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ADDENDUM 4
Via E-Mail
DATE: August 12, 2020

Contract 20-C-00021; D.L. Tippin Administration Building Rehabilitation – Phase 1-Building and Site Improvements

Bidders on the above referenced project are hereby notified that the following addendum is made to the Contract Documents. BIDS TO BE SUBMITTED SHALL CONFORM TO THIS NOTICE.

- Item 1: Replace Section 21 13 16 Pre-action Sprinkler Systems with the attached Section 21 13 16 Pre-action Sprinkler Systems.
- Item 2: Replace Section 21 22 00 Clean-agent Fire Extinguishing Systems with the attached Section 21 22 00 Clean-agent Fire Extinguishing Systems.
- Item3: Replace Section 23 23 14 Hydronic Specialties with the attached Section 23 23 14 Hydronic Specialties.
- Item 4: Replace Section 23 73 13 Packaged Air-cooled Water Chillers with the attached Section 23 73 13 Packaged Air-cooled Water Chillers.
- Item 5: Replace Section 23 74 13 Air Handling Units with the attached Section 23 74 13 Air Handling Units.
- Item 6: Replace Section 28 31 11 Fire Alarm and Smoke Detection Systems with the attached Section 28 31 11 Fire Alarm and Smoke Detection Systems.
- Item 7: Replace plan sheets G100, A900, M002, M101, M201, M202, M401, M402, FP001, FP101, E201, E301 and E404 with the attached plan sheets G100, A900, M002, M101, M201, M202, M401, M402, FP001, FP101, E201, E301 and E404.
- Item 8: Attached for reference are Improvements to Water Supply drawings.
- Item 9: Attached is the Report of Subsurface Exploration and Geotechnical Engineering.
- Item 10: Attached are Pre-bid RFIs and Responses.
- Item 11: Attached are copies of RFIs and Responses.

All other provisions of the Contract Documents and Specifications not in conflict with this Addendum shall remain in full force and effect. Questions are to be e-mailed to Contract.Administration@tampagov.net.

Jim Greiner

Jim Greiner, P.E., Contract Management Supervisor

SECTION 21 13 16 – PRE-ACTION SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other related Specification sections, apply to this section.

1.2 SUMMARY

- A. Section Includes:

1. Pipes, fittings, and specialties.
2. Specialty valves.
3. Sprinkler specialty pipe fittings.
4. Sprinklers.
5. Alarm devices.
6. Manual control stations.
7. Control panels.
8. Pressure gages.

- B. Related Requirements:

1. Section 21 11 19 "Fire Department Connections" for exposed-, flush-, and yard-type fire department connections.
2. Section 23 05 23 "General-Duty Valves for Water-Based Fire-Suppression Piping" for ball, butterfly, check, gate, post-indicator, and trim and drain valves.

1.3 DEFINITIONS

- A. Standard-Pressure Sprinkler Piping: Pre-action sprinkler system piping designed to operate at working pressure of 175-psig maximum.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

- B. Shop Drawings: For Pre-action sprinkler systems signed and sealed by a qualified professional engineer registered in the State of Florida.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include all design calculations.

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3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 4. Wiring Diagrams: For power, signal, and control wiring.
 5. Coordinate all requirements with the fire alarm system contractor and installer. Do not duplicate controls and systems. Obtain copy of fire alarm shop drawings and submit pre-action system shop drawings together for review.
- C. Delegated-Design Submittal: For pre-action sprinkler systems signed and sealed by the qualified professional engineer. The qualified professional engineer shall become the engineer of record.
1. Indicate compliance with performance requirements and design criteria, including analysis data.
 2. Include design calculations.
 3. Indicate the Following on Reflected Ceiling Plans:
 - a. Ceiling penetrations and ceiling-mounted items.
 - b. Method of attaching hangers to building structure.
 - c. Other ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
 4. Indicate the Following on Occupied Work Area Plans:
 - a. Controls and alarms.
 - b. Equipment and furnishings.
 5. Indicate the Following on Access Floor Space Plans:
 - a. Method of supporting piping.
 6. Indicate the Following on Ceiling Plans:
 - a. Method of supporting piping.
 - b. Other equipment located in the ceiling space that is being protected including sprinkler piping, HVAC equipment, raceways, or conduit.
 7. Coordinate all requirements with the fire alarm system contractor and installer. Do not duplicate controls and systems. Obtain copy of fire alarm shop drawings and submit pre-action sprinkler system shop drawings together for review.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Domestic water piping.
 2. HVAC hydronic piping.

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3. HVAC ductwork
4. Data and Electrical equipment and wiring
5. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Life Safety fixtures.
 - d. Speakers.

B. Qualification Data: For qualified Installer.

C. Approved Sprinkler Piping Drawings: Working plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations as a confirmation of the Architect-Engineer's calculations. Base calculations on results of fire-hydrant flow test.

D. Fire-hydrant flow test report.

E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include "Contractor's Material and Test Certificate for Aboveground Piping."

F. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For pre-action sprinkler systems and specialties to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Sprinkler Cabinets: Finished, wall-mounted, steel cabinet with hinged cover, and with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler used on Project.

1.8 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installer's responsibilities include designing, fabricating, and installing sprinkler systems and providing professional engineering services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test.
 - a. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified professional engineer.

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- B. Welding Qualifications: Qualify procedures and operators according to 2010 ASME Boiler and Pressure Vessel Code.

1.9 WORK INCLUDED

- A. This section covers equipment, installation, testing and all materials required for the dry-pipe pre-action fire sprinkler protection packaged system, single interlock with electric/electric release. All equipment shall be housed in a pre-assembled and a free standing cabinet.
- B. Contractor shall be responsible for the complete system planning, coordination, layout, hydraulic calculations (to confirm Architect-Engineer's calculations), preparation of shop drawings, field installation, coordination and completion in accordance with project requirements and applicable codes and standards.
- C. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the work of this section in accordance with the true intent and meaning of the contract documents shall be provided by this Contractor and incorporated under this section of the work at no additional cost to the owner.

1.10 WARRANTY

- A. Warranty: Repair or replace components that fail in materials or workmanship. Manufacturer's warranty shall be in the name of the Owner.
 - 1. Warranty Period: One year minimum from date of Substantial Completion, or longer if standard manufacturer's warranty is longer.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTIONS

- A. Double-Interlock Pre-Action Sprinkler System: System to provide coverage for rooms as indicated on drawings. The method of release of the deluge valve priming water pressure shall be by a pneumatic solenoid valve and an electric actuator. The pre-action system riser shall be of a listed and approved assembly. The system riser shall be equipped with a rubber seated check valve downstream of the deluge valve and prior to the supervisory air connection. Automatic sprinklers are attached to piping containing low-pressure air. Actuation of a fire-detection system, located in same area as sprinklers, opens deluge valve, permitting water to flow into sprinkler piping. Water will then discharge from opened sprinklers. The pre-action system shall be provided with all necessary appurtenances to complete the system. The system shall be installed in conformance with the current Edition of N.F.P.A. 13, Standard for Installation of Sprinkler Systems.
- B. Interface the pre-action system with the clean agent fire suppression system. The clean agent system control panel shall be provided as a dual panel that also supervises and controls the pre-action fire suppression system. Provide all initiation and detection devices required for the pre-action system and connect them to the dual pre-action/clean agent control panel. The building fire alarm system will monitor the clean agent system control panel. Refer to specification sections 28 31 11 and 21 22 00 and coordinate.

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- C. Provide system to hazard occupancy classification required by the authority having jurisdiction.

2.2 PERFORMANCE REQUIREMENTS

- A. Sprinkler system equipment, specialties, accessories, installation, and testing shall comply with the following:
 - 1. NFPA 13.
- B. Standard-Pressure Piping System Component: Listed for 175-psig minimum working pressure.
- C. Sprinkler system design shall be approved by authorities having jurisdiction.
 - 1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping, valves, and backflow preventers.
 - 2. Sprinkler Occupancy Hazard Classifications:
 - a. Data Equipment Rooms: Ordinary Hazard, Group 1
 - 3. Minimum Density for Automatic-Sprinkler Piping Design:
 - a. Ordinary-Hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. area.
 - 4. Maximum Protection Area per Sprinkler: According to UL listing.
 - 5. Maximum Protection Area per Sprinkler:
 - a. Data Equipment Rooms: 130 sq. ft.
 - 6. Total Combined Hose-Stream Demand Requirement: According to NFPA 13 unless otherwise indicated:
 - a. Ordinary-Hazard Occupancies: 250 gpm for 60 minutes.

2.3 STEEL PIPE AND FITTINGS

- A. Schedule 40, Galvanized-Steel Pipe: ASTM A 135/A 135M; ASTM A 795/A 795M, Type E or ASME B36.10M wrought steel. Pipe ends may be factory or field formed to match joining method.
- B. Galvanized-Steel Pipe Nipples: ASTM A 733, made of ASTM A 53/A 53M, standard-weight, seamless steel pipe with threaded ends.
- C. Galvanized-Steel Couplings: ASTM A 865/A 865M, threaded.
- D. Galvanized, Gray-Iron Threaded Fittings: ASME B16.4, Class 125, standard pattern.
- E. Malleable- or Ductile-Iron Unions: UL 860.
- F. Cast-Iron Flanges: ASME B16.1, Class 125.
- G. Plain-End-Pipe Fittings: UL 213, ductile-iron body with retainer lugs that require one-quarter turn or screwed retainer pin to secure pipe in fitting.

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H. Grooved-Joint, Steel-Pipe Appurtenances:

1. Pressure Rating: 175-psig minimum.
2. Galvanized, Grooved-End Fittings for Steel Piping: ASTM A 47/A 47M, malleable-iron casting or ASTM A 536, ductile-iron casting, with dimensions matching steel pipe.
3. Grooved-End-Pipe Couplings for Steel Piping: AWWA C606 and UL 213 rigid pattern, unless otherwise indicated, for steel-pipe dimensions. Include ferrous housing sections, EPDM-rubber gasket, and bolts and nuts.

2.4 COPPER TUBE AND FITTINGS

- A. Hard Copper Tube: ASTM B 88, Type L and ASTM B 88, Type M water tube, drawn temper.
- B. Cast-Copper, Solder-Joint Fittings: ASME B16.18 pressure fittings.
- C. Wrought-Copper, Solder-Joint Fittings: ASME B16.22 pressure fittings.
- D. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick.
- F. Copper Unions: MSS SP-123, cast-copper-alloy, hexagonal-stock body, with ball-and-socket, metal-to-metal seating surfaces and solder-joint or threaded ends.
- G. Copper Pressure-Seal Fittings:
 1. Standard: UL 213.
 2. NPS 2 and Smaller: Wrought-copper fitting with EPDM-rubber O-ring seal in each end.
 3. NPS 2-1/2 to NPS 4 : Cast-bronze fitting with EPDM-rubber O-ring seal in each end.
- H. Grooved-Joint, Copper-Tube Appurtenances:
 1. Grooved-End Copper Fittings: ASTM B 75 , copper tube or ASTM B 584 bronze castings.
 2. Grooved-End-Tube Couplings: To fit copper-tube dimensions, with design similar to AWWA C606. Include ferrous housing sections, EPDM-rubber gasket suitable for hot and cold water, and bolts and nuts.
- I. Copper-Tube, Extruded-Tee Connections:
 1. Description: Tee formed in copper tube according to ASTM F 2014.

2.5 SPECIALTY VALVES

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating:
 1. Standard-Pressure Piping Specialty Valves: 175-psig minimum.

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- C. Body Material: Cast or ductile iron.
- D. Size: Same as connected piping.
- E. End Connections: Flanged or grooved.
- F. Pre-action Valves:
 - 1. Standard: UL 260.
 - 2. Design: Differential-pressure type.
 - 3. Include UL 1486, quick-opening devices, trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - 4. Air-Pressure Maintenance Device:
 - 5. Standard: UL 260.
 - 6. Type: Automatic device to maintain minimum air pressure in piping.
 - 7. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and 175-psig 300-psig outlet pressure.
 - 8. Air Compressor:
 - Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - Motor Horsepower: Fractional.
 - Power: 120-V ac, 60 Hz, single phase.
- G. Deluge Valves:
 - 1. Standard: UL 260.
 - 2. Design: Hydraulically operated, differential-pressure type.
 - 3. Include trim sets for alarm-test bypass, drain, electrical water-flow alarm switch, pressure gages, drip cup assembly piped without valves and separate from main drain line, and fill-line attachment with strainer.
 - 4. Dry, Pilot-Line Trim Set: Include dry, pilot-line actuator; air- and water-pressure gages; low-air-pressure warning switch; air relief valve; and actuation device. Dry, pilot-line actuator includes cast-iron, operated, diaphragm-type valve with resilient facing plate, resilient diaphragm, and replaceable bronze seat. Valve includes threaded water and air inlets and water outlet. Loss of air pressure on dry, pilot-line side allows pilot-line actuator to open and causes deluge valve to open immediately.
 - 5. Air-Pressure Maintenance Device:
 - a. Standard: UL 260.
 - b. Type: Automatic device to maintain minimum air pressure in piping.

- c. Include shutoff valves to permit servicing without shutting down sprinkler piping, bypass valve for quick filling, pressure regulator or switch to maintain pressure, strainer, pressure ratings with 14- to 60-psig adjustable range, and 175-psig outlet pressure.
6. Air Compressor:
 - a. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 - b. Motor Horsepower: Fractional.
 - c. Power: 120-V ac, 60 Hz, single phase.
 - d. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
- H. Automatic (Ball Drip) Drain Valves:
 1. Standard: UL 1726.
 2. Pressure Rating: 175-psig minimum.
 3. Type: Automatic draining, ball check.
 4. Size: NPS 3/4 .
 5. End Connections: Threaded.

2.6 SPRINKLER PIPING SPECIALTIES

- A. General Requirements for Pre-action System Fittings: UL listed for pre-action service.
- B. Branch Outlet Fittings:
 1. Standard: UL 213.
 2. Pressure Rating: 175-psig minimum.
 3. Body Material: Ductile-iron housing with EPDM seals and bolts and nuts.
 4. Type: Mechanical-tee and -cross fittings.
 5. Configurations: Snap-on and strapless, ductile-iron housing with branch outlets.
 6. Size: Of dimension to fit onto sprinkler main and with outlet connections as required to match connected branch piping.
 7. Branch Outlets: Grooved, plain-end pipe, or threaded.
- C. Flow Detection and Test Assemblies:
 1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 2. Pressure Rating: 175-psig minimum.

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3. Body Material: Cast- or ductile-iron housing with orifice, sight glass, and integral test valve.
 4. Size: Same as connected piping.
 5. Inlet and Outlet: Threaded.
- D. Branch Line Testers:
1. Standard: UL 199.
 2. Pressure Rating: 175-psig minimum.
 3. Body Material: Brass.
 4. Size: Same as connected piping.
 5. Inlet: Threaded.
 6. Drain Outlet: Threaded and capped.
 7. Branch Outlet: Threaded, for sprinkler.
- E. Sprinkler Inspector's Test Fittings:
1. Standard: UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
 2. Pressure Rating: 175-psig minimum.
 3. Body Material: Cast- or ductile-iron housing with sight glass.
 4. Size: Same as connected piping.
 5. Inlet and Outlet: Threaded.
- F. Adjustable Drop Nipples:
1. Standard: UL 1474.
 2. Pressure Rating: 250-psig minimum 300 psig.
 3. Body Material: Steel pipe with EPDM O-ring seals.
 4. Size: Same as connected piping.
 5. Length: Adjustable.
 6. Inlet and Outlet: Threaded.
- G. Flexible Sprinkler Hose Fittings:
1. Standard: UL 1474.
 2. Type: Flexible hose for connection to sprinkler, and with bracket for connection to ceiling grid.
 3. Pressure Rating: 175-psig minimum.
 4. Size: Same as connected piping, for sprinkler.

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2.7 SPRINKLERS

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide."
- B. Pressure Rating for Residential Sprinklers: 175-psig maximum.
- C. Pressure Rating for Automatic Sprinklers: 175-psig minimum.
- D. Pressure Rating for High-Pressure Automatic Sprinklers: 250-psig minimum.
- E. Automatic Sprinklers with Heat-Responsive Element:
 - 1. Nonresidential Applications: UL 199.
 - 2. Characteristics: Nominal 1/2-inch orifice with Discharge Coefficient K of 5.6, and for "Ordinary" temperature classification rating unless otherwise indicated or required by application.
- F. Sprinkler Finishes: Chrome plated and painted.
- G. Sprinkler Escutcheons: Materials, types, and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
 - 1. Ceiling Mounting: Aluminum, white finish, one piece, flat.
- H. Sprinkler Guards:
 - 1. Standard: UL 199.
 - 2. Type: Wire cage with fastening device for attaching to sprinkler.

2.8 ALARM DEVICES

- A. Alarm-device types shall match piping and equipment connections.
- B. Electrically Operated Alarm Bell:
 - 1. Standard: UL 464.
 - 2. Type: Vibrating, metal alarm bell.
 - 3. Size: 6-inch minimum diameter.
 - 4. Finish: Red-enamel factory finish, suitable for outdoor use.
 - 5. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Pressure Switches:
 - 1. Standard: UL 346.
 - 2. Type: Electrically supervised water-flow switch with retard feature.
 - 3. Components: Single-pole, double-throw switch with normally closed contacts.

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4. Design Operation: Rising pressure signals water flow.

D. Valve Supervisory Switches:

1. Standard: UL 346.
2. Type: Electrically supervised.
3. Components: Single-pole, double-throw switch with normally closed contacts.
4. Design: Signals that controlled valve is in other than fully open position.
5. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application

E. Heat Detectors:

Heat detectors on the ceiling shall be provided as part of the pre-action sprinkler system, and shall initiate the first phase of the pre-action fire suppression system. These detectors shall be UL listed for use with the pre-action control panel and shall be completely wired and connected.

2.9 MANUAL CONTROL STATIONS

- A. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide" for hydraulic operation, with union, NPS 1/2 pipe nipple, and bronze ball valve.
- B. Include metal enclosure labeled "MANUAL CONTROL STATION" with operating instructions and cover held closed by breakable strut to prevent accidental opening.

2.10 CONTROL PANELS

- A. A. Description: Refer to specification section 21 22 00 for the panel requirements. One control panel shall be provided that will supervise and control both the clean agent and the pre-action fire suppression systems. Single-area, two-area, or single-area cross-zoned type control panel as indicated, including NEMA ICS 6, Type 1 enclosure, detector, alarm, and solenoid-valve circuitry for operation of deluge valves.
 1. Listed in UL's "Fire Protection Equipment Directory" or FM Global's "Approval Guide" when used with thermal detectors and Class A detector circuit wiring.
 2. Electrical characteristics are 120-V ac, 60 Hz, with 24-V dc rechargeable batteries.
 3. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application
 4. Provide and connect required ceiling mounted heat detectors in accordance with section 2.8 E.
 5. Provide wiring to supervise air compressor.

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- B. Manual Control Stations: Electric operation, metal enclosure, labeled "MANUAL CONTROL STATION," with operating instructions and cover held closed by breakable strut to prevent accidental opening.
- C. Panels Components:
 - 1. Refer to specification section 21 22 00 for the panel requirements. One control panel shall be provided that will supervise and control both the clean agent and the pre-action fire suppression systems.
 - 2. Wiring to supervise air compressor.
 - 3. Power supply.
 - 4. Battery charger.
 - 5. Standby batteries.
 - 6. Field-wiring terminal strip.
 - 7. Electrically supervised solenoid valves and polarized fire-alarm bell.
 - 8. Lamp test facility.
 - 9. Single-pole, double-throw auxiliary alarm contacts.
 - 10. Rectifier.

2.11 PRESSURE GAGES

- A. Standard: UL 393.
- B. Dial Size: 3-1/2- to 4-1/2-inch diameter.
- C. Pressure Gage Range: 0- to 250-psig minimum.
- D. Label: Include "WATER" or "AIR/WATER" label on dial face.
- E. Air System Piping Gage: Include retard feature and "AIR" or "AIR/WATER" label on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Perform fire-hydrant flow test according to NFPA 13 and NFPA 291. Use results for system hydraulic calculations required in "Quality Assurance" Article.
- B. Report test results promptly and in writing.

3.2 SERVICE-ENTRANCE PIPING

- A. Connect sprinkler piping to water-service piping for service entrance to building. Comply with requirements in Section 211100 "Facility Fire-Suppression Water-Service Piping" for exterior piping.
- B. Install shutoff valve, check valve, pressure gage, and drain at connection to water service.

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3.3 WATER-SUPPLY CONNECTIONS

- A. Connect sprinkler piping to building's interior water-distribution piping. Comply with requirements for interior piping in Section 221116 "Domestic Water Piping."
- B. Install shutoff valve, check valve, pressure gage, and drain at connection to water supply.

3.4 PIPING INSTALLATION

- A. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated on approved working plans.
 - 1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect-Engineer before deviating from approved working plans.
 - 2. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.
- B. Piping Standard: Comply with NFPA 13 requirements for installation of sprinkler piping.
- C. Use listed fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes.
- D. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- E. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- F. Install "Inspector's Test Connections" in sprinkler system piping, complete with shutoff valve, and sized and located according to NFPA 13.
- G. Install sprinkler piping with drains for complete system drainage.
- H. Install sprinkler control valves, test assemblies, and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.
- I. Install automatic (ball drip) drain valves to drain piping between fire department connections and check valves. Drain to floor drain or to outside building.
- J. Connect air compressor to the following piping and wiring:
 - 1. Pressure gages and controls.
 - 2. Electrical power system.
 - 3. Fire-alarm devices, including low-pressure alarm.
- K. Install alarm devices in piping systems.
- L. Install hangers and supports for sprinkler system piping according to NFPA 13. Comply with requirements in NFPA 13. In seismic-rated areas, refer to Section 210548 "Vibration and Seismic Controls for Fire-Suppression Piping and Equipment."
- M. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with

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soft-metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they are not subject to freezing.

- N. Drain pre-action sprinkler piping.
- O. Pressurize and check pre-action sprinkler system piping and air-pressure maintenance devices
- P. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
- Q. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 210517 "Sleeves and Sleeve Seals for Fire-Suppression Piping."
- R. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 210518 "Escutcheons for Fire-Suppression Piping."

3.4 JOINT CONSTRUCTION

- A. Install couplings, flanges, flanged fittings, unions, nipples, and transition and special fittings that have finish and pressure ratings same as or higher than system's pressure rating for aboveground applications unless otherwise indicated.
- B. Install unions adjacent to each valve in pipes NPS 2 and smaller.
- C. Install flanges, flange adapters, or couplings for grooved-end piping on valves, apparatus, and equipment having NPS 2-1/2 and larger end connections.
- D. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- E. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.
- F. Flanged Joints: Select appropriate gasket material in size, type, and thickness suitable for water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.
- H. Twist-Locked Joints: Insert plain end of steel pipe into plain-end-pipe fitting. Rotate retainer lugs one-quarter turn or tighten retainer pin.
- I. Steel-Piping, Cut-Grooved Joints: Cut square-edge groove in end of pipe according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join steel pipe and grooved-end fittings according to AWWA C606 for steel-pipe joints.

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- J. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.
- K. Copper-Tubing Grooved Joints: Roll rounded-edge groove in end of tube according to AWWA C606. Assemble coupling with housing, gasket, lubricant, and bolts. Join copper tube and grooved-end fittings according to AWWA C606 for steel-pipe grooved joints.
- L. Copper-Tubing, Pressure-Sealed Joints: Join copper tube and copper pressure-seal fittings with tools recommended by fitting manufacturer.
- M. Extruded-Tee Connections: Form tee in copper tube according to ASTM F 2014. Use tool designed for copper tube; drill pilot hole, form collar for outlet, dimple tube to form seating stop, and braze branch tube into collar.
- N. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

3.5 VALVE AND SPECIALTIES INSTALLATION

- A. Install listed fire-protection valves, trim and drain valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.
- B. Install listed fire-protection shutoff valves supervised open, located to control sources of water supply except from fire-department connections. Install permanent identification signs indicating portion of system controlled by each valve.
- C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water-supply sources.
- D. Specialty Valves:
 - 1. Install valves in vertical position for proper direction of flow, in main supply to system.
 - 2. Install deluge valves with trim sets for air supply, drain, priming level, alarm connections, ball drip valves, pressure gages, priming chamber attachment, and fill-line attachment.
 - a. Install air compressor and compressed-air-supply piping.
 - b. Install air-pressure maintenance device with shutoff valves to permit servicing without shutting down sprinkler system; bypass valve for quick system filling; pressure regulator or switch to maintain system pressure; strainer; pressure ratings with 14- to 60-psig Insert value adjustable range; and 175-psig maximum inlet pressure.
 - c. Install compressed-air-supply piping from building's compressed-air piping system.

3.6 SPRINKLER INSTALLATION

- A. Install sprinklers in suspended ceilings in center of acoustical ceiling panels.
- B. Install dry-type sprinklers with water supply from heated space. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing.

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- C. Install sprinklers into flexible, sprinkler hose fittings, and install hose into bracket on ceiling grid.

3.7 IDENTIFICATION

- A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.
- B. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 26 05 53 "Identification for Electrical Systems."

3.8 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
 - 1. Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.
 - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
 - 3. Flush, test, and inspect sprinkler systems according to NFPA 13, "Systems Acceptance" Chapter.
 - 4. Energize circuits to electrical equipment and devices.
 - 5. Start and run air compressors.
 - 6. Coordinate with fire-alarm tests. Operate as required.
 - 7. Coordinate with fire-pump tests. Operate as required.
 - 8. Verify that equipment hose threads are same as local fire department equipment.
- B. Sprinkler piping system will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

3.9 CLEANING

- A. Clean dirt and debris from sprinklers.
- B. Only sprinklers with their original factory finish are acceptable. Remove and replace any sprinklers that are painted or have any other finish than their original factory finish.

3.10 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves.

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3.11 PIPING SCHEDULE

- A. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight steel pipe with grooved ends, grooved-end fittings, grooved-end-pipe couplings, and grooved joints.
- B. Sprinkler specialty fittings may be used, downstream of control valves, instead of specified fittings.
- C. Copper-tube, extruded-tee connections may be used for tee branches in copper tubing instead of specified copper fittings. Branch-connection joints must be brazed.
- D. Standard-pressure, pre-action sprinkler system, NPS 2 and smaller shall be one of the following:
 - 1. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 - 2. Schedule 40, galvanized-steel pipe with plain ends; plain-end-pipe fittings; and twist-locked joints.
 - 3. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.
- E. Standard-pressure, pre-action sprinkler system, NPS 2-1/2 to NPS 4, shall be one of the following:
 - 1. Schedule 40, galvanized-steel pipe with threaded ends; galvanized, gray-iron threaded fittings; and threaded joints.
 - 2. Schedule 40, galvanized-steel pipe with cut-grooved ends; galvanized, grooved-end fittings for steel piping; grooved-end-pipe couplings for steel piping; and grooved joints.

3.12 SPRINKLER SCHEDULE

- A. Use sprinkler types in subparagraphs below for the following applications:
Rooms with Suspended Ceilings pendent sprinklers as indicated.
- B. Provide sprinkler types in subparagraphs below with finishes indicated.
Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.

3.13 SEQUENCE

- A. Upon initiation of a heat detector (Rate of Rise and 135°F fixed maximum) OR initiation of a sprinkler (155-degree F) in the protected space, a supervisory alarm on the fire alarm system via the control panel and the building fire alarm shall be activated.
- B. Upon initiation of a heat detector (Rate of Rise and 135°F fixed maximum) AND initiation of a sprinkler (155-degree F) in the protected space, a supervisory alarm on the fire alarm system via the control panel and the building fire alarm shall be activated; and the sprinkler shall flow water distribution to the space.

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END OF SECTION 21 13 16

SECTION 21 22 00 - CLEAN-AGENT FIRE-EXTINGUISHING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other related Specification sections, apply to this section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Piping and piping specialties.
 - 2. Extinguishing-agent containers.
 - 3. Extinguishing agent.
 - 4. Detection and alarm devices.
 - 5. Control and alarm panels.
 - 6. Accessories.
 - 7. Connection devices for and wiring between system components.
 - 8. Connection devices for power and integration into building's fire-alarm system.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. EPO: Emergency Power Off.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For clean-agent fire-extinguishing system signed and sealed by a qualified professional engineer registered in the State of Florida.
 - 1. Include plans, elevations, sections, details, and attachments to other work.
 - 2. Include all design calculations.
 - 3. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 4. Wiring Diagrams: For power, signal, and control wiring.
 - 5. Coordinate all requirements with the fire alarm system contractor and installer. Do not duplicate controls and systems. Obtain copy of fire alarm shop drawings and submit clean agent system shop drawings together for review.

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- C. Delegated-Design Submittal: For clean-agent fire-extinguishing system signed and sealed by the qualified professional engineer.
1. Indicate compliance with performance requirements and design criteria, including analysis data.
 2. Include design calculations for weight, volume, and concentration of extinguishing agent required for each hazard area.
 3. Indicate the Following on Reflected Ceiling Plans:
 - a. Ceiling penetrations and ceiling-mounted items.
 - b. Extinguishing-agent containers if mounted above floor, piping and discharge nozzles, detectors, and accessories.
 - c. Method of attaching hangers to building structure.
 - d. Other ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
 4. Indicate the Following on Occupied Work Area Plans:
 - a. Controls and alarms.
 - b. Extinguishing-agent containers, piping and discharge nozzles if mounted in space, detectors, and accessories.
 - c. Equipment and furnishings.
 5. Indicate the Following on Access Floor Space Plans:
 - a. Extinguishing-agent containers, piping and discharge nozzles, detectors, and accessories.
 - b. Method of supporting piping.
 6. Indicate the Following on Ceiling Plans:
 - a. Extinguishing-agent containers, piping and discharge nozzles, detectors, and accessories.
 - b. Method of supporting piping.
 - c. Other equipment located in the ceiling space that is being protected including sprinkler piping, HVAC equipment, raceways, or conduit.
 7. Coordinate all requirements with the fire alarm system contractor and installer. Do not duplicate controls and systems. Obtain copy of fire alarm shop drawings and submit clean agent system shop drawings together for review.

1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Sprinkler systems, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:

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1. Domestic water piping.
2. Items Penetrating Finished Ceiling Include the Following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Life Safety fixtures.
 - d. Speakers.
3. HVAC equipment.
4. Data equipment.

- B. Qualification Data: For qualified Installer and professional engineer registered in the State of Florida.B.
- C. Permit Approved Drawings: Working plans, prepared according to NFPA 2001 and NFPA 75, that have been approved by authorities having jurisdiction. Include design calculations.
- D. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For special agent system to include in emergency, operation, and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.
 1. Detection Devices: Not less than 20 percent of amount of each type installed.
 2. Container Valves: Not less than 10 percent of amount of each size and type installed.
 3. Nozzles: Not less than 20 percent of amount of each type installed.
 4. Extinguishing Agent: Not less than 100 percent of amount installed in largest hazard area. Include pressure-rated containers with valves.

1.8 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. FM Global Compliance: Provide components that are FM Approved and that are listed in FM Global's "Approval Guide."
- C. UL Compliance: Provide equipment listed in UL's "Fire Protection Equipment Directory."

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1.9 WORK INCLUDED

- A. This section covers equipment, installation, testing and all materials required for the clean agent fire suppression system.
- B. Contractor shall be responsible for the complete system planning, coordination, layout, calculations, preparation of shop drawings, field installation, coordination and completion in accordance with project requirements and applicable codes and standards.
- C. Work or equipment not indicated or specified which is necessary for the complete and proper operation of the work of this section in accordance with the true intent and meaning of the contract documents shall be provided by this Contractor and incorporated under this section of the work at no additional cost to the owner.

1.10 WARRANTY

- A. Warranty: Repair or replace components that fail in materials or workmanship. Manufacturer's warranty shall be in the name of the Owner.
 - 1. Warranty Period: One year minimum from date of Substantial Completion, or longer if standard manufacturer's warranty is longer.

PART 2 - PRODUCTS

2.1 CLEAN-AGENT SYSTEMS

- A. Description: Clean-agent fire-extinguishing system shall be an engineered system for total flooding of the hazard area.
- B. Delegated Design: Design clean-agent fire-extinguishing system and obtain approval from authorities having jurisdiction. Design system for Class A, B, and C fires as appropriate for areas being protected, and include safety factor. Use clean agent indicated and in concentration suitable for normally occupied areas.
- C. Performance Requirements: Discharge HFC 227ea or equivalent within 10 seconds and 7.1 percent concentration by volume at 70°F for 10-minute holding time in hazard areas.
 - 1. HFC 227ea or equivalent concentration in hazard areas greater than 9.0 percent immediately after discharge or less than 5.8 percent throughout holding time will not be accepted without written authorization from Owner and authorities having jurisdiction.
 - 2. System Capabilities: Minimum 620-psig calculated working pressure and 360-psig initial charging pressure.
- D. Verified Detection: Devices located in single zone. Sound alarm on activating single-detection device, and discharge extinguishing agent on actuating second-detection device.
- E. System Operating Sequence:
 - 1. Actuating First Detector: Visual indication on annunciator panel. Energize audible and visual alarms (slow pulse), shut down air-conditioning, ventilating systems and close HVAC dampers serving protected area, close doors in protected area, and send signal to fire-alarm system.

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2. Actuating Second Detector: Visual indication on annunciator panel. Energize audible and visual alarms (fast pulse), shut down power to protected equipment, start time delay for extinguishing-agent discharge for 30 seconds, and discharge extinguishing agent.
 3. Expiration of the adjustable time delay or when manual pull station is activated shall, transfer discharge relay contacts, energize release circuit with discharges the clean agent gas in the protected space. Extinguishing-agent discharge will operate audible alarms and strobe lights inside and outside the protected area. Initiate building fire alarm evacuation signals.
- F. Manual stations shall immediately discharge extinguishing agent when activate and initiate the building fire alarm evacuation signals.
- G. Operating abort switches will delay extinguishing-agent discharge while being activated, and switches must be reset to prevent agent discharge. Release of hand pressure on the switch will cause agent discharge if the time delay has expired.
- H. EPO: Will terminate power to protected equipment immediately on actuation.
- I. Low-Agent Pressure Switch: Initiate trouble alarm if sensing less than set pressure.
- J. Power Transfer Switch: Transfer from normal to stand-by power source.
- K. Seismic Performance: Fire-suppression piping and containers shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2.2 PIPING MATERIALS

- A. See "HFC 227ea or equivalent Agent Piping Applications", Article for applications of pipe, tube, fitting, and joining materials.
- B. Piping, Valves, and Discharge Nozzles: Comply with types and standards listed in NFPA 2001, Section "Distribution," for charging pressure of system.

2.3 PIPE AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, Type S, Grade B or ASTM A 106/A 106M, Grade A; Schedule 40, Schedule 80, and Schedule 160 or seamless steel pipe.
1. Threaded Fittings:
 - a. Malleable-Iron Fittings: ASME B16.3, Class 300.
 - b. Flanges and Flanged Fittings: ASME B16.5, Class 300 unless Class 600 is indicated.
 - c. Fittings Working Pressure: 620 psig minimum.
 - d. Flanged Joints: Class 300 minimum.

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2. Forged-Steel Welding Fittings: ASME B16.11, Class 3000, socket pattern.
 3. Steel, Grooved-End Fittings: FM Approved and NRTL listed, ASTM A 47/A 47M malleable iron or ASTM A 536 ductile iron, with dimensions matching steel pipe and ends factory grooved according to AWWA C606.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel.
- D. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- E. Steel, Keyed Couplings: UL 213, AWWA C606, approved or listed for clean-agent service, and matching steel-pipe dimensions. Include ASTM A 536, ductile-iron housing, rubber gasket, and steel bolts and nuts.

2.4 VALVES

- A. General Valve Requirements:
1. UL listed or FM Approved for use in fire-protection systems.
 2. Compatible with type of clean agent used.
- B. Container Valves: With rupture disc or solenoid and manual-release lever, capable of immediate and total agent discharge and suitable for intended flow capacity.
- C. Valves in Sections of Closed Piping and Manifolds: Fabricate to prevent entrapment of liquid, or install valve and separate pressure relief device.
- D. Valves in Manifolds: Check valve; installed to prevent loss of extinguishing agent when container is removed from manifold.

2.5 EXTINGUISHING-AGENT CONTAINERS

- A. Description: Steel tanks complying with ASME Boiler and Pressure Vessel Code: Section VIII, for unfired pressure vessels. Include minimum working-pressure rating that matches system charging pressure, valve, pressure switch, and pressure gage.
1. Finish: Red, enamel or epoxy paint.
 2. Manifold: Fabricate with valves, pressure switches, and connections for multiple storage containers, as indicated.
 3. Manifold: Fabricate with valves, pressure switches, selector switch, and connections for main- and reserve-supply banks of multiple storage containers.
 4. Storage-Tank Brackets: Factory- or field-fabricated retaining brackets consisting of steel straps and channels; suitable for container support, maintenance, and tank refilling or replacement.

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2.6 FIRE-EXTINGUISHING CLEAN AGENT

- A. HFC 227ea Clean Agent: Heptafluoropropane.
- B. FE-25.
- C. Approved equivalent.

2.7 DISCHARGE NOZZLES

- A. Equipment manufacturer's standard one-piece brass or aluminum alloy of type, size, discharge pattern, and capacity required for application.

2.8 MANIFOLD AND ORIFICE UNIONS

- A. Description: NRTL-listed device with minimum 2175-psig pressure rating, to control flow and reduce pressure of IG-541 gas in piping.
 - 1. NPS 2 and Smaller: Piping assembly with orifice, sized for system design requirements.
 - 2. NPS 2-1/2 and Larger: Piping assembly with nipple, sized for system design requirements.

2.9 CONTROL PANELS

- A. Description: FM Approved or NRTL listed, including equipment and features required for testing, supervising, and operating fire-extinguishing system. Provide a complete control panel that provides all the required circuits and controls for the clean agent fire suppression systems AND the pre-action fire suppression system. All initiation devices (manual pulls, heat detectors, and smoke detectors shall be connected to this control panel. Provide all required programming to implement the required sequence of control for both the clean agent and the pre-action fire suppression systems. Refer to the Pre-action Fire Suppression System specification for more requirements (21 13 16)
- B. Power Requirements: 120/240-V ac; with electrical contacts for connection to system components and fire-alarm system, and transformer or rectifier as needed to produce power at voltage required for accessories and alarm devices.
- C. Enclosure: NEMA ICS 6, Type 1, enameled-steel cabinet.
 - 1. Mounting: Recessed flush with surface.
- D. Supervised Circuits: Separate circuits for each independent hazard area.
 - 1. Detection circuits using addressable devices assigned to the required number of zones.
 - 2. Manual pull-station circuit.
 - 3. Alarm circuit.
 - 4. Release circuit.
 - 5. Abort circuit.

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6. EPO circuit.

E. Control-Panel Features:

1. Electrical contacts for shutting down fans, activating dampers, and operating system electrical devices.
2. Automatic switchover to standby power at loss of primary power.
3. Storage container, low-pressure indicator.
4. Service disconnect to interrupt system operation for maintenance with visual status indication on the annunciator panel.

F. Annunciator Panel: Graphic type showing protected, hazard-area plans, as well as locations of detectors and abort, EPO, and manual stations. Include lamps to indicate device-initiating alarm, electrical contacts for connection to control panel, and stainless-steel or aluminum enclosure.

G. Standby Power: Sealed lead calcium batteries with capacity to operate system for 24 hours and alarm for minimum of 15 minutes. Include automatic battery charger that has a varying charging rate between trickle and high depending on battery voltage, and that is capable of maintaining batteries fully charged. Include manual voltage control, dc voltmeter, dc ammeter, electrical contacts for connection to control panel, automatic transfer switch, and suitable enclosure.

2.10 DETECTION DEVICES

A. General Requirements for Detection Devices:

1. Comply with NFPA 2001, NFPA 72, and UL 268.
2. 24-V dc, nominal.
3. Provide all required smoke detection devices, and associated initiation and monitoring wiring, as part of the clean agent systems. Including detectors under the floor. These are not "building" fire alarm smoke detectors.
4. Provide all required heat detection devices associated with the pre-action fire suppression system, and associated initiation and monitoring wiring, as part of the clean agent system control panel. These are not "building" fire alarm system smoke or heat detectors.

B. Ionization Detectors: Dual-chamber type, having sampling and referencing chambers, with smoke-sensing element.

C. Photoelectric Detectors: LED light source and silicon photodiode receiving element.

D. Signals to the Central Fire Alarm Control Panel: Any type of local system trouble is reported to the central fire alarm control panel as a composite "trouble" signal. Alarms on each system zone are individually reported to the central fire alarm control panel as separately identified zones.

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2.11 MANUAL STATIONS

- A. General Description: Surface FM Approved or NRTL listed, with clear plastic hinged cover, 120-V ac or low voltage compatible with controls. Include contacts for connection to control panel.
- B. Manual Release: "MANUAL RELEASE" caption, and red finish. Unit can manually discharge extinguishing agent with operating device that remains engaged until unlocked.
- C. Abort Switch: "ABORT" caption, momentary contact, with green finish.
- D. EPO Switch: "EPO" caption, with yellow finish.

2.12 SWITCHES

- A. Description: FM Approved or NRTL listed, where available, 120-V ac or low voltage compatible with controls. Include contacts for connection to control panel.
 - 1. Low-Agent Pressure Switches: Pneumatic operation.
 - 2. Power Transfer Switches: Key-operation selector, for transfer of release circuit signal from main supply to reserve supply.
 - 3. Door Closers: Magnetic retaining and release device or electrical interlock to cause the door operator to drive the door closed.

2.13 ALARM DEVICES

- A. Description: Listed and labeled by an NRTL or FM Approved, low voltage, and surface mounting. Comply with requirements in Section 28 31 11 "Digital, Addressable Fire-Alarm System" or Section 28 31 12 "Zoned (DC Loop) Fire-Alarm System" for alarm and monitoring devices.
- B. Bells: Minimum 6-inch diameter.
- C. Horns: 90 to 94 dBA.
- D. Strobe Lights: Translucent lens, with "FIRE" or similar caption.

2.14 SIGNAGE

- A. Instructional signs shall be installed to provide a system in which the function of each device is easy to understand.
- B. At each horn/strobe within the protected space the following sign shall be provided:

WARNING
When Alarm Sounds
Vacate at Once
Extinguishing Agent
Being Released

- C. At each strobe outside the protected space the following sign shall be provided:

CAUTION

When Light Is Flashing

Agent Has Discharged

- D. At each door entering the protected space the following sign shall be provided:

2.15 KEEP DOOR CLOSED

Area Protected

By Clean Agent Fire Suppression System

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with hazard-area leakage requirements, installation tolerances, and other conditions affecting work performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 HFC 227EA OR EQUIVALENT AGENT PIPING APPLICATIONS

- A. Flanged pipe and fittings and flanged joints may be used to connect to specialties and accessories and where required for maintenance.
- B. NPS 2 and Smaller: Schedule 40, steel pipe; malleable-iron threaded fittings; and threaded joints.
- C. NPS 2-1/2 and Larger: Schedule 40, steel pipe; steel, grooved-end fittings; steel, keyed couplings; and grooved joints.

3.3 CLEAN-AGENT PIPING INSTALLATION

- A. Install clean-agent extinguishing piping and other components level and plumb, according to manufacturers' written instructions.
- B. Grooved Piping Joints: Groove pipe ends according to AWWA C606 dimensions. Assemble grooved-end steel pipe and steel, grooved-end fittings with steel, keyed couplings and lubricant according to manufacturer's written instructions.
- C. Install extinguishing-agent containers anchored to substrate.
- D. Install pipe and fittings, valves, and discharge nozzles according to requirements listed in NFPA 2001, Section "Distribution."
 - 1. Install valves designed to prevent entrapment of liquid, or install pressure relief devices in valved sections of piping systems.
 - 2. Support piping using supports and methods according to NFPA 13.

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3. Install seismic restraints for extinguishing-agent containers and piping systems.
4. Install control panels, detection system components, alarms, and accessories, complying with requirements of NFPA 2001, Section "Detection, Actuation, and Control Systems," as required for supervised system application.

3.4 CONNECTIONS

- A. Where installing piping adjacent to equipment, allow space for service and maintenance.
- B. Connect electrical devices to control panel and to building's fire-alarm system. Electrical power, wiring, and devices are specified in Section 28 31 11 "Digital, Addressable Fire-Alarm System".

3.5 IDENTIFICATION

- A. Identify system components and equipment. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify piping, extinguishing-agent containers, other equipment, and panels according to NFPA 2001.
- C. Install signs at entry doors for protected areas to warn occupants that they are entering a room protected with a clean-agent fire-extinguishing system.
- D. Install signs at entry doors to advise persons outside the room the meaning of the horn(s), bell(s), and strobe light(s) outside the protected space.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- C. Perform tests and inspections.
 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- D. Tests and Inspections:
 1. After installing clean-agent extinguishing piping system and after electrical circuitry has been energized, test for compliance with requirements.
 2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Sections "Inspection and Test Procedures" and "System Function Tests." Certify compliance with test parameters.
 3. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.

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4. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.
5. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Units will be considered defective if they do not pass tests and inspections.

F. Prepare test and inspection reports.

3.7 CLEANING

- A. Each pipe section shall be cleaned internally after preparation and before assembly by means of swabbing, using a suitable nonflammable cleaner. Pipe network shall be free of particulate matter and oil residue before installing nozzles or discharge devices.

3.8 SYSTEM FILLING

A. Preparation:

1. Verify that piping system installation is completed and cleaned.
2. Check for complete enclosure integrity.
3. Check operation of ventilation and exhaust systems.

B. Filling Procedures:

1. Fill extinguishing-agent containers with extinguishing agent, and pressurize to indicated charging pressure.
2. Install filled extinguishing-agent containers.
3. Energize circuits.
4. Adjust operating controls.

3.9 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain clean-agent fire-extinguishing systems.

END OF SECTION 21 22 00

SECTION 23 23 14 - HYDRONIC SPECIALTIES**PART 1 - GENERAL****1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.
- B. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of hydronic specialties required by this section is indicated on drawings and schedules, and by requirements of this section.
- B. Types of hydronic specialties specified in this section include the following:
 - 1. Balance Valves.
 - 2. Vent Valves.
 - 3. Air Separators.
 - 4. Compression Tanks
 - 5. Pump Discharge Valves.
 - 6. Shot Feeders.
 - 7. Liquid Flow Switches.
 - 8. Pressure Reducing Valves.
- C. Hydronic specialties furnished as part of factory-fabricated equipment, are specified as part of equipment assembly in other Division-23 sections.
- D. Refer to other Division-23 sections for insulation of hydronic specialties; not work of this section.

1.3 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of hydronic specialties of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Hydronic Specialty Types: Provide hydronic specialties of same type by same manufacturer.
- C. Codes and Standards:
 - 1. ASME Compliance: Manufacture and install hydronic specialties in accordance with ASME B31.9 "Building Services Piping".

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1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's technical product data and installation instructions for each type of hydronic specialty. Include pressure drop curve or chart for each type and size of hydronic specialty. Submit schedule indicating manufacturer's figure number, size, location, rated capacities, and features for each required hydronic specialty.
- B. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weights, required clearances, and method of assembly of components.
- C. Maintenance Data: Submit maintenance data and spare parts lists for each type of hydronic specialty. Include this data, product data, and shop drawings in maintenance manual; in accordance with requirements of Division 1.

PART 2 - PRODUCTS

2.1 HYDRONIC SPECIALTIES:

- A. General: Provide factory-fabricated hydronic specialties recommended by manufacturer for use in service indicated. Provide hydronic specialties of types and pressure ratings indicated for each service, or if not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes as indicated, and connections, which properly mate with pipe, tube, and equipment connections. Where more than one type is indicated, selection is Installer's option, but more than one type cannot be used on project.

2.2 BALANCE VALVES:

- A. General: Calibrated balance valves are specified in Specification Section 23135 Meters and Gauges and are work of this section.

2.3 VENT VALVES:

- A. Manual Vent Valves: Provide manual vent valves designed to be operated manually with screwdriver or thumbscrew, 1/8" NPS connection.
- B. Automatic Vent Valves: Provide automatic vent valves designed to vent automatically with float principle, stainless steel float and mechanisms, cast-iron body, pressure rated for 125 psi, 1/2" NPS inlet and outlet connections.
- C. Manufacturer: Subject to compliance with requirements, provide vent valves of one of the following:
 - 1. Armstrong Machine Works.
 - 2. Bell & Gossett ITT; Fluid Handling Div.
 - 3. Hoffman Specialty ITT; Fluid Handling Div.
 - 4. Spirax Sarco.

2.4 PUMP DISCHARGE VALVES:

- A. General: Provide pump discharge valves as indicated. Provide non-slam check valve with spring-loaded disc and calibrated adjustment feature permitting regulation of pump discharge flow and shutoff. Design valves to permit repacking under full line pressure, and with bolt-on bonnet. Provide flanged cast-iron valve body, pressure rated for 175 psi, maximum operating temperature of 300°F (149°C). Provide straight or angle pattern as indicated.
- B Manufacturer: Subject to compliance with requirements, provide pump discharge valves of one of the following:
 - 1. Amtrol, Inc.
 - 2. Armstrong Pumps, Inc.
 - 3. Bell & Gossett ITT; Fluid Handling Div.
 - 4. Taco, Inc.

2.5 SHOT FEEDERS:

- A. General: Provide shot feeders of minimum 5 gal. capacity or otherwise as indicated, constructed of cast iron or steel, for introducing chemicals in hydronic system. Provide funnel and valve on top for loading, drain valve in bottom, and recirculating valves on side. Construct for pressure rating of 125 psi.
- B Manufacturer: Subject to compliance with requirements, provide shot feeders of one of the following:
 - 1. Neptune Chemical Pump Co.
 - 2. Griswold Separators
 - 3. Vulcan Laboratories, Subsidiary of Clow Corp.
 - 4. York-Shiple, Inc.

2.8 PRESSURE REDUCING VALVES:

- A. General: Provide pressure reducing valves as indicated, of size and capacity as selected by Installer to maintain operating pressure on boiler system.
- B. Construction: Cast-iron or brass body, low inlet pressure check valve, inlet strainer removable without system shut-down, non-corrosive valve seat and stem, factory-set at operating pressure.
- C. Manufacturer: Subject to compliance with requirements, provide pressure reducing valves of one of the following:
 - 1. Amtrol, Inc.
 - 2. Armstrong Pumps, Inc.

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3. Bell & Gossett ITT; Fluid Handling Div.
4. Taco, Inc.

PART 3 - EXECUTION

3.1 INSPECTION:

- A. General: Examine areas and conditions under which hydronic specialties are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF HYDRONIC SPECIALTIES:

- A. Balance Valves: At Installer's option, install balance valves in lieu of terminal outlet valves and balance cocks. Install on each hydronic terminal and elsewhere as indicated. After hydronic system balancing has been completed, mark each balance valve with stripe of yellow lacquer across body and stop plate to permanently mark final balanced position.

3.3 VENT VALVES:

- A. Manual Vent Valves: Install manual vent valves on each hydronic terminal at highest point, and on each hydronic piping drop in direction of flow for mains, branches, and runouts, and elsewhere as indicated.
- B. Automatic Vent Valves: Install automatic vent valves at top of each hydronic riser and elsewhere as indicated. Install shutoff valve between riser and vent valve, pipe outlet to suitable plumbing drain, or as indicated.
- C. Flow Control Valves: Install flow control valves on discharge of each pump serving hydronic heating system or zone, and elsewhere as indicated. Install with check mechanism in upright position, with adequate clearance for service and replacement. Screw check down for automatic operation.

3.4 PUMP DISCHARGE VALVES:

- A. At Installer's option, install pump discharge valves on each pump discharge line in lieu of separate shutoff valve, check valve, and balance cock. Install in horizontal or vertical position with stem in upward position; allow clearance above stem for check mechanism removal. After hydronic system has been completed, mark calibrated name plate with stripe of yellow lacquer to permanently mark final balanced position.

3.5 SHOT FEEDERS:

- A. Install shot feeders on each hydronic system at pump discharge and elsewhere as indicated. Install in upright position with top of funnel not more than 48" above floor. Install globe valve in pump discharge line between recirculating lines. Pipe drain to nearest plumbing drain or as indicated.

3.6 PRESSURE REDUCING VALVES:

- A. Install for chilled water makeup system.

END OF SECTION 23 23 14

SECTION 23 73 13 – PACKAGED AIR-COOLED WATER CHILLERS**PART 1 – GENERAL****1.1 GENERAL REQUIREMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division – 1 specification sections, apply to work of this section.
- B. Division – 23 Basic Mechanical Materials and Methods section apply to work of this section.

1.2 SCOPE:

- A. The work under this section shall include furnishing all labor, materials, tools, appliances, and equipment, and performing all operations necessary for the complete installation of all equipment as shown, detailed, and/or scheduled on the drawings, and/or specified in this section of the specifications.
- B. Refer for Division – 26 sections for the following work; not work of this section.
 - 1. Power supply wiring from power source to power connection on chiller contactor enclosure. Include disconnects and starters as a part of Division – 23 where specified as furnished, or factory-installed, by manufacturer.
 - 2. Control power circuit from power source to chiller control panel in chiller.
- C. Provide the following electrical work as work of this section, complying with requirements of Division – 26 sections:
 - 1. Control wiring and conduit between field-installed controls, indicating devices, and pump control panels.
 - 2. Control wiring and conduit specified as work of Division – 23 for automatic Temperature Controls is work of Section 23971 – Automatic Temperature Controls.
 - 3. Interlock wiring specified as factory-installed is work of this section.

1.3 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of general-use packaged water chillers with characteristics, sizes and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Air Conditioning and Refrigeration Institute (ARI):
 - 1. 490-85 Refrigerant Liquid Receivers
 - 2. 520-85 Positive Displacement Refrigerant Compressors, Compressor Units and Condensing Units
- C. American Society of Mechanical Engineers (ASME):
 - 1. Boiler and Pressure Vessel Code

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2. Section 8-D-2-86, Pressure Vessels, Division 1
- D. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 1. 23-92 Safety Code for Mechanical Refrigeration
- E. American Society for Testing and Materials (ASTM):
 1. C534-82 Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form
- F. Chiller modules shall be constructed in accordance with the UL 1995 and NEC standards and be UL or ETL listed.
- G. Chiller modules shall be rated and tested in accordance with ARI 550/590 – Standard for Water Chilling Packages.
- H Chiller modules shall meet the safety standards of ANSI/ASHRAE 15 – Safety Standard for Refrigerated Systems.

1.4 SUBMITTALS:

- A. Product Data: Submit manufacturer's chiller specifications, installation and start-up instructions, and current accurate chiller performance data. Submit surge suppression devices to be provided with chiller.
- B. Shop Drawings: Submit manufacturer's assembly-type shop drawings indicating dimensions, weight loadings, required clearances, and methods of assembly of components.
- C. Wiring Diagrams: Submit manufacturer's electrical requirements for power supply wiring to the chiller. Submit manufacturer's ladder-type wiring diagrams for interlock and control wiring. Clearly differentiate between portions of wiring that are factory-installed and portions to be field-installed.
- D. Maintenance Data: Submit maintenance data and parts lists for the chiller, control, and accessory; including "trouble-shooting" maintenance guide. Include this data, product data, shop drawings, and wiring diagrams in maintenance manual; in accordance with requirements of Division – 1.
- E. Refer to Division – 26 sections for the following work; not work of this section.
 1. Power supply wiring from power source to power connection on pumps. Include starters, disconnects, and required electrical devices as a part of Division – 23 where specified as furnished, or factory-installed, by manufacturer.
- F. Provide the following electrical work as work of this section, complying with requirements of Division – 26 sections:
 1. Control wiring between field-installed controls, indicating devices, and pump control panels.
 2. Control wiring specified as work of Division – 23 for Automatic Temperature Controls is work of Sections 23971 – Automatic Temperature Controls.

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3. Interlock wiring specified as factory-installed is work of this section.

PART 2 – PRODUCTS

2.1 GENERAL:

- A. Furnish and install as shown on the plans, factory assembled, factory charged, and factory run tested air-cooled scroll compressor packaged chillers in the quantity specified. Each air-cooled modular chiller system shall consist of individual chiller modules and a tank and pump module that are assembled on site. Each chiller module shall be completely factory wired, and AHRI tested prior to shipment. Each module shall include a compressor, evaporator, air-cooled condenser, and controls. Controls shall be designed to allow the master controller to operate remaining slave modules in the event of a malfunction of any slave controller. The controls shall also be designed to operate on a distributed master control system which allows each individual slave microprocessor to operate on its own temperature sensor if there is a failure of the master microprocessor. Each module shall be assembled on an integral welded 201 stainless steel frame and be enclosed with epoxy painted aluminum panels. Each module shall be shipped individually and assembled on site. Each module shall be fully charged with refrigerant and factory tested for capacity and controller functions prior to shipment. The chiller system must be built for single point power supply connection to a central distribution block. The electrical distribution panel shall incorporate circuit breakers to provide branch circuit overload protection and electrical isolation for each chiller module. Electrical supply to each module shall consist of flexible conduit. No electrical connection to a module shall carry the load of more than that module. The electrical supply connections for each module shall be factory assembled and shipped with each module for field connection into the electrical distribution panel located on the tank and pump module. The maximum overcurrent protection for the chiller system should be sized to carry the load of current and future modules. Provide with a factory mounted main disconnect. Power distribution panel for single point power for 5 total modules and containing a circuit breaker for each module for branch circuit protection.
- B. Manufacturer: Subject to compliance with requirements. Air handlers and chillers will be of the same manufacturer:
 1. ArctiChill
 2. MultiStack
 3. Approved Equivalent

2.2 DESIGN REQUIREMENTS:

- A. General: The unit shall be pressure-tested, evacuated, and fully charged with Refrigerant-410A (R-410A) and shall include an initial oil charge. After assembly, a complete operational test shall be performed with water flowing through the cooler to assure that the refrigeration circuit operates correctly.

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- B. Performance: Refer to the schedule of performance on the drawings. The chiller shall be capable of stable operation to a minimum of 35 percent of full load without hot gas bypass. Performance shall be in accordance with ARI Standard 590.
- C. Acoustics: Sound pressure levels for the units shall meet or be lower than 67 dBA on the overall "A" weighted sound pressure level as measured from a distance of 30 feet from the side of the unit. Chiller manufacturer to provide acoustical treatment as necessary to meet this criteria.
- D. Construction: The unit frame shall be constructed of 201 stainless steel welded structural channel. This stainless steel shall be coated with baked-on powder paint, which, when subjected to ASTM B117 500 hour, salt spray testing, yields a minimum ASTM 2654 rating of "6". Units shall be designed in accordance with NFPA 70 (National Electric Code), ASHRAE/ANSI 23 Safety code for mechanical refrigeration, ASME and rated in accordance with ARI Standard 550/590-98. Provide Stainless Steel panels on welded stainless steel frame. The cabinet enclosure shall include easily removable access panels for service. Access panels shall be removable via stainless steel fasteners and retaining clips and shall not require access via sheet metal screws or protruding threaded fasteners
- E. Compressors: The chiller shall have hermetically sealed scroll compressor on each refrigeration circuit each with rotalock connections, crankcase heater, oil level sight glass, suction gas-cooled motor with solid-state sensors in the windings for overload protection, and in-line circuit breaker. There shall be two independent compressors and refrigerant circuits per module with a digital scroll compressor on the lead refrigeration circuit of the lead module for close temperature control and unloading to 30% (10% for 7.5 hp. Compressors shall be mounted to the heavy gauge galvanized steel frame with rubber-in-shear isolators.
- F. Evaporator: Dual circuit, brazed plate evaporator in each module constructed of 316 stainless steel plates and copper brazing. The fluid connections to each evaporator shall be roll grooved couplings for service convenience and ease of installation. Evaporators shall be insulated with $\frac{3}{4}$ " closed cell insulation. The minimum working pressure shall be 450 psi. The fluid piping shall be Schedule 40 stainless steel and insulated using closed cell pipe insulation to prevent condensation. Each chiller module shall have stainless steel service valves for the independent isolation of each evaporator, without affecting the fluid flow to the remaining evaporators. All pipe fittings and branch lines shall be stainless steel as well. Each chiller module shall connect to the adjacent module using roll grooved steel couplings and neoprene gaskets. Any type of module-to-module connection external to the modules is unacceptable. The supply and return fluid piping connections to each evaporator shall include a stainless steel electronic modulating valve and stainless steel manual isolation valve to service each module individually, while the remaining modules continue to operate - and to allow variable fluid flow. Each chiller module shall include an electronic modulating valve that allows fluid flow to only the active modules to match the cooling requirements to the system load. The valve body shall be stainless steel and the actuator shall be the slow opening type to minimize the sudden change in flow to the previously active modules. The valves shall have a minimum opening cycle time of not less than 60 seconds between the fully closed and open position. The valves shall have a minimum close off pressure of not less than 75 psi. A 40-mesh industrial grade suction diffuser strainer shall be factory installed between the header system and each evaporator. The strainer shall be serviceable by the isolation valves such that each strainer can be removed and cleaned without shutting down

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water flow or power to the entire system and allowing the remaining modules to continue to operate. In-line strainers that require complete system shutdown for service and isolation are not acceptable. Diffuser is coated for corrosion protection. The fluid piping shall be Schedule 40 stainless steel and insulated using closed cell pipe insulation to prevent condensation. Each chiller module shall have stainless steel service valves for the independent isolation of each evaporator, without affecting the fluid flow to the remaining evaporators. All pipe fittings and branch lines shall be stainless steel as well. Each chiller module shall connect to the adjacent module using roll grooved steel couplings and neoprene gaskets. Any type of module-to-module connection external to the modules is unacceptable.

- G. Condenser: The condenser fan motors shall be maintenance free, highly efficient Electronically Commutated Motors (ECM) with energy reduction capabilities of up to 35%. These variable speed fan assemblies shall vary fan motor RPM to maintain the refrigeration pressure of the chiller modules and allow operation of the chiller down to 0 F ambient. Aluminum fins mechanically bonded to coppers tubes with integral subcooling circuits. The coil shall be factory tested at a minimum of 600 psig. Provide factory mounted "architecturally pleasing" guard panels. Panel louver shall cover condenser, evaporator and compressor sections so all are hidden from sight. Wire screens or wire mesh will not be allowed.
- H. Coil Coating: Provide coating on all condenser coils, as described herein.
1. All condenser coils shall be provided with a factory-applied coating resistant to a salt air environment. The coils shall be protected with ElectroFin or equivalent oven baked epoxy coating providing a minimum salt spray corrosion resistance of more than 5000 hours per ASTM B117-90. The coil coating shall add no more than 0.12 mil thickness of the fins, and provide less than a 1% reduction in the overall heat transfer capacity of the coil.
 2. The coil coating company shall prove experience in salt resistant coatings for a period of over 10 years. The coating vendor shall provide a written 10 year warranty on all coil coatings with coil replacement (parts and labor included). Coating shall be performed in a controlled factory environment and shall be a "dip" coat process that fully covers coil fins, tubes and casing. Pre-coating fins without final "dip" coating is not acceptable. Field application coatings shall be limited to additional coverage of equipment, touch-up, and warranty work. Coating shall be: epoxy (E-coat) process with urethane U.V. top coats, polyelastomer (equal to Bronze-Glow), or phenolic epoxy (equal to "Heresite" products).
 3. The condensing units shall be sized to compensate for capacity losses due to coatings. Any degradation of equipment performance shall be clearly indicated in that equipment's shop drawing.
 4. Standard, uncoated aluminum fin, copper tube coils are not acceptable for exterior condenser coils.
- I. Refrigerant Circuit: Each refrigerant circuit shall include: compressor suction and discharge line shutoff valve, liquid line shutoff valve with charging port, low side pressure relief device, filter-drier, solenoid valve, sight glass with moisture indicator, thermostatic expansion valves,

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and flexible, closed-cell foam insulated suction line. Piping shall be Type L seamless copper, and shall have an insulated suction line using closed cell pipe insulation, compressor rotalock service valves, solenoid valves for compressor pumpdown, and Schrader service valves in the suction, discharge, and liquid lines. All refrigerant piping shall be coated with MicroGuard or equivalent coating for corrosion protection.

- J. Microprocessor Control Center shall include automatic start, stop, operating, and protection sequences across the range of scheduled conditions and transient. The Microprocessor Control Center shall be enclosed in a rain and dust tight NEMA 3R/12 powder painted steel cabinet with hinged, latched, and gasket sealed door. The master chiller module shall incorporate the master microprocessor controller. The master microprocessor shall communicate with the remaining slave microprocessors in each module via a local network communications protocol. The master microprocessor shall include a phase monitor to protect against low voltage, phase unbalance, phase loss, and phase reversal conditions. The master controller shall read all analog and fault port values from all slave module controllers and shall pass these values to the Building Automation System via BACnet.. Each chiller module control system shall include operational switches for each compressor; high and low pressure transmitters to provide indication of refrigeration pressures in each circuit; high and low refrigeration pressure alarms including shutting shut down the responsible compressor(s); anti-short cycling compressor timers; minimum compressor run timers; connection to Building Automation System. Provide with factory installed IFM Efector thermal dispersion type flow switches, service isolation valve and strainer for each evaporator. Paddle type flow switches are not acceptable
1. Provide automatic control of compressor start/stop, anti-coincidence and anti-recycle timers, automatic pumpdown shutdown, condenser fans, evaporator pump, evaporator heater, unit alarm contacts, and chiller operation from 0°F to 125°F ambient. Provide automatic reset to normal chiller operation after power failure.
 2. Provide remote water temperature reset via a Pulse Width Modulated (PWM) input signal or up to two steps of demand (load) limiting.
 3. Provide software stored in non-volatile memory, with programmed setpoints retained in lithium battery backed real time clock (RTC) memory for minimum 5 years.
 4. Provide minimum forty character liquid crystal display, descriptions in English, numeric data in English units. Provide sealed keypad with sections for Setpoints, Display/Print, Entry, Unit Options & clock, and On/Off Switch.
 5. Programmable Setpoints (within Manufacturer limits) shall include: display language; chilled liquid temperature setpoint and range, remote reset temperature range, set daily schedule/holiday for start/stop, manual override for servicing, low and high ambient cutouts, number of compressors, low liquid temperature cutout, low suction pressure cutout, high discharge pressure cutout, anti-recycle timer (compressor start cycle time), and anti-coincident timer (delay compressor starts).
 6. Display Data shall include: Return and leaving liquid temperatures, low leaving liquid temperature cutout setting, low ambient temperature cutout setting, outdoor air temperature, English data, suction pressure cutout setting, each system suction pressure, discharge pressure, liquid temperature reset via Building Automation System

(by others) via PWM input as standard or a 4-20milliamp or 0-10 VDC input or contact closure with optional BAS interface, anti-recycle timer status for each compressor, anti-coincident system start timer condition, compressor run status, no cooling load condition, day, date and time, daily start/stop times, holiday status, automatic or manual system lead/lag control, lead system definition, compressor starts/operating hours (each), status of hot gas valves, evaporator heater and fan operation, run permissive status, number of compressors running, liquid solenoid valve status, load & unload timer status, water pump status. The microprocessor shall provide the following minimum functions and alarms:

- a. Adjustable fluid temperature set point
 - b. Multiple stage compressor control, including compressor rotation to provide even compressor usage and wear.
 - c. High and low fluid temperature alarm set points
 - d. Water inlet and outlet temperature
 - e. Suction and discharge refrigeration pressures
 - f. Compressor run status
 - g. Current alarm status
 - h. Demand load
 - i. Compressor run hours
 - j. Alarm logging with minimum of previously 100 logged alarms with time and date of each occurrence
 - k. Remote start stop input
 - l. Dry contact for general alarm
7. System Safeties: Shall cause individual compressor systems to perform auto shut down; manual reset required after the third trip in 90 minutes. Include high discharge pressure, low suction pressure, high pressure switch, and motor protector. Compressor motor protector shall protect against damage due to high input current or thermal overload of windings.
 8. Unit Safeties: Shall be automatic reset and cause compressors to shut down if low ambient, low leaving chilled liquid temperature, under voltage, and flow switch operation. Contractor shall provide flow switch and wiring per chiller manufacturer requirements.
 9. Alarm Contacts: Provide low ambient, low leaving chilled liquid temperature, low voltage, low battery, and (per compressor circuit): high discharge pressure, and low suction pressure.

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10. Provide surge suppression devices for protection of all low voltage control and communications circuits. Devices shall be by EDCO, DiTek, Joslyn, or chiller manufacturer approved equal, and selected for the appropriate clamping voltage and surge energy capacity for each application.
 11. Interface Panel: A remote operator interface panel shall be provided to allow operator adjustment of user set points, and alarm monitoring. The remote interface panel shall be installed in the operator's control room. The wiring between the chiller and the remote panel shall be 6-conductor wiring with straight-through connections. The master controller shall be compatible with Modbus, Lon Works or BACNET Gateways and allow for its installation and connection to the electrical service inside the master chiller control panel and to Ethernet connections for Internet-based performance and fault monitoring and alerting.
- K. Power Connection: Provide Single Point Disconnect with Individual System Breakers: Single point Terminal Block with Non-Fused Disconnect and lockable external handle (in compliance with Article 440-14 of N.E.C.) shall be supplied to isolate power voltage for servicing. Provide factory-installed interconnecting wiring from disconnect to factory supplied circuit breakers.
- L. Tank and Pump Module
1. General: The chiller modules shall be shipped as a separate module and assembled on site. The module shall be fully factory tested prior to shipment. Electrical supply shall be via factory provided assembled wiring in flexible, liquid tight conduit and factory connected to the load distribution panel on the end of the module. Provide dual lead/lag pumps (one redundant) sized for both current and future duty, and a 150 gallon buffer tank contained in the pump module.
 2. Frame: The module shall be constructed on a stainless steel welded frame. The frame shall be of heavy duty, with minimum ¼" thick members.
 3. Cabinet: The chiller modules shall be enclosed with white painted aluminum panels. The cabinet enclosure shall include easily removable access panels for service. Access panels shall be removable via stainless steel fasteners and retaining clips. Panels shall not require access via sheet metal screws or protruding threaded fasteners.
 4. Pumps: Pumps shall be dual, independent cast iron bronze fitted centrifugal pumps or stainless steel centrifugal pumps. Each pump shall have a cast bronze dynamically balanced impeller, stainless steel shaft, carbon ceramic seal with stainless steel nuts and bolts. The pump motors shall be TEFC design and rated for a maximum speed of 3500 rpm. The pumps shall include inlet and discharge ports for venting and draining. The pumps shall not require disassembly from the chilled fluid piping for service access or repair.

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5. Pump Motors: The pump motors shall be TEFC design and rated for a maximum speed of 3500 rpm. The motor shall be premium efficient, and shall allow for the pumps to operate on factory provide variable frequency drives if the system is designed to operate with variable flow.
6. Reservoir: The chiller shall have a factory-mounted pressurized stainless steel storage reservoir to provide for system expansion and thermal storage for close temperature control of the leaving chiller fluid. The tank shall have a working pressure of not less than 125 psi and include a pressure relief valve set to operate at 100 psi to prevent over pressurization. The tank shall have a vacuum vent valve to prevent collapse of the tank under severe fluid discharge conditions. The low tank level switch shall be connected to the system microprocessor controller to provide visual indication and alarming of a low tank level condition. The tank shall include an air charging port at the top of the tank to allow for system pre-charge of the air cushion. The tank shall be insulated with ¾" closed cell insulation to prevent condensation and thermal absorption.
7. Fluid Piping: The fluid piping shall be Schedule 40 stainless steel and be insulated with closed cell pipe insulation to prevent condensation. The tank and pump module shall connect to the adjacent module using roll grooved steel couplings and neoprene gaskets. Any type of module-to-module connection external to the package is unacceptable.
8. Controls: Each pump shall be sized for 100% capacity and shall include magnetic motor starters and disconnect switches on each pump to allow for service repair while operating the back-up pump. The tank and pump module shall incorporate microprocessor controller to control all the operations of the pumps. The microprocessor shall communicate with the remaining microprocessors in each module via a local network communications protocol. Controls shall include operational switches for each pump; leaving fluid pressure transmitters to display the leaving fluid pressure; and integral pressure differential switch to switch to the backup pump upon loss of pressure of the primary pump
9. .Microprocessor: The microprocessor shall provide the following minimum functions and alarms:
 - a. Pump run status
 - b. Current alarm status
 - c. Pump run hours
 - d. Alarm logging with minimum of previously 100 logged alarms with time and date of each occurrence
 - e. Automatic lead/lag switchover of the pumps once per week
 - f. Pump discharge pressure

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2.3 REQUIRED OPTIONS AND ACCESSORIES

- A. Control Transformer: Shall convert unit power voltage to 120-1-60 (500VA capacity). Factory mounting includes primary- and secondary wiring between the transformer and the control panel. (Factory-mounted.)
- B. Low Ambient Kit: This accessory shall include all necessary components to permit chiller operation to 35°F ambient temperature. (Factory-mounted.)
- C. Suction Pressure Transducers: The addition of suction transducers shall allow the chiller to sense and display suction pressure. (Factory mounted.)
- D. Service Isolation Valves: Compressor service suction and discharge (ball type) isolation valves shall be added to unit per system in addition to the liquid line shutoff valves. Include a system high-pressure relief valve in compliance with ASHRAE 23. (Factory-mounted.)
- E. Crankcase Heaters: Provide compressor crankcase heaters for extra protection against liquid migration. (Factory-mounted.)
- F. Low Sound Fans: Provide low sound fans as required to meet specified maximum sound levels. (Factory-mounted.)
- G. Vibration Isolation: Neoprene pad isolators for mounting under unit base rails. (Field-mounted.)
- H. Protective Wire Panels for Hail Protection: Shall consist of close mesh (1/2") one-half inch (max.) welded-wire-mesh guards mounted on the exterior of the unit over the condenser coils and lower section of the chiller, which houses the compressors and evaporator to prevent unauthorized access, yet provide free air flow. (Factory-mounted.)

