CHRISTMAN
SINCE 1894

Addendum No.[2]

Project Name: Gier Park - HVAC
Project No.: 221125-050
Architect: Kingscott
Date: 12/11/2025

Bid Package No.: 1
Bid Due Date: 12/18/2025 @ 2:00PM

This Addendum is issued to inform the bidders of modifications in the scope of work being bid for this project.

A. Documents included in this Addendum:

i. Project Manual
   1. WC 20 – Various changes to scope, including the full requirement for all roofing, including flagging and flagging maintenance.
   2. WC 20 – Clarification on allowances, all ceiling tile removal and reinstallation to be funded via WC Allowance, funded on a Time & Material basis, provide labor rates on bid form.
   3. WC 20 – Added note about existing warranty on roof.
   4. WC 20 – Clarification on allowances, all painting to be funded via WC Allowance, funded on a Time & Material basis, provide labor rates on bid form.
   5. WC27 – Removal of all roofing scope notes.
   6. WC28 – Removal of all roofing scope notes.
   7. Sort Set revised to reflect changes to WC20.

ii. RFI's – All pre-bid RFI's received included.
iii. Kingscott Addendum 2 Narrative
iv. Kingscott Specifications
v. Kingscott Drawings

B. Other modifications:

- None

C. Bids are due 12/18/2025 @ 2:00PM.

- **Include in your bid the increase or decrease for all materials, labor, supervision, overhead and profit required to properly and completely execute the work described in this Addendum.**
- **Acknowledge receipt of this Addendum on the Bid Proposal Form.**

The applicable provisions of the Contract Documents shall govern all work included herein unless specifically noted otherwise.

END OF ADDENDUM NO. [#2]

Work Category No. 20 – General Trades

Work Included:

The subcontractor shall timely perform all work as detailed below, in accordance with the contract documents (including Bidding Requirements, Proposal Section, Contract Forms, General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

Reference WC Index

Work Category Notes:

1. Complete all exterior and interior Carpentry/Millwork (rough and finish) and various General Trades Work as noted within this Work Category, including all labor, materials and equipment required for a complete installation.
2. All exterior and interior rough and finish carpentry including counters, cabinets, trim, nailers, blocking and plywood sheathing.
3. If in-wall backing/blocking is required by a specific manufacturer for products included as part of this Work, though not specifically shown within the documents, i.e. architectural millwork.
4. Provide non-combustible wood blocking in walls for wall mounted accessories and equipment installed by Owner/others shown or specified.
5. All interior finish carpentry, architectural woodwork, stainless steel countertops, shelving and millwork. Provide all sealants to adjacent surfaces, including dissimilar materials. Coordinate counter top support spacing with WC 27 under lavatory guards and lavatory installation.
6. Furnish and install formed metal countertops and shelving.
7. Furnish and install all solid-surface materials and grommets as indicated.
8. All architectural hardware for cabinets supplied by this Work Category.
9. Install all custom casework fabricated and furnished by others including cabinets, p-lam coat shelves, p-lam and solid surface vanity tops, and solid surface windowsills.
10. All fabricated materials are to be shop assembled to the greatest extent possible before shipping to the job site.
11. All required temporary enclosures, materials, shoring, etc., to perform the demolition of the existing wall systems. Temporary enclosures must be weather tight.
12. Protect from damage existing finish work that is to remain.
13. Furnish and install sealants for all materials installed by this contractor such as cabinets, counters, sills, etc.
14. Furnish shop drawings, samples, product data, test reports, coordination drawings and other submittals as specified. Coordinate submittal schedule with the Construction Manager.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this Work Category.

1. Provide a 200 hour allowance for laborers to be used at the discretion of TCC. Daily time tickets will be required by TCC. All unused funds will be returned to the Owner.
2. Provide and install all metal stud, batt insulation, rigid insulation, and drywall, as well as drywall finishing and finish painting at all bulkheads/pipe housings as noted in the Sort Set included in this project manual.
3. Furnish and install all metal studs, gypsum board, plywood, blocking, etc as required unless noted otherwise.
4. This WC shall include cutting and patching in the existing roof for an installation of a new roof curb for WC27 mechanical piping, please refer to Sort Set details. Coordination with WC27 and 12 is absolutely necessary to ensure the installation of this curb is located correctly. Any repairs required in the existing roofing at the conclusion of this scope of work shall be installed by this WC. Include all flashing and roofing repair.
5. This WC shall temporarily protect roof after penetrations have been made to ensure a weather tight system is maintained.
6. Protect from damage existing finish work that is to remain. This WC to provide room protection for teacher/classroom belongings to cover, protect, and encase all belongings gathered in a central/localized area in plastic wrapping. This WC responsible to remove at the conclusion of the project.
7. Provide all patching and painting at plaster/drywall surfaces requiring repair where noted on project drawings.
8. Remove and salvage all ceiling tiles, acoustical ceiling tiles, metal ceiling tiles, ceiling grid etc. as required for roof penetrations and ceiling access as coordinated with electrical and mechanical contractor. This WC to provide replacement ceiling tiles and grid for any damages during the removal process. Include removal and adjustment of ceiling tiles to accommodate revised lighting plans. This WC to reinstall existing ceiling tiles, including any modifications required for mechanical and electrical equipment, at the end of the project.
9. This WC to demolish and removal base cabinets, countertops, shelving, anchors and supports at all casework locations. Where casework is required to be removed and reinstalled, coordinate with MEP contractors for extent of removal. Coordination with Mechanical contractor is necessary for layout of new units. This may require multiple site visits and coordination meetings to ensure field measuring is correct.
10. Install all new casework, blank offs, and louver covers where indicated at existing casework per project drawings.
11. This WC responsible for the infill, patch, and repair of existing walls, floors, ceilings, and surfaces to match existing where demolition occurs other than as described, including but not limited to and patching ductwork from mechanical demolition at all locations other than masonry openings.
    (a) Masonry openings are to be patched by others
    (b) Penetrations for sleeves/piping/conduits to be filled in by others, this WC required to repair flooring/drywall damaged/removed for installation of new work.
    (c) Refer to Sort Set for Roof Curb information & responsibilities for this WC.
12. At all locations where this WC creates a penetration through a presumed 1-hour fire rated wall, this

WC is responsible to provide fire caulk and fireproofing required to meet local code and requirements to maintain the 1-hour rating.

13. Provide temporary fire extinguishers (during construction) as located by the Construction Manager. Removal following use included. Quantity for each area to match minimum required by MIOSHA.

14. Caulk all installed countertops, base, wood trim reinstalled by this WC, etc. as required to complete assemblies removed and reinstalled by this WC.

15. Final cleanup for this work shall include broom sweeping.

16. Provide and install all flooring to match existing conditions as similar as possible upon completion of the installation of new mechanical equipment. Should the new equipment expose any areas not covered by the original unit, this WC shall patch and infill. This flooring patch-and-infill shall be funded via WC allowance tracked by time and material daily with tickets turned over to the construction manager.

17. Provide all roofing work for the entire project, including any temporary roofing required for penetrations by others. Ensure penetrations are entirely sealed and flashed correctly for all scopes of work, including but not limited to structural steel, mechanical, and electrical penetrations. Include flagging for the entire project, including where other work is taking place by other contractors.

   A. Roofing warranty must be maintained. Existing warranty provided by *Bloom Roofing*, product is Sika EPDM.

Related Work by Others:

1. Dumpsters
2. Temporary water and electrical
3. Benchmarks and column lines (one in each direction) by Construction Manager.
4. Independent testing and inspections by Owner.
5. Temporary heat by Construction Manager.
6. Slip sheets for electrical by WC28 on roof.
7. Slip sheets for mechanical/plumbing/gas by WC27 on roof.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $35,000. Reference Section 01020 for specific instructions on allowances.

Intent for allowance is to fund any and all painting, ceiling removal and replacement. Base bid shall not account for any painting/ceiling work, and shall instead provide a time and material rate for both on bid proposal form.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 20

Work Category No. 27 – HVAC Systems

Work Included:

The subcontractor shall timely perform all HVAC work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Contract Forms and General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

See Work Category Index and Cross Reference

Work Category Notes:

1. Furnish all labor, materials, tools and equipment associated with HVAC/sheet metal, and air distribution equipment Work, including associated insulation, formal MEP space coordination process, commissioning and start-up/testing, for a complete installation, indicated by the contract documents (not just limited to the HVAC drawings) or as required for a complete installation, including labor, materials, dampers, duct detectors, louvers, accessories, and equipment for a complete installation.
2. Provide and install all mechanical equipment, piping, valves, etc., as required for a full and complete installation including but not limited to all energy recovery units, finned tube radiant units, hot water heaters, hot water cabinet unit heaters, roof top units, unit ventilators, mini split units, condensing units, boilers, pumps, fan coils, expansion tanks, grilles, registers, diffusers, etc.
    a. This WC responsible to locate, cut, and waterproof all roofing assemblies. This WC shall flash and roof all penetrations in roof membrane. Include installation of pre-fabricated roof curbs. Where pre-fabricated roof curbs are not required, coordinate with WC20 location, size, and provide time to have built-in-place curbs/access. This WC shall waterproof at the end of the day, and consider this a daily task.
3. Include all required air plenums, including but not limited to insulated panels, sheet metal closures, misc. iron galvanized support angles, joint sealants, isolation valves, pressure relief valves, reducers, strainers, manual air vent, condensate neutralizer, condensate pump, manual air vet, access doors (including frames if required and hardware), fiberglass insulation, etc. for a complete installation.
4. Investigate areas prior to demolition activities, reroute and relocate existing services required for occupied operation. Cut, cap, and make safe, all existing ductwork and HVAC systems in renovated areas prior to demolition. Properly identify and mark system and components to be removed.
    a. All mechanical systems including compressors, boilers, etc., as indicated to be demolished and removed to be by this WC.
5. All cutting, capping, coring, patching and firesafing of walls, floors, ceilings, etc., required for the installation of this work. Patch and repair work is to be done professionally by skilled craftsmen. All such openings require prior written approval from the Construction Manager, before work begins. Furnish and install all sleeves and or misc. steel in walls, floors, roofs and ceilings that may be required by this W.C.
6. All utility connection, disconnections, tie-ins, crossovers, shut downs and similar work must be performed and scheduled so they will not interfere with other work. It may be necessary to make these changes during "off" hours, or it may be necessary to make "hot tap" connections. The contractor should plan on premium time for this work. Coordinate with the Construction Manager prior to performing this work.
7. Furnish access panels where required for the wall and ceiling valves, dampers and controls that are not

shown on the Architectural/Mechanical plans but are necessary for the Mechanical Systems.

8. Furnish all hoisting, lifting, scaffolding and handling of all materials required to complete this work category.

9. The Electrical and Mechanical Contractors will be required to coordinate in a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 1049. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination. These meetings shall be coordinated with the construction manager and shall be held on-site.

10. Provide and install mechanical equipment tags, pipe identification and other required identification of signage related to his work.

11. Provide and install all necessary supports/anchoring/unistrut assemblies required for this scope of work to install all material and equipment.

12. Coordinate with WC20 locations of all mechanical openings, penetrations, etc., where WC20 must provide additional housings and assemblies.

13. All single pipe/multipipe roof penetrations outside housings constructed by WC20 housings to be flashed, and sealed by this WC.

14. A coordination meeting will be set up between the controls contractor, mechanical contractor, electrician, and construction manager prior to control work. This will include all required work for a complete system as indicated in the construction documents.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this work category:

1. This work category shall assume base bid that 2nd shift (4:00PM – 12:00AM) from the months of February to June to get all overhead piping, inwall piping, rooftop routing, etc., completed to the fullest extent possible while the school is occupied.

2. Painting of all mechanical equipment to be done by this WC including but not limited to metal/plastic wall chases, filler panels, ductwork (interior and exterior) as noted and required in the drawings. Include caulking of these assemblies as required in base bid.

3. Paint all visible interior surfaces of ductwork flat black as required.

4. Install all louvers, metal fillers (Front, top and sides), sealants, etc. at interior and exterior penetrations. Include all painting required for mechanical equipment, covers, chases, etc.

5. Provide all roof curbs for mechanical equipment including but not limited to pipe curbs and equipment curbs.

6. Provide and install all slip-sheets required under mechanical units installed by this WC.

7. Provide and install metal/plastic wall chases, filler panels pre-finished & painted to match existing conditions. This WC to provide touch-up painting for surfaces scratched during installation and maneuvering of unit ventilators, chases, and filler panels.

8. This WC responsible for disconnecting supply piping at main and preparing for new connection.

9. At all locations where this WC creates a penetration through a presumed 1-hour fire rated wall, this WC is responsible to provide fire caulk and fireproofing required to meet local code and requirements to maintain the 1-hour rating.

10. Provide and install new 24V motorized damper duct up to relief hood.

11. Provide and install equipment stand as well as all roof slip-sheets for new condensing units as required.

12. Coordinate with WC 11 to field verify location of, dimension of, and extent of masonry removal to determine size required for new louvers.

13. Provide 16x12 transfer duct & grilles routed tight to underside of ceiling pre-finished to match existing adjacent wall color.

~~14. All metal deck cutting required to be performed by this WC. Roof structural steel support to be provided and installed by this WC in accordance with structural support details. Coordinate wood blocking/wood support with WC 20. All roofing repair to be done by this WC for all mechanical & plumbing penetrations required for new work to be installed.~~

~~15. Roofing and all roof associated assemblies required to be repaired in accordance with existing roof manufacturer requirements at all locations where this WC creates a penetration in the roof assembly.~~

~~*a.* Though this WC will not be the only contractor on the roof, this WC is responsible to provide all fall protection flagging and MIOSHA requirements to make the roof a safe working environment for all WC's required to be on the roof (WC01A, WC20, WC28). Include maintenance and removal when directed by General Contractor.~~

Addendum 2 removed notes 14 and 15. Added to WC20.

16. This WC to provide and install all condensate, refrigerant, and steam lines, including supports, anchors, and hangers as required to be furnished and installed.

17. This WC responsible to provide all controls for all mechanical equipment, including but not limited to furnishing and installing control valves, Split AC Monitoring, DDC system architecture, Equipment Start-up Intervals, Split system AC monitoring, Vertical Unit DX and HHW controls, relief hood controls, and Heating Hot Water System controls. Carry SC Tech as the controls subcontractor. If a substitute controls contractor is requested, a substitution request for a voluntary alternative is required. Include final commissioning and balancing of control systems as required.

18. This WC to provide all cleaning of existing diffusers & grilles to remain.

19. This WC responsible for all mechanical demolition including but not limited to removal of unit ventilators, unit ventilator controls, louvers, baseboard radiant heaters, steam traps, piping, and air conditioning units, finned tube & associated assemblies, existing ductwork, thermostats, and hydronic piping.

    a. This WC responsible to coordinate with WC 11 on all removal of exterior louvers, ensure that masonry can keep up with production of removal and can provide temporary protection and demolition for masonry assemblies as required. This WC responsible for removal of louvers.

20. Provide and install differential pressure device, verify install with TAB contractor also supplied by this WC.

21. This WC responsible for all TAB related requirements, including but not limited to balancing of existing FTR, CUH, UH, Convector, sequences of operations of controls, DDC system architecture & tie in.

22. This WC responsible for a pre-construction TAB report for all existing mechanical equipment to remain,

including but not limited to CUH/UH/Convector, FTR, and heating coil.

23. This WC responsible for a post-construction rebalancing of all existing equipment, including but not limited to FTR, CUH, UH, Convectors.

24. This WC responsible for all tie-ins to existing mechanical equipment including but not limited to existing OA duct to back of unit ventilator.

25. This WC responsible to remove all mechanical equipment required to be demolished including but not limited to mechanical pumps. For all items required to be turned over to owner, furnish material to owner warehouse located at *1717 Sams Way, Lansing, MI 48912.*

26. Mini-Split Indoor & Outdoor Units and all related accessories (thermostat, controls, etc.) to be provided by this WC. Coordinate electrical requirements with WC28.

27. This WC responsible for all sleeves and in-fill in penetrations where necessary, including concrete encasing, or mortar in-fill for penetrations made by this WC operations. Final architectural patching (drywall or VCT) by others. Final architectural painting by others.

28. Include safety plans, and adhere to local requirements for confined work space in tunnels as required for Mechanical equipment installation.

29. To the greatest extent possible, all metal enclosures, shrouds, unit ventilators, and accessories/components shall be pre-painted, if components do not come pre-painted by manufacturer, this WC shall have components powder coated to match adjacent surfaces prior to arriving on site.

Related Work by Others:

1. Power supply to mechanical equipment by W.C. 28.
2. Counter tops removal and reinstallation by WC 20.
3. Painting of all architectural assemblies to be done by WC 20.
4. Electrical disconnect of Unit Ventilators (Vertical and Horizontal) to be done by WC 28.
5. Flooring & wall base WC 20.
6. Roofing by WC20.

