

ADDENDUM NO. 2

**Alden Green House
11580 Walden Ave
Alden, NY 14004**

Bid date: January 16th, 2026

TO: All Prospective Bidders

FROM: Ben Perkins
Hayes Construction

DATE: January 14th, 2026

Item 1:

Question: CHI Overhead doors are called out can a Cornell be provided

Answer: An alternate manufacturer that meets or exceeds the basis of design requirements will be considered for the overhead doors.

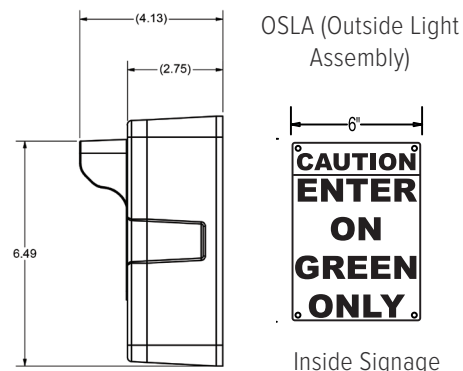
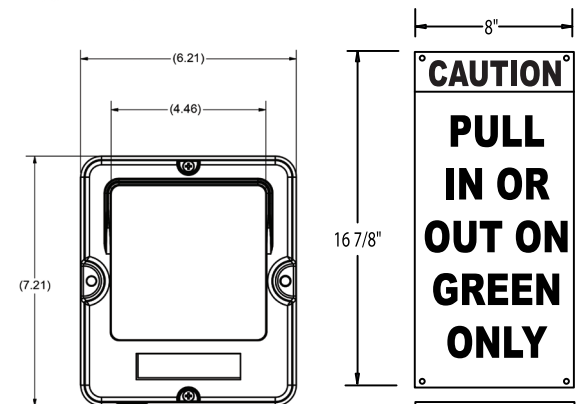
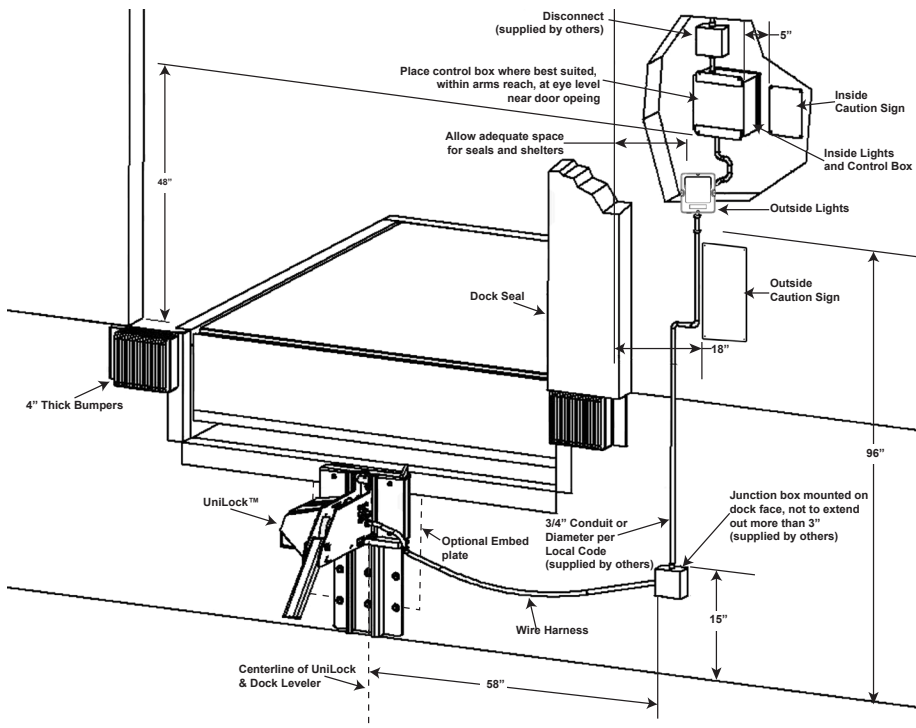
Item 2:

Question: On E102a at dock leveler there is a automatic vehicle restraint called is there spec for this

Answer: See attached for product spec sheet for basis of design vehicle restraint.

TPR® Vehicle Restraint

Specification Sheet & Submittal



Inside Signage

Outside Signage

Standard Features

Push-button activation (115v single-phase operation)	On-demand, IP67-rated motor, submersion proof up to 1 meter
iDock® 2.0 Controls with dynamic message display	Exclusive designed gear motor keeps hook continuously engaged
Advanced 3-color light communication system	Automatically ensures safe capture or auto-stores
Low profile 9" carriage - service range 9" to 30" off grade	Automatically re-engages if the restraint is forced down
Restraining force in excess of 32,000 lbs.	iDock 2.0 Controls connected online with optional myQ® Enterprise
Zinc-plated track and housing provides high-corrosion resistance	Designed and manufactured in the USA

General Description

All McGuire® TPR® truck positioned vehicle restraints are designed to secure a cargo trailer's rear impact guard (RIG) to reduce the likelihood of premature trailer separation during the loading/unloading process. The TPR vehicle restraint features an electric mechanical restraint mechanism, inside iDock control panel, exterior communication lights and instructional signs.

Exterior Lights

Low profile exterior lights are standard with LED for extended life. One light shows a red X and a green circle for color-impaired individuals. A set of caution signs warns truck drivers to "Pull in or out on green only".



Construction

The TPR® restraint system is a truck positioned restraint system designed to be permanently mounted to the loading dock foundation. Restraint back plate and housing shall be in a zinc finish for all weather protection. Once activated, the TPR seeks the RIG and exerts positive pressure to reduce the possibility of premature trailer separation from the dock. The TPR secures the trailer with over 32,000 lbs. of pull-out force. The motor is IP67 rated, making it submersion proof in up to 1 meter of water for 30 minutes.

Hooking Range & Capacity

The TPR® restraint system is designed to withstand a pulling force in excess of 32,000 lbs., giving an added margin of safety and protection. Maximum operational range is 4" to 10" horizontally from face of dock bumpers, and 9" to 30" vertically above drive approach.

Operation

As the truck backs into position, the Rear Impact Guard "RIG" contacts the TPR spring loaded structural steel housing which rides down its track, allowing the RIG to position itself on top of the housing. The exterior communication light is green and the interior light is red. Once trailer is positioned against the dock bumpers, the operator presses the "Engage" button allowing the hook to secure the trailer to the loading dock. Once restrained, the interior light is green allowing the dock attendant to safely enter the trailer while the exterior light is red warning the driver not to pull away from the dock. The TPR restraint maintains contact with the RIG and adjusts automatically with the trailer float motion to assure proper engagement at all times during the loading/unloading operation. After the loading is complete, the operator presses the "Release" button. When the trailer is released and the restraint is safely stored the interior light changes to red while the exterior light changes to green.

If the TPR is unable to secure the trailer's RIG, the restraint will communicate the fault condition, on the message display and by flashing an amber caution light.. If bypass of the system is necessary, it is recommended that you secure the trailer by other means before proceeding with the loading/unloading process. In bypass mode the exterior light is red the interior amber caution light accompanies the green light indicating to the dock attendant to proceed with caution.

Electrical

The TPR® vehicle restraint is available as a standalone unit or combined electronically in a single integrated control panel with your dock leveler selection. Electric motor is 1/10 HP TENV 115v single phase. Interior and exterior 12 volt LED lights are powered by an integral transformer located in the control panel. Electrical control panel is a NEMA 4X enclosure.



Please Note: Unless specifically noted on quotation, all electrical requirements, including mounting of control box, outside lights and signs, are the responsibility of others.

Warranty

All TPR® vehicle restraints feature a full one (1) year base warranty on all structural, mechanical and electrical parts, including freight and labor charges in accordance with Systems, LLC's Standard Warranty Policy. Systems, LLC warrants all components to be free of defects in materials and workmanship, under normal use, during the warranty period. This base warranty period begins upon the completion of installation or the sixtieth (60th) day after shipment, whichever is earlier.

Order Specifications

Optional Equipment

Check Options Desired

- | | |
|---|--|
| ☐ Integrated Control Panel | ☐ Approach Plate with Bracing
(Brick and block wall recommended) |
| ☐ Audible Alarm | ☐ Pit Mounting Plate |
| ☐ Restraint Engaged Interlock with Leveler | ☐ Special NEMA _____ Enclosure |
| ☐ Leveler Stored Interlocking | ☐ Other _____ |
| ☐ Wall Mounting Embed Plate
(Recommended on new construction) | |

*Options must also be selected on the iDock Controls Spec Sheet

Required Information

CUSTOMER	
JOB	
LOCATION	
NUMBER OF UNITS	
MODEL	
SIZE	
REPRESENTED BY	
SALES REP	

Certified for Construction

BY	
DATE	
COMPANY	
CITY & STATE	
DRAWING #	

SECTION 232113 - HYDRONIC PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Copper tube and fittings.
2. Plastic pipe and fittings.
3. Piping joining materials.
4. Transition fittings.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Delegated Design Submittals:

1. Design calculations and detailed fabrication and assembly of pipe anchors and alignment guides, hangers and supports for multiple pipes, expansion joints and loops, and attachments of the same to the building structure.
2. Locations of pipe anchors, alignment guides, and expansion joints and loops.
3. Locations of and details for penetrations, including sleeves and sleeve seals for exterior walls, floors, basement, and foundation walls.
4. Locations of and details for penetration and firestopping for fire- and smoke-rated wall and floor and ceiling assemblies.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Piping layout, or BIM model, drawn to scale, indicating the items described in this Section, and coordinated with all building trades.

B. Qualification Data: For Installer.

C. Welding certificates.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:

1. Installers of Pressure-Sealed Joints: Installers are to be certified by pressure-seal joint manufacturer as having been trained and qualified to join piping with pressure-seal pipe couplings and fittings.

B. Steel Support Welding: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

- C. Pipe Welding: Qualify procedures and operators in accordance with ASME Boiler and Pressure Vessel Code: Section IX.
 - 1. Comply with ASME B31.9 for materials, products, and installation.
 - 2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation are to be capable of withstanding the following minimum working pressures and temperatures unless otherwise indicated:
 - 1. Hot-Water Heating Piping: 100 psig at 180 deg F.
 - 2. Condensate-Drain Piping: 150 deg F.
 - 3. Air-Vent Piping: 180 deg F.
 - 4. Pressure-Relief-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

2.2 COPPER TUBE AND FITTINGS

- A. Drawn-Temper Copper Tube: ASTM B88, Type K and ASTM B88, Type L.
- B. Annealed-Temper Copper Tube: ASTM B88, Type K and ASTM B88, Type L.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18 pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22 pressure fittings. Do not use solder joints on pipe sizes greater than NPS 4.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends. Do not use solder joints on pipe sizes greater than NPS 4.
- F. Cast-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. Do not use solder joints on pipe sizes greater than NPS 4.
- G. Wrought-Copper Unions: ASME B16.22. Do not use solder joints on pipe sizes greater than NPS 4.
- H. Copper-Tube, Mechanically Formed Tee Fitting: For forming T-branch on copper water tube.
 - 1. Description: Tee formed in copper tube in accordance with ASTM F2014.
- I. Grooved, Mechanical-Joint, Copper Tube Appurtenances:
 - 1. Source Limitations: Obtain grooved mechanical-joint copper tube appurtenances from single manufacturer.
 - 2. Grooved-End Copper Fittings: ASTM B75 copper tube or ASTM B584 bronze castings.
 - 3. Grooved-End-Tube Couplings: To fit copper-tube dimensions; rigid pattern unless otherwise indicated; gasketed fitting EPDM gasket rated for minimum 230 deg F for use with ferrous housing, and steel bolts and nuts; 300 psig minimum CWP pressure rating.

- J. Copper-Tube, Pressure-Seal-Joint Fittings - Copper or Bronze:
 - 1. Source Limitations: Obtain copper-tube pressure-seal-joint fittings from single manufacturer.
 - 2. Housing: Copper or bronze.
 - 3. O-Rings and Pipe Stops: EPDM.
 - 4. Tools: Manufacturer's special tools.
 - 5. Minimum 200 psig working pressure rating at 250 deg F.

2.3 PLASTIC PIPE AND FITTINGS

- A. CPVC Plastic Pipe: ASTM F 441/F 441M, with wall thickness as indicated in "Piping Applications" Article.
 - 1. CPVC Plastic Pipe & Fittings: Cut groove with Mechanical-Joint fittings and couplings, ASTM F 439 for Schedule 80 pipe. Basis-of Design Product: Corzan HP.
 - 2. Grooved Mechanical-Joint Fittings and Couplings: Manufactured in two segments of cast ductile iron, conforming to ASTM A-536, Grade 65-45-12. Gasket shall be pressure-responsive synthetic rubber, grade to suit the intended service, conforming to ASTM D-2000. Mechanical Coupling bolts shall be zinc plated heat treated carbon steel track head conforming to ASTM A-449, with a minimum tensile strength of 110,000 psig.
 - a. Manufacturers: Subject to compliance with requirements, provide products by the following or equal:
 - 1) Victaulic Company.
 - b. Flexible Type: Use in all locations for CPVC piping. Gasket shall be Grade "EHP" EPDM compound with red and green color code designed for operating temperatures from -30°F to +250°F. Basis-of-design: Victaulic S/177N, S/W77.

2.4 PEX TUBE AND FITTINGS

- A. PEX Distribution System: PEX-a Piping, ASTM F 876, SDR 9 tubing.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Uponor; PEX-a Piping.
- B. Fittings for PEX Tube:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Uponor: PEX-a Tube Fittings.
 - 2. Fittings for PEX-a Tube: ASTM F 1960, cold expansion fittings with PEX Reinforcing Rings.
 - 3. Fittings for PEX-a Tube: Two-piece brass compression type complying with ASTM F 876.

2.5 PIPING JOINING MATERIALS

- A. 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 otherwise indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

- B. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- C. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer unless otherwise indicated.
- D. Solder Filler Metals: ASTM B32, lead-free alloys.
- E. Flux: ASTM B813, water flushable.
- F. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.
- G. 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.

2.6 TRANSITION FITTINGS

- A. General Requirements:
 - 1. Same size as pipes to be joined.
 - 2. Pressure rating at least equal to pipes to be joined.
 - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

PART 3 - EXECUTION

3.1 PIPING APPLICATIONS

- A. Hot-Water Heating Piping, Aboveground, NPS 2 (DN 50) and Smaller, to Be Any of the Following:
 - 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and pressure-seal joints.
 - 2. Schedule 80 CPVC pipe; cut groove Mechanical-Joint couplings and fittings.
- B. Hot-Water Heating Piping, Aboveground, NPS 2-1/2 (DN 65) and Larger, to Be Any of the Following:
 - 1. Type L, drawn-temper copper tubing, wrought-copper fittings, and grooved mechanical joints.
 - 2. Schedule 80 CPVC pipe; cut groove Mechanical-Joint couplings and fittings.
- C. Condensate-Drain Piping Installed Aboveground to Be Any of the Following:
 - 1. Type DWV, drawn-temper copper tubing, wrought-copper fittings, and pressure-seal joints.
 - 2. Schedule 40, PVC plastic pipe and fittings and solvent-welded joints.
- D. Air-Vent Piping:

1. Inlet: Same as service where installed with metal-to-plastic transition fittings for plastic piping systems, according to piping manufacturer's written instructions.
 2. Outlet: Type K, annealed-temper copper tubing with soldered or flared joints.
- E. Pressure-Relief-Valve-Inlet and -Outlet Piping for Hot-Water Piping: Same materials and joining methods as for piping specified for the service in which safety valve is installed, with metal-to-plastic transition fittings for plastic piping systems, according to piping manufacturer's written instructions.

3.2 INSTALLATION OF PIPING

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- D. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install groups of pipes parallel to each other, spaced to permit applying insulation and servicing of valves.
- L. Install drains, consisting of a tee fitting, NPS 3/4 ball valve, and short NPS 3/4 threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.
- M. Install piping at a uniform grade of 0.2 percent upward in direction of flow.
- N. Reduce pipe sizes using eccentric reducer fitting installed with level side up.
- O. Install branch connections to mains using mechanically formed tee fittings in main pipe, with the branch connected to the bottom of the main pipe. For up-feed risers, connect the branch to the top of the main pipe.
- P. Install valves according to Section 230523 "General-Duty Valves for HVAC Piping."
- Q. Install air vents and pressure-relief valves in accordance with Section 232116 "Hydronic Piping Specialties."

- R. Install unions in piping, NPS 2 and smaller, adjacent to valves, at final connections of equipment, and elsewhere as indicated.
- S. Install flanges in piping, NPS 2-1/2 and larger, at final connections of equipment and elsewhere as indicated.
- T. Install shutoff valve immediately upstream of each dielectric fitting.
- U. Comply with requirements in Section 230500 "Common Work Results for HVAC" for installation of expansion loops, expansion joints, anchors, and pipe alignment guides.
- V. Comply with requirements in Section 230553 "Identification for HVAC Piping and Equipment" for identifying piping.
- W. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 230500 "Common Work Results for HVAC."
- X. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 230500 "Common Work Results for HVAC."
- Y. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 230500 "Common Work Results for HVAC."

3.3 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- C. Soldered Joints: Apply ASTM B813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints in accordance with ASTM B828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B32.
- D. Brazed Joints: Construct joints in accordance with AWS's "Brazing Handbook," "Pipe and Tube" chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8/A5.8M.
- E. Threaded Joints: Thread pipe with tapered pipe threads in accordance with 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 unless dry seal threading is specified.
 - 2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
- F. Welded Joints: Construct joints in accordance with AWS D10.12M/D10.12, using qualified processes and welding operators in accordance with "Quality Assurance" Article.
- G. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

- H. Grooved Joints: Assemble joints with coupling and gasket, lubricant, and bolts. Cut or roll grooves in ends of pipe based on pipe and coupling manufacturer's written instructions for pipe wall thickness. Use grooved-end fittings and rigid, grooved-end-pipe couplings.
- I. Plain-End Mechanical-Coupled Joints: Prepare, assemble, and test joints in accordance with manufacturer's written installation instructions.
- J. Mechanically Formed Tee Fittings: Use manufacturer-recommended tools, procedure, and brazed joints.
- K. Pressure-Seal Joints: Use manufacturer-recommended tools and procedure. Leave insertion marks on pipe after assembly.

3.4 INSTALLATION OF DIELECTRIC FITTINGS

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 (DN 50) and Smaller: Use dielectric nipples.
- C. Dielectric Fittings for NPS 2-1/2 to NPS 4 (DN 65 to DN 100): Use dielectric flange kits.
- D. Dielectric Fittings for NPS 5 (DN 125) and Larger: Use dielectric flange kits.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements in Section 230529 "Hangers and Supports for HVAC Piping and Equipment" for hangers, supports, and anchor devices.
- B. Install hangers for copper tubing and steel piping, with maximum horizontal spacing and minimum rod diameters, to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- C. Install hangers for plastic piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- D. Install hangers for fiberglass piping, with maximum horizontal spacing and minimum rod diameters, to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- E. Support horizontal piping within 12 inches of each fitting and coupling.
- F. Support vertical runs of copper tubing and steel piping to comply with MSS SP-58, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- G. Support vertical runs of piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- H. Support vertical runs of fiberglass piping to comply with manufacturer's written instructions, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 TERMINAL EQUIPMENT CONNECTIONS

- A. Sizes for supply and return piping connections are to be the same as or larger than equipment connections.
- B. Install control valves in accessible locations close to connected equipment.
- C. Install bypass piping with globe valve around control valve. If parallel control valves are installed, only one bypass is required.
- D. Install ports for pressure gauges and thermometers at coil inlet and outlet connections. Comply with requirements in Section 230500 "Common Work Results for HVAC."

3.7 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 230553 "Identification for HVAC Piping and Equipment."

3.8 SYSTEM STARTUP

- A. Perform the following before operating the system:
 - 1. Open manual valves fully.
 - 2. Inspect pumps for proper rotation.
 - 3. Set makeup pressure-reducing valves for required system pressure.
 - 4. Inspect air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).
 - 5. Set temperature controls so all coils are calling for full flow.
 - 6. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.
 - 7. Verify lubrication of motors and bearings.

3.9 FIELD QUALITY CONTROL

- A. Prepare hydronic piping in accordance with ASME B31.9 and as follows:
 - 1. Leave joints, including welds, uninsulated and exposed for examination during test.
 - 2. Provide temporary restraints for expansion joints that cannot sustain reactions due to test pressure. If temporary restraints are impractical, isolate expansion joints from testing.
 - 3. Flush hydronic piping systems with clean water; then remove and clean or replace strainer screens.
 - 4. Isolate equipment from piping. If a valve is used to isolate equipment, its closure is to be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.
 - 5. Install pressure-relief valve, set at a pressure no more than one-third higher than test pressure, to protect against damage by expanding liquid or other source of overpressure during test.
- B. Perform the following tests on hydronic piping:
 - 1. Use ambient-temperature water as a testing medium unless there is risk of damage due to freezing. Another liquid that is safe for workers and compatible with piping may be used.

2. While filling system, use vents installed at high points of system to release air. Use drains installed at low points for complete draining of test liquid.
3. Isolate expansion tanks and determine that hydronic system is full of water.
4. Subject piping system to hydrostatic test pressure that is not less than 1.5 times the system's working pressure. Test pressure is not to exceed maximum pressure for any vessel, pump, valve, or other component in system under test. Verify that stress due to pressure at bottom of vertical runs does not exceed 90 percent of specified minimum yield strength or 1.7 times the "SE" value in Appendix A in ASME B31.9.
5. After hydrostatic test pressure has been applied for at least 10 minutes, examine piping, joints, and connections for leakage. Eliminate leaks by tightening, repairing, or replacing components, and repeat hydrostatic test until there are no leaks.
6. Prepare written report of testing.

END OF SECTION 232113

SECTION 236113 - COMPRESSED-AIR PIPING FOR HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Compressed air piping and specialties, operating at 100 psig.
- B. Related Sections include the following:
 - 1. Division 11 Section "Laboratory Fume Hoods" for compressed-air outlets in laboratory fume hoods.
 - 2. Division 12 Section "Laboratory Casework" for compressed-air outlets in casework.

1.3 DEFINITIONS

- A. D.I.S.S.: Diameter-index safety system.
- B. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.4 SUBMITTALS

- A. Product Data: For the following:
 - 1. Compressed-air tubes and fittings.
 - 2. Compressed-air valves.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Qualification Data: For Installer and testing agency.
- D. Brazing certificates.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For compressed-air piping specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications:
 - 1. Compressed-Air Piping Systems: Qualify installers according to ASSE Standard #6010.
 - 2. Pressure-Seal Joining Procedure for Copper Tubing: Qualify operators according to training provided by Viega; Plumbing and Heating Systems.
- B. Source Limitations: Obtain compressed-air service connections of same type and from same manufacturer as service connections provided for in Division 22 Section "Gas Piping for Laboratory and Healthcare Facilities."
- C. Brazing: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications," or AWS B2.2, "Standard for Brazing Procedure and Performance Qualification."
- D. ASME Compliance:
 - 1. Comply with ASME B31.1, "Power Piping," for laboratory compressed-air piping operating at more than 150 psig.
 - 2. Comply with ASME B31.9, "Building Services Piping," for laboratory compressed-air piping operating at 150 psig or less.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Copper Gas Tube: ASTM B 819, Type L, seamless, drawn temper, that has been manufacturer cleaned, purged, and sealed for compressed air service or according to CGA G-4.1 for oxygen service. Include standard marking of pipe for identification with "CA".
 - 1. General Requirements for Copper Fittings: Manufacturer cleaned, purged, and bagged for oxygen service according to CGA G-4.1.
 - 2. Wrought-Copper Fittings: ASME B16.22, solder-joint pressure type or MSS SP-73, with dimensions for brazed joints.
 - 3. Copper Unions: ASME B16.22 or MSS SP-123, wrought copper or cast-copper alloy.

2.2 JOINING MATERIALS

- A. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- B. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.3 VALVES

- A. General Requirements for Valves: Manufacturer cleaned, purged, and bagged according to CGA G-4.1 for oxygen service.
- B. Ball Valves: MSS SP-110, 3-piece body, brass or bronze.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amico Corporation.
 - b. BeaconMedaes.
 - c. Conbraco Industries, Inc.
 - d. NIBCO INC.
 - e. Squire-Cogswell/Aeros Instruments, Inc.
 - 2. Pressure Rating: 300 psig minimum.
 - 3. Ball: Full-port, chrome-plated brass.
 - 4. Seats: PTFE or TFE.
 - 5. Handle: Lever.
 - 6. Stem: Blowout proof with PTFE or TFE seal.
 - 7. Ends: Manufacturer-installed ASTM B 819, copper-tube extensions.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Cleaning of Compressed Air Tubing: If manufacturer-cleaned and -capped fittings or tubing are not available or if precleaned fittings or tubing must be recleaned because of exposure, have supplier or separate agency acceptable to authorities having jurisdiction perform the following procedures:
 - 1. Clean compressed air gas tube and fittings, valves, gages, and other components of oil, grease, and other readily oxidizable materials as required for oxygen service according to CGA G-4.1, "Cleaning Equipment for Oxygen Service."
 - 2. Wash compressed air gas tubing and components in hot, alkaline-cleaner-water solution of sodium carbonate or trisodium phosphate in proportion of 1 lb of chemical to 3 gal. of water.
 - a. Scrub to ensure complete cleaning.
 - b. Rinse with clean, hot water to remove cleaning solution.

3.2 PIPING APPLICATIONS

- A. Compressed Air Piping: Use Type L, copper tube; wrought-copper fittings; and brazed joints.

3.3 PIPING INSTALLATION

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of compressed-air piping. Indicated locations and arrangements were used to size pipe and calculate friction loss,

expansion, air-compressor sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

- B. Comply with ASSE Standard #6010 for installation of compressed-air piping.
- C. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal and coordinate with other services occupying that space.
- F. Install piping adjacent to equipment and specialties to allow service and maintenance.
- G. Install air and drain piping with 1 percent slope downward in direction of flow.
- H. Install nipples, unions, special fittings, and valves with pressure ratings same as or higher than system pressure rating used in applications below unless otherwise indicated.
- I. Install eccentric reducers, if available, where compressed-air piping is reduced in direction of flow, with bottoms of both pipes and reducer fitting flush.
- J. Install branch connections to compressed-air mains from top of main. Provide drain leg and drain trap at end of each main and branch and at low points.
- K. Install piping to permit valve servicing.
- L. Install piping free of sags and bends.
- M. Install fittings for changes in direction and branch connections.
- N. Install compressed-air service connections recessed in walls. Attach roughing-in assembly to substrate; attach finishing assembly to roughing-in assembly.
- O. Connect compressed-air piping to compressed-air outlets and equipment requiring compressed-air service.
- P. Install unions in copper compressed-air tubing adjacent to each valve and at final connection to each piece of equipment, machine, and specialty.
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping."
- R. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Division 23 Section "Sleeves and Sleeve Seals for HVAC Piping."
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Division 23 Section "Escutcheons for HVAC Piping."

3.4 VALVE INSTALLATION

- A. Install shutoff valve at each connection to and from compressed-air equipment and specialties.
- B. Install automatic drain valves on equipment, specialties, and piping with drain connection. Run drain piping to floor drain so contents spill over or into it.

3.5 JOINT CONSTRUCTION

- A. Remove scale, slag, dirt, and debris from outside of cleaned tubing and fittings before assembly.
- B. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Braze Joints" Chapter. Continuously purge joint with oil-free dry nitrogen during brazing.
- C. Soldered Joints: Apply ASTM B 813, water-flushable flux to tube end. Join copper tube and fittings according to ASTM B 828.

3.6 HANGER AND SUPPORT INSTALLATION

- A. Comply with requirements in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment" for pipe hanger and support devices.
- B. Vertical Piping: MSS Type 8 or 42, clamps.
- C. Individual, Straight, Horizontal Piping Runs:
 - 1. 100 Feet and Less: MSS Type 1, adjustable, steel, clevis hangers.
 - 2. Longer Than 100 Feet: MSS Type 43, adjustable, roller hangers.
- D. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze. Comply with requirements in Division 22 Section "Hangers and Supports for Plumbing Piping and Equipment" for trapeze hangers.
- E. Base of Vertical Piping: MSS Type 52, spring hangers.
- F. Support horizontal piping within 12 inches of each fitting and coupling.
- G. Rod diameter may be reduced 1 size for double-rod hangers, with 3/8-inch minimum rods.
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
 - 1. NPS 1/4: 60 inches with 3/8-inch rod.
 - 2. NPS 3/8 and NPS 1/2: 72 inches with 3/8-inch rod.
 - 3. NPS 3/4: 84 inches with 3/8-inch rod.
 - 4. NPS 1: 96 inches with 3/8-inch rod.
 - 5. NPS 1-1/4: 108 inches with 3/8-inch rod.
 - 6. NPS 1-1/2: 10 feet with 3/8-inch rod.
 - 7. NPS 2: 11 feet with 3/8-inch rod.

- I. Install supports for vertical copper tubing every 10 feet.

3.7 LABELING AND IDENTIFICATION

- A. Install identifying labels and devices for nonmedical laboratory compressed-air piping, valves, and specialties. Comply with requirements in Division 23 Section "Identification for HVAC Piping and Equipment."

3.8 FIELD QUALITY CONTROL FOR COMPRESSED-AIR PIPING IN NONMEDICAL FACILITIES

- A. Testing Agency: Engage qualified testing agency to perform field tests and inspections of compressed-air piping in nonmedical laboratory facilities and prepare test reports.
- B. Perform tests and inspections of compressed-air piping in nonmedical laboratory facilities and prepare test reports.
- C. Tests and Inspections:
 - 1. Piping Leak Tests for Compressed-Air Piping: Test new and modified parts of existing piping. Cap and fill general-service compressed-air piping with oil-free dry nitrogen to pressure of 50 psig above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
 - 2. Repair leaks and retest until no leaks exist.

END OF SECTION 236113

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. General-use switches, dimmer switches, and fan-speed controller switches.
2. General-grade single straight-blade receptacles.
3. General-grade duplex straight-blade receptacles.
4. Receptacles with arc-fault and ground-fault protective devices.
5. In-floor receptacles.
6. Floor boxes.
7. Locking receptacles.
8. Pin-and-sleeve receptacles.
9. Special-purpose power outlet assemblies.
10. Connectors, cords, and plugs.
11. Wall plates.

B. Related Requirements:

1. Section 260923 "Lighting Control Devices" for occupancy sensors, timers, control-voltage switches, and control-voltage dimmers.

1.2 DEFINITIONS

- A. Commercial/Industrial-Use Cord Reel: A cord reel subject to severe use in factories, commercial garages, construction sites, and similar locations requiring a harder service-type cord.
- B. UL 1472 Type I Dimmer: Dimmer in which air-gap switch is used to energize preset lighting levels.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
- B. Preinstallation Coordination Meeting(s): For ceiling-mounted cable reels. Conduct meeting at Project site before installation.
1. Attendees: Installers, fabricators, representatives of manufacturers, and administrators for field tests and inspections. Notify Architect and Construction Manager of scheduled meeting dates.

1.4 ACTION SUBMITTALS

A. Product Data:

1. Toggle switches.
2. Key lock switches.
3. Maintained-contact switches.
4. Momentary-contact switches.
5. Rocker switches.
6. Dimmer switches.
7. Single straight-blade receptacles
8. Duplex straight-blade receptacles.
9. Receptacles with GFCI device.
10. Receptacles with SPD device.
11. Locking receptacles.
12. Pin-and-sleeve receptacles.
13. Spring-driven commercial/industrial-use cord reels.
14. Cord reels for use in hazardous locations.
15. Cord connectors.

B. Shop Drawings:

1. Wiring diagrams for duplex straight-blade receptacles with integral switching means.

C. Samples:

1. One for each kind of toggle switch and cover plate accessory specified, in each finish and color specified.
2. One for each kind of key lock switch and cover plate accessory specified, in each finish and color specified.
3. One for each kind of maintained-contact switch and cover plate accessory specified, in each finish and color specified.
4. One for each kind of momentary-contact switch and cover plate accessory specified, in each finish and color specified.
5. One for each kind of rocker switch and cover plate accessory specified, in each finish and color specified.
6. One for each kind of dimmer switch and cover plate accessory specified, in each finish and color specified.
7. One for each kind of single straight-blade receptacle and cover plate accessory specified, in each finish and color specified.
8. One for each kind of duplex straight-blade receptacle and cover plate accessory specified, in each finish and color specified.
9. One for each kind of duplex straight-blade receptacle with integral switching means and cover plate accessory specified, in each finish and color specified.
10. One for each kind of receptacle with GFCI device and cover plate accessory specified, in each finish and color specified.
11. One for each kind of locking receptacle and cover plate accessory specified, in each finish and color specified.

12. One for each kind of pin-and-sleeve receptacle specified, in each finish and color specified.
13. One for each kind of cord connector specified, in each finish and color specified.

D. Field Quality-Control Submittals:

1. Field quality-control reports.

1.5 INFORMATIONAL SUBMITTALS

A. Manufacturers' Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:

1. Dimmers.
2. Single straight-blade receptacles.
3. Duplex straight-blade receptacles.
4. Duplex straight-blade receptacles with integral switching means.
5. Floorboxes.
6. Receptacles with GFCI device.
7. Locking receptacles.
8. Pin-and-sleeve receptacles.
9. Spring-driven commercial/industrial-use cord reels.
10. Cord reels for use in hazardous locations.

B. Sample warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

B. to include in all manufacturers' packing-label warnings and instruction manuals that include labeling conditions.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Items: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Extra Keys for Key Lock Switches: Two of each kind.
2. SPD Receptacles: Equal to 10 percent of quantity installed for each kind specified, but no fewer than three units.
3. Controlled Receptacles: Equal to 10 percent of quantity installed for each kind specified, but no fewer than three units.
4. Cord Connectors: Five of each kind.

B. Special Tools:

1. Proprietary equipment and software required to maintain, repair, adjust, or implement future changes to controlled receptacles.
2. Proprietary equipment required to maintain, repair, adjust, or implement future changes to cord connectors.

1.8 WARRANTY FOR DEVICES

A. Special Manufacturer Extended Warranty: Manufacturer warrants that devices perform in accordance with specified requirements and agrees to provide repair or replacement of devices that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Five years from date of Substantial Completion; full coverage for labor, materials, and equipment.
2. Follow-On Extended Warranty Period: Eight years from date of Substantial Completion; prorated coverage for materials only, free on board destination, freight prepaid.

1.9 WARRANTY FOR CORD REELS

A. Special Installer Extended Warranty: Installer warrants that fabricated and installed cord-reel power outlet assemblies perform in accordance with specified requirements and agrees to repair or replace assemblies that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Two years from date of Substantial Completion; full coverage for labor, materials, and equipment.

B. Special Manufacturer Extended Warranty: Manufacturer warrants that components of cord-reel power outlet assemblies perform in accordance with specified requirements and agrees to provide repair or replacement of components that fail to perform as specified within extended warranty period.

1. Extended Warranty Period: Three years from date of Substantial Completion; full coverage for labor, materials, and equipment.
2. Follow-On Extended Warranty Period: Eight years from date of Substantial Completion; full coverage for materials only, free on board destination, freight prepaid.

