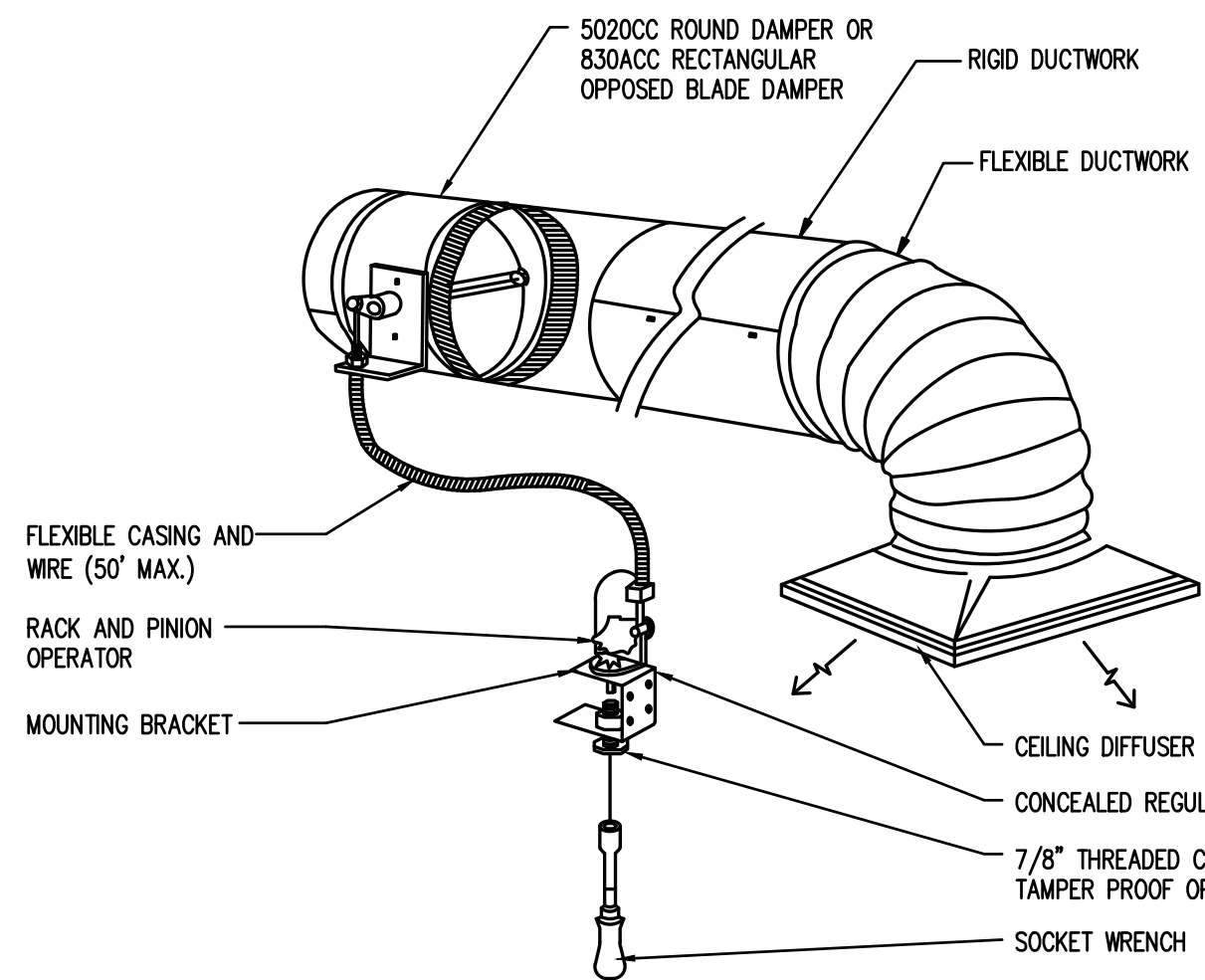
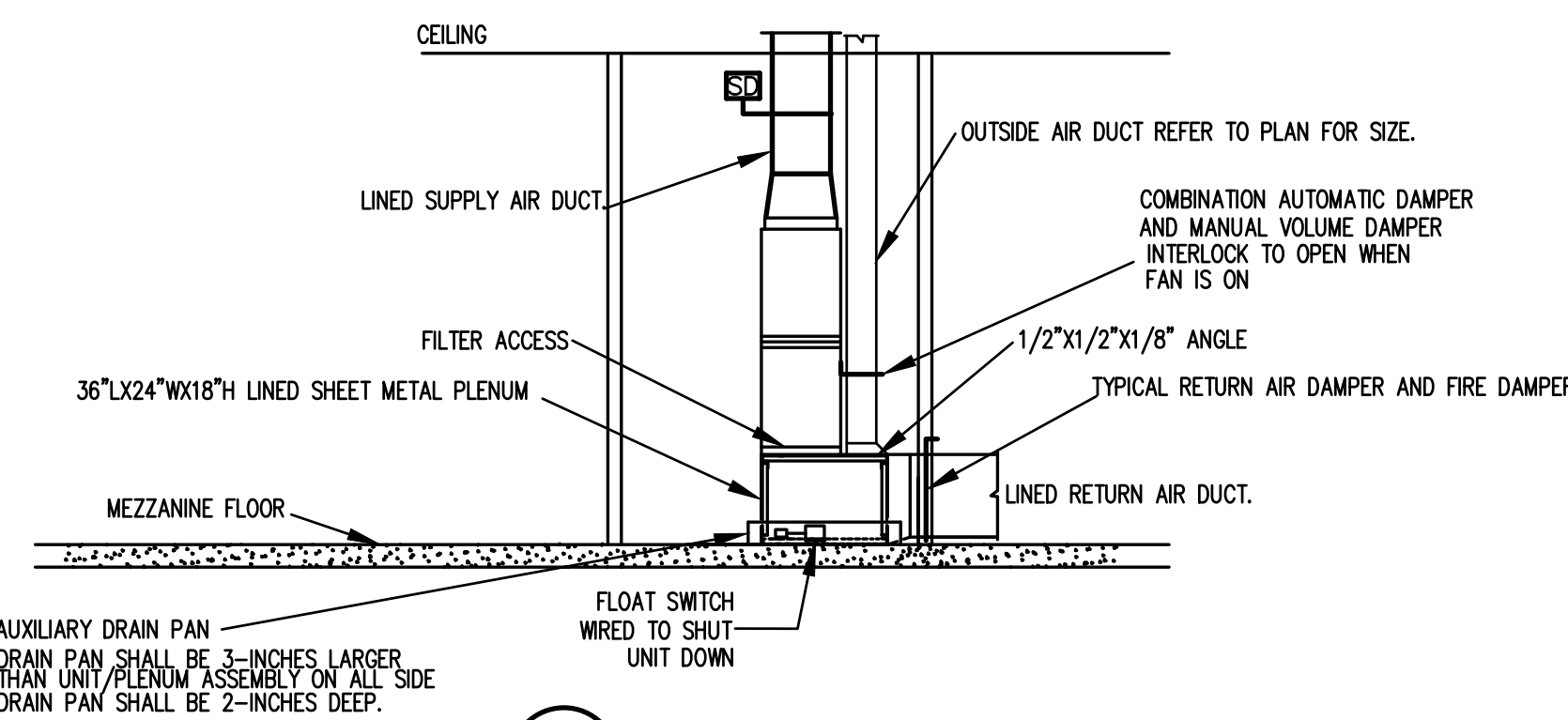


