition (SCADA)	1	LS			
23	Off-Site Water Storage Tank Mixer	1	LS			
24	Final Restoration	1	LS			
	Contingency Allowance			Two Hundred Thousand Dollars	$200,000.00	$200,000.00
	BASE BID TOTAL COST (write out both in words and figures)					

	BID ALTERNATE ITEMS					
BA1	Epoxy Coating of Treatment Plant Main Floor	1	LS			
BA2	WTP Garage Upgrades	1	LS			
BA3	Off-Site Violet Hill Pump Station Upgrades	1	LS			
	BID ALTERNATE TOTAL COST (write out both in words and figures)					

	TOTAL COST (base bid plus alternate)					

SECTION 011010
SUMMARY OF WORK – 1G

PART 1. GENERAL

1.01 SUMMARY

A. This contract consists of:
   1. The summary of this work is described in Section 011010 and the Contract Drawings.

B. The scope of work identified in this section is intended to be a summary only. The Contractor shall assume responsibility for all costs of labor, materials, equipment, and supplies not specifically included in this section that are required to provide complete and functioning structures, utilities, and equipment.

1.02 PROJECT AND SITE CONDITIONS

A. Project and site conditions are generally illustrated on the Drawings. Contractor is responsible for inspecting all work locations and familiarizing himself with conditions affecting the work prior to submitting a bid for the work.

B. The approximate locations of known underground utilities are shown on Drawings for Contractor's information. This does not relieve Contractor from the requirement to locate and protect the public and private utilities including utility poles. Repair of damage resulting from the Contractor's negligence or lack of planning shall be the responsibility of the Contractor

1.03 COORDINATION WITH UTILITY COMPANIES

A. The Contractor shall notify UDig NY and pertinent utility companies 72 hours in advance of doing any work at or adjacent to said utilities. All requirements of NYCRR 53 & NYS Code Rule 753 are applicable to this contract.

1.04 DESIGN ENGINEER'S ESTIMATE OF QUANTITIES

A. Bid Items and estimated quantities are presented on the Bid Item Table included in these Contract Documents. The estimated quantities for unit price pay items are approximate only and are included solely for the purpose of comparison of bids.

B. The Owner does not expressly or by implication agree that the nature of the materials encountered below the surface of the ground or the actual quantities of materials encountered or required will correspond therewith and reserves the right to increase or decrease any quantity or to eliminate any quantity as Owner may deem necessary.

C. Contractor will not be entitled to any adjustment in a unit bid price as a result of any change in an estimated quantity and agrees to accept the aforesaid unit bid prices as complete and total compensation for any additions or deductions caused by a variation in quantities, as a result of more accurate field measurement or by any changes or alterations in the Work ordered by the Owner.

D. This Summary of Work is not intended to substitute for thorough review of all Contract Drawings and Specifications by the Contractor. Items not specifically included in the Summary of Work but shown on the Contract Drawings and Specifications are the responsibility of the Contractor to complete. The Contractor shall include the cost of completing these items in the Bid Item most closely associated to the work item in question. No additional compensation will be provided to the Contractor for any of these items.

1.05 UNIT PRICE WORK REQUIREMENTS INCLUDE

A. This section identifies Bid Items and method of measurement and payment.

B. Provide all labor, materials, equipment, supplies, supervision, overhead & profit, and all services necessary to furnish and install each Bid Item as required by Contract Documents.

1.06 MEASUREMENTS FOR PAYMENT

A. Bid Items
   1. For unit price items, the Contractor shall be paid based on actual quantities measured in the field, as shown on the pay limits of the contract plans and described in the bid form times the unit price on the bid item table. The measurement for each Bid Item is listed under Part 3-Execution of this specification.
   2. For lump sum items, the Contractor shall be paid either by partial payments or Lump Sum after the completion of the Bid Item. For partial payments, the Contractor shall submit for Engineer's review and approval a "schedule of values" that shall provide the basis for partial payments. The total costs of all components of work shall equal the Lump Sum bid for this Item.
      a. If a Lump Sum item is not completed, the Contractor will receive payment proportionate to the amount of work completed.

B. Contractor shall prepare monthly payment requests in a standard form as given by the Engineer. Contractor shall review a preliminary payment request with the Engineer prior to submittal of the formal request.

C. On a daily basis as required, Contractor shall review daily production and payment quantities with the Engineer.

D. After the completion of the project, the measurements for each bid item shall be re-measured where necessary. The remaining payments from the Owner to the Contractor shall be adjusted accordingly to the final measurements of the bid items.

PART 2. PRODUCTS

This section is not used. Refer to individual specification sections for more information on each bid item.

PART 3. EXECUTION

3.01 MOBILIZATION AND GENERAL CONSTRUCTION - **Bid Items: #1**

A. Mobilization and General Construction bid item for the project shall be no more than the maximum 3.0 percent of the total contract cost.

B. Measurement and Payment for these items will be made as progress payments against the Lump Sum Prices on the Bid Form included in the Contract Documents.

C. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.
   1. Upon completion of mobilization as approved by the ENGINEER, two-third (2/3) of the items shall be considered complete and payments made.
   2. The remainder of the payments under these Items shall be made on a regular monthly basis that accounts for equal payment for General Construction Work throughout the Contract schedule, except that ENGINEER may withhold such payments for failure to complete General Construction work not specifically included elsewhere in the Documents, provided 10-days advance written notice has been provided to CONTRACTOR of the deficiency.

D. The lump sum bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Pre-construction photos, Pre-construction survey of adjacent properties to Construction Site, Record Drawings, Project Photos, Project Videos, and etc.
   2. Coordination of all inspections.

3. Certified Payrolls, MWBE documents, and other project documentation.
4. Maintenance and documentation of project schedule.
5. Maintenance of temporary field facilities, including Engineer's field office.
6. Procurement and maintenance of required insurance and bonds.
7. Shop drawings and material submittals.
8. As-built drawings.
9. Health and Safety Plans.
10. Mobilization of equipment and work force.
11. All required building permits.
12. All other work required by the Contract Documents but not listed individually under other Bid Items.

3.02 GENERAL SEDIMENTATION AND EROSION CONTROL - **Bid Items: #2**

A. Measurement and Payment for general sedimentation and erosion controls shall be a Lump Sum cost spread out over the entire length of the project. These items must be installed and maintained in accordance with NYS Department of Environmental Conservation (NYS DEC) and with the Sediment and Erosion Control Plans. This lump sum cost shall include all items as detailed in the Sediment and Erosion Control Plans and/or shown on the Contract Plans. The payments under this Item shall be made on a regular monthly basis that accounts for equal payment for sedimentation and erosion controls throughout the Contract schedule, except that ENGINEER may withhold such payments for failure to complete erosion control work, provided 10-days advance written notice has been provided to CONTRACTOR of the deficiency.

B. Payment under these Items shall be the same regardless of whether additional work is done or if the Contract is extended.

C. The general sediment and erosion control shall include all costs associated with complying with the erosion control plans as shown on the Contract Plans. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including but not limited to:

1. Layout and site preparation
2. Furnish and installing silt fence, culvert inlet protective devices (stone & block drop inlet protection, curb drop inlet protection, grate filters (inlet), HDPE culvert inlet protection, combo silt fence/check dam inlet protection) as required by or shown on the Contract Plans.
3. Installing and maintaining all additional sediment and erosion control devices as required to maintain full compliance with NYSDEC stormwater discharge requirements. These control devices may not be shown on the Contract Plans as the dewatering methods are within the means and methods of the CONTRACTOR and the control devices are a function of the dewatering method. All costs for these control devices shall be included in as part of this bid price.
4. Furnish and completing all dust control, dewatering operations, and daily seeding, mulching, and rough grading.
5. Maintenance of all sediment and erosion control components during the entire construction phase.
6. General compliance with the sediment and erosion control plan.

3.03 BURIED UTILITY LOCATING - **Bid Items: #3**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. The CONTRACTOR shall procure the services of a qualified utility locator to accurately locate all buried utilities. The utility locator shall locate all buried utilities within the grounds of the WTP.
   2. The utility locator shall accurately mark each utility in accordance with NYS Code Rule 753.
   3. The CONTRACTOR shall be responsible to maintain the utility markings (or demonstrate record keeping which allow for the utilities locations and type to remain known) for the duration of the project. In the event of the markings being lost, the CONTRACTOR shall procure the services of the utility locator to relocate the utilities at no additional cost to the OWNER. CONTRACTOR is responsible for providing OWNER with an AutoCAD 2023 compatible file that ENGINEER can insert into construction and as-built drawings
   4. Other appurtenant and incidental work

3.04 SITE EXCAVATION, BACKFILL, AND GRADING - **Bid Items: #4**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made. It is REQUIRED that the CONTRACTOR procure the services of a qualified engineer to develop an excavation, shoring and dewatering plan for this work. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
B. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout and field survey.
   2. Preparation and submission of a P.E. stamped excavation, shoring, and dewatering plan.
   3. Site preparation including all clearing and grubbing and the proper disposal of excess materials.
   4. Excavation, temporary sheathing, shoring, and bracing.
   5. Excavation of all excess materials on the site as required to bring the site to final grade.
   6. Import of all materials, backfill, and compaction as required to bring the site to final grade.
   7. Environmental controls and protection as required by the plans and permits.
   8. Excavation of materials to facilitate the installation of all new structures and utilities.
   9. Disposal of all excavated material which is unsuitable for unclassified backfill and disposal of all excess material per NYS DEC requirements
   10. Other appurtenant and incidental work.

3.05 SITE YARD IMPROVEMENTS - **Bid Items: #5**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout and field survey.

2. Site preparation including saw-cutting the street pavement, removing street pavement, curb and gutters, sidewalks, driveways, and the proper disposal of excess materials.
    a. All pavement, sidewalks, and curbs must be saw-cut before being removed by the CONTRACTOR. The CONTRACTOR cannot use his equipment to break up the pavement, sidewalks or curbs.
3. Excavation, temporary sheathing, shoring, and bracing.
4. Dewatering and environmental controls and protection as required by the plans and permits.
5. Select granular fill, unclassified backfill, subbase, pea stone, stone fill, and bedding, are included in this Bid Item. Note that any over-excavation and associated bedding and backfill required as result of the dewatering methods utilized shall be included in this item and the CONTRACTOR will receive no additional compensation for this work.
6. Furnishing and installing all buried piping including but not limited to:
    a. Test pit digging in coordination with the Owner and Engineer to located existing utilities as required to perform the Work.
    b. All underground piping, fittings, restrained couplings, restraints, connections, valves, thrust blocks, and etc. complete with bedding, backfill, subbase and compaction. Note that any over-excavation and associated bedding and backfill required as result of the dewatering methods utilized shall be included in this item and the CONTRACTOR will receive no additional compensation for this work.
    c. All connections.
    d. Complete water hydrant and isolation valve
    e. All pipe insulation where applicable
    f. Bedding and backfill for all existing pipes and conduits which are exposed during the execution of this work.
    g. All coring with link seals, neoprene boots, and all connections.
    h. All bacteria and pressure/leakage testing.
7. Complete water hydrant including:
    a. with lower barrel and inlet shoe. Provide barrel extension section as required for proper grade.
    b. Alignment and leveling of hydrant.
    c. Furnishing and installation of marker post.
    d. Installation of OWNER supplied hydrant marker ring.
    e. Pressure tests, leakage tests, disinfection and dechlorination, complete with verification of all main line and guard valves in the fully open position.
    f. The shut-off valves, anchor tee, and fittings shall be included in the bid item.
    g. Temporary support and maintenance of other utilities and structures affected by the work.
3. All proposed storm structures including all drainage piping for the new building, catch basins, and the garage/barn slim type trench drain.
4. Coated steel bollards with 3,000 psi concrete fill and 2” reflective tape.
5. Electrical kiosk.
6. All other appurtenant and incidental work.

3.06 SITE PAVING AND WALKWAYS - **Bid Items: #6**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout and field survey.
   2. Saw cutting for placement of utilities. This saw cutting is separate from and in addition to the saw cutting of the pavement for trenching restoration.
   3. All cleaning and surface preparation.
   4. Remove and dispose of all existing pavement per state and federal regulations.
   5. Prime coating of all applicable areas, including existing pavement edges.
   6. All fill as required to bring driveway/parking lot/walkways to final proposed grade.
   7. All subbase.
   8. All proof rolling and compaction.
   9. All Type 3 binder asphalt course.
   10. All Type 6 top asphalt course.
   11. All milling, keyways, and rebates.
   12. All tack coats.
   13. All concrete and reinforcement.
   14. All work as required to maintain existing or proposed drainage patterns.
   15. All ramps and walkways.
   16. Adjustment of valve boxes, manhole, and catch basin castings.
   17. Any repairs required due to asphalt installation, complete with "backing up" all new asphalt.
   18. Temporary protection, support and maintenance of other utilities and structures affected by the work.
   19. Asphalt paving resulting from trenching by other prime contractors.
   20. Other appurtenant and incidental work.

3.07 SITE DEMOLITION AND ABATEMENT WORK - **Bid Items: #7**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete all demolition of existing structures, mechanical equipment, process piping and all other demolition, but not limited to:
   1. Layout and field survey.
   2. All environmental controls and protection as required by the plans.
   3. All components of the decommissioning of existing pipes, including cutting and capping and plugging pipes with hydraulic cement.
   4. Removal of any piping, structures, tanks, equipment, concrete, asphalt, curbing, sidewalks, architectural, misc. metals, buildings, and all required demolition as shown on the Contract Plans.
   5. The Contractor shall thoroughly review Exhibit E to this Project Manual and procure the services of a licensed asbestos designer to develop an asbestos abatement work plan following the requirements of NYSDOL Code Rule 56. This plan shall include all asbestos abatement at the sites. The Contractor shall submit 2 copies of this work plan which will be maintained by the Owner and Engineer for record only.

6. The Contractor shall be responsible for following all requirements of the work plan. The cost of all abatement work which requires the use of a licensed asbestos abatement contractor shall be included in the bid.
7. Complete removal of the existing 4,000 caustic tank including full compliance with the submitted Asbestos Abatement Work Plan. The Contractor shall note that should the asbestos abatement work require full isolation of the area, then the abatement contractor must remain on-call and assist the personnel with any adjustments or any other operational issues that may arise which require accessing the area.
8. All demolition and disposal of all material in accordance with these Contract Documents and all state and federal laws

3.08 FLOCCULATOR BAFFLES - **Bid Items: #8**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Furnishing and installing FRP baffles at the influent and effluent at each flocculator tank (4 baffles) and all appurtenances as shown on the Contract Plans including but not limited to:
      - A complete design of the baffle system utilizing FRP materials following the typical details per the Contract Documents.
      - All connections, hardware, retrofitting, mounts, and supports.
   3. All other appurtenant and incidental work.

3.09 REHABILITATION OF EXISTING TRIDENT UNITS - **Bid Items: #9**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. New complete in-kind replacement blowers, motors, and air piping.
   2. Removal, storing, and reuse of media. Media to be stored in sanitary fashion.
   3. Hand tooling all rust and full recoat including primer, stripe coat, and top coat.
   4. Replacement of existing media retention grating and gaskets.
   5. Repairs and replacement of piston and waste gate including connection to existing.
   6. Replacement of all electrically and manually actuated valves.
   7. Replacement of all pressure switches.
   8. Replacement of all pressure gauges.
   9. Replacement of all solenoid valves.
   10. Replacement of all float switches.
   11. Replacement of all level transducers.
   12. All other miscellaneous repairs, modifications, and replacements required to provide complete functioning units.

3.10 REHABILITATION OF CONVENTIONAL FILTRATION UNITS - **Bid Items: #10**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Replacement of all electrically and manually actuated valves in accordance with Contract Drawings.
    2. Other incidental work.

3.11 REHABILITATION OF EXISTING SETTLING TANKS - **Bid Items: #11**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Demolition and disposal of existing wooden baffle walls.
    2. In-kind replacement of existing wooden baffle walls in accordance with Contract Drawings.
    3. Other incidental work.

3.12 RAW WATER PUMP STATION UPGRADES - **Bid Items: #12**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Replacement of existing pumps and motors of second vacuum prime assembly. Integrate new equipment into existing system.
    2. Replacement of existing air release valves
    3. All required fittings, adaptors, valves, and pipe.
    4. All other appurtenant and incidental work.

3.13 POTASSIUM PERMANGANATE STATION UPGRADES - **Bid Items: #13**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Chemical dosing/mixing tank.
    2. Spill containment tank.
    3. All plumbing, drain plumbing, valves, and flow meters.
    4. Chemical mixer.
    5. Complete chemical feed pumping system.

6. Backflow preventor – reduced pressure zone (RPZ) and discharge funnel.
7. Emergency shower and eyewash combination station.
8. All piping, fittings, adaptors, valves, anchors, hangers, supports, and other plumbing appurtenances.
9. All disinfection and pressure/leakage tests.
10. All taps and connections.
11. Other appurtenant and incidental work.

3.14 HIGH LIFT PUMPS - **Bid Items: #14**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Furnishing and installing three (3) high lift pumps and VFD rated motors and all appurtenances as shown on the Contract Plans including but not limited to:
      a. All flanged piping, fittings, isolation and check valves.
      b. All pressure relief valves, pressure gauges with isolation valves.
      c. All connections.
      d. All taps including sample taps.
      e. All finishes and painting.
      f. All supports and equipment pads.
      g. All equipment start-up and testing.
   3. All other appurtenant and incidental work.

3.15 PROCESS PIPING - **Bid Items: #15**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Furnishing and installing process piping in the existing building and new clarification unit building and all appurtenances as shown on the Contract Plans including but not limited to:
      a. All piping, fittings, valves (manual and electrical), restrained couplings, flanges, and all appurtenances.
      b. Air and pressure release valves, and pressure gauges.
      c. All static mixers, chemical injections quills.
      d. All connections and taps.
      e. Relocation of the existing chemical feed lines.
      f. All S.S. supports, concrete supports, and etc.
      g. All finishes and painting.
      h. All equipment start-up and testing.
   3. All other appurtenant and incidental work.

3.16 NEW BUILDING FOR CLARIFICATION UNITS - STRUCTURAL CONCRETE - **Bid Items: #16**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:

1. Layout and field survey.
2. The Contractor shall carefully review the available geotechnical data included in Exhibit F to this Project Manual.
3. Furnishing and installing the following including but not limited to:
   a. All applicable structural fill, backfill, geotextile fabric and compaction.
   b. All design, furnishing and erection of shoring and bracing.
   c. All waterstops, anchor bolts, chamfer strips, wall sleeves, grating embedment, keyways and miscellaneous penetrations (CONTRACTOR shall coordinate all hardware locations with the applicable equipment supplier).
   d. All wall sleeves and castings.
   e. All reinforcement, concrete and grout.
   f. All applicable concrete sealants.
   g. All concrete fill, patches, and etc.
   h. All cutting and coring.
   i. All construction, contraction and expansion joints.
4. Temporary support and maintenance of other utilities and structures affected by the work.
5. Other appurtenant and incidental work.

3.17 NEW BUILDING FOR CLARIFICATION UNITS - BUILDING - **Bid Items: #17**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including but not limited to:

1. Layout
2. Furnishing and installing all architectural components of the new building for the clarification units building including but not limited to:
   a. All connections to walls and slabs.
   b. All walls complete with lintels, wall sleeves, door/equipment/window openings.
   c. All control joints.
   d. All roof trusses, sheathing, roof covering system, gutters, snow guards, and appurtenances.
   e. All building siding components.
   f. All doors and windows, complete with hardware including overhead doors.
   g. All finishes and sealants (the General Contractor shall be responsible for sealing all penetrations, including penetrations by other trades).
   h. All penetrations/lintels for HVAC/electrical components. General Contractor shall include all openings noted on H Drawings within this bid price.
   i. Coordination with other trades for opening/wall sleeve size and locations.

3. Temporary support and maintenance of other utilities and structures affected by the work.
4. Other appurtenant and incidental work.

3.18 NEW TRIDENT CLARIFICATION UNITS - **Bid Items: #18**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Furnishing and installing all components of the two (2) new clarification units with controls including but not limited to:
      a. All flanged piping, fittings, valves, restrained couplings, supports, spare parts and all appurtenances. This item includes all air, chemical, process, and etc.
      b. All control panels, instrumentation, pumps, blowers, and other equipment required to provide complete functional units.
      c. All air relief valves, pressure gauges with isolation valves.
      d. All coring with link seals.
      e. All connections.
      f. All supports and equipment pads.
      g. All finishes and painting.
      h. All equipment start-up and testing.
      i. All pressure and leakage testing.
   3. Other appurtenant and incidental work.

3.19 UV DISINFECTION UNITS - **Bid Items: #19**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.

C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Furnishing and installing all components for the two (2) UV disinfection units including but not limited to:
      a. All lamps, instrumentation, spare parts, and appurtenances required to provide a complete functional unit.
      b. All connections.
      c. All supports, equipment pads, and pedestals.
      d. All finishes and painting.
      e. All disinfection and equipment start-up and testing.
      f. All pressure and leakage testing.
      g. Other appurtenant and incidental work.

3.20 POST-FILTER CHLORINATION FEED - **Bid Items: #20**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.

B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to provide a complete connection of the gaseous chlorine feed line to the treatment plant's entry point piping.

3.21 INSTRUMENTATION - **Bid Items: #21**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Flow indicators.
    2. Pressure indicators.
    3. Streaming current analyzer.
D. Instrumentation required for the operation of specific equipment is included in the respective Bid Item of each piece of equipment. This Item refers to instrumentation not specifically included in other equipment or Items.

3.22 SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) - **Bid Items: #22**

B. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
C. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
D. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
    1. Layout
    2. Furnishing and installing all components of all modifications, additions and new work regarding the SCADA system, including but not limited to:
        a. Furnishing and installation of all instrumentation equipment per Contract Documents.
        b. All design and execution of all PLC's, complete with all hardware, software and all other components as necessary to furnish a complete and functional SCADA system per the Contract Documents.
        c. All terminations and landings of all signal/control wiring (electrical contractor shall install the conduit and conductors).
        d. Coordination with the electrical contractor regarding conduits and conductors
        e. Furnishing and installing all new fiber optic cable (electrical contractor shall install the conduit)
        f. Furnishing and installation of all new control panels, complete with all necessary hardware, software and all other components as necessary to communicate with the SCADA system per the Contract Documents.
        g. All programming and associated work.
        h. Coordination with applicable equipment suppliers to ensure compatibility of equipment control panels with the new controls.
        i. Programming of all SCADA computers. All hardware, software and programming shall be included in this bid item.
        j. All start up from factory trained instrumentation representative.
    3. Temporary support and maintenance of other utilities and structures affected by the work.

4. Other appurtenant and incidental work

3.23 OFF-SITE WATER STORAGE TANK MIXER - **Bid Items: #23**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Layout
   2. Mixer with suspension kit, control panel and panel mount.
   3. All controls and connections.
   4. All coring and penetrations.
   5. Sealing of all wall penetrations.
   6. All equipment start-up and testing
   7. Furnishing and installing all other components of the tank mixer required to provide a complete functional unit.
   8. All other appurtenant and incidental work.

3.24 FINAL RESTORATION - **Bid Items: #24**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Replacement in kind of sidewalks, stairs, planters, walls, mailboxes, fences, and other items removed or damaged during the work.
   2. Rough grading of the area.
   3. Furnishing and placing acceptable topsoil on areas disturbed during the Work.
   4. Removing all stones over 1-inches in size for areas that will be mowed.
   5. Furnishing and applying grass seed on areas disturbed during the Work and irrigation and maintenance of newly seeded areas until accepted by the ENGINEER.
   6. Replacement of all shrubbery, trees, and other vegetation damaged or destroyed during the Work with comparable items. To the maximum extent practicable vegetative items shall be comparable in type, quality, and size.
   7. Removal and disposal of all surplus materials and packaging.
   8. Removal and disposal of all temporary utilities and services.
   9. Removal and disposal all temporary erosion and sediment control structures and materials used to control erosion and sediment losses.
   10. Brush-sweep all paved surfaces affected by the work.
   11. Other appurtenant and incidental work.

3.25 EPOXY COATING OF TREATMENT PLANT MAIN FLOOR - **Bid Items: #BA1**

A. Measurement for payment for this item will be made on a square-foot unit price basis.
B. Payment for this item shall be made based on the Unit Price for the corresponding Bid Item from the Bid Item Table included in the Contract Documents.

C. Each unit price shall include all costs labor, materials, equipment, overhead & profit, and supplies required to complete the work, including but not limited to:
   1. All surface preparation.
   2. A complete 100% epoxy industrial flooring system with a dry mill thickness of 62 mm.
   3. Other appurtenant and incidental work.

3.26 WTP GARAGE UPGRADES - **Bid Items: #BA2**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. All demolition, excavation, and disposal work.
   2. Protection of existing utilities.
   3. Furnishing and installing of complete slab, curb, wall, and roof systems in accordance with the Contract Drawings.
   4. All structural, architectural, and finishing elements.
   5. All openings and screens.
   6. Other incidental and appurtenant work.

3.27 OFF-SITE VIOLET HILL PUMP STATION UPGRADES- **Bid Items: #BA3**

A. Measurement for payment for this item will be made on a Lump Sum basis and no Measurement for Payment shall be made.
B. Payment for this item shall be made based on the Lump Sum bid on the Bid Forms in the Contract Documents. Partial payments shall be based on the approved schedule of values.
C. The lump sum price bid shall include all costs for labor, materials, equipment, and supplies required to complete the work including:
   1. Replacement of the existing two (2) pumps as indicated in the Contract Drawings.
   2. Provision of all necessary adaptors, fittings, and miscellaneous plumbing required to provide a complete functional replacement.

END OF SECTION

SECTION 074113

INSULATED METAL ROOF PANELS

SECTION 074113

INSULATED METAL ROOF PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Foamed-insulation-core standing seam metal roof panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

A. Division 07 Section "Joint Sealants" for field-applied Joint Sealants.

B. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

1.3 REFERENCES

A. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

B. ASTM International (ASTM): www.astm.org:

1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
3. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
4. ASTM A 924 – General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
5. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus
6. ASTM D 1621 – Compressive Properties of Rigid Cellular Plastics.
7. ASTM D 1622 – Apparent Density of Rigid Cellular Plastics.
8. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics
9. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
10. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
11. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
12. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.
13. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.
14. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

15. ASTM E 1646 - Standard Test Method for Water Penetration of Exterior Metal Roof Panel Systems by Uniform Static Air Pressure Difference.
16. ASTM E 1680 - Standard Test Method for Rate of Air Leakage through Exterior Metal Roof Panel Systems.
17. ASTM E 1980 - Practice for Calculating Solar Reflectance Index of Horizontal and Low-Sloped Opaque Surfaces.

C. Cool Roof Rating Council (CRRC): www.coolroofs.org/productratingprogram.html:

1. CRRC-1-2016 – CRRC Product Rating Program.

D. Green Seal (GS) www.greenseal.org
1. GS-11 – Green Seal Standard for Paints and Coatings, Edition 3.2, October 26, 2015.
US Green Building Council (USGBC): www.usgbc.org:

1.4 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.
b. Samples of each component.
c. Sample submittal from similar project.
d. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.
e. Sample warranty.
f. Certificate from an accredited third-party Quality Control Program.

1.5 Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements

1.6 Approved manufacturers must meet separate requirements of Submittals Article.

A. Installer Qualifications: Experienced Installer with minimum of five years' experience with successfully completed projects of a similar nature and scope.

1. Installer's Field Supervisor: Experienced mechanic [certified by metal panel manufacturer] supervising work on site whenever work is underway.

B. Buy American Compliance: Materials provided under work of this Section shall comply with the following requirements:

1. Buy American Act of 1933 BAA-41 U.S.C §§ 10a – 10d.
2. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA).

1.7 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency, and related trade contractors.

1. Coordinate building framing in relation to metal panel system.
2. Coordinate openings and penetrations of metal panel system.

1.8 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets for specified products.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, curbs, vents, snow guards, lightning arresting equipment, and special details. Make distinctions between factory and field assembled work.

1. Include data indicating compliance with performance requirements.
2. Indicate points of supporting structure that must coordinate with metal panel system installation.
3. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification:

1. Provide 12-inch- (305 mm-) long section of each metal panel profile.
2. Provide color chip verifying color selection.

1.9 INFORMATIONAL SUBMITTALS

A. Product Test Results: Indicating compliance of products with requirements.

B. Qualification Information: For Installer firm and Installer’s field supervisor.

C. Accreditation Certificate: Indicating that manufacturer is accredited under an accredited third-party quality control program, including IAS AC472 and based upon chapter 17 of the International Building Code (IBC).

D. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating that products comply with requirements.

E. Warranty:

1. Submit manufacturer's written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.
2. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.10 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.11 DELIVERY, STORAGE, AND HANDLING

A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components, or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.

1. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
2. Store in accordance with Manufacturer's written instructions. Provide wood collars for stacking and handling in the field.
3. Shield foam insulated metal panels from direct sunlight until installation.

1.12 WARRANTY

A. Special Manufacturer's Warranty: Submit Manufacturer's two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

B. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

C. Special Panel Finish Warranty: Submit Manufacturer's limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.

1. Fluoropolymer Two-Coat System:
   a. Color fading in excess of 5 or 10 for copper, silver metallic and bright red; Hunter units per ASTM D 2244.
   b. Chalking in excess of 6 for copper, silver metallic and bright red or 8 rating per ASTM D 4214.
   c. Failure of adhesion, peeling, checking, or cracking.

2. Modified Silicone-Polyester Two-Coat System:
   a. Color fading in excess of [5] or [7] for crimson red; Hunter units per ASTM D 2244.
   b. Chalking in excess of [7] for crimson red or [8] rating per ASTM D 4214.
   c. Failure of adhesion, peeling, checking, or cracking.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design Manufacturer: Metl-Span, a Nucor company; Lewisville, Texas Tel: 972.221.6656; Email: info@metlspan.com; Web: metlspan.com

1. Provide basis of design product , or comparable product approved by Architect prior to bid.

2.2 PERFORMANCE REQUIREMENTS

A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:

1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.

a. Roof Panel Wind Uplift Testing: Certify capacity of metal panels by testing of proposed assembly per ASTM E 72 or ASTM E 1592.

2. Roof Panel Snow Loads: As indicated on drawings.
3. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/240 of the span with no evidence of failure.

C. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by UL or other testing and inspection agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: Provide metal panel systems with the following characteristics when tested per ASTM E 84. The core shall have:

a. Flame spread index: 25 or less.
b. Smoke developed index: 450 or less.

2. Fire Performance of Insulated Roof: Class 1 roof and wall panel per ANSI/FM 4880.

D. Roof Panel Air Infiltration, ASTM E 1680: Maximum 0.023 cfm/sq. ft. (0.115 L/s per sq. m) at static-air-pressure difference of 12 lbf/sq. ft. (575 Pa).

E. Roof Panel Water Penetration Static Pressure, ASTM E 1646: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft. (958 Pa).

F. Test procedure for susceptibility to leakage of discontinuous roof systems protocol TAS 114: Water applied to a depth of 6" above the lowest section of roof profile. No water infiltration observed during the seven-day test period.

G. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

H. Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.114 btu/sf/hr/deg F at a 35° F (1.67° C) mean temperature.

2.3 INSULATED METAL ROOF PANELS

A. Standing Seam, Foamed-Insulation-Core Metal Roof Panels: Structural metal panels consisting of an exterior standing seam with an interior tongue and groove joint, coupled with a vapor seal in the standing seam, and provides superior resistance to air and moisture intrusion. Attached with concealed fasteners to the structure.

1. Basis of Design: Metl-Span, CFR Insulated Metal Panel.

2. G-90 Galvanized Coated Steel: ASTM A 653 or Aluminum-Zinc Alloy-Coated Steel: ASTM A 792/A 792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A 755/A 755M.

3. Exterior Face Sheet: Gauge thickness required to meet loads indicated on drawings, with stucco embossed surface.

    1) Finish: Fluoropolymer two-coat metallic color system.
    2) Color: As selected by Architect from manufacturer's standard colors.

4. Interior Face Sheet: Gauge thickness required to meet loads indicated on drawings, with stucco embossed surface Mesa profile.
    1) Finish: Fluoropolymer two-coat system.
    2) Color: As selected by Architect from manufacturer's standard colors.

5. Endlaps: Provide panels with factory endlaps, notching, swedging and backer plates; where panel lengths permit.

6. Low Eave Treatment: Provide cutback for trim/gutter installation; where panel lengths permit.

7. Panel Width: 42 inches (1067 mm).
6. Panel Thickness: 6 inch (152 mm).

7. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent
    a. Closed Cell Content: 90% or more as determined by ASTM D 6226

b. Compressive Strength: As required to meet structural performance requirements and with a minimum of 22 psi as determined by ASTM D 1621
c. Shear Strength: As required to meet structural performance requirements and with a minimum of 36 psi as determined by ASTM C 273
d. Tensile Strength: As required to meet structural performance requirements and with a minimum of 41 psi ASTM D 1623
e. Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622

d. Thermal Resistance (R-Value): 52.5 deg. F * hr * sq. ft./Btu as determined by ASTM C 518 at 35 degrees Fahrenheit mean temperature.

8. Heat Transfer Coefficient (U-factor): 0.022 Btu/hr * sq. ft. * deg. F as determined by ASTM C 1363 at 35 degrees Fahrenheit mean temperature. Tested specimen must include at least two engaged side joints.

2.4 METAL ROOF PANEL ACCESSORIES

A. General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panel face sheet.

C. Panel Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Provide corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

D. Joint Sealers: Provide Tape Mastic Sealants and Concealed Joint Sealants per Section 07 92 00, “Joint Sealants”.

E. Roof Accessories: Approved by metal panel manufacturer. Refer to Section 07 72 00 "Roof Accessories" for requirements for curbs, equipment supports, roof hatches, heat and smoke vents, ventilators, and preformed flashing sleeves.

F. Snow Guards: Compatible with standing seam roof and approved by metal panel manufacturer. Refer to Section 07 72 53 "Snow Guards" for requirements for snow guards attached to metal roof panels.

G. Roof Curbs: Compatible with standing seam roof and approved by metal panel manufacture. Refer to Section 07 72 10 “Roof Curbs” for requirements for roof curbs attached to metal roof panels.

2.5 FABRICATION

A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept sealant tape providing weathertight seal and preventing metal-to-metal contact and minimizing noise resulting from thermal movement.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

2.6 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

B. Exterior Face Sheet Coil-Coated Finish System

1. Silicone-Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.
   a. Basis of Design: Metl-Span, Silicone Polyester.

2. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat.
   a. Basis of Design: Metl-Span, Fluoropolymer.

C. Interior Face Sheet Coil-Coated Finish System:

1. Fluoropolymer Two-Coat System: 0.2-mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat
   a. Basis of Design: Metl-Span, Fluoropolymer

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.

1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.

2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:

   a. 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.
   b. 3/8 inch (9 mm) over any single roof plane.
   c. At Purlin Spacing 7 feet (2133 mm) or less: 1/8 inches (3 mm), out only.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

3.2 METAL PANEL INSTALLATION

A. Standing Seamed, Concealed-Fastener Insulated Metal Panels: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to metal framing using clips, fasteners, and sealants recommended for application by metal panel manufacturer.

1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.
2. Cut panels in field where required using manufacturer's recommended methods.
3. Provide weatherproof jacks for pipe and conduit penetrating metal panels.
4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.

C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers.

D. Joint Sealers: Install tape sealers and liquid sealants where indicated and where required for weatherproof performance of metal panel assemblies.

1. Seal panel side and perimeter joints using joint sealers indicated in manufacturer's instructions.
2. Seal roof panel joints utilizing tape sealer and vapor seal bead of non-curing butyl.
3. Prepare joints and apply sealants per requirements of Division 07 Section "Joint Sealants."

3.3 ACCESSORY INSTALLATION

A. General: Install metal panel accessories with positive anchorage to building and weathertight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.
2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

3.4 CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 074113

SECTION 074213

INSULATED METAL WALL PANELS

SECTION 074213

INSULATED METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Foamed-insulation-core concealed fastener metal wall panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

A. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

B. REFERENCES

C. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:

1. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems.

D. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:

1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

E. ASTM International (ASTM): www.astm.org:

1. ASTM A 653 - Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.

2. ASTM A 755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.

3. ASTM A 792 - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.

4. ASTM A 240 – Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels and for General Applications

5. ASTM C 518 - Standard Test Method for Steady State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

6. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus

7. ASTM D 1621 - Compressive Properties of Rigid Cellular Plastics.

8. ASTM D 1622 - Apparent Density of Rigid Cellular Plastics.

9. ASTM D 2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

10. ASTM D 4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.

11. ASTM D 6226 - Standard Test Method for Open Cell Content of Rigid Cellular Plastics

12. ASTM E 72 - Standard Test Methods of Conducting Strength Tests of Panels for Building Construction.

13. ASTM E 84 - Test Methods for Surface Burning Characteristics of Building Materials.

14. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.

15. ASTM E 331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.

16. ASTM E 1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

F. National Fire Protection Association (NFPA)

1. NFPA 259 – Test Method for Potential Heat of Building Materials.

2. NFPA 285 – Evaluation of Fire Propagation Characteristics of Exterior Non-Load Bearing Wall Assemblies.

3. NFPA 286 – Fire Test of Evaluating Conditions of Wall and Ceiling Finish to Roof Fire Growth.

G. Green Seal (GS) www.greenseal.org

1. GS-11 – Green Seal Standard for Paints and Coatings, Edition 3.2, October 26, 2015.

1.3 QUALITY ASSURANCE

A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer approved under an accredited third-party quality control program

B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum ten years' experience in the manufacturing of similar products and successful use in similar applications.

1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:

a. Product data, including certified independent test data indicating compliance with requirements.

b. Samples of each component.

c. Sample submittal from similar project.

d. Project references: Minimum of five installations not less than five years old, with Owner and Architect contact information.

e. Sample warranty.

f. Certificate from an accredited third-party Quality Control Program.

2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements

3. Approved manufacturers must meet separate requirements of Submittals Article.

C. Installer Qualifications: Experienced Installer [certified by metal panel manufacturer] with minimum of five years' experience with successfully completed projects of a similar nature and scope.

1. Installer's Field Supervisor: Experienced mechanic certified by metal panel manufacturer supervising work on site whenever work is underway.

D. Buy American Compliance: Materials provided under work of this Section shall comply with the following requirements:

1. Buy American Act of 1933 BAA-41 U.S.C §§ 10a – 10d.

2. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA)

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.

1. Coordinate building framing in relation to metal panel system.

2. Coordinate openings and penetrations of metal panel system.

1.5 ACTION SUBMITTALS

A. Product Data: Manufacturer’s data sheets for specified products.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.

1. Include data indicating compliance with performance requirements.

2. Indicate points of supporting structure that must coordinate with metal panel system installation.

3. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification:

1. Provide 12-inch- (305 mm) long section of each metal panel profile.

2. Provide color chip verifying color selection.

1.6 INFORMATIONAL SUBMITTALS

A. Product Test Results: Indicating compliance of products with requirements.

B. Qualification Information: For Installer

C. Accreditation Certificate: Indicating that manufacturer is accredited under an accredited third-party Quality Control Program, including IAS AC472 and based upon chapter 17 of the International Building Code (IBC).

D. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating products comply with requirements.

E. Warranty:

1. Submit manufacturer’s written two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

2. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping. Protect painted surfaces with a protective covering before shipping.

1. Deliver, unload, store, and erect metal panels and accessory items without deforming panels or exposing panels to surface damage from weather or construction operations.

2. Store in accordance with Manufacturer's written instructions.

3. Shield foam insulated metal panels from direct sunlight until all components are installed.

1.9 WARRANTY

A. Special Manufacturer’s Warranty: Submit Manufacturer’s two (2) year limited warranty providing panels to be free from defects in materials and workmanship, beginning from the date of substantial completion excluding coil coatings (paint finishes) that are covered under a separate warranty.

B. The installation contractor shall issue a separate warranty against defects in installed materials and workmanship, beginning from the date of substantial completion of the installation.

C. Special Panel Finish Warranty: Submit Manufacturer’s limited warranty on the exterior paint finish for adhesion to the metal substrate and limited warranty on the exterior paint finish for chalk and fade.

1. Fluoropolymer Two-Coat System:
    a. Color fading in excess of 5 or 10 for copper, silver metallic and bright red; Hunter units per ASTM D 2244.
    b. Chalking in excess of 6 for copper, silver metallic and bright red or 8 rating per ASTM D 4214.
    c. Failure of adhesion, peeling, checking, or cracking.

2. Modified Silicone-Polyester Two-Coat System:

a. Color fading in excess of 5 or 7 for crimson red; Hunter units per ASTM D 2244.
b. Chalking in excess of 7 for crimson red.
c. Failure of adhesion, peeling, checking, or cracking.

1.10 PRODUCTS

1.11 MANUFACTURER

A. Basis of Design Manufacturer: Metl-Span, a Nucor company; Lewisville, Texas Tel: 972.221.6656; Email: info@metlspan.com; Web: metlspan.com.

B. Provide basis of design product , or comparable product approved by Architect prior to bid.

1.12 PERFORMANCE REQUIREMENTS

A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E 72 or ASTM E 1592 applied in accordance with ICC AC 04, Section 4, Panel Load Test Option or Section 5, Panel Analysis Option:

1. Wind Loads: Determine loads based on applicable building code, wind speed, importance factor, exposure category, and internal pressure coefficient indicated on drawings.

a. Wind Negative Pressure: Certify capacity of metal panels by testing of proposed assembly.

2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/240 of the span with no evidence of failure.

C. Fire Performance Characteristics: Provide metal panel systems with the following fire-test characteristics determined by indicated test standard as applied by testing and inspection agency acceptable to authorities having jurisdiction.

1. Surface-Burning Characteristics: The insulating core shall have been tested per ASTM E 84. The core shall have:

a. Flame spread index: 25 or less.

b. Smoke developed index: 450 or less.

2. Room Test Performance: FM Global 4880: The panel assembly shall not support a self-propagating fire which reaches any limits of the 50' (15.24m) high corner test structure as evidenced by flaming or material damage of the ceiling of the assembly.

3. Fire Propagation: The fire assembly shall meet the requirements of the standard for NFPA 285

4. Fire Growth: The fire assembly shall meet the requirements of the standard for NFPA 286

5. Potential Heat: Determined in accordance with NFPA 259

6. IBC Chapter 26: Panel Performance under the above test methods, shall meet the requirements of IBC, Chapter on foam plastics.

D. Air Infiltration, ASTM E 283:

1. Maximum 0.0002 cfm/sq. ft. (0.001 L/s per sq. m) at static air pressure difference of 1.57 lbf/sq. ft. (75 Pa).

2. Maximum 0.0009 cfm/sq. ft. (0.005 L/s per sq. m) at static-air-pressure difference of 6.24 lbf/sq. ft. (300 Pa).

3. Maximum 0.01 cfm/sq. ft. (0.050 L/s per sq. m) at static-air-pressure difference of 20 lbf/sq. ft. (958 Pa).

E. Water Penetration Static Pressure:

1. ASTM E 331: No uncontrolled water penetration at a static pressure of 20 lbf/sq. ft. (958 Pa).

2. ASTM E 331 Modified (2-hour duration): No uncontrolled water penetration at a static pressure of 6.24 lbf/sq. ft. (300 Pa).

F. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

G. Thermal Performance: When tested in accordance with ASTM C 518, Measurement of Steady State thermal Transmission, the panels shall provide a k factor of 0.114 btu/sf/hr/deg F at a 35° F (1.67° C) mean temperature.

1.13 INSULATED METAL WALL PANELS

A. Concealed Fastener, Insulated Metal Wall Panels with foam core: Structural metal panels consisting of exterior metal sheet with five major tapered inverted ribs 1 by 1/4 inches (25.4 by 6.4 mm) with a mesa profile between the inverted ribs, and interior metal sheet with a Mesa or

INSULATED METAL WALL PANELS

Light Mesa profile, with factory foamed-in-place polyurethane core in thermally-separated profile, with tongue-and-groove panel edges, attached to supports using concealed fasteners.

1. Basis of Design: Metl-Span, CF Flute

2. G-90 galvanized coated steel conforming to ASTM A 653 or AZ-50 aluminum-zinc alloy coated steel, conforming to ASTM A 792/A 792M, minimum grade 33, pre-painted by the coil-coating process per ASTM A 755/A 755M.

    a. Exterior Face Sheet: gauge thickness as required to meet loads indicated on drawings, with stucco embossed surface.
        1. Finish: Fluoropolymer two-coat system.
        2. Color: As selected by Architect from manufacturer's standard colors.

    b. Interior Face Sheet: gauge thickness as required to meet loads indicated on drawings, with stucco embossed surface and Mesa or Light Mesa profile.
        1. Finish: Fluoropolymer two-coat system.
        2. Color: As selected by Architect from manufacturer's standard colors.

3. Panel Width: 42 inches (1067 mm)

4. Panel Thickness: 3 inch (76 mm)

5. Insulating Core: Polyurethane with zero ozone depletion potential blowing agent

    a. Closed Cell Content: 90% or more as determined by ASTM D 6226

    b. Compressive Strength: As required to meet structural performance requirements and with a minimum of 22 psi as determined by ASTM D 1621

    c. Shear Strength: As required to meet structural performance requirements and with a minimum of 36 psi as determined by ASTM C 273

    d. Tensile Strength: As required to meet structural performance requirements and with a minimum of 41 psi ASTM D 1623

    e. Minimum Density: 2.0 pcf (32 kg/m3) as determined by ASTM D 1622

    f. Thermal Resistance R-Value: 26.2.

6. Heat Transfer Coefficient (U-factor): 0.039 Btu/hr * sq. ft. * deg. F as determined by ASTM C 1363 at 35 degrees Fahrenheit mean temperature. Tested specimen must include at least two engaged side joints.

1.14 METAL WALL PANEL ACCESSORIES

A. General: Provide complete metal panel assemblies incorporating trim, copings, fasciae, gutters and downspouts, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panels.

C. Panel Clips: ASTM A 653/A 653M, G90 (Z180) hot-dip galvanized zinc coating, one-piece, configured for concealment in panel joints, and identical to clips utilized in tests demonstrating compliance with performance requirements.

D. Panel Fasteners: Self-drilling or Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

E. Joint Sealers:

1. Sealants: Provide Tape Mastic Sealants, Non-skinning sealants, and Urethane Sealants in accordance with manufacturers standards

2. Vertical Joint Gasket: Manufacturers standard EPDM gasket. Color: Black Or custom color.

1.15 FABRICATION

A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Fabricate metal panel joints configured to accept sealant providing weathertight seal.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

1.16 FINISHES

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturer’s written instructions.

B. Exterior Face Sheet Coil-Coated Finish System

1. Silicone-Polyester Two-Coat System: 0.20 – 0.25 mil primer with 0.7 – 0.8 mil color coat.

a. Basis of Design: Metl-Span, Silicone Polyester.

2. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat, meeting solar reflectance index requirements.

a. Basis of Design: Metl-Span, Fluoropolymer.

C. Interior Face Sheet Coil-Coated Finish System

1. Fluoropolymer Two-Coat System: 0.2-mil primer with 0.7 - 0.8 mil 70 percent PVDF fluoropolymer color coat

a. Basis of Design: Metl-Span, Fluoropolymer

PART 2 - EXECUTION

2.1 EXAMINATION

A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.

1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.

2. Panel Support Tolerances: Confirm that metal panel supports are within tolerances acceptable to metal panel manufacturer but not greater than the following:

a. 1/4 inch (6 mm) in 20 foot (6100 mm) in any direction.

b. 3/8 inch (9 mm) over any single wall plane.

c. Girt Spacing 8 feet (2438 mm) or more: 1/4 inch (6 mm) out only.

d. Girt Spacing Less Than 8 feet (2438 mm): 1/8 inch (3 mm) out only.

e. CF Architectural girt spacing less than 4 feet (1219 mm): 1/16 inch (1.5 mm) inch out only.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

2.2 METAL PANEL INSTALLATION

A. Concealed-Fastener Insulated Metal Panels with foam core: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, and project drawings. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Attach panels to metal framing using screws, fasteners, sealants, and adhesives recommended for application by metal panel manufacturer.

1. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer.

2. Cut panels in field where required using manufacturer's recommended methods.

3. Provide weatherproof jacks for pipe and conduit penetrating metal panels.

4. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer

C. Attach panel flashing trim pieces to supports using recommended fasteners and joint sealers

D. Joint Sealers: Install sealants where indicated and where required for weatherproof performance of metal panel assemblies

1. Seal panel base assembly, openings, panel head joints, and perimeter joints using sealants indicated in manufacturer's instructions

2. Seal wall panel joints; apply continuously without gaps in accordance with manufacturer's written instructions, approved shop drawings, and project drawings

3. Prepare joints and apply sealants per requirements of Division 07 Section.

2.3 ACCESSORY INSTALLATION

A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel assembly, including trim, copings, flashings, sealants, closure strips, and similar items.

2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.

3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

2.4 FIELD QUALITY CONTROL

2.5 CLEANING AND PROTECTION

A. Remove temporary protective films immediately in accordance with metal panel manufacturer's instructions. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

END OF SECTION 074213

SECTION 077253

SNOW GUARDS

SECTION 077253

SNOW GUARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Rail-type, seam-mounted snow guards.

1.3 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for snow guards.

B. Shop Drawings: Include roof plans showing layouts and attachment details of snow guards.

1. Include details of rail-type snow guards.
2. Include calculation of number and location of snow guards based on snow load, roof slope, roof type, components, spacings, and finish.

1.4 INFORMATIONAL SUBMITTALS

A. Product Test Reports: For each type of snow guard, for tests performed by manufacturer and witnessed by a qualified testing agency.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Requirements: Provide snow guards that withstand exposure to weather and resist thermally induced movement without failure, rattling, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

1. Temperature Change: 120 deg F.

B. Structural Performance:

1. Snow Loads: As indicated on Drawings.

2.2 RAIL-TYPE SNOW GUARDS

A. Seam-Mounted, Rail-Type Snow Guards:

1. Acceptable manufactures:
   a. Berger
   b. Alpine
   c. Or engineer approved equal.

2. Description: Snow guard rails fabricated from metal pipes, bars, or extrusions, anchored to brackets and equipped with one rail.
3. Material and Finish: Aluminum; mill.
4. Material and Finish: Stainless steel; mill.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, snow guard attachment, and other conditions affecting performance of the Work.

1. Verify compatibility with and suitability of substrates including compatibility with existing finishes or primers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare substrates for bonding snow guards.

B. Prime substrates according to snow guard manufacturer's written instructions.

3.3 INSTALLATION

A. Install snow guards according to manufacturer's written instructions.

B. Attachment for Standing-Seam Metal Roofing:

1. Do not use fasteners that will penetrate metal roofing, or fastening methods that void metal roofing finish warranty.
2. Seam-Mounted, Rail-Type Snow Guards: Stainless-steel clamps attached to vertical ribs of standing-seam metal roof panels.

END OF SECTION 077253

SECTION 133419

METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Structural-steel framing.
2. Metal roof panels.
3. Metal wall panels.
4. Accessories.

B. Related Requirements:

1. Section 074116 "Insulated Metal Roof Panels"
2. Section 074213.19 "Insulated Metal Wall Panels"
3. Section 077253 "Snow Guards"

1.2 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.3 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project Site.

1. Review methods and procedures related to metal building systems including, but not limited to, the following:

a. Condition of foundations and other preparatory work performed by other trades.
b. Structural load limitations.

c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
d. Required tests, inspections, and certifications.
e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.

2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:

a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
b. Structural limitations of purlins and rafters during and after roofing.
c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
d. Temporary protection requirements for metal roof panel assembly during and after installation.
e. Roof observation and repair after metal roof panel installation.

3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:

a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
b. Structural limitations of girts and columns during and after wall panel installation.
c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
d. Temporary protection requirements for metal wall panel assembly during and after installation.
e. Wall observation and repair after metal wall panel installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Metal roof panels.
b. Metal wall panels.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:

1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.

2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

    a. Show wall-mounted items including personnel doors, vehicular doors, windows, and louvers.

4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches (1:8)

    a. Flashing and trim.
    b. Gutters.
    c. Downspouts.

C. Door Schedule: For doors and frames. Use same designations indicated on Drawings. Include details of reinforcement.

D. Delegated Design Submittals: For metal building systems.

1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation, licensed in the State of New York.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Welding certificates.

C. Letter of Design Certification: Signed and sealed by a qualified professional engineer, licensed in the State of New York. Include the following:

1. Name and location of Project.
2. Order number.
3. Name of manufacturer.
4. Name of Contractor.
5. Building dimensions including width, length, height, and roof slope.
6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
7. Governing building code and year of edition.
8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).

9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

D. Material Test Reports: For each of the following products:

1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Tension-control, high-strength, bolt-nut-washer assemblies.
4. Shop primers.
5. Nonshrink grout.

E. Source quality-control reports.

F. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panel finishes to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.

1. Accreditation: Manufacturer's facility accredited according to IAS AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload and store metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.10 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 25 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.

1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

B. Primary-Frame Type:

1. Rigid Modular: Solid-member, structural-framing system with interior columns.

C. End-Wall Framing:

1. Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load, and end-wall columns or load-bearing end-wall and corner columns and rafters.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts at eave ends. Manufacturer’s standard purlins and joists flush framed girts at gable ends.

E. Eave Height: As indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on Drawings.

G. Roof Slope: 4 inches per 12 inches (1:3)

H. Roof System: Manufacturer's standard standing-seam insulated metal panel.

1. Liner Panels: None.

I. Exterior Wall System: Manufacturer's standard foamed-insulation-core metal wall panels.

1. Liner Panels: None.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal building system.

B. Structural Performance: Metal building systems to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."

1. Design Loads: As indicated on Drawings.
2. Deflection and Drift Limits:

a. No greater than the following:

1) Purlins and Rafters: Vertical deflection of 1/240 from imposed snow load and 1/180 total of the span.
2) Girts: Horizontal deflection of 1/240 of the span.
3) Metal Roof Panels: Vertical deflection of 1/240 from imposed snow load and 1/180 total of the span.
4) Metal Wall Panels: Horizontal deflection of 1/240 total of the span.
5) Design secondary-framing system to accommodate deflection of primary
6) Lateral Drift: Maximum of 1/400 of the building height.

C. Seismic Performance: Metal building system to withstand the effects of earthquake motions determined according to 2020 New York Building Code.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:

1. Wind Loads: As indicated on Drawings.

F. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E1680 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

G. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E1646 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

H. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:

1. Test-Pressure Difference: 6.24 lbf/sq. ft. (300 Pa).

I. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.

1. Uplift Rating: UL 90.

J. Thermal Performance for Opaque Elements: Provide the following maximum U-factors and minimum R-values when tested according to ASTM C1363 or ASTM C518:

1. Roof:

a. U-Factor: 0.035.
b. R-Value: 52.5

2. Walls:

a. U-Factor: 0.052.
b. R-Value: 26.2

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.

1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.

2. Rigid Modular Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide interior columns fabricated from round steel pipes or tubes, or shop-welded, built-up steel plates.
3. Frame Configuration: Single gable.
4. Exterior Column: Tapered.
5. Rafter: Tapered.

E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly to comply with the following:

1. End-Wall Rafters: C-shaped, cold-formed, structural-steel sheet; or I-shaped sections fabricated from shop-welded, built-up steel plates or structural-steel shapes.

F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:

1. Purlins:

   a. C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.

      1) Depth: As needed to comply with system performance requirements. 12 gauge minimum.

2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- (64-mm-) wide flanges.

   a. Depth: 8 Inches. 14 gauge minimum.

3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
4. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch- (25-mm-) diameter, cold-formed structural tubing to stiffen primary-frame flanges.
5. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.
6. Base or Sill Angles: Manufacturer's standard base angle, minimum 3-by-2-inch (76-by-51-mm), fabricated from zinc-coated (galvanized) steel sheet.
7. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
8. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
9. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

G. Bracing: Provide adjustable wind bracing as follows:

1. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.

H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

I. Materials:

1. W-Shapes: ASTM A992/A992M; ASTM A572/A572M, Grade 50 or 55 (345 or 380); or ASTM A529/A529M, Grade 50 or 55 (345 or 380).
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55 (345 or 380); or ASTM A529/A529M, Grade 50 or 55 (345 or 380).
3. Plate and Bar: ASTM A36/A36M; ASTM A572/A572M, Grade 50 or 55 (345 or 380); or ASTM A529/A529M, Grade 50 or 55 (345 or 380).
4. Steel Pipe: ASTM A53/A53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A1011/A1011M, Structural Steel (SS), Grades 30 through 55 (205 through 380), or High-Strength Low-Alloy Steel (HSLAS) or High-Strength Low-Alloy Steel with Improved Formability (HSLAS-F), Grades 45 through 70 (310 through 480); or cold-rolled, ASTM A1008/A1008M, Structural Steel (SS), Grades 25 through 80 (170 through 550), or HSLAS, Grades 45 through 70 (310 through 480).
7. Metallic-Coated Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80 (230 through 550), or HSLAS or HSLAS-F, Grades 50 through 80 (340 through 550); with G60 (Z180) coating designation; mill phosphatized.
8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A755/A755M.

    a. Zinc-Coated (Galvanized) Steel Sheet: ASTM A653/A653M, SS, Grades 33 through 80 (230 through 550), or HSLAS or HSLAS-F, Grades 50 through 80 (340 through 550); with G90 (Z275) coating designation.
    b. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, SS, Grade 50 or 80 (340 or 550); with Class AZ50 (AZM150) coating.

9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A307, Grade A, carbon-steel, hex-head bolts; ASTM A563 (ASTM A563M) carbon-steel hex nuts; and ASTM F844 plain (flat) steel washers.

    a. Finish: Plain.

10. High-Strength Bolts, Nuts, and Washers, Grade A325 (Grade A325M): ASTM F3125/F3125M, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers.

    a. Finish: Plain.

11. High-Strength Bolts, Nuts, and Washers, Grade A490 (Grade A490M): ASTM F3125/F3125M, Type 1, heavy-hex steel structural bolts or Grade F2280 tension-control, bolt-nut-washer assemblies with splined ends; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.

12. Tension-Control, High-Strength Bolt-Nut-Washer Assemblies: ASTM F3125/F3125M, Grade F1852, Type 1, heavy-hex or round head assemblies consisting of steel structural bolts with splined ends; ASTM A563, Grade DH, (ASTM A563M, Class 10S) heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1 hardened carbon-steel washers.

    a. Finish: Plain

13. Headed Anchor Rods: ASTM F1554, Grade 36.

    a. Configuration: Straight.
    b. Nuts: ASTM A563 (ASTM A563M) heavy-hex carbon steel.
    c. Plate Washers: ASTM A36/A36M carbon steel.
    d. Washers: ASTM F436 (ASTM F436M) hardened carbon steel.
    e. Finish: Hot-dip zinc coating, ASTM F2329, Class C.

J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.

1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).

    a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.

2.5 METAL ROOF PANELS

A. Refer to Section 074116 “Insulated Metal Roof Panels”

2.6 METAL WALL PANELS

A. Refer to Section 074213.19 “Insulated Metal Wall Panels”

2.7 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

B. Metal Soffit Panels: Match material of metal wall panels.

1. Finish: Match finish and color of metal wall panels.

2.8 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.

1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.

1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
2. Clips: Manufacturer's standard, formed from stainless steel sheet, designed to withstand negative-load requirements.
3. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
4. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch (0.46-mm) nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.

1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.

E. Gutters: Metl Span or approved equal and rack trim, end caps, corners, etc. Detailed in accordance with manufacturer's specifications and installation guidelines.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch (0.46-mm) nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- (3-m-) long sections, complete with formed elbows and offsets.

1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

H. Materials:

1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
2. Fasteners for Metal Roof Panels:

a. Refer to Secion 074116 "Insulated Metal Roof Panels"

3. Fasteners for Metal Wall Panels:

a. Refer to Section 074213.19 "Insulated Metal Wall Panels"

4. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
5. Blind Fasteners: High-strength aluminum or stainless steel rivets.
6. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
7. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
8. Metal Panel Sealants:

a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
b. Joint Sealant: ASTM C920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.9 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.

1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members to be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

1. Make shop connections by welding or by using high-strength bolts.
2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

1. Make shop connections by welding or by using non-high-strength bolts.
2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.10 SOURCE QUALITY CONTROL

A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.

1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.

a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 133419

SECTION 266216
TRANSFORMERS – DRY TYPE, UNDER 600V

PART 1. GENERAL

1.01 REFERENCES

A. NEMA, ANSI, IEEE, and UL.

1.02 SUBMITTALS

A. Submittals Package:
   1. For Transformers Rated 75KVA and Below: Submit the product data, and quality control submittals specified below all at the same time as a package.

B. Product Data: Catalog sheets, specifications and installation instructions.

C. Quality Control Submittals:
   1. Transformers Rated 75KVA and Below: Submit certified report of the Company's routine commercial NEMA tests for each type transformer.

D. Contract Closeout Submittals:
   1. Operation and Maintenance Data: Deliver 2 copies, covering the installed products, to the Owner's Representative.
   2. Energy Efficiency Rebate Documentation:
      a. Deliver 2 copies of documentation to the Owner's Representative showing the costs associated with purchase of any Energy Star labeled transformers.
         1) Submittal of confidential or proprietary documentation may be accommodated thru the rebate organization's legal declarations.
      b. The documentation will be forwarded to Facility supervisory personnel for their use in pursuing energy efficiency rebate incentive funds that may be, or may become, available during the course of this Contract thru organizations such as:
         1) New York State Energy Research and Development Authority (NYSERDA): New York Energy Smart program (518) 862-1090, www.nyserda.org.

1.03 DELIVERY, STORAGE AND HANDLING

A. Storage of Transformers: Provide supplemental heating devices, such as incandescent lamps or low wattage heaters within the enclosure or under a protective covering to control dampness. Maintain this protection from the time equipment is delivered to the site until it is energized.

PART 2. PRODUCTS

2.01 DRY TYPE TRANSFORMERS

A. By Acme Electric Corp. Power Products Div., Cutler-Hammer Inc., General Electric Co., Jefferson Electric Inc., Niagara Transformer Corp., Sola/Hevi-Duty Unit of General Signal, or Square D Co.:
   1. Two winding insulating type construction.
   2. Labeled for EPA Energy Star Program (based on NEMA TP1 Guide for Determining Energy Efficiency for Distribution Transformers), except where a specific type of dry type transformer is indicated on the drawings.
   3. Enclosures for Transformers Installed in Dry Protected Locations (unless otherwise indicated):
      a. Ventilated enclosure for transformers rated over 10KVA.
      b. Enclosures for transformers rated 10KVA and under may be ventilated or non-ventilated.
   4. Enclosure for Transformers in Damp Locations (unless otherwise indicated):
      a. Outdoor/ventilated enclosure equipped with weathershields for transformers rated over 10KVA.
      b. Enclosures for transformers rated 10KVA and under may be ventilated enclosure equipped with weathershields or non-ventilated.
   5. Primary Taps (minimum of): 3-15KVA two-5 percent FCBN, over 15 KVA four 2-1/2 percent FCBN and two 2-1/2 percent FCAN.
   6. Mounting accessories.

PART 3. EXECUTION

3.01 INSTALLATION

A. Install dry type transformers where indicated on the drawings.

END OF SECTION 266216

SECTION 262417
CIRCUIT BREAKERS FOR EXISTING PANELBOARDS

PART 1 GENERAL

1.01 SUBMITTALS

A. Not required.

PART 2 PRODUCTS

2.01 CIRCUIT BREAKERS

A. Similar to existing circuit breakers.

B. Compatible with existing panelboard.

C. Number of poles and ampere trip rating as indicated on drawings.

D. Complete with accessories required for installation.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install new circuit breakers in existing panelboards where indicated.