PART 2 - PRODUCTS

2.1 GENERAL-USE SWITCHES AND DIMMER SWITCHES

A. Toggle Switch:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

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- a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: NEMA WD 1, UL CCN WMUZ and UL 20.
4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) General-duty, 120-277 V, 20 A
 - a) Single pole.
 - b) Two pole.
 - c) Three way.
 - d) Four way.
 - e) Motor rated.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. Toggle Switch with Forked Key Lock:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:

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- a. Reference Standards: NEMA WD 1, UL CCN WMUZ and UL 20.
- 4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) 120-277 V, 20 A
 - a) Single pole.
 - b) Three way.
 - c) Four way.
- C. Rocker Switch:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
 - 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 3. General Characteristics:
 - a. Reference Standards: NEMA WD 1, UL CCN WMUZ and UL 20.
 - 4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) 120-277 V, 20 A
 - a) Single pole.
 - b) Three way.
 - c) Four way.
 - 5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.
- D. Type I Dimmer Switch:

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1. Basis of Design Product: Subject to compliance with requirements, provide Leviton IP710-DLZ or a comparable product by one of the following:
 - a. Wattstopper; A Legrand Group Brand
 - b. Sensor Switch, Inc.
 - c. Hubbell Building Automation, Inc.
 - d. NX Controls, a Current Lighting Brand
 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 3. General Characteristics:
 - a. Reference Standards: NEMA WD 1, UL CCN EOYX and UL 1472 Type I dimmer.
 4. Options:
 - a. Device Color: Selected by architect.
 - b. Switch Style: Push button with LED.
 - c. Dimming Control Style: Slide.
 - d. 0-10V control compatible with drivers in luminaires.
 - e. Adjustable low-end and high-end trims.
 5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.
- E. Type KP3 Dimmer Switch:
1. Basis of Design Product: Subject to compliance with requirements, provide products by one of the following:
 - a. Wattstopper; A Legrand Group Brand
 - b. NX Controls, a Current Lighting Brand
 - c. Hubbell Building Automation, Inc.
 - d. Sensor Switch, Inc.
 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

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3. General Characteristics:
 - a. Reference Standards: NEMA WD 1, UL CCN EOYX and UL 1472 Type I dimmer.
4. Options:
 - a. Device Color: Selected by architect.
 - b. Switch Style: 3 Push buttons with LEDs programmed for raise, lower, on/off.
 - c. 24V control signal compatible with room controller.
 - d. Engraved label on each button.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.2 GENERAL-GRADE SINGLE STRAIGHT-BLADE RECEPTACLES

A. Single Straight-Blade Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) General-duty, NEMA 5-15R and NEMA 5-20R (in office only).
 - 2) General-duty, NEMA 6-20R, NEMA 6-30R and NEMA 6-50R (in office only).

- 3) General-duty, NEMA 14-30R (Dryer) and NEMA 14-50R (Range).
- 4) Heavy-duty, NEMA 5-15R and NEMA 5-50R.
- 5) Heavy-duty, NEMA 6-30R and NEMA 6-50R.
- 6) Heavy-duty, NEMA 14-20R, NEMA 14-30R (Dryer), NEMA 14-50R (Range).
- 7) Extra-heavy-duty, NEMA 5-15R and NEMA 5-20R.
- 8) Extra-heavy-duty, NEMA 6-20R.

5. Accessories:

- a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device. Provide stainless steel cover plate in warehouse, kitchens and food preparation areas.
- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

B. Tamper-Resistant, Floor-Mounted Display Straight-Blade Receptacle:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
- 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
 - b. Configuration: NEMA 5-15R.
- 4. Options:
 - a. Finish: Nickel plated.

2.3 GENERAL-GRADE DUPLEX STRAIGHT-BLADE RECEPTACLES

A. Duplex Straight-Blade Receptacle:

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems

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- c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
 - 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
 - 4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) General-duty, NEMA 5-15R, NEMA 5-20R (in office only).
 - 2) General-duty, smooth face, NEMA 5-15R, NEMA 5-20R (in office only).
 - 3) General-duty, NEMA 6-15R, NEMA 6-20R (in office only).
 - 4) Heavy-duty, NEMA 5-15R, NEMA 5-20R.
 - 5) Heavy-duty, NEMA 6-15R, NEMA 6-20R.
 - 6) Extra-heavy-duty, NEMA 5-15R, NEMA 5-20R.
 - 7) Extra-heavy-duty, smooth face, NEMA 5-15R, NEMA 5-20R.
 - 8) Extra-heavy-duty, NEMA 6-20R.
 - 9) Extra-heavy-duty, smooth face, NEMA 6-20R.
 - 5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device. Provide stainless steel cover plate in warehouse, kitchens and food preparation areas.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.
- B. Tamper-Resistant Duplex Straight-Blade Receptacle:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
 - 2. Regulatory Requirements:

- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
- 4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration:
 - 1) General-duty, NEMA 5-20R.
 - 2) General-duty, smooth face, NEMA 5-20R.
 - 3) Heavy-duty, NEMA 5-20R.
 - 4) Heavy-duty, smooth face, NEMA 5-20R.
 - 5) Extra-heavy-duty, NEMA 5-20R.
- 5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device. Provide stainless steel cover plate in warehouse, kitchens and food preparation areas.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.4 RECEPTACLES WITH GROUND-FAULT PROTECTIVE DEVICES

- A. General-Grade, Weather-Resistant, Tamper-Resistant Duplex Straight-Blade Receptacle with GFCI Device:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
 - 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 3. General Characteristics:
 - a. Reference Standards: UL CCN KCXS, UL 498, and UL 943.

4. Options:
 - a. Device Color: Selected by architect.
 - b. Configuration: Heavy-duty, NEMA 5-20R.
5. Accessories:
 - a. Cover Plate: 0.060 inch (1.5 mm) thick, high-impact thermoplastic (nylon) with smooth finish and color matching wiring device; from same manufacturer as wiring device. Provide stainless steel cover plate in warehouse, kitchens and food preparation areas.
 - b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.5 SPD RECEPTACLES

See "Surge Protective Device (SPD) Receptacles" Article in the Evaluations for information on SPD ratings.

- A. General Description: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 1449, and FS W-C-596, with integral SPD in line to ground, line to neutral, and neutral to ground.
 1. 125 V, 20 A, straight-blade type.
 2. SPD Components: Multiple metal-oxide varistors; with a nominal clamp-level rating of 400 V and minimum single transient pulse energy dissipation of 240 J, according to IEEE C62.41.2 and IEEE C62.45.
 3. Active SPD Indication: Visual and audible, with light visible in face of device to indicate device is "active" or "no longer in service."
- B. Duplex SPD Convenience Receptacles:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart).
 - b. Hubbell Incorporated; Wiring Device-Kellems.
 - c. Leviton Manufacturing Co., Inc.
 - d. Pass & Seymour/Legrand (Pass & Seymour).

2.6 IN-FLOOR RECEPTACLES

- A. General Description: Recessed 1-gang cast iron floor box with duplex receptacle.
 1. Basis of Design Product: Subject to compliance with requirements, provide Wiremold Omnibox 880CS1-1 or a comparable product.
 2. Regulatory Requirements:

- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: NFPA 70, UL 498, UL listed for tile, carpet and terrazzo floors.
 - b. Product description:
 - 1) Manufactured from cast iron designed for use on metal reinforcement bar and related accessories before encapsulation in concrete and approved for use on grade and above grade floors. The box shall contain the following number of conduit knockouts: four 1-inch. The box shall be fully adjustable, providing a maximum of 1-3/4-inch pre-pour adjustment, and a maximum of 1/2-inch after-pour adjustment. The cover plate shall be flush with the finished floor.
- 4. Options:
 - a. Device Color: Brushed aluminum cover plate with (2) flip lids.
 - b. Configuration: Heavy-duty, NEMA 5-20R, cast iron box for use in concrete floors.

2.7 FLOOR BOXES

- A. General Description: Recessed 6-gang concrete floor box with power and data compartments.
 - 1. Basis of Design Product: Subject to compliance with requirements, provide Wiremold RFB6E-OG or a comparable product.
 - 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 3. General Characteristics:
 - a. Reference Standards: NFPA 70, UL 498, UL listed for tile, carpet, terrazzo and wood floors.
 - b. Product Description:
 - 1) Manufactured from stamped steel and painted with a fusion-bonded epoxy designed for use on metal reinforcement bar and related accessories before encapsulation in concrete, and approved for use on grade and above grade floors. The box shall be 13-1/8" L x 12-1/2" W x 3-1/4" H. Provide box with six (6) independent wiring compartments that allow capacity for up to six

(6) duplex receptacles, communication and/or audio/video services. The box shall permit feed through tunneling from adjacent compartments. Two (2) of the six (6) compartments shall have a minimum wiring capacity of 23 cu in and four (4) compartments shall have a minimum wiring capacity of 52cu in. Four (4) of the six (6) compartments shall have a minimum of 3-1/4 inches of space behind the device plates and two (2) of the six (6) compartments shall have a minimum of 2-3/8 inches of space behind the device plates. The box shall contain the following number of conduit knockouts: twelve 3/4-inch, four (4) 1-inch, and twelve 1-1/4-inch . The box shall be fully adjustable, providing a maximum of 1-3/8-inch pre-pour adjustment, and a maximum of 3/4-inch after-pour adjustment. The box shall include a series of device mounting plates that will accept both duplex power devices as well as plates that will accommodate workstation connectivity outlets and modular adapters, audio/video device plates, and other open system devices.

4. Options:

- a. Device Color: Black.
- b. Configuration: Heavy-duty, for use in concrete floors.

5. Accessories:

- a. Cover Plate: Round die cast aluminum hinged cover with black powder-coated finish, (2) sliding openings, and low-profile beveled edge complying with ADA guidelines.
- b. Securing Screws for Cover Plate: Metal with head color matching wallplate finish.

2.8 LOCKING RECEPTACLES

A. NEMA, 125 V, Locking Receptacle:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:

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- a. Reference Standards: UL CCN RTRT and UL 498.
- 4. Options:
 - a. Device Color: Black with yellow voltage indication on face.
 - b. Configuration: 2 pole, 3 wire, grounding, NEMA L5-15R, NEMA L5-20R, NEMA L5-30R.
- B. NEMA, 250 V, Locking Receptacle:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
 - 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
 - 3. General Characteristics:
 - a. Reference Standards: UL CCN RTRT and UL 498.
 - 4. Options:
 - a. Device Color: Black with blue voltage indication on face.
 - b. Configuration:
 - 1) 2 pole, 3 wire, grounding, NEMA L6-15R, NEMA L6-20R, NEMA L6-30R.
 - 2) 3 pole, 4 wire, grounding, NEMA L14-20R, NEMA L14-30R, NEMA L15-20R, NEMA L15-30R.
 - 3) 4 pole, 5 wire, grounding, NEMA L21-20R, NEMA L21-30R.

2.9 PIN-AND-SLEEVE RECEPTACLES

- A. C2 Series, 125/250 V, Pin-and-Sleeve Receptacles:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)

2. Regulatory Requirements:

- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

- a. Reference Standards: UL CCN QLIW, UL 1682, and UL 1686.
- b. Series: UL 1686 C2 and IEC 60309-2 Series II.
- c. Voltage Rating: 125/250 V.

4. Options:

a. Configuration:

- 1) 2 pole, 3 wire, 30 A, IP67, 60 A, IP67.
- 2) 3 pole, 4 wire, 30 A, IP67 60 A, IP67 100 A, IP67.
- 3) 4 pole, 5 wire, 30 A, IP67 60 A, IP67 100 A, IP67.

B. C2 Series, 480 V, Pin-and-Sleeve Receptacles:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Eaton (Arrow Hart)
- b. Hubbell Incorporated; Wiring Device-Kellems
- c. Leviton Manufacturing Co. Inc.
- d. Pass and Seymour/Legrand (Pass and Seymour)

2. Regulatory Requirements:

- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

- a. Reference Standards: UL CCN QLIW, UL 1682, and UL 1686.
- b. Series: UL 1686 C2 and IEC 60309-2 Series II.
- c. Voltage Rating: 480 V.

4. Options:

a. Configuration:

- 1) 2 pole, 3 wire, 30 A, IP67 60 A, IP67.
- 2) 3 pole, 4 wire, 30 A, IP67 60 A, IP67 100 A, IP67.
- 3) 4 pole, 5 wire, 30 A, IP67 60 A, IP67 100 A, IP67.

2.10 SPECIAL-PURPOSE POWER OUTLET ASSEMBLIES

A. Ceiling-Mounted and Floor-Mounted Power Outlet Cord Management Assembly:

1. Source Limitations: Obtain all components for each power outlet cord management assembly from single manufacturer.
2. Regulatory Requirements: Components listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics: Provide the following specified products with fabricated power outlet cord management assembly:
 - a. Cord Management System:
 - 1) Spring-driven commercial/industrial-use cord reel, #12 AWG conductors minimum.
 - b. Termination Fitting:
 - 1) Outdoor-use, watertight, sealed cord connector with NEMA receptacle indicated on equipment schedule.

B. Spring-Driven Commercial/Industrial-Use Cord Reel, No. 12 AWG Conductors:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Eaton (Arrow Hart)
 - b. Hubbell Incorporated; Wiring Device-Kellems
 - c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
2. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
3. General Characteristics:
 - a. Reference Standards: UL CCN SBCV and UL 355.
 - b. Spring take-up retraction mechanism.
4. Options:
 - a. Electrical Rating with Cable: 600 V, 25 A.
 - b. Color: Black.
 - c. Enclosure Degree of Protection: Type 4.
 - d. Ball stop.
 - e. Pivot base.
 - f. Spool Capacity:

- 1) No. 12 AWG, two wires and equipment ground, 40 ft (12.2 m).
- 2) No. 12 AWG, three wires and equipment ground, 40 ft (12.2 m).
- 3) No. 12 AWG, five wires and equipment ground, 40 ft (12.2 m).

5. Termination Fitting:

- a. Outdoor-use, watertight, sealed cord connector with NEMA receptacle indicated on drawing notes.

C. Spring-Driven Commercial/Industrial-Use Cord Reel, No. 10 AWG Conductors:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Eaton (Arrow Hart)
- b. Hubbell Incorporated; Wiring Device-Kellems
- c. Leviton Manufacturing Co. Inc.
- d. Pass and Seymour/Legrand (Pass and Seymour)

2. Regulatory Requirements: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

3. General Characteristics:

- a. Reference Standards: UL CCN SBCV and UL 355.
- b. Spring take-up retraction mechanism.

4. Options:

- a. Electrical Rating with Cable: 600 V, 30 A.
- b. Color: Black.
- c. Enclosure Degree of Protection: Type 4.
- d. Ball stop.
- e. Pivot base.
- f. Spool Capacity:

- 1) No. 10 AWG, two wires and equipment ground, 40 ft (12.2 m).
- 2) No. 10 AWG, three wires and equipment ground, 40 ft (12.2 m).
- 3) No. 10 AWG, five wires and equipment ground, 40 ft (12.2 m).

5. Termination Fitting:

- ~~3~~a. Outdoor-use, watertight, sealed cord connector with NEMA receptacle indicated on drawing notes.

2.11 CONNECTORS, CORDS, AND PLUGS

A. Outdoor-Use, Watertight, Sealed Cord Connector:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Eaton (Arrow Hart)
- b. Hubbell Incorporated; Wiring Device-Kellems

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- c. Leviton Manufacturing Co. Inc.
 - d. Pass and Seymour/Legrand (Pass and Seymour)
- 2. Regulatory Requirements:
 - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
- 3. General Characteristics:
 - a. Reference Standards: UL CCN AXUT and UL 498.
- 4. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
- 5. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
- 6. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.
- 7. Options:
 - a. Configuration:
 - 1) NEMA 5-20.
 - 2) NEMA 6-20.
 - 3) NEMA L5-15.
 - 4) NEMA L5-20.
 - 5) NEMA L5-30.
 - 6) NEMA L6-15.
 - 7) NEMA L6-20.
 - 8) NEMA L6-30.
 - 9) NEMA L14-20.
 - 10) NEMA L14-30.
 - 11) NEMA L15-20.
 - 12) NEMA L15-30.
 - 13) NEMA L16-20.
 - 14) NEMA L16-30.
 - 15) NEMA L21-20.

2.12 WALL PLATES

- A. Single and combination types shall match corresponding wiring devices.
 - 1. Plate-Securing Screws: Metal with head color to match plate finish.
 - 2. Material for Finished Spaces: Smooth, high-impact thermoplastic and 0.035-inch- thick, satin-finished.
 - 3. Material for food preparation areas: Type 302 stainless steel.

4. Material for Unfinished Spaces: Galvanized steel.
5. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

B. Cord Reels:

1. Examine roughing-in for cord reel mounting and power connections to verify actual locations of mounts and power connections before cord reel installation.
2. Examine walls, floors, and ceilings for suitable conditions where cord reel will be installed.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SWITCHES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."
 - a. Mark cover or cover plate using hot, stamped, or engraved machine printing with black-filled lettering, and provide durable wire markers or tags inside device box or outlet box.

3.3 INSTALLATION OF STRAIGHT-BLADE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

D. Interfaces with Other Work:

1. Do not install Type 3 SPD, including surge-protected relocatable taps and power strips, on branch circuit downstream of GFCI device.

3.4 INSTALLATION OF LOCKING RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in NEMA WD 6.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

3.5 INSTALLATION OF PIN-AND-SLEEVE RECEPTACLES

A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with installation instructions in NECA NEIS 130.
2. Mounting Heights: Unless otherwise indicated in Contract Documents, comply with mounting heights recommended in NECA NEIS 1.
3. Receptacle Orientation: Unless otherwise indicated in Contract Documents, orient receptacle to match configuration diagram in UL 1686.
4. Consult Architect for resolution of conflicting requirements.

C. Identification:

1. Identify cover or cover plate for device with panelboard identification and circuit number in accordance with Section 260553 "Identification for Electrical Systems."

3.6 INSTALLATION OF CORD REELS AND FITTINGS

- A. Comply with manufacturer's instructions.

3.7 INSTALLATION OF CONNECTORS, CORDS, AND PLUGS

- A. Comply with manufacturer's instructions.

B. Reference Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' instructions, comply with standard practices.
2. Consult Architect for resolution of conflicting requirements.

C. Interfaces with Other Work:

1. Coordinate with Section 262726.43 "Special-Purpose Power Outlet Assemblies" for installation of connectors and cords on fabricated power-outlet cord management assemblies.

3.8 FIELD QUALITY CONTROL OF SWITCHES

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.

B. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

C. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to supervise field tests and inspections.

3.9 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Insert and remove test plug to verify that device is securely mounted.
 - 2. Verify polarity of hot and neutral pins.
 - 3. Measure line voltage.
 - 4. Measure percent voltage drop.
 - 5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.

- C. Nonconforming Work:
 - 1. Device will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to supervise field tests and inspections.

3.10 FIELD QUALITY CONTROL OF LOCKING RECEPTACLES

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Insert and remove test plug to verify that device is securely mounted.
 - 2. Verify polarity of hot and neutral pins.
 - 3. Measure line voltage.
 - 4. Measure percent voltage drop.
 - 5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
 - 6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.
- C. Nonconforming Work:
 - 1. Device will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.

- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to supervise field tests and inspections.

3.11 FIELD QUALITY CONTROL OF PIN-AND-SLEEVE RECEPTACLES

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Insert and remove test plug to verify that device is securely mounted.
 - 2. Measure line voltage.
 - 3. Measure percent voltage drop.
 - 4. Measure ground impedance, which must be not greater than 2 ohms.
 - 5. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.
- C. Nonconforming Work:
 - 1. Device will be considered defective if it does not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:
 - 1. Engage factory-authorized service representative to supervise field tests and inspections.

3.12 FIELD QUALITY CONTROL OF CORD REELS AND FITTINGS

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 - 1. Perform tests and inspections indicated in manufacturer's instructions.
- C. Nonconforming Work:
 - 1. Components and assemblies will be considered defective if they do not pass tests and inspections.
 - 2. Remove and replace defective units and retest.
- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:

1. Engage factory-authorized service representative to supervise field tests and inspections.

3.13 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

- A. Field tests and inspections must be witnessed by authorities having jurisdiction.
- B. Tests and Inspections:
 1. Perform tests and inspections indicated in manufacturer's instructions.
- C. Nonconforming Work:
 1. Unit will be considered defective if it does not pass tests and inspections.
 2. Remove and replace defective units and retest.
- D. Assemble and submit test and inspection reports.
- E. Manufacturer Services:
 1. Engage factory-authorized service representative to supervise field tests and inspections.

3.14 SYSTEM STARTUP FOR SWITCHES

- A. Engage a factory-authorized service representative to perform startup service.
 1. Complete installation and startup checks for momentary switches, dimmer switches, and fan-speed controller switches in accordance with manufacturer's instructions.

3.15 ADJUSTING

- A. Occupancy Adjustments for Controlled Receptacles: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.
- B. Cord Reels and Fittings: Adjust spring mechanisms and moving parts of cord reels and fittings to function smoothly, and lubricate as recommended in writing by manufacturer.

3.16 PROTECTION

- A. Devices:
 1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.

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2. After installation, protect wires and cables, devices, device boxes, outlet boxes, covers, and cover plates from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

B. Cord Reels and Fittings:

1. After installation, protect cord reels and fittings from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

C. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION 262726

SECTION 263600 - TRANSFER SWITCHES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. Section Includes:

1. Contactor-type automatic transfer switches.
2. Circuit breaker-type automatic transfer switches.
3. Transfer switch accessories.

- B. Related Requirements:

1. Section 262413 "Switchboards" for automatic transfer control requirements.

1.3 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for transfer switches.
2. Include rated capacities, operating characteristics, electrical characteristics, and accessories.

- B. Shop Drawings:

1. Include plans, elevations, sections, details showing minimum clearances, conductor entry provisions, gutter space, and installed features and devices.
2. Include material lists for each switch specified.
3. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer switch and bypass/isolation switch.
4. Riser Diagram: Show interconnection wiring between transfer switches, annunciators, and control panels.

1.4 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.

- B. Field quality-control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.
 - 1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Features and operating sequences, both automatic and manual.
 - b. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.6 QUALITY ASSURANCE

- A. Testing Agency Qualifications:
 - 1. Member company of NETA.
 - a. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

1.7 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace components of transfer switch or transfer switch components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- 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. Comply with NEMA ICS 1.
- C. Comply with NFPA 110.
- D. Comply with UL 1008 unless requirements of these Specifications are stricter.

- E. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- F. Tested Fault-Current Closing and Short-Circuit Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 - 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
 - 2. Short-time withstand capability for 30 cycles.
- G. Repetitive Accuracy of Solid-State Controls: All settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- H. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.62. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- I. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism. Switches for emergency or standby purposes shall be mechanically and electrically interlocked in both directions to prevent simultaneous connection to both power sources unless closed transition.

~~J. Service Rated Transfer Switch:~~

- ~~1. Comply with UL 869A and UL 489.~~
- ~~2. Provide terminals for bonding the grounding electrode conductor to the grounded service conductor.~~
- ~~3. In systems with a neutral, the bonding connection shall be on the neutral bus.~~
- ~~4. Provide removable link for temporary separation of the service and load grounded conductors.~~
- ~~5. Surge Protective Device: Service rated.~~
- ~~6. Ground Fault Protection: Comply with UL 1008 for normal and alternative buses~~
- ~~7. Service Disconnecting Means: Externally operated, manual electrically actuated.~~

~~K.~~ J. Neutral Switching: Where four-pole switches are indicated, provide overlapping neutral contacts switched with phase poles.

~~L. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.~~

~~M.~~ K. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, by color-code or by numbered or lettered wire and cable with printed tape markers at terminations. Color-coding and wire and cable markers are specified in Section 260553 "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.
4. Accessible via front access.

N.L. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.2 CONTACTOR-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:
1. ABB, Electrification Business.
 2. Caterpillar, Inc.; Electric Power Division.
 3. Cummins Power Generation.
 4. Eaton.
 5. Generac.
 6. Kohler Power Systems.
 7. Ruselectric, Inc.
 8. Vertiv; Vertiv Holdings Co.
- B. Comply with Level 1 equipment according to NFPA 110.
- C. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are unacceptable.
 2. Switch Action: Double throw; mechanically held in both directions.
 3. Contacts: Silver composition or silver alloy for load-current switching. Contactor-style automatic transfer-switch units, rated 600 A and higher, shall have separate arcing contacts.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.
 5. Material: Hard-drawn copper, 98 percent conductivity.
 6. Main and Neutral Lugs: Mechanical type.
 7. Ground bar.
 8. Connectors shall be marked for conductor size and type according to UL 1008.
- D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.

- E. Electric Nonautomatic Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- F. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- G. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel.
- H. Automatic Transfer-Switch Controller Features:
 - 1. Controller operates through a period of loss of control power.
 - 2. Undervoltage Sensing for Each Phase of Normal and Alternate Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 - 3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
 - 4. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
 - 5. Test Switch: Simulate normal-source failure.
 - 6. Switch-Position Pilot Lights: Indicate source to which load is connected.
 - 7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
 - 8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
 - 9. Transfer Override Switch: Overrides automatic retransfer control so transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
 - 10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
 - 11. Engine Shutdown Contacts:
 - a. Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
 - 12. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers

and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

- a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
- b. Push-button programming control with digital display of settings.
- c. Integral battery operation of time switch when normal control power is unavailable.

I. Large-Motor-Load Power Transfer:

1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.

2.3 CIRCUIT BREAKER-TYPE AUTOMATIC TRANSFER SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. ABB, Electrification Business.
 2. Caterpillar, Inc.; Electric Power Division.
 3. Cummins Power Generation.
 4. Eaton.
 5. Emerson Electric Co., Automation Solutions.
 6. Generac.
 7. Kohler Power Systems.
- B. Comply with Level 2 equipment according to NFPA 110.
- C. Switching Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
1. Limitation: Switches using contactor-based components are unacceptable.
 2. Switching Action: two electrically interlocked circuit breakers programmed transfer.
 3. Contacts: Silver composition or silver alloy for load-current switching.
 4. Conductor Connectors: Suitable for use with conductor material and sizes.

5. Material: Hard-drawn copper, 98 percent conductivity.
 6. Main and Neutral Lugs: Mechanical type.
 7. Ground bar.
 8. Connectors shall be marked for conductor size and type according to UL 1008.
- D. Automatic Open-Transition Transfer Switches: Interlocked to prevent the load from being closed on both sources at the same time.
1. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
- E. Automatic Delayed-Transition Transfer Switches: Pauses or stops in intermediate position to momentarily disconnect both sources, with transition controlled by programming in the automatic transfer-switch controller. Interlocked to prevent the load from being closed on both sources at the same time.
1. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals for alternative source. Adjustable from zero to six seconds, and factory set for one second.
 2. Sources shall be mechanically and electrically interlocked to prevent closing both sources on the load at the same time.
 3. Fully automatic break-before-make operation with center off position.
- F. Electric Switch Operation: Electrically actuated by push buttons designated "Normal Source" and "Alternative Source." Switch shall be capable of transferring load in either direction with either or both sources energized.
- G. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval shall be adjustable from 1 to 30 seconds.
- H. Digital Communication Interface: Matched to capability of remote annunciator or annunciator and control panel. .
- I. Transfer Switches Based on Circuit-Breaker Components: Comply with UL 489 and UL 869A.
- J. Automatic Transfer-Switch Controller Features:
1. Controller to be integrated into main switchboard for operation of main circuit breakers in a Main-Main configuration with interlocks.
 2. Controller operates through a period of loss of control power.
 3. Undervoltage Sensing for Each Phase of Normal and Alternative Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage shall be adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 4. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.

5. Time Delay for Retransfer to Normal Source: Adjustable from zero to 30 minutes, and factory set for 10 minutes. Override shall automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
6. Test Switch: Simulate normal-source failure.
7. Switch-Position Pilot Lights: Indicate source to which load is connected.
8. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
9. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
10. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
11. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
12. Engine Shutdown Contacts:
 - a. Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods shall be adjustable from 10 to 30 minutes. Factory settings shall be for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is unavailable.

K. Large-Motor-Load Power Transfer:

1. In-Phase Monitor: Factory-wired, internal relay controls transfer so contacts close only when the two sources are synchronized in phase and frequency. Relay shall compare phase relationship and frequency difference between normal and emergency sources and initiate transfer when both sources are within 15 electrical degrees, and only if transfer can be completed within 60 electrical degrees. Transfer shall be initiated only if both sources are within 2 Hz of nominal frequency and 70 percent or more of nominal voltage.
2. Motor Disconnect and Timing Relay Controls: Designated starters in loss of power scenario shall disconnect motors before transfer and reconnect them selectively at an

adjustable time interval after transfer. Control connection to motor starters shall be through wiring external to automatic transfer switch. Provide adjustable time delay between 1 and 60 seconds for reconnecting individual motor loads. Provide relay contacts rated for motor-control circuit inrush and for actual seal currents to be encountered.

~~2.4 TRANSFER SWITCH ACCESSORIES~~

~~A. Remote Annunciator and Control System:~~

- ~~1. Source Limitations: Same manufacturer as transfer switch in which installed.~~
- ~~2. Include the following functions for indicated transfer switches:~~
 - ~~a. Indication of sources available, as defined by actual pickup and dropout settings of transfer switch controls.~~
 - ~~b. Indication of switch position.~~
 - ~~c. Indication of switch in test mode.~~
 - ~~d. Indication of failure of digital communication link.~~
 - ~~e. Key switch or user code access to control functions of panel.~~
 - ~~f. Control of switch test initiation.~~
 - ~~g. Control of switch operation in either direction.~~
- ~~3. Malfunction of annunciator, annunciation and control panel, or communication link shall not affect functions of automatic transfer switch. In the event of failure of communication link, automatic transfer switch automatically shall revert to standalone, self-contained operation. Automatic transfer switch sensing, controlling, or operating function shall not depend on remote panel for proper operation.~~
- ~~4. Remote Annunciation and Control Panel: Solid state components. Include the following features:~~
 - ~~a. Controls and indicating lights grouped together for each transfer switch.~~
 - ~~b. Label each indicating light control group. Indicate transfer switch it controls, location of switch, and load it serves.~~
 - ~~c. Digital Communication Capability: Matched to that of transfer switches supervised.~~
 - ~~d. Mounting: Flush, modular, steel cabinet unless otherwise indicated.~~

2.52.4 SOURCE QUALITY CONTROL

- A. Factory Tests: Test and inspect components, assembled switches, and associated equipment according to UL 1008. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.
- B. Prepare test and inspection reports.
 1. For each of the tests required by UL 1008, performed on representative devices, for emergency systems. Include results of test for the following conditions:

- a. Overvoltage.
- b. Undervoltage.
- c. Loss of supply voltage.
- d. Reduction of supply voltage.
- e. Alternative supply voltage or frequency is at minimum acceptable values.
- f. Temperature rise.
- g. Dielectric voltage-withstand; before and after short-circuit test.
- h. Overload.
- i. Contact opening.
- j. Endurance.
- k. Short circuit.
- l. Short-time current capability.
- m. Receptacle withstand capability.
- n. Insulating base and supports damage.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Annunciator and Control Panel Mounting: Flush in wall unless otherwise indicated.
- B. Identify components according to Section 260553 "Identification for Electrical Systems."
- C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.
- D. Comply with NECA 1.

3.2 CONNECTIONS

- A. Wiring to Remote Components: Match type and number of cables and conductors to generator sets, control and communication requirements of transfer switches as recommended by manufacturer. Increase raceway sizes at no additional cost to Owner if necessary to accommodate required wiring.
- B. Wiring Method: Install cables in raceways and cable trays except within electrical enclosures. Conceal raceway and cables except in unfinished spaces.
 - 1. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."

- E. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- F. Connect twisted pair cable according to Section 260523 "Control-Voltage Electrical Power Cables."
- G. Route and brace conductors according to manufacturer's written instructions and Section 260529 "Hangers and Supports for Electrical Systems." Do not obscure manufacturer's markings and labels.
- H. Final connections to equipment shall be made with liquidtight, flexible metallic conduit no more than 18 inches in length.

3.3 FIELD QUALITY CONTROL

- A. Administrant for Tests and Inspections:
 - 1. Engage qualified testing agency to administer and perform tests and inspections.
- B. Tests and Inspections:
 - 1. After installing equipment, test for compliance with requirements according to NETA ATS.
 - 2. Visual and Mechanical Inspection:
 - a. Compare equipment nameplate data with Drawings and Specifications.
 - b. Inspect physical and mechanical condition.
 - c. Inspect anchorage, alignment, grounding, and required clearances.
 - d. Verify that the unit is clean.
 - e. Verify appropriate lubrication on moving current-carrying parts and on moving and sliding surfaces.
 - f. Verify that manual transfer warnings are attached and visible.
 - g. Verify tightness of all control connections.
 - h. Inspect bolted electrical connections for high resistance using one of the following methods, or both:
 - 1) Use of low-resistance ohmmeter.
 - 2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method according to manufacturer's published data.
 - i. Perform manual transfer operation.
 - j. Verify positive mechanical interlocking between normal and alternate sources.
 - k. Perform visual and mechanical inspection of surge arresters.
 - l. Inspect control power transformers.
 - 1) Inspect for physical damage, cracked insulation, broken leads, tightness of connections, defective wiring, and overall general condition.

- 2) Verify that primary and secondary fuse or circuit-breaker ratings match Drawings.
 - 3) Verify correct functioning of drawout disconnecting contacts, grounding contacts, and interlocks.
3. Electrical Tests:
 - a. Perform insulation-resistance tests on all control wiring with respect to ground.
 - b. Verify settings and operation of control devices.
 - c. Calibrate and set all relays and timers.
 - d. Verify phase rotation, phasing, and synchronized operation.
 - e. Perform automatic transfer tests.
 - f. Verify correct operation and timing of the following functions:
 - 1) Normal source voltage-sensing and frequency-sensing relays.
 - 2) Engine start sequence.
 - 3) Time delay on transfer.
 - 4) Alternative source voltage-sensing and frequency-sensing relays.
 - 5) Automatic transfer operation.
 - 6) Interlocks and limit switch function.
 - 7) Time delay and retransfer on normal power restoration.
 - 8) Engine cool-down and shutdown feature.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
 - a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
5. After energizing circuits, perform each electrical test for transfer switches stated in NETA ATS and demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and retransfer from emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Transfer switches will be considered defective if they do not pass tests and inspections.
- F. Remove and replace malfunctioning units and retest as specified above.
- G. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment.
- B. Training shall include testing ground-fault protective devices and instructions to determine when the ground-fault system shall be retested. Include instructions on where ground-fault sensors are located and how to avoid negating the ground-fault protection scheme during testing and circuit modifications.
- C. Coordinate this training with that for generator equipment.

END OF SECTION 263600

MFP:mfp 11/13/2025

SECTION 226313 - GAS PIPING FOR LABORATORY AND HEALTHCARE FACILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Pipes, tubes, and fittings.
2. Shape-memory-metal couplings.
3. Joining materials.
4. Ball valves.

B. Owner-Furnished Material:

1. Gas Manifolds
2. Emergency Shut Off Valve
3. Carbon Dioxide Tank

1.2 DEFINITIONS

- A. Laboratory gas piping systems include carbon dioxide for laboratories.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings: Include diagrams for power, signal, and control wiring.

1.4 INFORMATIONAL SUBMITTALS

- A. Brazing certificates.
- B. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For specialty gas piping specialties to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

- A. Brazing: Qualify processes and operators in accordance with ASME Boiler and

Pressure Vessel Code, Section IX, "Welding and Brazing Qualifications," or AWS B2.2/B2.2M.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Laboratory carbon dioxide operating at recommended outlet pressure 40psig.

2.2 PIPES, TUBES, AND FITTINGS

- A. Copper Laboratory Gas Tube: ASTM B819, Type K, seamless, drawn temper. Include standard color label for Carbon Dioxide piping.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Copper Unions: ASME B16.22 or MSS SP-123, wrought-copper or cast-copper alloy.