MECHANICAL SPECIFICATIONS		GM Architect	
1)	Provide all heating, ventilation and air conditioning items indicated on the drawings, described in this specification or required for a complete and proper installation.	2)	Comply with all pertinent codes, ordinances and regulations. Refer to website for Dept. of Community Affairs for current Codes Editions.
	The contractor shall not attempt to precisely scale dimensions from the drawings to obtain construction dimensions and clearances. The contractor shall verify all actual dimensions and clearances. Although these plans are diagrammatic in nature, they shall be followed as state conditions, new construction, and work by other trades shall permit. Deviations from these drawings, which are required to conform to the available space or the actual building construction, shall be made at no additional cost to the owner.		
4)	Furnish without extra charge, any additional material and labor required to comply with the above codes and standards, even though the work may not be described in the contract documents. Where the requirements of the contract documents exceed the requirements of the above codes and standards, the contract documents shall take precedence.		
5)	All equipment and material shall be new and of first quality. Equipment and material shall be the same or equal to the basis of design listed on these drawings and shall be UL listed.		
6)	Cooperate and coordinate with other trades in order that all systems in the work may be installed in the best arrangement.		
7)	Examine the areas and conditions under which work of this section will be installed. Correct conditions detrimental to the proper and timely completion of the work. Notify Architect of any discrepancies. Do not proceed until unsatisfactory conditions have been corrected.		
8)	Avoid interference with structure, and with work of other trades. Install all equipment per manufacturer's instructions. Install accessible parts, including equipment, coils, valves, dampers, controls, and filters with adequate clearance for inspection, adjustments, repair and replacement.		
9)	All other materials not specifically described but required for a complete and proper installation shall be as selected by the contractor subject to acceptance by the Engineer.		
10)	All ductwork shall be fabricated from galvanized sheet metal duct and conform to SMACNA "HVAC Duct Construction Standards-Metal and Flexible. Seal all joints in ductwork with mastic sealant.		
11)	Flexible duct: Flex master; Alcoa UPC36(R-6.0); Alcoa UPC31 (R-8) or Thermflex, Type 3, insulated, 5'-0" Maximum length unless noted otherwise. Class 1 rating with R-value of 6.0 when located inside building insulation envelope and R-8 when located outside building insulation envelope. Install with no more than 135 degrees maximum of total bends per run. Maximum individual bend shall not exceed 45 degrees each. Support at 8 feet on centers with hangers having at least 2-inches of width at duct contact points. Flexible connectors shall not pass through any wall floor or ceiling weather rated or not. Provide 36-inches of metal duct at penetration of draft stops, fire walls and smoke walls.		
12)	Outside duct insulation: Insulate ducts and fittings with two, staggered layers of 7-inch foamed plastic sheet insulation, (Armo-Flex sheets) 6-pound density, having a thermal conductivity of not more than 0.28 at 75°F. Apply insulation with smooth side of coating both surfaces to be joined completely with a thin coat of waterproof instant bonding adhesive. Adjacent sheets shall fit under compression. Apply a 16-mil embossed aluminum jacket with a 2-inch overlap at longitudinal and transverse joints, secured in place with 7-inch by .015-inch aluminum bands on 18-inch centers. Overall insulation value must be R-8 for exterior duct as per ASHRAE 90.1 & IECC.		
13)	Duct Liner: Owens Corning Aeroflex Plus, or equivalent. Incombustible glass fiber complying with ASTM C 1071; flexible blanket; impregnated surface and edges coated with acrylic polymer shown to be fungus and bacteria resistant by testing to ASTM C 21. Apparent Thermal Conductivity: Maximum of 0.31 at 75 degrees F. Service Temperature: 250 degrees F. Density: 1.5 pounds/cubic foot. Install using adhesive (50% coverage) and galvanized steel fasteners with welded press-on head Thickness: 1-inch.		
14)	Condensate drain piping shall be ASTM D2665 PVC with solvent welded fittings. Drain piping shall be no smaller than the drain connection size on equipment. Slope of 1/8 inch per foot continuously toward drains. All indoor condensate shall be insulated with preformed flexible plastic cellular foam. All outdoor condensate drain piping shall be primed and painted with a coating system recommended by the piping manufacturer for protection against deterioration from weather and UV-light exposure. All piping shall be adequately supported to maintain proper slope and avoid sagging.		
15)	Refrigerant piping shall conform to manufacturer's recommendations and installation instructions. Refrigerant piping shall be ASTM B280 Type ACR or ASTM B88 Type 1 drawn copper tubing with wrought copper fittings. Insulate suction line with 3/8" thick flexible foamed plastic cellular foam (ArmoFlex or equivalent). All piping shall be adequately supported. Insulation installed outdoors shall be painted with two coats of Armoal MB coating or equivalent. Refrigerant pipes shall be installed in accordance with ASHRAE standard 15-2022 section 9.12 and shall be tested in accordance with ASHRAE standard 15-2022 section 9.13. Contractor shall issue a letter to design team stating that refrigerant pipes has been installed and tested under the referenced sections. Contractor shall refer to ASHRAE standard 15-2022 sections 9.10 and 9.11 for additional information regarding refrigerant piping. Penetration of refrigerant pipes shall be protected with a through penetration protection means. The through penetration protection shall be the same or higher rating than the assembly.		
16)	Thermostats: Provide 24 volt, programmable 24-hour, 7-day thermostat to control heating stages in sequence with delay between stages and supply fan to maintain temperature setting. For Heat Pumps include system selection switch heat-off-cool and fan control switch (auto-on), emergency heat switch (auxiliary/emergency heat indicator lights).		
17)	Provide fire and smoke rated flexible connections between fans and ducts. Material shall comply with NFPA 90A requirements for material in supply air stream.		
18)	Install all equipment in accordance with manufacturer's instructions and recommendations including clearances recommended for proper operation or service. All filters and serviceable parts shall be readily accessible.		
19)	Indoor duct insulation: Foil-faced fiberglass, Owens Corning Type 75 or equal, 2.2" thick(R-6), unless the insulated duct is outside building insulation envelope (attic, crawlspace or unconditioned space) in which case the duct insulation thickness shall be 3" thick(R-8). Duct shall have a flame spread rating of not more than 25 and smoke developed rating of not more than 50. Glass-Fiber insulation: All service duct wraps with foil scrim and having backing and a k-value of 0.30 at 75° F mean temperature and an average maximum density of 0.75 lb./cu. ft.		
20)	All supply, return and outside air ducts shall be insulated. Install acoustical duct liner on the interior surface of the first five (5) linear feet of supply duct downstream and the last five (5) linear feet of return duct upstream of all air handlers and rooftop units. Insulate the concealed tops of all ceiling mounted supply air diffusers with foil-faced fiberglass, 1.5#/cubic foot density, 2" thick. Seal edges to ceiling grid with foil faced tape to provide vapor tight seal.		
21)	All low-pressure duct branches shall contain manual balancing dampers. Manual balancing dampers shall also be installed in the continuation of the main, if the main duct is smaller or the same size as the branch duct, or if the continuation of the main serves only one device.		
22)	Make all duct elbows right angle type with single -thickness turning vanes or construct with centerline radius 1-1/2 times the duct width.		
23)	Duct sizes shown on plans are clear, interior dimensions. Duct sizes shown shall be enlarge to allow for liner at locations of interior liner.		
24)	Do not cut into or reduce the size of any structural member without the permission of the Architect.		
25)	Provide weather-proof flashing at all duct and pipe penetrations through the building walls and roof. As a minimum, flashings shall be designed and installed in accordance with SMACNA standards. Flashings shall be guaranteed weathertproof.		
26)	Support all HVAC units, ductwork, piping and other appurtenances from structure, provide vibration isolation at all fans which are not internally isolated. Provide hanger rod with built in rubber-in-the-isolator. Between drain pan and unit provide 4 inch rubber-in-shear isolator. Do not attach vibration isolator to drain pan. Do not screw or drive fasteners into non-structural components such as roof decks or non-load bearing walls.		
27)	Thoroughly clean all components and remove all dirt, scale, oil, and other foreign substances. Provide clean air filters for all equipment.		
28)	Perform all tests necessary to demonstrate the integrity of the complete installation to the approval of the Engineer and all other authorities having jurisdiction. Make all adjustments necessary and balance the completed system in accordance with the data shown. Balance the systems in accordance with NEBB or ABCO standards. Acceptable tolerances shall be minus ten percent to plus five percent of all measurements. Balancing shall be done by an independent licensed (by NEBB or AABC) TAB contractor. Make the following tests and submit reports to the Architect: <div><div>a) Airflow rate at each supply, return and exhaust outlet or inlet.</div><div>b) Total airflow rate and total static pressure for each supply and exhaust fan. Test exhaust fans with room doors closed.</div><div>c) Motor speed, for multiple speed fans (e.g. high, medium, low).</div><div>d) For direct drive fans, provide speed settings and actual rpm, including EDM motor driven fans</div><div>e) Provide fan and motor rpm for belt driven fans. Provide shoe sizes.</div><div>f) Outside airflow rate to each HVAC unit and supply fan.</div><div>g) Motor current (and compare with nameplate data) at all motors.</div><div>h) Entering and leaving air dry-bulb and wet-bulb conditions at all cooling coils.</div><div>i) Heat output capacity for unit heaters, heating devices and coils (kW or MBH).</div><div>j) Manufacturer, model and serial number for each piece of HVAC equipment scheduled on drawings.</div><div>k) Calibrate thermostats to be within one degree of actual temperature at thermostat.</div><div>l) Verify that all HVAC devices operate as scheduled or indicated (i.e. ON-OFF, 2-stage, variable output (SOR heaters), etc).</div></div>		
29)	The entire system shall be warranted for a period of one (1) year beginning with Owner's acceptance of the work. Compressors shall include a minimum of five (5) year parts only warranty from the manufacturer. All labor and materials necessary to repair or replace the system or portions thereof, during that time shall be warranted for a period of one (1) year from the repair or replacement.		
30)	SUBMITTALS AND SUBMITTAL PROCEDURES: <div><div>a. Contractor shall review the submittal data and check for the purpose of compliance with safety requirements, verification of dimensions, contract documents and methods and means prior to submitting to design professional. Contractor shall indicate approval by indicating such on the submittal.</div><div>b. Transmit each submittal electronically in PDF format.</div><div>c. Sequentially number submittal files and transmittal form. Revise submittals with original number and a sequential alphabetic suffix. File names shall describe item included in file.</div><div>d. Identify Project, the Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy. Each file shall include an index of items included in file.</div><div>e. Apply the Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents.</div><div>f. Submittal data for all items in project shall be submitted at one time. Submittal shall be divided into groups with file sizes not exceeding 6 MB. If there is unavailable data such as control submittals, etc., these may be submitted later if not doing so would delay project progress. Data shall include capacities, complete installation instructions, dimensional data and electrical data, BHP, motor HP, operating weights and load distribution at mounting points.</div><div>g. Deliver submittals electronically to the Design Professional.</div><div>h. Schedule submittals to expedite the Project, and coordinate submission of related items.For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.</div><div>i. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work.</div><div>j. Provide space for the Contractor and the Architect/ review stamps.</div><div>k. When revised for resubmission, identify all changes made since previous submission.</div><div>l. Distribute copies of reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.</div><div>m. Submittals not requested will not be recognized or processed.</div><div>n. Provide files containing only related items (such as piping, equipment, air distribution, etc.)</div></div>		
31)	Instruct Owner's representative in the operation of the systems, using the operation and maintenance manual as a teaching aid.		
32)	Provide an operation and maintenance manual. As a minimum, the manual shall contain: <div><div>a. A complete list of all equipment and appurtenances with equipment designations (per Drawings), manufacturers, and catalog numbers.</div><div>b. Copies of manufacturers' brochures and instructions for operation and maintenance of all mechanical equipment, including replacement parts lists.</div></div>		
33)	Horizontal Air Handler unit: Indoor fan-coil unit shall be direct-expansion horizontal heat pump air handler with electric strip heat suspended from structure with auxiliary drip pan and condensate drain. Provide float switch in drip pan to shut down unit if pan begins to fill. Unit shall be complete with cooling coil, fan, fan motor, piping connections, electrical controls, microprocessor control system, and integral temperature sensing. Cabinet shall be fully insulated for improved thermal and acoustic performance. Condensate pan shall have internal trap and auxiliary drip pan under coil header. Provide condensate trap recommended by manufacturer. Air filters shall be 1-inch-thick glass fiber, disposable type arranged for easy replacement. Provide number of stages as scheduled. Provide condensate overflow switch (Rectarexal Safe-T-Switch Model SSI or equivalent) wired to shut unit down in case of condensate overflow.		
34)	Vertical Air Handler unit: Indoor fan-coil unit shall be direct-expansion vertical heat pump air handler with electric strip heat mounted on plenum with auxiliary drip pan and condensate drain. Provide float switch in drip pan to shut down unit if pan begins to fill. Unit shall be complete with cooling coil, fan, fan motor, piping connections, electrical controls, microprocessor control system, and integral temperature sensing. Cabinet shall be fully insulated for improved thermal and acoustic performance. Condensate pan shall have internal trap and auxiliary drip pan under coil header. Provide condensate trap recommended by manufacturer. Air filters shall be 1-inch-thick glass fiber, disposable type arranged for easy replacement. Provide number of stages as scheduled. Provide condensate overflow switch (Rector safe Safe-T-Switch Model SSI or equivalent) wired to shut unit down in case of condensate overflow.		
35)	Small Split Air Handler unit (4 WAY): The unit shall be a four-way cassette style indoor unit that recesses into the ceiling with a ceiling grille. The indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, electronic modulating linear expansion device, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes shall be charged with dehydrated air before shipment from the factory. The unit shall be provided with an integral condensate lift mechanism that will be able to raise drain water 18-31/4" inches above the condensate pan. Both refrigerant lines to the indoor units shall be insulated with 3/8" closed cell foam plastic Xmmflex? Refer to Schedule on Drawings for additional specifications.		
36)	Small Split Condensing unit: Casing: House components in welded steel frame with galvanized steel panels with weather resistent, baked enamel finish. Mount controllers and controls in weatherproof panel provided with full opening access doors. Provide removable access doors or panels with quick fasteners. Compressor: Hermetically sealed, 3600 rpm maximum, resiliently mounted with positive lubrication and internal motor protection. Compressor: Hermetic reciprocating type or Hermetic scroll type. Condenser Coils: Aluminum fins mechanically bonded to seamless copper tubing or all aluminum fins and tube. Air test under water to 425 psig, and vacuum dehydrate. Seal with holding charge of refrigerant. Coil Guard: Louvered or PVC coat steel wire. Fans and motors: Direct driven propeller type condenser fans with fan guard on discharge. Weatherproof motors suitable for outdoor use, single phase permanent split capacitor with permanent lubricated ball bearings and built in thermal overload protection. Fan Guard: PVC coat steel wire. Refrigerant circuit: For each refrigerant circuit, provide: Filter drier liquid line. Suction accumulator. Suction and liquid line service valves and gas ports. Charging valve. Condenser pressure relief mechanism. Factory wired with single point power connection. Factory wired controls shall include, high- and low-pressure cutoffs, internal winding thermostat for compressor, control circuit transformer, non-cycling reset relay. Provide a surge capacitor and lightning arrester in unit cabinet for protection from power surges due to lightning and switching transients. Provide controls to permit operation down to 0 degrees F ambient temperature were scheduled to include: Crankcase heater with thermostat. Head pressure switch to light fan motors in response to refrigerant condensing pressure. Solid state control to vary speed of one condenser fan motor in response to refrigerant condensing pressure. Refer to Schedule on Drawings for additional specifications.		
37)	Air Source Heat Pumps (4P): outdoor-mounted, air-cooled split system outdoor section suitable for rooftop installation, consisting of a hermetic compressor, an air-cooled coil, the propeller-type blow-thru outdoor fans, accumulator, full refrigerant charge, and control box. Unit shall function as the outdoor component of an air-to air cooling system and used in a refrigeration circuit matched to the indoor unit. Unit construction shall comply with ANSI/ASHRAE 15, latest revision, the NEC, and UL standards. Provide rail support system compatible with roofing system. Refer to Schedule on Drawings for additional specifications.		
38)	Provide a duct smoke detector on the supply duct of each air handling unit or rooftop unit with design airflow exceeding 2,000 CFM, and where smaller air handling units have common return ductwork or plenum and total air flow exceeds 2,000 CFM. Install detector in accordance with the International Mechanical Code section 608. Smoke Detection Control System with Georgia Amendments 2018. Detectors shall be provided by the electrical/fire alarm subcontractor and shall be installed by the mechanical subcontractor. For other fans, such as exhaust fans with design airflows exceeding 2,000 CFM, coordinate with the electrical/fire alarm subcontractor to provide room or duct smoke detectors. Where no fire alarm system is installed in building provide smoke detector, audio visual annunciator and trouble indicator in an approved location. Duct smoke detector trouble conditions shall activate a visible or audible signal in an approved location and shall be identified as air duct detector trouble. Provide contacts to automatically shut down all such fan motors when smoke is detected, to indicate detector status to the fire alarm system, and to require a manual reset of the shut-down relay.		
39)	Fire damper; curtain type with blades outside air stream except when located behind grilles when blades may be in air stream. Provide 1-1/2" hr class unless noted otherwise, vertical or horizontal mounting as shown on drawings. Provide access doors for access to fire or smoke dampers having fusible links. Doors shall be re-placable, rated, fusible link. Doors shall be pressure relief access doors; and shall be outward opening for access doors installed upstream from dampers and inward opening for access doors installed downstream from dampers adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."		