B. Add new circuits equally across phases to prevent overloading any phase in the panelboard. After new and existing circuits are energized, take current reading on panelboard feeder during a heavy usage time period. If phases are substantially unbalanced, rearrange both new and existing circuits in panelboard to equally distribute load between all phases, and provide new typewritten directory indicating equipment controlled by each circuit breaker.

END OF SECTION 262417

SECTION 263214
AUTOMATIC TRANSFER SWITCH

PART 1 GENERAL

1.01 RELATED WORK SPECIFIED ELSEWHERE

A. Switchboards: Section 260441.

1.02 REFERENCES

A. UL 1008 listed, CSA certified.

B. NFPA 70 - National Electric Code.

C. NFPA 110.

D. NEMA Standard ICS2-447-AC Transfer Switches.

E. IEEE Standard 446.

F. NEC Articles 700,701, 702.

G. ISO 9001.

1.03 TRANSFER SWITCH OPERATING DESCRIPTION

A. Design Criteria: The transfer switch is required to:
1. Transmit signals to the alternator indicating when the unit should start and stop.
2. The automatic transfer switch shall have provisions to transfer supply to emergency loads in the facility between the normal source (utility feed) and the standby source (diesel generator package). In phase voltage monitoring shall be provided to control switch operation between two energized sources.
3. The automatic transfer switch shall have provisions to test the diesel-alternator unit under load and unloaded. A selector switch shall be provided for “TEST UNDER LOAD” and “TEST UNLOADED”.
4. The automatic transfer switch shall have provisions to automatically test the diesel-alternator unit on a scheduled basis, as well as to manually initiate a test. A “MANUAL/OFF/AUTOMATIC” Test selector switch as well as “PUSH TO START TEST” and “PUSH TO STOP TEST” pushbuttons shall be provided.
5. Provisions shall be provided to select the frequency (daily/weekly/monthly) and the day of the month/week and time of day that the automatic testing is initiated.
6. Indication shall be provided for availability of both the “Normal” and “Emergency” sources.
7. Indication shall be provided for the switch position – “Normal” or “Emergency”.
8. Provide remote alarm and indication capability.
9. Controls using touch screen controller are acceptable, if not provided then physical switches and buttons will be required.

B. Description of Operation – Automatic Operation:

1. The transfer switch monitors electrical parameters of normal and emergency feeders.
2. In normal operating condition, the mechanism of the transfer switch is in the normal position and the diesel-alternator (Section 263213) unit shut down. Sequence of transfer operation occurs as follows:
    a. The voltage on any phase of the normal feeder drops below 85 percent of normal, initiating in the transfer switch after an adjustable time delay (set at 2 seconds) to ride through voltage fluctuations and momentary outages.
    b. At the end of the adjustable time delay, the diesel-alternator unit is signaled to automatically start.
    c. A voltage-frequency device in the transfer switch prevents transfer until the emergency feeder voltage rises to 90 percent of normal and the frequency reaches 95% nominal.
    d. The transfer switch transfers load to the emergency feeder.
    e. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
    f. When voltage on all phases of the normal feeder is restored to 90 percent voltage, transfer from emergency to normal feeder is initiated after an adjustable time delay (set at 30 minutes) in the transfer switch.
    g. The transfer switch transfers load to the normal feeder at the end of the time delay provided that the in-phase monitor is satisfied. Exception: If the emergency power source should fail and the normal power source has been restored, retransfer to the normal source of power shall be immediate, by passing the retransfer delay timer.
    h. The unit continues to run unloaded 5 minutes, after which the control equipment shuts down the engine and resets the system.
    i. Permanently attached manual operating handle(s) allow for safe manual transfer under load. The switch operating speed is the same operated electrically or manually.

C. Description of Operation – Generator/Transfer Switch Test:
1. Automatic Test:
    a. With the Test Selector Switch in the “AUTOMATIC” position the generator shall be exercised as follows on a scheduled basis.
        1. When the time specified on the test scheduler occurs the diesel-alternator unit is signaled to automatically start.
        2. With the load selector switch in the “TEST UNLOADED” position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
        3. With the load selector switch in the “TEST UNDER LOAD” position an auxiliary device (in-phase monitoring or programmed transition) in the transfer switch assures the normal and emergency power sources are synchronized.
        4. The transfer switch transfers load to the emergency generator.
        5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.

6. The generator carries the load for 30 minutes (as described above), after which the generator synchronizes with the normal (utility) source and the transfer switch operates to connect the load to the utility.
7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.

2. Manually Initiated Test:
   a. With the Test Selector Switch in the "MANUAL" position the generator shall be exercised as follows:
      1. When the "PUSH TO START TEST" button is pressed the diesel-alternator unit is signaled to start.
      2. With the load selector switch in the "TEST UNLOADED" position the generator runs unloaded for the length of time established above for retransferring load to the Normal Source (set at 30 minutes) after which the generator shuts down.
      3. With the load selector switch in the "TEST UNDER LOAD" position an auxiliary device (in-phase monitoring or programmed transition) in the transfer switch assures the normal and emergency power sources are synchronized.
      4. The transfer switch transfers load to the emergency generator.
      5. Complete transition from onset of normal feeder failure to emergency feeder transfer shall not exceed 10 seconds.
      6. The generator carries the load until the "PUSH TO STOP TEST" pushbutton is pressed, after which the generator synchronizes with the normal (utility) source and the transfer switch operates to reconnect the load to the utility.
      7. The generator continues to run unloaded in the cool down mode for 5 minutes after the load is transferred to the normal source before the transfer switch sends a command to shut down the engine.

1.04 SUBMITTALS

A. Submittals Package: Submit the product data, shop drawings, and quality control submittals specified below at the same time as a package.

B. Shop Drawings:
   1. Installation details (coordination with connected equipment).

C. Product Data:
   1. Catalog sheets, specifications and installation instructions.
   2. Bill of materials.
   3. Detailed sequence of operations (format similar to TRANSFER SWITCH OPERATING DESCRIPTION).
   4. Company's data indicating maintenance schedule.
   5. Name, address and telephone number of nearest fully equipped service organization.

D. Quality Control Submittals:
   1. Design Data:
      a. Company's data indicating the switch will meet the requirements of 1.03 B.
      b. Certified data from the Company proving that the switch will meet the requirements of 1.03 A. Design Criteria.
   2. Company Field Advisor Data: Include:
      a. Name, business address and telephone number of Company Field Advisor secured for the required services.
      b. Certified statement from the Company listing the qualifications of the Company Field Advisor.
      c. Services and each product for which authorization is given by the Company, listed specifically for this project.
   3. Completed Installation List.

E. Contract Closeout Submittals:
   1. Operation and Maintenance Data: Deliver 2 copies, covering the installed product, to the Owner's Representative. Include name, address and telephone number of nearest fully equipped service organization.
   2. Test Report: Switch/System acceptance test report.
   3. Certificate: Affidavit, signed by the Company Field Advisor, certifying that the switch operation with the related equipment meets the contract requirements and is operating properly.

1.05 QUALITY ASSURANCE

A. List of Completed Installations: If brand names other than those specified are proposed for use, furnish the name, address and telephone number of a least 5 comparable installations which can prove the proposed products have operated satisfactorily for 3 years.

B. Company Field Advisor: Secure the services of a Company Field Advisor for a minimum of 8 working hours for the following:
   1. Render advice regarding installation and final adjustment of the switch.
   2. Witness final switch/system test and then certify with an affidavit that the switch is installed in accordance with the contract documents and is operating properly.
   3. Train facility personnel on the operation and maintenance of the switch (minimum of one 2-hour session).
   4. Explain available service programs to facility supervisory personnel for their consideration.

C. Service Availability: A fully equipped service organization capable of guaranteeing response time within 8 hours to service calls shall be available 24 hours a day, 7 days a week to service the completed Work.

1.06 MAINTENANCE

A. Spare Parts:

1. Special tools if required for the regular maintenance and minor repairs of the switch.

1.07 WITHSTAND AND CLOSE RATINGS:

A. The ATS shall be rated to close on and withstand the available rms symmetrical short circuit current at the ATS terminals with the type of overcurrent protection shown on the plans. WCR ATS ratings as be as follows when used with specific circuit breakers:

ATS Size	**Withstand & Closing Rating MCCB**	**W/CURRENT LIMTING FUSES**
30	22,000A	100,000
70 - 200	22,000A	200,000
230	22,000A	100,000
260 – 400	42,000A	200,000
600 – 1200	65,000A	200,000
1600 – 2000	85,000A	200,000
2600 – 3000	100,000A	200,000

PART 2 PRODUCTS

2.01 AUTOMATIC TRANSFER SWITCH

A. Automatic Switch Co.'s ASCO 300 Series with Group G Controller, Russelectric Inc.'s, Model RMT, or Zenith Controls Inc.'s ZTS, with:
   1. Double throw construction.
   2. Ratings as indicated on drawings.
   3. Accessories to perform the functions specified in TRANSFER SWITCH OPERATING DESCRIPTION.
   4. NEMA 1 enclosure.
   5. Electrically operated and mechanically held.
   6. Adjustable time delay, 0-6 seconds, to override momentary outages before initiating engine starting. Once engine is signaled to start it must run for at least the duration of the time delay before engine shut down.
   7. Adjustable time delay, 0-30 minutes, on retransfer to normal feeder with bypass of time delay in event of emergency feeder failure.
   8. Adjustable time delay, 0-10 minutes, on engine cool down.
   9. Adjustable time delay, 0-5 seconds, on transfer to emergency feeder.
   10. Test switch, momentary type, (permanent type are acceptable when accompanied by flashing red lights at the transfer switch and generator set to indicate switch is not in automatic mode), to simulate normal feeder failure (unit to start and transfer to emergency feeder).
   11. In-phase Monitor, or Programmed Transition (Programmed transition adjustable 0-6 second time delay, factory set at 2 seconds).
   12. Presignal transfer time delay contact closure (time adjustable, factory set at 15

seconds).

13. Two identified pilot lights to indicate switch position (green normal, red emergency).
14. Start contacts, silver plated.
15. Auxiliary contact on main shaft (closed on normal).
16. Auxiliary contact on main shaft (closed on emergency).
17. Automatic exerciser for exercising the referenced diesel-alternator engine (no transfer to emergency feeder), minimum 30 minutes every 168 hours (7 days).
18. Equipment ground lug.
19. Communications interface to work with the Remote Annunciator.
20. Include auxiliary dry contacts for remote monitoring to include:
    a. General ATS fault
    b. Failed to Transfer
    c. On Backup Power
21. Live parts shielded from personnel when door is open.
22. ATS shall be 4-pole.

2.03 NAMEPLATES

A. General: Precision engrave letters and numbers with uniform margins, character size minimum 3/16 inch high as indicated on the One Line Diagram.
   1. Phenolic: Two color laminated engravers stock, 1/16-inch minimum thickness, machine engraved to expose inner core color (black letters on white background).

PART 3 EXECUTION

3.01 INSTALLATION

A. Install all required engine starting signal circuitry from switches to engine start conductor junction box. Engine start signal shall be transmitted automatically upon loss of normal source voltage. The start signal shall prevent dry cranking of the generator by requiring the generator to reach proper output and run for at least the duration of the cool-down timer.

B. Install switch so that the maximum height above the floor to the center of the operating handle does not exceed 6'-0".

C. Identify switch, indicating designation, load served and normal feeder designation, by riveting or bolting nameplate to cover.

3.02 FIELD QUALITY CONTROL

A. Preliminary Switch/System Test:
   1. Preparation: Have the Company Field Advisor adjust the switch for the completed system (including the related equipment) and then operate it long enough to assure that it is performing properly.
   2. Run a preliminary test for the purpose of:

a. Determining whether the switch is in a suitable condition to conduct an acceptance test.
b. Checking and adjusting equipment.
c. Training facility personnel.

B. Switch/System Acceptance Test:
1. Preparation: Coordinate test with related equipment manufacturer and notify the Owner's Representative at least three (3) working days prior to the test so arrangements can be made to have a Facility Representative witness the test.
2. Make the following tests:
a. Test each switch function step by step as summarized under TRANSFER SWITCH OPERATING DESCRIPTION.
3. Submit written report of test results signed by Company Field Advisor and the Owner's Representative. Give a copy of the final report to the Owner's Representative.

END OF SECTION

SECTION 263214
AUTOMATIC TRANSFER SWITCH

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SECTION 265119
LIGHT-EMITTING DIODE (LED) FIXTURES

PART 1 GENERAL

1.01 SUBMITTALS

A. Product Data: Catalog sheets, specifications and installation instructions, including:

1. Technical information for each fixture that proves that it meets specified requirements. Include data which proves proposed lamp and ballast combinations do not exceed specified total harmonic distortion.

2. Candlepower distribution curves for each type fixture if different from Company or catalog number specified.

B. Samples: One of each product if requested.

C. Quality Control Submittals:

1. List of Installations for Electronic Ballasts: If brand names other than those specified are proposed for use, furnish the name, address, and telephone number of at least 5 comparable installations which can prove the proposed products have operated satisfactorily for 1 year. The installations shall present a grand total of at least 5000 ballasts.

1.02 QUALITY ASSURANCE

A. Equipment Qualifications For Products Other Than Those Specified:

1. At the time of submission provide written notice to the Owner's Representative of the intent to propose and “or equal” for products other than those specified. Make the “or equal” submission in a timely manner to allow the Owner's Representative sufficient time to review the proposed product, perform inspections and witness test demonstrations.

2. If products other than those specified are proposed for use furnish the name, address, and telephone numbers of at least 5 comparable installations that can prove the proposed products have performed satisfactorily for 3 years. Certify in writing that the owners of the 5 comparable installations will allow inspection of their installation by the Owner's Representative and the Company Field Advisor.

a. Make arrangements with the owners of 2 installations (selected by the Owner's Representative) for inspection of the installations by the Owner's Representative. Also obtain the services of the Company Field Advisor for the proposed products to be present. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the installations for the inspection and provide at least one alternative date for each inspection.
b. Only references from the actual owner or owner's representative (Security Supervisor, Maintenance Supervisor, etc.) will be accepted.

References from dealers, system installers or others, who are not the actual owners of the proposed products, are not acceptable.

1) Verify the accuracy of all references submitted prior to submission and certify in writing that the accuracy of the information has been confirmed.

3. The product manufacturer shall have test facilities available that can demonstrate that the proposed products meet the contract requirements.
   a. Make arrangements with the test facility for the Owner's Representative to witness test demonstrations. Also obtain the services of the Company Field Advisor for the proposed product to be present at the test facility. Notify the Owner's Representative a minimum of 3 weeks prior to the availability of the test facility and provide at least one alternative date for the testing.
4. Provide written certification from the manufacturer that the proposed products are compatible for use with all other equipment proposed for use for this system and meet all contract requirements.

PART 2 PRODUCTS

2.01 LUMINAIRES

A. Type Wall Mounted LED: Full metal fixture liner inside reinforced fiberglass housing: Cooper Fail-Safe LED:

1. Lamp Type: LED.
2. Fixture Length: 4'
3. Luminaire to operate at 120 - 277V and connected for operation on 120V circuit, unless otherwise indicated on drawing.
4. Mounting:
   a. Wall mounted.
5. Housing:
   a. die-formed aluminum
6. Fixture is suitable for operation from -20 degrees C to 25 degrees c ambient conditions.
7. Wet location Listed.
8. IP56
9. LED lamp listed IESNA LM79/LM80
10. 5 year warranty.
11. Opal Polycarbonate Lens
12. Vandal Resistant & High Abuse Housing

B. Type LED Wall Pack: Rugged, die-cast, aluminum housing. all polycarbonate one piece vandal resistant door, high-power LEDs; Cooper Lumark Crosstour LED Wall Pack Series:

1. Lamp Type: Solid State.
2. Luminaire to operate at 120V circuit, unless otherwise indicated on drawing.
3. Photoelectric cell for dusk to dawn operation.
4. Mounting:
   a. Wall mounted.
5. Housing:
   a. Rugged, die-cast, single piece aluminum.
6. Diffuser: Symmetric LED lens.
7. Fixture is suitable for operation from -40 degrees C to 40 degrees c ambient conditions.

8. Wet location Listed.
9. IP65
10. LED lamp listed UL 8750

PART 3 EXECUTION

3.01 INSTALLATION

A. General: Install fixtures at locations indicated on the drawings.

B. Finishing Collar or Combination Finishing Collar/Outlet Box (Surface Mounted Fixture Used With Exposed Raceway):
   1. Provide finishing collar where surface mounted fixture is installed on an exposed raceway outlet box and the fixture base is larger than the outlet box.
   2. Provide combination finishing collar/outlet box where surface mounted fixture is not indicated to be installed on an exposed raceway outlet box, but raceway cannot be run directly into fixture body due to fixture design.

END OF SECTION

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SECTION 406000
SUPERVISORY CONTROL AND DATA ACQUISITION (SCADA) SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. All equipment and wiring shall conform to standard electrical practice and to all applicable sections of the NEC reference to low voltage applications.

B. Include, in general, with the SCADA System but without limitation:
   1. Control panel enclosures for new applications.
   2. All necessary hardware, software and programming (both for upgrades to existing systems and for new applications) to perform the SCADA functions described herein and required for operation of the system.
   3. Provide and install an IO/Historical Server that is suitable for the SCADA system defined in this specification.
   4. Install Self-Healing Ring Fiber Optic 8 Port Switches in all PLC cabinets.
   5. Furnish and supply all variable frequency drives unless otherwise noted.
   6. Furnish and install the Main CP PLC-1 with two racks in the existing enclosure.
   7. Furnish and install the Filter #1 Console RIO#1 in the existing enclosure.
   8. Furnish and install the Filter #2 Console RIO#2 in the existing enclosure.
   9. Furnish and install the Raw Water CP PLC-2 in a Stainless Steel NEMA 4X enclosure.
   10. Furnish and install all instrumentation.
   11. Furnish and install Variable Frequency Drives (VFDs) for the three (3) Raw Water Pumps, three (3) High Lift Pumps, and two (2) Backwash Pumps.
   12. Furnish and install a VPN connection with a Firewall that meets Department of Health security requirements for a water plant.
   13. Develop the operators monthly report in digital format for printout.

C. The SCADA System shall execute the following functions:
   1. Monitor and control operations via one (1) operator work station (HMI) and four (4) local operator interface terminal (OIT) at the consisting of industrial computers with touch screen capability and HMI client application software.
   2. Automatically record information pertaining to these operations using the Historian software as specified.
   3. Communicate between hardware components and field instrumentation.
   4. Provide the operator monthly report in digital format for printing.

D. Include field-testing and services of qualified representatives of the SCADA System supplier.

E. It is the intent of this Contract that the SCADA installations be complete in all respects and ready for use and operation. The Contractor shall be responsible for all details, devices, accessories and special construction necessary to properly finish, install, adjust, test and place in successful continuous operation a complete installation.

F. The Schedules in this Section are not necessarily complete. The Contractor shall not rely on the Schedules but shall thoroughly examine the Contract Documents prior to bid to determine the work required under this Contract.

1.02 QUALITY ASSURANCE

A. All equipment covered by these specifications shall be the products of reputable, qualified, and successful manufacturers who are of proven ability and have long experience in the production of such equipment.

B. All equipment specified in this Section shall be provided by the SCADA System Supplier.

C. The Contractor shall pay all royalty or license fees for use of patented devices or systems and shall protect the Owner from patent infringement litigation thereon.

D. All components of the SCADA System have been included under this Section so that the OWNER will receive completely coordinated and properly integrated system for efficiency, ease in operation and, correct functional relationship among all elements of the system. Therefore, it is the intent of this Contract that the equipment specified under this Section will be furnished by a single SCADA System Supplier. This does not require that all equipment be manufactured by a single manufacturer, but does require that the SCADA System Supplier be responsible for the satisfactory operation of the instrumentation and metering equipment and the SCADA System furnished hereunder.

1.03 SYSTEMS INTEGRATOR:

The physical layout of the SCADA system is shown on the contract drawings and the equipment specifications. The use of an “or equal” system will require the SCADA supplier to document experience on at least 10 similar systems with major upgrades of equal size or larger subject to the approval of the ENGINEER. The SCADA System shall be in compliance with these specifications and plans.

A. If the Contactor proposes an “or equal” SCADA system, it shall be understood that the proposed system meets or exceeds the specified performance and construction and offers a cost savings to the OWNER. The CONTRACTOR may be responsible for engineering time to review proposed substitutions.

B. The following is a minimum qualifications submittal:

1. SCADA system supplier shall submit, within 15 (fifteen) calendar days of the bid, detailed information on their staff and organization to show compliance with the Quality Assurance requirements of this Section. The Qualifications submittal shall be submitted and favorably reviewed before any further submittals will be accepted. Failure to meet the minimum requirements shall be grounds for rejection as acceptable.

2. Copy of UL-508 certificate for panel fabrication facilities.

3. Five (5) references for water or wastewater projects successfully completed within the last five years. Successful completion shall be defined as a finished project completed on Potential references shall be for projects where the SCADA system supplier's contract, excluding change orders, is $125,000 minimum.

C. The SCADA System Supplier will also be the SCADA System Installer and will designate an experienced employee as the Systems Integrator. The Systems Integrator will be responsible for all planning, field planning, submittals, proposals, on site coordination, installation, proper programming and operation of the fiber equipment, all callbacks, all warranty items and training of the Owners employee's on the system operation and all field programmable system parameters. The Systems Integrator will be the sole contact for the Owner, General Contractor and the Project Engineer. After commencement of the SCADA installation, the Systems Integrator will be required to be on site at least 1 day (8 hours) per week and will provide the Project Engineer with at least 48 hours notice of the scheduled site visit.

D. The SCADA Systems Supplier will be required to be located within 100 miles of the site and be able to provide onsite assistant within 4 hours if required in the event of an emergency.

E. Warranty: The SCADA Systems Supplier will provide a complete labor, mileage and parts replacement warranty for one year after final acceptance of the work for all equipment provided by the SCADA System Supplier.

F. The SCADA System Integrator must be a UL-508A certified panel shop at the time of Bid, or utilize a UL508 panel shop for all panel design and construction.

1.04 PERFORMANCE REQUIREMENTS

A. The SCADA System Supplier, through the Systems Integrator, shall have total responsibility for the performance and compatibility of the entire SCADA system as shown on the Drawings and as specified herein. The SCADA supplier shall have sole responsibility for the

quality and proper functioning all of components shown on the Drawings, as specified herein, and as specified in Section 407000 “Instrumentation Equipment” including those not of the supplier’s manufacture.

1.05 Submittals

A. Shop Drawings

1. The SCADA System supplier shall submit detailed shop drawings, complete information on all components, theory of operation, evidence of chemical compatibility, equipment piping and valve layouts, and detailed electrical wiring and SCADA diagrams.

2. All submittals to include (3) hard copies shall be submitted as well as an electronic copy and be sufficient in detail to demonstrate that the supplier will furnish the equipment in accordance with the Contract Documents and that the equipment is satisfactory for its intended use. The Contractor shall submit a complete list of parts and supplies for each different item of equipment installed, and a list of parts and supplies that are recommended by the manufacturer to assure efficient operation of the equipment.

3. As a minimum, submit the following documentation with the shop drawings:
   a. Physical description of all hardware.
   b. Functional description of all hardware and programming.
   c. Theory of operation.
   d. Operating procedures.
   e. Listing of programming used.
   f. Internal wiring diagrams for each panel, numbered wire, numbered terminal on the instrument and numbered terminal block. This includes both new panels and upgrades to existing panels.
   g. Complete, and in every detail, interconnection wiring diagram and process and instrumentation diagrams (loop diagrams) in accordance with ISAS5.4 Instrument Loop Diagrams, Illustration 7.4, latest revision, showing all field and panel mounted equipment and terminal identification. Use the same component identification as shown on the drawings and indicated herein where possible.
   h. List of all inputs and outputs for each PLC.

4. Prior to the Instrumentation and SCADA System Supplier starting work on the SCADA system, a meeting shall be held with the General Contractor, the Electrical Contractor, the SCADA System Supplier, the Engineer, and the Owner. The purpose of the meeting will be to resolve all issues regarding system architecture, SCADA loop functions, and SCADA functions. This meeting typically takes one day and should be scheduled as soon as reasonably possible after the award of the contract (typically 30 days). The SCADA System Supplier is expected to have his project team in place prior to the

meeting and all relevant members of that team shall be in attendance at the meeting.

B. Operation and Maintenance Manual - The Contractor shall furnish complete operation and maintenance manuals for the treatment modules including part schedules to assist in assembly, disassembly, and ordering parts. Specific operation and maintenance instructions shall be prepared for the entire system by the SCADA System Supplier. Operation and maintenance instructions for individual components should be included with the package; however, written instructions, drawings, and schematics must cover the complete system, not just specific components.

PART 2 PRODUCTS

2.01 PROCESS EQUIPMENT

See Section 407000 “Instrumentation Equipment”

2.02 SYSTEM SCADA

A. The Control system vendor shall supply the SCADA system and furnish additional components to the SCADA system providing all necessary control functions for totally integrated operation of the plant process. Included in the upgrades, but not limited to, shall be the raw water pumps, flocculation tanks, filters, clear wells, high lift pumps, backwash pumps, trident units, blowers, chemical feed, and UV. The controls shall be as described hereafter.

B. Control Panels
1. All controls panels which are to be located indoors shall be of NEMA 12 (oil and dust tight) free standing design constructed of 14 gauge cold rolled steel provided with a finish of rust inhibiting primer followed by two (2) coats of industrial grade enamel, white inside and ANSI 61 gray outside. Panel components will be mounted and wired to terminal strips for Contractor field connections. All outdoor enclosures shall be stainless steel NEMA 4X with heaters.

C. Programmable Logic Controller

1. PLCs shall be Allen Bradley CompactLogix with Ethernet capabilities or equal.

2. Factory programmed Programmable Logic Controller (PLC) shall be provided within all control panels. The SCADA system noted herein must be capable of expansion. The PLCs shall be capable of monitoring inputs and providing outputs as required for system

logic, and shall include no less than 20% spare analog and discrete inputs and outputs, 20% spare non-volatile logic memory with no less than 8K words, 1920 registers, 2.5 ms/K scan time, and 14 bit analog resolution.

3. The PLC shall accept analog inputs (4-20madc) from system analyzers and transmitters for monitoring and trending on an Operator Workstation (HMI) and Operator Interface Terminal (OIT) as specified herein, as depicted on the Process, Instrumentation and SCADA Diagram and the project specifications.

4. System logic will monitor and control all components to the water treatment plant as shown on the Drawings or this specification.

The following lists the required PLC, hardware and software requirements, UPS requirements, etc.

5. PLC-1 Main CP

   A. Rack -1 Layout – The PLC-1 rack 1 shall consist of 1 Allen Bradley CompactLogix Controller with CPU, Power Supply, Ethernet, 1.5M Memory, and Analog and Digital IO:

      4 – 16 Pt. Output Card 1769-OB16K
      6 – 16 Pt. 24 VDC Input Cards 1769-IQ16
      4 – 4 Pt. Analog Input Cards 1769-IF4
      3 – 8 Pt. Analog Output Cards 1769-OF8C

   B. Rack-2 Layout – The PLC-1 rack 2 shall consist of:

      1 – 16 Pt. Output Card 1769-OB16K
      1 – 16 Pt. 24 VDC Input Cards 1769-IQ16
      2 – 4 Pt. Analog Input Cards 1769-IF4
      1 – 8 Pt. Analog Output Cards 1769-OF8C

   C. Power Supply Module – Each rack shall have a power supply. The power supply module shall be a CompactLogix 1769-PA4 120/240V AC Power Supply (5V @ 4 Amp).

   D. Central Processing Unit (CPU) – The CPU shall be a CompactLogix Ethernet processor model# 1769-L33ER or Engineer Approved Equal.

E. Fiber Optic Modem – Stratix Self-Healing Ring Switch with a fault contact. The fault contact will be brought into a spare DI and incorporated into the SCADA system for alarm and monitoring. The switch shall include two fiber and two ethernet ports.

F. Uninterruptible Power Supply – The UPS in PLC-1 will be shall be a 1 KVA Smart UPS.

G. Fiber Optic Patch Panel – A Fiber Optic Patch Panel will be incorporated in PLC-1 as to provide a termination for Fiber Optic Cables.

H. Fiber Optic Patch Cables – Fiber Optic Patch Cables will be used in PLC-1 to run from the Fiber Optic Patch Panel to the Fiber Optic Switch.

I. Ethernet switch sized for application. This shall be a Stratix ethernet switch with 6 copper ports minimum. One of the copper ports shall be tied to the fiber switch.

J. Operator Interface Terminal (OIT) – The OIT for PLC-1 shall be a PanelView Plus 7 Performance, 15" Color Active Matrix TFT Display. The OIT will have a touchscreen, Standard Communications (Ethernet & RS-232, AC Input and 64MBFlash/64MB RAM.) as a minimum

K. All inputs shall be fused at the PLC control panel by the SCADA vendor.

L. Additional IO Points and Programming shall be added as required by the IO list and the SCADA strategies.

6. RIO-1 Filter 1 Console

A. Rack Layout – The RIO-1 rack shall consist of Power Supply, Ethernet, 1.5M Memory, and Analog and Digital IO:

1 – Remote IO communication module 1769-AENTR
2 – 16 Pt. 24VDC Input Cards 1769-IQ16
2– 16 Pt. Output Card 1769-OB16K
1 – 4 Pt. Analog Input Cards 1769-IF4
1 – 4 Pt. Analog Output Card 1769-OF4CI

B. RIO-1 shall be mounted in the existing console #1 control enclosure.

C. Power Supply Module – The power supply module shall be a CompactLogix 1769-PA4 120/240V AC Power Supply (5V @ 4 Amp).

D. Fiber Optic Modem – Stratix Self-Healing Ring Switch with a fault contact. The fault contact will be brought into a spare DI and incorporated into the SCADA system for alarm and monitoring. The switch shall include two fiber and two ethernet ports.

E. Uninterruptible Power Supply – The UPS in RIO-1 will be shall be a 1 KVA Smart UPS.

F. Fiber Optic Patch Panel – A Fiber Optic Patch Panel will be incorporated in RIO-1 as to provide a termination for Fiber Optic Cables.

G. Fiber Optic Patch Cables – Fiber Optic Patch Cables will be used in RIO-1 to run from the Fiber Optic Patch Panel to the Fiber Optic Switch.

H. Ethernet switch sized for application. This shall be a Stratix ethernet switch with 6 copper ports minimum. One of the copper ports shall be tied to the fiber switch.

I. Operator Interface Terminal (OIT) – The OIT for RIO-1 shall be a PanelView Plus 7 Performance, 15" Color Active Matrix TFT Display. The OIT will have a touchscreen, Standard Communications (Ethernet & RS-232, AC Input and 64MBFlash/64MB RAM.) as a minimum

J. All inputs shall be fused at the RIO control panel by the SCADA vendor.

K. Additional IO Points and Programming shall be added as required by the IO list and the SCADA strategies.

7. RIO-2 Filter 2 Console

A. Rack Layout – The RIO-2 rack shall consist of Power Supply, Ethernet, 1.5M Memory, and Analog and Digital IO:

1 – Remote IO communication module 1769-AENTR
2 – 16 Pt. 24VDC Input Cards 1769-IQ16
2– 16 Pt. Output Card 1769-OB16K
1 – 4 Pt. Analog Input Cards 1769-IF4

1 – 4 Pt. Analog Output Card 1769-OF4CI

B. RIO-2 shall be mounted in the existing console #2 control enclosure.

C. Power Supply Module – The power supply module shall be a CompactLogix 1769-PA4 120/240V AC Power Supply (5V @ 4 Amp).

D. Fiber Optic Modem – Stratix Self-Healing Ring Switch with a fault contact. The fault contact will be brought into a spare DI and incorporated into the SCADA system for alarm and monitoring. The switch shall include two fiber and two ethernet ports.

E. Uninterruptible Power Supply – The UPS in RIO-2 will be shall be a 1 KVA Smart UPS.

F. Fiber Optic Patch Panel – A Fiber Optic Patch Panel will be incorporated in RIO-2 as to provide a termination for Fiber Optic Cables.

G. Fiber Optic Patch Cables – Fiber Optic Patch Cables will be used in RIO-2 to run from the Fiber Optic Patch Panel to the Fiber Optic Switch.

H. Ethernet switch sized for application. This shall be a Stratix ethernet switch with 6 copper ports minimum. One of the copper ports shall be tied to the fiber switch.

I. Operator Interface Terminal (OIT) – The OIT for RIO-1 shall be a PanelView Plus 7 Performance, 15" Color Active Matrix TFT Display. The OIT will have a touchscreen, Standard Communications (Ethernet & RS-232, AC Input and 64MBFlash/64MB RAM.) as a minimum

J. All inputs shall be fused at the RIO control panel by the SCADA vendor.

K. Additional IO Points and Programming shall be added as required by the IO list and the SCADA strategies

8. PLC-2 Raw Water Pump Station Control Panel

A. Rack -1 Layout – The PLC-1 rack 1 shall consist of 1 Allen Bradley CompactLogix Controller with CPU, Power Supply, Ethernet, 1.5M Memory, and Analog and Digital IO:

4 – 16 Pt. Output Card 1769-OB16K
6 – 16 Pt. 24 VDC Input Cards 1769-IQ16
4 – 4 Pt. Analog Input Cards 1769-IF4
3 – 8 Pt. Analog Output Cards 1769-OF8C

B. Power Supply Module – Each rack shall have a power supply. The power supply module shall be a CompactLogix 1769-PA4 120/240V AC Power Supply (5V @ 4 Amp).

C. Central Processing Unit (CPU) – The CPU shall be a CompactLogix Ethernet processor model# 1769-L33ER or Engineer Approved Equal.

D. Fiber Optic Modem – Stratix Self-Healing Ring Switch with a fault contact. The fault contact will be brought into a spare DI and incorporated into the SCADA system for alarm and monitoring. The switch shall include two fiber and two ethernet ports.

E. Uninterruptible Power Supply – The UPS in PLC-1 will be shall be a 1 KVA Smart UPS.

F. Fiber Optic Patch Panel – A Fiber Optic Patch Panel will be incorporated in PLC-1 as to provide a termination for Fiber Optic Cables.

G. Fiber Optic Patch Cables – Fiber Optic Patch Cables will be used in PLC-1 to run from the Fiber Optic Patch Panel to the Fiber Optic Switch.

H. Ethernet switch sized for application. This shall be a Stratix ethernet switch with 6 copper ports minimum. One of the copper ports shall be tied to the fiber switch.

I. Operator Interface Terminal (OIT) – The OIT for PLC-1 shall be a PanelView Plus 7 Performance, 15” Color Active Matrix TFT Display. The OIT will have a touchscreen, Standard Communications (Ethernet & RS-232, AC Input and 64MBFlash/64MB RAM.) as a minimum

J. All inputs shall be fused at the PLC control panel by the SCADA vendor.

K. Additional IO Points and Programming shall be added as required by the IO list and the SCADA strategies

9. SCADA1 – SCADA Computer 1

   A. SCADA1 – SCADA Computer 1 shall be a AP Server with 5000 Tag minimum. SCADA1 shall also be equipped with TCP/IP and TCP/IP I/O drivers for plant-wide communications.

   B. The SCADA vendor shall be responsible for supplying and installing all software and necessary hardware and obtaining all licenses necessary to meet the requirements of SCADA1.

   C. SCADA1 will have Ethernet capabilities and come equipped with a 19" flat screen monitor. The HMI shall come with FactoryTalk View Site Edition 200 Display.

D. Automatic System Operation – WWTP

1. Automatic system operation shall be based on alarm and SCADA levels displayed on the operator work station (HMI) and operator interface terminal (OIT) in desired engineering units (ft, gpm, %, etc.) as follows:

   a. Raw Water Pump Station
      1. Raw Water Pump #1 HOA status
      2. Raw Water Pump #1 Run Status
      3. Raw Water Pump #1 Speed
      4. Raw Water Pump #1 general fault alarm
      5. Raw Water Pump #1 elapsed run time
      6. Raw Water Pump #1 Seal Fail
      7. Raw Water Pump #1 Thermal Overload
      8. Raw Water Pump #1 Call to Run Pilot Light
      9. Raw Water Pump #1 Running Pilot Light
      10. Raw Water Pump #1 Fault Pilot Light
      11. Raw Water Pump #1 ETM
      12. Raw Water Pump #2 HOA status
      13. Raw Water Pump #2 Run Status
      14. Raw Water Pump #2 Speed
      15. Raw Water Pump #2 elapsed run time
      16. Raw Water Pump #2 Seal Fail
      17. Raw Water Pump #2 Thermal Overload
      18. Raw Water Pump #2 Call to Run Pilot Light
      19. Raw Water Pump #2 Running Pilot Light

20. Raw Water Pump #2 Fault Pilot Light
21. Raw Water Pump #2 ETM
22. Raw Water Pump #3 HOA status
23. Raw Water Pump #3 Run Status
24. Raw Water Pump #3 Speed
25. Raw Water Pump #3 elapsed run time
26. Raw Water Pump #3 Seal Fail
27. Raw Water Pump #3 Thermal Overload
28. Raw Water Pump #3 Call to Run Pilot Light
29. Raw Water Pump #3 Running Pilot Light
30. Raw Water Pump #3 Fault Pilot Light
31. Raw Water Pump #3 ETM
32. Priming Comp #1 Running
33. Priming Compressor #1 Fault
34. Priming Comp #2 Running
35. Priming Compressor #2 Fault
36. Raw Water Tank High Alarm Float
37. Raw Water Tank Low Alarm Float
38. Raw Water Tank liquid level (ft) (via pressure transducer)
39. Raw Water Tank low level alarm (via pressure transducer)
40. Raw Water Tank high level alarm (via pressure transducer)
41. Raw Water Pump Sequence 1-2-3
42. Raw Water Pump Sequence 2-3-1
43. Raw Water Pump Sequence 3-2-1
44. Raw Water Flow Instantaneous
45. Raw Water Flow Totalizer

b. Potassium Permanganate Feed
   1. Potassium Permanganate Pump #1 Start
   2. Potassium Permanganate Pump #1 Speed Out
   3. Potassium Permanganate Pump #1 Stroke
   4. Potassium Permanganate Pump #1 High Pressure Switch
   5. Potassium Permanganate Pump #1 Flow Switch
   6. Potassium Permanganate Pump #2 Start
   7. Potassium Permanganate Pump #2 Speed Out
   8. Potassium Permanganate Pump #2 Stroke
   9. Potassium Permanganate Pump #2 High Pressure Switch
   10. Potassium Permanganate Pump #2 Flow Switch

c. Chlorine Feed
   1. Chlorine Gas Valve Open Command

2. Chlorine Gas Valve Close Command
3. Chlorine Gas Valve Open Limit Switch
4. Chlorine Gas Valve Closed Limit Switch
5. Sodium Hypochlorite Pump #1 Start
6. Sodium Hypochlorite Pump #1 Speed Out
7. Sodium Hypochlorite Pump #1 Stroke
8. Sodium Hypochlorite Pump #1 High Pressure Switch
9. Sodium Hypochlorite Pump #1 Flow Switch
10. Sodium Hypochlorite Pump #2 Start
11. Sodium Hypochlorite Pump #2 Speed Out
12. Sodium Hypochlorite Pump #2 Stroke
13. Sodium Hypochlorite Pump #2 High Pressure Switch
14. Sodium Hypochlorite Pump #2 Flow Switch
15. Chlorine Leak Detector Alarm
16. Chlorine Vacuum High
17. Chlorine Vacuum Low
18. Pre-Chlorinator Out of Gas
19. Post Chlorinator Out of Gas

d. Coagulant Feed
1. Coagulant Feed Pump #1 Start
2. Coagulant Feed Pump #1 Speed Out
3. Coagulant Feed Pump #1 Stroke
4. Coagulant Feed Pump #1 High Pressure Switch
5. Coagulant Feed Pump #1 Flow Switch
6. Coagulant Feed Pump #2 Start
7. Coagulant Feed Pump #2 Speed Out
8. Coagulant Feed Pump #2 Stroke
9. Coagulant Feed Pump #2 High Pressure Switch
10. Coagulant Feed Pump #2 Flow Switch
11. Raw Water Turbidity
12. Raw Water Turbidity Loss of Echo
13. Raw Water Turbidity Sample Valve Open
14. Raw Water pH
15. Raw Water pH Sample Valve Open
16. Streaming Current
17. Streaming Current Sample Valve Open

e. Secondary Coagulant Feed
1. Secondary Coagulant Feed Pump #1 Start

2. Secondary Coagulant Feed Pump #1 Speed Out
3. Secondary Coagulant Feed Pump #1 Stroke
4. Secondary Coagulant Feed Pump #1 High Pressure Switch
5. Secondary Coagulant Feed Pump #1 Flow Switch
6. Secondary Coagulant Feed Pump #2 Start
7. Secondary Coagulant Feed Pump #2 Speed Out
8. Secondary Coagulant Feed Pump #2 Stroke
9. Secondary Coagulant Feed Pump #2 High Pressure Switch
10. Secondary Coagulant Feed Pump #2 Flow Switch

f. Trident Unit #1
1. Unit#1 HOA
2. Unit #1 Flow
3. Unit#1 Influent Flow Control Valve FCV104 Command
4. Unit#1 Influent Flow Control Valve FCV104 Open Switch
5. Unit#1 Influent Flow Control Valve FCV104 Closed Switch
6. Unit#1 Clarifier Pressure Transmitter
7. Unit#1 High Pressure Flush Initiate
8. Unit#1 Clarifier High Pressure Shutdown
9. Unit #1 Surface Wash Solenoid Valve SV107 Open
10. Unit #1 Surface Wash Solenoid Valve SV107 Close
11. Unit #1 Filter High Level
12. Unit #1 Filter Low Level Alarm
13. Unit #1 Filter Level Transmitter
14. Unit#1 Filter High Head Loss
15. Unit #1 Filter Pressure Transmitter
16. Unit #1 Effluent Control Valve FCV101 Open Command
17. Unit #1 Effluent Control Valve FCV101 Close Command
18. Unit #1 Effluent Control Valve FCV101 Open Limit Switch
19. Unit #1 Effluent Control Valve FCV101 Closed Limit Switch
20. Unit#1 Backwash Valve CV102 Open Command
21. Unit#1 Backwash Valve CV102 Close Command
22. Unit #1 Backwash Valve CV102 Open Limit Switch
23. Unit#1 Backwash Valve CV102 Closed Limit Switch
24. Unit#1 Filter To Waste Valve FCV108 Open Command
25. Unit#1 Filter To Waste Valve FCV108 Close Command
26. Unit#1 Filter To Waste Valve FCV108 Open Limit Switch
27. Unit#1 Filter To Waste Valve FCV108 Closed Limit Switch
28. Unit#1 Air Inlet Valve CV103 Open Command
29. Unit#1 Air Inlet Valve CV103 Close Command

30. Unit#1 Air Inlet Valve CV103 Open Limit Switch
31. Unit#1 Air Inlet Valve CV103 Closed Limit Switch
32. Unit#1 Air Scour Valve CV105 Open Command
33. Unit#1 Air Scour Valve CV105 Close Command
34. Unit#1 Air Scour Valve CV105 Open Limit Switch
35. Unit#1 Air Scour Valve CV105 Close Limit Switch
36. Unit #1 Effluent Turbidity
37. Unit #1 Effluent Turbidity Loss of Echo
38. Unit#1 High Effluent Turbidity Alarm Contact
39. Unit #1 Turbidity Sample Pump Call to Run
40. Unit#1 Auto Flush Cycle Initiate Selected
41. Unit#1 Selected For Manual Initiate
42. Unit#1 Auto Backwash Cycle Initiate Selected
43. Unit#1 Flush Cycle Manual Initiate Pushbutton
44. Unit#1 Backwash Cycle Manual Initiate Pushbutton
45. Unit#1 Call to Run Pilot Light
46. Unit#1 Running Pilot Light
47. Unit#1 Fault Pilot Light
48. Unit#1 Backwashing Pilot light
49. Unit#1 Flushing Pilot Light
50. Unit#1 ETM

g. Trident Unit #2
1. Unit#2 HOA
2. Unit #2 Flow
3. Unit#2 Influent Flow Control Valve FCV204 Command
4. Unit#2 Influent Flow Control Valve FCV204 Open Limit Switch
5. Unit#2 Influent Flow Control Valve FCV204 Open Limit Switch
6. Unit#2 Clarifier Pressure Transmitter
7. Unit#2 High Pressure Flush Initiate
8. Unit#2 Clarifier High Pressure Shutdown
9. Unit #2 Surface Wash Solenoid Valve SV207 Open
10. Unit #2 Surface Wash Solenoid Valve SV207 Close
11. Unit #2 Filter High Level
12. Unit #2 Filter Low Level Alarm
13. Unit #2 Filter Level Transmitter
14. Unit#2 Filter High Head Loss
15. Unit #2 Filter Pressure Transmitter
16. Unit #2 Effluent Control Valve FCV201 Open Command

17. Unit #2 Effluent Control Valve FCV201 Close Command
18. Unit #2 Effluent Control Valve FCV201 Open Limit Switch
19. Unit #2 Effluent Control Valve FCV201 Closed Limit Switch
20. Unit#2 Backwash Valve CV202 Open Command
21. Unit#2 Backwash Valve CV202 Close Command
22. Unit #2 Backwash Valve CV202 Open Limit Switch
23. Unit#2 Backwash Valve CV202 Closed Limit Switch
24. Unit#2 Filter To Waste Valve FCV208 Open Command
25. Unit#2 Filter To Waste Valve FCV208 Close Command
26. Unit#2 Filter To Waste Valve FCV208 Open Limit Switch
27. Unit#2 Filter To Waste Valve FCV208 Closed Limit Switch
28. Unit#2 Air Inlet Valve CV203 Open Command
29. Unit#2 Air Inlet Valve CV203 Close Command
30. Unit#2 Air Inlet Valve CV203 Open Limit Switch
31. Unit#2 Air Inlet Valve CV203 Closed Limit Switch
32. Unit#2 Air Scour Valve CV205 Open Command
33. Unit#2 Air Scour Valve CV205 Close Command
34. Unit#2 Air Scour Valve CV205 Open Limit Switch
35. Unit#2 Air Scour Valve CV205 Close Limit Switch
36. Unit #2 Effluent Turbidity
37. Unit #1 Effluent Turbidity Loss of Echo
38. Unit#2 High Effluent Turbidity Alarm Contact
39. Unit #2 Turbidity Sample Pump Call to Run
40. Unit#2 Auto Flush Cycle Initiate Selected
41. Unit#2 Selected For Manual Initiate
42. Unit#2 Auto Backwash Cycle Initiate Selected
43. Unit#2 Flush Cycle Manual Initiate Pushbutton
44. Unit#2 Backwash Cycle Manual Initiate Pushbutton
45. Unit#2 Call to Run Pilot Light
46. Unit#2 Running Pilot Light
47. Unit#2 Fault Pilot Light
48. Unit#2 Backwashing Pilot light
49. Unit#2 Flushing Pilot Light
50. Unit#2 ETM

h. Air Blowers
1. Air Blower #1 HOA
2. Air Blower #1 Start
3. Air Blower #1 Run Status
4. Air Blower #1 Fault
5. Air Blower #1 ETM

6. Air Blower #2 HOA
7. Air Blower #2 Start
8. Air Blower #2 Run Status
9. Air Blower #2 Fault
10. Air Blower #2 ETM
11. Air Blower Pressure Switch
12. Air Blower #3 HOA
13. Air Blower #3 Start
14. Air Blower #3 Run Status
15. Air Blower #3 Fault
16. Air Blower #3 ETM
17. Air Blower #4 HOA
18. Air Blower #4 Start
19. Air Blower #4 Run Status
20. Air Blower #4 Fault
21. Air Blower #4 ETM

i. Backwash Pumps
1. Backwash Pump #1 HOA
2. Backwash Pump #1 Start
3. Backwash Pump #1 Run Status
4. Backwash Pump #1 Fault
5. Backwash Pump #1 Speed Out
6. Backwash Pump #1 Speed In
7. Backwash Pump #1 ETM
8. Backwash Pump #2 HOA
9. Backwash Pump #2 Start
10. Backwash Pump #2 Run Status
11. Backwash Pump #2 Fault
12. Backwash Pump #2 Speed Out
13. Backwash Pump #2 Speed In
14. Backwash Pump #2 ETM
15. Clearwell Level
16. Clearwell High Level Float
17. Clearwell Low Level Float
18. Backwash Rate Controller FCV002 Open Command
19. Backwash Rate Controller FCV002 Close Command
20. Backwash Low Rate Valve CV008 Open Command
21. Backwash High Rate Valve CV009 Open Command
22. Backwash Blow Off Valve CV010 Open Command
23. Backwash Flow Rate

j. High Service Pumps
   1. High Service Pump #1 HOA
   2. High Service Pump #1 Start
   3. High Service Pump #1 Run Status
   4. High Service Pump #1 Fault
   5. High Service Pump #1 Speed Out
   6. High Service Pump #1 Speed In
   7. High Service Pump #1 Call to Run Pilot Light
   8. High Service Pump #1 Running Pilot Light
   9. High Service Pump #1 Fault Pilot Light
   10. High Service Pump #1 ETM
   11. High Service Pump #2 HOA
   12. High Service Pump #2 Start
   13. High Service Pump #2 Run Status
   14. High Service Pump #2 Fault
   15. High Service Pump #2 Speed Out
   16. High Service Pump #2 Speed In
   17. High Service Pump #2 Call to Run Pilot Light
   18. High Service Pump #2 Running Pilot Light
   19. High Service Pump #2 Fault Pilot Light
   20. High Service Pump #2 ETM
   21. High Service Pump #3 HOA
   22. High Service Pump #3 Start
   23. High Service Pump #3 Run Status
   24. High Service Pump #3 Fault
   25. High Service Pump #3 Speed Out
   26. High Service Pump #3 Speed In
   27. High Service Pump #3 Call to Run Pilot Light
   28. High Service Pump #3 Running Pilot Light
   29. High Service Pump #3 Fault Pilot Light
   30. High Service Pump #3 ETM
   31. High Service Pump #1 Check Valve Open
   32. High Service Pump #2 Check Valve Open
   33. High Service Pump #3 Check Valve Open
   34. High Service Sequence 1-2-3-4 Selected
   35. High Service Sequence 2-3-4-1 Selected
   36. High Service Sequence 3-4-1-2 Selected
   37. High Service Sequence 4-1-2-3 Selected
   38. Finished Water Flow Instantaneous
   39. Finished Water Flow Totalizer

40. Reservoir Level

k. Flocculator
1. Flocculator#1 HOA
2. Flocculator#1 Call to Run
3. Flocculator#1 Run Status
4. Flocculator#1 Fault
5. Flocculator#1 Speed Output
6. Flocculator#1 Speed Input
7. Flocculator#1 Streaming Current Meter
8. Flocculator#2 HOA
9. Flocculator#2 Call to Run
10. Flocculator#2 Run Status
11. Flocculator#2 Fault
12. Flocculator#2 Speed Output
13. Flocculator#2 Speed Input
14. Flocculator#2 Streaming Current Meter

l. Flocculator Coagulant Feed
1. Floc Coagulant Feed Pump #1 Start
2. Floc Coagulant Feed Pump #1 Run Status
3. Floc Coagulant Feed Pump #1 Fault
4. Floc Coagulant Feed Pump #1 Speed Out
5. Floc Coagulant Feed Pump #1 Speed In
6. Floc Coagulant Feed Pump #1 High Pressure Switch
7. Floc Coagulant Feed Pump #1 Flow Switch
8. Floc Coagulant Feed Pump #2 Start
9. Floc Coagulant Feed Pump #2 Run Status
10. Floc Coagulant Feed Pump #2 Fault
11. Floc Coagulant Feed Pump #2 Speed Out
12. Floc Coagulant Feed Pump #2 Speed In
13. Floc Coagulant Feed Pump #2 High Pressure Switch
14. Floc Coagulant Feed Pump #2 Flow Switch

m. Conventional Filter Common
1. Raw Water Turbidity
2. Effluent Turbidity
3. Filter Sequence Manual 1-2-3-4
4. Filter Sequence Manual 2-3-4-1
5. Filter Sequence Manual 3-4-1-2
6. Filter Sequence Manual 4-1-2-3

n. Conventional Filter #1
1. Conv Filter #1 HOA
2. Treatment Unit#1 Effluent Turbidity
3. Filter#1 Effluent Turbidity
4. Conv Filter#1 Level
5. Conv Filter#1 Low Level Float
6. Conv Filter#1 High Level Float
7. Conv Filter#1 Influent Valve Open Command
8. Conv Filter#1 Influent Valve Open Limit Switch
9. Conv Filter#1 Influent Valve Closed Limit Switch
10. Conv Filter#1 Effluent Valve Open Command
11. Conv Filter#1 Effluent Valve Close Command
12. Conv Filter#1 Effluent Valve Open Limit Switch
13. Conv Filter#1 Effluent Valve Closed Limit Switch
14. Conv Filter#1 Backwash Valve Open Command
15. Conv Filter#1 Backwash Valve Open Limit Switch
16. Conv Filter#1 Backwash Valve Closed Limit Switch
17. Conv Filter#1 Air Scour Valve Open Command
18. Conv Filter#1 Air Scour Valve Open Limit Switch
19. Conv Filter#1 Air Scour Valve Closed Limit Switch
20. Conv Filter#1 Drain Valve Open Command
21. Conv Filter#1 Drain Valve Open Limit Switch
22. Conv Filter#1 Drain Valve Closed Limit Switch
23. Conv Filter#1 to Waste Valve Open Command
24. Conv Filter#1 to Waste Valve Close Command
25. Conv Filter#1 to Waste Valve Open Limit Switch
26. Conv Filter#1 to Waste Valve Closed Limit Switch

o. Conventional Filter #2
1. Conv Filter #2 HOA
2. Treatment Unit#2 Effluent Turbidity
3. Filter#2 Effluent Turbidity
4. Conv Filter#2 Level
5. Conv Filter#2 Low Level Float
6. Conv Filter#2 High Level Float
7. Conv Filter#2 Influent Valve Open Command
8. Conv Filter#2 Influent Valve Open Limit Switch
9. Conv Filter#2 Influent Valve Closed Limit Switch
10. Conv Filter#2 Effluent Valve Open Command
11. Conv Filter#2 Effluent Valve Close Command

12. Conv Filter#2 Effluent Valve Open Limit Switch
13. Conv Filter#2 Effluent Valve Closed Limit Switch
14. Conv Filter#2 Backwash Valve Open Command
15. Conv Filter#2 Backwash Valve Open Limit Switch
16. Conv Filter#2 Backwash Valve Closed Limit Switch
17. Conv Filter#2 Air Scour Valve Open Command
18. Conv Filter#2 Air Scour Valve Open Limit Switch
19. Conv Filter#2 Air Scour Valve Closed Limit Switch
20. Conv Filter#2 Drain Valve Open Command
21. Conv Filter#2 Drain Valve Open Limit Switch
22. Conv Filter#2 Drain Valve Closed Limit Switch
23. Conv Filter#2 to Waste Valve Open Command
24. Conv Filter#2 to Waste Valve Close Command
25. Conv Filter#2 to Waste Valve Open Limit Switch
26. Conv Filter#2 to Waste Valve Closed Limit Switch

p. Trident Clarifier #1
1. Clarifier#1 Influent Valve Position
2. Clarifier#1 Influent Flow
3. Clarifier#1 Inlet Turbidity
4. Clarifier#1 Tube Settler Level
5. Clarifier#1 Tube Settler High Level Alarm
6. Clarifier#1 Tube Settler Low Level Alarm
7. Clarifier#1 Sludge Collector Run Status
8. Clarifier#1 Sludge Collector Fault
9. Clarifier#1 Recirc Pump Run Status
10. Clarifier#1 Recirc Pump Fault
11. Clarifier#1 Sludge Recirc Flow
12. Clarifier#1 Transfer Pump Run Status
13. Clarifier#1 Transfer Pump Fault
14. Clarifier#1 Transfer Valve Position
15. Clarifier#1 Sludge Blowdown Valve Position
16. Clarifier#1 Polymer Pump Run Status
17. Clarifier#1 Polymer Pump Fault
18. Clarifier#1 Polymer Flow

q. Trident Clarifier #2
1. Clarifier#2 Influent Valve Position
2. Clarifier#2 Influent Flow
3. Clarifier#2 Inlet Turbidity
4. Clarifier#2 Tube Settler Level

5. Clarifier#2 Tube Settler High Level Alarm
6. Clarifier#2 Tube Settler Low Level Alarm
7. Clarifier#2 Sludge Collector Run Status
8. Clarifier#2 Sludge Collector Fault
9. Clarifier#2 Recirc Pump Run Status
10. Clarifier#2 Recirc Pump Fault
11. Clarifier#2 Sludge Recirc Flow
12. Clarifier#2 Transfer Pump Run Status
13. Clarifier#2 Transfer Pump Fault
14. Clarifier#2 Transfer Valve Position
15. Clarifier#2 Sludge Blowdown Valve Position
16. Clarifier#2 Polymer Pump Run Status
17. Clarifier#2 Polymer Pump Fault
18. Clarifier#2 Polymer Flow

r. Ultraviolet Disinfection System
1. UV #1 on
2. UV #1 off
3. UV #1 general fault alarm
4. UV #2 on
5. UV#2 off
6. UV #2 general fault
7. UV Flow

s. Emergency Generator
1. Generator on
2. Generator off
3. Generator fail to start
4. Generator general fault alarm
5. Low Fuel
6. Battery Low
7. ATS Transferred
8. ATS Failed to Transfer

E. Operator Controls – Local Control Panels (Supplied by Equipment Suppliers)
1. The Trident Clarifier#1 and Trident Clarifier#2 shall come with its own Control Panel in a NEMA 12 enclosure. The SCADA connection shall be via ethernet.

2. The UV System Shall come with two Control Panels in NEMA 12 enclosures. The

SCADA connection shall be hardwired discrete signals.

F. Fiber Optic Port Switch (Six) – The fiber optic port switch shall be a Stratix Self-Healing Ring or Engineer Approved Equal.

1. General
   a. The PLC ,Remote I/O panel and Workstation shall be connected to the SCADA network backbone through a 10/100 Industrial Rail Ethernet Switch. The Switch shall support fault tolerant ring architecture and shall provide full duplex capability and redundant power. 10/100 Industrial Rail Ethernet Switch shall provide five or more 10/100 Fast Ethernet ports, plus one standby port via RJ45 interfaces and one V.24 interface for external management. Two uplink ports shall be provided for integrated connectivity to the fault tolerant Network backbone. Depending upon the fiber used the uplink ports will be Cat 6 cable or multimode fiber with ST connectors.

2. Frame Switching Functions

   a. All data received by the switch from the system bus or at the ports shall be stored and checked for validity. Invalid and defective frames as well as fragments shall be discarded. The switch shall forward valid frames.

   b. The switch shall learn all source addresses per port. Only packets with: unknown addresses, this address or a multi/broadcast address in the destination address shall be sent to this port. The switch shall be capable of learning two thousand (2,000) addresses.

   c. The Switch shall monitor the age of the learned addresses. The Switch shall delete address entries from the data table that exceed a certain age.

   d. The Switch shall support two priority queues. The classification of received data packets to these classes shall be done by: the pre-defined classification in statistical address entries and the priority of the data packet included in the VLAN packet.

   e. On data packets with VLAN tags the switch shall analyze the 3 bit priority field. Data packets with VLAN tags and a maximum long data field shall be transmitted. Data packets received without VLAN tags shall be transmitted without VLAN tags.

3. Specific Functions of the TP/TX Interface

a. The Switch shall monitor the connected TP/TX line segments for short circuit or interrupt using regular link test pulses in accordance with IEE standard 802.3 10/100BASE-TP/TX. The Switch shall not transmit any data in a TP/TX segment from which it does not receive a link test pulse.

b. If the reception line pair is incorrectly connected (RD+ and RD- switched) polarity shall be automatically reversed.

c. 8 Port minimum.

4. Self-Healing Functions

a. The Switches shall allow the backbone to assimilate a ring architecture. I one does switch fails or the backbone cable is cut, the ring structure shall change itself into a line structure within 0.5 seconds with up to 50 Switches on the network.

5. Voltage Supply

a. The voltage supply shall be redundant 24 VDC power supplies

6. Management

a. The Switch shall support SNMP and Web-based management for extensive diagnosis and configuration functions to allow easy startup procedures and allow network and device information. The Switch shall support TCPP/IP protocol family.

7. Technical Specifications

a. Operating Voltage – 24 VDC -25%, +33%

b. Current Consumption – 0.8 A max. at 24 VDC

c. Overload current protection – thermal fuse

d. Ambient temperature - 0°C to 50°C

e. Storage Temperature - -20°C to 80°C

f. Humidity – 10% to 90% (non-condensing)

g. Port attenuation – 11dB at 1300nm

8. Rail Switch shall be newest switch by Stratix.

2.03 SCADA STRATEGIES – Water Plant

A. The following SCADA strategies describing the operations of each SCADA loop indicated on the Drawings will be considered the essence of the specifications. Furnish and install all necessary equipment, instruments, software modules and appurtenances to achieve the performance as hereinafter described, even though such items may not be included in any specific listing of equipment to be furnished. An involved system of this nature requires emphasis on the functional aspects of the Specifications while the technical details serve to indicate the desired manner in which the end result will be accomplished. The control and monitoring strategies indicated below are for equipment external to any existing or proposed packaged process equipment. Control strategies for the packaged process equipment shall be as described in other parts of this specification and as required for proper operation of the system. The following control strategies are associated with the treatment facility indicated below:

1. Raw Water Pumps
   a. The three Raw Water Pumps shall be operated via SCADA through the RAW Pump Station CP. On the front of the main control panel there is a control station for each raw water pump, consisting of a three position Manual/Off/ Automatic selector switch, three (3) indicator lights, and elapsed run time meter (ETM). There is also a Raw Water Pump selector switch for lead/lag selection. On the front of the Raw Pump Station CP there is also a control station for each raw water pump, consisting of a three position Manual/Off/ Automatic selector switch, three (3) indicator lights, and elapsed run time meter (ETM). The functions of these devices are as follows:

   b. The hand position is simply an "ON" switch, the respective raw water pump will be called to run whenever the selector switch is in the hand position. To shut the pump "OFF" simply return the selector switch to the "OFF" position. In the Automatic Position the raw water pump(s) will be called to Run by the programmable logic controller (PLC) whenever a treatment unit requires raw water either during normal filter operation or during a flush cycle. Whenever a filter is called to run either manually or automatically it will not run unless at least one raw water pump is available. A raw water pump is considered available if it's respective Hand/Off/Auto operation selector switch is in the Automatic position.

c. The Raw Water pump Selection switch at the main cp is used to set the lead lag order for the Raw Water pumps. The SCADA system shall accept the input from this switch to set the order of the pumps. The main control panel OIT shall have a software selector switch that allows the operator to choose between the physical switch setting lead lag or a software lead lag option. The software initiated lead lag shall give the operator the ability to select lead/lag/lag-lag and give an operator input for time of rotation.

If a pump is running and the pump faults the SCADA system shall shut the pump off, alarm the operator, remove the pump from rotation and start the next pump in the rotation.

d. SCADA: The SCADA shall indicate and display the operation status for each Raw Water Pump, including lead/lag status, HOA status, pump running status, general fault, motor high temperature alarm, seal failure alarm, elapsed run time and % speed. The SCADA shall accept and display each of the above status and alarm conditions.

e. At the plant SCADA shall monitor the raw water turbidity, pH, and streaming current. These parameters shall be used to inject chemical and monitor the plant.

2. Raw Water Priming Compressors

a. The two Raw Water Priming Compressors are operated from their local control panels. SCADA shall monitor the priming compressors via the Raw Water pump Station CP. The SCADA vendor shall review the Raw Water Priming Compressors control panels to ensure compatibility between the systems.