2.3 JOINING MATERIALS

- A. Brazing Filler Metals: AWS A5.8M/A5.8, BCuP Series, copper-phosphorus alloys.

2.4 VALVES

- A. General Requirements for Valves: Manufacturer cleaned, purged, and bagged in accordance with CGA G-4.1 for oxygen service.
- B. Ball Valves:
 - 1. Basis-of-Design Product: Subject to compliance with requirements, available manufacturers offering products may be incorporated into the work include, but are not limited to, the following:
 - a. Amico Corporation
 - b. Apollo Valves; a part of Aalberts Integrated Piping Systems
 - c. BeaconMedaes
 - d. Marwin Valve; Richards Industries
 - e. NIBCO INC.
 - f. Ohio Medical Corporation
 - g. Tri-Tech Medical
 - 2. Standard: MSS SP-110.
 - 3. Description: Three-piece body, brass or bronze.
 - 4. Pressure Rating: 300 psig minimum.
 - 5. Ball: Full-port, chrome-plated brass.
 - 6. Seats: PTFE or TFE.
 - 7. Handle: Lever

8. Stem: Blowout proof with PTFE or TFE seal.
9. Ends: Manufacturer-installed ASTM B819, copper-tube extensions

PART 3 - EXECUTION

3.1 EARTHWORK

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling and for underground warning tapes.

3.2 INSTALLATION OF PIPING

- A. General Location and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of gas piping. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Comply with NFPA 55 for installation of laboratory gas piping.
- C. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- F. Install piping adjacent to equipment and specialties to allow service and maintenance.
- G. Install nipples, unions, special fittings, and valves with pressure ratings same as or higher than system pressure rating used in applications specified in "Piping Schedule" Article unless otherwise indicated.
- H. Install piping to permit valve servicing.
- I. Install piping free of sags and bends.
- J. Install fittings for changes in direction and for branch connections.
- K. Connect gas piping to gas sources and to gas outlets and equipment requiring gas service.
- L. Install unions in copper tubing adjacent to each valve and at final connection to each specialty and piece of equipment.

- M. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220500 "Common Work Results for Plumbing."
- N. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220500 "Common Work Results for Plumbing."
- O. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220500 "Common Work Results for Plumbing."
- P. Prepare tubing and install fittings using tools by product manufacturer.

3.3 INSTALLATION OF VALVES

- A. Install shutoff valve at each connection to gas laboratory equipment and specialties.

3.4 JOINT CONSTRUCTION

- A. Ream ends of pipes and tubes and remove burrs.
- B. Remove scale, slag, dirt, and debris from outside of cleaned tubing and fittings before assembly.
- C. Brazed Joints: Join copper tube and fittings in accordance with CDA's "Copper Tube Handbook," Ch. "Brazed Joints." Do not use flux. Continuously purge joint with oil-free, dry nitrogen during brazing.
- D. Extruded-Tee Outlets: Form branches in copper tube in accordance with ASTM F2014, with tools recommended by tube manufacturer.
- E. Flanged Joints:
 - 1. Copper Tubing: Install flange on copper tubes. Use pipe-flange gasket between flanges. Join flanges with gasket and bolts in accordance with ASME B31.9 for bolting procedure.
 - 2. PVC Piping: Install PVC flange on PVC pipes. Use pipe-flange gasket between flanges. Join flanges with gasket and bolts in accordance with ASME B31.9 for bolting procedure.

3.5 INSTALLATION OF HANGERS AND SUPPORTS

- A. Comply with requirements for hangers, supports, and anchor devices specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Vertical Piping: MSS Type 8 or Type 42, clamps.
- C. Individual, Straight, Horizontal Piping Runs:

1. 100 Feet (30 m) and Less: MSS Type 1, adjustable, steel, clevis hangers.
 2. Longer Than 100 Feet (30 m): MSS Type 43, adjustable, roller hangers.
- D. Multiple, Straight, Horizontal Piping Runs 100 Feet (30 m) or Longer: MSS Type 44 pipe rolls. Support pipe rolls on trapeze. Comply with requirements in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment" for trapeze hangers.
- E. Base of Vertical Piping: MSS Type 52 spring hangers.
- F. Install hangers for copper tubing with maximum horizontal spacing and minimum rod diameters to comply with MSS SP-58, NFPA 99, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.
- G. Support horizontal piping within 12 inches of each fitting and coupling.
- H. Support vertical runs of copper tubing to comply with MSS SP-58, NFPA 99, locally enforced codes, and authorities having jurisdiction requirements, whichever are most stringent.

3.6 IDENTIFICATION

- A. Install identifying labels and devices for specialty gas piping, valves, and specialties. Comply with requirements in Section 220553 "Identification for Plumbing Piping and Equipment."

3.7 FIELD QUALITY CONTROL FOR LABORATORY FACILITY SPECIALTY GAS

- A. Testing Agency:
1. Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
1. Piping Leak Tests for Specialty Gas Piping: Test new and modified parts of existing piping. Cap and fill specialty gas piping with oil-free, dry nitrogen to pressure of 50 psig above system operating pressure, but not less than 150 psig. Isolate test source and let stand for four hours to equalize temperature. Refill system, if required, to test pressure; hold for two hours with no drop in pressure.
 2. Repair leaks and retest until no leaks exist.
- C. Piping will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.

3.8 PROTECTION

- A. Protect tubing from damage.
- B. Retain sealing plugs in tubing, fittings, and specialties until installation.

- C. Clean tubing not properly sealed, and where sealing is damaged, in accordance with "Preparation" Article.

3.9 PIPING SCHEDULE

- A. Carbon Dioxide. Piping NPS 3 (DN 80) and Smaller to Operate at More Than 185 psig (1275 kPa): Type K, copper tube; wrought-copper fittings; and brazed joints.

3.10 VALVE SCHEDULE

- A. Shutoff Valves: Ball valve with manufacturer-installed ASTM B819, copper-tube extensions.

END OF SECTION 226313

ABBREVIATIONS:

AF	ABOVE FINISHED FLOOR
A	AMPERE
AC	ASYMMETRIC INTERRUPTING CAPACITY
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BKR	BREAKER
C	CONDUIT
CLG	CEILING
CKT	CIRCUIT
CU	COPPER
DA	DIAMETER
DN	DOWN
EA	EACH
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EMER	EMERGENCY
ETR	EXISTING TO REMAIN

F	FUSED
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FTL	FEED THRU LUGS

GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GND	GROUND

HP	HORSEPOWER
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K	MULTIPLE OF 1000
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JB	JUNCTION BOX
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LTG	LIGHTING
-----	----------

LV	LOW VOLTAGE
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MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MIN	MINIMUM
MLO	MAIN LUG ONLY
MTG HT	MOUNTING HEIGHT

NL	NIGHT LIGHT
NEC	NATIONAL ELECTRICAL CODE
NF	NON-FUSED
NTS	NOT TO SCALE

OC	OVER-COUNTER - EC TO VERIFY HEIGHT OF COUNTER TOP
OCF	OVERCURRENT PROTECTION

P	POLE
PH	PHASE
PNL	PANEL
PRI	PRIMARY

TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
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UC	UNDER-CABINET
----	---------------

V	VOLT
---	------

VIF	VERIFY IN FIELD
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W	WATT
---	------

WG	WIREGUARD
----	-----------

WP	WEATHERPROOF
----	--------------

XFMR	TRANSFORMER
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DISTRIBUTION / BRANCH WIRING

SYMBOL	DESCRIPTION
	PANELBOARD/LOAD CENTER - REFER TO PANELBOARD SCHEDULE
	HOMERUN TO PANELBOARD - ARROW HEADS INDICATE NUMBER OF POLES. TEXT ADJACENT TO ARROW HEADS INDICATES PANELBOARD AND CIRCUIT DESIGNATIONS. SLASHES INDICATE CURRENT CARRYING CONDUCTORS. SLASH WITH DOT INDICATES GROUNDING CONDUCTOR. SLASH WITH G INDICATES ISOLATED GROUND CONDUCTOR.
	RACEWAY OR CABLE WITH CONDUCTORS AS NOTED
	CONDUIT OR CABLE UP
	CONDUIT OR CABLE DOWN
	TRANSFORMER
	UNDERGROUND ELECTRICAL CONDUIT

DEVICES

SYMBOL	DESCRIPTION
	WALL - SWITCH OCCUPANCY SENSOR SUBSCRIPTS DENOTE TYPE: PIR - PASSIVE INFRARED D - 0-10V DIMMER DT - DUAL-TECHNOLOGY
	CEILING MOUNTED OCCUPANCY SENSOR SUBSCRIPTS DENOTE TYPE: PIR - PASSIVE INFRARED US - ULTRASONIC USC - ULTRASONIC CORRIDOR COVERAGE DT - DUAL-TECHNOLOGY
	SWITCH PACK FOR OCCUPANCY SENSORS
	LIGHTING ROOM CONTROLLER
	AMBIENT LIGHT SENSOR
	PHOTOCELL
	TOGGLE SWITCH SUBSCRIPTS DENOTE TYPE: 2 - TWO POLE SWITCH 3 - THREE WAY SWITCH 4 - FOUR WAY SWITCH LV - LOW VOLTAGE SWITCH K - KEY OPERATED SWITCH KP - DIMMING KEYPAD/SCHIE CONTROLLER T - MOTOR-RATED SWITCH D - DIMMER CONTROL WP - WEATHER PROOF ROMAN NUMERALS INDICATE GANGED SWITCHES LETTERS (a,b,c) INDICATE SWITCH LEGS
	DUPLEX RECEPTACLE - 125V, 20A SUBSCRIPTS DENOTE TYPE: CH - INTEGRAL USB CHARGER GFI - GROUND FAULT CIRCUIT INTERRUPTER GRIP - CONNECTED TO GFCI CIRCUIT BREAKER OC - OVER COUNTER TVSS - TRANSIENT VOLTAGE SURGE SUPPRESSOR UC - UNDER COUNTER WP - WEATHER PROOF WHILE-IN-USE WR - WEATHER-RESISTANT TR - TAMPER RESISTANT
	SPLIT-WIRED DUPLEX RECEPTACLE (HALF-SWITCHED)
	CEILING-MOUNTED RECEPTACLE
	DOUBLE DUPLEX RECEPTACLE
	SURFACE-MOUNTED DUPLEX RECEPTACLE
	EQUIPMENT CONNECTION - DIRECT CONNECTION OR MATCH CORD AND CAP AS REQUIRED
	DISCONNECT SWITCH SUBSCRIPTS DENOTE RATINGS: ##AS - AMPERE RATING OF SWITCH ##AF - AMPERE RATING OF FUSE NF - NON-FUSED
	EQUIPMENT RECEPTACLE - REFER TO NOTE FOR CONFIGURATION
	JUNCTION BOX
	TIME SWITCH
	MOTOR CONNECTION
	RECESSED FLOOR BOX WITH POWER AND LOW VOLTAGE COMPARTMENTS
	DATA OUTLET WITH (1) RJ45 JACK IN 4" SQUARE OUTLET BOX WITH 3/4" CONDUIT STUBBED TO ABOVE ACCESSIBLE CEILING. PROVIDE (1) CAT-6 CABLE TO PATCH PANEL IN OFFICE I.T. ROOM.
	DATA OUTLET WITH (2) RJ45 JACKS IN 4" SQUARE OUTLET BOX WITH 3/4" CONDUIT STUBBED TO ABOVE ACCESSIBLE CEILING. PROVIDE (2) CAT-6 CABLES TO PATCH PANEL IN OFFICE I.T. ROOM.
	COMBINATION POWER/LOW-VOLTAGE BOX FOR WALL-MOUNTED TV WITH (1) DUPLEX TVSS RECEPTACLE, (1) CAT-6 CABLE AND (1) RG-6 CABLE TO NEAREST DATA ROOM.
	ADDRESSABLE LOAD SHED MODULE
	PROVISION FOR WIRELESS ACCESS POINT. EXTEND (1) CAT-6 CABLE TO PATCH PANEL IN OFFICE I.T. ROOM. PROVIDE S SERVICE LOOP AT ACCESS POINT LOCATION.

LIGHTING

SYMBOL	DESCRIPTION
	LIGHTING FIXTURE AND OUTLET BOX
	CEILING LIGHTING FIXTURE AND OUTLET BOX
	WALL-MOUNTED LIGHTING FIXTURE AND OUTLET BOX
	POLE-MOUNTED SITE LIGHT
	SHADING/EM DENOTES EMERGENCY FIXTURE - FIXTURE TO BE PROVIDED WITH BODINE GTD SWITCHPACK DEVICE TO ALLOW LOCAL SWITCH CONTROL.
	SHADING/NL DENOTES NIGHT-LIGHT FIXTURE - FIXTURE TO BE UNSWITCHED
	EXIT SIGN - SOLID QUADRANT DENOTES DIRECTIONAL ARROWS AND LINE DENOTES PANEL/S/FACES
	EMERGENCY SHUNT RELAY

FIRE ALARM

SYMBOL	DESCRIPTION
	FIRE ALARM CONTROL PANEL
	FIRE ALARM ANNUNCIATOR PANEL
	MANUAL PULLSTATION
	SMOKE DETECTOR
	SMOKE DETECTOR WITH SOUNDER BASE
	MULTI-CRITERIA DETECTOR WITH CARBON MONOXIDE SENSOR
	HEAT DETECTOR
	CARBON MONOXIDE ALARM WITH SOUNDER BASE
	DUCT-MOUNTED SMOKE DETECTOR
	VALVE TAMPER SWITCH
	FLOW SWITCH
	REMOTE TEST STATION
	AUDIO NOTIFICATION DEVICE
	VISUAL NOTIFICATION DEVICE
	FIRE ALARM AUDIO/VISUAL NOTIFICATION DEVICE
	DOOR HOLD-OPEN
	FIRE ALARM RELAY ACCESS CONTROL OVERRIDE

SECURITY / ACCESS CONTROL

SYMBOL	DESCRIPTION
	RACEWAY/BOX PROVISION FOR CARD/PROXIMITY READER
	RACEWAY/BOX PROVISION FOR ELECTRIC LATCH/STRIKE
	RACEWAY/BOX PROVISION FOR DOOR CONTACT
	RACEWAY/BOX PROVISION FOR PUSHBUTTON
	RACEWAY/BOX PROVISION FOR REQUEST TO EXIT SENSOR
	PROVISION FOR SECURITY CAMERA. EXTEND (1) CAT-6 CABLE TO PATCH PANEL IN OFFICE I.T. ROOM. PROVIDE S SERVICE LOOP AT CAMERA LOCATION

ONE-LINE DIAGRAMS

SYMBOL	DESCRIPTION
	THERMAL MAGNETIC CIRCUIT BREAKER
	ELECTRONIC TRIP CIRCUIT BREAKER
	SWITCH
	FUSE
	GROUND FAULT PROTECTION DEVICE
	CURRENT TRANSFORMER
	VOLTAGE TRANSFORMER
	MULTIFUNCTION DIGITAL METER
	GROUND CONNECTION
	GENERATOR
	AUTOMATIC TRANSFER SWITCH
	PANELBOARD - REFER TO PANELBOARD SCHEDULE
	TRANSFORMER - REFER TO TRANSFORMER SCHEDULE
	UNIT SUBSTATION TRANSFORMER
	SURGE PROTECTION DEVICE (TVSS)
	SUBMETER

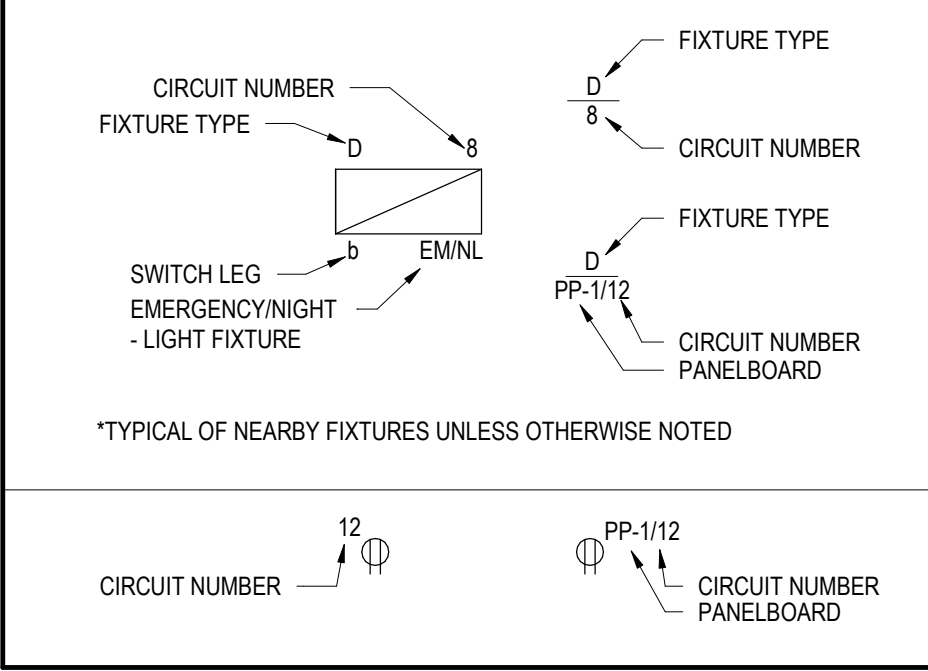
GENERAL

DEVICES	DESCRIPTION
	HEAVY LINEWEIGHT DENOTES NEW DEVICE, EQUIPMENT, OR CONNECTION
	LIGHT LINEWEIGHT DENOTES EXISTING DEVICE, EQUIPMENT, OR CONNECTION TO REMAIN
	BROKEN LIGHT LINEWEIGHT DENOTES EXISTING DEVICE, EQUIPMENT, OR CONNECTION TO BE REMOVED
	ROMAN NUMERALS INDICATE NUMBER OF DEVICES

MOUNTING HEIGHTS

DEVICES	MOUNTING HEIGHT
RECEPTACLES	18" AFF
EXTERIOR RECEPTACLES	24" AFF
SWITCHES	44" AFF
DATATEL/COM OUTLETS	18" AFF
FIRE ALARM MANUAL PULLSTATIONS	44" AFF
RESIDENTIAL LOAD CENTERS	TOP AT 60" AFF
FIRE ALARM VISUAL NOTIFICATION DEVICE	ENTIRE LENS BTW 80"-96" AFF
MOUNTING HEIGHTS OF DEVICES TO THE CENTER OF DEVICE AS INDICATED, UNLESS OTHERWISE NOTED	

BRANCH CIRCUIT IDENTIFICATION



LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER & CAT. No.	LAMP(S)	BALLAST/VOLT.	MOUNTING	NOTES
L1	6" LED DOWNLIGHT WITH HIGH EFFICACY DIMMING AND WET LOCATION RATING	FHoSE A3i	LED	277V	RECESSED	LUMINAIRES FURNISHED BY OWNER AND INSTALLED BY CONTRACTOR
L2	2' x 4' LED FLAT PANEL WITH SMOOTH FROSTED LENS, INTEGRAL HIGH EFFICACY DRIVER, SELECTABLE OUTPUT, 0-10V DIMMING, AND FIVE YEAR WARRANTY	COOPER LIGHTING 24FPSL2SCT3	LED 4620 LUMENS 4000K 80CRI	277V	RECESSED	
L3	1' x 4' LED FLAT PANEL WITH SMOOTH FROSTED LENS, INTEGRAL HIGH EFFICACY DRIVER, SELECTABLE OUTPUT, 0-10V DIMMING, AND FIVE YEAR WARRANTY	COOPER LIGHTING 14FPSL1SCT3	LED 3050 LUMENS 4000K 80CRI	277V	RECESSED	
L4	1' x 1' LED FLAT PANEL WITH SMOOTH FROSTED LENS, INTEGRAL HIGH EFFICACY DRIVER, SELECTABLE OUTPUT, 0-10V DIMMING, AND FIVE YEAR WARRANTY	COOPER LIGHTING 11MMS-L3C5-UNV	LED 1660 LUMENS 4000K 80CRI	277V	SURFACE MOUNTED	
L5	24" LED HIGH BAY FIXTURE WITH FROSTED POLYCARBONATE LENS, INTEGRAL HIGH EFFICACY DRIVER, 0-10V DIMMING, SURFACE MOUNT, BRACKETS, AND FIVE YEAR WARRANTY	COOPER LIGHTING LHBS-1218-UNV-L84050	LED 12000 LUMENS 4000K 80CRI	277V	PENDANT MOUNTED	
L6	48" LED STRIPLIGHT WITH FROSTED DROP LENS, INTEGRAL HIGH EFFICACY DRIVER, SELECTABLE OUTPUT, 0-10V DIMMING, FLAT END CAPS, AND FIVE YEAR WARRANTY	COOPER LIGHTING 4SNX-SL3-L-UNV-CC83-CD-4000K	LED 4300 LUMENS 4000K 80CRI	277V	SURFACE MOUNTED	
L6a	48" LED STRIPLIGHT WITH FROSTED DROP LENS, INTEGRAL HIGH EFFICACY DRIVER, SELECTABLE OUTPUT, 0-10V DIMMING, FLAT END CAPS, AND FIVE YEAR WARRANTY	COOPER LIGHTING 4SNX-SL3-L-UNV-CC83-CD-4000K	LED 4300 LUMENS 4000K 80CRI	277V	WALL MOUNTED	
W1	E26 LAMP HOLDER		A19 GREEN LED BULB FURNISHED BY OWNER	120V	WALL MOUNTED	

EXTERIOR LUMINAIRE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER & CAT. No.	LAMP(S)	BALLAST/VOLT.	MOUNTING	NOTES
WE1	9'x8'x18" EXTERIOR LED WALL PACK WITH DIE CAST ALUMINUM HOUSING AND BACK PLATE, FULL CUTOFF LENS, FORWARD THROW DISTRIBUTION, IP65 RATING, AND 5 YEAR WARRANTY	LITHONIA LIGHTING WDGE3 LED P2 70CRI RFT 40K	LED 8600 LUMENS 4000K 70CRI	MVOLT	WALL MOUNTED AT 12'-0" AFG	ARCHITECT TO SELECT FINISH. PROVIDE WIRELESS MESH NETWORK CONTROL MODULE.
WE2	9'x8'x18" EXTERIOR LED WALL PACK WITH DIE CAST ALUMINUM HOUSING AND BACK PLATE, FULL CUTOFF LENS, TYPE 4 DISTRIBUTION, IP65 RATING, AND 5 YEAR WARRANTY	LITHONIA LIGHTING WDGE3 LED P2 70CRI R4 40K	LED 8700 LUMENS 4000K 70CRI	MVOLT	WALL MOUNTED AT 12'-0" AFG	ARCHITECT TO SELECT FINISH. PROVIDE WIRELESS MESH NETWORK CONTROL MODULE.
X1a	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 3 MEDIUM DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P5 40K 70CRI T3M	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 30'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X1b	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 3 MEDIUM DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P5 40K 70CRI T3M	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X2	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 3 MEDIUM DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P7 40K 70CRI T3M	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 30'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X3	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 3 MEDIUM DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P3 40K 70CRI T3M	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X4	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 5 WIDE DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P5 40K 70CRI T5W	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X5	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, TYPE 5 WIDE DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P7 40K 70CRI T5W	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X6	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, FORWARD THROW DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P3 40K 70CRI TFTM	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X7	LED POLE MOUNTED AREA FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP66 RATING, FORWARD THROW DISTRIBUTION, AND FIVE YEAR WARRANTY	LITHONIA LIGHTING DSX0 LED P5 40K 70CRI TFTM	LED 12000 LUMENS 4000K 70CRI	277V	POLE MOUNTED AT 20'-0" AFG	PROVIDE WIRELESS MESH NETWORK CONTROL MODULE
X8	9'x9' LED SURFACE MOUNT CANOPY FIXTURE WITH DIE CAST ALUMINUM HOUSING, IP65 RATING, SELECTABLE LUMENS, AND FIVE YEAR WARRANTY	COOPER LIGHTING CLCS15S-PC	LED 3700 LUMENS 4000K 70CRI	277V	SURFACE MOUNTED	

TRANSFORMER SCHEDULE

EQUIP. NO.	RATING	LOCATION	PRIMARY VOLTAGE	SECONDARY VOLTAGE	SUPPLY FROM	REMARKS
T-1	2500KVA	EXTERIOR	4800A 12470Δ	480Y/277V	POWER HOUSE	DUAL PRIMARY
T-2	30KVA	ELEC 133	480Δ	208Y/120V	HP-G1	115C RISE, 220C INSULATION RATING
T-3	150KVA	ELEC 116	480Δ	208Y/120V	HDP-D	
T-4	45KVA	ELEC 116	480Δ	208Y/120V	HDP-D	115C RISE, 220C INSULATION RATING
T-5	75KVA	ELEC 133	480Δ	208Y/120V	HP-M1	
T-EM1	15KVA	MECH 132	480Δ	208Y/120V	HDP-EM	
T-FL1	30KVA	CORRIDOR CEILING	480Δ	208Y/120V	HDP-B	115C RISE, 220C INSULATION RATING
T-FL2	30KVA	CORRIDOR CEILING	480Δ	208Y/120V	HDP-B	115C RISE, 220C INSULATION RATING
T-FL3	30KVA	CORRIDOR CEILING	480Δ	208Y/120V	HDP-C	115C RISE, 220C INSULATION RATING

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Client: 11580 Walden Ave LLC

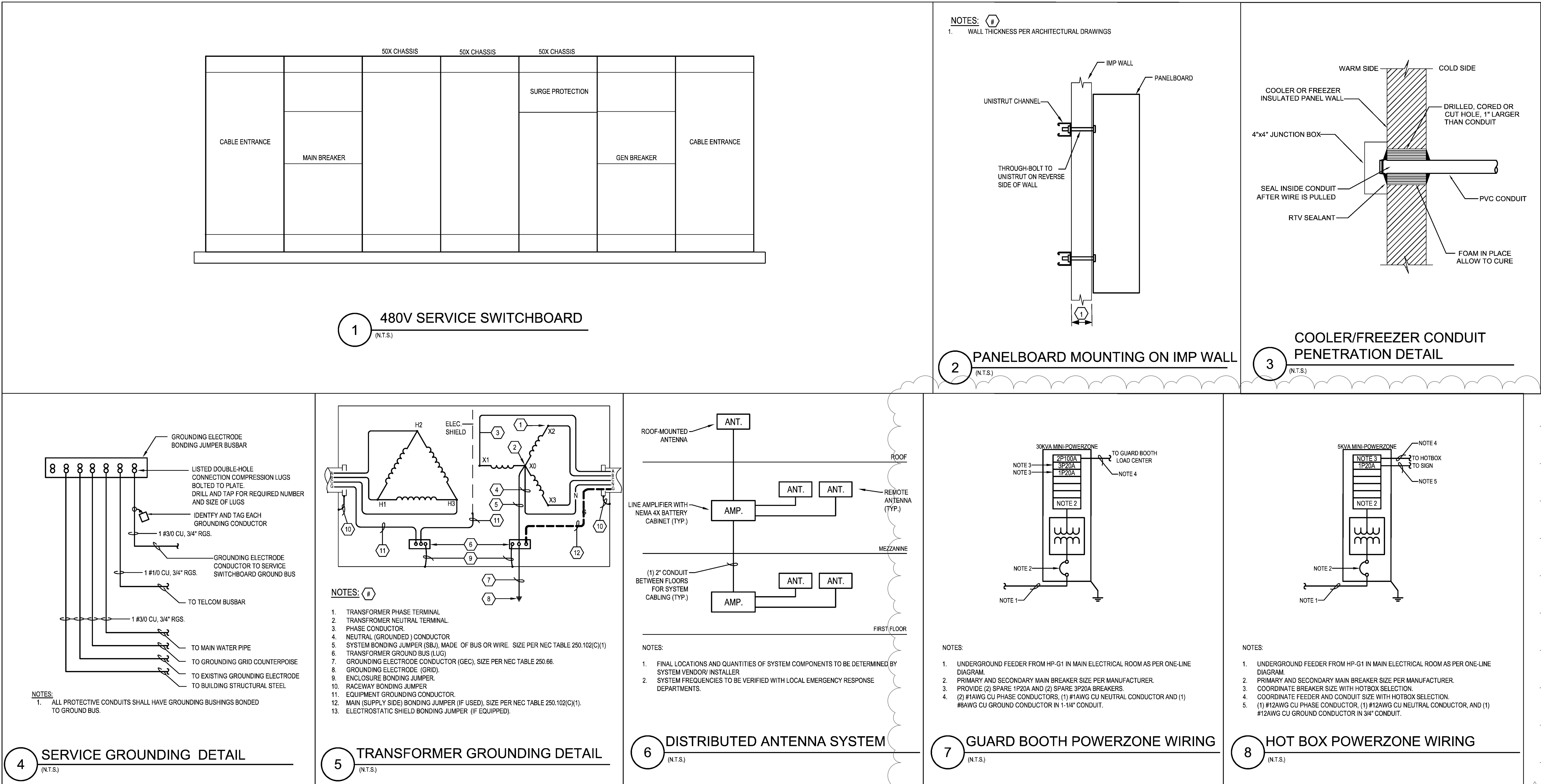
Project: Alden Green House

Project Address: 11580 Walden Ave

Drawing History:	#	Date	Description
	1	1/14/2026	MEP REVISIONS

Date: 11/26/2025
Project Number: 24003
Sheet Title: **SYMBOL LEGEND, DETAILS & SCHEDULES**

Sheet Number: **E001-2**



MECHANICAL EQUIPMENT CONNECTION SCHEDULE											
EQUIP. NO.	EQUIPMENT DESCRIPTION	LOCATION	VOLTAGE	PHASE	AMPS	WIRE SIZE	GND SIZE	CONDUIT SIZE	PANEL	CIRCUIT BREAKER	REMARKS
AHU-1A	40-TON AHU - FLOWER 1	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM1	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-1B	40-TON AHU - FLOWER 1	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM1	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-2A	40-TON AHU - FLOWER 2	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM2	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-2B	40-TON AHU - FLOWER 2	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM2	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-3A	40-TON AHU - FLOWER 3	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM3	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-3B	40-TON AHU - FLOWER 3	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM3	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-4A	40-TON AHU - FLOWER 4	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM1	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-4B	40-TON AHU - FLOWER 4	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM1	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-5A	40-TON AHU - FLOWER 5	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM2	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-5B	40-TON AHU - FLOWER 5	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM2	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-6A	40-TON AHU - FLOWER 6	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM3	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-6B	40-TON AHU - FLOWER 6	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM3	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-7A	40-TON AHU - FLOWER 7	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM4	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-7B	40-TON AHU - FLOWER 7	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM4	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-8A	40-TON AHU - FLOWER 8	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM4	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-8B	40-TON AHU - FLOWER 8	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM4	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-9A	40-TON AHU - FLOWER 9	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM5	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-9B	40-TON AHU - FLOWER 9	ROOF	480	3	157.2	#2/0 AWG	#6 AWG	2"	HP-PM5	3P175A	INTEGRATED DISCONNECT AND GFCI RECEPTACLE
AHU-10A	9-TON AHU - VEG 1	ROOF	480	3	55	#4 AWG	#10 AWG	1-1/4"	HP-PM5	3P60A	INTEGRATED DISCONNECT
AHU-10B	9-TON AHU - VEG 1	ROOF	480	3	55	#4 AWG	#10 AWG	1-1/4"	HP-PM5	3P60A	INTEGRATED DISCONNECT
AHU-11A	9-TON AHU - VEG 2	ROOF	480	3	55	#4 AWG	#10 AWG	1-1/4"	HP-PM3	3P60A	INTEGRATED DISCONNECT
AHU-11B	9-TON AHU - VEG 2	ROOF	480	3	55	#4 AWG	#10 AWG	1-1/4"	HP-PM3	3P60A	INTEGRATED DISCONNECT
AHU-12	7 TON AHU - CULT/CORR	ROOF	480	3	26	#10 AWG	#10 AWG	3/4"	HP-PM5	3P35A	INTEGRATED DISCONNECT
AHU-13	15 TON AHU - REC/VM/MAINT	ROOF	480	3	48	#6 AWG	#10 AWG	1"	HP-PM5	3P60A	INTEGRATED DISCONNECT
AHU-14	7 TON AHU - DIST/INV	ROOF	480	3	26	#10 AWG	#10 AWG	3/4"	HP-PM4	3P35A	INTEGRATED DISCONNECT
AHU-15	13 TON AHU - PACKAGING	ROOF	480	3	44	#6 AWG	#10 AWG	1"	HP-PM6	3P50A	INTEGRATED DISCONNECT
AHU-16A	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-16B	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-16C	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-16D	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-16E	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-16F	10 TON AHU - DRY	ROOF	480	3	12	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	INTEGRATED DISCONNECT
AHU-17	9 TON AHU - BUCKTRIM	ROOF	480	3	36	#8 AWG	#10 AWG	3/4"	HP-PM6	3P45A	INTEGRATED DISCONNECT
AHU-18	11 TON AHU - OFFICE	ROOF	480	3	32	#8 AWG	#10 AWG	3/4"	HP-M2	3P35A	INTEGRATED DISCONNECT
AHU-19	10 TON AHU - OFFICE	ROOF	480	3	30	#10 AWG	#10 AWG	3/4"	HP-M2	3P40A	INTEGRATED DISCONNECT
AHU-20	8 TON AHU - OFFICE	ROOF	480	3	26	#10 AWG	#10 AWG	3/4"	HP-M2	3P35A	INTEGRATED DISCONNECT
EF-1	CO2 PURGE - FLOWER 1	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM1	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-2	CO2 PURGE - FLOWER 2	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM2	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-3	CO2 PURGE - FLOWER 3	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM3	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-4	CO2 PURGE - FLOWER 4	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM1	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-5	CO2 PURGE - FLOWER 5	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM2	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-6	CO2 PURGE - FLOWER 6	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM3	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-7	CO2 PURGE - FLOWER 7	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM4	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-8	CO2 PURGE - FLOWER 8	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM4	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-9	CO2 PURGE - FLOWER 9	ROOF	480	3	2.6	#12 AWG	#12 AWG	3/4"	HP-PM5	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-10	CO2 PURGE - VEG 1	ROOF	480	3	1.4	#12 AWG	#12 AWG	3/4"	HP-PM5	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-11	CO2 PURGE - VEG 2	ROOF	480	3	1.4	#12 AWG	#12 AWG	3/4"	HP-PM5	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
EF-12	MECH ROOM EXHAUST	ROOF	208	1	1.9	#12 AWG	#12 AWG	3/4"	LP-M1	2P15A	PROVIDE 2P15A NEMA 3R DISCONNECT
EF-13	TOILETS EXHAUST	ROOF	208	1	1.9	#12 AWG	#12 AWG	3/4"	LP-P3	2P15A	PROVIDE 2P15A NEMA 3R DISCONNECT
EF-14	OFFICE EXHAUST	ROOF	208	1	1.9	#12 AWG	#12 AWG	3/4"	LP-P3	2P15A	PROVIDE 2P15A NEMA 3R DISCONNECT
EF-15	UNISEX RESTROOM EX.	ROOF	208	1	1.5	#12 AWG	#12 AWG	3/4"	LP-M1	2P15A	PROVIDE 2P15A NEMA 3R DISCONNECT
EF-16a	CEILING VENTILATION	CEILING	208	3	16.7	#12 AWG	#12 AWG	3/4"	LP-M1	3P35A	PROVIDE 3P35A NEMA 3R DISCONNECT
EF-16b	CEILING VENTILATION	CEILING	208	3	16.7	#12 AWG	#12 AWG	3/4"	LP-M1	3P35A	PROVIDE 3P35A NEMA 3R DISCONNECT
EF-17	GRIND ROOM EXHAUST	ROOF	480	3	1.1	#12 AWG	#12 AWG	3/4"	HP-PM6	3P15A	PROVIDE 3P15A NEMA 3R DISCONNECT
ACC-1	NURSERY SPLIT SYSTEM	ROOF	480	3	13	#10 AWG	#10 AWG	3/4"	HP-PM3	3P25A	PROVIDE 3P25A NEMA 3R DISCONNECT
ACC-2	NURSERY SPLIT SYSTEM	ROOF	480	3	13	#10 AWG	#10 AWG	3/4"	HP-PM3	3P25A	PROVIDE 3P25A NEMA 3R DISCONNECT
ACC-3	IT ROOM SPLIT SYSTEM	ROOF	480	3	13	#10 AWG	#10 AWG	3/4"	HP-M2	3P25A	PROVIDE 3P25A NEMA 3R DISCONNECT
ACC-4	IT ROOM SPLIT SYSTEM	ROOF	480	3	13	#10 AWG	#10 AWG	3/4"	HP-M2	3P25A	PROVIDE 3P25A NEMA 3R DISCONNECT
ACC-5	ELEC SPLIT SYSTEM	ROOF	480	3	13	#10 AWG	#10 AWG	3/4"	HP-M2	3P25A	PROVIDE 3P25A NEMA 3R DISCONNECT
ACC-6A	WIC SPLIT SYSTEM	ROOF	480	3	15	#10 AWG	#10 AWG	3/4"	HP-PM4	3P20A	PROVIDE 3P20A NEMA 3R DISCONNECT
ACC-6B	WIC SPLIT SYSTEM	ROOF	480	3	15	#10 AWG	#10 AWG	3/4"	HP-PM4	3P20A	PROVIDE 3P20A NEMA 3R DISCONNECT
ACC-7A	WIF SPLIT SYSTEM	ROOF	480	3	15	#12 AWG	#12 AWG	3/4"	HP-PM4	3P15A	PROVIDE 3P20A NEMA 3R DISCONNECT
ACC-7B	WIF SPLIT SYSTEM	ROOF	480	3	15	#12 AWG	#12 AWG	3/4"	HP-PM4	3P15A	PROVIDE 3P20A NEMA 3R DISCONNECT
FCU-6A	WIC FAN COIL	COLD STORAGE 129A	120	1	15	#12 AWG	#12 AWG	3/4"	LP-M1	1P20A	PROVIDE 1P20A NEMA 3R DISCONNECT
FCU-6B	WIC FAN COIL	COLD STORAGE 129A	120	1	15	#12 AWG	#12 AWG	3/4"	LP-M1	1P20A	PROVIDE 1P20A NEMA 3R DISCONNECT
FCU-7A	WIF FAN COIL	WIF 129B	208	1	15	#12 AWG	#12 AWG	3/4"	LP-M1	2P20A	PROVIDE 2P20A NEMA 3R DISCONNECT
FCU-7C	WIF FAN COIL	WIF 129B	208	1	15	#12 AWG	#12 AWG	3/4"	LP-M1	2P20A	PROVIDE 2P20A NEMA 3R DISCONNECT
-	DEFROST	WIF 129B	208	1	23	#10 AWG	#10 AWG	3/4"	LP-M1	2P30A	PROVIDE 2P30A NEMA 3R DISCONNECT
-	DEFROST	WIF 129B	208	1	23	#10 AWG	#10 AWG	3/4"	LP-M1	2P30A	PROVIDE 2P30A NEMA 3R DISCONNECT