Allowances:

This Contractor shall include in their Base Bid a Construction Manager's allowance of $20,000. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 27

Work Category No. 28 – Electrical Systems

Work Included:

The subcontractor shall timely perform all Electrical work, as detailed below, in accordance with the contract documents (including Bidding Requirements, Contract Forms and General Conditions, Supplemental Conditions, General Requirements, Addenda, etc.), including, but not limited to, the following Specification Sections and Work Scope Items. Unless otherwise noted, this contractor is responsible for all items specified in the following specifications sections:

See Work Category Index and Cross Reference

Work Category Notes:

1. Furnish and install all electrical systems, including power, fire alarm, system commissioning, etc., indicated by the contract documents (not just limited to the electrical drawings) or as required for a complete installation, including labor, materials, equipment, adhesives, fasteners, supports, hangers, grounds, blocking, shims and all necessary anchoring devices and accessories.
2. Investigate areas prior to demolition activities, reroute and relocate existing services required for occupied operation. Cut, cap, and make safe, all existing electrical systems in renovated areas prior to demolition. Properly identify and mark system and components to be removed by others.
3. All cutting, capping, coring, patching and firesafing of walls, floors, ceilings, etc., required for the installation of this work. Patch and repair work is to be done professionally by skilled craftsmen. All such openings require prior written approval from the Construction Manager, before work begins. Furnish and install all sleeves and or misc. steel in walls, floors, roofs and ceilings that may be required by this W.C.
4. All utility connection, disconnections, tie-ins, crossovers, shut downs and similar work must be performed and scheduled so they will not interfere with other work. It may be necessary to make these changes during "off" hours, or it may be necessary to make "hot tap" connections. The contractor should plan on premium time for this work. Coordinate with the Construction Manager prior to performing this work.
5. Furnish access panels where required for the wall and ceiling valves, dampers and controls that are not shown on the Architectural/Electrical plans but are necessary for the Electrical Systems.
6. Extreme care is to be taken when installing hangers and equipment in the area that has "spray on fireproofing", so as not to damage it. This contractor will be responsible for patching fireproofing incase of damage by this trade. This work is to be performed by a qualified contractor so that the warranty will not be affected.
7. Furnish all hoisting, lifting, scaffolding and handling of all materials required to complete this work category, all locating and installing of electrical equipment in place shall be reviewed prior to bidding, and bids shall include all means of installation necessary for equipment, including any door removal necessary for equipment sizes to fit in spaces.
8. The Electrical and Mechanical Contractors will be required to coordinate in a formal coordination process to accomplish the rough-in and final layout as required and specified in Section 1049. Any relocation required to coordinate work will be done at no additional cost to the Owner. All contractors are required to furnish layout and coordination prints for their work prior to these meetings allowing the team to be better prepared at each coordination meeting. Detailers will be provided by this contractor to accomplish this coordination. These meetings shall be coordinated with the construction manager and shall be held on-site.

9. Provide and install panel labeling, identification and other required identification of signage related to his work.

10. The electrical contractor will provide concrete equipment pads for required panelboards. Accommodate floor finishes when calculating elevations.

11. A coordination meeting will be set up between the controls contractor, mechanical contractor, electrical contractor, and construction manager prior to control work. This will include all required work for a complete system as indicated in the construction documents.

12. Electrical connections to equipment and devices provided by others, including by not limited to duct detectors, fire dampers, flow and tamper switches, variable frequency drives, power assist door motors, food service equipment, etc. Verify construction documents have been coordinated with power requirements of equipment prior to installation of devices.

13. Install electrical disconnects for all mechanical equipment provided by W.C. 27.

Specific Notes and Details:

The following details and notes are included in this Work Category; this list is to clarify the specific items noted below and does not exclude other details or otherwise limit the scope of work for this work category:

1. This work category shall assume base bid that 2nd shift (4:00PM – 12:00AM) from the months of February to June to get all overhead conduit, wire pulls, inwall piping, rooftop routing, etc., completed to the fullest extent possible while the school is occupied to ensure work can be completed by August

2. At all locations where this WC creates a penetration through a presumed 1 hour fire rated wall, this WC is responsible to provide fire caulk and fireproofing required to meet local code and requirements to maintain the 1 hour rating.

~~3. Roofing and all roof associated assemblies required to be repaired in accordance with existing roof manufacturer requirements at all locations where this WC creates a penetration in the roof assembly.~~

Removed in Addendum 2 – Refer to WC20 for roofing requirements.

4. This WC responsible for all demolition associated with electrical assemblies, including but not limited to assemblies shown on the Electrical Riser Diagrams.

5. This WC responsible to relocate downstream electrical equipment to new panel affected by electrical demolition activities, including all work associated with re-feeding existing panels from new main distribution panel.

6. This WC responsible to provide and install all electrical equipment including but not limited to new lighting control equipment, new luminaire equipment, MDP, electrical panels, breakers, and inverters.

   a. Coordinate with LBWL for utility supplied/installed equipment.

7. This WC responsible for all removal, storage, and relocation of all electrical equipment including but not limited to lighting, surface mounted conduit, wall mounted equipment, wall switches, etc. as it interferes with the installation of new work.

8. Temporary power to be provided by this WC during all power shutdowns required to be performed for the safe demolition of all electrical devices & equipment. This WC to include lighting and power stations for the use of electrical tools and equipment of 120v.

9. Disconnect and make safe all unit ventilators, outdoor air units, radiant ceiling panels, pumps, etc. for equipment removal by WC 27, include receptacles as noted in drawings.

10. This WC responsible for all removal and replacement of asphalt/concrete surfaces, and turf grass surfaces associated with the installation of new electrical service. All excavation and backfill related to Work including suitable backfill, compaction, & restoration and removal (from site) of all unsatisfactory fill in accordance with the documents.
11. New utility pad mounted transformer to be provided by LBWL.
12. This WC to take precautions when installing underground conduit so as to not damage existing underground utilities including but not limited to existing storm and sanitary lines crossing in the path of the new proposed electrical conduit.
13. This WC to provide updated typed-in directories for all panels affected by this scope of work.
14. Disconnect and remove all electrical equipment required to be demolished/removed including but not limited to existing VFDs and provide new as required for a full and complete installation, including all bracing/supports/anchoring required.
15. This WC to provide all protection measures as required to perform this scope of work.

Related Work by Others:

1. Installation of access panels/doors by W.C. 20
2. Low voltage wiring not identified on the drawings by the trade providing equipment.
3. Site utilities to transformers/cabinets by Utility Company.
4. Temperature Control wiring and conduit associated with the mechanical systems by W.C. 27.

Allowances:

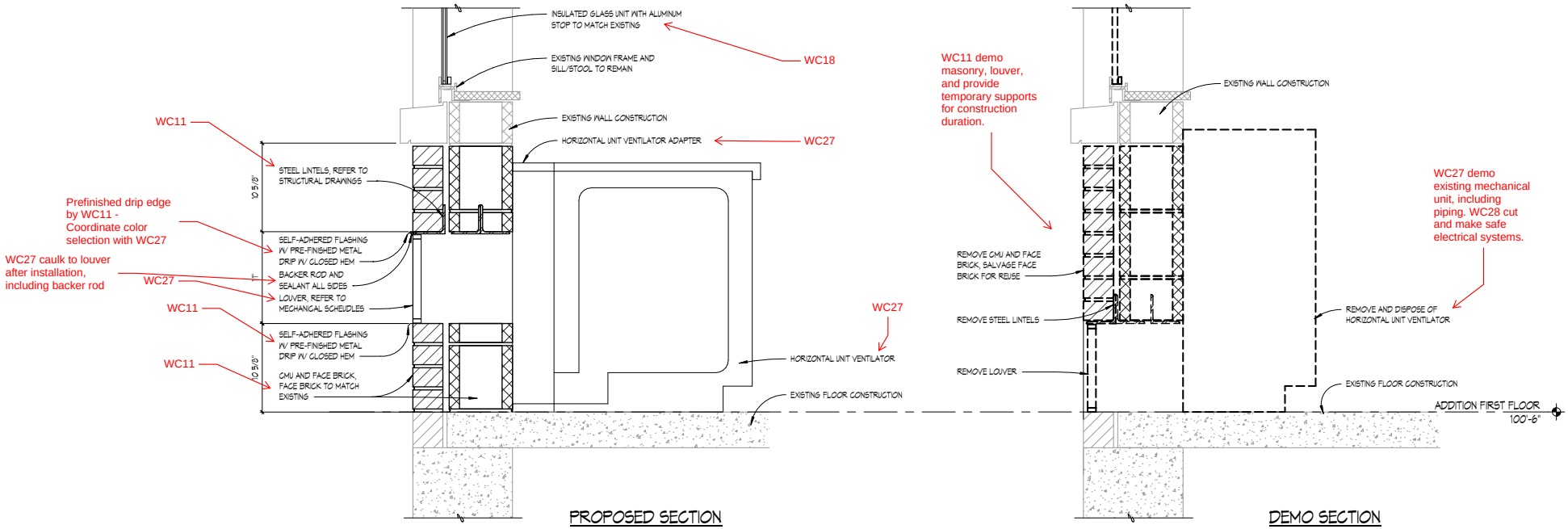
This Contractor shall include in their Base Bid a Construction Manager's allowance of $20,000. Reference Section 01020 for specific instructions on allowances.

Unit Prices:

Unit Prices are to be complete furnished in-place operations, and include all costs, incidental materials and work, insurance, fringes, bonds, engineering, overhead and profit. Reference the Trade Contract Proposal form for unit pricing required.

End of Work Category No. 28

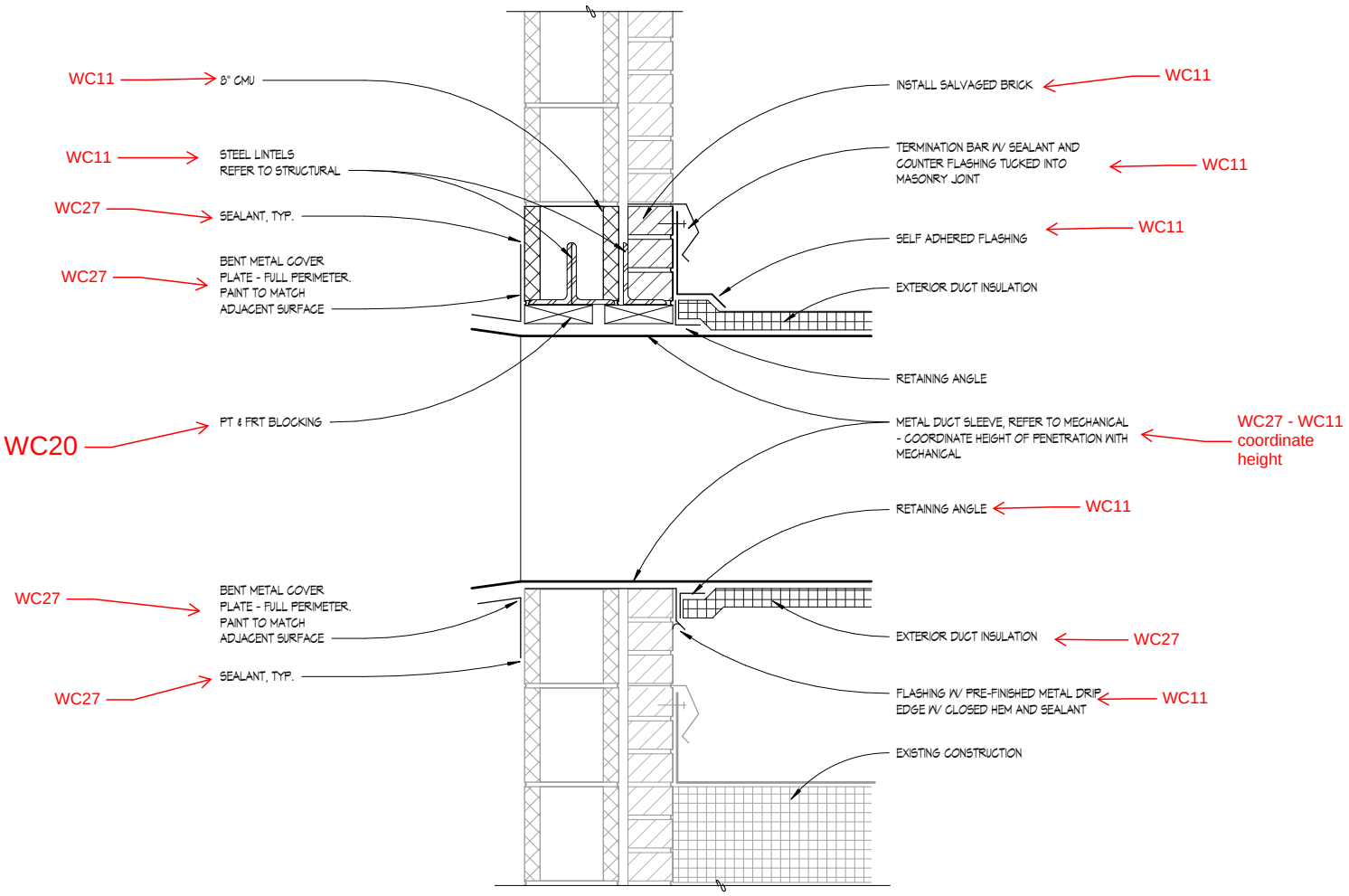
SORT SET - WC RESPONSIBILITIES - NEW LOUVER & UNIT INSTALLATION
DRAWING A4.1 DETAIL 2



*LOUVER WIDTHS VARY, REFER TO MECHANICAL DRAWINGS
*ALIGN LOUVERS WITH MASONRY COURSING
*TOOTH IN OPENING WHEN REDUCING WIDTH
*PROVIDE LOUVER SLEEVE AS REQUIRED

2 TYPICAL LOUVER DETAIL 1975
1 1/2" = 1'-0"

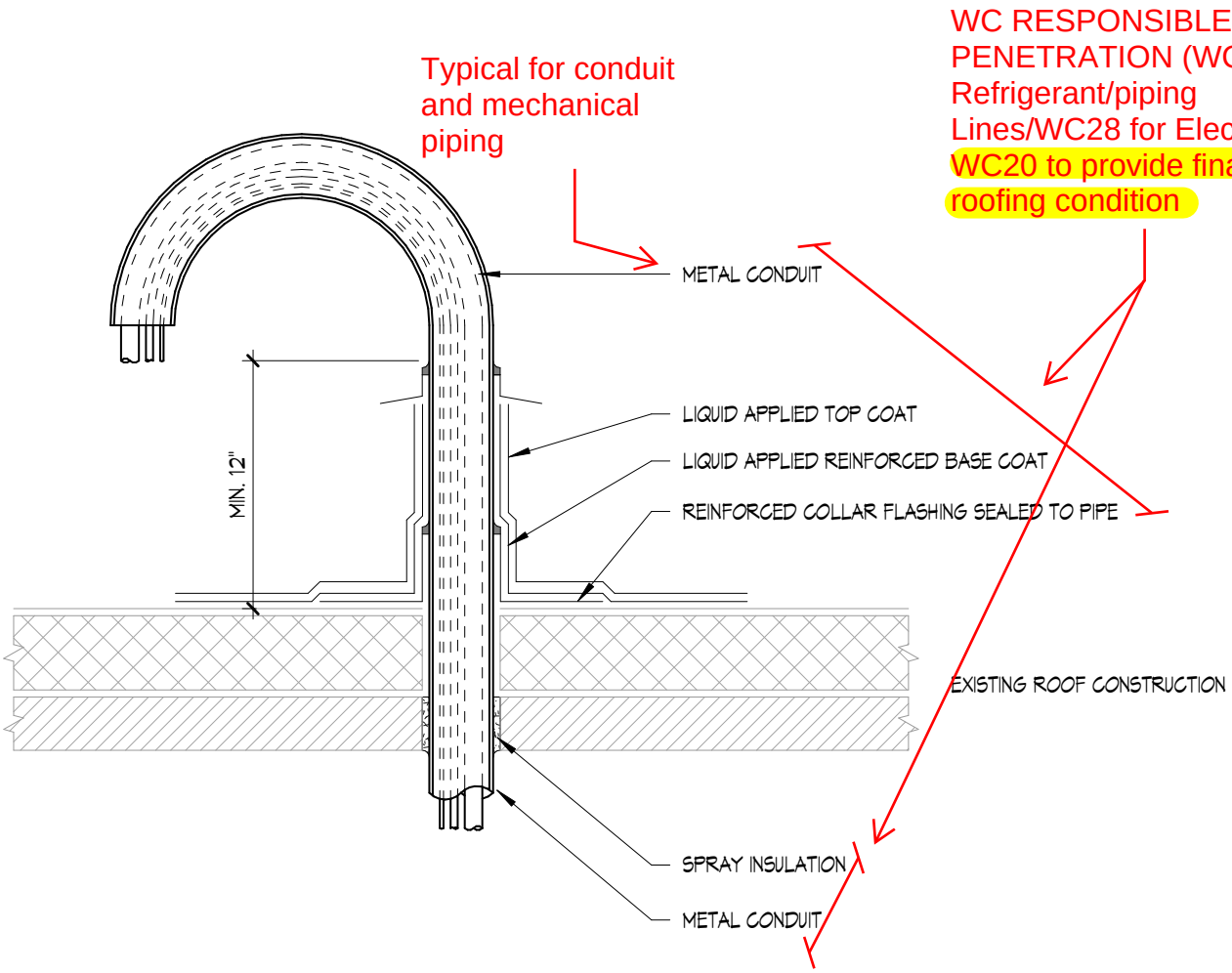
SORT SET - WC RESPONSIBILITIES - THROUGHWALL DUCT PENETRATION
DRAWING A4.1 DETAIL 3



3 DUCT PENETRATION THROUGH EXISTING WALL
1 1/2" = 1'-0"

SORT SET - WC RESPONSIBILITIES - TYPICAL PIPE PENETRATION AT ROOFING

DRAWING A5.1 DETAIL 3



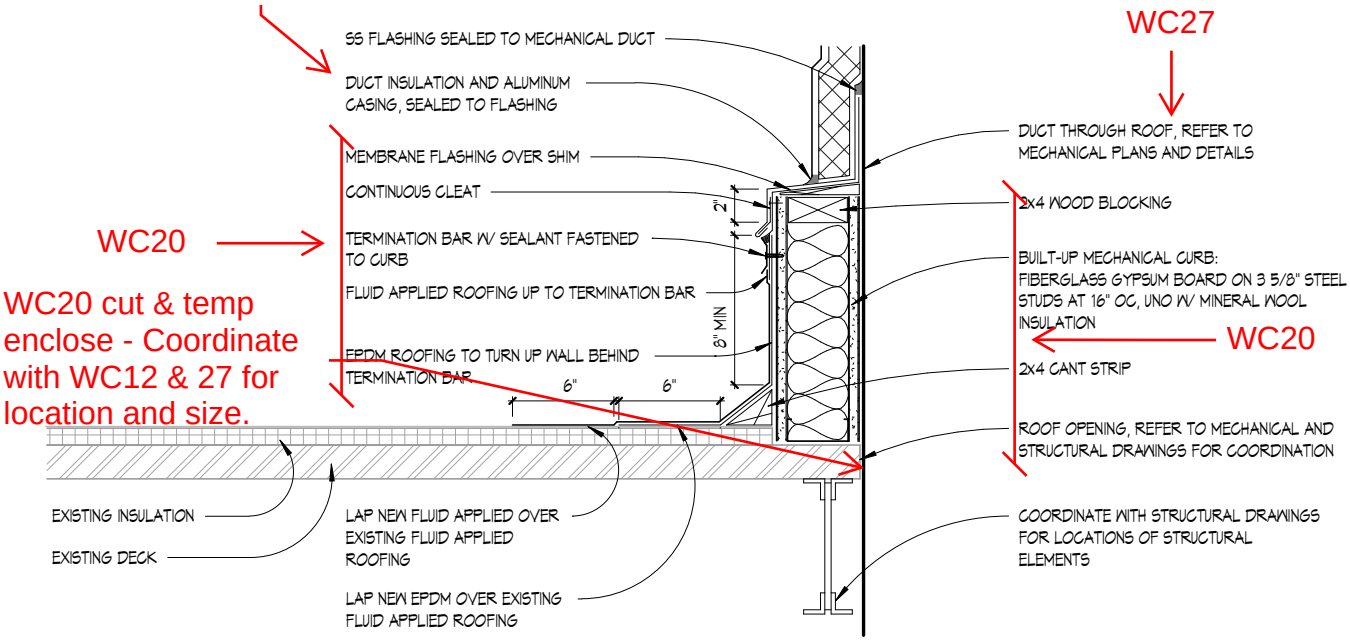
NOTES:
1. COORDINATE WITH MECHANICAL DETAILS.
2. COORDINATE WITH ROOFING MANUFACTURER TO MAINTAIN ROOF WARRANTY.
3. INSTALL ALL COMPONENTS SECURELY, CONTINUOUS, AND WEATHER TIGHT.