2.4 START-UP SERVICE:

- A. Start-up Service: Manufacturer shall furnish a factory-trained service representative to perform leak testing, evacuation, dehydration, and charging of the unit. Chiller manufacturer shall maintain service staff no more than 25 miles from the jobsite. The service agency noted shall be the direct representative of the manufacturer and shall devote the majority of its efforts on behalf of manufacturer's equipment and shall not be merely a local service company designated by the manufacturer. Start-up service shall include the following:
 - 1. Check equipment for possible shipping damage.
 - 2. Check all safety controls and interlocks.
 - 3. Check unit installation and isolation.
 - 4. Pressure test leak check, and charge unit with manufacturer provided refrigerant.
 - 5. Start unit and make necessary adjustments.
 - 6. Provide formal factory training for proper operation of equipment for owner staff.
 - 7. Provide complete report of activities accomplished.
- B. The installing Contractor shall be responsible for the installation of the equipment and any associated piping and wiring in accordance with the manufacturer's recommendations.

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Contractor shall be responsible for all pneumatic piping and/or electrical control work. He shall notify the manufacturer 10 days prior to start-up procedure. The Contractor shall also be responsible for placing the pumps, and system in proper operation so that a load is available for the start-up of the machine.

PART 3 – EXECUTION

3.1 EQUIPMENT:

- A. Each piece of equipment shall be installed in accordance with the approved recommendations of the manufacturer to conform to the contract documents. The installation shall be accomplished by workmen skilled in this type of work.
- B. Each piece of equipment shall be installed to be free of noise and vibration. Provide vibration isolators as per manufacturer's recommendations and/or as herein specified.
- C. Deliver equipment to the site in manufacturer's original packaging. Clearly mark each item with the proper identification number. Store in accordance with the requirements of Section 23010.

3.2 WARRANTY:

- A. Each chiller shall be provided with a one year warranty for both parts and labor by the manufacturer. In addition each chiller shall be provided with an extended four-year compressor parts only warranty. The manufacturer's warranty shall cover items found to be defective in material and workmanship and does not include routine maintenance or service.

END OF SECTION 23 37 13

SECTION 23 74 13 - AIR HANDLING UNITS**PART 1 - GENERAL****1.1 RELATED DOCUMENTS:**

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 specification sections, apply to work of this section.
- B. Division-23 Basic Mechanical Materials and Methods sections apply to work of this section.

1.2 DESCRIPTION OF WORK:

- A. Extent of air handling unit work is indicated by drawings and schedules, and by requirements of this section.
- B. Types of air handling units required for project include the following:
 - 1. Factory fabricated variable volume air handling unit.
- C. Refer to other Division-23 sections for piping; ductwork; and testing, adjusting and balancing of air handling units; not work of this section.

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's specifications for air handling units showing dimensions, capacities, ratings, performance characteristics, gages and finishes of materials, and installation instructions.
 - 1. Shop Drawings: Submit assembly-type shop drawings showing unit dimensions, construction details, and field connection details.
 - 2. Maintenance Data: Submit maintenance instructions, including lubrication instructions, filter replacement, motor and drive replacement, and spare parts lists. Include this data, product data, and shop drawings in maintenance manuals; in accordance with requirements of Division 1.

1.4 DELIVERY, STORAGE AND HANDLING:

- A. Handle air handling units and components carefully to prevent damage, breaking, denting and scoring. Do not install damaged air handling units or components; replace with new.
- B. Store air handling units and components in clean dry place. Protect from weather, dirt, fumes, water, construction debris, and physical damage.
- C. Comply with manufacturer's rigging and installation instructions for unloading air handling units, and moving them to final location.

1.5 QUALITY ASSURANCE:

- A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of air handlers, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.

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- B. Codes and Standards:
- C. Air-Conditioning and Refrigeration Institute (ARI):
 - 1. 430-78 Standard for Central Station Air Handling Units. Directory of Certified Applied Air Conditioning Products
- D. Air Moving and Conditioning Association (AMCA):
 - 1. 99-83 Standards Handbook
 - 2. 300-67 Test Code for Sound Rating
 - 3. 301-76 Methods for Calculating Fan Sound Ratings from Laboratory Test Data
- E. American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE):
 - 1. 68-78 Method of Testing In-Duct Sound Power Measurement Procedure for Fans
- F. American Society for Testing and Materials (ASTM):
 - 1. C423-77 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method
 - 2. D3359-83 Measuring Adhesion by Tape Test
 - 3. E84-81* Surface Burning Characteristics of Building Materials
 - 4. E90-81* Airborne-Sound Transmission Loss of Building Partitions, Laboratory Measurement
 - 5. E413-73* Sound Transmission Class, Classification for Determination
 - 6. G23-81 Operating Light-Exposure Apparatus
- G. Anti-Friction Bearing Manufacturer's Association, Inc. (AFBMA):
 - 1. 9-1978 Load Ratings and Fatigue Life for Ball Bearings
- H. National Fire Protection Association (NFPA):
 - 1. 90A-1985 Installation of Air Conditioning and Ventilating Systems

PART 2 - PRODUCTS

2.1 FACTORY FABRICATED AIR HANDLING UNIT

- A. Standards and Certification Compliance:
 - 1. Standards: ARI 430.
 - 2. Certification: ARI Directory of Certified Applied Air Conditioning Products.
 - 3. Operating limits: AMCA 99 (Class A, B, C, as defined by Standard 1401-66).
 - 4. Sound power level ratings: AMCA 300 and 301, or ASHRAE 68.

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- B. Casings: Double wall, 26 gauge 201 stainless steel, or equivalent strength construction, fastened to a steel support frame. Provide reinforced support points for setting or hanging the unit.
1. All steel shall be mill-galvanized, or phosphatized and coated inside and out with minimum two coats, corrosion resistant enamel paint. Manufacturers paint and paint system shall meet the minimum specifications of ASTM D3359 adhesion.
 2. Coil and fan casings shall have removable panels for servicing or replacement of components. These removable panels are not to be construed as inspection or access panels.
 - a. Unit inspection doors shall be a minimum of 6 inches high by 6 inches wide in each end of fan sections and in other locations shown on the drawings. Doors shall be double wall, insulated, hinged and provided with heavy duty latches. Doors shall be designed to open against the unit static pressure unless properly safety latched and gasketed to prevent air leakage.
 - b. Unit access doors shall be provided, as shown on drawings. Access doors shall be double wall, insulated, hinged and provided with heavy duty latches. Minimum door width shall be 12 inches. Door height shall be full height as determined by unit casing but not to exceed 6'-0". Doors shall be hinged to open against fan operating pressure unless properly safety latched and gasketed to prevent air leakage.
 - c. Airway access sections with hinged and latched access doors shall be provided as shown on drawings. Sections shall be provided with access doors on each side unless otherwise indicated on drawings. Access sections located downstream of the cooling coil shall be insulated as specified for unit casing.
- C. Fan: Double width, double inlet airfoil type, factory balanced. The maximum allowable noise generation is indicated on the drawings. The vibration tolerance is specified in Section, NOISE AND VIBRATION CONTROL. Provide self-aligning, pillow block or flanged type, regreaseable, ball type bearings selected for 200,000 hours average life, per AFBMA Standard 9. Extend grease lines for interior fan or motor bearings to the outside of the casing. Internally mounted motors and drives do not require a separate drive guard.
1. Fan motor and drive: Furnish from the factory with the air handling unit.
 2. Flexible connection: Provide for units with internally mounted motor and drive.
- D. Fan Section Construction: Fan, motor and drive assembly shall be factory mounted on an isolation frame supported on springs with 1-1/2 inches minimum deflection. Provide thrust restraint spring for fans with horizontal discharge. External vibration isolation, and flexible connections to ductwork and in piping to and from coils are required in addition to the internal isolation.
- E. Coils:
1. Tubes: Seamless copper tubing - .025" nominal thickness.
 2. Fins: 0.0055 inch aluminum mechanically bonded or soldered or helically wound around tubing. Provide copper fins for sprayed coil applications.

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3. Headers: Copper, welded steel or cast iron.
 4. "U" Bends, Where Used: Machine die formed, silver brazed to tube ends.
 5. Coil Casing: 16 gage Type 304 stainless steel with tube supports at 48-inch maximum spacing. Construct casing to eliminate air bypass and moisture carry-over. Provide duct connection flanges.
 6. Protection: Unless protected by the coil casing, provide cardboard, plywood, or plastic material at the factory to protect tube and finned surfaces during shipping and construction activities.
 7. Vents and Drain: Coils that are not vented or drainable by the piping system shall have capped vent/drain connections extended through coil casing. Construct of red brass (non-ferrous) material.
 8. Condensate Drain Pan: Condensate drain pan shall be constructed of Type 304 stainless steel and shall be sloped at 1/8" per foot to the outlet. Extend under cooling coil and header. Provide outlet connection. Insulate pan with not less than 1/2-inch thick, rigid, water impervious insulation of sprayed or foamed-in-place type. Insulation adhesive and inner coating shall comply with NFPA 90A flame spread and smoke generation requirements.
 9. Filter Box: Provide for type of filters shown.
 10. Internal Insulation:
 - a. Materials shall meet NFPA 90A flame spread and smoke generation requirements.
 - b. Fiberglass: Provide 2 inch thick, 1-1/2 PCF insulation between the outer casing and the inner liner, factory applied with adhesive and mechanical fasteners. Apply sealant to all visible raw edges and butt joints of insulation. Provide full uncompressed insulation 2" thick under condensate drain pan. Provide additional insulation under coil section with additional protective metal liner if required to meet this specification.
- F. Manufacturer: Subject to compliance with requirements, provide air handling units of one the following. Air handlers and chillers will be of the same manufacturer::
1. Carrier
 2. McQuay
 3. Trane
 4. York

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify that coils, filters, motors, drives and other components are matched with the proper air handling unit.

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- B. Assemble air handling unit components following manufacturer's instructions for handling, testing and operation. Repair damaged galvanized areas, and paint.
- C. Vacuum clean interior of air handling units prior to operation.
- D. Repair air leaks from or into casing that can be heard or felt during normal operation.

3.2 WARRANTY

- A. Provide a five-year parts and labor warranty for the air handling unit.

END OF SECTION 23 74 13

SECTION 283111 - FIRE ALARM AND SMOKE DETECTION SYSTEMS**PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Addressable, supervised fire alarm and smoke detection system. System shall be a voice evacuation type system.

1.2 RELATED SECTIONS

- A. Section 26 0500: ELECTRICAL REQUIREMENTS
- B. NFPA-2001 – Standard on Clean Agent Fire Extinguishing Systems, 2012
- C. Refer to Specification Sections 21 2200 and 21 1316

1.3 REFERENCES.

- A. NFPA 70 - National Electrical Code - 2014.
- B. NFPA 72 - National Fire Alarm Code - 2013.
- C. 6th Edition of the Florida Fire Prevention Code (2017) including NFPA 101 – Life Safety Code – Florida Specific Edition.
- D. NFPA 90A – Standard for the Installation of Air Conditioning and Ventilating Systems
- E. 6th Edition of the Florida Building Code – 2017.
- F. Americans with Disabilities Act (ADA)

1.4 REGULATORY REQUIREMENTS AND APPROVALS

The system must have proper listing and/or approval from the following agencies:

- A. State Fire Marshall: State of Florida Uniform Fire Safety Rules and Standards.
- B. Underwriters Laboratories Inc. (UL):
 - 1. No. 50 Cabinets and Boxes, current edition
 - 2. No. 268 Smoke Detectors for Fire Protective Signaling Systems, current edition
 - 3. No. 864 Control Units for Fire Protective Signaling Systems, current edition
 - 4. No. 464 Audible Signaling Appliances.
 - 5. No. 38 Manually Actuated Signaling Boxes.
 - 6. No. 1481 Power supplies for Fire Protective Signaling Systems.
 - 7. No. 1971 Visual Indicating Appliances.

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- C. **Modular Labeling:** The Fire Alarm Control Panel shall meet the Modular Listing requirements of Underwriters Laboratories Inc. To facilitate system changes and expansions, and to ensure that all subassemblies have the proper listing, each subassembly of the FACP shall carry the appropriate UL modular label. This includes all printed circuit board assemblies, power supplies, and enclosure parts. Systems which do not include modular labeling may require return to the factory for modifications, and are not acceptable.

1.5 DESCRIPTION OF SYSTEM

- A. The system shall be both an addressable and supervised, microprocessor based fire alarm control system with transient protection on each circuit and walk-through test capability. Each component of the system shall be UL listed for its use. The system shall have a Dynamic LCD display and be connected to the a remote monitoring station for emergency notification. The system shall include, but not be limited to, alarm initiating devices, alarm notification appliances, control panels, printer, auxiliary control devices, annunciators, power supplies, and wiring as shown on the drawings and specified herein.

1.6 SCOPE

- A. A new intelligent reporting, microprocessor controlled fire detection system shall be installed in accordance with the specifications and drawings.
- B. **Basic Performance:**
 - 1. Alarm, trouble and supervisory signals from all intelligent reporting devices shall be encoded onto an NFPA Style 6 (Class A) signaling line circuit.
 - 2. Initiation device circuits shall be wired Class B (NFPA Style B).
 - 3. Indicating appliance circuits shall be wired Style Y (Class B).
 - 4. Digitized electronic signals shall employ check digits or multiple polling.
 - 5. A single ground or open on any system signaling line circuit, initiating device circuit, or indicating appliance circuit shall not cause system malfunction, loss of operating power or the ability to report an alarm.
 - 6. Alarm signals arriving at the main FACP shall not be lost following a power failure (or outage) until the alarm signal is processed and recorded.
 - 7. All point devices shall be tamper resistant and the control panel shall report trouble by plain language address for any device which is tampered with.
 - 8. System shall be installed in strict compliance with current ADA regulations.

C. BASIC SYSTEM FUNCTIONAL OPERATION

When a fire alarm condition is detected and reported by one of the system initiating devices or appliances, the following functions shall immediately occur:

- 1. The System Alarm LED shall flash.
- 2. A local piezo-electric signal in the control panel shall sound. The system trouble signal shall be distinctly separate from the system alarm signal.

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3. The 80-character LCD display shall indicate all information associated with the Fire Alarm condition, including the type of alarm point and its location within the protected premises. This information shall be displayed in "plain language" which is acceptable to the Owner and shall not be coded.
4. History storage equipment shall log the information associated each new Fire Alarm Control Panel condition, along with time and date of occurrence, for dial-up down load capability for remote print out of history.
5. All system output programs assigned via control-by-event equations to be activated by the particular point in alarm shall be executed, and the associated System Outputs (alarm indicating appliances and/or relays) shall be activated. Specifically, if any device in a individual building is in alarm, the system shall activate all alarm indicating appliances in that respective building from which the alarm was initiated.

1.7 QUALIFICATIONS

- A. Manufacturer: Company specializing in smoke detection and fire alarm systems with five (5) years documented experience.
- B. Installer: Company specializing in smoke detection and fire alarm systems with five (5) years documented experience and certified by the Florida State Licensing Board as fire alarm installing contractor.
- C. The Contractor shall maintain a service department capable of responding within 24 hours for maintenance and minor services, and four hours for major outages.
- D. A supervisor shall be assigned to the project and shall have a minimum 3 years experience installing fire alarm systems and be on site while fire alarm work is being performed.
- E. The fire alarm contractor shall be certified by the State of Florida with a current alarm contractor 1 license. The installation shall be supervised by an employee of the contractor who is qualified and has one of the following certifications: Alarm Contractor License 1; or an American Society of Industrial Security (ASIS) Certification. Copies of certifications for both the Company and the supervising installer shall be submitted with the project submittals and shall be approved prior to the commencement of work.

1.8 SUBMITTALS

- A. Submit six (6) copies shop drawings and product data, including detailed cut sheets on all equipment and devices, including control panel, batteries, power supplies, and all system devices. Shop drawings shall be submitted to the building department and fire marshal as required by the building department and fire marshal.
- B. Provide complete point to point wiring diagrams, data sheets, and equipment ratings, layout, dimensions, and finishes. Wiring diagrams shall indicate wire sizes and types. Submit cut sheets on wire types.
- C. Submit manufacturer's installation instructions.
- D. Submit manufacturer's certificate that the system meets or exceeds specified requirements - certification per NFPA 72.

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- E. Submit copy of Contractor's license before work begins.
- F. Submit battery calculations, indicating a 30% spare capacity. Battery calculations shall be submitted with shop drawings with point to point wiring indicated.
- G. Submit voltage drop calculations for indicating appliance circuits if required by the local fire marshal.
- H. Submit power supply and indicating circuit appliance load calculations, including the separate strobe circuit.
- I. Submit amplifier load calculations using a 1 watt setting per speaker. This shall provide for spare capacity the amplifiers and allow for field adjustments.
- J. Certifications: Together with the shop drawing submittal, submit a certification from the major equipment manufacturer indicating that the proposed supervisor of installation and the proposed performer of contract maintenance is an authorized representative of the major equipment manufacturer. Include names and addresses in the certification.

1.9 PROJECT RECORD DRAWINGS

- A. Contractor shall provide five (5) sets of As-built drawings produced on AutoCAD and all .DWG and .BAK files on CD to the Owner upon completion of project.
- B. As-builts shall include the location of end-of-line devices and exact conduit and wire routing. Numbers and types or conductors shall be indicated for each circuit.
- C. Provide all point addresses and device descriptions on the record drawings.

1.10 OPERATION AND MAINTENANCE DATA

- A. Provide two (2) copies of operation and maintenance data prior to beginning construction for all point devices, CPUs, and all other equipment. Manuals shall be in 3" three ring binders with plastic pocket holders and red in color.
- B. Include operating instructions, and maintenance and repair procedures. Provide all proprietary information and a copy of installation instructions for each device in each set of manuals.
- C. Provide manufacturer representative's letter stating that system is operational.
- D. Provide as-built drawings complete with point numbers, junction box locations conduit and circuit routing.
- E. Spec sheets on each system component, including operational data.
- F. Name, phone number and address of the installing fire alarm contractor, as well as the nearest factory authorized representative.
- G. System operating instructions and procedures sufficient to instruct owner's representative in operation of the system.
- H. All system certifications, warranty statements and other agreements.
- I. Any other information pertinent to the maintenance and repair of the system.

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1.12 SOFTWARE

- A. The manufacturer, or authorized distributor, must maintain software version records on the system installed. The system software shall be upgraded free of any charge if a new version is released during the warranty period. For new version to correct operating problems, free upgrade shall apply during the entire life of the system. Provide updated read only software to District Maintenance Management with operation and maintenance manuals. Provide a copy of the updated program inside the FACP on site.

1.13 DELIVERY, STORAGE, AND HANDLING

- A. Products shall be delivered to job site in manufacturers original shipping packages.
- B. Provide storage and protection of products, as needed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Notifier NFS2 Series
- B. Edwards Systems Technologies – EST-3
- C. All systems shall be provided complete with voice command station(s) and associated annunciator.
- D. Specification and model numbers, where given, reflect Notifier devices. Equal devices shall be provided by alternative approved manufacturers.

NOTE : Approval of manufacturer's equipment does not in any way relieve the Contractor from meeting the performance criteria as outlined in the Plans and Specifications

2.2 MAIN FIRE ALARM CONTROL PANEL:

- A. The main FACP Central Console shall contain a microprocessor based Central Processing Unit (CPU). The CPU shall communicate with, supervise and control the following types of equipment used to make up the system: intelligent detectors, addressable modules, local and remote operator terminals, printers, annunciators, and other system controlled devices.

The fire alarm system shall be capable of utilizing node-to-node, direct fiber connected multi-priority peer-to-peer network operations. All network wiring shall be fiber optic cable. The peer-to-peer network shall contain multiple nodes consisting of the command center, main controller, remote control panels, annunciators, and workstations. Each node is an equal, active functional node of the network, which is capable of stand-alone decision making and generating network tasks to other nodes in the even of a node failure or fiber communications failure between nodes. The network fiber shall be connected in a Class A configuration, a single break on the network fiber isolates the system into two groups of panels. Each group continues to function as a peer-to-peer network working with their combined data bases. Should multiple fiber connections fail, the network shall re-configure into many sub-networks and continue to respond to alarm events from every panel that can transmit and receive network messages. Fire alarm fiber optic cabling shall be dedicated to the fire alarm system and be independent from the plant data network.

NOTE: This project only consist of one fire alarm control panel. Future panels will be connected via fiber so this initial main panel shall have the ability to expand to future panels and be connected over fiber optic cable.

The main FACP shall perform the following functions:

1. Supervise and monitor all intelligent/addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.
2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to monitor and control modules.
3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed.
4. Visually and audibly annunciate any trouble, supervisory or alarm condition on operator's terminals, panel display, and annunciators.
5. The FACP shall be UL listed for compatibility with a security system.
6. Provide a graphic display at the FACP which indicates each device location and address. This can be a copy of the as-drawings folded and attached to the FACP.
7. System shall be a complete voice evacuation type system, capable of live and pre-recorded messages.
8. Audio Annunciation and Control
 - a. Provide a master one-way emergency audio control unit as part of the main alarm control panel. The emergency audio control shall contain a paging microphone and shall be capable of generating and delivering multi-channel audio messages simultaneously over copper and/or fiber media to remote parts of the facility. The control unit shall be located in the main reception office area.
 - b. All audio messages and live pages shall originate at the one-way audio control unit. The one-way audio control unit shall store up to 32 minutes of pre-recorded audio messages digitally as WAV files. These messages shall be automatically directed to various areas in a facility under program control. The unit shall have the capacity to store up to 200 individual audio messages and to simultaneously play back seven (7) different messages in addition to live page message.
 - c. During non-alarm conditions, the control unit shall continuously distribute a default audio message to all amplifiers, providing total audio path supervision. To enhance system survivability, each remote FACP cabinet containing an amplifier shall play the default audio message in the event of a fire AND a control network system failure.
 - d. The one-way emergency audio control shall provide control switches to direct live paging messages as follows:
 - aa. "All Call" to direct the page messages to all areas in the facility, overriding all other messages and tones.

- bb. "Page to Evacuation Area" to direct the message to the evacuation area(s), overriding all other messages and tones.
- cc. "Page to Alert Area" to direct page messages to the area(s) receiving the alert message and tones, overriding all other messages and tones.
- dd. "Page to Balance Building" to direct page messages to the areas) in the facility NOT receiving either the evacuation area or alert area messages.
- e. The system shall automatically deliver a preannounce tone of 1000 Hz for three seconds when the emergency operator presses the microphone PTT key. A 'ready to page' LED shall flash during the preannounce phase, and turn steady when the system is ready for the user's page delivery. The system shall include a page deactivation timer which activates for 3 seconds when the emergency user release the microphone talk key. Should the user subsequently press the microphone key during the deactivation period a page can be delivered immediately. Should the timer complete its cycle the system shall automatically restore emergency signaling and any subsequent paging will be preceded by the pre-announce tone. A VU display shall indicate voice level to the emergency operator.
- f. The one-way audio control unit shall be capable of supporting up to 64 remote microphone inputs and a line level audio input.
- g. The fire alarm control panels shall support remote cabinets with zoned amplifiers to receive, amplify and distribute messages through speakers over supervised circuits.
- h. The master one-way emergency audio control unit shall be by Notifier/Honeywell, DVC Series.
- i. Voice communications shall incorporate one way communications and tone generating, with true digital integrated audio into the peer-to-peer fiber network, multiplexing 8 independent audio channels. The system shall include distributed audio amplifiers, minimum one for each speaker circuit, for system survivability. The channels if simultaneous audio for fire alarm activation shall be programmed as follows:

Channel 1: Mass Notification Message (highest priority)

Channel 2: Fire Alarm Message

Channel 3: Alert Message

Channel 4: Stand-by Message

Channel 5: Weather Message

Channel 6: Spare (future use)

Channel 7: Telephone Input Paging

Channel 8: Manual Paging

B. System Capacity and General Operation

1. The control panel shall provide, or be capable of expansion to 198 intelligent/addressable devices per loop plus 2048 annunciation points per system.
2. The Fire Alarm Control Panel shall include a full featured operator interface control and annunciation panel that shall include a backlit Liquid Crystal Display, individual, color coded system status LEDs, and an alphanumeric keypad for the Field Programming and Control of the Fire Alarm System.
3. All programming or editing of the existing program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
4. The FACP shall be able to provide the following features:
 - a. Block Acknowledge. Charger Rate Control.
 - b. Control-By-Time. Day/Night Sensitivity.
 - c. Device Blink Control. Drift Compensation.
 - d. NFPA 72 Sensitivity Test. System Status Reports.
 - e. Alarm Verification. Printer Interface. Include printer either integral with the panel or stand alone. Provide printer stand and two boxes of printer paper. S-232 serial port.
 - f. CRT Display Interface. Non-Alarm Module Reporting.
 - g. Periodic Detector Test. Trouble Reminder.
 - h. Upload/Download to PC Computer.
 - i. Verification Counters. Walk Test.
 - j. Maintenance Alert. Security Monitor Points.

C. Central Processing Unit

1. The Central Processing Unit shall communicate with, monitor, and control all other modules within the control panel. Removal, disconnection or failure of any control panel module shall be detected and reported to the System Display by the Central Processing Unit.
2. The Central Processing Unit shall contain and execute all control-by-event programs for specific action to be taken if an alarm condition is detected by the system. Such control-by-event programs shall be held in non-volatile programmable memory, and shall not be lost even if system primary and secondary power failure occurs.

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3. The Central Processing Unit shall also provide a real-time clock for time annotation of all system displays. The Time-of-Day and date shall not be lost if system primary and secondary power supplies fail.

D. Display

1. The System Display shall provide all the controls and indicators used by the system operator and may also be used to program all system operational parameters.
2. The Display Assembly shall contain, and display as required, custom alphanumeric labels for all Intelligent Detectors, Addressable Modules, and Software zones. Include point address display for each.
3. The System Display shall provide an 80-character back-lit alphanumeric Liquid Crystal Display (LCD). It shall also provide 5 Light-Emitting-Diodes (LEDs), that will indicate the status of the following system parameters: AC POWER, SYSTEM ALARM, SYSTEM TROUBLE, DISPLAY TROUBLE, and SIGNAL SILENCE.
4. The System Display shall provide a 25-key touch key-pad with control capability to command all system functions, entry of any alphabetic or numeric information, and field programming. Two different password levels will be accessible through the Display Interface Assembly to prevent unauthorized system control or programming.
5. The System Display shall include the following operator control switches: SIGNAL SILENCE, LAMP TEST, RESET, SYSTEM TEST, and ACKNOWLEDGE.

E. Loop Interface Board

1. Loop Interface Boards shall be provided to monitor and control each of the Signaling Line Circuit (SLC) Loops in the system. The Loop Interface Board shall contain its own microprocessor, and shall be capable of operating in Local Mode in the case of a failure in the Main CPU of the Control Panel.
2. The Loop Interface Board shall not require any jumper cuts or address switch settings to initialize SLC Loop operations.
3. The Loop Interface Board shall provide power to, and communicate with, all of the Intelligent/Addressable Detectors and Addressable Modules connected to its SLC Loop over a single pair of wires. This SLC Loop shall be capable of operation as NFPA Style 4, Style 6, or Style 7. Provide a minimum of 2 SLC interface circuits.
4. The Loop Interface Board shall be able to drive 2 Style 4 runs of these SLC Loops, each up to 10,000 feet in length, for an effective Loop span of 20,000 feet.
5. The Loop Interface Board shall receive analog information from all Intelligent Detectors and shall process this information to determine whether normal, alarm, or trouble conditions exist for that particular detector. The Loop Interface Board software shall include software to automatically maintain the detector's desired sensitivity level by adjusting for the effects of environmental factors, including the accumulation of dust in each detector. The analog information may also be used for automatic detector testing and for the automatic determination of detector maintenance requirements.

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6. The Loop Interface Board shall communicate with up to 198 Intelligent/Addressable Detectors and Addressable Modules on its SLC loop and verify proper device function and status.
- F. Serial Interface Board
1. The Serial Interface Board shall provide the EIA-232 interfaces between the Fire Alarm Control Panel and the UL Listed Electronic Data Processing (EDP) peripherals.
 2. The Serial Interface Board shall allow the use of multiple printers, CRT monitors, and other peripherals connected to the EIA-232 ports.
 3. The Serial Interface Board shall provide one EIA-485 port for the serial connection of the optional Annunciator and Control Subsystem components.
 4. The Serial Interface Board shall have LEDs that will show that it is in regular communication with the Annunciators or other EIA485 connected peripheral device.
 5. All EIA-232 serial output circuits shall be optically isolated.
- G. Enclosures:
1. The control panels shall be housed in a UL listed cabinet suitable for surface or semi-flush mounting. Cabinet and front shall be corrosion protected, given a rust-resistant prime coat, and manufacturer's standard finish. The control panel shall have a sheet of lexan mechanically fastened to the front of the entire panel such that all functions are still accessible.
 2. The back box and door shall be constructed of .060 steel with provisions for electrical conduit connections into the sides and top.
 3. All fire alarm equipment locks shall be keyed alike.
 3. The door shall provide a key lock and shall include a glass or other transparent opening for viewing of all indicators. For convenience, the door may be hinged on either the right or left side (field selectable).
 4. The control unit shall be modular in structure for ease of installation, maintenance, and future expansion.
- H. The CPU shall be capable of being programmed on site without requiring the use of any external programming equipment. Systems that require the use of external programmers or change of EPROMs are not acceptable. An external programmer may be used for the initial set-up but shall not be required for programming changes.
- I. The CPU and associated equipment are to be protected so that they will not be affected by voltage surges or line transients consistent with UL standard 864.
- J. Each peripheral device connected to the CPU shall be continuously scanned for proper operation. Data transmissions between the CPU and peripheral devices shall be reliable and error free. The transmission scheme used should employ dual transmission or other equivalent error checking techniques.
- K. Power Supply:

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1. The Main Power Supply shall operate on 120 VAC, 60 Hz, and shall provide all necessary power for the FACP. Circuit shall be a dedicated circuit.
 2. It shall provide a minimum of 3.0 amps of usable indicating appliance power, using a switching 24 VDC regulator. The power supply shall be sufficient to supply the required power for a minimum the entire building in alarm simultaneously, plus simultaneously provide continuous monitoring, supervision and annunciation of the remainder of the building.
 3. It shall be expandable for additional indicating appliance power in 3.0 ampere steps. Provide one spare 3 ampere step in the current installation for future use. Also provide 2 extra circuits in each NAC panel in the system.
 4. It shall provide a battery charger for 24 hours of standby using dual-rate charging techniques for fast battery recharge.
 5. It shall provide a very low frequency sweep earth detect circuit, capable of detecting earth faults on sensitive addressable modules.
 6. It shall be power-limited using Positive Temperature Coefficient (PTC) resistors.
 7. It shall provide meters to indicate battery voltage and charging current.
 8. Provide all required power supplies at each fire alarm terminal cabinet at each building. Power supplies shall be installed in a separate lockable cabinet.
- L. System Circuit Supervision:
1. The FACP shall supervise all circuits to intelligent devices, annunciators and conventional peripherals and annunciate loss of communications with these devices. The CPU shall continuously scan above devices for proper system operation and upon loss of response from a device shall sound an audible trouble, indicate that device or devices are not responding and print the information on the printer.
 2. Sprinkler system valves, standpipe control valves, PIV, and main gate valves shall be supervised for off-normal position.
- M. Field Wiring Terminal Blocks
1. For ease of service all wiring terminal blocks shall be the plug-in type and have sufficient capacity for 18 to 12 AWG wire. Terminal blocks that are not permanently fixed or mounted are not acceptable. Mount terminal blocks inside the fire alarm terminal cabinets. Wire nuts are not acceptable.
- N. Operators Terminal: Provide the following functions in addition to any other functions required for the system.
1. Acknowledge (ACK/STEP) Switch:
 - a. Activation of the control panel Acknowledge switch in response to a single new Alarm and/or Trouble condition shall silence the local panel piezo electric signal and change the System Alarm or Trouble LED from flashing mode to steady-ON mode. If additional new Alarm or Trouble conditions exist or are detected and

- reported in the system, depression of this switch shall advance the 80-character LCD display to the next Alarm or Trouble condition.
- b. Depression of the Acknowledge switch shall also silence all remote annunciator piezo sounders.
2. Signal Silence Switch.
 - a. Activation of the Signal Silence Switch shall cause all programmed Alarm Indicating Appliances and relays to return to the normal condition after an alarm condition. The selection of indicating circuits and relays that are silenceable by this switch shall be fully field programmable within the confines of all applicable standards. No delay in the activation.
 3. System Reset Switch.
 - a. Activation of the System Reset Switch shall cause all electronically-latched initiating devices, appliances or software zones, as well as all associated output devices and circuits, to return to their normal condition.
 - b. If the alarm condition(s) still exist, or if they reoccur in the system after System Reset Switch activation, the system shall abort the reset and indicate as to this affect on the LCD display.
 4. System Test Switch.
 - a. Activation of the System Test Switch shall initiate an automatic test of all Intelligent/Addressable detectors in the system. The System Test shall activate the electronics in each intelligent sensor, simulating an alarm condition and causing the transmission of the alarm condition from that sensor to the Fire Alarm Control Panel. The Fire Alarm Control Panel shall interpret the data from each sensor installed in the system. A report summarizing the results of this test shall be displayed automatically on the System Liquid Crystal Display, as well as on any CRTs or printers in the System.
 5. Lamp Test Switch.
 - a. Activation of the Lamp Test Switch shall sequentially turn on all LED indicators, System Liquid Crystal Display and Local Piezo-Electric signal, and then automatically return the Fire Alarm Control Panel to the previous condition.
- O. Dial-Up Connection
1. Provide RS232 port for dial up connection to down load event history. Provide Procom Plus 4.8, CD, Windows, by Symantec, #14-00-00397 or latest up-date and all programing required for start-up.
- P. System Expansion: Design the main FACP and transponders so that the system can be expanded in the future (to include the addition of thirty (30%) percent more circuits or zones) without disruption or replacement of the existing control panel. This shall include hardware capacity, software capacity and cabinet space. NAC panels shall have two spare circuits available for future use.

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- Q. It shall be the responsibility of the equipment supplier /installer to ensure that all equipment supplied will fit in locations designated on plans and in the specifications. As-built drawings shall indicate all locations of control modules and conduit routing.
- R. Specific System Operations
1. Smoke Detector Sensitivity Adjust: Means shall be provided for adjusting the sensitivity of any or all analog intelligent smoke detectors in the system from the System keypad or from the keyboard of the video terminal. Sensitivity range shall be within the allowed UL window.
 2. Alarm Verification: Each of the Intelligent/Addressable Smoke Detectors in the system may be independently selected and enabled to be an alarm verified detector. The Alarm Verification Function shall be programmable from 5 to 50 seconds and each detector shall be able to be selected for verification during the field programming of the system, or anytime after system turn-on. The Alarm Verification shall not require any additional hardware to be added to the Fire Alarm Control Panel. The FACP shall keep a count of the number of times that each detector has entered the verification cycle. These counters may be displayed and reset by the proper operator commands.
 3. System Point Operations
 - a. Any Device in the system may be Enabled or Disabled through the system keypad or video terminal.
 - b. Any system output point may be turned on, or off, from the system keypad or the video terminal.
 4. Point Read: The system shall be able to display the following point status diagnostic functions without the need for peripheral equipment. Each point will be annunciated for the parameters listed:
 - a. Device Status.
 - b. Device Type.
 - c. Custom Device Label.
 - d. Software Zone Label.
 - e. Device Zone Assignments.
 - f. Analog Detector Sensitivity.
 - g. All Program Parameters.
 5. System Status Reports: Upon command from an operator of the system, a status report will be generated and printed, listing all system status:
 6. System History Recording and Reporting: The Fire Alarm Control Panel shall contain a History Buffer that will be capable of storing up to 400 system output/input/control activations. Each of these activations will be stored and time and date stamped with the actual time of the activation, until an operator requests that the contents be either displayed or printed. The contents of the History Buffer may be manually reviewed, one

event at a time, and the actual number of activations may also be displayed and or printed. The History Buffer shall use non-volatile memory. Systems that use volatile memory for history storage are not acceptable.

7. Automatic Detector Maintenance Alert: The Fire Alarm Control Panel shall automatically interrogate each Intelligent System Detector and shall analyze the detector responses over a period of time. If any Intelligent Detector in the system responds with a reading that is below or above normal limits, then the system will enter the Trouble Mode, and the particular Intelligent Detector will be annunciated on the System Display, and printed on the System Printer. This feature shall in no way inhibit the receipt of Alarm conditions in the system, nor shall it require any special hardware, special tools or computer expertise to perform.
- T. All addressable devices, including detectors, bases, and control modules shall be labeled with the applicable station code, and/or point (SLC) address. All devices shall be labeled as to NAC panel and corresponding circuit.
- U. Audio Amplifiers
1. Each audio power amplifier shall have integral audio signal de-multiplexers, allowing the amplifier to select any one of eight digitized audio channels as directed by system programming.
 2. Audio amplifiers shall be power limited and protected from short circuits conditions on the audio circuit wiring. Each amplifier output shall provide a selectable 25/70 Vrms output, suitable for connection to emergency speakers.
 3. To enhance system survivability in the event of a total loss of audio data communications, all amplifiers shall default to the local "EVAC" tone generator channel. If the local panel has an alarm condition, then all amplifiers will sound the EVAC message on their speaker circuits. In the event of a loss of the fully digitized, multiplexed audio riser data, the audio amplifiers shall automatically default to an internally generated alarm tone which shall sound a 3-3-3 temporal pattern.
 4. Amplifiers shall also include a 24 VDC notification appliance circuit rated at 24Vdc @ 3.5A for connection of visible (strobe) appliances. This circuit shall be fully programmable.
 5. Provide as minimum, one twenty (20) watt audio amplifier per speaker circuit. Initial amplifier loading shall not exceed 80% in order to allow for future system expansion. Calculations shall assume each speaker is connected at one (1) watt.
 6. Audio amplifiers shall be Notifier devices.

2.3 SYSTEM COMPONENTS:

- A. Manual Pull Station: Semi-flush mounted, supervised, normally open single action, addressable type manual pull station. Manual stations shall be single action and shall be constructed of impact resistant lexan with raised white lettering and a smooth high gloss finish. The station shall have a hinged front with key lock. Stations which utilize screwdrivers, Allen wrenches, or other commonly available tools shall not be accepted. Stations shall be keyed alike with the fire alarm control panel. When the station is operated,

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the handle shall lock in a protruding manner to facilitate quick visual identification of the activated station

B. Speakers and Strobes:

1. Speaker-Strobe-Wall

- a. Provide low profile wall mounted strobe-strobes at the locations shown on the drawings.
- b. The low profile strobe-strobes shall mount in a North American 4" x 2 1/8" square electrical box, without trims or extension rings, and protrude less than 1" from the finished wall. Exterior devices shall be installed in a weatherproof, watertight box.
- c. The strobe output shall be switch selectable from the following available settings: 2W (90dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (81dBA) at 10 ft. when measured in reverberation room per UL-464. Frequency response shall be 400 to 4,000Hz. The selected strobe wattage shall be visible when the strobe-strobe is in its installed position.
- d. The strobe output shall be switch selectable as required by its application from the following available settings: 15cd, 30cd, 75cd & 110cd. Selected strobe rating shall be visible when the strobe-strobe is in its installed position. Light shall be evenly distributed throughout the required volume using cavity and mask "FullLight" technology to prevent hot spots. Strobes using specular reflectors shall not be considered as equal.
- e. When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules
- f. Strobe and strobe power, strobe silencing, and strobe synchronization shall be accomplished over a single pair of wires. Both the strobe and strobe elements shall provide in and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.
- g. Exterior devices shall be weatherproof, waterproof type.
- h. The low profile wall mounted strobe-strobes shall be Notifier.

3. Strobe-Strobe-Ceiling

- a. Provide low profile ceiling mounted strobe-strobes at the locations shown on the drawings.
- b. Strobe-strobes shall mount in a North American 4" x 2 1/8" square electrical box, or a 960A-4RF round flush box, and protrude less than 1.6" from the finished ceiling.
- c. The strobe output shall be switch selectable from the following available settings: 2W (91dBA), 1W (87dBA), 1/2W (84dBA), or 1/4W (80dBA) at 10 ft. when measured in reverberation room per UL-1480. Frequency response shall be 400

to 4,000Hz. The selected strobe wattage shall be visible when the strobe-strobe is in its installed position.

- d. The strobe output shall be switch selectable as required by its application from the following available settings: 15cd, 30cd, 75cd & 95cd or 95cd, 115cd, 150cd, & 177cd. Selected strobe rating shall be visible when the strobe-strobe is in its installed position.
- e. When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules
- f. Strobe power and synchronization shall be accomplished over a single pair of wires. Both the strobe and strobe elements shall provide in and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.
- g. The low profile ceiling mounted strobe-strobes shall be Notifier.

C. Strobe Lights:

1. Visual Flashing Lamps (Xenon Strobe): Visual indicating appliances shall be comprised of xenon flashtube and be entirely solid state and field adjustable. These devices shall be UL listed for use as a fire alarm indicating appliance and be capable of either ceiling or wall mounting. The lexan lens shall be pyramidal in shape to allow better visibility.
2. Shall operate on 24 VDC nominal.
3. Shall meet the requirements of the ADA as defined in UL standard 1971 and shall meet the following criteria:
 - a. The maximum pulse duration shall be 2/10ths of one second.
 - b. Unless otherwise specified on the drawings or required for ADA compliance, the intensity shall be a minimum of 75 candela.
 - c. The flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz.
 - d. Strobes shall be synchronized wherever required by NFPA-72.
4. Must be UL listed for system or current design with ADA required flash rate and intensity. Must be field adjustable.

D. Audible/Visual Combination Devices:

1. Audio/Visual Alarm Indicating Appliance: Audio/Visual units shall provide a common enclosure for the fire alarm audible and visual alarm devices. The housing shall be designed to accommodate either strobes, bells, chimes, or strobes. The unit shall be complete with a tamper resistant, pyramidal shaped lexan lens with "Fire" lettering visible from a 180 degree field of view. The front panel or bezel which is constructed of cast metal or LEXAN maybe inverted so that the lens is below the audible device. The lamp assembly shall incorporate a built-in reflector for more efficient light propagation and a special shock-mounting arrangement to resist lamp failure due o vibration. Unit

shall be complete with all mounting hardware including backbox. Audio/Visual unit shall be UL Listed as a fire alarm indicating appliance.

2. Shall meet the applicable requirements of Section B listed above for audibility.
3. Shall meet the requirements of Section C listed above for visibility.
4. Notifier with the ADA required flash rate and intensity.

E. Intelligent Photoelectric Smoke Detectors

1. Smoke detectors shall be intelligent and addressable devices, and shall connect with two wires to one of the Fire Alarm Control Panel Signaling Line Circuit loops. Up to 250 intelligent detectors may connect to one SLC loop.
2. The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density.
3. The detectors shall be ceiling-mount and shall include a twist-lock base. Detectors shall be capable of mounting in an audible base when provided.
4. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated at the detector itself (by activating a magnetic switch) or initiated remotely on command from the control panel.
5. The detectors shall provide address-setting means on the detector head using decimal switches. Because of the possibility of installation error, systems that use binary jumpers on dip-switches to set the detector address are not acceptable. The detectors shall also store an internal identifying code that the control panel shall use to identify the type of detector.
6. The detectors shall provide dual alarm and power LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the control panel. Both LEDs may be placed into steady illumination by the control panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs shall be controlled through the system field program. An output connection shall also be provided in the base to connect an external remote alarm LED.
7. The detector sensitivity shall be set through the Fire Alarm Control Panel, and shall be adjustable in the field through the field programming of the system. Sensitivity may be automatically adjusted by the panel on a time-of-day basis.
8. Using software in the FACP, the detectors shall automatically compensate for dust accumulation and other slow environmental changes that may affect their performance. The detectors shall be listed by UL as meeting the calibrated sensitivity test requirements of NFPA Standard 72.
9. Detectors shall be listed to U.L. Standard 268 and shall be documented compatible with the control equipment to which it is connected. Detectors shall be listed for this purpose by Underwriters Laboratories, Inc. The detectors shall obtain their operating

power from the fire alarm panel supervised detection loop. The operating voltage shall be 24 VDC (nominal). Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal to be generated at the control panel.

10. To minimize nuisance alarms, voltage and RF transient suppression techniques shall be employed as-well-as an insect screen. The detector head shall be easily disassembled to facilitate cleaning.
 11. Detector and associated base shall be labeled with the applicable matching station code.
 12. Notifier #FSP-851 or equal.
- F. Duct Mounted Smoke Detectors: Duct mounted smoke detectors shall be of the solid state photoelectric type and shall operate on the light scattering photodiode principle. The detectors shall be the same as the smoke detectors described in Section 2.04, E., above. Detectors shall be 4 wire operation, addressable type for use on an addressable type system. The detectors shall be mounted in a duct housing with an integral red LED which shall pulse continuously to indicate power on and glow continuously to indicate alarm or sensor trouble condition. The detectors shall be designed to ignore invisible airborne particles or smoke densities that are below the factory set alarm point. No radioactive materials shall be used. Provide supervised automatic fan shutdown via the control panel.
1. Provide a remote alarm indicator with a test switch for duct mounted smoke detector. Provide a sampling tube sized for the required duct width and rated for the air velocity present in the duct.
- G. Monitor Module (Individual Addressable Module)
1. Addressable Monitor modules shall be provided to connect one supervised IDC zone of conventional Alarm Initiating Devices (any N.O. dry contact device), such as tamper switches and water flow switches, to the Fire Alarm Control Panel Signaling Line Circuit (SLC) Loops.
 2. The Monitor Module shall mount in a 4-inch square, 2-1/8" deep electrical box. Label the box with an address point and box to be painted red.
 3. The IDC zone may be wired for Style D or Style B operation. The Monitor module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Fire Alarm Control Panel shall use to identify the type of device. Modules that use binary jumpers or dip-switches are subject to installation errors and are not acceptable. An LED shall be provided that shall flash under normal conditions, indicating that the Monitor module is operational and in regular communication with the control panel.
 4. All Monitor Modules shall be located in an accessible area without the need for a ladder.
- H. Control Module
1. Addressable Control Modules shall be provided to supervise and control the operation of one conventional Indicating Appliance Circuit (IAC) of compatible, 24 VDC powered,

polarized Audio/Visual Indicating Appliances. For fan shutdown and other auxiliary control functions, the control module may be set to operate as a dry contact relay.

2. The Control Module shall mount in a standard 4-inch square, 2-1/8" deep electrical box, or to a surface mounted backbox, or adjacent to the Fire Alarm Control Panel.
 3. The IAC may be wired for Style Z or Style Y IAC (Up to 1 Amp of Inductive A/V Signal, or 2 Amps of Resistive A/V Signal) operation, or as a Dry Contact (Form C) Relay. The relay coil shall be magnetically latched to reduce wiring connection requirements, and to insure that 100% of all auxiliary relay or IACs may be energized at the same time on the same pair of wires.
 4. Audio/Visual Power shall be provided by a separate supervised Power Loop from the main Fire Alarm Control Panel or from a supervised, UL listed Remote Power Supply, as required. All NAC panels shall be mounted at 5" to the top of the panel. NAC panels are to be located in IDF rooms or electrical rooms. Mechanical rooms are acceptable only at listed heights.
 5. The Control Module shall provide address-setting means using decimal switches and shall also store an internal identifying code that the Control Panel shall use to identify the type of device. Modules that use binary jumpers or dip-switches are subject to installation errors and are not acceptable. An LED shall be provided that shall flash under normal conditions, indicating that the Control Module is operational and is in regular communication with the Control Panel.
 6. A magnetic test switch shall be provided to test the module without opening or shorting its IAC wiring.
 7. Notifier #CMX-1 or equal.
- I. Isolator Module
1. Isolator Modules shall be provided to automatically isolate wire-to-wire short circuits on an SLC loop. The Isolator Module shall limit the number of modules or detectors that may be rendered inoperative by a short circuit fault on the SLC Loop. At least one isolator module shall be provided for each floor or protected zone of the building.
 2. If a wire-to-wire short occurs, the Isolator Module shall automatically open-circuit (disconnect) the SLC loop. When the short circuit condition is corrected, the Isolator Module shall automatically reconnect the isolated section of the SLC loop.
 3. The Isolator Module shall not require any address-setting, and its operations shall be totally automatic. It shall not be necessary to replace or reset an Isolator Module after its normal operation.
 4. The Isolator Module shall mount in a standard 4-inch deep electrical box, in a surface mounted backbox, or in the Fire Alarm Control Panel. It shall provide a single LED that shall flash to indicate that the Isolator is operational and shall illuminate steadily to indicate that a short circuit condition has been detected and isolated.
 5. Notifier #ISO-X or equal.

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2.4 BATTERIES AND CHARGER:

A. Batteries:

1. Shall be 12 volt, Gell-Cell type. Provide additional batteries and batteries for all new power supplies, as required.
2. Batteries shall have sufficient capacity to power the fire alarm system for not less than 24 hours plus 5 minutes of alarm, plus 30% spare additional capacity.
3. The batteries are to be completely maintenance free. No liquids are required. Fluid level checks refilling, spills and leakage shall not be required.
4. Provide battery calculations clearly indicating the required 30% spare capacity. Calculations shall be submitted for approval.
5. Provide separate battery cabinets where necessary.

2.5 LIGHTNING PROTECTION

- A. Provide surge suppression on all initiation device circuits (SLC loops) and all indicating appliance circuits. Surge suppression shall be UL listed and Fire marshal approved for use with the specific fire alarm system and control panel. Surge devices shall be installed in a separate cabinet with separate terminal boards from the control panel. Clamping voltage shall be 43 volts. EDCO #PC-642C for signal circuit and EDCO #P264 series for alarm circuits. EDCO only.
- B. Provide lightning and surge protection at all points entering and leaving the building and at the FACP location shown on the drawings.
- C. Provide 120 volt surge suppressor for the 120 volt power circuit to the FACP and all power expander panels. Leviton #51020WM or approved equal.

2.6 DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT)

- A. Provide automatic digital monitoring and signaling capability for connection of the fire alarm control panel to a remote monitoring company. The DACT may be internal to the FACP or separate. Provide conduit and cabling from the fire alarm control panel to the DACT in order to transmit all trouble and alarm conditions. Provide the required two dedicated telephone lines from the main telephone backboard directly to the FACP for monitoring the DACT. Provide the required 120 volt power circuit. Coordinate connection and remote monitoring requirements with Owner's telecommunications personnel.
- B. IP and fire alarm communicator with built-in dialer shall be Honeywell Model #IPGSM-4G
- C. The communicator shall annunciate all alarms, trouble signals, and supervisory signals to the remote monitoring location as a point-to-point address with the description of the device and the location by building and room number.

2.7 CLEAN AGENT FIRE SUPPRESSION

- A. Provide all required control and monitoring interface with the clean agent fire suppression system. Refer to specification 21 2200 and provide all required power, fire alarm wiring, and

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fire alarm control. Provide control of any dampers as required to close and seal the room in alarm. Provide indication of all supervisory, trouble, and alarm signals from the clean agent panels.

- B. Monitor the clean agent panel for alarm, trouble, and supervisory. All smoke detection in the clean agent spaces shall be provided as a part of the clean agent system, per specification 21 2200.
- C. The control panel will be a combined pre-action system and clean agent system control panel. Refer to specification 21 13 16. Provide the fire alarm system smoke detector above the pre-action/clean agent control panel.

2.8 PRE-ACTION SPRINKLER SYSTEM

- A. Provide all required control and monitoring interface with the pre-action fire suppression system. Refer to specification 21 13 16 and provide all required power, fire alarm wiring, and fire alarm control, including the following:
 - 1. Ceiling mounted heat detectors. These detectors shall be included as part of the pre-action control system and connected to the pre-action control panel.
 - 2. Supervise the air compressor status.
 - 3. Monitor the pre-action control panel(s) for alarm, trouble and supervisory signals.

2.9 ACCESS CONTROL SYSTEM DOOR RELEASE

- A. Provide all required control to release all means of egress doors for the access control for free egress upon the initiation of a fire alarm.

PART 3 - SEQUENCE OF OPERATION

3.1 ENTIRE BUILDING

- A. The system shall supervise all initiation devices and indicating appliances. Initiation devices shall, when placed in an alarm mode, sound all building general alarm, flash strobe lights, annunciate the address of the initiating device to the FACP, FAA, and notify the monitoring company through the DACT.
 - 1. Activate all programmed indicating circuits until silenced.
 - 2. Actuate all programmed strobe units until the panel is reset.
 - 3. Annunciate the active initiating devices.
- B. All initiation devices shall, when placed in a trouble mode, indicate the address of the device experiencing trouble to the FACP, FAA and to the monitoring company via the DACT.

PART 4 - PROGRAMMING

4.1 PROGRAMMING AND SOFTWARE MODIFICATIONS

- A. The system shall be fully programmed, set up and made operational prior to substantial completion. The Contractor shall include re-programming of the system up to three more times after substantial completion (for each phase of construction and each building) to make Owner requested revisions, Fire Marshal requested revisions or Engineer requested revisions to the program. The Contractor shall re-certify the system each time a program change is made and provide a new written certification.
- B. The FACP and CPU shall have the capability to be fully programmable by Owner's personnel. Provide a full copy of the system final program and settings on a CD in the p[roject close-out documents. Also provide another copy of the CD inside the FACP.
- C. The Manufacturer shall provide all the necessary documentation and training to allow the Owner's personnel to maintain, program and change software.
- D. The services of a factory trained and authorized technician shall be available to perform all system software modifications, upgrades or changes. Response time of the technician to the site shall not exceed 4 hours.
- E. Provide all hardware, software, programming tools and documentation necessary to modify the fire alarm system on site. Modification includes addition and deletion of devices, circuits, zones and changes to system operation and custom label changes for devices or zones. The system structure and software shall place no limit on the type or extent of software modifications on-site. Modification of software shall not require power-down of the system or loss of system fire protection while modifications are being made.
- F. All programming or editing of the program in the system shall be achieved without special equipment and without interrupting the alarm monitoring functions of the Fire Alarm Control Panel.
- G. Field Programming
 - 1. The system shall be programmable, configurable and expandable in the field without the need for special tools or electronic equipment and shall not require field replacement of electronic integrated circuits.
 - 2. All programming shall be accomplished through the standard FACP keyboard or through the Video Display Terminal.
 - 3. All field defined programs shall be stored in non-volatile memory.
 - 4. The programming function shall be enabled with a password that may be defined specifically for the system when it is installed. Two levels of password protection shall be provided in addition to a key-lock cabinet. One level is used for status level changes such as zone disable or manual on/off commands. A second (higher-level) is used for actual change of program information.

PART 5 - EXECUTION**5.1 INSTALLATION OF FIRE ALARM AND DETECTION SYSTEMS**

- A. Installation shall be in accordance with the NEC, NFPA 72, local and state codes, as shown on the drawings, and as recommended by the major equipment manufacturer.
 - 1. Pay for all permits and fees.
- B. All conduit, junction boxes, conduit supports and hangers shall be concealed in finished areas and may be exposed only in unfinished areas. Junction box covers shall be painted red. Conduit shall be spot painted red approximately every 4 feet. Smoke detectors shall not be installed prior to the system programming and test period. If construction is ongoing during this period, measures shall be taken to protect smoke detectors from contamination and physical damage. All boxes, terminal and junction boxes shall be mounted in an accessible location without the use of a ladder.
- C. All fire detection and alarm system devices, control panels and remote annunciators shall be flush mounted when located in finished areas and may be surface mounted when located in unfinished areas.
- D. Install fire alarm and detection systems as indicated, in accordance with equipment manufacturer's written instructions and complying with applicable portions of NEC and NECAs "Standard of Installation" and NFPA-72E.
- E. Wiring Systems and Materials:
 - 1. Wiring shall be in accordance with requirements of the National Electrical Code (e.g., NEC Article 760) and NFPA Regulation 72 and as recommended by the manufacturer of the fire alarm system. The fire alarm system, including components and wiring shall be completely installed and wiring shall be properly tagged and color coded. The Electrical Contractor shall make final connections as shown and required by the equipment manufacturer's wiring instructions. Wire nuts are not acceptable.
 - 2. All fire alarm system wiring must be new. All underground cable shall be rated for wet locations. THHN and/or THWN are not acceptable.
 - 3. Number and size of conductors shall be as recommended by the fire alarm system manufacturer, but not less than 14 AWG (1.02 mm) for Initiating Device Circuits and Signaling Line Circuits, and 12 AWG (1.63 mm) for Indicating Appliance Circuits.
 - 4. All wire and cable shall be listed and/or approved by a recognized testing agency for use with a protective signaling system.
 - 5. Wiring used for the communication loop shall be twisted and shielded and installed in conduit. The system should permit use of IDC and IAC wiring in the same conduit with the communication loop.
 - 6. All field wiring shall be completely supervised. In the event of a primary power failure, disconnected standby battery, removal of any internal modules, or any open circuits in the field wiring; a trouble signal will be activated until the system and its associated field wiring are restored to normal condition.

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7. Color Code - The wire color for the addressible fire alarm cabling shall be consistent throughout the project. Submit proposed color coding prior to installation.
 8. All wiring to be installed in conduit with continuous ground.
 9. All junction box covers shall be painted red. All lengths of conduits shall be spot painted red approximately every 4 feet or more often if required by the Authority Having Jurisdiction.
 10. AHU shutdown relays and equipment control relays shall be mounted within three (3) feet of controlled device. AHU shutdown relays shall be wired on a separate, dedicated circuit.
 11. All boxes with internal devices, such as the CMX modules, shall be labeled as to the device inside, its station code and plain language address.
 12. All exposed devices shall have Roberts tamper proof screws.
 13. The use of wire nuts for wire splices and/or terminations is not acceptable. All terminations shall be made on terminals on fire alarm devices or inside terminal cabinets.
- F. Provide conduit, wire and circuit breakers to connect fire alarm control panels (or new power expander panels) to a dedicated circuit. Connection to the fire alarm system shall be on a dedicated branch circuit, maximum 20 amperes. The circuit breaker shall be accessible to authorized personnel only and shall be marked FIRE ALARM CIRCUIT CONTROL. Provide a padlockable handle lock. Fire Alarm Control Panel Primary Power wiring shall be 12 AWG, copper minimum. The Control Panel Cabinet shall be grounded securely via a separate equipment grounding conductor to the panelboard equipment ground bar. The system ground shall be tested and corrected as necessary to allow proper system operation. Breaker lock is acceptable and include this provision on all NAC panel circuits (120 volt).
- J. All equipment and components shall be new, and the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling (fire alarm) system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.
- K. All equipment and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.
- L. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). Fasteners and supports shall be adequate to support the required load.
- M. All wiring shall be installed in conduit. Conduit shall be 1/2 inch minimum. Conduit fill shall not exceed 40 percent of interior cross sectional area where three or more cables are contained within a single conduit. Conduit shall be installed in accordance with The National Electrical Code (NEC), local and state requirements. Underground conduit shall be at a minimum of 24" below grade. Provide a brightly colored plastic tape buried 6 inches below

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grade, above the fire alarm conduits, for identification purposes in case of future digging. All cabling or wiring underground shall be wet location rated. THHN and/or THWN are not acceptable.

- N. Cable must be separated from any open conductors of Power, or Class 1 circuits, and shall not be placed in any conduit, junction box or raceway containing these conductors, as per NEC Article 760-29.
- O. Wiring for 24 volt control, alarm notification, emergency communication and similar power-limited auxiliary functions may be run in the same conduit as initiating and signaling line circuits. All circuits shall be provided with transient suppression devices and the system shall be designed to permit simultaneous operation of all circuits without interference or loss of signals.
- P. Conduit shall not enter the Fire Alarm Control Panel, or any other remotely mounted Control Panel equipment or backboxes, except where conduit entry is specified by the FACP manufacturer. All conduits for FACP to enter separate cabinet adjacent to FACP.
- Q. Terminal Boxes, Junction Boxes and Cabinets: All boxes and cabinets shall be UL listed for their use and purpose. Mounting shall be at 5 feet or less to top of boxes. Ceiling mount is not acceptable.
- R. Initiating circuits shall be arranged to serve like categories (manual, smoke, water flow). Mixed category circuitry shall not be permitted except on signaling line circuits connected to intelligent reporting devices.
- S. Pull stations to be labeled with its point address.
- T. Sensors to be labeled with its point address.
- U. Mounting and locating of Duct Detectors shall be to manufacturers specifications.
- V. Strobe DB level to adhere to local code levels, but as a minimum shall meet NFPA requirements.
- W. Provide approved clear covers on devices for areas prone to vandalism or other damage: Hallways, Common Bathrooms.
- X. FACP shall be located not in unsecured areas. Also surge suppression for FACP shall be mounted in approved separate cabinet located next to FACP.
- Y. Junction boxes to be readily accessible. If wall mounted do not mount less than 40" from finished floor. Ceiling mounting is not acceptable.
- Z. Free wire not acceptable. Entire system must be in conduit.
- AA. Installed system shall comply with all requirements of local authority.
- BB. The Fire Alarm system shall be UL listed as a Central Station Service.

5.2 QUALITY ASSURANCE

- A. NEC Compliance comply with NEC as applicable to construction and installation of fire alarm and detection system components and accessories.

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- B. UL Compliance and Labeling - Provide fire alarm and detection system components which are UL listed and labeled. Installation is to be by a UL listed installer.
- C. Misc. compliance - The fire alarm system is to be installed in accordance with the equipment manufacturer's written instructions and comply with all applicable portions of the NECAs "Standard Installation" and all local codes and ordinances.

5.3 SYSTEM GUARANTEE, MAINTENANCE & TESTING

- A. All work performed and all material and equipment furnished under this contract shall be guaranteed against defects in materials and workmanship for a period of twelve (12) months commencing the date of acceptance by the Fire Marshall and the Owner. Warranty service shall be provided by a qualified factory trained representative of the equipment manufacturer. Service response time shall be a maximum of four (4) hours before arrival to site. The full cost of maintenance, labor and materials required to correct any defect during this one year period shall be included in the submitted bid. The warranty shall include parts, labor, prompt field service, pick-up, and delivery.
- B. These warranty services for the fire alarm system shall be provided from a factory trained authorized representative of the manufacturer of the major equipment.

5.4 TESTING AND FIELD QUALITY CONTROL

- A. The Manufacturer's representative shall perform a quality inspection of the final installation and, in the presence of the Engineer, Electrical Contractor, fire marshal and Owner's Representatives, shall perform a complete functional test of the system. Provide the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.
 1. Before energizing the cables and wires, check for correct connections and test for short circuits, ground faults, continuity, and insulation.
 2. Open initiating device circuits and verify that the trouble signal actuates.
 3. Open signaling line circuits and verify that the trouble signal actuates.
 4. Open and short indicating appliance circuits and verify that trouble signal actuates.
 5. Ground initiating device circuits and verify response of trouble signals.
 6. Ground signaling line circuits and verify response of trouble signals.
 7. Ground indicating appliance circuits and verify response of trouble signals.
 8. Check presence and audibility of tone at all alarm notification devices.
 9. Check installation, supervision, and operation of all intelligent smoke detectors during a walk test.
 10. Each of the alarm conditions that the system is required to detect should be introduced on the system. Verify the proper receipt and the proper processing of the signal at the FACP and the correct activation of the control points.

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11. When the system is equipped with optional features, the manufacturer's manual should be consulted to determine the proper testing procedures. This is intended to address such items as verifying controls performed by individually addressed or grouped devices, sensitivity monitoring, verification functionality and similar.
12. To assure that wire size, power supply, number of devices on a circuit, etc. are suitable to support 100% of devices being in alarm or operated simultaneously, this test shall include the following:
 - a. Place all sensors and monitor modules in alarm. Each shall display it's address and alarm condition. At least the first ten (10) devices on each circuit shall also have their alarm LEDs lighted.
 - b. Operate all control modules for the alarm or operated condition. Each module shall display it's address and condition.
 - c. Reset all alarmed and operated devices. The panel shall display the address or zone of any off-normal devices.
 - d. Test a representative number of sensors for alarm verification by momentarily testing for alarm. The sensor shall not initiate an alarm. Then, test by placing the sensor in alarm such that it remains in alarm for the selected verification time. The sensor shall initiate an alarm.
 - e. In addition, the Contractor shall also perform all electrical and mechanical tests required by the equipment manufacturer's testing standards and the National Fire Protection Association - 72. All test and report costs shall be included in the contract price.
 - f. Inspect relays and signals for malfunctioning, and where necessary adjust units for proper operation to fulfill project requirements. Any fine adjustment shall be performed by specially trained personnel in direct employ of manufacturer of the fire alarm detection system equipment.

B. At the final inspection a factory trained representative of the manufacturer of the major equipment shall demonstrate that the systems function properly in every respect.

C. The Contractor shall supply personnel and required auxiliary equipment for testing without additional cost to the Owner.

5.5 DOCUMENTATION

A. After completion of the tests and adjustments listed above, the Contractor shall submit the following information to the the Owner.

1. A copy of the test report described in this specification and a Certificate of Compliance prepared as per National Fire Protection Association Standard 72 and State Fire Marshal's Rule 4A-48 to be completed at final test.
2. A checkout report shall be prepared by the installation technicians and submitted in triplicate, one (1) copy of which will be registered with the equipment manufacturer. The report shall include, but not be limited to:

- a. A complete list of equipment installed and wired.
 - b. Indication that all equipment is properly installed and functions and conforms with these specifications.
 - c. Test result of individual initiating devices and indicating appliances.
 - d. Serial numbers, locations by address and model number for each installed detector.
 - e. Technician's name, certificate number and date.
3. Affixed to FACP a standard service tag, as described in rule 4A-48 for fire alarm contractors by the Office of the State Fire Marshal.
 4. Before final acceptance of work; the Contractor shall deliver six (6) copies of a composite "Operating and Shop Maintenance Manual." Each manual shall contain, but not be limited to:
 - a. A statement of guarantee including date of termination and name and phone number of the person to be called in the event of equipment failure.
 - b. Individual factory issued manuals containing all technical information on each piece of equipment installed. In the event that such manuals are not obtainable from the factory, it shall be the responsibility of the Contractor to compile and include them. Advertising brochures or operational instructions shall not be used in lieu of the required technical manuals.
 - c. Three (3) copy of all approved shop drawings, instruction sheets, operating instructions, and spare parts bulletins.
 5. A system certification verifying the proper system operation shall be required prior to acceptance by the Owner.
- B. Provide typewritten, short form operation instructions and locate them at the fire alarm control panel in a location as instructed by the Owner.

5.6 INSTRUCTION AND TRAINING:

- A. Provide training for up to two separate training sessions on the operation, maintenance, and repair of the system at the Contractor's expense. Training shall be certified by the manufacturer and be at different times at the convenience of the Owner. Include transportation, room and board where required for the necessary training. The training session, for personnel selected by the Owner, shall be presented by a fully qualified, trained representative of the equipment manufacturer who is thoroughly knowledgeable of the specific installation. Videotaping of the training shall be an option of the Owner.
- B. Provide a written description of standard control panel functions and user instructions at each FACP. These instructions shall be written in standard laymen's English so that an unfamiliar operator can accomplish basic functions such as reset.

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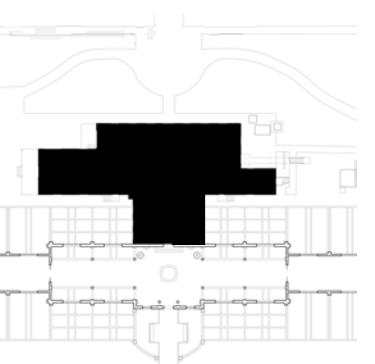
Building and Site Improvements

- C. Provide instruction as required for operating the system. "Hands-on" demonstrations of the operation of all system components and the entire system including program changes and functions shall be provided.
- D. The Contractor and/or the Systems Manufacturer's representatives shall provide a typewritten "Sequence of Operation" to the Owner.
- E. Provide a copy of the software program on site in CD format, taped or otherwise permanently stored inside the FACP.