40)	Grilles, Registers and Diffusers: Grilles, registers, and diffusers as indicated on the drawings have been selected from the catalog of the manufacturer noted as the basis of design. Sizes, types, and performance of the devices to be provided must be coordinated to insure conformity with design basis. Sidelaw supply grilles and registers shall have vertical flat blades; sidelaw return grilles shall have horizontal blades. Grilles and registers with borders shall have felt or rubber gaskets cemented to the back face and hiding screws not over 18 inches on centers around the perimeter. Holding screws shall be counter-sunk to fit flush with face of grille or register. Grilles passing air through partitions shall be as described for wall return grilles, one for each side of partition. Register dampers shall be of the gung-operated, opposed blades type, operated through the face of the register. Operating mechanism shall not project through the register face. Mounting frame shall be coordinated with architectural reflected ceiling plans. Construction shall be of steel or aluminum as scheduled, with frame type to match ceiling construction. Sidelaw supply grilles and registers shall be double-deflection type, with vertical flat frames. Construction shall be of steel, with 3/4-inch blade spacing. Return air grilles, return air registers, exhaust grilles, exhaust registers and transfer air grilles located in ceilings shall be constructed of aluminum with "egg-crate" design, with 1/2-inch x 1/2-inch x 1/2-inch grids. Frame style shall be compatible with ceiling construction. Install wall grilles and registers with horizontal edges parallel to ceiling. Concentric diffuser assemblies at roof top units shall have point-ready exterior finish and 1-inch lined supply and return ducts that transition to diffuser size within 24 inches vertically of the bottom of roof top unit curb.		
41)	Basic motor requirements: basic requirements apply to mechanical equipment motors, unless otherwise indicated. Motors 1/2 hp and larger: Polyphase, unless otherwise scheduled. Motors smaller than 1/2 hp: single phase. Frequency rating: 60 Hz. Service factor: according to NEMA MG 1, general purpose continuous duty, design type "B." Enclosure: open drip-proof, unless otherwise indicated. Efficiency: motors shall have a higher efficiency rating than industry standard average motor as delineated in IEEE Standard 102, type S, grade NS, class 25, use 0. Thermal protection: where indicated or required, internal protection automatically stops power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal protection device automatically resets when motor temperature returns to normal range, unless otherwise indicated.		
42)	Hangers and supports: Building attachments: concrete inserts or structural-steel fasteners appropriate for building materials, and beam clamps. Hanger materials: galvanized, steel sheet or round, threaded steel rod. Hangers installed in corrosive atmospheres: electrogalvanized, all-thread rod or galvanized rods with threads painted after installation. Sheets and rod sizes: comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters. Duct attachments: Duct attachments: strap metal covers, blind rivets, or self-tapping metal screws; compatible with duct materials. Trapeze and riser support galvanized steel shapes and plates: steel shapes complying with ASTM A 36/A 36M.		
43)	Sealant materials: joint and seam sealants, general: the term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics. Joint and seam tape: 2 inches wide; glass-fiber fabric reinforced. Joint and seam sealant: one-part, nonsag, solvent-release-curing, polyurethyl butyl sealant, formulated with a minimum of 75 percent solids. Flanged joint mastics: one-part, acid-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, type S, grade NS, class 25, use 0.		
44)	Packaged Roof Top Units-Gas Heat: Outdoor packaged units, ground mounted, electrically controlled, 2-stage stage cooling with gas heat units, as scheduled, utilizing scroll hermetic compressor(s) for cooling duty and an indirect fired gas furnace section for heating duty. Unit shall exceed ASHRAE 90.1-2001 Energy Standards, be rated in accordance with AHJ Standards 210/240 or 360 and 270, in accordance with UL Standard 1995, conform to ASHRAE 15, latest revision, be UL-tested and certified in accordance with ANSI Z21.47 Standards. Factory assembled, single phase and cooling unit. Contained within the unit, condenser piping, controls, refrigerant charge, and thermal expansion valve. Unit cabinet shall be constructed of galvanized steel, and shall be phosphatized/bonderized and coated with a pre-painted baked enamel finish on all externally exposed surfaces. Coils shall have aluminum fins mechanically bonded to copper tubing. Evaporator fan compartment interior cabinet surfaces shall be insulated with a minimum 1/2-inch, thick, 1 lb. density, flexible fiberglass insulation, neoprene coated on the air side. Cabinet insulation shall meet ASHRAE Standard 62P. Aluminum foil-faced fiberglass insulation shall be used in the gas heat compartment. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation. Cabinet panels shall be easily removable for servicing. Condenser coils shall have protective wire guards. Unit shall have a factory-installed, sloped condensate drain pan made of a non-corrosive material, with a minimum 3/4-inch-14 NPT connection and shall comply with ASHRAE Standard 62. Unit shall have 2-inch pleated MERV 7 disposable filters a removable. Filter access panel to provide filter access. Unit shall have standard thru-the-bottom utility connection capability and accessory powered convenience receptacle. Provide matching pre-fabricated roof curb with direct, duct attachment capability. Provide low- and high-pressure safety switches, anti-short cycle safety, and low ambient operation. Provide microprocessor control panel and complete, factory-wired controls, including discharge air temperature sensor, and communications interface. Refer to schedule for layout basis. Substitutions shall match the features of specified model. Provide condensate overflow switch (Rectarexal Safe-T-Switch Model SSI or equivalent) wired to shut unit down in case of condensate overflow. Refer to Schedule on Drawings for additional specifications.		
45)	BI-POLAR IONIZATION DESIGN & PERFORMANCE CRITERIA: <div><div>The Bi-polar Ionization system shall be capable of effectively killing microorganisms downstream of the bi-polar ionization equipment (mold, bacteria, virus, etc.). Controlling gas phase contaminants generated from human occupants, building structure and furnishings. Capable of reducing static space charges. Increasing the interior ion levels, both positive and negative, to a minimum of 800 ions/cm<sup>3</sup> measured 5 feet from the floor. Self-cleaning requiring no maintenance or replacement parts. Producing a minimum of 160M ions/cc. The bi-polar ionization system shall operate in a manner such that equal amounts of positive and negative ions are produced. Uni-polar ion devices shall not be acceptable.</div><div>Velocity Profile: The air purification device shall not have maximum velocity profile.</div><div>Humidity: Plasma Generators shall not require preheat protection when the relative humidity of the entering air exceeds 85%. Relative humidity from 0 - 100%, condensing, shall not cause damage, deterioration or dangerous conditions within the air purification system. Air purification system shall be capable of wash down duty.</div><div>Equipment Requirements: Electrode Specifications (Bi-polar Ionization): Each Plasma Generator with Bi-polar Ionization output shall include the required number of electrodes and power generators sized to the air handling equipment capacity. A minimum of one electrode pair per 2,400 CFM of air flow shall be provided. Bi-polar ionization tubes manufactured of glass and steel mesh shall not be acceptable due to replacement requirements, maintenance, performance output reduction over time, ozone production and corrosion. Electrodes shall be energized when the main unit disconnect is turned on and the fan is operating. Electrodes shall be made from carbon fiber to prevent oxidation over time. Internal circuitry shall be provided to sense air flow across the electrode output/ionization systems requiring the use of a mechanical air pressure switch to cycle the electrodes only when the fan is operating shall not be acceptable due to high failure rates and pressure sensitivity. Electrode pair shall provide a minimum of 160 million ions per cubic centimeter per second for a minimum of 2 inches. Both positive and negative ions, in equal quantities. Devices providing less than 160 million ions/cc per electrode pair shall not be acceptable. Each Plasma Generator shall be provided with a self-cleaning system that is field programmable to change the number of days between the cleaning cycle. Systems without a no-maintenance, self-cleaning system shall not be acceptable. Each electrode pair shall be designed with a banana style plug such that it can be field replaced, if necessary. Each Plasma Generator shall be provided with an inline on/off switch, universal voltage input (24VAC to 240VAC or DC), magnets for mounting to the fan inlet, replaceable carbon fiber emitters and a programmable self-cleaning system.</div><div>Air Handler &amp; Plenum Mounted Units (non-ductless mini-split units): Where so indicated on the plans and/or schedules Plasma Generator(s) shall be supplied and installed. The mechanical contractor shall mount the Plasma Generator and wire it to the AHU control power (24VAC) as instructed by the Air Purification Manufacturer's instructions or line voltage subject to power availability. Each unit shall be designed with a molded casing, self-cleaning system, self-cleaning test button, power status LED and dry contacts to prove ion output is operating properly. The dry contacts shall close to prove the ion generator is working properly and may be daisy chained in series such that only one dry contact per AHU is required to interface to the BAS or the optional DCU controller. Dry contacts proving power has been applied in lieu of the ion output is actually operating, are not acceptable. Manufacturers providing multiple ion modules that have dam status wired in parallel, and not in series, shall not be acceptable.</div><div>Ionization Requirements: Plasma Generators with Bi-polar ionization output shall be capable of controlling gas phase contaminants and shall be provided for all equipment listed above.</div><div>The Bi-polar ionization system shall consist of Bi-Polar Plasma Generator and integral power supply. The Bi-polar system shall be installed where indicated on the plans or specified to be installed. The device shall be capable of being powered by 24VAC to 240VAC without the use of an external transformer. Ionization systems requiring isolation transformers shall not be acceptable.</div><div>Ionization Output: The ionization output shall be controlled such that an equal number of positive and negative ions are produced. Imbalanced levels shall not be acceptable.</div><div>Ionization output from each electrode shall be a minimum of 160 million ions/cc when tested at 2? from the ionization generator.</div><div>All manufacturers shall provide documentation by an independent NELAP accredited laboratory that proves the product has minimum kill rates for the pathogens given the allotted time and in a space condition.</div><div>Ozone Generation: The operation of the electrodes or Bi-polar ionization units shall conform to UL 867-2007 with respect to ozone generation. There shall be no ozone generation during any operating condition, with or without airflow.</div><div>Control Requirements: All Plasma Generators shall have internal short circuit protection, overload protection, and automatic fault reset circuit breakers. Systems with manual fuses shall not be allowed. Integral airflow sensing shall modulate the Plasma output as the airflow velocity or stops. A mechanical airflow switch shall not be acceptable as a means to activate the Plasma device due to high failure rates and possible pressure reversal. The installing contractor shall mount and wire the Plasma device within the air handling unit specified or as shown on the plans. The contractor shall follow all manufacturer IOW instructions during installation. Dry contacts shall be provided to prove there are ions being produced. Systems providing indication that power is applied to the Plasma device, but not directly sensing the power at the ion output, shall not be acceptable.</div></div>		
46)	All HVAC equipment such as AH, OJ, EF, AC, HP, and RTU shall have visible nameplates with their associated marks on them.		
47)	Louvers:6" deep, 12 gauge (10.081) elcted and 30-minute draz anodized extruded aluminum, drainable blades and frame, back mounted 1/2" mesh 18-gauge screen, flange frame. Lower shall be rated for no water carry-through at 900 feet velocity, 0.15" maximum pressure drop for 4-foot square sample tested according to AMCA Standard 560, 1973. American Warming LE-315 (alum.), Ruskin (ELF-63750; Louvers & Dampers EL-6; Industrial Louvers 653 alum.; Vent Products #4650; Shipman LE-33 (alum.); Arrow United EM615-0 (alum.); Greenheck ESD-603. Provide adapter to match corrugations in metal panel.		
48)	Fabric Duct Specification: <div><div>Product must be classified in accordance with the 25/50 flame spread/smoke development requirements of UL723 based on NFPA 90A - 1993, "Installation of Air Conditioning and Ventilating Systems". In addition, products must be classified in accordance with ICC Evaluation Service AC167 and UL 2518.</div><div>Fabric duct air dispersion system must design in software which documents, calculates and provides: pressure loss, inlet velocity, turbulent condition warnings, throw capability, entrainment, deflection, flow models, sizing, installation methods, sound generated and temperature corrections.</div><div>Manufacturer must provide a 10 Year Non-Prorated Warranty. Prorated warranties are not accepted.</div><div>Protect Fabric Duct systems from damage during shipping, storage and handling. Store products inside and protect from weather.</div><div>Phihoda Fabric Duct Air Dispersion System shall be constructed of Classic (PMS) fabric. The material is a woven fire retardant and permeable fabric complying with the following characteristics:<div><div>a. Fabric: 100X Flame Retardant Polyester</div><div>b. Weight: 6.5 oz./yd<sup>2</sup> per ASTM D3776 minimum</div><div>c. Strength: warp1880/ weft1090N Per ISO13934</div><div>d. Shrinkage: Max. 0.5% per ISO 6330-2000</div><div>e. Available Standard Colors: White (RAL 9016), Light Grey (Pantone 420/RAL 7035), Dark Grey (Pantone 424/RAL 7037), Yellow (Pantone 135/RAL 1017), Light Blue (Pantone 2915/RAL 5012) Blue (Pantone 7462/RAL 5005) Green (Pantone 340/ RAL7037) Black (Pantone 418/RAL9017), Red (Pantone)87/RAL 3001). Custom color available, Architect/Owner must specify PANTONE or RAL number.</div><div>f. Temperature Range: -75°F to +230°F</div><div>g. Permeability: 2 cm (+/-1) (to prevent condensation only)</div><div>h. Fire Retardant: Must meet the requirements in NFPA 90-A, ICC AC-167 and UL2518</div></div></div><div>Air Dispersion Method<div><div>A. Laser Cut Perforations/holes (long throw)<div><div>-4mm - 3? diameter project dependent.</div><div>-Laser cut (punching method not acceptable)</div><div>-location, number and size determined by manufacturer</div><div>-directional Textile Air Control Pockets to prevent excessive air deflection</div></div></div><div>Provide system in sections optimized for maintenance (16" maximum for diameters over 32"), connected by zippers. Zippers must provide closure completely around the circumference to prevent leakage.</div><div>Each section to have a unique tag including information about: manufacturers order number, position, diameter of section, length of section, maintenance instruction, code compliance and contact details for spare parts.</div><div>Zipper inlet connection.</div><div>Endcap may be zippered or sewn to the last duct section as required.</div><div>Equalizers (flow correctors) and/or dampers to be included as shown on plans or schedules.</div><div>Include hooks which slide into track profile or snap on to wire/cable or continuous fabric strip which slides into track if shown in detail or noted on plans</div><div>Include SS inlet clamp for securing to metal outlet connection point.</div><div>Do not use fabric duct air diffusers in concealed locations (unless pressurized plenum space intended for air distribution).</div><div>Fabric diffusers shall be designed from minimum 0.25% water gage to 3? as the maximum - 0.5? being the standard.</div><div>Design temperatures between -75F and 230F</div><div>Manufacturer shall approve all technical design parameters.</div><div>Single Cable/Wire Suspension - One row cable system located 1.25? above 12 o'clock of Fabric duct system. Fabric Duct system to be attached to hardware using one single row of plastic hooks located 12 o'clock spaced 20 inches. Hardware to include cable, cable clamps, turnbuckles, and tie down straps as required. Support hangers spaced as follows:<div><div>Examine area and conditions under which the Phihoda Fabric Duct system is to be installed. Do not continue any installation until unsatisfactory conditions have been corrected.</div><div>Install chosen suspension system in accordance with the requirements of the manufacturer. Installation instructions to be provided by the manufacturer with product.</div><div>Coordinate layout with suspended ceiling, lighting layouts, and similar finished work.</div><div>Clean air handling unit and other ductwork prior to the Phihoda fabric duct system as it is installed. Make sure that all dust and debris from installation is removed from the air handling unit and other ductwork before connecting the fabric duct system.</div><div>If the Fabric duct system becomes soiled during the installation, it should be removed and cleaned following the manufacturers cleaning instructions.</div><div>Internal rings (ALU, SS, or Heat-resistant plastic)</div><div>Internal Aluminum Arcs (placed in roof of duct at factory from 10 to 2, holds duct open)</div><div>Tensioning device to remove wrinkles/creases</div></div></div><div>Ceiling Ventilator shall have corrosion resistant galvanized steel housing with four-point mounting capability. It shall be ducted to a cap on roof or wall using round ductwork. Blower assembly shall be removable, have a centrifugal-type blower wheel and a permanently lubricated motor designed for continuous operation. Non-metallic damper/duct connector shall be included. Fan and heater shall be separately controllable. Fan shall contain electric heater. Air delivery shall be no less than scheduled and sound level no greater than listed in the schedule. All air and sound ratings shall be certified by IHV.</div><div>Electric Wall Mount Heater: Heater shall be UL listed and labelled with terminal box and cover, and built-in controls. Heater shall be made in three pieces consisting of back enclosure, heater assembly and front panel. Front panel shall be attached with concealed fasteners. Heating Elements: Nickel-chromium heating element wire shall be encased in a steel or copper sheath. Aluminum fins shall be pressure bonded to the sheath. Enclosure: Enclosure shall be minimum 20-gauge painted steel for surface mounting. Front Panel: Bar grille type panel with down deflection toward floor. Finish shall be paint on steel bars. Grille shall be surrounded by decorative satin finished aluminum accent frame. Unit shall be fan forced type including fan motor, fan and controls with thermostat adjustment accessible through front grille. Unit shall also include thermal safety cutoffs in the event of over temperature conditions. Refer to Schedule on Drawings for additional specifications.</div></div></div></div>		
51)	Acceptable Manufacturers are:		
Air Handlers & Heat Pumps, Packaged Units:		Carrier, Trane, York, Lennox	
Small Split Units:		Mitsubishi, Daikin, Hitachi, Toshiba	
Grilles, Registers & Diffusers:		Titus, Nakor, Price, Tuttle & Bailey, Kruger, Metal Aire (Color selection submitted to Architect)	
Fans:		Twin-City, Cook, Greenheck, Penn Barry, Acme, American Cool Air, Captive Air, Solar & Palau	
Electric Heaters:		Markel, Q-Mark, Raywall, Indeco	
Louvers/Dampers/Fire Dampers:		United Entech, Greenheck, Ruskin, Arrow United, Lloyd Industries, Air Balance (Color selection submitted to Architect)	
Controls-provided with unit:		Provide thermostats by same manufacturer as equipment	
JOB NO.: 02405			
DRAWN BY: JWK/KMP			
CHECKED BY: KMP			
DESCRIPTION: CD-REVIEW-DOCS			
DATE: 12.02.24			
DESCRIPTION: DD-REVIEW			
DATE: 00.00.24			
DESCRIPTION: CD-REVIEW			
DATE: 12.02.24			
DESCRIPTION: BID-CONSTRUCTION			
DATE: 00.00.24			
REVISIONS:			
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1 BOWDEN CABLE CONTROL SYSTEM  
SCALE: N.T.S.