3

CONDENSING UNIT CONDUIT

NOT TO SCALE

WC27 including sealing



WC20

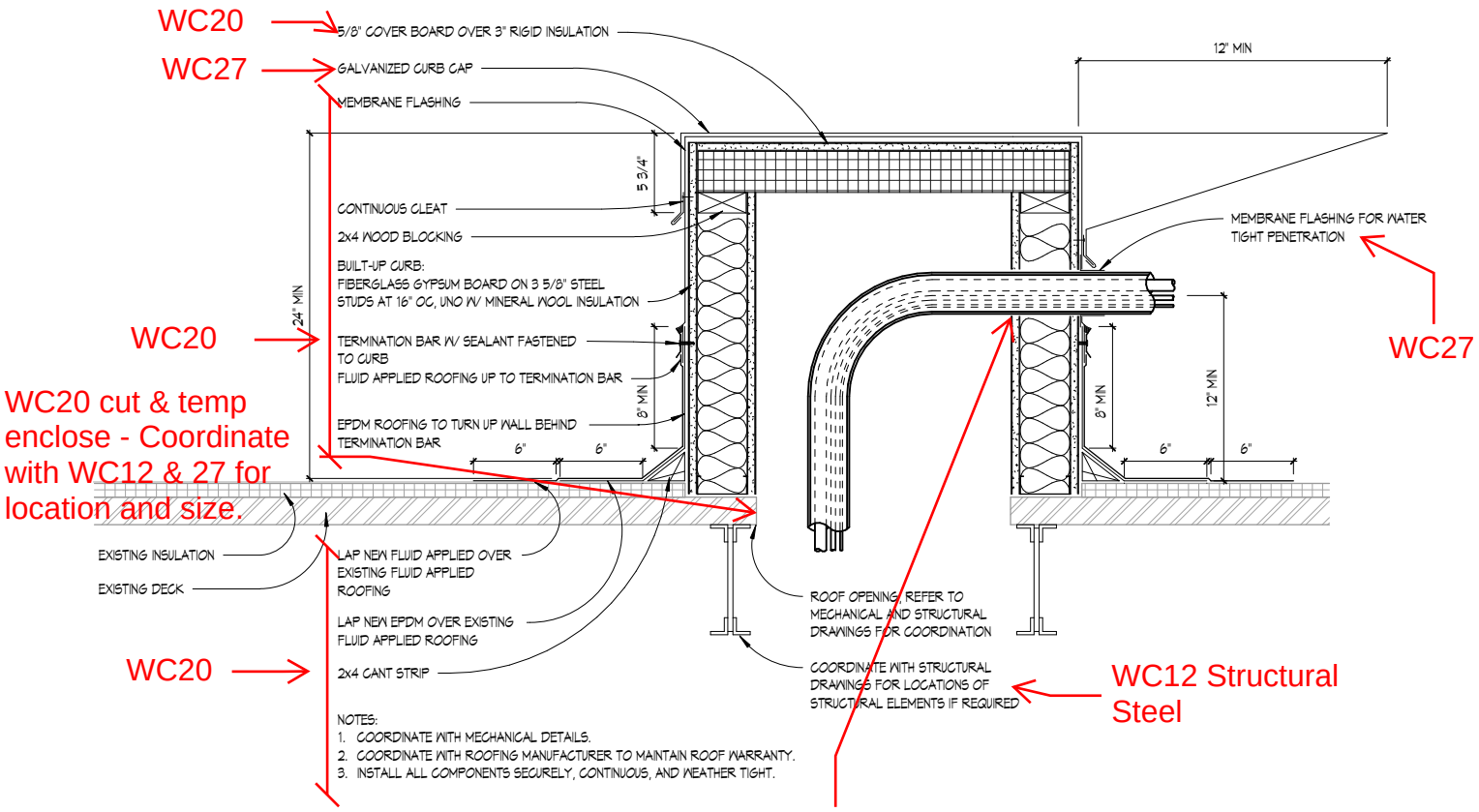
WC20 cut & temp enclose - Coordinate with WC12 & 27 for location and size.

NOTES:
1. COORDINATE WITH MECHANICAL DETAILS.
2. COORDINATE WITH ROOFING MANUFACTURER TO MAINTAIN ROOF WARRANTY.
3. INSTALL ALL COMPONENTS SECURELY, CONTINUOUS, AND WEATHER TIGHT.

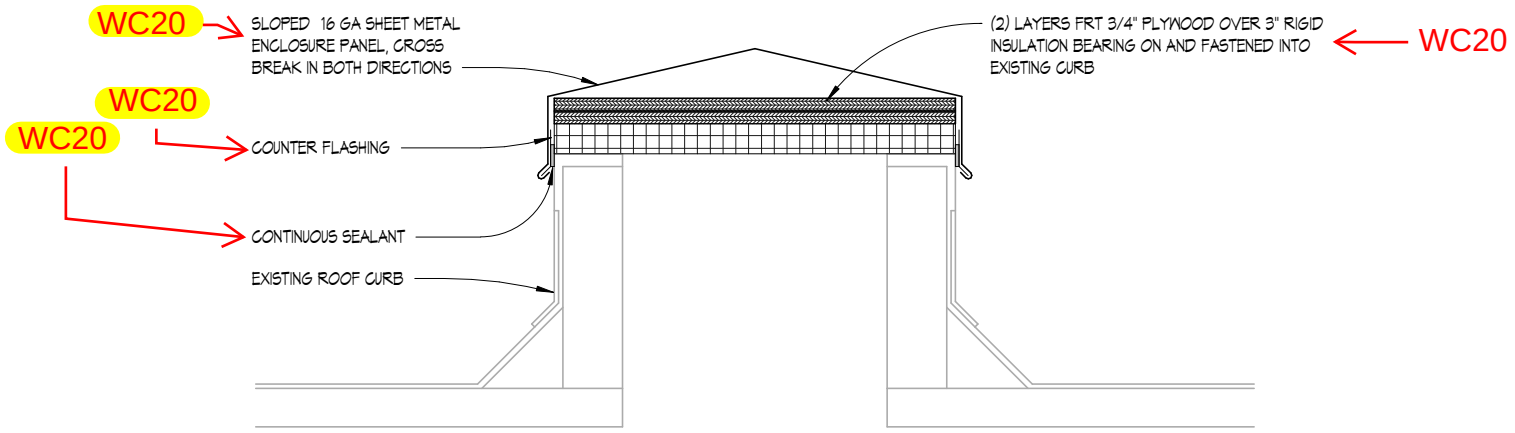
4

DUCT THROUGH ROOF DETAIL

NOT TO SCALE



5 GROUPED PIPE CURB DETAIL
NOT TO SCALE



1 CURB CAPPING DETAL
NOT TO SCALE

The Christman Company

RFI LOG

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
7	0	SC Technologies for Controls	Closed		None	12/08/2025	Austin Brown	Brown, Austin (Th...		12/12/2025	12/10/25								No

Q: Austin Brown Sent Mon Dec 8, 2025 at 05:08 pm EST
VUV - Controls: Please confirm with LSD if they want factory controls or controls by SCT on the VUV's. In the past SCT provided the controls on VUV's

A: Austin Brown (The Christman Company (LAN)) Responded Wed Dec 10, 2025 at 04:02 pm EST
Units to be shipped with controls included, SCTech to be utilized for tie into building BMS and all other controls wirings.

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
6	0	WC20 Ceilings and WC27 Scope of Work	Closed		None	12/08/2025	Austin Brown	Brown, Austin (Th...		12/12/2025	12/11/25								No

Q: Austin Brown Sent Mon Dec 8, 2025 at 04:52 pm EST
It appears that the WC-20 General trades will be removing all ceilings for MEP trades. Does this include all ceilings where new piping and duct is being installed? Or are you requiring we install these systems through the grid?

A: Austin Brown (The Christman Company (LAN)) Responded Thu Dec 11, 2025 at 10:46 am EST
WC20 will remove ceilings on a time and material basis funded via the work category allowance.

WC27 and 28 will need to account for ceiling tile removal and reinstallation of existing during the 2nd shift work, the expectation is that WC27 and WC28 will be running all overhead piping/supports during the 2nd shift, and will re-install on a daily basis to ensure teachers/students re-entering these spaces receive the space as they left it.

WC20 will not be on site daily to remove and reinstall just for WC27 and 28 2nd shift work. WC20 will remove bulk ceiling areas where required for significant work.

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
5	0	Pro-press on 2" lines	Closed		None	12/08/2025	Austin Brown	Suardini, Lindsey...		12/12/2025	12/10/25								No

Q: Austin Brown Sent Mon Dec 8, 2025 at 04:49 pm EST
Section 23 2113 Hydronic Piping: This section calls for Copper pipe/ Sweat joints for 2” and under, can Copper Press seal joints be used on 2” and under as it has been on previous Lansing School Projects?

A: Lindsey Suardini (Kingscott) Responded Tue Dec 9, 2025 at 10:17 am EST
Copper piping and fittings under 2"can be pro-press, specification section will be updated accordingly for addendum 02 to reflect this change.

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
4	0	WC27 Providing Steel	Closed		None	12/08/2025	Austin Brown	Brown, Austin (Th...		12/12/2025	12/10/25								No

Q: Austin Brown Sent Mon Dec 8, 2025 at 04:47 pm EST
Note 14 on WC27 indicates mechanical shall provide and install all steel.

There is also a work scope for WC12 structural steel, please clarify if this is to be provided by WC27.

A: Austin Brown (The Christman Company (LAN)) Responded Wed Dec 10, 2025 at 04:00 pm EST
WC12 to provide structural steel on this project, this typo will be removed from this work scope in Addendum 2.

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
3	0	Roofing Scope WC 27 & WC 20	Closed		None	12/08/2025	Austin Brown	Brown, Austin (Th...		12/12/2025	12/10/25								No

Q: Austin Brown Sent Mon Dec 8, 2025 at 04:45 pm EST
All schools are requiring each work category to carry the necessary roof work for their respected trade. It is also in WC-27 to provide roof flagging. This could possibly create some confusion in the construction process with so many different trades carrying roof work scope. We suggest wrapping all of the roof work into one work category – preferably WC 20 as they would have the most roofing work in their package to build the group pipe curbs.

A: Austin Brown (The Christman Company (LAN)) Responded Wed Dec 10, 2025 at 04:01 pm EST

The Christman Company

#	Revision	Subject	Status	Responsible Contractor	Received From	Date Initiated	RFI Manager	Assignee	Ball In Court	Due Date	Closed Date	Location	Schedule Impact	Cost Impact	Cost Code	Sub Job	RFI Stage	Distribution List	Private
		WC20 responsible for all roofing work. Cooridnation between trades on location, sizing and removal of all roofing must occur. Roofing warranty must be maintained, refer to WC20 for additional information in Addendum 2.																	
2	0	Substitution Request - Boiler Exhaust Fan	Closed		None	12/08/2025	Austin Brown	Suardini, Lindsey...		12/12/2025	12/10/25								No
	Q:	Austin Brown Sent Mon Dec 8, 2025 at 04:09 pm EST I would like to request Van-Packer to be considered as an approved manufacturer for the boiler exhaust flue stack for specification section 235100-2.4-A Model-CS-CSplus-Spec-Sheet-VP0014-R01.pdf 2020-CS-Catalog.pdf																	
	A:	Lindsey Suardini (Kingscott) Responded Tue Dec 9, 2025 at 10:12 am EST Manufacturer is not approved as an equal therefore it will not be added to the specification sections.																	
1	0	Substitution Request - Portalsplus	Closed		None	12/04/2025	Austin Brown	Szeszulski, Sami ... Suardini, Lindsey...		12/10/2025	12/10/25								No
	Q:	Austin Brown Sent Thu Dec 4, 2025 at 07:22 am EST On drawing A5.1 Detail 5 it is showing a roof curb. Can we use Portals-plus in lieu of the curbs, which are attached on top of roof membrane then striped-in per manufactures specifications and warranty specification. These have been used and approved in the past on the Lansing schools. Portalsplus.pdf																	
	A:	Lindsey Suardini (Kingscott) Responded Wed Dec 10, 2025 at 02:27 pm EST Portals-plus is acceptable. Please incorporate metal enclosure. See attached image and RFI response. RFI #001 Response - Substitution Request Portalsplus.pdf																	

The Christman Company
208 N Capitol Ave
Lansing, Michigan 48933-1357
P: (517) 482-1488

Project: 221125-050 LSD - Gier Park AC
Lansing, Michigan 48906

RFI #1: Substitution Request - Portalsplus

Revision	0	**Status**	Open
To	Sami Szeszulski (Kingscott) Lindsey Suardini (Kingscott)	**From**	Austin Brown (The Christman Company (LAN)) 208 N. Capitol Ave Lansing, Michigan 48933-1357
Date Initiated	Dec 4, 2025	**Due Date**	Dec 10, 2025
Location		**Project Stage**	
Cost Impact		**Schedule Impact**	
Spec Section		**Cost Code**	
Drawing Number		**Reference**	
Linked Drawings			
Received From			
Copies To			

Activity

Question

Question from Austin Brown The Christman Company (LAN) *on Thursday, Dec 4, 2025 at 07:22 AM EST*

On drawing A5.1 Detail 5 it is showing a roof curb. Can we use Portals-plus in lieu of the curbs, which are attached on top of roof membrane then striped-in per manufactures specifications and warranty specification. These have been used and approved in the past on the Lansing schools.

Attachments
Portalsplus.pdf

Awaiting an Official Response

Please confirm if these pipe portals could be used in conjunction with a sheet metal enclosure, the basis of design is to have a covered pipe curb to protect pipe penetrations in the roof. See the attached picture for an example of what we are intending to achieve with these covered pipe curbs.

KINGSCOTT
ARCHITECTURE | ENGINEERING | DESIGN

Date: 12/11/2025

Project: Gier Park HVAC Improvements

Owner: Lansing School District

Location: Lansing, MI

A/E #: 2616.17

ADDENDUM NO. 02

SPECIAL NOTE:
The Notice to Bidders, Instructions to Bidders, General Conditions of the Contract for Construction, Supplementary Conditions of the Contract for Construction, and all modifications and previously issued Contract Documentation are a part of this Addendum.

SCOPE OF WORK:
The following items are changes, additions, deletions, clarifications and/or errors and omissions in plans & specifications and shall be considered by each Bidder in making up and submitting their proposal. All items shall be considered a part of the Contract Documents.

NOTICE TO ALL BIDDERS:
All Bidders shall take note of all items covered by this Addendum. Each Bidder shall review the total scope of his responsibilities with respect to his contract work and his interface with the work of others, as well as his required interface with their work.

SPECIFICATIONS:
Section 000110 – Table of Contents (Re-issued):

- Section 095113 – Acoustical Panel Ceiling added.

Section 095113 – Acoustical Panel Ceiling (Added):

- Added to the project.

Section 232113 – Hydronic Piping (Re-issued):

- RFI #5 - Revised fittings and unions for copper piping for 2” and under to be press seal

DRAWINGS:
MD1.1: Mechanical Demolition Plan – Unit 100 (Re-issued)

- Revised demolition keynote language.

MD1.2: Mechanical Demolition Plan – Unit 200 (Re-issued)

- Revised demolition keynote language.

MD1.12: Roof Mechanical Demolition Plan – Unit 300 (Re-issued)
- Revised demolition keynote language.

MH1.1: First Floor Mechanical HVAC Plan – Unit 100 (Re-issued)
- Revised N.I.C. scope area to indicate correct scope of work.

MH1.2: First Floor Mechanical HVAC Plan – Unit 200 (Re-issued)
- Revised N.I.C. scope area to indicate correct scope of work.

MP1.1: First Floor Mechanical Piping Plan – Unit 100 (Re-issued)
- Revised N.I.C. scope area to indicate correct scope of work.