END OF SECTION 283111



Rick Rowe
AR13510 2019.02.20



Project Information

City of Tampa

David L. Tippin Water
Treatment Facility
Phase I - Building &
Site Improvements

7125 North 30th Street
Tampa, Florida 33610

Project Number 1706.00

Distribution

No.	Description	Date
1	Design Development	07.20.18
2	50% CDs	09.24.18
3	90% CDs	12.07.18
4	Permit CDs	02.26.19

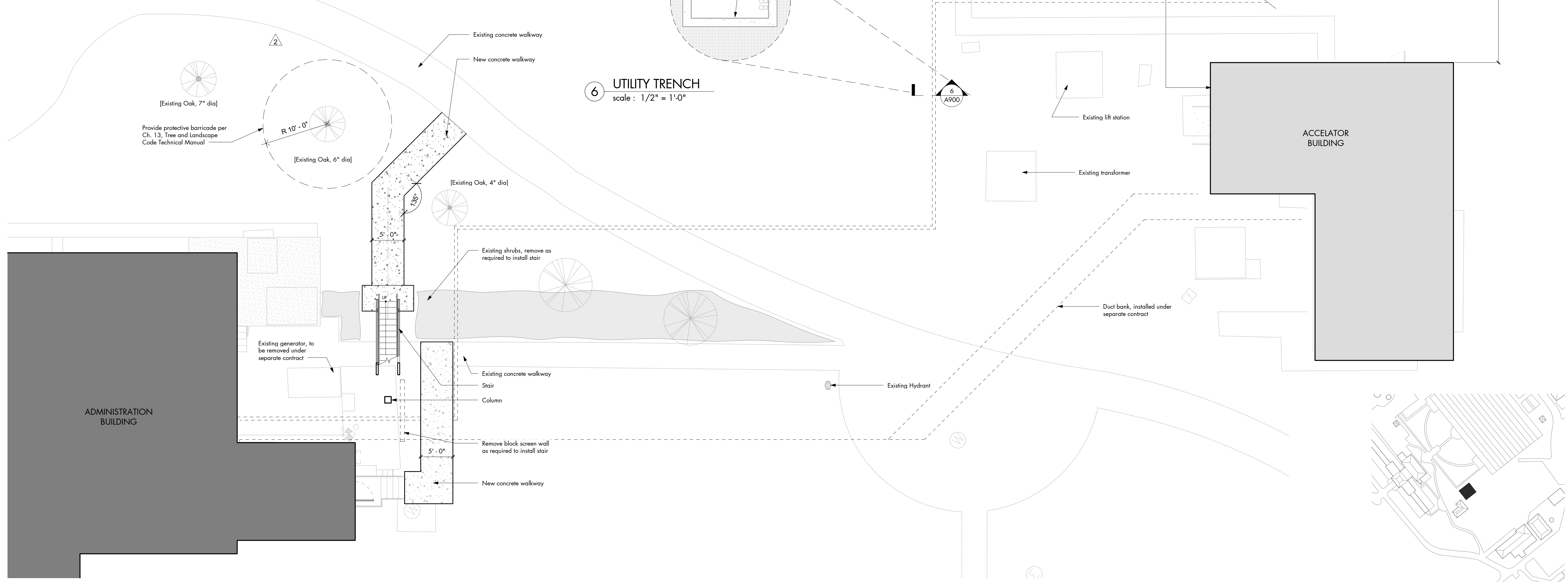
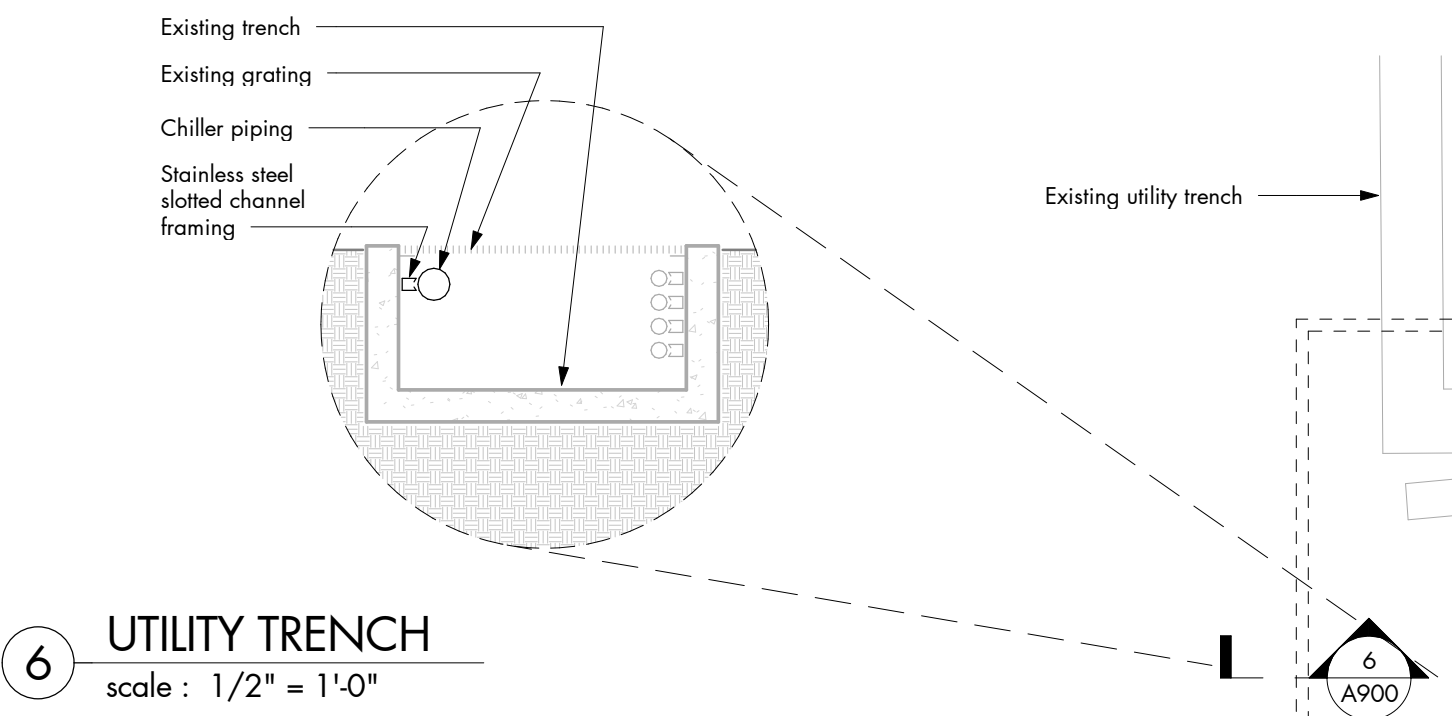
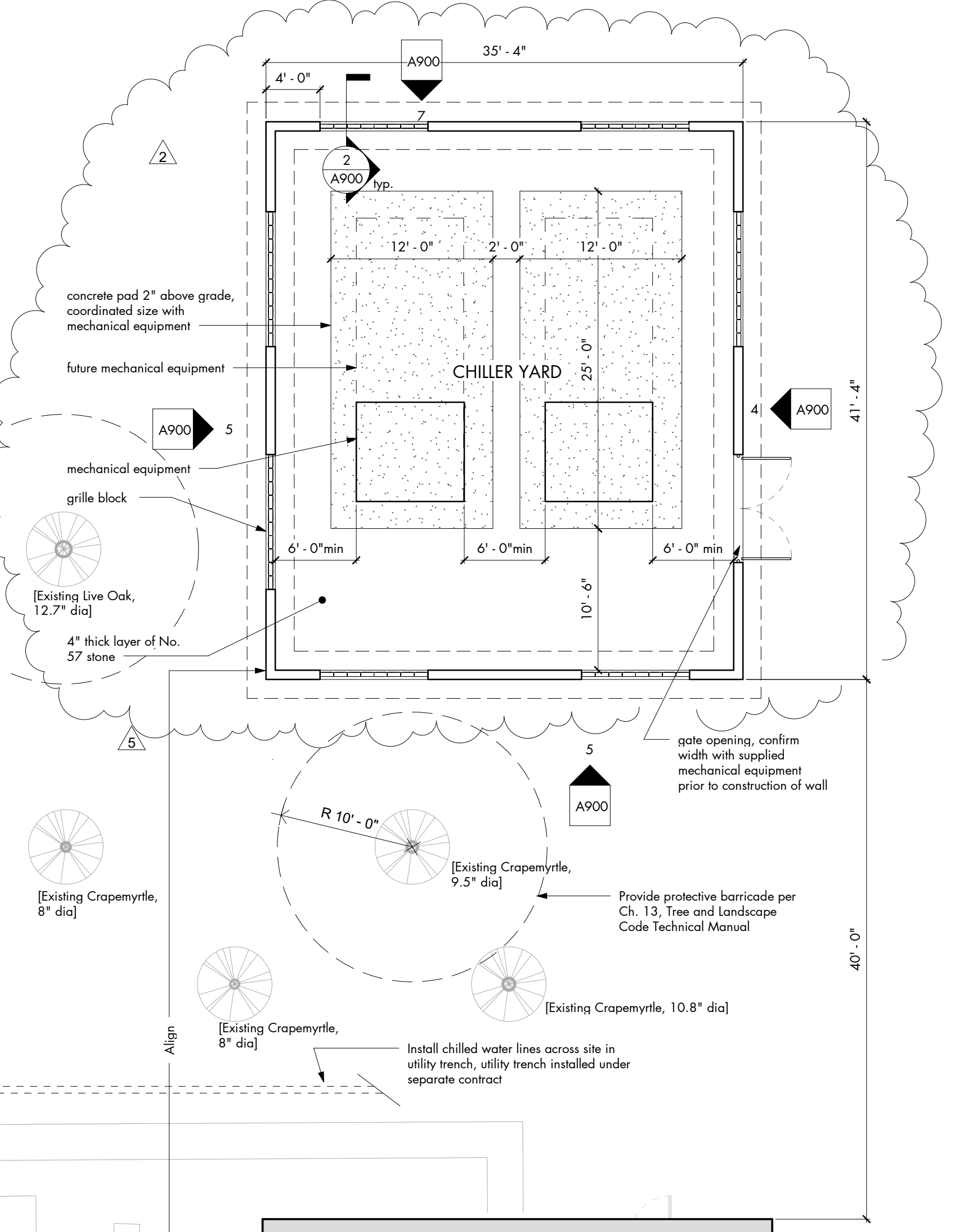
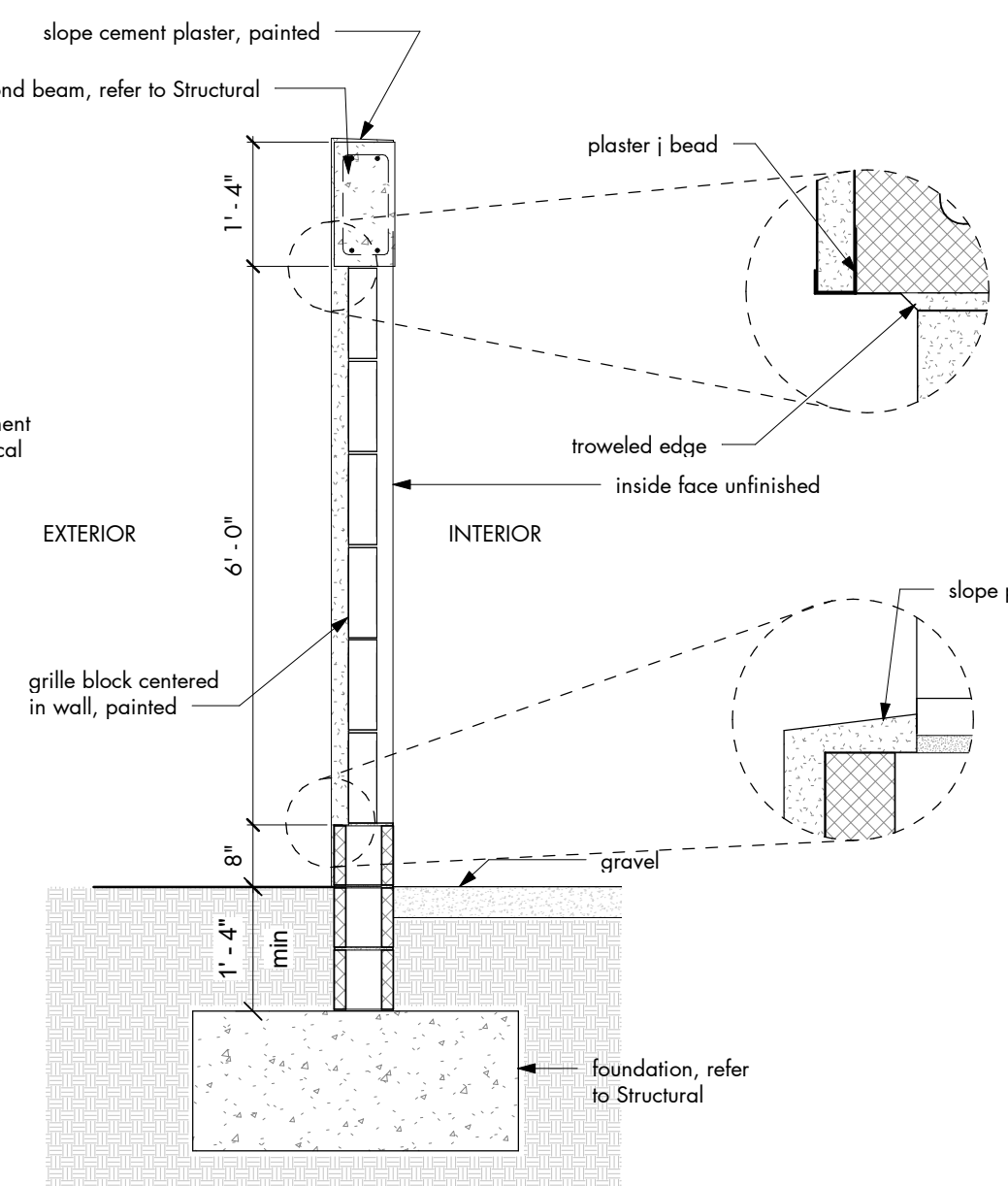
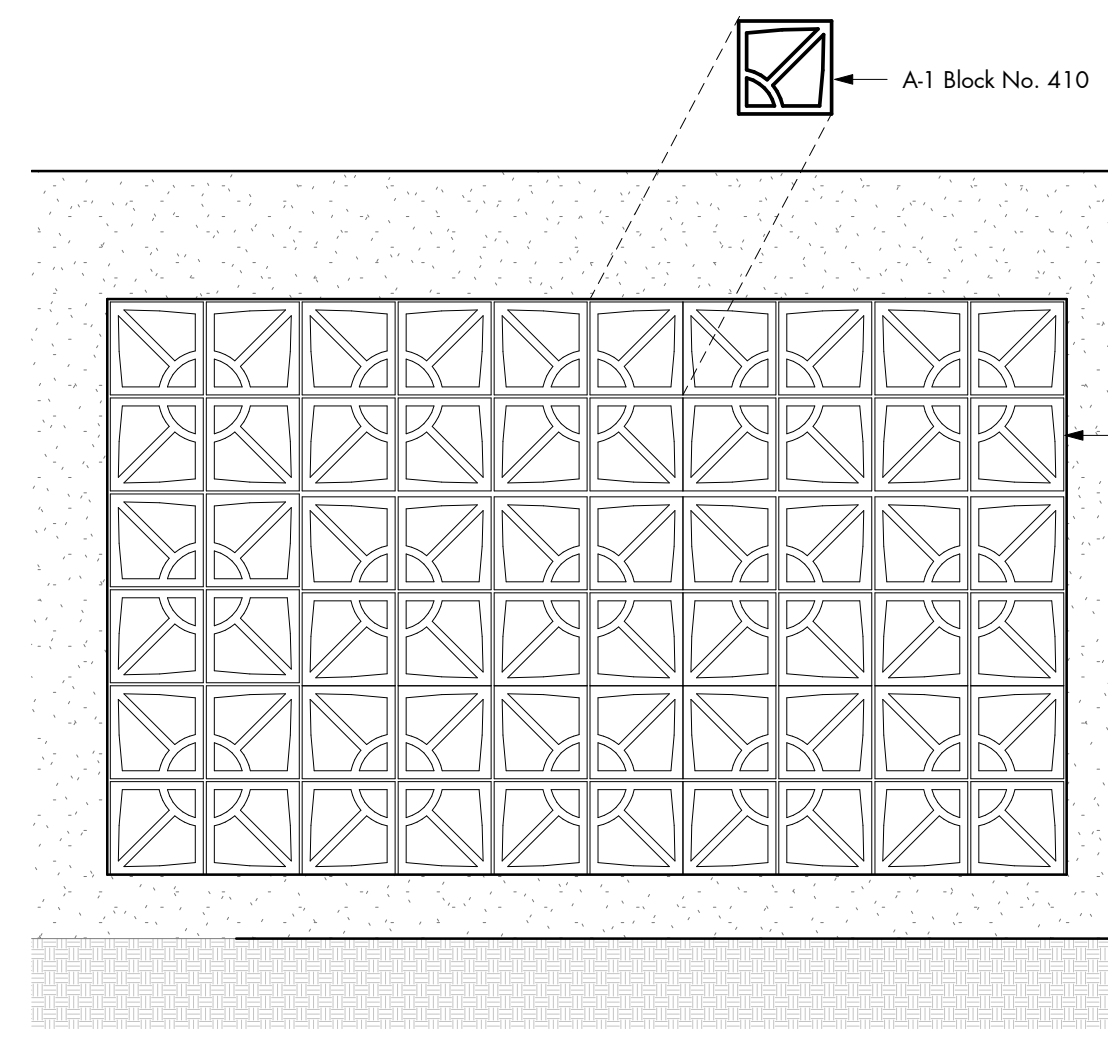
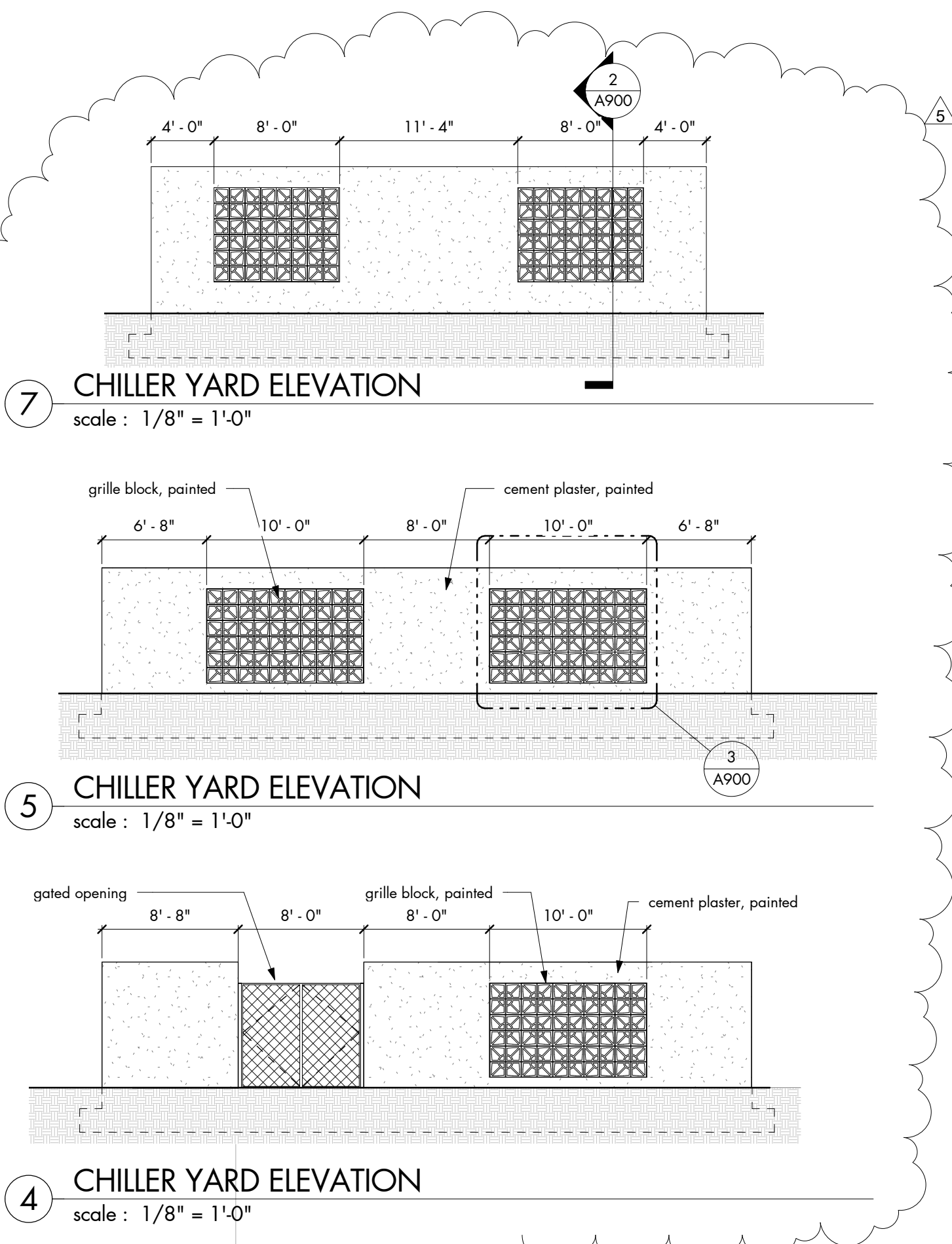
Revisions

No.	Description	Date
2	Permit REV 2	09.18.19
5	Addendum 1	07.17.20

Sheet Information

CHILLER YARD

A900

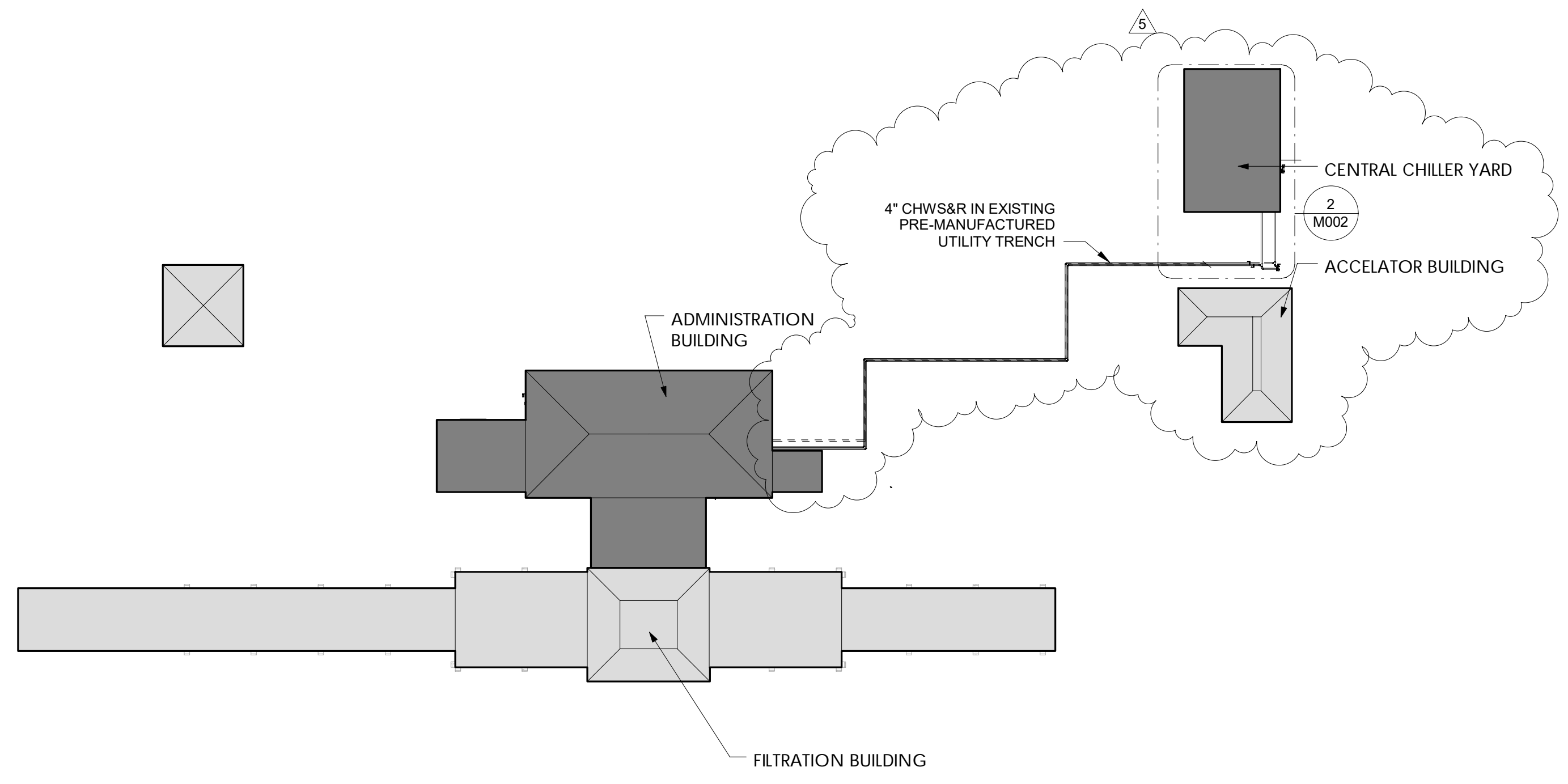
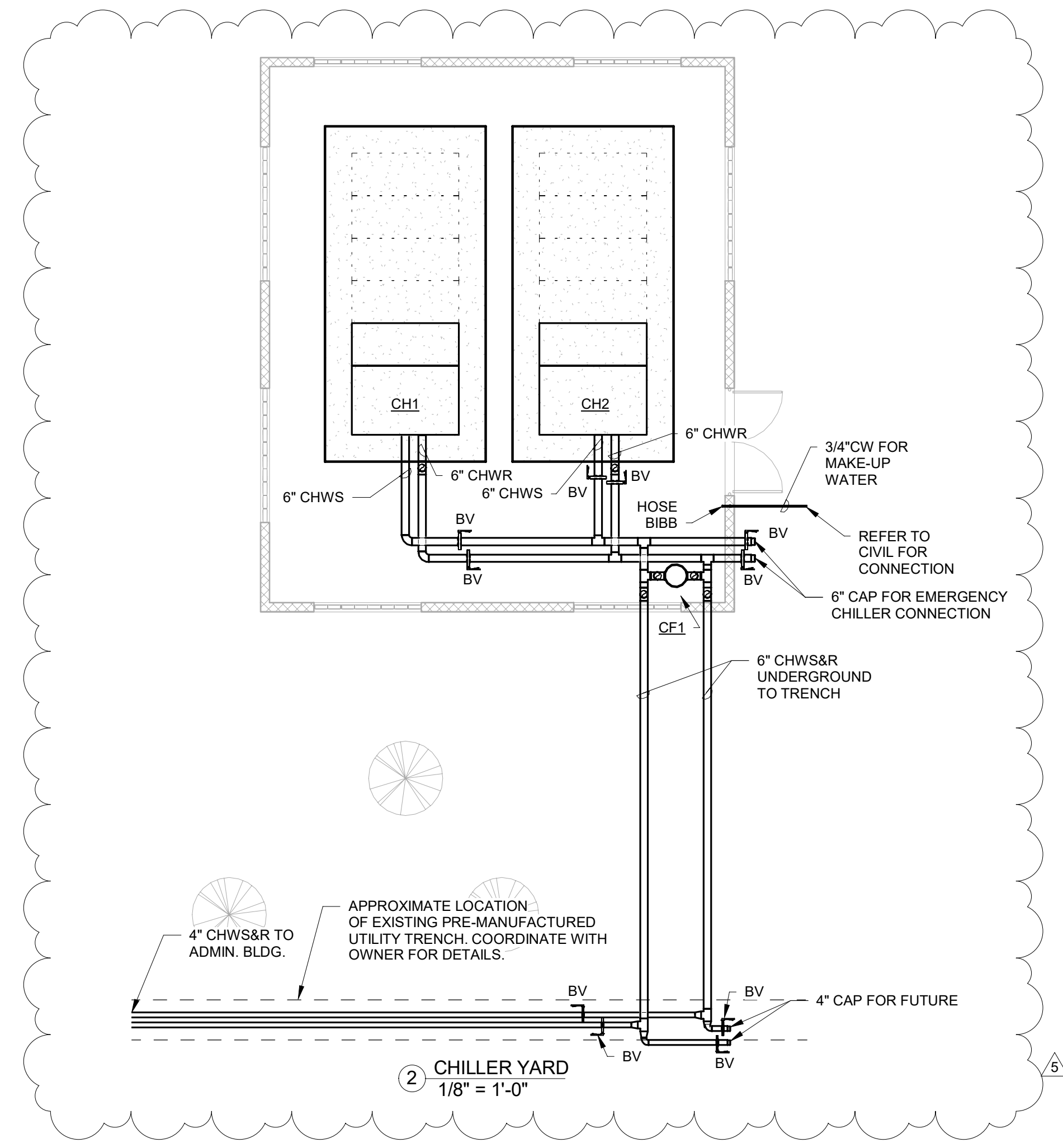
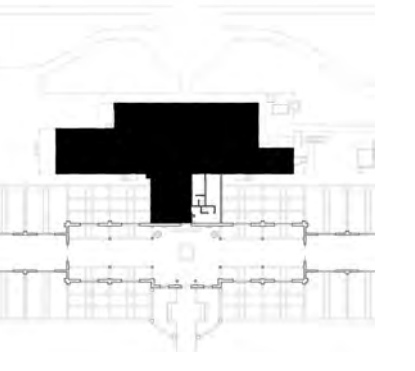


1 CHILLER YARD
scale : 1/8" = 1'-0"

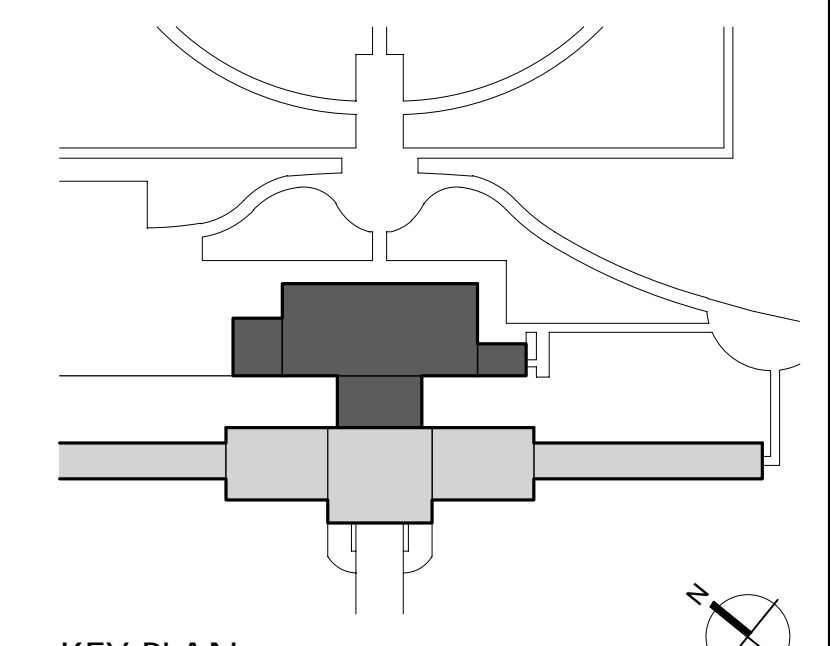
KEY PLAN

PRINTED COPIES OF THIS DOCUMENT ARE NOT CONSIDERED SIGN AND SEALED AND THE SIGNATURE MUST BE VERIFIED ON ANY ELECTRONIC COPIES.

Harry W. Portellos
 P.E. 61597
 TO THE BEST OF MY KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE 2017 FLORIDA BUILDING CODE



① MECHANICAL SITE PLAN
 1" = 40'-0"



KEY PLAN

Project Information
 City of Tampa

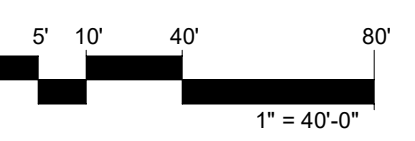
David L. Tippin Water Treatment Facility
 Phase I - Building & Site Improvements

7125 North 30th Street
 Tampa, Florida

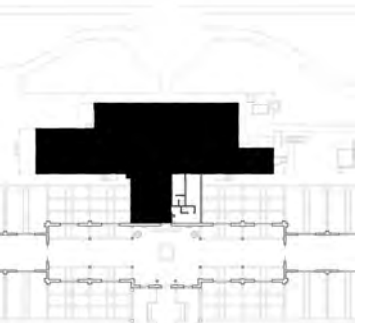
Project Number		1706.00
Distribution		
No.	Description	Date
1	DD	07.20.18
2	50% CDs	09.24.18
3	90% CDs	12.07.18
4	Permit CDs	02.26.19

Revisions		
No.	Description	Date
5	Addendum 1	07.17.20

Sheet Information
 MECHANICAL SITE PLAN

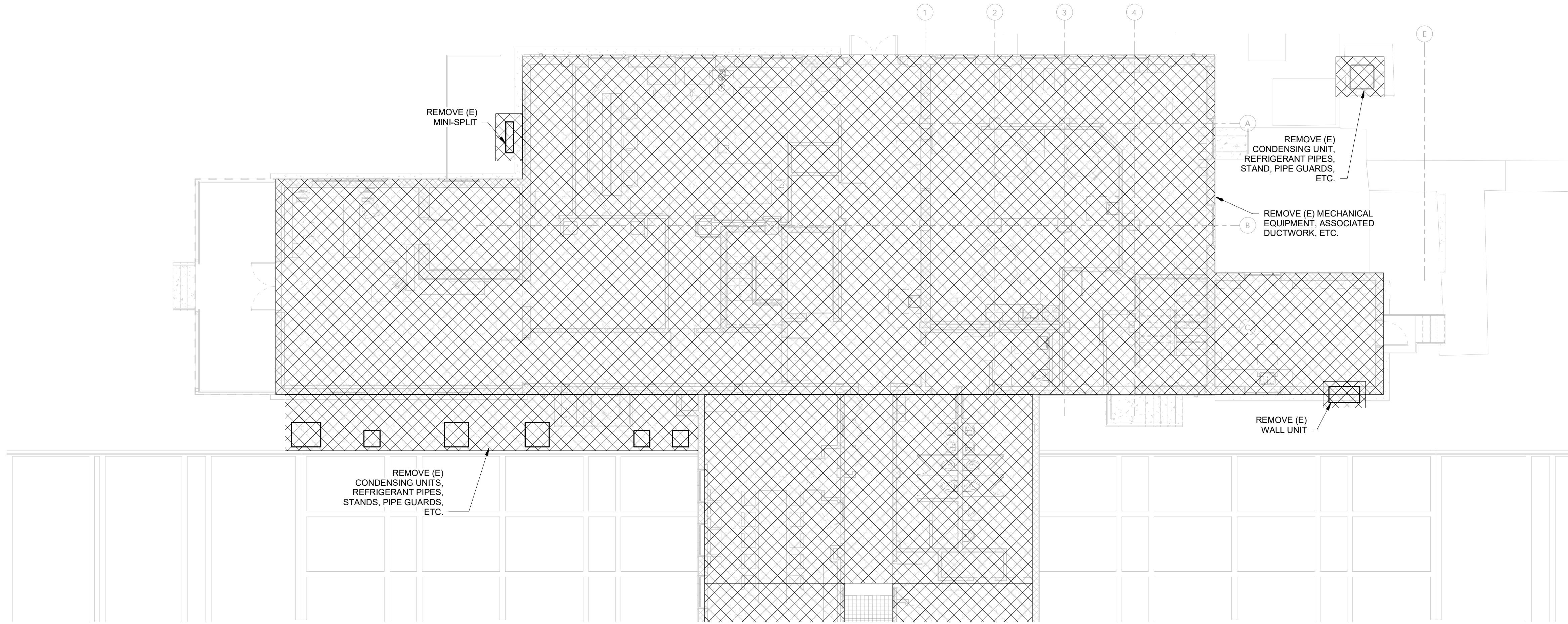


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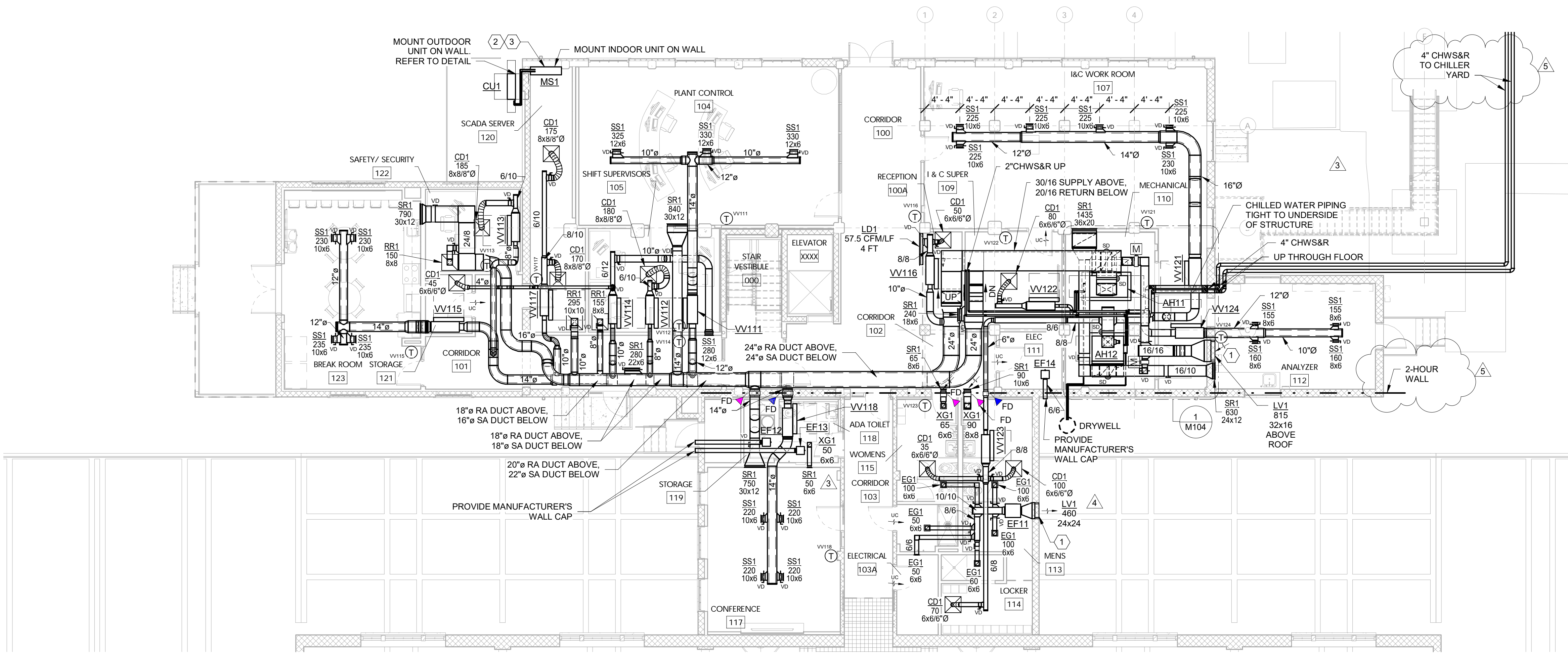


Distribution		
No.	Description	Date
1	DD	07.20.18
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4	Permit CDs	02.26.19

Revisions		
No.	Description	Date
3	REV 3	12.16.19
4	Permit REV 4	02.24.20
5	Addendum 1	07.17.20



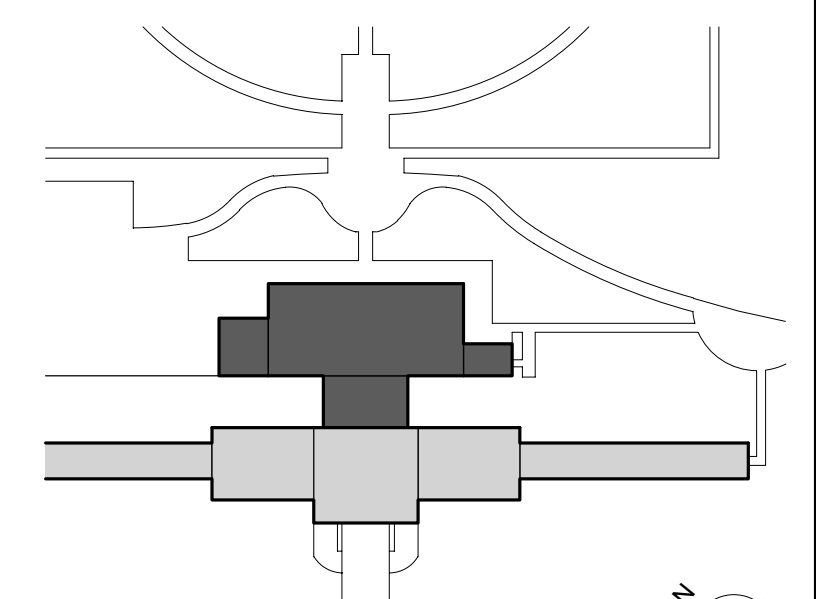
ADMINISTRATION BUILDING MECHANICAL DEMOLITION FIRST FLOOR PLAN
1/8" = 1'-0"



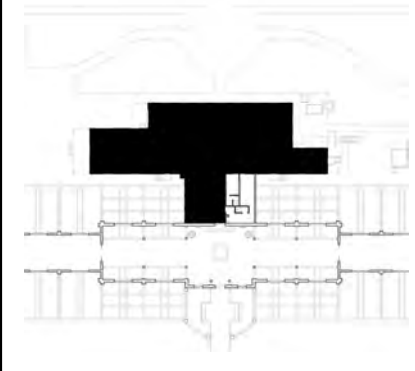
ADMINISTRATION BUILDING MECHANICAL NEW WORK FIRST FLOOR PLAN
1/8" = 1'-0"

DRAWING NOTES:

- FABRICATE 10" DEEP PLENUM ON BACKSIDE OF LOUVER. ALL CORNERS OF PLENUM TO BE CONTINUOUSLY WELDED AND ENTIRE FABRICATION IS TO BE HOT DIPPED GALVANIZED. BOTTOM PANEL SHALL SLOPE 1" FOOT BACK TO LOUVER SO COLLECTED WATER DRAINS BACK INTO LOUVER. PROVIDE WEATHERPROOF SEAL AT LOUVER/PLENUM CONNECTION.
- ROUTE REFRIGERANT LINES THROUGH WALL AND SEAL WALL PENETRATION WEATHERTIGHT.
- SUPPORT REFRIGERANT LINES FROM ABOVE. ROUTE LINES AS DIRECTLY AS POSSIBLE, MINIMIZING TURNS. LINES SHALL BE SIZED AS DIRECTED BY THE MANUFACTURER'S REPRESENTATIVE. REFER TO SCHEDULE AND SPECIFICATIONS.



KEY PLAN



No.	Description	Date
1	DD	07.20.18
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AIR HANDLING UNIT SCHEDULE - CHILLED WATER

MARK	SUPPLY AIR (CFM)	OA Air Quantity (CFM)	SYSTEM WARM-UP (CFM)	STATIC PRESSURE (EXT/TOTAL)	RETURN/MAIN AIR PATH														ELECTRICAL			FAN ARRANGEMENT / TYPE	MIN BASE RAIL HEIGHT	MANUFACTURER	MODEL	UNIT WEIGHT (LBS)	DISCH SOUND POWER LEVELS (OCTAVES)	RAD. SND. POWER LVLS (OCTAVES)	LOCATION	SPACE SERVED	NOTES
					AIR QUANTITY (CFM)	ENTERING TEMP (°F DB / °F WB)	LEAVING TEMP (°F DB / °F WB)	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	COOLING COIL (ROWS/SFP)	MAX AIR PRESSURE DROP (IN H2O)	FACE VELOCITY (FPM)	FILTER NOTES	WATER FLOW (GPM)	CHILLED WATER TEMPEINTING (DEG/DEG)	MAX WATER PRESSURE DROP (FT H2O)	MAX FAN SPEED (RPM)	FAN MOTOR (HP/BHP)	VOLTAGE	PHASE	HZ										
AH11	3,985	610	4,140	2.5/3.78	3,985	77.6/64.2	52.8/51.6	147.9	106.7	6/9	0.51	405	MERV 8	24.6	42/54	7.8	1825	7.5/3.1	240 V	3	60 HZ	MOTORIZED IMPELLER	6	TRANE	UCCCAR10	1300	83/75/80/80/77/73/69/64	75/75/77/77/74/69/68/68	MECH ROOM 110	1ST FLOOR NORTH	1-12
AH12	2,240	205	2,230	2.5/3.80	2,240	76.7/62.5	52.8/51.5	71.2	57.8	6/9	0.46	392	MERV 8	11.7	42/54	2.5	2100	4.0/1.9	240 V	3	60 HZ	MOTORIZED IMPELLER	6	TRANE	UCCCAR06	1000	91/80/90/78/75/69/65/58	83/76/90/78/73/66/65/59	MECH ROOM 110	1ST FLOOR SOUTH	1-12
AH21	2,580	160	2,735	2.5/4.09	2,580	76.1/61.8	52.8/51.5	76.12	64.9	6/9	0.57	460	MERV 8	12.7	42/54	2.7	2210	4.0/2.5	240 V	3	60 HZ	MOTORIZED IMPELLER	6	TRANE	UCCCAR06	1000	93/82/93/81/77/71/67/60	83/75/86/76/74/67/66/60	MECH ROOM 212	2ND FLOOR NORTH	1-11
AH22	2,175	170	2,375	2.5/3.85	2,175	76.5/62.4	52.8/51.6	67.9	55.7	6/9	0.45	390	MERV 8	11.3	42/54	2.3	2015	4.0/1.7	240 V	3	60 HZ	MOTORIZED IMPELLER	6	TRANE	UCCCAR06	1000	90/79/90/78/74/68/64/57	82/75/90/75/73/66/64/58	MECH ROOM 212	2ND FLOOR SOUTH	1-11

- NOTES:**
- PROVIDE POSITIVE SLOPED (IN MIN OF TWO PLANES) STAINLESS STEEL DRAIN PAN WITH DRAIN OUTLET IN BOTTOM OF PAN. DRAIN PAN SHALL EXTEND 8" BEYOND COOLING COIL OR FAN SECTIONS SHALL HAVE DRAIN PANS. COIL CASING, INCLUDING CROSS BRACING, SHALL BE STAINLESS STEEL CONSTRUCTION. PROVIDE RED BRASS (NON-FERROUS) COIL CONNECTIONS, VENTS AND DRAINS AND EXTEND THROUGH THE COIL CASING.
 - PROVIDE DOUBLE WALL UNIT, MINIMUM 2", THROUGHOUT UNIT (INCLUDING BELOW DRAIN PAN) WITH A SOLID INNER LINER. UNIT SHALL HAVE FACTORY FABRICATED DOUBLE WALL FILTER PLENUM MIXING BOX. PROVIDE FULL SIZED HINGED ACCESS DOORS AT PLENUM SECTION, FILTER SECTION, COIL SECTION(S), AND FAN SECTION. BOTH HEATING AND COOLING COILS SHALL BE ACCESSIBLE ON THE UPSTREAM AND DOWNSTREAM SIDE.
 - PROVIDE PREMIUM EFFICIENCY MOTORS. SEE SPECIFICATIONS.
 - UNITS SHALL HAVE INTERNAL VIBRATION ISOLATORS WITH 2" DEFLECTION. UNIT SHALL HAVE 1" NEOPRENE PADS BETWEEN THE BASE RAILS AND THE 4" HOUSEKEEPING PAD.
 - PROVIDE OVERSIZED FANS NOT TO EXCEED RADIATED SOUND POWER PER ASHRAE. PROVIDE REMOTE BEARING LUBRICATION LINES, EXTENDED TO JUST INSIDE THE ACCESS DOOR.
 - PROVIDE SINGLE HEADER ON AFTER FILTERS FOR EFFECTIVE SEALING.
 - PROVIDE MAGNAHELIC DIFFERENTIAL PRESSURE GAGE AT FILTER.
 - FAN RPM AND OUTLET VELOCITY ARE MAXIMUM. PROVIDE OVERSIZED FANS NOT TO EXCEED VALUES INDICATED. PROVIDE ADJUSTABLE PITCH SHEAVE ON FAN MOTORS 10 HP AND LESS.
 - CHILLED WATER COILS SHALL NOT EXCEED 11 FINS PER INCH.
 - VAV SYSTEM WITH VARIABLE FREQUENCY DRIVE FOR FAN CONTROL. SEE VARIABLE FREQUENCY DRIVE SCHEDULE.
 - BASE RAIL HEIGHT INDICATED IS FOR BASIS OF DESIGN UNIT. OTHER MANUFACTURER'S MAY REQUIRE ADDITIONAL BASE RAIL HEIGHT ALLOWANCE FOR THE CONDENSATE DRAIN TRAP WHERE THE DRAIN LINE PENETRATES THE BASE RAIL INSTEAD OF THE UNIT'S SIDE CASING.
 - PROVIDE CONDENSATE PUMP.

FAN SCHEDULE

MARK	SERVES	AIR QUANTITY (CFM)	DRIVE	TIP SPEED	MOTOR RPM	FAN SPEED (RPM)	STATIC PRESSURE (IN H2O)	ELECTRICAL			FAN MOTOR (BHP/HP)	SONES	MANUFACTURER	MODEL	MOUNTING LOCATION	WEIGHT (LBS)	INTERLOCK	NOTES
								VOLTAGE	PHASE	HZ								
EF11	TOILETS	460 CFM	BELT	2,340	1725	1,555	0.375	115 V	1	60 Hz	0.12/0.25	7.4	GREENHECK	BCF-106-4	ABV CLG	78	AH12	1.2,3,5
EF12	STORAGE 119	50 CFM	DIRECT	-	675	675	0.25	115 V	1	60 Hz	16 WATTS	1.1	GREENHECK	SP-B70	CLG	9	AH11	1.2,3,4,5
EF13	ADA TOILET 118	50 CFM	DIRECT	-	675	675	0.25	115 V	1	60 Hz	16 WATTS	1.1	GREENHECK	SP-B70	CLG	9	AH11	1.2,3,4,5
EF14	ELEC 111	50 CFM	DIRECT	-	675	675	0.25	115 V	1	60 Hz	16 WATTS	1.1	GREENHECK	SP-B70	CLG	9	AH11	1.2,3,4,5
EF21	ADA TOILET 214	50 CFM	DIRECT	-	675	675	0.25	115 V	1	60 Hz	16 WATTS	1.1	GREENHECK	SP-B70	CLG	9	AH21	1.2,3,4,5
EF22	TOILET 211	50 CFM	DIRECT	-	675	675	0.25	115 V	1	60 Hz	16 WATTS	1.1	GREENHECK	SP-B70	CLG	9	AH22	1.2,3,4,5

- NOTES:**
- COORDINATE WITH ELECTRICAL DRAWINGS.
 - PROVIDE WITH FACTORY DISCONNECT.
 - INTERLOCK VIA DDC SYSTEM. PROVIDE ALL REQUIRED CONTACTS AND RELAYS.
 - PROVIDE WITH WEATHERPROOF WALL CAP.
 - PROVIDE BACKDRAFT DAMPER.
- CONTINUOUS = FAN SHALL RUN CONTINUOUSLY DURING OCCUPANCY.

DUST COLLECTOR SCHEDULE

MARK	DC1	
FAN TYPE	BI	
FAN DIA	IN.	18
FILTER	NO.	6
FILTER AREA EACH	SQ. FT.	206
AIRFLOW	CFM	3,600
TOTAL STATIC PRESSURE	IN. WG.	12
MOTOR	HP	15
SPEED	RPM	3,450
ELECTRICAL	VOLT/Ø/60	240/3/60
WEIGHT	LBS.	1,365
MANUFACTURER	-	AAF
MODEL	-	3RC6
NOTES	-	1,2,3

- NOTES:**
- PROVIDE WITH 5.0 SCFM @ 100 PSIG OF COMPRESSED AIR AND FILTER REGULATOR.
 - HORIZONTAL INTAKE WITH VERTICAL DISCHARGE.
 - PRIMARY MATERIAL OF CONSTRUCTION IS HOT ROLLED STEEL WITH 2 COAT FINISH.
 - ABSOLUTELY NO ALUMINUM DUST OR ALUMINUM PARTICLES SHALL BE COLLECTED BY THIS SYSTEM.

WELDING EXHAUST SCHEDULE

MARK	WE1	
FILTER MEDIA	SQ FT	452
AIRFLOW	CFM	900
EXTRACTOR ARM DIA	IN.	10
SOUND LEVEL	dB(A)	77 AT 5 FT
MOTOR	HP	3
SPEED	RPM	3450
ELECTRICAL	VOLT/Ø/60	240/1/60
WEIGHT	LBS.	660
MANUFACTURER	-	MILLER
MODEL	-	FILTAIR 5 951639
NOTES	-	1

- NOTES:**
- PORTABLE WELDING FUME EXHAUST.

MINI-SPLIT SCHEDULE

MARK	AREA SERVED	COOLING CAPACITY (BTUH)	AIR QUANTITY (HIGH) (CFM)	ENERGY EFFICIENCY (SEER)	REFRIGERANT	MANUFACTURER	INDOOR UNIT		CU/HP OUTDOOR UNIT		ELECTRICAL				NOTES
							MODEL	DIMENSIONS (WxHxD)	MODEL	DIMENSIONS (WxHxD)	VOLTAGE	PHASE	MCA (AMPS)	MCCP (AMPS)	
MS1	SCADA SERVER	36,000	920	18.8	R-410A	MITSUBISHI	PKA-A36KA7	46x15x19	PUY-A36NKA7	42x14x53	240 V	1	25 A	30 A	1-6

- NOTES:**
- INDOOR UNIT: DUCTLESS SPLIT AIR CONDITIONING UNIT WITH REMOVABLE FRONT GRILLE, WASHABLE REUSABLE FILTERS, AUTO-RESTART. PROVIDE POWER SUPPLY CORD AND ACCESSORIES FOR WALL MOUNTING, WIRELESS REMOTE CONTROL WITH 24 HOUR TIME, FOUR SPEED FAN CONTROL, AUTO-COOL-DRY-FAN MODE. UL LISTED.
 - OUTDOOR UNIT SHALL BE SECURED TO THE PAD WITH HOT DOPPED GALVANIZED HARDWARE. ALL REFRIGERANT LINES SHALL BE RIGIDLY SUPPORTED. CONCEAL LINES AS MUCH AS POSSIBLE.
 - INSULATE ALL SUCTION LINES.
 - SHALL BE ON EMERGENCY GENERATOR.
 - PROVIDE WITH INLINE CONDENSATE PUMP POWERED THROUGH THE AIR HANDLER.
 - PROVIDE WALL MOUNTING BRACKET.
- COMPONENTS FOR MINI-SPLIT SYSTEM INSTALLATION**
- INTERIOR LINESSET COVER: ALL LINESSETS, WHICH ARE INSTALLED INSIDE THE BUILDING, SHALL BE ENCLOSED IN AN EXTRUDED PVC LINESSET COVER SYSTEM, WHICH SHALL CONSIST OF COMPONENTS THAT DISASSEMBLE EASILY TO PROVIDE RAPID INSTALLATION AND FACILITATE FUTURE ACCESS FOR TESTING AND/OR REPAIRS AND SHALL HAVE NO EXPOSED FIXINGS OR CLOSURE MECHANISMS. THEY SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. LINESSET COVERS FABRICATED FROM FOLDED METAL OR FROM PLASTIC OR METAL DOWNSPOUTS ARE NOT ACCEPTABLE. ENCLOSURE SYSTEM SHALL BE SLIMDUCT MD SERIES OR EQUIVALENT WITH COMPATIBLE AND APPROPRIATE ELBOWS, COUPLERS, CEILING TRIM, WALL INLETS, AND END COVERS.
 - EXTERIOR LINESSET COVER: ALL LINESSETS, WHICH ARE INSTALLED OUTSIDE THE BUILDING, SHALL BE ENCLOSED IN AN EXTRUDED PVC LINESSET ENCLOSURE SYSTEM, WHICH SHALL CONSIST OF COMPONENTS THAT DISASSEMBLE EASILY TO PROVIDE RAPID INSTALLATION AND FACILITATE FUTURE ACCESS FOR TESTING AND/OR REPAIRS. ALL CLOSURE SCREWS AND ANY EXPOSED FIXING HARDWARE SHALL BE STAINLESS STEEL. NO EXTERNAL FIXINGS SHALL BE VISIBLE EXCEPT IN THE CASE OF SPECIFIC COMPONENTS THAT CANNOT BE FIXED INTERNALLY. ALL LINESSET COVERS SHALL BE CORRECTLY SIZED TO ACCOMMODATE THE LINESSET ITSELF AND ANY DRAIN HOSE OR ELECTRICAL WIRING WHICH MAY ALSO BE ENCLOSED. LINESSET COVERS SHALL BE APPROPRIATELY COLORED TO FIT IN WITH BUILDING ARCHITECTURE AND SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. LINESSET COVERS FABRICATED FROM FOLDED METAL OR FROM PLASTIC OR METAL DOWNSPOUTS ARE NOT ACCEPTABLE LINESSET COVERS SHALL BE SLIMDUCT SD SERIES OR EQUIVALENT WITH COMPATIBLE AND APPROPRIATE ELBOWS, COUPLERS, WALL INLETS, AND END COVERS. ALL ASSOCIATED ANCHORAGE AND CONNECTING HARDWARE SHALL BE EITHER STAINLESS STEEL OR HOT DIPPED GALVANIZED.
 - CONDENSATE DRAIN HOSE: CONDENSATE DRAIN HOSE SHALL BE ADEQUATELY SIZED AND INSTALLED WITH SUFFICIENT SLOPE TO ENSURE GRAVITY FLOW OF CONDENSATE WATER TO OUTSIDE THE BUILDING. WHERE GRAVITY FLOW IS NOT POSSIBLE, A SUITABLY SIZED PUMP SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. ALL DRAIN HOSE SHALL BE FLEXIBLE AND SHALL BE INSTALLED WITHOUT KINKS OR RESTRICTIONS, WHICH COULD INHIBIT THE FREE FLOW OF CONDENSATE WATER. INSULATED CONDENSATE DRAIN HOSE SHALL BE SLIMDUCT MODEL DSH-14 OR EQUIVALENT.
 - CONDENSER MOUNTING BRACKETS: ALL MINISPLIT CONDENSERS SHALL BE FIRMLY MOUNTED IN AN AREA, WHICH IS EASILY ACCESSIBLE FOR PERIODIC MAINTENANCE AND/OR REPAIRS. CONDENSER BRACKETS SHALL BE PRESSED STEEL, GALVANIZED AND POWDER COATED. ALL BOLTS AND FIXINGS SHALL BE RUSTPROOF AND ALL BRACKETS SHALL BE FITTED WITH RUBBER ANTI VIBRATION MOUNTINGS UNDERNEATH THE CONDENSER. BRACKETS SHALL BE CORRECTLY SIZED FOR PHYSICAL DIMENSIONS OF CONDENSER AND WEIGHT CAPABILITY AND SHALL BE INSTALLED STRICTLY IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. SUITABILITY OF BOTH MOUNTING SURFACE AND FIXING BOLTS TO HANDLE COMBINED LOAD SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO INSTALLATION.
 - WALL MOUNTED: CONDENSERS, WHICH MUST BE HUNG FROM BUILDING SURFACES, SHALL BE MOUNTED ON A PURPOSE MADE BRACKET DESIGNED SPECIFICALLY FOR THE TYPE OF MOUNT REQUIRED EQUIVALENT TO SLIMDUCT MODEL C-KU2.
 - CONDENSATE PUMP: WHERE CONDENSATE DISCHARGE TERMINATES ABOVE AC UNIT ELEVATION, A CONDENSATE DRAIN PUMP EQUIVALENT TO 115 VOLT/60 HZ, .20 WATT EZ-TRAP/ASPEN PUMPS MODEL ASP-ML-115 WITH INSTALLATION KIT PROVIDED. THE INSTALLATION KIT SHALL INCLUDE PUMP/CABLE ASSEMBLY, PVC ELBOW AND LINESSET COVER, CEILING FLASHING, INLET AND DISCHARGE HOSE, WALLPLUGS AND SCREWS.
 - THE PUMP SHALL BE SELF PRIMING AND SELF LEVELING, OPERATES AUTOMATICALLY ON WATER RISE, HAS A CAPACITY OF 0.8 GPH @ 26 FOOT HEAD, OPERATES EXTREMELY QUIETLY AT 23 DB(A) AND SHALL BE RATED FOR MINISPLITS UP TO 30,000 BTU/HR. THE PUMP SHALL BE THERMALLY PROTECTED, POTTED FOR WATER RESISTANCE, INCLUDES WATERPROOF TERMINATION OF ELECTRICAL AND ALARM WIRING AND IS UL LISTED. THE PUMP AND WATER LEVEL SENSOR SHALL BE CONSOLIDATED INTO ONE SINGLE UNIT IN WHICH THE PUMP IS MOUNTED DIRECTLY ABOVE THE SENSOR HOUSING/RESERVOIR WHICH IS TRANSPARENT TO FACILITATE INSPECTION. THE SENSOR HOUSING/RESERVOIR DISASSEMBLES EASILY FROM THE PUMP TO FACILITATE CLEANING AND MAINTENANCE AND INCLUDES A STAINLESS STEEL MESH FILTER WHICH EASILY REMOVABLE FOR CLEANING. IT ALSO INCLUDES VOLT FREE NO & NC CONTACTS RATED AT 5 AMP INDUCTIVE AND 8 AMP RESISTIVE AT LINE VOLTAGE. THESE CONTACTS WILL ENERGIZE THE PUMP ON RISE OF WATER LEVEL, HOWEVER, IF THE WATER LEVEL CONTINUES TO RISE BECAUSE WATER IS NOT BEING EVACUATED FOR ANY REASON, THEY WILL CUT POWER TO PUMP AND EVAPORATOR.
 - THE PUMP SHALL BE LOCATED AT THE FIRST LINESSET COVER ELBOW FROM THE AC UNIT. THE ELBOW AND LINESSET COVER BOTH HAVE REMOVABLE COVERS WHICH PROVIDE EASY ACCESS FOR INSTALLATION, CHECKING AND MAINTENANCE OF THE PUMP UNIT AND/OR THE DRAIN HOSES, WIRING OR LINESSETS.

VARIABLE FREQUENCY DRIVE SCHEDULE					
MARK		VFDAH11	VFDAH12	VFDAH21	VFDAH22
SERVICE	-	AH11	AH12	AH21	AH22
MOTOR	HP	8	4	4	4
OPEN PROTOCOL	-	BACNET	BACNET	BACNET	BACNET
ELECTRICAL	VOLT/Ø/60	240/3/60	240/3/60	240/3/60	240/3/60
MCA	AMPS	33	17.5	17.5	17.5
LOCATION	-	MECH 110	MECH 110	MECH 212	MECH 212
ENCLOSURE	-	NEMA4	NEMA4	NEMA4	NEMA4
DIMENSIONS	H"xW"xD"	40x31x18	40x31x18	40x31x18	40x31x18
MANUFACTURER	-	ALLEN BRADLEY	ALLEN BRADLEY	ALLEN BRADLEY	ALLEN BRADLEY
MODEL	-	23C-X033E10BNNNANN-LR-10HP	23C-X017E10BNNNANN-LR-5HP	23C-X017E10BNNNANN-LR-5HP	23C-X017E10BNNNANN-LR-5HP
NOTES	-	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7	1,2,3,4,5,6,7

NOTES:

- PROVIDE FULL SPEED MANUAL BYPASS WITH BOTH AN INTERLOCKING MAIN DISCONNECT SWITCH AND A DRIVE DISCONNECT SWITCH.
- PROVIDE INTEGRAL FACTORY WIRED DC LINK REACTORS.
- PROVIDE INTEGRAL FACTORY WIRED EMI FILTERS.
- PROVIDE REMOTE START/STOP CAPABILITY IN BOTH DRIVE AND BYPASS MODE.
- DRIVE AND BYPASS SHALL BE RATED AT 100,000 AMP MAXIMUM INPUT INTERRUPTING CAPABILITY, NO EXCEPTIONS.
- DIVISION 23 SHALL FURNISH THE DRIVE. DRIVE INSTALLED BY DIVISION 26. SEE DIVISION 26 SPECIFICATIONS.
- COORDINATE DDC SYSTEM PROTOCOL AND INTERFACE WITH THE CONTROLS CONTRACTOR.

AIR COOLED CHILLER SCHEDULE					
MARK		CH1	CH1(FUTURE)	CH2	CH2(FUTURE)
REFRIGERANT TYPE	-	R-410A	R-410A	R-410A	R-410A
NOMINAL CAPACITY (ARI)	TONS	30	150	30	150
OPERATING CAPACITY	TONS	27.9	133	27.9	133
AMBIENT TEMP	*F	95	95	95	95
EVAPORATOR WATER FLOW	GPM	65.0	266	65.0	266
PRESSURE DROP	FT. HEAD	6.6	6.6	6.6	6.6
ENTERING / LEAVING WATER TEMP.	*F/*F	54/42	54/42	54/42	54/42
# FANS/HP EACH	-	3/1.5	15/1.5	3/1.5	15/1.5
UNIT TOTAL EER @ DESIGN	-	10.1	10.1	10.1	10.1
NO. OF COMPRESSORS	#	2	10	2	10
INDEPENDENT REFRIG. CIRCUITS (MIN.)	#	2	10	2	10
COMPRESSOR POWER INPUT	KW/TON	1.191	1.191	1.191	1.191
ELECTRICAL	VOLT/Ø/60	240/60/3	240/60/3	240/60/3	240/60/3
MCA / MOC PD	AMPS	190/200	700/800	190/200	700/800
PERFORMANCE PER ARI STANDARD 550					
IPLV	EER	13.702	13.702	13.702	13.702
100%	EER	10.304	10.304	10.304	10.304
75%	EER	13.061	13.061	13.061	13.061
50%	EER	14.386	14.386	14.386	14.386
25%	EER	13.664	13.664	13.664	13.664
SOUND PRESSURE LEVELS (OCTAVES)	dB (63 THRU 8000)	78.8/78/73/74/71/69.5/65/59.5	78.8/78/73/74/71/69.5/65/59.5	78.8/78/73/74/71/69.5/65/59.5	78.8/78/73/74/71/69.5/65/59.5
OPERATING WEIGHT	LBS	2,500	12,500	2,500	12,500
MAXIMUM DIMENSIONS	L"xW"xH"	96"x38"x89"	96"x190"x89"	96"x38"x89"	96"x190"x89"
MANUFACTURER	-	ARCTI CHILL	ARCTI CHILL	ARCTI CHILL	ARCTI CHILL
MODEL	-	PACVMV0300D3	PACVMV0300D3	PACVMV0300D3	PACVMV0300D3
NOTES	-	1-19	1-19	1-19	1-19

NOTES:

- UNITS SHALL BE MADE IN THE USA.
- CHILLER PERFORMANCE SHALL BE RATED IN ACCORDANCE WITH AHRI.
- PROVIDE WITH FACTORY INSTALLED IFM EFECTOR THERMAL DISPERSION TYPE FLOW SWITCHES, SERVICE ISOLATION VALVE AND STRAINER FOR EACH EVAPORATOR. PADDLE TYPE FLOW SWITCHES ARE NOT ACCEPTABLE.
- SERVICE TO EACH MODULE SHALL BE ABLE TO BE PERFORMED WHILE OTHER MODULES REMAIN IN OPERATION.
- EACH MODULE SHALL CONSIST OF TWO SCROLL COMPRESSORS ON INDIVIDUAL CIRCUITS WITH COMPRESSOR WRAPS. THE LEAD COMPRESSOR SHALL BE A DIGITAL SCROLL.
- PROVIDE WITH A FACTORY MOUNTED DISCONNECT. POWER DISTRIBUTION PANEL FOR SINGLE POINT POWER FOR 5 TOTAL MODULES AND CONTAINING A CIRCUIT BREAKER FOR EACH MODULE FOR BRANCH CIRCUIT PROTECTION.
- CHILLER MUST BE CAPABLE OF VARIABLE PRIMARY FLOW THROUGH THE EVAPORATOR.
- PROVIDE FACTORY MOUNTED "ARCHITECTURALLY PLEASING" GUARD PANELS. PANEL LOUVER SHALL COVER CONDENSER, EVAPORATOR AND COMPRESSOR SECTIONS SO ALL ARE HIDDEN FROM SIGHT. WIRE SCREENS OR WIRE MESH WILL NOT BE ALLOWED.
- PROVIDE VARIABLE SPEED ECM LOW NOISE CONDENSER FANS.
- A CONTROL POWER TRANSFORMER SHALL BE FACTORY INSTALLED AND FACTORY WIRED TO PROVIDE UNIT CONTROL POWER. BACNET CONTROLS INTERFACE AND MICROPROCESSOR CONTROLS UNIT TO BE CONTROLLED TO DISCHARGE WATER TEMPERATURE. CONTROLLING THE CHILLER BASED ON RETURN WATER TEMPERATURE IS NOT ACCEPTABLE.
- PROVIDE DUAL LEADLAG PUMPS (ONE REDUNDANT) SIZED FOR BOTH CURRENT AND FUTURE DUTY AND 150 GALLON BUFFER TANK IN PUMPING MODULE.
- PROVIDE A CONDENSER COIL AND INTERNAL COMPONENT COATING WITH A MINIMUM OF 5,000 HOURS IN THE ASTM B-117 SALT SPRAY TEST. COATING MAY NOT DECREASE HEAT TRANSFER BY MORE THAN 1%. ADSIL, LUVATA AND FACTORY APPLIED COMPLETECOAT ARE APPROVED. BAKE PHENOLIC COATINGS ARE NOT ACCEPTABLE.
- PROVIDE STAINLESS STEEL UNIT CASING AND FRAME SUPPORTS.
- PROVIDE OWNER TRAINING FOR TWO MEMBERS OF THE OWNERS STAFF TO ATTEND A TRAINING SESSION AT THE FACTORY. PRICE TO INCLUDE ALL TRAVEL, LODGING AND MEALS.
- PROVIDE START UP ASSISTANCE PERFORMED BY A FACTORY AUTHORIZED TECHNICIAN.
- PROVIDE ONE YEAR LABOR AND 5 YEAR UNIT PARTS WARRANTY ON THE ENTIRE CHILLER.
- PROVIDE FACTORY WITNESS TESTING FOR THREE OWNER REPRESENTATIVES. PRICE TO INCLUDE ALL TRAVEL, LODGING AND MEALS.
- CONTRACTOR MAY PROVIDE AN ALTERNATE MANUFACTURER AS A SEPARATE LINE ITEM ON THE BID GRANTED THAT THE ALTERNATE MANUFACTURER MEETS THE ENTIRETY OF THE SPECIFICATION. BASE BID SHALL BE BASIS OF DESIGN.
- VFD'S SHALL BE MANUFACTURED BY ALLEN BRADLEY.

VARIABLE AIR VOLUME BOX SCHEDULE WITH ELECTRIC HEAT																
MARK	MAX. COOLING CFM	MIN. COOLING CFM	MIN. HEATING CFM	TERMINAL SIZE	SOUND (NC)			HEAT			ELECTRICAL			MANUFACTURER	MODEL	NOTES
					DISCH	RAD	BTUH	KW	STEPS	VOLTAGE	PHASE	HZ				
VV111	985 CFM	330	330	10	73/69/62/53/45/46	64/58/51/45/39/39	14,300	4.0	SCR	240 V	1	60 Hz	TRANE	VCFE10	1-6	
VV112	180 CFM	75	75	04	65/55/48/42/30/30	56/51/38/33/26/24	3,200	1.0	SCR	120 V	1	60 Hz	TRANE	VCFE04	1-6	
VV113	185 CFM	80	80	04	65/55/48/42/30/30	56/51/38/33/26/24	3,400	1.0	SCR	120 V	1	60 Hz	TRANE	VCFE04	1-6	
VV114	325 CFM	155	155	06	67/61/54/48/36/36	60/56/45/39/32/28	6,700	2.0	SCR	120 V	1	60 Hz	TRANE	VCFE06	1-6	
VV115	930 CFM	460	460	10	72/68/61/52/44/46	63/58/51/44/39/39	19,900	6.0	SCR	240 V	1	60 Hz	TRANE	VCFE10	1-6	
VV116	280 CFM	85	85	05	66/61/53/48/36/36	59/55/45/39/32/28	3,600	1.0	SCR	120 V	1	60 Hz	TRANE	VCFE05	1-6	
VV117	345 CFM	115	115	06	67/61/54/48/36/36	60/56/46/40/32/28	5,000	1.5	SCR	120 V	1	60 Hz	TRANE	VCFE06	1-6	
VV118	880 CFM	235	235	10	71/68/61/52/44/46	62/57/51/44/39/38	10,100	3.0	SCR	120 V	1	60 Hz	TRANE	VCFE10	1-6	
VV121	1355 CFM	650	650	12	73/65/61/56/48/47	64/57/49/44/39/37	23,800	7.0	SCR	240 V	1	60 Hz	TRANE	VCFE12	1-6	
VV122	80 CFM	75	75	04	59/49/41/34/21/25	51/45/34/27/22/18	3,200	1.0	SCR	120 V	1	60 Hz	TRANE	VCFE04	1-6	
VV123	205 CFM	115	115	05	66/56/49/43/31/31	57/51/39/34/26/24	5,100	1.5	SCR	120 V	1	60 Hz	TRANE	VCFE05	1-6	
VV124	630 CFM	340	340	08	73/65/60/53/42/39	62/56/48/45/38/35	14,700	4.5	SCR	240 V	1	60 Hz	TRANE	VCFE08	1-6	
VV125	780 CFM	295	295	08	70/67/60/51/43/45	61/56/50/43/38/38	12,600	3.5	SCR	120 V	1	60 Hz	TRANE	VCFE08	1-6	
VV212	480 CFM	210	210	08	71/64/57/51/40/37	59/54/45/42/36/32	8,100	2.5	SCR	120 V	1	60 Hz	TRANE	VCFE08	1-6	
VV213	480 CFM	200	200	08	71/64/57/51/40/37	59/54/45/42/36/32	8,500	2.5	SCR	120 V	1	60 Hz	TRANE	VCFE08	1-6	
VV214	995 CFM	420	420	10	73/69/62/53/45/47	64/58/52/45/40/39	18,100	5.5	SCR	240 V	1	60 Hz	TRANE	VCFE10	1-6	
VV221	470 CFM	190	190	08	70/63/57/51/40/37	59/54/45/42/36/32	8,200	2.5	SCR	120 V	1	60 Hz	TRANE	VCFE08	1-6	
VV222	640 CFM	305	305	08	73/65/60/53/42/39	62/57/48/45/38/35	13,200	4.0	SCR	240 V	1	60 Hz	TRANE	VCFE08	1-6	
VV223	910 CFM	305	305	10	72/68/61/52/44/46	63/57/51/44/39/39	13,200	4.0	SCR	240 V	1	60 Hz	TRANE	VCFE10	1-6	
VV224	355 CFM	90	90	06	67/62/54/48/36/36	60/56/46/40/33/28	3,900	1.0	SCR	120 V	1	60 Hz	TRANE	VCFE06	1-6	

NOTES:

- DDC CONTROLS BY CONTROLS CONTRACTOR.
- PROVIDE REINFORCED NON-POROUS FOIL LAMINATE FOR MICROBIAL PROTECTION. LINER SHALL BE SECURED BY STEEL Z CLIPS OR OVERLAPPING PANEL CONSTRUCTION TO SEAL ALL EDGES. THE INSULATION SHALL BE RIGID COMPRESSED GLASS FIBERS, FOUR POUND DENSITY, WITH R3.5 R-VALUE, AND SHALL COMPLY WITH ASTM C665, UL 181, AND NFPA90A.
- CONTRACTOR SHALL VERIFY PROPER CLEARANCES IN FRONT OF CONTROL HEATER PANELS. PROVIDE WITH INTEGRAL FACTORY MOUNTED SAFETY DISCONNECT, PRIMARY FUSING AND ALL REQUIRED CONTACTS AND RELAYS. COORDINATE WITH ELECTRICAL. PROVIDE FACTORY WIRED CONTROL TRANSFORMER. VAV TERMINAL SHALL HAVE SINGLE POINT POWER CONNECTION.
- PROVIDE APPROPRIATE DIFFERENTIAL PRESSURE SWITCH TO PROPERLY CONTROL THE HEATER. THE EQUIPMENT SUPPLIER SHALL REVIEW THE DRAWINGS PRIOR TO ORDERING TO ASCERTAIN DUCT PRESSURES.
- ALL PERFORMANCE DATA SHALL BE BASED ON TESTS CONDUCTED IN ACCORDANCE WITH ASHRAE 130-2008 AND AHRI 880-2008. ALL NC LEVELS DETERMINED USING AHRI 8855-2008, APPENDIX E RATED WITH 1" WG PRESSURE AT THE TERMINAL INLET.
- PROVIDE MAGNETIC HEATER CONTACTORS.