MECHANICAL EQUIPMENT CONNECTION SCHEDULE CONT.											
EQUIP. NO.	EQUIPMENT DESCRIPTION	LOCATION	VOLTAGE	PHASE	AMPS	WIRE SIZE	GND SIZE	CONDUIT SIZE	PANEL	CIRCUIT BREAKER	REMARKS
VAV-1	FACILITIES VAV	FACILITIES SHOP	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	INTEGRATED DISCONNECT
VAV-2	OFFICE 129C VAV	OFFICE 129C	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	INTEGRATED DISCONNECT
VAV-3	OFFICE - 126	OFFICE - 126	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G1	1P15A	INTEGRATED DISCONNECT
VAV-4	CART FILL 125 VAV	CART FILL 125	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G1	1P15A	INTEGRATED DISCONNECT
VAV-5	PRE-ROLL VAV	PRE-ROLL CART FILLING - 124	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G1	1P15A	INTEGRATED DISCONNECT
VAV-6	OFFICE - 108B VAV	OFFICE - 108B	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-7	OFFICE - 108C VAV	OFFICE - 108C	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-8	OFFICE - 108D VAV	OFFICE - 108D	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-9	OFFICE - 108E VAV	OFFICE - 108E	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-10	OFFICE - 108F VAV	OFFICE - 108F	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-11	CONF ROOM VAV	CONF ROOM - 108G	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-12	BREAK ROOM VAV	BREAK ROOM	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
VAV-13	CULT. OFFICE VAV	CULTIVATION OFFICE	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	INTEGRATED DISCONNECT
VAV-14	OPEN OFFICE - 108 VAV	OPEN OFFICE - 108	120	1	-	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	INTEGRATED DISCONNECT
CUH-1	UNIT HEATER	MECH 133	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CUH-2	UNIT HEATER	CORRIDOR C-05	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CUH-3	UNIT HEATER	CORRIDOR C-05	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CUH-4	UNIT HEATER	CORRIDOR C-04	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-G1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CUH-5	UNIT HEATER	VESTIBULE 101	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CUH-6	UNIT HEATER	SPRINKLER 108h	120	1	.58	#12 AWG	#12 AWG	3/4"	LP-G2	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
CA-1A	AIR COMPRESSOR	MECH 133	480	3	10HP	#12 AWG	#12 AWG	3/4"	HP-M1	3P15A	PROVIDE 3P15A NF DISCONNECT
CA-1B	AIR COMPRESSOR	MECH 133	480	3	10HP	#12 AWG	#12 AWG	3/4"	HP-M1	3P15A	PROVIDE 3P15A NF DISCONNECT
PR-1A	RECIRC PUMP	MECH 133	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
PR-1B	RECIRC PUMP	MECH 133	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT
P-1A	HOT WATER PUMP	MECH 133	480	3	2HP	#12 AWG	#12 AWG	3/4"	HP-M1	3P15A	PROVIDE 3P15A NF DISCONNECT
P-1B	HOT WATER PUMP	MECH 133	480	3	2HP	#12 AWG	#12 AWG	3/4"	HP-M1	3P15A	PROVIDE 3P15A NF DISCONNECT
B-1	BOILER	MECH 133	120	1	-	#12 AWG	#12 AWG	3/4"	LP-M1	1P15A	PROVIDE 1P15A TOGGLE DISCONNECT



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Signature & Seal:

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Client: 11580 Walden Ave
LLC

Project: Alden Green House

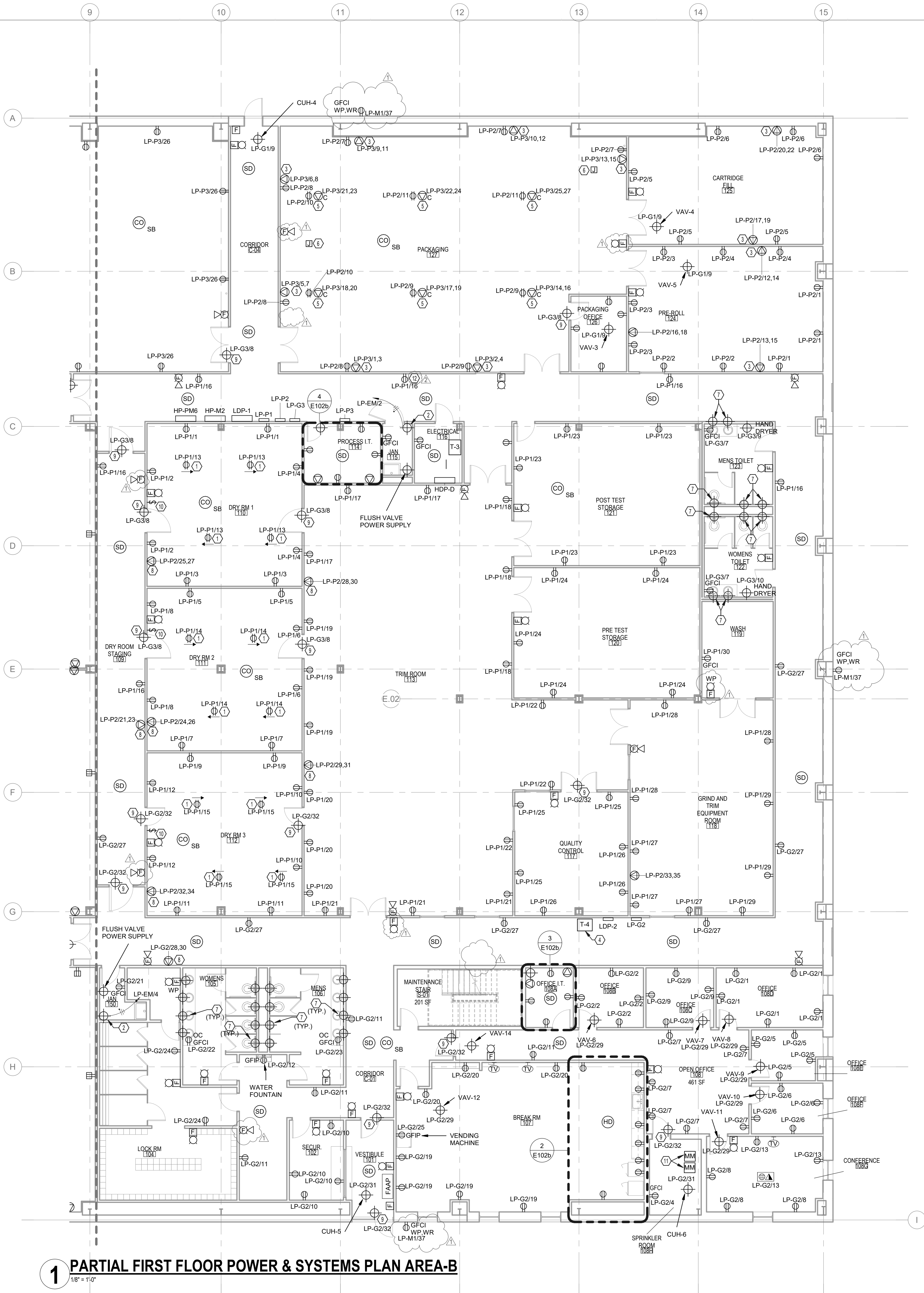
Project Address: 11580 Walden Ave

Drawing History: # Date Description
1 1/14/2026 MEP REVISIONS

Date: 11/26/2025
Project Number: 24003
Sheet Title: MECHANICAL
EQUIPMENT
CONNECTION
SCHEDULE

Sheet Number: E005

E102a



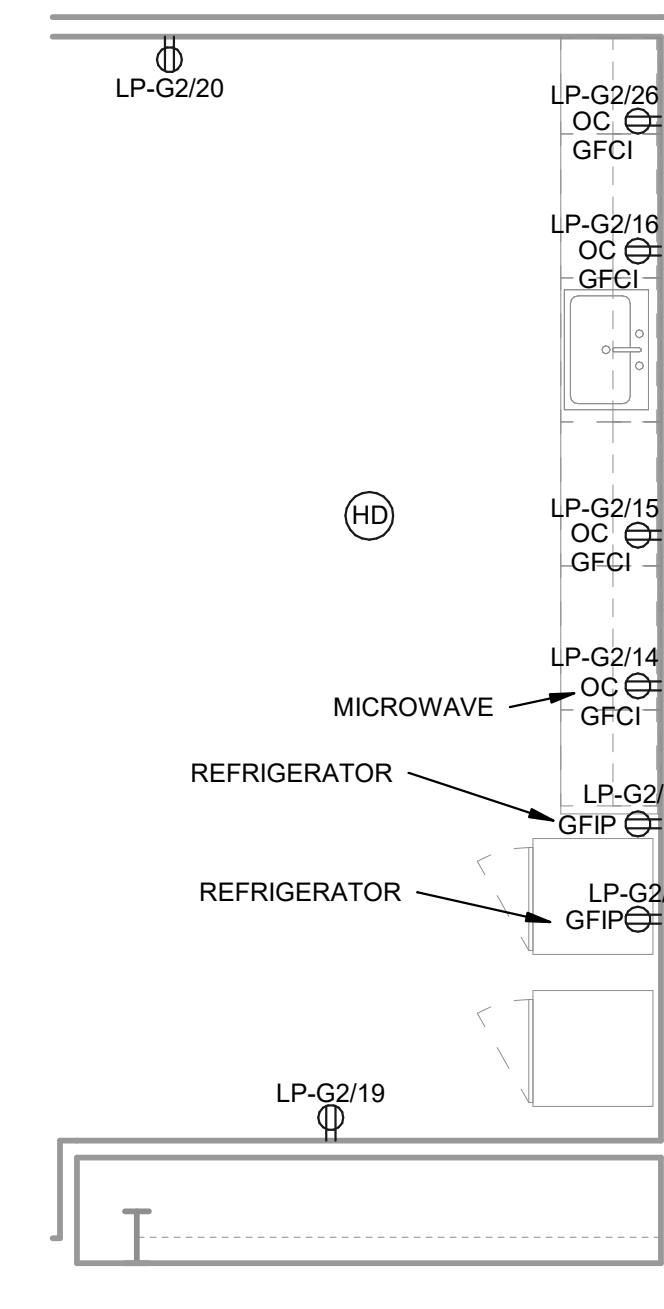
1 PARTIAL FIRST FLOOR POWER & SYSTEMS PLAN AREA-B
1/8" = 1'-0"

ELECTRICAL DRAWING NOTES:

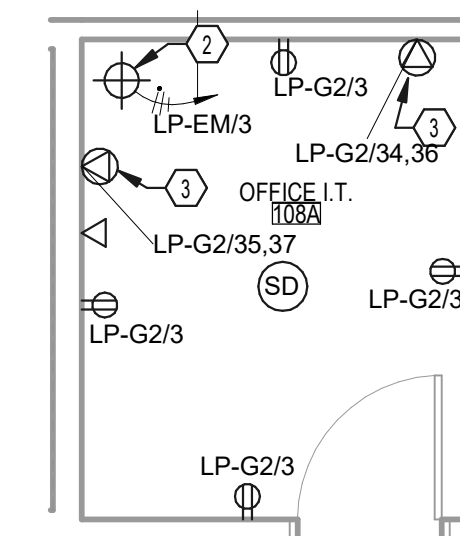
1. CEILING MOUNTED RECEPTACLE FOR HORIZONTAL FANS. MOUNT RECEPTACLE ON UNISTRUT. SUSPEND FAN FROM UNISTRUT. FANS ARE FURNISHED BY OWNER AND INSTALLED BY ELECTRICAL CONTRACTOR. ARROW INDICATES AIRFLOW DIRECTION. COORDINATE EXACT LOCATION WITH OWNER.
2. PROVISION FOR EMERGENCY RESPONDER RADIO REPEATER. SYSTEM LAYOUT BY ELECTRICAL CONTRACTOR. RELOCATE POWER HITS AS REQUIRED. PROVIDE REQUIRED POWER CONNECTION AND COMMUNICATIONS CABLEING.
3. NEMA L6-30R RECEPTACLE. SUSPEND TRANSFORMER FROM BUILDING STRUCTURE. LOCATE ABOVE ACCESSIBLE CEILING.
5. PROVIDE (1) CEILING MOUNTED CORD REEL WITH NEMA L6-30R RECEPTACLE AND (1) CEILING MOUNTED CORD REEL WITH NEMA L5-20R RECEPTACLE. PROVIDE CEILING MOUNTED JUNCTION BOX WITH 1" CONDUIT TO PANEL HOP-D.
7. FLUSH VALVE POWER SUPPLY. PROVIDE 3/4" CONDUIT TO POWER SUPPLY IN NEAREST JANITOR CLOSET.
8. PROVIDE WEATHER RESISTANT NEMA L6-20R RECEPTACLE WITH WEATHER PROOF IN USE COVER FOR PORTABLE PACKAGED ODOR CONTROL UNIT. DOOR POWER SUPPLY. COORDINATE REQUIREMENTS WITH DOOR HARDWARE.
10. CONNECT SWITCH TO HORIZONTAL AIRFLOW FAN CIRCUIT. PROVIDE FIRE ALARM MONITOR MODULES FOR SPRINKLER TAMPER AND FLOW SWITCHES. COORDINATE REQUIREMENTS WITH FIRE PROTECTION INSTALLER.
12. POWER FOR SMARTFOG CONTROLLER. COORDINATE LOCATION WITH SMARTFOG INSTALLER.

GENERAL ELECTRICAL NOTES:

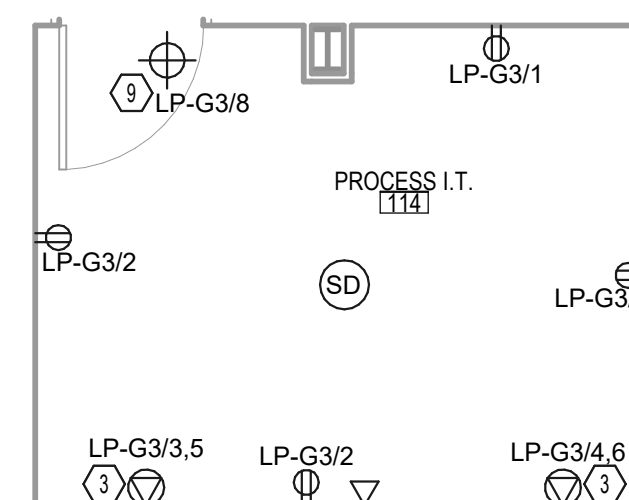
- A. PROVIDE BRANCH CIRCUITING FOR ALL DEVICES SHOWN. BRANCH WIRING IS, IN GENERAL, NOT SHOWN WITH THE FOLLOWING UNDERSTANDING: THE CONTRACTOR SHALL "CIRCUIT UP" ALL DEVICES SHOWN IN THE MOST EFFECTIVE ROUTING, BASED ON CONSTRUCTION CONDITIONS AND/OR RESTRICTIONS.
- B. THE USE OF EXPOSED RACEWAYS IN FINISHED AREAS IS NOT ACCEPTABLE UNLESS ALL OTHER METHODS OF RACEWAY CONCEALMENT HAVE BEEN EXHAUSTED. ALL CONDUIT/WIRE/CABLEING SHALL BE RUN WITHIN THE CEILING AND WALL SPACES.
- C. THE CONTRACTOR SHALL PERFORM ALL WORK TO THE 2017 EDITION OF THE NEC.
- D. THE CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES, AND SHALL REVIEW TRADE DRAWINGS FOR COORDINATION PURPOSES.
- E. UNLESS OTHERWISE NOTED, ALL BRANCH CIRCUIT WIRING SHALL BE #12 AWG MINIMUM.
- F. CIRCUIT NUMBERS ON THIS DRAWING ARE FOR THE SOLE PURPOSE OF CLARIFICATION, AND ARE NOT INTENDED TO INDICATE THE POLE POSITION IN THE PANELBOARD. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL CONNECT ALL DEVICES TO AVAILABLE CIRCUITS IN DESIGNATED PANELBOARDS. THE CONTRACTOR SHALL INDICATE THE CORRECT CIRCUIT DESIGNATIONS ON A TYPED PANELBOARD SCHEDULE AND ON "AS BUILT" DRAWINGS.



2 PARTIAL FIRST FLOOR POWER & SYSTEMS PLAN - KITCHENETTE
1/4" = 1'-0"



3 PARTIAL FIRST FLOOR POWER & SYSTEMS PLAN - OFFICE IT
1/4" = 1'-0"



4 PARTIAL FIRST FLOOR POWER & SYSTEMS PLAN - PROCESS IT
1/4" = 1'-0"

Signature & Seal:

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Client: 11580 Walden Ave
LLC

Project: Alden Green House

Project Address: 11580 Walden Ave

Drawing History:	#	Date	Description
	1	1/9/2026	REVISIONS
	2	1/14/2026	MEP REVISIONS

Date: 11/26/2025
Project Number: 24003
Sheet Title:

**PARTIAL FIRST
FLOOR POWER &
SYSTEMS PLAN
AREA-B**

Sheet Number: **E102b**

Signature & Seal:

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Client: 11580 Walden Ave
LLC

Project: Alden Green House

Project Address: 11580 Walden Ave

Drawing History:	#	Date	Description
	1	1/9/2026	REVISIONS
	2	1/14/2026	MEP REVISIONS

Date: 11/26/2025
Project Number: 24003
Sheet Title: **PARTIAL FIRST FLOOR COMMUNICATIONS & SECURITY PLAN AREA-A**

Sheet Number: **E103a**

GENERAL ELECTRICAL NOTES:

- PROVIDE BRANCH CIRCUITING FOR ALL DEVICES SHOWN. BRANCH WIRING IS, IN GENERAL, NOT SHOWN WITH THE FOLLOWING UNDERSTANDING: THE CONTRACTOR SHALL "CIRCUIT UP" ALL DEVICES SHOWN IN THE MOST EFFECTIVE ROUTING, BASED ON CONSTRUCTION CONDITIONS AND/OR RESTRICTIONS.
- THE USE OF EXPOSED RACEWAYS IN FINISHED AREAS IS NOT ACCEPTABLE UNLESS ALL OTHER METHODS OF RACEWAY CONCEALMENT HAVE BEEN EXHAUSTED. ALL CONDUIT/WIRE/CABLING SHALL BE RUN WITHIN THE CEILING AND WALL SPACES.
- THE CONTRACTOR SHALL PERFORM ALL WORK TO THE 2017 EDITION OF THE NEC.
- THE CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES, AND SHALL REVIEW TRADE DRAWINGS FOR COORDINATION PURPOSES.
- UNLESS OTHERWISE NOTED, ALL BRANCH CIRCUIT WIRING SHALL BE #12 AWG MINIMUM.
- CIRCUIT NUMBERS ON THIS DRAWING ARE FOR THE SOLE PURPOSE OF CLARIFICATION, AND ARE NOT INTENDED TO INDICATE THE POLE POSITION IN THE PANELBOARD. UNLESS OTHERWISE NOTED, THE CONTRACTOR SHALL CONNECT ALL DEVICES TO AVAILABLE CIRCUITS IN DESIGNATED PANELBOARDS. THE CONTRACTOR SHALL INDICATE THE CORRECT CIRCUIT DESIGNATIONS ON A TYPED PANELBOARD SCHEDULE AND ON "AS BUILT" DRAWINGS.

ELECTRICAL DRAWING NOTES:

- PROVISION FOR ACCESS CONTROLS. COORDINATE REQUIREMENTS WITH ACCESS CONTROLS INSTALLER AND DOOR HARDWARE.
- PRIVA ENVIRONMENTAL SENSOR CONNECTION. PROVIDE 1" CONDUIT BACK TO PROCESS I.T. ROOM. COORDINATE REQUIREMENTS WITH PRIVA INSTALLER.
- 4TH x 8TH CABLE TRAY WITH WALL MOUNT BRACKETS. MOUNT TO IMP WALL PANEL ABOVE CORRIDOR CEILING. BASIS OF DESIGN: EATON FLEXTRAY FT4X8 AND FT8X8CS.
- SMART FOG/HUMIDITY SENSOR. PROVIDE 3/4" CONDUIT WITH 18AWG 4CONDUCTOR SHIELDED CABLE BACK TO CORRESPONDING SMART FOG CONTROLLER IN CORRIDOR. COORDINATE WITH MECHANICAL AND PLUMBING. COORDINATE SENSOR LOCATION WITH SMART FOG DRAWINGS.

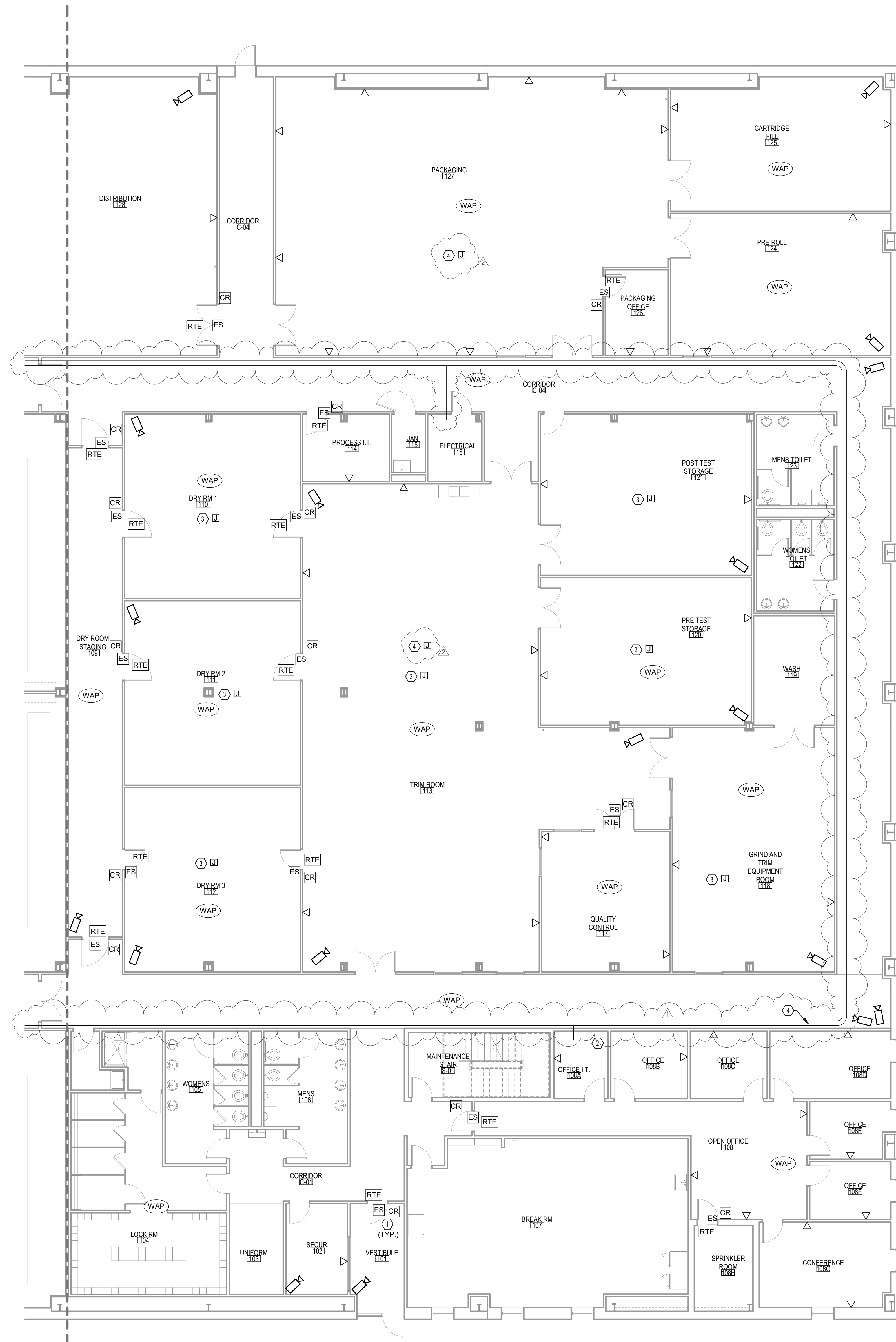


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GENERAL ELECTRICAL NOTES:

- PROVIDE BRANCH CIRCUITING FOR ALL DEVICES SHOWN. BRANCH WIRING IS, IN GENERAL, NOT SHOWN WITH THE FOLLOWING EXCEPTIONS:
- A. THE CONTRACTOR SHALL PROVIDE BRANCH CIRCUITING FOR ALL DEVICES SHOWN IN THE MOST EFFECTIVE RESTORING, BASED ON CONSTRUCTION CONDITIONS AND OTHER RESTRICTIONS.
- B. THE CONTRACTOR SHALL EXPOSE RACEWAYS IN FINISHED AREAS IS NOT ACCEPTABLE UNLESS ALL OTHER METHODS OF RACEWAY CONCEALMENT HAVE BEEN EXHAUSTED. ALL CONDUIT/WIRE/CABLING SHALL BE INSTALLED WITHIN THE RACEWAY.
- C. THE CONTRACTOR SHALL PERFORM ALL WORK TO THE 2017 EDITION OF THE NEC.
- D. THE CONTRACTOR SHALL COORDINATE ALL WORK BETWEEN TRADES, AND SHALL REVIEW TRADE DRAWINGS FOR COORDINATION PURPOSES.
- E. UNLESS OTHERWISE NOTED, ALL BRANCH CIRCUIT WIRING SHALL BE #12 AWG MINIMUM.
- F. CIRCUIT NUMBERS ON THIS DRAWING ARE FOR THE SOLE PURPOSE OF CLARIFICATION, AND ARE NOT INTENDED TO INDICATE THE POLE POSITION OF THE PANELS. THE CONTRACTOR SHALL VERIFY THE LOCATION. THE CONTRACTOR SHALL CONNECT ALL DEVICES TO AVAILABLE CIRCUITS IN DESIGNATED PANELBOARDS. THE CONTRACTOR SHALL INDICATE THE LOCATION OF CIRCUITS ON THE DRAWING, BASED ON A TYPICAL PANELBOARD SCHEDULE AND ON AS'BUILT DRAWINGS.

ELECTRICAL DRAWING NOTES :

1. PROVISION FOR ACCESS CONTROLS. COORDINATE REQUIREMENTS WITH ACCESS CONTROLS INSTALLER AND DOOR HARDWARE.
2. PROVIDE (4) 48-PORT PATCH PANELS IN OWNER SUPPLIED SERVER RACK.
3. PROVIDE (1) 12-PORT PATCH PANEL IN OWNER SUPPLIED SERVER RACK.
4. PROVIDE (1) 12-PORT PATCH PANEL IN OWNER SUPPLIED SERVER RACK. BACK TO PROCESS IT1 ROOM. COORDINATE REQUIREMENTS WITH PRIVA.
5. 4TH & 8TH CABLE TRAY WITH WALL MOUNT BRACKETS. MOUNT TO IMP WALL PANEL ABOVE CORRIDOR CEILING, BASIS OF DESIGN: EATON FLEXTRAY FT48X8 AND FT808X8.
6. SMART FOG HUMIDITY SENSOR. PROVIDE 3/4" CONDUIT WITH 18AWG 4-CONDUCTOR SHIELDED CABLE BACK TO CORRESPONDING SMART FOG CONTROLLER IN CORRIDOR. COORDINATE WITH MECHANICAL AND PLUMBING. COORDINATE SENSOR LOCATION WITH SMART FOG DRAWINGS.

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Client: 11580 Walden Ave
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Project: Alden Green House

Project Address: 11580 Walden Ave

Drawing History:	#	Date	Description
	1	1/9/2026	REVISIONS
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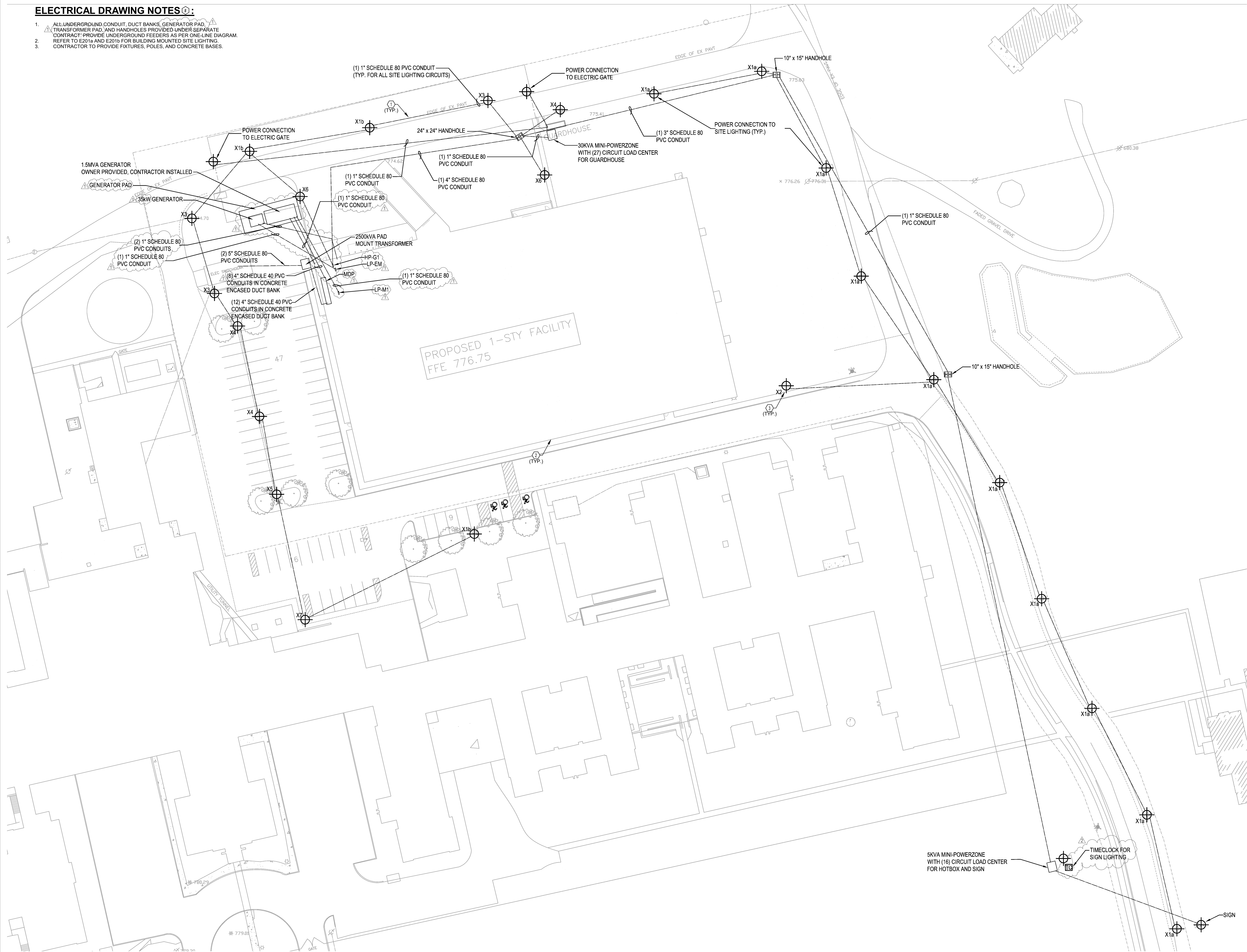
1 PARTIAL FIRST FLOOR PLAN COMMUNICATIONS & SECURITY PLAN AREA-B
1/8" = 1'-0"

Date: 11/26/2025
Project Number: 24003
Sheet Title: **PARTIAL FIRST
FLOOR
COMMUNICATIONS
& SECURITY PLAN
AREA-B**

Sheet Number: **E103b**

ELECTRICAL DRAWING NOTES:

1. ALL UNDERGROUND CONDUIT, DUCT BANKS, GENERATOR PAD, TRANSFORMER PAD, AND HANDHOLES PROVIDED UNDER SEPARATE CONTRACT. PROVIDE UNDERGROUND FEEDERS AS PER ONE-LINE DIAGRAM.
2. REFER TO E201a AND E201b FOR BUILDING MOUNTED SITE LIGHTING.
3. CONTRACTOR TO PROVIDE FIXTURES, POLES, AND CONCRETE BASES.