MP1.2: First Floor Mechanical Piping Plan – Unit 200 (Re-issued)
- Revised N.I.C. scope area to indicate correct scope of work.

M4.0: Enlarged Mechanical Plans (Re-issued)
- Revised piping layout to show a primary/secondary system in lieu of a variable primary system.
- Revised demolition keynote language.
- Added mechanical demolition general notes to sheet.

M7.0: Mechanical Riser Diagrams (Re-issued)
- Revised piping diagram to show a primary/secondary system in lieu of a variable primary systems.
- Edited gas riser diagram to show existing vs new scope.

M8.0: Control Diagrams (Re-issued)
- Revised unit ventilator control diagram to show occupancy sensor and revised SOO to include occupancy controls.

M8.1: Control Diagrams (Re-issued)
- Revised heating hot water system control diagram SOO to indicate the correct sequence for a redundant boiler operation. Cleaned up control diagram to show correct points and devices.
- Added flow meter for make-up water to air separator.
- Added chemical shot feeder.

ED1.1: First Floor Power Demolition Plan – Unit 100 (Re-issued)
- Added keynote D3.
- Added keynote D3 to office areas where indicated.

ED1.2: First Floor Power Demolition Plan – Unit 200 (Re-issued)
- Added keynote D3.
- Added keynote D3 to office areas where indicated.

ED1.12: Roof Power Demolition Plan – Unit 200 (not-issued)

- Added keynote D3.

EP1.1: First Floor Power Plan – Unit 100 (Re-issued)

- Added keynote R3.
- Added keynote R3 to office areas where indicated.

EP1.2: First Floor Power Plan – Unit 200 (Re-issued)

- Added keynote R3.
- Added keynote R3 to office areas where indicated.

EP1.11: Roof Power Plan – Unit 100 (not-issued)

- Added keynote R3.

EP1.12: Roof Power Plan – Unit 200 (not-issued)

- Added keynote R3.

END OF ADDENDUM

SECTION 000110 - TABLE OF CONTENTS

SECTION 095113
ACOUSTICAL PANEL CEILINGS

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 acoustical panels, trims and exposed suspension systems for interior ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.5 CLOSEOUT SUBMITTALS

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

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: Class A according to ASTM E1264.
2. Smoke-Developed Index: 450 or less.

B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS **APC-1**

A. Basis-of-Design Product: Subject to compliance with requirements, provide:
1. USG Interiors, Inc.; Subsidiary of USG Corporation; **USG 86785** Acoustical Panels or comparable product by one of the following:
   a. CertainTeed Corp.
   b. Armstrong World Industries, Inc

B. Insert drawing designation for each product required. Use the same designation for the acoustical panels in this article and for the related suspension system in "Metal Suspension System" Article; together, they make up the ceiling assembly. Use these designations on Drawings to identify each ceiling assembly.

C. Acoustical Panel Standard: Provide manufacturer's standard panels according to ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

D. Classification: Provide panels as follows:

A. Material: 3354 – Fiberglass with DuraBrite® acoustically transparent membrane; CAC backing

B. Surface Material: DuraBrite scrim with factory-applied latex paint

C. Color: White.

D. Light Reflectance (LR): Not less than 0.88.

E. Ceiling Attenuation Class (CAC): Not less than CAC indicated in a schedule 35.

F. Noise Reduction Coefficient (NRC): Not less than 0.90.

G. Edge/Joint Detail: Square Tegular

H. Thickness: 1 inch.

I. Weight: 0.64 LBS/SF

J. Modular Size: 24 by 24 inches or 24 by 48 inches.

K. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D3273, ASTM D3274, or ASTM G21 and evaluated according to ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Armstrong World Industries, Inc.
   2. Rockfon (Rockwool International)
   3. USG Corporation.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories according to ASTM C635/C635M and designated by type, structural classification, and finish indicated.

   1. High-Humidity Finish: Where indicated, provide coating tested and classified for "severe environment performance" according to ASTM C635/C635M.

C. Wide-Face, Aluminum-Capped, Double-Web, Hot-Dip Galvanized, G60, Steel Suspension System: Main and cross runners roll formed from cold-rolled steel sheet; hot-dip galvanized, G60 coating designation; with prefinished, 15/16-inch-wide aluminum caps on flanges.

1. Structural Classification: Intermediate-duty system.
2. Face Design: Flat, flush.
3. Cap Finish: Painted white.

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper.
2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch-diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch-diameter bolts.

E. Hold-Down Clips: Where indicated, provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees. / At all vestibule locations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

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

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION

A. Install acoustical panel ceilings according to ASTM C636/C636M and manufacturer's written instructions.

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.
9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.

1. Arrange directionally patterned acoustical panels as follows:

a. As indicated on reflected ceiling plans.
b. Install panels with pattern running in one direction parallel to long axis of space.
c. Install panels in a basket-weave pattern.

2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
4. Protect lighting fixtures and air ducts according to requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet non-cumulative.

3.5 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

SECTION 23 2113
HYDRONIC PIPING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Hydronic system requirements.

B. Heating water piping, above grade.

C. Equipment drains and overflows.

D. Pipe hangers and supports.

E. Unions, flanges, mechanical couplings, and dielectric connections.

1.2 RELATED REQUIREMENTS

A. Section 07 8400 - Firestopping.

B. Section 09 9123 - Interior Painting.

C. Section 23 0516 - Expansion Fittings and Loops for HVAC Piping.

D. Section 23 0523 - General-Duty Valves for HVAC Piping.

E. Section 23 0553 - Identification for HVAC Piping and Equipment.

F. Section 23 0719 - HVAC Piping Insulation.

G. Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

H. Section 25 3516 - Integrated Automation Sensors and Transmitters: Pipe-mounted product furnishing.

I. Section 25 3519 - Integrated Automation Control Valves: Product furnishing.

J. Section 26 0583 - Wiring Connections: Electrical characteristics and wiring connections.

1.3 REFERENCE STANDARDS

A. ANSI/FCI 70-2 - Control Valve Seat Leakage; 2021.

B. ASME BPVC-IX - Boiler and Pressure Vessel Code, Section IX - Qualification Standard for Welding, Brazing, and Fusing Procedures; Welders; Brazers; and Welding, Brazing, and Fusing Operators; 2023.

C. ASME B16.3 - Malleable Iron Threaded Fittings: Classes 150 and 300; 2021.

D. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings; 2021.

E. ASME B16.22 - Wrought Copper and Copper Alloy Solder-Joint Pressure Fittings; 2021.

F. ASME B31.9 - Building Services Piping; 2020.

G. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2022.

H. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2023a.

I. ASTM B32 - Standard Specification for Solder Metal; 2020.

J. ASTM B88 - Standard Specification for Seamless Copper Water Tube; 2022.

K. ASTM B88M - Standard Specification for Seamless Copper Water Tube (Metric); 2020.

L. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers; 2024.

M. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications; 2007 (Reapproved 2019).

N. AWS A5.8M/A5.8 - Specification for Filler Metals for Brazing and Braze Welding; 2019.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020, with Errata (2023).

P. AWWA C606 - Grooved and Shouldered Joints; 2022.

Q. MSS SP-58 - Pipe Hangers and Supports - Materials, Design, Manufacture, Selection, Application, and Installation; 2018, with Amendment (2019).

1.4 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data:

1. Include data on pipe materials, pipe fittings,and accessories.

2. Indicate valve data and ratings.

3. Show grooved joint couplings, fittings, and specialties on drawings and product submittals, specifically identified with the manufacturer's style or series designation.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

B. Provide all grooved joint couplings, fittings, valves, specialties, and grooving tools from a single manufacturer.

C. Coupling Manufacturer:

1. Perform on-site training by factory-trained representative to the Contractor's field personnel in the proper use of grooving tools and installation of grooved joint products.

2. Periodic job site visits by factory-trained representative to ensure best practices in grooved joint installation.

D. Welder Qualifications: Certify in accordance with ASME BPVC-IX.

1.6 PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing hydronic piping systems with the following minimum working-pressure ratings:

1. Hot-Water Piping: 150 psig at 200 deg. F

PART 2 PRODUCTS

2.1 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers, and supports as required, as indicated, and as follows:

1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.

2. Use non-conducting dielectric connections whenever jointing dissimilar metals.

3. Grooved mechanical joints may be used in accessible locations only.

a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Architect.

b. Use rigid joints unless otherwise indicated.

4. Provide pipe hangers and supports in accordance with ASME B31.9 or MSS SP-58 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated:

1. Provide drain valves where indicated, and if not indicated, provide at least at main shut-off, low points of piping, bases of vertical risers, and at equipment. Use 3/4 inch gate valves with cap; pipe to nearest floor drain.

2. Isolate equipment using butterfly valves with lug end flanges or grooved mechanical couplings.

3. For throttling, bypass, or manual flow control services, use butterfly valves.

4. In heating water systems, butterfly valves may be used interchangeably with gate and globe valves.

E. Welding Materials and Procedures: Comply with ASME BPVC-IX.

2.2 HEATING WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M, Schedule 40, black, using one of the following joint types:

1. Welded Joints: ASTM A234/A234M, wrought steel welding type fittings; AWS D1.1/D1.1M welded.

2. Threaded Joints: ASME B16.3, malleable iron fittings.

3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.

B. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn, using one of the following joint types:

1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings.

a. Solder: ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

b. Braze: AWS A5.8M/A5.8 BCuP copper/silver alloy.

2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.

2.3 EQUIPMENT DRAINS AND OVERFLOWS

A. Copper Tube: ASTM B88 (ASTM B88M), Type L (B), drawn; using one of the following joint types:

1. Solder Joints: ASME B16.18 cast brass/bronze or ASME B16.22 solder wrought copper fittings; ASTM B32 lead-free solder, HB alloy (95-5 tin-antimony) or tin and silver.

2.4 PIPE HANGERS AND SUPPORTS

A. Provide hangers and supports that comply with MSS SP-58.

1. If type of hanger or support for a particular situation is not indicated, select appropriate type using MSS SP-58 recommendations.

B. In grooved installations, use rigid couplings with offsetting angle-pattern bolt pads or with wedge-shaped grooves in header piping to permit support and hanging in accordance with ASME B31.9.

2.5 UNIONS, FLANGES, MECHANICAL COUPLINGS, AND DIELECTRIC CONNECTIONS

A. Unions for Pipe of 2 Inches and Less:

1. Ferrous Piping: 150 psi brass or malleable iron, threaded.

2. Copper Pipe: Press seal joints.

B. Flanges for Pipe 2 Inches and Greater:

1. Ferrous Piping: 150 psig forged steel, slip-on.

2. Copper Piping: Bronze.

3. Gaskets: 1/16 inch thick, preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.

1. Dimensions and Testing: In accordance with AWWA C606.

2. Mechanical Couplings: Comply with ASTM F1476.

3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.

4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

5. Manufacturers:

a. Anvil International: www.anvilintl.com/#sle.

b. Gruvlok by ASC Engineered Solutions www.asc-es.com

c. Victaulic Company: www.victaulic.com/#sle.

d. Substitutions: See Section 01 6000 - Product Requirements.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. See Section 23 2500 for additional requirements.

3.2 PIPING APPLICATIONS

A. Heating water piping, above grade:

1. Pipe sizes 3/4" - 2": Copper, press seal joints.

2. Pipe sizes 2 1/2" and larger: Schedule 40 black steel, welded joints or grooved joints where allowed

3.3 INSTALLATION

A. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

B. Install in accordance with manufacturer's instructions.

C. Route piping in orderly manner, parallel to building structure, and maintain gradient.

D. Install piping to conserve building space and to avoid interference with use of space.

E. Group piping whenever practical at common elevations.

F. Sleeve pipe passing through partitions, walls, and floors.

G. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified.

H. Slope piping and arrange to drain at low points.

I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

J. Grooved Joints:

1. Install in accordance with the manufacturer's latest published installation instructions.

2. Gaskets to be suitable for the intended service, molded, and produced by the coupling manufacturer.

K. Pipe Hangers and Supports:

1. Install in accordance with ASME B31.9, ASTM F708, or MSS SP-58.

2. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.

3. Place hangers within 12 inches of each horizontal elbow.

4. Use hangers with 1-1/2 inches minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

5. Support vertical piping at every other floor. Support riser piping independently of connected horizontal piping.

6. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

7. Provide copper plated hangers and supports for copper piping.

L. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. See Section 23 0719.

M. Provide access where valves and fittings are not exposed. Coordinate size and location of access doors with Section 08 3100 .

N. Use eccentric reducers to maintain top of pipe level.

O. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc-rich primer to welds.

P. Install valves with stems upright or horizontal, not inverted.

3.4 FIELD QUALITY CONTROL

A. Prepare hydronic piping according to 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 shall be capable of sealing against test pressure without damage to valve. Install blinds in flanged joints to isolate equipment.

5. Install safety 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 shall not 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, "Building Services Piping."

5. After hydrostatic test pressure has been applied for at least 4 hours, 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.

C. Perform the following before operating the system:

1. Open manual valves fully.

2. Inspect pumps for proper rotation. Set makeup pressure-reducing valves for required system pressure.

3. 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).

4. Set temperature controls so all coils are calling for full flow.

5. Inspect and set operating temperatures of hydronic equipment, such as boilers, chillers, cooling towers, to specified values.

6. Verify lubrication of motors and bearings.

FIRST FLOOR MECHANICAL DEMOLITION PLAN - UNIT 100
SCALE: 3/32" = 1'-0"

MECHANICAL DEMOLITION NOTES

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3. VERIFY DEPTH, SIZE, LOCATIONS AND CONDITION OF EXISTING UTILITIES IN THE FIELD, INCLUDING POINTS OF CONNECTION PRIOR TO STARTING ANY WORK.
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6. ALL ITEMS INDICATED WITH BROKEN LINES SHALL BE REMOVED COMPLETE, WITH ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, INSULATION, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTS.
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MECHANICAL DEMOLITION KEYNOTES

- Z1 REMOVE UNIT VENTILATOR, ASSOCIATED LOUVER, AND ALL ASSOCIATED PIPING, VALVES, FITTINGS AND ACCESSORIES
- Z2 REMOVE AIR COMPRESSOR AND ALL ASSOCIATED PNEUMATIC CONTROLS INCLUDING BUT NOT LIMITED TO CONTROL PANELS, GAUGES, PIPING, ETC.
- Z3 REMOVE STEAM BOILER, CONDENSATE RETURN UNITS, PUMPS, BOILER FEED WATER UNIT, FLASH TANK, STEAM TRAPS WITHIN EXISTING BOILER ROOM. DEMOLISH ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES ASSOCIATED WITH THIS EQUIPMENT UNLESS OTHERWISE NOTED. STEAM AND CONDENSATE PIPING IN TUNNELS TO BE CAPPED AT TUNNEL ENTRANCE AND ABANDONED IN PLACE.
- Z4 REMOVE ROOF-MOUNTED PACKAGED AC UNIT SERVING THE MAIN OFFICE. DEMOLISH ALL EXISTING REFRIGERANT PIPING, FITTINGS AND ACCESSORIES. DEMOLISH ALL ASSOCIATED DUCTWORK, FITTINGS, GRILLES AND DIFFUSERS. COORDINATE WITH ARCHITECTURAL FOR ROOF PATCHING DETAILS.
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- Z7 REMOVE FLOOR-MOUNTED STEAM HEATER AND ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES BACK TO STEAM MAIN. COORDINATE WITH ARCHITECTURAL TO PATCH FLOORS AS NEEDED.
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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

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DESIGN DEVELOPMENT	09.26.2025
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KEY PLAN

JOB NO. 2616.07

N

SHEET TITLE
FIRST FLOOR MECHANICAL DEMOLITION PLAN - UNIT 100

SHEET NO.
MD1.1

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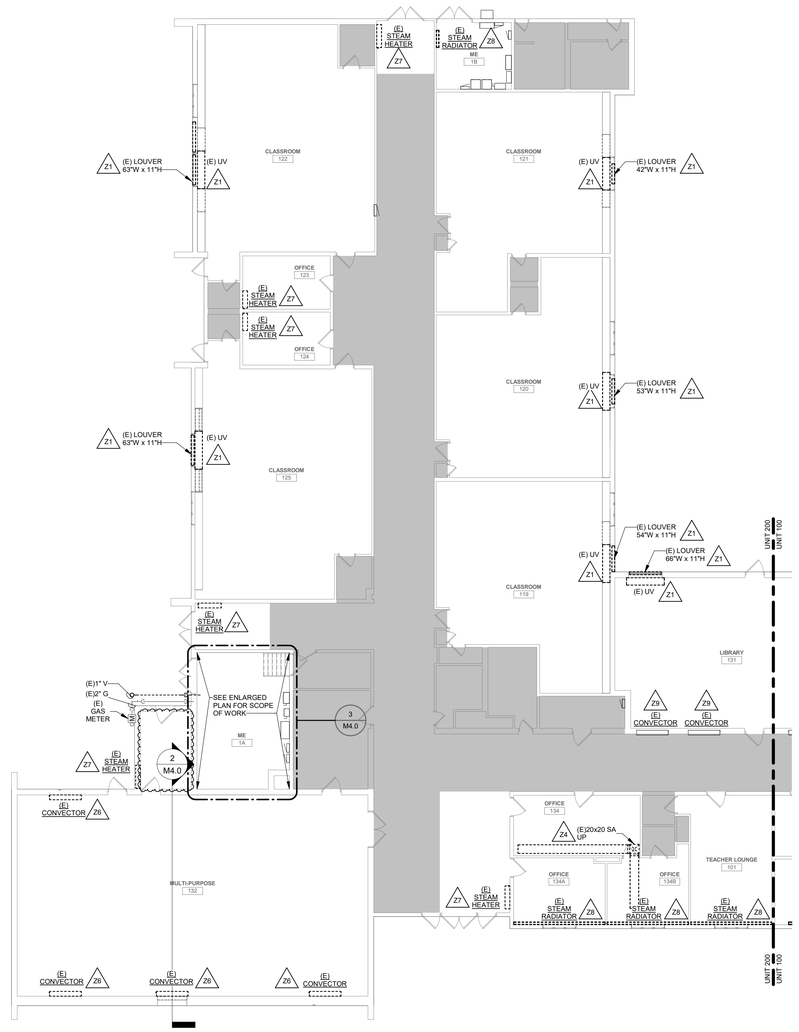