AIR DISTRIBUTION DEVICE SCHEDULE									
MARK		CD1	RR1	EG1	SS1	SR1	XG1	LD1	LV1
NECK SIZE	INCH	-	22x22	-	-	-	-	THREE 1/2" SLOTS	ANSI/AMCA 540 & 550 LISTED AND FL PRODUCT APPROVAL
MODULE/FACE SIZE	INCH	24x24/24x24	24x24/23x23	-	-	-	-	4x48	-
MANUFACTURER	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	PRICE	TITUS	RUSKIN
MODEL NUMBER	-	AMCD	APDDR	80	620	530	80	ML-37-NT	EME6625D
MANUFACTURER	-	J&J	TITUS	TITUS	TITUS	TITUS	TITUS	-	-
MODEL NUMBER	-	AL1444-33-TR	PAR-AA	50F	300FS	350RL	50F	-	-
CONSTRUCTION	-	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	STEEL	ALUMINUM	ALUMINUM	ALUMINUM
NOTES	-	1, 2, 4	1, 4, 6	1, 4, 6, 7	4	1, 4, 5	4, 6, 7	3, 9	3, 4, 8

NOTES:

- NECK SIZE OF DEVICE IS EQUAL TO THE DUCT SIZE INDICATED ON THE DRAWING.
- PROVIDE WITH SQUARE TO ROUND ADAPTER. REFER TO PLANS FOR SIZE.
- COORDINATE COLOR AND FINISH TEXTURE BY SAMPLE SUBMITTAL TO ARCHITECT.
- SEE PLANS FOR SIZE.
- WHERE FIRE DAMPER IS INDICATED TO BE ADJACENT TO THE GRILLE, THE GRILLE SHALL BE SECURED TO THE FIRE DAMPER IN ACCORDANCE WITH THE FIRE DAMPER MANUFACTURER'S WRITTEN INSTRUCTION. THE FIRE DAMPER FOR THIS APPLICATION SHALL BE EQUIVALENT TO RUSKIN IBD20G UL 555 CLASSIFIED DAMPER.
- WHERE GRILLE IS INDICATED TO BE LOCATED IN LAY-IN CEILINGS, PROVIDE 24X24 LAY-IN PANEL BORDER, WHITE IN COLOR.
- PAINT INSIDE OF DUCT & GRILLE FLAT BLACK WHEN CAN BE SEEN THROUGH FACE OF GRILLE.
- LOUVER WIND-DRIVEN RAIN PERFORMANCE SHALL BE WITHOUT A DAMPER : 99.9% EFFECTIVE AT PREVENTING WATER PENETRATION THROUGH LOUVER WHEN AMCA-500L TESTED AT 50 MILES PER HOUR WIND WITH 8 INCHES PER HOUR RAINFALL AND 2.155 FEET PER MINUTE AIRFLOW THROUGH THE FREE AREA. PENETRATION CLASS 'A' WITH DISCHARGE CLASS (INTAKE) '3' IN ACCORDANCE WITH AMCA 500-L WIND DRIVEN RAIN TEST. THE LOUVER SHALL BE ANSI/AMCA 540 AND ANSI/AMCA 550 LISTED AND SHALL HAVE A FLORIDA PRODUCT APPROVAL.
- LINEAR DIFFUSER WITH ADJUSTABLE PATTERN CONTROLLER. PROVIDE WITH INSULATED SUPPLY PLENUM WITH BOOT & END CAPS. REFER TO ARCHITECTURAL FOR ADDITIONAL DETAILS.

REMARKS:

- REFER TO PLANS FOR EXACT LOCATIONS OF ALL DIFFUSERS, GRILLES AND REGISTERS.
- COORDINATE FRAME STYLES WITH CEILING SYSTEM ACTUALLY FURNISHED.
- NC VALUES FOR DIFFUSERS, GRILLES AND REGISTERS SHALL NOT EXCEED 35 WITH A ROOM ABSORPTION RATE OF 10DB IE. 10-12 WATTS.
- REFER TO THE MECHANICAL LEGEND FOR A DESCRIPTION OF THE AIR DEVICE MARK.
- WHERE THE CONNECTING DUCT OR PLENUM CAN BE OBSERVED THROUGH THE FACE OF THE GRILLE, THE VISIBLE DUCTWORK SHALL BE PAINTED FLAT BLACK.
- LOUVERS ARE PROVIDED UNDER A DIFFERENT DIVISION. REFER TO ARCHITECTURAL DRAWINGS.

SHOT FEEDER SCHEDULE		
MARK		CF1
CAPACITY	GALLONS	5
SERVICE	-	CHILLED WATER
WEIGHT	LBS.	-
MANUFACTURER	-	GRISWOLD SEPARATORS
MODEL NUMBER	-	FB-5
NOTES	-	1

NOTE:

- PROVIDE WITH REMOVABLE SOCK.

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Harry W. Portellos
P.E. 61597

TO THE BEST OF MY KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE 2017 FLORIDA BUILDING CODE

Project Information
City of Tampa

David L. Tippin Water Treatment Facility
Phase I - Building & Site Improvements

7125 North 30th Street
Tampa, Florida

Project Number 1706.00

No.	Description	Date
1	DD	07.20.18
2	50% CDs	09.24.18
3	90% CDs	12.07.18
4	Permit CDs	02.26.19

Revisions

No.	Description	Date
3	REV 3	12.16.19
5	Addendum 1	07.17.20

Sheet Information
HVAC SCHEDULES

M202

WATERSIDE TEMPERATURE CONTROL SEQUENCES

CHILLER AND PUMPS:

SYSTEM 1 U0600-1

SEQUENCE OF OPERATIONS

SYSTEM 1 FLOW

SYSTEM GENERAL DESCRIPTION:

THE CHILLED WATER SYSTEM CONSISTS OF THE FOLLOWING:

TWO (2) CHILLERS, CONFIGURED AS: ONE (1) LEAD AND ONE (1) LAG

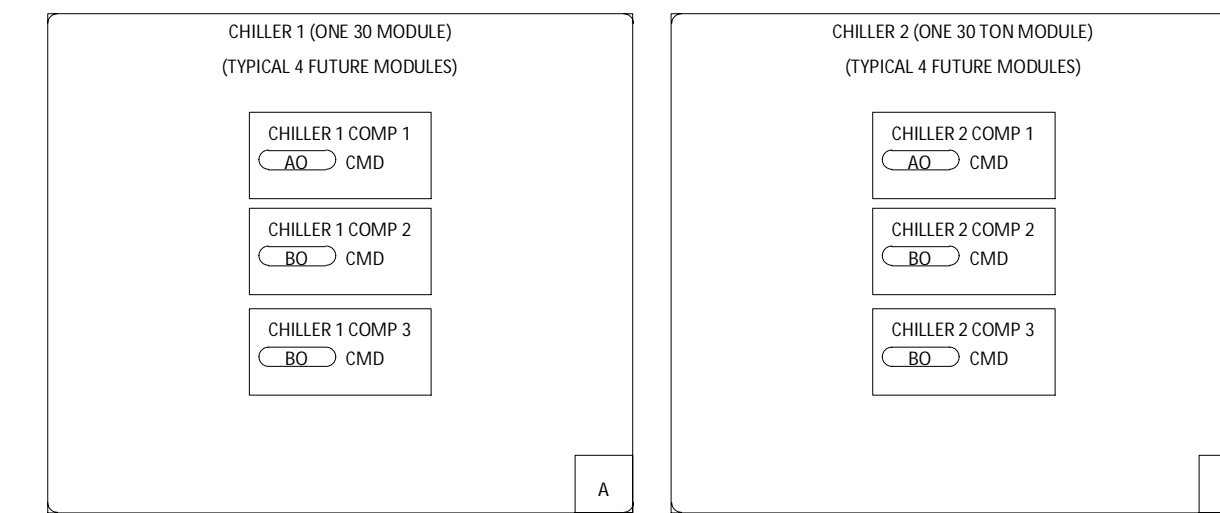
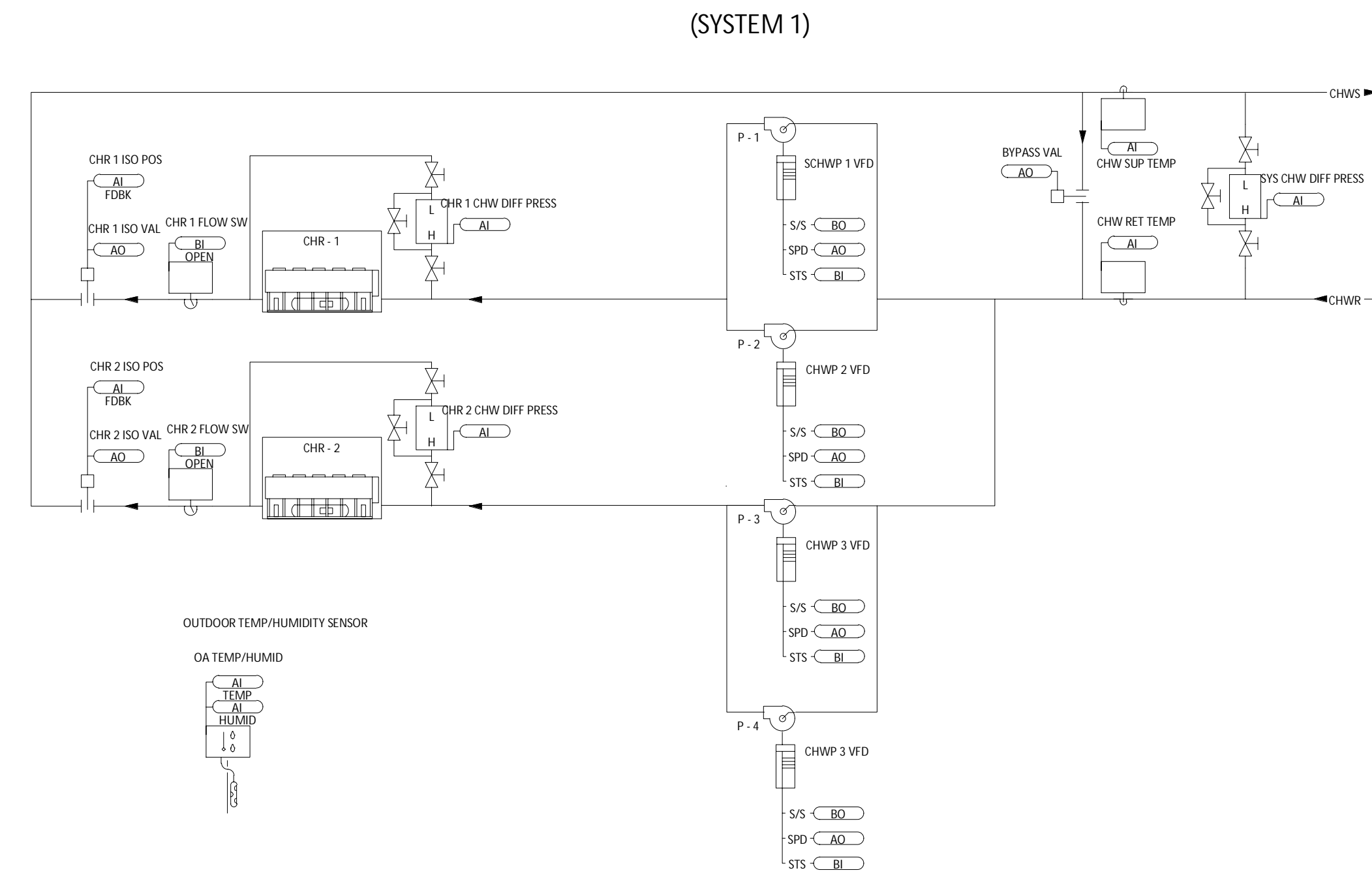
FOUR (4) CHILLED WATER PUMPS: ONE (1) LEAD, ONE (1) LAG AND TWO (2) STANDBY

ONE (1) CHILLED WATER ISOLATION VALVE PER CHILLER

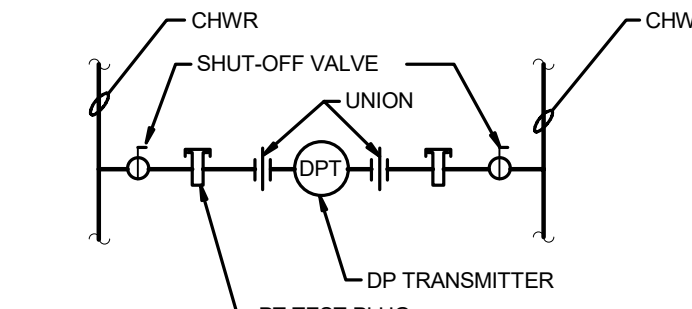
CHILLED WATER BYPASS VALVE

THE BUILDING AUTOMATION SYSTEM (BAS) CONTROLLER PROVIDES STAND-ALONE CONTROL OR CONTROL FROM A HIGHER LEVEL BAS AND PROVIDES LEAD/LAG/STANDBY CONTROL FOR THE CHILLED WATER PUMPS AND CONTROLS THE CHILLED WATER BYPASS VALVE TO MAINTAIN MINIMUM FLOW THROUGH OPERATING CHILLERS.

- THE CHILLER IS DESIGNED TO OPERATE WITH HIGH VOLTAGE POWER SUPPLIED TO THE UNIT AT ALL TIMES.
- AS LONG AS THERE IS POWER ON THE SYSTEM, THE MASTER MICROPROCESSOR SELECTS THE LEAD CHILLER MODULE AND ROTATES THIS LEAD ONCE EVERY 168 HOURS (WEEK). THE LEAD MODULE'S ELECTRONIC ISOLATION VALVE WILL INITIALLY BE PROVIDED WITH FULL POWER INPUT DURING THE VALVE FULLY OPEN.
- THE CHILLER SYSTEM IS ENABLED WHEN THE SYSTEM ON/OFF SWITCH ON THE REMOTE INTERFACE PANEL IS ENERGIZED, AND THE REMOTE START/STOP RELAY IS ENABLED (EITHER THROUGH A CONTACT CLOSURE OR THROUGH THE BUILDING BMS).
- THE VARIABLE FREQUENCY DRIVES FOR THE CHILLER PUMPS SHALL MONITOR THE OPENING AND CLOSING OF THE ELECTRONIC VALVES ON THE EVAPORATORS WHICH ARE CONTROLLED BASED ON CHILLER SYSTEM LEAVING FLUID TEMPERATURE (THE VFD CAN ALSO BE CONTROLLED BASED ON THE SYSTEM DIFFERENTIAL PRESSURE IF REQUIRED PROVIDED, AS A MINIMUM, THE VFD'S MUST PROVIDE THE MINIMUM FLOW AS REQUIRED BY THE CHILLERS. PRESSURE DIFFERENTIAL ACROSS THE CHILLERS CANNOT BE USED AS A MEANS OF CONTROL FOR THE VARIABLE PRIMARY PUMPS). THE VFD'S SHALL ALLOW THE PUMPS TO DELIVER THE REQUIRED FLOW THROUGH EACH OPERATING EVAPORATOR. THE PUMP SPEED VARIES PROPORTIONALLY TO THE NUMBER OF MODULES THAT ARE OPERATING (ELECTRONIC VALVES OPEN) IN THE CHILLER SYSTEM.
- THE ELECTRONIC ISOLATION VALVE OF THE LEAD CHILLER IDENTIFIED IN STEP 2 IS ALREADY ENERGIZED THEREFORE, THE SYSTEM PUMP MUST PRODUCE THE MINIMUM FLOW REQUIRED BY THE LEAD CHILLER. A SYSTEM BYPASS WITH VALVE SHALL BE PROVIDED BY THE CUSTOMER AND INSTALLED EXTERNAL OF THE CHILLER AT THE MOST REMOTE AIR HANDLER OR OTHER SUITABLE REMOTE LOCATION FROM THE CHILLERS.
- ONCE THIS MINIMUM FLOW IS ESTABLISHED AND THE SYSTEM DEMAND (BASED ON LEAVING FLUID TEMPERATURE. CONTROLLING TO RETURN TEMP IS NOT ACCEPTABLE) INDICATES THAT THERE IS A REQUIREMENT FOR COOLING, THE LEAD COMPRESSOR (DIGITAL OR VARIABLE SPEED) OF THE LEAD MODULE WILL ENERGIZE PROVIDED ALL SAFETIES OF THAT REFRIGERATION CIRCUIT ARE SATISFIED.
- ONCE THERE IS A SYSTEM LOAD, THE BMS WILL MODULATE THE SYSTEM BYPASS DECREASING THE BYPASS FLOW, AS THE FLOW RATE THROUGH THE FAN COILS INCREASE. THIS CONTROL IS PROVIDED BY THE CUSTOMER EXTERNAL OF THE CHILLER, AND IS PRESUMED TO BE BASED ON THE PRESSURE DIFFERENTIAL ACROSS THE MOST REMOTE FAN COIL OR USER.
- AS THE SYSTEM DEMAND CONTINUES TO INCREASE, THE SECOND COMPRESSOR WITHIN THAT MODULE WILL ENERGIZE PROVIDED ALL SAFETIES ON THAT CIRCUIT ARE SATISFIED.
- AS THE SYSTEM DEMAND CONTINUES TO INCREASE, THE LEAVING FLUID TEMPERATURE FROM THE CHILLER SYSTEM WILL SLOWLY INCREASE UNTIL THE DIFFERENTIAL SET POINT IS REACHED. WHEN THE DIFFERENTIAL IS REACHED, A SECOND MODULE WILL BE BROUGHT ON-LINE (FUTURE OPERATION). INSTEAD OF OPENING THE VALVE FULLY IN THIS CHILLER MODULE, WHICH WILL CAUSE A SUBSTANTIAL DROP IN FLOW IN THE PREVIOUSLY OPERATING MODULE AND A LOW LEAVING FLUID TEMPERATURE CONDITION, BOTH VALVES WILL MODULATE SLOWLY IN BOTH CHILLER MODULES TO MAINTAIN A CONSTANT LEAVING FLUID TEMPERATURE UNTIL THEY BOTH ARE FULLY OPENED.
- AS THE FLOW AND DEMAND CONTINUE TO INCREASE, AND THE TEMPERATURE ONCE AGAIN REACHES THE SET POINT PLUS DIFFERENTIAL SETTING, THE SECOND COMPRESSOR ON THE SECOND MODULE WILL ENERGIZE.
- ON A DECREASE IN SYSTEM DEMAND (AND FLOW) SUCH THAT THE LEAVING FLUID TEMPERATURE REACHES THE SET POINT MINUS THE DIFFERENTIAL, A COMPRESSOR WILL DE-ENERGIZE, AND THE MODULATING VALVES WILL ONCE AGAIN BALANCE THE FLOW BETWEEN THE OPERATING MODULES.
- THIS PROCESS OCCURS THROUGHOUT THE OPERATING RANGE OF THE CHILLER SYSTEM. AT ALL "IN-BETWEEN" STAGES OF SYSTEM CAPACITY AND DEMAND BALANCING, THE MODULATING VALVES SHALL MAINTAIN A CONSTANT LEAVING FLUID TEMPERATURE ACROSS ALL OPERATING CHILLER MODULES.
- FUTURE OPERATION - THE MICROPROCESSOR WILL PROVIDE A NEW LEAD CHILLER MODULE ONCE A WEEK TO EVEN THE RUN TIME BETWEEN MODULES.



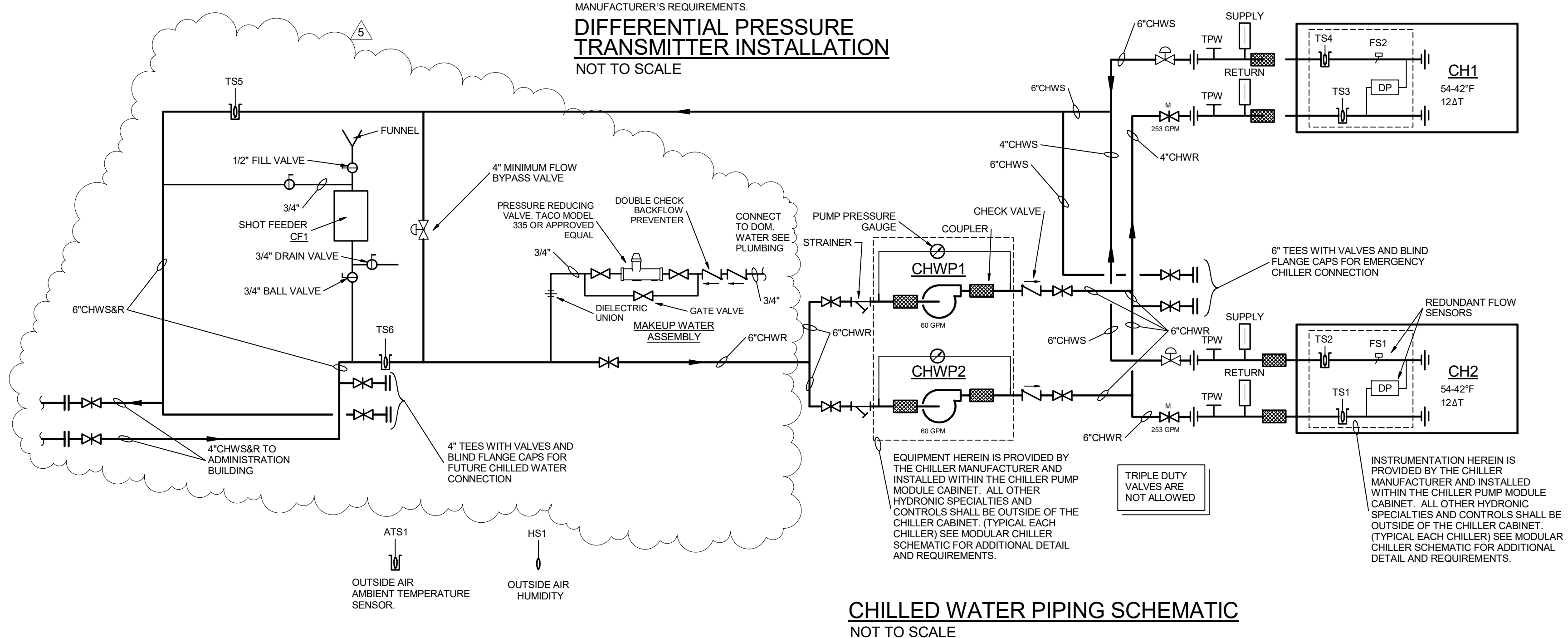
MODULAR CHILLER SCHEMATIC
NOT TO SCALE



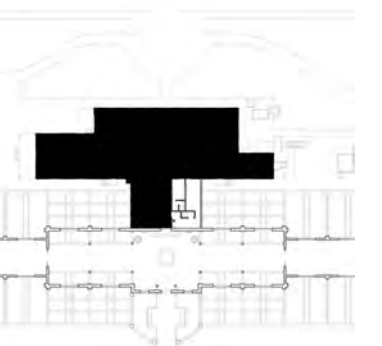
DIFFERENTIAL PRESSURE TRANSMITTER INSTALLATION
NOT TO SCALE

HYDRONIC PIPING LEGEND

GENERAL	VALVES
DIRECTION OF FLOW	GATE VALVE
STRAINER	GLOBE VALVE
THERMOMETER	CHECK VALVE
PRESSURE GAGE	BUTTERFLY VALVE (MANUAL)
FLOWMETER (PADDLE TYPE)	TWO POSITION CONTROL VALVE (BUTTERFLY)
FLOW SWITCH	STRAIGHT-THRU MODULATING CONTROL VALVE
FLEXIBLE PIPING CONNECTION	FLOW VENTURI/CIRCUIT BALANCING VALVE
PUMP	BALL VALVE
PRESSURE SENSOR	BUTTERFLY VALVE WITH MEMORY STOP (MANUAL)
DIFFERENTIAL PRESSURE SENSOR	THREE-WAY MODULATING CONTROL VALVE
TEMPERATURE SENSOR	THREE-WAY TWO POSITION SOLENOID VALVE
TEMPERATURE & PRESSURE TEST WELL	



CHILLED WATER PIPING SCHEMATIC
NOT TO SCALE

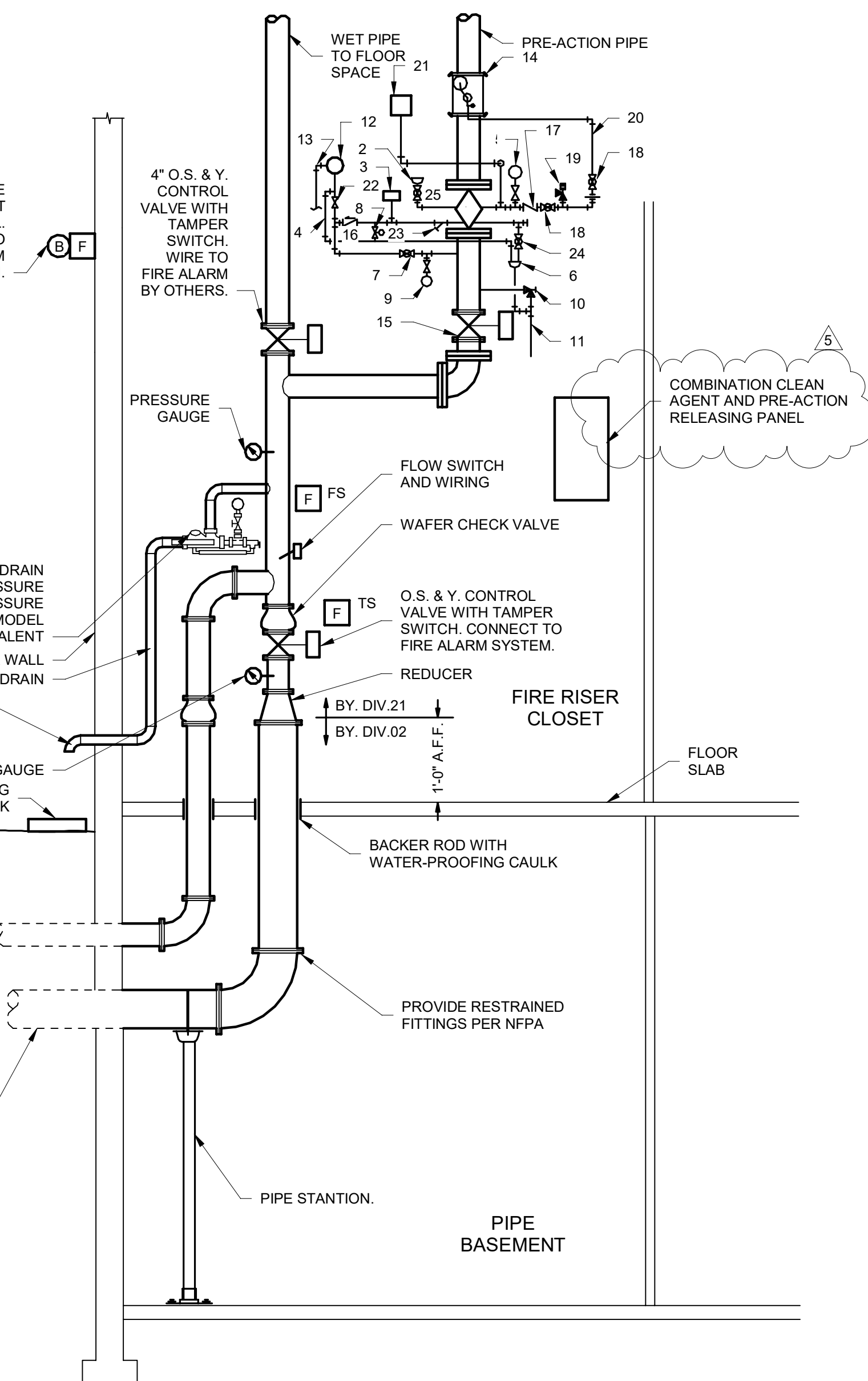


No.	Description	Date
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4	Permit CDs	02.26.19

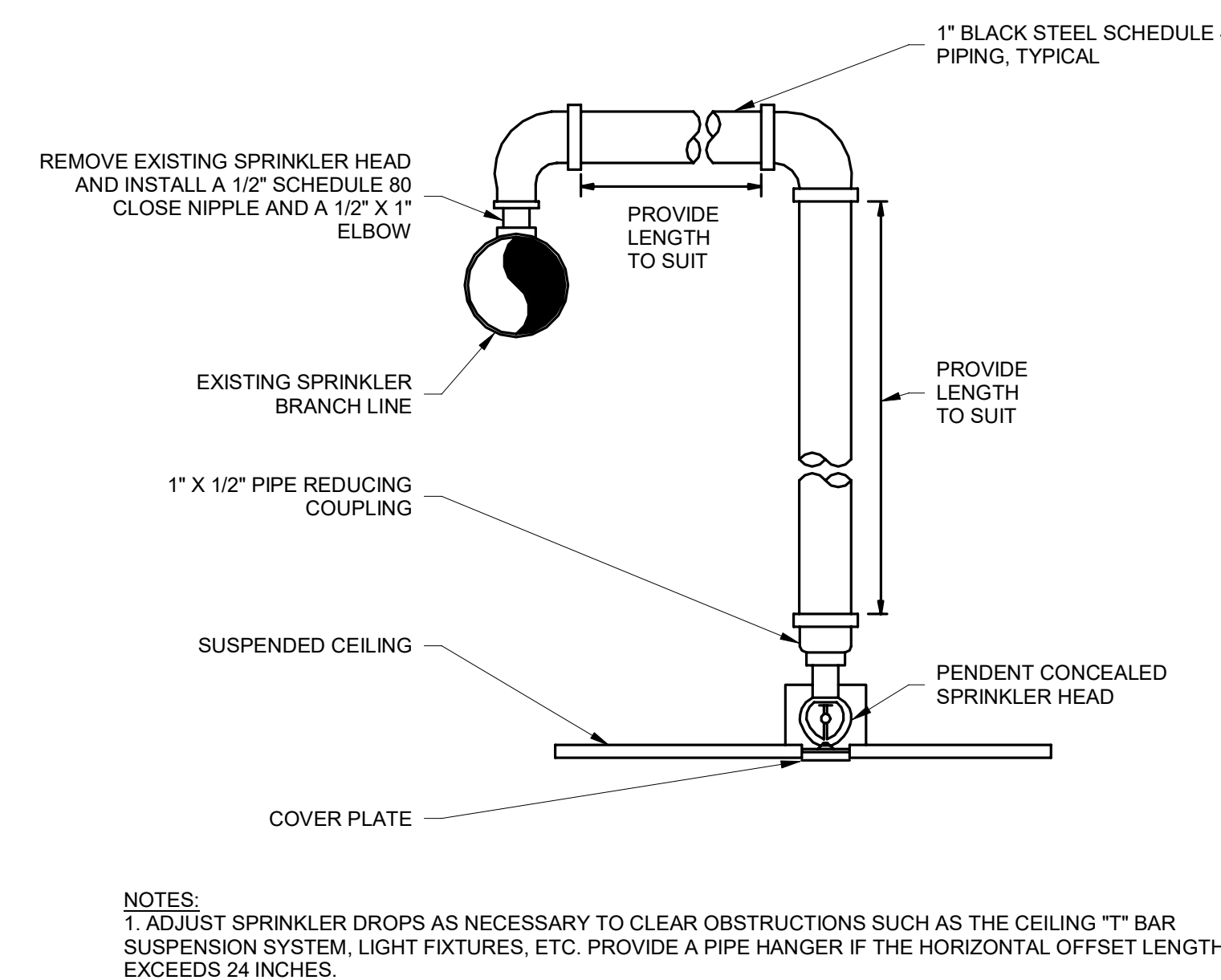
No.	Description	Date
5	Addendum 1	07.17.20

PRE-ACTION PIPE RISER NOTES

- PRE-ACTION VALVE: PRE-ACTION PIPE VALVE WITH RETARD CHAMBER, PRESSURE SWITCH, LOW AIR ALARM, MAIN DRAINS, WATER MOTOR GONG, AIR MAINTENANCE DEVICE AND QUICK OPENING DEVICE. TYCO MODEL DPV-1 OR EQUIVALENT.
- PRIMING CUP
- LOCAL ALARM SWITCH OR ALARM TRANSMITTER
- RESTRICTED ALARM VENT
- AIR PRESSURE GAGE
- DRAIN CUP
- ALARM TEST VALVE (NORMALLY CLOSED)
- AUTOMATIC DRAIN VALVE
- WATER PRESSURE GAGE
- MAIN DRAIN ANGLE VALVE
- DRAIN CUP AND MAIN DRAIN DISCHARGE TO OUTSIDE OF BLDG. (4'-0" PIPE LENGTH INSIDE OF BLDG.)
- WATER MOTOR GONG
- DRAIN RUN THROUGH WALL TO OUTSIDE OF BLDG.
- AIR COMPRESSOR: PROVIDE A 120V AIR COMPRESSOR WITH ADEQUATE CAPACITY TO RESTORE NORMAL AIR PRESSURE IN THE DRY PIPE SYSTEM WITHIN 30 MINUTES. PROVIDE FLANGED INCREASERS / REDUCERS TO ADAPT PIPE SIZE TO VALVE SIZE.
- OS & Y VALVE WITH TAMPER SWITCH. WIRE TO FIRE ALARM BY OTHERS.
- CHECK VALVE TO PREVENT TRIPPING VALVE WHEN TESTING ALARM
- AIR LINE CHECK VALVE
- AIR SUPPLY GLOBE VALVE (RENEWABLE DISC TYPE)
- PRESSURE RELIEF VALVE 20.
- AIR SUPPLY LINE
- ELECTRIC LOW AIR PRESSURE ALARM TRANSMITTER
- ALARM CONTROL VALVE (NORMALLY OPEN)
- STRAINER
- DRAIN GLOBE VALVE
- PRIMING VALVE (NORMALLY CLOSED).

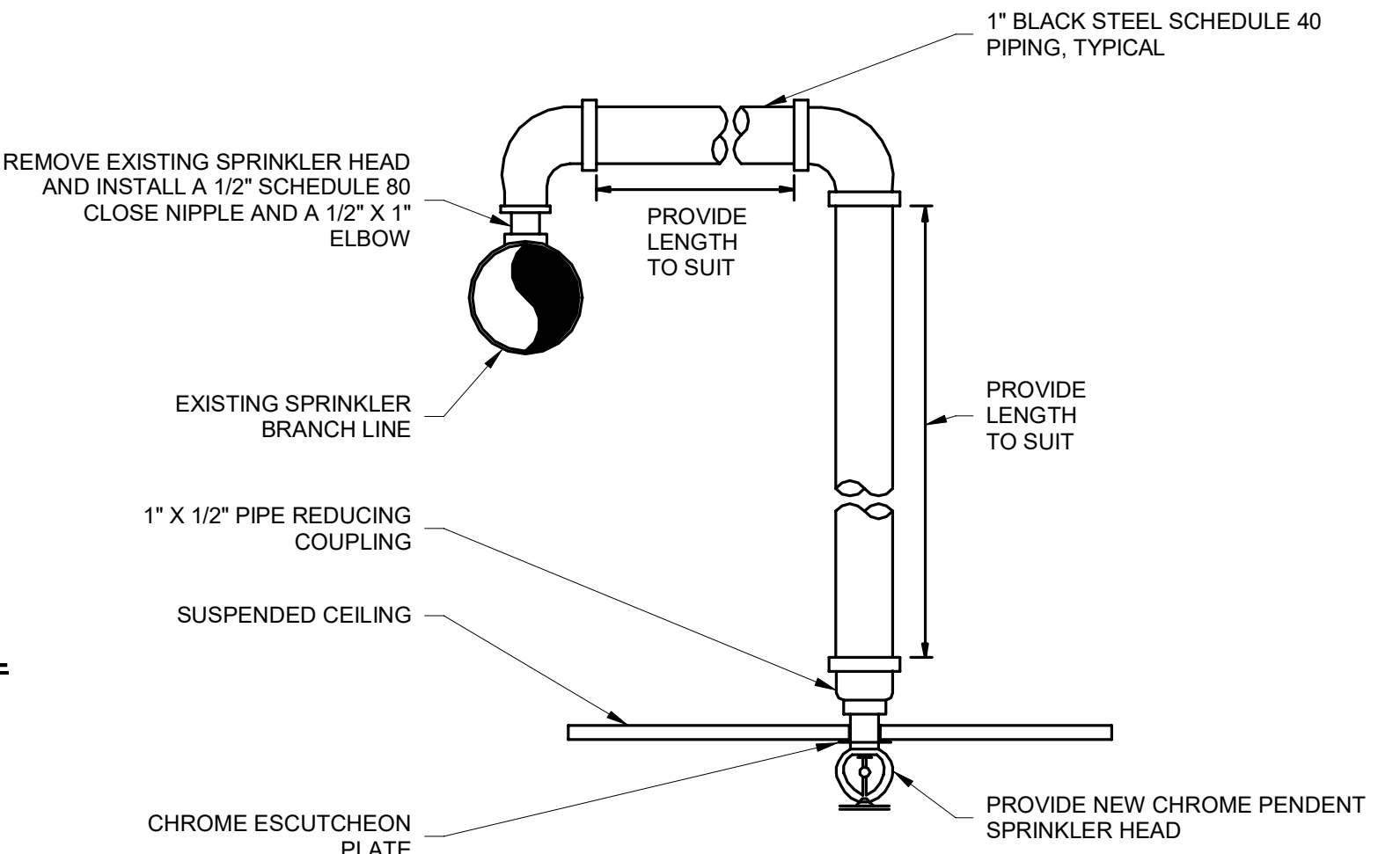


FIRE PROTECTION RISER AND FIRE DEPARTMENT CONNECTION DETAIL
NOT TO SCALE



- NOTES:**
1. ADJUST SPRINKLER DROPS AS NECESSARY TO CLEAR OBSTRUCTIONS SUCH AS THE CEILING "T" BAR SUSPENSION SYSTEM, LIGHT FIXTURES, ETC. PROVIDE A PIPE HANGER IF THE HORIZONTAL OFFSET LENGTH EXCEEDS 24 INCHES.

TYPICAL NEW CONCEALED SPRINKLER HEAD DROP
NOT TO SCALE



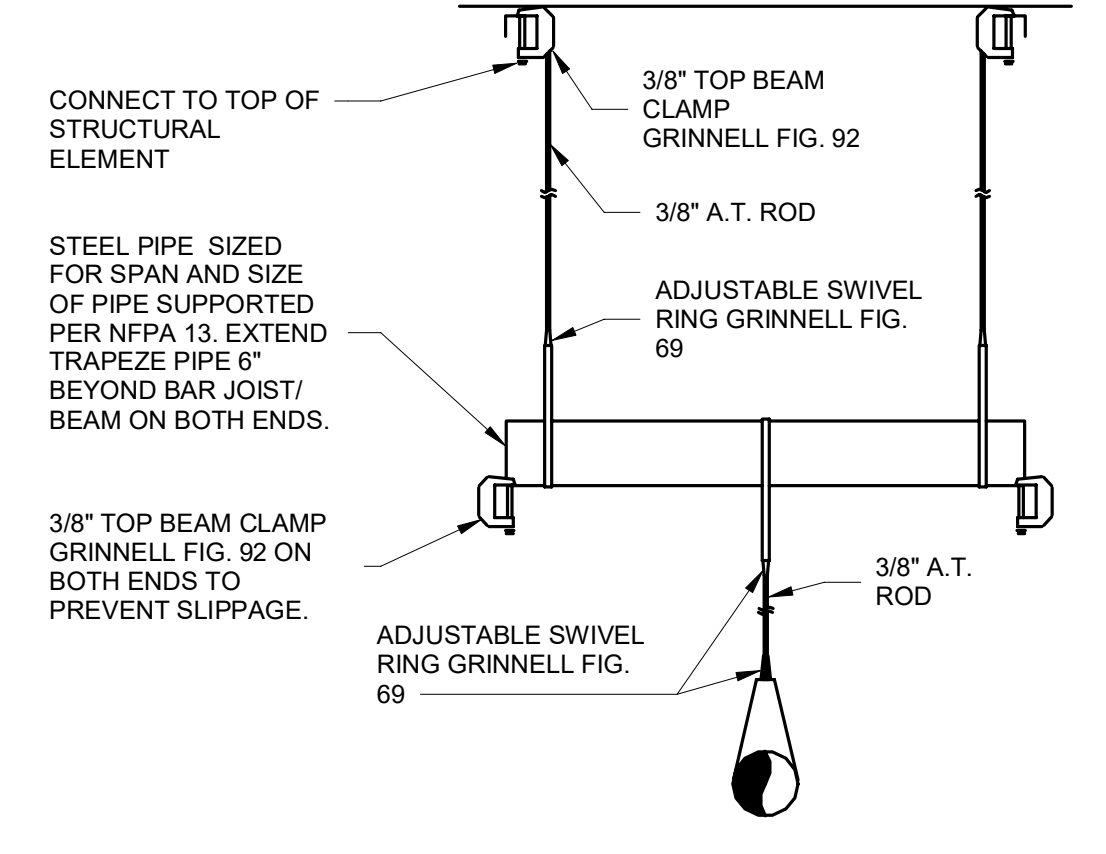
- NOTES:**
1. ADJUST SPRINKLER DROPS AS NECESSARY TO CLEAR OBSTRUCTIONS SUCH AS THE CEILING "T" BAR SUSPENSION SYSTEM, LIGHT FIXTURES, ETC. PROVIDE A PIPE HANGER IF THE HORIZONTAL OFFSET LENGTH EXCEEDS 24 INCHES.
2. THIS SPRINKLER HEAD DROP IS APPLICABLE ONLY WHERE IT IS NOT NECESSARY TO RETAIN AN UPRIGHT SPRINKLER FOR PROTECTION OF COMBUSTIBLE CONSTRUCTION ABOVE THE CEILING.

TYPICAL NEW SPRINKLER HEAD DROP
NOT TO SCALE

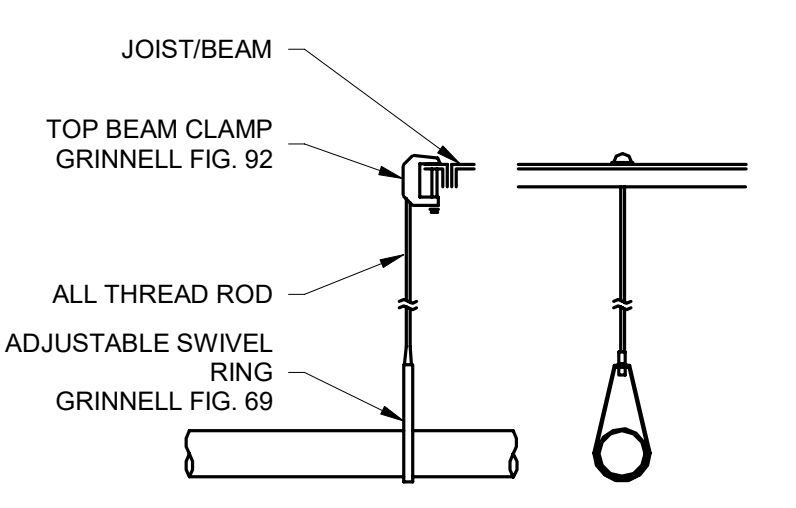
SPRINKLER SYSTEM DESIGN CRITERIA

- THE FOLLOWING AREAS ARE LIGHT HAZARD:
 - a. RESTROOMS
 - b. CORRIDORS
 - c. OFFICES
 - d. LOBBIES
 - f. ATTIC*
- THE FOLLOWING AREAS ARE ORDINARY HAZARD, GROUP 1:
 - a. STORAGE ROOMS
 - b. MECHANICAL ROOMS
 - c. ELECTRICAL ROOMS
 - d. JANITOR CLOSETS
- MAXIMUM SPRINKLER COVERAGE:
 - a. LIGHT HAZARD - 225 SQ. FT. PER SPRINKLER. (*EXCEPTION: ATTIC AREA IS COMBUSTIBLE CONSTRUCTION WITH MEMBERS LESS THAN 3 FT ON CENTER WHICH REQUIRES 130 SQ. FT. PER SPRINKLER.)
 - b. ORDINARY HAZARD, GROUP 1 & 2 - 130 SQ. FT. PER SPRINKLER.
- DENSITY/AREA REQUIREMENTS:
 - a. LIGHT HAZARD - 0.10 GPM PER SQ. FT. OVER MOST REMOTE 1500 SQ. FT. OF AREA. ALLOW 100 GPM FOR HOSE DEMAND. (*EXCEPTION: ATTIC AREA UNDER GABLE ROOF IS MOST REMOTE 1950 SQ. FT.)
 - b. ORDINARY HAZARD, GROUP 1 - 0.15 GPM PER SQ. FT. OVER MOST REMOTE 1500 SQ. FT. OF AREA. ALLOW 250 GPM FOR HOSE DEMAND.
- FLOW TEST DATA:

STATIC PRESSURE:	66 PSI
RESIDUAL PRESSURE:	64 PSI
FLOW:	1,278 GPM
DATE:	12/04/18
LOCATION:	HYDRANT LOCATED AT SOUTHWEST CORNER OF FILTRATION BUILDING CITY OF TAMPA
SOURCE:	
- BASED ON THE FLOW TEST INFORMATION GIVEN IN ITEM 5, PROVIDE A SAFETY FACTOR OF AT LEAST 10 PSI BETWEEN THE CALCULATED PRESSURE DEMAND AND THE WATER SUPPLY AVAILABLE PRESSURE AT THE REQUIRED FLOW RATE.



TRAPEZE PIPE HANGER DETAIL
NOT TO SCALE



PIPE HANGER DETAIL
NOT TO SCALE

GENERAL FIRE PROTECTION NOTES

- ALL FIRE PROTECTION WORK SHALL MEET ALL OF THE REQUIREMENTS OF THE FOLLOWING:
 - A. FLORIDA BUILDING CODE (FBC) 6TH EDITION (2017). THIS CODE INCLUDES THE 2017 FBC BUILDING, MECHANICAL, PLUMBING, ENERGY CONSERVATION, FUEL GAS, ACCESSIBILITY, AND TEST PROTOCOLS VOLUMES. FURTHER, SEE "REFERENCED STANDARDS" IN THE FBC BUILDING CHAPTER 35; FBC MECHANICAL CHAPTER 15; FBC PLUMBING CHAPTER 14; FBC ENERGY CONSERVATION CHAPTER 6; AND FBC FUEL GAS CHAPTER 8) (EFFECTIVE DECEMBER 31, 2017)
 - B. 6TH EDITION OF THE FLORIDA FIRE PREVENTION CODE (FFPC); (THIS CODE ALSO INCLUDES THE FLORIDA VERSIONS OF NFPA 1 AND NFPA 101.) (EFFECTIVE DECEMBER 31, 2017)
 - C. 2014 NATIONAL ELECTRIC CODE
 - D. PROVIDE FIRE PROTECTION SYSTEM IN ACCORDANCE WITH FAC 61G15-32.004 DESIGN OF WATER BASED FIRE PROTECTION SYSTEMS.
- PIPING SHALL BE SIZED BY HYDRAULIC CALCULATION METHOD NFPA 13 (2013).
- ALL FIRE PROTECTION WORK SHALL MEET ALL OF THE REQUIREMENTS OF NFPA. COMPLY WITH STATE FIRE MARSHAL RULE 4A-47 FOR ELEVATORS. ALL MATERIALS, METHODS, AND DESIGN SHALL BE PER EDITION OF NFPA 13 REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
- FLUSH AND TEST SYSTEM IN ACCORDANCE WITH NFPA 13, AND 24.
- PROVIDE PLANS AND HYDRAULIC CALCULATIONS IN CONFORMANCE WITH THE REQUIREMENTS OF NFPA 13 AND THE FLORIDA BUILDING CODE. PLANS AND CALCULATIONS SHALL BE SIGNED AND SEALED BY A DELEGATED PROFESSIONAL ENGINEER, REGISTERED IN THE STATE OF FLORIDA AND SUBMITTED TO THE AUTHORITY HAVING JURISDICTION (AHJ) FOR APPROVAL. PRIOR TO ISSUING PLANS AND CALCULATIONS, THE DELEGATED PROFESSIONAL ENGINEER SHALL ISSUE A LETTER ADDRESSED TO HARRY W. PORTELLOS, P.E., ON THEIR COMPANY LETTERHEAD, STATING THAT HE/SHE IS ACCEPTING THE ROLE AS ENGINEER OF RECORD FOR THE FIRE PROTECTION PORTION OF THE PROJECT. ONCE HARRY W. PORTELLOS, P.E. RECEIVES THE LETTER, HE WILL RELINQUISH THE TITLE OF ENGINEER OF RECORD TO THE DELEGATED PROFESSIONAL ENGINEER.
- SPRINKLER SYSTEMS SHALL BE INSTALLED BY PERSONNEL WHO HAVE ENGINEERING FACILITIES AND EXPERIENCE IN SUCH WORK AND WHO ARE REGULARLY EMPLOYED TO DO SUCH WORK.
- ALL MATERIALS SHALL BE OF APPROVED QUALITY AND THE WORK SHALL BE DONE IN A THOROUGH AND WORKMANLIKE MANNER. THE WORK, MATERIALS AND TEST SHALL BE IN ACCORDANCE WITH THE CURRENT REQUIREMENTS OF NFPA 13.
- SPRINKLERS SHALL BE 1/2" ORIFICE TYPE OF ORDINARY DEGREE RATING EXCEPT WHERE EXCESSIVE TEMPERATURES ARE ANTICIPATED. IN THESE LOCATIONS, HIGH TEMPERATURE SPRINKLERS SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 13. THE CONTRACTOR SHALL INDICATE SPRINKLER TEMPERATURE RATING, ORIFICE SIZE AND TYPE ON FINAL DRAWINGS. SPRINKLER AND ESCUTCHEON SHALL BE CHROME PLATED.
- COORDINATE EXACT LOCATION OF SPRINKLERS, PIPING, AND EQUIPMENT WITH CEILING, ELECTRICAL, MECHANICAL, AND STRUCTURAL COMPONENTS OF BUILDING. MAKE MODIFICATIONS WITHOUT ADDITIONAL COST TO THE OWNER.
- ALL MATERIAL SHALL BE UL LISTED OR FM APPROVED.
- REFER TO THE ARCHITECTURAL DRAWINGS FOR LOCATIONS OF ALL SMOKE AND FIRE RATED WALLS WHICH FIRE PROTECTION PIPING PENETRATES. FIRE PROTECTION PIPING SHALL BE SMOKE/FIRE SAFED IN AN APPROVED MANNER WHEN PENETRATING RATED WALLS AND FLOORS. PROVIDE SLEEVES OR OTHER APPROVED MEANS AND SEAL OPENINGS IN WALLS, FLOORS, AND PARTITIONS IN SUCH A MANNER AS TO MAINTAIN THE SMOKE AND FIRE RATING OF THAT WALL, FLOOR OR CEILING.
- SPACING OF SPRINKLERS: THE SPACING AND SIZES OF PIPES SHALL CONFORM TO THE REQUIREMENTS OF NFPA 13. SPRINKLERS SHALL BE WITHIN 1" OF CENTER OF ACOUSTICAL PANEL. PROVIDE SWING JOINT IF REQUIRED TO ACCOMPLISH THIS. SPRINKLERS SHALL BE AT LEAST 6" FROM ANY CEILING FIXTURE. COORDINATE THE LOCATION OF SPRINKLERS AND PIPING WITH THE ELECTRICAL AND MECHANICAL DRAWINGS.
- PIPE SUPPORTS, HANGERS, CLAMPS, RODS AND OTHER ACCESSORIES: SHALL BE OF AN APPROVED TYPE AND IN SUFFICIENT NUMBER TO PROPERLY SUPPORT ALL PIPING. PIPING SHALL BE SUPPORTED BY ROUND WROUGHT U-TYPE APPROVED ADJUSTABLE HANGERS. PROVIDE ALL HANGERS INCLUDING TRAPEZE HANGERS AS REQUIRED TO COMPLY WITH NFPA 13. HANG TO TOP CHORD OF BAR JOIST ONLY.
- ALL CONDUIT BETWEEN CONTROLLER AND DEVICES BEING CONTROLLED SHALL BE BY DIVISION 21 AND SHALL BE IN CONFORMANCE TO DIVISION 26 REQUIREMENTS.
- PROVIDE ANY ADDITIONAL DRAINS REQUIRED TO COMPLY WITH NFPA 13 AND LOCAL CODES (WITHOUT ADDITIONAL COST TO OWNER).
- PROVIDE A SINGLE AIR VENT WITH A CONNECTION CONFORMING TO NFPA 8.16.6 ON EACH WET PIPE SYSTEM UTILIZING METALLIC PIPE.
- ALL BIDDERS ARE ENCOURAGED TO VISIT THE SITE AND THOROUGHLY FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS PRIOR TO SUBMITTING THEIR BID. NO ADDITIONAL COST WILL BE APPROVED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
- SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

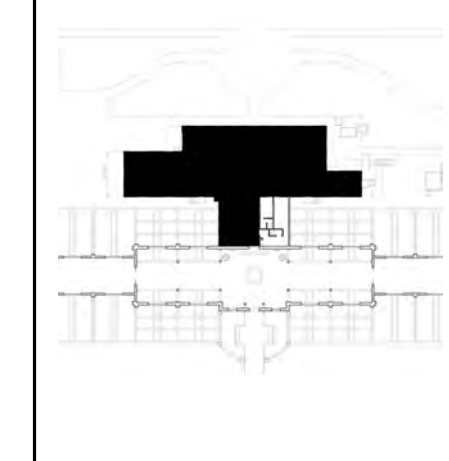
THE FIRE PROTECTION SYSTEM SHALL BE PROVIDED AS A COMPLETE DESIGN-BUILD DELIVERY, INCLUDING COMPLETE DESIGN DRAWINGS, HYDRAULIC CALCULATIONS, ETC., AS NECESSARY FOR PERMIT AND ANY OTHER REQUIREMENTS BY THE AUTHORITY HAVING JURISDICTION BASED ON THESE DOCUMENTS. ALL CALCULATIONS AND DESIGN DRAWINGS SHALL BE PRODUCED UNDER THE DIRECT SUPERVISION OF THE FLORIDA REGISTERED PROFESSIONAL ENGINEER AND ALL DOCUMENTS SHALL BE SIGNED AND SEALED BY THIS ENGINEER OF RECORD. ANY PREVIOUS ENGINEER OF RECORD (EOR) USED FOR THE DEVELOPMENT OF THE DESIGN-BUILD PERFORMANCE SPECIFICATION WILL RELINQUISH THE EOR TO THIS NEW EOR.
OBTAIN FLOW TEST RESULTS AND EVALUATE IF A FIRE PUMP AND OTHER APPURTENANCES WILL BE NEEDED. IF A FIRE PUMP IS NEEDED NOTIFY THE ARCHITECT AND ELECTRICAL ENGINEER IMMEDIATELY.

FIRE PROTECTION DRAWING INDEX	
SHEET NUMBER	SHEET NAME
FP001	FIRE PROTECTION GENERAL NOTES AND DETAILS
FP101	ADMINISTRATION BUILDING FIRE PROTECTION FIRST AND SECOND FLOOR

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Harry W. Portellos
P.E. 61597

TO THE BEST OF MY KNOWLEDGE, THESE DRAWINGS AND THE PROJECT MANUAL ARE COMPLETE AND COMPLY WITH THE 2017 FLORIDA BUILDING CODE



Project Information
City of Tampa

David L. Tippin Water Treatment Facility
Phase 1 - Building & Site Improvements

7125 North 30th Street
Tampa, Florida

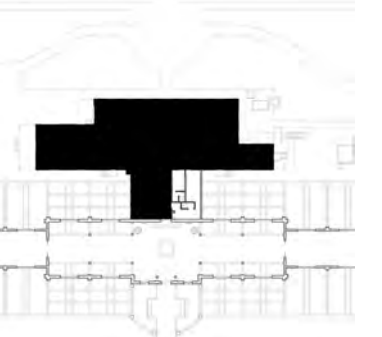
Project Number 1706.00

No.	Description	Date
1	DD	07.20.18
2	50% CDs	09.24.18
3	90% CDs	12.07.18
4	Permit CDs	02.26.19

No.	Description	Date
5	Addendum 1	07.17.20

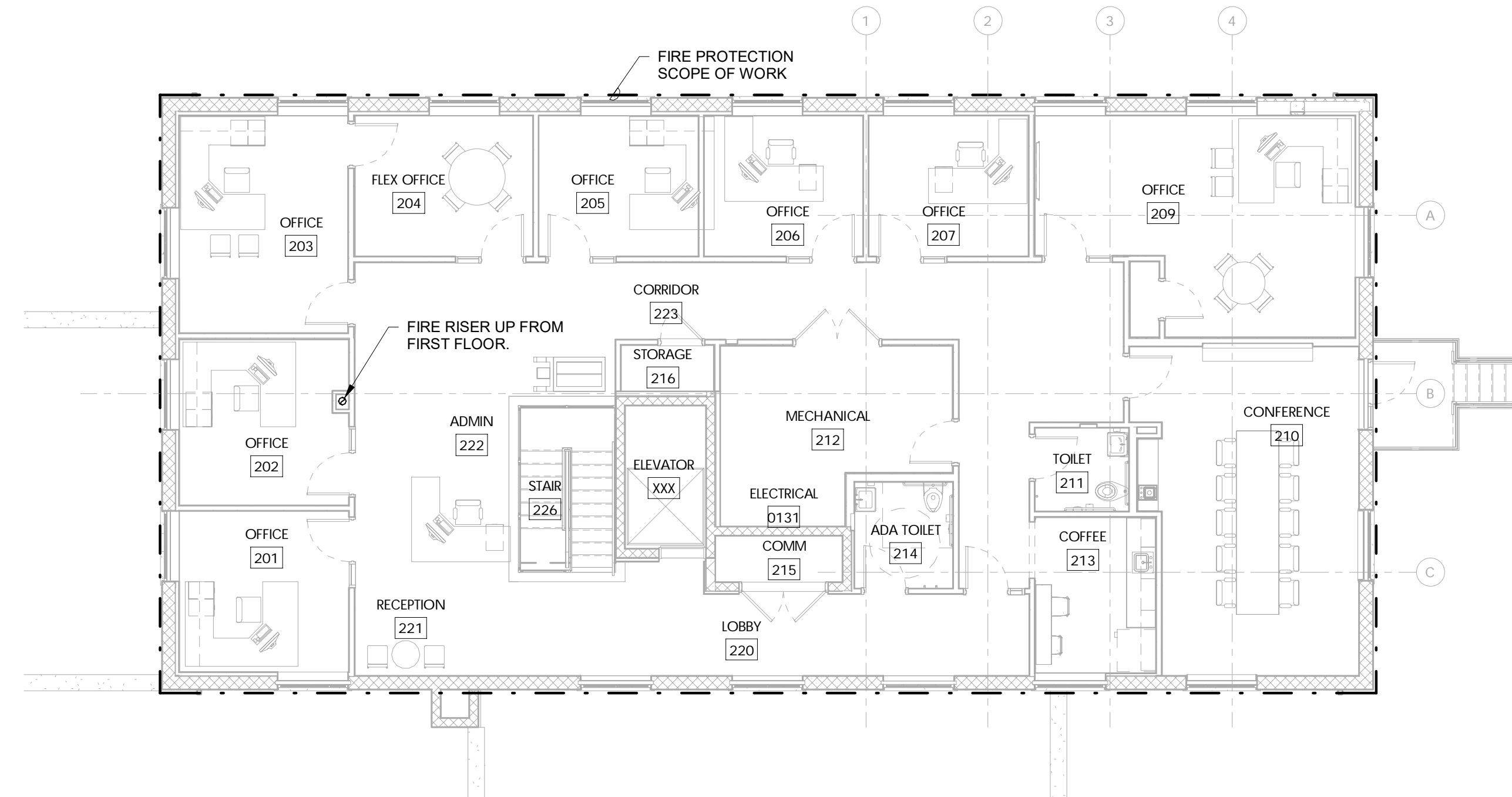
Sheet Information

FIRE PROTECTION GENERAL NOTES AND DETAILS



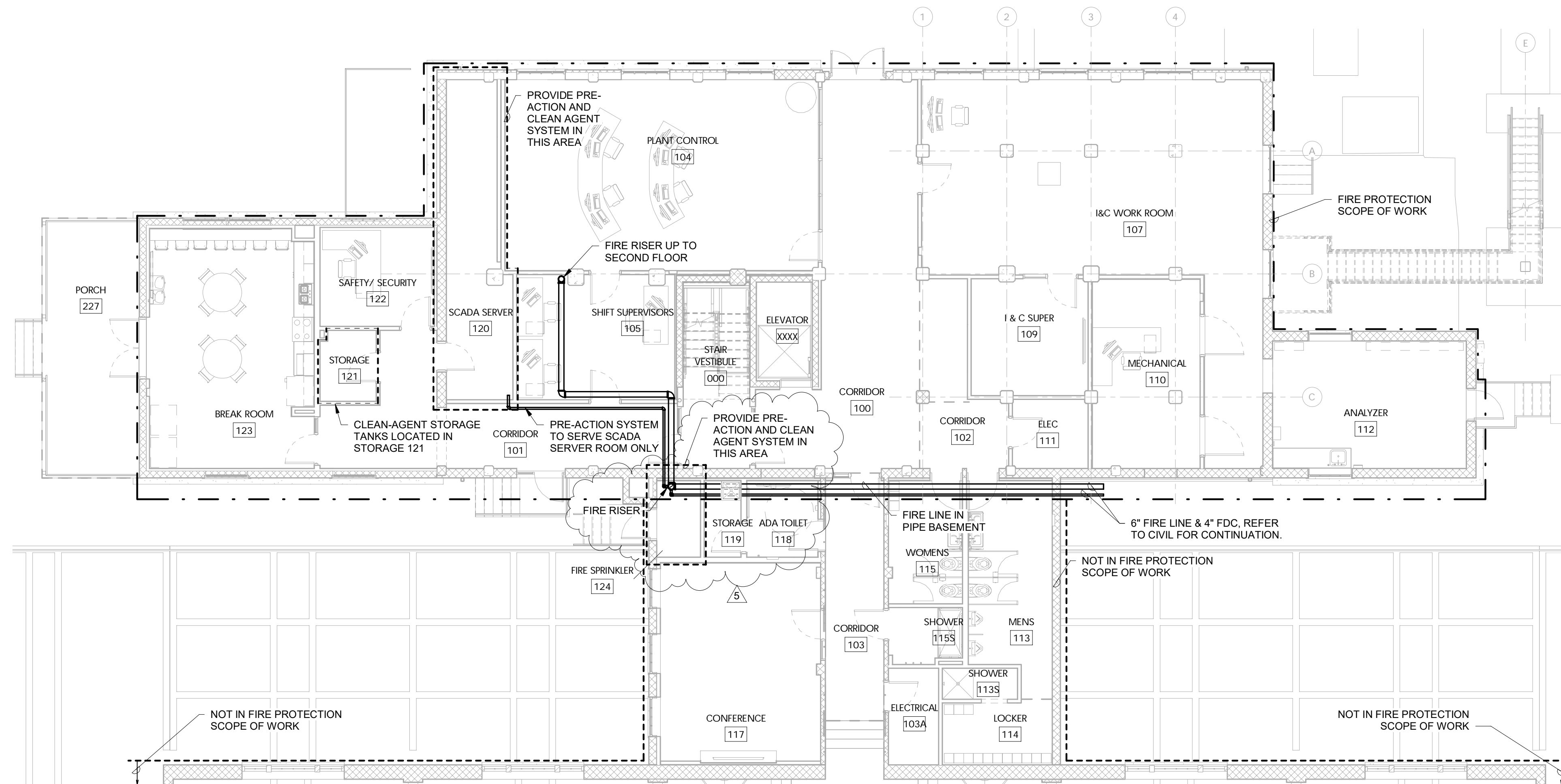
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- Division 21 - Fire Protection Scope**
1. Provide fire sprinkler system in scope of work area as indicated on plans.
 2. All storage, mechanical, electrical, janitorial and communications areas shall be designed to Ordinary Hazard (Group 1), not to exceed 130 sq. ft. per sprinkler. Design shall be based on 0.15 gpm per sq. ft. over 1,500 sq. ft..
 3. All other spaces shall be designed to Light Hazard. Area per sprinkler shall not to exceed 225 sq. ft. of coverage. Design shall be based on 0.10 gpm per sq. ft. over 1,500 sq. ft..

ADMINISTRATION BUILDING FIRE PROTECTION NEW WORK SECOND FLOOR PLAN
1/8" = 1'-0"



ADMINISTRATION BUILDING FIRE PROTECTION NEW WORK FIRST FLOOR PLAN
1/8" = 1'-0"

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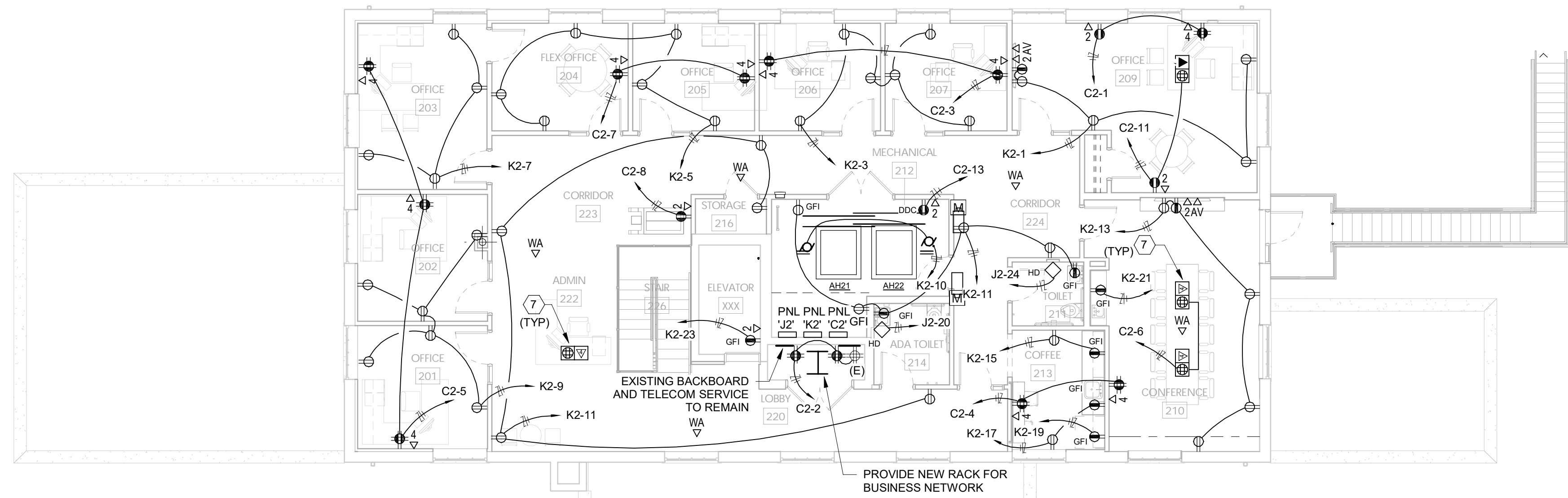
No.	Description	Date
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3	REV 3	12.16.19
5	Addendum 1	07.17.20

GENERAL NOTES:

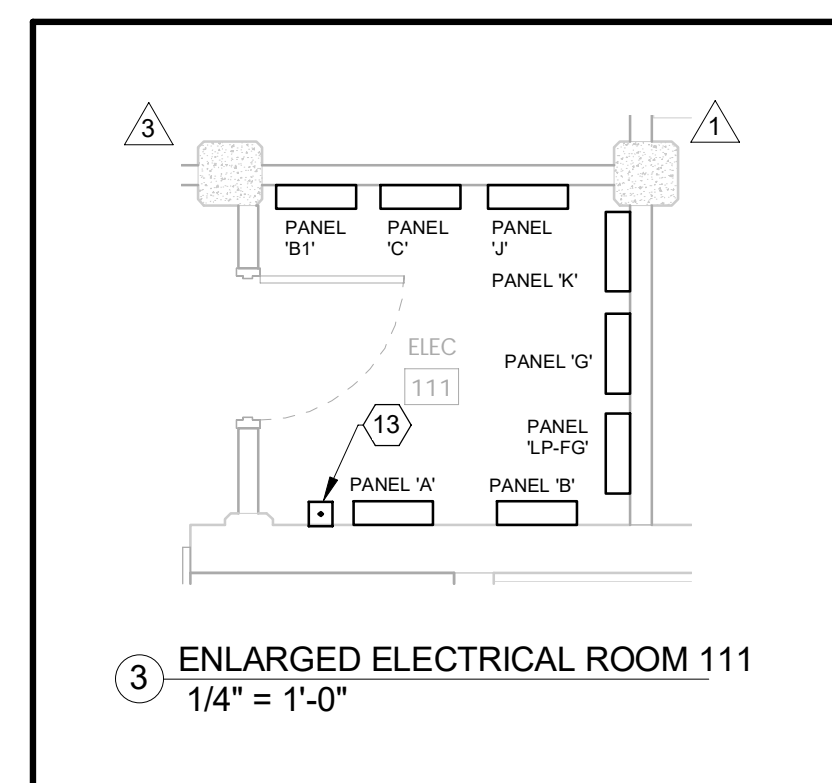
1. THERE ARE NUMEROUS AREAS WITH EXPOSED (OPEN) CEILINGS AND EXISTING WALLS WHERE BOXES AND RACEWAYS WILL BE REQUIRED TO BE EXPOSED OR SURFACE MOUNTED. ALL EXPOSED AND SURFACE MOUNTED DEVICES, BOXES, RACEWAYS AND FREE-WIRED WIRING SHALL BE INSTALLED IN A NEAT AND ORDERLY FASHION, AND ROUTED PERPENDICULAR AND PARALLEL TO THE BUILDING STRUCTURE.
2. ALL FREE-WIRED CABLING SHALL BE ROUTED IN A NEAT AND ORDERLY FASHION, ROUTED PERPENDICULAR AND PARALLEL TO THE BUILDING STRUCTURE, AND BUNDLED INTO VELCRO TIE-WRAPS WITH NOT MORE THAN 24 CABLES PER TIE-WRAP. ROUTE THE CABLE TO THE NEAREST CABLE TRAY OR DIRECTLY TO THE IT RACK, WHICHEVER IS THE SHORTEST ROUTE.
3. CONTRACTOR SHALL HOLD A PRE-INSTALLATION CONFERENCE PRIOR TO ANY NEW WORK TO REVIEW AND DISCUSS ALL OPEN CEILING AREAS AND ALL SURFACE MOUNTED RACEWAYS ON WALLS WITH THE ARCHITECT. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR OPEN CEILING AREAS. SPECIAL PLANNING AND CARE WILL BE REQUIRED FOR A CLEAN INSTALLATION THAT IS COORDINATED WITH ALL OTHER SYSTEMS THAT ARE EXISTING AND NEW.
4. EXISTING IT VOICE AND DATA SERVICES TO THE SECOND FLOOR SHALL REMAIN AND BE CONNECTED INTO NEW DATA RACK.