2 AH-3 DETAIL  
SCALE: N.T.S.

MECHANICAL SYMBOLS & ABBREVIATIONS LEGEND									
NEW PIPE, DUCTWORK OR EQUIPMENT									
DUCT SIZE: FIRST DIMENSION IS SIDE DRAWN									
FLEXIBLE ROUND DUCTWORK									
FIRE DAMPER, SMOKE DAMPER, SMOKE DETECTOR									
CEILING SUPPLY DIFFUSER									
CEILING RETURN OR EXHAUST AIR									
SA DUCT OUT OF TU BOX WITH DUCT LINER FOR THE FIRST FIVE FEET OF DUCT OUT OF TU BOX									
SIDEWALL REGISTER OR GRILLE									
CHANGE IN PIPE OR DUCT SIZE OR SHAPE									
REFRIGERANT PIPING									
CONDENSATE OR OTHER DRAIN PIPING									
ELBOW TURNED DOWN OR TURNED UP IN PIPING									
THERMOSTAT, ARROW SHOWS CONTROL WIRING PATH									
TIME CLOCK									
DIAMETER									
U.C. UNDER-CUT DOOR 3/4", UNLESS OTHER SIZE NOTED									
INDICATES EQUIPMENT ON PLANS; TOP ITEM SHOWS TYPE OF EQUIPMENT AND BOTTOM ITEM SHOWS SPECIFIC MARK NUMBER									
ITEM IN HEXAGON SHOWS AIR DEVICE MARK NUMBER, ITEM ABOVE LINE SHOWS NECK SIZE, ITEM BELOW LINE SHOWS AIR FLOW THROUGH DEVICE, AND NUMBER IN FRONT SHOWS QUANTITY IF MORE THAN ONE									
ABOVE FINISHED FLOOR									
AIR HANDLING UNIT									
BYPASS DAMPER									
BRITISH THERMAL UNITS, THOUSAND BRITISH THERMAL UNITS									
CAPACITY									
CFM CUBIC FEET PER MINUTE									
CEILING									
CONDENSING UNIT									
DB, WB DRY BULB TEMPERATURE, WET BULB TEMPERATURE									
EA EXHAUST AIR, EXHAUST GRILLE									
EF EXHAUST FAN									
EXT SP EXTERNAL STATIC PRESSURE (USUALLY EXPRESSED IN INCHES OF WATER IN GAGE)									
HP HEAT PUMP UNIT									
MVD, VD MANUAL VOLUME DAMPER									
OA OUTSIDE AIR									
RA, RG RETURN AIR, RETURN GRILLE									
RTU PACKAGED ROOFTOP UNIT									
SA SUPPLY AIR									
A AUDIBLE/VISUAL ALARM DEVICE CONNECTED TO DUCT SMOKE DETECTOR									
VAC, PH VOLTS ALTERNATING CURRENT, NUMBER OF PHASES									
W, KW WATTS, KILOWATTS									
ACCESS DOOR									
RADIUS ELBOW (R=1.5)									
VANED ELBOW									
MANUAL VOLUME DAMPER (MVD), MOTOR OPERATED DAMPER (MOD)									

ELECTRIC CABINET HEATER SCHEDULE				
MARK	HEATER KW	VOLTS/PH	BASIS OF DESIGN	NOTES
EW-1	1.5	120/1	BROAN 174	1:2:3
1. MOUNT UNIT HEATERS AT 90° AFF. 2. VERTICAL WALL MOUNTED EXPOSED HEATER. 3. VERIFY ELECTRIC POWER REQUIREMENTS WITH ELECTRICAL PLANS, WHICH TAKE PRECEDENCE OVER THIS INFORMATION.				

SELF-CLEANING IONIZATION SYSTEM SCHEDULE			
AIRFLOW CAPACITY MIN-MAX CFM	BASIS OF DESIGN GLOBAL PLASMA SOLUTIONS	NOTES	
0-2400	GPS-FC24-AC	1:2:3:4:5	
0-1200	GPS-FC	1:4:7:8	
0-8000	GPS-MOD	1:2:3:4:6	
1. ONE SELF-CLEANING IONIZATION SYSTEM SHALL BE INSTALLED PER SYSTEM, INTERLOCK TO RUN WITH EVAPORATOR FAN. 2. UNIT SHALL BE EQUIPPED WITH UNIVERSAL VOLTAGE INPUT, IN-LINE ON-OFF SWITCH, PROGRAMMABLE AUTO-CLEANING CYCLE. 3. UNIT SHALL BE EQUIPPED WITH PLASMA ON INDICATION LIGHT, ALARM CONTACTS, MAGNETS, AND CARBON FIBER BRUSH EMITTERS. 4. SYSTEM SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. 5. USE THIS SYSTEM FOR UP TO 3-TON AIR HANDLING UNITS. 6. ONE IONIZATION SYSTEM PER GROUND MOUNTED PACKAGED UNIT PU-1 AND PU-2. 7. SYSTEM SHALL BE USED FOR DUCTLESS MINI SPLITS. 8. SYSTEM SHALL BE EQUIPPED WITH CARBON FIBER BRUSHES AND LED OPERATION STATUS.			

LOUVER SCHEDULE						
MARK	W X H (INCHES)	CFM	FREE AREA (SQ. FT.)	PRESS. DROP (IN. W.G.)	(COLOR BY ARCHITECT)	BASIS OF DESIGN
L-1	42"x18"	1250	2.14	0.06	ENAMEL	GREENHECK ESD 403
L-2	36"x12"	400	1.17	0.06	ENAMEL	GREENHECK ESD 403
1. COORDINATE WITH ARCHITECTURAL PLANS FOR LOUVER ELEVATION, PAINT LOUVER TO MATCH EXTERIOR WALL. 2. STATIONARY EXTRUDED ALUMINUM DRAINABLE BLADE LOUVER, PROVIDE WITH BROSSCREEN AND FACTORY BAKED ENAMEL FINISH. 3. PROVIDE FULL SIZE 24-INCHES DEEP SHEET METAL PLENUM BEHIND PLENUM. 4. TOP OF LOUVER AT BOTTOM OF STRUCTURE.						

PACKAGED ROOFTOP UNIT SCHEDULE																				
MARKED	AIRFLOW	SUPPLY AIR CFM	MIN. OUTSIDE AIR CFM	EXT. SP. IN. W.G.	NOMINAL TONS	EVAP. COIL ENTERING AIR DB F°	EVAP. COIL LEAVING AIR WB F°	EVAP. COIL DESIGN CONDITIONS DB F°	EVAP. COIL LEAVING AIR WB F°	SYSTEM COOLING MAX. REQUIREMENTS (MBH)	OUTSIDE AIR TEMP. DB F°	GAS HEAT MBH	HEATING COIL DB F°	HEATING COIL DESIGN CONDITIONS DB F°	POWER VAC/PH	BASIS OF DESIGN CARRIER	WEIGHT LBS	NOTES		
PU-1	HORIZONTAL	5,250	1000	1.0	15.0	78.5	65.5	55.0	54.0	180.0	135.0	95	144/118	180/146	61.5	87.5	208/3	48FD16M24S-0A040	1800	1:2:3:4:5:6:7:8:9:10:11:12
PU-2	HORIZONTAL	5,250	1000	1.0	15.0	78.5	65.5	55.0	54.0	180.0	135.0	95	144/118	180/146	61.5	87.5	208/3	48FD16M24S-0A040	1800	1:2:3:4:5:6:7:8:9:10:11:12
PU-3	HORIZONTAL	1,750	315	0.65	5.0	78.5	65.5	55.0	54.0	60.0	44.0	95	87/54	50/40	60.0	93.0	208/3	48CCK06M24S-0A040	700	1:2:3:4:5:6:7:8:9:10:11:12

1. PROVIDE FILTERS, CONDENSATE TRAP, PIPING, FLEXIBLE CONNECTIONS, PROGRAMMABLE T-STAT, AND CONDENSATE P-TRAP TO DISCHARGE INTO DRY WELL. HORIZONTAL SUPPLY AND HORIZONTAL RETURN UNIT. UNIT SHALL BE MOUNTED ON CONCRETE PAD.

2. VERIFY ELECTRIC POWER REQUIREMENTS WITH ELECTRICAL PLANS, WHICH TAKE PRECEDENCE OVER THIS INFORMATION.

3. PACKAGED UNIT SHALL HAVE MEDIUM STATIC MOTOR, PROVIDE MANUFACTURER'S APPROVED SOUND ATTENUATION BLANKETS FOR COMPRESSORS. PROVIDE CONDENSER COIL GUARD.

4. PROVIDE MANUFACTURER'S SUPPLY AIR SMOKE DETECTOR. ELECTRICAL SHALL INTERLOCK IT WITH BUILDING FIRE ALARM SYSTEM. PROVIDE MANUFACTURER'S INTEGRAL CONDENSATE OVERFLOW SWITCH.