1 ELECTRICAL SITE LIGHTING PLAN
1\"/>

Signature & Seal:

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Project: Alden Green House

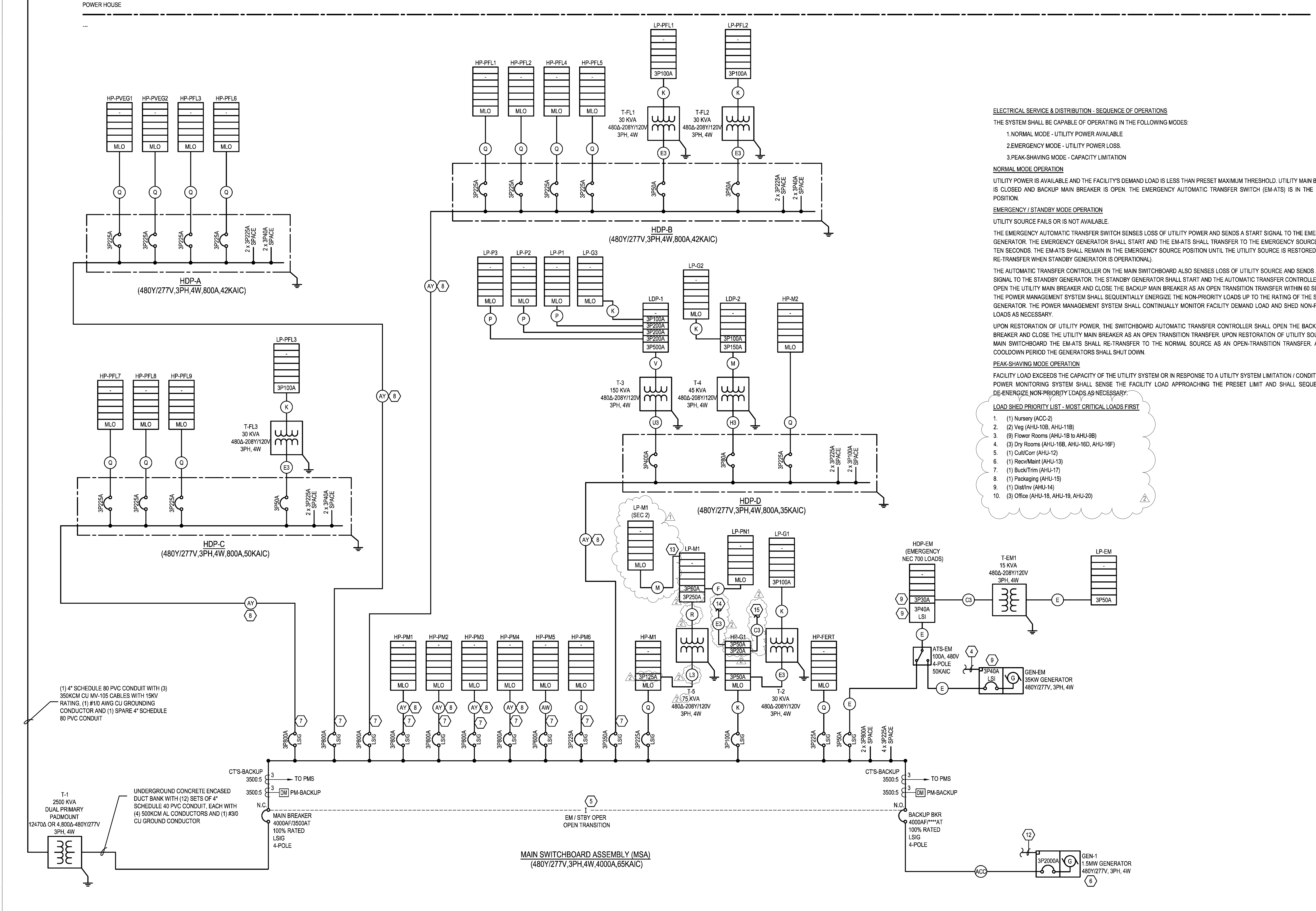
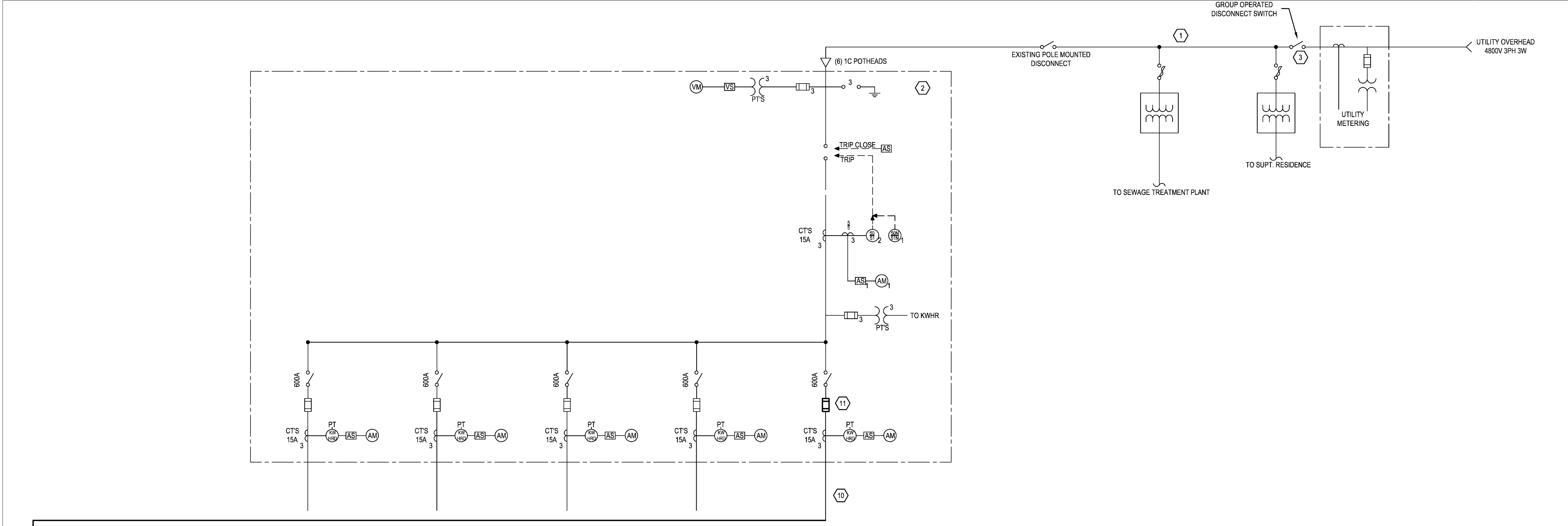
Project Address: 11580 Walden Ave

Drawing History:

#	Date	Description
1	1/9/2026	REVISIONS
2	1/14/2026	MEP REVISIONS

Date: 10/10/2025
Project Number: 24003
Sheet Title: **ELECTRICAL SITE LIGHTING PLAN**

Sheet Number: **E304**

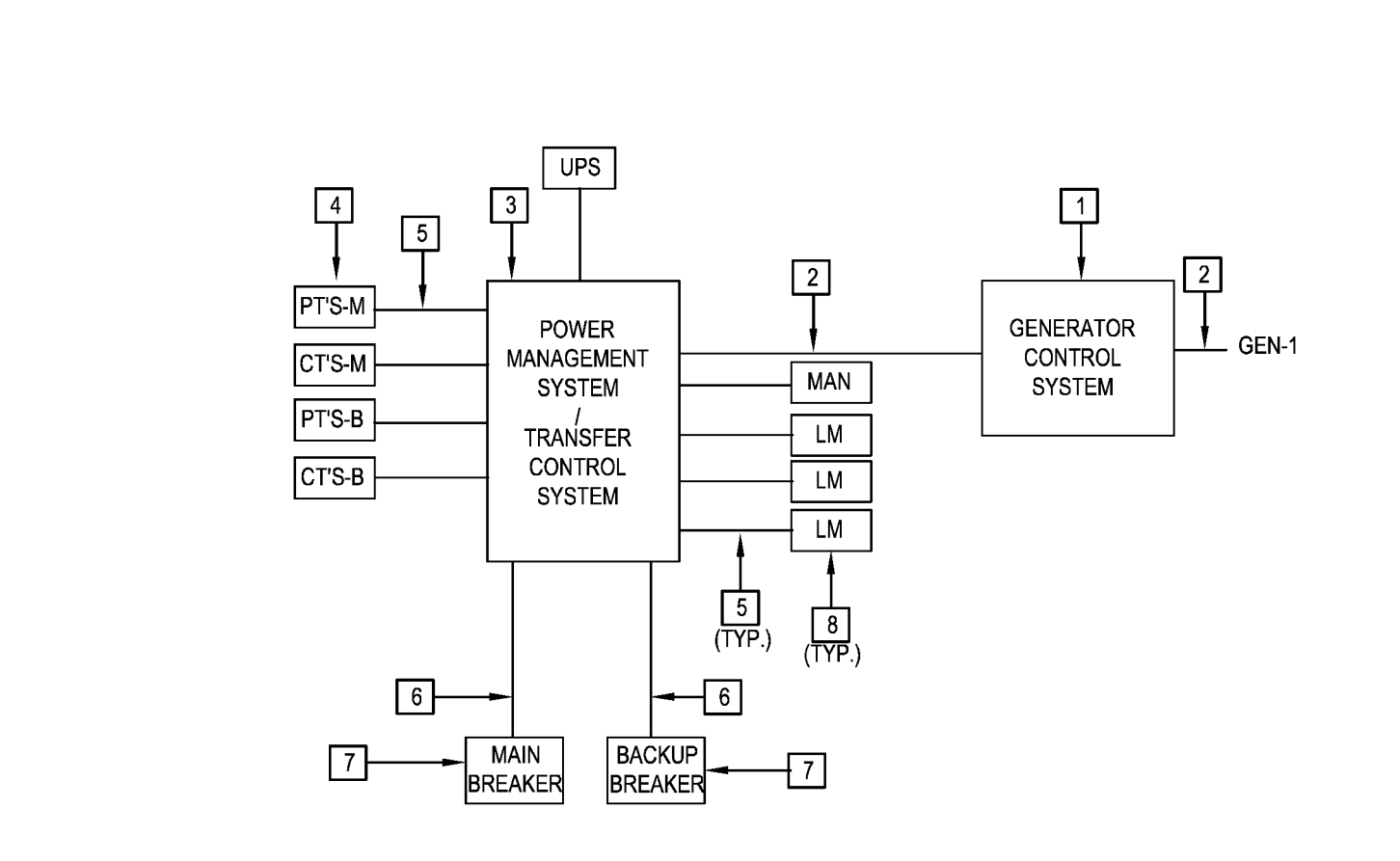


FEEDER SCHEDULE											
COPPER CONDUCTORS						ALUMINUM CONDUCTORS					
DESIGNATION	PHASE	NEUTRAL	EQUIP. GND	CONDUIT		DESIGNATION	PHASE	NEUTRAL	EQUIP. GND	CONDUIT	
CONDUCTOR SIZE AWG/KCMIL	QUANTITY	QUANTITY	QUANTITY	QUANTITY		CONDUCTOR SIZE AWG/KCMIL	QUANTITY	QUANTITY	QUANTITY	QUANTITY	
SIZE AWG/KCMIL	QUANTITY	QUANTITY	QUANTITY	QUANTITY		SIZE AWG/KCMIL	QUANTITY	QUANTITY	QUANTITY	QUANTITY	
A 15 12 3 12 1 1 1/4 1	-	-	-	-	-	AK 100 10 3 10 1 6 1 1 1/4 1	-	-	-	-	-
B 20 12 3 12 1 1 1/4 1	-	-	-	-	-	AL 125 20 3 20 1 4 1 2 1	-	-	-	-	-
C 30 10 3 10 1 1 1/4 1	-	-	-	-	-	AM 150 30 3 30 1 4 1 2 1	-	-	-	-	-
D 40 8 3 8 1 1 1/4 1	-	-	-	-	-	AN 175 40 3 40 1 4 1 2 1/2 1	-	-	-	-	-
E 50 6 3 6 1 1 1/4 1	-	-	-	-	-	AP 200 250 3 250 1 4 1 2 1/2 1	-	-	-	-	-
F 60 4 3 4 1 1 1/4 1	-	-	-	-	-	AQ 225 300 3 300 1 2 1 3 1	-	-	-	-	-
G 70 4 3 4 1 8 1 1 1/4 1	-	-	-	-	-	AR 250 350 3 350 1 2 1 3 1	-	-	-	-	-
H 80 3 3 3 1 8 1 1 1/4 1	-	-	-	-	-	AS 300 500 3 500 1 2 1 4 1	-	-	-	-	-
J 90 2 3 2 1 8 1 1 1/4 1	-	-	-	-	-	AT 350 400 6 400 2 1 2 2 1/2 2	-	-	-	-	-
K 100 1 3 1 1 8 1 1 1/4 1	-	-	-	-	-	AU 400 250 6 250 2 1 2 2 1/2 2	-	-	-	-	-
L 125 1 3 1 1 6 1 1 1/4 1	-	-	-	-	-	AV 500 350 6 350 2 1 10 2 3 2	-	-	-	-	-
M 150 10 3 10 1 6 1 1 1/4 1	-	-	-	-	-	AW 600 500 6 500 2 2 10 2 4 2	-	-	-	-	-
N 175 20 3 20 1 6 1 2 1	-	-	-	-	-	AX 700 350 9 350 3 3 30 3 3 3	-	-	-	-	-
P 200 30 3 30 1 6 1 2 1	-	-	-	-	-	AY 800 400 9 400 3 3 30 3 3 3	-	-	-	-	-
Q 225 40 3 40 1 4 1 2 1/2 1	-	-	-	-	-	AZ 1000 350 12 350 4 4 40 4 3 4	-	-	-	-	-
R 250 250 3 250 1 4 1 2 1/2 1	-	-	-	-	-	AAA 1200 500 12 500 4 250 4 4 4	-	-	-	-	-
S 300 350 3 350 1 4 1 3 1	-	-	-	-	-	ABB 1600 400 18 400 6 350 6 4 6	-	-	-	-	-
T 350 500 3 500 1 3 1 4 1	-	-	-	-	-	ACC 2000 500 21 500 7 400 7 4 7	-	-	-	-	-
U 400 300 6 300 2 2 2 2 1/2 2	-	-	-	-	-	ADD 2500 500 27 500 9 400 9 4 9	-	-	-	-	-
V 500 250 6 250 2 2 2 3 2	-	-	-	-	-	AEE 3000 600 27 600 9 400 9 4 9	-	-	-	-	-
W 600 350 6 350 2 1 2 3 2	-	-	-	-	-						
X 700 500 6 500 2 10 2 4 2	-	-	-	-	-						
Y 800 300 9 300 3 10 3 3 3	-	-	-	-	-						
Z 1000 400 9 400 3 20 3 3 3	-	-	-	-	-						
AA 1200 350 12 350 4 30 4 3 4	-	-	-	-	-						
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AC 2000 400 18 400 6 250 6 3 6	-	-	-	-	-						
AD 2500 400 24 400 8 300 8 3 8	-	-	-	-	-						
AE 3000 500 24 500 8 400 8 3 8	-	-	-	-	-						
ALTERNATE CONFIGURATION						ALTERNATE CONFIGURATION					
U 400 600 3 600 1 2 1 4 1	-	-	-	-	-	AT 350 600 3 600 1 1 1 4 1	-	-	-	-	-
Y 800 600 6 800 2 10 2 4 2	-	-	-	-	-	AY 800 750 6 750 2 30 2 4 2	-	-	-	-	-
AA 1200 600 9 600 3 30 3 4 3	-	-	-	-	-	AZ 1000 600 9 600 3 40 3 4 3	-	-	-	-	-
BB 1600 600 12 600 4 40 4 4 4	-	-	-	-	-	ABB 1600 600 15 600 5 350 5 4 5	-	-	-	-	-
CC 2000 600 15 600 5 250 5 4 5	-	-	-	-	-	ACC 2000 600 18 600 6 400 6 4 6	-	-	-	-	-

NOTES:
1. ALL CONDUIT FILL CAPACITIES ARE BASED ON THIN INSULATION.
2. ALL CONDUIT FILL CAPACITIES ARE BASED ON EMT CONDUIT. IF ALTERNATE CONDUIT IS USED, CONTRACTOR SHALL ADJUST CONDUIT SIZE ACCORDING TO NEC.
3. ALL 23 KV CABLES MUST BE INSTALLED IN RGS CONDUIT WITH APPROPRIATE WARNING LABELS.

- GENERAL NOTES:**
- LSISIG INDICATES CIRCUIT BREAKER WITH ADJUSTABLE ELECTRONIC TRIP UNIT.
 - ALL NORMAL BRANCH SWITCHBOARDS AND DISTRIBUTION PANELBOARDS (400A+) SHALL BE FULLY RATED.
 - ALL NORMAL BRANCH PANELBOARDS SHALL BE SERIES RATED.
 - ALL EMERGENCY AND STANDBY PANELBOARDS SHALL BE FULLY RATED.
 - SUBPANELS TO MATCH IC RATINGS OF UPSTREAM PANELBOARDS.

- ELECTRICAL DRAWING NOTES (A) :**
- EXISTING SERVICE CONDUCTORS, SWITCHGEAR, AND EQUIPMENT TO REMAIN.
 - EXISTING MEDIUM VOLTAGE SWITCHGEAR TO REMAIN.
 - GROUP OPERATED DISCONNECT REPLACED IN A SEPARATE CONTRACT.
 - (1) 1" CONDUIT TO LP-EM FOR GENERATOR ACCESSORY CIRCUITS AND (1) 1" CONDUIT TO ATS-EM FOR GENERATOR CONTROLS. PROVIDE CONTROL WIRING AND BRANCH CIRCUIT WIRING FOR ENCLOSURE HEATER, BATTERY HEATER, COOLANT HEATER, BATTERY CHARGER, AND RECEPTACLE. COORDINATE WITH GENERATOR REQUIREMENTS. UNDERGROUND CONDUITS PROVIDED UNDER SEPARATE CONTRACT.
 - INTEGRATED AUTOMATIC TRANSFER CONTROLLER BY SWITCHBOARD MANUFACTURER.
 - 1.5MW GENERATOR IS OWNER SUPPLIED AND CONTRACTOR INSTALLED.
 - (2) 4" UNDERSLAB CONDUITS PROVIDED AND INSTALLED UNDER A SEPARATE CONTRACT. PROVIDE AND INSTALL FEEDERS.
 - USE ALTERNATE AY FEEDER CONFIGURATION.
 - EMERGENCY BRANCH CIRCUIT OVERCURRENT PROTECTION DEVICES TO BE SELECTIVELY COORDINATED PER MANUFACTURER'S TABLES.
 - UTILIZE EXISTING SWITCH FOR NEW FEEDER. RE-FEED EXISTING LOAD FROM ANOTHER AVAILABLE SWITCH. EXTENDREWORK CONDUCTORS AS REQUIRED.
 - PROVIDE NEW SIZE SLOW SPEED FUSERS IN EXISTING SWITCH.
 - (1) 1" CONDUIT TO LP-M1 FOR GENERATOR ACCESSORY CIRCUITS AND (1) 1" CONDUIT TO ELEC ROOM FOR GENERATOR CONTROLS. PROVIDE CONTROL WIRING AND BRANCH CIRCUIT WIRING FOR ENCLOSURE HEATER, BATTERY HEATER, COOLANT HEATER, BATTERY CHARGER, AND RECEPTACLE. COORDINATE WITH GENERATOR REQUIREMENTS. UNDERGROUND CONDUITS PROVIDED UNDER A SEPARATE CONTRACT.
 - PROVIDE FEED-THRU LUGS.
 - TO GUARD HOUSE MINI-POWERZONE.
 - TO HOTBOX MINI-POWERZONE.



- NOTES: (A)**
- GENERATOR CONTROL SYSTEM TO BE PROVIDED BY GENERATOR MANUFACTURER.
 - START/STOP SIGNAL. WIRING PER MANUFACTURER'S RECOMMENDATIONS.
 - POWER / LOAD MANAGEMENT AND BREAKER CONTROL SYSTEM FOR PROGRAMMED LOAD TRANSFER. TO BE PROVIDED BY SWITCHGEAR MANUFACTURER. THE SYSTEM SHALL BE UTILITY GRADE RELAY SYSTEM ACCEPTABLE TO NYSEG FOR OPEN TRANSITION. THE SYSTEM SHALL BE CAPABLE OF PROVIDING ALL FUNCTIONS ACCORDING TO SEQUENCE OF OPERATION FOR MULTIPLE MODES OF OPERATION. THE SYSTEM SHALL BE CAPABLE OF VOLTAGE AND LOAD MONITORING FOR OPEN TRANSITION TRANSFER, AND CONTROLLING THE MAIN AND BACKUP POWER BREAKERS.
 - RELAYING CLASS INSTRUMENT TRANSFORMERS. PROVIDE POTENTIAL TRANSFORMERS IF REQUIRED BY THE SYSTEM FOR ACCEPTABLE VOLTAGE.
 - WIRING PER MANUFACTURER'S RECOMMENDATIONS.
 - BREAKER STATUS, OPEN, CLOSE, CIRCUITS, WIRING PER MANUFACTURER'S RECOMMENDATIONS.
 - POWER BREAKER ELECTRICALLY OPERATED.
 - ADDRESSABLE LOAD SHED MODULES. QUANTITY AS INDICATED ON DRAWINGS.

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Project: Alden Green House

Project Address: 11580 Walden Ave

Drawing History:

#	Date	Description
1	1/9/2026	REVISIONS
2	1/14/2026	MEP REVISIONS

Date: 10/29/2025
Project Number: 24003
Sheet Title: ONE-LINE DIAGRAM

Sheet Number: E501

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AIR HANDLING UNIT SCHEDULE

UNIT NO.	AREA SERVED	SUPPLY AIRFLOW	OUTSIDE AIR AIRFLOW	ELECTRICAL				SUPPLY FAN		COOLING SECTION				HEATING SECTION				FILTER	WEIGHT	MAKE / MODEL	NOTES				
				VOLTAGE / PHASE / HZ	MCA	MOP	HP	TOTAL S.P. ("W.C.)	EXTERNAL S.P. ("W.C.)	TOTAL BTU/H	SENSIBLE BTU/H	MOISTURE REMOVAL RATE (LBS/Hr)	EAT (DBWB)	LAT DEWPOINT	REFRIGERANT	EER	TYPE					KW	CAPACITY BTU/H	EAT	LAT
AHU-1A & 1B AHU-2A & 2B	FLOWER 1	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
	FLOWER 2	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-3A & 3B	FLOWER 3	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-4A & 4B	FLOWER 4	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-5A & 5B	FLOWER 5	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-6A & 6B	FLOWER 6	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-7A & 7B	FLOWER 7	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-8A & 8B	FLOWER 8	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-9A & 9B	FLOWER 9	12250 CFM	0 CFM	460 / 3 / 60	157.2 A	175 A	5 HP	2.71" W.C.	1.5" W.C.	504.9 MBH	338.8 MBH	163 LBS / HR	78°F / 66°F	52.6°F	R-454B	10.09	ELECTRIC	90	307 MBH	78°F	88°F	MERV 8 & MERV 14	5170 LBS	AAON / RN 031	1,2,3,4
AHU-10A & 10B	VEG 1	4800 CFM	0 CFM	460 / 3 / 60	55 A	60 A	5 HP	3.01" W.C.	1.75" W.C.	128.9 MBH	62.9 MBH	66.3 LBS / HR	88°F / 80.0°F	74.7°F	R-454B	13.33	ELECTRIC	20	68.2 MBH	88°F	100°F	MERV 8 & MERV 14	1581 LBS	AAON / RN 009	1,2,3,4
AHU-11A & 11B	VEG 2	4800 CFM	0 CFM	460 / 3 / 60	55 A	60 A	5 HP	3.01" W.C.	1.75" W.C.	128.9 MBH	62.9 MBH	66.3 LBS / HR	88°F / 80.0°F	74.7°F	R-454B	13.33	ELECTRIC	20	68.2 MBH	88°F	100°F	MERV 8 & MERV 14	1581 LBS	AAON / RN 009	1,2,3,4
AHU-12	CULTIVATION / CORRIDOR	2400 CFM	480 CFM	460 / 3 / 60	26 A	35 A	5 HP	2.62" W.C.	1.25" W.C.	80.4 MBH	64.1 MBH	--	77°F / 63.5°F	53°F	R-454B	12.15	GAS	--	121.5 MBH	49°F	96°F	MERV 8 & MERV 14	1350 LBS	AAON / RNA007	1,2,3
AHU-13	RECEIVING / CULTIVATION STORAGE / MAINTENANCE	3500 CFM	300 CFM	460 / 3 / 60	48 A	60 A	5 HP	3.18" W.C.	1.35" W.C.	161.3 MBH	136.3 MBH	--	77°F / 63.5°F	53°F	R-454B	10.9	GAS	--	236.9 MBH	47°F	90°F	MERV 8 & MERV 14	2123 LBS	AAON / RNA015	1,2,3
AHU-14	DISTRIBUTION / INVENTORY	2400 CFM	400 CFM	460 / 3 / 60	26 A	35 A	5 HP	2.62" W.C.	1.25" W.C.	80.4 MBH	64.1 MBH	--	77°F / 63.5°F	53°F	R-454B	12.15	GAS	--	121.5 MBH	49°F	96°F	MERV 8 & MERV 14	1350 LBS	AAON / RNA007	1,2,3
AHU-15	PACKAGING	4800 CFM	600 CFM	460 / 3 / 60	44 A	50 A	5 HP	3.22" W.C.	1.25" W.C.	164.8 MBH	128.8 MBH	--	77°F / 63.5°F	53°F	R-454B	11.86	GAS	--	236.9 MBH	47°F	93°F	MERV 8 & MERV 14	2302 LBS	AAON / RNA 013	1,2,3
AHU-16A / 16B / 16C / 16D / 16E / 16F	DRY ROOMS	1200 CFM	0 CFM	460 / 3 / 60	12 A	15 A	1 HP	2.13" W.C.	1.2" W.C.	36.2 MBH	25.6 MBH	10.1 LBSHR	70°F / 50.4°F	52.3°F	R-454B	11.75	HOT GAS REHEAT	--	25.5 MBH	--	70°F	MERV 8 & MERV 14	1227 LBS	AAON / RN 010	1,2,3,4
AHU-17	BUCKING / TRIM / QUALITY CONTROL	4000 CFM	1400 CFM	460 / 3 / 60	36 A	45 A	7.5 HP	2.74" W.C.	1.25" W.C.	110 MBH	90 MBH	--	68°F / 58°F	53°F	R-454B	13.33	GAS	--	158 MBH	47°F	83°F	MERV 8 & MERV 14	1950 LBS	AAON / RNA009	1,2,3,4
AHU-18	OFFICE	4000 CFM	800 CFM	460 / 3 / 60	32 A	35 A	5 HP	2.75" W.C.	1.35" W.C.	128.1 MBH	103.7 MBH	--	76.9°F / 63°F	53°F	R-454B	14.01	GAS	--	236.9 MBH	47°F	100°F	MERV 8 & MERV 14	2038 LBS	AAON / RNA011	1,2,3
AHU-19	PRE-POST TEST STORAGE / CORRIDOR	3500 CFM	700 CFM	460 / 3 / 60	30 A	40 A	3 HP	3.37" W.C.	1.25" W.C.	120 MBH	97 MBH	--	78°F / 63°F	54°F	R-454B	11.86	GAS	--	122 MBH	47°F	80°F	MERV 8 & MERV 14	1484 LBS	AAON / RNA010	1,2,3
AHU-20	GRIND AND TRIM EQUIPMENT ROOM	1170 CFM	1170 CFM	460 / 3 / 60	26 A	35 A	2HP	1.41" W.C.	5" W.C.	95 MBH	46 MBH	--	90°F / 78°F	54°F	R-454B	12.44	GAS	--	122 MBH	2°F	95°F	MERV 8 & MERV 14	1384 LBS	AAON / RNA008	1,2,3,4

- NOTES:
- AHU FURNISHED BY OWNER, INSTALLED BY MC
 - AHU CURB FURNISHED BY OWNER, INSTALLED BY MC
 - AHU AND DOUBLE WALL INSULATED PLENUM CURB PROVIDED AND INSTALLED BY MC
 - AHU TO THE INTO PRIVIA CONTROL SYSTEM. COORDINATE WITH PRIVIA DESIGN DOCUMENTS.

EXHAUST FAN SCHEDULE

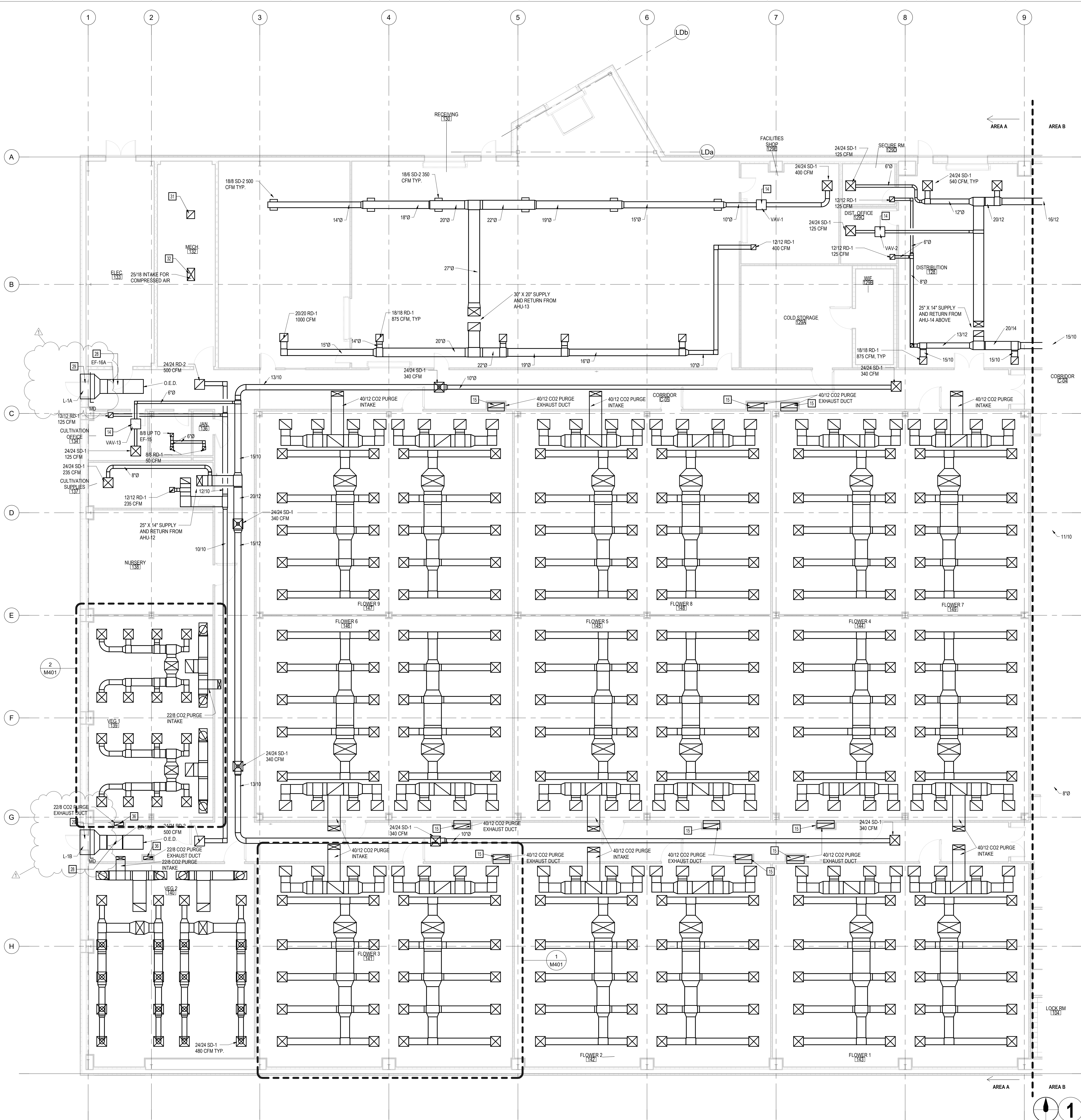
UNIT NO.	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6	EF-7	EF-8	EF-9	EF-10	EF-11	EF-12	EF-13	EF-14	EF-15	EF-16A, 16B	EF-17
SERVICE	FLOWER 1	FLOWER 2	FLOWER 3	FLOWER 4	FLOWER 5	FLOWER 6	FLOWER 7	FLOWER 8	FLOWER 9	VEG 1	VEG 2	MECH ROOM	TOILETS / JAN	OFFICE	UNISEX RESTROOM	CEILING VENTILATION	GRIND ROOM EXHAUST
SYSTEM	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	CO2 PURGE	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST
FAN	CFM	2400	2400	2400	2400	2400	2400	2400	2400	900	900	200	400	600	100 CFM	9000 CFM	1170 CFM
S.P. (IN. W.C.)	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	1.25" W.C.	5" W.C.	5" W.C.	5" W.C.	25" W.C.	1.25" W.C.	1.25" W.C.
DRIVE	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	BELT	DIRECT	DIRECT	DIRECT	DIRECT	BELT	BELT
SONES	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	11.4	11.4	7.4	7.4	7.8	1.7	18.1	12.9
MOTOR	HP	1 HP	1 HP	1 HP	1 HP	1 HP	1 HP	1 HP	1 HP	12 HP	12 HP	1/6 HP	1/6 HP	1/6 HP	1/6 HP	5 HP	1/2 HP
ELEC (VOLTS / PH / HZ)	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	208 / 1 / 60	208 / 1 / 60	208 / 1 / 60	208 / 1 / 60	208 / 60 / 3	460 / 3 / 60
MCA	2.6 A	2.6 A	2.6 A	2.6 A	2.6 A	2.6 A	2.6 A	2.6 A	2.6 A	14 A	14 A	1.9 A	1.9 A	1.9 A	1.5 A	16.7 A	1.1 A
MOP	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	15 A	35 A	15 A
CURB	TYPE	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	STANDARD	--	STANDARD
MATERIAL	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	ALUMINUM	--	ALUMINUM
HEIGHT	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	14"	--	14"
ROOF OPENING	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	--	YES
ACCESSORIES	DISCONNECT	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
BIRDSCREEN	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	--	YES
BACK DRAFT DAMPER	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
MOTOR OF DAMPER	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	--	YES
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK
MODEL	GB-180	GB-180	GB-180	GB-180	GB-180	GB-180	GB-180	GB-180	GB-180	GB-180 HP	GB-180 HP	G-080-VG	G-080-VG	G-090-VG	G-060-VG	BSQ - 240	GB-160 HP
REMARKS	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	1,4	5	2	2	2	3	4

1. CO2 PURGE EXHAUST FAN, PROVIDE WALL MOUNTED SWITCH FOR UNIT OVERRIDE. CONNECT TO AIRGAS CONTROL SYSTEM.
2. GENERAL EXHAUST FAN, UNIT TO RUN WHEN BUILDING IS OCCUPIED.
3. CEILING VENTILATION EXHAUST FAN, PROVIDE TEMPERATURE SENSOR FOR UNIT CONTROL.
4. EXHAUST FAN HAS ASSOCIATED FILTER BOX. REFER TO FILTER SCHEDULE FOR MORE INFORMATION.
5. MECHANICAL ROOM EXHAUST FAN, UNIT TO BE CONTROLLED OFF SPACE TEMPERATURE SENSOR. UNIT TO TURN ON WHEN SPACE GETS ABOVE 85 DEGREES.