The RAW Water Pump Station CP shall monitor the Raw Water Priming Compressors for run status and fault. This shall be done with discrete contacts.

b. SCADA: The SCADA shall indicate the operating status for the, raw water priming compressors, including, “raw water priming compressor #1 general alarm”, “raw water priming compressor #1 run status”, “raw water priming compressor #2 general alarm”, and “raw water priming compressor #1 run status”. The SCADA shall accept and display each of the above status and alarm conditions.

3. Permanganate Dosing Station

a. The 2 proposed permanganate pumps shall operate and pace via with the plant SCADA to provide dosing for the total plant influent flow. The system shall operate as follows:

   SCADA shall pace permanganate feed pump #1 and #2 to maintain an operator preset permanganate dose to the raw water pump station. The 4-20 mA pacing signal for the permanganate pumps shall come from the total influent flow to the filters. The SCADA shall operate the pumps in the lead/lag configuration. In the event of the lead pump failing, the SCADA shall start the lag pump and initiate an alarm.

b. SCADA: The SCADA shall indicate and display the operation status for each permanganate pumps, including pump HOA status, pump running status, general fault, % speed and lead/lag status. The SCADA shall continuously display and record the liquid level and total volume of the permanganate tank. The SCADA shall show the following alarm conditions for each pump: pump general fault. The SCADA shall show the following for the permanganate tank: operator preset storage tank low level alarm and redundant low level alarm (physical float. The SCADA shall display a permanganate leak alarm (float in the secondary containment for the permanganate).

4. Primary Coagulant

a. The 2 proposed primary coagulant pumps shall operate and pace via with the plant SCADA to provide dosing for the total plant influent flow. The system shall operate as follows: SCADA shall pace primary coagulant feed pump #1 and #2 to maintain an operator preset primary coagulant dose to the raw water. The 4-20 mA pacing signal for the primary coagulant pumps shall come from the streaming current meter. The SCADA shall operate the pumps in the lead/lag configuration. In the event of the lead pump failing, the SCADA shall start the lag pump and initiate an alarm.

b. SCADA: The SCADA shall indicate and display the operation status for each primary coagulant pumps, including pump HOA status, pump running status, general fault, % speed and lead/lag status. The SCADA shall continuously display and record the liquid level and total volume of the primary coagulant tank. The SCADA shall show the following alarm conditions for each pump: pump general fault.

c. The SCADA shall show the following for the primary coagulant tank: operator preset storage tank low level alarm and redundant low-level alarm (physical float. The SCADA shall display a primary coagulant leak alarm (float in the secondary containment for the primary coagulant)

5. Secondary Coagulant

a. The 2 proposed secondary coagulant pumps shall operate and pace via with the plant SCADA to provide dosing for the total plant influent flow. The system shall operate as follows: SCADA shall pace secondary coagulant feed pump #1 and #2 to maintain an operator preset secondary coagulant dose to the filter inlets. The 4-20 mA pacing signal for the secondary coagulant pumps shall come from the individual filter flow meters. The SCADA shall operate the pumps in the lead/lag configuration. In the event of the lead pump failing, the SCADA shall start the lag pump and initiate an alarm.

b. SCADA: The SCADA shall indicate and display the operation status for each secondary coagulant pumps, including pump HOA status, pump running status, general fault, % speed and lead/lag status. The SCADA shall continuously display and record the liquid level and total volume of the secondary coagulant tank. The SCADA shall show the following alarm conditions for each pump: pump general fault. The SCADA shall show the following for the secondary coagulant tank: operator preset storage tank low level alarm and redundant low level alarm (physical float. The SCADA shall display a secondary coagulant leak alarm (float in the secondary containment for the secondary coagulant)

6. Pre-Chlorine Gas

a. The pre-chlorine gas valve shall be monitored and controlled by the main control panel. Scada shall allow the operator to input a dosing rate that adjusts the pre-chlorination valve based on the total plant influent flow.

b. The SCADA shall monitor the pre-chlorine gas valve for: Valve Position, and Pre-Chlorinator out of gas. The SCADA shall accept and display each of the statuses above and alarm conditions.

<u>Filters</u>

There are four filters at the Rhinebeck water plant, two conventional filters and two Trident filters. In order to get the best treatment flow should be delivered evenly across the filters that are in service when the plant is in operation. The two conventional filters are rated for 400gpm and the two Tridents are rated for 338gpm. The plant will run with three filters in

service and the fourth shall be resting as a backup. The operator shall set the desired plant flow as a user adjustable input on the OIT. SCADA will then calculate the flow to each filter that is in service. The operator shall set the order of the filters from the OIT or switch on the main control panel. Once the filters are called to run by the wetwell level and the raw water pumps start the SCADA system shall set the flow control valve to evenly distribute the flow to the filters. There is only one flow control valve for the two conventional filters so if both filters are being used the conventional flow control valve shall be set to the flow of two filters. Each trident has its own flow control valve that will be set to maintain the flow to each Trident. See below for specific filter operations.

7. Conventional Filters
    a. The conventional filters consist of two (2) 0.576 MGD treatment units and all associated valves and equipment. The SCADA system shall automatically sequence all valves, pumps, blowers etc. during general filtering operation, backwash and flush cycles. All treatment units can be either manually or automatically operated via a three position selector switch located on the front of the main control panel or the OIT. All filter backwash cycles can be manually or automatically initiated via control switches on the front of the main control panel or OIT.

    b. When the HOA is the auto position the conventional filters will be called to run based on the clearwell level, lead/lag treatment unit selection, and the lead/lag treatment unit “ON” setpoints set by the operator in the OIT. The conventional filter will not shutdown in the auto mode until the clearwell level is at or above the treatment units “OFF” setpoint set by the operator in the OIT. In hand or auto the conventional filters will not run unless there is at least one raw water pump available.

    c. The conventional filter flow control valve is controlled to maintain a raw water flow to the conventional filters clarifier unit based on an operator adjustable input. When the valve is set to auto the PLC adjusts the flow to conventional filters by opening and closing the conventional filter flow control valve. The operator inputs a flow setpoint to the conventional filters and the PLC monitors the conventional filter raw water flow meter. If the flow needs to be raised the PLC will send a signal to the valve to open and if the flow needs to decrease the PLC will send a signal to the valve to close.

    d. The flow to the conventional filters initially enters two flocculator tanks. The flocculator tanks include streaming current meters for measuring the charge on particles entering the flocculator tank. The streaming current measurement is sent to SCADA as a 4-20mA signal. Based on the streaming current signal coagulant is added to the flocculator tanks.

There is also a flocculator in each flocculator tank. The flocculator is driven by a VFD and is paced to maintain a user defined setpoint. SCADA shall send a signal to the flocculator for speed and monitor the flocculators for run status and fault.

e. The flow goes from the flocculation tanks through the two settling tanks to the two conventional filters. Each filter has an automated inlet valve, effluent valve, backwash valve, air scour valve, drain valve, and filter to waste valve. Each conventional filter and valve has an HOA software button on the OIT. When a filter is in auto it is turned on based on the clearwell level. When the level in the clearwell drops below the user defined filter on setpoint the SCADA system shall open the inlet and effluent valve to allow flow through the filter to the clearwell. The filters turn off by closing the inlet and effluent valves when the clearwell rises above the all filters off setpoint.

SCADA controls the conventional filter backwash when in auto. The filter will backwash based on either the filter level rising above a user defined "filter backwash setpoint" or the filters running for a user defined "filter run time". Once an automated backwash cycle is initiated the SCADA system shall close the inlet and effluent valves on the filter, open the air scour valve and turn on the lead blower for a user defined "air scour time". Once the air scour is completed the SCADA shall shutoff the blower, close the air scour valve, open the backwash valve and open the drain valve. Once the backwash valve and drain valve are open the SCADA system shall start the backwash pumps. The backwash flow rate shall be set by the backwash flow control valve. The backwash will continue for a use adjustable "backwash cycle time" setpoint. Once the backwash cycle is complete SCADA will shut off the backwash pumps and close the backwash and drain valves and return the filter to normal operation.

The SCADA shall monitor the filter influent turbidity and effluent turbidity. Whenever a filter influent turbidity is above a user defined influent turbidity high alarm SCADA shall alarm the operator. Whenever the filter is in auto and effluent turbidity is above a user defined filter effluent turbidity high setpoint the SCADA system shall alarm the operator and run the filter to waste. To run the filter to waste SCADA shall close the filter effluent valve, open the filter inlet valve, open the filter to waste valve, and turn on the raw water pump. SCADA shall run the filter to waste until the effluent turbidity is below the filter effluent turbidity high setpoint.

SCADA shall also allow the operator to drain the filters from the SCADA OIT. This shall be done by the operator selecting the drain valve on the OIT and clicking a software button to open the drain valve.

f. SCADA shall monitor and control the conventional filter flow meter and flow control valve for the following: Conventional Filter Flow, Conventional Filter Flow Control Valve Position, Conventional Filter Flow Control Valve Open Relay, Conventional Filter Flow Control Valve Close Relay, and Conventional Filter Flow Control Valve Fail Relay.

8. Trident Filters

a. The Trident filters consist of two (2) 0.487 MGD treatment units and all associated valves and equipment. The SCADA system shall automatically sequence all valves, pumps, blowers etc. during general filtering operation, backwash and flush cycles. All treatment units can be either manually or automatically operated via a three-position selector switch located on the front of the main control panel or the OIT. All filter backwash and clarifier flush cycles can be manually or automatically initiated via control switches on the front of the main control panel or OIT.

b. When the HOA is the auto position the Trident filters will be called to run based on the clearwell level, lead/lag treatment unit selection, and the lead/lag treatment unit "ON" setpoints set by the operator in the OIT. The Trident filter will not shutdown in the auto mode until the clearwell level is at or above the treatment units "OFF" setpoint set by the operator in the OIT. In hand or auto the Trident filters will not run unless there is at least one raw water pump available.

c. The new Trident Clarifiers will come on based on a signal they receive from the SCADA system. SCADA shall send over a flow signal to the new Trident Clarifier Control Panel to set the new clarifier influent control valve. SCADA shall receive back from the Trident Clarifier Control Panel the inlet flow.

d. SCADA shall also receive and display the following from the Trident Clarifier Control Panel: Clarifier #1 in service, clarifier #1 influent valve position, clarifier #1 influent flow, clarifier #1 transfer valve position, clarifier #1 sludge blow down valve position, clarifier #1 sludge recycle valve position, clarifier #1 tube settler level, clarifier #1 sludge recirc flow, clarifier #1 inter-clarifier turbidity, clarifier #1 sludge collector run status, clarifier #1 sludge collector fault, clarifier #1 recirc pump run status, clarifier #1 recirc pump fault, clarifier #1 transfer pump run status, clarifier #1 transfer pump fault, Clarifier #2 in service, clarifier #2 influent valve position, clarifier #2 influent flow, clarifier #2 transfer valve position, clarifier #2 sludge blow down valve position, clarifier #2 sludge recycle valve position, clarifier #2 tube settler level, clarifier #2 sludge recirc flow, clarifier #2 inter-clarifier turbidity, clarifier #2 sludge collector run status, clarifier #2 sludge collector fault, clarifier #2

recirc pump run status, clarifier #2 recirc pump fault, clarifier #2 transfer pump run status, clarifier #2 transfer pump fault,

e. The Trident filter flow control valve is controlled to maintain a raw water flow to the Trident filters clarifier unit based on an operator adjustable input. When the valve is set to auto the PLC adjusts the flow to the Trident filters by opening and closing the Trident filter flow control valve. The operator inputs a filter flow setpoint to the Trident filters and the PLC monitors the Trident filter raw water flow meter. If the flow needs to be raised the PLC will send a signal to the valve to open and if the flow needs to decrease the PLC will send a signal to the valve to close.

f. Filter Level Control - The water level in the filter compartment is controlled by a modulating control valve. This valve receives time proportioned contact closures for open/close operation from the main control panel. The level controller is used to control the filter level to a desired setpoint as set by the operator on OIT. Using the OIT, the controller can display local setpoint 1 "1 LSP" (level setpoint), actual filter level and the controller output in percent (0-100%). When a treatment unit is shut off, the level controller is programmed to go into the manual failsafe mode and force the close contact output on, fully closing the level control valve. To change a setpoint value simply enter it into the OIT.

There is a two (2) position treatment unit sequence selector switch located on the front of the control panel for lead/lag treatment unit sequence selection. This determines which treatment units will run when the clearwell level drops below the lead/ lag unit "ON" set points as set by the operator on the operator interface unit. For example: if the sequence selector switch is placed in "1-2" position, unit 1 would be the lead unit and unit 2 would be the lag. In the above example should unit 1 not be available for operation unit 2 would then become the lead unit. This operation shall be replicated in the OIT and the operator shall have a software selector switch that allows them to choose between the OIT or selector switch on the front of the control panel.

The clearwell level determines when the lead and lag treatment units are called to run. When the clearwell level drops below the "lead unit on" setpoint as set by the operator on the operator interface unit the "lead" unit as determined by the sequence selection willbe called to filter. The unit will continue to filter until the clearwell level raises above the "all units off" setpoint as set by the operator on the operator interface unit. However should the clearwell level continue to drop below the "lag unit on" setpoint as set by the operator on the operator interface unit both the "lead" and "lag" treatment units will run until the clearwell level raises above the "all units off" setpoint as set by the operator on the operator interface unit.

g. Backwash and flush cycles may be initiated manually via the backwash/flush cycle control station located on the front of the control panel or if selected, automatically as required. The control station consists of three (3) two position selector switches one (1) formanual/auto flush cycle initiation selection, one (1) for manual/auto backwash cycle initiation selection and one (1) fortreatment unit selection formanual initiated backwash or flush. And two pushbuttons one (1) for backwash cycle manual initiate and one (1) for flush cycle manualinitiate.

To manually initiate either a flush or backwash cycle simply position the flush or backwash cycle initiate selector switch to the manual mode, select the desired treatment unit to be flushed or backwashed via the treatment unit select for manual initiate selector switch and then depress the desired flush or backwash manual initiate pushbutton. **NOTE:** the treatment unit that you desire to flush or backwash must be either in the automatic or manual mode in order to initiate a manual backwash or flush.

Automatic backwash cycle initiation will occur when the respective treatment unit run time exceeds the backwash based on run time setpoint as set by the operator on the operator interface unit or the filter reaches an operator adjustable setpoint initially set to 8'of headloss and the respective headloss pressure switch (PSLl0l or 201) closes.

Automatic flush cycle initiation will occur when the respective treatment unit run time exceeds the flush based on run time setpoint as set by the operator on the operator interface unit or the clarifier pressure exceeds 1.8 psi and the respective clarifier pressure switch (PSH104 or 204) closes.

The backwash and flush cycle initiation selector switches must be in the automatic position or the cycle will not be initiated automatically. If the switch is in the manual position the respective treatment unit flushing orbackwashing pilot light will flash indicating that the unit is in need of a backwash (based on runtime or high headloss)or a flush (based on runtime or high clarifier pressure) but is not initiating the cycle because the backwash or flush cycle initiate selector switch is in the manual position.

Only one treatment unit may be flushing orbackwashing at one time. Should a treatment unit require a flush or backwash while the other is currently flushing or backwashing the respective cycle pilot light will flash until the other treatment unit has completed it's cycle. Once complete the treatment unit may be flushed or backwashed either automatically or manually as described above.

A treatment unit can be flushed and backwashed in one cycle if so desired. This is accomplished by enabling the flush with backwash option for the respective unit. With this option enabled the treatment unit will automatically flush every time a backwash cycle is initiated weather or not it is needed.

There shall be clearwell level backwash/high service pump enable and inhibit set points in the operator interface terminal. These are to prevent the backwash and/or high service pump(s) from drawing down the clearwell to low and causing damage to the Pump(s). The inhibit setpoint will not allow a backwash cycle to be initiated or a high lift pump to run if the clearwell level is at or below the inhibit setpoint. The backwash cycle will not be able to be initiated or a high service pump called to run until the clearwell level rises to or above the enable setpoint.

A backwash or flush cycle may be terminated at any time in the cycle by simply turning the respective treatment unit mode of operation selector switch to the "OFF" position. Once the switch is returned to the "Auto" or "Manual" position the cycle will not continue. A new cycle could be manually initiated if desired or the unit would backwash or flush automatically if required.

h. Clarifier Flush Cycle - As described above a clarifier flush cycle may be initiated by any of the following conditions, depending on the position of the flush cycle initiate" Man/Auto" selector switch.
   1. High clarifier pressure (Auto only)
   2. Accumulated filter runtime since last flush (Auto only)
   3. Manually pressing the initiate pushbutton (manual only)

   Once the clarifier flush has been initiated it's respective flushing pilot light (amber) will be illuminated, the influent valve will close, the waste gate will open and the air blower will start. Once the air blower discharge has reached adequate pressure and the air blower pressure switch (PSH002) closes the clarifier air inlet valve will open and air will be injected into the clarifier (stage 1). Next, the influent valve will open until the flush setpoint is reached on the influent flow PID controller now flushing the clarifier with air & water simultaneously (stage 2). After flushing the influent valve will close and the air will continue to be injected into the clarifier (stage 3). The air blower will then shut off, the clarifier air inlet valve will close and the clarifier bed will be allowed to settle (stage 4). Next the influent will again open until the flush setpoint is reached on the influent flow controller flushing the clarifier with water (stage 5). Next, the influent valve closes and the waste gate remains open allowing the trough to empty, the waste gate will

then close (stage 6), completing the flush cycle. The filter will return to operation automatically.

There is a watch dog timer monitoring the length of time it takes for a flush cycle to complete. If the flush cycle hangs up and is not completed before the watch dog timer expires the flush cycle will be terminated and the treatment unit will return to operation. The treatment unit failure pilot light (red) will be illuminated and the operator interface unit will be flashing "Treatment Unit no.* Flush Cycle Failure". However, if the pressure in the clarifier is still to high, the treatment unit will request another flush cycle if the flush cycle initiate selector switch is in the "Auto" position. ***IMPORTANT*** The watch dog timer preset must be set greater than the sum of all six (6) flush stages to avoid incomplete flush cycles and failures.

i. Filter Backwash Cycle - As described above a filter backwash cycle may be initiated by any of the following conditions, depending on the position of the backwash cycle initiate "Man/Auto" selector switch.
   1. High headloss pressure in filter (Auto only)
   2. Accumulated filtering time since last backwash (Auto only)
   3. Manually pressing the initiate pushbutton (Manual only)

   Once a filter backwash cycle has been initiated it's respective backwashing pilot light (amber) will be illuminated, The filter drain down valve will open and the water from the filter compartment will drain to the clearwell until the drain down timer expires or the low level float (LSLl0l or 201) is reached (stage 1). Next the filter drain down valve will close, the waste gate will open and two (2) air blowers will start, when the air blowers discharge has reached adequate pressure and the air blower pressure switch (PSH002) closes the filter air inlet valve will open allowing air to be injected into the filter compartment (stage 2). Next, the backwash pump will start, the existing filters backwash rate of flow control valve will open fully, the blowoff valve to the clearwell will open and the filter backwash isolation and low rate backwash valves will open, allowing water to be pumped into the filter compartment. The air and "low rate" water will run simultaneously until the refill timer preset has expired or the high level float (LSHlOl or 201) is reached (stage 3). Next, the air blowers will stop, the filter air inlet valve will close and the filter will continue to backwash at "low rate" (stage 4). Next, the low rate backwash valve will close and the high rate backwash valve will open allowing "high rate" water flow to enter the filter compartment (stage 5). Next, both the high rate and backwash isolation valves will close, the backwash pump will continue to run, pumping water through the blowoff valve, The waste gate will remain open allowing for the trough to drain (stage 6). Next, the waste gate, blowoff valve and existing filter backwash rate of flow valve will close and the

backwash pump will shut off. The influent valve will then open until the filtering setpoint on the influent flow controller is reached, the filter to waste valve is opened and the treatment unit filters to waste until the filter to waste timer has expired (stage 7). The backwash cycle is complete after stage 7 and the treatment unit will return to operation automatically.

As described in the backwash initiation section a clarifier flush can be initiated simultaneously with a backwash if the flush with backwash option is enabled in the operator interface unit. Since the flush cycle requires an air blower through stage 3 of the flush cycle and the backwash cycle needs an air blower for stages 2 and 3 of the backwash cycle, a slight overlap of stages might occur depending on the stage timer preset values. Therefore, if the backwash cycle needs the blower before the flush cycle is done with it, the backwash cycle will simply continue in it's current stage and wait until the air blower is available before advancing.

There is a watch dog timer monitoring the length of time for a backwash cycle to complete. If the backwash cycle hangs up and is not completed before the watch dog timer expires the backwash cycle will be terminated and the treatment unit will return to operation. The treatment unit failure pilot light (red) will illuminated and the operator interface unit will be flashing "Treatment Unit no.* Backwash Cycle Failure". ***IMPORTANT*** The watch dog timer preset must be set greater than the sum of all seven (7) backwash stages to avoid incomplete backwash cycles and failures.

j. SCADA: The SCADA shall indicate and display the operation and alarm status of the sludge press components as noted within this specification.

9. Blowers
   a. There are four (4) blowers at the Rhinbeck water treatment plant. Two blowers, Blower #1 and Blower #2, are dedicated to the Trident Units. Two blowers, Blower #3 and Blower #4, are dedicated to the conventional filters. Each blower has an HOA and when in auto are operated via SCADA as described in the sections above.

   b. SCADA shall monitor and control the blowers for Blower #1 HOA, Blower #1 Start, Blower #1 Run Status, Blower #1 Fault, Blower #2 HOA, Blower #2 Start, Blower #2 Run Status, Blower #2 Fault, Blower #3 HOA, Blower #3 Start, Blower #3 Run Status, Blower #3 Fault, Blower #4 HOA, Blower #4 Start, Blower #4 Run Status, and Blower #4 Fault.

10. High Service Pumps

a. The three high service pumps shall be operated via SCADA through the Main CP. On the front of the control panel there is a control station for each high service pump, consisting of a three position Manual/Off/ Automatic selector switch, three (3) indicator lights, and elapsed run time meter (ETM). The functions of these devices are as follows:

b. The hand position is simply an "ON" switch, the respective high service pump will be called to run whenever the selector switch is in the hand position. To shut the pump "OFF" simply return the selector switch to the "OFF" position. In the Automatic Position the high service pump(s) will be called to Run by the programmable logic controller (PLC) when the reservoir level decreases to operator adjustable set point for “lead-on”, “lag-on”, and “lag-lag-on”. When a high service pump is running in the "Auto" position the pump will shut off when the reservoir level increases to an operator adjustable “pump-off” set point. The set point is user defined setpoint in the control system set by the Chief Operator of the water plant. The high service pump shall run in a lead/lag/lag-lag fashion. The SCADA system shall allow the operator to set the order of pump and allow the operator to set an operator adjustable alternation time. When the reservoir level drop below the lead pump on setpoint the SCADA system shall start the lead pump at minimum speed and ramp the speed up if the reservoir level continues to drop. If the lead pump is running at max speed and the reservoir level continues to drop the SCADA system shall start the lag pump at minimum sped and ramp the lead pump down to minimum speed. The SCADA system shall ramp the lead and lag pumps up together if the level in the reservoir continues to drop. If the lead and the lag pump are running at maximum speed and the reservoir level continues to drop the SCADA system shall start the lag-lag pump at minimum speed and ramp down the lead and lag pumps to minimum speed. If the reservoir level continues to drop the SCADA system shall ramp all three pumps, lead, lag, and lag-lag, up together.

   If the lead pump faults the SCADA system shall log the fault, alarm the operator and start the lag pump. If the lag pump faults while it is being called to service the SCADA system shall log the fault, alarm the operator and start the lag-lag pump. If the lag-lag pump faults while in service the SCADA system shall log the fault, and alarm the operator.

c. The control system shall also monitor the high service pump check valve for open and closed position. The check valves shall include a limit switch that indicates the valve is closed. When SCADA sees that the valve is no longer closed it shall signal the valve as open. If a high service pump is called to run and its check valve does not open in a user defined time the SCADA system shall alarm the operator, shut the pump off and move to the next pump in the rotation.

d. SCADA: The SCADA shall indicate and display the operation status for each high service pump, including lead/lag/lag-lag status, HOA status, pump running status, general fault, motor high temperature alarm, seal failure alarm, elapsed run time and % speed. The SCADA shall continuously display and record the reservoir liquid level. The SCADA shall show the following alarm conditions: pump general fault, reservoir tank low level alarms, redundant low-level alarms (physical float), high level alarms, redundant high-level alarm (physical float), and check valve position. The SCADA shall accept and display each of the above status and alarm conditions

11. UV System

a. There shall be two UV units installed at the Rhinebeck water treatment plant. The two UV units shall be operated by vendor supplied UV control panels. The SCADA shall accept communication from the UV control panel to display run status and alarms. The SCADA system shall also accept the UV flow from the UV flow meter and display it.

b. SCADA: The SCADA shall indicate the operation status for the UV System, including run, and general fault. The SCADA shall accept and display each of the above status and alarm conditions.

12. Backwash Pumps

a. There are two backwash pumps at the Rhinebeck water plant. The two pumps supply backwash water for the two conventional filters and the two trident filters. When then Backwash pumps are in auto they operate as described above.

b. SCADA shall monitor and control the following backwash parameters: Backwash Pump #1 HOA, Backwash Pump #1 Start, Backwash Pump #1 Run Status, Backwash Pump #1 Fault, Backwash Pump #1 Check Valve Status, Backwash Pump #2 HOA, Backwash Pump #2 Start, Backwash Pump #2 Run Status, Backwash Pump #2 Fault, Backwash Pump #2 Check Valve Status, and Backwash Flow.

13. Distribution Flow Meter

a. The distribution flow meter shall be used to pace the corrosion inhibitor and the post chlorine feed.

b. SCADA shall continuously display and record the instantaneous distribution flow and totalized flow. The SCADA system shall also display and record the daily totalized flow. Upon loss of the flow signal the SCADA shall alarm the operator.

14. Corrosion Inhibitor Feed
    a. There are two corrosion inhibitor feed pumps. The corrosion inhibitor feed pumps will be paced by the total plant effluent flow, combined sum of all filters effluent flow. The two proposed corrosion inhibitor feed pumps shall operate, and pace with one another, via the plant SCADA. When in auto the operator shall set a speed for the corrosion inhibitor pumps at the SCADA panel. In the event of the lead pump failing, the SCADA shall start the lag pump and initiate an alarm. The SCADA shall allow for the operators to set the lag order of the pumps within each control duty.

    b. SCADA: The SCADA shall indicate and display the operation status for each corrosion inhibitor pump, including pump duty status, HOA status, pump running status, general fault, % speed and lead/lag status. The SCADA shall continuously display and record the liquid level and total volume of the corrosion inhibitor tank. The SCADA shall show the following alarm conditions for each pump: pump general fault. The SCADA shall show the following for the corrosion inhibitor tank: operator preset storage tank low level alarm and redundant low-level alarm (physical float).

15. Post Chlorine Chloramatic Valve
    a. The post chlorine gas valve shall be monitored and controlled by the main control panel. Scada shall allow the operator to input a dosing rate that adjusts the post chlorination valve based on the total plant effluent flow.

    b. The SCADA shall monitor the post chlorine gas valve for: Valve Position, and Post Chlorinator out of gas. The SCADA shall accept and display each of the statuses above and alarm conditions.

16. Callout Alarm- Output System

    a. The SCADA shall provide 8 distinct digital alarm outputs within main control panel PLC. The SCADA shall allow for the operator to categorize each alarm condition in the system into a “callout”, no “callout category”. The SCADA shall further allow each alarm condition in the “callout category” to be selected by the operator into one of the 8 digital outputs. These outputs shall be sent to an auto dialer supplied by the SCADA vender and installed in the Control Building.

2.04 POWER SUPPLIES

A. Furnish power supplies located in the PLC cabinets of the d-c solid state type, designed for 2 and 4 wire transmitter loops where integrals instrument power supplies are not provided. Furnish power supplies suitable for use up to 15 instrument loops and designed for 4-20

mAdc current signals.

2.05 OPERATOR WORKSTATIONS

1. The SCADA vendor shall supply the operator workstations as part of the base bid shown in the bid form.
2. The SCADA vendor shall include installation, software, and programming in the bid price.
3. Operator Workstations shall be Dell Precision or equal. The minimum workstation requirements are:

a. 3.00 GHz Intel® Pentium 4 processors w/2 MB Cache
b. 4GB ECC RAM
c. Dell 20" flat panel monitor
d. 80 GB Hard Drive, ATA-100 interface, 7200 RPM
e. 48X CD-ROM and 48X CD-RW/DVD combo
f. Two (2) 3COM 3C905 10/100/1000 Ethernet, PCI Adapter, Twisted Pair network cards. Motherboard mounted Ethernet ports are not acceptable.
g. Dual Monitor Graphics Card suitable to handle the graphics of the SCADA application (Include display cable(s) and adapter(s) compatible with Graphics Card and Monitor)
h. External keyboard
i. Microsoft Mouse
j. Sound Card
k. Speakers

2.06 SERVERS

1. The SCADA vendor shall supply the servers as part of the base bid shown in the bid form.
2. The SCADA vendor shall include installation, software, and programming in the bid price.
3. Servers shall be Dell PowerEdge or equal. Server shall be a in a rack mountable chassis. Unless specified elsewhere, the Servers shall have the following minimum characteristics:
   a. 3.00 GHz Intel® Pentium 4 processors w/2 MB Cache
   b. 4GB ECC RAM
   c. Dell 20" flat panel monitor
   d. RAID 5 Controller
   e. Drive Bay for five (5) 1 inch Hot Pluggable SCSI Hard Drives

f. Five (5) 1.2TB Hard Drives, 10000 RPM
g. 24X DVD RW
h. Two (2) 3COM 3C905 10/100/1000 Ethernet, PCI Adapter, Twisted Pair network cards. Motherboard mounted Ethernet ports are not acceptable.
i. Redundant Power Supplies
j. Dual Monitor Graphics Card suitable to handle the graphics of the SCADA application (Include display cable(s) and adapter(s) compatible with Graphics Card and Monitor)
k. External keyboard
l. Microsoft Mouse
m. Sound Card
n. Speaker

2.07 OPERATOR WORK STATION SOFTWARE DESCRIPTIONS

A. The software package shall be Allan Bradley or Engineer approved equal. Provide one copy of Microsoft Windows (latest compatible version) and one copy of Microsoft Excel for Windows (latest version). In addition, provide one copy of a remote SCADA software package, such as PC Anywhere, to allow remote access to the plant SCADA system by the plant operator.

B. All analog inputs shall be available for trending.

C. The SCADA supplier shall assume that a total of 200 display screens will be required for this project. The exact configuration and content of each display will be determined during the kick-off meeting and shop drawing review.

D. Furnish software for the operator workstation which shall generate data, graphics, reports, alarms, journaling, historical replay, and trending and shall provide data acquisition and operator graphics. Furnish a software system consisting of a system configurator and real-time, multi-tasking SCADA system. Furnish a system configurator which shall run under DOS and shall be a CAD based system development environment including a database builder and graphic builder. Furnish a run-time system which will execute the data collection system and shall provide a graphic operator interface.

1. Operator workstation multitasking : Furnish a software operating system that provides multitasking which allows the operator workstation to perform multiple tasks in apparently, a simultaneous manner.

2. Language Compiler: Furnish a software language compiler which provides a

programming facility for creation of display and report formats and allows access to signal values from the Real-Time Data Base, Static and Historic Data Bases. Furnish with the operator workstation software a full-screen editor that can be used to create and modify displays, reports and application software.

3. System Configurator: Furnish an operator workstation software system configurator which uses a menu-driven, fill-in-the-blanks method to configure or modify the system databases and lists. No programming knowledge shall be required. Furnish the data base stored on compact disks, and two 2 USB 3 thumb drives . Include the following data bases and list utilities:
   a. Polling list
   b. Static data base
   c. Real-Time data base
   d. Remote list tables
   e. Display data lists
   f. Node routing table
   g. Historic data list

4. Operator Display System: Furnish a display system which along with the keyboard shall be the primary interface to the DCI system. Furnish the display system that presents to the operator with current operating status in alpha-numeric or mimic form and allows the operator to modify network parameters and change the status. Furnish the system designed to allow the operator to display and signal and to change set points, turn field devices on or off, and open or close valves. Furnish the system to allow the operator to call up any display with a mouse pointing device. In addition to displays required to access, to program, and to perform diagnostics, the five graphical displays shall include:
   a. All alarm points
   b. Alarm history
   c. Equipment status display for all equipment which sends a status signal to the DCI System,
   d. Running times of all major equipment.
   e. Status of startup and shutdown requirements.
   f. Status of startup and shutdown cycle.
   g. Group displays for the following:
      1. Indicators for flow rates.
      2. Indicators for all analyzers.
      3. Numeric display for all totalizers.
      4. Indicators for wet well levels.
   h. Flow schematic for each treatment process showing events of the startup and shutdown programs and operating parameters.

5. System Trend Display: Furnish a dedicated real-time display system with an internal data storage buffer which shall allow up to 40 variables to be trended simultaneously. Furnish a system which shall display any five trends in one minute, six minute or an operator-defined time frame. Furnish a data zoom which shall automatically re-compute the scale. Furnish the historic trend displays for each parameter shown on the Drawings. In addition, furnish a trend display for summation of the well flow meters.

6. X, Y Plot: Furnish a system to plot any one parameter versus four parameters in a real-time X, Y plot. The system shall allow any 40 trended variables to be plotted.

7. Trend Windows: Furnish a system capable of displaying a trend window on another display. Each trend window shall contain up to three parameters. The time frame of the window shall be operator-defined ranging from 0.5 minutes to 24 hours.

8. Report System: Furnish a report system which allows both demand reports and scheduled reports to be printed on the line printer. Accumulation of data may be accomplished at Main SCADA Room. Demand logs shall normally depict instantaneous values and shall be invoked through a Report Select Menu. Scheduled reports shall be printed daily, monthly and yearly and shall depict accumulated information over an interval.

9. Alarm System: Furnish a comprehensive alarm system including both logical and analog alarms grouped into four priority classes; critical, non-critical, operator guide and event. Time stamped state and change-of-state alarms for logical signals and high, high-high, low, low-low, set point deviation and rate-of-change alarms for analog signals shall be displayed on the CRT. In addition, all alarms shall be recorded in an alarm history file and presented in an alarm history display. Furnish an audible alarm with audible silence and alarm acknowledge function keys. Acknowledged, unacknowledged and return-to-normal alarm conditions shall be differentiated by color on the CRT. Using the printer dedicated for alarms, all alarms shall be printed to provide a hard copy historical path. The OWNER will designate the priority of each alarm during review of shop drawings.

10. Event Driven Historian: Furnish a journal file to record all significant events reported or initiated by the operator workstation. A significant event is defined as any action which directly affects the network, e.g. sign on, sign off and signal value changes. All events shall be stored with a time/date stamp. Data shall be logged to a minimum of 14 different files. Each file shall be capable of accepting 20 points. The system shall be able to log data at two rate.

11. Shift Historian: Furnish data base to file historic data. The system shall provide on-line data reduction for up to 23 variables, shall scan the selected variables every ten seconds and shall store a three sample average value in an hourly file every 30 seconds. The

hourly files shall be averaged in shift file. This process shall be repeated for daily and weekly files. Each file shall contain 120 time-stamped records for each variable.

12. Historical Replay: Furnish an on-line historical replay to allow the operator to review historical files created by the Event and Shift Historian; to permit the operator to recover historical data from a floppy disk or flexible disc; to generate monthly and yearly reports if the system storage is not adequate. Furnish a system which shall replay data in a tabular or graphical format. The entire software system shall maintain full operation during historical replay.

    a. Furnish a spreadsheet, tabular replay display to permit simultaneous viewing of up to eight variables. The tabular replay shall allow the operator to scroll up and down through the file in groups of 18 records and scroll sideways in groups of eight variables.

    b. Furnish graphical relay displays in trend style display which shall graph up to five variables at a time. From the keyboard the operator shall be able to scroll through the file forward and backward. By using a cursor the operator shall be able to move across the graph to display the time and value of each sample in the file.

13. Security System: Furnish a security system to ensure that access is restricted to authorized personnel through the sign-on procedure by assigning user identification and password protection. Furnish the system so that once signed-on, the operator may set the system time and date through a menu display. Four levels of access to system functions shall be provided.

14. Timekeeping System: Furnish a five-year, battery backed up real-time calendar clock with the operator workstation which automatically updated the software clocks upon power up. Furnish the system so that the operator can set the date and time and set the software clocks via a menu display. Furnish the system to synchronize the entire system.

15. Interactive Compiler: Furnish a menu-driven program for configuring SCADA schemes. Furnish fill-in-the-blanks screen displays to enable an operator to create and edit tasks, perform linking and downloading operations, and provide self-documentation. Furnish the compiler to allow on-line modification of the controller load files.

16. Diagnostic Program: Furnish an on-line system diagnostic program that runs the Portable Engineer Interface computer and permits the user to view and edit aspects of a system while the system performs its normal task.

2.08 SPARE PARTS AND EQUIPMENT

A. Furnish the following spare parts and equipment and store as directed:
   1. One of each type of plug-in, process I/O board for PLC.
   2. 20 blank formatted re-writable CDs for the CD-RW drive
   3. 5 spares for lights, fuses, or other consumable items.
   4. 2 USB 3 thumb drives with the complete working PLC program in the format of the written program.
   5. 1 digital copy of " as built", and three (3) hard copies of " as built"

2.09 TOOLS

A. Furnish a complete set of special tools required for the maintenance and operation of this equipment, as designed by the equipment manufacturer.

2.10 SHOP PAINTING

A. Furnish equipment with a complete manufacturer's standard corrosion resistant finish at the point of manufacturer. Engage the instrumentation supplier to provide adequate paint for repainting any areas damaged during delivery, storage or installation.

2.11 SHOP TESTING THE SCADA SYSTEM

A. Prior to shipment of the new SCADA system, factory test all elements of the system, both hardware and software to demonstrate that the total system satisfies all of the requirements of this Specification.

B. Furnish all special testing materials and equipment. Where it is not practical to test with real process variables, provide suitable means of simulation. These simulation techniques shall be subject to the approval of the Engineer.

C. Testing shall not be considered complete until all tests and test documentation has been completed, reviewed, and approved by the Engineer. Tests shall generally conform to the applicable sections of ISA-RP55.1. Demonstrate that all equipment conforms to these Specifications by submitting test results for similar units.

D. Coordinate all of the testing with all other associated suppliers and with the Owner, as specified. Notify the Engineer at least four weeks prior to start of test.

E. As a minimum, test the System at the factory with simulated inputs and outputs. Exercise all components and test all functions over their entire range. During the test, operate the system long enough to demonstrate that it is capable of continuous operation.

F. Submit a minimum of six copies of the results of the factory tests to the Engineer for review.

G. In the event that the conditions specified are not met or if the test is deemed unsatisfactory for other reasons, correct the fault and retest the entire system until the tests are satisfactory to the Owner all at no additional cost to the Owner.

H. The Owner may elect to have up to three of his authorized representatives present to witness the tests. The Owner's authorized representatives will have access to all parts of the equipment, apparatus and test instruments and will have the right to check any or all readings, calibrations, or any factor necessary to determine whether or not the performances are in accordance with the Specifications.

I. Prior to the Factory Acceptance Test the SCADA vendor shall submit all screen shots to Owner for review. Once approved the SCADA vendor shall integrate them into the system.

J. The Owner reserves the right to waive the presence of any or all of his representatives at any or all witness tests. This right of waiver does not release the manufacturer from performing the required tests.

2.12 ELECTRICAL REQUIREMENTS

A. The power service to the PLC SCADA Panels shall be 120vac, 60 hz, single phase from the UPS provided under this section.

PART 3 EXECUTION

3.01 INSTALLATION

B. The SCADA System supplier shall be responsible install all equipment in accordance with the Drawings and manufacturer's recommendations or as directed by the Engineer.

3.02 PLANT STARTUP AND OPERATOR TRAINING

A. The SCADA supplier shall provide field tests of all the equipment specified to demonstrate compliance with all requirements for complete and ready for operation of all equipment. Final acceptance of the SCADA system will be made after complete system testing in the field is complete and the treatment system has operated for 2 weeks.

B. The SCADA system supplier shall provide a minimum of twenty (20) work days of onsite service for plant startup. Training shall be conducted by a factory trained plant operator

employed by the manufacturer, and shall include all SCADA components.

C. The SCADA system supplier shall also provide a minimum of five (5) work days of onsite operator training. Training shall be conducted by a factory trained plant operator employed by the manufacturer, and shall include all SCADA components.

3.03 FIELD ACCEPTANCE TESTING FOR SCADA SYSTEM

A. The objective of these tests is to demonstrate that the SCADA System is operating and complying with the specified performance requirements.

B. Perform witnessed Functional Acceptance Tests on the complete system. Demonstrate each function to the satisfaction of the Engineer and the Owner on a paragraph-by paragraph basis.

C. Each test shall be witnessed and signed off by both the Contractor and the Engineer upon satisfactory completion.

D. Conduct the actual testing program with prior approved procedures and documentation.

E. For each test description include the following minimum information:
   1. Spec page and paragraph of function or loop demonstrated.
   2. Description of function or SCADA strategy and test to demonstrate it.
   3. Space for sign off and date by the Contractor, the Engineer, and the Owner.

F. After receipt of approval by the Engineer of the documentation and the test procedures and forms, set a date to start the test.

3.04 DEFINITION OF ACCEPTANCE

A. SCADA System acceptance shall be defined as that time when the following requirements have been fulfilled:

   1. All submittals and documentation have been submitted and reviewed and approved.
   2. The complete SCADA System has successfully completed all testing requirements cited herein.
   3. The training program has been completed.

END OF SECTION

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SECTION 461000
HIGH LIFT DISTRIBUTION PUMPS

PART 1. GENERAL

1.01 SCOPE

A. The CONTRACTOR shall furnish all labor, material, tools, supervision, transportation and installation equipment to furnish and install:

1. Three (3) fully operational VIT pumps and controls as specified herein and shown on the Drawings.

2. Variable Frequency Drives (VFD) and accessories for speed control of either constant or variable torque loads.

B. The two provided pumps are replacements for two pumps in an existing three-pump system. The third existing pump will remain operational. The two new pumps will be controlled by the same control logic as the pumps they are replacing.

C. Pumps that are supplied under this specification shall be vertical turbine open lineshaft design with product lubrication, including a bowl assembly, column assembly, discharge head and driver. The discharge head shall be designed to carry the entire weight of the bowl and column assembly along with the specified driver without excessive vibration or noise. All of the supplied equipment shall conform to this specification.

D. The required units shall be Gould's Water Technology Model 12WAHC with 5 stages, or an approved equal.

1.02 QUALITY ASSURANCES

A. Warranty

1. The manufacturer shall warrant their pumps to be free of defects for a period of one year after the product is put into operation or eighteen months from the shipment date, whichever occurs first.

B. Certifications

1. The pump manufacturer shall be certified to the ISO 9001 standard for design and manufacture of vertical turbine pumps.

2. The manufacturer shall be capable of producing vertical turbine pumps certified to NSF/ANSI 61 & 372.

3. Pressure containing fabrications shall be welded only by those whom are qualified on ASME code section IX. Welder certification shall be provided with the submittal package.

C. Foundry

1. The manufacturer shall own and operate its own U.S. based foundry producing vertical turbine components.

D. Testing Standards

1. All vertical turbine pumps shall conform to ANSI/AWWA E101-88 and to the most current edition of Hydraulic Institute Standards.

1.03 SUBMITTALS

A. With the proposal, the contractor shall submit complete fabrication and assembly drawings together with detailed specifications covering materials, parts, devices, and accessories. The data and specifications for each pumping unit shall include, but not be limited to the following:

1. Name of Manufacturer
2. Type and Model
3. Design Rotational Speed
4. Number of Stages
5. Type of Bowl Bearings
6. Type of line shaft bearings
7. Size of Shafting
8. Size of Pump Column
9. Size of Discharge Outlet
10. OD of Pump Bowls
11. Weight
12. Type of Finish
13. Total Weight
14. Total Pump Length
15. Complete performance curves showing capacity versus head, NPSH required, efficiency, and BHP plotted scales consistent with performance requirements

PART 2. PRODUCTS

2.01 MANUFACTURER

A. Goulds Water Technology, A Xylem Brand.

B. Or Approved Equal.

C. The equipment covered by this specification shall be standard products as manufactured by Gould's Water Technology or an approved equivalent. All pumps and pump components specified in this specification shall be supplied by a single pump manufacturer. The pump manufacturer shall be required to supply the pumps and drivers, and shall be responsible for their compatibility only.

2.02 OPERATION SELECTION

A. Stated total dynamic head (TDH) includes lift and all system pressure. Pump manufacturer shall include pump's internal loses.

1. Pump item number: Goulds VIT 12 WAHC

2. Number of required units: Three (3)

3. Capacity: 700 gpm @ 415 ft TDH

4. Driver horsepower: 100 Hp

5. Efficiency: 779% - 85.9 %

6. Maximum pump operating speed: 1,770 rpm

7. Minimum column and discharge diameter, inches:11.6 in.

8. NPSHR not to exceed: 18.1 ft

B. The pump horsepower requirements for any point on the curve shall not utilize the service factor nor exceed the motor nameplate horsepower rating.

2.03 SERVICE CONDITIONS

A. Liquid to be pumped: Drinking Water

B. Pumping temperature (PT): Approximately 45-55 F

C. Specific gravity at PT: 0.998

D. Viscosity at PT: 1.31 centipoise (cP)

E. Vapor pressure at PT/max temp:

F. Pumping Liquid pH: 7.2-7.3

G. Suction pressure: 9.21 mmHg

H. Available liquid level from sump floor: 13 feet

I. Site elevation: 16 ft

J. Distance from bottom of strainer to bottom of sump: 12’-4”

2.04 MATERIALS AND CONSTRUCTION

A. The vertical turbine lineshaft can pump shall conform to the materials of construction for enclosed lineshaft with oil lube design. (Insert table from Xylem Online pump configuration, or review and edit applicable table below)

DISCHARGE HEAD ASSEMBLY			
Description	**MC**	**Material Description**	**ASTM**
Headshaft	2227	SST 416	A582 S41600
Adjusting Nut	2242	Steel 1018	A108 G10180
Gib Key	2242	Steel 1018	A108 G10180
Slinger	5121	Rubber	3CA715A25 B14
Discharge Head	9645	Steel	A120 GRB
Stuffing Box Bearing	1109	Bronze	B584 C90300
Stuffing Box	1003	Cast Iron	A48 CL30
Stuffing Box Gasket	5136	Acrylic Gasket	Garlock Blue Guard
Split Gland	1203	SST 316	A744 GR.CF-8M
Gland Adjusting Screw	2229	SST 316	A276 S31600
Packing	5026	Acrylic Yarn	Packmaster 2
COLUMN AND LINESHAFT ASSEMBLY			
Column Pipe (FLG)	6501	Black Pipe	A53
Column Bolting	2298	Grade 8	SAE J429 GR8
Lineshaft	2227	SST 416	A582 S41600
Bearing Retainer	1003	Cast Iron	A48 CL30
Lineshaft Bearing	1109	Bronze	B584 C90300
Lineshaft Coupling	2265	SST 416	A582 S41600
BOWL ASSEMBLY			
Bowl Shaft	2227	SST 416	A582 S41600
Intermediate Bowl	6911	Coated Cast Iron	A48 CL30
Inter Bowl Bearing	1109	Bronze	B584 C90300
Impeller	1398	Bronze	B584 C87600
Impeller Taper Lock	2242	Steel 1018	A108 G10180
Wear Rings (optional)	1128	Bronze	B148 C95200
Hex Bolt	2298	Grade 8	SAE J429 GR8
Sand Collar	1205	SST 304	A744 S30400
Suction Bowl / Bell	1003	Cast Iron	A48 CL30
Suction Bearing	1109	Bronze	B584 C90300
Suction Strainer	6952	Galvanized Steel	A108 G10180
Plug	1046	Mal Iron	A197

B. Bowl Assembly

1. The suction bowl shall be designed to provide conservative entrance velocities and direct the flow to the first stage impeller. The inner surface of the suction bell shall be smooth and free of sharp projections which could cause turbulence or cavitation. The suction casing shall be designed to house the suction bell bearing by means of four vanes.

2. The bowls shall be smooth and free of sharp projections and shall have register fits for alignment and be connected by flanged and bolted construction. Bowl sizes 6" to 15" shall be porcelain enameled on the bowl interior. Bowl sizes 16" and larger shall be epoxy-lined.

3. The impellers shall be machined and finished smooth to insure proper performance. They are to be balanced prior to assembly. The impellers shall be connected to the bowl shaft by means of collet design.

4. The suction strainer shall be a threaded basket design and have a free inlet area of at least 3-4 times the impeller eye area. The suction strainer shall be connected to the bowl assembly suction casing.

C. Column Assembly

1. The column shall include flanged connections and shall be of open design with product lubrication.

2. The bearing spacing shall be selected to insure operation at a minimum of 25% above or below the first critical speed. Bearing spacing shall not exceed 5 feet.

3. For 3"-12" product lubricated column assemblies, the column shall be designed with drop-in steel or cast-iron bearing retainers. The interior of the column shall be free of offsets, burrs, discontinuities and irregularities.

4. The lineshaft shall be of adequate size to transmit the full power of the pump without slip, excessive vibration or elongation, and shall have threaded joints. Lineshaft lengths shall not exceed 10 feet. The lineshaft shall have left hand threads that tighten during pump operation.

D. Discharge Head Assembly

1. For above ground service, the discharge head shall be fitted with a flanged discharge connection. The flange shall be a 150 LB R.F. ANSI flange for fabricated steel heads. The discharge head shall be designed to carry the entire weight of the complete pump and driver without distortion when spanning an opening of sufficient size to permit removal of the complete pump assembly. The discharge head shall be provided with a coupling guard. Lifting lugs shall be provided as standard.

2. The stuffing box shall be designed for 6 rings of packing and lantern ring. An extra-long bearing shall be located below the packing in the stuffing box. Packing lubrication leakage through the stuffing box shall be drained back to the sump. The packing gland shall be of a two piece design.

E. Driver

1. The driver will be a VHS electric motor. The driver and any related equipment will ship unmounted from the pump to ship.

2.05 COATING

A. The bowl assembly exterior shall be coated with Tnemec 141; minimum dry film thickness 8 mils.

B. The column assembly interior and exterior shall be coated with Tnemec 141; minimum dry film thickness 8 mils.

C. The head assembly interior and exterior shall be coated with Tnemec 141; minimum dry film thickness 8 mils.

D. For oil lubrication configuration, tube assembly exterior shall be coated with Tnemec 141; minimum dry film thickness 8 mils.

2.06 TESTING

A. All factory testing shall conform to the most current edition of the Hydraulic Institute Standards. All pump performance testing shall be performed at the manufacturer's facility. (Specify if there are any additional standards)

B. Performance testing shall be non-witnessed and performed on the fully assembled unit with job motor. The test shall cover seven points including the design point (HI 14.6). The design point shall be used for any performance evaluation. Certified test results shall be provided for record purposes for approval prior to shipment.

C. Hydrostatic testing shall be non-witnessed in compliance with HI14.6. Hydro testing is to be performed on the pressure containing components. Certified test results shall be provided for record purposes for approval prior to shipment.

D. All non-witness testing shall require written prior to release for shipment.

E. Field/functional testing will be performed by the contractor to insure proper mechanical operation at the jobsite. All testing data to be used for evaluation shall be performed at the pump manufacturer's facility.

F. Motor tests and test reports shall be provided as required in accordance with the motor specification.

2.07 SPARE PARTS

A. MECHANICAL

1. One (1) complete set of mechanical seals for each pump type.

2. One (1) complete set of bearings for each pump type.

3. One (1) complete set of o-rings for each pump.

4. One (1) impeller for each size pump.

PART 3. EXECUTION

3.01 DELIVERY, STORAGE, HANDLING, AND INSTALLATION

A. Contractor shall off-load equipment at installation site using equipment of sufficient size and design to prevent injury or damage. Immediately after off-loading, contractor shall inspect complete pump and appurtenances for shipping damage or missing parts. Any damage or discrepancy shall be noted in written claim with shipper prior to accepting delivery. Validate all pump serial numbers and parts lists with shipping documentation. Notify the manufacturer's representative of any unacceptable conditions noted with shipper.

3.02 INSTALLATION

A. Installation must be in accordance with written instructions supplied by the manufacturer at time of delivery.

B. Suction pipe connections are vacuum tight. Fasteners at all pipe connections must be tight. Install pipe with supports and thrust blocks to prevent strain and vibration on pump piping. Install and secure all service lines (level control, air release valve or pump drain lines) as required.

C. Check motor and control data plates for compatibility to site voltage. Install and test the station ground prior to connecting line voltage to control panel.

D. Prior to applying electrical power to any motors or control equipment, check all wiring for tight connection. Verify that protective devices (fuses and circuit breakers) conform to project design documents. Manually operate circuit breakers and switches to ensure operation without binding. Open all circuit breakers and disconnects before connecting utility power. Verify line voltage, phase sequence and ground before actual start-up.

E. The Drawings show the general arrangement of the equipment and the major components. The Contractor is responsible for installing a fully operational unit complete with ancillary connections such as air, water, power, and instrumentation. The Contractor is responsible for providing all necessary supports, braces, pads, connections, etc. to make the unit fully functional and operational in accordance with the manufacturer's instructions.

3.03 FIELD QUALITY CONTROL

A. Operational Test

1. Prior to acceptance by OWNER, formal start-up and testing of all equipment and control systems shall be conducted by the CONTRACTOR, in the presence of the ENGINEER and a representative of the pump vendor, to determine if the installed equipment meets the purpose and intent of the specifications. Tests shall demonstrate that all equipment is electrically, mechanically, structurally, hydraulically and otherwise acceptable; it is safe and in optimum working condition; and conforms to the specified operating

characteristics. No additional compensation shall be made for repeat tests if the first test should prove unsuccessful.

B. Manufacturer Training

1. A representative of the of the pump supplier shall, at the successful completion of start-up provide one day of on-site training for the operators and shall demonstrate the basic operation and maintenance procedures. This training may not be conducted until such time that all start-up and testing has been successfully completed. The vendor is cautioned that these training sessions must be scheduled in advance and have prior approval to be considered completed.

C. Follow-up service:

1. The manufacturer's representative shall return to the facility at the end of the Warranty period to address any operational issues which have arisen. This inspection does not eliminate the possible need for the representative to return sooner if equipment problems arise.

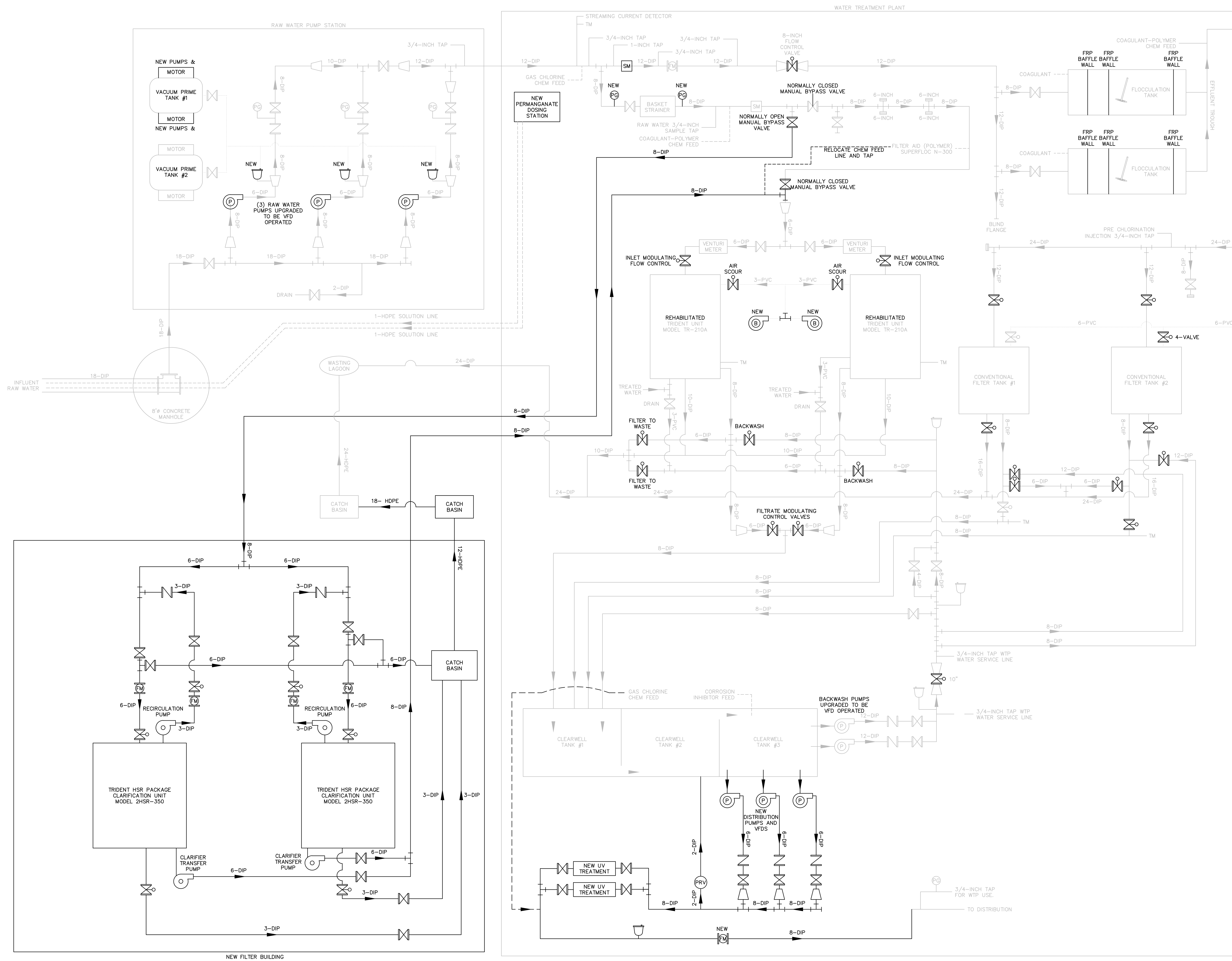
3.04 WARRANTY

A. A written two-year standard warranty from the date of the successful equipment start-up shall be provided by the equipment supplier to guarantee that there shall be no defects in material, performance, or workmanship in any item supplied.

B. Warranties and guarantees by the suppliers of various components in lieu of a single source responsibility by the manufacturer or representative will not be accepted. the manufacturer shall be solely responsible for the guarantee of the complete pump.

C. In the event a component fails to perform as specified or is proven defective in design, material or workmanship during the guarantee period, the manufacturer shall provide replacement parts without cost to the owner.