5. PROVIDE BUILT-IN HUMID-MIZER ADAPTIVE DEHUMIDIFICATION SYSTEM. HOT GAS REHEAT COIL SYSTEM SHALL WORK INDEPENDENTLY OF COOLING CIRCUIT TO CONTROL HUMIDITY WITHIN OCCUPIED SPACE.

6. PROVIDE MANUFACTURER'S 2-STAGE GAS HEAT. PROVIDE GAS DISCHARGE DEFLECTOR THAT DEFLECTS FLUE UPWARD. PROVIDE FLUE DISCHARGE HEAT SHIELD.

7. PROVIDE MOTORIZED MINIMUM OUTSIDE AIR HOOD. INTERLOCK MINIMUM OUTSIDE AIR DAMPER TO OPEN WHEN EVAPORATOR FAN IS ON.

8. 2-STAGE COOLING WITH HUMID-MIZER. PROVIDE 2-SPEED INDOOR FAN CONTROLLED. FAN SHALL HAVE STAGED AIR VOLUME SYSTEM FOR COOLING.

9. UNDER HEATING SUPPLY CFM SHALL BE SET TO PROVIDE 100% OF AIR AT BOTH STAGES. UNDER COOLING MODE STAGE FAN TO MATCH COOLING STAGE.

10. PROVIDE GLOBAL PLASMA IONIZATION SYSTEM, REFER TO SCHEDULE FOR FURTHER INFORMATION.

11. PROVIDE GAS ECONOMIZER WITH ELECTROMECHANICAL CONTROLS AND FIELD INSTALLED ECONOMIZER ACCESSORIES. GRCOM2R10E4000 WITH POL224. INSTALL RELIEF HOOD AT RETURN AIR DUCT.

12. PROVIDE TEMPERATURE ECONOMIZER WITH BAROMETRIC RELIEF. BAROMETRIC HOOD SHALL BE FIELD INSTALLED ACCESSORIES.

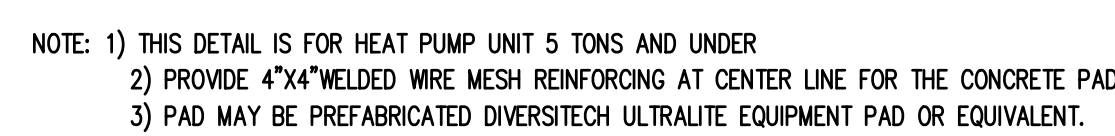
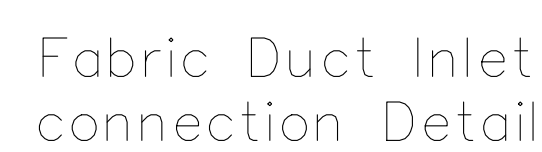
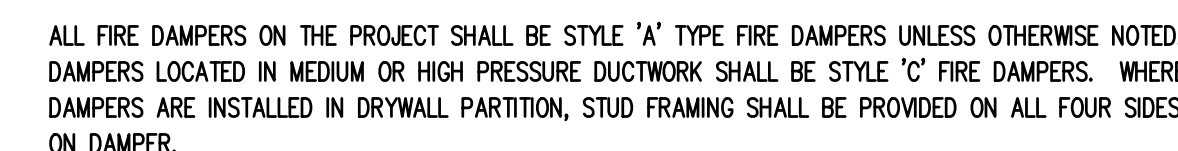
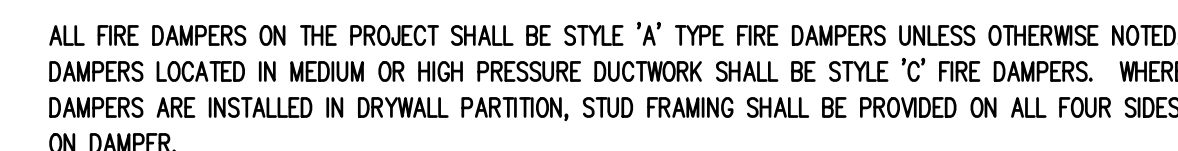
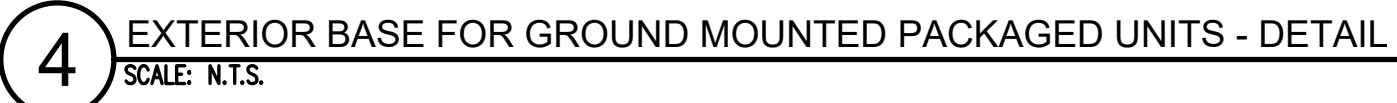
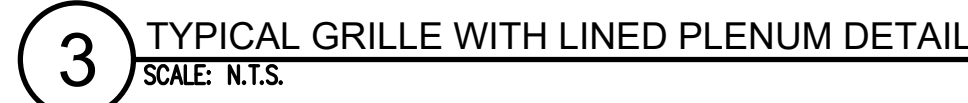
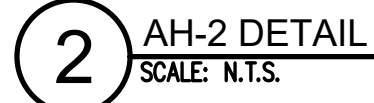
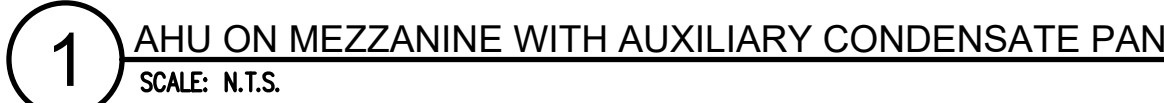
13. PROVIDE GAS ECONOMIZER WITH ELECTROMECHANICAL CONTROLS AND FIELD INSTALLED ECONOMIZER ACCESSORIES. GRCOM2R10E2000 WITH POL224. INSTALL RELIEF HOOD AT RETURN AIR DUCT.

HEAT PUMP AIR HANDLING UNIT SCHEDULE														
MARK	SUPPLY AIR CFM	OUTSIDE AIR CFM	EXT. SP. IN. W.G.	EVAP. COIL ENTERING AIR DESIGN CONDITIONS DB F°	EVAP. COIL LEAVING AIR DESIGN CONDITIONS WB F°	SYSTEM COOLING MAX. REQUIREMENTS (TONS)	SUPPLY HEAT WEIGHT (LBS)	POWER VAC/PH	BASIS OF DESIGN CARRIER	NOTES				
AH-1	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10:11			
AH-2	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10			
AH-3	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10			
AH-4	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10:11			
AH-5	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10			
AH-6	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10			
AH-7	1,400	250	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 7.5	250	208/1	FTSANXC48L	1:2:3:4:5:6:7:8:9:10			
AH-8	1,750	315	0.60	3/4	78.2 65.3 55.0	54.0	46.4 32.6 11.3	250	208/1	FTSANB060L	1:2:3:4:5:6:7:8:9:10			
AH-9	1,750	315	0.60	3/4	78.2 65.3 55.0	54.0	46.4 39.8 11.3	250	208/1	FTSANB060L	1:2:3:4:5:6:7:8:9:10			
AH-10	1,050	125	0.60	1/2	77.1 64.3 55.0	54.0	32.6 22.0 6.0	250	208/1	FTSANXC36L	1:2:3:4:5:6:7:8:9:10			
1. UNIT AT 208/14 AUXILIARY HEATER AT 208/14 UNIT SHALL HAVE SINGLE POINT CONNECTION. AIR-HANDLING UNIT WITH ECM MOTOR. 2. VERIFY ELECTRIC POWER REQUIREMENTS WITH ELECTRICAL PLANS, WHICH TAKE PRECEDENCE OVER THIS INFORMATION. 3. PROVIDE AIR FILTERS, DUCT CONNECTIONS AND VIBRATION ISOLATION. PROVIDE PROGRAMMABLE THERMOSTAT AND SUPP. ELEC. HEAT MODULE CONNECTED TO UNIT FOR SINGLE POINT OF CONNECTION. 4. PROVIDE CONDENSATE PIPING TO DISCHARGE INTO DRAIN PAN. 5. PROVIDE AUXILIARY DRAIN PAN UNDER THE AIR HANDLERS WITH FLOAT ACTIVATED SWITCH TO SHUT THE UNIT DOWN IN CASE OF CONDENSATE OVERFLOW. REFER TO DETAIL PROVIDED. 6. PROVIDE DUCT SMOKE DETECTOR IN SUPPLY AIR DUCT OF AIR-HANDLING UNIT. 7. FLOAT ACTIVATED CONDENSATE SWITCH SHALL BE PROVIDED AND INSTALLED BY HVAC CONTRACTOR. DUCT SMOKE DETECTORS SHALL BE PROVIDED BY ELECTRICAL CONTRACTOR AND INSTALLED BY HVAC CONTRACTOR. 8. PROVIDE COIL OUTLET SWITCH TO SHUT UNIT DOWN IN CASE OF CONDENSATE OVERFLOW. WIRE COIL OUTLET SWITCH IN SERIES WITH AUXILIARY CONDENSATE SWITCH LOCATED IN DRAIN PAN. 9. PROVIDE GLOBAL PLASMA IONIZATION SYSTEM, REFER TO SCHEDULE FOR FURTHER INFORMATION. 10. UNIT SHALL HAVE MANUFACTURER'S REFRIGERANT LEAK DETECTION DISSIPATION SYSTEM. 11. PROVIDE CARRIER PROGRAMMABLE THERMOSTAT WITH FOUR SMART SENSORS. LOCATE SENSORS AND THERMOSTAT AS PER DRAWINGS.														

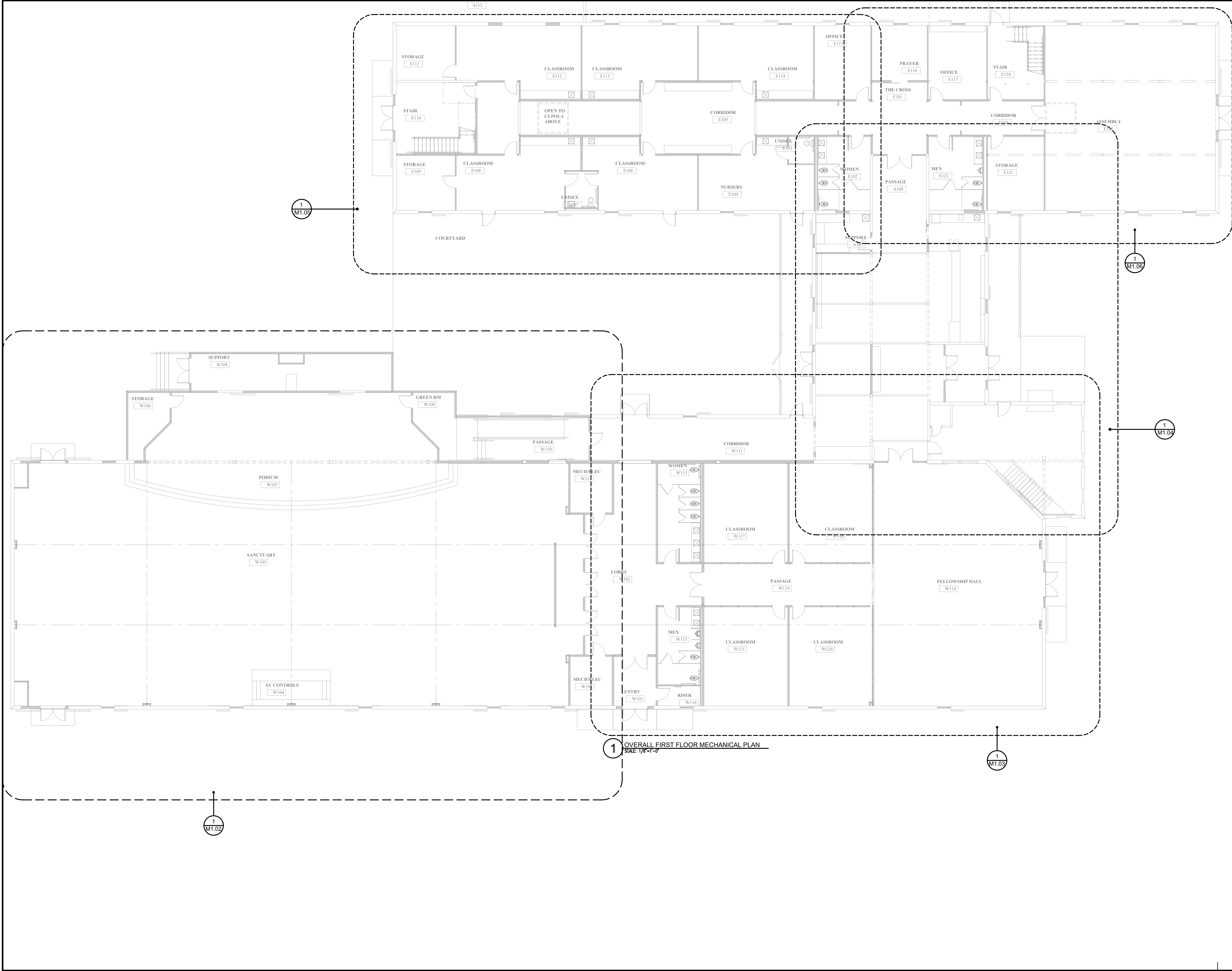
AIR COOLED HEATPUMP UNIT SCHEDULE												
MARK	AHU SERVED	HEAT PUMP HEATING CAP (MBH)	SEER2	HSPF2	NOM. CAP. (TONS)	REFRIG.	OA TEMP SUMMER (DB)	OA TEMP WINTER (DB)	WEIGHT (LBS)	POWER VAC/PH	BASIS OF DESIGN CARRIER	NOTES
HP-1	AH-1	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-2	AH-2	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-3	AH-3	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-4	AH-4	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-5	AH-5	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-6	AH-6	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-7	AH-7	31.2	17.0	8.1	4.0	R454B	93	18	350	208/1	27TPA848A003	1:2:3:4:5:6
HP-8	AH-8	37.5	17.5	8.1	5.0	R454B	93	18	350	208/1	27TPA860A003	1:2:3:4:5:6
HP-9	AH-9	37.5	17.5	8.1	5.0	R454B	93	18	350	208/1	27TPA860A003	1:2:3:4:5:6
HP-10	AH-10	23.6	15.2	8.1	3.0	R454B	93	18	350	208/1	27TPA836A003	1:2:3:4:5:6