SPLIT SYSTEM SCHEDULE

INDOOR UNIT	INDOOR UNIT NO.		FCU-1	FCU-2	FCU-3	FCU-4	FCU-5	FCU-6A, 6B	FCU-7A, 7B
	SERVICE		NURSERY	NURSERY	IT ROOM	IT ROOM	ELECTRICAL	WIC	WIF
	SUPPLY AIRFLOW		600 CFM	600 CFM	600 CFM	600 CFM	600 CFM	4080 CFM	4112 CFM
	SETPOINT TEMPERATURE		--	--	--	--	--	35°F	-10°F
	NOMINAL COOLING CAPACITY		BTUH	18,000 BTUH	18,000 BTUH	18,000 BTUH	18,000 BTUH	36,000 BTUH	26,000 BTUH
	NOMINAL HEATING CAPACITY		BTUH	--	--	--	--	--	--
	ELECTRICAL		W	30	30	30	30	330	330
	SOUND PRESSURE LEVELS			48 DBA	48 DBA	48 DBA	48 DBA	48 DBA	48 DBA
	DRAIN PIPE			1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"	1-1/4"
	DIMENSIONS			37-1/3" X 9" X 11-1/2"	37-1/3" X 9" X 11-1/2"	37-1/3" X 9" X 11-1/2"	37-1/3" X 9" X 11-1/2"	37-1/3" X 9" X 11-1/2"	37-1/3" X 9" X 11-1/2"
ELECTRICAL	WEIGHT		25 LBS	25 LBS	25 LBS	25 LBS	25 LBS	163 LBS	134 LBS
	MCA		13 A	13 A	13 A	13 A	13 A	15 A	15 A
	MOP		25 A	25 A	25 A	25 A	25 A	20 A	20 A
	VOLTAGE		460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	460 / 3 / 60	115 / 1 / 60	208 / 1 / 60
	OUTDOOR UNIT NO.		ACC-1	ACC-2	ACC-3	ACC-4	ACC-5	ACC-6A, 6B	ACC-7A, 7B
OUTDOOR UNIT	SERVICE		FCU-1	FCU-2	FCU-3	FCU-4	FCU-5	FCU-6A, 6B	FCU-7A, 7B
	DIMENSIONS		37" X 12" X 21"	37" X 12" X 21"	37" X 12" X 21"	37" X 12" X 21"	37" X 12" X 21"	200 LBS	183 LBS
	WEIGHT		104 LBS	104 LBS	104 LBS	104 LBS	104 LBS	200 LBS	183 LBS
	SOUND PRESSURE LEVELS		52 DBA	52 DBA	52 DBA	52 DBA	52 DBA	52 DBA	52 DBA
	REFRIGERANT PIPING DIMENSIONS		LIQUID (HIGH PRESSURE)	1/4"	1/4"	1/4"	1/4"	1/2"	1-1/8"
UNIT CONNECTIONS			SUCTION	1/2"	1/2"	1/2"	1/2"	1-1/8"	1-3/8"
	MAX PIPE LENGTH		98'	98'	98'	98'	98'		
	REFRIGERANT		A2L	A2L	A2L	A2L	A2L	A2L - R-454A	A2L - R-454A
MANUFACTURER		HITACHI	HITACHI	HITACHI	HITACHI	HITACHI	BOHN	BOHN	
MODEL (INDOOR / OUTDOOR)		RAC-DJ18WHAA / RAK-DJ18RHAA	RAC-DJ18WHAA / RAK-DJ18RHAA	RAC-DJ18WHAA / RAK-DJ18RHAA	RAC-DJ18WHAA / RAK-DJ18RHAA	RAC-DJ18WHAA / RAK-DJ18RHAA	BEM040AY8AEAB000 / BCH0050MDACYA000	BEM0250BY4EMAB000 / BEM0250BY4EMAB000	
NOTES:		1, 3, 4, 7	1, 2, 4	1, 2, 4	1, 2, 4	1, 2, 4	5, 6	6, 8	

- NOTES:
- LOW AMBIENT COOLING PACKAGE
 - PROVIDE WALL THERMOSTAT FOR CONTROL
 - TIE INTO PRIVIA CONTROL SYSTEM
 - PROVIDE 14" TALL ROOF RAIL SYSTEM FOR OUTDOOR UNIT MOUNTING
 - PROVIDE WITH AIR DEFROST, SINGLE BRANCH PIPING, FACTORY INSTALLED HEAD PRESSURE CONTROL, CRANK CASE HEATER, THERMOSTAT, SOLENOID VALVE, AND THERMO EXPANSION VALVE.
 - WIC TO HAVE A SETPOINT OF 35°F / WIF TO HAVE A SETPOINT OF -10°F.
 - PROVIDE CONDENSATE PUMP WITH UNIT
 - PROVIDE WITH ELECTRIC DEFROST, SINGLE BRANCH PIPING, FACTORY INSTALLED HEAD PRESSURE CONTROL, CRANK CASE HEATER, THERMOSTAT, SOLENOID VALVE, AND THERMO EXPANSION VALVE.



- GENERAL MECHANICAL NOTES:**
- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
 - ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
 - PROVIDE VOLUME DAMPERS ON ALL DUCTWORK BRANCHES FOR BALANCING.
 - INSTALL ALL UNITS PER MANUFACTURERS REQUIREMENTS.
 - COORDINATE LOCATION OF ALL ROOF UNITS WITH BUTLER BUILDING OPENINGS.
 - ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A1048 FOR MORE INFORMATION.

- MECHANICAL DRAWING NOTES:**
- CULTIVATION UNIT RTU UNIT TO BE TIED INTO PRIVIA CONTROLS SYSTEM. AAOON TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIVIA CONTROL. MECHANICAL CONTRACTOR TO TIE IN PRIVIA AAOON CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL AAOON UNITS PRIVIA CONTROLS TO BE DAISY CHAINED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH. CO2 PURGE EXHAUST FAN UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14" ABOVE FINISHED ROOF. REFER TO DETAIL 6 ON M501 FOR MORE INFORMATION.
 - NON-CULTIVATION ROOF TOP UNIT. UNIT TO BE CONTROLLED OFF SPACE THERMOSTAT. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH. COOLER ROOM CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNIT ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - FREZZER UNIT CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNITS AN 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - GENERAL EXHAUST FAN. UNIT TO RUN CONTINUOUSLY DURING OCCUPIED OPERATION.
 - SPLIT SYSTEM FOR NURSERY ROOM. UNITS TO BE TIED INTO PRIVIA CONTROLS SYSTEM. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING THROUGH PIPE PORTAL TO WALL MOUNTED FAN COIL UNITS.
 - AIR INTAKE FOR MECHANICAL ROOM. PROVIDE MOTORIZED DAMPER ON INTAKE. DAMPER TO OPEN WHEN MECHANICAL ROOM EF TURNS ON.
 - 12" X 12" PIPE PORTAL. PIPE PORTAL TO ALLOW FOR REFRIGERANT PIPING AND ELECTRICAL CONDUIT FOR SPLIT SYSTEM THROUGH ROOF. PROVIDE CURB WITH UNIT.
 - CONDENSATE FROM CULTIVATION RTU THROUGH THE ROOF OPENING. EACH RTU HAS (2) CONDENSATE PIPES THAT ARE TO BE PIPED TOGETHER WITH A SINGLE P-TRAP. PIPE CONDENSATE INSIDE TO DROPS BELOW SLAB. COORDINATE WITH PIPE STUBBED THROUGH FLOOR IN PHASE 1.
 - IT ROOM SPLIT SYSTEM. CONDENSER TO BE MOUNTED ON 14" HIGH ROOF RAILS. INDOOR UNIT TO HAVE WALL MOUNTED THERMOSTAT FOR CONTROL.
 - WALL MOUNTED BOILER FOR VAV REHEAT SYSTEM. 3" INTAKE AND EXHAUST THROUGH ROOF. COORDINATE GAS AND WATER REQUIREMENT WITH PLUMBING PLANS. PROVIDE WALL MOUNTED LOOP CONTROL CENTER FOR BOILER PUMPS, AND HOT WATER LOOP CONTROL AND SETPOINTS.
 - VAV FOR REHEAT CONTROL. PROVIDE WALL THERMOSTAT FOR VAV CONTROL. PIPING TO HAVE VALVE KIT WITH CONTROL VALVE. REFER TO DETAIL 9 ON M501 FOR PIPING INFORMATION.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 40" X 18" RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
 - CEILING CABINET UNIT HEATER. PROVIDE INTEGRAL THERMOSTAT FOR UNIT SETPOINT CONTROL. HANG UNIT OFF STRUCTURE ABOVE. PROVIDE CONTROL VALVE FOR HOT WATER CONTROL.
 - EVAPORATOR FOR FREEZER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. CONDENSATE DRAIN FROM UNIT TO BE HEAT TRACED. UNITS TO RUN LEADLAG SO THAT THEY GET EQUAL USE.
 - EVAPORATOR FOR COOLER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. UNITS TO RUN LEADLAG FOR EQUAL USE.
 - CIRCUIT SETTER FOR HOT WATER LOOP CONTROL. SET TO MINIMUM FLOW REQUIREMENTS FOR THE SYSTEM. COORDINATE WITH BOILER AND PUMP INSTALLATION.
 - IN LINE PUMPS FOR HOT WATER SYSTEM. SUPPORT PUMPS OFF WALL SYSTEM. PUMPS TO RUN OFF LOOP PRESSURE CONTROL. PROVIDE DP SENSOR AT END OF SYSTEM.
 - SPLIT SYSTEM FOR ELECTRIC ROOM. PROVIDE WALL THERMOSTAT FOR UNIT SETPOINT. COORDINATE LOCATION WITH ELECTRICAL PLANS FOR AVAILABLE WALL SPACE.
 - COMPRESSORS FOR COMPRESSED AIR SYSTEM. PIPING AND SYSTEM DESIGN BY OWNER. COORDINATE WITH OWNER PROVIDED DESIGN DRAWINGS FOR INSTALL. REFER TO DETAILS 3 AND 5 ON M501 FOR MORE INFORMATION.
 - SMARTFOG HUMIDIFIER PURCHASED BY OWNER. INSTALLED BY MECHANICAL CONTRACTOR. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
 - PRIVIA CONTROL SENSOR. PRIVIA SYSTEM PURCHASED BY OWNER. REFER TO PRIVIA DESIGN DRAWINGS FOR REQUIRED COORDINATION WITH AAOON UNITS.
 - MOBILE AIR FILTRATION UNIT. COORDINATE LOCATION WITH PROVIDED OUTLET. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
 - DOAS SYSTEM FOR GRINDTRIM EQUIPMENT ROOM. UNIT IS CONTROLLED BY PRIVIA CONTROL SYSTEM. INSTALL UNIT LEVEL, ON 14" HIGH ROOF CURB.
 - GRINDTRIM ROOM EXHAUST FAN. UNIT TO FOLLOW DETAIL 7 ON M501 FOR FILTER BOX INSTALL. PROVIDE 7-12 ON EXHAUST RISER FOR EXHAUST FILTRATION. UNIT TO RUN WHEN AHU-20 IS ON.
 - CEILING VENTILATION EXHAUST FAN. HANG UNIT IN CEILING SPACE OFF STRUCTURE ABOVE. PROVIDE CONTROLLABLE TEMPERATURE SENSOR IN THE MIDDLE OF THE CEILING SPACE OR EF CONTROL. SET UNIT TO TURN ON WHEN TEMPERATURE SENSOR READS ABOVE 85 DEGREES.
 - 5" X 5" LOUVER FOR CEILING VENTILATION EXHAUST. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - 5" X 5" LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - MECHANICAL ROOM EXHAUST FAN. PROVIDE MOTORIZED DAMPER ON UNIT DUCT. DAMPER TO OPEN AND UNIT TO TURN ON WHEN SPACE IS ABOVE 85 DEGREES. PROVIDE WALL MOUNTED TEMPERATURE SENSOR FOR UNIT CONTROL.
 - AIR INTAKE FOR COMPRESSED AIR. REFER TO DETAIL 3 ON M501 FOR CONTROLS. CONDENSATE FROM FAN COIL UNITS TO BE PIPED TO NEAREST FLOOR DRAIN/WOP SINK WITH AIR GAP TO DRAIN. CONDENSATE PUMP TO BE PROVIDED WHERE NEEDED.
 - MAIN AHU THERMOSTAT. COORDINATE FINAL LOCATION WITH OWNER.
 - CO2 PURGE SYSTEM OVERRIDE SWITCH. WHEN SWITCH IS ACTIVATED THE MOTORIZED DAMPERS ON BOTH THE INTAKE AND EXHAUST FAN OPEN AND THE EF TURNS ON.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 22" X 18" RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
 - CO2 SUPPLY TO EACH GROW ROOM AIR HANDLER. COORDINATE WITH OWNER DESIGNED CO2 SYSTEM. PIPE TO RUN INTO SUPPLY DUCT AND SENSOR TO BE INSTALLED FOR CO2 CONTROL.
 - SMARTFOG CONTROLLER. COORDINATE HOOK UPS WITH PLUMBING AND ELECTRICAL CONTRACTORS. HANG OFF WALL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
 - 1" COMPRESSED AIR TO PACKAGING EQUIPMENT. PROVIDE 8 1/2" CA HOOK UPS WITH BALL VALVES AT EACH OF THE 6 BRANCHES.
 - PROVIDE REFRIGERANT MONITORING WITH VISUAL ALARM IN THE COOLER BOX AS WELL AS ON THE CORRIDOR WALL. ENSURE MONITORING PER ASHRAE 15 BASED ON A2L REFRIGERANT REQUIREMENTS.

FIRST FLOOR MECHANICAL DUCTWORK PLAN - AREA A
1/18" = 1'-0"

TRAUTMAN ASSOCIATES

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CONSULTANT TYPE (BOLD)	CONSULTANT NAME (BOLD)
CONSULTANT ADDRESS (NOT BOLD)	CONSULTANT ADDRESS (NOT BOLD)
CONSULTANT ADDRESS (NOT BOLD)	CONSULTANT ADDRESS (NOT BOLD)

Signature & Seal:

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Client: 11580 WALDEN AVE LLC

Project: Alden Green House

Project Address: 11580 Walden Ave, Alden, NY 14004

Drawing History:

#	Date	Description
1	01/14/2025	MEP REVISIONS

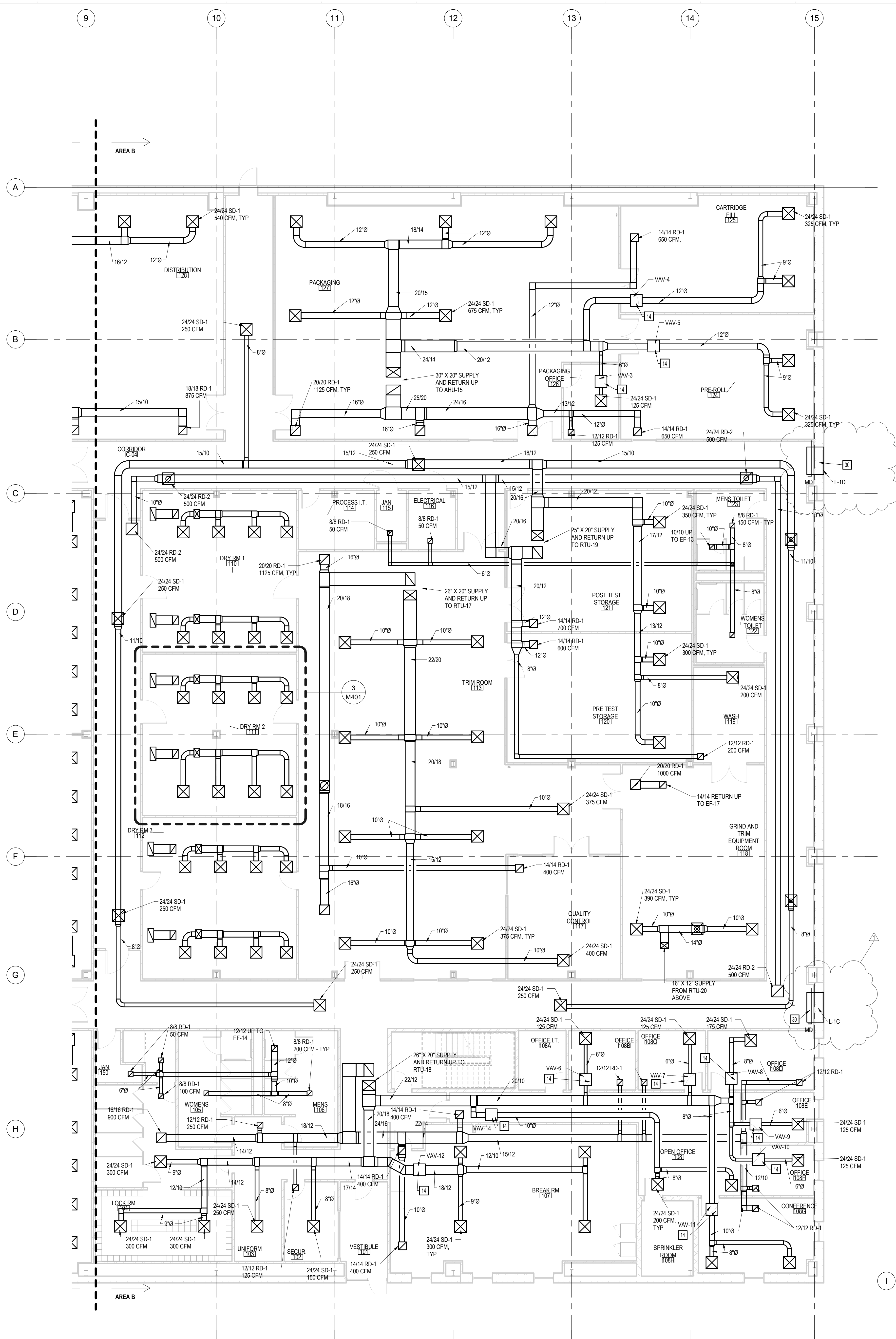
Project Status:

Date: 11/26/2025

Project Number: 24003

Sheet Title: FIRST FLOOR MECHANICAL DUCTWORK PLAN - AREA A

Sheet Number: M101A



- GENERAL MECHANICAL NOTES:**
- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
 - ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
 - PROVIDE VOLUME DAMPERS ON ALL DUCTWORK BRANCHES FOR BALANCING.
 - INSTALL ALL UNITS PER MANUFACTURERS REQUIREMENTS.
 - COORDINATE LOCATION OF ALL ROOF UNITS WITH BUTLER BUILDING OPENINGS.
 - ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A1048 FOR MORE INFORMATION.
- MECHANICAL DRAWING NOTES:**
- CULTIVATION UNIT RTU. UNIT TO BE TIED INTO PRIVA CONTROLS SYSTEM. AAO TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIVA CONTROL. MECHANICAL CONTRACTOR TO TIE IN PRISM AHON CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL AAO UNITS PRISM CONTROLS TO BE DAILY CHANGED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF FINISH.
 - CO2 PURGE EXHAUST FAN. UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A SECONDARY ON/OFF SWITCH ON WALL IN ASSOCIATED FLOWER ROOM. ENSURE UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14" ABOVE FINISHED ROOF. REFER TO DETAIL 6 ON M501 FOR MORE INFORMATION.
 - NON-CULTIVATION ROOF TOP UNIT. UNIT TO BE CONTROLLED OFF SPACE THERMOSTAT. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH. COOLER ROOM CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNIT ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - FREEZER UNIT CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNITS AN 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - GENERAL EXHAUST FAN. UNIT TO RUN CONTINUOUSLY DURING OCCUPIED OPERATION.
 - SPLIT SYSTEM FOR NURSERY ROOM. UNITS TO BE TIED INTO PRIVA CONTROLS SYSTEM. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING THROUGH PIPE PORTAL TO WALL MOUNTED FAN COIL UNITS.
 - AIR INTAKE FOR MECHANICAL ROOM. PROVIDE MOTORIZED DAMPER ON INTAKE DAMPER TO OPEN WHEN MECHANICAL ROOM EX TURNS ON.
 - 12" X 12" PIPE PORTAL. PIPE PORTAL TO ALLOW FOR REFRIGERANT PIPING AND ELECTRICAL CONDUIT FOR SPLIT SYSTEM THROUGH ROOF. PROVIDE CURB WITH UNIT.
 - CONDENSATE FROM CULTIVATION RTU THROUGH THE ROOF OPENING. EACH RTU HAS (2) CONDENSATE PIPES THAT ARE TO BE PIPED TOGETHER WITH A SINGLE P-TRAP. PIPE CONDENSATE INSIDE TO DROPS BELOW SLAB. COORDINATE WITH PIPE STUBBED THROUGH FLOOR IN PHASE 1.
 - IT ROOM SPLIT SYSTEM. CONDENSER TO BE MOUNTED ON 14" HIGH ROOF RAILS. INDOOR UNIT TO HAVE WALL MOUNTED THERMOSTAT FOR CONTROL.
 - WALL MOUNTED BOILER FOR VAV REHEAT SYSTEM. 3" INTAKE AND EXHAUST THROUGH ROOF. COORDINATE GAS AND WATER REQUIREMENT WITH PLUMBING PLANS. PROVIDE WALL MOUNTED LOOP CONTROL CENTER FOR BOILER, PUMPS, AND HOT WATER LOOP CONTROL AND SETPOINTS.
 - VAV FOR REHEAT CONTROL. PROVIDE WALL THERMOSTAT FOR VAV CONTROL. PIPING TO HAVE VALVE KIT WITH CONTROL VALVE. REFER TO DETAIL 9 ON M501 FOR PIPING INFORMATION.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 40"W X 18" RS-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
 - CEILING CABINET UNIT HEATER. PROVIDE INTEGRAL THERMOSTAT FOR UNIT SETPOINT CONTROL. HANG UNIT OFF STRUCTURE ABOVE. PROVIDE CONTROL VALVE FOR HOT WATER CONTROL.
 - EVAPORATOR FOR FREEZER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. CONDENSATE DRAIN FROM UNIT TO BE HEAT TRACED. UNITS TO RUN LEADLAG SO THAT THEY GET EQUAL USE.
 - EVAPORATOR FOR COOLER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. UNITS TO RUN LEADLAG FOR EQUAL USE.
 - CIRCUIT SETTER FOR HOT WATER LOOP CONTROL. SET TO MINIMUM FLOW REQUIREMENTS FOR THE SYSTEM. COORDINATE WITH BOILER AND PUMP INSTALLATION.
 - INLINE PUMPS FOR HOT WATER SYSTEM. SUPPORT PUMPS OFF WALL SYSTEM. PUMPS TO RUN OFF LOOP PRESSURE CONTROL. PROVIDE DP SENSOR AT END OF SYSTEM.
 - SPLIT SYSTEM FOR ELECTRIC ROOM. PROVIDE WALL THERMOSTAT FOR UNIT SETPOINT. COORDINATE LOCATION WITH ELECTRICAL PLANS FOR AVAILABLE WALL SPACE.
 - COMPRESSORS FOR COMPRESSED AIR SYSTEM. PIPING AND SYSTEM DESIGN BY OWNER. COORDINATE WITH OWNER PROVIDED DESIGN DRAWINGS FOR INSTALL. REFER TO DETAILS 3 AND 5 ON M501 FOR MORE INFORMATION.
 - SMARTFOG HUMIDIFIER PURCHASED BY OWNER. INSTALLED BY MECHANICAL CONTRACTOR. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
 - PRIVA CONTROL SENSOR. PRIVA SYSTEM PURCHASED BY OWNER. REFER TO PRIVA DESIGN DRAWINGS FOR REQUIRED COORDINATION WITH AAO UNITS.
 - MOBILE AIR FILTRATION UNIT. COORDINATE LOCATION WITH PROVIDED OUTLET. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
 - DOAS SYSTEM FOR GRIND/TRIM EQUIPMENT ROOM. UNIT IS CONTROLLED BY PRIVA CONTROL SYSTEM. INSTALL UNIT LEVEL ON 14" HIGH ROOF CURB.
 - GRIND/TRIM ROOM EXHAUST FAN. UNIT TO FOLLOW DETAIL 7 ON M501 FOR FILTER BOX INSTALL. PROVIDE 7-12 ON EXHAUST RISER FOR EXHAUST FILTRATION. UNIT TO RUN WHEN AHU-20 IS ON.
 - CEILING VENTILATION EXHAUST FAN. HANG UNIT IN CEILING SPACE OFF STRUCTURE ABOVE. PROVIDE CONTROLLABLE TEMPERATURE SENSOR IN THE MIDDLE OF THE CEILING SPACE OF EF CONTROL. SET UNIT TO TURN ON WHEN TEMPERATURE SENSOR READS ABOVE 95 DEGREES.
 - 5' X 5' LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - 5' X 5' LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - MECHANICAL ROOM EXHAUST FAN. PROVIDE MOTORIZED DAMPER ON UNIT DUCT. DAMPER TO OPEN AND UNIT TO TURN ON WHEN SPACE IS ABOVE 85 DEGREES. PROVIDE WALL MOUNTED TEMPERATURE SENSOR FOR UNIT CONTROL.
 - AIR INTAKE FOR COMPRESSED AIR. REFER TO DETAIL 3 ON M501 FOR CONTROLS. CONDENSATE FROM FAN COIL UNITS TO BE PIPED TO NEAREST FLOOR DRAIN/MOP SINK WITH AIR GAP TO DRAIN. CONDENSATE PUMP TO BE PROVIDED WHERE NEEDED.
 - MAIN AHU THERMOSTAT. COORDINATE FINAL LOCATION WITH OWNER.
 - CO2 PURGE SYSTEM OVERRIDE SWITCH. WHEN SWITCH IS ACTIVATED THE MOTORIZED DAMPERS ON BOTH THE INTAKE AND EXHAUST FAN OPEN AND THE EF TURNS ON.
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 - CO2 SUPPLY TO EACH GROW ROOM AIR HANDLER. COORDINATE WITH OWNER DESIGNED CO2 SYSTEM. PIPE TO RUN INTO SUPPLY DUCT AND SENSORS TO BE INSTALLED FOR CO2 CONTROL.
 - SMARTFOG CONTROLLER. COORDINATE HOOK UPS WITH PLUMBING AND ELECTRICAL CONTRACTORS. HANG OFF WALL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
 - 1" COMPRESSED AIR TO PACKAGING EQUIPMENT. PROVIDE 6 1/2" CA HOOK UPS WITH BALL VALVES AT EACH OF THE 8 BRANCHES.
 - PROVIDE REFRIGERANT MONITORING WITH VISUAL ALARM IN THE COOLER BOX AS WELL AS ON THE CORRIDOR WALL. ENSURE MONITORING PER ASHRAE 15 BASED ON A2L REFRIGERANT REQUIREMENTS.

1 FIRST FLOOR MECHANICAL DUCTWORK PLAN - AREA B
1/8" = 1'-0"

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	CONSULTANT ADDRESS (NOT BOLD)
CONSULTANTS:	CONSULTANT TYPE (BOLD)
	CONSULTANT NAME (BOLD)
	CONSULTANT ADDRESS (NOT BOLD)
	CONSULTANT ADDRESS (NOT BOLD)

Signature & Seal:

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Client: **11580 WALDEN AVE LLC**

Project: **Alden Green House**

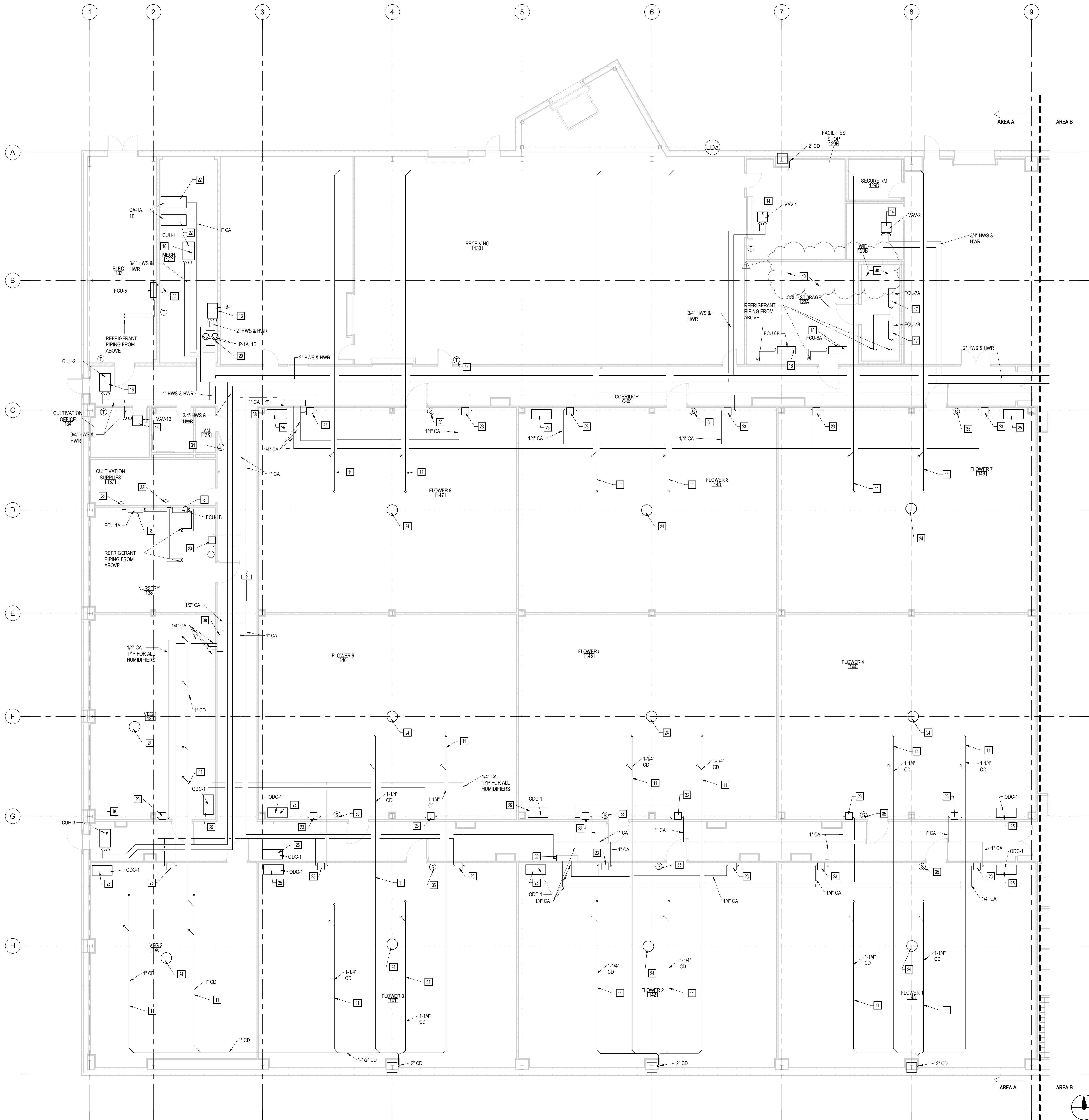
Project Address: 11580 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

Date: 11/26/2025
Project Number: 24003
Sheet Title: **FIRST FLOOR MECHANICAL DUCTWORK PLAN - AREA B**

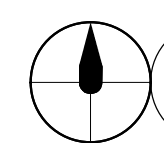
Sheet Number: **M101B**



- GENERAL MECHANICAL NOTES:**
- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
 - ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
 - PROVIDE VOLUME DAMPERS ON ALL DUCTWORK BRANCHES FOR BALANCING.
 - INSTALL ALL UNITS PER MANUFACTURERS REQUIREMENTS.
 - COORDINATE LOCATION OF ALL ROOF UNITS WITH BULDER BUILDING OPENINGS.
 - ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A104B FOR MORE INFORMATION.

- MECHANICAL DRAWING NOTES:**
- CULTIVATION UNIT RTU. UNIT TO BE TIED INTO PRIMA CONTROLS SYSTEM. ACON TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIMA CONTROLS. MECHANICAL CONTRACTOR TO TIE IN PRIMA ACON CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL ACON UNITS PRIMA CONTROLS TO BE DASH CHAINED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
 - CO2 PURGE EXHAUST FAN. UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A SECONDARY ON/OFF SWITCH ON WALL IN ASSOCIATED FLOWER ROOM. ENSURE UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14" ABOVE FINISHED ROOF. REFER TO DETAIL 6 ON M501 FOR MORE INFORMATION.
 - NON-CULTIVATION ROOF TOP UNIT. UNIT TO BE CONTROLLED OFF SPACE THERMOSTAT. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH. MECHANICAL CONTRACTOR TO TIE IN PRIMA ACON CONTROLS FOR BACKUP. INSTALL UNIT ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - FREER UNIT CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
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 - AIR INTAKE FOR MECHANICAL ROOM. PROVIDE MOTORIZED DAMPER ON INTAKE. DAMPER TO OPEN WHEN MECHANICAL ROOM EF TURNS ON.
 - 12" X 12" PIPE PORTAL. PIPE PORTAL TO ALLOW FOR REFRIGERANT PIPING AND ELECTRICAL CONDUIT FOR SPLIT SYSTEM THROUGH ROOF. PROVIDE CURB WITH UNIT.
 - CONDENSATE FROM CULTIVATION RTU THROUGH THE ROOF OPENING. EACH RTU HAS (2) CONDENSATE PIPES THAT ARE TO BE PIPED TOGETHER WITH A SINGLE P. TRAP. PIPE CONDENSATE INSIDE TO DROPS BELOW SLAB. COORDINATE WITH PIPE STUBBED THROUGH FLOOR IN PHASE 1.
 - IT ROOM SPLIT SYSTEM. CONDENSER TO BE MOUNTED ON 14" HIGH ROOF RAIS. INDOOR UNIT TO HAVE WALL MOUNTED THERMOSTAT FOR CONTROL.
 - WALL MOUNTED BOILER FOR VAV REHEAT SYSTEM. 3" INTAKE AND EXHAUST THROUGH ROOF. COORDINATE GAS AND WATER REQUIREMENT WITH PLUMBING PLANS. PROVIDE WALL MOUNTED LOOP CONTROL CENTER FOR BOILER, PUMPS, AND HOT WATER LOOP CONTROL AND SETPOINTS.
 - VAV FOR REHEAT CONTROL. PROVIDE WALL THERMOSTAT FOR VAV CONTROL. PIPING TO HAVE VALVE KIT WITH CONTROL VALVE. REFER TO DETAIL 3 ON M501 FOR PIPING INFORMATION.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 40" W X 18" H RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
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 - EVAPORATOR FOR FREEZER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. CONDENSATE DRAIN FROM UNIT TO BE HEAT TRACED. UNITS TO RUN LEADLAG SO THAT THEY GET EQUAL USE.
 - EVAPORATOR FOR COOLER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. UNITS TO RUN LEADLAGS FOR EQUAL USE.
 - CIRCUIT SETTER FOR HOT WATER LOOP CONTROL. SET TO MINIMUM FLOW REQUIREMENTS FOR THE SYSTEM. COORDINATE WITH BOILER AND PUMP INSTALLATION.
 - NINE PUMPS FOR HOT WATER SYSTEM. SUPPORT PUMPS OFF WALL SYSTEM. PUMPS TO RUN OFF LOOP PRESSURE CONTROL. PROVIDE DP SENSOR AT END OF SYSTEM.
 - SPLIT SYSTEM FOR ELECTRIC ROOM. PROVIDE WALL THERMOSTAT FOR UNIT SETPOINT. COORDINATE LOCATION WITH ELECTRICAL PLANS FOR AVAILABLE WALL SPACE.
 - COMPRESSORS FOR COMPRESSED AIR SYSTEM. PIPING AND SYSTEM DESIGN BY OWNER. COORDINATE WITH OWNER PROVIDED DESIGN DRAWINGS FOR INSTALL. REFER TO DETAILS 3 AND 5 ON M501 FOR MORE INFORMATION.
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 - PRIMA CONTROL SENSOR. PRIMA SYSTEM PURCHASED BY OWNER. REFER TO PRIMA DESIGN DRAWINGS FOR REQUIRED COORDINATION WITH ACON UNITS.
 - MOBILE AIR FILTRATION UNIT. COORDINATE LOCATION WITH PROVIDED OUTLET. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
 - DOGS SYSTEM FOR GRINDTRIM EQUIPMENT ROOM. UNITS TO BE CONTROLLED BY PRIMA CONTROL SYSTEM. INSTALL UNIT LEVEL ON 14" HIGH ROOF CURB.
 - GRINDTRIM ROOM EXHAUST FAN. UNIT TO FOLLOW DETAIL 7 ON M501 FOR FILTER BOX INSTALL. PROVIDE 1/2" ON EXHAUST RISER FOR EXHAUST FILTRATION. UNIT TO RUN WHEN AHU-20 IS ON.
 - CEILING VENTILATION EXHAUST FAN. HANG UNIT IN CEILING SPACE OFF STRUCTURE ABOVE. PROVIDE CONTROLLABLE TEMPERATURE SENSOR IN THE MIDDLE OF THE CEILING SPACE OF EF CONTROL. SET UNIT TO TURN ON WHEN TEMPERATURE SENSOR READS ABOVE 65 DEGREES.
 - 5' X 5' LOUVER FOR CEILING VENTILATION EXHAUST. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - 5' X 5' LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - MECHANICAL ROOM EXHAUST FAN. PROVIDE MOTORIZED DAMPER ON UNIT DUCT. DAMPER TO OPEN AND UNIT TO TURN ON WHEN SPACE IS ABOVE 65 DEGREES. PROVIDE WALL MOUNTED TEMPERATURE SENSOR FOR UNIT CONTROL.
 - AIR INTAKE FOR COMPRESSED AIR. REFER TO DETAIL 3 ON M501 FOR CONTROLS. CONDENSATE FROM FAN COIL UNITS TO BE PIPED TO NEAREST FLOOR DRAIN/PO. SINK. WITH AIR CAP TO DRAIN. CONDENSATE PUMP TO BE PROVIDED WHERE NEEDED.
 - MAIN AHU THERMOSTAT. COORDINATE FINAL LOCATION WITH OWNER.
 - CO2 PURGE SYSTEM OVERRIDE SWITCH. WHEN SWITCH IS ACTIVATED THE MOTORIZED DAMPERS ON BOTH THE INTAKE AND EXHAUST FAN OPEN AND THE EF TURNS ON.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 22" X 18" RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
 - CO2 SUPPLY TO EACH GROW ROOM AIR HANDLER. COORDINATE WITH OWNER DESIGNED CO2 SYSTEM. PIPE TO RUN INTO SUPPLY DUCT AND SENSOR TO BE INSTALLED FOR CO2 CONTROL.
 - SMARTFOG CONTROLLER. COORDINATE HOOK UPS WITH PLUMBING AND ELECTRICAL CONTRACTORS. HANG OFF WALL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
 - 1" COMPRESSED AIR TO PACKAGING EQUIPMENT. PROVIDE 6 1/2" CA HOOK UPS WITH BALL VALVES AT EACH OF THE 6 BRANCHES.
 - PROVIDE REFRIGERANT MONITORING WITH VISUAL ALARM IN THE COOLER BOX AS WELL AS ON THE CORRIDOR WALL. ENSURE MONITORING PER ASHRAE 15 BASED ON AXL REFRIGERANT REQUIREMENTS.