FIRST FLOOR MECHANICAL DEMOLITION PLAN - UNIT 200
SCALE: 3/32" = 1'-0"

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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

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KEY PLAN

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JOB NO. 2616.07

SHEET TITLE
FIRST FLOOR MECHANICAL DEMOLITION PLAN - UNIT 200

SHEET NO.
MD1.2

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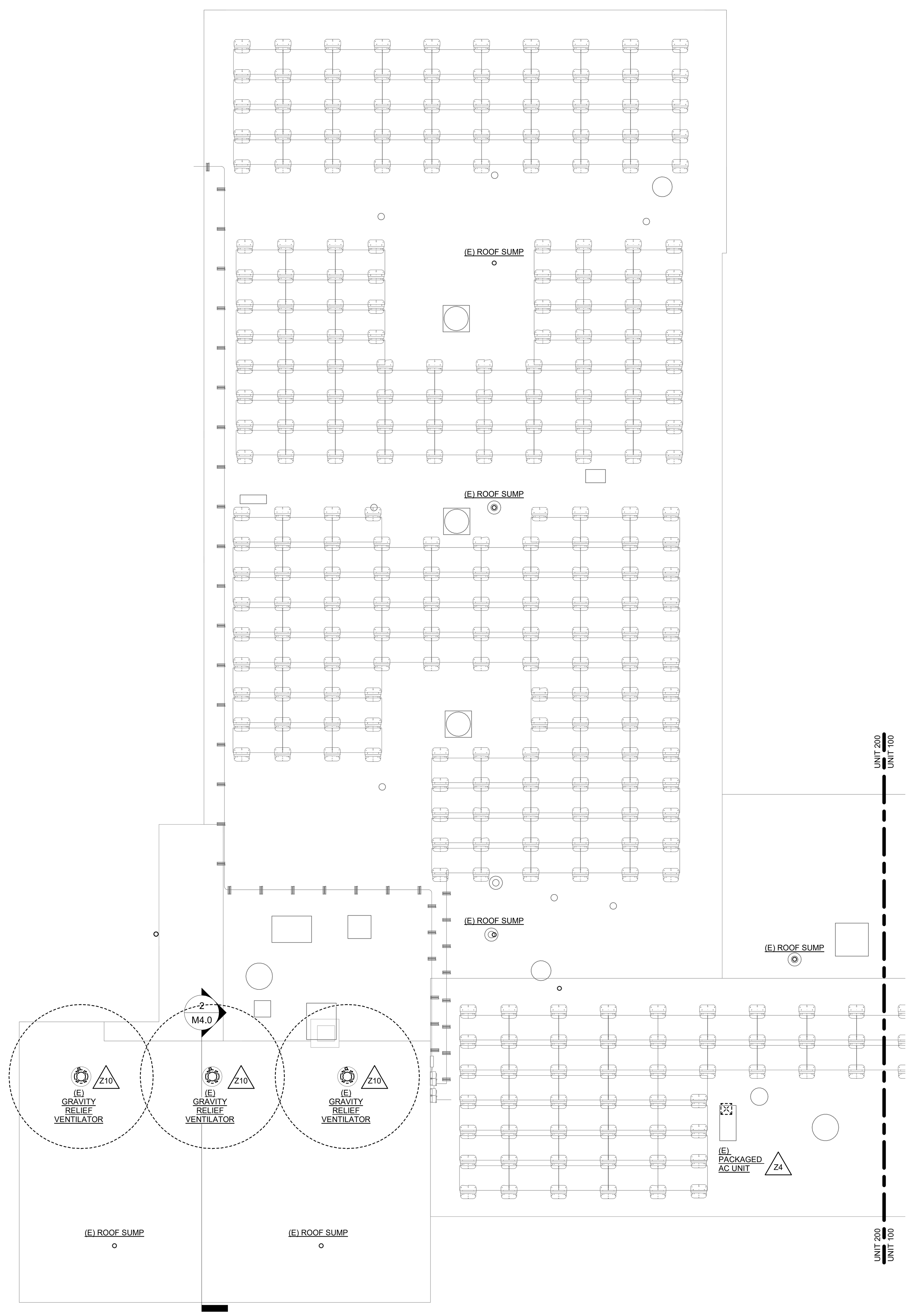

ROOF MECHANICAL DEMOLITION PLAN - UNIT 200
SCALE: 3/32" = 1'-0"

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GIER PARK HVAC IMPROVEMENTS

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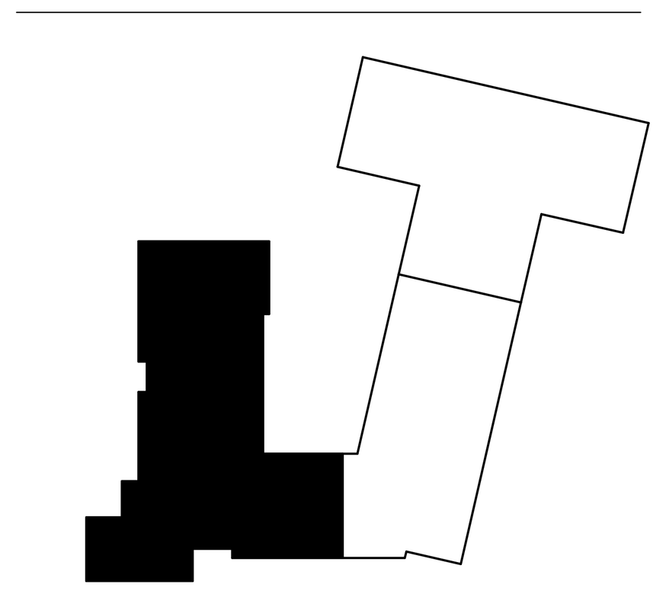

KEY PLAN

JOB NO. 2616.07

SHEET TITLE
ROOF MECHANICAL DEMOLITION PLAN - UNIT 200

SHEET NO.
MD1.12

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FIRST FLOOR MECHANICAL HVAC PLAN - UNIT 100

SCALE: 3/32" = 1'-0"

HVAC GENERAL NOTES

1. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. PROVIDE HVAC SYSTEMS COMPLETE PER SPECIFICATION, SMACNA STANDARDS, AND PER APPLICABLE CODES INCLUDING ALL NECESSARY OFFSETS, FITTINGS, SPECIAL RADIUS OR MITERED ELBOWS WHICH ARE REQUIRED DUE TO SPACE CONSTRAINTS OR STRUCTURAL CONDITIONS OR OTHER CONDITIONS.
2. CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE WORK OF ALL OTHER TRADES. ALL DUCTWORK IS TO BE ROUTED AS HIGH AS POSSIBLE. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. VERIFY ALL CLEARANCES PRIOR TO THE FABRICATION OF ANY WORK.
3. DUCTWORK/PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE AND SHALL NOT BE LOCATED OVER ELECTRICAL EQUIPMENT/PANELS. PROVIDE REQUIRED CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT. DUCTWORK/PIPING SHALL NOT INTERFERE WITH ELECTRICAL EQUIPMENT CLEARANCE.
4. DUCTWORK/PIPING SHALL NOT BE INSTALLED IN A LOCATION THAT RESTRICTS THE ACCESS TO MECHANICAL DEVICES REQUIRING ACCESS.
5. THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL, ETC. FOR THE PROPER INSTALLATION OF ALL MECHANICAL SYSTEMS.
6. COORDINATE FLOOR, WALL, ROOF PENETRATIONS, LOUVER SIZES, PAD LOCATIONS ETC. WITH ARCHITECTURAL TRADES. SEAL ALL PIPING AND DUCT PENETRATIONS.
7. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
8. COORDINATE AND PROVIDE ACCESS DOORS IN HARD CEILING AREAS FOR ACCESS TO BALANCING DAMPERS, ETC. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
9. BRANCH DUCTWORK TO GRILLES, REGISTERS AND DIFFUSERS SHALL BE THE SAME SIZE AS THE GRILLE, REGISTER OR DIFFUSER NECK SIZE WHERE NO DUCT SIZE IS INDICATED ON PLAN.
10. MAXIMUM LENGTH OF FLEXIBLE DUCT SHALL BE 5'-0".
11. FOR EQUIPMENT VALVING, COMPONENT, AND PIPING ARRANGEMENT, REFER TO PIPING DIAGRAMS AND DETAILS.
12. PAINT ALL VISIBLE INTERIOR SURFACES OF EXHAUST/RETURN GRILLES, REGISTERS AND VISIBLE ASSOCIATED DUCTWORK FLAT BLACK.
13. THE CEILING SPACE IS USED AS A RETURN AIR PLENUM. NO PLASTIC MATERIALS INCLUDING PVC PIPING, CONDUIT, WIRING, ETC. SHALL BE USED. ALL MATERIAL IN THE CEILING SPACE IS TO BE PLENUM RATED.
14. PROVIDE CODE REQUIRED CLEARANCE/ACCESS DOORS FOR DAMPERS, VALVES, AND CLEANOUTS LOCATED IN WALLS OR ABOVE HARD CEILINGS. COORDINATE LOCATIONS WITH ARCHITECT. REFER TO ARCHITECTURAL PLANS FOR CEILING TYPES.
15. DUCTWORK TO AND FROM VAV BOXES/TERMINAL UNITS SHALL BE EQUAL TO THE BOX CONNECTIONS SIZES UNLESS INDICATED OTHERWISE.
16. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
17. ALL BRANCH PIPING TO TERMINAL UNITS TO BE 3/4" UNLESS OTHERWISE NOTED.
18. ROOF MOUNTED EQUIPMENT REQUIRING SERVICE SHALL BE LOCATED A MINIMUM OF 10 FEET FROM ROOF EDGES. WHERE EQUIPMENT CAN'T BE LOCATED AWAY FROM ROOF EDGE AND GUARD RAILS ARE NOT PROVIDED, PROVIDE PERMANENT FALL ARREST ANCHORAGE CONNECTION DEVICE THAT COMPLIES WITH ANSI/ASSE Z 359.1.

MECHANICAL KEYNOTES

- H1 NEW DECORATIVE, CLEAR ANODIZED, DRAINABLE BLADE LOUVER PROVIDED BY MANUFACTURER. COORDINATE WITH ARCHITECT AND STRUCTURAL FOR DETAILS AND SUPPORT REQUIRED FOR INSTALLATION OF LOUVER.
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- H3 MOUNT NEW CONDENSING UNIT ON STEEL RAILS. ROUTE REFRIGERANT PIPING FROM CONDENSING UNIT TO CASSETTE(S) THROUGH A COVERED PIPE CURB.
- H4 MOUNT NEW CONDENSING UNIT ON 6" REMOVABLE PAD. ROUTE ASSOCIATED REFRIGERANT PIPING THROUGH COVERED PIPE CURB.
- H5 MOUNT NEW SPLIT SYSTEM CONDENSING UNIT ON STEEL RAILS. ROUTE REFRIGERANT PIPING FROM CONDENSING UNIT TO INDOOR WALL-MOUNTED UNIT THROUGH A COVERED PIPE CURB.
- H6 CONNECT NEW HHWS & HHWR PIPING TO NEW UNIT VENTILATOR, REFER TO MANUFACTURER'S GUIDE FOR INSTALLATION OF PIPING TO NEW UNIT. COORDINATE WITH ARCHITECT TO PROVIDE PIPE COVERS FOR HYDRONIC PIPING FROM CEILING TO UNIT, AS NEEDED.
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- H9 MOUNT NEW ROOFTOP UNIT ON NEW STRUCTURAL STEEL PLATFORM. SEE STRUCTURAL DRAWINGS FOR MORE DETAILS. ROUTE CONDENSATE DRAIN FROM RTU-1 COOLING COIL TO NEAREST ROOF DRAIN. SEE DETAIL ON SHEET M5.1 FOR MORE DETAILS
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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

ISSUANCES	DATE
DESIGN DEVELOPMENT	09.26.2025
CONSTRUCTION DOCUMENTS	11.14.2025
ADDENDUM 02	12.11.2025

KEY PLAN

N

JOB NO. 2616.07

SHEET TITLE

FIRST FLOOR MECHANICAL HVAC PLAN - UNIT 100

SHEET NO.

MH1.1

SES
Strategic Energy Solutions®
4000 W. Eleven Mile Road Berkley, MI 48072
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SES Project # 25 0588 25

LAST PRINTED: 12/12/2025 11:09 AM
Autodesk Docs://LSD - Gier Park HVAC Improvements/25 0588 25_LSD Gier Park AC Upgrade_AEP_2025.rvt

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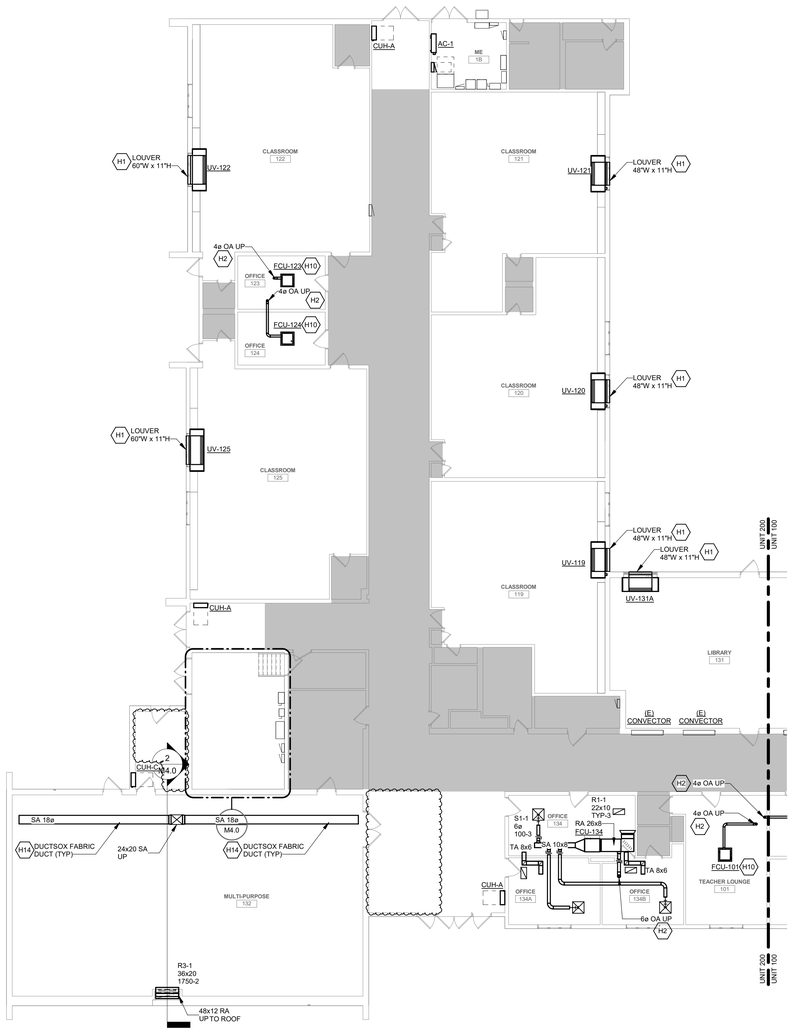

FIRST FLOOR MECHANICAL HVAC PLAN - UNIT 200
SCALE: 3/32" = 1'-0"

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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

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Lansing School District

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KEY PLAN

JOB NO. 2616.07

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SHEET TITLE
FIRST FLOOR MECHANICAL HVAC PLAN - UNIT 200

SHEET NO.
MH1.2

Strategic Energy Solutions®
4000 W. Eleven Mile Road Berkley, MI 48072
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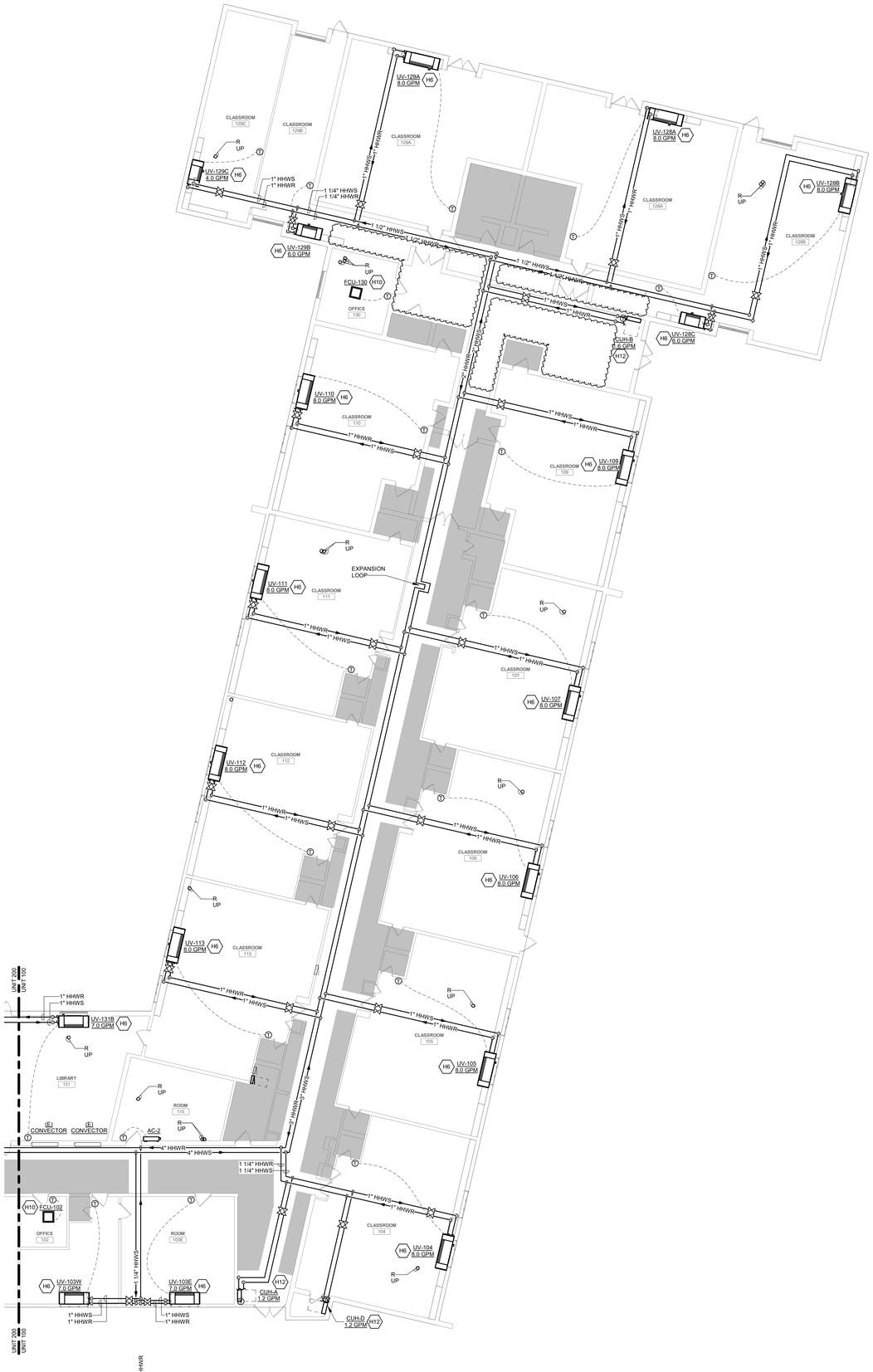