DRAWING NOTES:

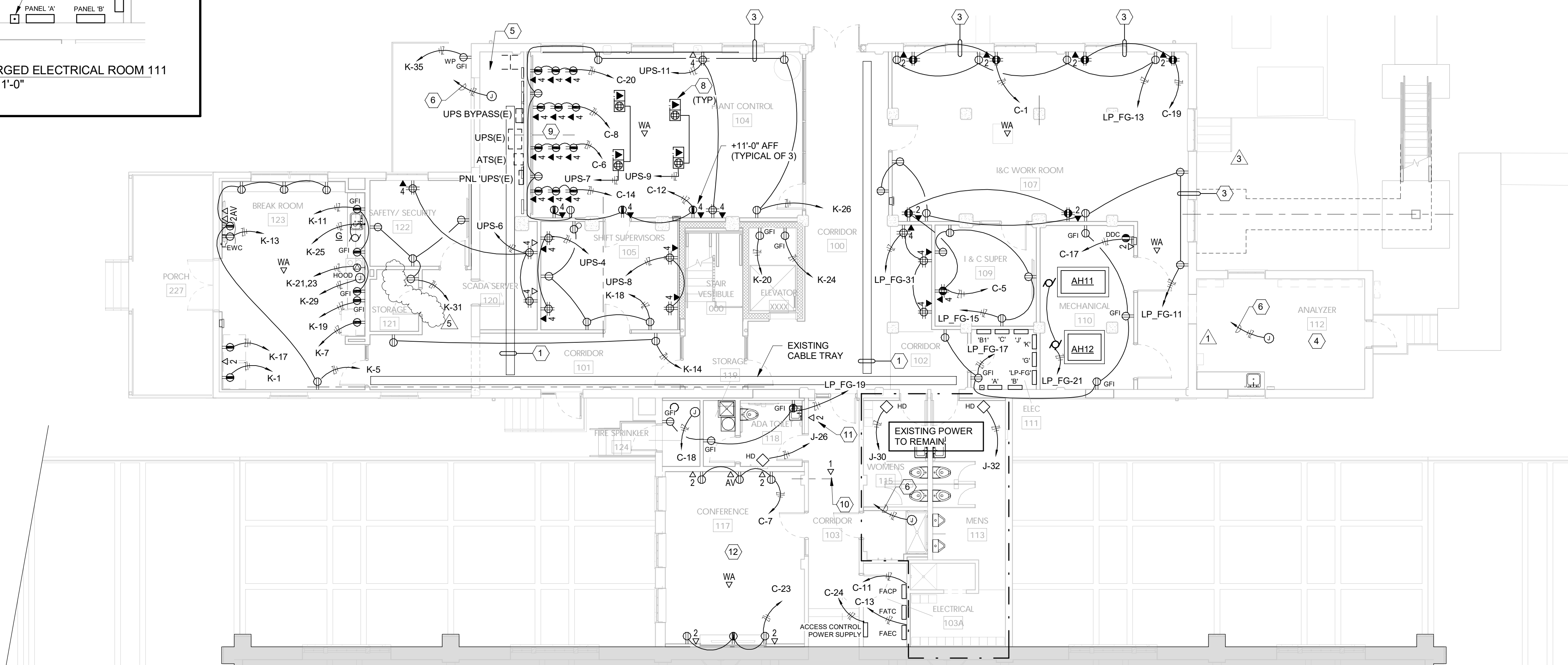
1. PROVIDE NEW CABLE TRAY AND CONNECT TO THE OWNER CABLE TRAY AND TO EXTEND TO THE AREAS INDICATED. PROVIDE TRAY THAT MATCHES THE EXISTING OWNER TRAY, 8" WIDE BY 5" DEEP, BASKET TYPE (WIREDMID CABLE-MGR). PROVIDE ALL REQUIRED HANGERS, SUPPORTS, FACTORY BENDS AND CONNECTIONS.
2. PROVIDE JUNCTION BOXES ABOVE AND BELOW THE CEILING AND FLOOR AREAS AS REQUIRED TO RE-ROUTE THE EXISTING RACEWAYS THAT ARE LOCATED IN THIS AREA. REFER TO THE DEMOLITION NOTES ON E100.
3. CONDUIT AND BOXES SHALL BE SURFACE MOUNTED ALONG THIS WALL. RUN CONDUIT AT 6" AFF.
4. EXISTING CIRCUITS IN ROOM 112 ARE TO REMAIN AND BE EXTENDED TO NEW PANEL.
5. ALLEXISTING CIRCUITS IN THE SCADA SERVER ROOM SHALL REMAIN. THESE CIRCUITS ARE CONNECTED TO THE UPS PANEL.
6. PROVIDE NEW 120 VOLT CIRCUIT TO CONNECT TO EXISTING RECEPTACLES IN THIS SPACE. CONNECT ANY EXISTING UPS CIRCUITS TO THE NEW UPS PANEL.
7. RACEWAY FOR FLOOR BOXES ON 2ND FLOOR (POWER AND DATA) SHALL BE ROUTED INSIDE THE SECOND FLOOR SLAB/TOPPING PAD, AND THEN OVER TO NEW WALL AND UP. BOXES SHALL NOT BE MORE 4" DEEP.
8. RACEWAY FOR FIRE RATED POKE-THRU TYPE FLOOR BOXES ON THE 1ST FLOOR SHALL BE ROUTED UNDER THE FLOOR IN THE CRAWL SPACE, AND OVER TO THE SCADA ROOM OR UP IN A NEW WALL AND UP TO THE CEILING. NO EXPOSED RACEWAY IN OCCUPIED AREAS.
9. REFER TO ARCHITECTURAL ELEVATION FOR VIDEO WALL OUTLET PLACEMENT.
10. PROVIDE CAT 6 CABLE FROM BUSINESS RACK ON THE SECOND FLOOR FOR A FUTURE CAMERA TO VIEW THE DOOR ENTRY. CAMERAS WILL BE BY OWNER. PROVIDE A 10 FOOT SERVICE LOOP ABOVE CEILING.
11. PROVIDE DATA OUTLET ON THE WALL WITH TWO CAT 6 CABLES FOR VOICE COMMUNICATIONS. SEE NOTE 1, SHEET E301.
12. CONFERENCE ROOM 117 WILL HAVE A GWB/IN-ACCESSIBLE CEILING. ANY AND ALL JUNCTION BOXES OR ANY OTHER DEVICES REQUIRING ACCESS SHALL BE LOCATED IN THE TOILET ROOM OR STORAGE ROOM FOR ACCESS. THE LIGHTING JUNCTION BOX MAY BE LOCATED ABOVE THE AIRCRAFT CABLE CANOPY COVER.
13. MAIN SERVICE DISCONNECT "EPO". REFER TO POWER RISER DIAGRAM.



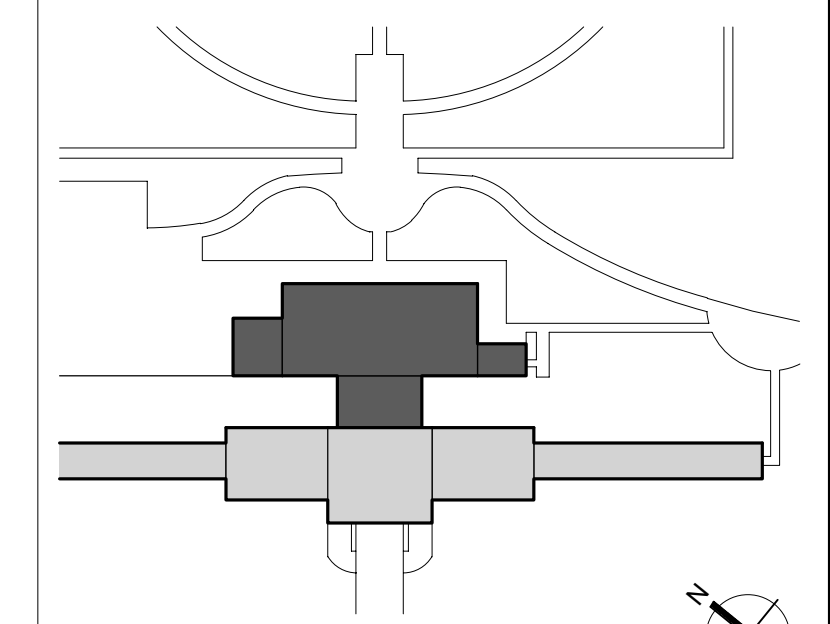
2 ADMINISTRATION BUILDING POWER AND SYSTEMS PLAN - SECOND FLOOR
1/8" = 1'-0"



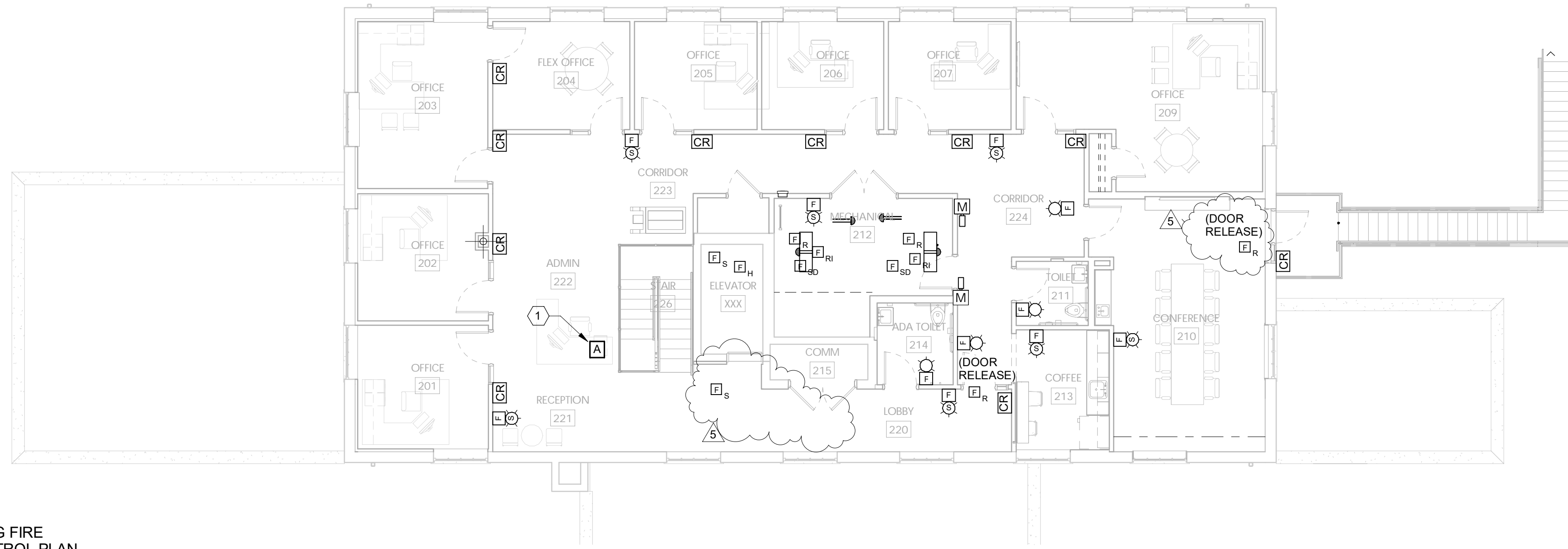
3 ENLARGED ELECTRICAL ROOM 111
1/4" = 1'-0"



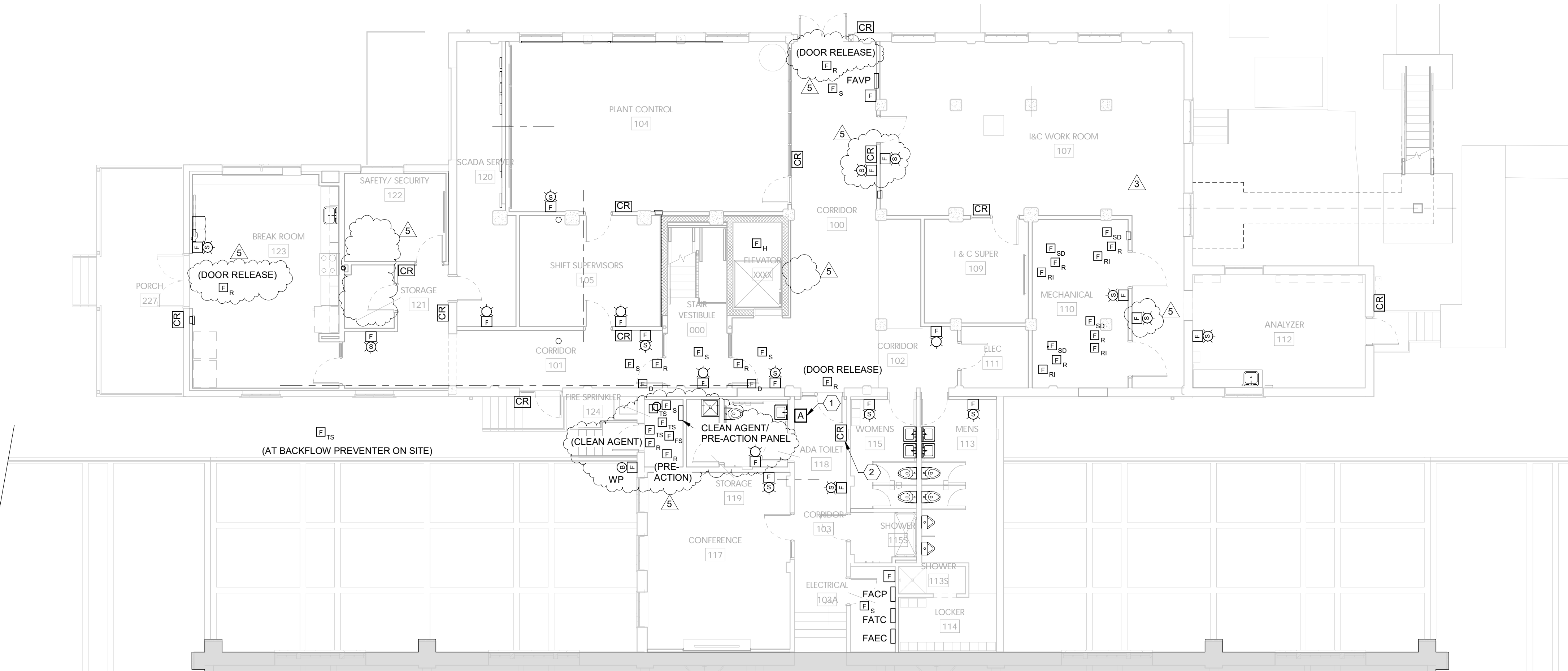
1 ADMINISTRATION BUILDING POWER AND SYSTEMS PLAN - FIRST FLOOR
scale: 1/8" = 1'-0"



KEY PLAN



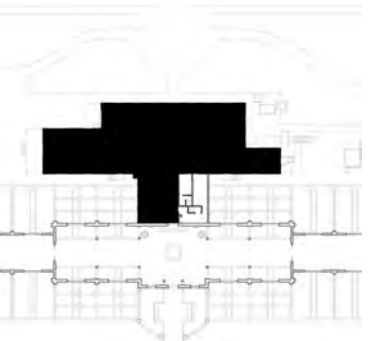
ADMINISTRATION BUILDING FIRE
ALARM AND ACCESS CONTROL PLAN -
SECOND FLOOR
1/8" = 1'-0"



ADMINISTRATION BUILDING FIRE
ALARM AND ACCESS CONTROL PLAN -
FIRST FLOOR
1/8" = 1'-0"

DRAWING NOTES:

- 1 THE RECEPTIONIST IN ADMIN 222 WILL REQUIRE A MEANS TO "BUZZ-IN" PERSONS REQUESTING ENTRY ON THE FIRST FLOOR ENTRY INTO CORRIDOR 102. VOICE COMMUNICATIONS WILL BE PROVIDED VIA THE CITY VOIP SYSTEM (OR INFORMACAST) VIA ONE OF THE CAT 6 PORTS IN THE NEAREST DATA OUTLET BY THE RECEPTIONIST. THE DATA OUTLET ON THE WALL IN CORRIDOR 103 WILL BE USED FOR THE CITY'S COMMUNICATION CONNECTION ON THE FIRST FLOOR. THE COMMUNICATIONS DEVICE (PHONE HAND SET, WALL TWO-WAY SPEAKER, ETC.) WILL BE PROVIDED BY THE CITY.
- 2 PROVIDE FOR A MEANS TO RELEASE THE ACCESS CONTROLLED DOOR FROM THE RECEPTIONIST IN ADMIN 222. THE RELEASE SHALL BE PART OF THE ACCESS CONTROL SYSTEM AND SHALL BE EITHER A BUTTON AT THE RECEPTION DESK OR COMPUTER BASED KEY STROKE OR TOUCH PANEL.



Project Information

City of Tampa

David L. Tippin Water
Treatment Facility
Phase I - Building &
Site Improvements

7125 North 30th Street
Tampa, Florida

Project Number 1706.00

Distribution

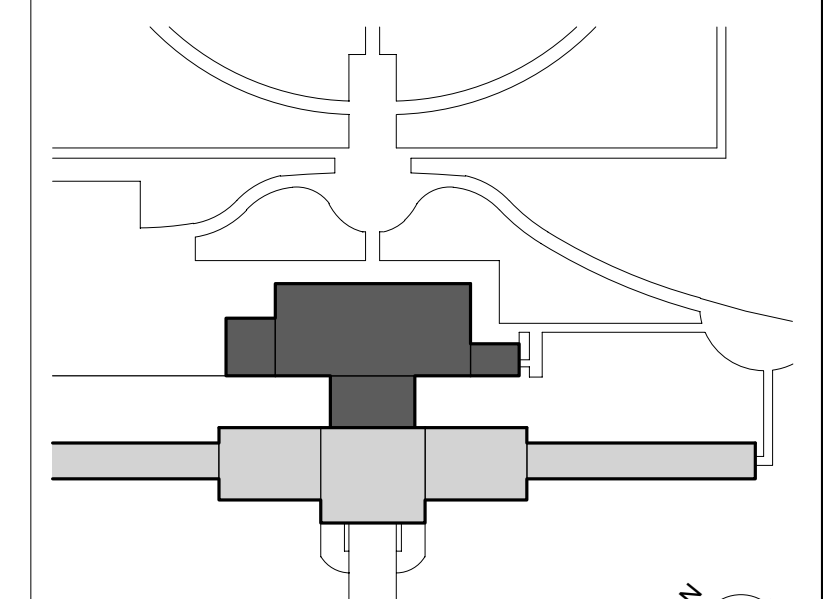
No.	Description	Date
1	DD	07.20.18
2	50% CDs	09.24.18
3	90% CDs	12.07.18
4	Permit CDs	02.26.19

Revisions

No.	Description	Date
3	REV 3	12.16.19
5	Addendum 1	07.17.20

Sheet Information

ADMINISTRATION
BUILDING FIRE ALARM AND
ACCESS CONTROL PLANS



KEY PLAN

E301

NEW PANEL 'LP-FG'

PANEL: LP-FG		AIC RATING: 22000		AMPS SERVICE: 120/ 240 V.		1PH, 3W		MLO: 0 AMPS		MCB: 100 AMPS		
DESCRIPTION	KVA	BKR	CKT	A	B	CKT	BKR	KVA	DESCRIPTION	KVA	BKR	CKT
REC. NE FLOOR BUFFER	0.5	20	1			2	20	0.4	REC. PORCH SPLIT			
REC. NW FLOOR BUFFER	0.5	20	3			4	20	0.4	REC. PORCH SPLIT			
REC. SE FLOOR BUFFER	0.5	20	5			6	20	1	LTG. PIPE GAL. WASH RM			
REC.	0.5	20	7			8	20	1	LTG. PIPE GAL. 9-19			
REC.	0.5	20	9			10	20	1	LTG. PIPE GAL. 10-20			
REC. I&C WRK RM	0.9	20	11			12	20	1	LTG. PIPE GAL. 21-29			
REC. I&C WRK RM	0.7	20	13			14	20	1	LTG. FLTR GAL. N RTNDA			
REC. I&C SUPER	0.9	20	15			16	20	1	LTG. FLTR GAL. N RTNDA			
REC. COR. MECH/ELEC	1.1	20	17			18	20	0.4	REC. PIPE GAL. 9-20			
REC. ADA TOILET STOR	0.5	20	19			20	20	0.4	REC. PIPE GAL. 21-30			
EQ. CONDENSATE PUMP	0.5	20	21			22	20	0.5	REC. LION FOUNT. HEAD			
SPARE	0	20	23			24	20	1	LTG. PIPE GAL. 22-30			
SPARE	0	20	25			26	20	0	SPARE			
SPARE	0	20	27			28	20	0	SPARE			
SPARE	0	20	29			30	20	0	SPARE			
REC. RCPT. DESK	1.1	20	31			32	20	0	SPARE			
SPARE	0	-	33			34	-	0	SPARE			
SPARE	0	-	35			36	-	0	SPARE			
SPARE	0	-	37			38	-	0	SPARE			
EQ. SPD2	0	2P	39			40	-	0	SPARE			
EQ. SPD2	0	2P	41			42	-	0	SPARE			
A PH = 8.10 B PH = 9.20												
SERVES CONN LOAD FACTOR FEED DIVERSITY KVAD PANEL KVAD												
LIGHTING	7.00	x	1.25	=	8.75	x	=					
RECEPT	9.80	x	*	=	9.80	x	=					
MISC EQUIP	0.50	x	1.00	=	0.50	x	=					
A/C	0.00	x	1.00	=	0.00	x	=					
HEATING	0.00	x	1.00	=	0.00	x	=					
LARGEST MOTOR	0.00	x	1.25	=	0.00	x	=					
OTHER MOTORS	0.00	x	1.00	=	0.00	x	=					
OTHER	0.00	x	1.00	=	0.00	x	=					
SPARE												
TOTALS	17.30	KVA			24.00	KVA						

* PER N.E.C. TABLE 220.44

NEW PANEL 'C'

PANEL: C		AIC RATING: 22000		AMPS SERVICE: 120/ 240 V.		3PH, 4W, HI-LEG DELTA		MLO: 0 AMPS		MCB: 200 AMPS			
DESCRIPTION	KVA	BKR	CKT	A	B	C	CKT	BKR	KVA	DESCRIPTION	KVA	BKR	CKT
REC. I&C WRK RM	0.7	20	1				2	2P	3.9	PNL C2			
BLANK	0	-	3				4	100	4	PNL C2			
REC. I&C WRK RM	0.7	20	5				6	20	0.5	REC. PLNT CONTROL			
REC. CONF RM 117	0.5	20	7				8	20	0.5	REC. PLNT CONTROL			
BLANK	0	-	9				10	-	0	BLANK			
EQ. FACP	0.4	20	11				12	20	0.5	REC. PLNT CONTROL			
EQ. FAEC	0.4	20	13				14	20	0.5	REC. PLNT CONTROL			
BLANK	0	-	15				16	-	0	SPARE			
EQ. DDC CNTRL	0.4	20	17				18	20	0.5	EQ. PNE-ACTION			
REC. I&C WRK RM	0.7	20	19				20	20	0.5	REC. PLNT CONTROL			
BLANK	0	-	21				22	-	0	SPARE			
REC. CONF RM 117	0.5	20	23				24	20	0.5	EQ. ACCESS CNTRL			
SPARE	0	20	25				26	20	0	SPARE			
SPARE	0	20	27				28	-	0	SPARE			
SPARE	0	20	29				30	20	0	SPARE			
SPARE	0	20	31				32	20	0	SPARE			
SPARE	0	-	33				34	-	0	SPARE			
SPARE	0	20	35				36	20	0	SPARE			
EQ. SPD2	0	3P	37				38	20	0	SPARE			
EQ. SPD2	0	3P	39				40	-	0	SPARE			
EQ. SPD2	0	-	41				42	-	0	SPARE			
A PH = 8.20 B PH = 4.00 C PH = 4.00													
SERVES CONN LOAD FACTOR FEED DIVERSITY KVAD PANEL KVAD													
LIGHTING	0.00	x	1.25	=	0.00	x	=						
RECEPT	5.60	x	*	=	5.60	x	=						
MISC EQUIP	2.70	x	1.00	=	2.70	x	=						
A/C	0.00	x	1.00	=	0.00	x	=						
HEATING	0.00	x	1.00	=	0.00	x	=						
LARGEST MOTOR	0.00	x	1.25	=	0.00	x	=						
OTHER MOTORS	0.00	x	1.00	=	0.00	x	=						
OTHER	7.90	x	1.00	=	7.90	x	=						
SPARE													
TOTALS	16.20	KVA			83.04	KVA							

* PER N.E.C. TABLE 220.44

NEW PANEL 'B1'

PANEL: B1		AIC RATING: 22000		AMPS SERVICE: 120/ 240 V.		3PH, 4W, HI-LEG DELTA		MLO: 0 AMPS		MCB: 200 AMPS			
DESCRIPTION	KVA	BKR	CKT	A	B	C	CKT	BKR	KVA	DESCRIPTION	KVA	BKR	CKT
MTR. SOUTH EXFAN	0.8	3P	1				2	2P	3	EQ. EWH1			
MTR. SOUTH EXFAN	0.8	15	3				4	40	3	EQ. EWH1			
MTR. SOUTH EXFAN	0.8	-	5				6	20	0.3	EQ. HWP			
EQ. CHEM SCAN RM	4.8	2P	7				8	2P	2.4	A/C. MS1/CU1			
EQ. CHEM SCAN RM	4.8	60	9				10	30	2.4	A/C. MS1/CU1			
PNL G	10.4	3P	11				12	3P	1.8	PLC-B VIA ATS			
PNL G	4.4	100	13				14	30	1.8	PLC-B VIA ATS			
PNL G	11.3	-	15				16	-	1.8	PLC-B VIA ATS			
HEAT. DRYER	1.8	2P	17				18	20	0	SPARE			
HEAT. DRYER	1.8	20	19				20	20	0	SPARE			
SPARE	0	-	21				22	-	0	SPARE			
SPARE	0	20	23				24	20	0	SPARE			
SPARE	0	20	25				26	20	0	SPARE			
SPARE	0	-	27				28	-	0	SPARE			
SPARE	0	-	29				30	-	0	SPARE			
SPARE	0	-	31				32	-	0	SPARE			
SPARE	0	-	33				34	-	0	SPARE			
SPARE	0	-	35				36	-	0	SPARE			
EQ. SPD2	0	3P	37				38	-	0	SPARE			
EQ. SPD2	0	3P	39				40	-	0	SPARE			
EQ. SPD2	0	-	41				42	-	0	SPARE			
A PH = 17.20 B PH = 24.10 C PH = 13.30													
SERVES CONN LOAD FACTOR FEED DIVERSITY KVAD PANEL KVAD													
LIGHTING	0.00	x	1.25	=	0.00	x	=						
RECEPT	3.20	x	*	=	3.20	x	=						
MISC EQUIP	15.90	x	1.00	=	15.90	x	=						
A/C	4.80	x	1.00	=	4.80	x	=						
HEATING	0.00	x	1.00	=	0.00	x	=						
LARGEST MOTOR	2.40	x	1.25	=	3.00	x	=						
OTHER MOTORS	0.00	x	1.00	=	0.00	x	=						
OTHER	31.50	x	1.00	=	31.50	x	=						
SPARE													
TOTALS	54.60	KVA			83.04	KVA							

* PER N.E.C. TABLE 220.44

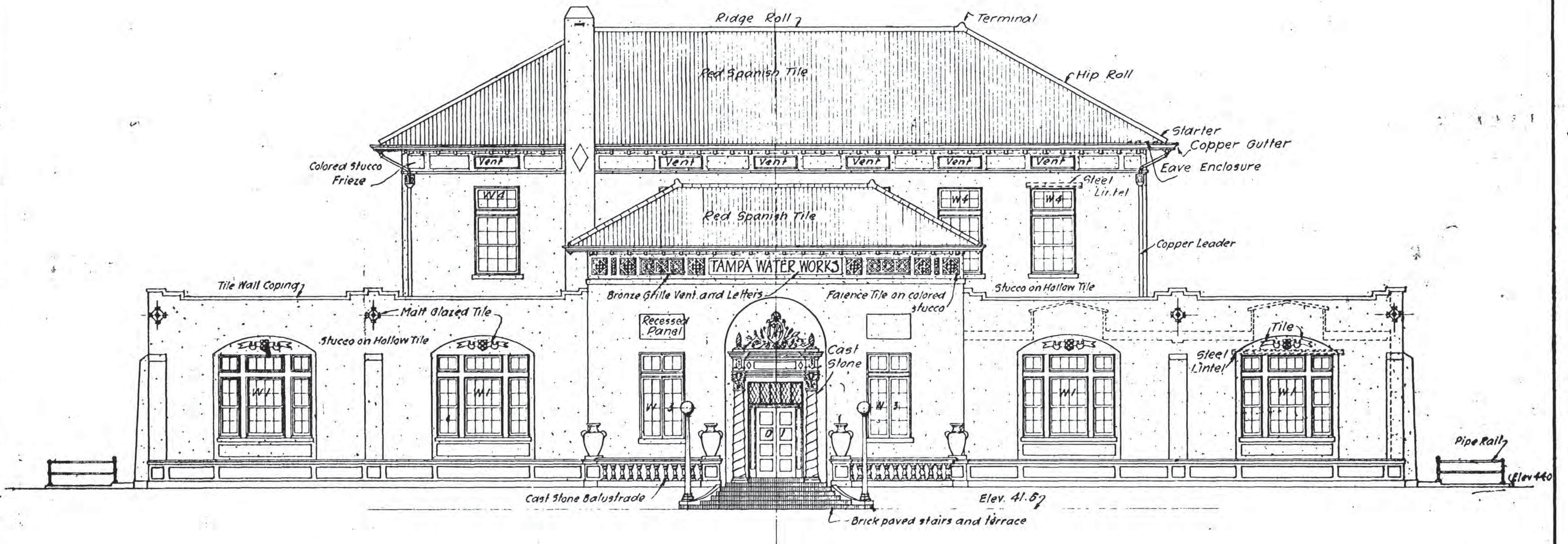
NEW PANEL 'J'

PANEL: J		AIC RATING: 22000		AMPS SERVICE: 120/ 240 V.		3PH, 4W, HI-LEG DELTA		MLO: 225 AMPS		MCB: 0 AMPS			
DESCRIPTION	KVA	BKR	CKT	A	B	C	CKT	BKR	KVA	DESCRIPTION	KVA	BKR	CKT
HEAT. VV111	2	2P	1				2	3P	1.3	A/C. AH11			
HEAT. VV111	2	30	3				4	20	1.3	A/C. AH11			
HEAT. VV115	3	2P	5				6	-	1.3	A/C. AH11			
HEAT. VV115	3	40	7				8	3P	1.3	A/C. AH12			
HEAT. VV121	3.3	2P	9				10	20	1.3	A/C. AH12			
HEAT. VV121	3.3	40	11				12	-	1.3	A/C. AH12			
HEAT. VV118	3	40	13				14	2P	3	EQ. EWH1			
HEAT. VV124	2.3	2P	15				16	40	3	EQ. EWH1			
HEAT. VV124	2.3	30	17				18	20	0.3	EQ. HWP			
MTR. EF11	0.7	20	19				20	2P	2.4	A/C. MS1/CU1			
PNL J2	15.4	3P	21				22	30	2.4	A/C. MS1/CU1			
PNL J2	9.2	100	23				24	20	0.3	MTR. EF12, EF13			
PNL J2	11.6	-	25				26	20	1.5	EQ. HAND DRYER			
SPARE	0	-	27				28	-	0	BLANK			
SPARE	0	20	29				30	20	1.5	EQ. HAND DRYER			
SPARE	0	20	31				32	20	1.5	EQ. HAND DRYER			
SPARE	0	-	33				34	-	0	SPARE			
SPARE	0	20	35				36	20	0	SPARE			
EQ. SPD2	0	3P	37				38	20	0	SPARE			
EQ. SPD2	0	3P	39				40	-	0	SPARE			
EQ. SPD2	0	-	41				42	-	0	SPARE			
A PH = 31.30 B PH = 31.00 C PH = 22.50													
SERVES CONN LOAD FACTOR FEED DIVERSITY KVAD PANEL KVAD													
LIGHTING	0.00	x	1.25	=	0.00	x	=						
RECEPT	0.00	x	*	=	0.00	x	=						
MISC EQUIP	10.80	x	1.00	=	10.80	x	=						
A/C	12.60	x	1.00	=	12.60	x	=						
HEATING	24.20	x	1.00	=	24.20	x	=						
LARGEST MOTOR	0.70	x	1.25	=	0.88	x	=						
OTHER MOTORS	0.30	x	1.00	=	0.30	x	=						
OTHER	36.20	x	1.00	=	36.20	x	=						
SPARE													
TOTALS	84.80	KVA			93.42	KVA							

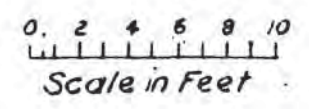
* PER N.E.C. TABLE 220.44

NEW PANEL 'J2'

PANEL: J2		AIC RATING: 22000		AMPS SERVICE: 120/ 240 V.		3PH, 4W, HI-LEG DELTA		MLO: 100 AMPS		MCB: 0 AMPS	
DESCRIPTION	KVA	BKR	CKT	A							



FRONT ELEVATION



For details of facade
See Dwg No 2072-68

DRAWING NO. 2072-49

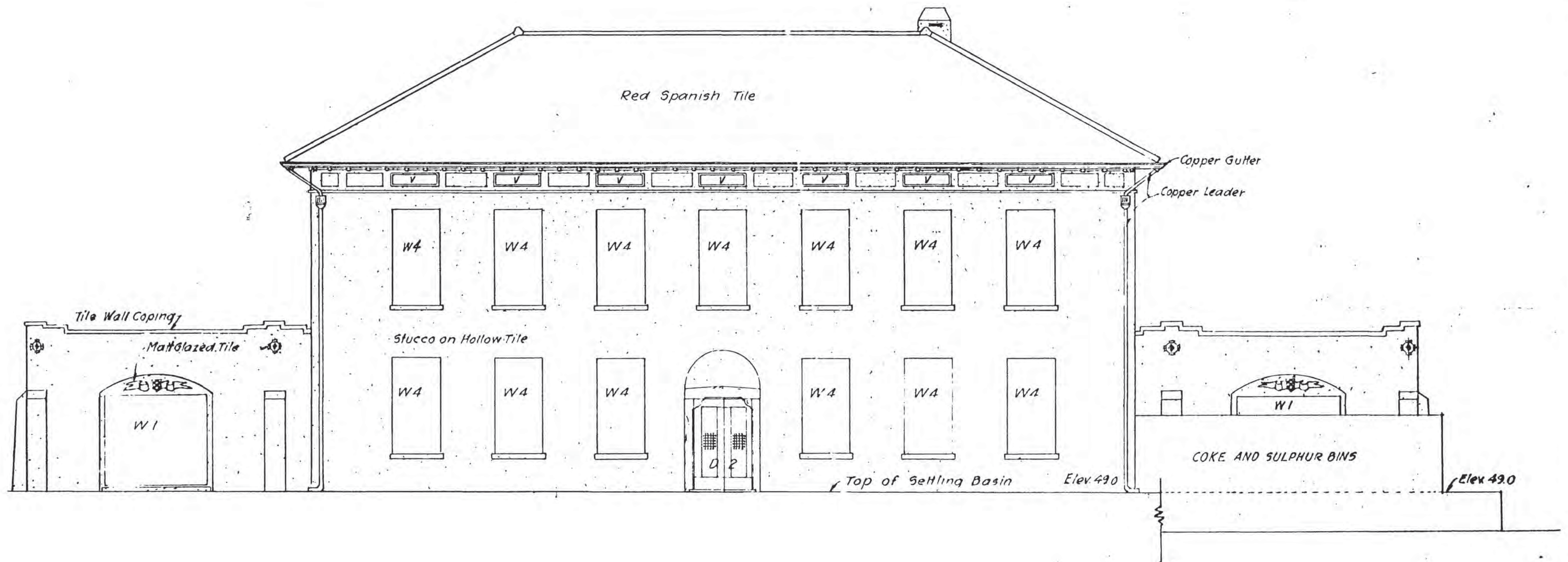
TAMPA, FLORIDA
IMPROVEMENTS TO WATER SUPPLY
HILLSBOROUGH RIVER PROJECT
FILTRATION PLANT-FILTER & CHEMICAL HOUSE
FRONT ELEVATION

Nicholas S. Hill, Jr.
Consulting Engineer
112 East 19th Street
New York City February 1, 1924

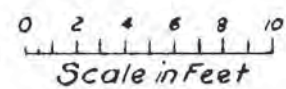
C9-1-98

Scale: 3/4"=1'-0"

Drawn by AM	Checked by [Signature]	Examined by [Signature]	Reviewed by AIR	Approved by J.K.K.
Revisions				



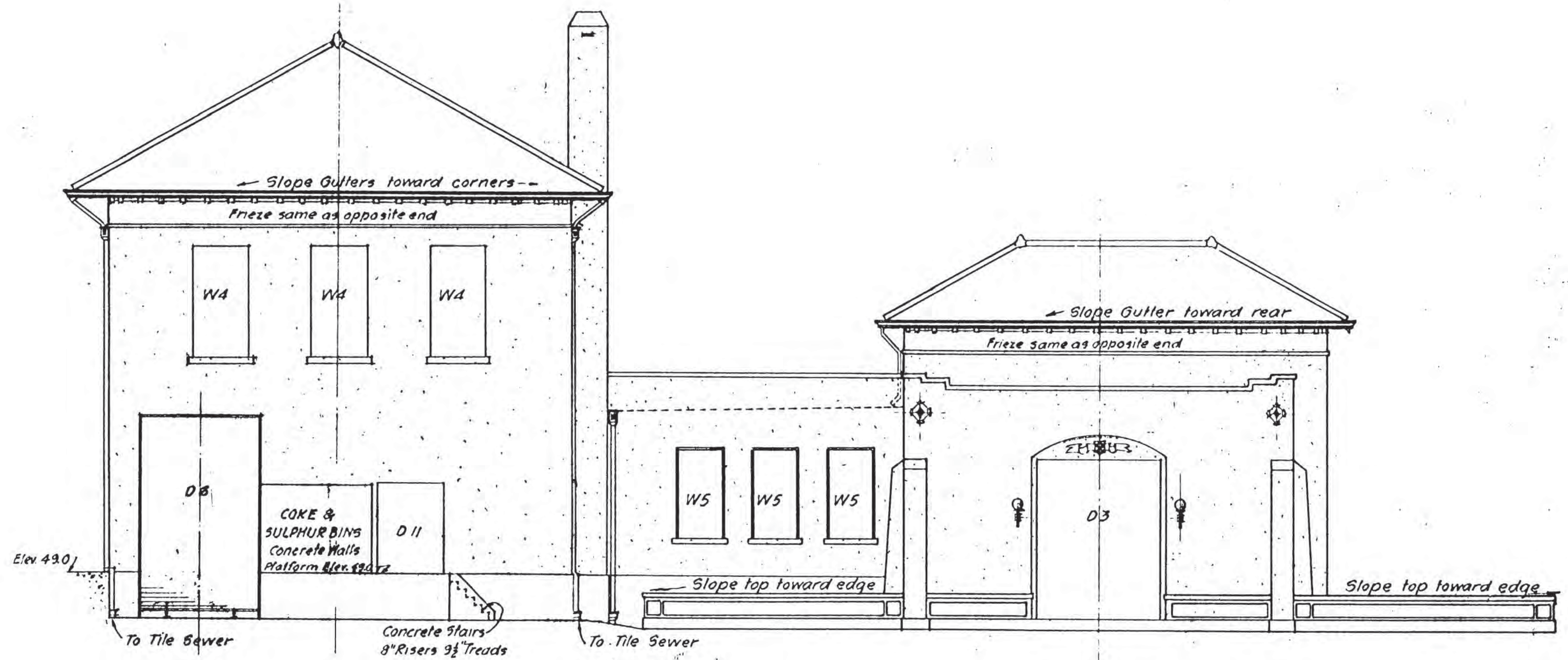
REAR ELEVATION



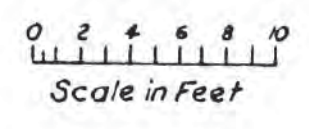
HRWTP 2-1-24 (63)
IMP. TO WATER

DRAWING NO. 2072-50

<p>C9-1-99 B74</p>		<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT-FILTER & CHEMICAL HOUSE REAR ELEVATION</p>			
		<p>Nicholas S. Hill, Jr. Consulting Engineer 112 East 19th Street New York City February 1, 1924</p>			
<p>Drawn by A. H.</p>	<p>Checked by J. H.</p>	<p>Examined by J. H.</p>	<p>Reviewed by A. H.</p>	<p>Approved by S. H. K.</p>	<p>Revisions</p>



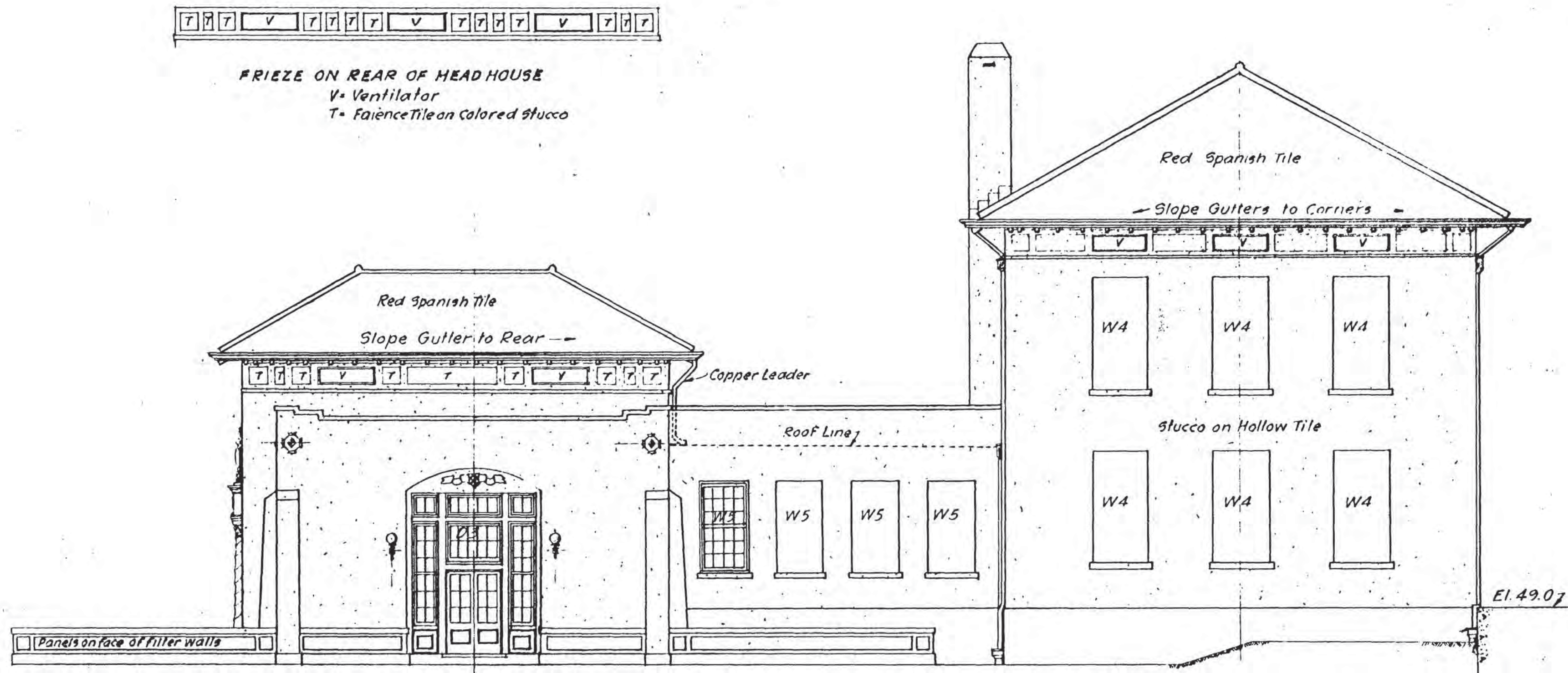
NORTH ELEVATION



HRWTP 2-1-24 IMP. TO WATER (63)

DRAWING NO. 2072-51

<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT-FILTER & CHEMICAL HOUSE NORTH ELEVATION Nicholas S. Hill, Jr. Consulting Engineer 112 East 19th Street New York City February 1, 1924</p>		<p>Scale: 1/2" = 1'-0"</p>					
		<p>C9-7-100</p>	<p>Drawn by AM</p>	<p>Checked by [Signature]</p>	<p>Examined by [Signature]</p>	<p>Reviewed by [Signature]</p>	<p>Approved by [Signature]</p>
<p>Revisions</p>		<p>[]</p>	<p>[]</p>	<p>[]</p>	<p>[]</p>	<p>[]</p>	<p>[]</p>



Note:
 Pipe rail and entrance to pipe gallery
 not shown.
 V = Ventilator
 T = Faience Tile on Colored Stucco

SOUTH ELEVATION

0 2 4 6 8
 Scale in Feet
 $\frac{1}{8}'' = 1'-0''$

Note:
 For Schedule of Doors and Windows
 See Drawing No. 2072-33

HRWTP 2-1-24 IMP. TO WATER

63

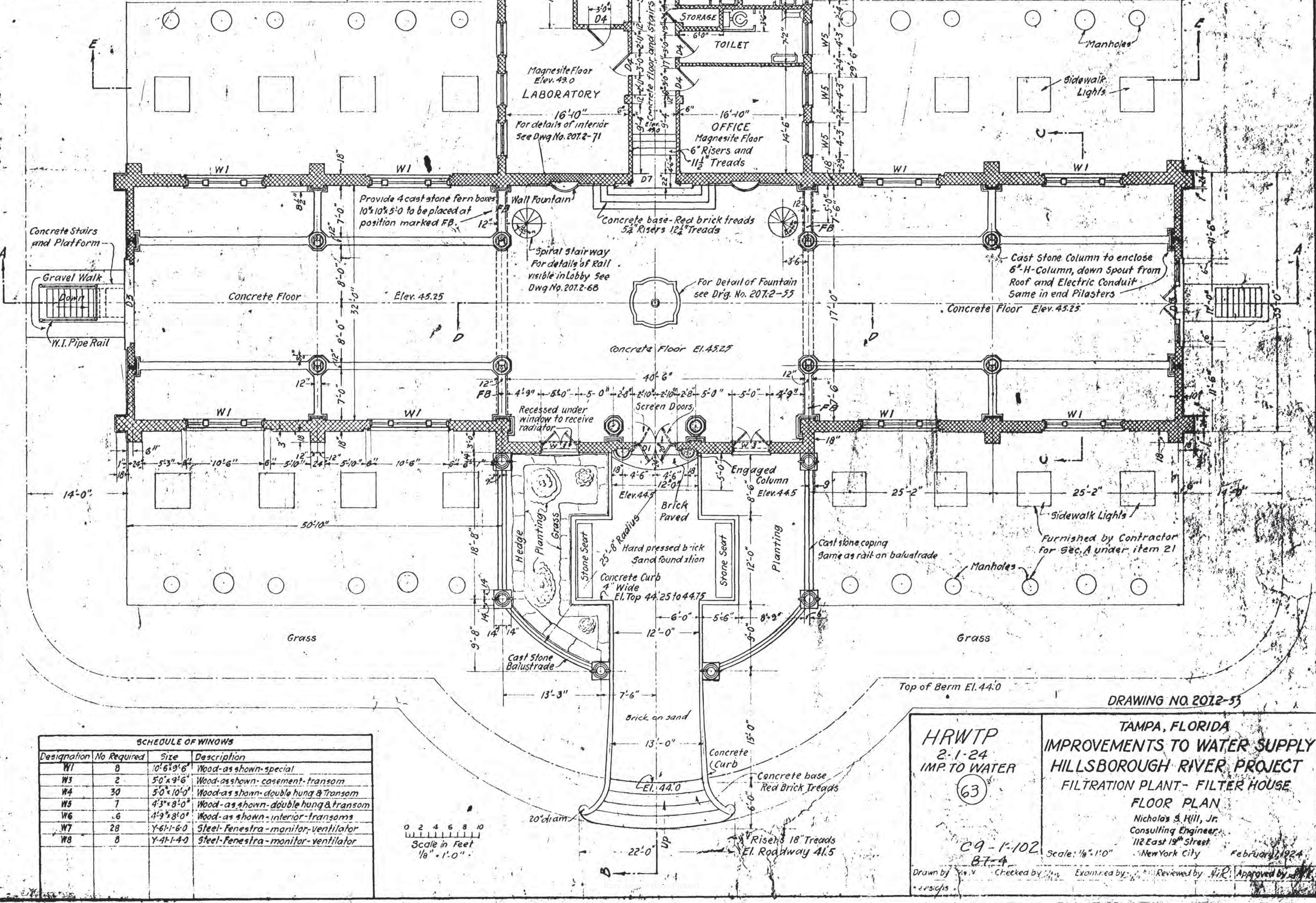
DRAWING NO. 2072-52

TAMPA FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT-FILTER & CHEMICAL HOUSE SOUTH ELEVATION Nicholas S. Hill, Jr. Consulting Engineer 112 East 19 th Street New York City February 1, 1924		Scale: $\frac{1}{8}'' = 1'-0''$		
		C9-1-101 B74		
Drawn by A.S.	Checked by J.S.	Examined by J.S.	Reviewed by J.S.	Approved by P.K.K.
Revisions	1	2	3	4

SCHEDULE OF DOORS			
Designation	No. Required	Size	Description
D1	1	6'-0" x 11'-0"	Special-wood-double
D2	1	8'-0" x 11'-0"	Special-wood
D3	2	11'-0" x 14'-0"	Wood-glazed
D4	9	3'-0" x 7'-0"	Wood-upper panel glazed
D5	2	3'-9" x 7'-0"	Wood-solid panel
D6	1	12'-0" x 17'-0"	Steel-ralling
D7	1	6'-0" x 11'-0"	Special-cast stone frame only
D13	2	6'-0" x 8'-0"	Wood-glazed-double

Note:
Dimensions are face to face of tile before plastering.

For Plan of Chemical House See Dwg. No. 207.2-34



SCHEDULE OF WINDOWS			
Designation	No. Required	Size	Description
W1	8	10'-6" x 9'-6"	Wood-as shown-special
W3	2	5'-0" x 9'-6"	Wood-as shown-casement-transom
W4	30	5'-0" x 10'-0"	Wood-as shown-double hung & transom
W5	7	4'-3" x 8'-0"	Wood-as shown-double hung & transom
W6	6	4'-9" x 8'-0"	Wood-as shown-interior-transoms
W7	28	4'-6" x 1'-6"	Steel-Fenestra-monitor-ventilator
W8	8	4'-4" x 1'-4"	Steel-Fenestra-monitor-ventilator

DRAWING NO 2072-53

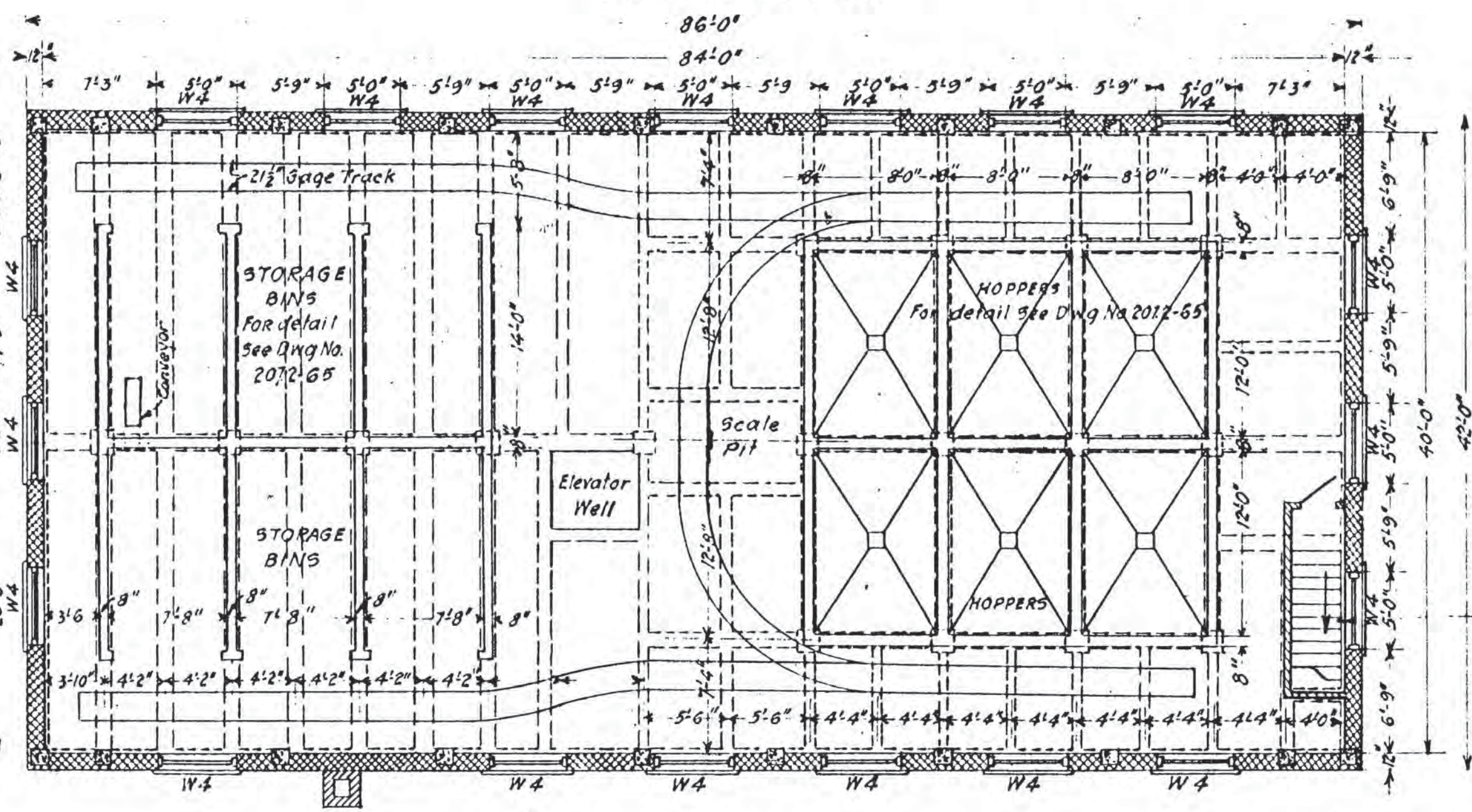
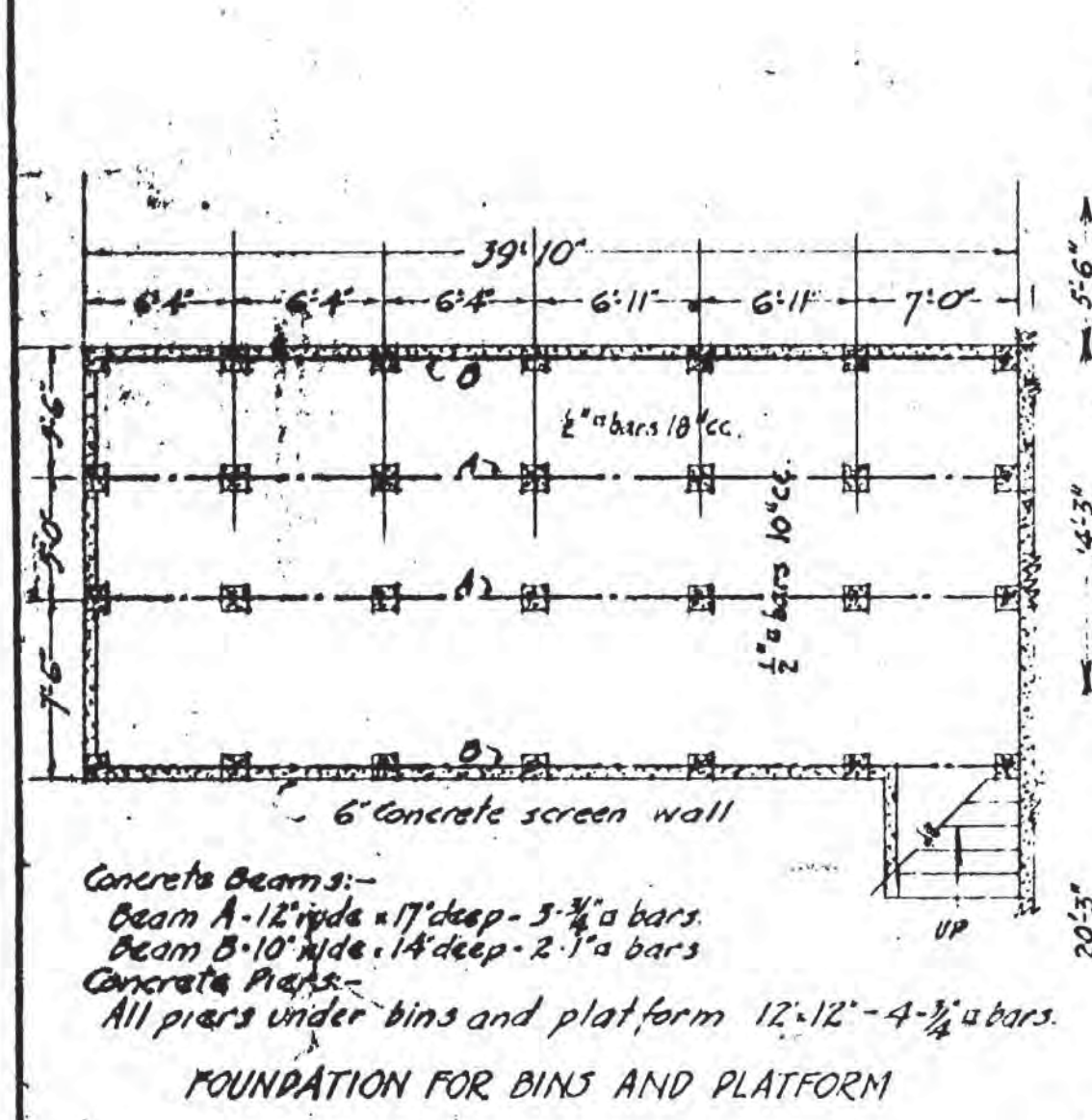
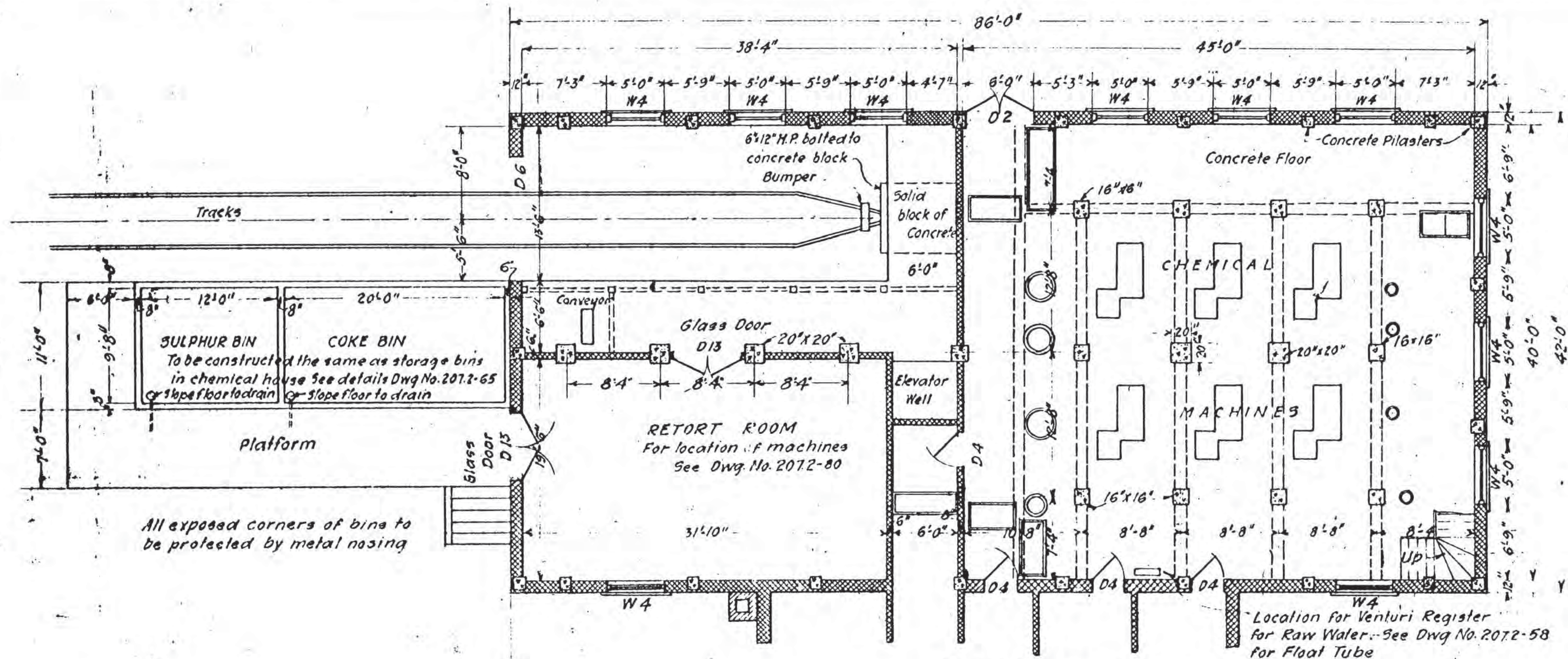
HRWTP
2-1-24
IMP. TO WATER

(63)

TAMPA, FLORIDA
IMPROVEMENTS TO WATER SUPPLY
HILLSBOROUGH RIVER PROJECT
FILTRATION PLANT- FILTER HOUSE
FLOOR PLAN
Nicholas S. Hill, Jr.
Consulting Engineer
112 East 19th Street
New York City

Scale: 1/8" = 1'-0"
C9-1-102
B7-4
February 1924

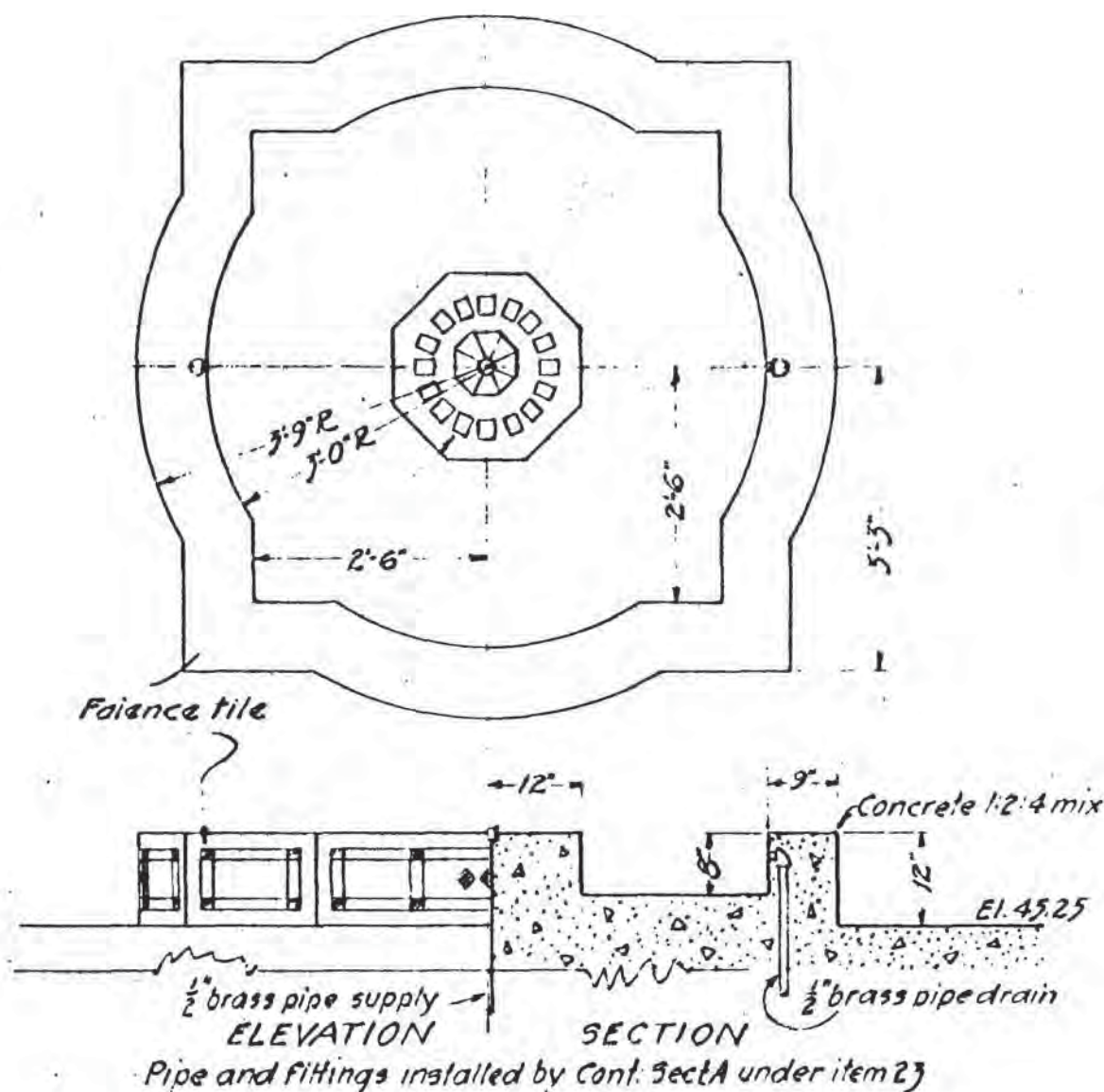
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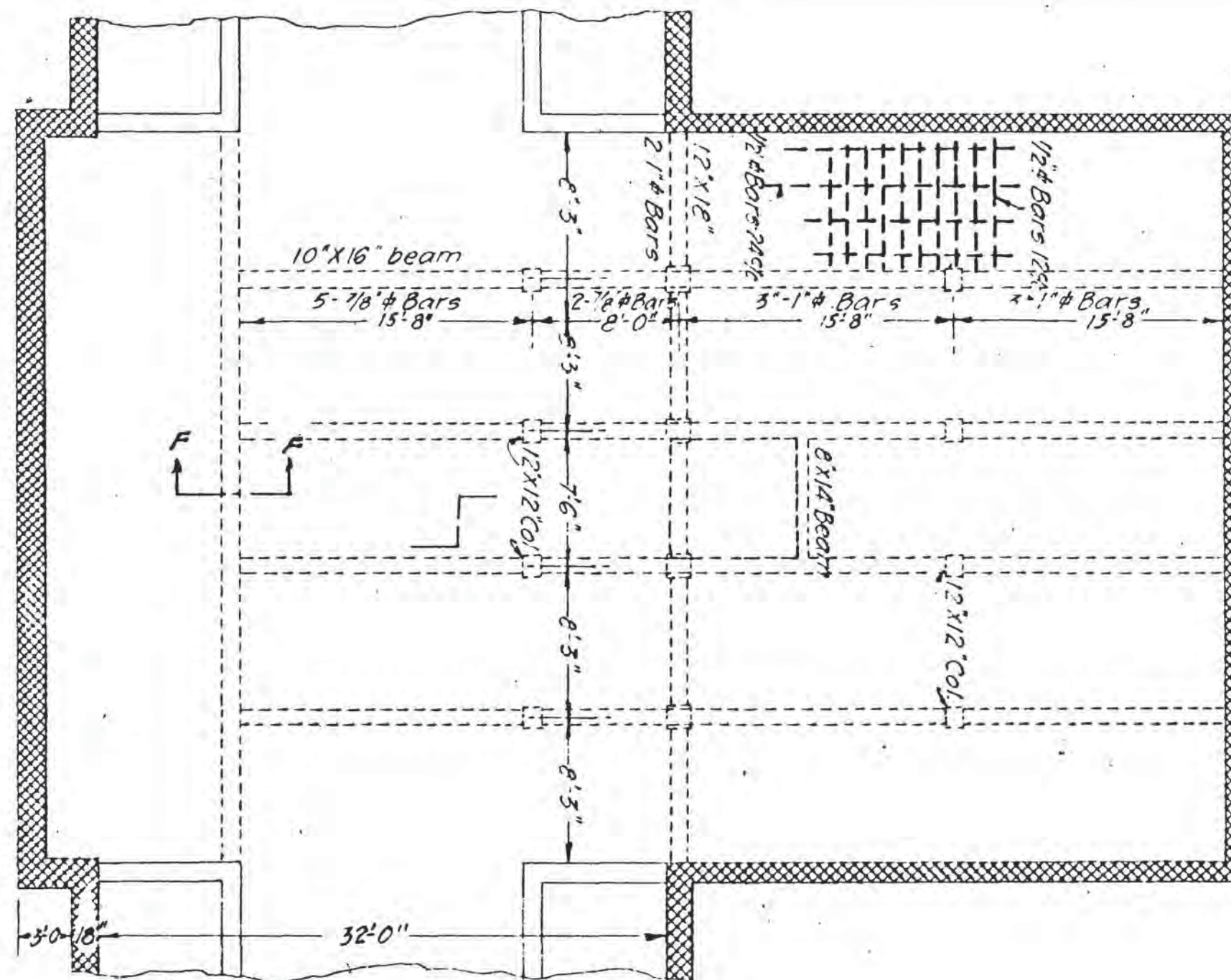
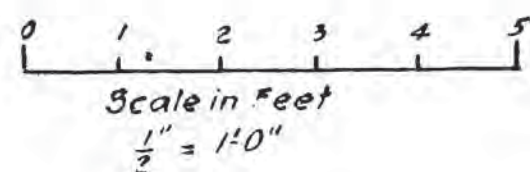
HRWTP 2-1-24 IMP. TO WATER (63)

DRAWING NO. 2072-54

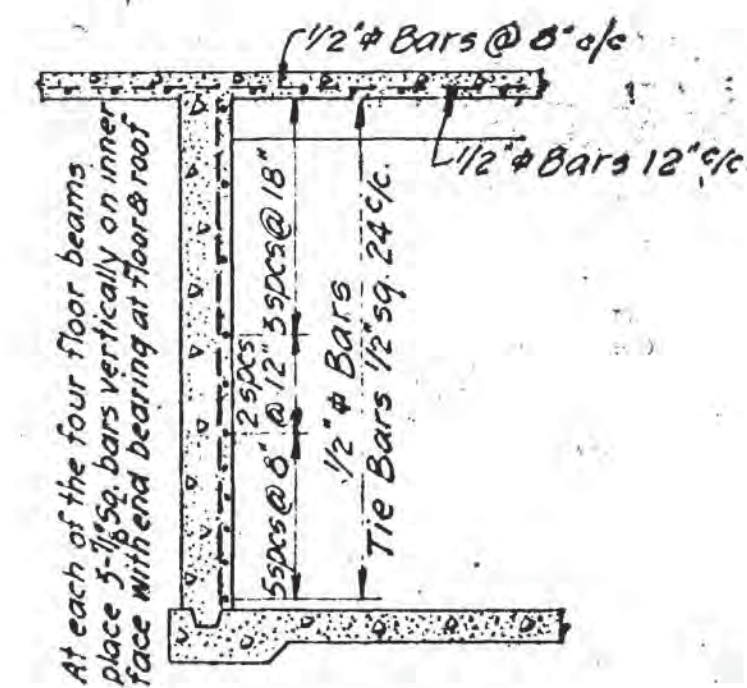
<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT - CHEMICAL HOUSE FLOOR PLANS</p> <p>Nicholas S. Hill, Jr. Consulting Engineer 112 East 19th Street New York City</p> <p>Scale: 3/8" = 1'-0" February 1, 1924</p>				
<p>Drawn by S.W.M. Revisions</p>	<p>Checked by F.W.S.</p>	<p>Examined by A.W.S. H.C.</p>	<p>Reviewed by R.R.</p>	<p>Approved by R.K.K.</p>