ADDED COMPRESSED AIR PIPING TO THE PLAN AS WELL AS MOVING HUMIDIFIERS BASED ON INFORMATION FROM SMARTFOG.



FIRST FLOOR MECHANICAL PIPING PLAN - AREA A



ARCHITECTS / ENGINEERS

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Signature & Seal:

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Client: 11580 WALDEN AVE
LLC

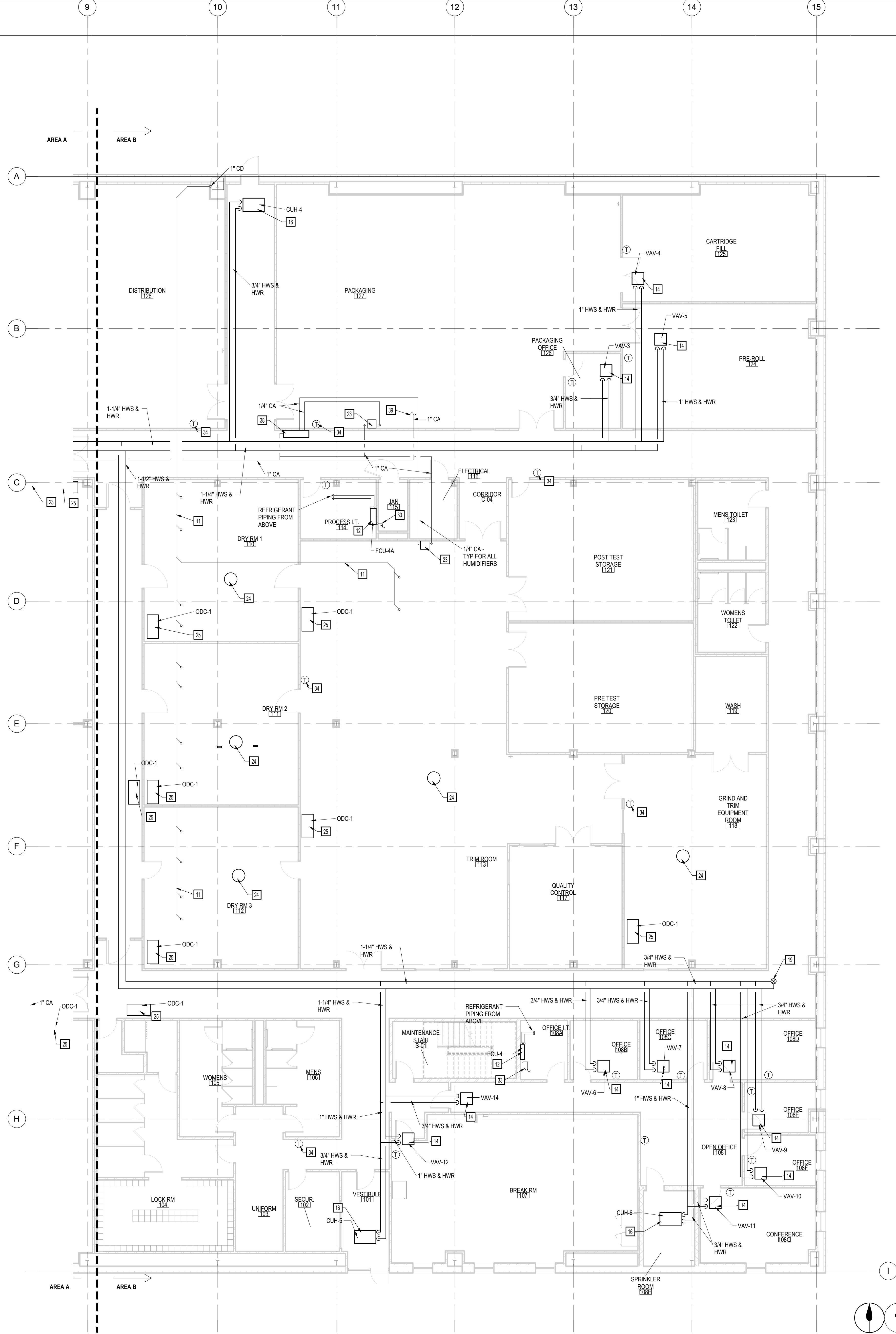
Project: Alden Green House

Project Address: 11508 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

Date: 11/26/2025
Project Number: 24003
Sheet Title: FIRST FLOOR MECHANICAL PIPING AND EQUIPMENT PLAN - AREA A
Sheet Number: M102A



1 FIRST FLOOR MECHANICAL PIPING PLAN - AREA B
1/8" = 1'-0"

GENERAL MECHANICAL NOTES:

- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
- ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
- PROVIDE VOLUME DAMPERS ON ALL DUCTWORK BRANCHES FOR BALANCING.
- INSTALL ALL UNITS PER MANUFACTURER'S REQUIREMENTS.
- COORDINATE LOCATION OF ALL ROOF UNITS WITH BUTLER BUILDING OPENINGS.
- ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A104E FOR MORE INFORMATION.

MECHANICAL DRAWING NOTES:

- CULTIVATION UNIT RTU. UNIT TO BE TIED INTO PRIVA CONTROLS SYSTEM. AAOH TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIVA CONTROL. MECHANICAL CONTRACTOR TO TIE IN PRISM AAOH CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL AAOH UNITS PRISM CONTROLS TO BE DAISY CHAINED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
- CO2 PURGE EXHAUST FAN. UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A SECONDARY ON/OFF SWITCH ON WALL IN ASSOCIATED FLOWER ROOM. ENSURE UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14\"/>

ADDED COMPRESSED AIR PIPING TO THE PLAN AS WELL AS MOVING HUMIDIFIERS BASED ON INFORMATION FROM SMARTFOG.



ARCHITECTS / ENGINEERS

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Signature & Seal:

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Client: 11580 WALDEN AVE LLC

Project: Alden Green House

Project Address: 11580 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

Date: 11/26/2025

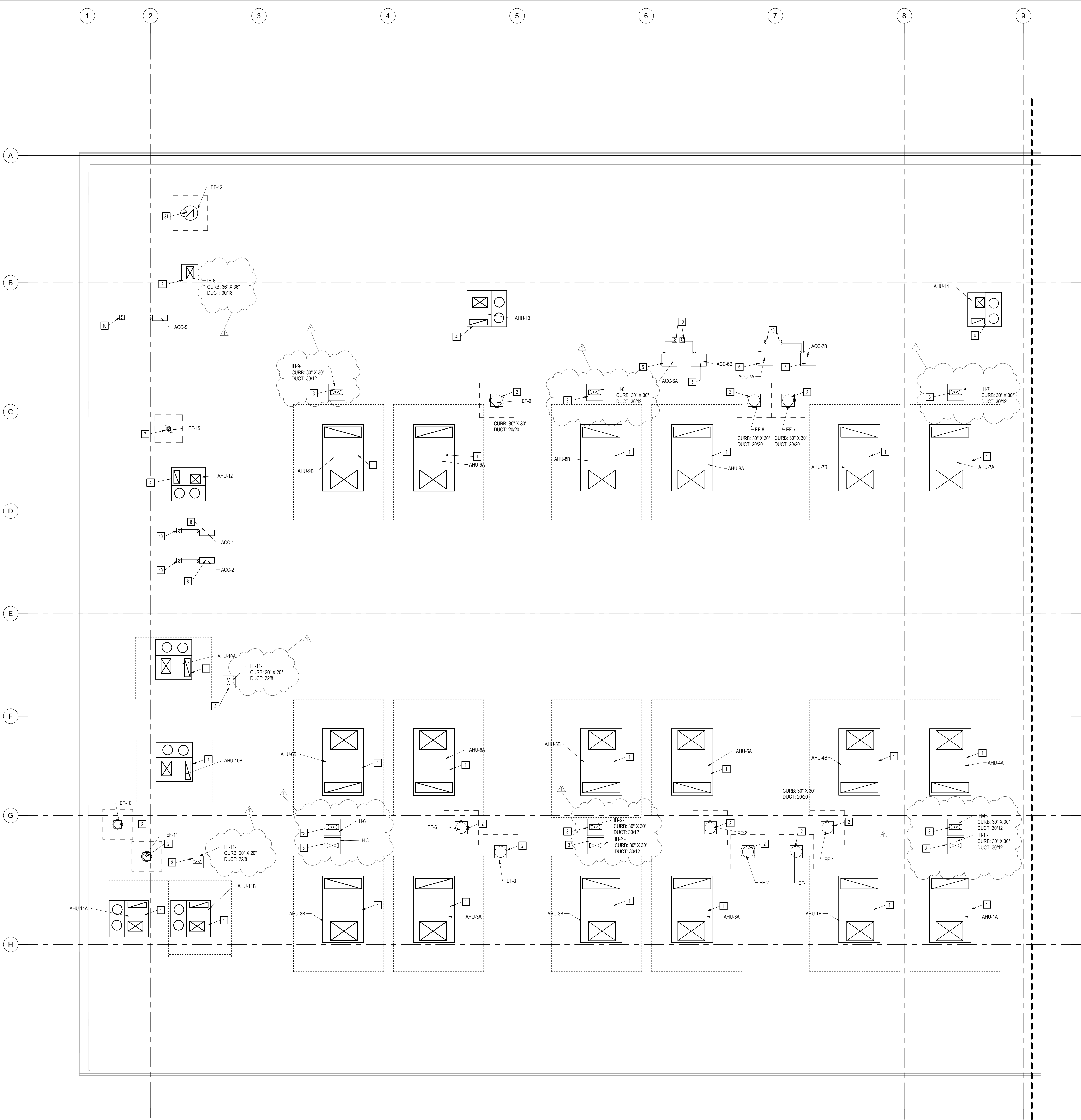
Project Number: 24032

Sheet Title:

FIRST FLOOR MECHANICAL PIPING AND EQUIPMENT PLAN - AREA B

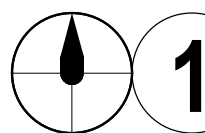
Sheet Number:

M102B



- GENERAL MECHANICAL NOTES:**
- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
 - ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
 - PROVIDE VOLUME DAMPERS ON ALL DUCTWORK BRANCHES FOR BALANCING.
 - INSTALL ALL UNITS PER MANUFACTURERS REQUIREMENTS.
 - COORDINATE LOCATION OF ALL ROOF UNITS WITH BUTLER BUILDING OPENINGS.
 - ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A104B FOR MORE INFORMATION.

- MECHANICAL DRAWING NOTES:**
- CULTIVATION UNIT RTU UNIT TO BE TIED INTO PRIMA CONTROLS SYSTEM. AAOH TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIMA CONTROL MECHANICAL CONTRACTOR TO TIE IN PRIMA AAOH CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL AAOH UNITS PRIMA CONTROLS TO BE DAISY CHAINED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
 - CO2 PURGE EXHAUST FAN. UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A SECONDARY ON/OFF SWITCH ON WALL IN ASSOCIATED FLOWER ROOM. ENSURE UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14" ABOVE FINISHED ROOF. REFER TO DETAIL 6 ON M501 FOR MORE INFORMATION.
 - NON-CULTIVATION ROOF TOP UNIT. UNIT TO BE CONTROLLED OFF SPACE THERMOSTAT. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
 - COOLER ROOM CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNIT ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - FREZZER UNIT CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
 - GENERAL EXHAUST FAN. UNIT TO RUN CONTINUOUSLY DURING OCCUPIED OPERATION.
 - SPLIT SYSTEM FOR NURSERY ROOM. UNITS TO BE TIED INTO PRIMA CONTROLS SYSTEM. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING THROUGH PIPE PORTAL TO WALL MOUNTED FAN COIL UNITS.
 - AIR INTAKE FOR MECHANICAL ROOM. PROVIDE MOTORIZED DAMPER ON INTAKE. DAMPER TO OPEN WHEN MECHANICAL ROOM EF TURNS ON.
 - 12" X 12" PIPE PORTAL. PIPE PORTAL TO ALLOW FOR REFRIGERANT PIPING AND ELECTRICAL CONDUIT FOR SPLIT SYSTEM THROUGH ROOF. PROVIDE CURB WITH UNIT.
 - CONDENSATE FROM CULTIVATION RTU THROUGH THE ROOF OPENING. EACH RTU HAS (2) CONDENSATE PIPES THAT ARE TO BE PIPED TOGETHER WITH A SINGLE P-TRAP. PIPE CONDENSATE INSIDE TO DROPS BELOW SLAB. COORDINATE WITH PIPE STUBBED THROUGH FLOOR IN PHASE 1.
 - IT ROOM SPLIT SYSTEM. CONDENSER TO BE MOUNTED ON 14" HIGH ROOF RAILS. INDOOR UNIT TO HAVE WALL MOUNTED THERMOSTAT FOR CONTROL.
 - WALL MOUNTED BOILER FOR VAV REHEAT SYSTEM. 3" INTAKE AND EXHAUST THROUGH ROOF. COORDINATE GAS AND WATER REQUIREMENT WITH PLUMBING PLANS. PROVIDE WALL MOUNTED LOOP CONTROL CENTER FOR BOILER, PUMPS, AND HOT WATER LOOP CONTROL AND SETPOINTS.
 - VAV FOR REHEAT CONTROL. PROVIDE WALL THERMOSTAT FOR VAV CONTROL. PIPING TO HAVE VALVE KIT WITH CONTROL VALVE. REFER TO DETAIL 9 ON M501 FOR PIPING INFORMATION.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 40"W X 18" RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
 - CEILING CABINET UNIT HEATER. PROVIDE INTEGRAL THERMOSTAT FOR UNIT SETPOINT CONTROL. HANG UNIT OFF STRUCTURE ABOVE. PROVIDE CONTROL VALVE FOR HOT WATER CONTROL.
 - EVAPORATOR FOR FREEZER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. CONDENSATE DRAIN FROM UNIT TO BE HEAT TRACED. UNITS TO RUN LEADLAG SO THAT THEY GET EQUAL USE.
 - EVAPORATOR FOR COOLER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. UNITS TO RUN LEADLAG FOR EQUAL USE.
 - CIRCUIT SETTER FOR HOT WATER LOOP CONTROL. SET TO MINIMUM FLOW REQUIREMENTS FOR THE SYSTEM. COORDINATE WITH BOILER AND PUMP INSTALLATION.
 - INLINE PUMPS FOR HOT WATER SYSTEM. SUPPORT PUMPS OFF WALL SYSTEM. PUMPS TO RUN OFF LOOP PRESSURE CONTROL. PROVIDE DP SENSOR AT END OF SYSTEM.
 - SPLIT SYSTEM FOR ELECTRIC ROOM. PROVIDE WALL THERMOSTAT FOR UNIT SETPOINT. COORDINATE LOCATION WITH ELECTRICAL PLANS FOR AVAILABLE WALL SPACE.
 - COMPRESSORS FOR COMPRESSED AIR SYSTEM. PIPING AND SYSTEM DESIGN BY OWNER. COORDINATE WITH OWNER PROVIDED DESIGN DRAWINGS FOR INSTALL. REFER TO DETAILS 3 AND 5 ON M501 FOR MORE INFORMATION.
 - SMARTFOG HUMIDIFIER PURCHASED BY OWNER. INSTALLED BY MECHANICAL CONTRACTOR. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
 - PRIMA CONTROL SENSOR. PRIMA SYSTEM PURCHASED BY OWNER. REFER TO PRIMA DESIGN DRAWINGS FOR REQUIRED COORDINATION WITH AAOH UNITS.
 - MOBILE AIR FILTRATION UNIT. COORDINATE LOCATION WITH PROVIDED OUTLET. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
 - DOAS SYSTEM FOR GRIND/TRIM EQUIPMENT ROOM. UNIT IS CONTROLLED BY PRIMA CONTROL SYSTEM. INSTALL UNIT LEVEL ON 14" HIGH ROOF CURB.
 - GRIND/TRIM ROOM EXHAUST FAN. UNIT TO FOLLOW DETAIL 7 ON M501 FOR FILTER BOX INSTALL. PROVIDE 7-12 ON EXHAUST RISER FOR EXHAUST FILTRATION. UNIT TO RUN WHEN AHU-20 IS ON.
 - CEILING VENTILATION EXHAUST FAN. HANG UNIT IN CEILING SPACE OFF STRUCTURE ABOVE. PROVIDE CONTROLLABLE TEMPERATURE SENSOR IN THE MIDDLE OF THE CEILING SPACE OF EF CONTROL. SET UNIT TO TURN ON WHEN TEMPERATURE SENSOR READS ABOVE 85 DEGREES.
 - 5' X 5' LOUVER FOR CEILING VENTILATION EXHAUST. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - 5' X 5' LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
 - MECHANICAL ROOM EXHAUST FAN. PROVIDE MOTORIZED DAMPER ON UNIT DUCT. DAMPER TO OPEN AND UNIT TO TURN ON WHEN SPACE IS ABOVE 85 DEGREES.
 - PROVIDE WALL MOUNTED TEMPERATURE SENSOR FOR UNIT CONTROL.
 - AIR INTAKE FOR COMPRESSED AIR. REFER TO DETAIL 3 ON M501 FOR CONTROLS.
 - CONDENSATE FROM FAN COIL UNITS TO BE PIPED TO NEAREST FLOOR DRAIN/MOP SINK. WITH AIR GAP TO DRAIN. CONDENSATE PUMP TO BE PROVIDED WHERE NEEDED.
 - MAIN AHU THERMOSTAT. COORDINATE FINAL LOCATION WITH OWNER.
 - CO2 PURGE SYSTEM OVERRIDE SWITCH. WHEN SWITCH IS ACTIVATED THE MOTORIZED DAMPERS ON BOTH THE INTAKE AND EXHAUST FAN OPEN AND THE EF TURNS ON.
 - CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 22"W X 18" RG-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
 - CO2 SUPPLY TO EACH GROW ROOM AIR HANDLER. COORDINATE WITH OWNER DESIGNED CO2 SYSTEM. PIPE TO RUN INTO SUPPLY DUCT AND SENSOR TO BE INSTALLED FOR CO2 CONTROL.
 - SMARTFOG CONTROLLER. COORDINATE HOOK UPS WITH PLUMBING AND ELECTRICAL CONTRACTORS. HANG OFF WALL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
 - 1" COMPRESSED AIR TO PACKAGING EQUIPMENT. PROVIDE 6 1/2" CA HOOK UPS WITH BALL VALVES AT EACH OF THE 6 BRANCHES.
 - PROVIDE REFRIGERANT MONITORING WITH VISUAL ALARM IN THE COOLER BOX AS WELL AS ON THE CORRIDOR WALL. ENSURE MONITORING PER ASHRAE 15 BASED ON A2L REFRIGERANT REQUIREMENTS.



ROOF MECHANICAL PLAN - AREA A

1/8" = 1'-0"



ARCHITECTS / ENGINEERS

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Client: 11580 WALDEN AVE
LLC

Project: Alden Green House

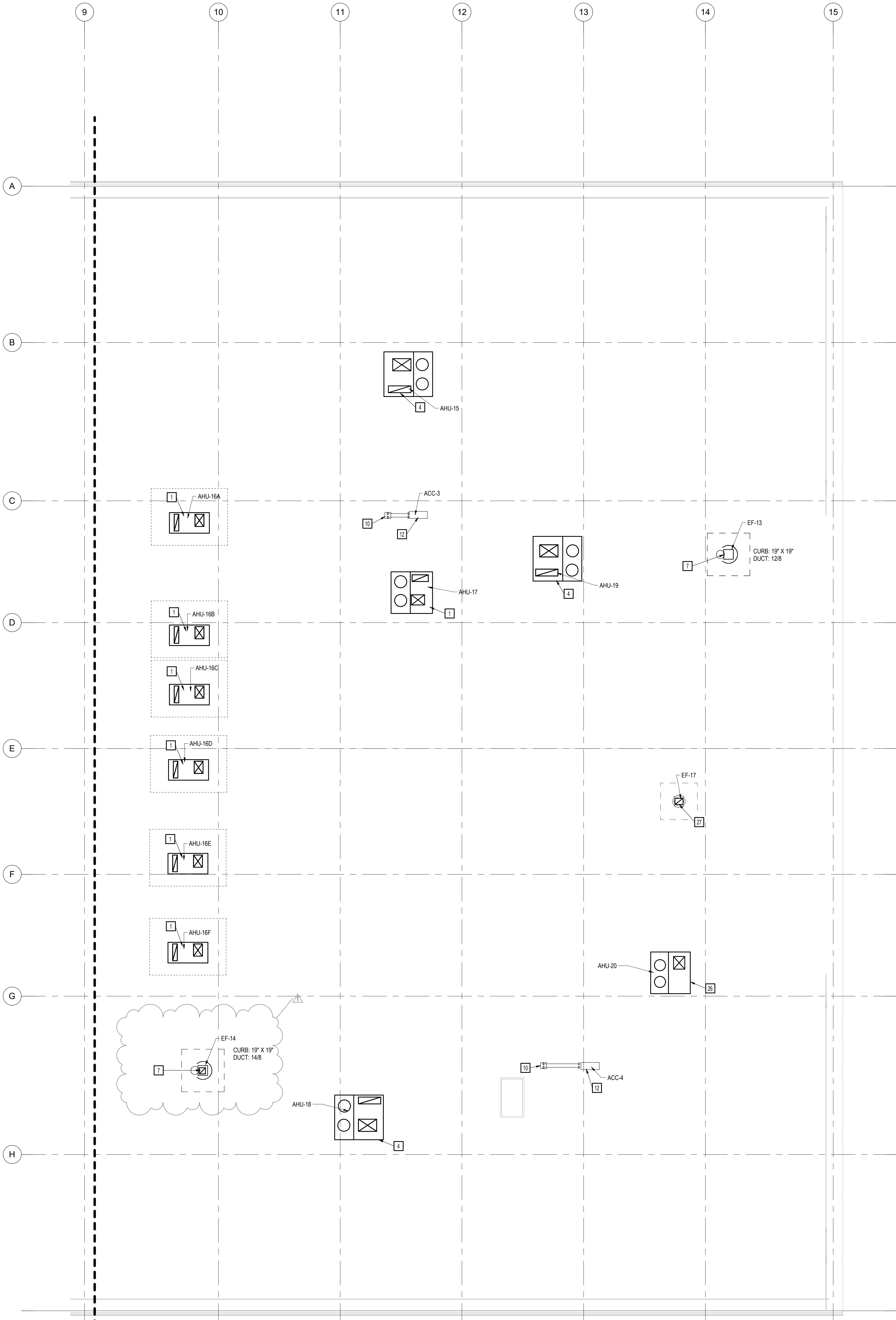
Project Address: 11580 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

Date: 11/26/2025
Project Number: 24003
Sheet Title: ROOF MECHANICAL
PLAN - AREA A

Sheet Number: M103A



GENERAL MECHANICAL NOTES:

- COORDINATE WORK WITH ALL TRADES PRIOR TO INSTALLATION.
- ALL 90 DEGREE TRANSITIONS IN DUCTWORK TO BE PROVIDED TURNING VANES.
- PROVIDE VOLUME DAMPERS ON ALL EXHAUST BRANCHES FOR BALANCING.
- INSTALL ALL UNITS PER MANUFACTURERS REQUIREMENTS.
- COORDINATE LOCATION OF ALL ROOF UNITS WITH BUTLER BUILDING OPENINGS.
- ALL PENETRATIONS THROUGH THE INSULATED METAL PANEL WALLS AND CEILINGS TO BE SEALED WATERTIGHT. REFER TO DETAIL 4 ON A1048 FOR MORE INFORMATION.

MECHANICAL DRAWING NOTES:

- CULTIVATION UNIT RTU UNIT TO BE TIED INTO PRIVIA CONTROLS SYSTEM. AAOON TO PROVIDE REQUIRED SENSORS IN UNIT AND DUCTWORK FOR PRIVIA CONTROL. MECHANICAL CONTRACTOR TO TIE IN PRISM AAOON CONTROLS FOR BACKUP. INSTALL UNIT THERMOSTAT IN RETURN DUCT. ALL AAOON UNITS PRISM CONTROLS TO BE DASHY CHAINED TOGETHER BACK TO CENTRAL SYSTEM. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
- CO2 PURGE EXHAUST FAN. UNIT TO BE CONTROLLED OFF AIRGAS SENSOR WITH A SECONDARY ON/OFF SWITCH ON WALL IN ASSOCIATED FLOWER ROOM. ENSURE UNIT IS INSTALLED LEVEL. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION. AIR INTAKE HOOD TO BE PROVIDED FOR CO2 PURGE AIR INTAKE. HOOD TO BE A MINIMUM 14" ABOVE FINISHED ROOF. REFER TO DETAIL 6 ON M501 FOR MORE INFORMATION.
- NON-CULTIVATION ROOF TOP UNIT. UNIT TO BE CONTROLLED OFF SPACE THERMOSTAT. ROOF CURB TO BE INSTALLED LEVEL WITH ROOF PITCH.
- COOLER ROOM CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNIT ON 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
- FREZZER UNIT CONDENSER. 2 UNITS PROVIDED FOR FULL REDUNDANCY. INSTALL UNITS AN 14" HIGH RAIL SYSTEM. PIPING TO RUN THROUGH PIPE PORTAL TO EVAPORATOR.
- GENERAL EXHAUST FAN. UNIT TO RUN CONTINUOUSLY DURING OCCUPIED OPERATION.
- SPLIT SYSTEM FOR NURSERY ROOM. UNITS TO BE TIED INTO PRIVIA CONTROLS SYSTEM. INSTALL UNITS ON 14" HIGH RAIL SYSTEM. PIPING THROUGH PIPE PORTAL TO WALL MOUNTED FAN COIL UNITS.
- AIR INTAKE FOR MECHANICAL ROOM. PROVIDE MOTORIZED DAMPER ON INTAKE. DAMPER TO OPEN WHEN MECHANICAL ROOM EF TURNS ON.
- 12" X 12" PIPE PORTAL. PIPE PORTAL TO ALLOW FOR REFRIGERANT PIPING AND ELECTRICAL CONDUIT FOR SPLIT SYSTEM THROUGH ROOF. PROVIDE CURB WITH UNIT.
- CONDENSATE FROM CULTIVATION RTU THROUGH THE ROOF OPENING. EACH RTU HAS (2) CONDENSATE PIPES THAT ARE TO BE PIPED TOGETHER WITH A SINGLE P-TRAP. PIPE CONDENSATE INSIDE TO DROPS BELOW SLAB. COORDINATE WITH PIPE STUBBED THROUGH FLOOR IN PHASE 1.
- IT ROOM SPLIT SYSTEM. CONDENSER TO BE MOUNTED ON 14" HIGH ROOF RAILS. INDOOR UNIT TO HAVE WALL MOUNTED THERMOSTAT FOR CONTROL.
- WALL MOUNTED BOILER FOR VAV REHEAT SYSTEM. 3" INTAKE AND EXHAUST THROUGH ROOF. COORDINATE GAS AND WATER REQUIREMENT WITH PLUMBING PLANS. PROVIDE WALL MOUNTED LOOP CONTROL, CENTER FOR BOILER, PUMPS, AND HOT WATER LOOP CONTROL AND SETPOINTS.
- VAV FOR REHEAT CONTROL. PROVIDE WALL THERMOSTAT FOR VAV CONTROL. PIPING TO HAVE VALVE KIT WITH CONTROL VALVE. REFER TO DETAIL 9 ON M501 FOR PIPING INFORMATION.
- CO2 PURGE EXHAUST DUCT TO RUN DOWN TO 12" A.F.F. AND CONNECT TO 40"W X 18" RGT-1 IN FLOWER ROOM WALL. COORDINATE WITH GC ALL CUTTING AND PATCHING OF I.M.P. REFER TO DETAIL 7 ON M501 FOR MORE INFORMATION.
- CEILING CABINET UNIT HEATER. PROVIDE INTEGRAL THERMOSTAT FOR UNIT SETPOINT CONTROL. HANG UNIT OFF STRUCTURE ABOVE. PROVIDE CONTROL VALVE FOR HOT WATER CONTROL.
- EVAPORATOR FOR FREEZER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. CONDENSATE DRAIN FROM UNIT TO BE HEAT TRACED. UNITS TO RUN LEAD/LAG SO THAT THEY GET EQUAL USE.
- EVAPORATOR FOR COOLER. CONTROL UNIT OFF WALL MOUNTED THERMOSTAT. UNITS TO RUN LEAD/LAG FOR EQUAL USE.
- CIRCUIT SETTER FOR HOT WATER LOOP CONTROL. SET TO MINIMUM FLOW REQUIREMENTS FOR THE SYSTEM. COORDINATE WITH BOILER AND PUMP INSTALLATION.
- INLINE PUMPS FOR HOT WATER SYSTEM. SUPPORT PUMPS OFF WALL SYSTEM. PUMPS TO RUN OFF LOOP PRESSURE CONTROL. PROVIDE DP SENSOR AT END OF SYSTEM.
- SPLIT SYSTEM FOR ELECTRIC ROOM. PROVIDE WALL THERMOSTAT FOR UNIT SETPOINT. COORDINATE LOCATION WITH ELECTRICAL PLANS FOR AVAILABLE WALL SPACE.
- COMPRESSORS FOR COMPRESSED AIR SYSTEM. PIPING AND SYSTEM DESIGN BY OWNER. COORDINATE WITH OWNER PROVIDED DESIGN DRAWINGS FOR INSTALL. REFER TO DETAILS 3 AND 5 ON M501 FOR MORE INFORMATION.
- SMARTFOG HUMIDIFIER PURCHASED BY OWNER. INSTALLED BY MECHANICAL CONTRACTOR. REFER TO DETAIL 11 ON M501 FOR MORE INFORMATION.
- PRIVIA CONTROL SENSOR. PRIVIA SYSTEM PURCHASED BY OWNER. REFER TO PRIVIA DESIGN DRAWINGS FOR REQUIRED COORDINATION WITH AAOON UNITS.
- MOBILE AIR FILTRATION UNIT. COORDINATE LOCATION WITH PROVIDED OUTLET. COORDINATE LOCATION WITH OWNER PRIOR TO INSTALL.
- DOAS SYSTEM FOR GRIND/TRIM EQUIPMENT ROOM. UNIT IS CONTROLLED BY PRIVIA CONTROL SYSTEM. INSTALL UNIT LEVEL ON 14" HIGH ROOF CURB.
- GRIND/TRIM ROOM EXHAUST FAN. UNIT TO FOLLOW DETAIL 7 ON M501 FOR FILTER BOX INSTALL. PROVIDE 7-12 ON EXHAUST RISER FOR EXHAUST FILTRATION. UNIT TO RUN WHEN AHU-20 IS ON.
- CEILING VENTILATION EXHAUST FAN. HANG UNIT IN CEILING SPACE OFF STRUCTURE ABOVE. PROVIDE CONTROLLABLE TEMPERATURE SENSOR IN THE MIDDLE OF THE CEILING SPACE OF EF CONTROL. SET UNIT TO TURN ON WHEN TEMPERATURE SENSOR READS ABOVE 95 DEGREES.
- 5' X 5' LOUVER FOR CEILING VENTILATION EXHAUST. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
- 5' X 5' LOUVER FOR CEILING VENTILATION INTAKE. PROVIDE PLENUM BOX FOR LOUVER THROUGH EXTERIOR WALL AND A MOTORIZED DAMPER IN PLENUM BOX TO OPEN WHEN EF TURNS ON. LOUVER TO BE CUSTOM COLOR TO MATCH BUILDING EXTERIOR.
- MECHANICAL ROOM EXHAUST FAN. PROVIDE MOTORIZED DAMPER ON UNIT DUCT. DAMPER TO OPEN AND UNIT TO TURN ON WHEN SPACE IS ABOVE 85 DEGREES.
- PROVIDE WALL MOUNTED TEMPERATURE SENSOR FOR UNIT CONTROL.
- AIR INTAKE FOR COMPRESSED AIR. REFER TO DETAIL 3 ON M501 FOR CONTROLS.
- CONDENSATE FROM FAN COIL UNITS TO BE PIPED TO NEAREST FLOOR DRAIN/IMP SINK WITH AIR GAP TO DRAIN. CONDENSATE PUMP TO BE PROVIDED WHERE NEEDED.
- MAIN AHU THERMOSTAT. COORDINATE FINAL LOCATION WITH OWNER.
- CO2 PURGE SYSTEM OVERRIDE SWITCH. WHEN SWITCH IS ACTIVATED THE MOTORIZED DAMPERS ON BOTH THE INTAKE AND EXHAUST FAN OPEN AND THE EF TURNS ON.
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- CO2 SUPPLY TO EACH GROW ROOM AIR HANDLER. COORDINATE WITH OWNER DESIGNED CO2 SYSTEM. PIPE TO RUN INTO SUPPLY DUCT AND SENSOR TO BE INSTALLED FOR CO2 CONTROL.
- SMARTFOG CONTROLLER. COORDINATE HOOK UPS WITH PLUMBING AND ELECTRICAL CONTRACTORS. HANG OFF WALL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
- 1" COMPRESSED AIR TO PACKAGING EQUIPMENT. PROVIDE 6 1/2" CA HOOK UPS WITH BALL VALVES AT EACH OF THE 6 BRANCHES.
- PROVIDE REFRIGERANT MONITORING WITH VISUAL ALARM IN THE COOLER BOX AS WELL AS ON THE CORRIDOR WALL. ENSURE MONITORING PER ASHRAE 15 BASED ON A2L REFRIGERANT REQUIREMENTS.