FIRST FLOOR MECHANICAL PIPING PLAN - UNIT 100

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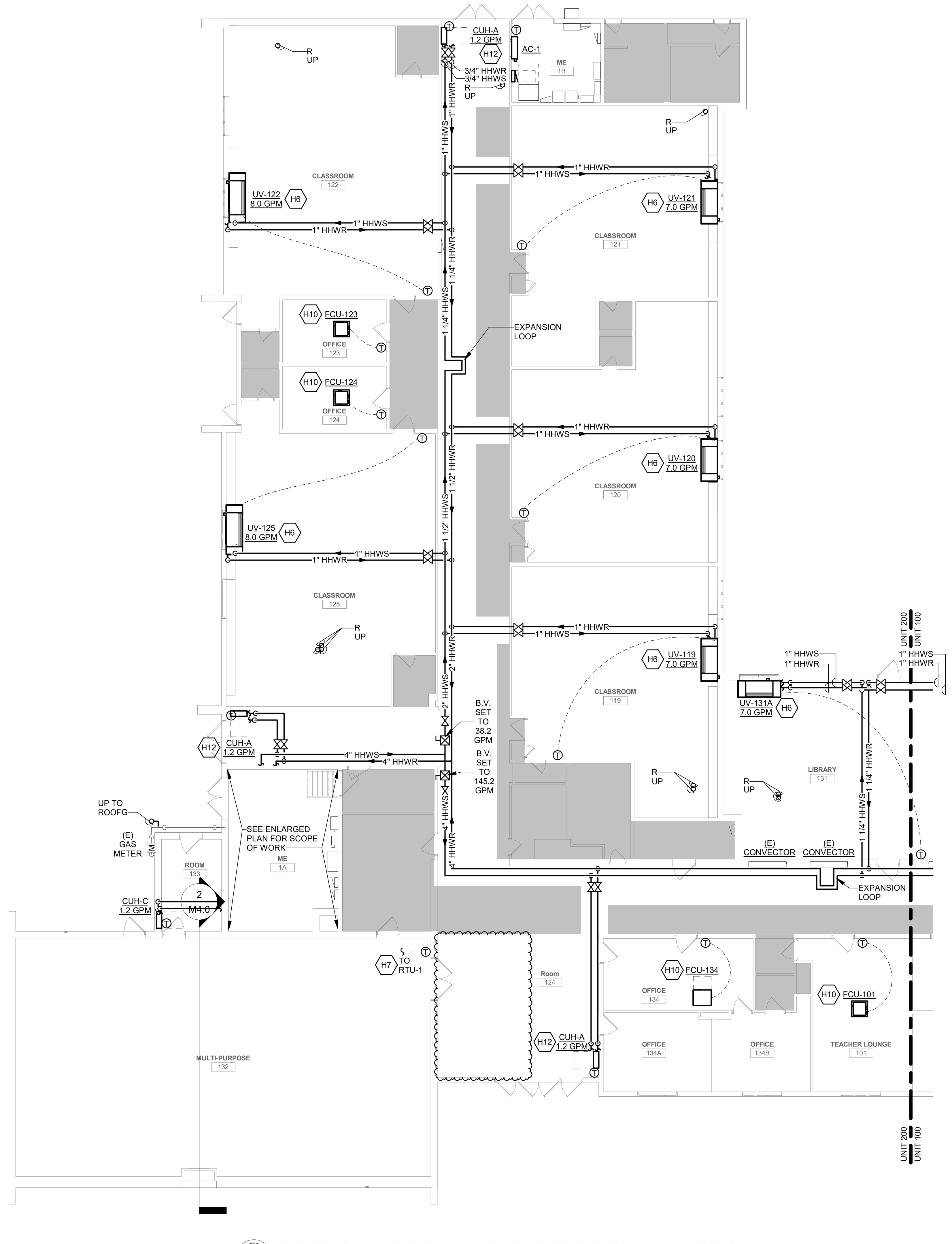

FIRST FLOOR MECHANICAL PIPING PLAN - UNIT 200

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H5 MOUNT NEW SPLIT SYSTEM CONDENSING UNIT ON STEEL RAILS. ROUTE REFRIGERANT PIPING FROM CONDENSING UNIT TO INDOOR WALL-MOUNTED UNIT THROUGH A COVERED PIPE CURB.

H6 CONNECT NEW HHWS & HHWR PIPING TO NEW UNIT VENTILATOR. REFER TO MANUFACTURER'S GUIDE FOR INSTALLATION OF PIPING TO NEW UNIT. COORDINATE WITH ARCHITECT TO PROVIDE PIPE COVERS FOR HYDRONIC PIPING FROM CEILING TO UNIT, AS NEEDED.

H7 PROVIDE THERMOSTAT WITH LOCKING COVER IN MULTI-PURPOSE ROOM

H8 ROUTE 8"Ø BOILER FLUE/INTAKE UP THROUGH ROOF AND TERMINATE A MINIMUM OF 3 FT ABOVE ROOF AND 10 FT MIN FROM ANY INTAKE. TRANSITION AS REQUIRED TO AVOID STRUCTURES, CONDUIT, PIPING, ETC. TERMINATE INTAKE WITH A GOOSENECK. BOILER VENTS TO BE CONSTRUCTED OF STAINLESS STEEL ONLY (PVC WILL NOT BE ACCEPTED) AND COMPLIANT WITH MFR RECOMMENDATIONS AND MMC 2021.

H9 MOUNT NEW ROOFTOP UNIT ON NEW STRUCTURAL STEEL PLATFORM. SEE STRUCTURAL DRAWINGS FOR MORE DETAILS.. ROUTE CONDENSATE DRAIN FROM RTU-1 COOLING COIL TO NEAREST ROOF DRAIN. SEE DETAIL ON SHEET M5.1 FOR MORE DETAILS

H10 ROUTE REFRIGERANT PIPING TO AND FROM RESPECTIVE CONDENSING UNIT ON ROOF TO CEILING CASSETTE THROUGH COVERED PIPE CURB. INSULATE AND ROUTE 3/4" PVC CONDENSATE DRAIN PIPE FROM CEILING CASSETTE TO NEAREST UTILITY SINK OR MECHANICAL ROOM FLOOR DRAIN.

H11 PIPE CURB SIZES AND LOCATION SHOWN AS REFERENCE ONLY.

H12 ROUTE NEW HHWS & HHWR PIPING DOWN TO NEW UNIT HEATER. COORDINATE WITH ARCHITECTURAL TO PROVIDE PIPE COVERS AS NEEDED TO CONCEAL EXPOSED PIPING FROM CEILING TO PIPING CONNECTIONS ON UNIT HEATER.

H13 ROUTE NEW S/A DUCT THROUGH ROOF THROUGH EXISTING RELIEF VENT OPENING. CONTRACTOR TO FIELD VERIFY ACTUAL LOCATION OF EXISTING OPENING PRIOR TO ROUTING DUCTWORK THROUGH THE ROOF.

H14 DUCTSOX FABRIC DUCT WITH INTERNAL HOOP SUPPORT SYSTEM MOUNTED AT ~15' 9" AFF. COORDINATE LOCATION WITH EXISTING LIGHTS AND BASKETBALL HOOPS. COORDINATE DISCHARGE/NOZZLE DIRECTION, SPACING, AND THROW WITH LIGHT FIXTURES. FABRIC DUCT MFR TO PROVIDE FINAL LAYOUT AND ENGINEERING INCLUDING, BUT NOT LIMITED TO, THROWS, VELOCITIES, MATERIALS, SPACING, ETC.

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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT
401 E. Gier St, Lansing, MI 48906

Lansing School District

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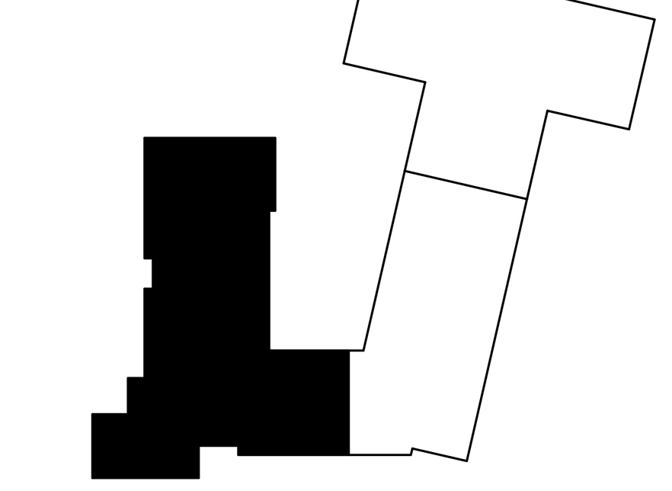

KEY PLAN

N

JOB NO. 2616.07

SHEET TITLE
FIRST FLOOR MECHANICAL PIPING PLAN - UNIT 200

SHEET NO.
MP1.2

SES
Strategic Energy Solutions®
4000 W. Eleven Mile Road Berkley, MI 48072
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SES Project # 25 0588 25

MECHANICAL DEMOLITION NOTES

1. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF WORK TO BE PERFORMED. THE EXACT EXTENT OF DEMOLITION SHALL BE AS REQUIRED BY THE NEW WORK.
2. PRIOR TO COMMENCEMENT OF WORK, CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING SITE CONDITIONS, SYSTEMS, AND UTILITIES. NOTIFY ARCHITECT OF ANY INTERFERENCES OR DISCREPANCIES.
3. VERIFY DEPTH, SIZE, LOCATIONS AND CONDITION OF EXISTING UTILITIES IN THE FIELD, INCLUDING POINTS OF CONNECTION PRIOR TO STARTING ANY WORK.
4. ANY INTERRUPTIONS OF EXISTING SERVICES AND/OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVANCE BY THE OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH THE PRESENT BUILDING'S OPERATION.
5. ALL ITEMS ON DEMOLITION PLANS SHALL BE CONSIDERED EXISTING UNLESS OTHERWISE NOTED. ALL WORK INDICATED ON PLANS HAS BEEN LOCATED PER EXISTING DRAWINGS AND/OR FIELD OBSERVATION AND REQUIRES FIELD VERIFICATION.
6. ALL ITEMS INDICATED WITH BROKEN LINES SHALL BE REMOVED COMPLETE, WITH ALL RELATED ITEMS INCLUDING HANGERS, SUPPORTS, INSULATION, CONTROLS, ETC. CAP ALL OPEN ENDED PIPES AND DUCTS.
7. ALL EXISTING WORK TO REMAIN SHALL BE PROTECTED FROM DAMAGE. WHERE DUCT OR PIPE INSULATION HAS BEEN DAMAGED DURING DEMOLITION, THE CONTRACTOR SHALL REPAIR INSULATION AS REQUIRED TO MATCH EXISTING.
8. THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL EQUIPMENT BEING REMOVED. ALL ITEMS REMOVED SHALL BE LEGALLY DISPOSED OF. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXISTING RELOCATED AND OWNER PROVIDED EQUIPMENT.

HVAC GENERAL NOTES

1. THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL EXTENT OF THE WORK. PROVIDE HVAC SYSTEMS COMPLETE PER SPECIFICATION, SMACNA STANDARDS, AND PER APPLICABLE CODES INCLUDING ALL NECESSARY OFFSETS, FITTINGS, SPECIAL RADIUS OR MITERED ELBOWS WHICH ARE REQUIRED DUE TO SPACE CONSTRAINTS OR STRUCTURAL CONDITIONS OR OTHER CONDITIONS.
2. CONTRACTOR SHALL COORDINATE THEIR WORK WITH THE WORK OF ALL OTHER TRADES. ALL DUCTWORK IS TO BE ROUTED AS HIGH AS POSSIBLE. PROVIDE ACCESS AROUND ALL NEW EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. VERIFY ALL CLEARANCES PRIOR TO THE FABRICATION OF ANY WORK.
3. DUCTWORK/PIPING SHALL BE ROUTED AS HIGH AS POSSIBLE AND SHALL NOT BE LOCATED OVER ELECTRICAL EQUIPMENT/PANELS. PROVIDE REQUIRED CLEARANCE IN FRONT OF ELECTRICAL EQUIPMENT. DUCTWORK/PIPING SHALL NOT INTERFERE WITH ELECTRICAL EQUIPMENT CLEARANCE.
4. DUCTWORK/PIPING SHALL NOT BE INSTALLED IN A LOCATION THAT RESTRICTS THE ACCESS TO MECHANICAL DEVICES REQUIRING ACCESS.
5. THE CONTRACTOR SHALL PROVIDE ALL MISCELLANEOUS SUPPORTING STEEL, ETC. FOR THE PROPER INSTALLATION OF ALL MECHANICAL SYSTEMS.
6. COORDINATE FLOOR, WALL, ROOF PENETRATIONS, LOUVER SIZES, PAD LOCATIONS ETC. WITH ARCHITECTURAL TRADES. SEAL ALL PIPING AND DUCT PENETRATIONS.
7. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF GRILLES, REGISTERS, AND DIFFUSERS.
8. COORDINATE AND PROVIDE ACCESS DOORS IN HARD CEILING AREAS FOR ACCESS TO BALANCING DAMPERS, ETC. REFER TO ARCHITECTURAL DRAWINGS FOR CEILING TYPES.
9. BRANCH DUCTWORK TO GRILLES, REGISTERS AND DIFFUSERS SHALL BE THE SAME SIZE AS THE GRILLE, REGISTER OR DIFFUSER NECK SIZE WHERE NO DUCT SIZE IS INDICATED ON PLAN
10. MAXIMUM LENGTH OF FLEXIBLE DUCT SHALL BE 5'-0".
11. FOR EQUIPMENT VALVING, COMPONENT, AND PIPING ARRANGEMENT, REFER TO PIPING DIAGRAMS AND DETAILS.
12. PAINT ALL VISIBLE INTERIOR SURFACES OF EXHAUST/RETURN GRILLES, REGISTERS AND VISIBLE ASSOCIATED DUCTWORK FLAT BLACK.
13. THE CEILING SPACE IS USED AS A RETURN AIR PLENUM. NO PLASTIC MATERIALS INCLUDING PVC PIPING, CONDUIT, WIRING, ETC. SHALL BE USED. ALL MATERIAL IN THE CEILING SPACE IS TO BE PLENUM RATED.
14. PROVIDE CODE REQUIRED CLEARANCE/ACCESS DOORS FOR DAMPERS, VALVES, AND CLEANOUTS LOCATED IN WALLS OR ABOVE HARD CEILINGS. COORDINATE LOCATIONS WITH ARCHITECT. REFER TO ARCHITECTURAL PLANS FOR CEILING TYPES.
15. DUCTWORK TO AND FROM VAV BOXES/TERMINAL UNITS SHALL BE EQUAL TO THE BOX CONNECTIONS SIZES UNLESS INDICATED OTHERWISE.
16. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.
17. ALL BRANCH PIPING TO TERMINAL UNITS TO BE 3/4" UNLESS OTHERWISE NOTED.
18. ROOF MOUNTED EQUIPMENT REQUIRING SERVICE SHALL BE LOCATED A MINIMUM OF 10 FEET FROM ROOF EDGES. WHERE EQUIPMENT CAN'T BE LOCATED AWAY FROM ROOF EDGE AND GUARD RAILS ARE NOT PROVIDED, PROVIDE PERMANENT FALL ARREST ANCHORAGE CONNECTION DEVICE THAT COMPLIES WITH ANSI/ASSE Z 359.1.

MECHANICAL ENLARGED KEYNOTES

M1 ROUTE 8"Ø BOILER FLUE/INTAKE UP THROUGH ROOF AND TERMINATE A MINIMUM OF 3 FT ABOVE ROOD AND 10 FT MIN FROM ANY INTAKE. TRANSITION AS REQUIRED TO AVOID STRUCTURES, CONDUIT, PIPING, ETC. TERMINATE INTAKE WITH A GOOSENECK. BOILER VENTS TO BE CONSTRUCTED OF STAINLESS STEEL ONLY (PVC WILL NOT BE ACCEPTED) AND COMPLIANT WITH MFR RECOMMENDATIONS AND MMC 2021.