1. PROVIDE WITH DEFROST CONTROLS, LOW AMBIENT HEAD PRESSURE CONTROLS, AND ANTI-SHORT CYCLE TIMER. PROVIDE COIL GUARD.  
2. VERIFY ELECTRIC POWER REQUIREMENTS WITH ELECTRICAL PLANS, WHICH TAKE PRECEDENCE OVER THIS INFORMATION.  
3. PROVIDE LIQUID LINE SOLENOID, CRANFORD HEATER, TXV, START CAPACITOR AND EXCEED AS RECOMMENDED BY MANUFACTURER FOR LONG LINE APPLICATIONS.  
4. PROVIDE MOUNTING PAD AS PER DATA PROVIDED.  
5. -STAGE COMPRESSION UNIT  
6. PROVIDE LONG LINE ACCESSORIES PER NOTE 3 WHERE REFRIGERANT PIPE LENGTHS EXCEEDS 80-EQUIVALENT FEET.









1 OVERALL FIRST FLOOR MECHANICAL PLAN  
SCALE: 1/8"=1'-0"

GM

Architect

102 Sammy Court  
WARNER ROBINS, GEORGIA 31088  
glmarch@outlook.com  
(478)-365-8976

ARCHITECT

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COVINGTON, GA 30014  
770.786.3031

OVERALL FIRST FLOOR MECHANICAL PLAN-PHASE I

Retrofit & Renovations for  
Madison Methodist Church

1091 Confederate Highway  
Madison, Georgia 30650

JOB NO.: 02405  
DRAWN BY: JWK/KMP  
CHECKED BY: KMP  
DATE: 12.02.24  
DESCRIPTION: CD-REVIEW-DOCS  
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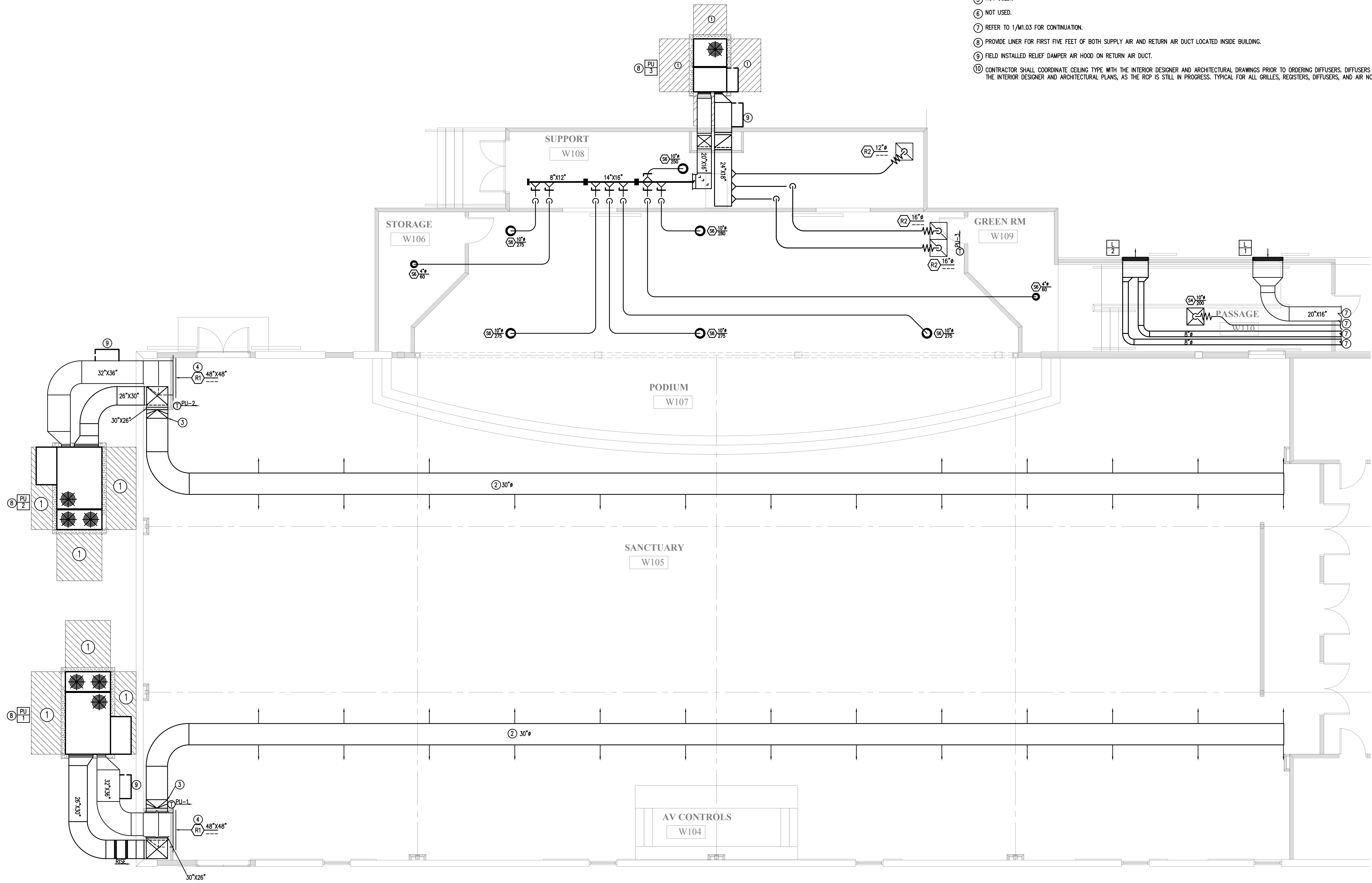
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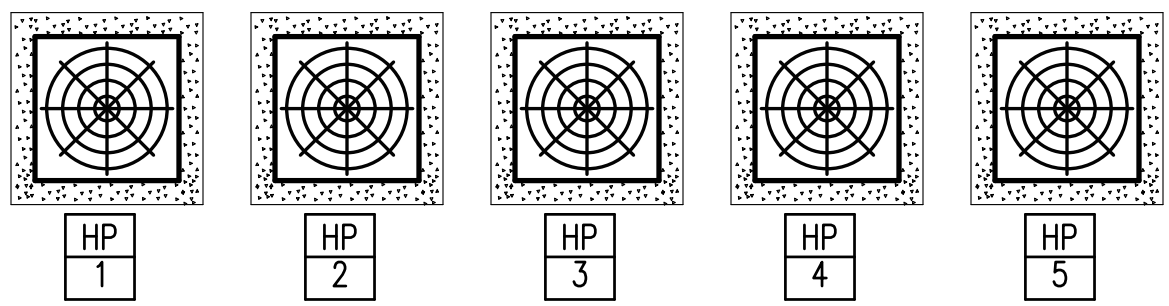
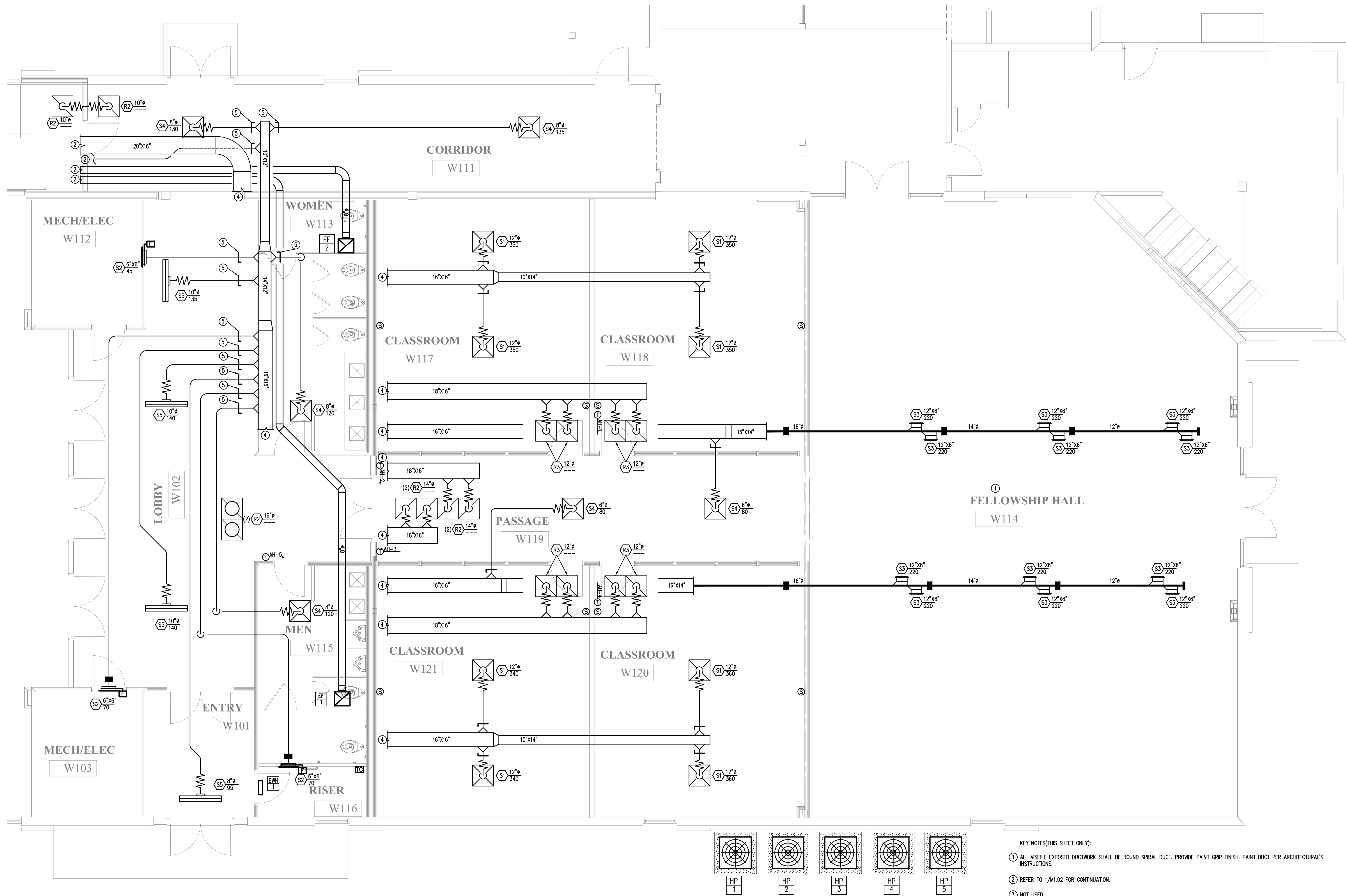
- KEY NOTES (THIS SHEET ONLY):
- UNIT ACCESS SPACE.
  - EXPOSED FABRIC SUPPLY AIR DUCTWORK. CONTRACTOR SHALL PROVIDE ROLLED EDGE AT FABRIC DUCT CONNECTION. REFER TO MANUFACTURER'S DETAIL AND SPECIFICATION FOR FURTHER INFORMATION. FABRIC DUCT LAYOUT BASIS: PRIHODA. DUCTWORK SHALL BE COORDINATED WITH MANUFACTURER. CONTRACTOR SHALL PROVIDE CORRECT AIRFLOW INFORMATION TO FABRIC DUCT MANUFACTURER TO CORRECTLY SIZE DUCT WORK PER MANUFACTURER'S CRITERIA. DUCTWORK SHALL BE NON-COLLAPSIBLE. REFER TO FABRIC DUCT SCHEDULE. LOCATE HIGH AT STRUCTURE. PROVIDE HIGH THROW DIFFUSERS. COORDINATE THE HEIGHT OF SPACE WITH MANUFACTURER.
  - STARTING POINT OF FABRIC DUCT WORK.
  - RETURN AIR GRILL AT 12" AFF. PROVIDE FULL SIZE LINED SHEET METAL PLENUM BEHIND GRILL.
  - NOT USED.
  - NOT USED.
  - REFER TO 1/M1.03 FOR CONTINUATION.
  - PROVIDE LINER FOR FIRST FIVE FEET OF BOTH SUPPLY AIR AND RETURN AIR DUCT LOCATED INSIDE BUILDING.
  - FIELD INSTALLED RELIEF DAMPER AIR HOOD ON RETURN AIR DUCT.
  - CONTRACTOR SHALL COORDINATE CEILING TYPE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL DRAWINGS PRIOR TO ORDERING DIFFUSERS. DIFFUSERS SHALL BE COMPATIBLE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL PLANS, AS THE RCP IS STILL IN PROGRESS. TYPICAL FOR ALL GRILLES, REGISTERS, DIFFUSERS, AND AIR NOZZLES.