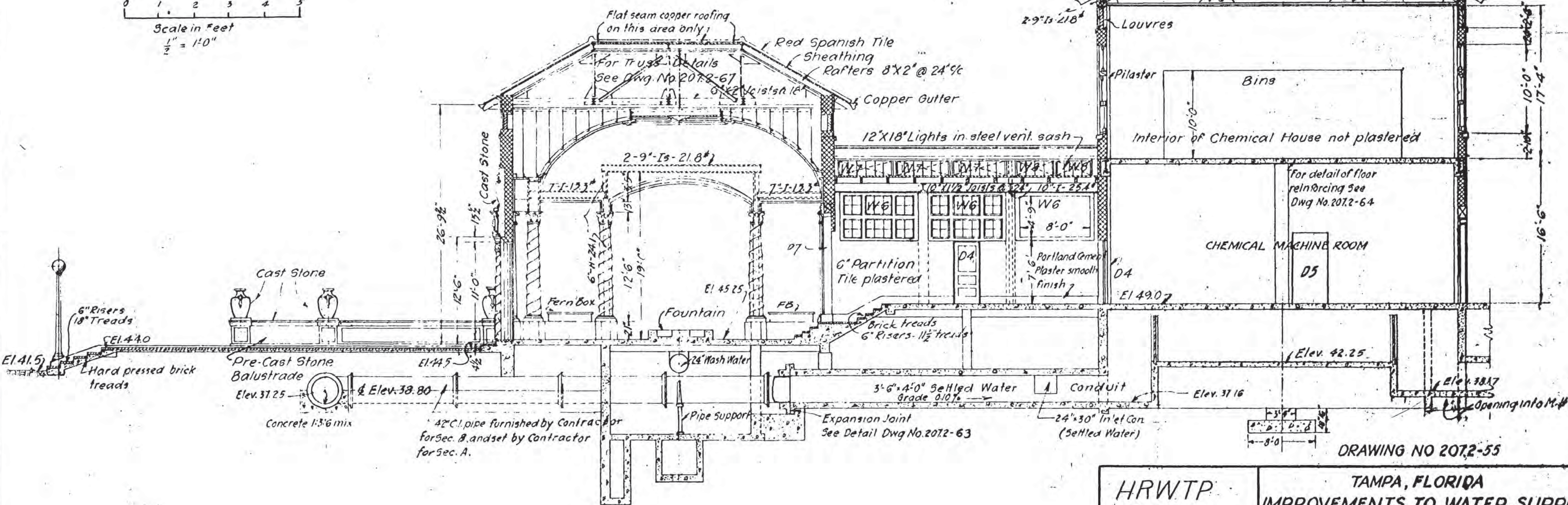
DETAIL OF FOUNTAIN



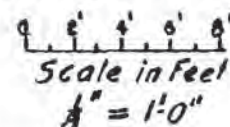
PLAN



SECTION F-F

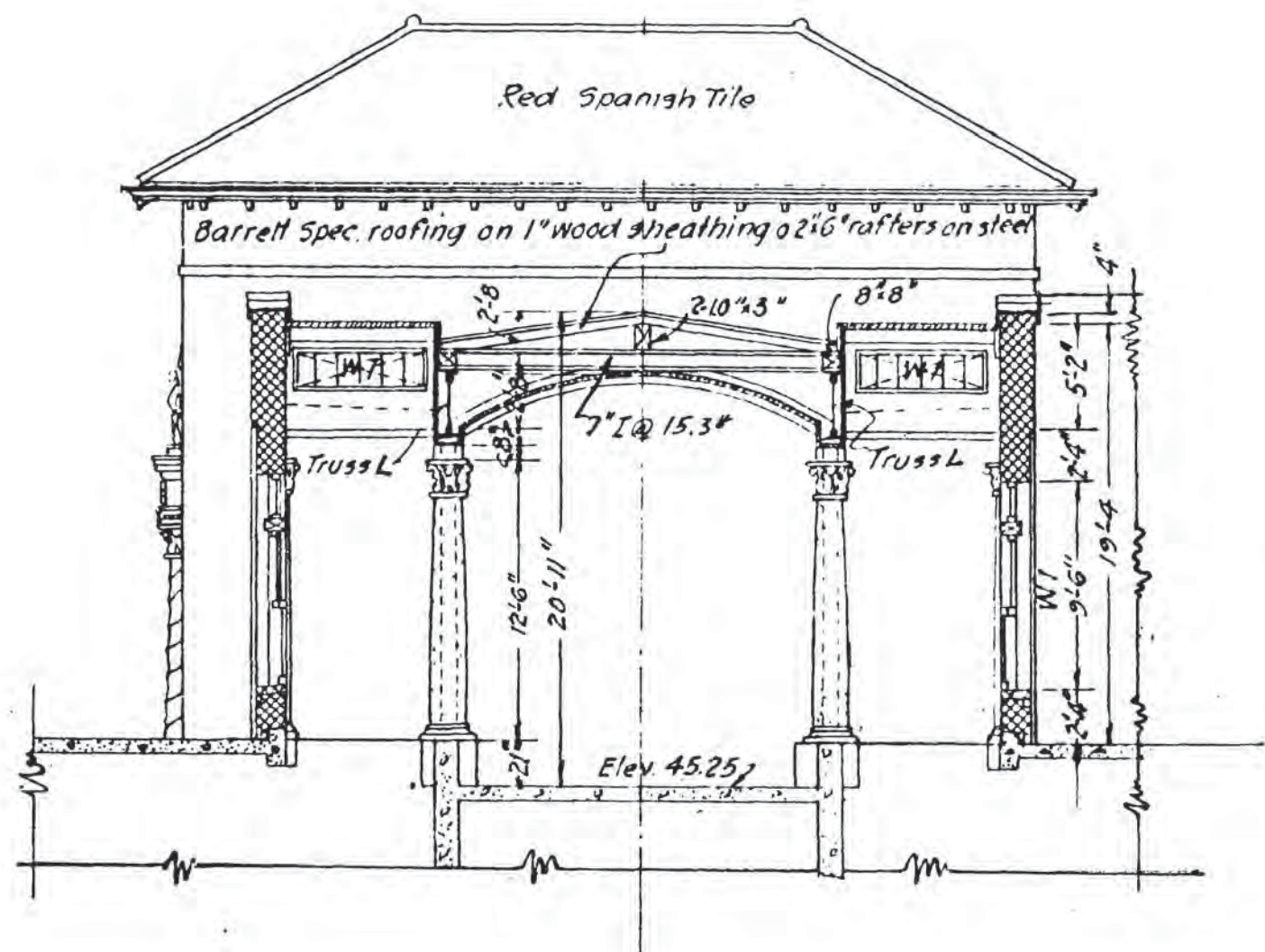


SECTION B-B

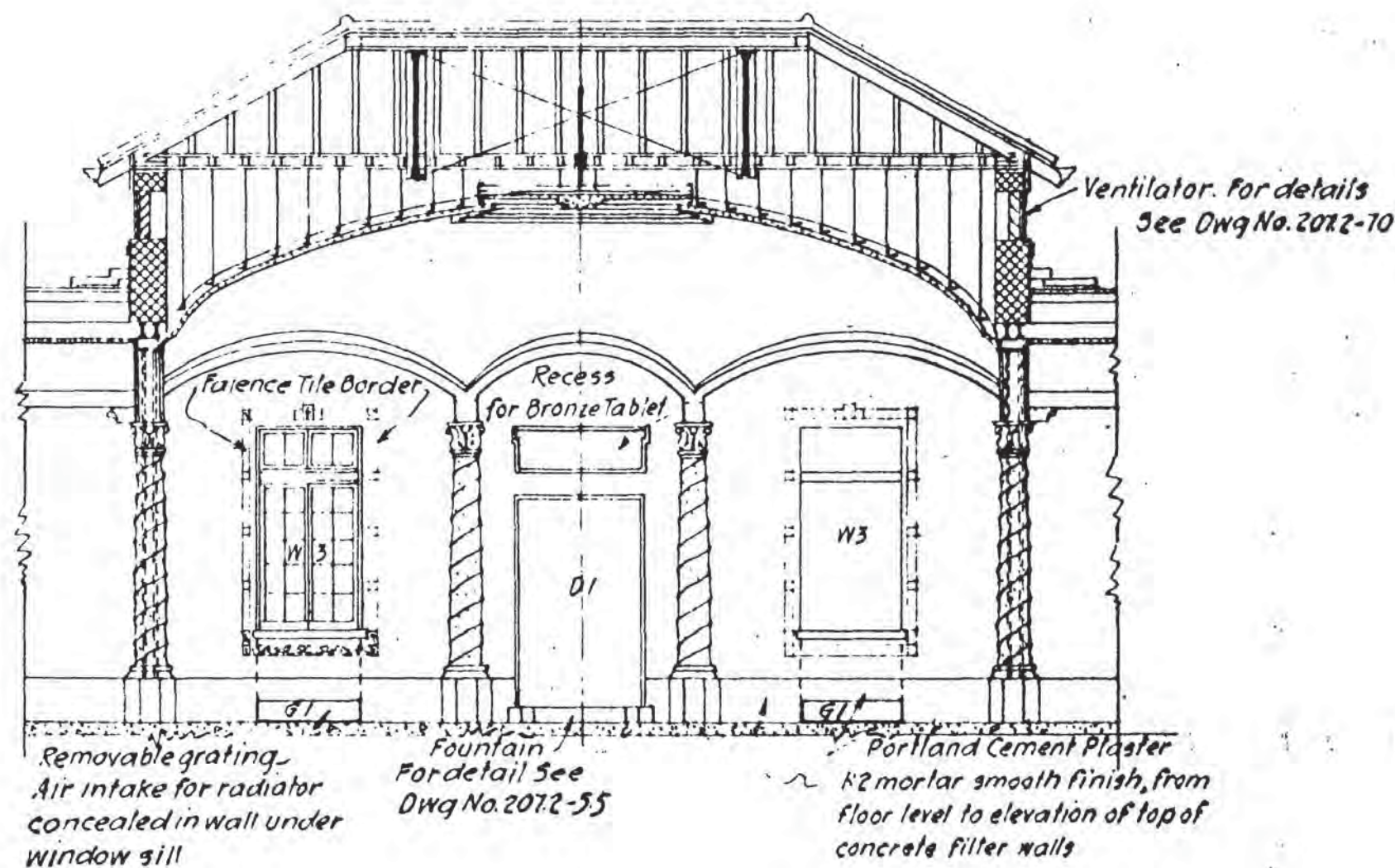


For PLAN See Drawing No. 2072-53

<p>HRWTP 2-1-24 IMP TO WATER 63</p>		<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT-FILTER AND CHEMICAL HOUSE PART PLAN AND SECTION</p>	
<p>C9-1-104 BT-4</p>		<p>Nicholas S. Hill, Jr. Consulting Engineer 112 East 19th Street New York City</p>	
<p>Scale: As shown</p>		<p>February 1, 1924</p>	
<p>Drawn by a.c.</p>	<p>Checked by <i>[initials]</i></p>	<p>Examined by <i>[initials]</i></p>	<p>Reviewed by</p>
<p>Revisions</p>			<p>Approved by</p>

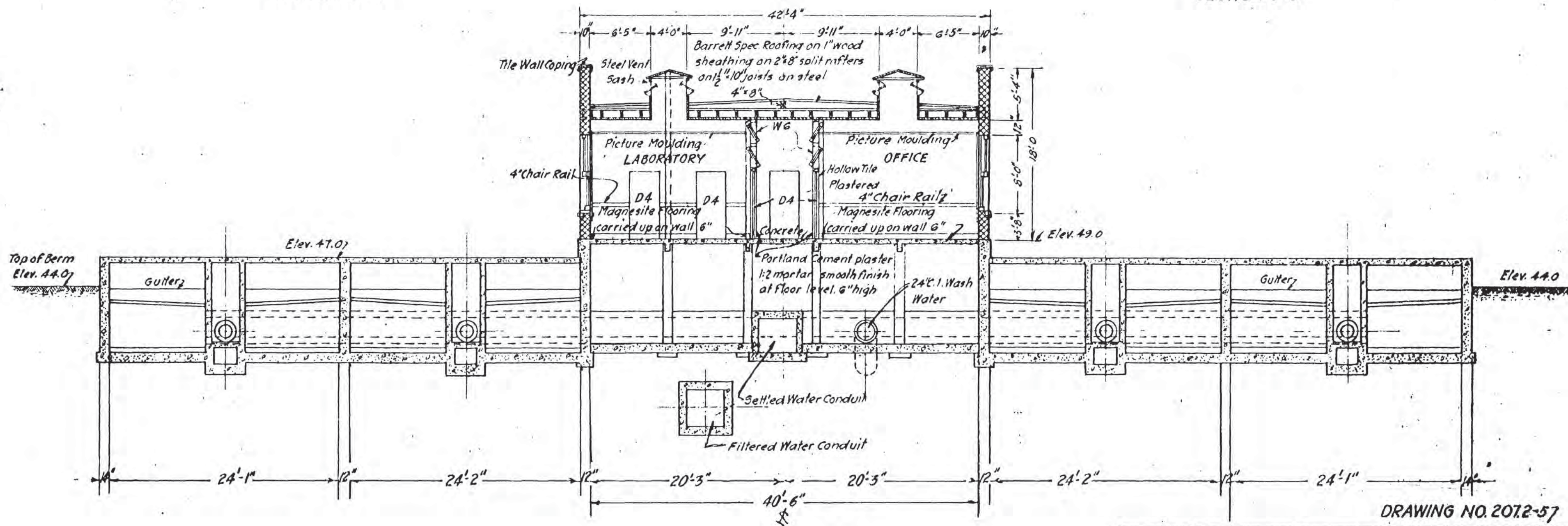


Note: For details of steel framing shown on this drawing See Dwg. Nos 207.2-66 & 67



SECTION C-C

SECTION D-D



SECTION E-E

Scales in feet
0 1 2 3 4 5 6 7 8

For PLAN See Drawing No 207.2-53

DRAWING NO. 207.2-57

<p>HRWTP 2-1-24 IMP. TO WATER</p>		<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT FILTER HOUSE SECTIONS</p>	
<p>(63)</p>		<p>Nicholas & Hill, Jr. Consulting Engineer 112 East 19th Street New York City</p>	
<p>C9-1-106 B7-4</p>		<p>Scale 3/8" = 1'-0"</p>	
<p>Drawn by A.C.</p>	<p>Checked by J.C.</p>	<p>Examined by J.C.</p>	<p>Reviewed by A.C.</p>
<p>Revisions</p>			

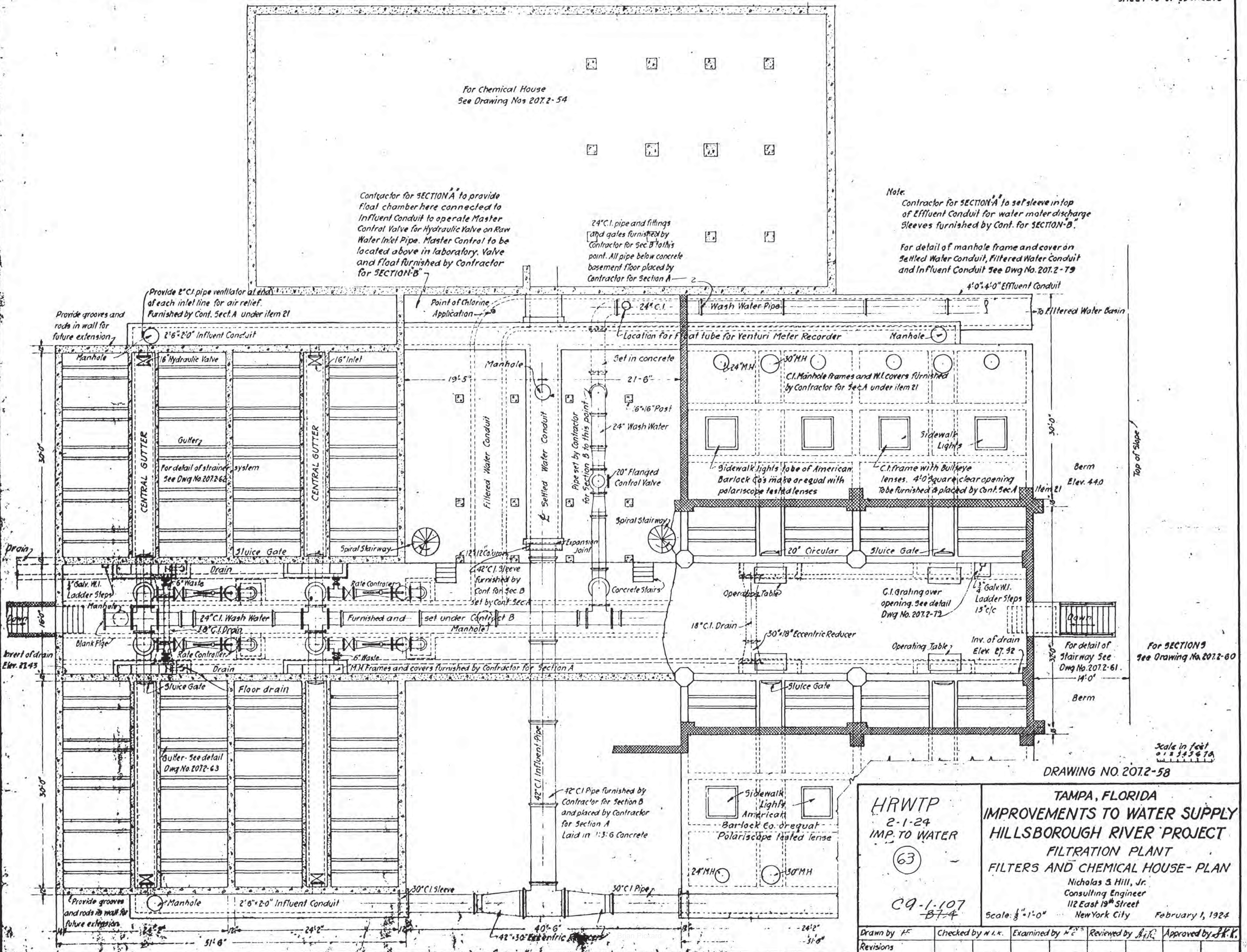
For Chemical House
See Drawing Nos 207.2-54

Contractor for SECTION A to provide float chamber here connected to Influent Conduit to operate Master Control Valve for Hydraulic Valve on Raw Water Inlet Pipe. Master Control to be located above in laboratory. Valve and float furnished by Contractor for SECTION-B

24" C.I. pipe and fittings and gates furnished by Contractor for Sec B at this point. All pipe below concrete basement floor placed by Contractor for Section A

Note:
Contractor for SECTION A to set sleeve in top of Effluent Conduit for water meter discharge. Sleeves furnished by Cont. for SECTION-B.

For detail of manhole frame and cover on Settled Water Conduit, Filtered Water Conduit and Influent Conduit See Dwg No. 207.2-79



4'-0" x 4'-0" Effluent Conduit
To Filtered Water Basin

Provide 2" C.I. pipe ventilator at end of each inlet line for air relief. Furnished by Cont. Sect. A under item 21

Provide grooves and rods in wall for future extension

Point of Chlorine Application

Location for float tube for Venturi Meter Recorder

16" Hydraulic Valve

16" Inlet

24" C.I.

Wash Water Pipe

Manhole

CENTRAL GUTTER

CENTRAL GUTTER

Manhole

Set in concrete

24" M.H.

30" M.H.

Manhole

Gutter

For detail of strainer system See Dwg No 207.2-62

Manhole

21'-6"

16"x16" Post

24" Wash Water

24" M.H.

30" M.H.

Manhole

Sluice Gate

Spiral Stairway

Expansion Joint

Spiral Stairway

Sidewalk Lights
Sidewalk lights to be of American Barlock Co's make or equal with polariscope tested lenses

C.I. frame with Bullseye lenses. 4'-0" square clear opening to be furnished & placed by Cont. Sec A

Berm Elev. 4.40

Drain

Rate Controller

Concrete Stairs

Concrete Stairs

Operating Table

Operating Table

Down

24" C.I. Wash Water

Rate Controller

42" C.I. Pipe furnished by Contractor for Section B and placed by Contractor for Section A Laid in 1:3:6 Concrete

Concrete Stairs

18" C.I. Drain

30" x 18" Eccentric Reducer

Down

Drain

M.H. Frames and covers furnished by Contractor for Section A

42" C.I. Influent Pipe

Concrete Stairs

30" x 18" Eccentric Reducer

Operating Table

Inv. of drain Elev. 27.92

Sluice Gate

Floor drain

42" C.I. Influent Pipe

Concrete Stairs

Sluice Gate

Operating Table

Berm

Gutter - See detail Dwg No 207.2-63

Manhole

42" C.I. Influent Pipe

Concrete Stairs

Sluice Gate

Operating Table

For detail of Stairway See Dwg No. 207.2-61

Manhole

2'-6" x 2'-0" Influent Conduit

42" C.I. Influent Pipe

30" C.I. Pipe

Sluice Gate

Operating Table

For detail of Stairway See Dwg No. 207.2-61

Provide grooves and rods in wall for future extension

Manhole

42" x 30" Eccentric Reducer

30" C.I. Pipe

Sluice Gate

Operating Table

For detail of Stairway See Dwg No. 207.2-61

For SECTION 9 See Drawing No 207.2-60

Scale in feet
0" = 1" = 0' 0"

DRAWING NO. 207.2-58

HRWTP
2-1-24
IMP. TO WATER
63

C9-1-107
-B74

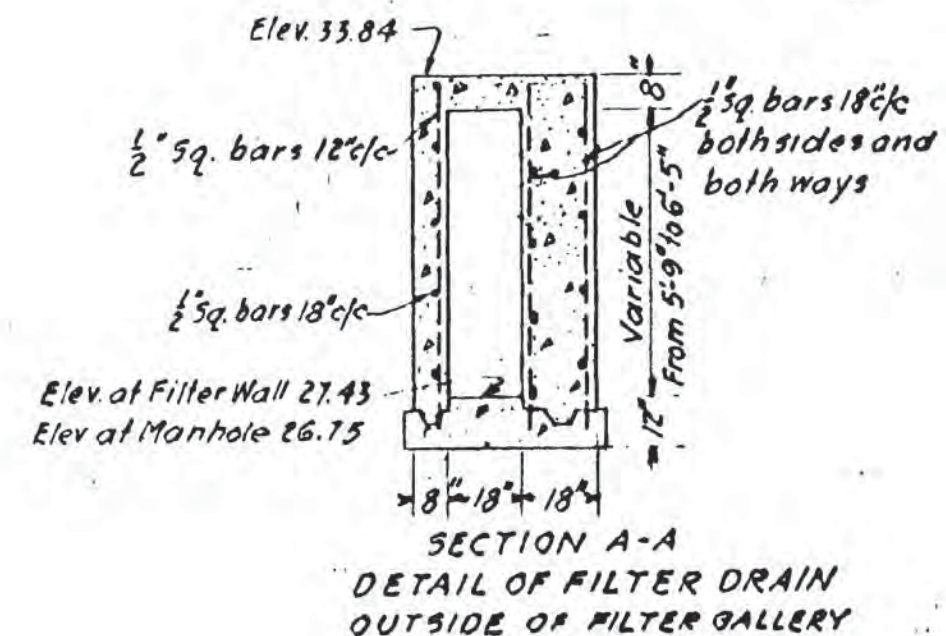
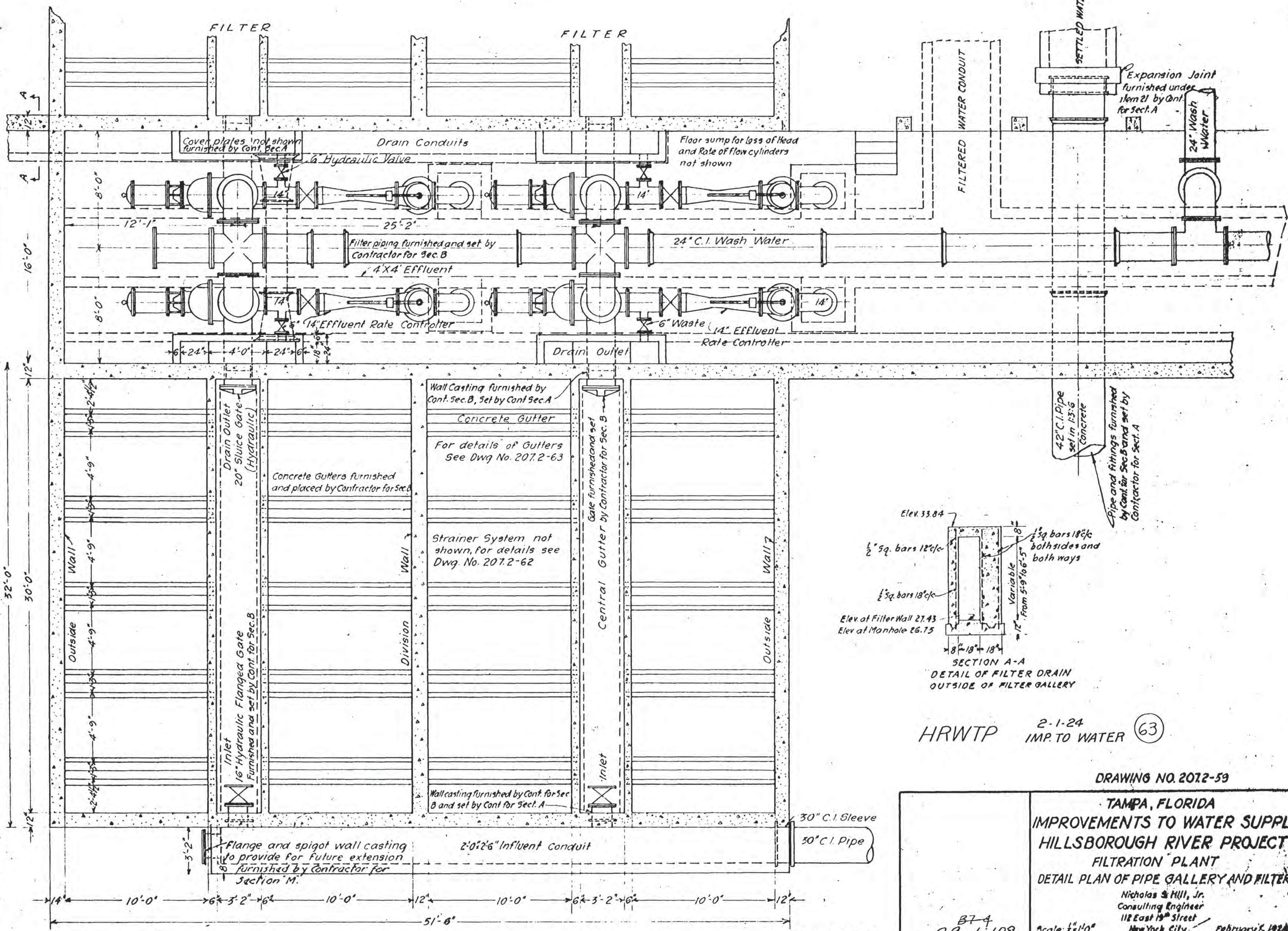
TAMPA, FLORIDA
IMPROVEMENTS TO WATER SUPPLY
HILLSBOROUGH RIVER PROJECT
FILTRATION PLANT
FILTERS AND CHEMICAL HOUSE - PLAN

Nicholas S Hill, Jr.
Consulting Engineer
112 East 19th Street
New York City

February 1, 1924

Scale: 3/8" = 1'-0"

Drawn by H.F.	Checked by M.L.K.	Examined by M.C.	Reviewed by J.H.R.	Approved by J.H.K.
Revisions				



HRWTP 2-1-24 IMP. TO WATER (63)

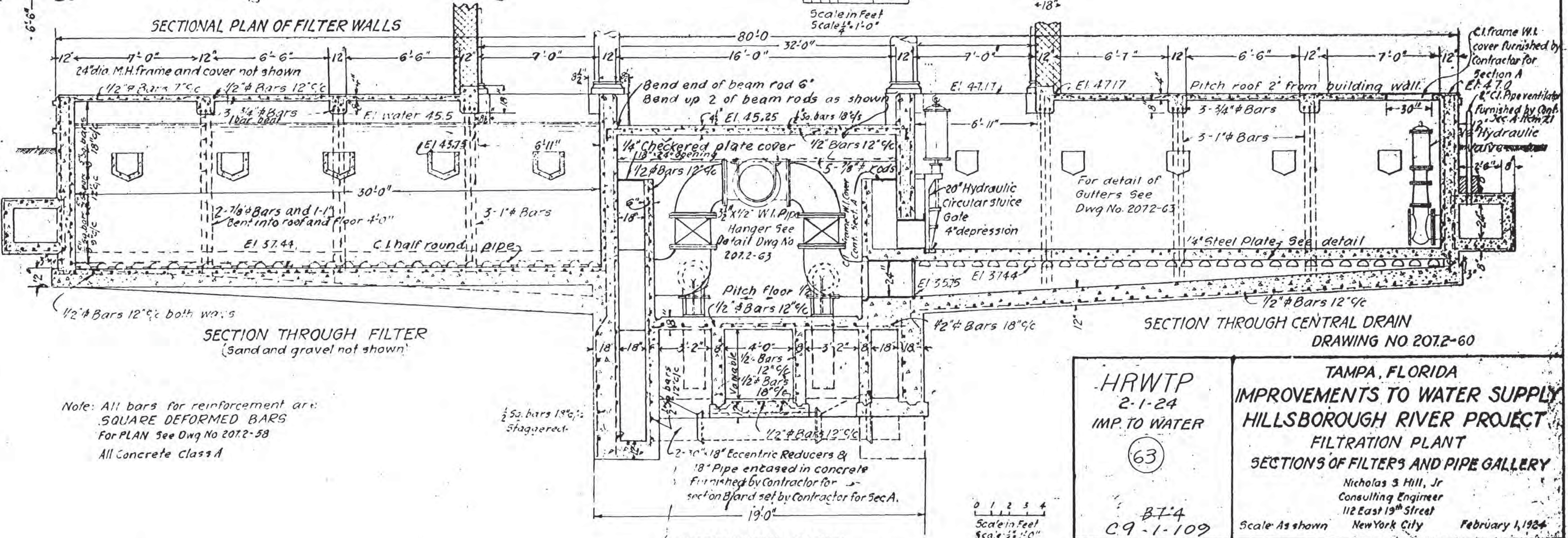
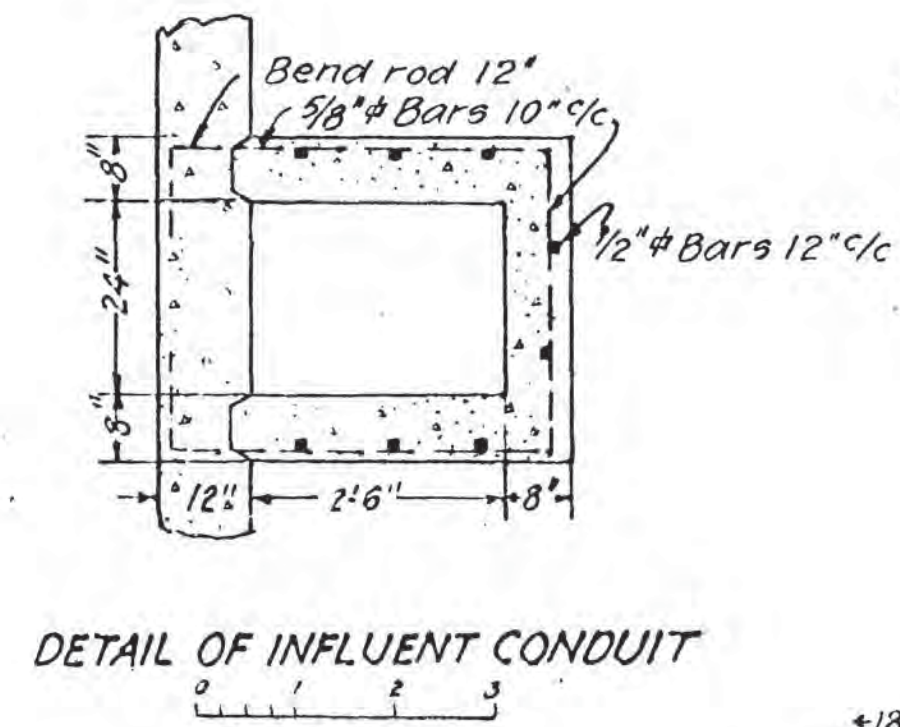
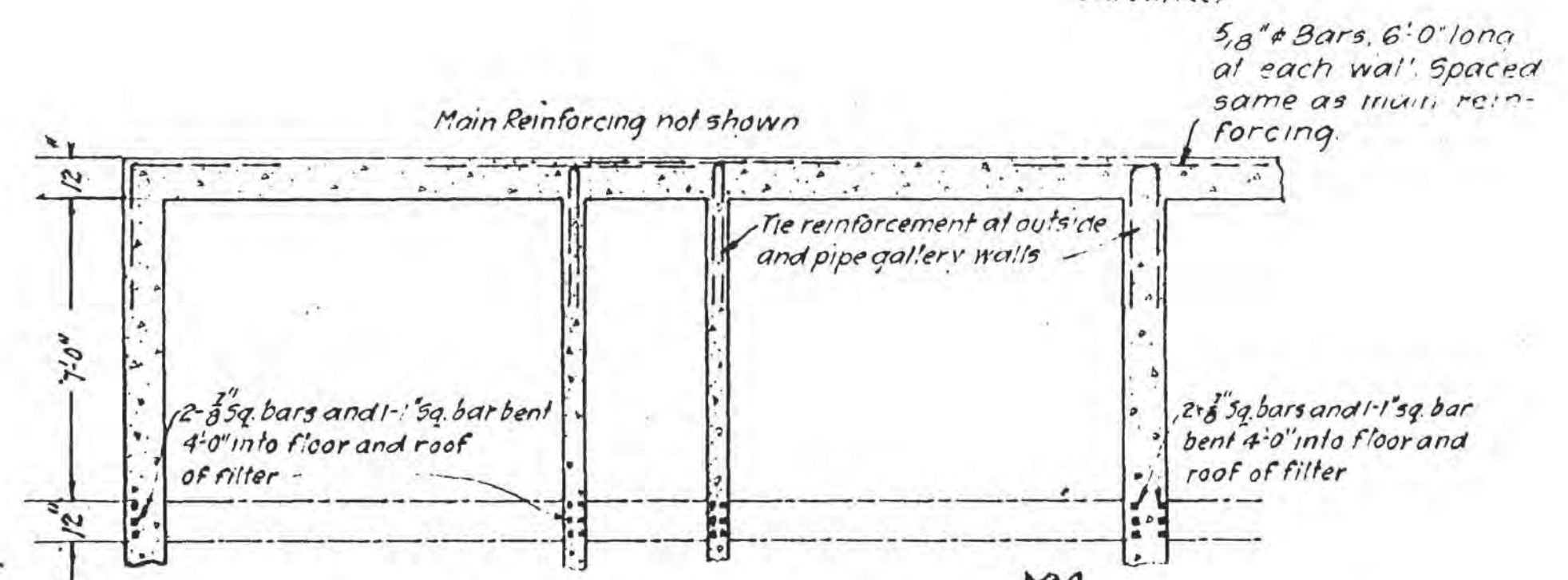
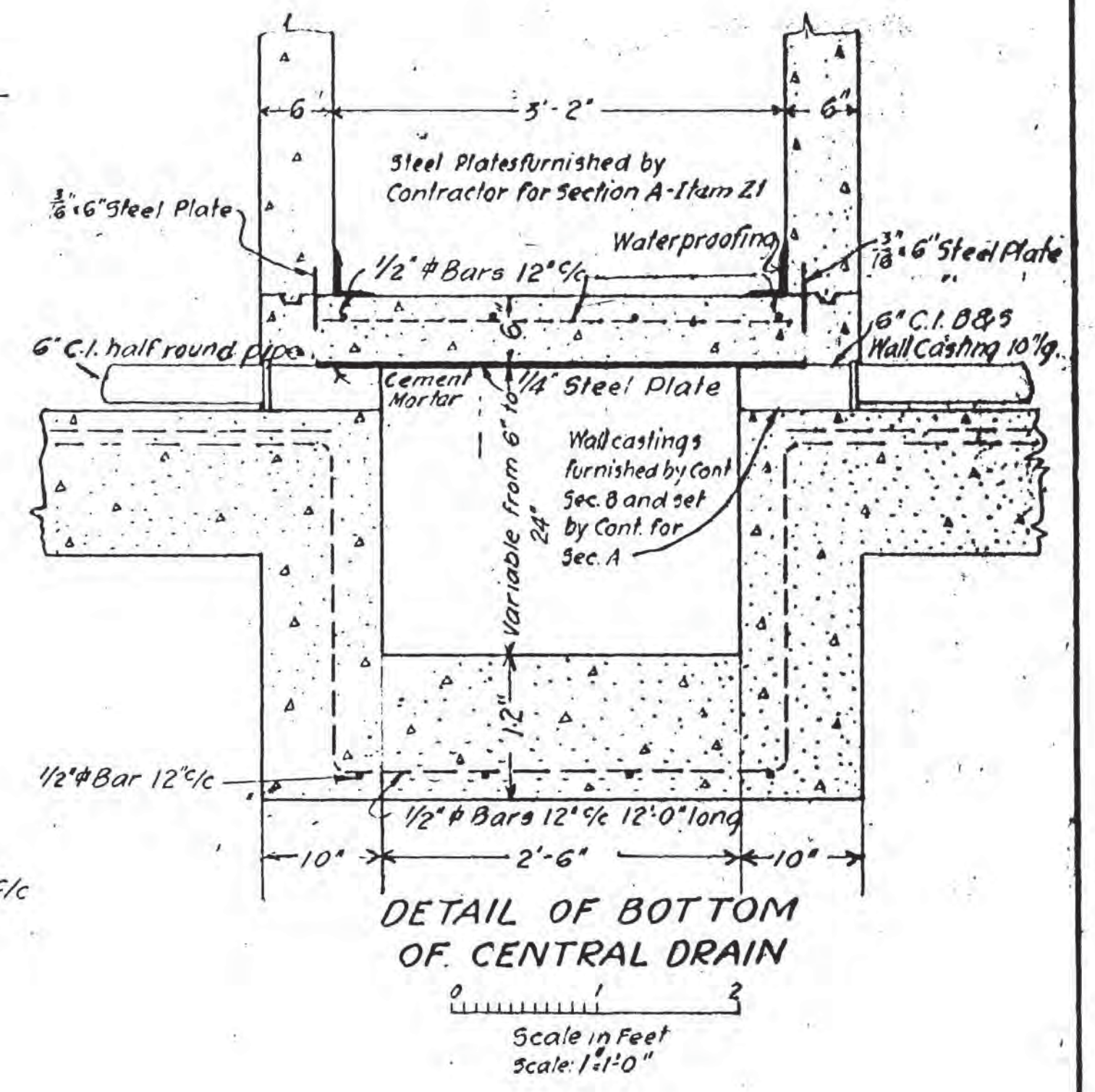
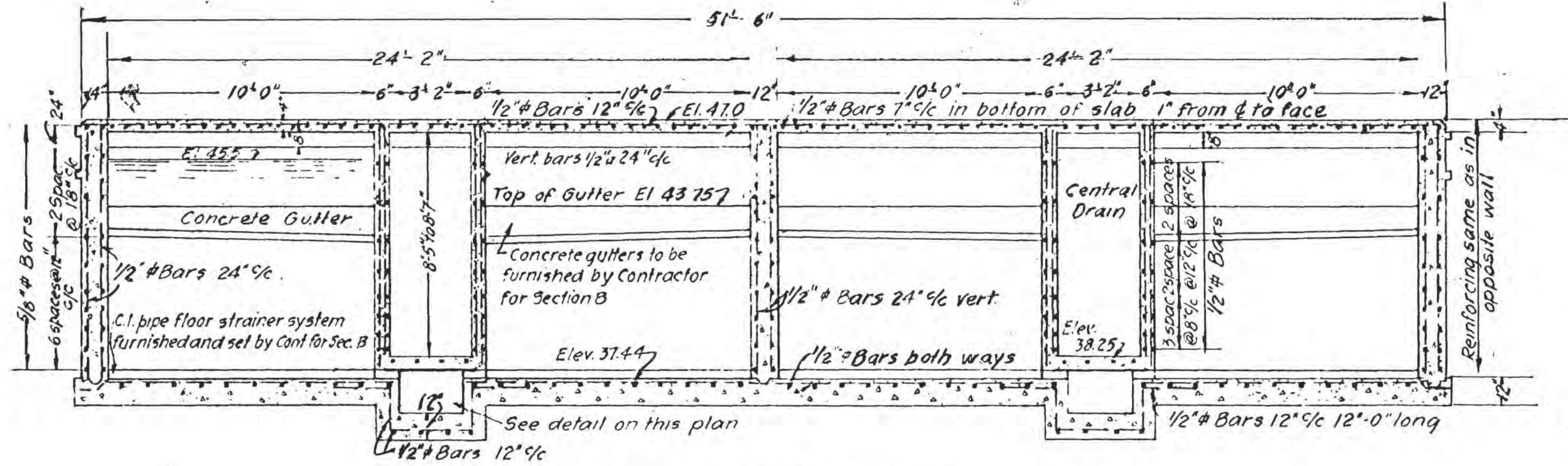
DRAWING NO. 2072-59

TAMPA, FLORIDA
**IMPROVEMENTS TO WATER SUPPLY
 HILLSBOROUGH RIVER PROJECT**
 FILTRATION PLANT
 DETAIL PLAN OF PIPE GALLERY AND FILTERS

Nicholas S. Hill, Jr.
 Consulting Engineer
 112 East 19th Street
 New York City. February 1, 1926

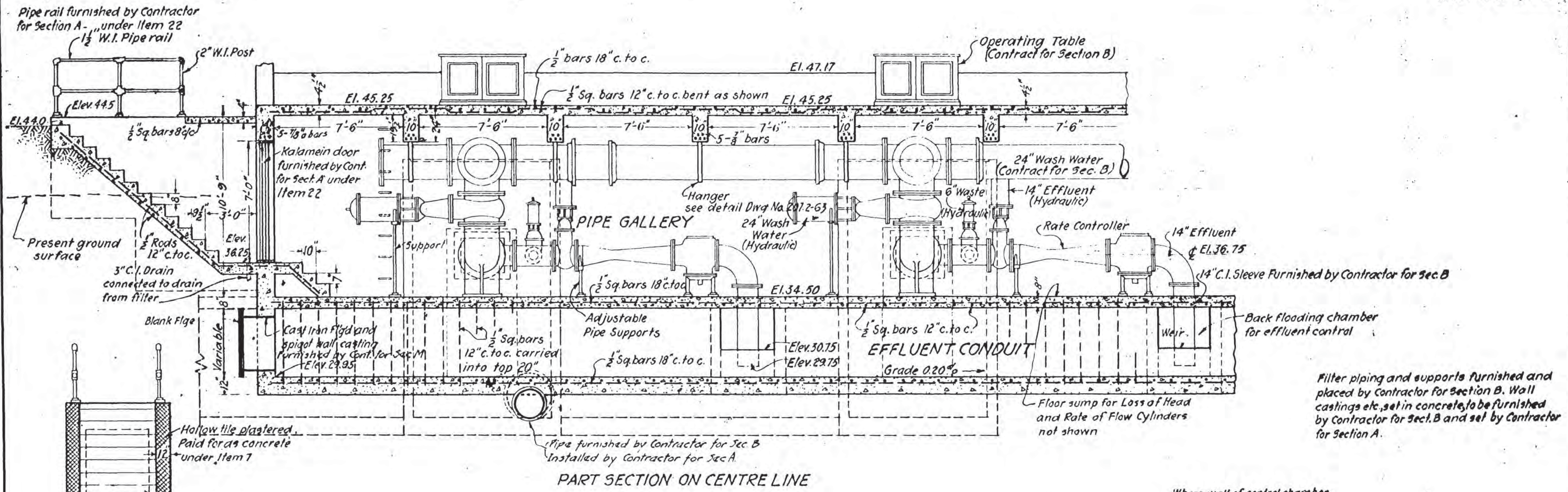
B74
C9-1-108 Scale: 1/4"=1'-0"

Drawn by SWM	Checked by N.K.	Examined by H.C.	Reviewed by J.R.	Approved by J.K.K.
Revisions				



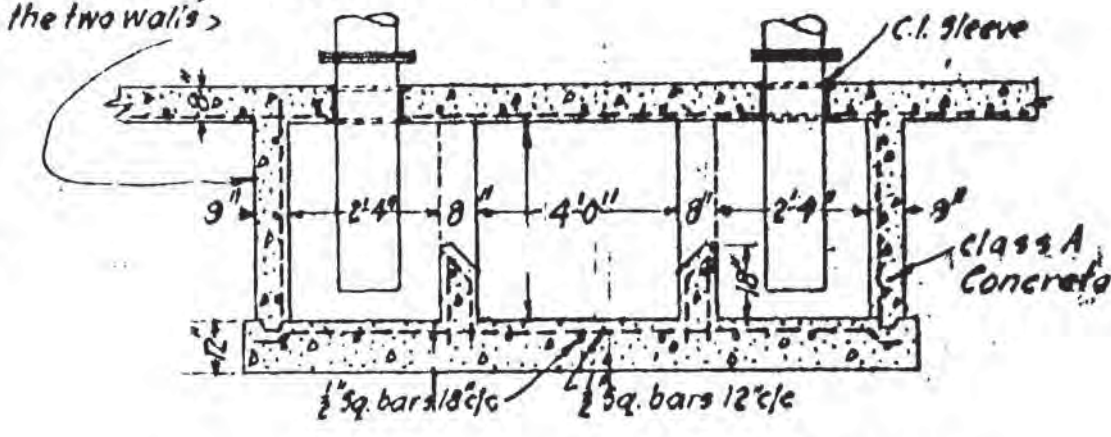
Note: All bars for reinforcement are SQUARE DEFORMED BARS
For PLAN See Dwg No 2072-58
All Concrete Class A

HRWTP 2-1-24 IMP. TO WATER 63		TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT SECTIONS OF FILTERS AND PIPE GALLERY Nicholas S Hill, Jr Consulting Engineer 112 East 19th Street New York City February 1, 1924	
B74 C9-1-109	Scale: As shown	Drawn by SWM Checked by N.K. Examined by J.C. Reviewed by A.L.R. Approved by	Revisions

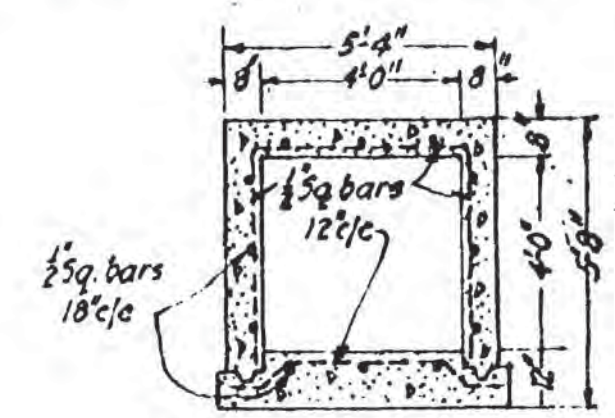


Filter piping and supports furnished and placed by Contractor for Section B. Wall castings etc. set in concrete to be furnished by Contractor for Sect. B and set by Contractor for Section A.

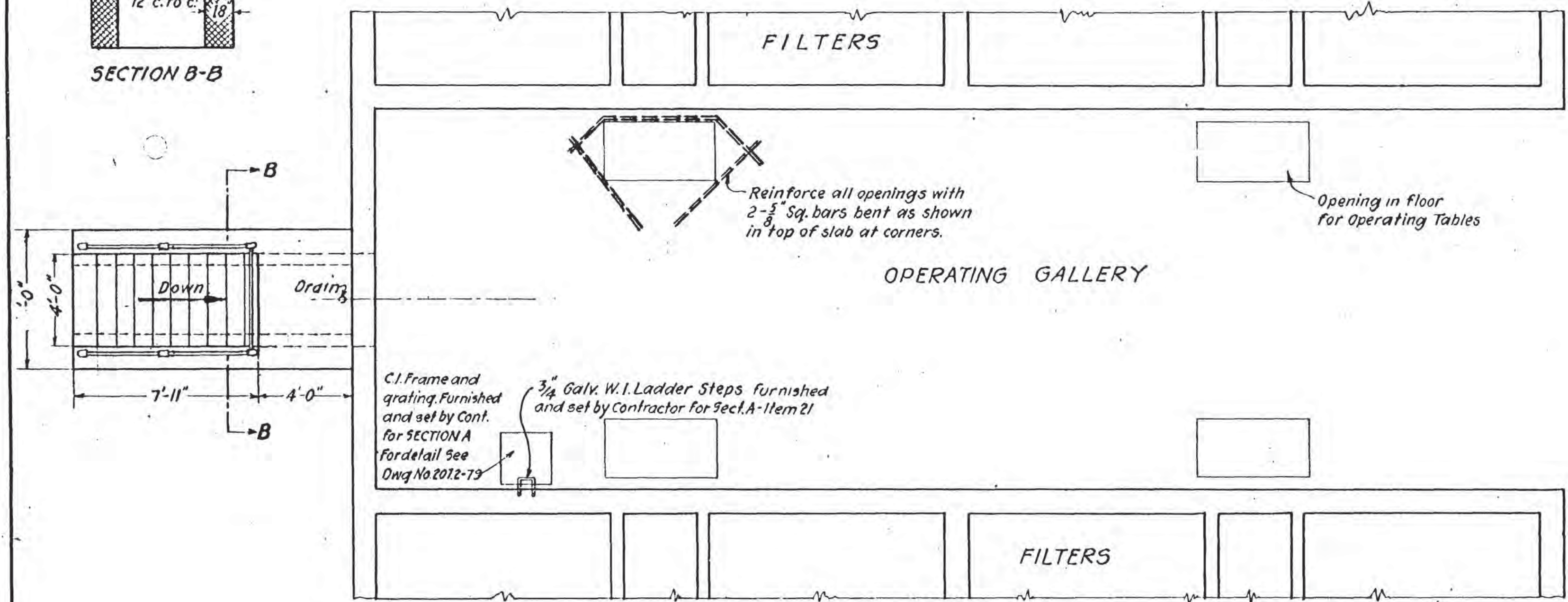
Where wall of control chamber is adjacent to wall of drain 1" of waterproofing shall be used between the two walls.



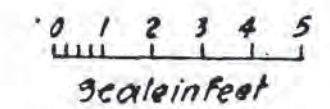
SECTION THROUGH CONTROL CHAMBER



SECTION OF FILTERED WATER CONDUIT OUTSIDE OF BUILDING



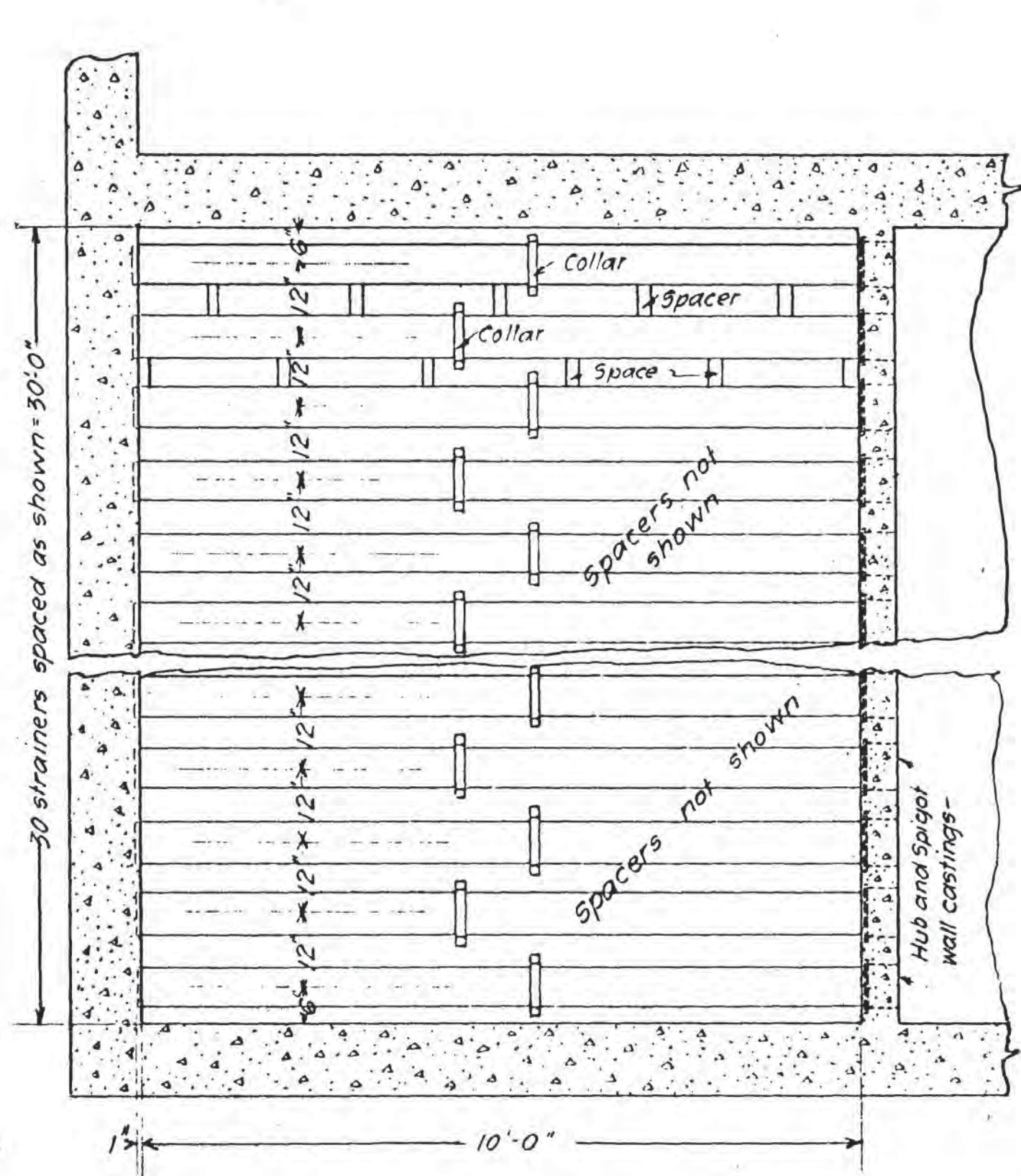
PART PLAN



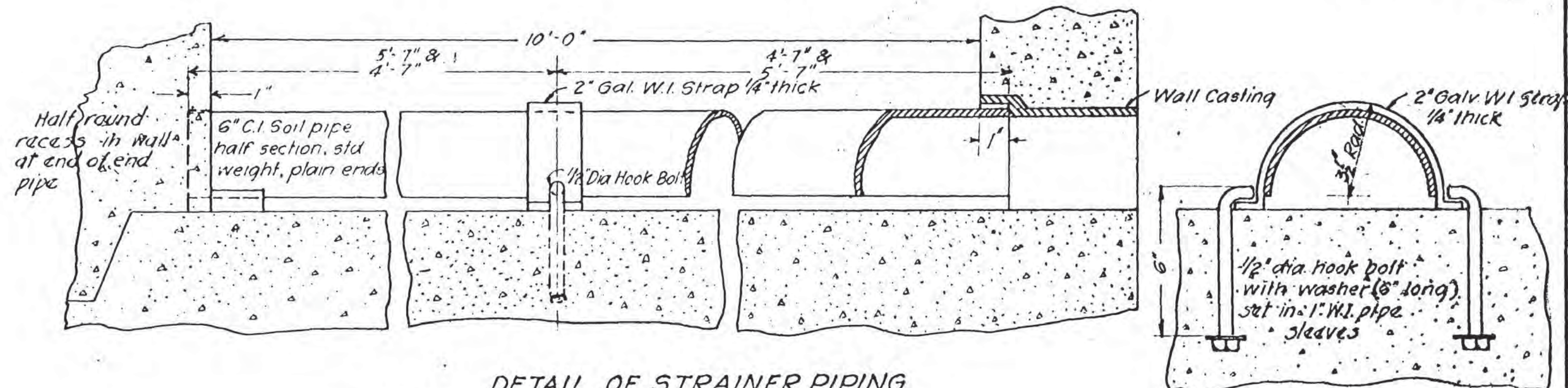
HRWTP 2-1-24 IMP. TO WATER (63) DRAWING NO. 2072-61

TAMPA, FLORIDA
**IMPROVEMENTS TO WATER SUPPLY
 HILLSBOROUGH RIVER PROJECT**
 FILTRATION PLANT
 DETAIL SECTION OF PIPE GALLERY
 Nicholas S. Hill, Jr.
 Consulting Engineer
 112 East 19th Street
 New York City February 1, 1924

Drawn by A.C.	Checked by N.L.C.	Examined by S.E.	Reviewed by J.P.	Approved by J.P.
Revisions				

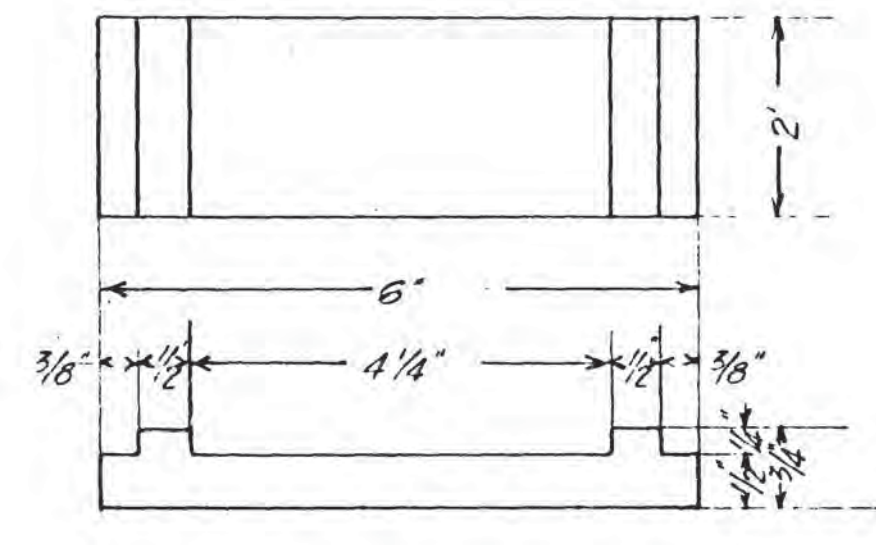


PLAN OF STRAINERS
Scale in feet
1/2" = 1'-0"

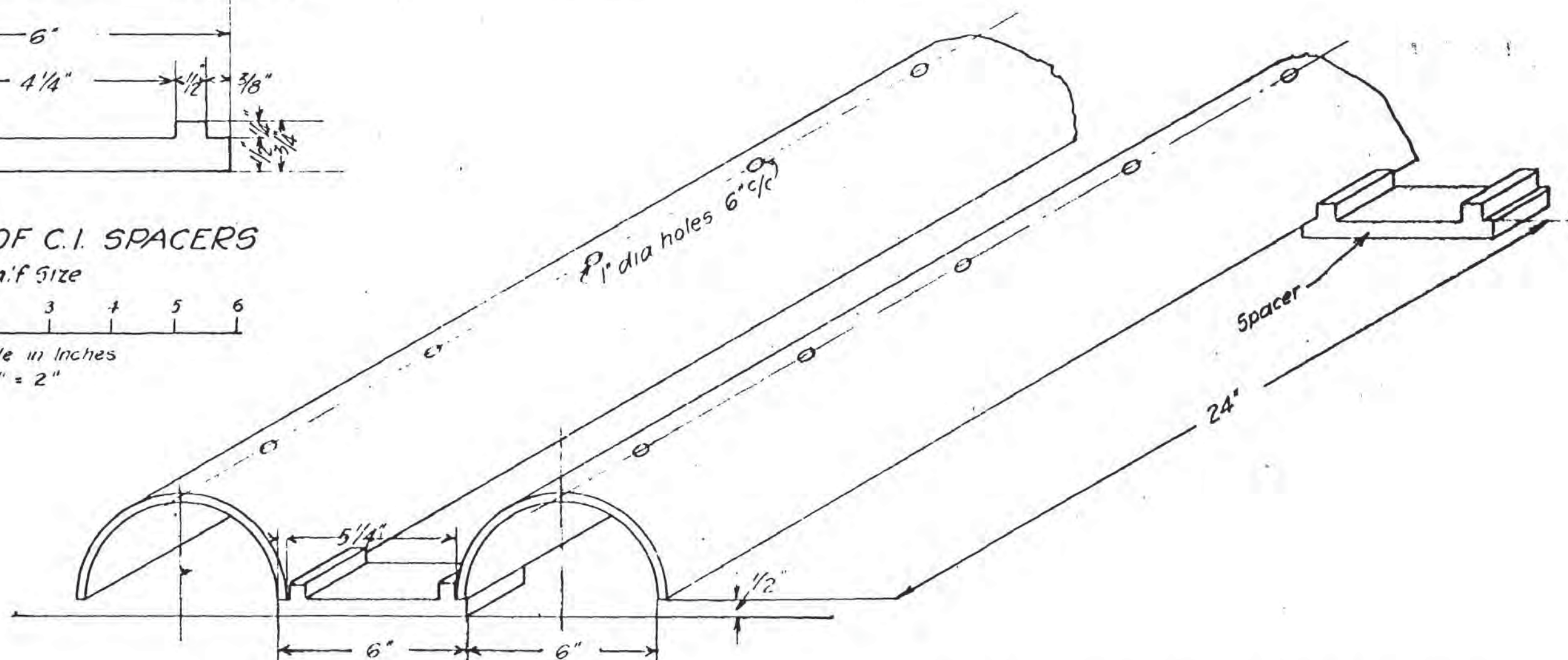


DETAIL OF STRAINER PIPING

DETAIL OF COLLAR
One required for each strainer

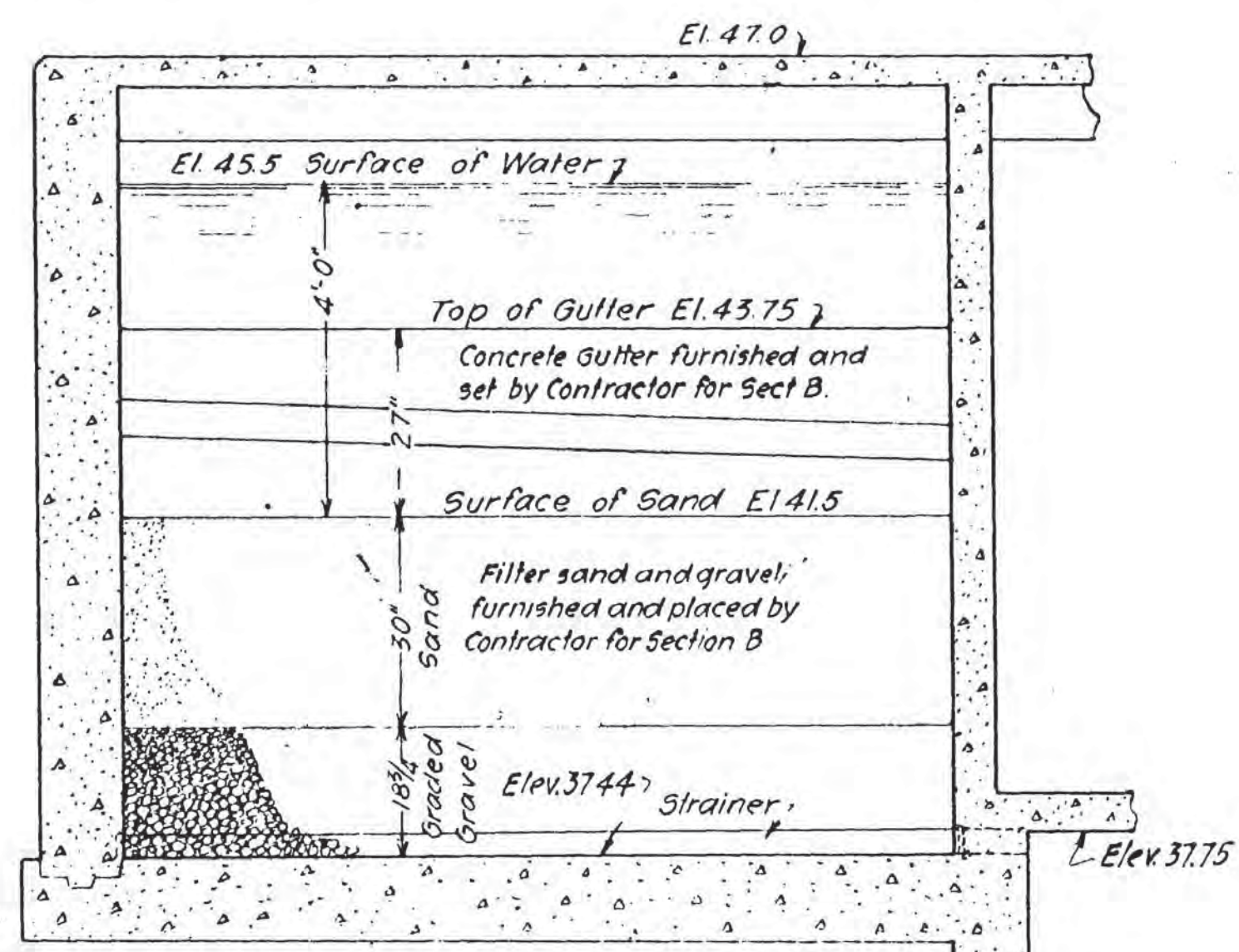


DETAIL OF C.I. SPACERS
Half Size
Scale in inches
1" = 2"

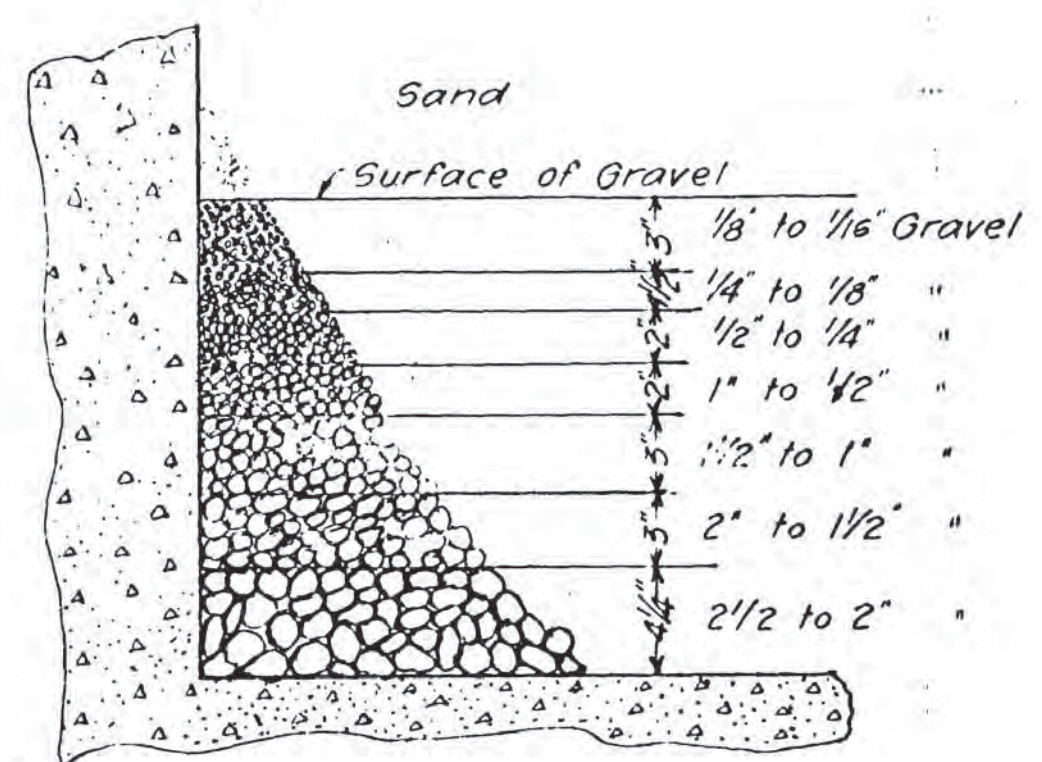


ARRANGEMENT OF STRAINERS
Furnished and set by Contractor for Sect. B

All bolts and wall castings to be set in concrete for strainer floor system to be furnished by Contractor for Section B and set by Contractor for Section A



PART SECTION OF FILTER
Scale in feet
1/2" = 1'-0"

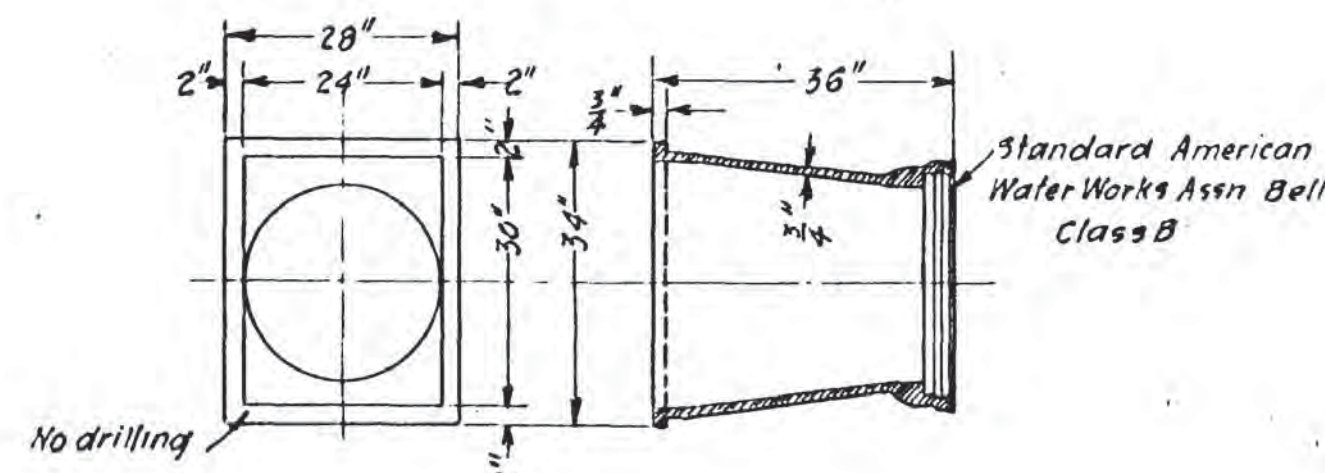
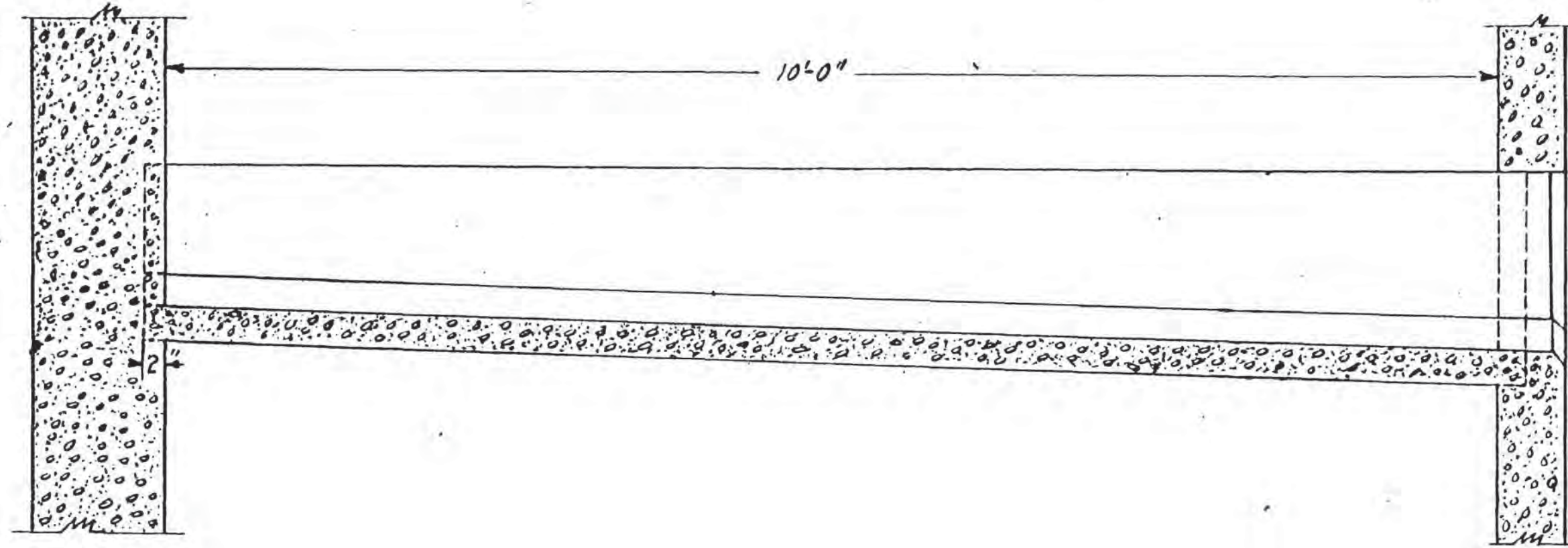
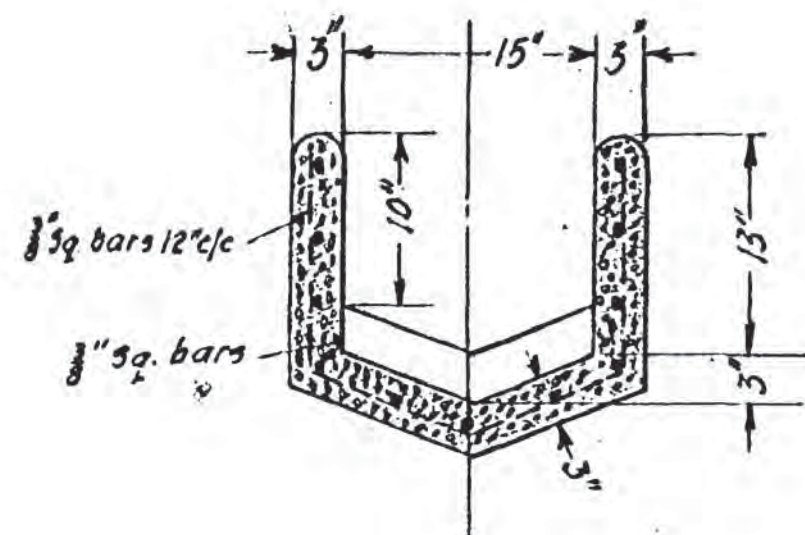