M2 DUCTSOX FABRIC DUCT WITH INTERNAL HOOP SUPPORT SYSTEM MOUNTED AT ~15' 5" AFF. COORDINATE LOCATION WITH EXISTING LIGHTS AND BASKETBALL HOOPS. COORDINATE DISCHARGE/NOZZLE DIRECTION, SPACING, AND THROW WITH LIGHT FIXTURES. FABRIC DUCT MFR TO PROVIDE FINAL LAYOUT AND ENGINEERING INCLUDING, BUT NOT LIMITED TO, THROWS, VELOCITIES, MATERIALS, SPACING, ETC.

MECHANICAL DEMOLITION KEYNOTES

Z1 REMOVE UNIT VENTILATOR, ASSOCIATED LOUVER, AND ALL ASSOCIATED PIPING, VALVES, FITTINGS AND ACCESSORIES

Z2 REMOVE AIR COMPRESSOR AND ALL ASSOCIATED PNEUMATIC CONTROLS INCLUDING BUT NOT LIMITED TO CONTROL PANELS, GAUGES, PIPING, ETC.

Z3 REMOVE STEAM BOILER, CONDENSATE RETURN UNITS, PUMPS, BOILER FEED WATER UNIT, FLASH TANK, STEAM TRAPS WITHIN EXISTING BOILER ROOM. DEMOLISH ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES ASSOCIATED WITH THIS EQUIPMENT UNLESS OTHERWISE NOTED. STEAM AND CONDENSATE PIPING IN TUNNELS TO BE CAPPED AT TUNNEL ENTRANCE AND ABANDONED IN PLACE.

Z4 REMOVE ROOF-MOUNTED PACKAGED AC UNIT SERVING THE MAIN OFFICE. DEMOLISH ALL EXISTING REFRIGERANT PIPING, FITTINGS AND ACCESSORIES. DEMOLISH ALL ASSOCIATED DUCTWORK, FITTINGS, GRILLES AND DIFFUSERS. COORDINATE WITH ARCHITECTURAL FOR ROOF PATCHING DETAILS.

Z5 REMOVE CEILING HUNG STEAM UNIT HEATER AND ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES BACK TO STEAM MAIN.

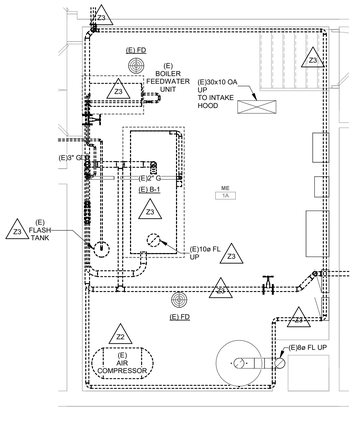
Z6 REMOVE STEAM CONVECTOR AND ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES BACK TO STEAM MAIN. DEMOLISH ALL ASSOCIATED EXTERIOR LOUVERS, IF APPLICABLE. COORDINATE WITH ARCHITECTURAL TO PATCH AND PAINT WALL AS NEEDED AND TO BLANK OFF ANY EXTERIOR OPENINGS.

Z7 REMOVE FLOOR-MOUNTED STEAM HEATER AND ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES BACK TO STEAM MAIN. COORDINATE WITH ARCHITECTURAL TO PATCH FLOORS AS NEEDED.

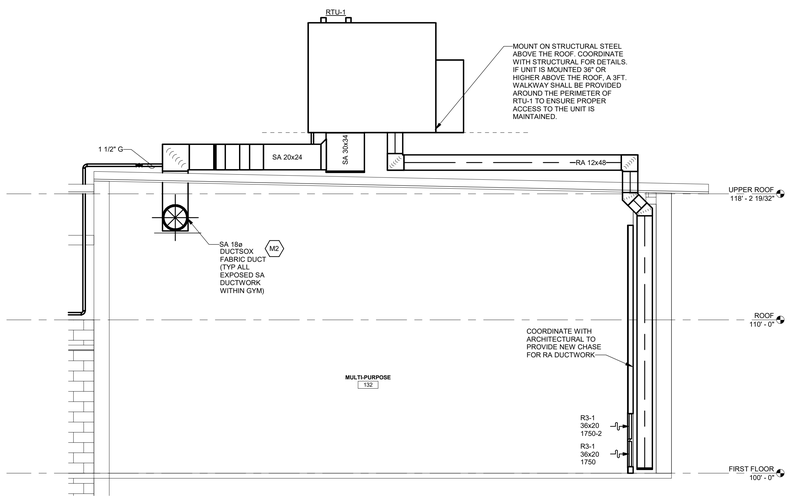
Z8 REMOVE WALL-MOUNTED STEAM RADIATORS AND ALL ASSOCIATED PIPING, FITTINGS, VALVES AND ACCESSORIES BACK TO STEAM MAIN. COORDINATE WITH ARCHITECTURAL TO PATCH WALLS AS NEEDED.

Z9 CONTRACTOR TO DISCONNECT EXISTING CONVECTOR AND ABANDON IN PLACE.

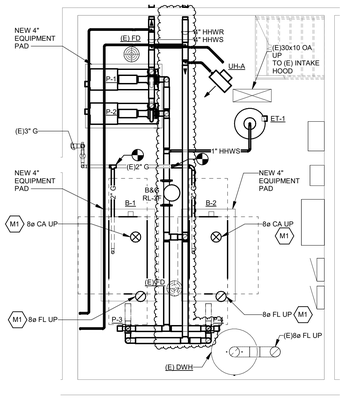
Z10 REMOVE ROOF MOUNTED GRAVITY RELIEF VENTILATORS AND CAP ALL ASSOCIATED ROOF OPENINGS.



ENLARGED MECHANICAL ROOM DEMOLITION PLAN
SCALE: 1/4" = 1'-0"



GYM N-S Section
SCALE: 1/4" = 1'-0"



ENLARGED MECHANICAL ROOM PLAN
SCALE: 1/4" = 1'-0"

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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

ISSUANCES	DATE
DESIGN DEVELOPMENT	09.26.2025
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JOB NO. 2616.07

SHEET TITLE
ENLARGED MECHANICAL PLANS

SHEET NO.
M4.0

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LAST PRINTED: 12/12/2025 9:43:29 AM
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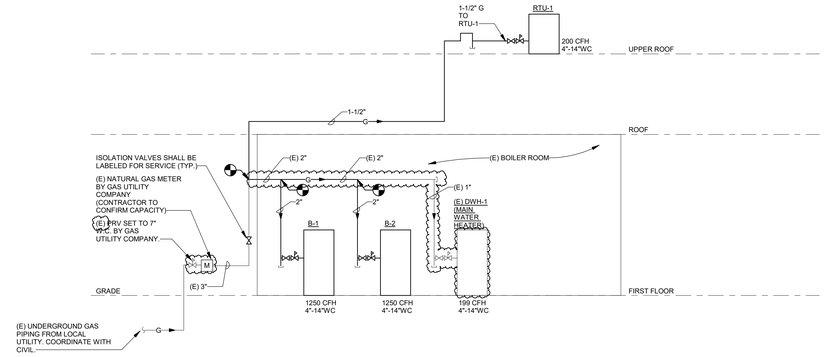
GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

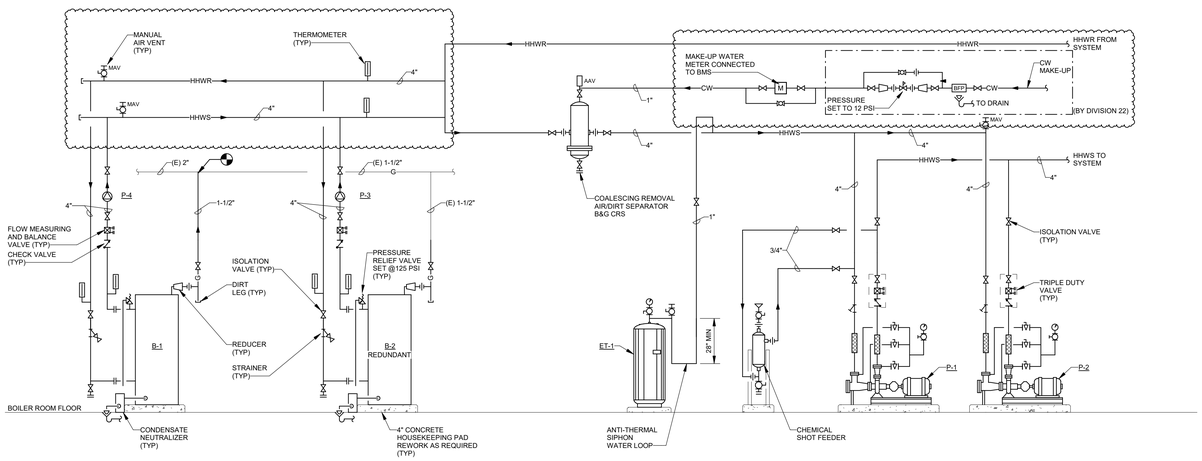
401 E. Gier St, Lansing, MI 48906

GAS LOAD SUMMARY	
EQUIPMENT ID	CFH
(E) DWH-1	199
B-1	1500
B-2	1500
RTU-1	200
TOTAL	3399

NOTES:
1. CONTRACTOR TO COORDINATE GAS LOAD AND PRESSURE REQUIREMENTS WITH LOCAL UTILITY COMPANY.
2. CONTRACTOR SHALL VERIFY ALL EQUIPMENT CONNECTION REQUIREMENTS (SIZES, LOCATION, TYPES, ETC.) PRIOR TO COMMENCEMENT OF WORK.
3. 7" W.C. DELIVERY PRESSURE. DISTRIBUTION OF GAS PIPING IS SIZED BASED ON A TOTAL DEVELOPMENT LENGTH OF 60 LINEAR FEET SCHEDULE 40 METALLIC PIPE TO FURTHEST EQUIPMENT.
4. CONTRACTOR TO VERIFY EQUIPMENT MINIMUM PRESSURE REQUIREMENTS FROM SUBMITTALS AND REQUEST ELEVATED PRESSURE FROM UTILITY COMPANY AS REQUIRED.



NATURAL GAS PIPING DIAGRAM
NO SCALE



HEATING HOT WATER SYSTEM PIPING DIAGRAM
NO SCALE

Lansing School District

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SHEET TITLE
MECHANICAL RISER DIAGRAMS

SHEET NO.
M7.0

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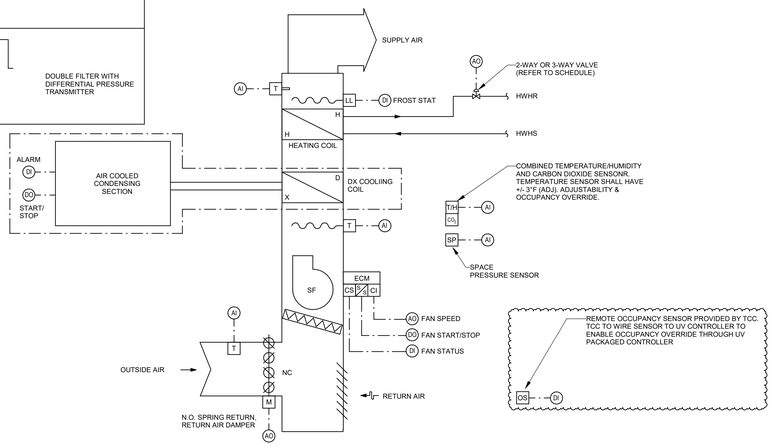
	SENSOR PROBE
	DISCONNECT SWITCH
	AVERAGING SENSOR
	DISPERSION TUBE
	PARALLEL BLADE DAMPER
	OPPOSED BLADE DAMPER
	BACKFLOW DAMPER
FMS	FLOW MEASURING STATION
DPS	BUILDING PRESSURE SENSOR
C	CHILLED WATER COIL
D	DX COIL
	ELECTRIC HEATING ELEMENT
H	GAS HEATING COIL
H	HEATING HOT WATER COIL
	ENERGY RECOVERY WHEEL
	FAN
	PLENUM FAN
	PROP FAN

AI	ANALOG INPUT
AO	ANALOG OUTPUT
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
VP	VIRTUAL POINT
CO2	CARBON DIOXIDE STAT
H	HUMIDISTAT
T	THERMOSTAT
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
H	HUMIDTY SENSOR
NOx	NOX SENSOR
OS	OCCUPANCY SENSOR
T	TEMPERATURE SENSOR
ECM	ELECTRONIC COMMUTATED MOTOR
M	MOTOR STARTER
S	START STOP
VFD	VARIABLE VREQUENCY DRIVE
BI	BIPOLAR IONIZATION
C	CURRENT SENSOR
CFM	CFM SENSOR
CM	CONTROL MODULE
CS	CURRENT SWITCH
CT	CURRENT TRANSDUCER
DPS	DIFFERENTIAL PRESSURE SENSOR
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DS	DOOR SWITCH
ES	END SWTICH
F	FLOW SWITCH
FM	FLOW METER
LL	LOW LIMIT / FREEZE STAT
LS	LIMIT SWITCH
M	DAMPER MOTOR
PS	PRESSURE SWITCH
R	CONTROL RELAY
SD	SMOKE DETECTOR
SP	STATIC PRESSURE
TD	TIME DELAY RELAY

	PUMP
	FILTER
DPT	SINGLE FILTER WITH DIFFERENTIAL PRESSURE TRANSMITTER
DPT	DOUBLE FILTER WITH DIFFERENTIAL PRESSURE TRANSMITTER



NOTE:

ALL SETPOINTS DESCRIBED IN A SEQUENCE SHALL BE ADJUSTABLE BY SYSTEM OPERATORS (CREATE REQUIRED VIRTUAL POINTS). APPROPRIATE DEADBANDS SHALL BE USED TO PREVENT SHORT CYCLING SITUATIONS.

CYCLING SITUATIONS:

TEMPERATURE CONTROLS SHALL BE FACTORY MOUNTED AND PROVIDED BY THE MANUFACTURER. ALL UNIT VENTS SHALL BE MONITORED/SHOWN BY THE BMS .AT MINIMUM, PROVIDE GRAPHICAL REPRESENTATION OF THE DIAGRAM AND ASSOCIATED POINTS INDICADED ABOVE.

SEQUENCE OF OPERATION:

OCCUPANCY CONTROL:
SUPPLY FAN SHALL BE STARTED/STOPPED BY THE BMS DIRECT DIGITAL CONTROLLER (DDC) ACCORDING TO THE MENU DRIVEN, ADJUSTIBLE WEEKLY SCHEDULING PROGRAM (COMPENSATED BY OPTIMUM START PROGRAM) AND BY OCCUPANCY OVERRIDE SWITCH ON SPACE TEMPERATURE SENSOR (SET FOR 2 HOURS, ADJUSTIBLE).

OCCUPANCY CONTROL SOURCE OPTIONS SHALL BE:
1. BUILDING MANAGEMENT SYSTEM (BMS)
2. OCCUPANCY OVERRIDE OPTION SHALL BE:
   A. HORIZONTAL PAD STAT (PUSH BUTTON)
   B. INPUT FROM OCCUPANCY SENSOR (BY EC)

UPON A CALL FOR OPERATION, THE OUTSIDE AIR DAMPER SHALL MODULATE TO 100% RE-CIRCULATION (CLOSED POSITION).

UPON PROOF OF SUCCESSFUL START AND OPERATION OF SUPPLY FAN, THE OUTSIDE AIR DAMPER SHALL MODULATE TO PROVIDE MINIMUM OUTSIDE AIR AS SCHEDULED ON MECHANICAL DRAWINGS AND ESTABLISHED BY TEST AND BALANCE CONTRACTOR.

DEFAULT CONTROL TEMPERATURE SETPOINTS SHALL BE:

- OCCUPIED 72.0°F COOLING, 70.0°F HEATING (ADJ)
- UNOCCUPIED 85.0°F COOLING, 62.0°F HEATING (ADJ)

SUPPLY FAN

THE SUPPLY FAN WILL RUN CONTINUOUSLY DURING OCCUPIED AND STANDBY MODES. IN UNOCCUPIED MODE THE SUPPLY FAN WILL ONLY RUN ON A CALL FOR COOLING, HEATING OR DEHUMIDIFICATION.

WHEN ACTIVE, THE SUPPLY FAN HAS 2 SPEED SETTINGS, LOW AND HIGH. THE FAN WILL RUN AT LOW SPEED DURING VENTILATION, ECONOMIZER COOLING, STAGE 1 COOLING/HEATING AND DEHUMIDIFICATION.

THE FAN WILL RUN AT HIGH SPEED DURING STAGE 2 COOLING/HEATING, STAGE 3 COOLING/HEATING AND STAGE 4 HEATING (IF APPLICABLE). AT HIGH SPEED THE FAN WILL GO TO 100% OF THE STANDARD CONDITION.

CO2 OPTION
WHEN THE SPACE CO2 DECREASES BELOW 1000 PPM (ADJ) THE RETURN AIR/OUTDOOR AIR DAMPER SHALL MODULATE THE OUTDOOR AIR BELOW THE MINIMUM POSITION TO MAINTAIN THE RETURN AIR CO2 AT 1000 PPM.

TEMPERATURE & HUMIDITY CONTROL

ECONOMIZER:
WHEN OUTDOOR AIR CONDITIONS ARE APPROPRIATE FOR FREE COOLING, THE OUTDOOR AIR/RETURN AIR DAMPERS SHALL MODULATE TO PROVIDE ADDITIONAL OUTDOOR AIR (ABOVE THE MINIMUM REQUIRED) TO ALLOW FOR FREE COOLING. THE CONTROLLER SHALL MEASURE THE MIXED AIR TEMPERATURE AND MODULATE THE ECONOMIZER DAMPERS IN SEQUENCE TO MAINTAIN A SETPOINT 2°F LESS THAN THE COOLING SUPPLY AIR TEMPERATURE SETPOINT. THE ECONOMIZER SHALL BE ENABLED WHENEVER:
1. OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.).
2. AND THE OUTSIDE AIR ENTHALPY IS LESS THAN 228TU/LB (ADJ.)
3. AND THE OUTSIDE AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE.
4. AND THE OUTSIDE AIR ENTHALPY IS LESS THAN THE RETURN AIR ENTHALPY.
5. AND THE SUPPLY FAN STATUS IS ON.