1 WORSHIP MECHANICAL PLAN - PHASE I  
SCALE: 3/16"=1'-0"

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- KEY NOTES (THIS SHEET ONLY):
- ① ALL VISIBLE EXPOSED DUCTWORK SHALL BE ROUND SPIRAL DUCT. PROVIDE PAINT GRP FINISH. PAINT DUCT PER ARCHITECTURAL'S INSTRUCTIONS.
  - ② REFER TO 1/M1.02 FOR CONTINUATION.
  - ③ NOT USED.
  - ④ REFER TO 1/M2.01 FOR CONTINUATION.
  - ⑤ TYPICAL YOUNG REGULATOR MODEL 270-896-LO CONCEALED CEILING REGULATOR WITH 7/8" THREADED CEILING CAP. PROVIDE BOWDEN CASING WIRE AS REQUIRED. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLING MANUAL VOLUME REGULATORS.
  - ⑥ CONTRACTOR SHALL COORDINATE CEILING TYPE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL DRAWINGS PRIOR TO ORDERING DIFFUSERS. DIFFUSERS SHALL BE COMPATIBLE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL PLANS, AS THE RCP IS STILL IN PROGRESS. TYPICAL FOR ALL GRILLES, REGISTERS, DIFFUSERS, AND AIR NOZZLES.

1 FELLOWSHIP HALL MECHANICAL PLAN - PHASE I  
SCALE: 1/4"=1'-0"

GM  
Architect

102 Sammy Court  
WARNER ROBINS, GEORGIA 31088  
gfmarch@outlook.com  
(478) 365-8976

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ENGINEERS

169 New Street, Macon, GA 31201  
(478) 743-4632 - T.E. Project # 24-070  
www.totalengineers.com

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FELLOWSHIP HALL MECHANICAL PLAN-PHASE I

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Madison Methodist Church

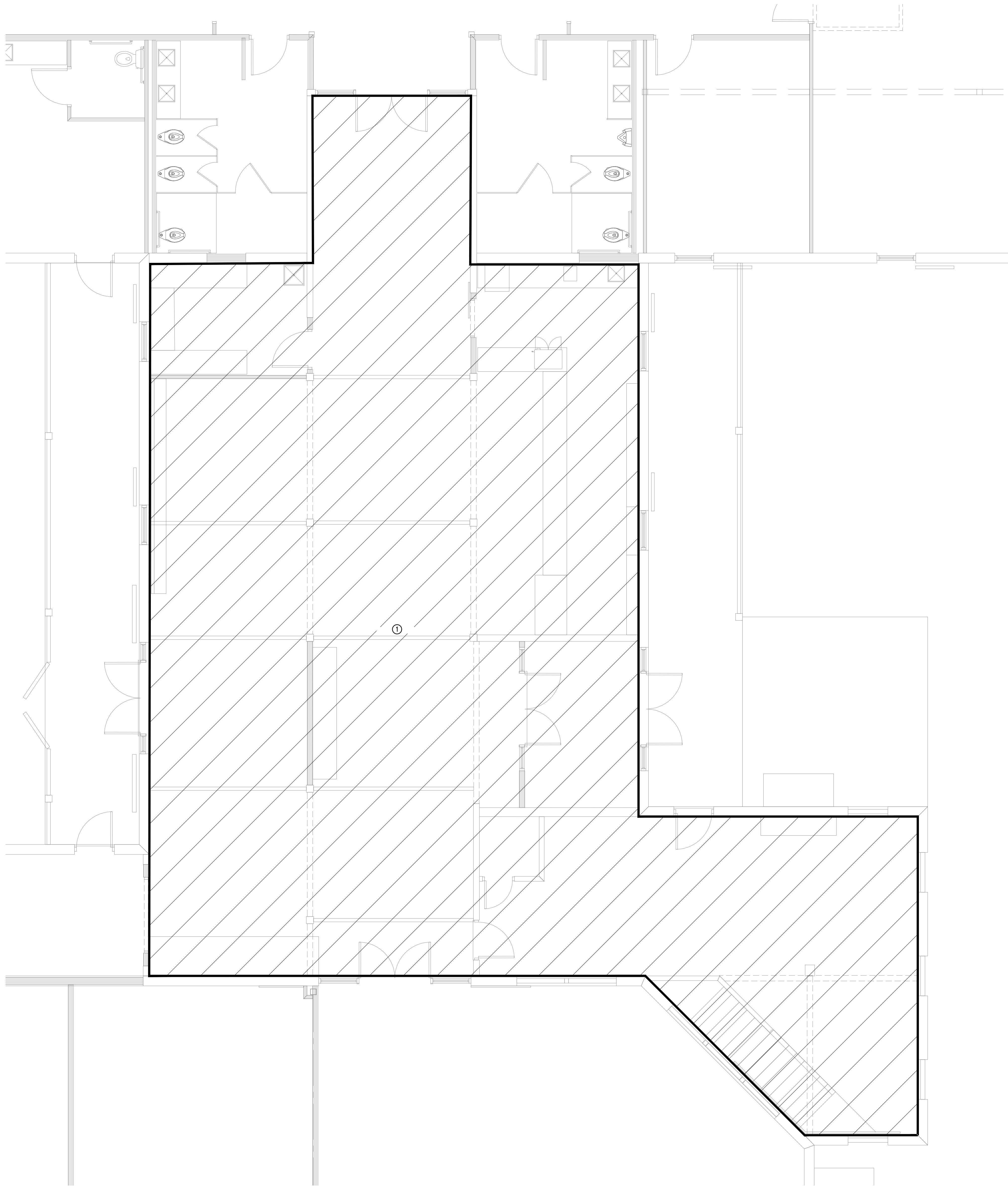
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KEY NOTES(THIS SHEET ONLY):  
① EXISTING MECHANICAL SYSTEM SERVING THIS AREA SHALL REMAIN AS IS. CONTRACTOR SHALL PROVIDE NEW GRILLS WHERE REQUIRED. CONTRACTOR SHALL RELOCATE GRILLS AS REQUIRED. CONTRACTOR SHALL REMOVE EXHAUST FANS FOR DEMOLITION BATHROOMS WITH ALL ITS ACCESSORIES AND CONTROLS.

1 GATHERING MECHANICAL PLAN - PHASE I  
SCALE: 1/4"=1'-0"

GM

Architect

102 Sammy Court  
WARNER ROBINS, GEORGIA 31088  
glmarch@outlook.com  
(478)-365-8976

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GATHERING MECHANICAL PLAN-PHASE I

Retrofit & Renovations for  
Madison Methodist Church

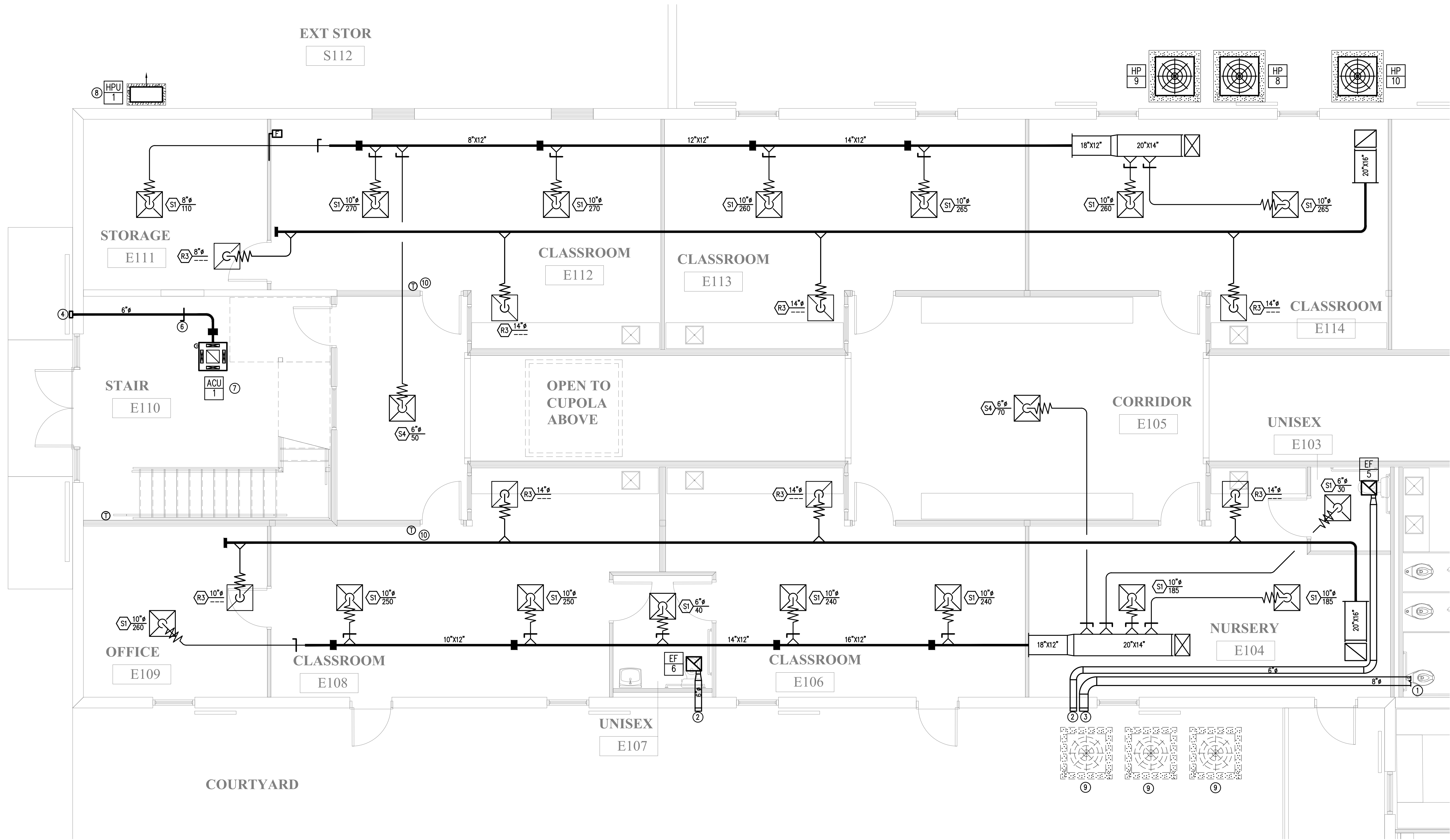
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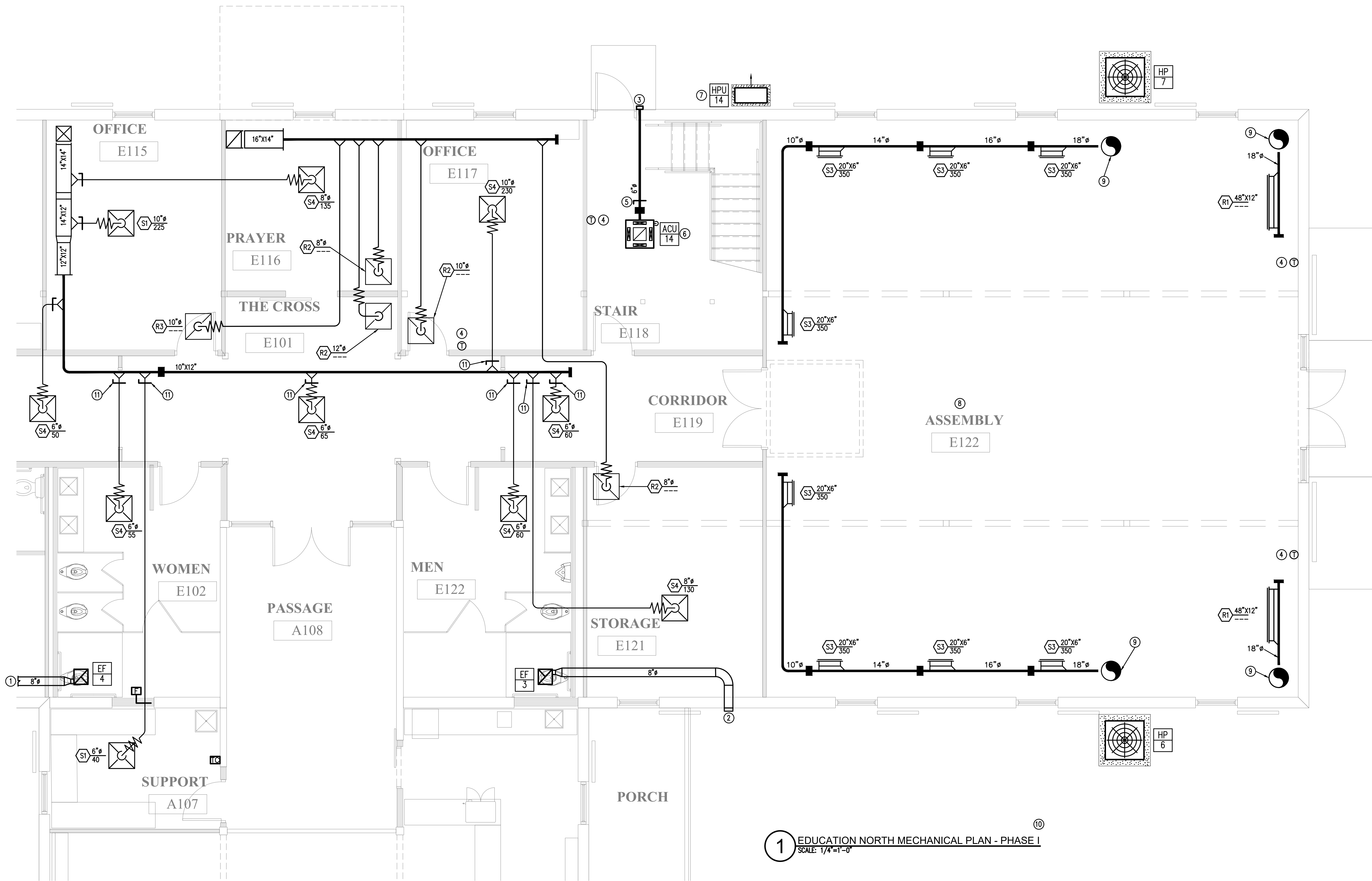