DETAIL OF GRAVEL IN FILTERS

63 HRWTP

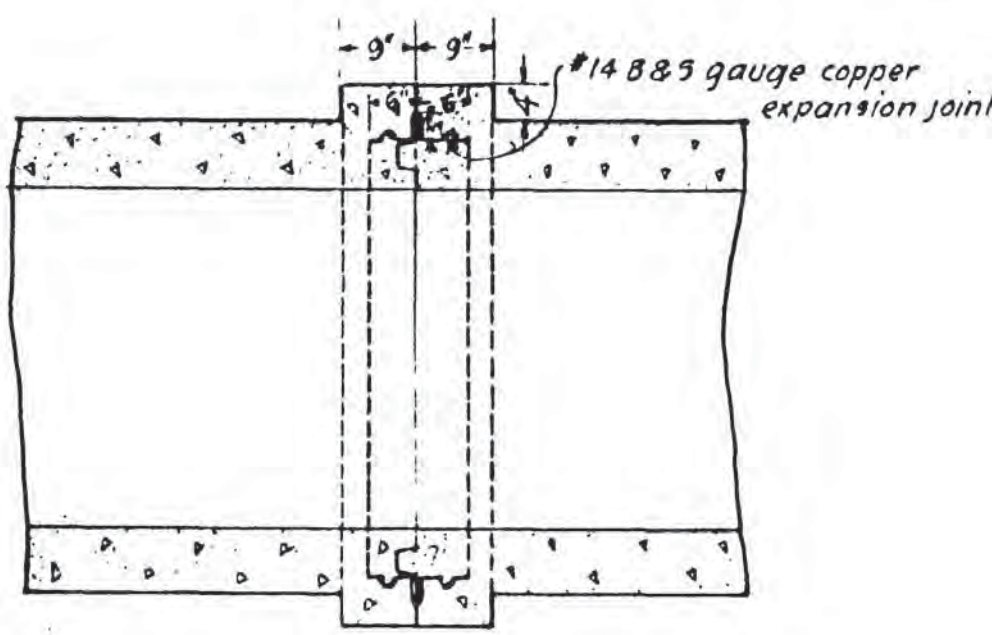
2-1-24
IMP. TO WATER
DRAWING NO. 2012-62

TAMPA, FLORIDA		IMPROVEMENTS TO WATER SUPPLY		HILLSBOROUGH RIVER PROJECT		FILTRATION PLANT - FILTERS		STRAINER SYSTEM & FILTERING MATERIAL	
Nicholas S Hill, Jr.		Consulting Engineer		112 East 19th Street		New York City		February 1, 1924	
C9-1-111		Scale: As shown							
Drawn by A.M.	Checked by N.C.S.	Examined by W.C.	Reviewed by H.R.	Approved by A.K.					
Revisions									



DETAIL OF SPECIAL CASTING

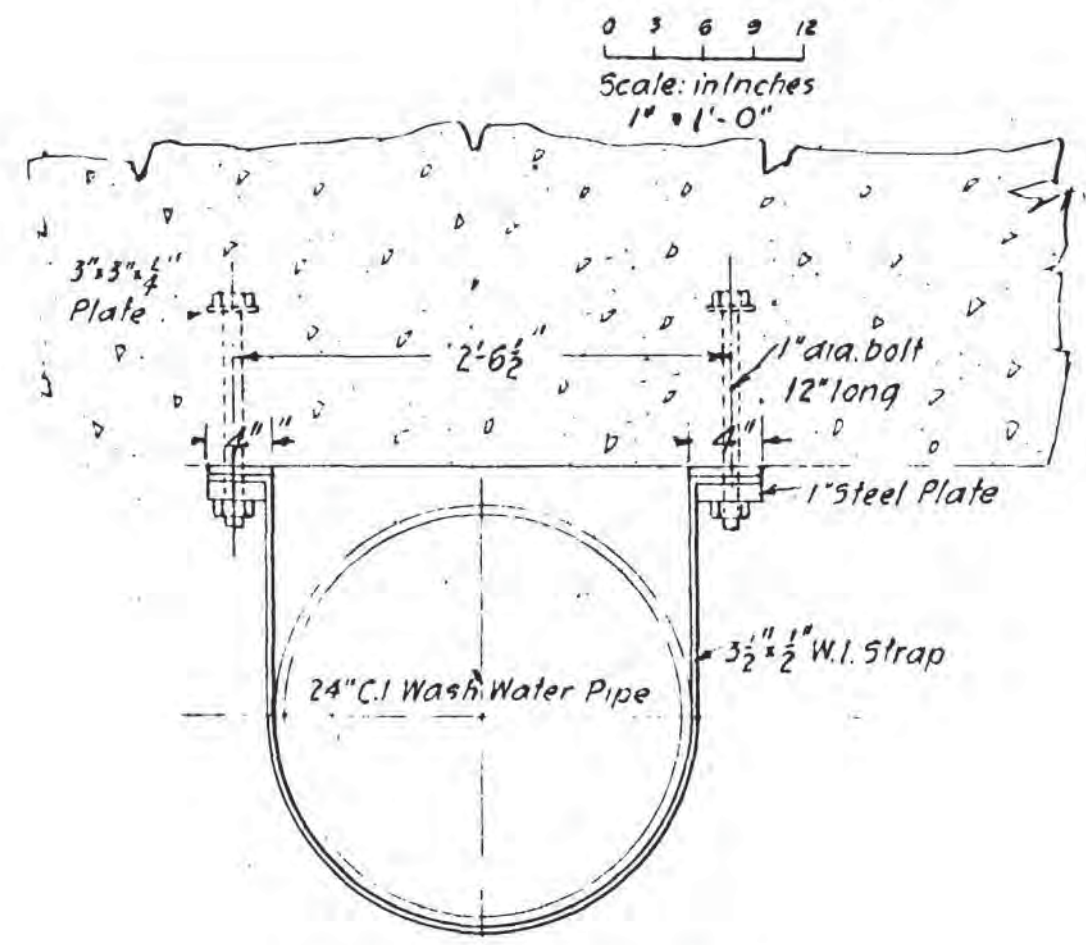
Scale in Inches
1" = 1'-0"



DETAIL OF CONCRETE EXPANSION JOINT

Scale in Feet
1/2" = 1'-0"

DETAIL OF GUTTER



DETAIL OF PIPE HANGER

Scale in Feet
1" = 1'-0"

HRWTP 2-1-24 (63)
IMP. TO WATER

DRAWING NO. 2072-63

TAMPA, FLORIDA
IMPROVEMENTS TO WATER SUPPLY
HILLSBOROUGH RIVER PROJECT
FILTRATION PLANT
MISCELLANEOUS DETAILS

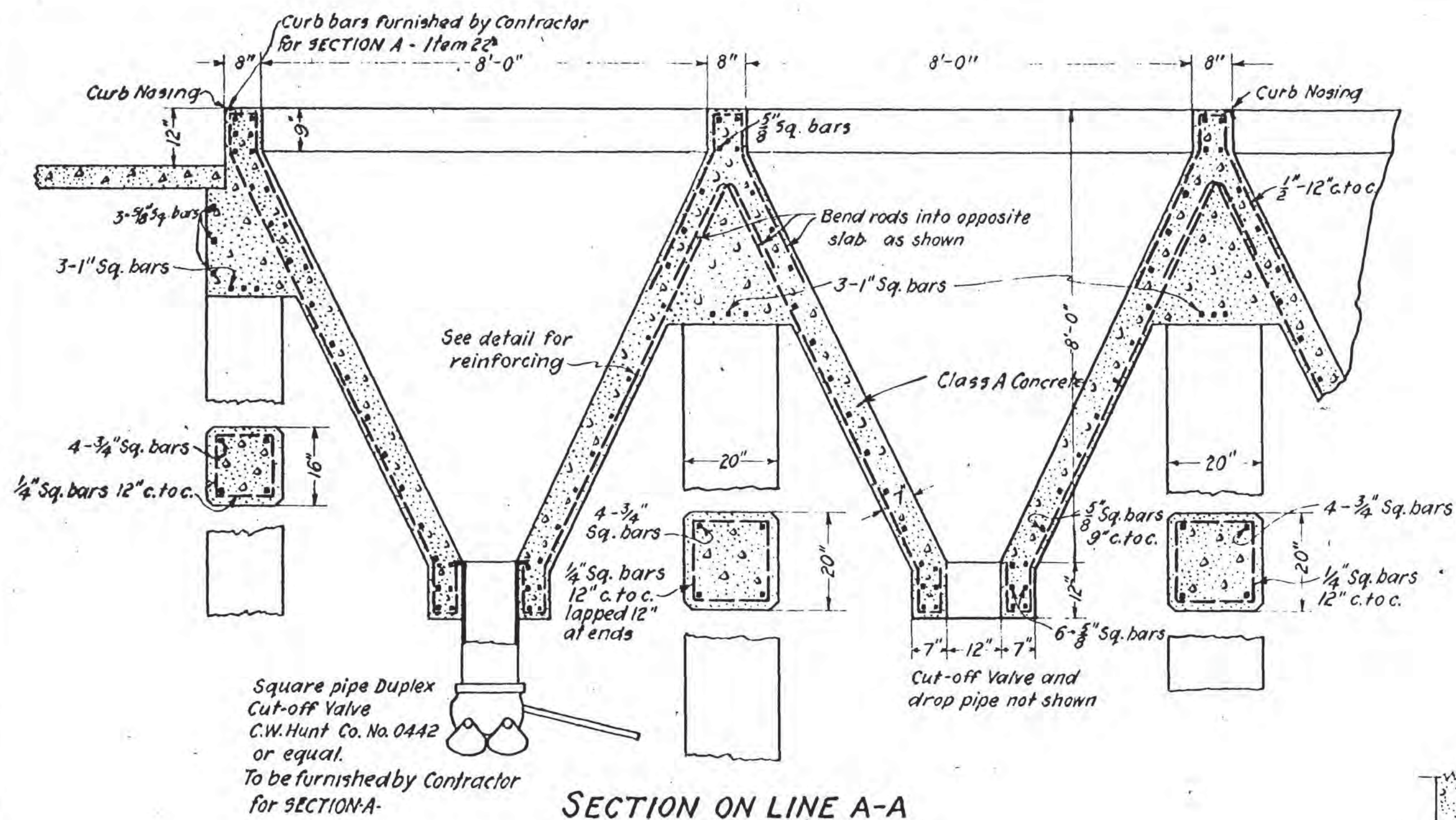
Nicholas S. Hill, Jr.
Consulting Engineer
112 East 19th Street
New York City

February 1, 1924

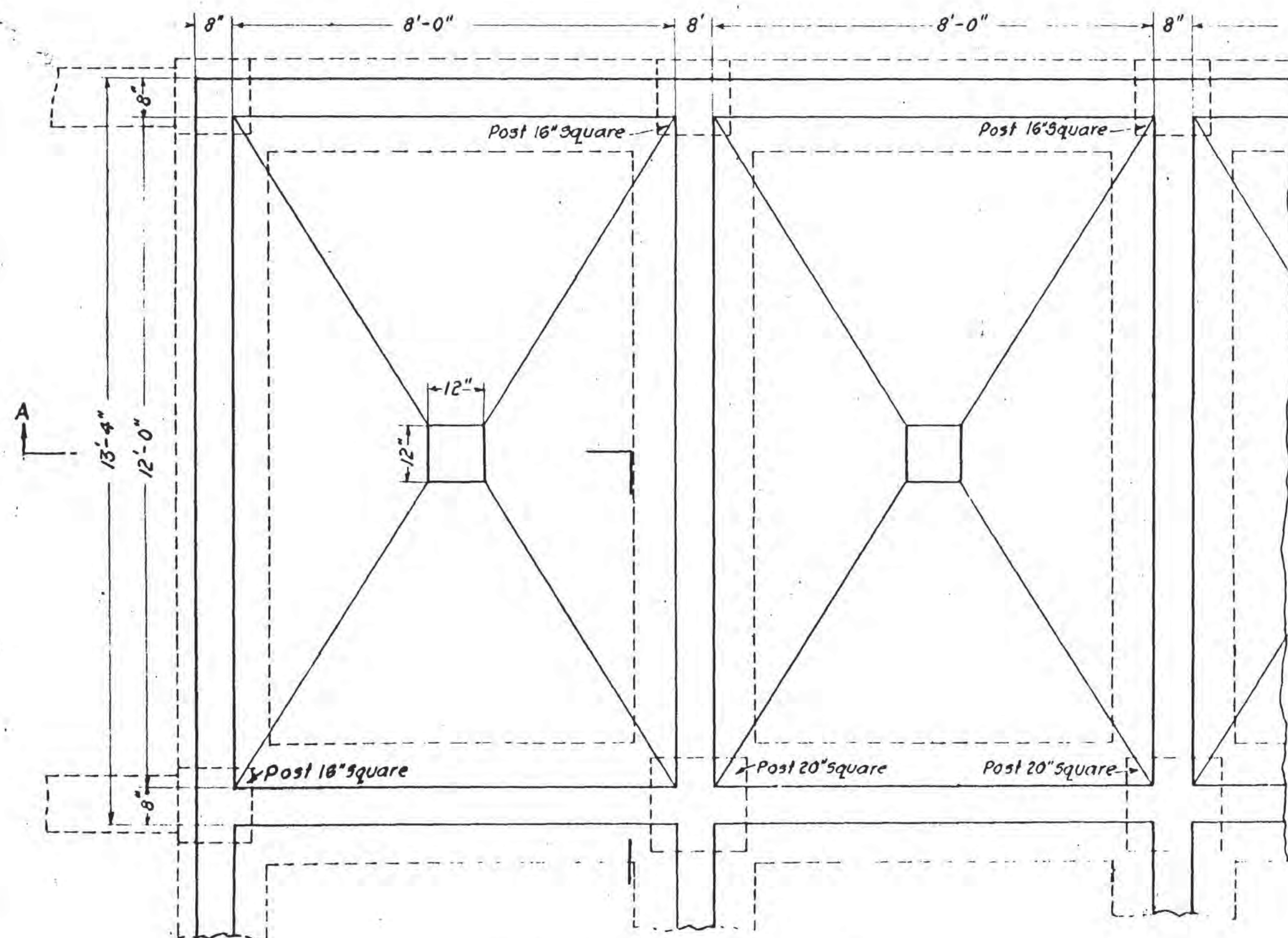
C9-1-112
-B7-4

Scale As shown

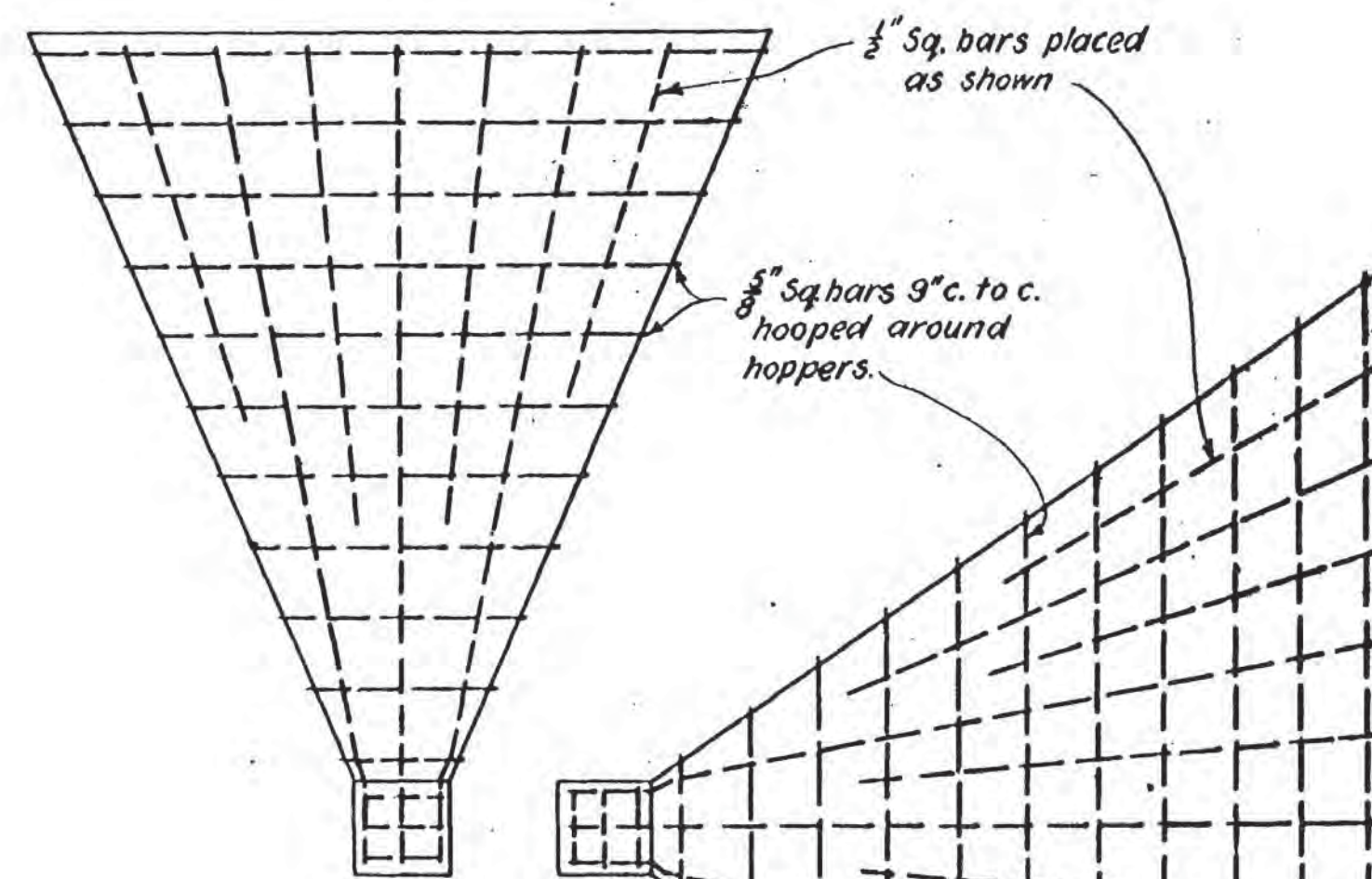
Drawn by J.L.	Checked by N.R.K.	Examined by R.V.S.	Reviewed by J.R.	Approved by N.S.H.
Revisions				



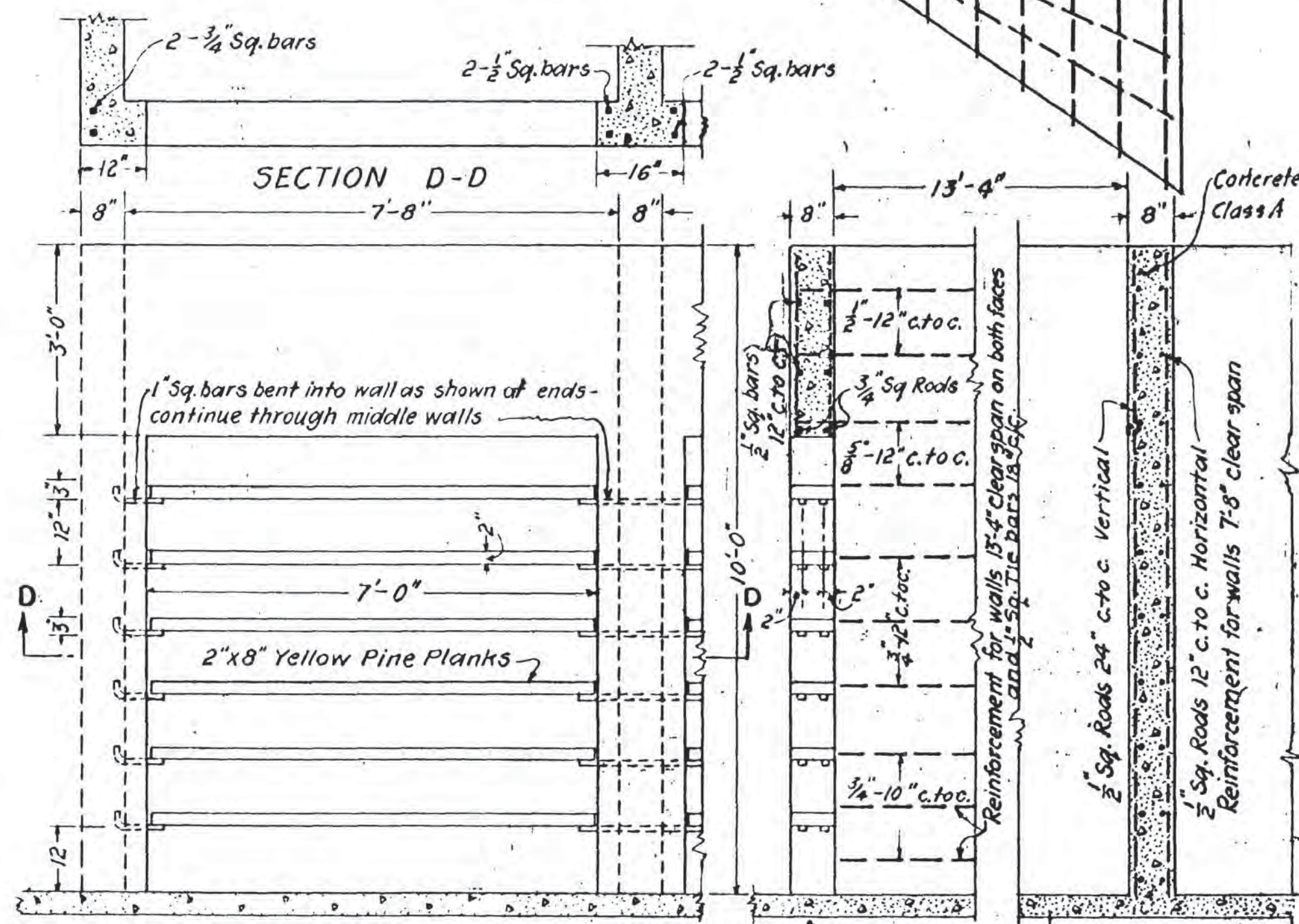
SECTION ON LINE A-A



PART PLAN OF HOPPERS
Scale: 1/2" = 1'-0"



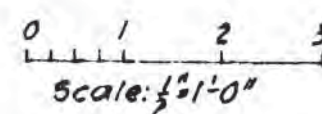
REINFORCING DETAIL
Scale: 1/2" = 1'-0"



DETAIL OF STORAGE BINS
Scale: 1/2" = 1'-0"

DRAWING NO 2072-65

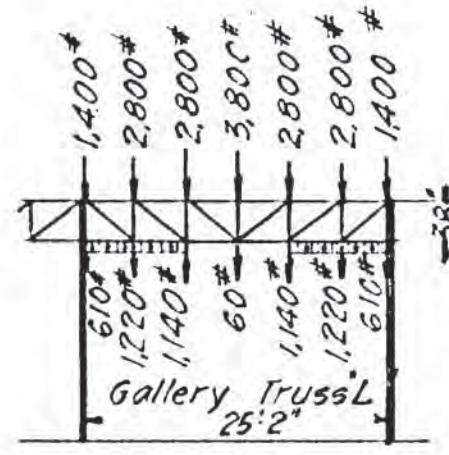
All bars for reinforcement are SQUARE DEFORMED BARS



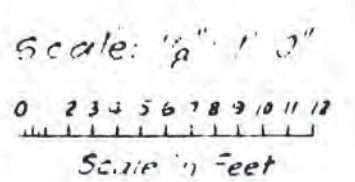
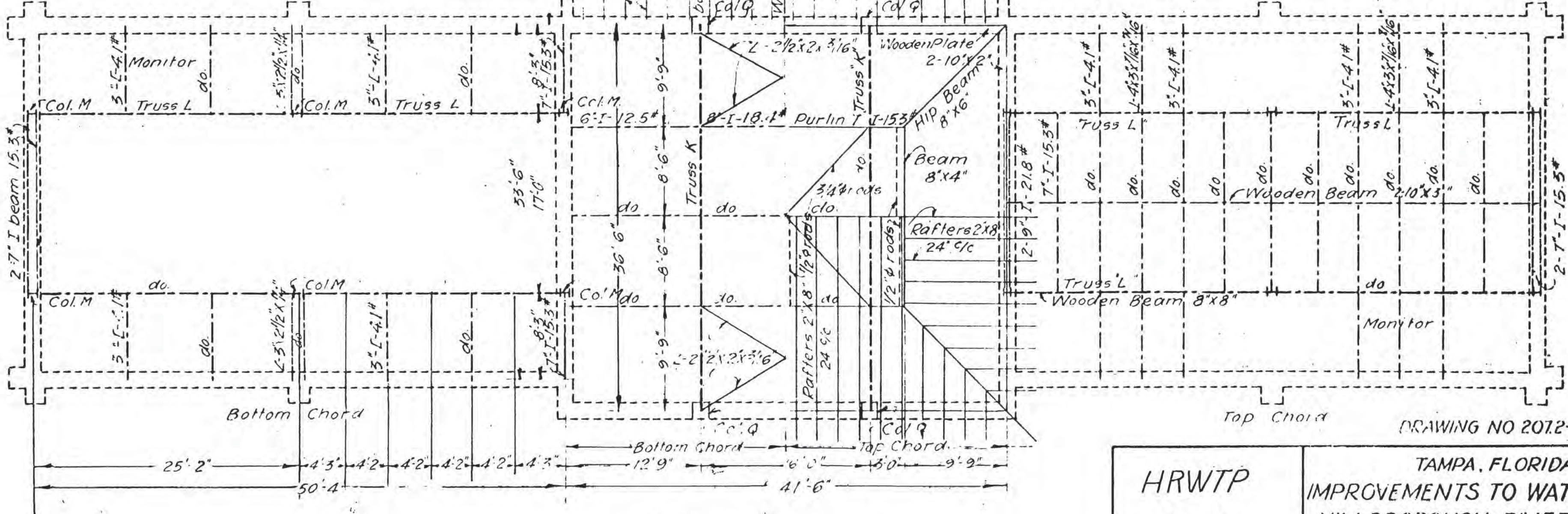
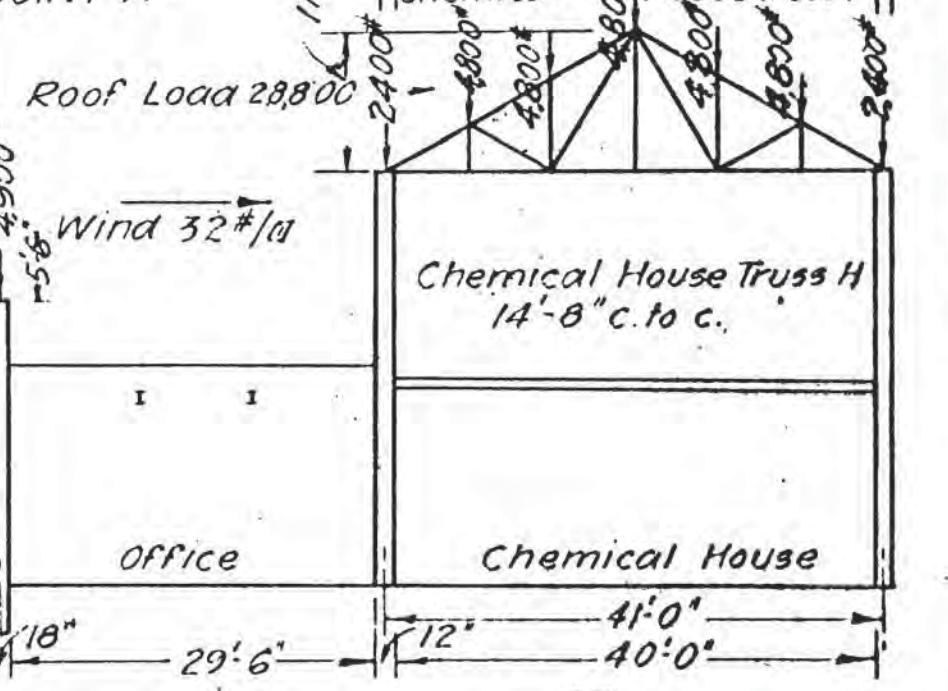
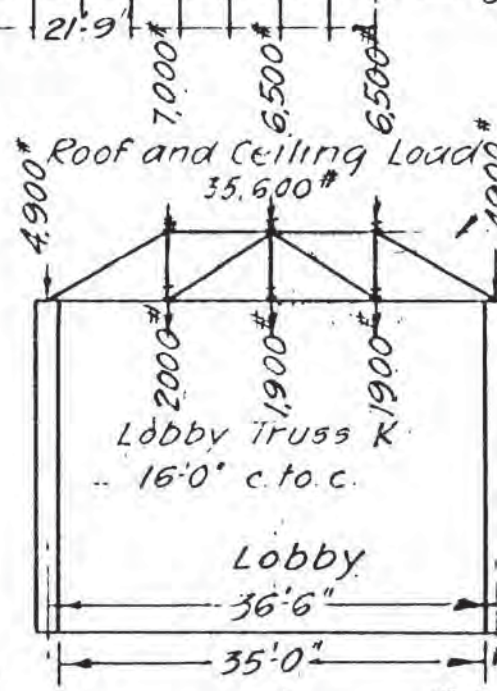
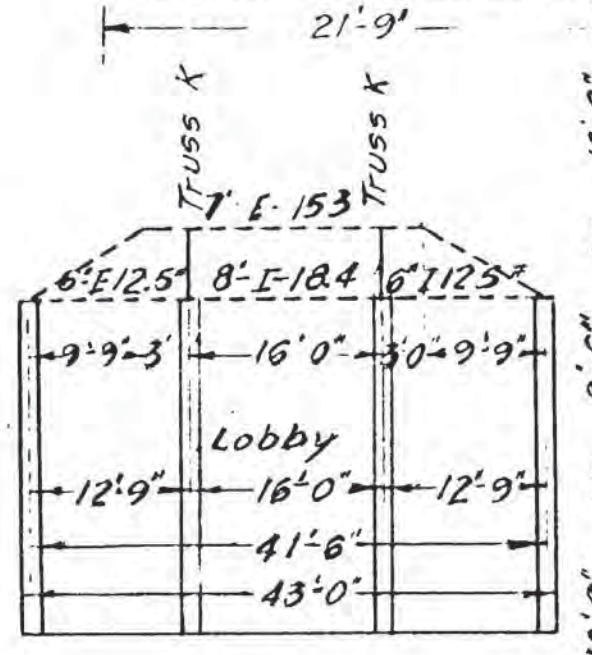
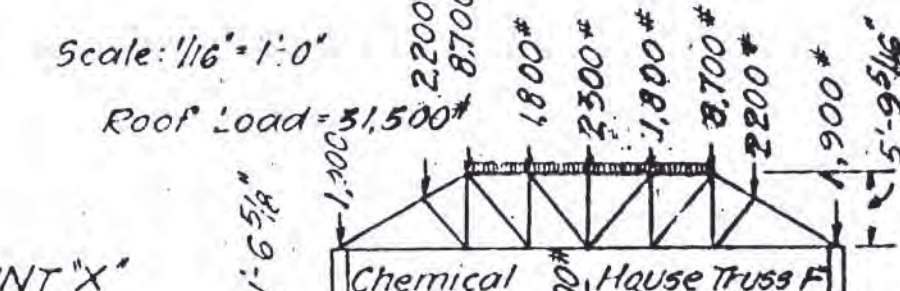
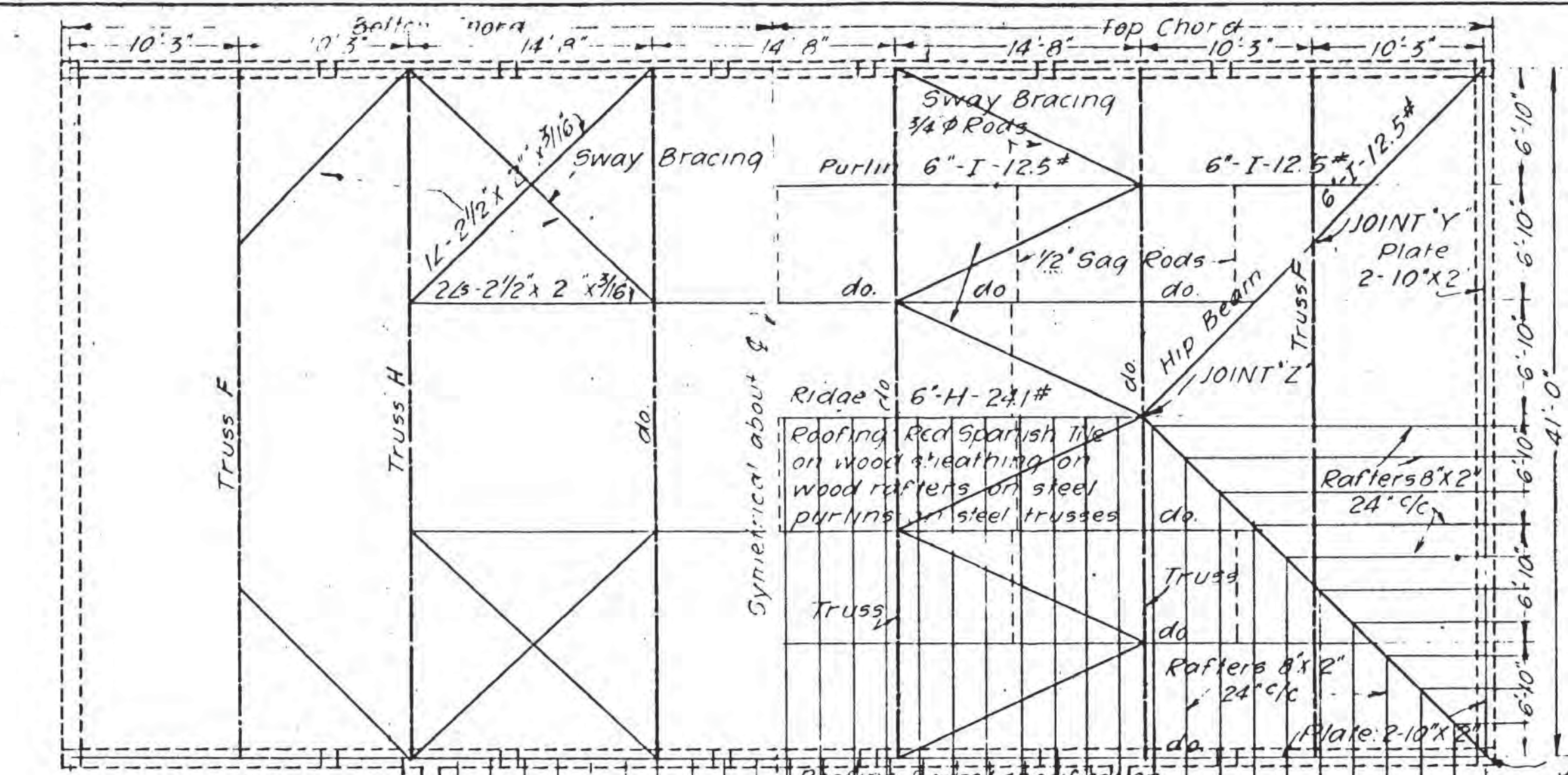
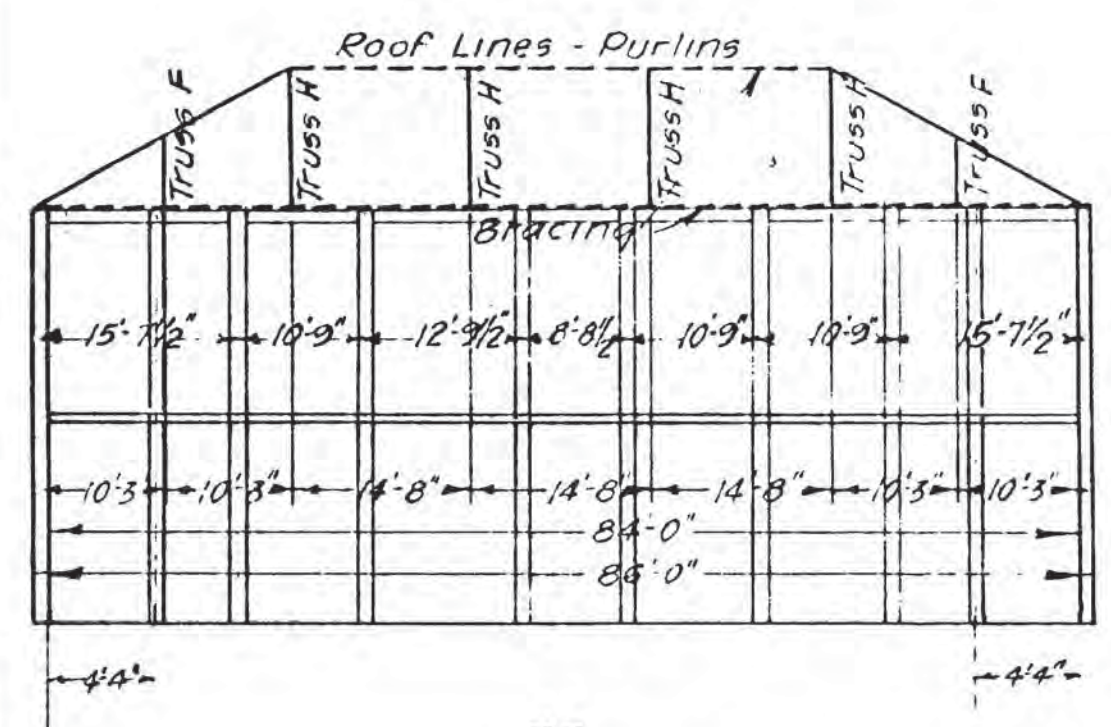
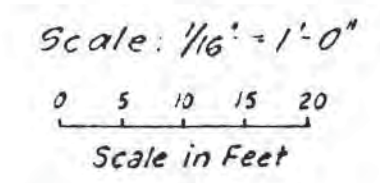
<p>HRWTP 2-1-24 IMP. TO WATER</p> <p>(63)</p> <p>B7-4 C9-1-114</p>	<p>TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT-CHEMICAL HOUSE HOPPERS AND BINS</p> <p>Nicholas S Hill, Jr. Consulting Engineer 112 East 19th Street New York City</p> <p>February 1, 1924</p>			
	<p>Drawn by A M</p>	<p>Checked by M. H. K.</p>	<p>Examined by H. H. K.</p>	<p>Reviewed by M. H. K.</p>
<p>Revisions</p>				

SCHEDULE OF COLUMNS

Col. M	12	6"-H-24.1*
Col. P	4	12"-12" Tile Concrete Filled
Col. Q	4	18"-18" Tile Concrete filled



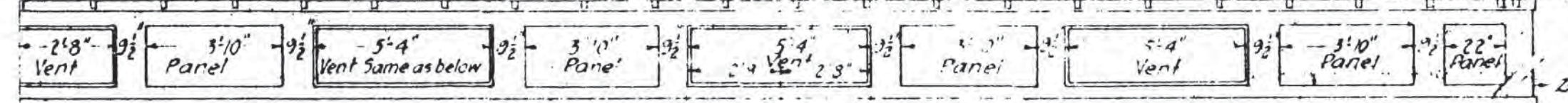
Load 23,800*



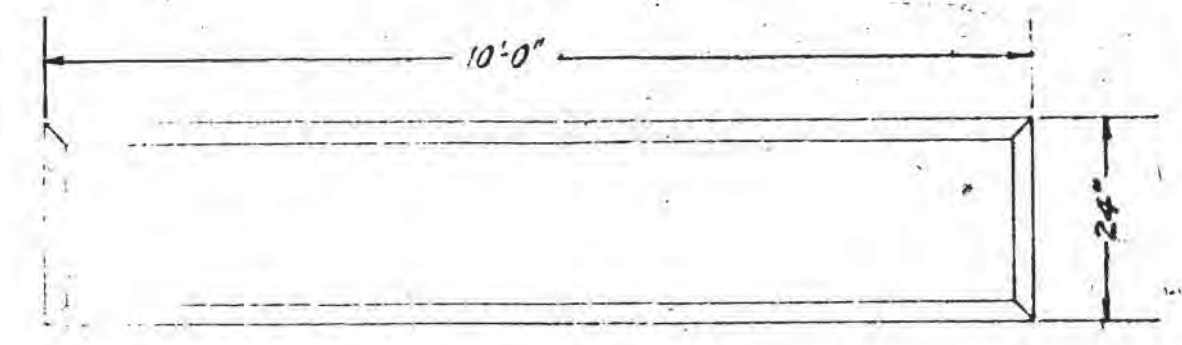
For details of TRUSSES see Dwg No. 2072-67

<p>HRWTP</p> <p>2-1-24</p> <p>IMP. TO WATER</p> <p>(63)</p> <p>874</p> <p>C9-1-115</p>	<p>TAMPA, FLORIDA</p> <p>IMPROVEMENTS TO WATER SUPPLY</p> <p>HILLSBOROUGH RIVER PROJECT</p> <p>FILTRATION PLANT-FILTER AND CHEMICAL HOUSE</p> <p>ROOF FRAMING PLAN</p> <p>Nicholas S Hill, Jr.</p> <p>Consulting Engineer</p> <p>112 East 19th Street</p> <p>New York City</p>			
	<p>February 1, 1924</p>			
	Drawn by	Checked by	Examined by	Reviewed by
	Revisions			

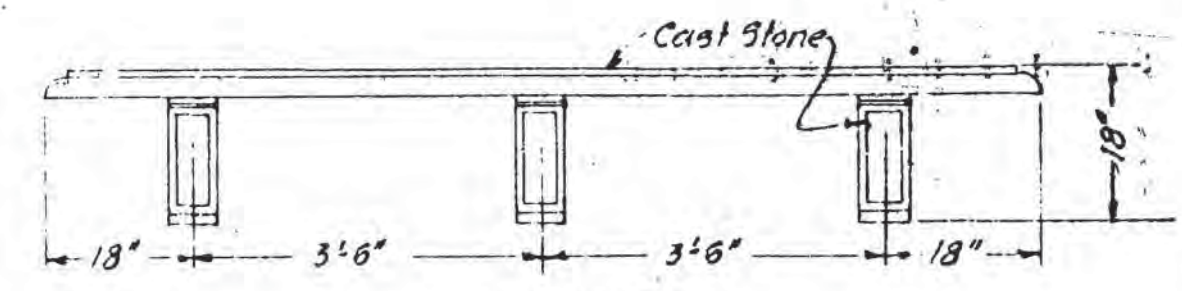
Red Spanish Tile



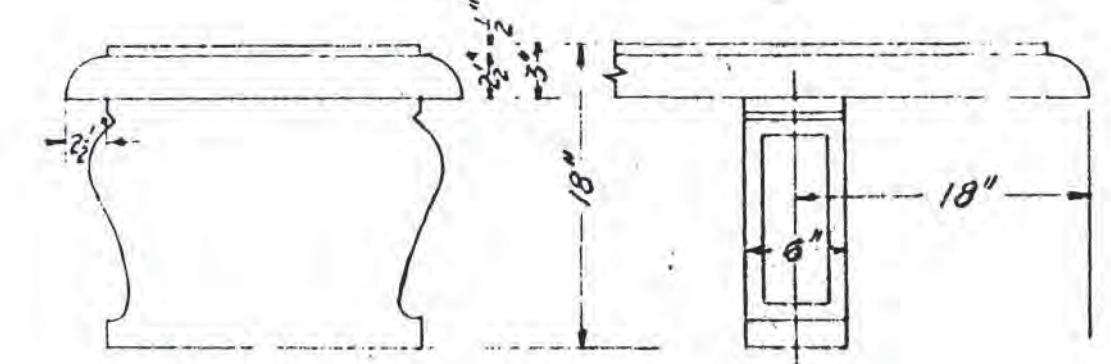
For dimensions see Dwg No 2072-70



PLAN

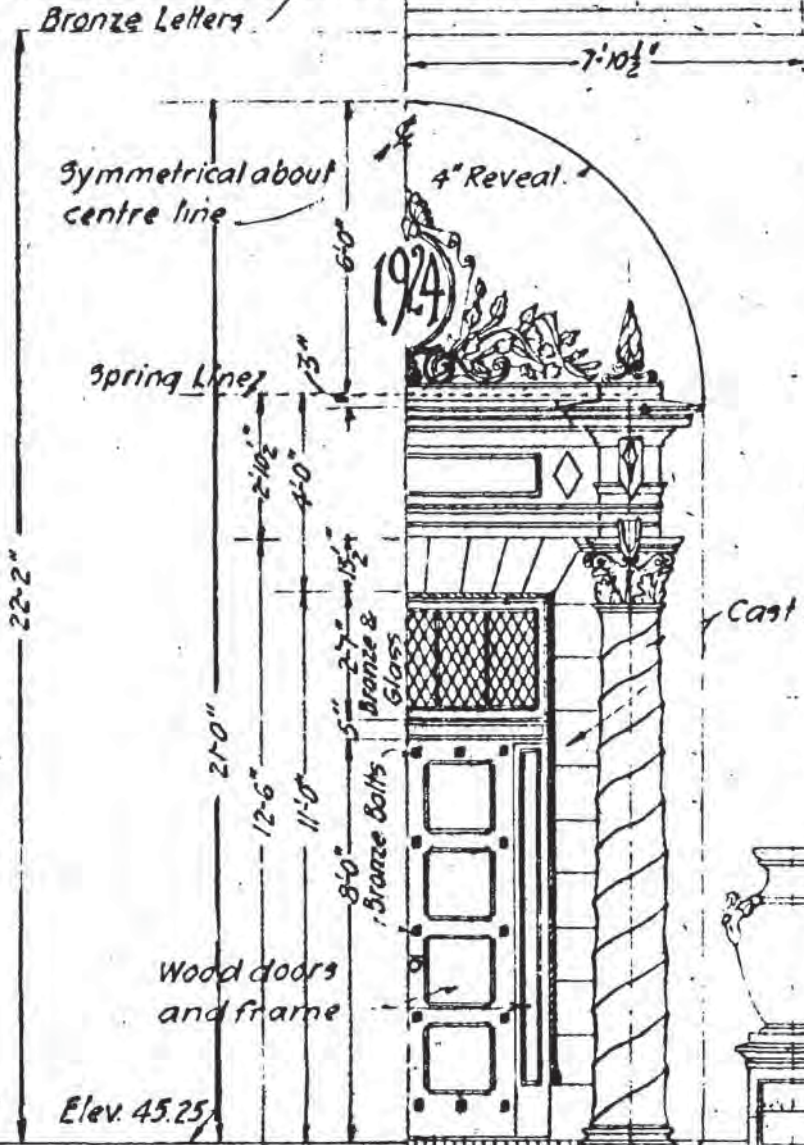


ELEVATION

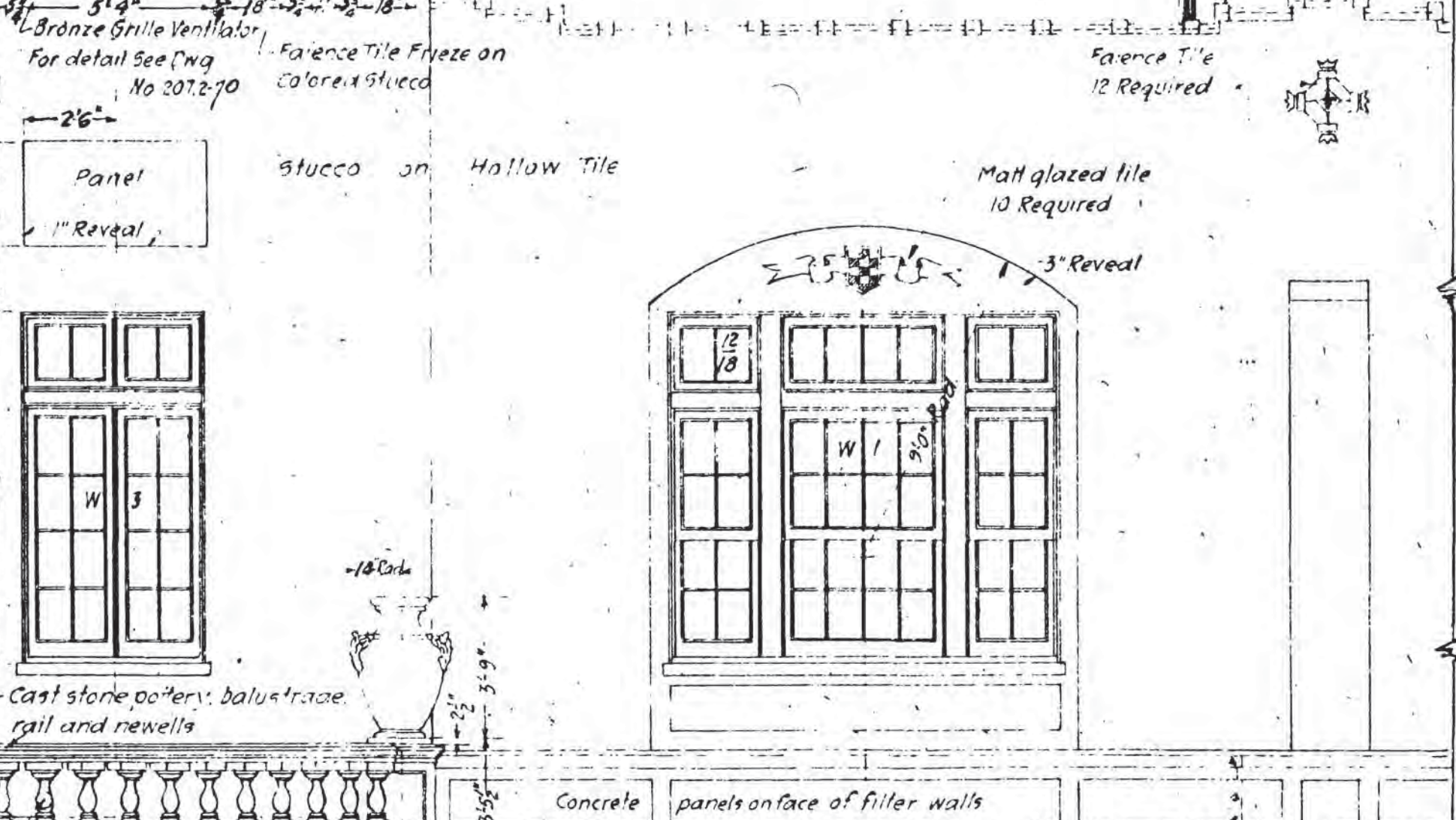


TERRACE BENCH
Two Required

TAMPA WATER WORKS



DETAIL OF FRONT ELEVATION



Panels and Frieze Colored Stucco

Tile coping to match roof tile

Faience Tile 12 Required

Matt glazed tile 10 Required

For dimensions see Dwg No 2072-70

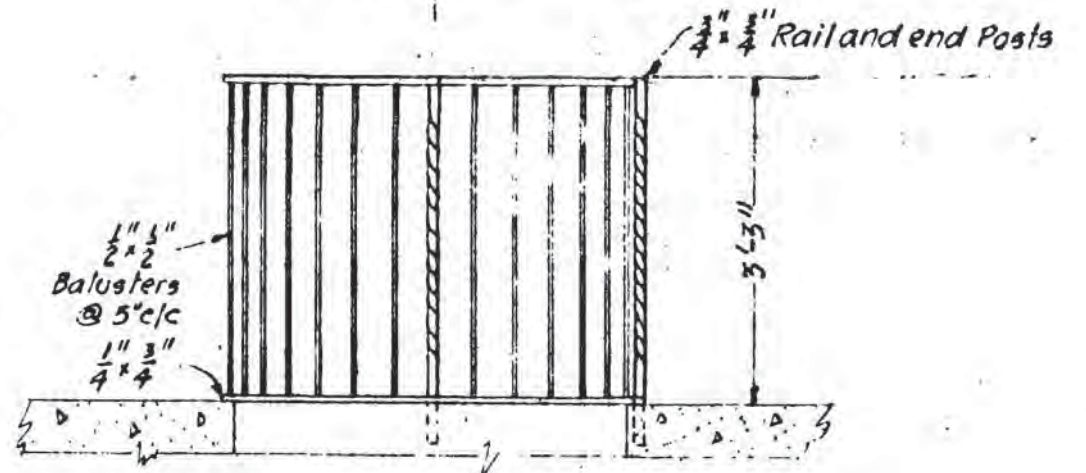
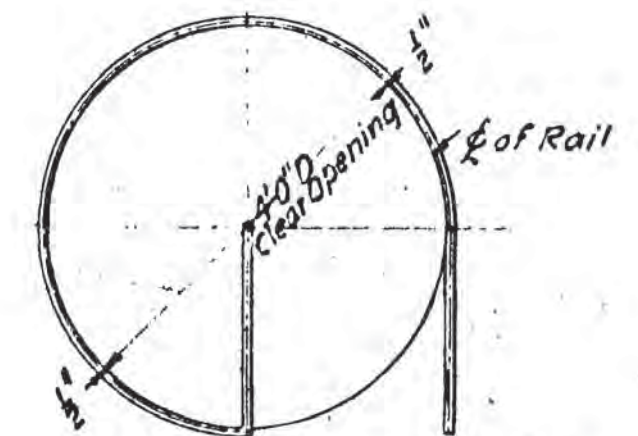
Bronze Grille Ventilator For detail see Dwg No 2072-70

Faience Tile Frieze on Colored Stucco

Stucco on Hollow Tile

Cast Stone Pottery Balustrade rail and newells

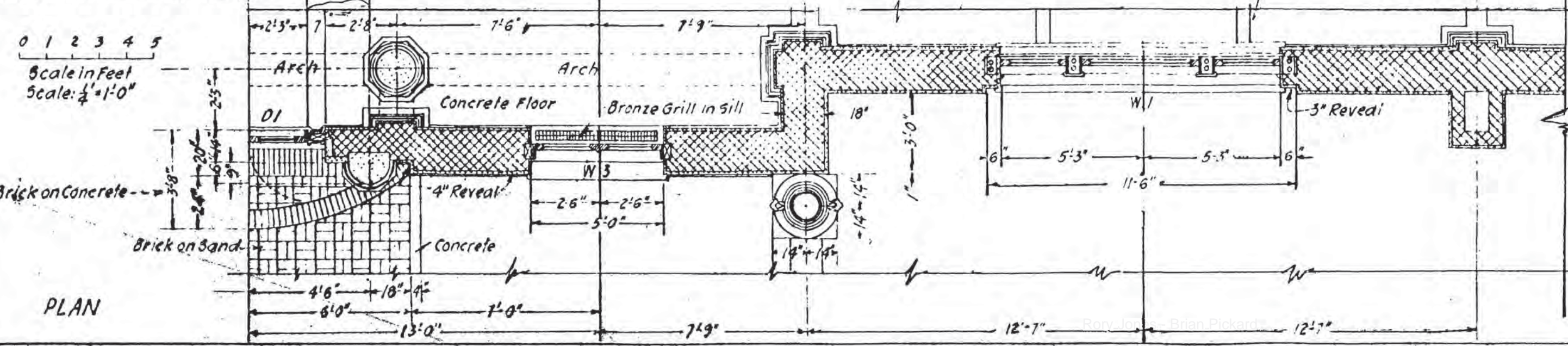
Concrete panels on face of filler walls



WROUGHT IRON RAIL FOR SPIRAL STAIRS
ONE REQUIRED AS SHOWN - ONE REQUIRED OPPOSITE HAND

Scale in Feet 1" = 2'-0" DRAWING NO 2072-68

Scale in Feet
Scale: 1/4" = 1'-0"

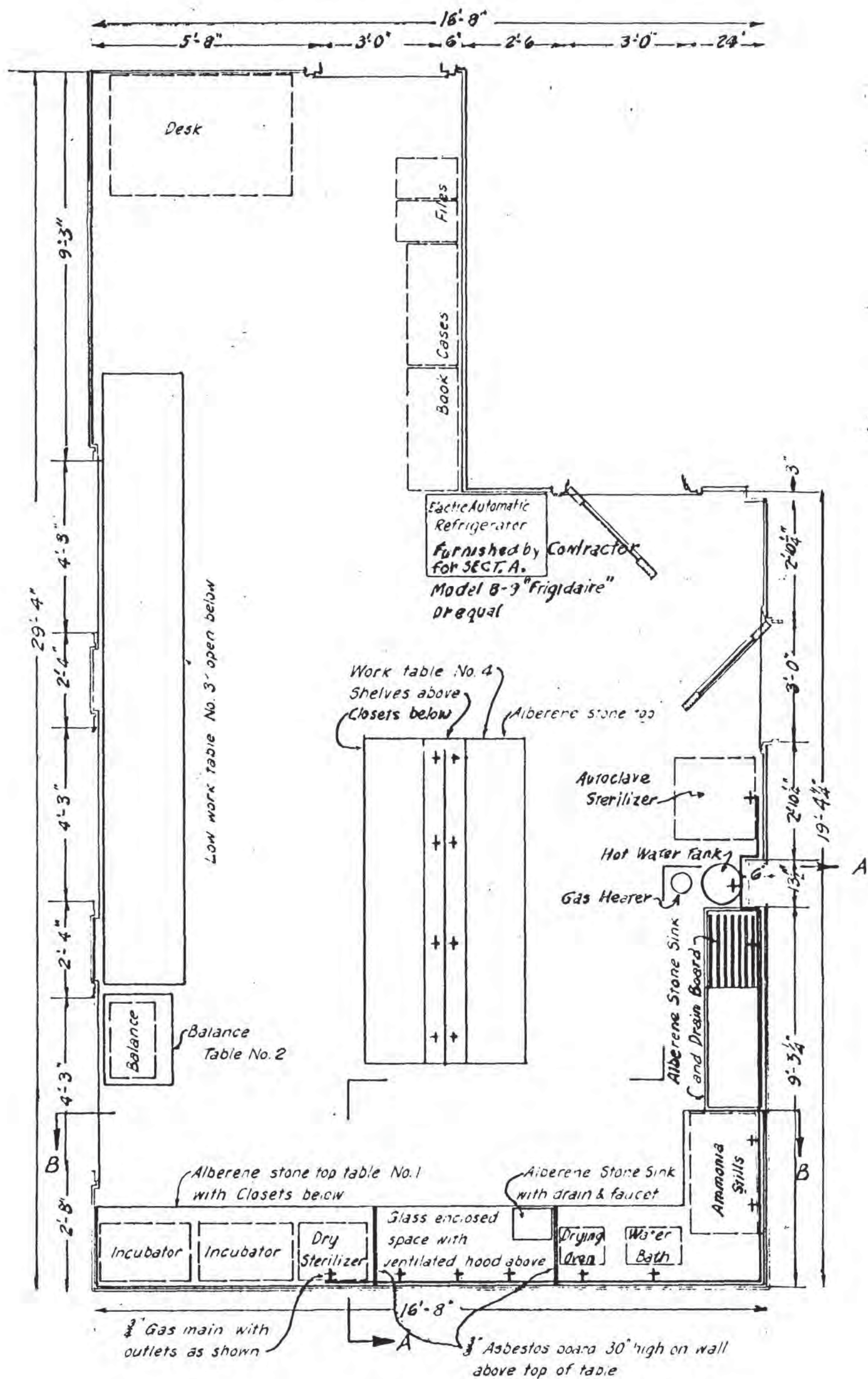


PLAN

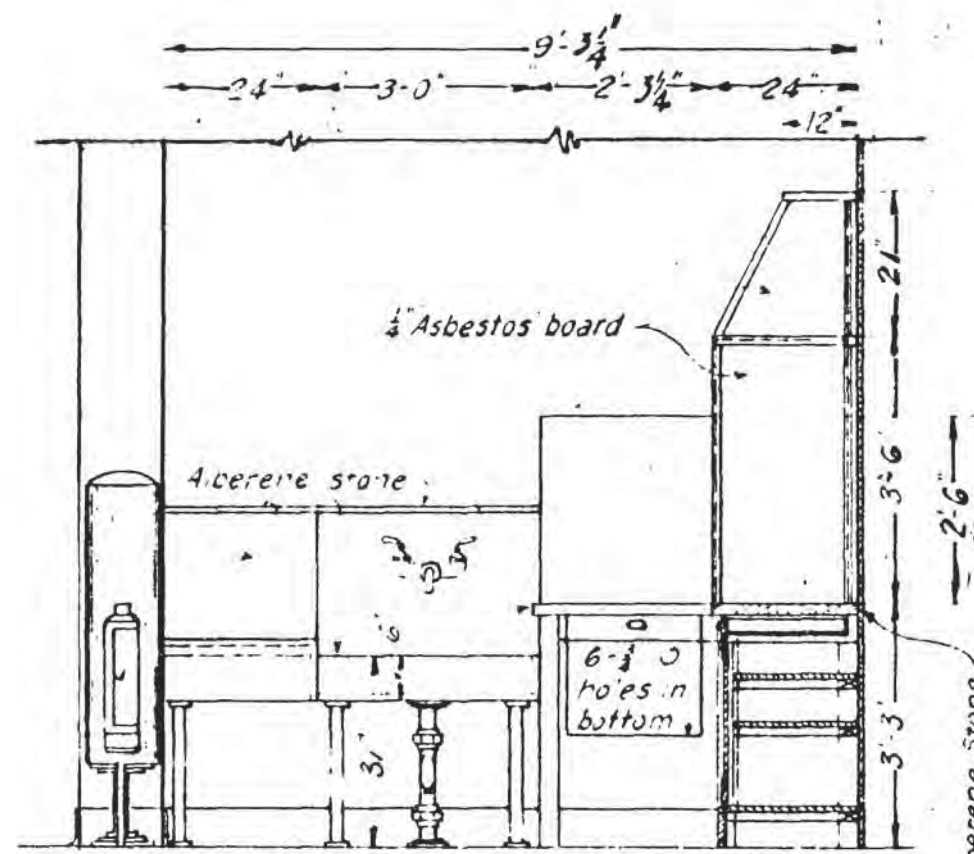
HRWTP
2-1-24
IMP-TO-WATER
63
C9-1-117
-874

TAMPA, FLORIDA
IMPROVEMENTS TO WATER SUPPLY
HILLSBOROUGH RIVER PROJECT
FILTRATION PLANT - FILTER HOUSE
EXTERIOR DETAILS
Nicholas S. Hill, Jr.
Consulting Engineer
112 East 19th Street
New York City
February 1, 1924

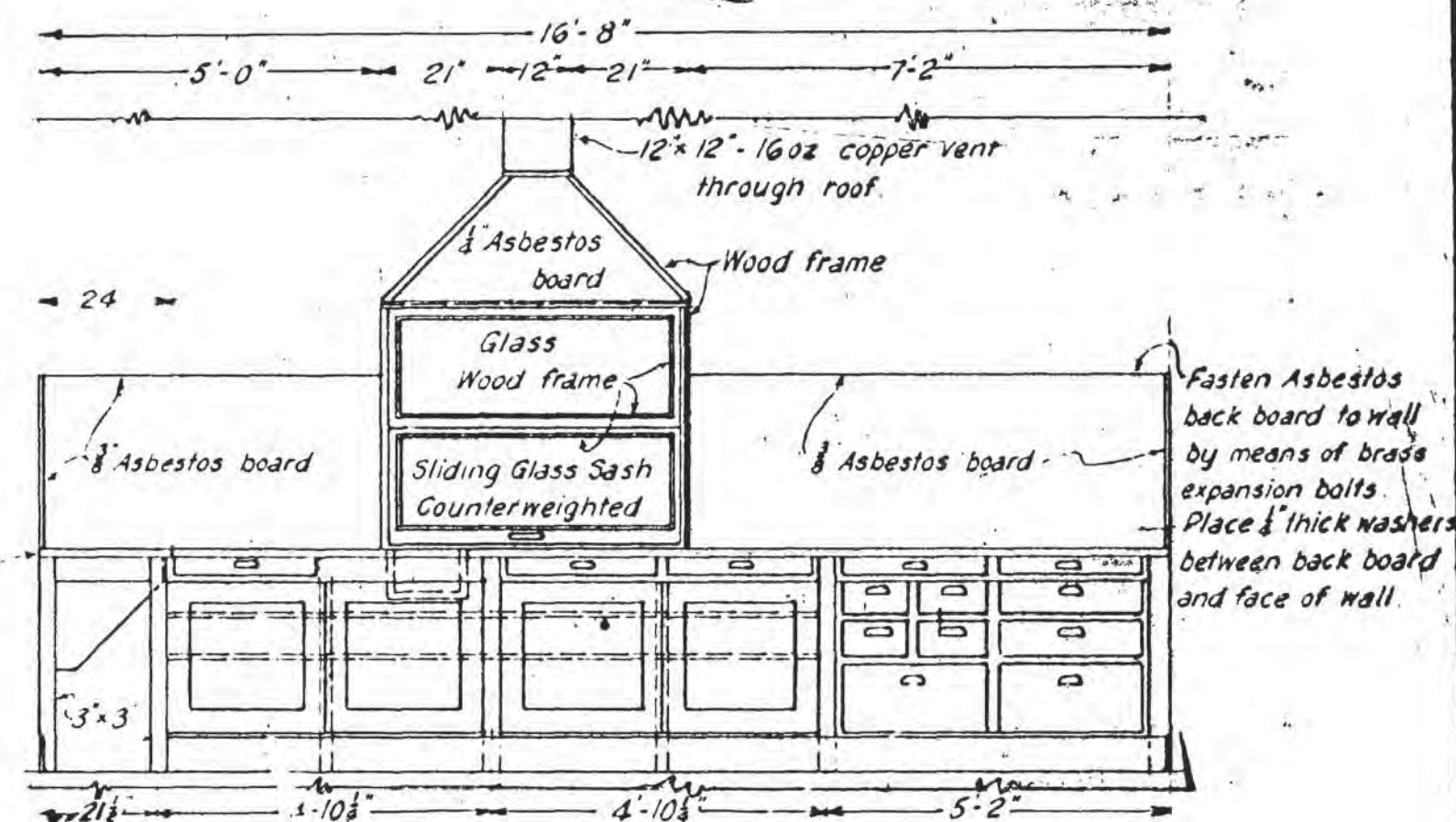
Drawn by	Checked by	Examined by	Reviewed by	Approved by
Revisors				



NOTE:
Provide locks on all drawers and closet doors.
Apparatus shown dotted is to be provided by the City.



SECTION A-A



SECTION B-B

TABLE NO. 1

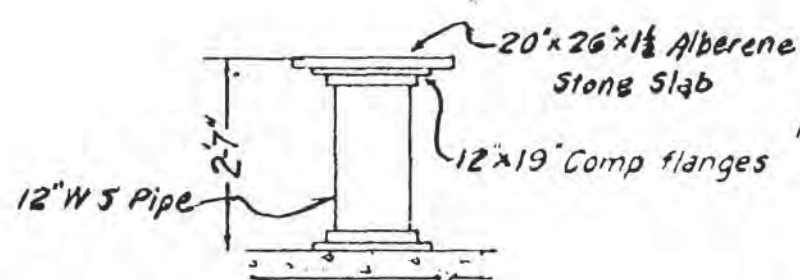


TABLE NO. 2

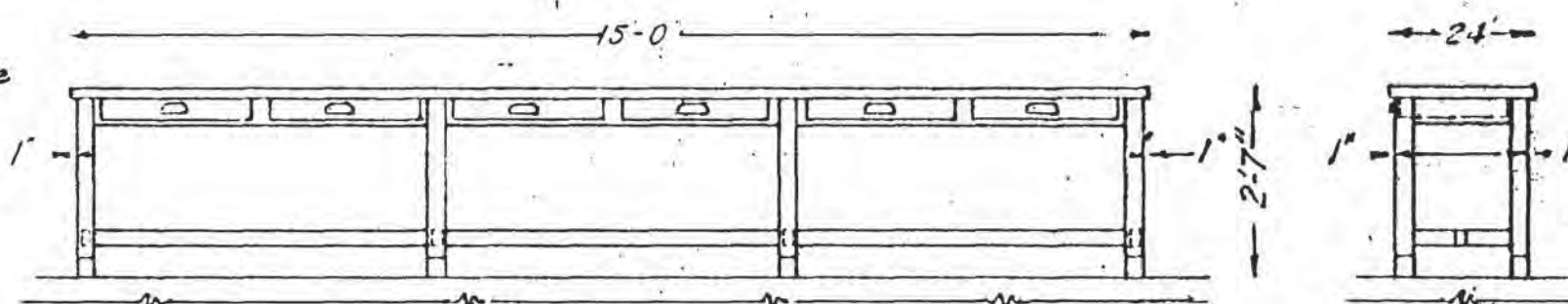
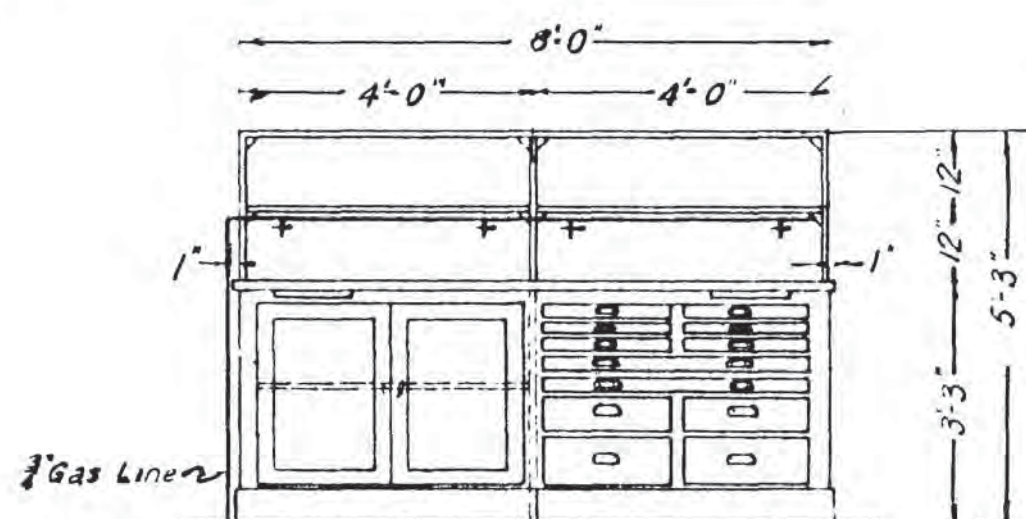
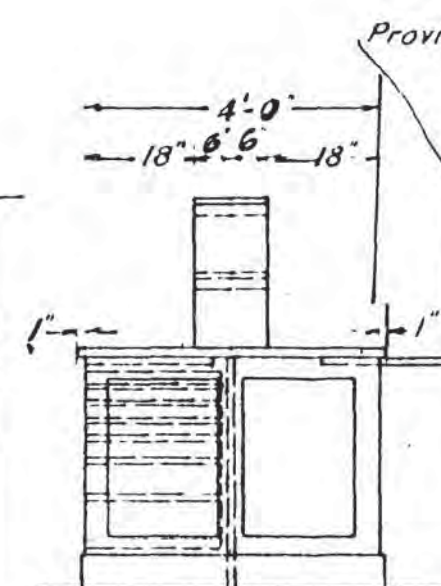


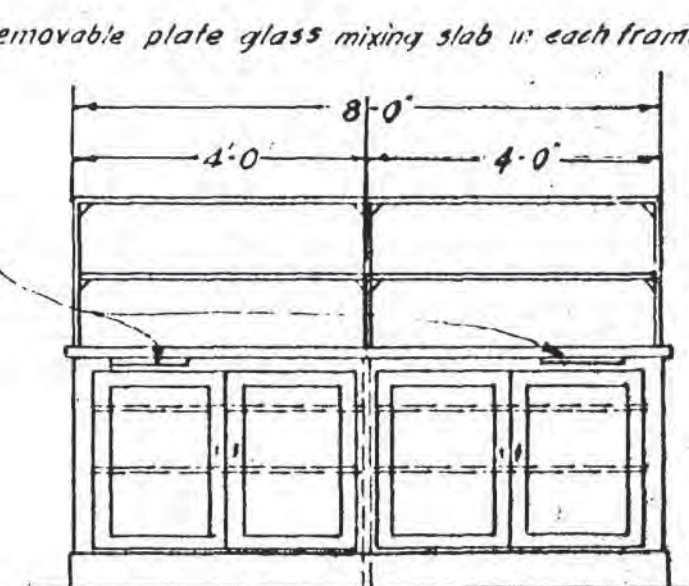
TABLE NO. 3



FRONT



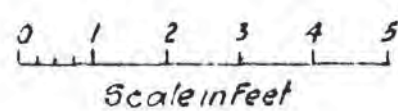
END



REAR

TABLE NO. 4

Tables Nos. 2, 3 and 4 shall be movable

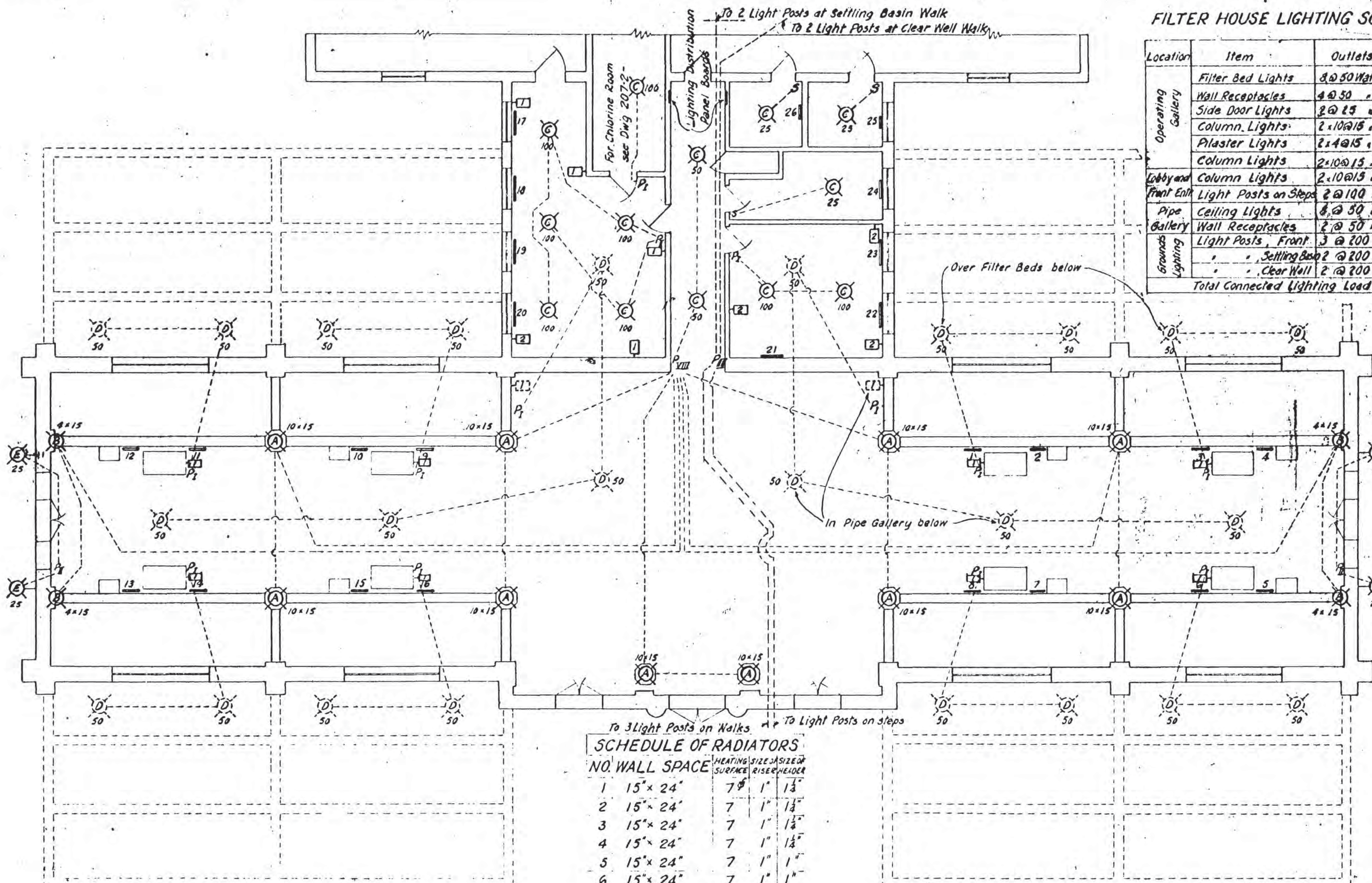


DRAWING NO. 2072-71

HRWTP 2-1-24 IMP TO WATER (63) B7-4 C9-1-120	TAMPA, FLORIDA IMPROVEMENTS TO WATER SUPPLY HILLSBOROUGH RIVER PROJECT FILTRATION PLANT CHEMICAL LABORATORY Nicholas S. Hill, Jr. Consulting Engineer 112 East 14th Street New York City	
	Scale: 3/8" = 1'-0"	February, 1928
Drawn by: c Revisions:	Checked by: J.P. Examined by: J.P. Reviewed by: K.S.C.	Approved by: P.K.K.