END OF SECTION



LEGEND:

DIP =	DUCTILE IRON PIPE
....	AIR FEED LINE
------	CHEM FEED LINE
	AIR RELIEF VALVE
	BLIND FLANGE
B	BLOWER
FM	FLOW METER
	PIPE REDUCER
PRV	PRESSURE RELIEF VALVE
PG	PRESSURE GAUGE
P	PUMP
TM	TURBIDITY METER
	VALVE CHECK
	VALVE ELECTRIC
	VALVE MANUAL
SM	STATIC MIXER

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DATE: 11/1/2024
DRAWN BY:
SCALE:
REVIEWED BY: RF
PROJECT NO.: ----
FILE:

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
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31 NORTH MAIN STREET, LIBERTY, NY 12754 - 845.747.9952
6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.9235
16 EAST MARKET ST., RED HOOK, NY 12571 - 518.452.1290
548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777

REVISIONS

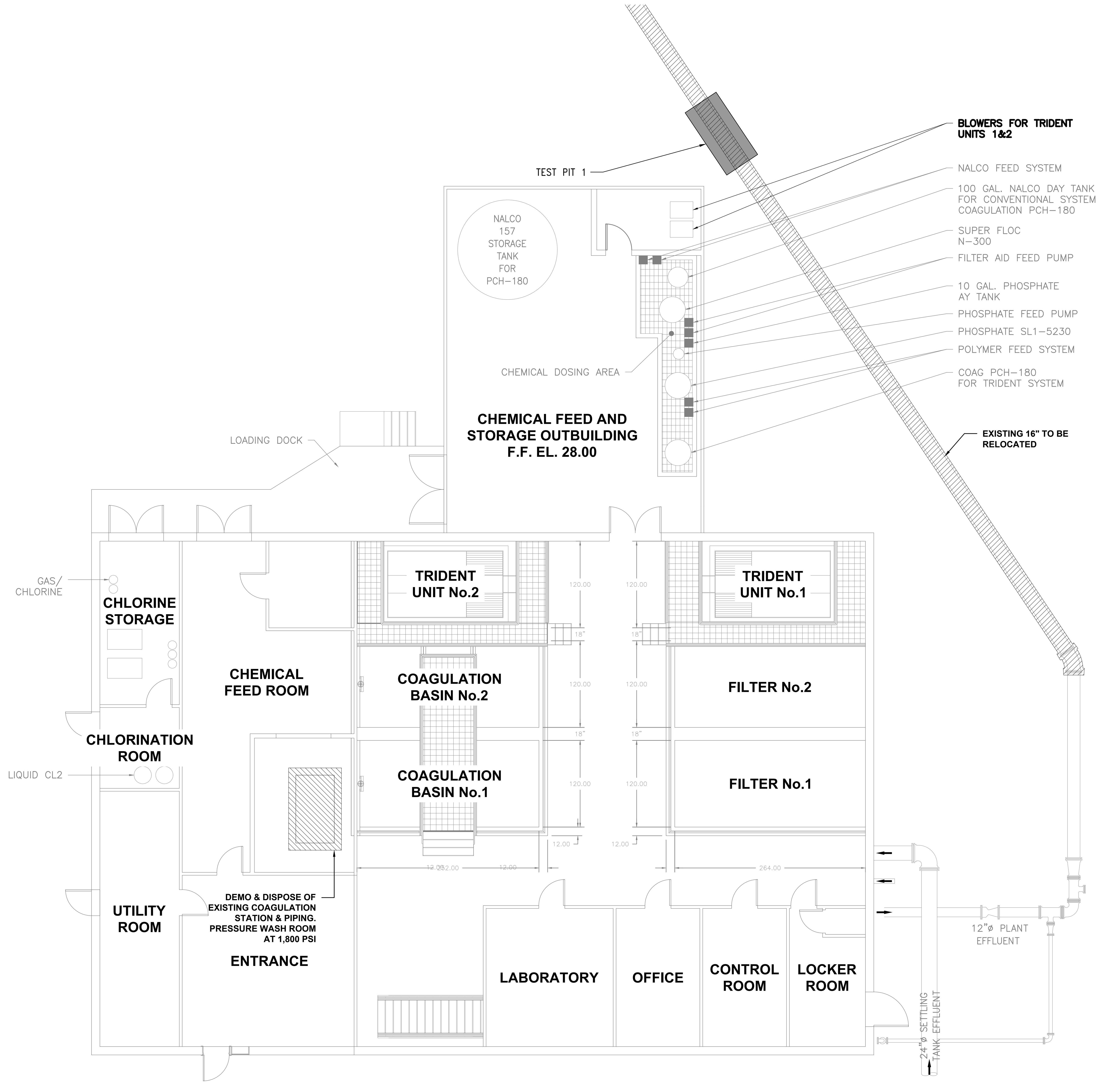
NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
2.	10/02/24	SEPT. 24 DOH COMMENTS

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

PROPOSED PROCESS FLOW DIAGRAM

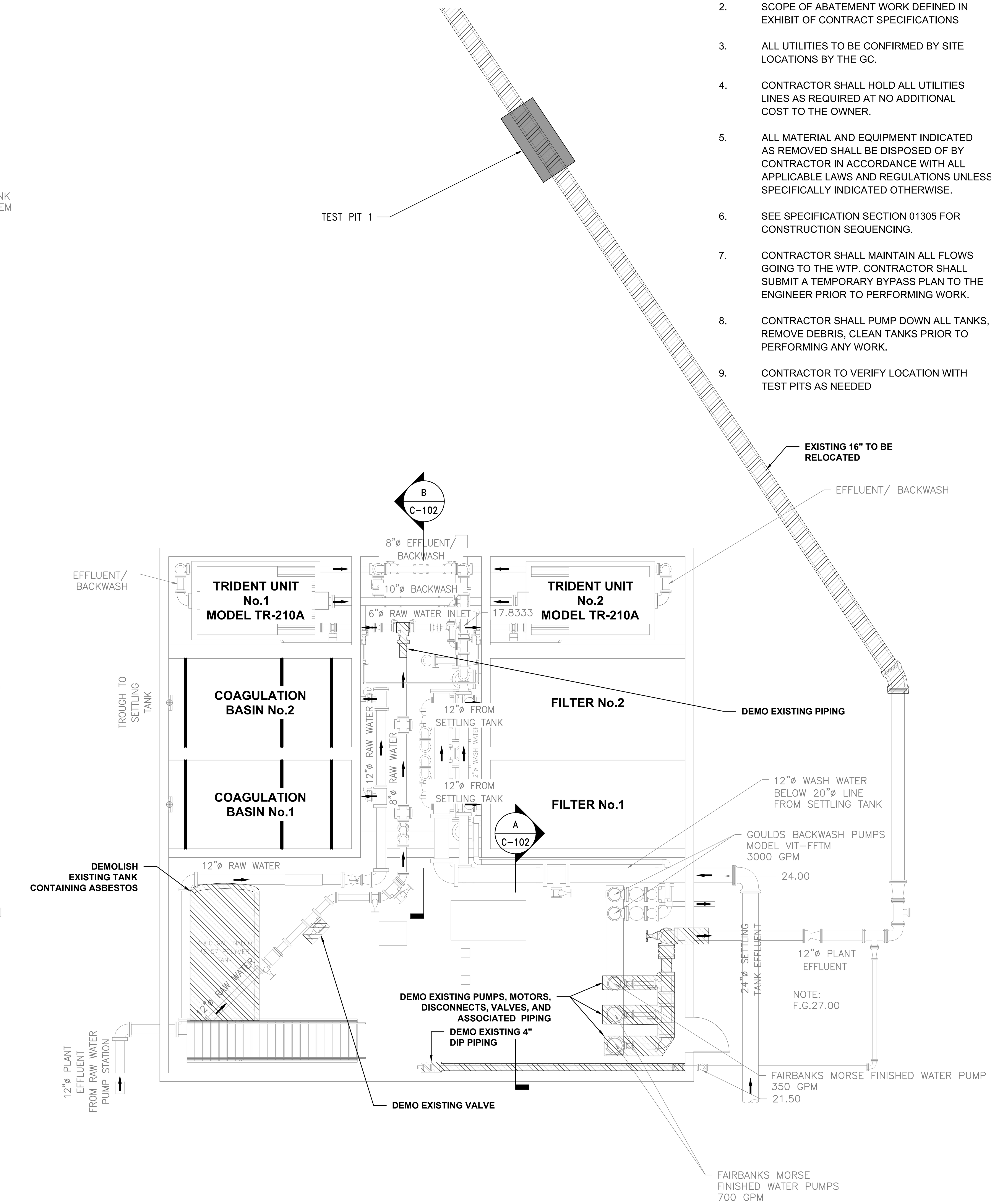
SHEET:
C-002

File: \\DE-FILES\PUBLIC\DRAWINGS\RHINEBECK (V)\22-2496 WTP\C-001 - 002 EX & PR PROCESS FLOW.DWG Saved: 11/1/2024 4:42:59 PM Plotted: 11/1/2024 4:43:27 PM User: Anthony Montoa LastSavedBy: montoao



OPERATING FLOOR DEMO PLAN

SCALE: 1/8"=1'-0"



LOWER FLOOR DEMO PLAN

SCALE: 1/8"=1'-0"

NOTES:

1. DEMO WORK TO INCLUDE ABATEMENT OF HAZARDOUS MATERIAL
2. SCOPE OF ABATEMENT WORK DEFINED IN EXHIBIT OF CONTRACT SPECIFICATIONS
3. ALL UTILITIES TO BE CONFIRMED BY SITE LOCATIONS BY THE GC.
4. CONTRACTOR SHALL HOLD ALL UTILITIES LINES AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
5. ALL MATERIAL AND EQUIPMENT INDICATED AS REMOVED SHALL BE DISPOSED OF BY CONTRACTOR IN ACCORDANCE WITH ALL APPLICABLE LAWS AND REGULATIONS UNLESS SPECIFICALLY INDICATED OTHERWISE.
6. SEE SPECIFICATION SECTION 01305 FOR CONSTRUCTION SEQUENCING.
7. CONTRACTOR SHALL MAINTAIN ALL FLOWS GOING TO THE WTP. CONTRACTOR SHALL SUBMIT A TEMPORARY BYPASS PLAN TO THE ENGINEER PRIOR TO PERFORMING WORK.
8. CONTRACTOR SHALL PUMP DOWN ALL TANKS, REMOVE DEBRIS, CLEAN TANKS PRIOR TO PERFORMING ANY WORK.
9. CONTRACTOR TO VERIFY LOCATION WITH TEST PITS AS NEEDED

DATE: 10/29/2024
DRAWN BY:
SCALE:
REVIEWED BY: RF
PROJECT NO.: ---
FILE:

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
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55 SOUTH MAIN ST, ONEONTA, NY 13820 - 607.432.8073
31 NORTH MAIN STREET, LIBERTY, NY 12754 - 845.747.9952
6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.6235
16 EAST MARKET ST., RED HOOK, NY 12571 - 518.452.1290
548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777

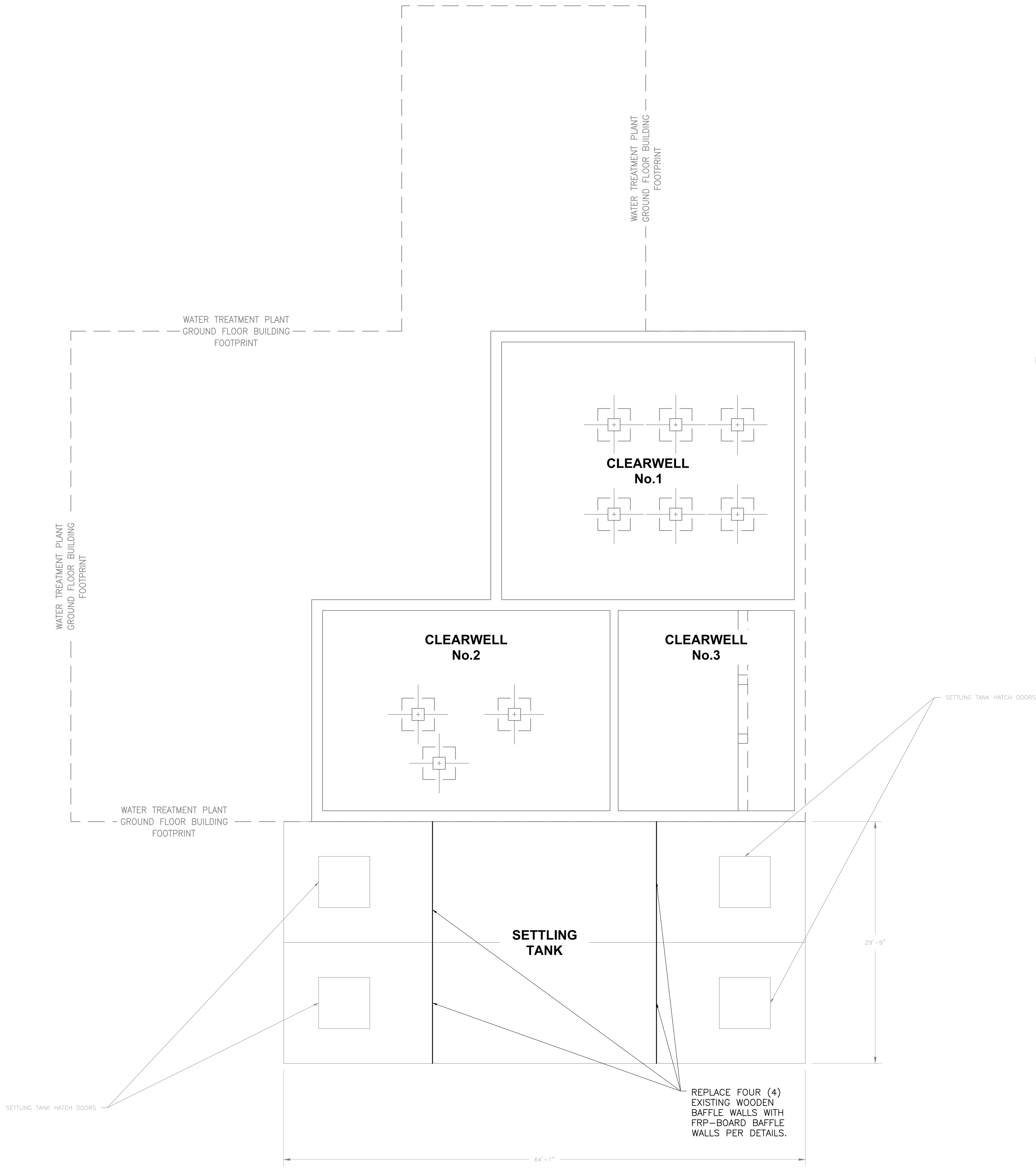
REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
2.	11/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

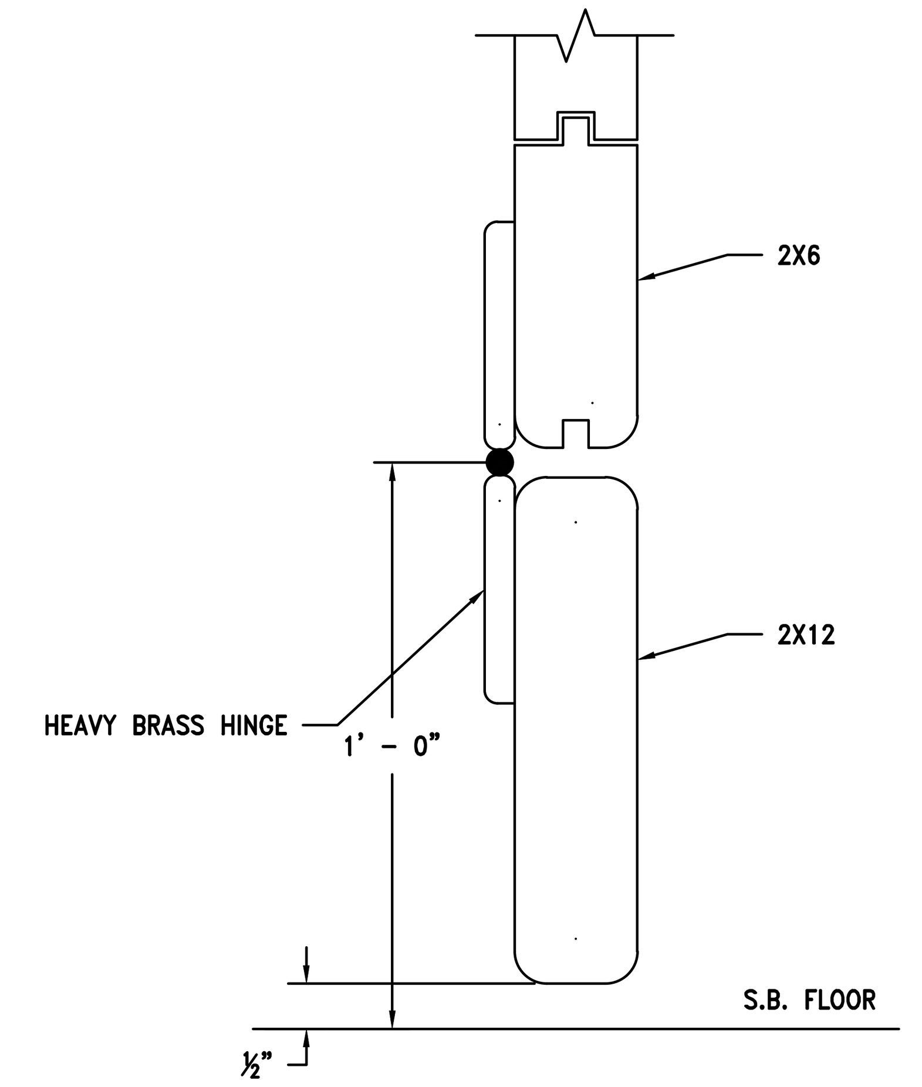
DEMO FLOOR PLANS

SHEET: C-101



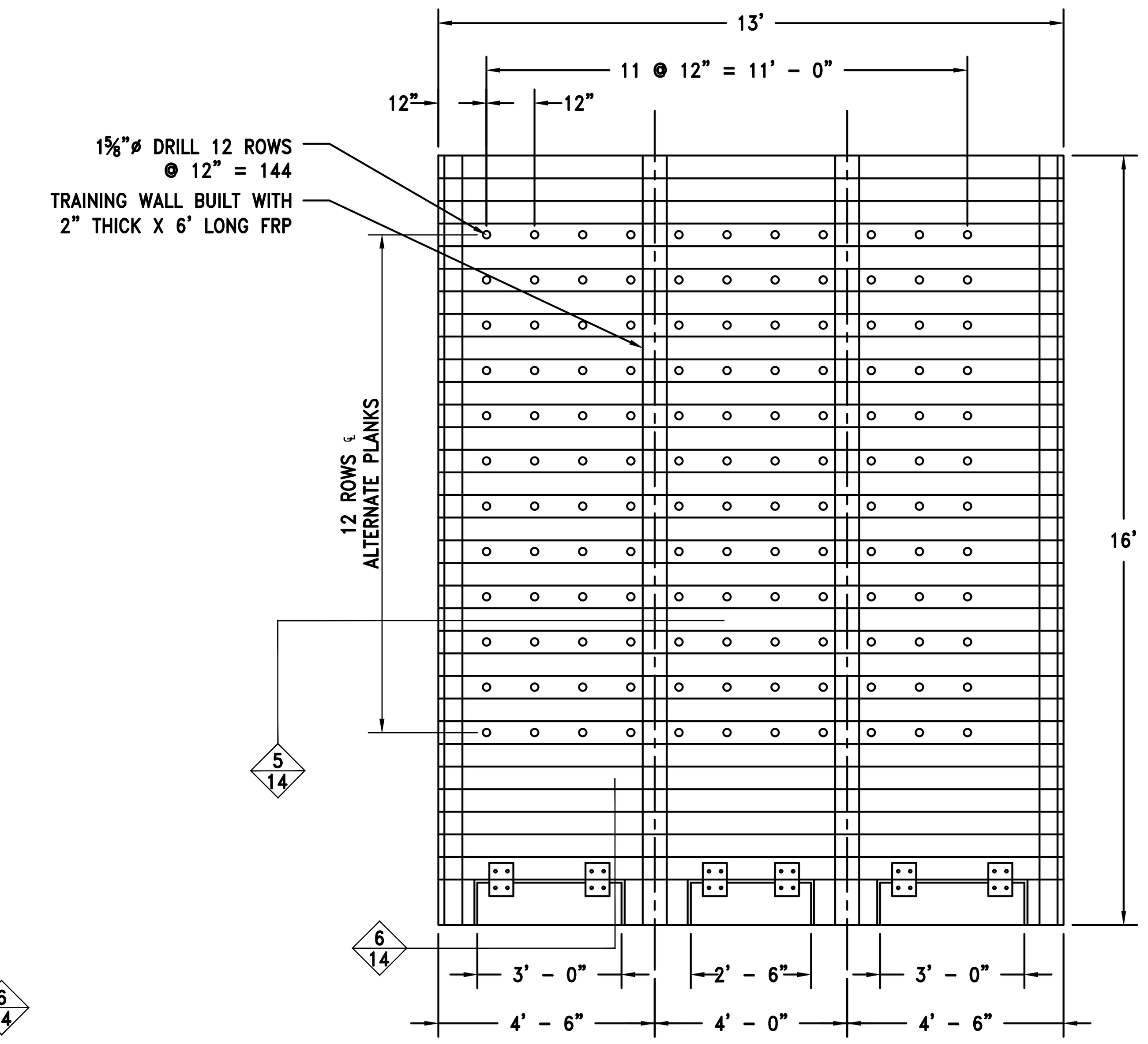
PROPOSED UPGRADES TO EXISTING SETTLING TANKS

SCALE: 1/8"=1'-0"



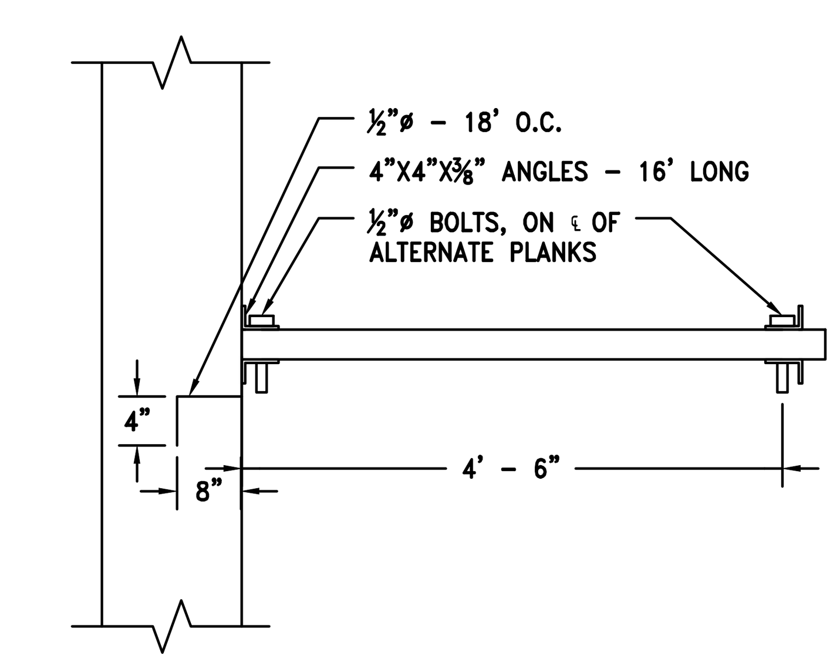
FLAP GATE SECTION 6/14

SCALE: NTS



TRAINING WALL DETAIL

SCALE: 1' - 3'



SECTION 5/14

SCALE: NTS

DATE:	10/29/2024
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SCALE:	
REVIEWED BY:	RF
PROJECT NO.:	---
FILE:	

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STATE OF NEW YORK · ROBERT O. FLORES · LICENSED PROFESSIONAL ENGINEER · No. 081360

REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

PROPOSED UPGRADES TO EXISTING SETTLING TANKS

SHEET: C-104

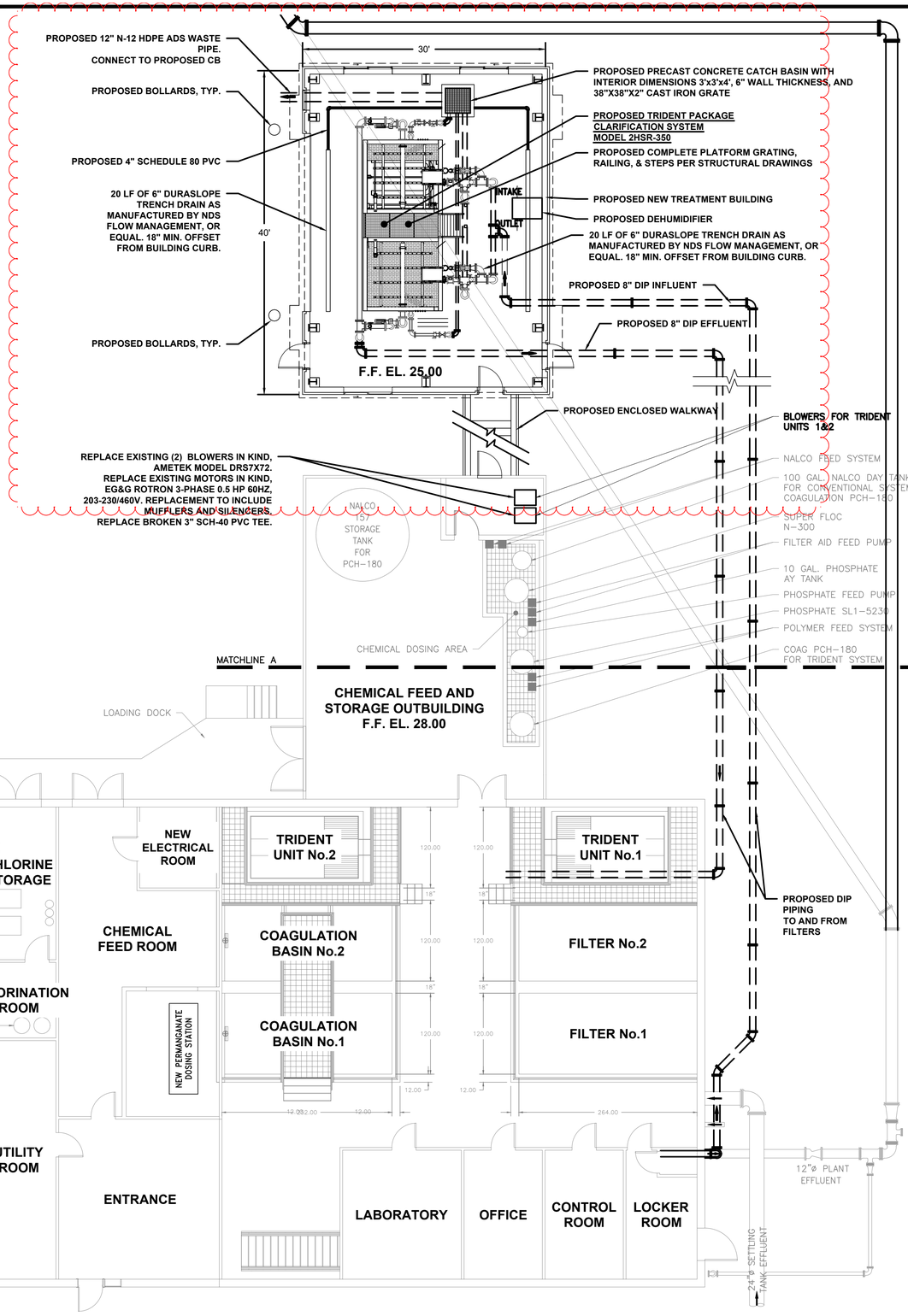
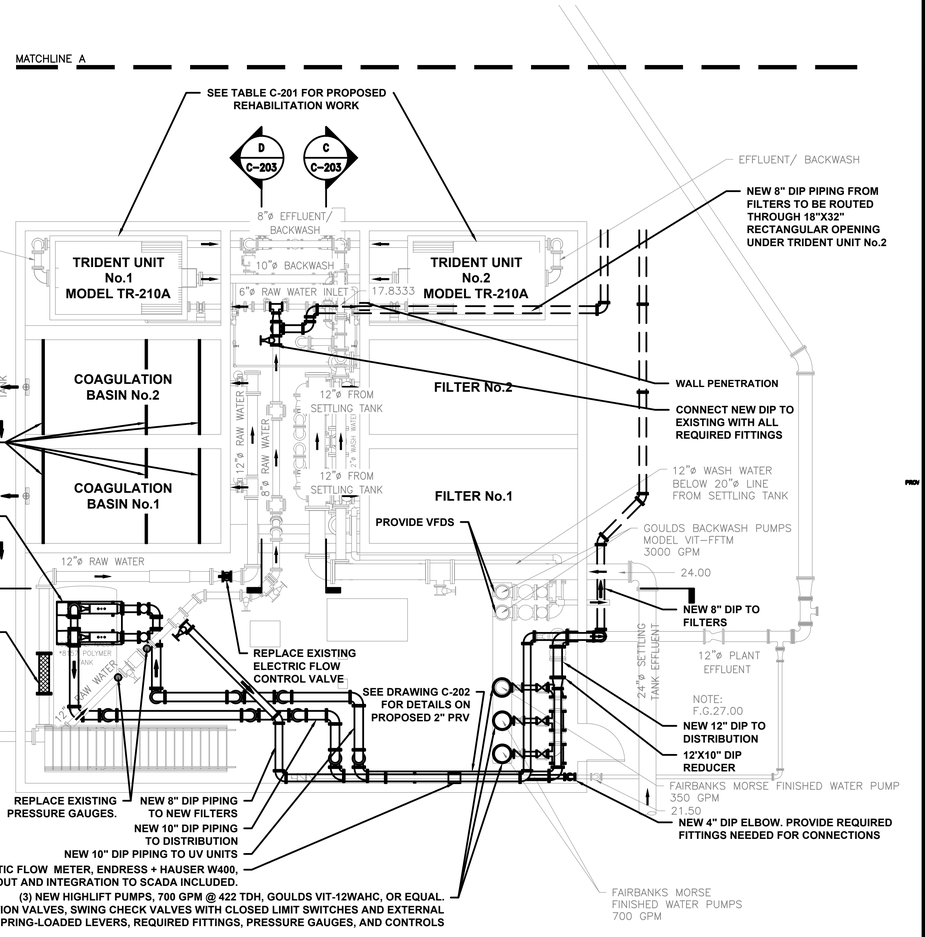


TABLE C-201A - REHABILITATION OF TR-210A TRIDENT UNITS			
SCOPE	QTY PER UNIT	QTY TOTAL	MODEL
HANDTOOL RUST AND FULL RECOAT	1	2	N/A
MEDIA RETENSION GRATING AND GASKET	1	2	FOR TRIDENT TR210A
PISTON AND WASTE GATE INCLUDING CONNECTION TO EXISTING	1	2	FOR TRIDENT TR210A
3-IN ELECTRIC ACTUATED VALVE	1	2	PRATT MK2 POSITRON II, 115V, 1/5 HP
6-IN ELECTRIC ACTUATED VALVE	1	2	PRATT MK2 POSITRON II, 115V, 1/5 HP
6-IN ELECTRIC ACTUATED MODULATING VALVE	2	4	PRATT MK2 POSITRON II, 115V, 1/5 HP
8-IN ELECTRIC ACTUATED VALVE	1	2	PRATT MK2 POSITRON II, 115V, 1/5 HP
PRESSURE SWITCHES	3	6	ASCO PB31B
PRESSURE GAUGE	2	4	BAILEY PTSDGD122110100
SOLENOID VALVE	1	2	
FLOAT SWITCH	3	6	
TRANSDUCERS	1	2	
TABLE C-201B - REHABILITATION OF CONVENTIONAL FILTRATION SYSTEM			
4-IN ELECTRIC ACTUATED VALVE	N/A	1	PRATT MK2 POSITRON II, 115V, 1/5 HP
6-IN ELECTRIC ACTUATED VALVE		2	PRATT MK2 POSITRON II, 115V, 1/5 HP
8-IN ELECTRIC ACTUATED VALVE		2	PRATT MK2 POSITRON II, 115V, 1/5 HP
10-IN ELECTRIC ACTUATED VALVE		1	PRATT MK2 POSITRON II, 115V, 1/5 HP
12-IN ELECTRIC ACTUATED VALVE		4	PRATT MK2 POSITRON II, 115V, 1/5 HP
16-IN ELECTRIC ACTUATED VALVE		2	PRATT MK2 POSITRON II, 115V, 1/5 HP

NOTES:

1. ALL UTILITIES TO BE CONFIRMED IN THE FIELD BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE COST IN BASE BID TO LOCATE ALL EXISTING SANITARY, WATER AND ELECTRIC LINES ON SITE BY A QUALIFIED PROFESSIONAL LOCATING SERVICE.
2. CONTRACTOR SHALL HOLD ALL UTILITIES LINES AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.
3. CONTRACTOR SHALL PROVIDE ALL S.S. SUPPORTS.
4. BURIED JOINTS SHALL BE RESTRAINED AND EXPOSED JOINTS SHALL BE FLANGED.
5. ALL HARDWARE SHALL BE S.S.
4. ALL PLUG VALVES SHALL BE GEAR ACTUATED PLUG VALVES.
5. ALL PLUG VALVES IN EQ AND WTP TANKS VALVE VAULT SHALL HAVE EXTENDED S.S. OPERATORS WITH VALVE BOX COVERS. PROVIDE ALL S.S. SUPPORTS, COUPLINGS, AND ALL APPURTENANCES.



DATE: 11/1/2024
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SCALE: ____
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PROJECT NO.: ----
FILE: ____

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548 BROADWAY, MONTICELLO, NY 12701 - 845.791.1777

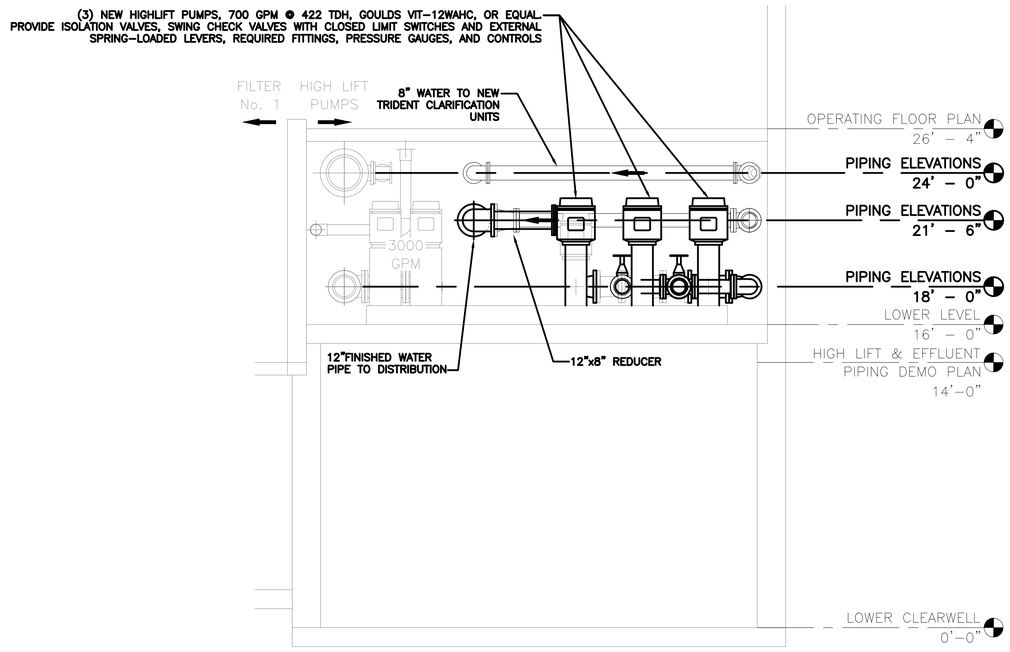
REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
1.	10/02/24	SEPT. 24 DOH COMMENTS
2.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

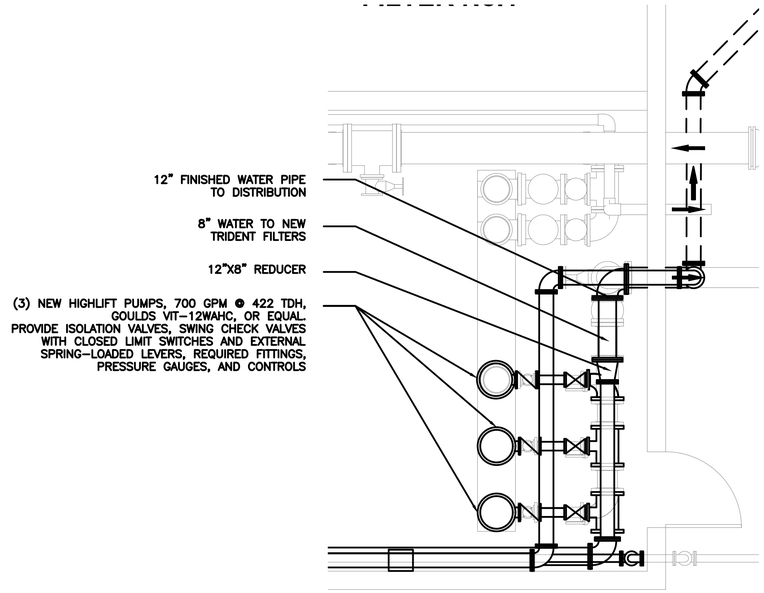
OVERALL NEW PIPING PLAN

SHEET: C-201



A C-202 HIGH LIFT PUMP NEW PIPING SECTION

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



HIGH LIFT PUMP NEW PIPING PLAN

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

NOTES:

1. ALL UTILITIES TO BE CONFIRMED IN THE FIELD BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE COST IN BASE BID TO LOCATE ALL EXISTING SANITARY, WATER AND ELECTRIC LINES ON SITE BY A QUALIFIED PROFESSIONAL LOCATING SERVICE.
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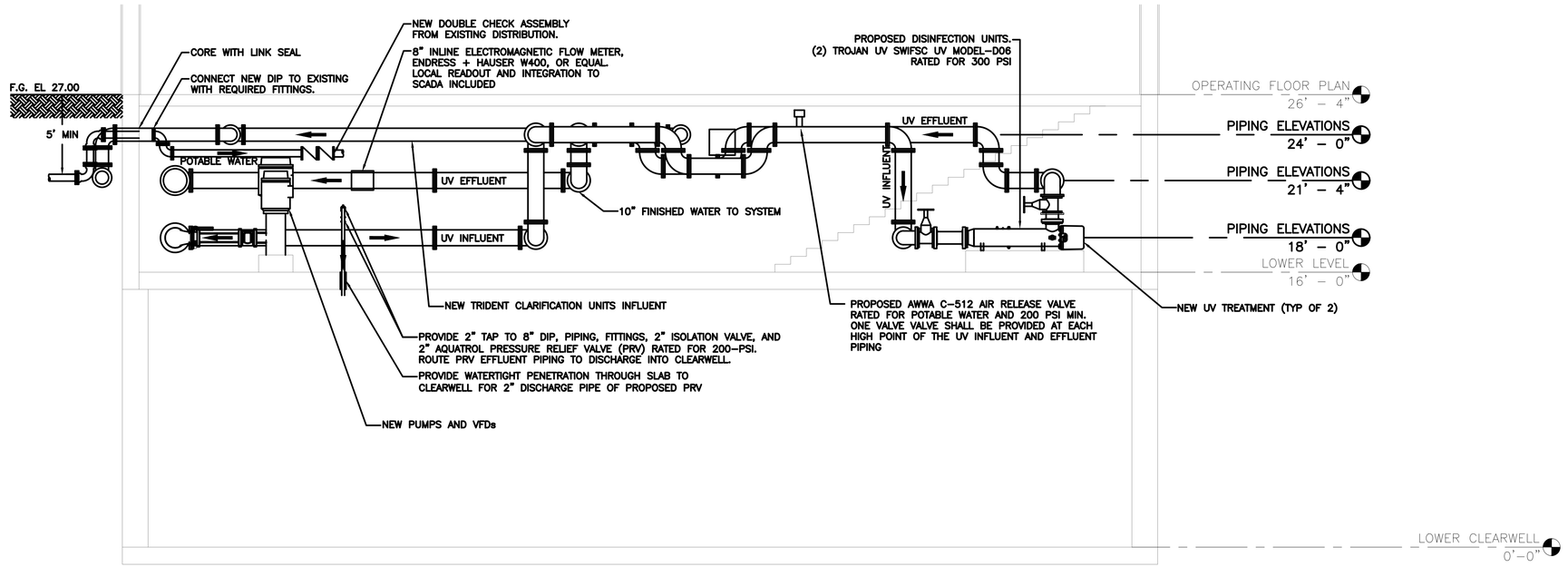

B C-202 FILTER AND UV TREATMENT PIPING SECTION

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

DATE: 11/1/2024
DRAWN BY:
SCALE:
REVIEWED BY: RF
PROJECT NO.: ----
FILE:

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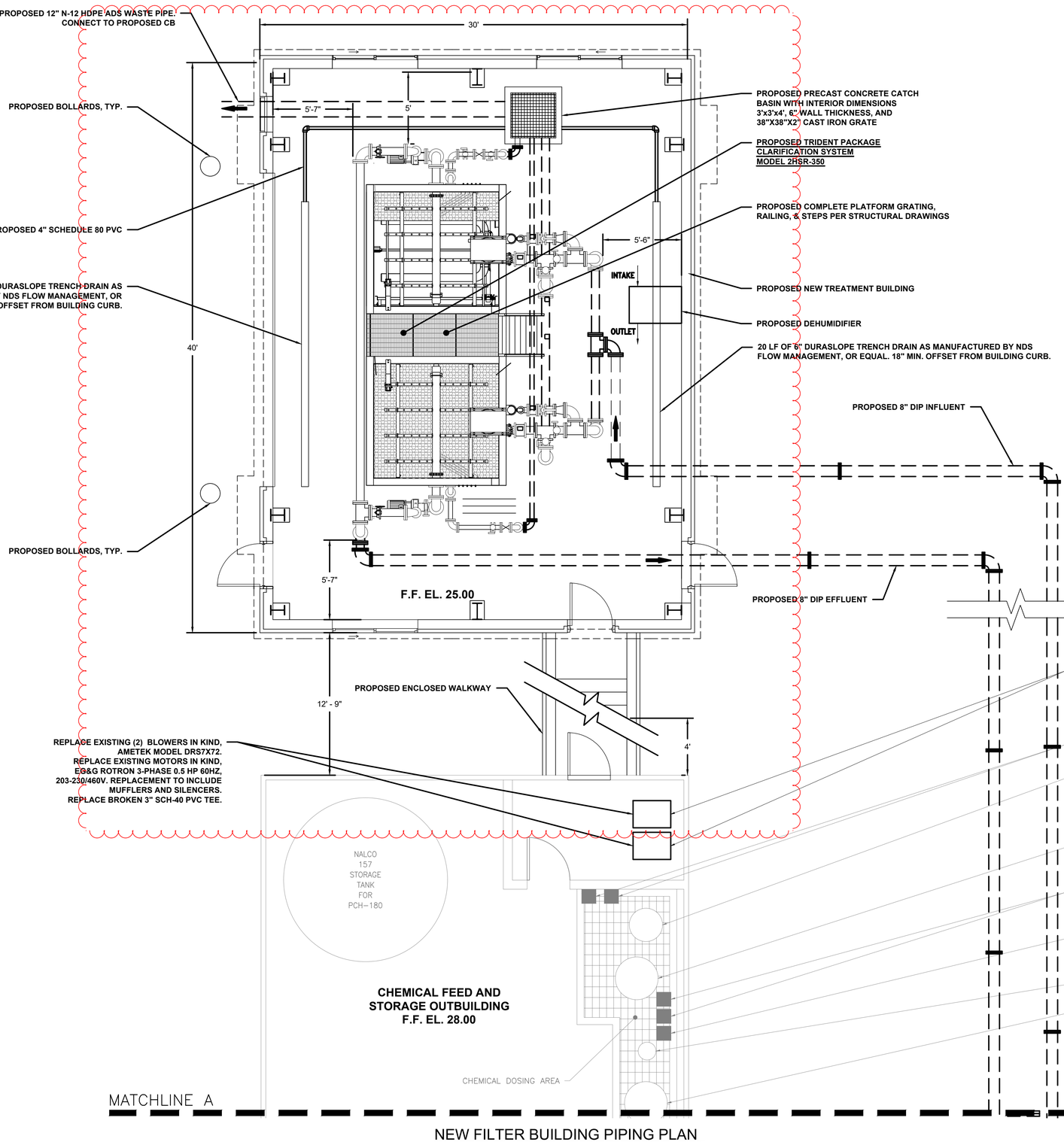
REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
2.	10/02/24	SEPT. 24 DOH COMMENTS
3.	11/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

NEW PIPING SECTIONS

SHEET: C-202



NEW FILTER BUILDING PIPING PLAN

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

NOTES:

1. ALL UTILITIES TO BE CONFIRMED IN THE FIELD BY THE CONTRACTOR. CONTRACTOR SHALL PROVIDE COST IN BASE BID TO LOCATE ALL EXISTING SANITARY, WATER AND ELECTRIC LINES ON SITE BY A QUALIFIED PROFESSIONAL LOCATING SERVICE.
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5. ALL PLUG VALVES IN EQ AND WTP TANKS VALVE VAULT SHALL HAVE EXTENDED S.S. OPERATORS WITH VALVE BOX COVERS. PROVIDE ALL S.S. SUPPORTS, COUPLINGS, AND ALL APPURTENANCES.

DATE: 11/1/2024
DRAWN BY: ____
SCALE: ____
REVIEWED BY: RF
PROJECT NO.: ----
FILE: ____

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CIVIL AND ENVIRONMENTAL ENGINEERING
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REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
2.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

NEW FILTER BUILDING PIPING PLAN

SHEET: C-204

Plot By: M:\DRAWINGS\RHINEBECK (VV)\22-2498 WTP\C-201 - 205 - PROPOSED FLOOR PLANS & SECTIONS.DWG Sheet: 11/7/2024 9:22:20 AM Plotted: 11/7/2024 9:31:39 AM User: Iris Brotea LastSavedBy: brotea

APPLICABLE CODE:

THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE (THE "UNIFORM CODE"): CONSTRUCTION SHALL CONFORM TO THE CURRENT EDITIONS OF THE 2018 INTERNATIONAL BUILDING CODE (IBC), THE 2020 NEW YORK STATE CODE SUPPLEMENT, THE 2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC), THE 2020 SUPPLEMENT TO THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE, AS WELL AS ALL OTHER CURRENT LOCAL, STATE, AND FEDERAL CODES AND REGULATIONS APPLICABLE TO THIS PROJECT. CONTRACTOR SHALL CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE APPLICABLE CODES.

BUILDING DATE & CODE

OCCUPANCY CLASSIFICATION: (CHAPTERS 3 & 5)

☒ SINGLE ☐ MIXED ☐ NON-SEPARATED ☐ COMBINATION

IF SEPARATED, FIRE RESISTANCE RATING OF FIRE BARRIER (TABLE 508.4): HR

OCCUPANCY CLASSIFICATION(S): U

USES: HIGHWAY VEHICLE & MISCELLANEOUS STORAGE

CONSTRUCTION CLASSIFICATION (CHAPTER 6): IIB

AUTOMATIC SPRINKLER SYSTEM PROVIDED: ☐ YES ☒ NO

NFPA STANDARD: ☐ 13 ☐ 13R

HEIGHT & AREA - ACTUAL (CHAPTER 5)

BUILDING HEIGHT	HEIGHT IN FEET	HEIGHT IN STORIES
	28' – 3"	1
BUILDING AREA SUMMARY	BUILDING AREA	
FIRST	11,644 SF	
TOTAL (NOT INCLUDING BASEMENT)	11,644 SF	

HEIGHT & AREA – ALLOWABLE (CHAPTER 5)

AREA PER TABLE 504.3 & 506.2

OCCUPANCY CLASSIFICATION	TABULAR AREA	TABULAR HEIGHT	
		FEET	STORIES
U	8,500 SF	55 FT	2

INCREASE DUE TO FRONTAGE ALLOWED, THEREFORE ALLOWABLE AREA INCREASED TO 14,875 SF

FIRE RESISTANCE OF BUILDING ELEMENTS:

BASED ON CONSTRUCTION TYPE IIB

	REQUIRED	PROVIDED	SECTION
STRUCTURAL FRAME	0	0	TABLE 601
BEARING WALLS (EXTERIOR)	NA	NA	TABLE 601
BEARING WALLS (INTERIOR)	NA	NA	TABLE 601
NON-BEARING WALLS (EXTERIOR)	0	0	TABLE 601
NON-BEARING WALS (INTERIOR)	0	0	TABLE 601
FLOOR CONSTRUCTION	0	0	TABLE 601
ROOF CONSTRUCTION	0	0	TABLE 601
VERTICAL EXIT ENCLOSURE	NA	NA	713.4
SHAFT ENCLOSURE	NA	NA	713.4
CORRIDORS	NA	NA	TABLE 1020.1

INTERIOR FINISHES:

BASED ON MOST RESTRICTIVE

USE GROUP B	REQUIRED	PROVIDED	SECTION
WALLS & CEILING: EXITS	NA	NA	TABLE 803.13
WALLS & CEILING: CORRIDORS	NA	NA	TABLE 803.13
WALLS & CEILING: ROOMS	NA	NA	TABLE 803.13
FLOORS	NA	NA	TABLE 803.13

FIRE PROTECTION SYSTEMS: CHAPTER 9

SIZE AND LOCATION OF FIRE AREAS INDICATED ON CODE COMPLIANCE DRAWING(S)

FIRE PROTECTION SYSTEM	REQUIRED	PROVIDED	SECTION
AUTOMATIC SPRINKLER	-	-	903
ALTERNATIVE AUTO FIRE EXIT	-	-	904
STANDPIPE	-	-	905
PORTABLE FIRE EXTINGUISHER	NO	YES	906
FIRE ALARM & DETECTION	-	-	907
EMERGENCY ALARM	-	-	908
SMOKE CONTROL SYSTEM	-	-	909
SMOKE & HEAT VENTS	-	-	910
FIRE COMMAND CENTER	-	-	911

MEANS OF EGRESS: CHAPTER 10

DESIGN OCCUPANT LOAD SUMMARY

FLOOR LEVEL	DESIGN OCCUPANT LOAD
FIRST	58
TOTAL	58

NOTE: DESIGN OCCUPANT LOAD FOR MEANS OF EGRESS SIZING.

MEANS OF EGRESS ELEMENT	REQUIRED	PROVIDED	SECTION
NUMBER OF EXITS	2	6	TABLE 1006.2.1
EXIT ACCESS TRAVEL DISTANCE	300	75	TABLE 1017.2
DEAD-END LIMIT	20	-	1020.4
COMMON PATH OF TRAVEL LIMIT	75	75	1006.2.1
EGRESS WIDTH			
ELEMENT	REQUIRED	PROVIDED	SECTION
DOORS – FIRST FLOOR	2.8	36	1005.3.2
STAIRS	NA	NA	1005.3.1
CORRIDORS – FIRST FLOOR	44" MIN	-	1020.2

PLUMBING FIXTURE REQUIREMENTS: CHAPTER 29

OCCUPANCY CLASSIFICATION	OCCUPANT LOAD	WATER CLOSETS MEN REQUIRED	WATER CLOSETS MEN PROVIDED	WATER CLOSETS WOMEN REQUIRED	WATER CLOSETS WOMEN PROVIDED	URINALS REQUIRED	URINALS PROVIDED	D.F. REQUIRED	D.F. PROVIDED	LAVATORIES MEN REQUIRED	LAVATORIES MEN PROVIDED	LAVATORIES WOMEN REQUIRED	LAVATORIES WOMEN PROVIDED
U	58	0	0	0	0	0	0	0	0	0	0	0	0

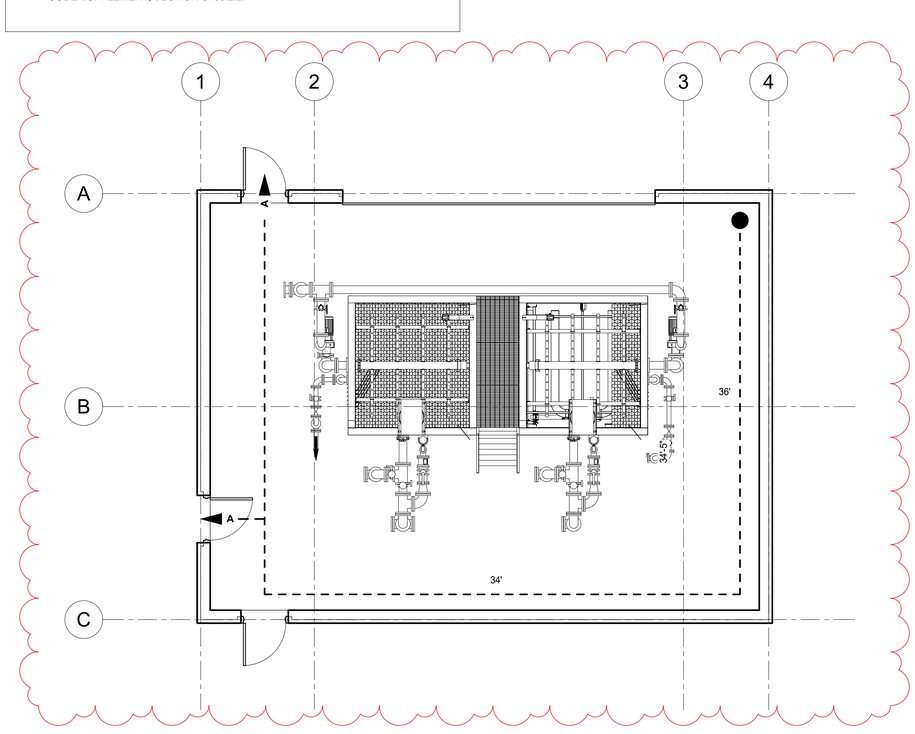
SEPARATE FACILITIES FOR EACH GENDER REQUIRED?	☐ YES	☒ NO	2902.2
SEPARATE EMPLOYEE FACILITIES REQUIRED?	☐ YES	☒ NO	2902.2
LOCATION OF EMPLOYEE FACILITIES COMPLIES?	☒ YES	☐ NO	2902.2
LOCATION OF PUBLIC FACILITIES COMPLIES?	☒ YES	☐ NO	2902.2
OTHER PLUMBING FIXTURE REQUIREMENTS?	Lavatories will be provided in new highway garage facility		

CODE:

1. ALL WORK SHALL CONFORM TO FEDERAL, STATE AND LOCAL CODES AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
2. DO NOT INSTALL FIRE EXTINGUISHERS/CABINETS/BRACKETS UNTIL ALL LOCATIONS HAVE BEEN REVIEWED AND APPROVED BY THE CODE AUTHORITY HAVING JURISDICTION. CONTRACTOR SHALL COORDINATE WITH FIRE MARSHALL PRIOR TO INSTALLATION.
3. THE ARCHITECTS CERTIFICATION ON THIS PROJECT IS ONLY FOR THE CONSTRUCTION WORK SHOWN TO BE DONE. IT DOES NOT CONSTITUTE APPROVAL OF ANY PRE-EXISTING CONDITIONS OR REVIEW OF THOSE CONDITIONS FOR CODE COMPLIANCE.
4. THE ARCHITECT'S CERTIFICATION ON THIS PROJECT IS FOR COMPLIANCE WITH THE BUILDING CODE OF NEW YORK STATE AND ITS VARIOUS REFERENCE STANDARDS, FOR PURPOSES OF OBTAINING A BUILDING PERMIT THROUGH THE AUTHORITY HAVING JURISDICTION AND TO CONVEY CONSTRUCTION REQUIREMENTS FOR THE PROJECT. CERTIFICATION DOES NOT GUARANTEE COMPLIANCE WITH LOCAL CODES THAT MAY APPLY.
5. GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, AIA DOCUMENT A201-2007 AND ANY OTHER DOCUMENTS AS PROVIDED BY THE OWNER SHALL BE INCORPORATED INTO THE OWNER-CONTRACTOR CONTRACT BY REFERENCE.
6. CONSTRUCTION SHALL CONFORM TO CURRENT EDITIONS OF THE NEW YORK STATE UNIFORM FIRE PREVENTION AND BUILDING CODE (THE "UNIFORM CODE"): CONSTRUCTION SHALL CONFORM TO CURRENT EDITIONS OF THE 2018 INTERNATIONAL BUILDING CODE (IBC), THE 2020 NEW YORK STATE UNIFORM CODE SUPPLEMENT, THE 2018 INTERNATIONAL ENERGY CONSERVATION CODE (IECC), THE 2020 SUPPLEMENT TO THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE, 2010 AMERICANS WITH DISABILITIES ACT (ADA) STANDARDS FOR ACCESSIBLE DESIGN (28 CFR PART 36, SUBPART D), 2009 ADA ACCESSIBILITY AND USABLE BUILDINGS AND FACILITIES (ICC/ANSI A117.1-2009), AS WELL AS WITH ALL OTHER CURRENT LOCAL, STATE AND FEDERAL CODES AND REGULATIONS APPLICABLE TO THIS PROJECT. CONTRACTOR SHALL CONSTRUCT THE PROJECT IN ACCORDANCE WITH THE APPLICABLE CODES RELEVANT TO THIS PROJECT.
7. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS AND PAYMENT OF ALL PERMIT AND APPLICATION FEES FOR THE CONSTRUCTION OF THE PROJECT.
8. TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS ARE IN CONFORMANCE WITH THE 2020 SUPPLEMENT OF THE NEW YORK STATE ENERGY CONSERVATION CONSTRUCTION CODE.
9. THE FOLLOWING IS AN EXCERPT FROM THE NEW YORK EDUCATION LAW ARTICLE 145 SECTION 7209 AND APPLIES TO THESE DRAWINGS: "IT IS A VIOLATION OF THIS LAW FOR ANY PERSON UNLESS HE IS ACTING UNDER THE DIRECT SUPERVISION OF A LICENSED ARCHITECT TO ALTER AN ITEM IN ANY WAY." IF ANY ITEM BEARING THE SEAL OF AN ARCHITECT IS ALTERED, THE ALTERING ARCHITECT SHALL AFFIX HIS SEAL AND NOTATION "ALTERED BY" FOLLOWED BY HIS SIGNATURE AND DATE OF SUCH ALTERNATION AND SPECIFIC DESCRIPTION OF THE ALTERATION.

ENERGY CODE REQUIREMENTS

1. THE NEW STRUCTURE COMPLIES WITH THE 2020 NYS BUILDING CODE REQUIREMENTS, PRESCRIPTIVE METHOD
2. CLIMATE ZONE (IECCNYS TABLE C301.1): 5A - SARATOGA COUNTY
3. ROOF (IECCNYS C402.1.4): METAL BUILDING
   - REQUIRED: U ≤ 0.035
   - PROVIDED: U = 0.022
   - NOTE: PRE-ENGINEERED BUILDING MANUFACTURER IS RESPONSIBLE FOR PROVIDING ENERGY CODE REQUIREMENTS IN WALL AND ROOF ASSEMBLY AS STIPULATED IN THE CONTRACT DOCUMENTS.
4. WALLS, ABOVE GRADE (IECCNYS C402.1.4): METAL BUILDING
   - REQUIRED: U ≤ 0.052
   - PROVIDED: U = 0.039
   - NOTE: PRE-ENGINEERED BUILDING MANUFACTURER IS RESPONSIBLE FOR PROVIDING ENERGY CODE REQUIREMENTS IN WALL AND ROOF ASSEMBLY AS STIPULATED IN THE CONTRACT DOCUMENTS.
5. WALLS, BELOW GRADE (IECCNYS C402.1.3): CONCRETE
   - REQUIRED: R ≥ 7.5 CI
   - PROVIDED: R = 10 CI
6. FLOORS (IECCNYS C402.1.3): UNHEATED SLAB-ON-GRADE
   - REQUIRED: R ≥ 10
   - PROVIDED: R = 10
7. DOORS (IECCNYS C402.1.3): OPAQUE NON-SWINGING DOORS
   - REQUIRED: R ≥ 4.75
   - PROVIDED: R = NA
8. DOORS (IECCNYS C402.1.4): SWINGING DOORS
   - REQUIRED: U ≤ 0.37
   - PROVIDED: U = NA
9. FENESTRATION REQUIREMENTS (IECCNYS C402.4):
   - A. FIXED
     - REQUIRED: U ≤ 0.38
     - PROVIDED: U = NA
   - B. ENTRANCE DOOR
     - REQUIRED: U ≤ 0.77
     - PROVIDED: U = 0.43
   - C. OPERABLES
     - REQUIRED: U ≤ 0.45
     - PROVIDED: U = NA
10. MAXIMUM FENESTRATION ALLOWABLE (IECCNYS C402.4):
    - REQUIRED: 0.30
    - PROVIDED: NA
    - REQUIRED TOTAL: 2125 SF
    - PROVIDED TOTAL: 0 SF
11. MINIMUM SKYLIGHT FENESTRATION (IECCNYS C402.4.2):
    - NOT APPLICABLE
12. WRITTEN STATEMENT:
    - TO THE BEST OF OUR KNOWLEDGE, BELIEF, AND PROFESSIONAL JUDGEMENT, THE DESIGN IS IN COMPLIANCE WITH THE ENERGY CODE. THIS STATEMENT IS BEING PROVIDED AS REQUIRED OF THE 2020 NYS ENERGY CODE SUPPLEMENT, SECTION C103.2.2.