1 EDUCATION SOUTH MECHANICAL PLAN - PHASE I  
SCALE: 1/4"=1'-0"

LINE LEGEND	
	DEMOLITION
	EXISTING TO REMAIN
	CONNECT TO EXISTING

- KEY NOTES (THIS SHEET ONLY):
- REFER TO 1/M1.06 FOR CONTINUATION.
  - 6" EXHAUST AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - 8" EXHAUST AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - 6" OUTSIDE AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - NOT USED.
  - SET MOTORIZED OUTSIDE AIR DAMPER AT 40 CFM. INTERLOCK DAMPER TO CLOSE WHEN EVAPORATOR FAN IS OFF.
  - ROUTE CONDENSATE DRAIN TO OUTSIDE TO 12-INCHES AFF. PROVIDE 45-DEGREE ELBOW AT DISCHARGE TO GUIDE CONDENSATE AWAY FROM EXTERIOR WALL. PROVIDE SPLASH BLOCK AT DISCHARGE. ROUTE CONDENSATE TOWARD CONDENSING UNITS. CONDENSATE PIPE SHALL BE HARD PVC.
  - ROUTE REFRIGERANT PIPES TO RESPECTIVE AIR-HANDLING UNIT INSIDE BUILDING. ROUTE AND SIZE PER MANUFACTURER'S INSTRUCTIONS. TYPICAL FOR ALL HEAT PUMP CONDENSING UNITS.
  - EXISTING HEAT PUMP UNIT SHALL BE REMAIN AS IS WITH ALL ITS ACCESSORIES AND CONTROLS. COORDINATE WITH GC AND ARCHITECTURAL FOR ADDITIONAL WORK ON THE UNITS. UNITS ARE SERVING EXISTING AREA.
  - TOP OF THERMOSTAT SHALL BE AT 48" AFF. PROVIDE BREATHABLE CLEAR PLASTIC, TAMPER PROOF AND LOCKABLE THERMOSTAT COVER.
  - CONTRACTOR SHALL COORDINATE CEILING TYPE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL DRAWINGS PRIOR TO ORDERING DIFFUSERS. DIFFUSERS SHALL BE COMPATIBLE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL PLANS, AS THE RCP IS STILL IN PROGRESS. TYPICAL FOR ALL GRILLES, REGISTERS, DIFFUSERS, AND AIR NOZZLES.



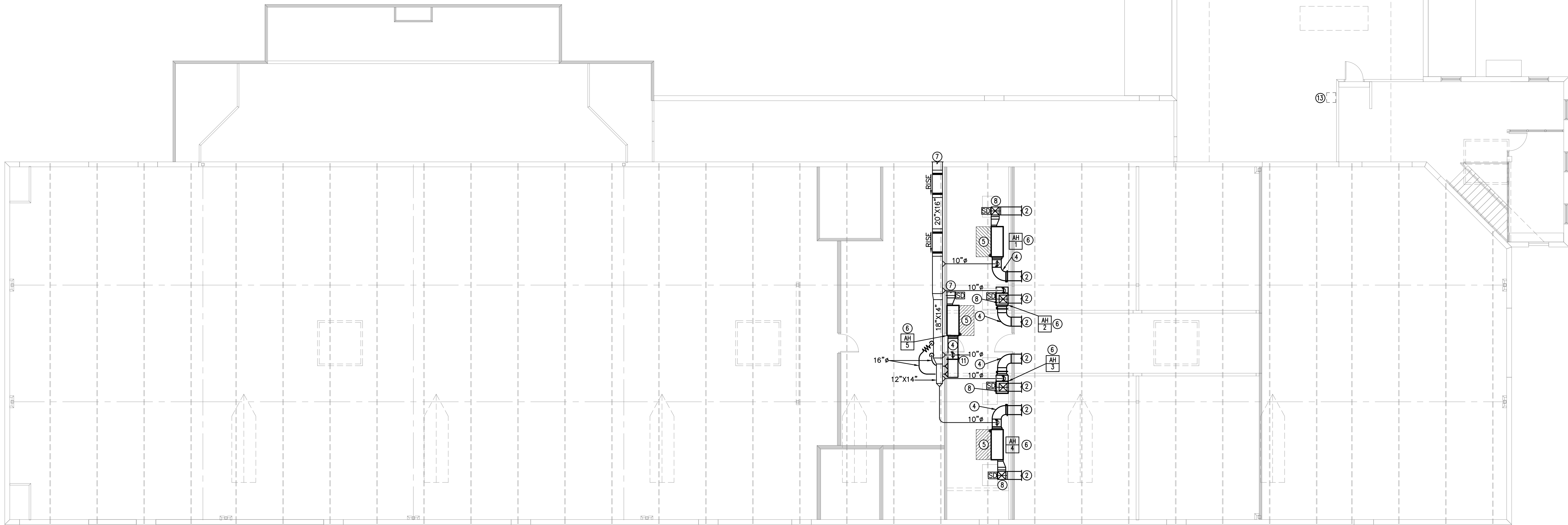
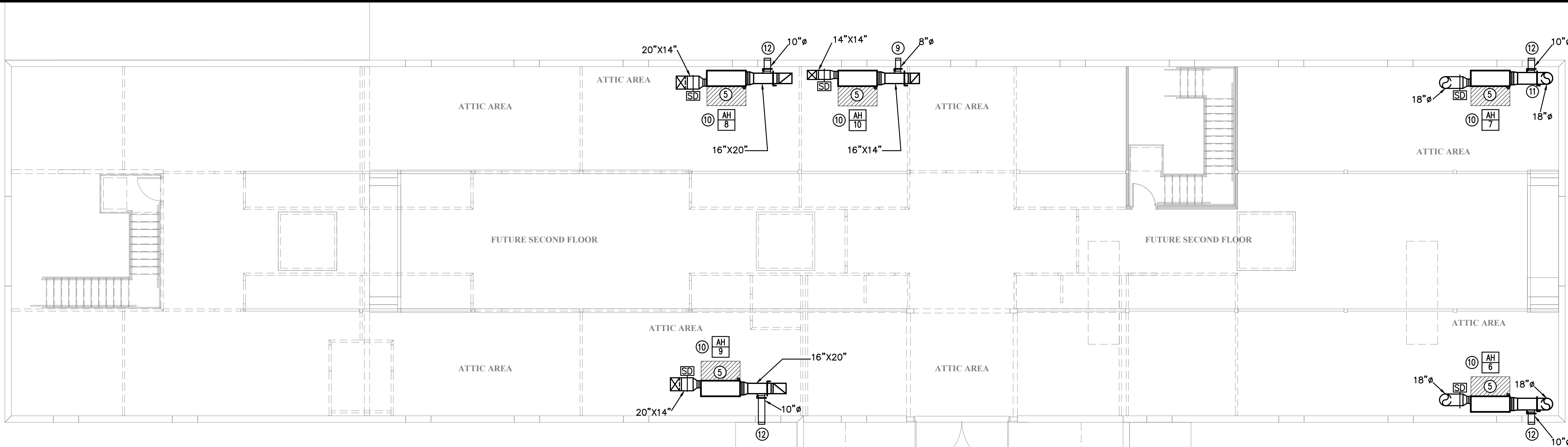


1 EDUCATION NORTH MECHANICAL PLAN - PHASE I  
SCALE: 1/4"=1'-0"

- KEY NOTES (THIS SHEET ONLY):
- 1 REFER TO 1/M1.05 FOR CONTINUATION.
  - 2 8" EXHAUST AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - 3 6" OUTSIDE AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - 4 TOP OF THERMOSTAT SHALL BE AT 48" AFF. PROVIDE BREATHABLE CLEAR PLASTIC, TAMPER PROOF AND LOCKABLE THERMOSTAT COVER.
  - 5 SET MOTORIZED OUTSIDE AIR DAMPER AT 40 CFM. INTERLOCK DAMPER TO CLOSE WHEN EVAPORATOR FAN IS OFF.
  - 6 ROUTE CONDENSATE DRAIN TO OUTSIDE TO 12-INCHES AFF. PROVIDE 45-DEGREE ELBOW AT DISCHARGE TO GUIDE CONDENSATE AWAY FROM EXTERIOR WALL. PROVIDE SPLASH BLOCK AT DISCHARGE. ROUTE CONDENSATE TOWARD CONDENSING UNITS. CONDENSATE PIPE SHALL BE HARD PVC.
  - 7 ROUTE REFRIGERANT PIPES TO RESPECTIVE AIR-HANDLING UNIT INSIDE BUILDING. ROUTE AND SIZE PER MANUFACTURER'S INSTRUCTIONS. TYPICAL FOR ALL HEAT PUMP CONDENSING UNITS.
  - 8 ALL VISIBLE EXPOSED DUCTWORK SHALL BE ROUND SPIRAL DUCT. PROVIDE PAINT GRIP FINISH. PAINT DUCT PER ARCHITECTURAL'S INSTRUCTIONS.
  - 9 PROVIDE DOUBLE WALL SPIRAL ELBOW.
  - 10 CONTRACTOR SHALL COORDINATE CEILING TYPE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL DRAWINGS PRIOR TO ORDERING DIFFUSERS. DIFFUSERS SHALL BE COMPATIBLE WITH THE INTERIOR DESIGNER AND ARCHITECTURAL PLANS, AS THE RCP IS STILL IN PROGRESS. TYPICAL FOR ALL GRILLES, REGISTERS, DIFFUSERS, AND AIR NOZZLES.
  - 11 TYPICAL YOUNG REGULATOR MODEL 270-896-LO CONCEALED CEILING REGULATOR WITH 7/8" THREADED CEILING CAP. PROVIDE BOWDEN CASING WIRE AS REQUIRED. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLING MANUAL VOLUME REGULATORS.

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1 OVERALL SECOND FLOOR MECHANICAL PLAN - PHASE 1  
SCALE: 1/8"=1'-0"

LINE LEGEND	
	DEMOLITION
	EXISTING TO REMAIN
	CONNECT TO EXISTING

- KEY NOTES (THIS SHEET ONLY):
- NOT USED.
  - REFER TO 1/M1.03 FOR CONTINUATION.
  - NOT USED.
  - 18"X16" RETURN AIR DUCT.
  - UNIT ACCESS SPACE.
  - ROUTE CONDENSATE TO FLOOR SINK BY PLUMBING LOCATED AT RISER ROOM. CONDENSATE PIPE SHALL BE HARD PVC PIPE.
  - REFER TO 1/M1.03 FOR CONTINUATION.
  - 16"X16" SUPPLY AIR DUCT.
  - 8" OUTSIDE AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - ROUTE CONDENSATE DRAIN TO OUTSIDE TO 12-INCHES AFF. PROVIDE 45-DEGREE ELBOW AT DISCHARGE TO GUIDE CONDENSATE AWAY FROM EXTERIOR WALL. PROVIDE SPLASH BLOCK AT DISCHARGE. ROUTE CONDENSATE TOWARD CONDENSING UNITS. CONDENSATE PIPE SHALL BE HARD PVC.
  - TYPICAL RETURN AIR MANUAL VOLUME DAMPER.
  - 10" OUTSIDE AIR WALL CAP. PAINT TO MATCH EXTERIOR WALL.
  - EXISTING FAN COIL UNIT SHALL REMAIN AS IS WITH ALL ITS DUCTWORK, ACCESSORIES AND CONTROLS. CONTRACTOR SHALL PROVIDE WORK AS NECESSARY TO RELOCATE ANY ADD GRILLES PER DEMOLITION WORK.

Retrofit & Renovations for  
**Madison Methodist Church**  
1091 Confederate Highway  
Madison, Georgia 30650

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