1

ROOF MECHANICAL PLAN - AREA B

1/8" = 1'-0"



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CONSULTANT TYPE (BOLD)
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CONSULTANT ADDRESS (NOT BOLD)
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Signature & Seal:

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Client: 11580 WALDEN AVE LLC

Project: Alden Green House

Project Address: 11508 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

Date: 11/26/2025

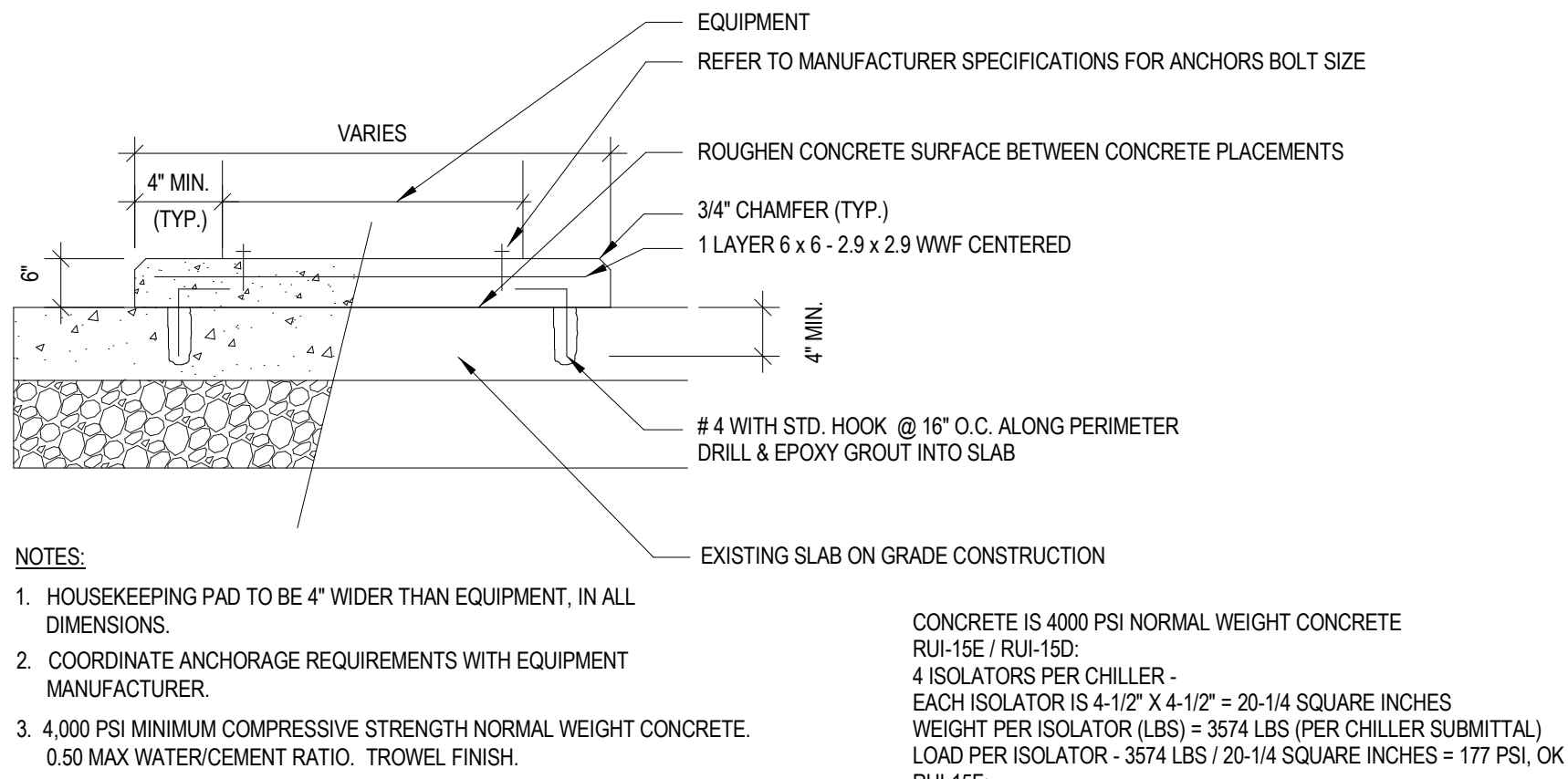
Project Number: 24003

Sheet Title:

ROOF MECHANICAL PLAN - AREA B

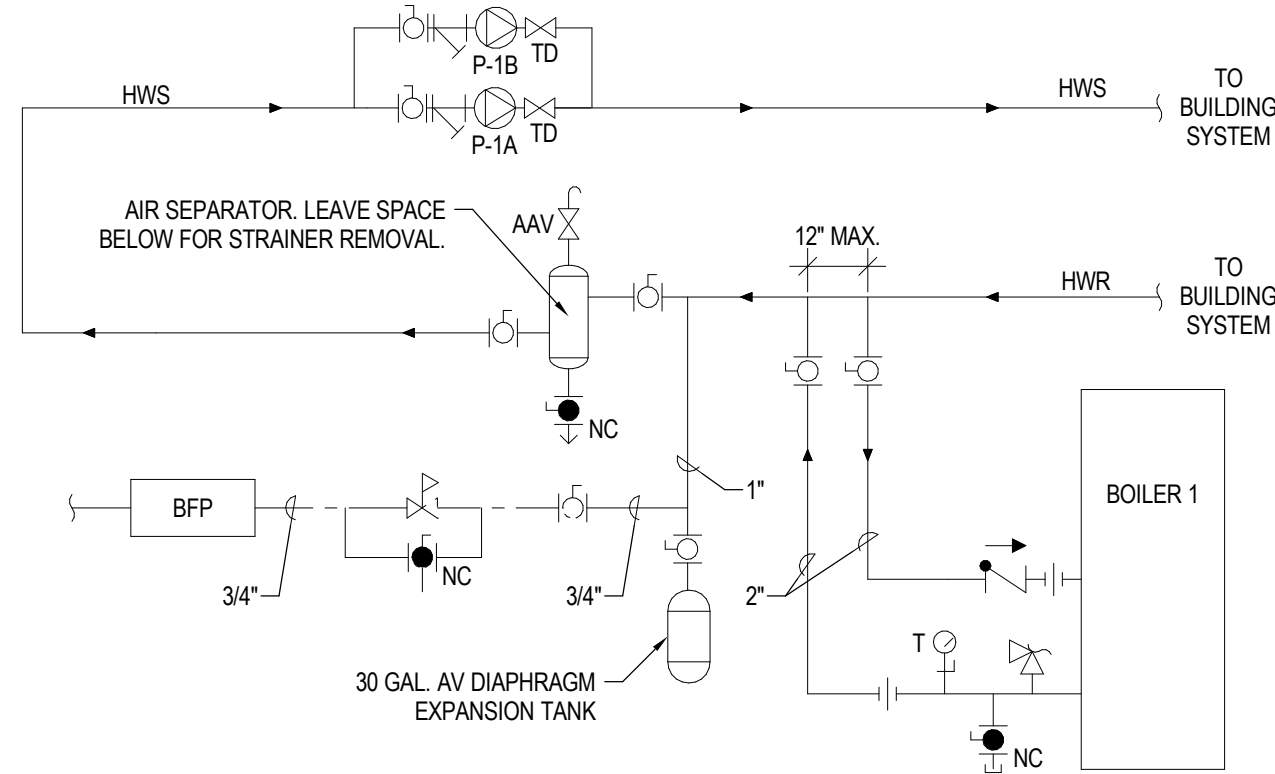
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M103B



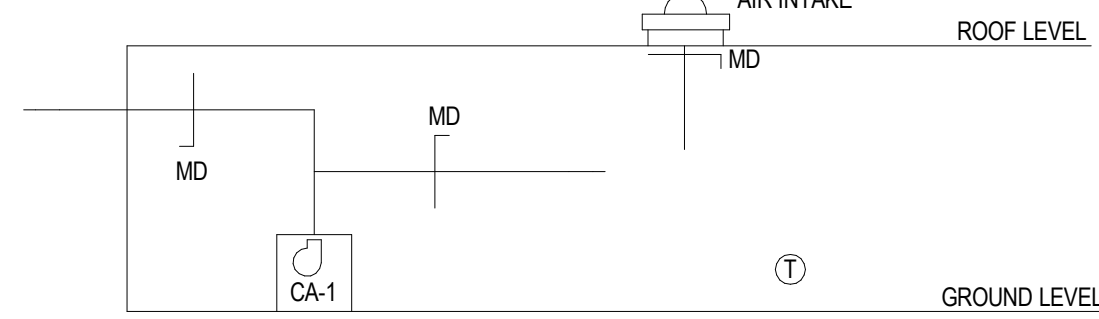
1 HOUSEKEEPING PAD DETAIL

N.T.S.



2 BOILER PIPING DIAGRAM

N.T.S.



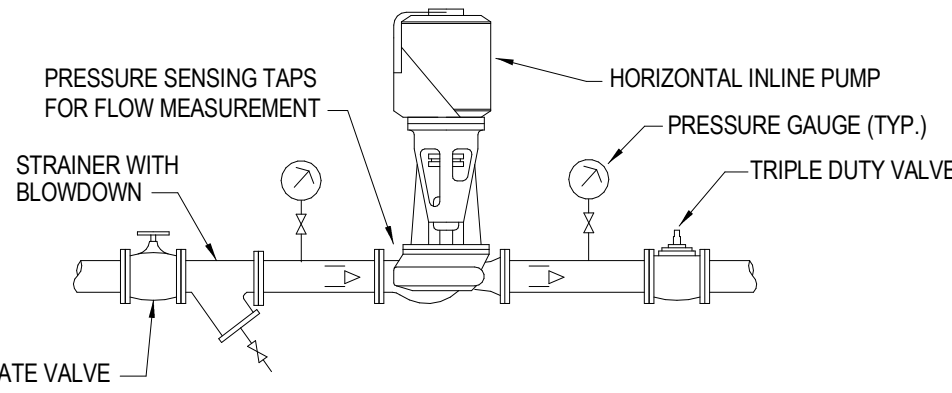
SEQUENCE OF OPERATIONS

COMPRESSORS ARE ON:
DURING WINTER OPERATION WHEN SPACE TEMPERATURE IS BELOW THE SETPOINT 70°F ADJ. EXHAUST DAMPER SHALL CLOSE AND RE-CIRCULATION DAMPER SHALL MODULATE TO MAINTAIN THE SPACE TEMPERATURE. IF SPACE TEMPERATURE IS TILL BELOW THE SET POINT, VAV ELECTRIC REHEAT COIL SCR CONTROLS WILL MODULATE TO MAINTAIN THE TEMPERATURE SET POINT. INTAKE AIR DAMPER IS HELD IN OPEN POSITION.

DURING SUMMER OPERATION WHEN SPACE TEMPERATURE IS ABOVE THE SET POINT 80°F ADJ. VAV BOX WILL MODULATE TO MAINTAIN THE SETPOINT. DURING THIS OPERATION, EXHAUST DAMPER AND INTAKE AIR DAMPER ARE HELD ON OPEN POSITION. RE-CIRCULATION DAMPER IS HELD IN CLOSED POSITION.

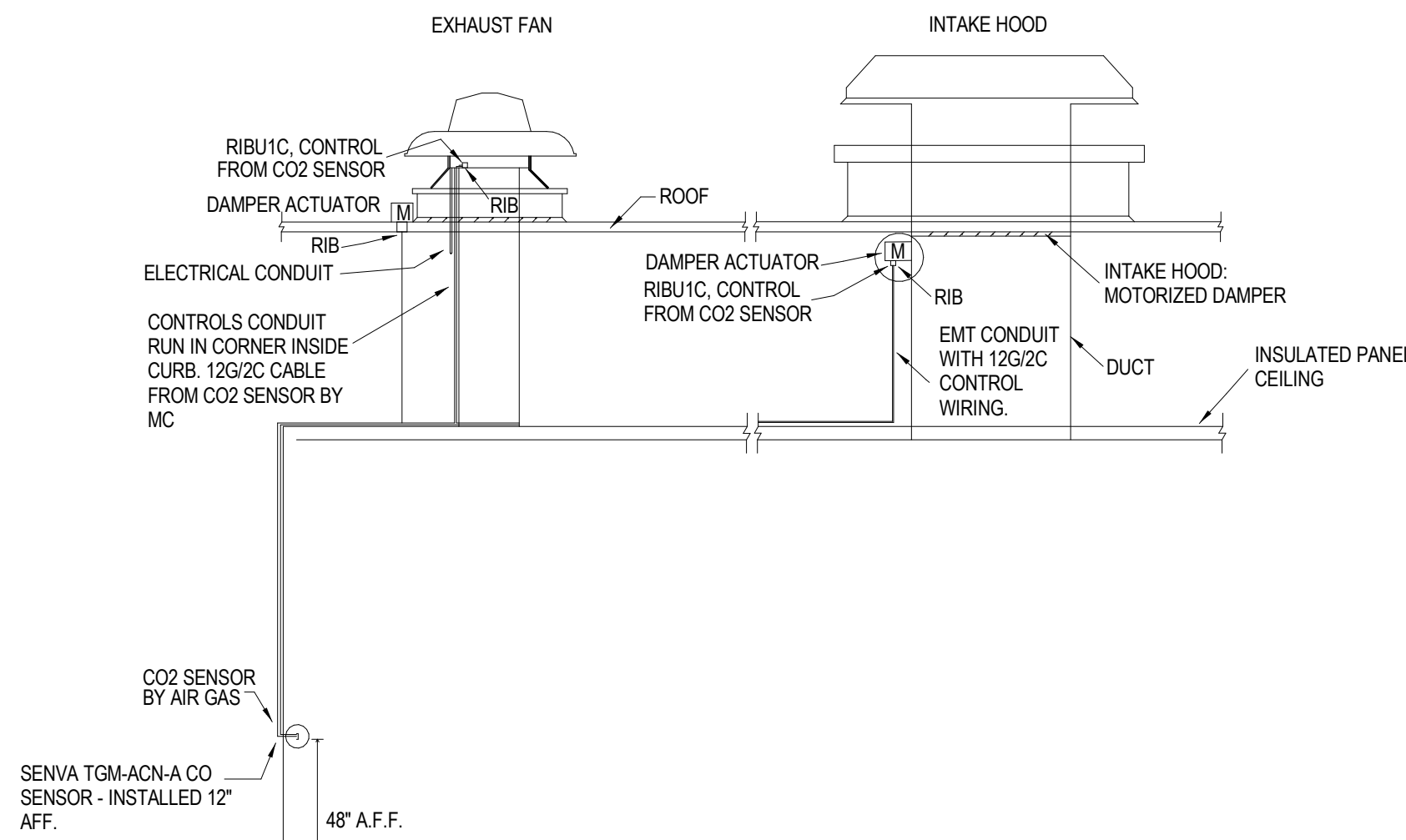
3 CONTROLS - COMPRESSOR VENTILATION

N.T.S.



4 IN LINE PUMP CONNECTION DETAIL

N.T.S.

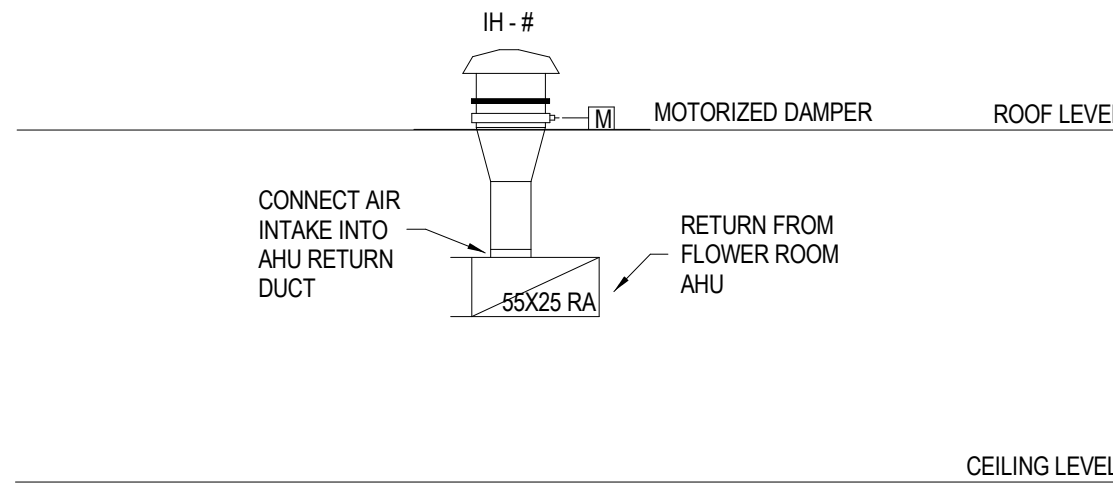


6 CO2 PURGE EXHAUST / INTAKE DETAIL

N.T.S.

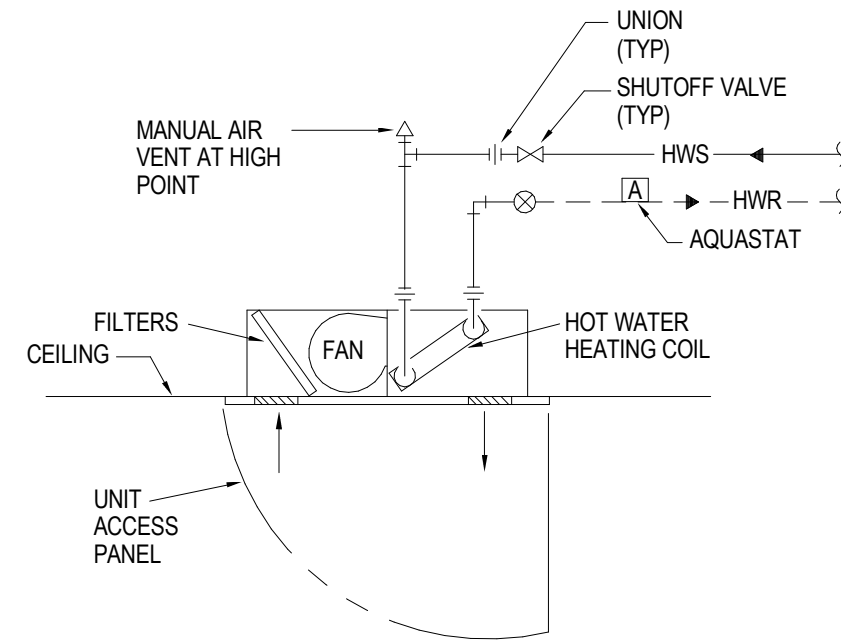
7 PURGE EXHAUST FAN DETAIL

N.T.S.



8 CO2 PURGE INTAKE SECTION VIEW

N.T.S.



10 RECESSED CEILING CABINET UNIT HEATER DETAIL

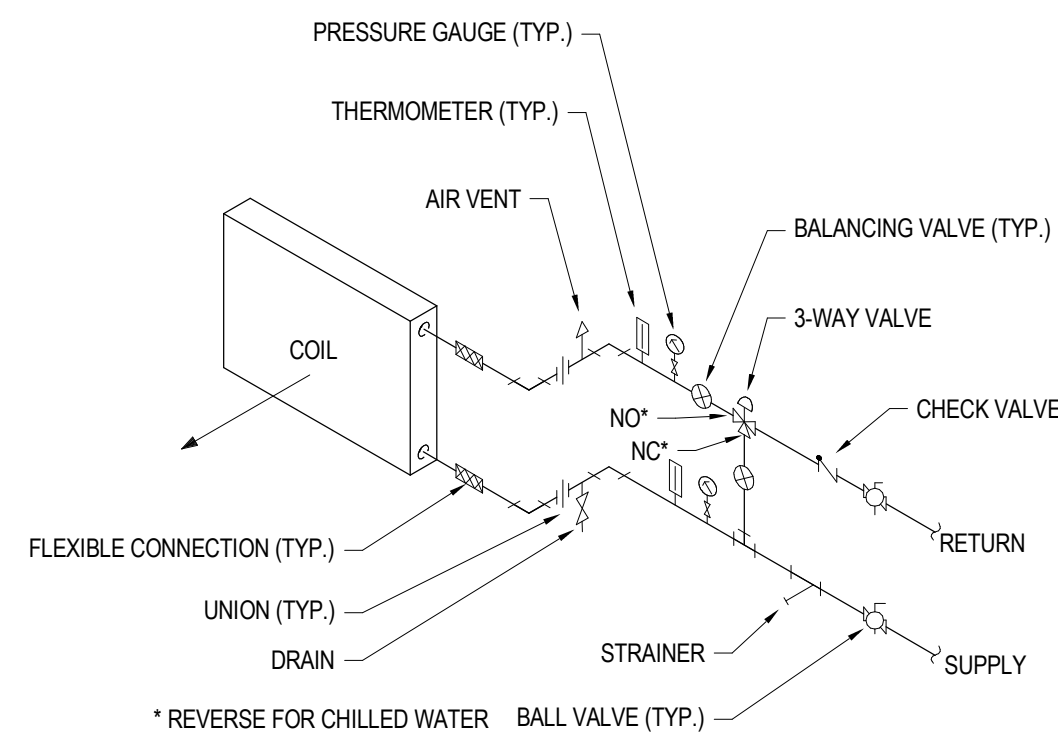
N.T.S.

NOTE:

- PROVIDE DRAIN AT LOW POINT.
- PIPING ARRANGEMENT FOR UNIT HEATERS SIMILAR.

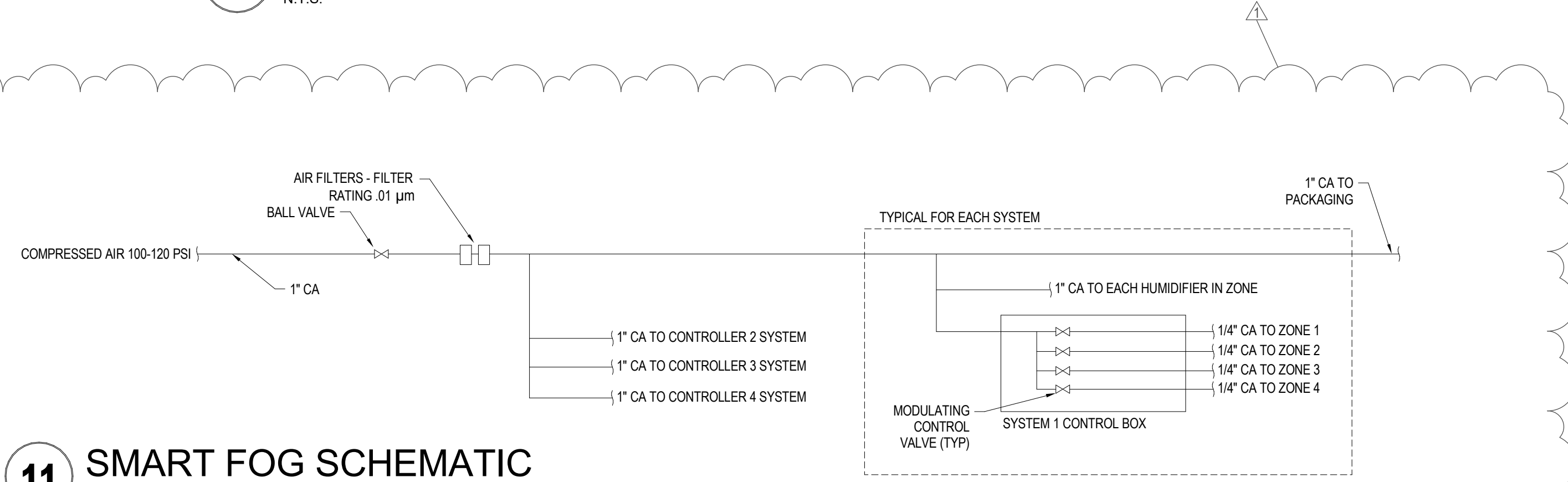
11 SMART FOG SCHEMATIC

N.T.S.



9 VAV 3-WAY VALVE COIL PIPING

N.T.S.



ARCHITECTS / ENGINEERS

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Signature & Seal:

Client: 11580 WALDEN AVE
LLC

Project: Alden Green House

Project Address: 11508 Walden Ave, Alden, NY 14004

Drawing History: # Date Description
1 01/14/2025 MEP REVISIONS

Project Status:

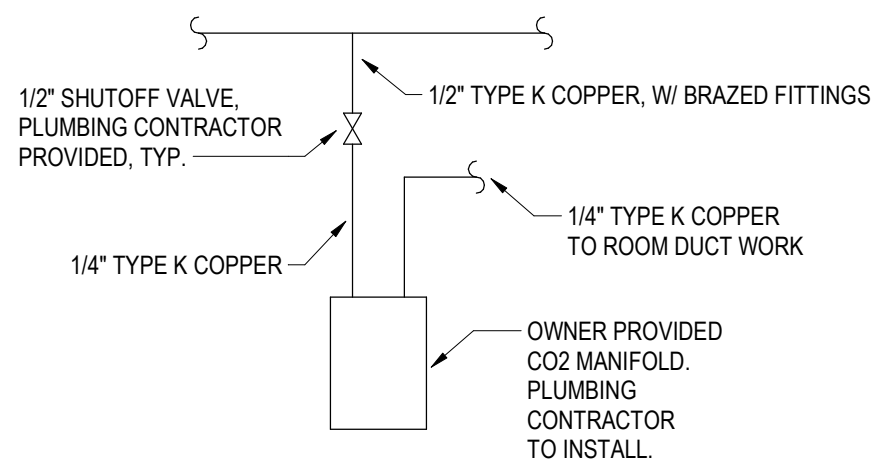
Date: 11/26/2025
Project Number: 24003
Sheet Title: MECHANICAL
DETAILS

Sheet Number:

M501

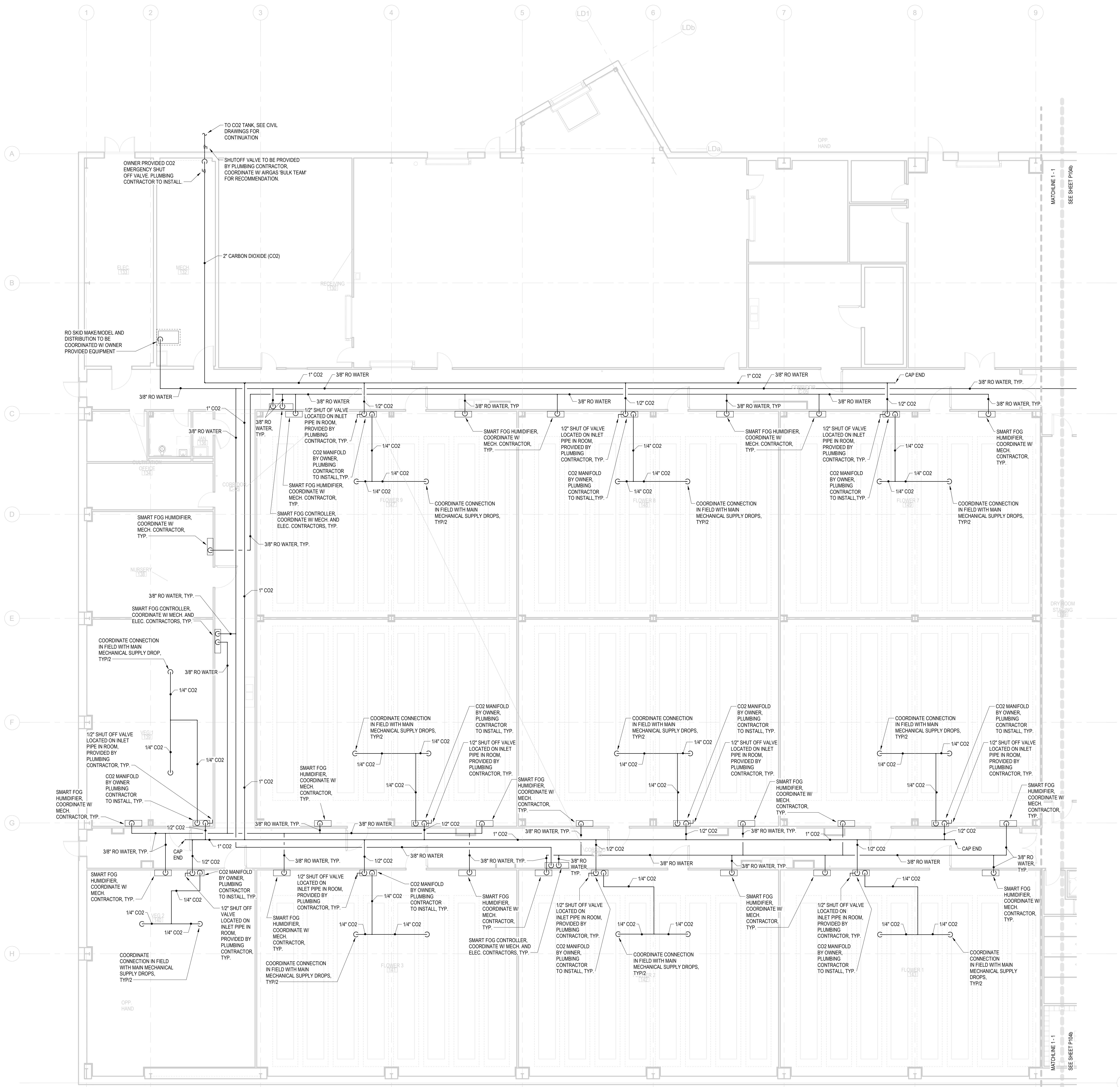
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SPECIALTY PIPE SCHEDULE	
SERVICE	MATERIAL
CARBON DIOXIDE (CO2)	TYPE K COPPER
RO WATER	PEX - A



2 CO2 TYP. MANIFOLD DETAIL

NOT TO SCALE



1 PARTIAL FIRST FLOOR SPECIALTY PIPING PLAN AREA A

1/8" = 1'-0"



ARCHITECTS / ENGINEERS

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LLC

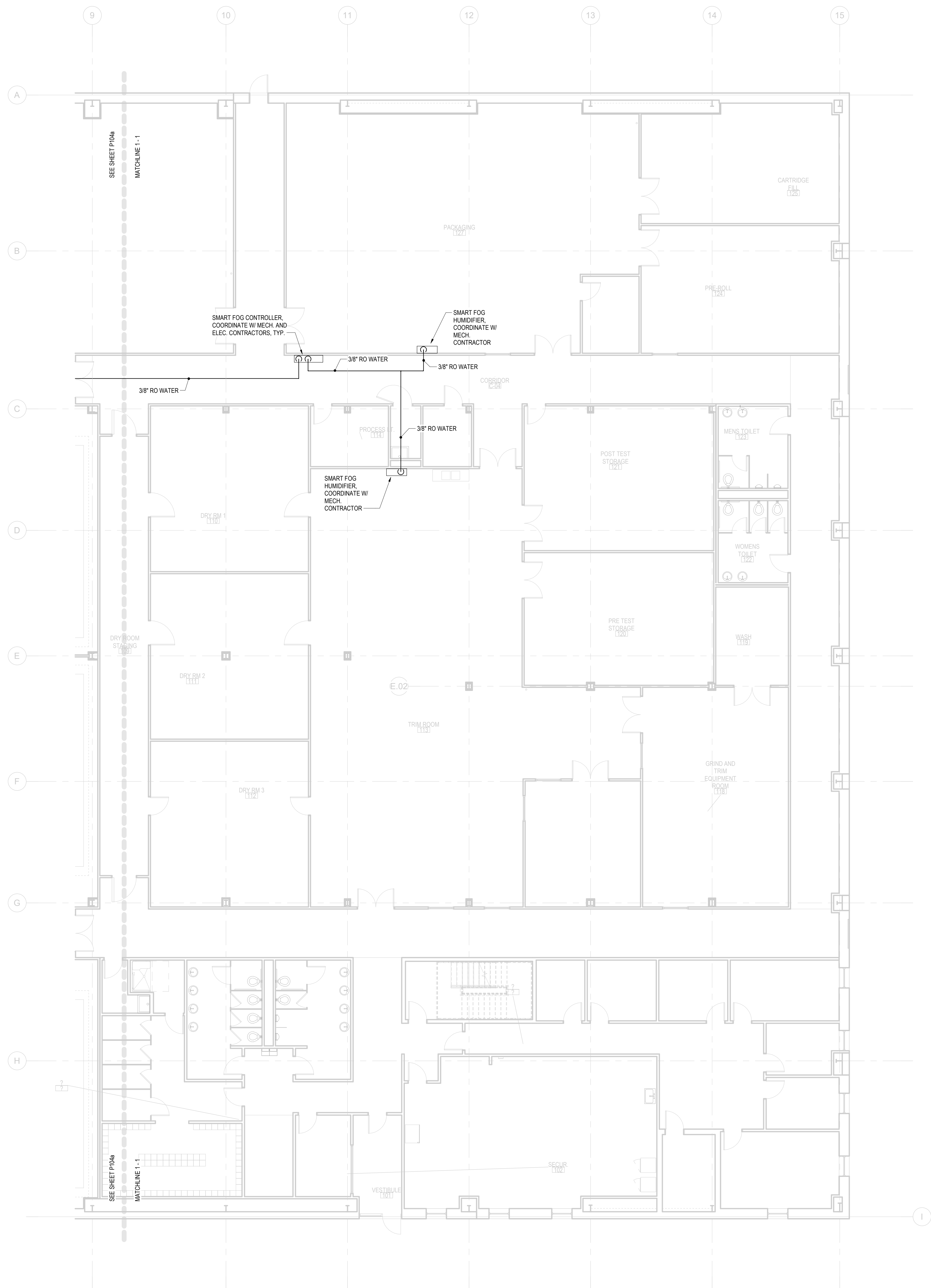
Project: ALDEN GREEN
HOUSE

Project Address: 11580 WALDEN AVE
TOWN OF ALDEN
NY 14004

Drawing History: # Date Description
1 01/14/26 MEP REV.

Date: 01/14/2026
Project Number: 24003
Sheet Title: PARTIAL FIRST
FLOOR SPECIALTY
PIPING PLAN AREA
A

Sheet Number: P104a



1 PARTIAL FIRST FLOOR SPECIALTY PIPING PLAN AREA B
1/8" = 1'-0"



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Signature & Seal:

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Client: 11580 WALDEN AVE
LLC

Project: ALDEN GREEN
HOUSE

Project Address: 11580 WALDEN AVE
TOWN OF ALDEN
NY 14004

Drawing History: # Date Description
1 01/14/26 MEP REV.

Date: 01/14/2026
Project Number: 24003
Sheet Title: **PARTIAL FIRST
FLOOR SPECIALTY
PIPING PLAN AREA
B**

Sheet Number: **P104b**