ROOM NAME (Code Definition) | AREA (SF) | OCC. LOAD FACTOR TABLE 1004.5 | OCCUPANTS | # OF EXITS REQUIRED * (CUMULATIVE EXITS)

980	20
49	1

XX' — PATH OF EGRESS TO AN EXIT - [TRAVEL DISTANCE NOTED IN (XX') EQUALS TOTAL DISTANCE FOR ROUTE] - MAXIMUM DISTANCE ALLOWED PER TABLE 1017.2

X — EXIT AND EXIT TYPE AS DESCRIBED BELOW

EXIT REQUIREMENTS BY TYPE

EXIT	OCCUP. LOAD	REQUIRED WIDTH (INCHES)*	PROVIDED WIDTH (INCHES)	NOTES
A	9	1.8	36	MIN WIDTH PER 1010.1.1 = 32 INCHES
B	14	2.8	36	MIN WIDTH PER 1010.1.1 = 32 INCHES

* REQUIRED WIDTH CALCULATED 1005.3.2: 0.2 INCHES PER OCCUPANT

DATE: 11.2024
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PROJECT NO.: 22-2496
FILE:

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28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
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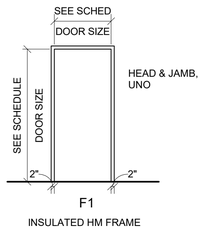
REVISIONS

NO.	DATE	DESCRIPTION
1	11/01/2024	ADDENDUM #1

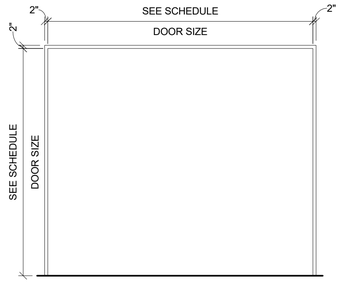
RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

CODE COMPLIANCE & LIFE SAFETY PLANS

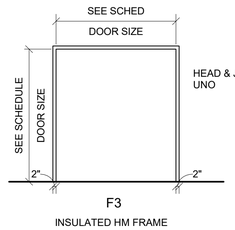
SHEET: A001



F1
INSTULATED HM FRAME



F2
STEEL CHANNEL



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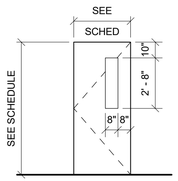
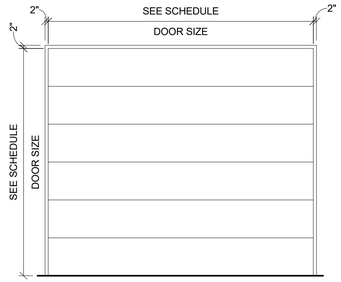
INSTULATED HM FRAME

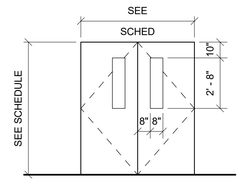


1
INSTULATED HM

DOOR FRAME TYPES



2
STEEL



3
INSTULATED HM

DOOR TYPES

1 A003 DOOR FRAME & TYPES
N.T.S

DOOR SCHEDULE

Type Mark	DOOR SIZE					DOOR			FRAME				DOOR FIRE RATING	MANUFACTURER	REMARKS	HARDWARE GROUP
	ROUGHT HEIGHT	ROUGH WIDTH	HEIGHT	WIDTH	THICKNESS	TYPE	MATERIAL	FINISH	TYPE	DEPTH	MATERIAL	FINISH				
C-130	15' - 0"	22' - 0"	15' - 0"	22' - 0"	1 3/4"	1	INSULATED HOLLOW METAL	PAINT, COLOR BY OWNER	F2	2" (W) x 5 3/4" (D)	HOLLOW METAL	PAINT, COLOR BY OWNER	N/A	OVERHEAD DOOR CORPORATION	SECTIONAL OVERHEAD DOORS 422 SERIES INSULATED STEEL DOORS	D1
C131	7' - 2"	3' - 4"	7' - 0"	3' - 0"	1 3/4"	1	INSULATED HOLLOW METAL	PAINT, COLOR BY OWNER	F1	2" (W) x 5 3/4" (D)	HOLLOW METAL	PAINT, COLOR BY OWNER	N/A	CECO ASSA-ABLOY	LEGION FLUSH	D1
C131	7' - 2"	3' - 4"	7' - 0"	3' - 0"	1 3/4"	1	INSULATED HOLLOW METAL	PAINT, COLOR BY OWNER	F1	2" (W) x 5 3/4" (D)	HOLLOW METAL	PAINT, COLOR BY OWNER	N/A	CECO ASSA-ABLOY	LEGION FLUSH	D1
C131	7' - 2"	3' - 4"	7' - 0"	3' - 0"		1	INSULATED HOLLOW METAL	PAINT, COLOR BY OWNER	F1	2" (W) x 5 3/4" (D)	HOLLOW METAL	PAINT, COLOR BY OWNER	N/A	CECO ASSA-ABLOY	LEGION FLUSH	D1
C131	7' - 2"	3' - 4"	7' - 0"	3' - 0"	1 3/4"	1	INSULATED HOLLOW METAL	PAINT, COLOR BY OWNER	F1	2" (W) x 5 3/4" (D)	HOLLOW METAL	PAINT, COLOR BY OWNER	N/A	CECO ASSA-ABLOY	LEGION FLUSH	D1

ABBREVIATIONS:

HM HOLLOW METAL
PF PREFINISHED
PT SEMI-GLOSS PAINT
STLSTEEL

HARDWARE SCHEDULE:

D1:
1. (3) 4-1/2"x 4-1/2" HINGES
2. (1) STORAGE LOCKSET
3. (1) CLOSER
4. WEATHERSTRIPPING
5. (1) SWEEP
6. (1) THRESHOLD

D2:
1. WEATHERSTRIPPING

D3:
1. (6) 4-1/2"x 4-1/2" HINGES
2. (1) STORAGE LOCKSET
3. (2) CLOSER
4. (2) SWEEP

D4:
1. (3) 4-1/2"x 4-1/2" HINGES
2. (1) PRIVACY LOCKSET
3. (1) CLOSER
4. (1) SWEEP
5. (1) WALL STOP

D5:
1. (3) 4-1/2"x 4-1/2" HINGES
2. (1) STORAGE LOCKSET
3. (1) CLOSER
4. (1) SWEEP

Window Schedule

Type Mark	Head Height	Window Size				Window Materials			Manufacturer	Egress Window
		Rough Height	Rough Width	Height	Width	Frame Finish	Trim Finish	Glazing		

DATE: 11.2024
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REVIEWED BY: AM
PROJECT NO.: 22-2496
FILE:

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223 MAIN ST, GOSHEN, NY 10924 - 845.615.9232

REVISIONS

NO.	DATE	DESCRIPTION
1	11/01/2024	ADDENDUM #1

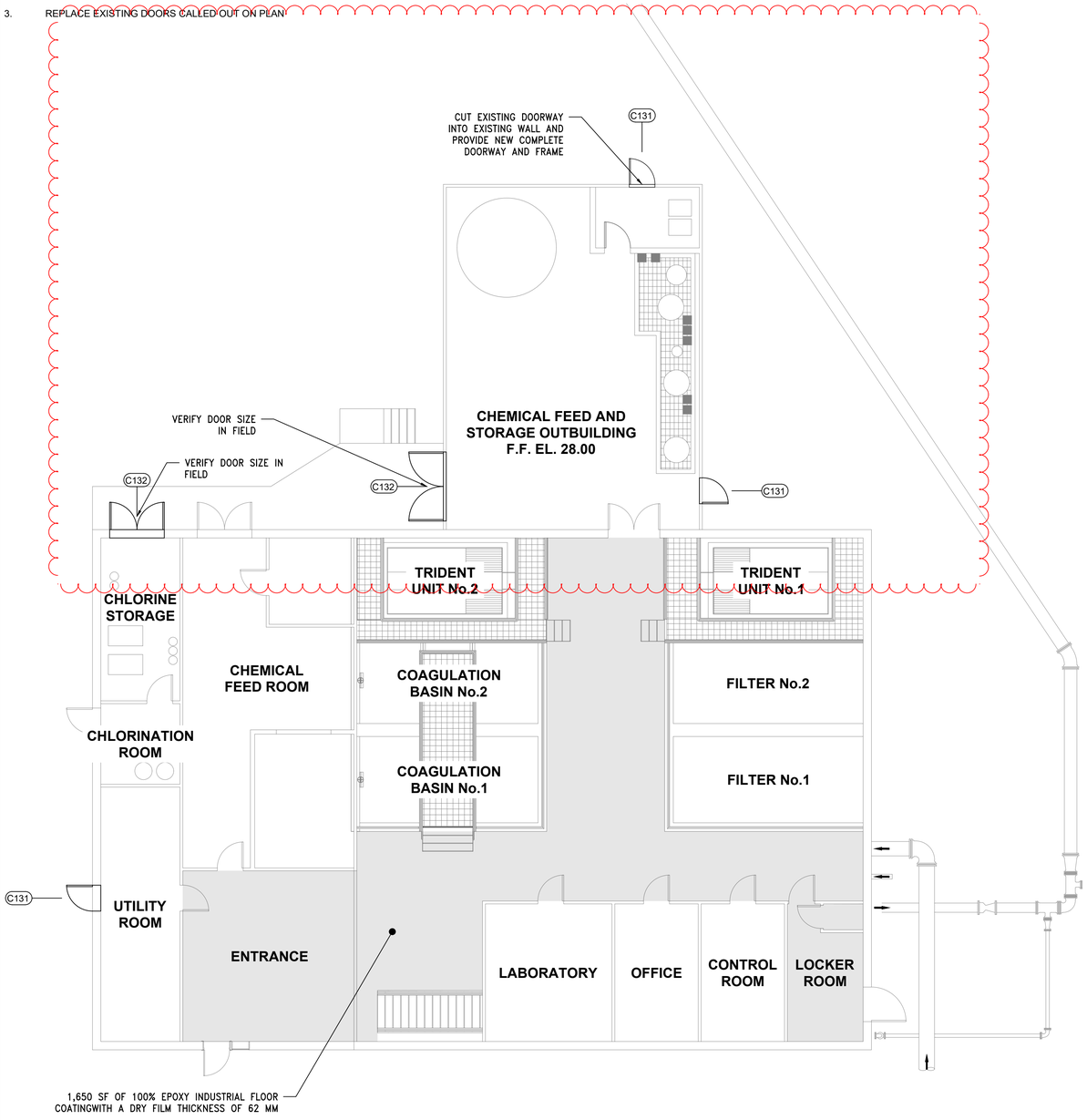
RHINEBECK WTP
IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

DOOR & WINDOW
OPENING SCHEDULE &
DETAILS

SHEET:
A003

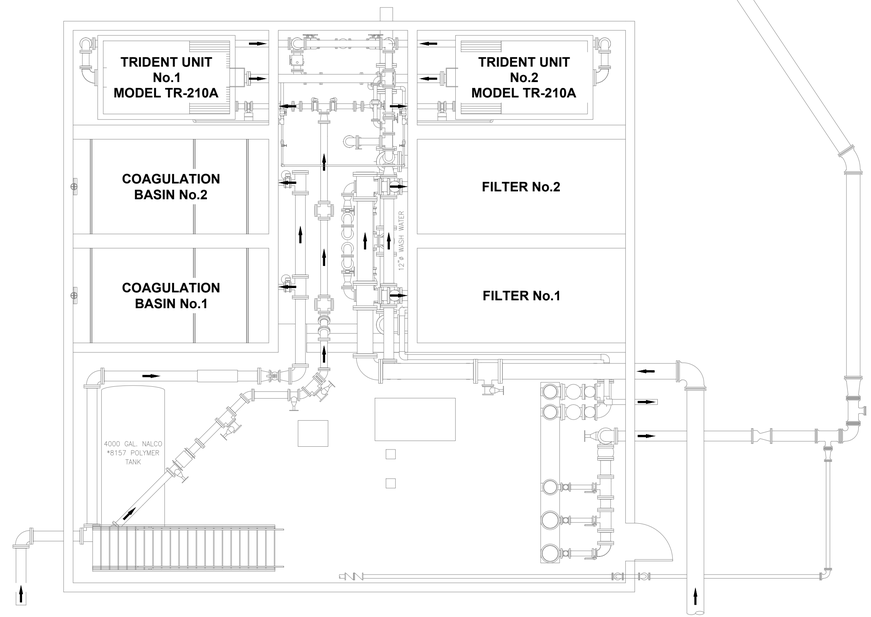
NOTES:

1. EPOXY COAT ALL FLOORS AS INDICATED ON PLAN
2. REPAIR LEAKS BY EXISTING ELECTRIC
3. REPLACE EXISTING DOORS CALLED OUT ON PLAN



OPERATING ARCHITECTURAL FLOOR PLAN

SCALE: 1/8"=1'-0"



LOWER ARCHITECTURAL FLOOR

SCALE: 1/8"=1'-0"

DATE: 11/1/2024
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SCALE:
REVIEWED BY: RF
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FILE:

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REVISIONS

NO.	DATE	DESCRIPTION
1.	06/21/24	MAY 2024 DOH COMMENTS
2.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

WTP REHAB FLOOR PLAN

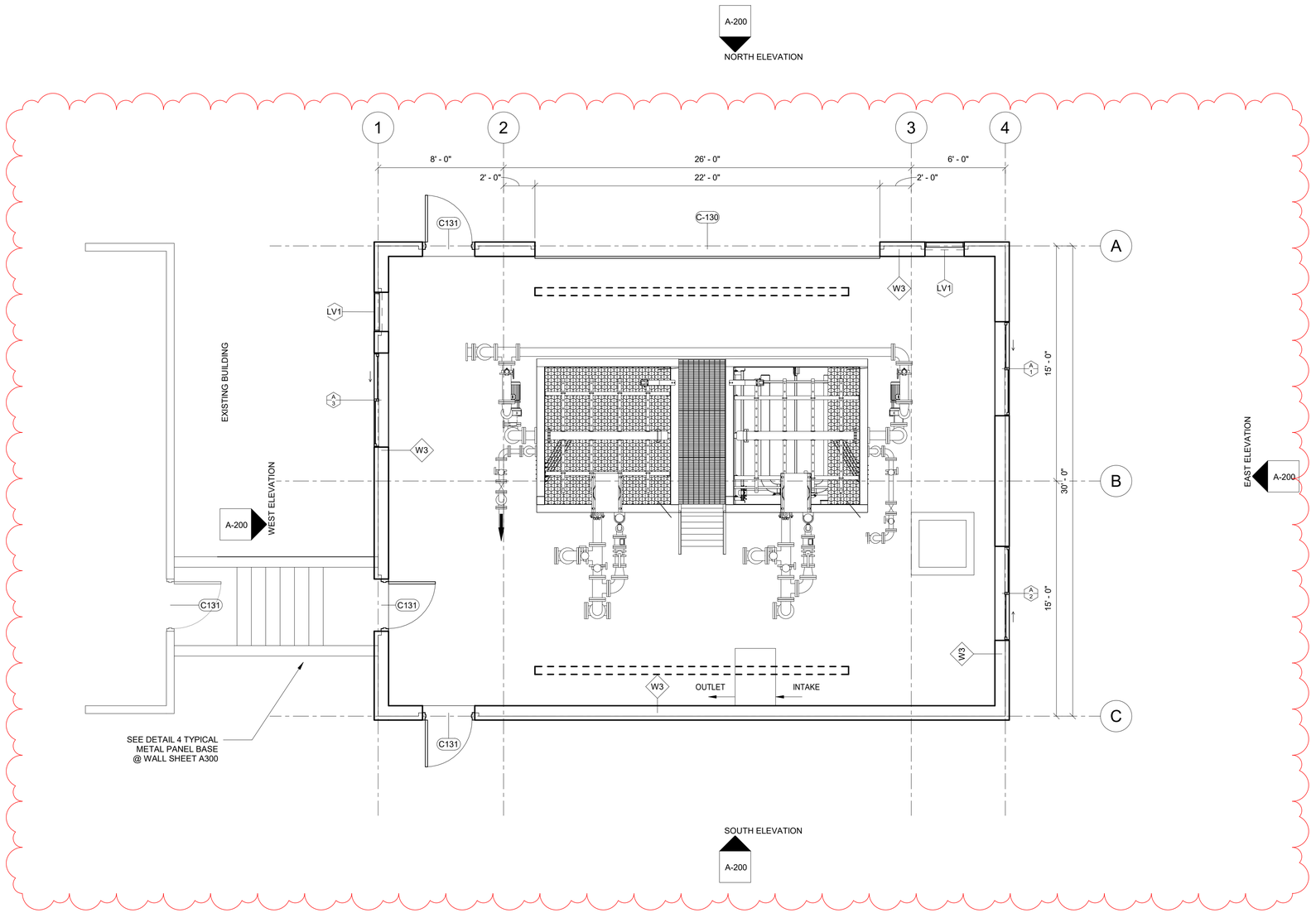
SHEET: A-100

ARCHITECTURAL LEGEND

- (#) • INDICATES KEYED NOTE.
- W- • INDICATES NEW WALL, REF WALL SCHEDULE.
- -- • INDICATES NEW WINDOW, REF WINDOW SCHEDULE ON 'A' DWGS
- -- • INDICATES NEW DOOR, REF DOOR SCHEDULE ON 'A' DWGS
- -- • INDICATES NEW GRIDLINE

PLAN NOTES

1. ALL ELEVATIONS ARE REFERENCED FROM 0'-0" = LEVEL 1 FINISH FLOOR.
2. GRIDLINES ARE LOCATED AT EXTERIOR FACE OF PEMB STEEL LINES.
3. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION METHODS FOR THIS STRUCTURE. CONNECTIONS, DETAILS AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE ARCHITECT / ENGINEER FOR CLARIFICATION IN A TIMELY MANNER PRIOR TO BID OPENING.
4. DIMENSIONS AT DOORS ARE ROUGH OPENING OF STRUCTURAL FRAME.
5. REFER TO SPECIFICATION 074116, 074213.19, AND 133419 FOR REQUIRED WARRANTIES.
6. CONTRACTOR TO PROVIDE PROOF OF MANUFACTURER'S INSTALLATION CERTIFICATION AND TRAINING.
7. CONTRACTOR TO PROVIDE DOCUMENTATION OF THE NECESSARY MANUFACTURER'S INSTALLATION. CERTIFICATION AND TRAINING CAN BE OBTAINED PRIOR TO INSTALLATION OF THE PEMB STRUCTURE.



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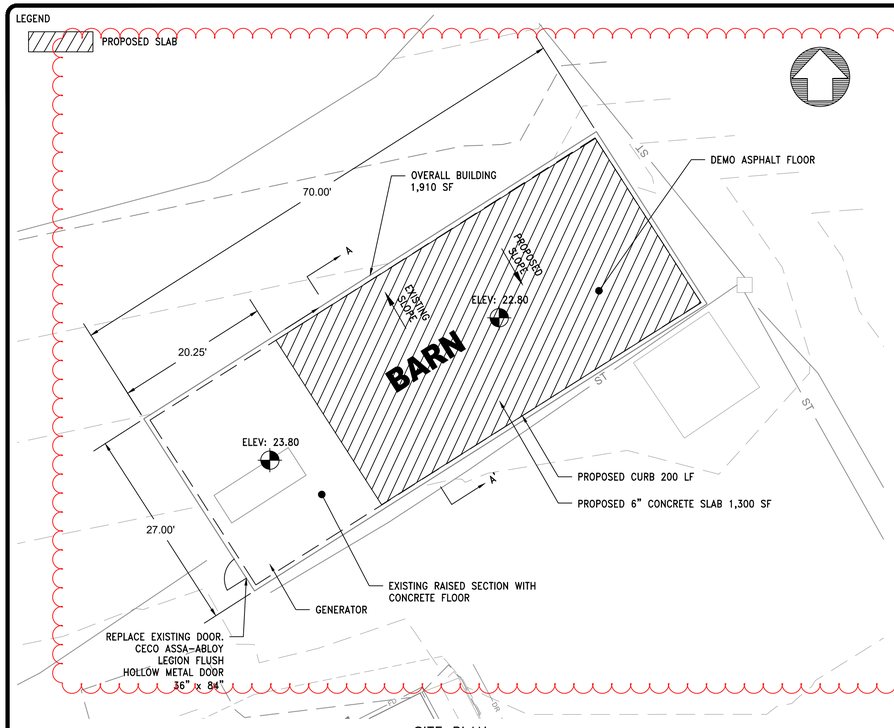
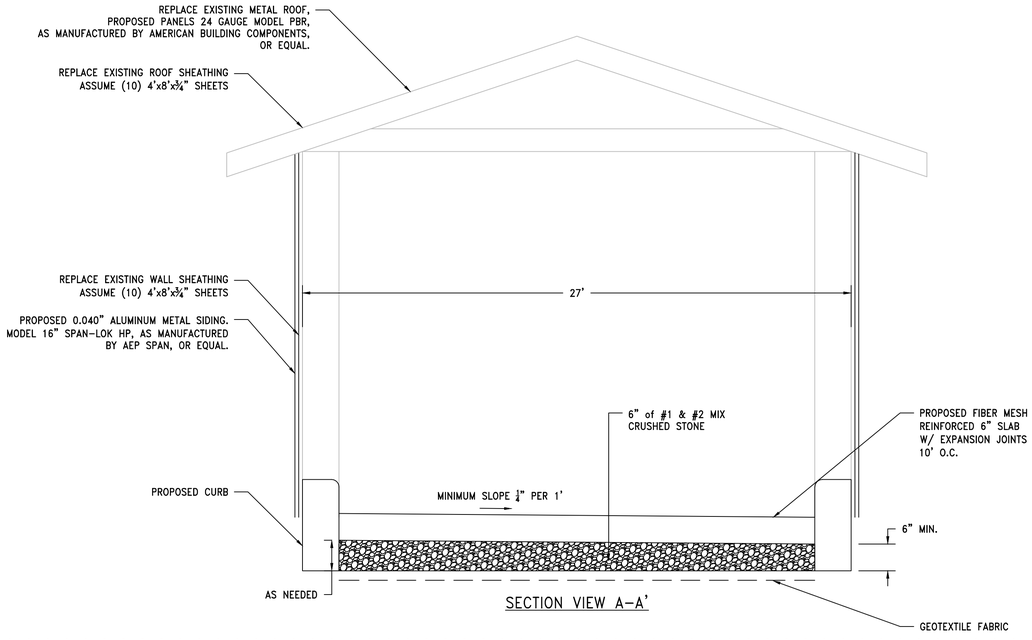
RHINEBECK WTP
IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

FIRST FLOOR PLAN

SHEET: A101



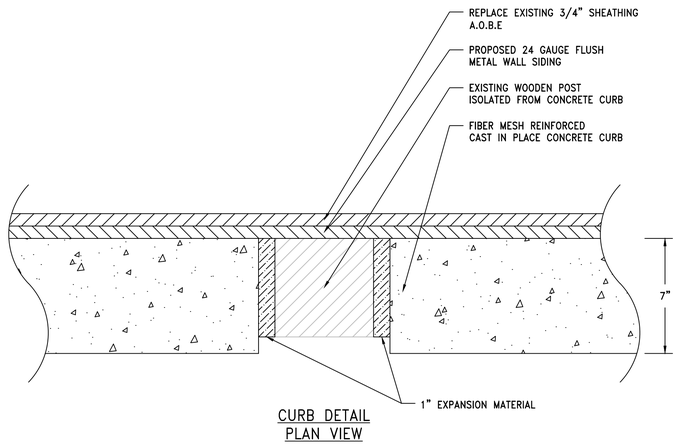
SITE PLAN
SCALE: 1" = 10'



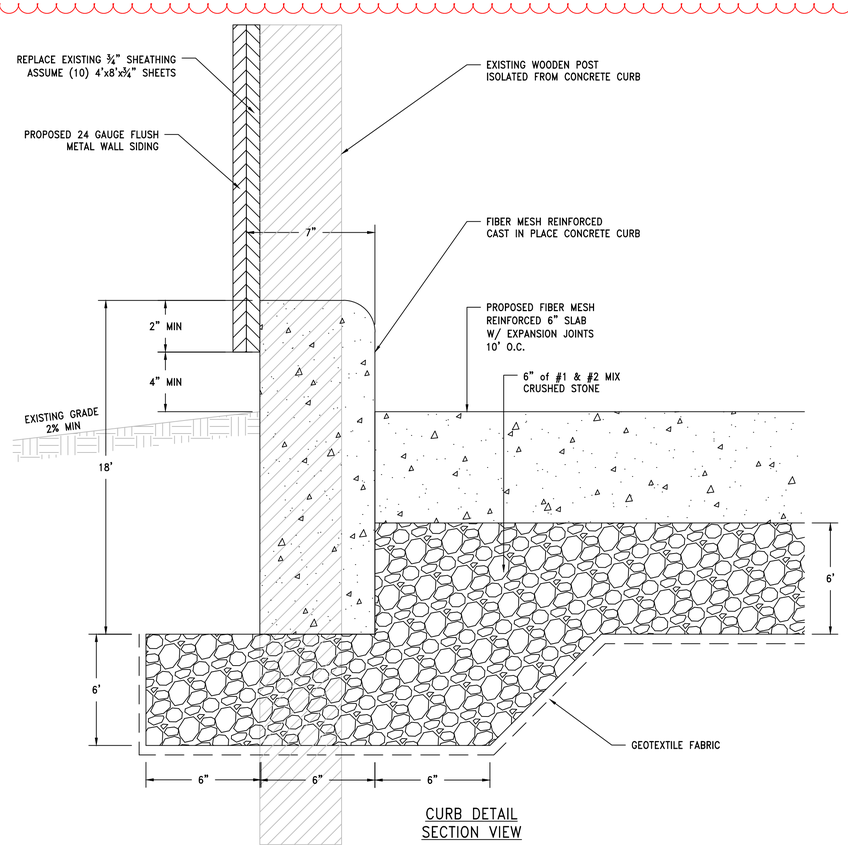
SECTION VIEW A-A'

NOTES:

1. CONCRETE CURB TO BE CAST AROUND EXISTING WOODEN POSTS/ COLUMNS.
2. REPLACE ALL EXISTING FASCIA BOARDS, SOFFITS, DRIP EDGES, & VENTS.
3. REPLACE EXISTING ROLL-UP OVERHEAD DOORS IN KIND.
4. CLOSE ALL OPENINGS IN ALL WALLS TO ENSURE THE BUILDINGS PROTECTED FROM THE ELEMENTS.
5. THERE IS NO EXISTING OR PROPOSED INSULATION.
6. REPLACE ALL THREE OVERHEAD LIFTING SECTIONAL ROLL-UP DOORS, OPENING DIMENSIONS 8'H X 10'W.
7. PROVIDE ONE TRUSS MOUNTED LED LIGHT AND ONE WALL POST MOUNTED RECEPTACLE 15' O.C. ALONG THE LENGTH OF THE BUILDING.



CURB DETAIL
PLAN VIEW



CURB DETAIL
SECTION VIEW

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1.	11/01/24	ADDENDUM #1

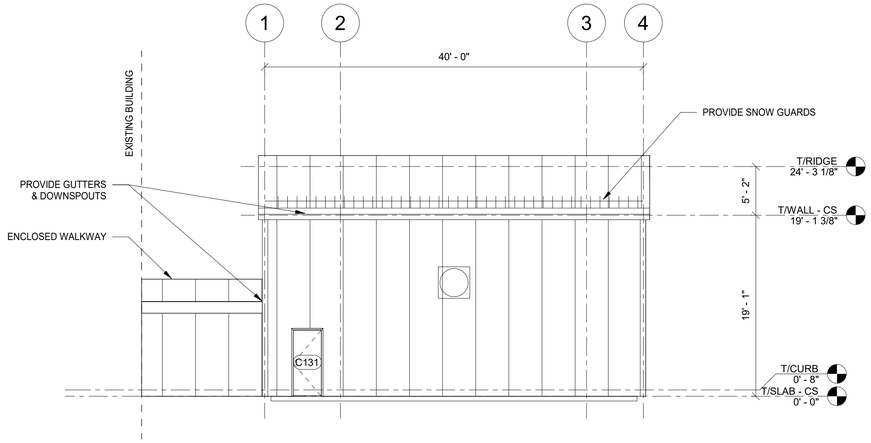
RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

PROPOSED UPGRADES TO
EXISTING BARN

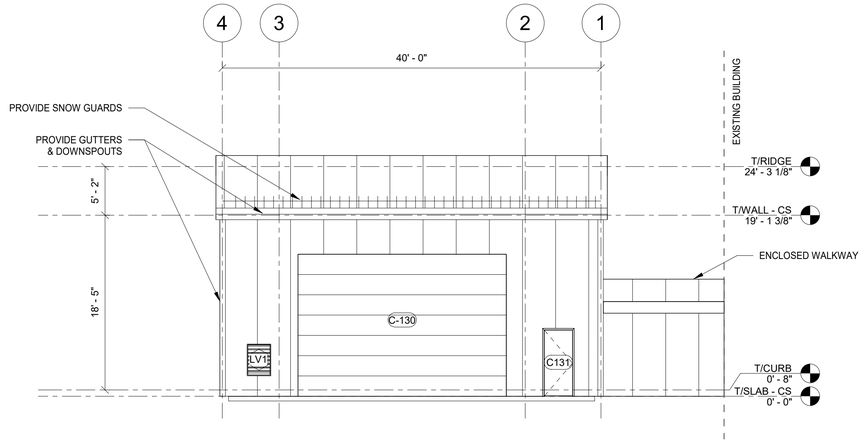
SHEET:
A-102

ELEVATION NOTES

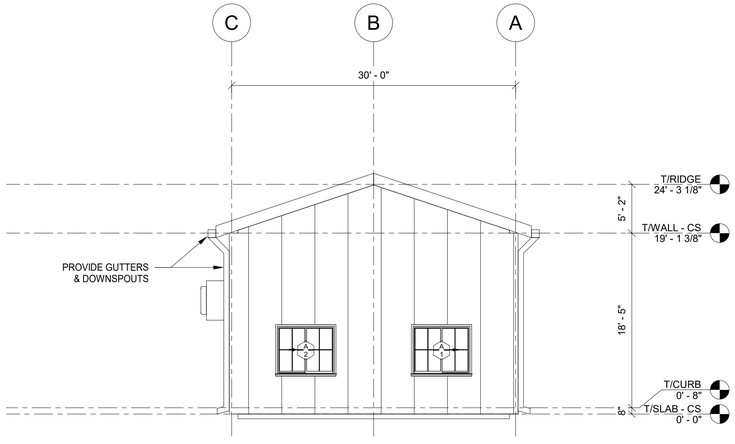
1. ALL ELEVATIONS ARE REFERENCED FROM 0'-0" = LEVEL 1 FINISH FLOOR.
2. GRIDLINES ARE LOCATED AT EXTERIOR FACE OF PEMB STEEL LINES.
3. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION METHODS FOR THIS STRUCTURE. CONNECTIONS, DETAILS AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE ARCHITECT / ENGINEER FOR CLARIFICATION IN A TIMELY MANNER PRIOR TO BID OPENING.
4. ALIGN JOINTS OF 42" ROOF PANELS WITH JOINTS OF 42" WALL PANELS.
5. DOOR, WINDOW, & STOREFRONT MANUFACTURER RESPONSIBLE FOR DESIGN OF ALL CONNECTIONS TO JAMBS, SILLS, & HEADERS.
6. DIMENSIONS SHOWN ON ELEVATIONS ARE ROUGH OPENING OF STRUCTURAL FRAME.
7. REFER TO SPECIFICATION 074116, 074213.19, AND 133419 FOR REQUIRED WARRANTIES.
8. CONTRACTOR TO PROVIDE PROOF OF MANUFACTURER'S INSTALLATION CERTIFICATION AND TRAINING.
9. CONTRACTOR TO PROVIDE DOCUMENTATION OF THE NECESSARY MANUFACTURER'S INSTALLATION. CERTIFICATION AND TRAINING CAN BE OBTAINED PRIOR TO INSTALLATION OF THE PEMP STRUCTURE.
11. ROOF PANELS SHALL BE 36" WIDE, 6" THICK, 24 GAUGE METAL SPAN INSULATED PANELS, LS-36, OR EQUAL.
12. WALL PANELS SHALL BE 36" WIDE, 3" THICK, 24-GAUGE METAL SPAN INSULATED PANELS, LS-36 OR EQUAL.



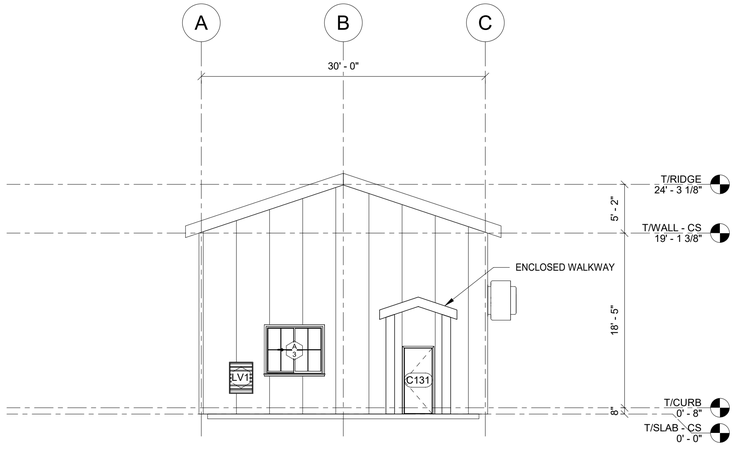
4 A-200 SOUTH ELEVATION
1/8" = 1'-0"



3 A-200 NORTH ELEVATION
1/8" = 1'-0"



2 A-200 EAST ELEVATION
1/8" = 1'-0"



1 A-200 WEST ELEVATION
1/8" = 1'-0"

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REVISIONS

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RHINEBECK WTP
IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

ELEVATIONS

SHEET:
A-200

ABBREVIATIONS:

"	INCH
#	NUMBER, POUND
&	AND
'	FEET
(E)	EXISTING
(N)	NEW
@	AT
A=	AXIAL FORCE
AB	ANCHOR BOLT
ABV	ABOVE
ACI	AMERICAN CONCRETE INSTITUTE
ADD	ADDENDUM, ADDITION
ADJ	ADJUST, ADJUSTABLE
AESS	ARCHITECTURALLY EXPOSED STRUCTURAL STEEL
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AVG	AVERAGE
AWS	AMERICAN WELDING SOCIETY
B/	BOTTOM OF
B/W	BETWEEN
BALC	BALCONY
BD	BOARD
BEV	BEVEL
BKR	BACKER
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BOC	BOTTOM OF CURB
BOT/BTM	BOTTOM
BOW	BOTTOM OF WALL
BP	BASEPLATE
BRDG	BRIDGE, BRIDGING
BRG	BEARING
BRK	BRICK
BSMT	BASEMENT
BU	BUILT-UP
C	CHANNEL
C=	COMPRESSION FORCE
CEM	CEMENT, CEMENTITIOUS
CGS	CENTER OF GRAVITY OF STRAND
CIP	CAST IN PLACE
CJ	CONTROL JOINT
CJP	COMPLETE JOINT PENETRATION
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
COMP	COMPOSITE, COMPENSATION
CONC	CONCRETE
COND	CONDITION
CONN	CONNECTION
CONSTR	CONSTRUCTION
CONT	CONTINUOUS
COORD	COORDINATE
CORR	CORRIDOR
CTR	CENTER
CTRL	CONTROL
CTSK	COUNTERSINK
CU	CUBIC
CUST	CUSTOM
CY	CUBIC YARD
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEFL	DEFLECTION
DEG	DEGREE
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DIA - Ø	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DKG	DECKING
DL	DEAD LOAD
DWG	DRAWING
DWGS	DRAWINGS
DWL	DOWEL
EA	EACH
EF	EACH FACE
EIFS	EXTERIOR INSULATED FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
ENGR	ENGINEER
EOD	EDGE OF DECK
EOP	EDGE OF PLATE
EOR	ENGINEER OF RECORD
EOS	EDGE OF SLAB
EQ	EQUAL
EQPT	EQUIP
ES	EACH SIDE
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR

F TO F	FACE TO FACE
F'c	CONCRETE COMPRESSIVE STRENGTH
FAB	FABRICATIONS/FABRICATED
FB	FLAT BAR
FD	FLOOR DRAIN
FF	FINISH FLOOR
FFE	FINISH FLOOR ELEVATION
FIN	FINISH
FLR	FLOOR
FNDN	FOUNDATION
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FR	FIRE RATED, FIRE RESISTIVE
FRM	FRAMED, FRAMING
FRT	FIRE RETARDANT TREATED
FT	FOOT, FEET
FTG	FOOTING
FUT	FUTURE
Fy	YIELD STRESS
GA	GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
GEN	GENERAL
GL	GLU-LAMINATED
GLB	GLU-LAMINATED BEAM
GND	GROUND
GR	GRADE
GYP	GYPSUM
GYP BD	GYPSUM BOARD
HAS	HEADED ANCHOR STUD
HC	HOLLOW CORE
HCP	HOLLOW CORE PLANK
HDR	HEADER
HEX	HEXAGONAL
HI	HIGH
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
HVAC	HEATING - VENTILATION - AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
ICF	INSULATED CONCRETE FORMS
ID	INSIDE DIAMETER
IJ	ISOLATION JOINT
IN	INCH, INCHES
INFO	INFORMATION
INSP	INSPECTION
INSUL	INSULATION
INT	INTERIOR
INV	INVERT
JT	JOINT, JOINTS
k	KILOPOUND (1000 POUNDS)
K-FT	KIP-FOOT (1000 POUND - FEET)
KIP	KILOPOUND (1000 POUNDS)
L	ANGLE, LEFT, LENGTH
LAM	LAMINATE, LAMINATED
LAT	LATERAL
LB	POUND
LF	LINEAL FEET, LINEAR FOOTAGE
LG	LONG
LIN	LINEAR
LIN FT	LINEAL FEET, LINEAR FOOTAGE
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LONG	LONGITUDINAL
LS	LONG SLOTTED
LSH	LONG SIDE HORIZONTAL
LSL	LAMINATED STRAND LUMBER
LSV	LONG SIDE VERTICAL
LT WT	LIGHT WEIGHT
LVL	LAMINATED VENEER LUMBER
MAX	MAXIMUM
MB	MACHINE BOLT
MC	MISCELLANEOUS CHANNEL
MCJ	MASONRY CONTROL JOINT
MECH	MECHANICAL
MEMB	MEMBRANE
MEP	MECHANICAL, ELECTRICAL, PLUMBING
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTL	METAL
MTL	METAL
MUL	MULLION
N	NORTH
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
NW	NORMAL WEIGHT

OC	ON CENTER
OD	OUTSIDE DIAMETER
OPNG	OPENING
OPP	OPPOSITE
OSB	ORIENTED STRAND BOARD
OWSJ	OPEN WEB STEEL JOIST
P/L	PROPERTY LINE
PAF	POWDER ACTUATED FASTENER
PC	PRECAST
PCF	POUNDS PER CUBIC FOOT
Pd	DRIFTED SNOW LOAD
PE	PROFESSIONAL ENGINEER
PEMB	PRE ENGINEERED METAL BUILDING
PERF	PERFORATE, PERFORATED, PERFORMANCE
PERIM	PERIMETER
PERP	PERPENDICULAR
Pf	FLAT ROOF SNOW LOAD
PJP	PARTIAL JOINT PENETRATION
PL	PLATE
PLF	POUNDS PER LINIER FOOT
PLWD	PLYWOOD
PMEJ	PREMOLDED EXPANSION JOINT
PMF	PREMOLDED FILLER
PNL	PANEL
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
Ps	SLOPED ROOF SNOW LOAD
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PT	PRESSURE TREATED
PTD	PAINTED
QTY	QUANTITY
R	RISER
R=	BEAM END SHEAR REACTION
RAD	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFER - REFERENCE
REINF	REINFORCING
REQ'D	REQUIRED
REV	REVISION
RO	ROUGH OPENING
SCHED	SCHEDULE
SCL	STRUCTURAL COMPOSITE LUMBER
SE	STRUCTURAL ENGINEER
SECT	SECTION
SF	SQUARE FEET
SGL	SINGLE
SHT	SHEET
SHTG	SHEATHING
SIM	SIMILAR
SIMP	SIMPSON STRONG TIE
SL	SNOIW LOAD
SOG	SLAB ON GRADE
SPEC	SPECIFICATIONS
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURAL
SUSP	SUSPENDED
SYS	SYSTEM
T	TREAD
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
T/	TOP OF
T=	TENSION FORCE
TAN	TANGENT
THK	THICK
THRD	THREADED
TOB	TOP OF BEAM
TOC	TOP OF COLUMN, TOP OF CURB, TOP OF CONCRETE
TOF	TOP OF FOOTING
TOJ	TOP OF JOIST
TOL	TOP OF LINTEL, LANDING
TOL	TOLERANCE
TOP	TOP OF PIER, TOP OF PLATE
TOPV	TOP OF PAVEMENT
TOS	TOP OF STEEL, TOP OF SLAB
TOW	TOP OF WALL
TRANS	TRANSVERSE
TRANSL	TRANSLUCENT
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
VERT	VERTICAL
VFY	VERIFY
VIF	VERIFY IN FIELD
W	SNOW DRIFT WIDTH
W/	WITH
W/O	WITHOUT
WCJ	WALL CONTRACTION JOINT
WD	WOOD
WF	WIDE FLANGE
WP	WORK POINT
WR	WATER RESISTANT, WATER RESISTIVE
WS	WATERSTOP
WT	WEIGHT
WWF	WELDED WIRE FABRIC

PROJECT DESCRIPTION:
1. PRE-ENGINEERED METAL BUILDING.
2. STEEL-FRAMED COVERED WALKWAY

GENERAL:
1. THE STRUCTURAL DRAWINGS ARE A PORTION OF THE CONTRACT DOCUMENTS AND ARE INTENDED TO BE USED IN CONJUNCTION WITH THE ARCHITECTURAL, CIVIL, MECHANICAL, AND ELECTRICAL DRAWINGS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE REQUIREMENTS FROM THE ENTIRE SET OF CONTRACT DOCUMENTS (INCLUDING THE PROJECT SPECIFICATIONS) INTO THEIR WORK.
2. THESE GENERAL NOTES SUPPLEMENT THE PROJECT SPECIFICATIONS. REFER TO THE PROJECT SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
3. NOTES AND DETAILS ON THE STRUCTURAL DRAWINGS SHALL TAKE PRECEDENCE OVER THE GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS.
4. VERIFY ALL DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS.
5. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION METHODS FOR THIS STRUCTURE. CONNECTIONS, DETAILS, AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE ARCHITECT/ENGINEER FOR CLARIFICATION IN A TIMELY MANNER PRIOR TO BID OPENING.

CODE REQUIREMENTS:
1. CONFORM TO 2018 INTERNATIONAL BUILDING CODE AS ADOPTED W/ AMMENDMENTS BY THE 2020 NYS BUILDING CODE.
2. ALL REFERENCE TO OTHER CODES AND STANDARDS (ACI, ASCE, ASTM, ETC.) SHALL BE FOR THE EDITIONS LISTED IN CHAPTER 35 OF THE IBC.

TEMPORARY CONDITIONS:
1. THE STRUCTURE HAS BEEN DESIGNED TO FUNCTION AS A UNIT UPON COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING ALL TEMPORARY BRACING AND/OR SUPPORT REQUIRED AS A RESULT OF THE CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES.
2. CONTRACTOR'S CONSTRUCTION METHODS AND/OR SEQUENCES SHALL RECOGNIZE AND CONSIDER THE EFFECTS OF THERMAL MOVEMENTS OF STRUCTURAL ELEMENTS DURING THE CONSTRUCTION PERIOD.

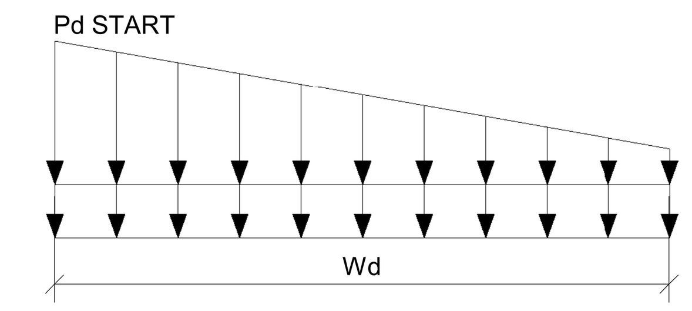
DESIGN CRITERIA:
1. DESIGN CRITERIA ASSUMED FOR PRELIMINARY FOUNDATION DESIGN - VERIFICATION REQUIRED UPON RECEIPT OF MANUFACTURER'S ENGINEERED SHOP DRAWINGS AND BASE REACTION CALCULATIONS. DESIGN WAS BASED ON THE STRENGTH AND DEFLECTION CRITERIA OF THE IBC. IN ADDITION TO THE DEAD LOADS, THE FOLLOWING LOADS AND ALLOWANCES WERE USED FOR DESIGN, WITH LIVE LOADS (L.L.) REDUCED IN ACCORDANCE WITH THE IBC:

A. RISK CATEGORY — III

B. DEAD LOADS	UNIFORM
1. ROOF	
• 6" INSULATED METAL ROOF PANEL	6 PSF
• COLLATERAL	20 PSF
• TOTAL ROOF DEAD LOAD	26 PSF

C. LIVE LOADS	UNIFORM	CONCENTRATED
1. ROOF	20 PSF	2000 LBS
2. SLAB-ON-GRADE	200 PSF	2000 LBS

D. SNOW LOADS	UNIFORM
1. GROUND SNOW LOAD, Pg	40 PSF
2. FLAT ROOF SNOW LOAD, Pf	37 PSF
3. EXPOSURE FACTOR, Ce	1.0
4. THERMAL FACTOR, Ct	1.2
5. IMPORTANCE FACTOR, Is	1.1
6. SLOPE FACTOR, Cs	1.0
7. SLOPED ROOF SNOW LOAD, Ps & Pbal	37 PSF
8. UNBALANCED SLOPED ROOF SNOW LOAD	
A. WINDWARD - FROM EAVE TO RIDGE	12 PSF
B. LEEWARD - FROM RIDGE TO 8' - 0"	56 PSF
C. LEEWARE - FROM 8' 0" TO EAVE	37 PSF
9. SNOW DRIFT	N/A



LOCATION	Wd	Pd START (PSF)	Pd END (PSF)
COLUMN LINE 1	9' - 8"	46	0

E. WIND LOADS	
1. WIND VELOCITY, V_{ULT}	120 MPH
2. WIND VELOCITY, V_{ASD}	93 MPH
3. EXPOSURE CATEGORY	C
4. INTERNAL PRESSURE COEFFICIENT, GC_{pi}	+/-0.18
5. COMPONENTS & CLADDING PRESSURES - STRENGTH LEVEL	UNIFORM
• ZONE 1 - ROOF INTERIOR	+20/-63 PSF
• ZONE 2r - ROOF RIDGE	+20/-92PSF
• ZONE 2e - ROOF EAVE	+20/-63 PSF
• ZONE 2n - ROOF RAKE	+20/-63 PSF
• ZONE 3r - ROOF RIDGE CORNER	+20/-109PSF
• ZONE 3e - ROOF EAVE CORNER	+20/-92 PSF
• ZONE 4 - WALL SURFACE	+34/-37 PSF
• ZONE 5 - WALL CORNER	+34/-46 PSF
OVERHANG	
• ZONE 1 - ROOF INTERIOR	-77 PSF
• ZONE 2r - ROOF RIDGE	-106 PSF
• ZONE 2e - ROOF EAVE	-78 PSF
• ZONE 2n - ROOF RAKE	-106 PSF
• ZONE 3r - ROOF RIDGE CORNER	-141 PSF
• ZONE 3e - ROOF EAVE CORNER	-124 PSF

F. SEISMIC LOADS	
1. SITE CLASS	D
2. IMPORTANCE FACTOR, Ie	1.25
3. SEISMIC DESIGN CATEGORY	B
4. EARTHQUAKE SPECTRAL RESPONSE, Ss	0.171
5. EARTHQUAKE SPECTRAL RESPONSE (1 SECOND), S_1	0.053
6. DESIGN SPECTRAL RESPONSE, S_{DS}	0.183
7. DESIGN SPECTRAL RESPONSE (1 SECOND), S_{D1}	0.086
8. SEISMIC RESISTING SYSTEM	
• STEEL SYSTEMS NOT SPECIFICALLY DETAILED FOR SEISMIC RESISTANCE	
9. RESPONSE MODIFICATION FACTOR, R	3.0
10. DEFLECTION AMPLIFICATION FACTOR, Cd	3
11. SEISMIC RESPONSE COEFFICIENT, Cs	0.076
12. BASE SHEAR, V	25 KIPS (ASD WIND)
13. ANALYSIS PROCEDURE	EQUIVALENT LATERAL FORCE PER ASCE 7-16 SECTION 12.8

FOUNDATIONS:
1. FOUNDATION DESIGN IS BASED ON GEOTECHNICAL REPORT, DATED JUNE 28, 2024 AND ADDENDA PREPARED BY ATLANTIC TESTING LABORATORIES, REPORT # CD10726-E-01-06-24. SOIL BEARING PRESSURE NOT TO EXCEED 3000 PSF FOR FOOTINGS WITHIN BUILDING FOOTPRINT. REFER TO GEOTECHNICAL REPORT FOR ALL PROJECT REQUIREMENTS PERTAINING TO EARTHWORK, INCLUDING BUT NOT LIMITED TO, EXCAVATION, BACKFILLING, COMPACTION, AND MATERIALS.
2. FOUNDATION SYSTEM - CONCRETE WALLS, COLUMN PIERS, SLABS-ON-GRADE AND SPREAD FOOTINGS.
3. ALL FOOTINGS SHALL BE A MINIMUM OF 54" BELOW LOWEST FINAL GRADE FOR EXTERIOR FOOTINGS AND 12" FOR INTERIOR FOOTINGS FOR BEARING ON MEDIUM PLASTICITY SOILS.
4. FOUNDATION UNITS SHALL BE CENTERED UNDER SUPPORTED STRUCTURAL MEMBERS, UNLESS NOTED OTHERWISE ON THE DRAWINGS.
5. THE CONTRACTOR SHALL REVIEW ALL GEOTECHNICAL ENGINEER RECOMMENDATIONS PRIOR TO THE COMMENCEMENT OF ANY SITE WORK.
6. STRUCTURAL FILL MATERIALS, PLACEMENT, AND COMPACTION REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE GEOTECHNICAL REPORT.
7. IMPORTED ENGINEERED STRUCTURAL FILL PLACED AS FILL BENEATH PROPOSED FOUNDATIONS/SLABS-ON-GRADE, AND AS BACKFILL, SHALL BE A MATERIAL CONSISTING OF PREDOMINATELY GRANULAR SOILS, FREE FROM ORGANIC MATTER, CLAY, ICE, DEBRIS, OR OTHER DELETERIOUS MATERIAL; SUCH AS IS OUTLINED IN THE GEOTECHNICAL REPORT . THE PROPOSED MATERIAL FOR ENGINEERED FILL SHALL BE REVIEWED AND APPROVED BY THE PROJECT ENGINEER.
8. PLACEMENT OF ALL FILL SHALL BE OBSERVED AND TESTED FOR RELATIVE COMPACTION BY A QUALIFIED TECHNICIAN UNDER THE GUIDANCE OF THE GEOTECHNICAL ENGINEER. MINIMUM TESTING FREQUENCY SHALL BE ESTABLISHED BY THE GEOTECHNICAL ENGINEER.
9. THE CONTRACTOR SHALL NOTIFY THE GEOTECHNICAL ENGINEER PRIOR TO COMMENCEMENT OF FILLING OPERATIONS.
10. ALL GENERAL EXCAVATIONS AND FOOTINGS SHALL BE INSPECTED AND APPROVED PRIOR TO THE PLACEMENT OF ANY SOIL BACKFILL AND/OR CONCRETE.
11. ALL FILL, BACKFILL AND COMPACTION ACTIVITIES, PARTICULARLY DURING WET WEATHER CONDITIONS, SHALL FOLLOW RECOMMENDATIONS OF THE GEOTECHNICAL ENGINEER.
12. PLACE BACKFILL AND FILL MATERIALS IN HORIZONTAL LAYERS NOT MORE THAN 8" IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HEAVY COMPACTION EQUIPMENT, AND NOT MORE THAN 6" IN LOOSE DEPTH FOR MATERIAL COMPACTED BY HAND-OPERATED TAMPERS.
13. ALL FOUNDATION ELEMENTS ARE TO BE PLACED ON UNDISTURBED APPROVED NATIVE SOIL OR ON APPROVED COMPACTED STRUCTURAL FILL AS OUTLINED IN THE GEOTECHNICAL REPORT. STRUCTURAL FILL SHALL EXTEND 1'-0" MINIMUM BEYOND THE FOUNDATION ELEMENT AND THEN DOWNWARD TO NATURAL SOILS AT A SLOPE OF 2 HORIZ. TO 1 VERT.
14. BACKFILL AND FILL MATERIALS SHALL BE COMPACTED TO 95% OF MAXIMUM DRY DENSITY ACCORDING TO THE MODIFIED PROCTOR TEST (ASTM D-1557).
15. BACKFILL AGAINST FOUNDATION WALLS BELOW GRADE SO THAT THE DIFFERENCE IN THE FILL LEVEL ON OPPOSITE SIDES OF THE WALL DOES NOT EXCEED 1'-0" AT ANY TIME.
16. EACH PRIME CONTRACTOR SHALL PROVIDE ALL TRENCHING WORK REQUIRED FOR ITS CONTRACT, INCLUDING TRENCH EXCAVATION, AND BACKFILL (WITH ACCEPTABLE FILL, SEE GEOTECHNICAL REPORT) TO WITHIN 1'-0" OF FINISH GRADE/FLOOR. ALL TRENCHING WORK WITHIN THE BUILDING FOOTPRINT SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. GENERAL CONTRACTOR MUST ACCEPT, IN WRITING, THE QUALITY OF THE TRENCH BACKFILL OF OTHER PRIME CONTRACTORS BEFORE BEGINNING WORK OVER THE TOP OF THE TRENCH.
17. EXCAVATION AND BACKFILL OPERATIONS SHALL BE MAINTAINED IN A DRY CONDITION. SURFACE AND INFILTRATING WATER SHALL BE REMOVED BY SITE GRADING AND PUMPING FROM SUMPS AS REQUIRED.
18. NO FOUNDATION CONCRETE SHALL BE PLACED IN WATER OR ON FROZEN SUBGRADE MATERIAL.
19. PROTECT IN-PLACE FOUNDATIONS AND SLABS FROM FROST PENETRATION UNTIL THE PROJECT IS COMPLETED.
20. THE CONTRACTOR IS RESPONSIBLE FOR EXCAVATION SAFETY. EXCAVATIONS MUST BE PERFORMED IN ACCORDANCE WITH THE CURRENT OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) STANDARDS.
21. PROVIDE TEMPORARY OR PERMANENT SUPPORTS WHETHER SHORING, SHEETING OR BRACING SO THAT NO HORIZONTAL MOVEMENT OR VERTICAL SETTLEMENT OCCURS TO EXISTING STRUCTURES, STREETS OR UTILITIES ADJACENT TO THE PROJECT SITE.

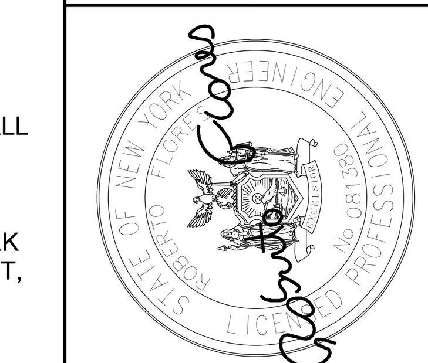
CONCRETE:
1. ALL CONCRETE WORK SHALL CONFORM TO "ACI 318 - BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND CHAPTER 19 OF THE NEW YORK STATE BUILDING CODE.
2. CONCRETE STRENGTHS SHALL BE VERIFIED BY STANDARD 28-DAY CYLINDER TESTS PER ASTM C39, UNLESS NOTED OTHERWISE, AND SHALL BE AS INDICATED IN SPECIFICATION 03300 & BELOW

LOCATION	EXPOSURE CLASS F S W C	AIR CONTENT	f'c psi	MAX W/C RATIO
INT. SLAB-ON-GRADE	F0 S0 W0 C0	1.0% - 3.0%	4000	0.50
EXT. SLAB-ON-GRADE	F3 S0 W0 C2	4.5% - 7.5%	5000	0.40
PIERS/FDN/RETAINING WALLS	F2 S0 W0 C1	4.5% - 7.5%	4500	0.45
FOOTINGS	F0 S1 W0 C1	1.0% - 3.0%	4000	0.50

3. MINIMUM CEMENT CONTENT PER CUBIC YARD SHALL BE AS INDICATED IN ACI 301 TABLE 4.2.2.1 & SPECIFICATION 033000.
4. THE CONTRACTOR SHALL SUBMIT CONCRETE MIX DESIGNS, ALONG WITH TEST DATA COMPLIANT WITH ACI-318 CHAPTER 5, A MINIMUM OF TWO WEEKS PRIOR TO PLACING CONCRETE.
5. UNLESS NOTED OTHERWISE, ALL CONCRETE SHALL BE NORMAL WEIGHT CONCRETE (±145 PCF) WITH ALL CEMENT CONFORMING TO ASTM C150, TYPE I / II. MAXIMUM AGGREGATE SIZE SHALL BE 1-1/2" FOR FOOTINGS AND 3/4" FOR WALLS AND SLABS, CONFORMING TO ASTM C33.
6. NO WATER MAY BE ADDED TO CONCRETE IN THE FIELD UNLESS IT CONFORMS TO THE APPROVED MIX DESIGN AND IS SPECIFICALLY APPROVED IN WRITING BY THE CONCRETE SUPPLIER.
7. NOTE 7 REMOVED.
8. A WATER REDUCING ADMIXTURE CONFORMING TO ASTM C494 USED IN STRICT CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS SHALL BE INCORPORATED INTO CONCRETE MIX DESIGNS. A HIGH RANGE WATER REDUCING ADMIXTURE CONFORMING TO ASTM C494 TYPE "F" OR TYPE "G" MAY BE USED IN CONCRETE MIXES, PROVIDED THAT THE SLUMP DOES NOT EXCEED 10-INCHES.
9. CONCRETE SHALL BE PLACED IN ONE CONTINUOUS OPERATION WHEREVER PRACTICAL. CONSTRUCTION JOINTS IN BEAMS, JOISTS, AND SLABS SHALL BE LOCATED AT MID-SPAN WITH REINFORCING CONTINUING THROUGH AS IF THE JOINT DID NOT OCCUR. VERTICAL CONSTRUCTION JOINTS IN WALLS SHALL BE LOCATED MIDWAY BETWEEN COLUMNS OR PILASTERS.
10. SLEEVES, OPENING, CONDUITS, AND OTHER EMBEDDED ITEMS NOT SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER PRIOR TO PLACING CONCRETE. CONDUITS EMBEDDED IN SLABS SHALL NOT BE LARGER IN OUTSIDE DIMENSION THAN ONE-THIRD THE THICKNESS OF THE SLAB AND SHALL NOT BE SPACED CLOSER THAN THREE DIAMETERS ON-CENTER.
11. THE CONTRACTOR SHALL PROVIDE SHOP DRAWINGS FOR THE LAYOUT OF CONSTRUCTION AND CONTROL JOINTS FOR CONCRETE SLABS-ON-GRADE. THE JOINTS SHALL BE LOCATED AT MAXIMUM 10'-0" ON-CENTER, EACH WAY, FORMING RECTANGLES WITH A LENGTH TO WIDTH RATIO NOT EXCEEDING 1.5 IN ANY DIRECTION. CONTROL JOINTS SHALL INTERSECT AT COLUMN BLOCKOUTS, AT ENDS OF BEARING WALLS, AND AT ALL RE-ENTRANT CORNERS IN THE SLAB.
12. ALL BOLTS AND/OR ANCHOR RODS EMBEDDED INTO CONCRETE SHALL CONFORM TO ASTM SPECIFICATION F1554 GRADE 36 UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS.
13. ANCHOR RODS ARE TO BE LOCATED BY MEANS OF TEMPLATE. ANCHOR RODS SHALL NOT BE HAND SET OR WET SET.
14. ANCHOR RODS AND EMBEDDED ITEMS SHALL BE SET IN ACCORDANCE WITH THE AISC CODE OF STANDARD PRACTICE SECTION 7.5.
15. WHERE NEW CONCRETE IS PLACED AGAINST EXISTING CONCRETE, THE EXISTING CONCRETE SURFACE SHALL BE CLEANED AND ROUGHENED TO A MINIMUM 1/4" AMPLITUDE.
16. PROVIDE 3/4" CHAMFERS ON ALL EXPOSED CONCRETE EDGES, UNLESS NOTED OTHERWISE.
17. PREPARATION, CONSTRUCTION, AND PROTECTION OF CONCRETE DURING COLD WEATHER OR HOT WEATHER SHALL CONFORM TO ACI 318 26.5.4, 26.5.5, AND ACI 306R AND 305R.

DATE:	01.23.24
DRAWN BY:	EK
SCALE:	12" = 1'-0"
REVIEWED BY:	CAM
PROJECT NO.:	22-2496
FILE:	

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
55 SOUTH MAIN ST, ONEONTA, NY 13820 - 607.432.8073
16 EAST MARKET ST, RED HOOK, NY 12571 - 518.452.1290
548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777
223 MAIN ST, GOSHEN, NY 10924 - 845.615.9232



REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

GENERAL STRUCTURAL NOTES

SHEET:
S001

REINFORCING STEEL:

1. REINFORCING STEEL SHALL BE DETAILED, FABRICATED, AND PLACED IN ACCORDANCE TO "ACI 318 — BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE" AND "ACI 315—MANUAL OF STANDARD PRACTICE FOR DETAILING REINFORCED CONCRETE STRUCTURES."
2. ALL REINFORCING STEEL SHALL CONFORM TO THE FOLLOWING SPECIFICATIONS AND GRADES UNLESS NOTED OTHERWISE ON THE STRUCTURAL DRAWINGS:
   A. SMOOTH WELDED WIRE FABRIC—ASTM A185
   B. ALL OTHER REINFORCEMENT—ASTM A615, GRADE 60
3. REINFORCING STEEL TO BE WELDED SHALL CONFORM TO ASTM A706. WELDING OF REINFORCING STEEL SHALL CONFORM TO AWS D1.4. ALL WELDING SHALL BE DONE BY AWS CERTIFIED WELDERS USING LOW HYDROGEN E70XX ELECTRODES.
4. REINFORCING STEEL SHALL BE SECURELY TIED IN-PLACE WITH #16 ANNEALED IRON WIRE. BARS IN BEAMS, SLABS, AND FOUNDATIONS SHALL BE SUPPORTED ON WELL-CURED CONCRETE BLOCKS, OR APPROVED METAL CHAIRS, AS SPECIFIED BY THE "CRSI MANUAL OF STANDARD PRACTICE," MSP-1.
5. ALL REINFORCEMENT SHALL BE FREE OF LOOSE MILL AND RUST SCALE, OIL, DIRT, OR COATINGS OF ANY KIND THAT REDUCE THE BOND STRENGTH TO THE CONCRETE.
6. REINFORCEMENT STEEL SHALL NOT BE DISPLACED OR ALTERED FOR THE CONVENIENCE OF OTHER TRADES UNLESS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
7. "WET SETTING" OF REINFORCING STEEL, ANCHOR RODS, EMBEDDED PLATES AND INSERTS IS NOT PERMITTED.
8. ALL REINFORCEMENT SHALL BE CONTINUOUS WITH ADEQUATE LAP LENGTHS AT SPLICE LOCATIONS.
9. THE FOLLOWING MINIMUM LAP SPLICE LENGTHS SHALL BE PROVIDED FOR ALL REINFORCING STEEL:

TYPICAL LAP SPLICE SCHEDULE (IN)

BAR SIZE	4,000 PSI		4,500 PSI		5,000 PSI	
	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS	TOP BARS	OTHER BARS
#3	16	16	16	16	16	16
#4	20	16	19	16	19	16
#5	25	20	24	19	23	17
#6	30	24	28	23	26	21
#7	49	38	46	36	43	34
#8	62	47	58	45	55	42
#9	76	58	71	55	68	52
#10	91	71	86	67	82	64
#11	110	85	103	80	98	76

   A. FOR CENTER-TO-CENTER SPACING LESS THAN SHOWN BELOW MULTIPLY THE ABOVE VALUES BY THE FACTOR INDICATED:

BAR	SPACING	FACTOR
#3	< 1.875"	1.5
#4	< 2.500"	1.7
#5	< 3.125"	2.0
#6	< 3.750"	2.2
#7	< 3.875"	2.1
#8	< 4.000"	2.0
#9	< 4.125"	1.9
#10	< 4.375"	1.7
#11	< 4.500"	1.6

   B. TABLE VALUES APPLY FOR CLEAR COVER GREATER THAN OR EQUAL TO 1-1/2". CONTACT ENGINEER OF RECORD IF CONDITIONS VARY.
   C. TOP BARS ARE HORIZONTAL BARS WITH MORE THAN 12" OF CONCRETE CAST BELOW THE BAR.
   D. VALUES ARE FOR UNCOATED BARS.
10. THE FOLLOWING MINIMUM CONCRETE COVER SHALL BE PROVIDED FOR ALL REINFORCING STEEL:

MINIMUM CONCRETE COVER (CAST-IN-PLACE)

USE	CLEAR COVER
FORMED CONCRETE SURFACES IN CONTACT W/ EARTH OR EXPOSED TO WEATHER	2" CLEAR COVER 1.5" CLEAR COVER TO TIES
SLAB-ON-GRADE BARS	2" CLEAR COVER FROM TOP OF SLAB
CONCRETE CAST AGAINST EARTH	3"

11. CONTINUE HORIZONTAL WALL BARS THROUGH PILASTERS, COLUMNS AND INTERSECTING WALLS.
12. PROVIDE HOOKED FOOTING DOWELS OF THE SAME SIZE AND SPACING AS THE VERTICAL WALL REINFORCEMENT. LAP SPLICE DOWELS TO THE VERTICAL WALL REINFORCEMENT AND TERMINATE WITH STANDARD 90 DEGREE HOOK INTO THE FOOTING. HOOK SHALL LAY IN-PLANE WITH BOTTOM REINFORCEMENT.
13. AT SLAB AND WALL OPENINGS, PROVIDE A MINIMUM OF TWO #5 BARS OVER, UNDER, AND AT THE SIDES OF THE OPENING. EXTEND THESE BARS A LAP DISTANCE (OR A MINIMUM OF 2'-0") PAST THE OPENING ON ALL SIDES.
14. PROVIDE ONE #5 FOR SINGLE LAYER, AND TWO #5 FOR DOUBLE LAYER REINFORCING, 4'-0" LONG, DIAGONALLY AT EACH CORNER OF ALL WALL AND SLAB OPENINGS.
15. REFERENCE TYPICAL DETAILS FOR THE DISPOSITION OF REINFORCEMENT AT WALL CORNERS, WALL INTERSECTIONS, AND FOR BARS IN SMALL WALL SECTIONS.
16. PROVIDE #5 CARRIER BAR AT 3'-0" MAX SPACING FOR ALL SLAB, JOIST, AND WALL REINFORCING NOT SUPPORTED BY OTHER TRANSVERSE REINFORCEMENT.
17. PROVIDE CORNER BARS AT CORNERS AND INTERSECTIONS FOR WALLS AND FOUNDATIONS EQUAL IN SIZE, NUMBER, AND SPACING TO HORIZONTAL REINFORCING. SIZE CORNER BARS TO PROVIDE A FULL LAP WITH HORIZONTAL REINFORCMENT ON EACH LEG.

SHORING AND RE-SHORING:

1. SHORING AND RE-SHORING IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL CONFORM TO ACI 347-04 AND ACI 347.2R-05.
2. SHORING AND SUPPORTING FORMWORK SHALL NOT BE REMOVED FROM HORIZONTAL MEMBERS BEFORE THE CONCRETE STRENGTH HAS REACHED AT LEAST 70 PERCENT OF THE SPECIFIED DESIGN STRENGTH AS DETERMINED FROM FIELD CURED CYLINDERS. IN ADDITION, SHORING SHALL NOT BE REMOVED SOONER THAN THE FOLLOWING:

SHORING AND RE-SHORING

ELEMENT	MINIMUM REMOVAL TIME	COMMENTS
WALLS, COLUMNS, AND BEAM SIDES	12 HR. CUMULATIVE WITH 50 DEGREES FARENHEIT SURROUNDING TEMPERATURE	WHERE FORMS ALSO SUPPORT FORMWORK FOR SLABS OR SOFFITS, THE REMOVAL TIME OF THE LATTER GOVERNS

CONCRETE ACCESSORIES:

1. DEFORMED BAR ANCHORS (D.B.A.) SHALL BE NELSON TYPE D2L (ICC ESR-2907) OR APPROVED EQUAL.
2. HEADED SHEAR STUDS SHALL BE NELSON HEADED ANCHORS WITH FLUXED ENDS (ICC ESR-2856) OR APPROVED EQUAL.
3. HEADED SHEAR STUDS AND DEFORMED BAR ANCHORS SHALL BE AUTOMATICALLY END-WELDED WITH THE MANUFACTURER'S STANDARD EQUIPMENT AND IN ACCORDANCE WITH THE ASSOCIATED ICC REPORTS.
4. PERMANENTLY EXPOSED EMBEDDED PLATES AND ANGLES SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION. EMBEDDED ITEMS SHALL NOT BE LOADED, NOR SHALL WELDS BE APPLIED, FOR A MINIMUM OF 7-DAYS AFTER CASTING OF CONCRETE.
5. PROVIDE WATERSTOPS AT ALL HORIZONTAL AND VERTICAL CONCRETE JOINTS WHERE INDICATED ON DRAWINGS AND DETAILS. WATERSTOPS INDICATED TO BE HYDROPHLLIC STRIP WATERSTOP SHALL MAINTAIN A MINIMUM CLEAR COVER OF 3 INCHES. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR ADDITIONAL INFORMATION.
6. APPROVED POST-INSTALLED ANCHORS ARE AS FOLLOWS:

APPROVED POST-INSTALLED CONCRETE ANCHORS

TYPE	ANCHOR	ICC REPORT
CONCRETE SCREW	SIMPSON TITEN HD	ICC ESR-2713
	HILTI KWIK HUS-EZ	ICC ESR-3027
EPOXY ADHESIVE	SIMPSON SET-XP	ICC ESR-2508
	HILTI HIT-RE 500V3	ICC ESR-2322
EXPANSION	SIMPSON STRONG-BOLT II	ICC ESR-3814
	HILTI KWIK BOLT TZ	ICC ESR-1917

   A. ALL ANCHORS SHALL BE INSTALLED IN STRICT CONFORMANCE TO THE APPLICABLE ICC REPORT.
   B. REINFORCEMENT SHALL NOT BE CUT IN NEW, OR EXISTING CONCRETE DURING INSTALLATION OF POST-INSTALLED ANCHORS.
   C. ANCHORS THAT ARE LEFT EXPOSED TO WEATHER SHALL BE STAINLESS STEEL OR HOT-DIPPED GALVANIZED.