FILTER HOUSE LIGHTING SCHEDULE OF SUB-CIRCUITS

Location	Item	Outlets	Connected Load per Circuit	No. of Circuits	Total Load	
Operating Gallery	Filter Bed Lights	8 @ 50 Watts.	650 Watts	2	1300 Watts	
	Wall Receptacles	4 @ 50 "				
	Side Door Lights	2 @ 25 "	480 "	2	960 "	
	Column Lights	2 x 10 @ 15 "				
	Pilaster Lights	2 x 4 @ 15 "				
Lobby and Front Entr.	Column Lights	2 x 10 @ 15 "	300 "	2	600 "	
	Light Posts on Steps	2 @ 100 "	500 "	1	500 "	
Pipe Gallery	Ceiling Lights	8 @ 50 "	500 "	1	500 "	
	Wall Receptacles	2 @ 50 "				
	Branches Lighting	Light Posts, Front	3 @ 200 "	600 "	1	600 "
		Light Posts, Clear Wall	2 @ 200 "	400 "	1	400 "
Total Connected Lighting Load					11	5140



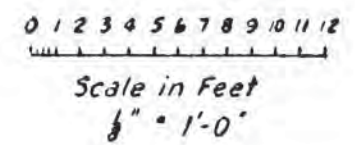
SCHEDULE OF RADIATORS

NO.	WALL SPACE	HEATING SURFACE	SIZE	SIZE	RISE	HEAD
1	15" x 24"	7 1/2"	1"	1 1/2"		
2	15" x 24"	7	1"	1 1/2"		
3	15" x 24"	7	1"	1 1/2"		
4	15" x 24"	7	1"	1 1/2"		
5	15" x 24"	7	1"	1"		
6	15" x 24"	7	1"	1"		
7	15" x 24"	7	1"	1"		
8	15" x 24"	7	1"	1"		
9	15" x 24"	7	1"	1 1/2"		
10	15" x 24"	7	1"	1 1/2"		
11	15" x 24"	7	1"	1 1/2"		
12	15" x 24"	7	1"	1 1/2"		
13	15" x 24"	7	1"	1"		
14	15" x 24"	7	1"	1"		
15	15" x 24"	7	1"	1"		
16	15" x 24"	7	1"	1"		
17	15" x 30"	9	1"	1 1/2"		
18	15" x 30"	9	1"	1 1/2"		
19	15" x 30"	9	1"	1 1/2"		
20	15" x 30"	9	1"	1 1/2"		
21	15" x 30"	9	1"	1 1/2"		
22	15" x 30"	9	1"	1"		
23	15" x 30"	9	1"	1"		
24	15" x 24"	7	1"	1"		
25	15" x 18"	5	1"	1"		
26	15" x 18"	5	1"	1"		

ELECTRICAL LEGEND

- (A) Band of lamps around head of column below capital. - 10 @ 15 watts
- (B) Half band of lamps - - - pilaster " - 4 @ 15 "
- (C) Ceiling Fixture with wall switch
- (D) Ceiling Fixture, watertight with guard, Marine type
- (E) Wall bracket
- [1] Wall Receptacle - Single Outlet
- [2] Wall Receptacle - Two Outlets
- S. Snap Switch
- P1. Push Button Switch - Single Switch
- P2. Push Button Switch - Two Switches
- Switch Control

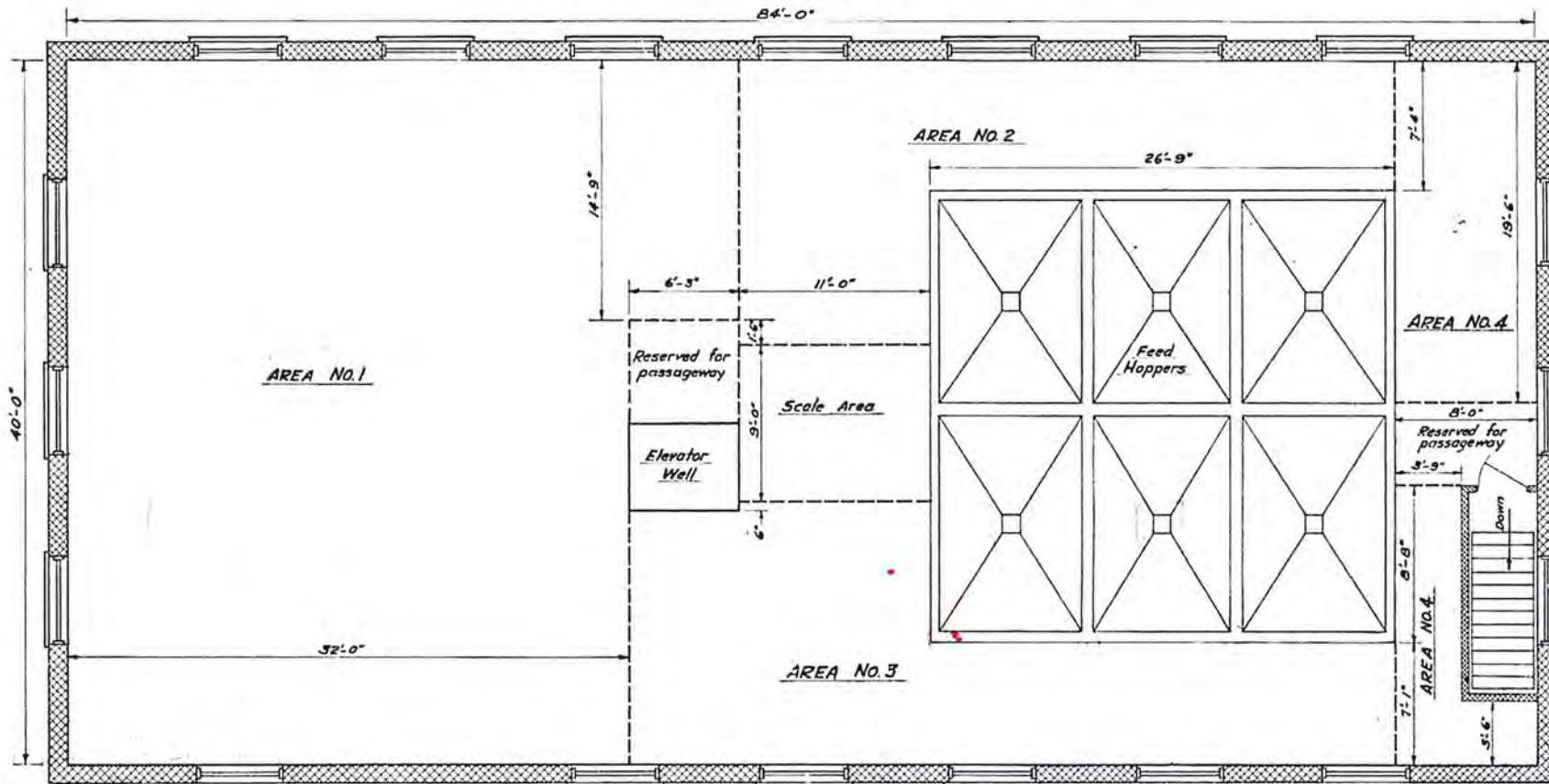
Note: Small figures alongside of Fixture Symbol indicates power of lamp in Watts.



DRAWING NO. 2072-72

<p>HRWTP</p> <p>2-1-24</p> <p>IMP. TO WATER</p> <p>(63)</p> <p>C9-1-121</p>	<p>TAMPA, FLORIDA</p> <p>IMPROVEMENTS TO WATER SUPPLY</p> <p>HILLSBOROUGH RIVER PROJECT</p> <p>FILTRATION PLANT-FILTER HOUSE</p> <p>LIGHTING AND HEATING</p>			
	<p>Nicholas S. Hill, Jr.</p> <p>Consulting Engineer</p> <p>112 East 19th Street</p> <p>New York City</p>			
	<p>Scale: 1/4" = 1'-0"</p> <p>February 1, 1924</p>			
Drawn by F.C.	Checked by F.B.B.	Examined by J.H.	Reviewed by L.R.	Approved by S.H.K.
Revisions				

CITY OF TAMPA
WATER TREATMENT PLANT
**ALLOWABLE FLOOR LOADING
CHEMICAL HOUSE STORE ROOM**



AREA NO.	AREA IN SQ. FT.	LIVE LOAD PER SQ. FT. IN POUNDS	TOTAL LIVE LOAD-IN POUNDS	ALUM				HYDRATED LIME				QUICKLIME		SODA ASH	
				DEPTH IN FT.-BULK	LAYERS OF 100 [#] SACKS	TOTAL LBS. IN SACKS	DEPTH IN FT.-BULK	LAYERS OF 50 [#] SACKS	TOTAL LBS. IN SACKS	DEPTH IN FT.-BULK	TOTAL LBS.	DEPTH IN FT.-BULK	LAYERS OF 100 [#] SACKS		
1	1372	600	823,200	8.0	20	796,000	15.0	40	804,000	10	820,000	12	30		
2	375	300	112,500	4.0	10	103,000	7.5	20	103,000	5	110,000	6	15		
3	440	300	132,000	4.0	10	126,000	7.5	20	126,000	5	125,000	6	15		
4	230	200	46,000	2.6	6	37,800	5.0	13	40,950	3.3	42,000	4	10		
TOTAL	2417		1,113,500			1,062,800			1,073,950		1,097,000				

HRWTP

2-12
CHEM. HOUSE

1
C9-2-26

R. M. JOHNSON
Supervisor of Filtration
February-1942
Scale-1"=4'

Live loads by
Nicholas S. Hill

A10(D)-01



December 19, 2018

Reference No. 11186500

Rowe Architects Incorporated
100 Madison Street, Suite 200
Tampa, Florida 33602-4704

Via Electronic and US Mail

Attn: Mr. John Hadley, AIA

**Re: Report of Subsurface Exploration and
Geotechnical Engineering Services
City of Tampa Tippin Water Treatment Plant Staircase
7125 North 30th Street
Tampa, Florida 33610**

1. Introduction

GHD is pleased to provide the results of our subsurface exploration to support the design of the above-referenced staircase at the existing water treatment plant facility. Described below are the methods and results of our subsurface exploration and evaluation of the subsurface conditions encountered at the project site. Based on our interpretation of the subsurface conditions from the soil boring data and our understanding of the proposed construction, conclusions and recommendations regarding site preparation, fill material placement and foundation design are included herein.

2. Summary

Our studies indicate that the site is suitable for the proposed staircase construction, provided the recommended site preparation is performed as discussed herein. Following the recommended subgrade preparation, the foundations for the proposed staircase may be designed based on an allowable soil bearing pressure of 3,000 pounds per square foot (psf).

3. Project Information

Based on provided site photographs and architectural renderings, we understand that a two-level, exterior staircase structure is proposed at the south end of the original Water Works filter house building. A soil boring was requested at the proposed column and spread footing area that will support the intermediate stair landing of the structure. The proposed column foundation is situated between an existing generator and CMU screening wall, and other underground utilities appear to be in the general vicinity. The existing site features are depicted on the attached **Figure 1**. Maximum column loads provided for our evaluation were no more than 50 kips. We anticipate that no additional fill will be needed to achieve finished grades.



4. Purpose and Scope of Services

Geotechnical engineering services were requested to provide information pertaining to the assessment of subsurface conditions and foundation system selection for the proposed staircase structure. For this evaluation, the following items have been performed:

- Coordinated with Sunshine State One Call and water treatment facility staff to identify possible buried underground utilities.
- As requested, performed one Standard Penetration Test (SPT) boring within the vicinity of the proposed staircase landing footing area to a nominal depth of 20 feet. The boring was located approximately 10 feet away from the proposed column area due to existing underground utilities that precluded safe drilling at the preferred location.
- Documented soil and groundwater conditions encountered in the boring, and collected soil samples for laboratory review. Visually classified the soils encountered in accordance with the Unified Soil Classification System (USCS).
- Reviewed the Hillsborough County Soil Survey (NRCS Web Soil Survey) pertaining to the shallow soil and groundwater conditions.
- Presented the results of our exploration and evaluations in an engineering report including:
 - The data developed during the study including soil profile and groundwater level.
 - An interpretation of the boring soil stratigraphy based on our testing and suitability of the location for the planned staircase structure, including discussions regarding potential geotechnical impacts.
 - Estimates of seasonal groundwater fluctuations.
 - Foundation subgrade preparation recommendations and foundation design information.

The results of the exploration have been used in the geotechnical engineering analysis and the formulation of recommendations. The results of the subsurface exploration, including the recommendations and the data on which they are based, are presented in this written report prepared by Florida licensed engineers specializing in geotechnical engineering who are familiar with the local soil conditions.

5. Subsurface Exploration and Testing

5.1 Soil Borings

The subsurface exploration program for this study included one SPT boring that extended to a depth of approximately 20 feet. The boring location is presented on the attached **Figure 1**. The boring location was established by GHD based on the provided utility plan and other provided information, and the boring was



located in the field by tape measurements from existing site features. Accordingly, the boring location is considered approximate.

The SPT boring (SPT-1) was performed in general accordance with ASTM D 1586 (Standard Test Method for Penetration Test and Split Barrel Sampling of Soils) using the rotary wash method, where a bentonite (clay) slurry (“drill mud” or “drill fluid”) was used to flush and stabilize the borehole. The upper 6 feet of the boring was advanced with a hand auger in order to check for buried utilities not indicated on the provided plans, and Standard Penetration sampling was performed thereafter at closely spaced intervals in the upper 10 feet and at 5 foot intervals for the remainder of the boring. A hand cone penetrometer was advanced with the hand auger boring to measure the relative density of the surficial soils (“P” values). After seating the sampler 6 inches into the bottom of the borehole, the number of blows required to drive the sampler one foot further with a standard 140 pound hammer dropped 30 inches is known as the “N” value or blowcount. The blowcount has been empirically correlated to soil properties. The recovered samples were placed into containers and returned to our office for visual review.

6. Laboratory Classification

6.1 Visual Manual Classification

Recovered soil samples were reviewed in our laboratory by a geotechnical engineer in general accordance with ASTM D 2488 (Standard Practice for Description and Identification of Soils (Visual Manual Procedure)). Based on the laboratory review and field boring logs, similar soils were grouped into strata, with each stratum described in general accordance with the nomenclature used in ASTM D 2487 (Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)).

7. Subsurface Conditions

7.1 Soil Survey

The U.S. Department of Agriculture – Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service (SCS), has mapped the shallow soils in this area of Hillsborough County. This information is available through the NRCS Web Soil Survey. The soil survey indicates the site was covered by Candler fine sand, 0 to 5 percent slopes (mapping unit 7) prior to development of the existing plant facility.

Candler fine sand, 0 to 5 percent slopes, in its undisturbed state, is nearly level to gently sloping and excessively drained, with a seasonal high water table below 80 inches. Typically, the surface layer of Candler fine sand consists of dark gray fine sand about 6 inches thick. The surface layer is followed by light yellowish brown fine sand. From depths of 35 to 72 inches, very pale brown fine sand is found. Below



a depth of 72 inches, and extending to a depth of 80 inches or more, is a mixture of very pale brown fine sand and strong brown loamy sand lamellae.

The USDA Soil Survey is not necessarily an exact representation of the soils on the site. The mapping is based on interpretation of aerial maps with scattered shallow borings for confirmation. Accordingly, borders between mapping units are approximate and the change may be transitional. Differences may also occur from the typical stratigraphy, and small areas of other similar and dissimilar soils may occur within the soil mapping unit. As such, there may be differences in the mapped descriptions included below and the boring descriptions obtained for this report. The survey is, however, a good basis for evaluating the shallow soil conditions of the area. Based on the results of our exploration, the soils encountered below the surficial fill material appear relatively similar to the described Candler soils.

7.2 Soil Borings

The soil profile encountered in our boring is presented on **Figure 2**. The transition between strata may be gradual and the indicated boundary approximate. Soil strata boundaries were estimated when they occurred between sample intervals. Small variations not considered important to engineering evaluation may have been omitted or abbreviated for clarity. Differences in subsurface conditions can and should be expected away from the boring location.

Boring SPT-1 initially revealed pale brown to grayish brown fine sand to slightly silty fine sand (Stratum 1) that extended to a depth of approximately 8 feet. The upper portion of Stratum 1 appeared consistent with fill soils used to raise and grade the site during initial development of the plant facility. Next, the boring indicated about 4 feet of very pale brown fine sand (Stratum 2), which was then underlain by grayish brown silty, clayey fine sand (Stratum 3) to the boring termination depth of approximately 20 feet.

Based on the SPT 'N' and hand cone penetrometer "P" values, the Stratum 1 sand was typically loose with occasional medium dense zones. The underlying Stratum 2 sand was similarly loose, and Stratum 3 was initially loose and then medium dense near the boring termination depth.

7.3 Groundwater Information

The surface of the unconfined surficial aquifer (groundwater table) was not encountered within 10 feet of the ground surface in boring SPT-1, which was performed in December 2018 during the current dry season. Relatively saturated soils were indicated during the drilling process near a depth of 13.5 to 15 feet. The position of the surface of the groundwater table will fluctuate seasonally, in response to variation in rainfall, surface drainage features, groundwater levels in nearby water bodies, and other factors.

The groundwater level presented in this report is the level that was measured at the time of our field activities. Fluctuations should be anticipated. We recommend that the Contractor assess the actual groundwater level at the time of the construction to determine groundwater impacts on the construction procedures.



8. Conclusions and Recommendations

The following conclusions and recommendations are based on the project characteristics previously described, the data obtained in our field exploration and our experience with similar subsurface conditions and construction types. If the final construction plans are significantly different from the conceptual conditions, or if subsurface conditions differ from those disclosed by the boring are encountered during construction, we should be notified immediately so that we might review the following recommendations and make changes, if needed. A general review of project plans and specifications by GHD is recommended prior to bidding in order to help insure that these recommendations have been implemented in accordance with our intent.

8.1 Site Preparation

1. Prior to construction, the location of any existing underground utility lines, tanks, etc. within the construction area should have been established. Provisions should be made to relocate any interfering utility lines within the construction area to appropriate locations. In this regard, it should be noted that if abandoned underground pipes are not properly removed or plugged, they may serve as conduits for subsurface erosion, which subsequently may result in settlement and/or ground depressions. Any excavations or cavities formed by the removal of utility conduits should be filled with clean structural fill placed and compacted in small lifts, as appropriate for the type of compaction equipment utilized.
2. The foundation subgrade soils should be compacted after excavation using a light compactor to densify soil loosened in the excavation. Footing subgrade soils should be tested to verify compaction to at least 95% of the modified Proctor maximum dry density (ASTM D-1557) to a minimum depth of 1 foot below the foundation subgrade and approved by the Geotechnical Engineer prior to placement of concrete. In-place density tests should be performed by an experienced geotechnical engineering technician working under the direction of a licensed Geotechnical Engineer to verify the required degree of compaction. A testing frequency of at least one test within each column foundation area is recommended. Backfill soils placed adjacent to footings or walls or over/around buried utilities should be carefully compacted with a vibratory plate compactor or tamp to avoid damaging the footings or walls. Approved sand fills to provide foundation embedment constraint should be placed in loose lifts not exceeding 6 inches and should be compacted to a minimum of 95% of the modified Proctor maximum dry density.
3. Prior to beginning compaction of the foundation subgrade, soil moisture contents may need to be controlled in order to facilitate proper compaction. If additional moisture is necessary to achieve compaction objectives, then water should be applied in such a way that it will not cause erosion or removal of the subgrade soils. Conversely, if the material being compacted is too moist, drying through aeration and/or deep raking may be necessary. The moisture content within the natural ground or fill soil should be controlled to within ± 2 percentage points of optimum as established in ASTM D-1557 to help ensure development of both density and stability during compaction operations.



4. If loose pockets are encountered in the footing excavations, the unsuitable materials should be removed, replaced, and compacted with acceptable material. This backfilling may be completed with a well-compacted, suitable fill such as clean sand. Sand backfill should be compacted to a dry density of at least 95% of the modified Proctor maximum dry density (ASTM D-1557), as previously described.
5. Care should be used when operating the compactor close to existing structures to avoid transmission of vibrations that could disturb occupants or cause damage to structures. Accordingly, the contractor is advised to observe and document distress on any nearby existing structures prior to beginning construction. Vibration monitoring could also be considered.
6. Utility trench backfill should follow the appropriate city or county requirements, or product manufacturer's specifications.

8.2 Foundation Design

With preparation of the existing subgrade and placement of fill in accordance with the preceding recommendations and provided loading conditions, the proposed staircase structure foundations can be constructed bearing in fill or existing ground. The foundations that bear in the compacted, existing soils or in structural fill may be designed based on a maximum net allowable bearing pressure of 3,000 pounds per square foot. Based upon the Florida Building Code, footing bottoms should be located at a depth of at least 12 inches below final grade.

Structure settlements were estimated based on an estimated maximum bottom of foundation bearing pressure of up to 3,000 pounds per square foot, maximum column loads of 50 kips, soil conditions encountered in the boring, plus the aforementioned foundation subgrade preparation. Total settlements are anticipated to be on the order of 1/2 inch or less. Differential settlements are anticipated to be on the order of 1/4 inch or less. Should structural loads exceed the previously discussed loading conditions, this office should be contacted to review our recommendations.

9. Limitations

Our professional services have been performed, our findings obtained, and our opinions prepared in accordance with generally accepted geotechnical engineering principles and practices. All testing was performed in general accordance with recognized methods and guidelines; minor procedural variations that are not expected to affect the conclusions reached herein may have been taken. GHD is not responsible for the conclusions, opinions or recommendations made by others based on these data.

The analysis and opinions submitted in this report are based upon the data obtained from the soil borings performed at the locations indicated. If site plans change and any subsurface variations become evident during subgrade preparation, a re-evaluation of the opinions contained in this report will be necessary after we have had an opportunity to observe the characteristics of the conditions encountered. The scope of our services does not include any environmental assessment or investigation for the presence or absence of hazardous or toxic materials in the soil, groundwater or surface water within or beyond the site studied. Any statements in this report regarding odors, staining of soils, or other unusual conditions observed are strictly for the information of our client.



10. Closure

We trust the information in this report meets your requirements at this time. Samples will be retained in our laboratory for approximately 30 days. We appreciate the opportunity to continue our involvement in this project. Should you have any questions, or require additional information, please do not hesitate to contact us at your convenience.

Sincerely,

GHD

Florida Engineering Certificate of Authorization No. 9931

Florida Geology Business No. GB711

Local Address | 5904 Hampton Oaks Parkway Suite F Tampa Florida 33610 USA



Steven A. Janosik, P.E. *12/19/2018*
Associate | Senior Geotechnical Engineer
Florida P.E. License No.: 69825

SAJ/AFA/cap-1

Encl. Figure 1 – Boring Location Map
Figure 2 – SPT Boring Profile



Andres F. Alberdi, P.E.
Principal
Florida P.E. License No.: 42449

Figures



LEGEND:

SPT-1 STANDARD PENETRATION TEST BORING LOCATION


NOTES:

1. BORING LOCATION IS APPROXIMATE.

Source: MICROSOFT PRODUCT SCREENSHOT(S) REPRINTED WITH PERMISSION FROM MICROSOFT CORPORATION, ACQUISITION DATE UNKNOWN, ACCESSED 2018.

0 15 30ft

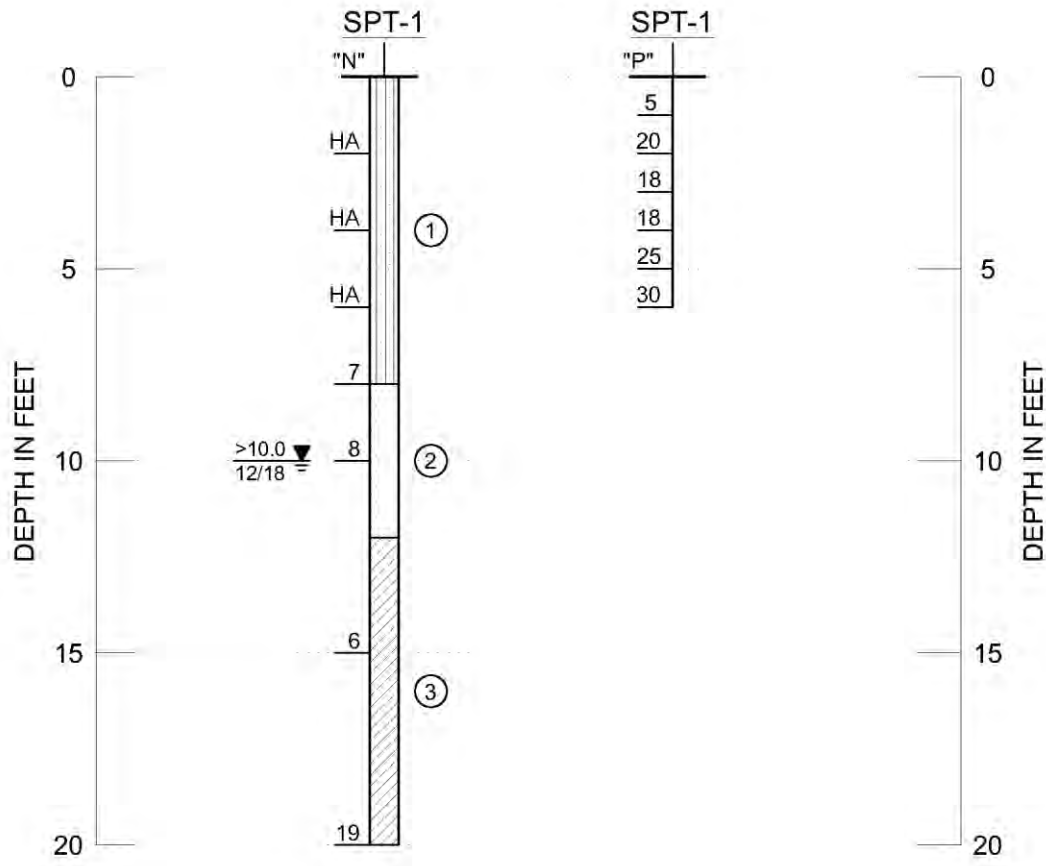


CITY OF TAMPA TIPPIN WATER
TREATMENT PLANT STAIRCASE
TAMPA, FL

BORING LOCATION MAP

11186500
Dec 19, 2018

FIGURE 1



LEGEND:

- ① PALE BROWN TO GRAYISH BROWN FINE SAND TO SLIGHTLY SILTY FINE SAND (SP/SP-SM)
 - ② VERY PALE BROWN FINE SAND (SP)
 - ③ GRAYISH BROWN SILTY, CLAYEY FINE SAND (SC-SM)
- (SP) UNIFIED SOIL CLASSIFICATION GROUP SYMBOL AS DETERMINED BY VISUAL REVIEW
- "N" BLOW COUNTS AT SHOWN DEPTH
- "P" HAND PENETROMETER READING AT SHOWN DEPTH (E= ERRATIC)
- HA BORING ADVANCED BY HAND AUGER
- $\frac{10.0}{12/18}$ DEPTH GROUNDWATER ENCOUNTERED AND DATE MEASURED (NE=NOT ENCOUNTERED)



CITY OF TAMPA TIPPIN WATER TREATMENT PLANT STAIRCASE TAMPA, FL

11186500
Dec 19, 2018

SPT BORING PROFILE

FIGURE 2

Contractor's Pre Bid Request for Information Log

David L. Tippin Water Treatment Facility Building and Site Improvements - Design

Phase 1 Administration Building

City of Tampa 17-D-00009

No.	Sheet /Spec	Disipline	Description	Response
1		Owner	Has an asbestos survey been conducted? If so, please provide the report.	No, an asbestos survey has not been conducted.
2		Owner	Are any roof cores available?	No.
3	081416.2.3.A.2	Architectural	The interior solid-core door species lists several species. Each species has a different price points. Please provide which wood species to include.	Maple.
4	011000.1.2.T.I.1.3.A.2.	Owner	Pursuant to this specification section, please provide the "Report of Asbestos and Lead Containing Paint and Materials Testing" by Terracon dated April 20, 2016	This specification section does not exist. Also, we are not aware of this report.
5	0112100.3.3.C	Architectural	Allowance no. 3 for carpet tile materials. Does this allowance include pad and glue?	The Allowance cost is for carpet tile material only. Base bid should include installation cost of carpet tile and other specified material.
6	0112100.3.3.D	Architectural	Allowance no. 4 for ceramic wall tile materials. Does this allowance include the thin set and grout materials?	The Allowance cost is for ceramic tile material only. Base bid should include installation cost of ceramic tile and other specified material.
7	S202	Structural	Sheet S202, Roof Framing Plan, note "Expose sheathing verify that sheathing is nailed w/ (3) 10d nails per 1x6 board, add fasteners if req." This upper roof is not in the scope to be replaced. Destructive demolition will be required to expose the substrate to verify the existing fastening. The entire roof will need to be removed and replaced only IF the existing fasteners do not meet the (3) 10d nails per 1x6 board requirement. We request to make removing the existing upper roof, adding fasteners to meet the fastening requirement and replacing this roof as an alternate.	Ignore the note 'Expose sheathing verify that sheathing is nailed w/ (3) 10d nails per 1x6 board, add fasteners if req'.
8	8/A800	Architectural	Callout note calls for painting of insulation on the underside of the deck. 1. What type of insulation is this? 2. What is paint product to be used to paint this insulation? 3. Please define the extent of the insulation to be painted.	The ceiling insulation noted in the welding shop on the drawings is, in fact, spray applied fireproofing (SFRM), which can be painted with a latex paint similar to the ones specified for other interior surfaces. The existing fireproofing covers the entire bottom side of the floor above, and exposed steel structure - all of it should be painted in the welding shop.
9	Instructions to Bidders	Owner	Section 2 General Instructions, Item I-2.01 Bidder's Responsibility – "Bidders shall carefully examine the entire site of the proposed work and adjacent premises . . . ". A site walk and access to visit the project site was denied due to COVID 19. How is this instruction to be handled?	
10	003119.1.1.G.1	Owner	"Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions. A site walk and access to visit the project site was denied due to COVID 19. How is this instruction to be handled?	
11	P002	Plumbing	There are two sheets labeled P002, Plumbing Fixtures. Which sheet is correct?	The sheet with the Revision titled 'Permit REV 4' dated 02.24.20. The other P002 should be disregarded.
12	S201	Structural	Sheet S201, note #14 – fill slab with 6" Styrofoam. Please provide specifications for the Styrofoam.	Styrofoam shall meet ASTM E1730
13	003119.1.1.B	Owner	Pursuant to this specification section, please provide the original construction drawings.	See attachments.
14	003119.1.1.D	Owner	Pursuant to this specification section, please provide the Topographic and Ground Penetrating Radar Survey.	See attachments.
15	003119.1.1.E	Owner	Pursuant to this specification section, please provide the Report of Subsurface Exploration and Geotechnical Engineering Services by GHD dated December 19, 2018.	See attachments.

Contractor's Pre Bid Request for Information Log

David L. Tippin Water Treatment Facility Building and Site Improvements - Design

Phase 1 Administration Building

City of Tampa 17-D-00009

No.	Sheet /Spec	Disipline	Description	Response
16	Demolition	Architectural	Due to the denial of access to the building due to COVID 19, please provide further information of the assemblies to be demolished. Ergo; ceiling types.	Refer to existing condition photos.
17	E301	Electrical	Second Floor: Is the highlighted area to be a Heat Detector? Item not listed on the electrical page legend.	Yes, the FH symbol in the elevator shaft on sheet E301 is a heat detector.
18		Owner	Is it possible to gain access to the property to measure the area needing sealed?	No. Please note that the drawings are to scale.
19		Owner	Is there any patching or pothole repair needed?	Bidders should plan on minor patching at the parking lot.
20	A302, A303	Architectural	We would like to know what kind of wood should we use for trim and paneling on the wall of the 117 and 210 conference room. Details 9 / sheet A303 and 5 / sheet A302.	Refer to specification 06 20 23 Interior Finish Carpentry
21	A600	Architectural	Door Schedule indicates there are hardware sets noted, but no hardware is listed. Can you provide this information?	Refer to specification 08 71 00 Door Hardware
22		Architectural	Elevator spec is listed as Thyssen Krupp "Endura MLR". This elevator does now allow for more than 12'8" of travel. The floor to floor distance is 16'6". Please advise if there will be an elevator change. Please see attached spec and snippet from plan for floor to floor dimension.	Per Thyssenkrupp literature, maximum travel for 1-Stage 2100 Endure MRL is up to 18'-8". Contact Thyssenkrupp for more information. Also note that Thyssenkrupp is the basis of design but other manufacturers may be acceptable.
23		Architectural	What is the spec for the solid surface window stool?	Use 1/2" Corian solid surface as basis of design, manufacturer's full range of standard colors (K-26836).
24		Architectural	General Note sheet A104 Clay tile at parapet coping to be replaced. Can this be part of the contingency allowance so everyone is bidding the same amount for this vague scope of work?	The parapet coping is generally in good shape. Plan on replacing any broken pieces through the contingency allowance.
25		Architectural	Can the scope of work at the chimney be labeled as part of the contingency allowance due to no details available?	No, refer to S403 and A200.
26		Electrical	Specifications Section 1.4.A specifies a Genetec GSC Synergis card access system. The section also indicates substitution requests can be made. One of our bidders offers a comparable product from S2 Security (see attached spec). Would this be an accepted substitution for bidding purposes? If not, please provide preferred vendor(s) for the Genetec system.	We do not pre-qualify.
27		Architectural	Regarding the Linear Wood Ceiling. A103, 14/A201. Will the sides be finished with Drywall? Cannot find a detail	No, the sides will be open.
28		Architectural	Re. the Acoustical Panels in detail 10/A103. These are the Tectum Panels called out in the spec correct?	Yes.
29		Architectural	Confirm there is no drywall or wood detail for the new Roller Shades? A102.	There will not be any type of built valance to house the roller shade at the top of the window.
30		Mechanical	It appears the pumps are part of the chiller skid is there a buffer tank on the skid as well?	Pumps and buffer tank are included in the packaged chiller system.
31		Mechanical	There does not appear to be a chiller yard layout / detail showing the air separator, make up water and other hydronic specialties. Please provide.	Air separator and hydronic specialties are included in the packaged chiller system. We will revise the chilled water schematic for clarity and indicate a hose bibb for make-up water at the chiller yard.

Contractor's Pre Bid Request for Information Log

David L. Tippin Water Treatment Facility Building and Site Improvements - Design

Phase 1 Administration Building

City of Tampa 17-D-00009

No.	Sheet /Spec	Disipline	Description	Response
32		Mechanical	Is any of the HVAC equipment 'owner provided' or is it all to be included in the bid? For reference, Spec section 23 74 13 (Packaged Outdoor Central Station AHUs) says that the owner is direct-purchasing the outdoor AHUs? To me the all the AHUs appear to be indoor units and they seem to be covered in However, spec section 23 73 13 (Modular Indoor Central Station AHUs) does not have that statement. It appears that all four (4) AHUs appear to be indoor units and would be covered by 23 73 13. Is that correct? If so, what equipment does section 23 74 13 correspond to?	All equipment will be included in bid. No HVAC equipment will be provided by owner. We will revise spec section to delete the reference to direct purchase.
33	A200	Architectural	On pg. A200 the Elevator Cabb Plan says EPX Floor Finish. Can you confirm if this is epoxy flooring since EPX is not used on the Finish Legend?	Basis of design should be Stonhard Stontec QBF system.
34	A700, A701, A702	Architectural	Please confirm if the interior stair railings are stainless steel or not.	Refer to specification 05 51 16.
35		Architectural	Please provide us the finish Floor & Ceiling schedule.	Refer to A102 for finish information and A103 for ceiling information.
36	122413	Architectural	We just noticed that according to Specification - Section 12 24 13 - 2.3 Shadeband Materials, B. 7. Orientation calls for "Railroaded". the only time we railroad is when the width of the window is wider than the width of the material. This not the case for this project. Can you clarify?	It is the design intent to have a single sheet of roller shade fabric per window. The specification covers scenarios in which the window is too wide, and it is not possible.
37	012200	Architectural	Specification section 012200.3.1.A states to include 250 lineal feet of chilled water pipe for the base bid. Sheet A900 – the length of the run from the administration building to the chiller yard is approximately 270 lineal feet (according the scale on sheet A900). Is the 250 lineal foot length in specification section 012200.3.1.A intended to include the total length of the chilled water pipe (both CWS and CWR)? Or is it intended for the run length from the administration building to the chiller yard?	The base bid should include 250 linear feet for both the chilled water return & supply lines for a total of 500 linear feet to go from the chiller yard to the units in the building. The utility trench will be by Owner, as part of a different project, and at this time we do not know what the route will be. Be sure to note 01 22 00 3.1.A.2, and provide unit cost for providing and installing a linear foot of chilled water line, in case more chilled water piping is required.
38	3/A100	Architectural	3/A100 shows the demolition of items in the third floor mechanical Attic. None of the renovation plans show any new work in the third level mechanical attic. Is any new work to be performed in this space?	No, the entire 3rd floor mechacnial attic will be removed and not replaced.
39	3/A100	Architectural	3/A100 shows the demolition of mechanical equipment in the third floor mechanical Attic. Due to the denial of access to the building due to COVID 19, please provide further information (description, photographs) of the mechanical equipment to be demolished.	The City will provide photographic documenation of existing conditions.
40	3/A100	Architectural	Demolition note 17 – remove entire floor structure, walls and ceiling. Due to the denial of access to the building due to COVID 19, please provide description of the floor structure, wall and ceiling assemblies.	This note applies to the 3rd floor mechanical attic. Floor structure, wall and ceiling assemblies are unknown.
41	A103	Architectural	Spaces 117,118, 119, 124 note "provide new ceiling framing in this area – refer to structural". Structural plans do not show ceiling framing for these spaces. Please provide additional information for the required framing.	Ignore this note.
42	10/A103	Architectural	Note - "Abrasive blast underside of concrete floor slab and structure". Is the abrasive blasting of the slab to be only at the acoustical ceilings or the entire concrete floor slab?	Refer to OTS ceiling type on A103.

Contractor's Pre Bid Request for Information Log

David L. Tippin Water Treatment Facility Building and Site Improvements - Design

Phase 1 Administration Building

City of Tampa 17-D-00009

No.	Sheet /Spec	Disipline	Description	Response
43	A100	Architectural	Space 0101, Key Note 4 – “Remove 14” concrete plinth – original floor slab to remain”. Please provide further information about the concrete plinth. Is there a single or multiple “plinths”? Same dimensions or do they vary in dimensions?	The entire hatched area in 0101 Locker Room represents the plinth to be removed.
44	A302	Architectural	Please confirm that the countertops at the conference room to be quartz agglomerate countertops.	Yes, refer to A102.
45	A300	Architectural	Please confirm that the countertops at the break room to be quartz agglomerate countertops.	Yes, refer to A102.
46	A301	Architectural	Please confirm that the countertops at the analyzer to be quartz agglomerate countertops.	Yes, refer to A102.
47	Cabinets	Architectural	Please provide the following for the cabinets: •Wood species of the stained wood base material. •Brand and color of the Plastic Laminate type 1 •Brand and color of the Plastic Laminate type 2 •Color of the Corian Quartz listed as Quartz type 1 •Color of the Corian Quartz listed as Quartz type 2 •Brand and color for the solid surface window sills	wood base: match door brand and color of plastic laminate: any manufacturer that meets specification is acceptable, color to be chosen from manufacturer's full range corian quartz: refer to 12 36 61 for basis of design. brand and color for solid surface window sills: see response to separate question
48		Architectural	[Tnemec is] not listed as an acceptable manufacturer for the resinous flooring on the subject project. Can we add Tnemec to the listed manufacturers in Section 096723, Article 2.1.A?	Follow specification 01 25 00 for any substitution request. We do not pre-qualify.
49	09 03 20 Historic Treatment of Plaster	Architectural	a. We assume this includes new plaster in stair 1? b. A102 shows Cement Plaster repair and repaint: what is the extent of the repairs and paint removal? c. There is not a defined quantity/scope for the repairs	The veneer plaster noted in Stair 1 can be a level 5 drywall finish. The references to interior cement plaster should read gypsum plaster. The exterior is cement plaster. The general scope for interior gypsum plaster is to leave existing in place; do not remove paint; patch and repair any damaged areas; repaint entire wall, feathering edges of existing paint. The intent was to have a prebid walk-through to allow potential bidders a chance to review extent. Because this is no longer possible, the City will provide a virtual walk-through with panoramic photographs.
50	08 03 52 Historic Treatment of Wood Windows	Architectural	a. there are no elevations or window schedule. Is the window restoration limited to the items on G301/A302? b. Please indicate the scope for the historic window treatment and provide a window schedule with dimensions.	Yes, the historic interior borrow lite windows are in place, and may need repair once paint is removed. Glazing may need to be replaced in areas.
51	06 03 12 Historic Wood Repair	Architectural	a. The only wood repair we see is limited to the window restoration. Please Confirm.	Historic wood repair is limited to the restoration of the borrow lite windows and trim in 117 Conference.
52	04 03 26 Historic Terra Cotta Unit Masonry Repair	Architectural	a. The spec reads like a pointing spec but the exterior is plaster or stucco. What is the scope of terra cotta repair?	This specification is provided for the repair and repointing of the exposed interior terra cotta.
53	09 03 91 Historic Treatment of Plain Painting	Architectural	a. This spec is paint removal and stain. Is this limited to the window frames?	Window frames and trim in 117 Conference. Existing paint elsewhere should not be removed.
54	1/A104	Architectural	Clarification	Do NOT replace roofing on low roofs flanking Administration building, over rooms 123 Break Room and 112 Analyzer. Do not provide new overflow scuppers. DO replace roofing at low roof connecting to Filter Gallery, over rooms 117 Conference and 113 Mens. Replace all downspouts as noted.
55	A102	Architectural	Clarification	The CT designation is listed on the finish plans but not the finish legend. It stands for Ceramic Wall Tile.

Contractor's Pre Bid Request for Information Log

David L. Tippin Water Treatment Facility Building and Site Improvements - Design

Phase 1 Administration Building

City of Tampa 17-D-00009

No.	Sheet /Spec	Disipline	Description	Response
56		Architectural	Clarification	Resin panels basis of design to be Varia by 3Form.
57	08 42 13	Architectural	Clarification	Provide Level E storefront / curtain wall and associated hardware
58	G100	General	Clarification	Disregard general notes #3, #6, #7, #12, #13, #14, #16, #23, #24
59	G100	General	Clarification	Disregard general note #17 but the Contractor is responsible for providing temporary shoring and bracing as required.
60	G100	General	Clarification	In regards to general note #18, the Contractor should assume the building will be empty of all furnishings and non-fixed equipment.
61	09 91 23 Interior Painting	Architectural	Clarification	Section C should read "Lead Paint may be encountered in the Work. Contractor to follow all applicable regulations when working around it."
62	M101	Mechanical	Clarification	Revise the 4-hour wall note to 2-hour wall on M-101.
63	FP101	Fire Protection	Clarification	Revise the Clean Agent System and Pre-Action Specifications to utilize one releasing panel and the detectors for both systems.
64	M103	Mechanical	Clarification	Basis of design for the dust collection system is no longer available from Monoxivent but the identical unit is available from AAF International.

Date Received	From	RFI	Date of Response	Addendum	Comments/Notes
15-Jun-2020	Kimberly McNeal	<p>Will there be a pre-proposal site visit/conference for the project or is the site accessible to the public for photos and notes prior to the bid due date?</p> <p>Response: Link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p>			https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f
18-Jun-2020	Jim Mozingo	<p>Pursuant to specification section 003119 we request the following documents:</p> <p>003119.1.1.B. - Original construction drawings. 003119.1.1.D. – Topographic and Ground Penetration Radar Survey 003119.1.1.E. – Report of Subsurface Exploration</p>			
19-Jun-2020	Jim Mozingo	<p>Has an asbestos survey been conducted? If so, please provide the report. Response: No, an asbestos survey has not been conducted.</p> <p>Will a site walk be scheduled for the bidders? If not, we would like to schedule an appointment to visit the site. Response: No. A link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p> <p>Are any roof cores available? Response: No.</p> <p>The interior solid-core door species lists several species. Each species has a different price points. Please provide which wood species to include. (Sheet / Spec 081416.2.3.A.2) Response: Maple</p> <p>Pursuant to this specification section, please provide the "Report of Asbestos and Lead Containing Paint and Materials Testing" by Terracon dated April 20, 2016 (Sheet / Spec 011000.1.2.T.1.1.3.A.2) Response: This specification section does not exist. Also, we are not aware of this report.</p> <p>Allowance no. 3 for carpet tile materials. Does this allowance include pad and glue? (Sheet / Spec 0112100.3.3.C) Response: The Allowance cost is for carpet tile material only. Base bid should include installation cost of carpet tile and other specified material.</p> <p>Allowance no. 4 for ceramic wall tile materials. Does this allowance include the thin set and grout materials? (Sheet / Spec 0112100.3.3.D) Response: The Allowance cost is for ceramic tile material only. Base bid should include installation cost of ceramic tile and other specified material.</p> <p>Sheet S202, Roof Framing Plan, note "Expose sheathing verify that sheathing is nailed w/ (3) 10d nails per 1x6 board, add fasteners if req." This upper roof is not in the scope to be replaced. Destructive demolition will be required to expose the substrate to verify the existing fastening. The entire roof will need to be removed and replaced only IF the existing fasteners do not meet the (3) 10d nails per 1x6 board requirement. We request to make removing the existing upper roof, adding fasteners to meet the fastening requirement and replacing this roof as an alternate. Response: Ignore the note 'Expose sheathing verify that sheathing is nailed w/ (3) 10d nails per 1x6 board, add fasteners if req'.</p> <p>Callout note calls for painting of insulation on the underside of the deck. (Sheet / Spec 8/A800) 1. What type of insulation is this? 2. What is paint product to be used to paint this insulation? 3. Please define the extent of the insulation to be painted. Response: The ceiling insulation noted in the welding shop on the drawings is, in fact, spray applied fireproofing (SFRM), which can be painted with a latex paint similar to the ones specified for other interior surfaces. The existing fireproofing covers the entire bottom side of the floor above, and exposed steel structure - all of it should be painted in the welding shop.</p> <p>Section 2 General Instructions, Item I-2.01 Bidder's Responsibility – "Bidders shall carefully examine the entire site of the proposed work and adjacent premises".</p>	3-Aug-2020	Word attachment <i>DL Tippin Administration Building - RFI - 20.06.19</i>	

Date Received	From	RFI	Date of Response	Addendum	Comments/Notes
		<p>A site walk and access to visit the project site was denied due to COVID 19. How is this instruction to be handled? (Sheet / Spec 003119.1.1.G.1)</p> <p>"Instructions to Bidders" for the Bidder's responsibilities for examination of Project site and existing conditions. A site walk and access to visit the project site was denied due to COVID 19. How is this instruction to be handled? Response: Link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p> <p>There are two sheets labeled P002, Plumbing Fixtures. Which sheet is correct? Response: The sheet with the Revision titled 'Permit REV 4' dated 02.24.20. The other P002 should be disregarded.</p> <p>Sheet S201, note #14 – fill slab with 6" Styrofoam. Please provide specifications for the Styrofoam. Response: Styrofoam shall meet ASTM E1730</p> <p>Pursuant to this specification section, please provide the original construction drawings. (Sheet / Spec 003119.1.1.B) Response: See attachment</p> <p>Pursuant to this specification section, please provide the Topographic and Ground Penetrating Radar Survey. (Sheet / Spec 003119.1.1.D) Response: See attachment</p> <p>Pursuant to this specification section, please provide the Report of Subsurface Exploration and Geotechnical Engineering Services by GHD dated December 19, 2018. (Sheet / Spec 003119.1.1.E) Response: See attachment</p> <p>Due to the denial of access to the building due to COVID 19, please provide further information of the assemblies to be demolished. Ergo; ceiling types. (Sheet / Spec Demolition) Response: Refer to existing condition photos.</p> <p>Specification section 012200.3.1.A states to include 250 lineal feet of chilled water pipe for the base bid. Sheet A900 – the length of the run from the administration building to the chiller yard is approximately 270 lineal feet (according the scale on sheet A900).</p>			https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f
20-Jun-2020	Abhinaya Da Pallati	<p>1. Is it possible to gain access to the property to measure the area needing sealed? Response: Link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p> <p>2. Is there any patching or pothole repair needed?</p>			https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f
22-Jun-2020	Jason Lancaster	<p>1. Sheet E301 second floor. Is the highlighted area to be a Heat Detector? Item not listed on the electrical legend page. Response: Yes, the FH symbol in the elevator shaft on sheet E301 is a heat detector.</p>			PDF attachment <i>RFI #1</i>
24-Jun-2020	Rich Shannon	<p>Will there be a Pre-Bid Meeting arranged for this project by the City of Tampa? If not, are we able to schedule any site visits with our potential subcontractors? Response: Link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p>	24-Jun-2020	No	No meeting nor site visits are being scheduled.
24-Jun-2020	April Russell	<p>Could you confirm if U-WMBE firms certified with City of Tampa AND the Hillsborough County Economic Department will count towards the 24% participation goal for the above mentioned project? Response: Only City Certified firms count.</p>	24-Jun-2020	No	
26-Jun-2020	Abhinaya Da Pallati	<p>1. We would like to know what kind of wood should we use for trim and paneling on the wall of the 117 and 210 conference room. Details 9 / sheet A303 and 5 / sheet A302.</p>			Image attached in e-mail
26-Jun-2020	Abhinaya Da Pallati	<p>1. On sheet A102, Finish Plans, Specify the following: PL-1 Quartz, type 1 / Plastic Laminate, type 1 PL-1 Quartz, type 1 / Plastic Laminate, type 1 However, there is no more detail about the type and color of Quartz and Plastic Laminate. Could you complete this information?</p>			Image attached in e-mail
29-Jun-2020	April Russell	<p>Door Schedule indicates there are hardware sets noted, but no hardware is listed. Can you provide this information? Response: Refer to specification 08 71 00 Door Hardware</p>			PDF attachment <i>RFI #2</i>

Date Received	From	RFI	Date of Response	Addendum	Comments/Notes
29-Jun-2020	Jason Lancaster	<p>1. Elevator spec is listed as Thyssen Krupp "Endura MLR". This elevator does not allow for more than 12'8" of travel. The floor to floor distance is 16'6". Please advise if there will be an elevator change. Please see attached spec and snippet from plan for floor to floor dimension. Response: Per Thyssenkrupp literature, maximum travel for 1-Stage 2100 Endure MRL is up to 18'-8". Contact Thyssenkrupp for more information. Also note that Thyssenkrupp is the basis of design but other manufacturers may be acceptable.</p> <p>2. What is the spec for the solid surface window stool. Response: Use 1/2" Corian solid surface as basis of design, manufacturer's full range of standard colors (K-26836).</p> <p>3. General Note sheet A104 Clay tile at parapet coping to be replaced. Can this be part of the contingency allowance so everyone is bidding the same amount for this vague scope of work. Response: The parapet coping is generally in good shape. Plan on replacing any broken pieces through the contingency allowance.</p> <p>4. Can the scope of work at the chimney be labeled as part of the contingency allowance due to no details available? Response: No, refer to S403 and A200.</p>			
30-Jun-2020	Abhinaya Da Pallati	<p>On pg. A200 the Elevator Cabb Plan says EPX Floor Finish. Can you confirm if this is epoxy flooring since EPX is not used on the Finish Legend? (See Screenshot) Response: Basis of design should be Stonhard Stontec QBF system.</p>			Image attached in e-mail
30-Jun-2020	Brian Howell	<p>Will there be a pre-bid walkthrough for the above referenced project? Response: No. A link to the 360 tour is https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f This tour is being provided as a courtesy. Bidders should base their bid on the plans and specifications, and not attempt to quantify items based on this tour.</p>			https://mls.ricohtours.com/6aa22c2c-2e87-4953-b195-a039deb7984f
30-Jun-2020	Dane Abriel	<p>This is our price proposal for the D.L. Tippin Administration Building Rehabilitation projects Epoxy Flooring section. We used a Key Resins alternate as listed in the spec.</p>		No	Equivalent products are evaluated after the project award. Your prospects at this time are the GC's among the "planholders" on the demandStar.com site.
2-Jul-2020	Jim Mozingo	<p>Is the 250 lineal foot length in specification section 012200.3.1.A intended to include the total length of the chilled water pipe (both CWS and CWR)? Or is it intended for the run length from the administration building to the chiller yard? Response: The base bid should include 250 linear feet for both the chilled water return & supply lines for a total of 500 linear feet to go from the chiller yard to the units in the building. The utility trench will be by Owner, as part of a different project, and at this time we do not know what the route will be. Be sure to note 01 22 00 3.1.A.2, and provide unit cost for providing and installing a linear foot of chilled water line, in case more chilled water piping is required.</p> <p>3/A100 shows the demolition of items in the third floor mechanical Attic. None of the renovation plans show any new work in the third level mechanical attic. Is any new work to be performed in this space? Response: No, the entire 3rd floor mechanical attic will be removed and not replaced.</p> <p>3/A100 shows the demolition of mechanical equipment in the third floor mechanical Attic. Due to the denial of access to the building due to COVID 19, please provide further information (description, photographs) of the mechanical equipment to be demolished. Response: The City will provide photographic documentation of existing conditions.</p> <p>Demolition note 17 – remove entire floor structure, walls and ceiling. Due to the denial of access to the building due to COVID 19, please provide description of the floor structure, wall and ceiling assemblies. (Sheet / Spec 3/A100) Response: This note applies to the 3rd floor mechanical attic. Floor structure, wall and ceiling assemblies are unknown.</p> <p>Spaces 117,118, 119, 124 note "provide new ceiling framing in this area – refer to structural". Structural plans do not show ceiling framing for these spaces. Please provide additional information for the required framing. (Sheet / Spec A103)</p> <p>Note - "Abrasive blast underside of concrete floor slab and structure" Is the abrasive blasting of the slab to be only at the acoustical ceilings or the entire concrete floor slab? (Sheet / Spec 10/A103) Response: Refer to OTS ceiling type on A103.</p> <p>Space 0101, Key Note 4 – "Remove 14" concrete plinth – original floor slab to remain". Please provide further information about the concrete plinth. Is there a single or multiple "plinths"? Same dimensions or do they vary in dimensions? (Sheet / Spec A100) Response: The entire hatched area in 0101 Locker Room represents the plinth to be removed.</p>			Word attachment DL Tippin Administration Building - RFI - 20.07.02

Date Received	From	RFI	Date of Response Addendum Comments/Notes
		<p>Please confirm that the countertops at the conference room to be quartz agglomerate countertops. (Sheet / Spec 5/A302) Response: Yes, refer to A102.</p> <p>Please confirm that the countertops at the break room to be quartz agglomerate countertops. (Sheet / Spec 2/A300) Response: Yes, refer to A102.</p> <p>Please confirm that the countertops at the analyzer to be quartz agglomerate countertops. (Sheet / Spec 8/A301) Response: Yes, refer to A102.</p> <p>Please provide the following for the cabinets: (Sheet / Spec Cabinets)</p> <ul style="list-style-type: none"> • Wood species of the stained wood base material. • Brand and color of the Plastic Laminate type 1 • Brand and color of the Plastic Laminate type 2 • Color of the Corian Quartz listed as Quartz type 1 • Color of the Corian Quartz listed as Quartz type 2 • Brand and color for the solid surface window sills <p>Response: wood base: match door brand and color of plastic laminate: any manufacturer that meets specification is acceptable, color to be chosen from manufacturer's full range corian quartz: refer to 12 36 61 for basis of design. brand and color for solid surface window sills: see response to separate question</p>	
6-Jul-2020	Jim Mozingo	<p>Is an addendum forthcoming? We have requested supporting documentation that is referenced in the specifications but it has not been issued. We formally request a bid date extension once the responses to the questions and the supporting documents have been issued.</p>	
6-Jul-2020	Chad Holmes	<p>Tnemec high-performance coatings are utilized all over Tampa and at the Tippin WTP, and I just noticed we are not listed as an acceptable manufacturer for the resinous flooring on the subject project. Can we add Tnemec to the listed manufacturers in Section 096723, Article 2.1.A? Response: Follow specification 01 25 00 for any substitution request. We do not pre-qualify.</p>	
6-Jul-2020	Brian Howell	<ol style="list-style-type: none"> 1. Specifications Section 1.4.A specifies a Genetec GSC Synergis card access system. The section also indicates substitution requests can be made. One of our bidders offers a comparable product from S2 Security (see attached spec). Would this be an accepted substitution for bidding purposes? 2. If not, please provide preferred vendor(s) for the Genetec system. 3. Regarding the Linear Wood Ceiling. A103, 14/A201. Will the sides be finished with Drywall? Cannot find a detail. 4. Re. the Acoustical Panels in detail 10/A103. These are the Tectum Panels called out in the spec correct? 5. Confirm there is no drywall or wood detail for the new Roller Shades? A102. 6. It appears the pumps are part of the chiller skid is there a buffer tank on the skid as well? 7. There does not appear to be a chiller yard layout / detail showing the air separator, make up water and other hydronic specialties. Please provide. 8. Is any of the HVAC equipment 'owner provided' or is it all to be included in the bid? For reference, Spec section 23 74 13 (Packaged Outdoor Central Station AHUs) says that the owner is direct-purchasing the outdoor AHUs? To me the all the AHUs appear to be indoor units and they seem to be covered in However, spec section 23 73 13 (Modular Indoor Central Station AHUs) does not have that statement. It appears that all four (4) AHUs appear to be indoor units and would be covered by 23 73 13. Is that correct? If so, what equipment does section 23 74 13 correspond to? 9. We sent an earlier RFI asking whether a pre-bid walkthrough would be scheduled, but did not receive a response. Please confirm. 	
7-Jul-2020	Abhinaya Da Pallati	<ol style="list-style-type: none"> 1. Please confirm if the interior stair railings are stainless steel or not. 2. Please provide us the finish Floor & Ceiling schedule. 3. We just noticed that according to Specification - Section 12 24 13 - 2.3 Shadeband Materials, B. 7. Orientation calls for "Railroaded". the only time we railroad is when the width of the window is wider than the width of the material. This not the case for this project. Can you clarify? 	
7-Jul-2020	April Russell	<p>Would it be possible to schedule a site walk thru for a few subcontractors Thursday afternoon, 07-09, for the above mentioned solicitation?</p>	
7-Jul-2020	April Russell	<p>Could you supply sign specifications and schedule.</p>	PDF attachment RFI #3

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7-Jul-2020	April Russell	Please clarify intent for restroom new wall tile. A-102 finish plan calls out CT as wall finish but elevation plans show no wall tile. Please clarify: a) Height of desired wall tile b) type/tile size of desired wall tile c) drawing calls out resinous base to match floor, wall tile needs something to transition between the resinous base and wall tile if tile base is not used.			PDF attachment RFI #4
8-Jul-2020	Rich Shannon	1. 09 03 20 Historic Treatment of Plaster a. We assume this ncludes new plaster in stair 1? b. A102 shows Cement Plaster repair and repaint: what is the extent of the repairs and paint removal? c. There is not a defined quantity/scope for the repairs Response: The veneer plaster noted in Stair 1 can be a level 5 drywall finish. The references to interior cement plaster should read gypsum plaster. The exterior is cement plaster. The general scope for interior gypsum plaster is to leave existing in place; do not remove paint; patch and repair any damaged areas; repaint entire wall, feathering edges of existing paint. The intent was to have a prebid walk-through to allow potential bidders a chance to review extent. Because this is no longer possible, the City will provide a virtual walk-through with panoramic photographs. 2. 08 03 52 Historic Treatment of Wood Windows..... a. there are no elevations or window schedule. Is the window restoration limited to the items on G301/A302? b. Please indicate the scope for the historic window treatment and provide a window schedule with dimensions. Response: Yes, the historic interior borrow lite windows are in place, and may need repair once paint is removed. Glazing may need to be replaced in areas. 3. 06 03 12 Historic Wood Repair a. The only wood repair we see is limited to the window restoration. Please Confirm. Response: Historic wood repair is limited to the restoration of the borrow lite windows and trim in 117 Conference. 4. 04 03 26 Historic Terra Cotta Unit Masonry Repair a. The spec reads like a pointing spec but the exterior is plaster or stucco. What is the scope of terra cotta repair? Response: This specification is provided for the repair and repointing of the exposed interior terra cotta. 5. 09 03 91 Historic Treatment of Plain Painting a. This spec is paint removal and stain. Is this limited to the window frames? Response: Window frames and trim in 117 Conference. Existing paint elsewhere should not be removed.			
8-Jul-2020	Brian Howell	1. Note 11 on sheet A102 calls to provide room signage throughout. Please indicate quantity or locations of signs and specification. 2. Detail 10 on A103 calls to abrasive blast underside of existing concrete floor slab and structure. What is the purpose of this scope? If only for preparing surface for painting, would another method be acceptable if warranted? 3. A100 note 23 calls for shoring at removal of load bearing walls. There does not appear to be an architectural or structural detail provided for what is to replace the load bearing wall. Please advise. 4. A102 note 4 calls to strip existing paint from existing structure and clay tile. Please provide locations for this scope.			
9-Jul-2020	Brian Howell	1. Item I-2.15 in Section 2 of the Instruction to Bidders references the Contract Provisions of the Labor Standards which "may be attached to and made a part of the Agreement". Please clarify if Davis Bacon requirements are in place for this project. 2. Detail 5 at A103 calls for a new wood joist to be sistered to an existing wood ceiling joist, but does not indicate 'typical'. Is this detail typical and required for all ceiling joists in rooms 117, 118, and 119?			

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9-Jul-2020	Jim Mozingo	<p>Specification - Section 12 24 13 - 2.3 Shadeband Materials, B. 7. Orientation calls for "Railroaded". Railroaded is when the width of the window is wider than the width of the material. This not the case for this project. Can you clarify? (Sheet / Spec 122412.2.3)</p> <p>Response: It is the design intent to have a single sheet of roller shade fabric per window. The specification covers scenarios in which the window is too wide, and it is not possible.</p> <p>Note 24. Maintain negative pressure in all designated construction areas. Is this necessary? (Sheet / Spec M001)</p> <p>Note 28. Rust coat all chilled and condenser water piping and fittings. Is rust coating necessary? If so, please provide product information for the coating. (Sheet / Spec M001)</p> <p>Air Cooled Chiller Schedule, Note 14 – Provide Owner training for two members of the owners staff to attend a training session at the factory. Price to include all travel, lodging and meals. Is this necessary? (Sheet / Spec M202)</p> <p>Air Cooled Chiller Schedule, Note 17 – Provide factory witness testing for three owner representative. Price to include all travel, lodging and meals. Is this necessary? (Sheet / Spec M202)</p>			Word attachment <i>DL Tippin Administration Building - RFI - 20.07.09</i>
14-Jul-2020	Brian Howell	<ul style="list-style-type: none"> For the resin panel privacy screen, please specify manufacturer, thickness, color/finish, and decorative pattern. Also provide attachment detail at floor. 			
17-Jul-2020	Brian Howell	Will a response be issued to the Pre-bid RFIs? If so, will the bid due date be revised?			
17-Jul-2020	April Russell	Could you advise if any addendum's will be issued to respond the submitted RFI's and also a change in bid date to allow for review of this information?			
17-Jul-2020	Craig Weaver	I had a subcontractor ask me if there has been an asbestos report done on the building, Has there been one? Are we or the owner responsible for this?			
17-Jul-2020	Craig Weaver	Do you have an asbestos report and a Geotech report that you can send me on this DL Tippen Admin Building that is bidding on July 21st - ? Is there Asbestos on this project?			
17-Jul-2020	Jim Mozingo	<p>Specification section 011000.1.2.T.1.1.3 references an asbestos and lead report. Please provide the referenced report.</p> <p>Specification section 011000.1.2.T.1.2.3 references specification section 030105. However this specification section is not included in the issued documents. Please provide the references specification section.</p> <p>Specification section 011000.1.2.T.1.2.3 references specification section 030101. However this specification section is not included in the issued documents. Please provide the references specification section.</p> <p>Specification section 011000.1.2.T.1.3.1 references detail 1/S3.1. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.3.5 references detail 2/S3.1. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.3.6 references detail 2/S3.2. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.3.6.C.8 references detail 1/S3.2. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.4.1.A.1 references detail 1/S3.3. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.7.5.A.1 references detail 2/S3.3. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p> <p>Specification section 011000.1.2.T.1.7.6.B.1 references specification section 036500. However this referenced specification section is not included in the issued documents. Please provide the referenced specification section.</p> <p>Specification section 011000.1.2.T.1.7.8.A.1 references detail 1/S3.2. However this referenced detail is not included in the issued documents. Please provide the referenced detail.</p>			Word attachment <i>DL Tippin Administration Building - RFI - 20.07.16</i>

Date Received	From	RFI	Date of Response	Addendum	Comments/Notes
		<p>Specification section 011000.1.2.T.I.7.8.B.1 references specification section 099653. However this referenced specification section is not included in the issued documents. Please provide the referenced specification section.</p> <p>Specification section 011000.1.2.T.I.7.9.B.1 references specification section 099653. However this referenced specification section is not included in the issued documents. Please provide the referenced specification section.</p> <p>Specification section 011000.1.2.T.I.8.6.B.1 references specification section 092200. However this referenced specification section is not included in the issued documents. Please provide the referenced specification section.</p> <p>Specification section 011000.1.2.T.I.10.1.B.1 references specification section 047200. However this referenced specification section is not included in the issued documents. Please provide the referenced specification section.</p>			
22-Jul-2020	Jim Mozingo	<p>Sheet A101, note 20 "infill opening – match existing finish". Due to COVID 19 we have not been afforded access the DL Tippin Administration Building to observe the existing conditions and the finishes to be matched. What is the exact finish to be matched?</p> <p>The existing elevator shaft is too small for the specified elevator. Please advise on the direction for a new elevator.</p> <p>Modify the existing elevator shaft to accept the specified elevator? Size the elevator to fit into the existing shaft, custom-built? Refurbish the existing elevator?</p> <p>Notation on section 13/A201 "Infill wall recessed, finish to match existing". Due to COVID 19 we have not been afforded access the DL Tippin Administration Building to observe the existing conditions and the finishes to be matched. What is the exact finish to be matched?</p> <p>Sheet G100 note 2 "Do not scale drawings". The majority of the plans have none or very few dimensions shown.</p> <p>Sheet G100 note 12 "Replace or repair any and all underground/underslab utility services...". Does this refer to only underground/underslab utilities that are damaged during construction? Any existing damage prior to construction is not covered by this note.</p> <p>Sheet A102, Note 3 – "Patch, repair and clean all divots, holes and gashes in concrete slab and structure". Due to COVID 19 we have not been afforded access the DL Tippin Administration Building to observe the existing conditions. Please expand and further define this note.</p> <p>Sheet A102, Note 11 – "Provide room signage throughout". Neither Specifications, sign schedule nor design has been issued. Please provide a sign specification, sign schedule and design.</p>			Word attachment <i>DL Tippin Administration Building - RFI - 20.07.20</i>
23-Jul-2020	Jim Mozingo	<p>Specification section 080352 – Historic Treatment of Wood Windows discusses replacing glazing. Note 3 on sheet A/600 states "All exterior glazing to be GL-3". Are the exterior windows to be reglazed with GL-3 glass? If so, are the muntins large enough to be routed to accept laminated glass?</p> <p>Equipment such as a telescoping forklift, excavator, boom truck, crane, concrete truck will be necessary for the delivery, erection, construction of the new exterior stairs, chiller yard and mechanical equipment. Will the area around the new exterior stair and chiller yard locations support such equipment such as:</p> <ul style="list-style-type: none"> • Area is accessible? • Ground will support the equipment? • No underground pipe, vaults other underground items that will fail under the load of such equipment? (Sheet / Spec Site Access Logistics) 			Word attachment <i>DL Tippin Administration Building - RFI - 20.07.22</i>
30-Jul-2020	Jim Mozingo	<p>Due to the lack of response to questions, documents and specification sections referenced in the specs not issued and the tropical storm that is forecasted to hit the state of Florida, will the bid for 20-C-00021 - DL Tippin Administration Building scheduled for Tuesday, 4 August be postponed? Response: See addendum 3.</p>			