EPOXY REPAIR ADHESIVE:

1. EPOXY REPAIR ADHESIVE SHALL CONFORM TO ASTM C881 AND SHALL BE A TWO-COMPONENT, LIQUID EPOXY WITH NON-SAG CONSISTENCY AND LONG POT LIFE. THE EPOXY ADHESIVE SHALL BE SUITABLE FOR USE ON DRY OR DAMP SURFACES.
2. ADHESIVE SHALL MEET THE FOLLOWING MINIMUM REQUIREMENTS:
   A. 14 DAY BOND STRENGTH (SLANT SHEAR) = 1690 PSI
   B. 7 DAY TENSILE STRENGTH = 7150 PSI
   C. 7 DAY COMPRESSIVE STRENGTH = 12000 PSI
   D. LINEAR COEFFICIENT OF SHRINKAGE = 0.008 (MAX VALUE)
3. HOLE SIZES AND INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND THE REQUIREMENTS SET FORTH IN THE APPROVED ICC EVALUATION REPORT.
4. REINFORCEMENT SHALL NOT BE CUT OR DAMAGED IN EITHER NEW OR EXISTING CONCRETE DURING INSTALLATION.

PRE-ENGINEERED METAL BUILDING (PEMB):

1. THE PRE-ENGINEERED BUILDING SUPPLIER SHALL FURNISH THE FRAME REACTIONS TO THE ENGINEER OF RECORD, PRIOR TO COMMENCEMENT OF FOUNDATION CONSTRUCTION. THE REACTIONS FURNISHED SHALL BE THE MAXIMUM, WORST-CASE REACTIONS RESULTING FROM LOAD CASES.
2. SUBMIT ENGINEERED AND CHECKED SHOP DRAWINGS AND CALCULATIONS TO THE ENGINEER FOR REVIEW. SHOP DRAWINGS AND CALCULATIONS SHALL BE SIGNED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER IN THE LOCAL JURISDICTION. SUBMITTALS SHALL INCLUDE PLANS LOCATING AND DEFINING ALL ELEMENTS FURNISHED BY THE MANUFACTURER, WITH ALL MAJOR OPENINGS SHOWN. SECTIONS AND DETAILS SHOWING CONNECTIONS, BASEPLATES, WALL CONDITIONS AND ROOF CONDITIONS OF THE PRE-ENGINEERED BUILDING. ALL SUBMITTAL MATERIAL MUST BE REVIEWED AND APPROVED BY THE ENGINEER PRIOR TO CONSTRUCTION AND INSTALLATION.
3. THE PRE-ENGINEERED BUILDING SUPPLIER SHALL FURNISH ANCHOR ROD INFORMATION TO THE FOUNDATION CONTRACTOR. ANCHOR ROD PATTERNS SHOWN ON THE FOUNDATION DETAILS ARE SCHEMATIC ONLY. THE GENERAL CONTRACTOR SHALL FURNISH AND SUPPLY THE ANCHOR RODS FOR INSTALLATION IN FOUNDATIONS.
4. ALL ANCHOR RODS SHALL BE F1554 GRADE 36. EMBED ANCHOR RODS 18" MINIMUM INTO CONCRETE PIERS; FINAL ANCHOR BOLT LAYOUT AND EMBEDMENTS SHALL BE CONFIRMED UPON RECEIPT OF PEMB REACTIONS AND DRAWINGS.
5. ALL STEEL SHALL BE FACTORY PRIMED..
6. PRE-ENGINEERED METAL BUILDING STEEL SHALL BE AS FOLLOWS:
   A. RIGID CLEAR SPAN FRAMES: I-SHAPED FRAME SECTIONS FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES. INTERIOR COLUMNS WHERE SHOWN SHALL BE FABRICATED FROM ROUND STEEL PIPES OR TUBES, OR SHOP-WELDED, BUILT-UP STEEL PLATES.
      a. FRAME CONFIGURATION: SINGLE GABLE.
      b. EXTERIOR COLUMN: TAPERED.
      c. RAFTER: TAPERED.
   B. END-WALL FRAMING: MANUFACTURER'S STANDARD PRIMARY END-WALL FRAMING FABRICATED FOR FIELD-BOLTED ASSEMBLY TO COMPLY WITH THE FOLLOWING:
      a. END-WALL RAFTERS: C-SHAPED, COLD-FORMED, STRUCTURAL-STEEL SHEET; OR I-SHAPED SECTIONS FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES.
   C. SECONDARY FRAMING: MANUFACTURER'S STANDARD SECONDARY FRAMING, INCLUDING PURLINS, GIRTS, EAVE STRUTS, FLANGE BRACING, BASE MEMBERS, GABLE ANGLES, CLIPS, HEADERS, JAMBS, AND OTHER MISCELLANEOUS STRUCTURAL MEMBERS. UNLESS OTHERWISE INDICATED, FABRICATE FRAMING FROM EITHER COLD-FORMED, STRUCTURAL-STEEL SHEET OR ROLL-FORMED, METALLIC-COATED STEEL SHEET, PREPAINTED WITH COIL COATING, TO COMPLY WITH THE FOLLOWING:
      a. PURLINS: C- OR Z-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES; MINIMUM 2-1/2-INCH- (64-MM-) WIDE FLANGES.
      b. GIRTS: C- OR Z-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES. FORM ENDS OF Z-SECTIONS WITH STIFFENING LIPS ANGLED 40 TO 50 DEGREES FROM FLANGE, WITH MINIMUM 2-1/2-INCH- (64-MM-) WIDE FLANGES.
      c. EAVE STRUTS: UNEQUAL-FLANGE, C-SHAPED SECTIONS; FABRICATED FROM BUILT-UP STEEL PLATES, STEEL SHEET, OR STRUCTURAL-STEEL SHAPES; TO PROVIDE ADEQUATE BACKUP FOR METAL PANELS.
      d. FLANGE BRACING: MINIMUM 2-BY-2-BY-1/8-INCH (51-BY-51-BY-3-MM) STRUCTURAL-STEEL ANGLES OR 1-INCH- (25-MM-) DIAMETER, COLD-FORMED STRUCTURAL TUBING TO STIFFEN PRIMARY-FRAME FLANGES.
      e. SAG BRACING: MINIMUM 1-BY-1-BY-1/8-INCH (25-BY-25-BY-3-MM) STRUCTURAL-STEEL ANGLES.
      f. BASE OR SILL ANGLES: MANUFACTURER'S STANDARD BASE ANGLE, MINIMUM 3-BY-2-INCH (76-BY-51-MM), FABRICATED FROM ZINC-COATED (GALVANIZED) STEEL SHEET.
      g. PURLIN AND GIRT CLIPS: MANUFACTURER'S STANDARD CLIPS FABRICATED FROM STEEL SHEET. PROVIDE GALVANIZED CLIPS WHERE CLIPS ARE CONNECTED TO GALVANIZED FRAMING MEMBERS.
      h. FRAMING FOR OPENINGS: CHANNEL SHAPES; FABRICATED FROM COLD-FORMED, STRUCTURAL-STEEL SHEET OR STRUCTURAL-STEEL SHAPES. FRAME HEAD AND JAMB OF DOOR OPENINGS AND HEAD, JAMB, AND SILL OF OTHER OPENINGS.
   D. BRACING: PROVIDE ADJUSTABLE WIND BRACING AS FOLLOWS:
      a. RIGID PORTAL FRAMES: FABRICATED FROM SHOP-WELDED, BUILT-UP STEEL PLATES OR STRUCTURAL-STEEL SHAPES TO MATCH PRIMARY FRAMING; OF SIZE REQUIRED TO WITHSTAND DESIGN LOADS.

ALUMINUM:

1. STRUCTURAL ALUMINUM SHALL BE DOMESTIC ALLOY 6061-T6. QUALITY, FABRICATIONS, ASSEMBLY, AND ERECTION SHALL BE IN ACCORDANCE WITH THE ALUMINUM ASSOCIATION'S SPECIFICATION FOR ALUMINUM STRUCTURES, LATEST EDITION.

   MATERIAL
   A. SHEET AND PLATE: ASTM B209
   B. ROLLED BARS AND RODS: ASTM B211
   C. EXTRUDED BARS, RODS, SHAPES, AND TUBES: ASTM B221
   D. ROLLED OR EXTRUDED STRUCTURAL SHAPES: ASTM B308
   E. EXTRUDED STRUCTURAL PIPE AND TUBE: ASTM B429

2. FASTENERS: UNLESS DETAILED OTHERWISE, ALL FASTENERS SHALL BE 316 STAINLESS STEEL. ALUMINUM BOLTS, WHERE SPECIFIED SHALL BE 2024-T4 OR 6061-T6 ALLOY.
3. ALL WELDING SHALL CONROM WITH AWS D.1.2, LATEST STRUCTURAL WELDING CODE-ALUMINUM.
4. DESIGN AND DETAILING OF THE CONNECTIONS IS THE RESPONSIBILITY OF THE FABRICATOR AND FABRICATOR'S ENGINEER. ENGINEER SHALL BE REGISTERED IN THE LOCAL JURISDICTION. USE RATIONAL ENGINEERING DESIGN AND STANDARD PRACTICE FOR THE CRITERIA SET FORTH IN THE CONTRACT DOCUMENTS. THE DETAILS SHOWN ON THE DRAWINGS ARE CONCEPTUAL AND DO NOT INDICATE THE REQUIRED WELD SIZES OR NUMBER OF BOLTS UNLESS SPECIFICALLY NOTED.
5. ALL ALUMINUM ITEMS SHALL BE ANODIZED UNLESS OTHERWISE NOTED. ANODIZING FINISH SHALL COMPLY WITH STANDARDS FOR ANODIZED ARCHITECTURAL ALUMINUM BY THE ALUMINUM ASSOCIATION. DO NOT ANODIZE ALUMINUM SURFACES WITHIN 3 INCHES OF ANY SURFACE INDICATED TO BE FIELD WELDED. ANODIZED FINISH SHALL BE CLEAR ANODIZED PER AA-M10C11C21A41 WITH A MINIMUM 0.7 MIL COATING.
6. WHERE THE CONTACT OF DISSIMILAR METALS MAY CAUSE ELECTROLYSIS OR WHERE ALUMINUM WILL COME IN CONTACT WITH CONCRETE, MORTAR OR PLASTER, THE CONTACT SURFACE OF THE ALUMINUM SHALL BE COATED WITH 1 COAT OF ZINC CHROMATE PRIMER AND 1 HEAVY COAT OF ALUMINUM PIGMENTED ASPHALT PAINT.
7. THOROUGHLY CLEAN STRUCTURAL ALUMINUM. REMOVE OIL, GREASE, AND SIMILAR CONTAMINANTS IN ACCORDANCE WITH SSPC SP-1 "SOLVENT CLEANING".
8. ALUMINUM GRATING & STAIR TREADS SHALL BE 6063-T6 AND HAVE A CLEAR ANODIZED PER AA-M10C11C21A41 WITH A MINIMUM 0.7 MIL COATING.

DATE: 01.23.24
DRAWN BY: EK
SCALE: 12" = 1'-0"
REVIEWED BY: CAM
PROJECT NO.: 22-2496
FILE:

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
55 SOUTH MAIN ST, ONEONTA, NY 13820 - 607.432.8073
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546 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777
223 MAIN ST, GOSHEN, NY 10924 - 845.615.9232

REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

GENERAL STRUCTURAL NOTES

SHEET: S002

SPECIAL INSPECTIONS - STEEL

Inspections & Test	Cont.	Per.	IBC Ref.	Required For Project	Referenced Standard
Steel Construction				Yes	
1. Structural Steel				Yes	
a. Inspection Tasks Prior To Welding				Yes	
iii. Manufacturer certifications for welding consumables available		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
i. Welder Qualification records and continuity records	X		1705.2.1	Yes	AISC 360 Table N.5.4-1
ii. Welding Procedure Specifications (WPS) Available	X		1705.2.1	Yes	AISC 360 Table N.5.4-1
iv. Material identification (type/grade)		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
v. Welder identification system		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
vi. Fit up of groove welds (including joint geometry)		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
vii. Fit up of CJP groove welds of HSS, T-, Y-, and K-joints without backing (including joint geometry)		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
viii. Configuration and finish of access holes		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
ix. Fit-up of fillet welds		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
x. Check Welding equipment		X	1705.2.1	Yes	AISC 360 Table N.5.4-1
b. Inspection Tasks During Welding				Yes	
i. Control and Handling of welding consumables.		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
ii. No welding over cracked tack welds.		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
iii. Environmental Conditions		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
iv. Verify WPS followed		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
v. Verify Welding Techniques		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
vi. Placement and installation of steel headed stud anchors		X	1705.2.1	Yes	AISC 360 Table N.5.4-2
c. Inspection Tasks after Welding				Yes	
i. Welds cleaned		X	1705.2.1	Yes	AISC 360 Table N.5.4-3
ii. Size, length, and location of welds	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
iii. Welds meet visual acceptance criteria	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
iv. Arc strikes	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
v. K-area		X	1705.2.1	Yes	AISC 360 Table N.5.4-3
vi. Weld access holes in rolled heavy shapes and built-up heavy shapes	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
vii. Backing removed and weld tabs removed (if required)	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
viii. Repair activities	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
iv. Document acceptance or rejection of welded joint or member	X		1705.2.1	Yes	AISC 360 Table N.5.4-3
x. No prohibited welds have been added without the approval of the EOR		X	1705.2.1	Yes	AISC 360 Table N.5.4-3
d. Inspection Tasks Prior to Bolting				Yes	
i. Manufacturer's certification available for fastener materials	X		1705.2.1	Yes	AISC 360 Table N.5.6-1
ii. Fasteners marked in accordance with ASTM requirements		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
iii. Proper fasteners selected for the joint detail (grade, type, bolt length if threads are to be excluded from shear plane)		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
iv. Proper bolting procedure selected for joint detail		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
v. Connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet applicable requirements.		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
vi. Pre-installation verification testing by installation personnel observed and documented for fastener assemblies and methods used.		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
vii. Proper storage provided for bolts, nuts, washers and other fastener components. X 1705.2.11 AISC 360 Table N5.6-1		X	1705.2.1	Yes	AISC 360 Table N.5.6-1
e. Inspection Tasks During Bolting				Yes	
i. Fastener assemblies, of suitable condition, placed in all holes and washers (if required) are positioned as required.		X	1705.2.1	Yes	AISC 360 Table N.5.6-2
ii. Joint brought to the snug-tight condition prior to the pretensioning operation.		X	1705.2.1	Yes	AISC 360 Table N.5.6-2
iii. Fastener component not turned by the wrench prevented from rotating.		X	1705.2.1	Yes	AISC 360 Table N.5.6-2
iv. Fasteners are pretensioned in accordance with the RCSC Specification, progressing systematically from the most rigid point toward the free edges.		X	1705.2.1	Yes	AISC 360 Table N.5.6-2
f. Inspection Tasks After Bolting				Yes	
i. Document acceptance or rejection of bolted connections.	X		1705.2.1	Yes	AISC 360 Table N.5.6-3

SPECIAL INSPECTIONS - CONCRETE

Inspections & Test	Cont.	Per.	IBC Ref.	Required For Project	Referenced Standard
Concrete Construction				Yes	
1. Inspect reinforcement, including prestressing tendons, and verify placement.		X	1705.3	Yes	ACI 318 Ch. 20, 25.2, 25.3, 26.6.1-26.6.3 IBC 1908.4
2 Reinforcing Bar Welding:			1705.3	No	
a. Verify weldability of reinforcing bars other than ASTM A706:		X	1705.3	No	AWS D1.4 ACI 318: 26.6.4
b. Inspect single pass fillet welds, maximum 5/16" ACI 318: 26.6.4		X	1705.3	No	AWS D1.4 ACI 318: 26.6.4
c. Inspect all other welds	X		1705.3	No	AWS D1.4 ACI 318: 26.6.4
3. Inspect anchors cast in concrete.		X	1705.3	Yes	ACI 318: 17.8.2
4. Inspect anchors post-installed in hardened concrete members.			1705.3	Yes	
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads.	X		1705.3	Yes	ACI 318: 17.8.2.4
b. Mechanical anchors and adhesive anchors not defined in item 4a.		X	1705.3	Yes	ACI 318: 17.8.2
5. Verify use of required design mix		X	1705.3	Yes	ACI 318: Ch. 19, 26.4.3, 26.4.4; IBC 1904.1, 1904.2, 1908.2, 1908.3
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of concrete.	X		1705.3	Yes	ASTM C172, ASTM C31; ACI 318: 26.5, 26.12; IBC 1908.10
7. Inspect concrete and shotcrete placement for proper application techniques.	X		1705.3	Yes	ACI 318: 26.5; IBC 1908.6, 1908.7, 1908.8
8. Verify maintenance of specified curing temperature and techniques.		X	1705.3	Yes	ACI 318: 26.5.3-26.5.5 IBC: 1908.9
9. Inspect Prestressed concrete for:			1705.3	No	
a. Application of prestressing forces	X		1705.3	No	ACI 318: 26.10
b. Grouting of bonded prestressing tendons	X		1705.3	No	ACI 318: 26.10
10. Inspect erection of precast concrete members		X	1705.3	No	ACI 318: Ch. 26.9
11. Verify in-situ concrete strength, prior to stressing tendons in post-tensioned concrete and prior to removal of shores and forms from beams and structural slabs.		X	1705.3	No	ACI 318: 26.11.2
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.		X	1705.3	Yes	ACI 318: 26.11.2b
13. Fabricated Items - Precast Concrete		X	1704.2.5; 1705.10	No	

SPECIAL INSPECTIONS - FOUNDATIONS

Inspections & Test	Cont.	Per.	IBC Ref.	Required For Project	Referenced Standard
Foundations				Yes	
A. Soils				Yes	
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.		X	1705.6	Yes	
2. Verify excavations are extended to a proper depth and have reached proper material.		X	1705.6	Yes	
3. Perform classification and testing of compacted fill materials.		X	1705.6	Yes	
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X		1705.6	Yes	
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly.		X	1705.6	Yes	
B. Driven Deep Foundations				No	
1. Verify element materials, sizes and lengths, comply with the requirements.	X		1705.7	No	
2. Determine capacities of test elements and conduct additional load tests, as required.	X		1705.7	No	
3. Inspect driving operations and maintain complete and accurate records for each elements	X		1705.7	No	
4. Verify placement locations and plumbness, confirm type and size of hammer, record number of blows per foot of penetration, determine required penetrations to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X		1705.7	No	
5. For steel elements, perform additional special inspections in accordance with Section 1705.2.	--	--	1705.7	No	
6. For concrete elements and concrete-filled elements, perform tests and additional special inspections in accordance with Section 1705.3.	--	--	1705.7	No	
7. For specialty elements, perform additional inspections as determined by the registered design professional in responsible charge.	--	--	1705.7	No	
C. Cast-in-place Deep Foundations				No	
1. Inspect drilling operations and maintain complete and accurate records for each element.	X		1705.8	No	
2. Verify placement locations and plumbness, confirm element diameters, bell diameters (if applicable), lengths, embedment into bedrock (if applicable) and adequate end-bearing strata capacity. Record concrete or grout volumes.	X		1705.8	No	
3. For concrete elements, perform tests and additional special inspections in accordance with Section 1705.3.	--	--	1705.8	No	
D. Helical Pile Foundations	X		1705.9	No	

SPECIAL INSPECTION AND TESTING:

1. SPECIAL INSPECTION WILL BE PROVIDED BY THE OWNER BASED ON THE REQUIREMENTS OF THE CURRENT EDITION OF THE NYSBC AS SUMMARIZED IN THE SPECIAL INSPECTION AND TESTING PROGRAM ON SHEET S003. THE CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE AND ACCESS FOR THE SPECIAL INSPECTOR TO PERFORM THESE INSPECTIONS.

STRUCTURAL OBSERVATION:

1. THE STRUCTURAL ENGINEER OF RECORD (SER) WILL PERFORM STRUCTURAL OBSERVATIONS BASED ON THE REQUIREMENTS OF THE IBC AT THE STAGES OF CONSTRUCTION LISTED BELOW. THE CONTRACTOR SHALL PROVIDE SUFFICIENT NOTICE AND ACCESS FOR THE SER TO PERFORM THESE OBSERVATIONS:

STRUCTURAL OBSERVATIONS

CONSTRUCTION PHASE	OBSERVATION BY SER	COMMENTS
PRIOR TO FIRST CONCRETE POUR	X	REF FOOTNOTE A, B, C
AT COMPLETION OF HORIZONTAL ROOF DIAPHRAGM	X	REF FOOTNOTE A, B
PRIOR TO COVERING STRUCTURAL ELEMENTS	X	REF FOOTNOTE A, B
AS REQUIRED TO ADDRESS STRUCTURAL ISSUES	X	REF FOOTNOTE A, B

A. STRUCTURAL OBSERVATIONS ARE INTENDED TO VERIFY GENERAL CONFORMANCE WITH THE STRUCTURAL DRAWINGS. SPECIAL INSPECTIONS AND TESTING ARE STILL REQUIRED.

B. A FIELD REPORT WILL BE SUBMITTED TO THE BUILDING DEPARTMENT FOLLOWING EACH VISIT.

C. STRUCTURAL OBSERVATION TO OCCUR AFTER THE REINFORCING STEEL HAS BEEN INSTALLED.

SUBMITTALS:

1. SHOP DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO THE FABRICATION AND CONSTRUCTION OF ALL STRUCTURAL ITEMS INCLUDING THE FOLLOWING:

SUBMITTALS

ITEM	SUBMITTAL (A, C)	DEFERRED SUBMITTAL (B, C)	COMMENTS
CONCRETE MIX DESIGNS	X		
CONCRETE REINFORCEMENT	X		
REINFORCING STEEL MILL CERTS	X		
CONCRETE ANCHORAGES	X		
EMBEDDED STEEL ITEMS	X		
PRE-ENGINEERED METAL BUILDING SHOP DRAWINGS AND BASE REACTIONS	X	X	
ALUMINUM GUARDRAILS	X	X	
ALUMINUM STAIRS, GRATING, AND FRAMING	X		

A. IF THE SHOP DRAWINGS DIFFER FROM OR ADD TO THE DESIGN OF THE STRUCTURAL DRAWINGS, THEY SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN NEW YORK STATE. ANY MODIFICATIONS TO THE STRUCTURAL DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER AND ARE SUBJECT TO REVIEW AND ACCEPTANCE BY THE STRUCTURAL ENGINEER OF RECORD.

B. DESIGN DRAWINGS, SHOP DRAWINGS, AND CALCULATIONS FOR THE DESIGN AND FABRICATION OF ITEMS THAT ARE DESIGNED BY OTHERS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN NEW YORK STATE. CALCULATIONS SHALL BE INCLUDED FOR ALL CONNECTIONS TO THE STRUCTURE CONSIDERING LOCALIZED EFFECTS ON STRUCTURAL ELEMENTS INDUCED BY THE CONNECTION LOADS. DESIGN SHALL BE BASED UPON THE REQUIREMENTS OF THE NYSBC AND AS NOTED UNDER "DESIGN CRITERIA."

C. FIELD ENGINEERED DETAILS DEVELOPED BY THE CONTRACTOR THAT DIFFER FROM, OR ADD TO, THE STRUCTURAL DRAWINGS SHALL BEAR THE SEAL AND SIGNATURE OF A STRUCTURAL ENGINEER REGISTERED IN NEW YORK STATE AND SHALL BE SUBMITTED TO THE ARCHITECT PRIOR TO CONSTRUCTION. ANY SUCH DETAILS ARE SUBJECT TO REVIEW AND ACCEPTANCE BY THE STRUCTURAL ENGINEER OF RECORD.

DATE:	01.23.24
DRAWN BY:	EK
SCALE:	12" = 1'-0"
REVIEWED BY:	CAM
PROJECT NO.:	22-2496
FILE:	

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
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548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777
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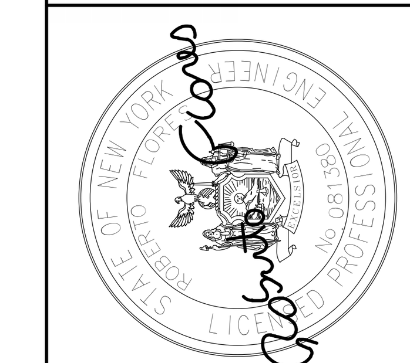


REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

SPECIAL INSPECTION & SUBMITTALS

SHEET: S003

STRUCTURAL LEGEND

- [-] • INDICATES FOUNDATION TYPE MARK, REFERENCE THE FOUNDATION SCHEDULE.
- LOW / HIGH • INDICATES FLOOR/ROOF STEP.
- LOW / HIGH • INDICATES TOP FOUNDATION WALL STEP.
- LOW / HIGH • INDICATES TOP FOOTING STEP.
- • INDICATES STRUCTURAL WALL BELOW.
- (#) • INDICATES KEYED NOTE.
- (--) • INDICATES NEW GRIDLINE

FOUNDATION PLAN NOTES

1. ALL ELEVATIONS REFERENCED FROM 0'-0" = FF.
2. VERIFY ALL DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS AND METAL BUILDING DRAWINGS. GRIDLINES ARE LOCATED AT OUTSIDE FACE OF CONCRETE FOUNDATION WALLS AND CENTERLINE OF COLUMNS WHERE INDICATED.
3. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION METHOD FOR THIS STRUCTURE. CONNECTIONS, DETAILS AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS ARISE REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE STRUCTURAL ENGINEER OF RECORD FOR CLARIFICATION IN A TIMELY MANNER PRIOR TO BID OPENING.
4. REFERENCE MEP DRAWINGS FOR ALL ELEVATIONS, PIPE PENETRATIONS, ETC. REFER TO STRUCTURAL DETAILS CORRESPONDING TO SPECIFIC ITEMS SUCH AS PIPE PENETRATIONS, OPENINGS, ETC.
5. VERIFY SIZE AND LOCATION OF ALL SLAB AND WALL PENETRATIONS.
6. ALL WALL FOOTINGS ARE WF1, UNLESS OTHERWISE NOTED. WALL FOOTINGS ARE CENTERED ON FOUNDATION WALLS.
7. TOP OF FOOTING ELEVATION IS -4' - 0" UNLESS OTHERWISE NOTED.
8. ALL STEM WALLS TO BE 8" THICK UNO ON PLAN, REINFORCEMENT TO BE #5@12" OC, EW, CENTER OF WALL.
9. TOP OF FOUNDATION WALL ELEVATION IS 1'-0" UNLESS OTHERWISE NOTED.
10. TOP OF PIER ELEVATION IS 0'-0" UNLESS OTHERWISE NOTED.
11. NOTE 11 REMOVED.

WALL FOOTING SCHEDULE

MARK	WIDTH	THICKNESS	LONG. REINF.	TRANS. REINF.
WF1	2' - 0"	1' - 0"	(3) #5, EQ SP, BTM	#5 @18" OC, BTM

FOOTING SCHEDULE

MARK	LENGTH	WIDTH	THICKNESS	LONG. REINF.	TRANS. REINF.
F1	3' - 6"	3' - 6"	1' - 0"	(4) #5, EQ SP, BTM	(4) #5, EQ SP, BTM
F2	5' - 6"	5' - 6"	1' - 0"	(6) #5, EQ SP, BTM	(6) #5, EQ SP, BTM

PIER SCHEDULE

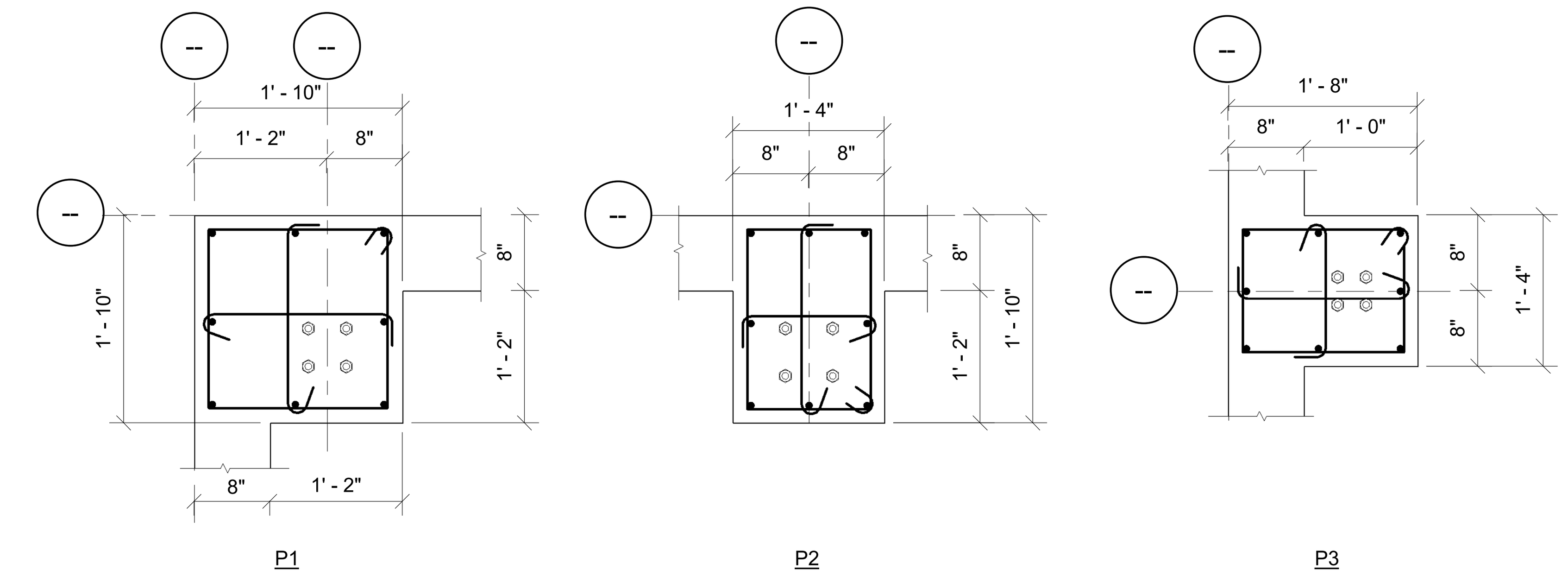
MARK	SIZE	VERT REINF	TIES
P1	22"x22"	(8) #5, EQ SP	1 @2",1 @3", REMAINDER @10"
P2	16"x22"	(8) #5, EQ SP	1 @2",1 @3", REMAINDER @10"
P3	16"x20"	(8) #5, EQ SP	1 @2",1 @3", REMAINDER @10"

KEYNOTES (#)

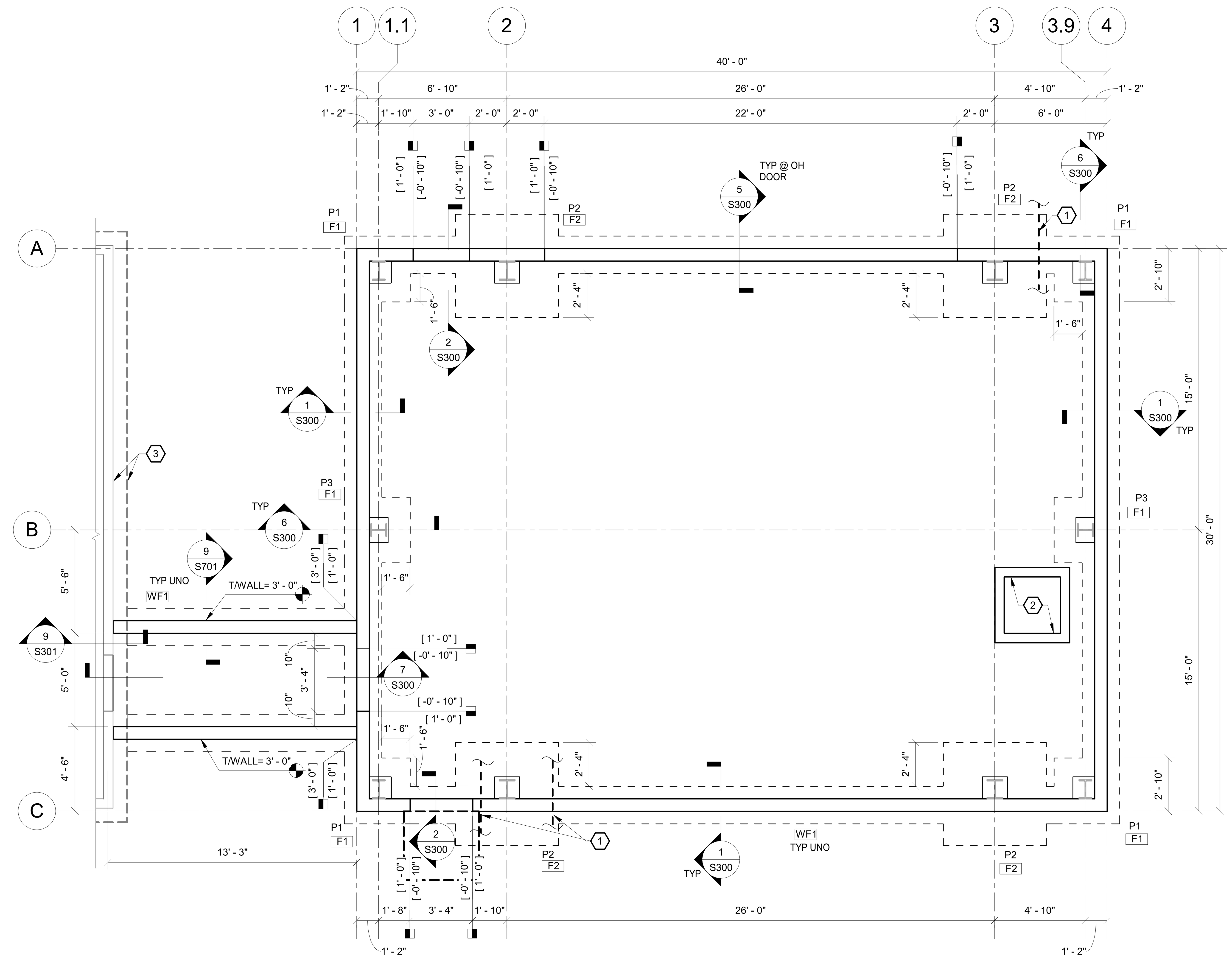
1 PIPE PENETRATION THROUGH FOUNDATION WALL; REFER TO MECH PLANS AND S300 FOR ADDITIONAL INFORMATION

2 PRECAST CATCH BASIN PER CIVIL/MECH

3 EXISTING FOUNDATIONS, VERIFY LOCATION AND T/FTG ELEVATION IN FIELD



2 PIER TYPES
S100 N.T.S



1 FOUNDATION PLAN
S100 1/4" = 1'-0"

DATE:	01.23.24
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STATE OF NEW YORK · ROBERTO FLORES · No 081380 · LICENSED PROFESSIONAL ENGINEER

REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

FOUNDATION PLAN

SHEET: S100

STRUCTURAL LEGEND

- INDICATES FOUNDATION TYPE MARK, REFERENCE THE FOUNDATION SCHEDULE.
- LOW HIGH • INDICATES FLOOR/ROOF STEP.
- LOW HIGH • INDICATES TOP FOUNDATION WALL STEP.
- LOW HIGH • INDICATES TOP FOOTING STEP.
- INDICATES STRUCTURAL WALL BELOW.
- # • INDICATES KEYED NOTE.
- -- • INDICATES NEW GRIDLINE

FRAMING PLAN NOTES

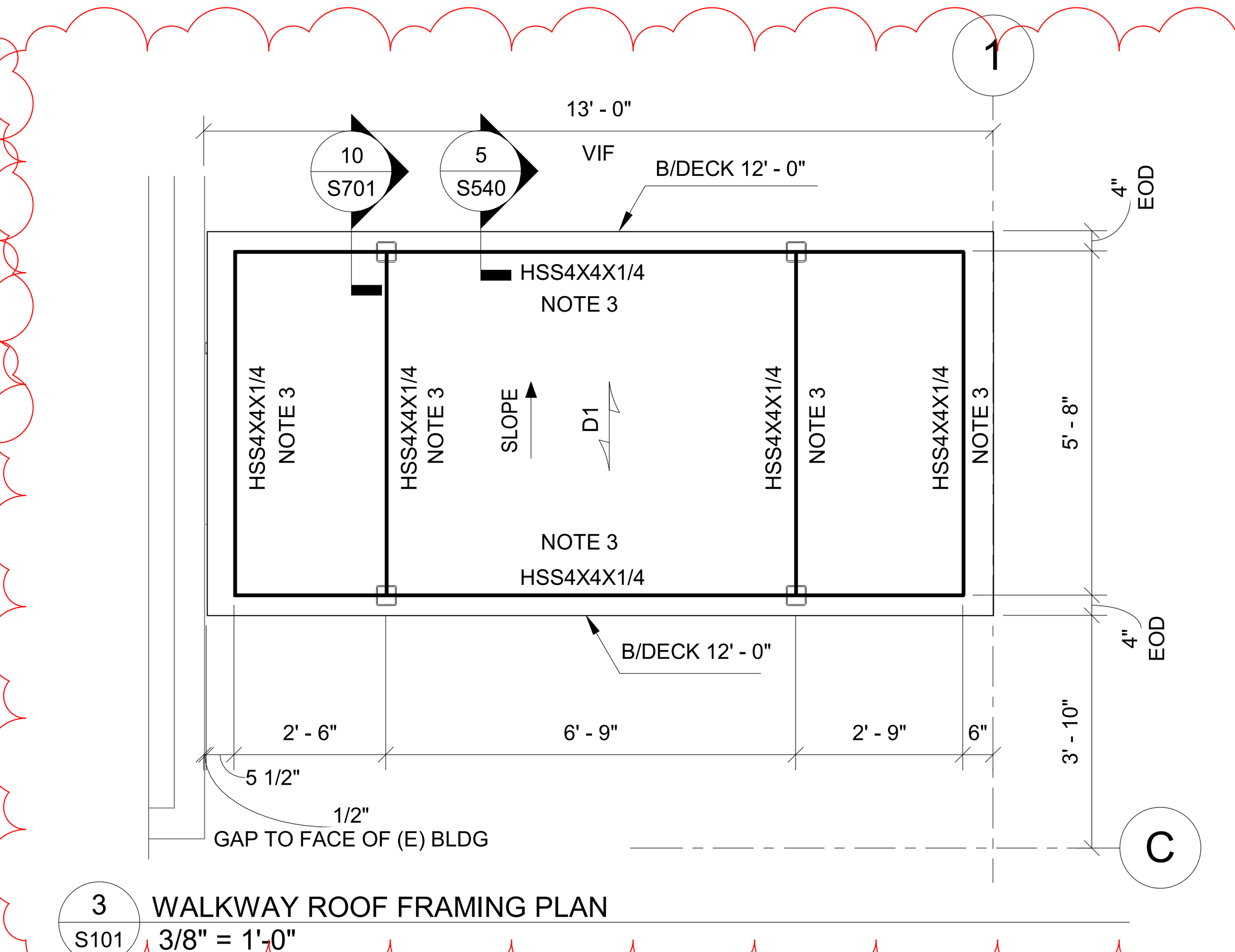
1. ALL ELEVATIONS ARE REFERENCED FROM 0'-0" = FF = 25.0'.
2. VERIFY ALL DIMENSIONS WITH THE ARCHITECTURAL DRAWINGS AND THE METAL BUILDING DRAWINGS. GRIDLINES ARE LOCATED AT EXTERIOR FACE OF CONCRETE FOUNDATION WALLS AND CENTERLINE OF COLUMNS WHERE INDICATED.
3. DETAILS ON THESE PLANS ARE INTENDED TO DEPICT THE GENERAL CONSTRUCTION METHODS FOR THIS STRUCTURE. CONNECTIONS, DETAILS AND CONDITIONS NOT SPECIFICALLY SHOWN THAT ARE SIMILAR TO THOSE THAT ARE SPECIFIED SHALL BE ASSUMED ONE AND THE SAME. IF QUESTIONS REGARDING THE APPLICATION OF DETAILS ARE ENCOUNTERED, NOTIFY THE ENGINEER FOR CLARIFICATION IN A TIMELY MANNER PRIOR TO BID OPENING.
4. REFERENCE MEP DRAWINGS FOR ALL ELEVATIONS, PIPE PENETRATIONS, ETC. REFER TO STRUCTURAL DETAILS CORRESPONDING TO SPECIFIC ITEMS SUCH AS PIPE PENETRATIONS, OPENINGS, ETC.
5. REFERENCE ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION FOR ALL DOORS.
6. G1 INDICATES SPAN DIRECTION OF 1 1/2" SERRATED ALUMINUM GRATING W/ 3/16" BEARING BARS @ 1 3/16" OC AND CROSS BARS @ 2" OC. ALL EDGES OF GRATING AND OPENINGS IN GRATING SHALL BE BANDED.
7. ALL GRATING SHALL CONFORM TO ANSI/NAAMM MBG 531. ATTACH TO SUPPORTING STEELWITH MANUFACTURER'S STANDARD HOLD DOWN CLIPS. GRATING AND HARDWARE SHALL HAVE EITHER STAINLESS STEEL TYPE 316 FINISH OR ANODIZED FINISH.

KEYNOTES

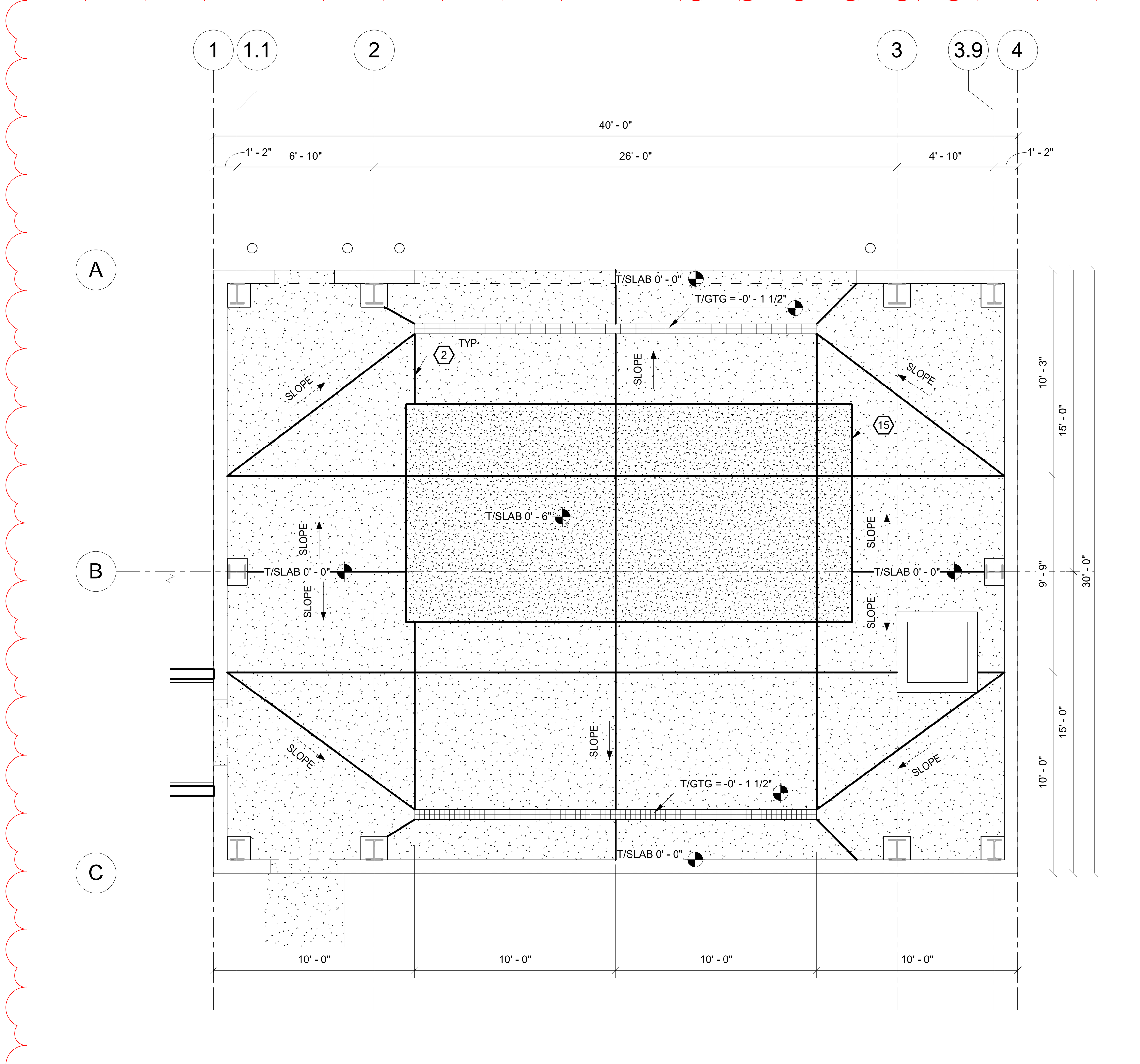
1	8" NORMAL WEIGHT SLAB-ON-GRADE. REINFORCE WITH #5 @ 16" OC EW, PER 3/S301
2	CONTROL JOINT, CONTINUE THROUGH AND INCLUDE IN HOUSEKEEPING PAD WHERE APPLICABLE, TYPICAL PER 5/S301
3	14" THICK CAST-IN-PLACE EQUIPMENT PAD (SLAB-ON-GRADE); REINFORCE WITH #5@12" OC, EW, T&B. FINAL DIMENSIONS OF PAD TO BE COORDINATED WITH EQUIPMENT MANUF; PAD EXTENTS TO BE MIN 6" GREATER THAN EQUIPMENT EXTENTS EA SIDE. T/ PAD PER PLAN
4	BOLLARD, TYPICAL PER 11/S300.
5	ALUMINUM STAIRS, CONT'R TO SUBMIT AS PART OF DELEGATED DESIGN
6	ALUMINUM POST TO BE RT4x4x0.188, REFERENCE 3/S701 FOR ATTACHMENT TO SLAB
7	THICK DASHED LINE INDICATES EXTENTS OF ALUMINUM HANDRAIL PER 1/S701
8	TRENCH DRAIN, 6" WIDE x 20' - 0" LONG DURO-SLOPE BY NDS W/ GALVANIED DS-221 GRATING OR APPROVED EQUAL, PER 9/S301.
9	SLAB OPENING FOR CATCH BASIN, PER MECHANICAL
10	5" THICK SLAB-ON-GRADE; REINFORCE WITH EPOXY-COATED #5 @ 12 EW, 2" CLEAR FROM TOP OF SLAB
11	EXISTING EXTERIOR WALL OF CHEMICAL FEED/STORAGE BLDG, FF ELEV = 28.0'
13	CAST-IN-PLACE CONCRETE STAIRS, REINFORCE W/ #5@12" OC, EW, PER DETAIL 7/S300
14	600S162-43 INFILL METAL STUD WALL W/ 600T150-43 TOP AND BOTTOM TRACK; U-BRIDGING MID-HEIGHT OF WALL PER 3/S540 & 4/S540
15	EDGE JOINT, PER 5/S301

ROOF FRAMING PLAN NOTES

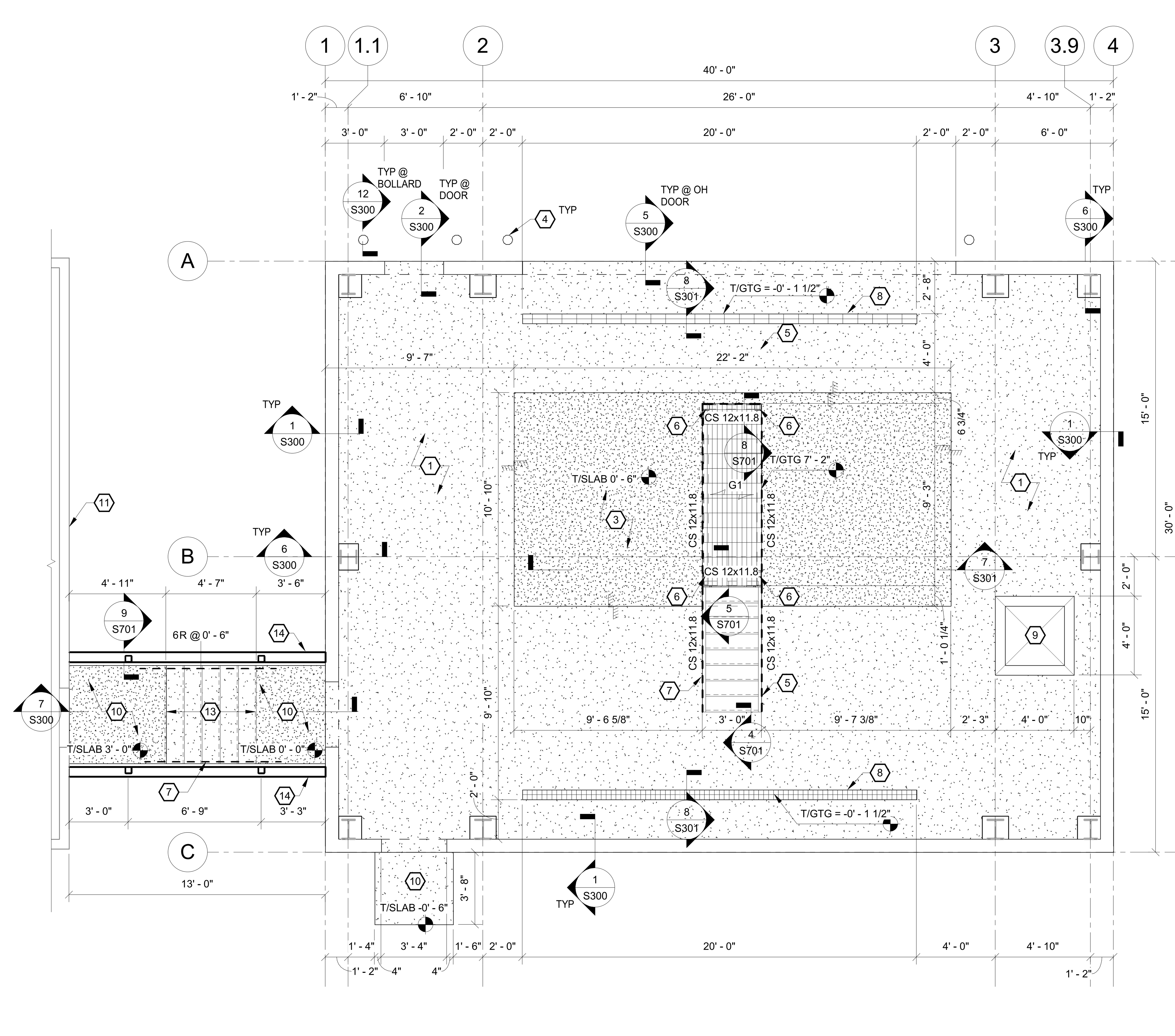
1. ALL ELEVATIONS ARE REFERENCED FROM 0'-0" = FF = 25.0'.
2. D1 INDICATES SPAN DIRECTION OF 3" TYPE N METAL ROOF DECK, 20 GAGE, GALVANIZED (G90). FASTEN TO STEEL SUPPORTS (END AND INTERIOR SUPPORTS) WITH HILTI X-ENP19 PAF IN A 36/4 PATTERN. SIDELAP FASTENING TO BE HILTI SCREW S-SLC01/02 AT 12" OC. FASTENER SUBSTITUTION ACCEPTABLE UPON APPROVAL OF PROPOSED FASTENER DOCUMENTATION BY THE EOR.
3. ALL WELDED FRAME TO BE FABRICATED AS ONE UNIT WITH MITERED CORNERS.



3 S101 WALKWAY ROOF FRAMING PLAN 3/8" = 1'-0"



2 S101 SLAB PLAN 1/4" = 1'-0"



1 S101 FIRST FLOOR STRUCTURAL FRAMING PLAN 1/4" = 1'-0"

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DRAWN BY:	EK
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REVIEWED BY:	CAM
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FILE:	

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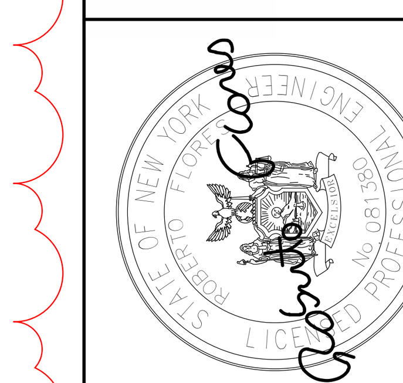


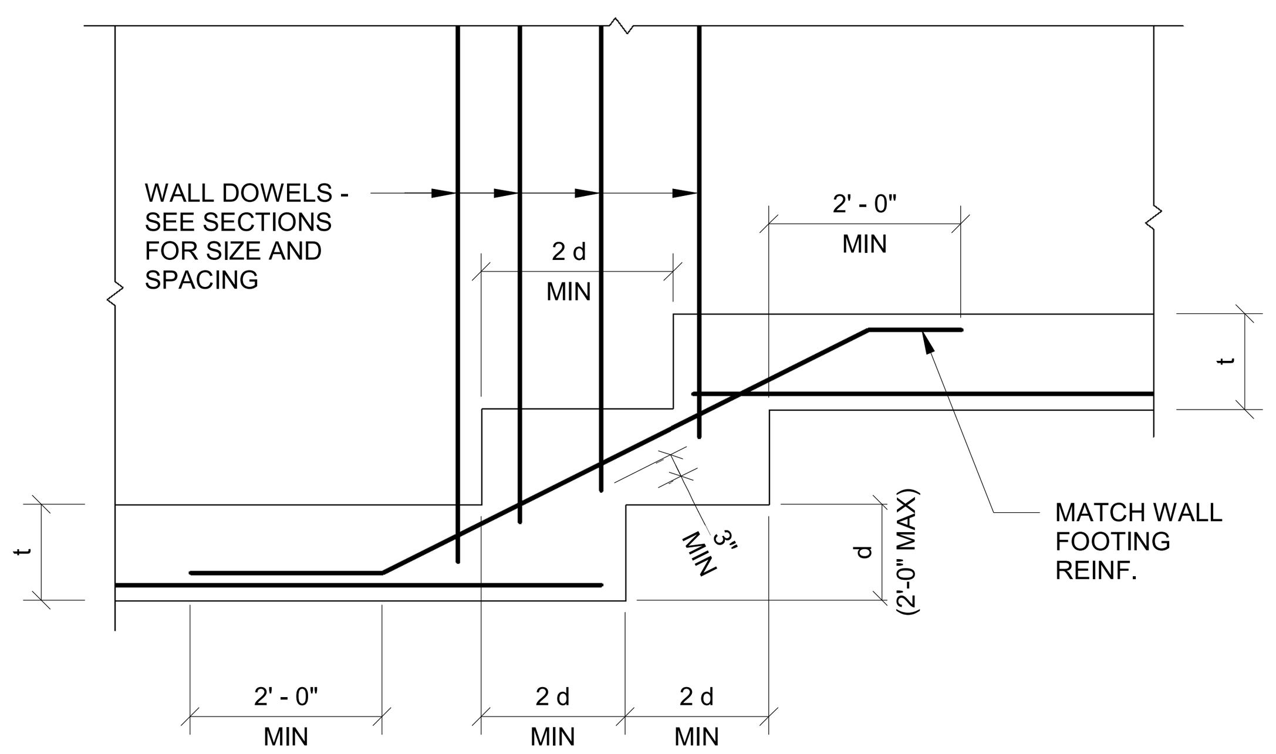
REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

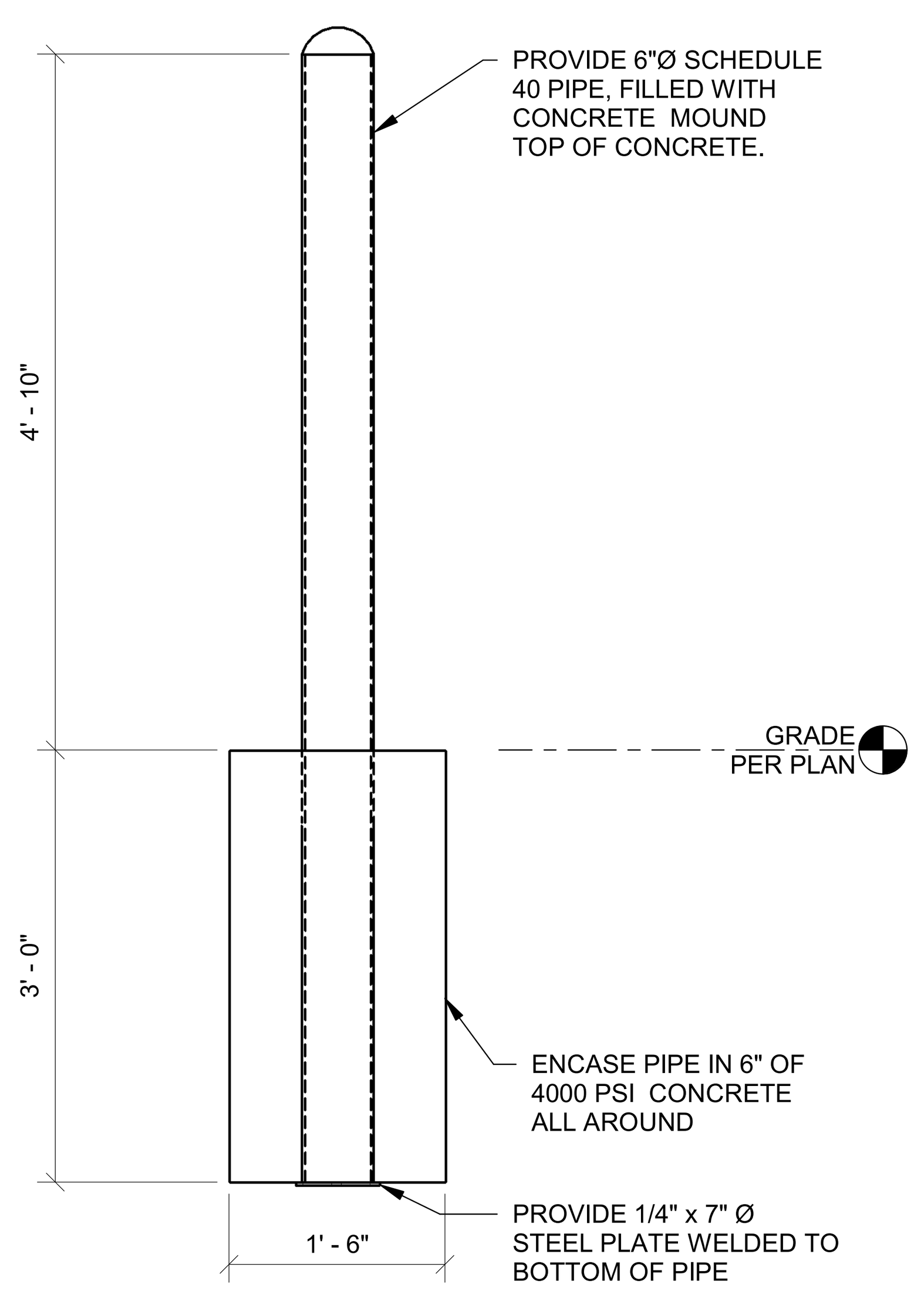
RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

FIRST FLOOR FRAMING PLAN

SHEET: S101



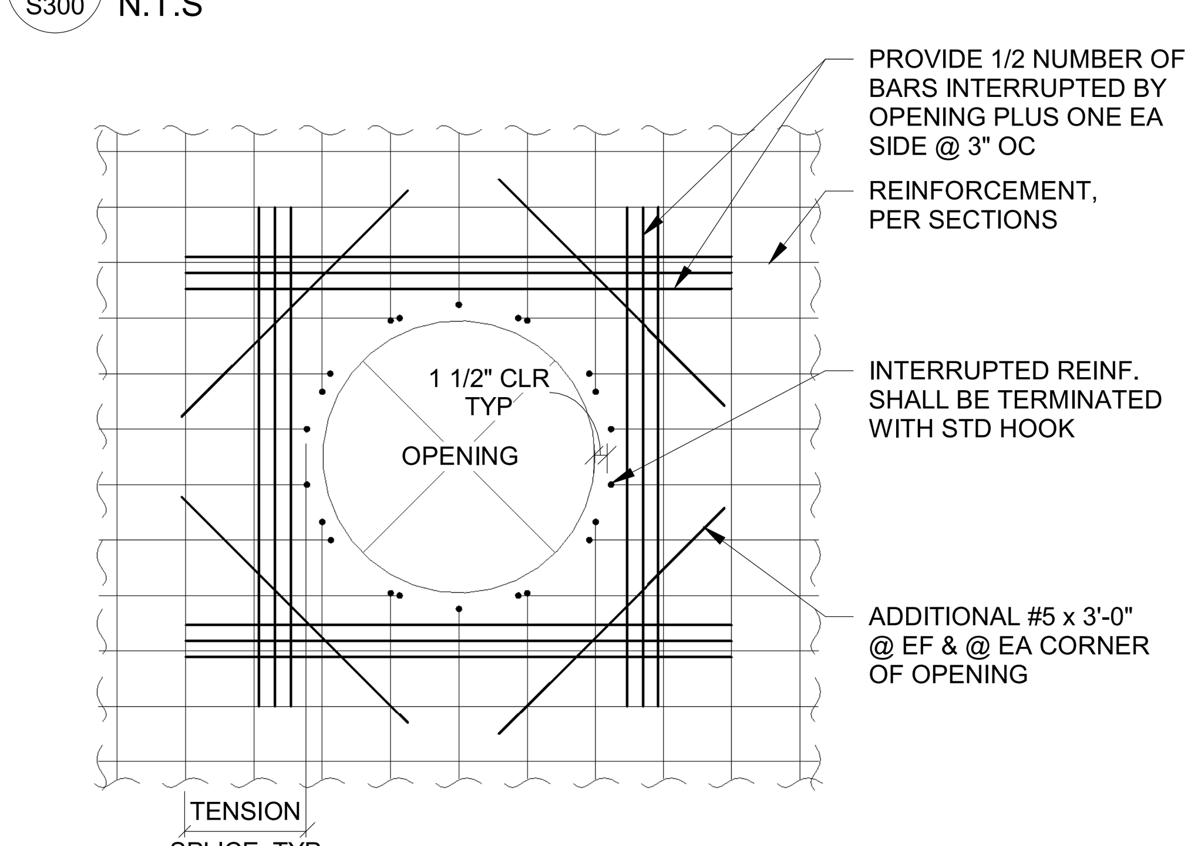
13 TYPICAL STEPPED FOOTING DETAIL
S300 N.T.S



NOTES:

1. REFER TO PLANS FOR LOCATIONS

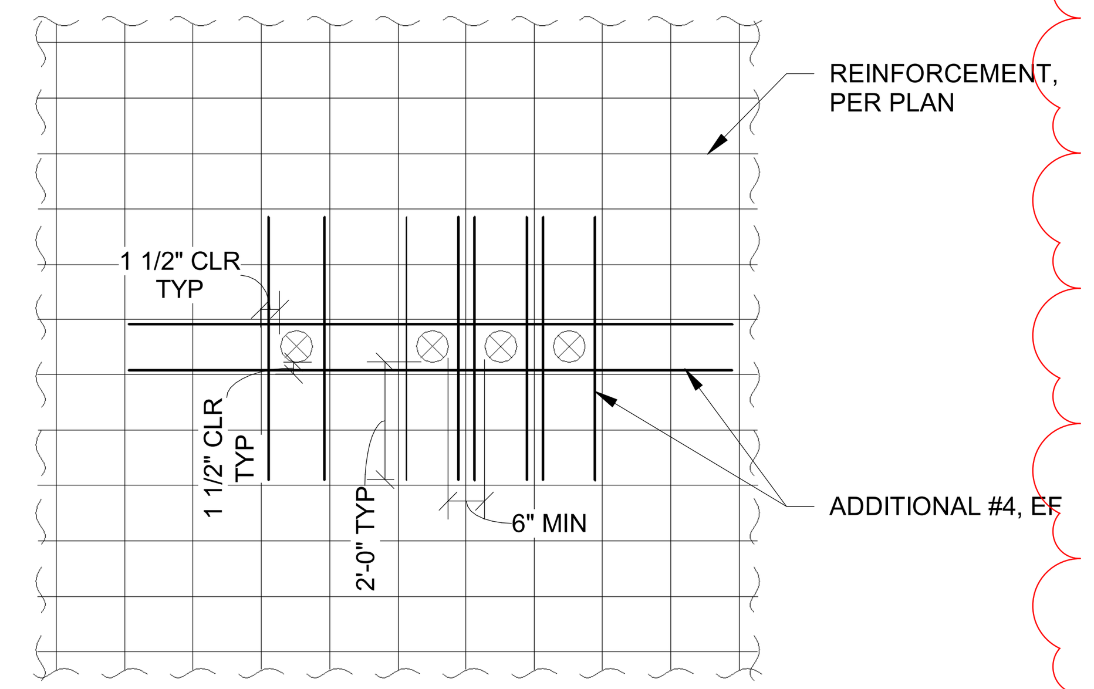
12 TYPICAL 6" BOLLARD SECTION
S300 N.T.S



NOTES:

1. MAX OPENING SIZE 4' - 0"

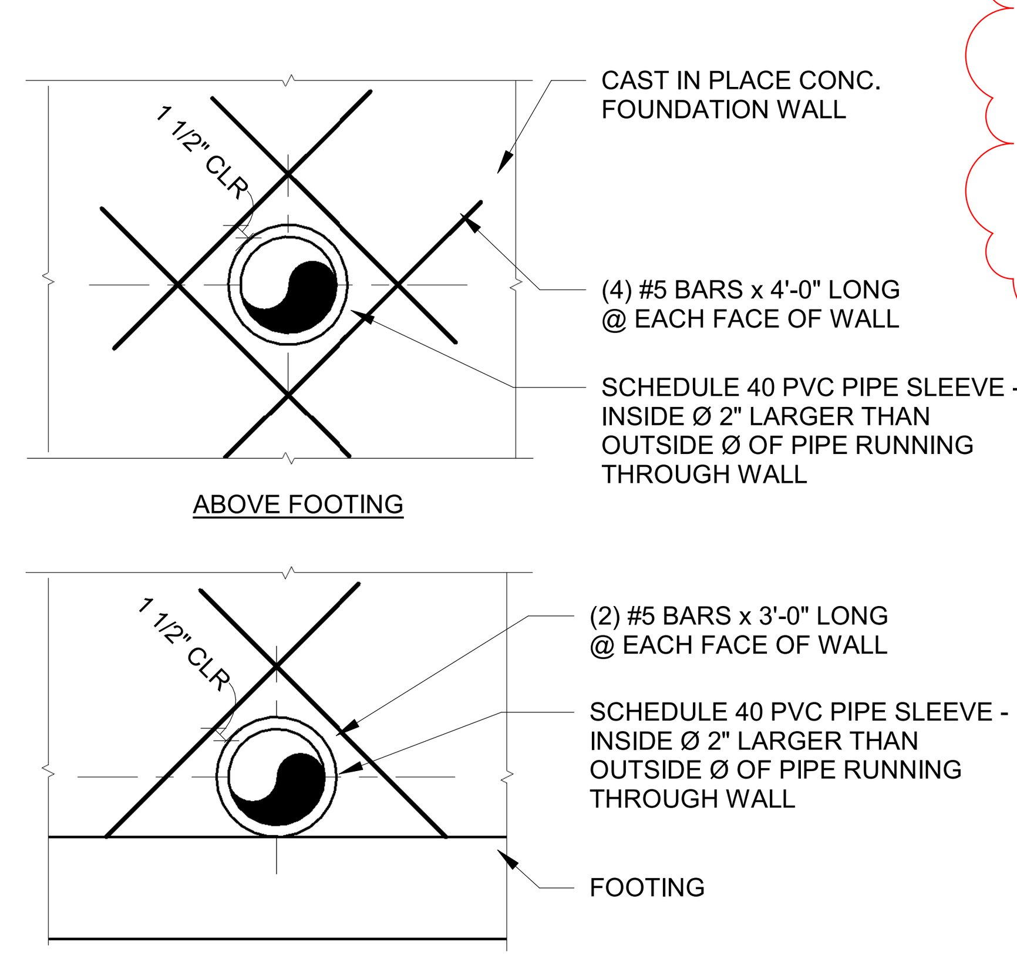
11 TYPICAL WALL SLEEVE OPENING
S300 N.T.S



NOTES:

1. COORDINATE THE LOCATION OF THE SLEEVES SUCH THAT THEY DO NOT INTERRUPT THE WALL REINFORCEMENT.

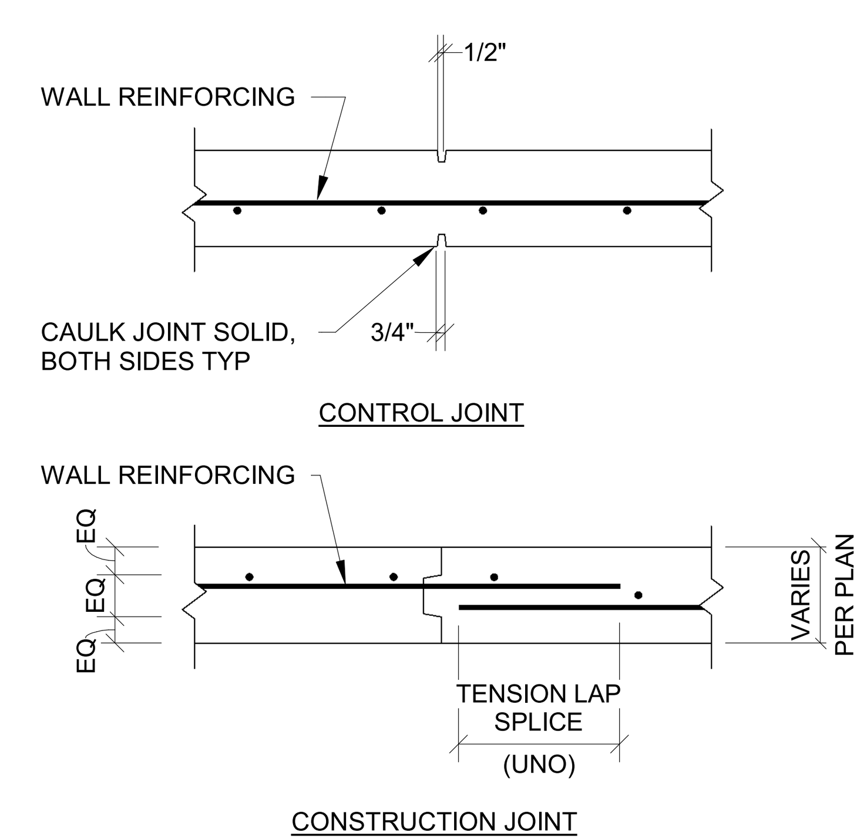
10 TYPICAL MULTIPLE WALL SLEEVE OPENING DETAIL
S300 N.T.S



NOTES:

1. PROVIDE 6" MINIMUM CLEAR COVER BETWEEN ADJACENT OPENINGS.

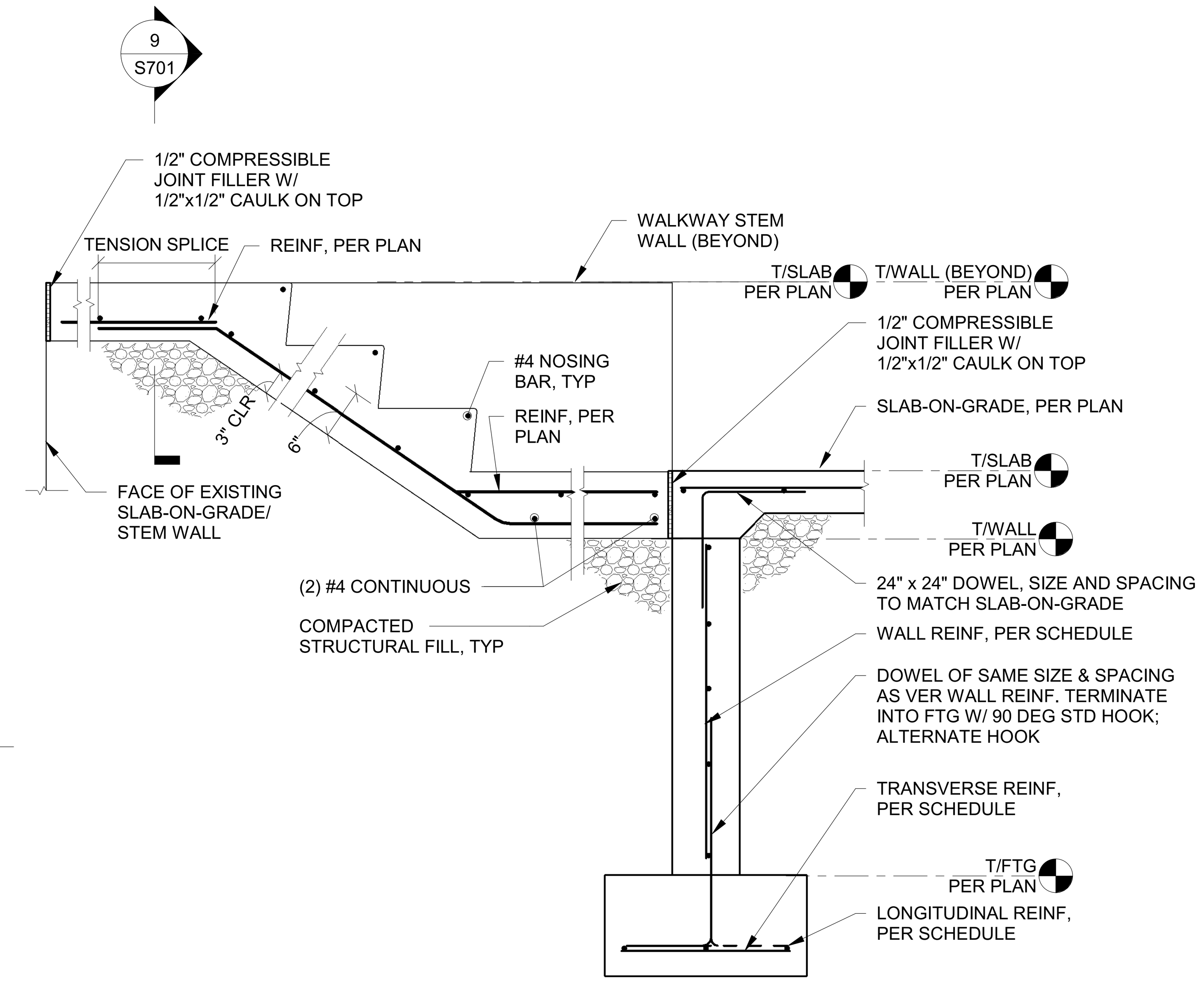
9 TYPICAL WALL REINFORCING FOR PIPE OPENING
S300 N.T.S



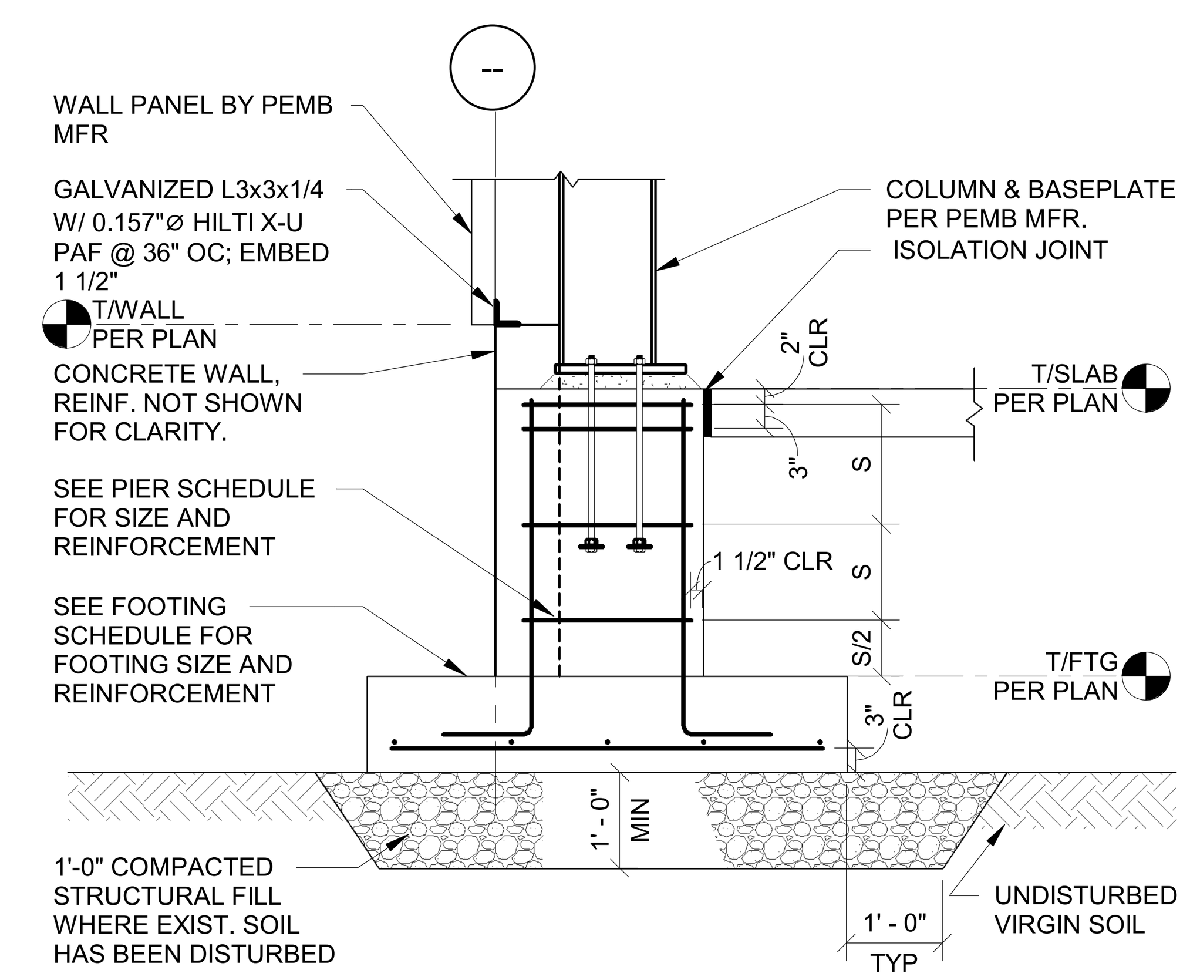
NOTES:

1. PROVIDE CONSTRUCTION AND CONTROL JOINTS IN CONCRETE WALLS AS FOLLOWS UNLESS OTHERWISE INDICATED:
   - FOUNDATION WALLS - 25'-0" (MAX)
2. DO NOT PLACE WITHIN 5 FEET OF A PIER, CORNER, INTERSECTIONS, AND ENDS.
3. COORDINATE JOINT LOCATIONS WITH BRICK VENEER CONTROL JOINT LOCATIONS, SEE ARCHITECTURAL DRAWINGS.
4. ALL CONSTRUCTION JOINTS MUST BE LOCATED ON SHOP DRAWINGS AND APPROVED BY THE ENGINEER OF RECORD. NO CONSTRUCTION JOINTS MAY BE FORMED IN THE FIELD WITHOUT THE ENGINEERS APPROVAL

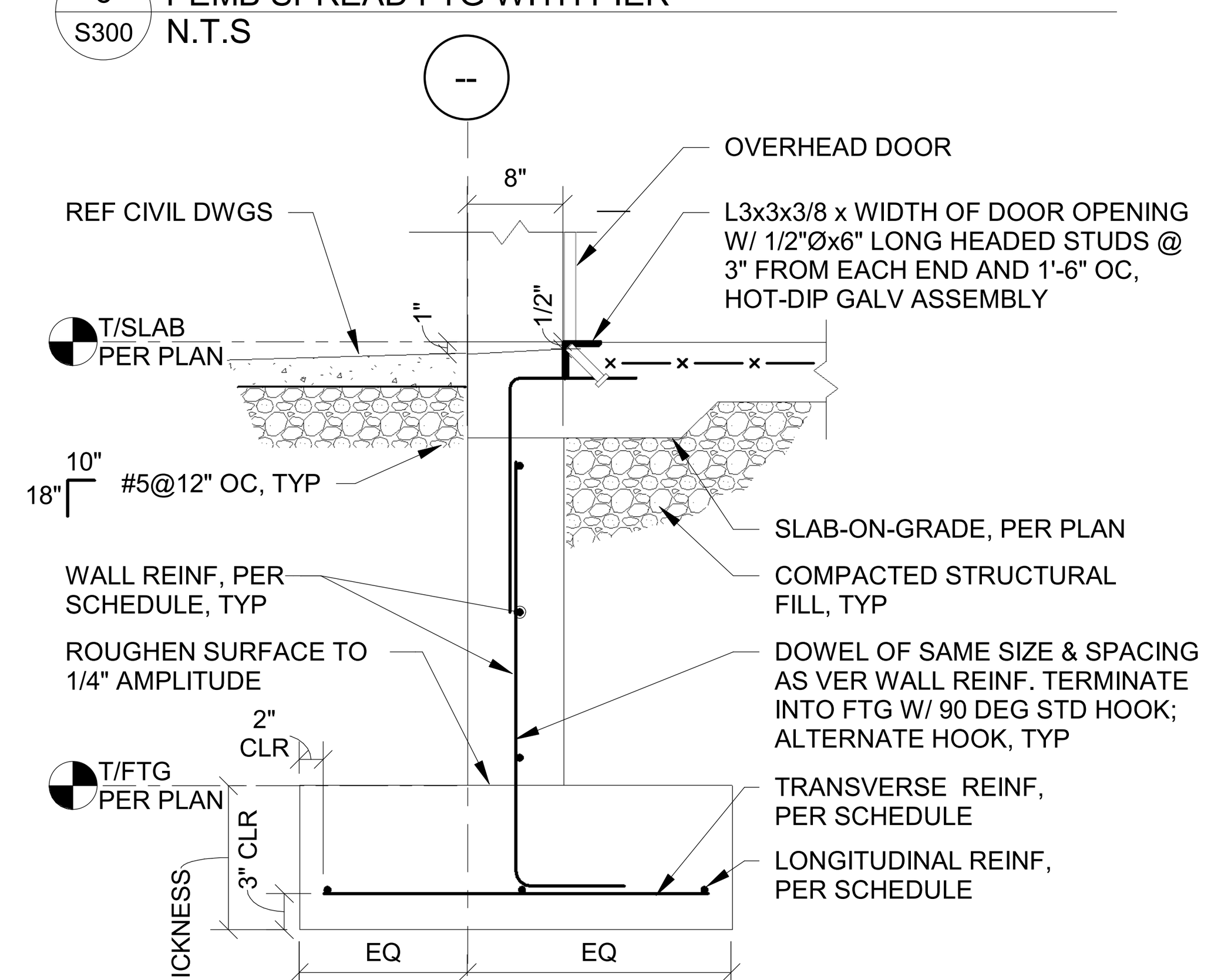
8 TYPICAL CONCRETE WALL JOINT DETAILS
S300 N.T.S



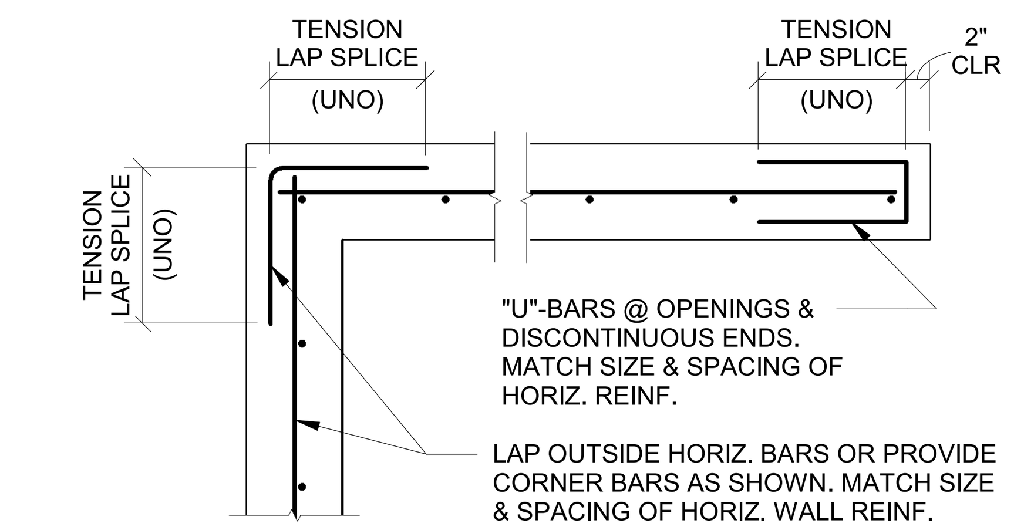
7 DETAIL @WALKWAY SLAB
S300 N.T.S



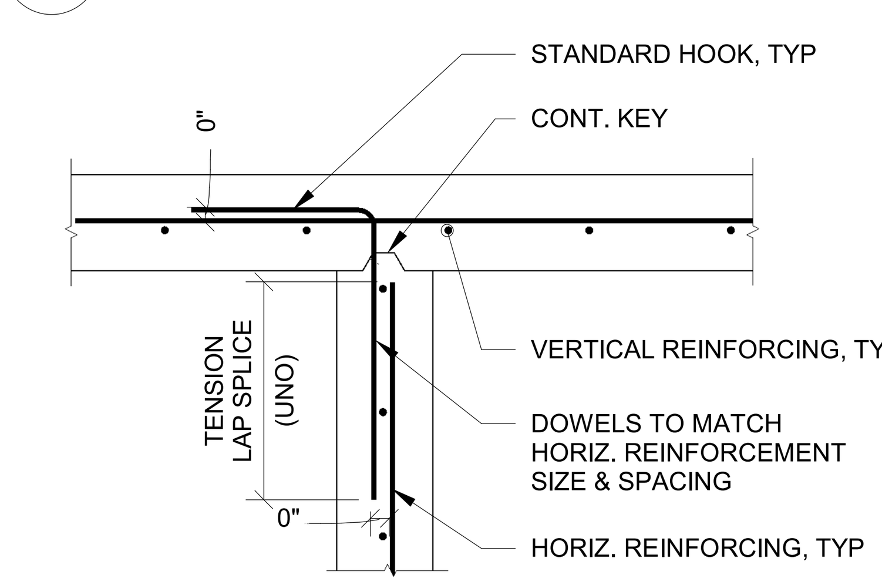
6 PEMB SPREAD FTG WITH PIER
S300 N.T.S



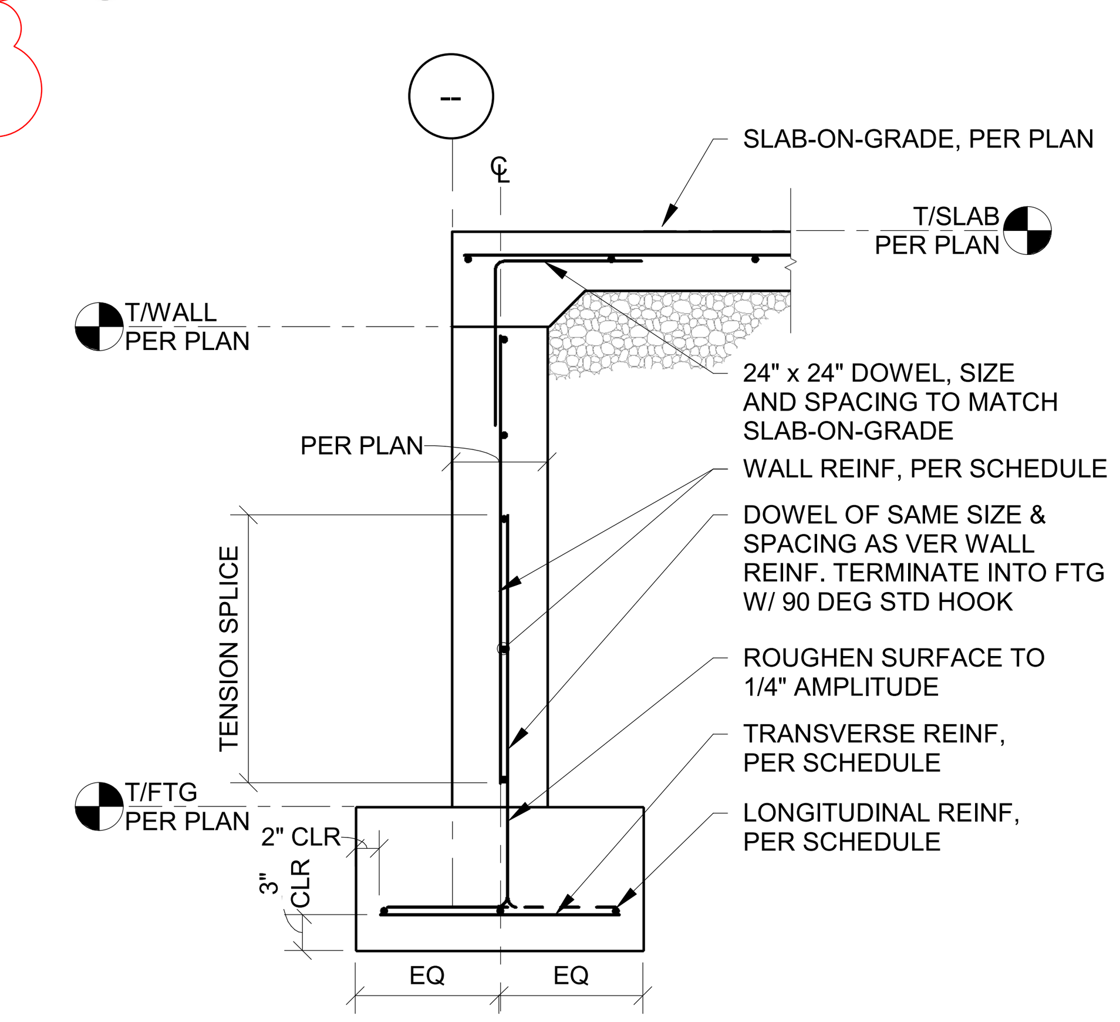
5 TYPICAL FDN DETAIL @ VEHICLE DOOR
S300 N.T.S



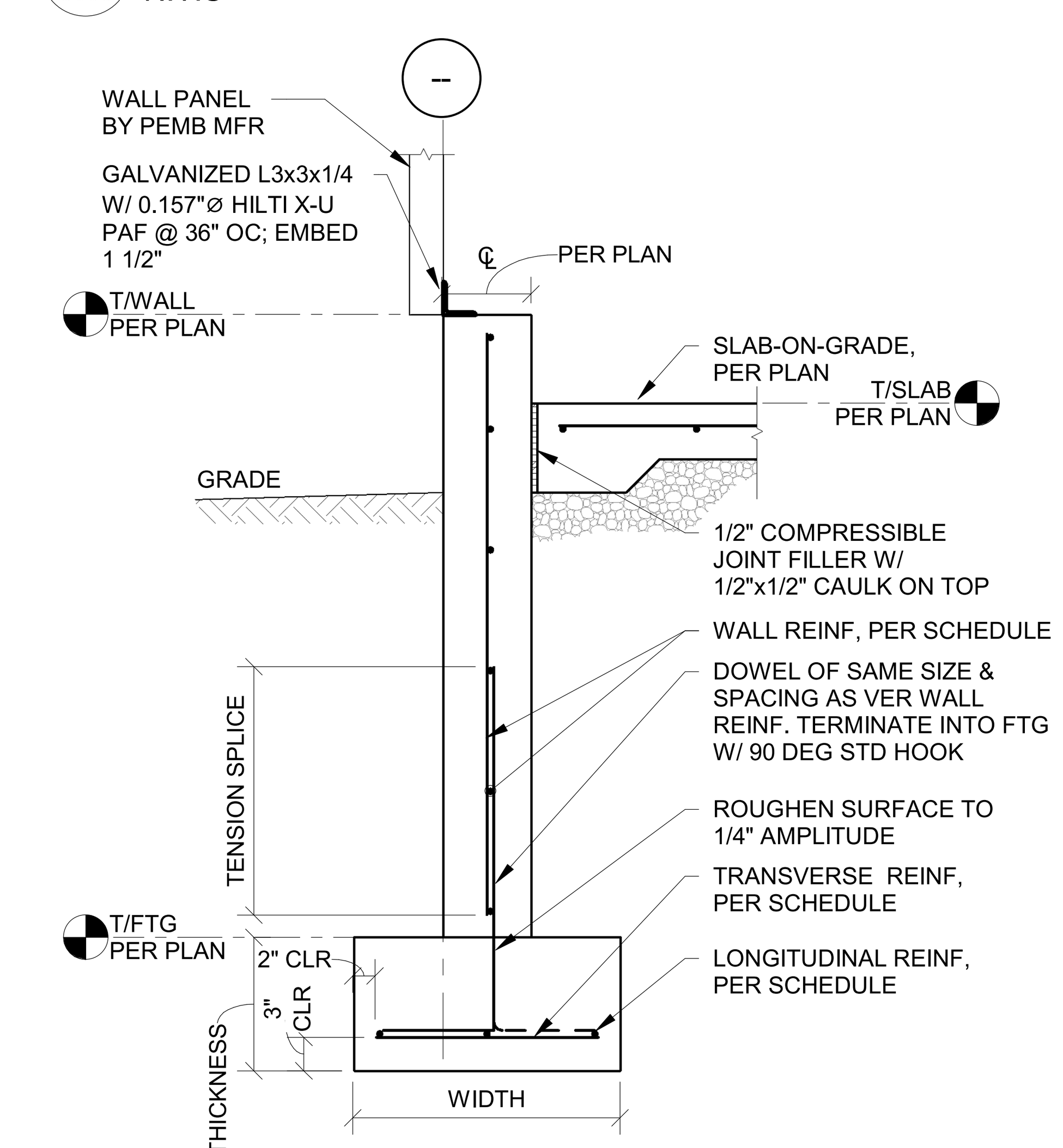
4 TYPICAL CONCRETE WALL CORNER & END DETAIL
S300 N.T.S



3 TYPICAL CONCRETE WALL INTERSECTION DETAIL
S300 N.T.S



2 TYPICAL FOUNDATION WALL DETAIL
S300 N.T.S



1 TYPICAL FOUNDATION WALL DETAIL
S300 N.T.S

WARNING - IT IS A VIOLATION OF NEW YORK EDUCATION LAW SECTION 7209.2, FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER OR LAND SURVEYOR, TO ALTER THIS DOCUMENT IN ANY WAY. IF ALTERED THE ALTERING PERSON SHALL COMPLY WITH THE REQUIREMENTS OF NEW YORK EDUCATION LAW, SECTION 7209.2.

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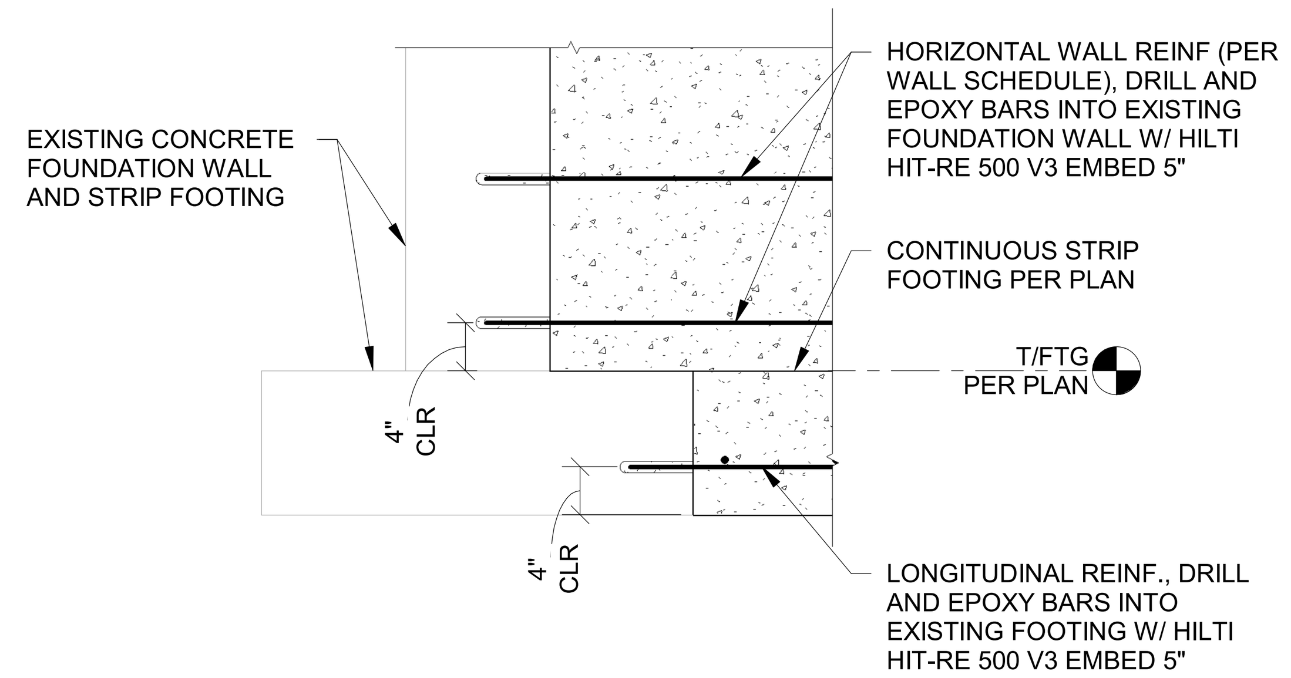
REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

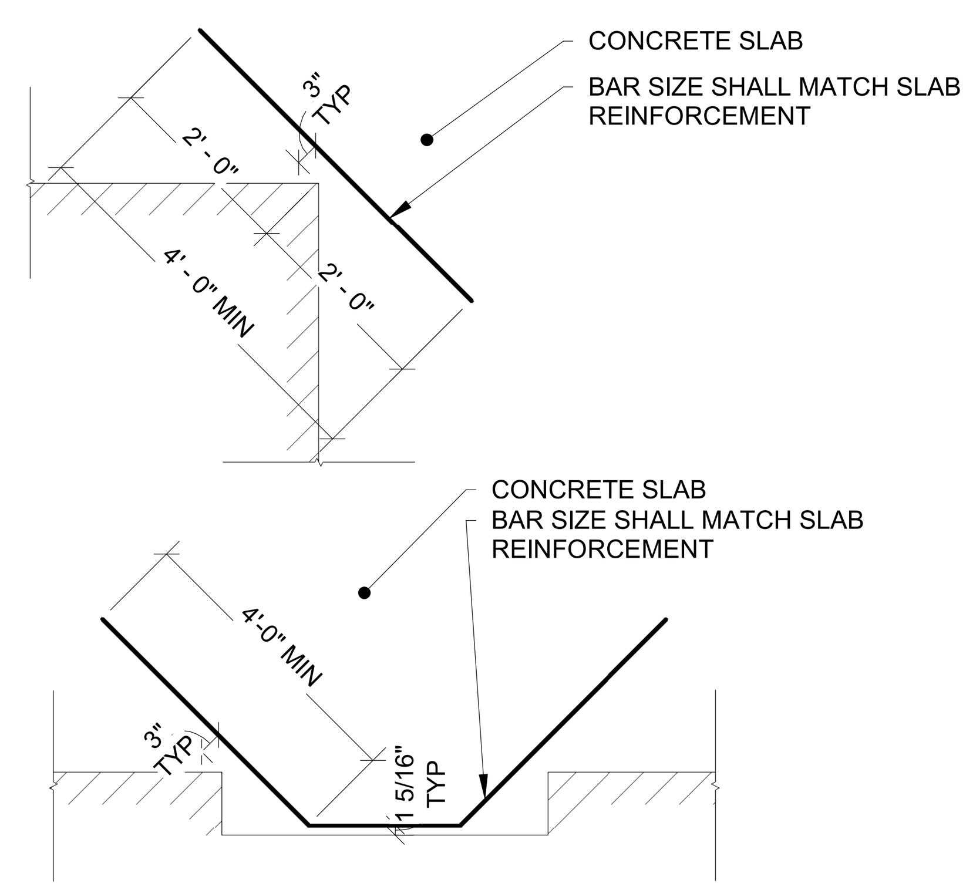
RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

CONCRETE DETAILS

SHEET:
S300



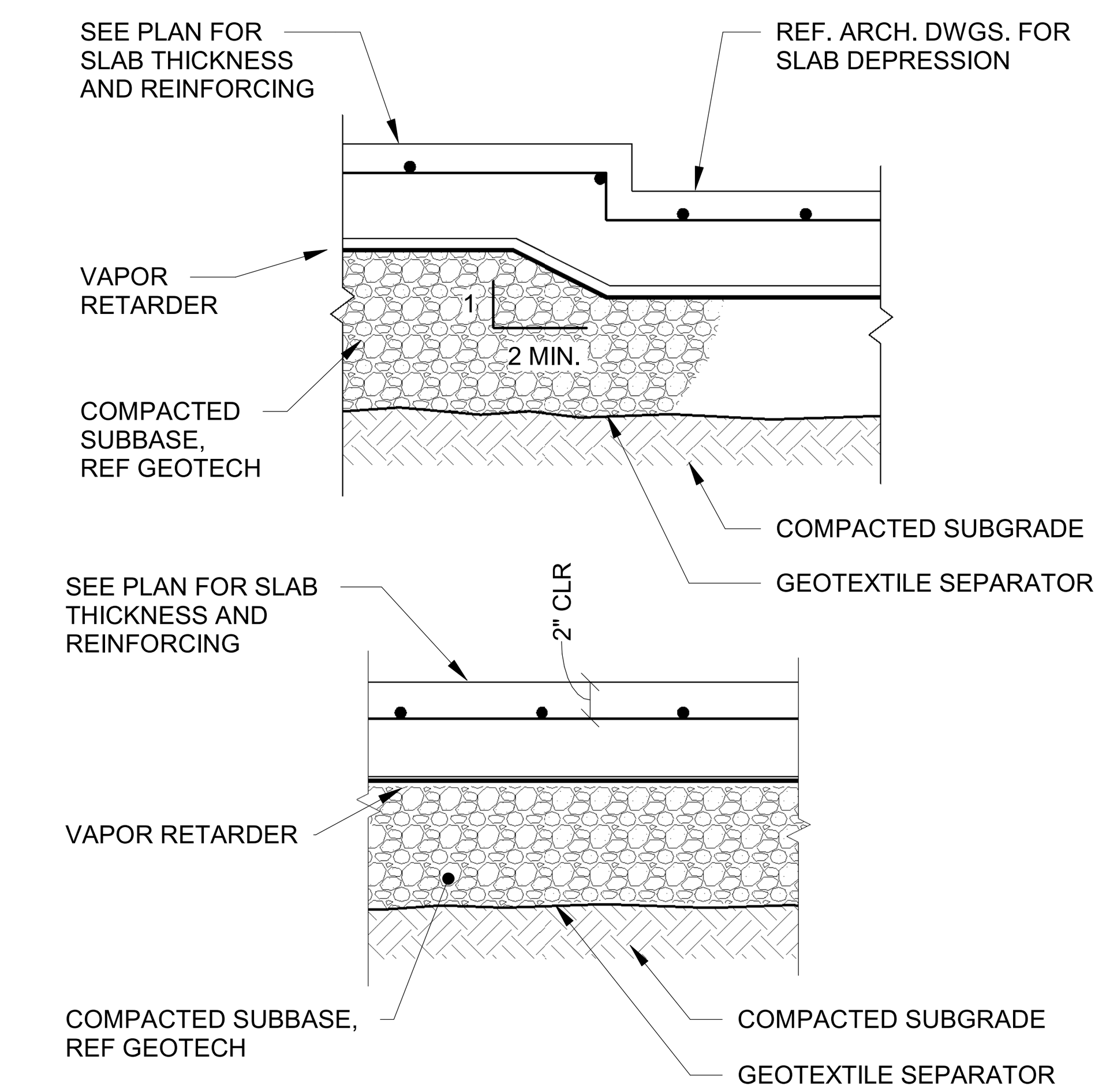
9 / S301 INTERIOR SPREAD FOOTING @ EXISTING FOOTING
N.T.S



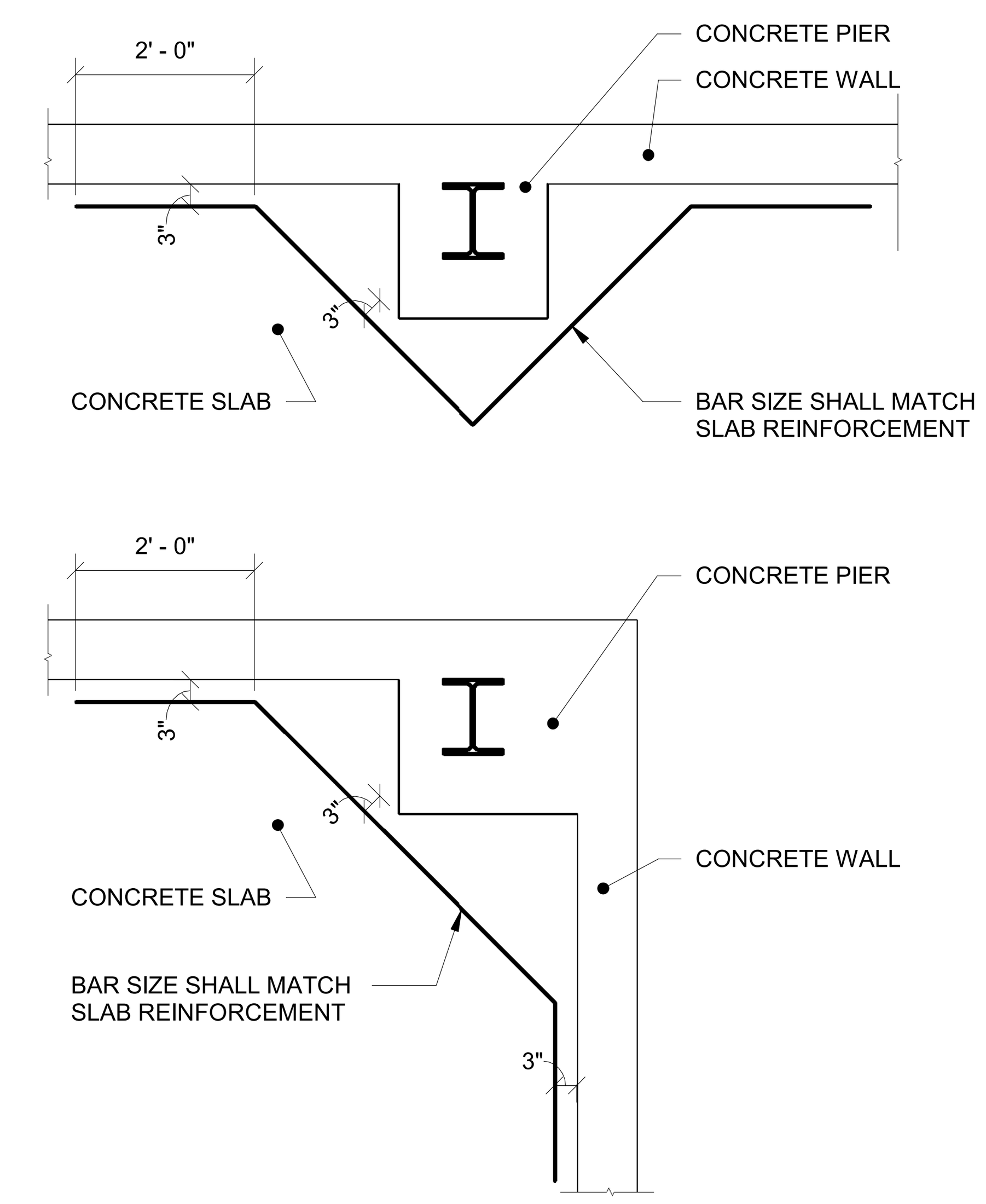
NOTES:

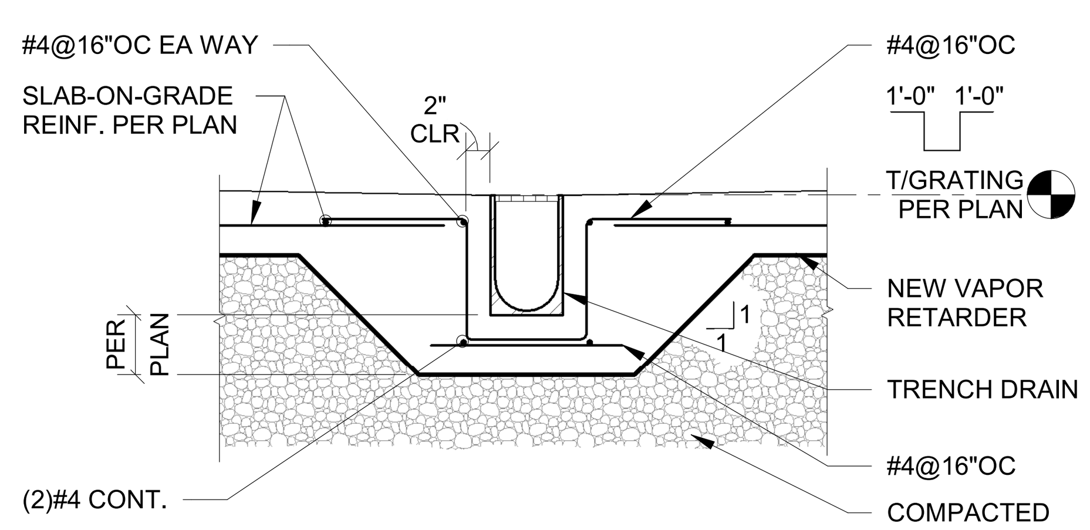
1. DETAIL APPLIES AT ALL CONCRETE SLAB RE-ENTRANT CORNERS.

6 / S301 TYPICAL RE-ENTRANT CORNER PLAN DETAILS
N.T.S

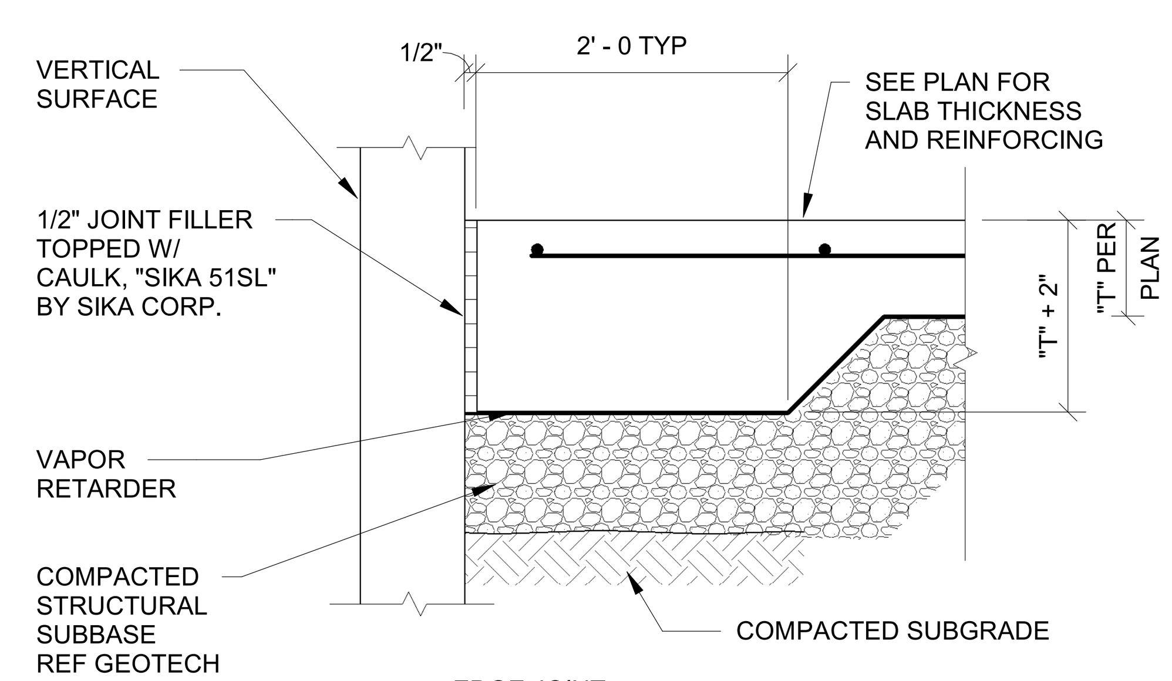


3 / S301 TYPICAL SLAB-ON-GRADE CONSTRUCTION
N.T.S

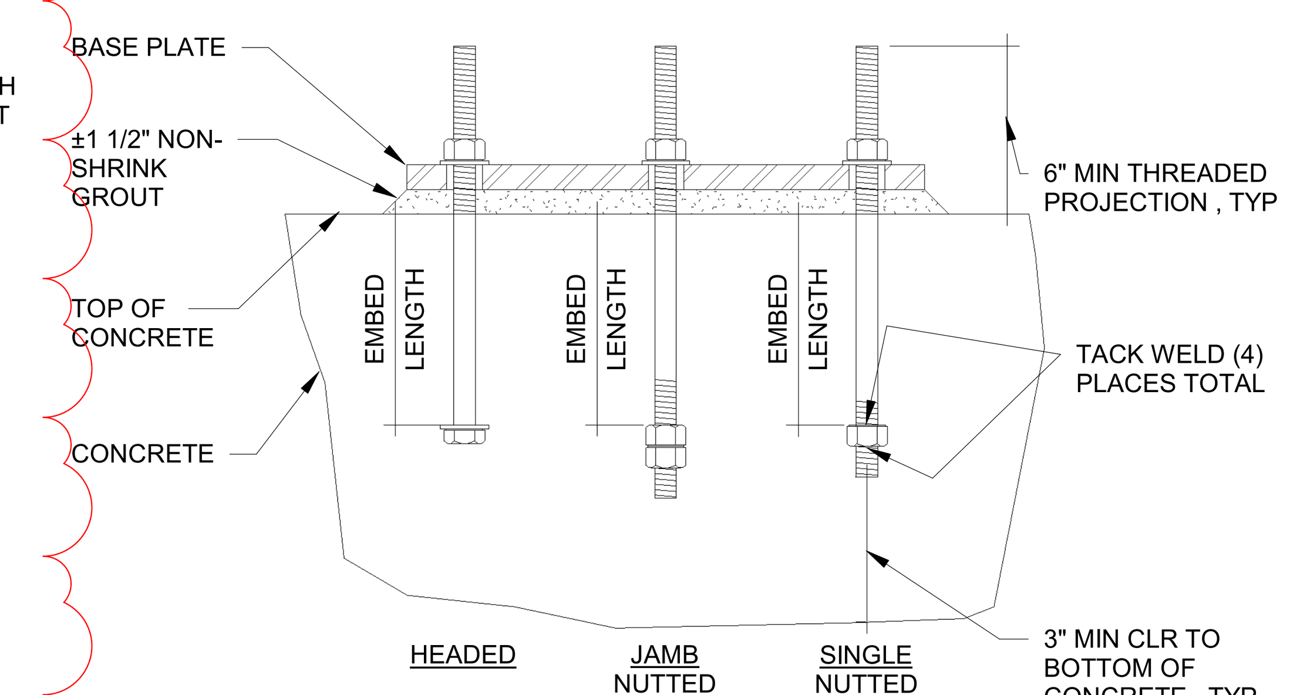




8 / S301 TYPICAL TRENCH DRAIN DETAIL @ NEW SLAB
N.T.S



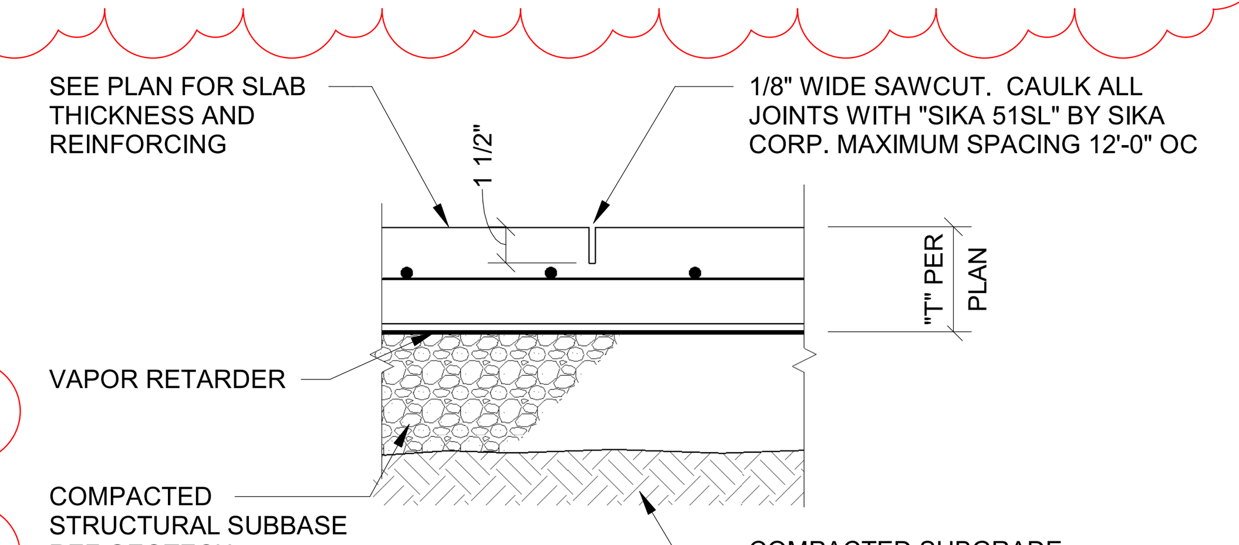
EDGE JOINT



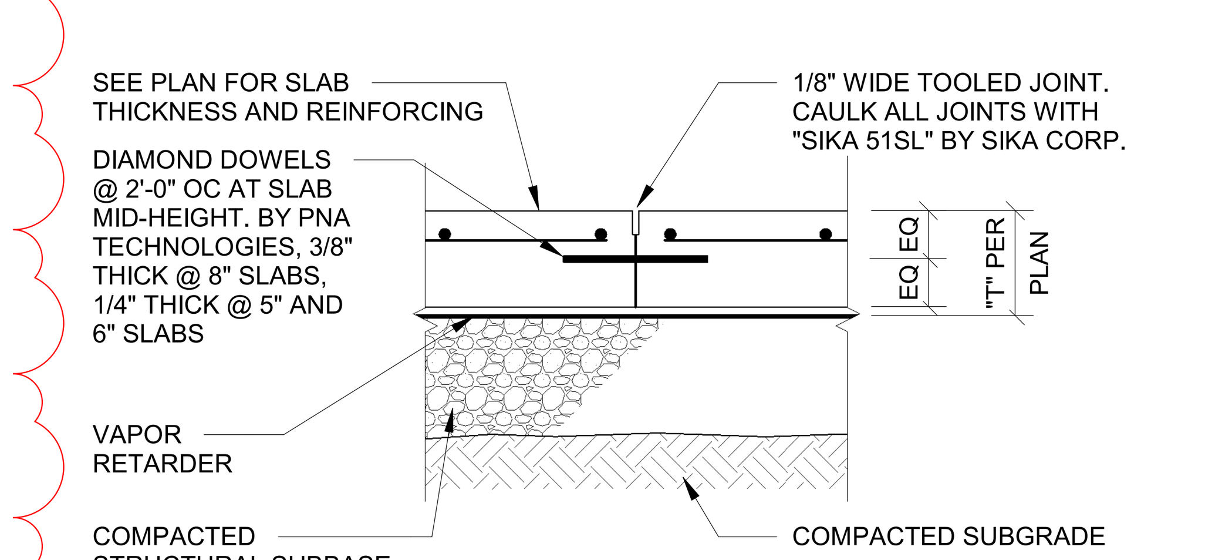
NOTES:

1. ANCHOR RODS TO BE ASTM F1554 GRADE 36.
2. NUTS FOR ANCHOR RODS SHALL BE STANDARD HEX NUTS TYPE ASTM A563-A.
3. WASHER FOR ANCHOR RODS SHALL BE ASTM F436. PROVIDE WASHER BETWEEN ALL NUTS AND BASE PL'S.
4. ALL ANCHOR ROD EMBEDED ENDS SHALL BE ONE OF THE FOLLOWING
   A. HEADED
   B. JAMB NUTTED (DOUBLE NUTTED)
   C. SINGLE NUTTED (TACK WELD IN (4) LOCATIONS TO SECURE NUT IN PLACE)
5. ALL HOLES IN BASE PLATES SHALL BE ANCHOR ROD DIAMETER + 3/16" MAXIMUM.
6. ALL ANCHOR RODS, NUTS, AND WASHERS SHALL BE HOT-DIPPED GALVANIZED.

2 / S301 TYPICAL ANCHOR ROD EMBEDMENT DETAIL
N.T.S

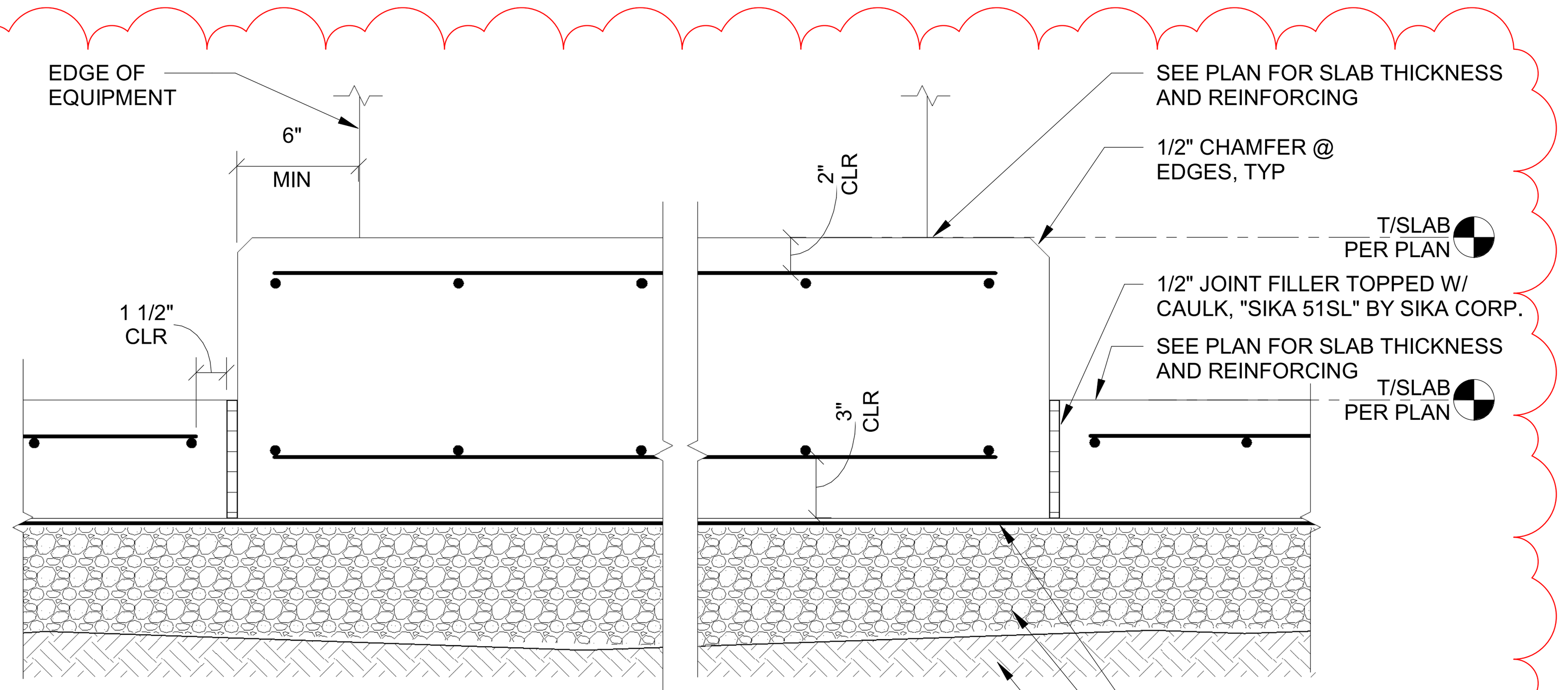


CONTROL JOINT



CONSTRUCTION JOINT

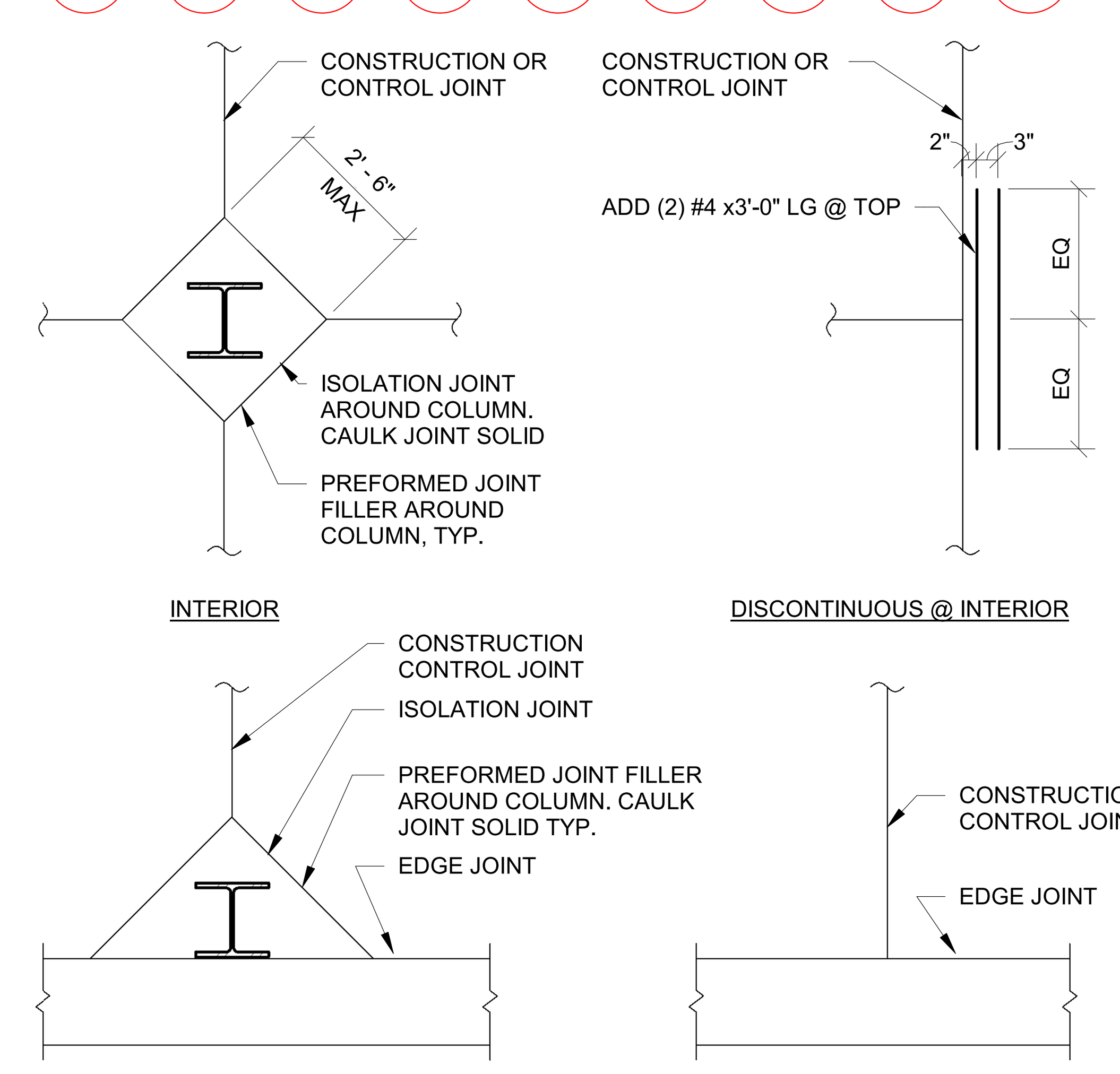
5 / S301 TYPICAL SLAB-ON-GRADE JOINTS
N.T.S



NOTES:

1. REF PLANS FOR SIZE AND LOCATION OF PADS
2. CALLOUTS APPLICABLE ALL FOUR SIDES OF EQUIPMENT PAD
3. COORDINATE/ CONFIRM FINAL SIZE OF EQUIPMENT SLAB WITH MANUFACTURER. EDGE OF SLAB SHALL BE OFFSET 6" MIN FROM OUTSIDE FACE OF EQUIPMENT.

7 / S301 EQUIPMENT SLAB
N.T.S

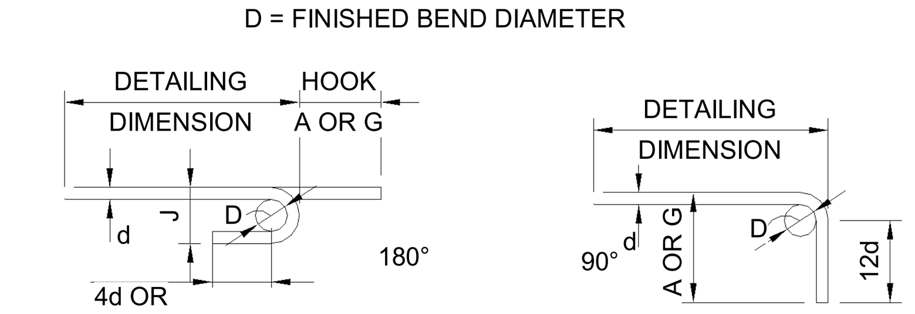


NOTES:

1. SEE PLAN FOR SLAB JOINT LOCATIONS.

4 / S301 TYPICAL SLAB-ON-GRADE JOINT DETAILS
N.T.S

RECOMMENDED END HOOKS
ALL GRADES OF STEEL
D = FINISHED BEND DIAMETER



BAR SIZE	D, IN.	180° HOOKS, IN.		90° HOOKS N.
		A OR G	J	A OR G
#3	2 1/4	5	3	6
#4	3	6	4	8
#5	3 3/4	7	5	10
#6	4 1/2	8	6	12
#7	5 1/4	10	7	14
#8	6	11	8	16
#9	9 1/2	15	11 3/4	19
#10	10 3/4	17	13 1/4	22
#11	12	19	15 3/4	24
#12	18 1/4	27	21 3/4	31

1 / S301 TYPICAL REBAR END HOOK DETAIL
N.T.S

DATE: 01.23.24
DRAWN BY: EK
SCALE: As indicated
REVIEWED BY: CAM
PROJECT NO.: 22-2496
FILE:

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING
28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
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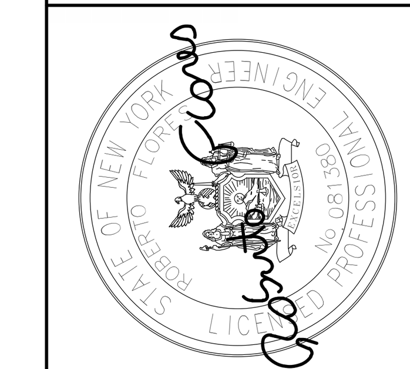


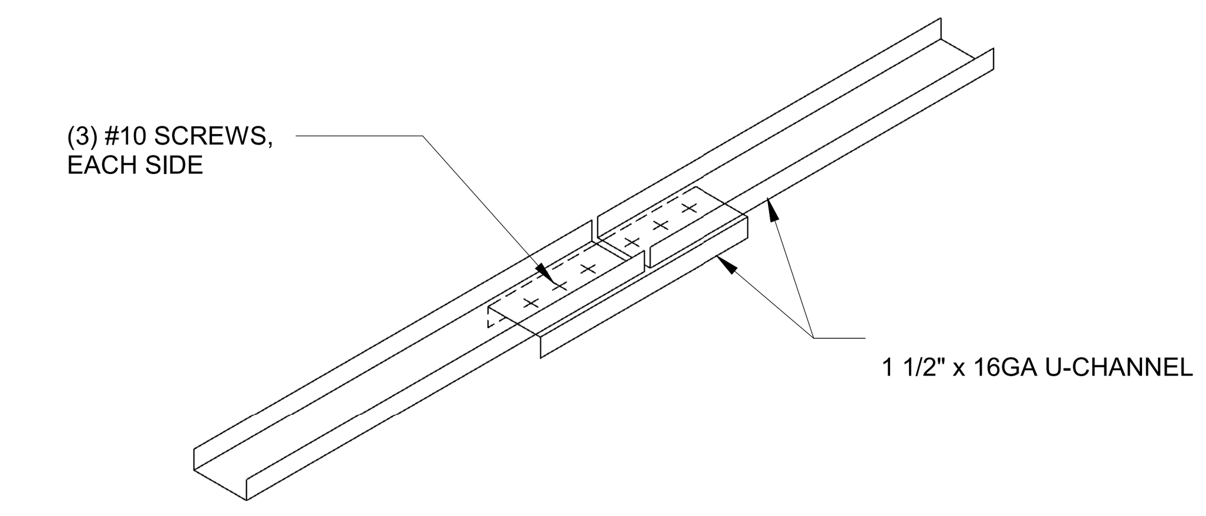
REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

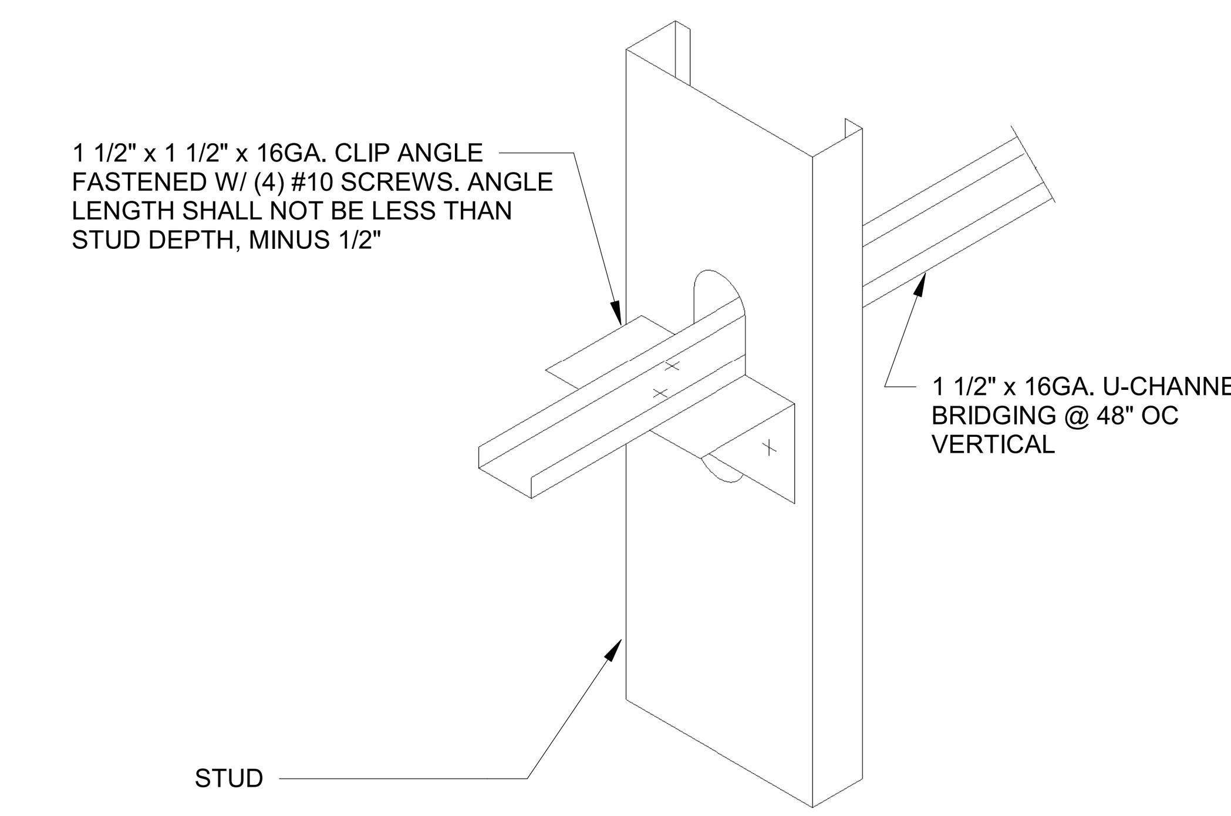
RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

CONCRETE DETAILS

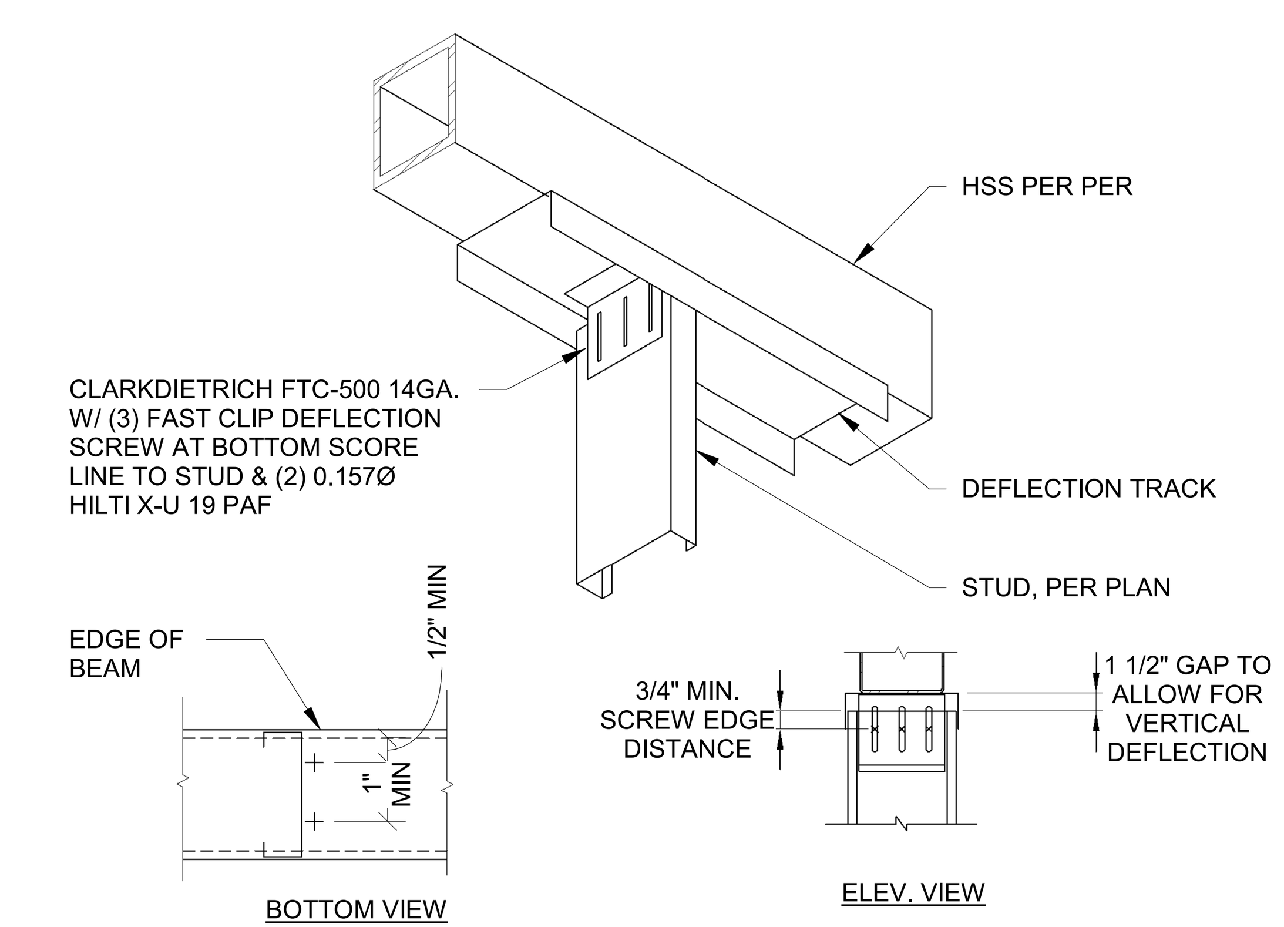
SHEET:
S301



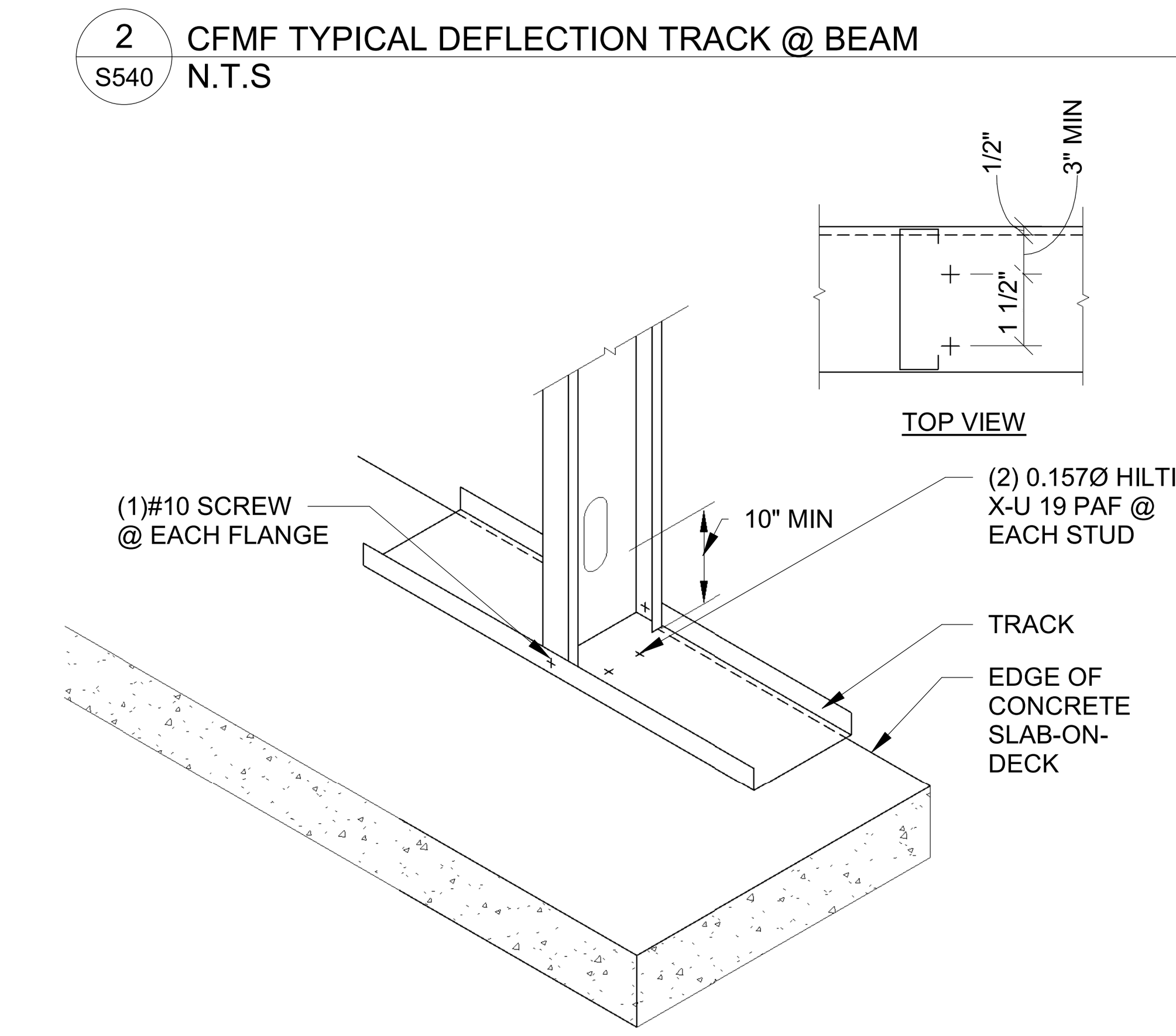
4 / S540 — CFMF U-BRIDGING SPLICE DETAIL
N.T.S



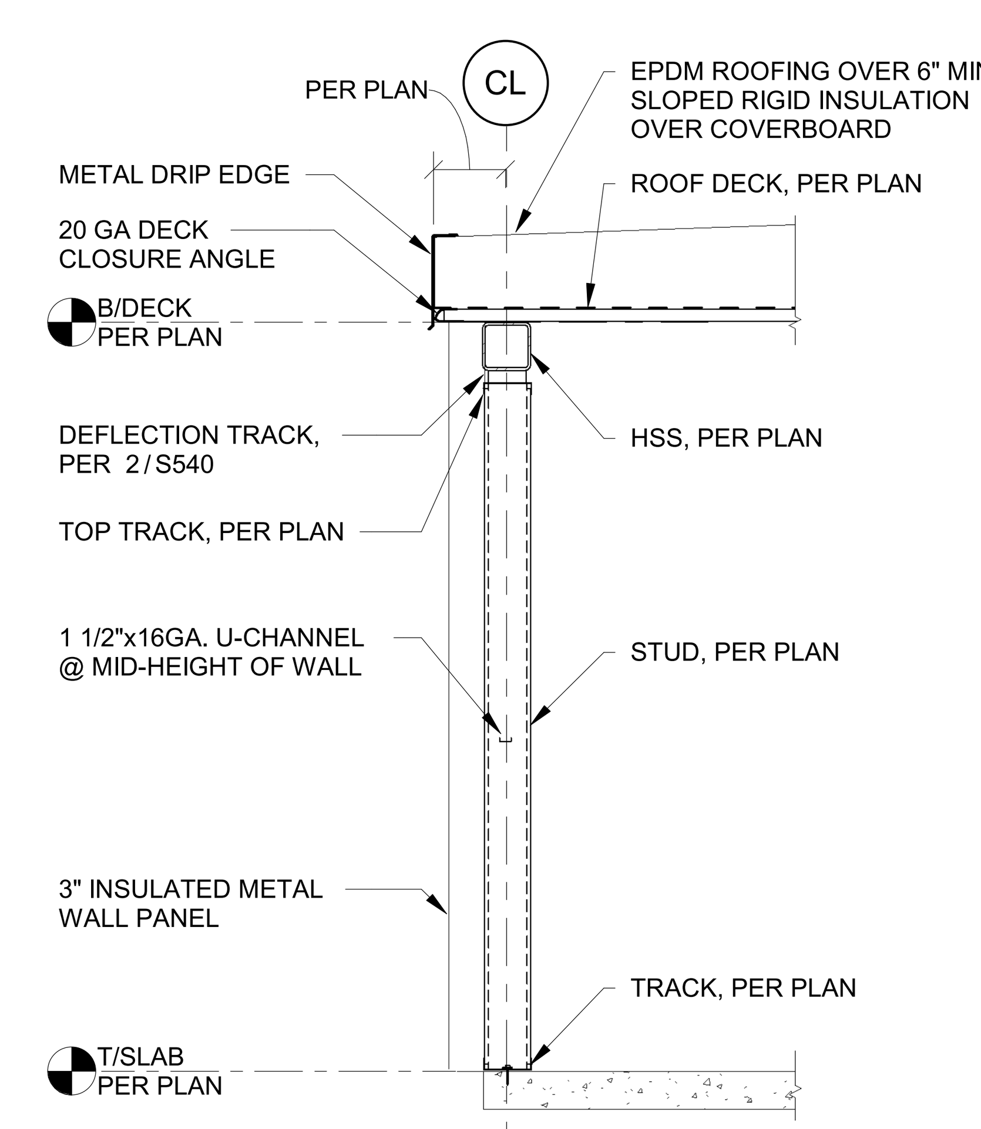
3 / S540 — CFMF WALL U-BRIDGING CONNECTION
N.T.S



2 / S540 — CFMF TYPICAL DEFLECTION TRACK @ BEAM
N.T.S



1 / S540 — CFMF TRACK CONNECTION @ SLAB
N.T.S



5 / S540 — CFMF WALL DETAIL
N.T.S

DATE:	01.23.24
DRAWN BY:	EK
SCALE:	As indicated
REVIEWED BY:	CAM
PROJECT NO.:	22-2496
FILE:	

DELAWARE ENGINEERING, D.P.C.
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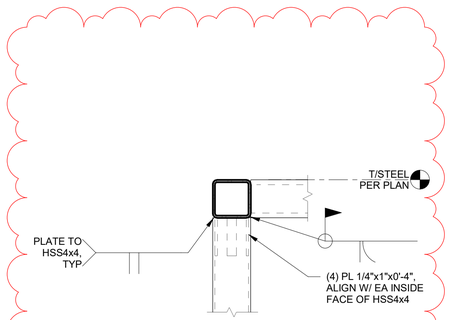
REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

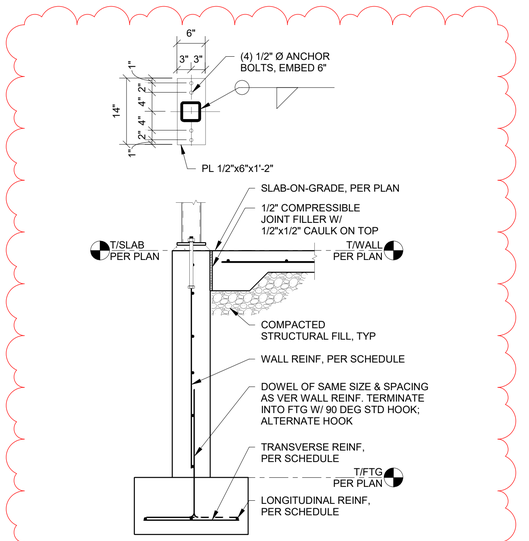
RHINEBECK WTP IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

CFS DETAILS

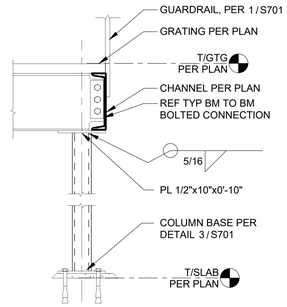
SHEET:
S540



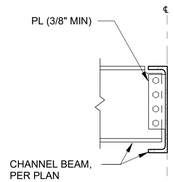
10 S701 FIXED CONNECTION @ HSS
N.T.S



9 S701 DETAIL @WALKWAY SLAB
N.T.S



8 S701 POST BASE @ SLAB
N.T.S



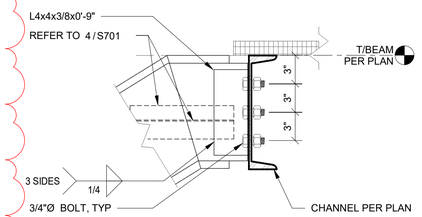
MINIMUM NUMBER OF ROWS OF BOLTS
C8 - 2 C12 - 3

BEAM TO BEAM

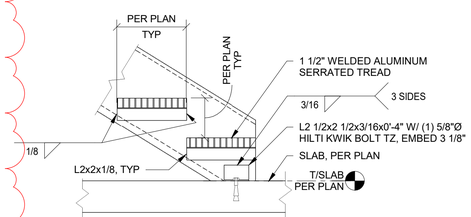
NOTES:

1. AT ALL BEAM CONNECTIONS, PROVIDE NUMBER OF 3/4" Ø A325 BOLTS REQUIRED TO SATISFY REACTIONS SHOWN ON FRAMING PLANS, BUT IN NO CASE LESS THAN THE MINIMUM NUMBER OF ROWS OF BOLTS FOR THE BEAM DEPTH AS INDICATED IN THE TABLE.

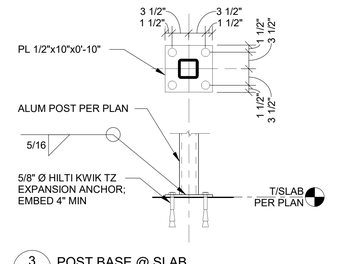
6 S701 BEAM TO BEAM CONNECTION
N.T.S



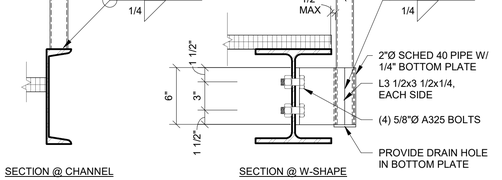
5 S701 STAIR STRINGER CONNECTION
N.T.S



4 S701 STAIR STRINGER @ SLAB
N.T.S

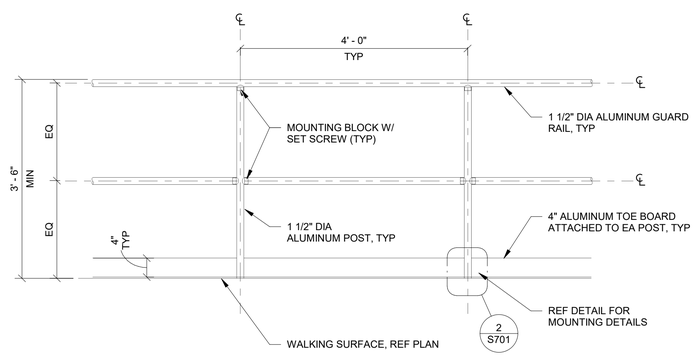


3 S701 POST BASE @ SLAB
N.T.S



2 S701 TYPICAL GUARDRAIL POST BASE CONNECTIONS
N.T.S

NOTE:
ALL GUARDRAIL AND HANDRAIL SHALL BE DESIGNED AND SUBMITTED TO THE ENGINEER AS A DELEGATED SUBMITTAL AS SPECIFIED IN THE GENERAL STRUCTURAL NOTES. THE ELEVATION AND DETAILS SHOWN ARE FOR REFERENCE ONLY.



1 S701 TYPICAL GUARDRAIL ELEVATION
N.T.S

NOTES:
1. SEAL CONCRETE SURFACE W/ (2) COATS 'SEAL-HARD', BY L+M CONSTRUCTION CHEMICAL CO.
2. ALL SLAB-ON-GRADE REBAR SHALL BE EPOXY COATED.
3. SLAB-ON-GRADE, POLE FOOTING NOT BY PANEL MANUF.
4. REFER TO CIVIL/ELEC FOR LOCATION

7 S701 ELECTRICAL KIOSK
N.T.S

DELAWARE ENGINEERING, D.P.C.
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DATE: 01.23.24
DRAWN BY: EK
SCALE: As indicated
REVIEWED BY: CAM
PROJECT NO.: 22-2496
FILE:

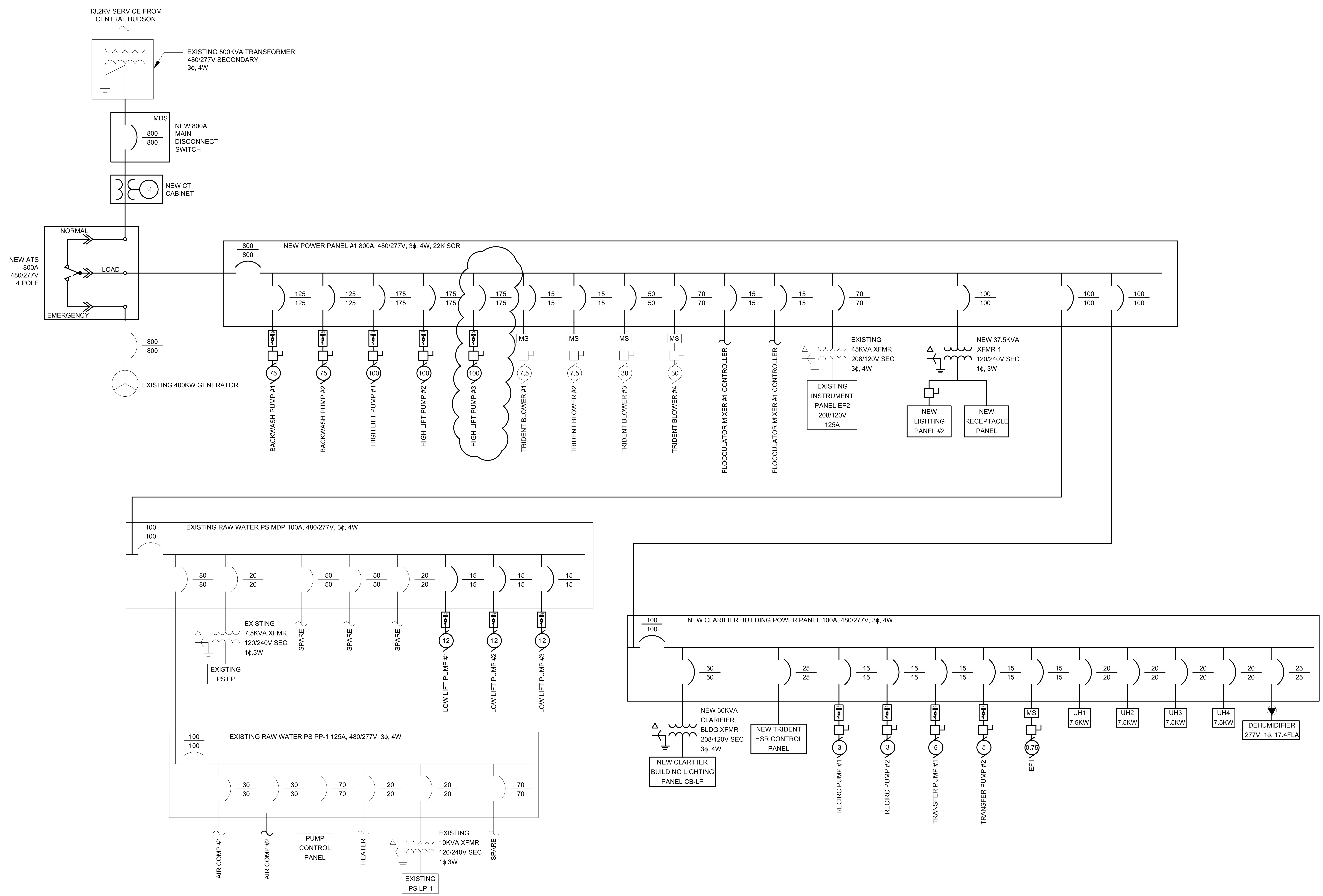
REVISIONS

NO.	DATE	DESCRIPTION
1	11/1/2024	ADDENDUM #1

RHINEBECK WTP
IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

MISC DETAILS

SHEET: S701



DATE: 10/28/2024
DRAWN BY: EMB
SCALE: NTS
REVIEWED BY: RF
PROJECT NO.: ----
FILE:

DELAWARE ENGINEERING, D.P.C.
CIVIL AND ENVIRONMENTAL ENGINEERING

28 MADISON AVENUE EXTENSION, ALBANY, NY 12203 - 518.452.1290
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31 NORTH MAIN STREET, LIBERTY, NY 12754 - 845.747.9952
6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.9235
16 EAST MARKET ST., RED HOOK, NY 12571 - 518.452.1290
548 BROADWAY, MONTICELLO, NY 12701 - 845.791.7777

REVISIONS

NO.	DATE	DESCRIPTION
1.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

ONE LINE DIAGRAM

SHEET:
E-003

CONDUIT AND CABLE SCHEDULE

CONDUIT NO.	CONDUIT SIZE	CABLE QTY.	CABLE SIZE	PURPOSE	FROM	VIA	TO	REMARKS
A1.1	(x2) 4"	4/EA	600MCM	POWER	UTILITY		MDS	
A1.2	(x2) 4"	4/EA	600MCM	POWER	MDS		CT CABINET	
A1.3	(x2) 4"	4/EA	600MCM	POWER	CT CABINET		ATS	
A1.4	(x2) 3"	4/EA	350MCM	POWER	EXISITING GENERATOR CONNECTION FEED		ATS	EX CABLES
A1.5	(x2) 4"	4/EA	600MCM	POWER	ATS		NEW POWER PANEL #1	
A2.1	1"	4	#4	POWER	NEW POWER PANEL #1		EXISTING 45KVA XFMR	
A2.2	1-1/4"	4	#3	POWER	NEW POWER PANEL #1		NEW 37.5KVA XFMR-1	
A2.3	1-1/4"	4	#3	POWER	NEW 37.5KVA XFMR-1	DISCONNECT	NEW LIGHTING PANEL	
A2.4	1-1/4"	4	#3	POWER	NEW 37.5KVA XFMR-1		NEW RECEPTACLE PANEL	
B1.1	3/4"	4	#12	POWER	NEW POWER PANEL #1		EXISTING TRIDENT BLOWER #1 MS	
B1.2	3/4"	4	#12	POWER	NEW POWER PANEL #1		EXISTING TRIDENT BLOWER #2 MS	
B1.3	3/4"	4	#8	POWER	NEW POWER PANEL #1		EXISTING TRIDENT BLOWER #3 MS	
B1.4	3/4"	4	#8	POWER	NEW POWER PANEL #1		EXISTING TRIDENT BLOWER #4 MS	
B2.1	3/4"	1	CAT6	CONTROL	FILTER #1 RIO		MAIN CONTROL PANEL	
B2.2	3/4"	1	CAT6	CONTROL	FILTER #2 RIO		MAIN CONTROL PANEL	
C1.1	1-1/2"	4	#2	POWER	NEW POWER PANEL #1		NEW CLARIFIER BUILDING POWER PANEL	
C1.2	3/4"	4	#8	POWER	NEW CLARIFIER BUILDING POWER PANEL		NEW CLARIFIER BUILDING XFMR	
C1.3	1"	4	#2	POWER	NEW CLARIFIER BUILDING XFMR		NEW CLARIFIER BUILDING LIGHTING PANEL	
C1.4	3/4"	4	#10	POWER	NEW CLARIFIER BUILDING POWER PANEL		NEW TRIDENT HSR CONTROL PANEL	
C1.5	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW TRIDENT HSR CONTROL PANEL	
C1.6	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		UNIT A CONTROL PANEL	
C1.7	3/4"	1	CAT6	CONTROL	NEW TRIDENT HSR CONTROL PANEL		UNIT A CONTROL PANEL	
C1.8	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		UNIT B CONTROL PANEL	
C1.9	3/4"	1	CAT6	CONTROL	NEW TRIDENT HSR CONTROL PANEL		UNIT B CONTROL PANEL	
C2.1	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL		CLARIFIER TRANSFER PUMP #1 VFD	
C2.2	3/4"	4	#12	POWER	CLARIFIER TRANSFER PUMP #1 VFD	DISCONNECT	CLARIFIER TRANSFER PUMP #1	
C2.3	3/4"	1	CAT6	CONTROL	UNIT A CONTROL PANEL		CLARIFIER TRANSFER PUMP #1 VFD	
C2.4	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL		RECIRC PUMP #1 VFD	
C2.5	3/4"	4	#12	POWER	RECIRC PUMP #1 VFD	DISCONNECT	RECIRC PUMP #1	
C2.6	3/4"	1	CAT6	CONTROL	UNIT A CONTROL PANEL		RECIRC PUMP #1 VFD	
C2.7	3/4"	4	#12	POWER	UNIT A CONTROL PANEL	DISCONNECT	CLARIFIER #1 DRIVE UNIT	
C3.1	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL		CLARIFIER TRANSFER PUMP #2 VFD	
C3.2	3/4"	4	#12	POWER	CLARIFIER TRANSFER PUMP #2 VFD	DISCONNECT	CLARIFIER TRANSFER PUMP #2	
C3.3	3/4"	1	CAT6	CONTROL	UNIT B CONTROL PANEL		CLARIFIER TRANSFER PUMP #2 VFD	
C3.4	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL		RECIRC PUMP #2 VFD	
C3.5	3/4"	4	#12	POWER	RECIRC PUMP #2 VFD	DISCONNECT	RECIRC PUMP #2	
C3.6	3/4"	1	CAT6	CONTROL	UNIT B CONTROL PANEL		RECIRC PUMP #2 VFD	
C3.7	3/4"	4	#12	POWER	UNIT B CONTROL PANEL	DISCONNECT	CLARIFIER #2 DRIVE UNIT	
C4.1	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		INFLUENT ACTUATED VALVE #1	
C4.2	3/4"	8	#14	CONTROL	UNIT A CONTROL PANEL		INFLUENT ACTUATED VALVE #1	
C4.3	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE RECYCLE VALVE #1	
C4.4	3/4"	8	#14	CONTROL	UNIT A CONTROL PANEL		SLUDGE RECYCLE VALVE #1	
C4.5	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE BLOWDOWN VALVE #1	
C4.6	3/4"	8	#14	CONTROL	UNIT A CONTROL PANEL		SLUDGE BLOWDOWN VALVE #1	
C4.7	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		CLARIFIER TRANSFER VALVE #1	
C4.8	3/4"	8	#14	CONTROL	UNIT A CONTROL PANEL		CLARIFIER TRANSFER VALVE #1	
C5.1	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		INFLUENT ACTUATED VALVE #2	
C5.2	3/4"	8	#14	CONTROL	UNIT B CONTROL PANEL		INFLUENT ACTUATED VALVE #2	
C5.3	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE RECYCLE VALVE #2	
C5.4	3/4"	8	#14	CONTROL	UNIT B CONTROL PANEL		SLUDGE RECYCLE VALVE #2	
C5.5	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE BLOWDOWN VALVE #2	
C5.6	3/4"	8	#14	CONTROL	UNIT B CONTROL PANEL		SLUDGE BLOWDOWN VALVE #2	
C5.7	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		CLARIFIER TRANSFER VALVE #2	
C5.8	3/4"	8	#14	CONTROL	UNIT B CONTROL PANEL		CLARIFIER TRANSFER VALVE #2	
C6.1	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		INLET METER #1	
C6.2	3/4"	1	16TS	CONTROL	UNIT A CONTROL PANEL		INLET METER #1	
C6.3	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		INLET METER #2	
C6.4	3/4"	1	16TS	CONTROL	UNIT B CONTROL PANEL		INLET METER #2	
C6.5	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE RECIRC METER #1	
C6.6	3/4"	1	16TS	CONTROL	UNIT A CONTROL PANEL		SLUDGE RECIRC METER #1	
C6.7	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		SLUDGE RECIRC METER #2	
C6.8	3/4"	1	16TS	CONTROL	UNIT B CONTROL PANEL		SLUDGE RECIRC METER #2	
C7.1	3/4"	1	16TS	CONTROL	UNIT A CONTROL PANEL		LEVEL TRANSMITTER #1	
C7.2	3/4"	1	16TS	CONTROL	UNIT B CONTROL PANEL		LEVEL TRANSMITTER #2	
C7.3	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		TURBIDIMETER ASSEMBLY #1	
C7.4	3/4"	1	16TS	CONTROL	UNIT A CONTROL PANEL		TURBIDIMETER ASSEMBLY #1	
C7.5	3/4"	1	VSC	PWR/CTRL	TURBIDIMETER CONTROLLER #1		TURBIDIMETER SENSOR #1	
C7.6	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		TURBIDIMETER ASSEMBLY #2	
C7.7	3/4"	1	16TS	CONTROL	UNIT B CONTROL PANEL		TURBIDIMETER ASSEMBLY #2	
C7.8	3/4"	1	VSC	PWR/CTRL	TURBIDIMETER CONTROLLER #2		TURBIDIMETER SENSOR #2	
C8.1	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING LIGHTING PANEL		DOOR OPENER MOTOR	
C8.2	3/4"	6	#14	CONTROL	DOOR OPENER CONTROLLER		DOOR OPENER MOTOR	

CONDUIT AND CABLE SCHEDULE

CONDUIT NO.	CONDUIT SIZE	CABLE QTY.	CABLE SIZE	PURPOSE	FROM	VIA	TO	REMARKS
D1.1	3/4"	3	#12	POWER	NEW POWER PANEL #1		FLOCCULATOR MIXER #1 CONTROLLER	
D1.2	3/4"	3	#12	POWER	NEW POWER PANEL #1		FLOCCULATOR MIXER #2 CONTROLLER	
P1.1	2"	4	2/0	POWER	NEW POWER PANEL #1		NEW HIGH SERVICE PUMP #1 VFD	
P1.2	2"	4	2/0	POWER	NEW HIGH SERVICE PUMP #1 VFD	DISCONNECT	NEW HIGH SERVICE PUMP #1	
P1.3	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW HIGH SERVICE PUMP #1 VFD	
P1.4	3/4"	4	#14	CONTROL	MAIN CONTROL PANEL		HIGH SERVICE PUMP #1 CHECK VALVE	LIMIT SWITCH
P2.1	2"	4	2/0	POWER	NEW POWER PANEL #1		NEW HIGH SERVICE PUMP #2 VFD	
P2.2	2"	4	2/0	POWER	NEW HIGH SERVICE PUMP #2 VFD	DISCONNECT	NEW HIGH SERVICE PUMP #2	
P2.3	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW HIGH SERVICE PUMP #2 VFD	
P2.4	3/4"	4	#14	CONTROL	MAIN CONTROL PANEL		HIGH SERVICE PUMP #2 CHECK VALVE	LIMIT SWITCH
P3.1	2"	4	2/0	POWER	NEW POWER PANEL #1		NEW HIGH SERVICE PUMP #3 VFD	
P3.2	2"	4	2/0	POWER	NEW HIGH SERVICE PUMP #3 VFD	DISCONNECT	NEW HIGH SERVICE PUMP #3	
P3.3	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW HIGH SERVICE PUMP #3 VFD	
P3.4	3/4"	4	#14	CONTROL	MAIN CONTROL PANEL		HIGH SERVICE PUMP #3 CHECK VALVE	LIMIT SWITCH
P4.1	1-1/4"	4	#1	POWER	NEW POWER PANEL #1		NEW BACKWASH PUMP #1 VFD	
P4.2	1-1/4"	4	#1	POWER	NEW BACKWASH PUMP #1 VFD	DISCONNECT	NEW BACKWASH PUMP #1	
P4.3	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW BACKWASH PUMP #1 VFD	
P5.1	1-1/4"	4	#1	POWER	NEW POWER PANEL #1		NEW BACKWASH PUMP #2 VFD	
P5.2	1-1/4"	4	#1	POWER	NEW BACKWASH PUMP #2 VFD	DISCONNECT	NEW BACKWASH PUMP #2	
P5.3	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		NEW BACKWASH PUMP #2 VFD	
L1.1	1-1/2"	4	#2	POWER	NEW POWER PANEL #1		EXISTING RAW WATER PS MDP	
L1.2	2"	1	FIBER	CONTROL	MAIN CONTROL PANEL		NEW RAW WATER CONTROL PANEL	
L1.3	3/4"	3	#12	POWER	EXISTING PS LP-1		NEW RAW WATER CONTROL PANEL	
L2.1	3/4"	4	#8	POWER	EXISTING RAW WATER PS MDP		NEW RAW WATER PUMP #1 VFD	
L2.2	3/4"	4	#8	POWER	NEW RAW WATER PUMP #1 VFD		NEW RAW WATER PUMP #1	
L2.3	3/4"	1	CAT6	CONTROL	NEW RAW WATER PUMP #1 VFD		NEW RAW WATER CONTROL PANEL	
L2.4	3/4"	8	#14	CONTROL	NEW RAW WATER PUMP #1 VFD		NEW RAW WATER PUMP #1 THERM/SEAL	
L3.1	3/4"	4	#8	POWER	EXISTING RAW WATER PS MDP		NEW RAW WATER PUMP #2 VFD	
L3.2	3/4"	4	#8	POWER	NEW RAW WATER PUMP #2 VFD		NEW RAW WATER PUMP #2	
L3.3	3/4"	1	CAT6	CONTROL	NEW RAW WATER PUMP #2 VFD		NEW RAW WATER CONTROL PANEL	
L3.4	3/4"	8	#14	CONTROL	NEW RAW WATER PUMP #2 VFD		NEW RAW WATER PUMP #2 THERM/SEAL	
L4.1	3/4"	4	#8	POWER	EXISTING RAW WATER PS MDP		NEW LOW LIFT PUMP #3 VFD	
L4.2	3/4"	4	#8	POWER	NEW RAW WATER PUMP #3 VFD		NEW RAW WATER PUMP #3	
L4.3	3/4"	1	CAT6	CONTROL	NEW RAW WATER PUMP #3 VFD		NEW RAW WATER CONTROL PANEL	
L4.4	3/4"	8	#14	CONTROL	NEW RAW WATER PUMP #3 VFD		NEW RAW WATER PUMP #3 THERM/SEAL	
L5.1	3/4"	4	#14	CONTROL	NEW RAW WATER CONTROL PANEL		EXISTING AIR COMPRESSOR CP 1	
L5.2	3/4"	4	#14	CONTROL	NEW RAW WATER CONTROL PANEL		EXISTING AIR COMPRESSOR CP 2	
M1.1	3/4"	3	#12	POWER	PUMP STATION PANEL		MIXER MS/DC	
M1.2	3/4"	10	#14	CONTROL	PUMP STATION PANEL		MIXER CONTROL PANEL	
M1.3	3/4"	4	#12	POWER	MIXER CONTROL PANEL		MIXER	
M1.4	3/4"	10	#14	CONTROL	MIXER CONTROL PANEL		MIXER	
U1.1	3/4"	3	#8	POWER	EXISTING INSTRUMENT POWER PANEL		UV CP #1	
U1.2	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		UV CP #1	
U1.3	3/4"	-	VSC	PWR/CTRL	UV CP #1		UV UNIT #1	
U2.1	3/4"	3	#8	POWER	EXISTING INSTRUMENT POWER PANEL		UV CP #2	
U2.2	3/4"	1	CAT6	CONTROL	MAIN CONTROL PANEL		UV CP #2	
U2.3	3/4"	-	VSC	PWR/CTRL	UV CP #2		UV UNIT #2	
F1.1	3/4"	3	#12	POWER	EXISTING INSTRUMENT POWER PANEL		NEW EFFLUENT FM TRANSMITTER	
F1.2	3/4"	1	16TS	CONTROL	MAIN CONTROL PANEL		NEW EFFLUENT FM TRANSMITTER	
F1.3	3/4"	1	VSC	PWR/CTRL	NEW EFFLUENT FM TRANSMITTER		NEW EFFLUENT FLOW METER	
F2.1	3/4"	3	#12	POWER	EXISTING INSTRUMENT POWER PANEL		NEW CLARIFIER FLOW CONTROL VALVE	
F2.2	3/4"	8	#14	CONTROL	MAIN CONTROL PANEL		NEW CLARIFIER FLOW CONTROL VALVE	
H1.1	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL	MS/DC	EF1	
H1.2	3/4"	3	#12	POWER	LV1		EF1 MS/DC	
H1.3	3/4"	3	#12	POWER	LV2		EF1 MS/DC	
H1.4	3/4"	2	#12	CONTROL	TSTAT		EF1 MS/DC	
H1.5	3/4"	2	#12	CONTROL	HSTAT		EF1 MS/DC	
H2.1	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL	DISCONNECT	UH1	
H2.2	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL	DISCONNECT	UH2	
H2.3	3/4"	2	#12	CONTROL	TSTAT		UH1	
H2.4	3/4"	2	#12	CONTROL	TSTAT		UH2	
H2.5	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL	DISCONNECT	UH3	
H2.6	3/4"	4	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL	DISCONNECT	UH4	
H2.7	3/4"	2	#12	CONTROL	TSTAT		UH3	
H2.8	3/4"	2	#12	CONTROL	TSTAT		UH4	
H3.1	3/4"	3	#12	POWER	NEW CLARIFIER BUILDING POWER PANEL		DEHUMIDIFER 277V RECEPTACLE	
H3.2	3/4"	2	#12	CONTROL	DEHUMIDIFIER		DEHUMIDIFIER HSTAT	

DATE: 10/28/2024
DRAWN BY: EMB
SCALE: NTS
REVIEWED BY: RF
PROJECT NO.: ----
FILE:

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6 TOWNSEND STREET, WALTON, NY 13856 - 607.865.9235
16 EAST MARKET ST., RED HOOK, NY 12571 - 518.452.1290
548 BROADWAY, MONTICELLO, NY 12701 - 845.791.1777

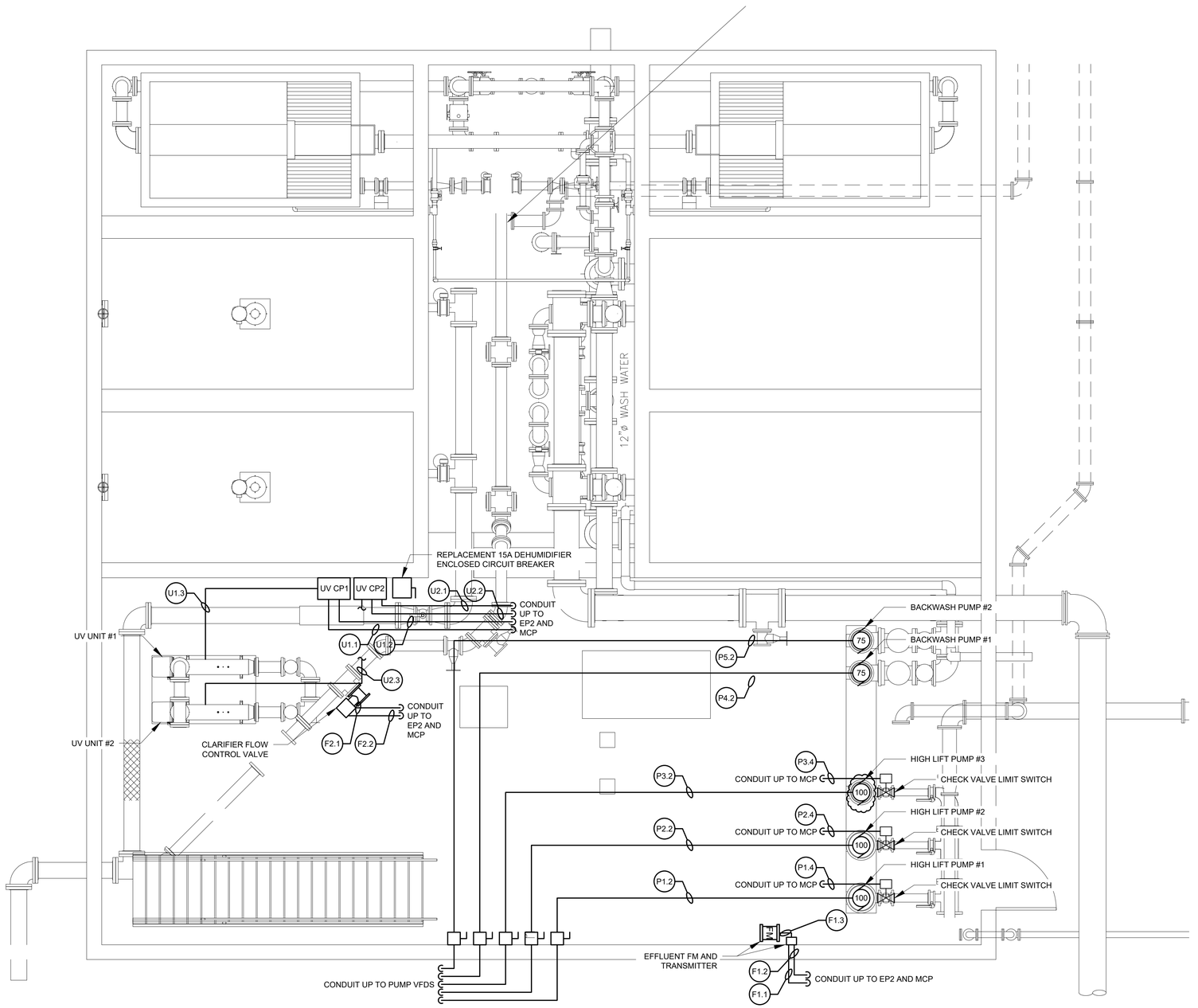
REVISIONS

NO.	DATE	DESCRIPTION
1.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

CONDUIT & CABLE SCHEDULES

SHEET: E-004



0 2 4 8

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

DATE: 10/28/2024
DRAWN BY: EMB
SCALE: AS SHOWN
REVIEWED BY: RF
PROJECT NO.: ---
FILE: ---

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REVISIONS

NO.	DATE	DESCRIPTION
1.	11/01/24	ADDENDUM #1

RHINEBECK WTP
PLANT IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NEW YORK

LOWER LEVEL
ELECTRICAL PLAN

SHEET:
E-104

Belt Drive Upblast Centrifugal Wall
Exhaust Fan

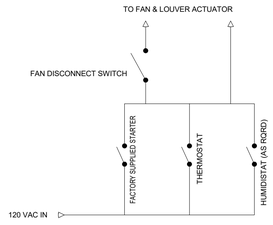
MARK INFORMATION		FAN INFORMATION						MOTOR INFORMATION						
QTY	MARK	MODEL	VOLUME (CFM)	TOTAL EXTERNAL SP (IN WG)	FAN RPM	OPERATING POWER (HP)	WEIGHT (LB.)	SIZE (HP)	V/C/P	ENCLOSURE	MOTORRPM	WINDINGS	NEC FLA*	SONES
1	EF1	CUBE-300-7	5,300	0.29	415	0.54	216	0.75	460/60/3	TF	1725	1	1.6	7.3

*NEC FLA - Based on table 430.250 or 430.248 of National Electrical Code 2020. Actual motor FLA may vary for sizing thermal overload, consult factory"

EF1 : SELECTED OPTIONS AND ACCESSORIES
Standard Curb Cap Size - 40 Square
Sidewall Mounting - Fan Configured for Wall-Mounted Applications
Curb will be Through Wall, 6 in. Wall Thickness
UL/cUL 705 Listed - "Power Ventilators"
Switch, NEMA-1, Toggle,
Foam Curb Seal (Factory Applied)
Damper Shipped Loose, WD-330-PB-34X34, Gravity Operated, Coated, Nominal Size
Coated with Permatector, Concrete Gray-RAL 7023, Fan And Attached Acc
Hood Hasps
Stainless Steel Fasteners - 300 Series
Stainless Steel Shaft - 300 Series
Wiring Pigtail, Internal, General, 9 ft from Unit of Flexible Metal Conduit
Birdscreen: Stainless Steel, nom. 69% Free Area
Bearings with Grease Fittings, L10 life of 100,000 hrs (L50 avg. life 500,000 hrs)
Conduit Chase Qty 1

HVAC NOTES:

1. EXHAUST FANS AND LOUVERS SHALL BE GREENHECK OR APPROVED EQUAL
2. HYDRONIC HEATERS SHALL BE MODINE.
3. ALL EQUIPMENT INSTALLATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
4. EXHAUST FANS SHALL HAVE HONEYWELL T6051A1016/U COOLING THERMOSTATS AS SHOWN. HONEYWELL H466166 LINE VOLTAGE HUMIDISTATS SHALL BE INSTALLED WHERE SHOWN. SINGLE POLE SWITCHES W/PILOT LIGHT (EXP AS REQUIRED) SHALL PROVIDE MANUAL OVERRIDE WHERE SHOWN. THE FAN SHALL RUN ON CLOSED CONTACTS IN ANY CONTROL. GREENHECK CAPS FILE WILL BE PROVIDED UPON REQUEST.
5. ALL HEATERS SHALL HAVE HONEYWELL T4 PRO TH4110U2005 PROGRAMMABLE THERMOSTATS. AQUASTATS SHALL PROVIDE FAN CONTROL FOR UNIT HEATERS.
6. ALL HYDRONIC PIPING SHALL BE TYPE L COPPER W/1" FIBERGLASS INSULATION INSTALLED AS A REVERSE RETURN SYSTEM.
4. THE WEIGHT OF THE UNIT HEATERS, FANS AND OTHER HVAC EQUIPMENT SHALL BE VERIFIED BEFORE PURCHASE AND THE APPROPRIATE HANGERS AND SUPPORTS WILL BE CONFIRMED AND PROVIDED BY THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING AND PROVIDING ALL NECESSARY SUPPORTS, BRACES, PADS, CONNECTIONS, ETC. TO MAKE THE UNIT FULLY FUNCTIONAL AND OPERATIONAL IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
5. THE DRAWINGS SHOW THE GENERAL ARRANGEMENT OF THE EQUIPMENT AND THE MAJOR COMPONENTS. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING A FULLY OPERATIONAL UNIT COMPLETE WITH ANCILLARY CONNECTIONS SUCH AS AIR, WATER, POWER, FUEL, AND INSTRUMENTATION.
6. CONTRACTOR SHALL COORDINATE MOUNTING AND INSTALLATION OF ALL UNITS, AND ACCESSORY DEVICES TO BE COMPATIBLE WITH AMBIENT AND ENVIRONMENTAL CONDITIONS OF INSTALLATION LOCATION.
7. CONTRACTOR SHALL PROVIDE PENETRATIONS AND RESPECTIVE FLASHING THROUGH WALLS, FLOORS, AND CEILINGS AS NECESSARY TO ROUTE VENTING PIPES, CONDENSATE PIPES, AND ANY OTHER ACCESSORIES NECESSARY FOR THE PROPE FUNCTION OF THE HVAC UNITS.
8. CONTRACTOR SHALL BE RESPONSIBLE FOR PIPING AND CONNECTING UNITS TO FUEL SOURCES, IF APPLICABLE.
9. 9. IF DAMPERS ARE TO BE INSTALLED IN A ROOM CONTAINING A GENERATOR, THE CONTRACTOR SHALL COORDINATE THE NORMAL POSITION OF THE DAMPERS WITH THE ENGINEER PRIOR TO INSTALLATION.

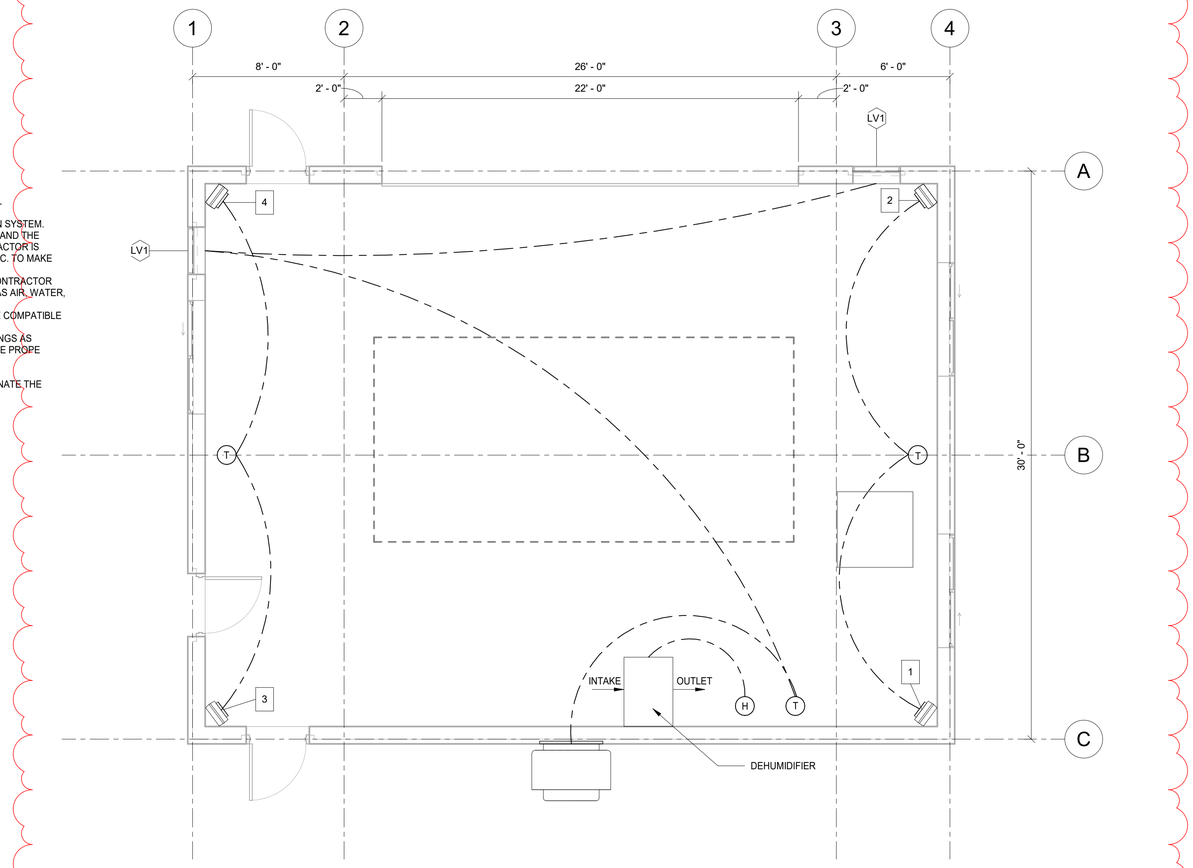


TYPICAL EXHAUST FAN WIRING SCHEMATIC
NTS

LOUVER SCHEDULE						
MARK TYPE	ID #	TAG	QTY	MODEL	WIDTH	HEIGHT
LV1	1-1	LV1	2	ECD-601	32	40

UNIT HEATER SCHEDULE									
ID	LOCATION	MANUFACTURER & MODEL NUMBER	TYP	KW	BTU	AIRFLOW (CFM)	VOLT/PH/HZ	MAX MTG HGT (FT)	NOTES
UH-1	CLARIFIER BLDG	MODINE NEW-480360-075	HORIZONTAL	7.5	25,600	700	460/3/60	8.5	NEW ADJUSTABLE WALL MOUNT BRACKET
UH-2	CLARIFIER BLDG	MODINE NEW-480360-075	HORIZONTAL	7.5	25,600	700	460/3/60	8.5	NEW ADJUSTABLE WALL MOUNT BRACKET
UH-3	CLARIFIER BLDG	MODINE NEW-480360-075	HORIZONTAL	7.5	25,600	700	460/3/60	8.5	NEW ADJUSTABLE WALL MOUNT BRACKET
UH-4	CLARIFIER BLDG	MODINE NEW-480360-075	HORIZONTAL	7.5	25,600	700	460/3/60	8.5	NEW ADJUSTABLE WALL MOUNT BRACKET

DEHUMIDIFIER SCHEDULE								
CAPACITY	LOCATION	MANUFACTURER & MODEL NUMBER	TYP	KW	BTU/H	AIRFLOW (CFM)	VOLT/PH/HZ	NOTES
PPD AT 80°/60% RH	CLARIFIER BLDG	ANDEN A710V3	HORIZONTAL	6.35	16,168	700	277/1/60	CEILING HANGERS AND WALL MOUNTS INCLUDED AS NEEDED PROVIDE A HARD-PIPE PVC DRIP LINE TO THE PROPOSED CB IN THE ROOM



1 H-101 Level 1 HVAC
1/4" = 1'-0"

DATE: 11.2024
DRAWN BY: IB
SCALE: As indicated
REVIEWED BY: Approver
PROJECT NO.: 22-2496
FILE:

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REVISIONS

NO.	DATE	DESCRIPTION
1	11/01/2024	ADDENDUM #1

RHINEBECK WTP
IMPROVEMENTS
VILLAGE OF RHINEBECK
DUTCHESS COUNTY, NY

HVAC FLOOR PLN

SHEET:
H-101