COOLING (SUMMER-OCCUPIED)
IF THE CONTROL TEMPERATURE IS HIGHER THAN THE COOLING SET POINT AND IF THE OUTDOOR AIR TEMPERATURE IS TOO HIGH TO ALLOW FREE COOLING, THE UNIT CONTROLLER WILL CALL FOR MECHANICAL DX COOLING. THE UNIT CONTROLLER WILL DETERMINE WHICH STAGE OF DX COOLING IS MOST EFFICIENT TO HANDLE THE COOLING LOAD BASED ON THE SPACE, RETURN, SUPPLY AND OUTDOOR AIR TEMPERATURES. USING A PRE-ENGINEERED CONTROL STRATEGY THE CONTROLLER WILL THEN PLACE THE UNIT IN THE APPROPRIATE STAGE OF DX COOLING.

REMOTE CONDENSING UNIT
THE COMPRESSOR SHALL BE ENABLED BY THE CONTROLLER BASED UPON ON A DEMAND FOR DX COOLING. THE COMPRESSOR SHALL HAVE A MINIMUM ON TIME OF 60 SECONDS AND A MINIMUM OFF TIME COMPRESSOR OFF TIME OF 60 SECONDS. THE COMPRESSOR WILL SHUT DOWN IF ANY OF THE FOLLOWING OCCUR:

- LOW PRESSURE SWITCH / HIGH PRESSURE SWITCH OPEN.
- SUPPLY FAN STATUS ALARM.
- CONDENSER FAN STATUS ALARM.
- CONDENSATE FLOAT SWITCH OPEN.
- FREEZE STAT CLOSES.
- INDOOR COIL FREEZE PROTECTION TEMPERATURE SENSOR FALLS BELOW SETPOINT.
- COAXIAL COIL FREEZE PROTECTION TEMPERATURE SENSOR FALLS BELOW SETPOINT.
- OUTDOOR AIR TEMPERATURE FALLS BELOW COMPRESSOR LOCKOUT SETPOINT.

WHEN THE SPACE HUMIDITY SENSOR REACHES 60%RH (ADJ) SETPOINT, THE UNIT DX COIL SHALL MODULATE TO LOWER THE COIL DISCHARGE TEMPERATURE AND SHALL MODULATE OPEN THE HEATING HOT WATER CONTROL VALVE AND BMS SHALL ENERGIZE THE CIRC PUMP TO MAINTAIN A DISCHARGE AIR TEMPERATURE NOT LESS THAN 55 DEGREES.

HEATING
IF THE CONTROL TEMPERATURE IS LOWER THAN THE HEATING SETPOINT THE HOT WATER VALVE WILL OPEN PROPORTIONALLY BASED ON THE DEMAND GENERATED VIA THE OUTPUT OF AN ADJUSTABLE PI LOOP.

IN OCCUPIED MODE, IF THE OUTDOOR AIR TEMPERATURE FALLS BELOW 45.0˚F THEN THE SUPPLY AIR IS MAINTAINED AT A MINIMUM OF 50.0˚F VIA A SUPPLY AIR LOW LIMIT.

IF THE SUPPLY FAN IS OFF (TYPICALLY ONLY OCCURS IN UNOCCUPIED MODE WHEN THERE IS NO COOLING, HEATING OR DEHUM. DEMAND) AND IF THE OUTDOOR AIR TEMPERATURE FALLS BELOW 45.0˚F, THE HOT WATER VALVE WILL OPEN 30% TO A "BLEED" POSITION.

IF THERE IS A HOT WATER COIL FREEZE STAT TRIP, THE VALVE SHALL SPRING OPEN. THE CONTROL SIGNAL TO THE HOT WATER VALVE SHALL BE SELECTABLE AS 2-10VDC OR 0-10VDC. ALL TEMPERATURE pARAMETERS ARE CONFIGURABLE.

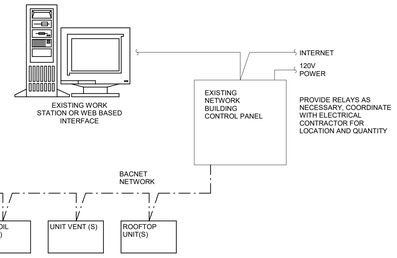
FREEZE PROTECTION (ALL MODES)

WHEN SPACE TEMPERATURE IS 35°F OR BELOW THE DIGITAL INPUT WILL BE NORMALLY OPEN. IF THE CONTACT GOES CLOSED, THE UNIT WILL CONTINUE TO RUN BUT COOLING WILL BE DISABLED AND THE HOT WATER VALVE WILL BE PARTIALLY OPENED.

FIRE ALARM MODE CONTROL:

THE SUPPLY FAN SHALL SHUT DOWN AND OUTDOOR AIR DAMPERS SHALL CLOSE WHEN ANY AUTOMATIC OR MANUAL FIRE ALARM DEVICE IS PLACED INTO ALARM BY THE BUILDING FIRE ALARM CONTROL PANEL. SYSTEM SHALL MANUALLY RESET FOLLOWING AN ALARM EVENT.

UNIT VENTILATOR W/REMOTE DX AND HHW CONTROL DIAGRAM
NO SCALE

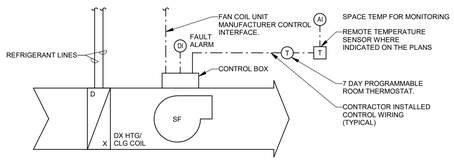


GENERAL CONTROLS INTENT:

GENERAL INTENT:
1. INTEGRATE ALL NEW COMPONENTS INTO EXISTING BMS. UPDATE GRAPHICS AND SEQUENCES ACCORDINGLY TO REFLECT NEW EQUIPMENT.

BUILDING AUTOMATION SYSTEM NOTES:
1. CONFIGURATION AND ORDER OF CONTROLLER CONNECTION IS FOR REPRESENTATION PURPOSES ONLY. TTC CONTROL SYSTEM DRAWINGS SHALL REFLECT ACTUAL AS-BUILT CONDITIONS, INCLUDING ORDER IN WHICH CONTROLLERS ARE CONNECTED WITHIN THE NETWORK. DDC PANELS SHALL BE LOCATED IN MECHANICL, STORAGE, OR CUSTODIAL SPACES WITH 120V CONTROL POWER AT EACH. WHERE DDC PANELS AND/OR POWER SUPPLIES ARE REQUIRED, IT IS THE TCC RESPONSIBILITY TO PROVIDE POWER TO THOSE PANELS AND COORDINATE WITH THE ELECTRICAL ENGINEER/CONTRACTOR. IT SHOULD BE NOTED THAT ADDITIONAL ELEMENTS SUCH AS GENERAL VALVES, OTHER NON-ACTIVELY CONTROLLED DEVICES, AND/OR OTHER NETWORK COMMUNICATION DEVICES (SUCH AS SWITCHES,GATEWAYS, ROUTERS, SERVERS, ETC.) MAY NOT BE SHOWN ON CONTROLS DRAWINGS. REFER TO THE DETAILS, PROJECT PLANS, AND SPECIFICATIONS FOR ADDITIONAL DEVICES AND INSTRUCTIONS THAT ARE REQUIRED IN THE CONSTRUCTION OF THESE SYSTEMS.
2. ALL CONTROL POINTS SHALL BE TRENDABLE. AFTER THE SYSTEM IS BALANCED, COMMISSIONED, AND OPERATIONAL, TRENDING WILL BE REQUIRED TO VERIFY THE ACCURACY AND ACCEPTABILITY OF THE CONTROL SEQUENCES. PROVIDE ADDITIONAL ADJUSTMENTS AND/OR CHANGES IN STRATEGY IN ORDER TO HONE BUILDING OPERATION AND OPTIMIZE ENERGY USAGE. ALL SET POINTS SHALL BE OPERATOR ADJUSTABLE THROUGH THE BMS AT THE OPERATOR'S WORKSTATION (OWS).
3. PROVIDE PROGRAMMING FOR ADDITIONAL ALARMS AS REQUESTED BY THE OWNER AND/OR ENGINEER.
4. SEE FLOOR PLANS, SPECIFICATIONS, AND SHOP DRAWINGS FOR MINIMUM CLEARANCE OF ALL MECHANICAL EQUIPMENT AND CONTROL DEVICES. MAINTAIN ACCEPTABLE CLEARANCE IN ALL AREAS REQUIRED FOR SERVICE AND ACCESS OF MECHANICAL EQUIPMENT AS PER ANY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.
5. ALL POINTS SHALL BE INCLUDED ON GRAPHICS THROUGH BMS AT OWS.
6. FOR EQUIPMENT PROVIDED WITH BACNET OR MODBUS CONTROLLERS/COMMUNICATION INTERFACES, PROVIDE SUB-GRAPHICS THROUGH THE BMS AT THE OWS. THE GRAPHIC SHALL DISPLAY ALL POINTS LISTED IN INDIVIDUAL CONTROL DIAGRAMS. PROVIDE ADDITIONAL READ/WRITE POINTS UPON REQUEST BY THE OWNER FOR SUCH EQUIPMENT.
7. PROVIDE ALL DEVICES SHOWN IN THE DIAGRAMS NOT PROVIDED BY THE UNIT MANUFACTURER AS REQUIRED TO PROVIDE THE DESIRED SEQUENCE OF OPERATION. REFER TO INDIVIDUAL CONTROL DIAGRAMS.
8. UNLESS OTHERWISE NOTED, ROOM THERMOSTATS, CO2 SENSORS AND/OR HUMIDISTATS SHALL HAVE SET-POINT ADJUSTMENT CAPABILITY AND TEMPERATURE/HUMIDITY DISPLAY.

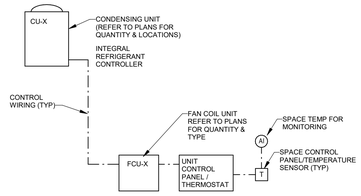
BMS SYSTEM ARCHITECTURE
NO SCALE



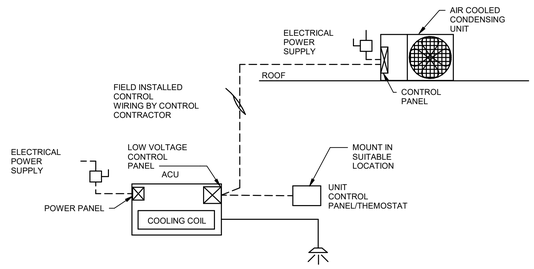
NOTE:

FAN COIL CONTROLS BY CONDENSING UNIT MANUFACTURER.

FAN COIL UNIT CONTROL DIAGRAM
NO SCALE



CONDENSING UNIT CONTROL DIAGRAM
NO SCALE



SEQUENCE OF OPERATION

THE ACU IS EQUIPPED WITH A DIRECT EXPANSION COOLING COIL. THE ACU & ITS ASSOCIATED CONDENSING UNIT ARE OPERATED BY ITS OWN INTEGRAL CONTROLS TO MAINTAIN SPACE TEMPERATURE SETPOINT.

DX MODE: WHEN THE ACU CALLS FOR COOLING THE CONDENSER FAN IS ENABLED & STAGED THROUGH ITS PACKAGED CONTROLS TO MAINTAIN TEMPERATURE SETPOINT.

THE ROOM AIR CONDITIONING UNIT AND ASSOCIATED OUTDOOR CONDENSING UNIT SHALL OPERATE THROUGH ITS INTERNAL CONTROLS (COOLING, HUMIDIFICATION) TO MAINTAIN TEMPERATURE AND HUMIDITY SETPOINTS (72 DEG. F/30 % RH, ADJUSTABLE).

THESE SETPOINTS SHALL BE USER ADJUSTABLE THROUGH THE BMS.

ACU CONTROL DIAGRAM
NO SCALE

KINGSCOTT
PORTAGE | CHELSEA | GRAND RAPIDS | ROYAL OAK

GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

ISSUANCES	DATE
DESIGN DEVELOPMENT	09.26.2025
CONSTRUCTION DOCUMENTS	11.14.2025
ADDENDUM 02	12.11.2025

JOB NO. 2616.07

SHEET TITLE
CONTROL DIAGRAMS

SHEET NO.
M8.0

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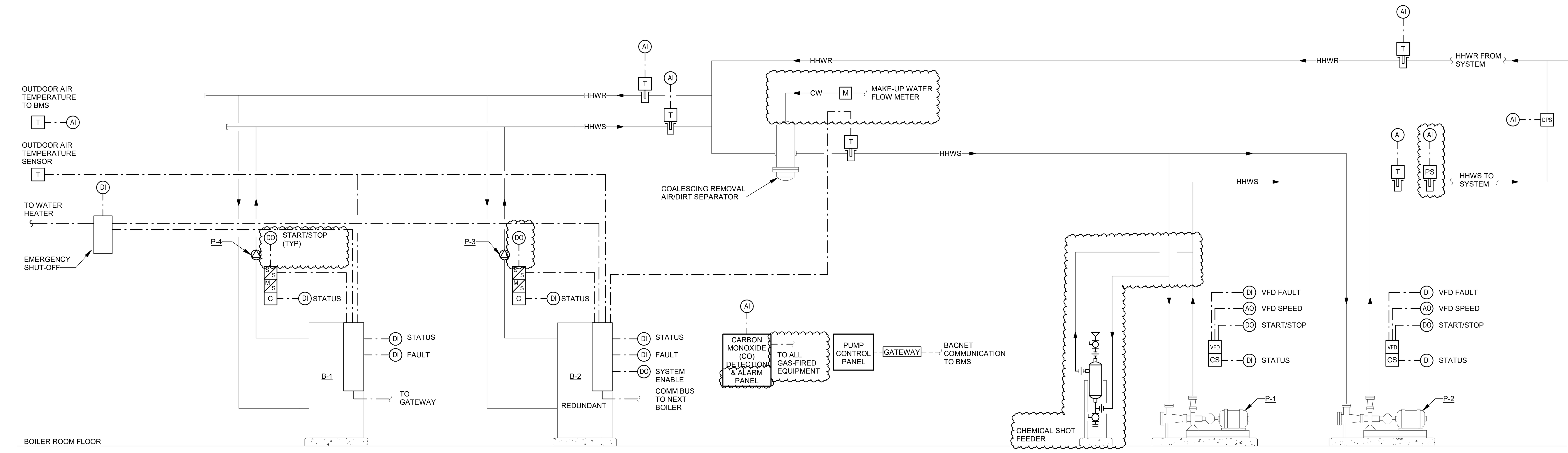


HEATING HOT WATER SUPPLY (HHWS) RESET SCHEDULE	
OUTSIDE AIR TEMPERATURE	HHWS TEMPERATURE
< 60°F	120°F
45°F - 60°F	130°F
30°F - 45°F	140°F
15°F - 30°F	150°F
< 15°F	160°F

HEATING HOT WATER SYSTEM - PRIMARY/SECONDARY SEQUENCE OF OPERATIONS:
NOTE: ALL SETPOINTS AND TIME INTERVALS SHALL BE ADJUSTABLE BY THE SYSTEM OPERATOR.

HEATING HOT WATER PLANT MANAGER

1. THE BUILDING MANAGEMENT SYSTEM (BMS) SHALL INCLUDE A HEATING HOT WATER PLANT MANAGER TO CONTROL THE SECONDARY HEATING HOT WATER PUMPS AND TO MONITOR HEATING GOT WATER SYSTEM SENSORS AND ACCESSORIES.
2. TO PREVENT SHORT CYCLING, THE HEATING HOT WATER SYSTEM SHALL RUN FOR AND BE OFF FOR A MINIMUM ADJUSTABLE TIME (BOTH TIMES USER ADJUSTABLE).
3. HEATING HOT WATER PLANT SHALL BE ENABLED BY THE BMS BASED WHEN OUTSIDE AIR TEMPERATURE IS BELOW 60°F (ADJ) AND ANY DOWNSTREAM EQUIPMENT SERVED CALLS FOR HEATING.

SECONDARY PUMP CONTROL

1. WHEN THE HEATING HOT WATER SYSTEM IS ENABLED, THE LEAD HEATING HOT WATER SECONDARY PUMP SHALL BE ENABLED. EACH PUMP WILL PROVE OPERATION TO THE BMS WITH ITS CURRENT SWITCH.
2. IF A PUMP FAILS, AN ALARM WILL BE SENT TO THE BMS AND THE STANDBY PUMP WILL BE ACTIVATED.
3. THE PLANT MANAGER SHALL ALTERNATE LEAD PUMP OPERATION BASED ON RUN TIME HOURS OR AT THE BEGINNING OF EACH WEEK.
4. THE CONTROLLER SHALL MODULATE PUMP SPEED TO MAINTAIN HEATING HOT WATER DIFFERENTIAL PRESSURE AS SET BY THE TEST & BALANCE CONTRACTOR. THE VFDS MINIMUM SPEED SHALL NOT DROP BELOW 20% (ADJ).
5. THE SYSTEM SHALL RESET THE DIFFERENTIAL PRESSURE SETPOINT BASED ON VALVE POSITIONS IN THE SYSTEM UTILIZING CRITICAL ZONE RESET STRATEGY. THE CRITICAL ZONE SHALL BE THE VALVE IN THE SYSTEM THAT NEEDS TO BE 100% OPEN TO SATISFY THE CURRENT LOAD. CRITICAL ZONE RESET SHALL BE DISABLED WHEN SYSTEM IS NOT IN OCCUPIED MODE.

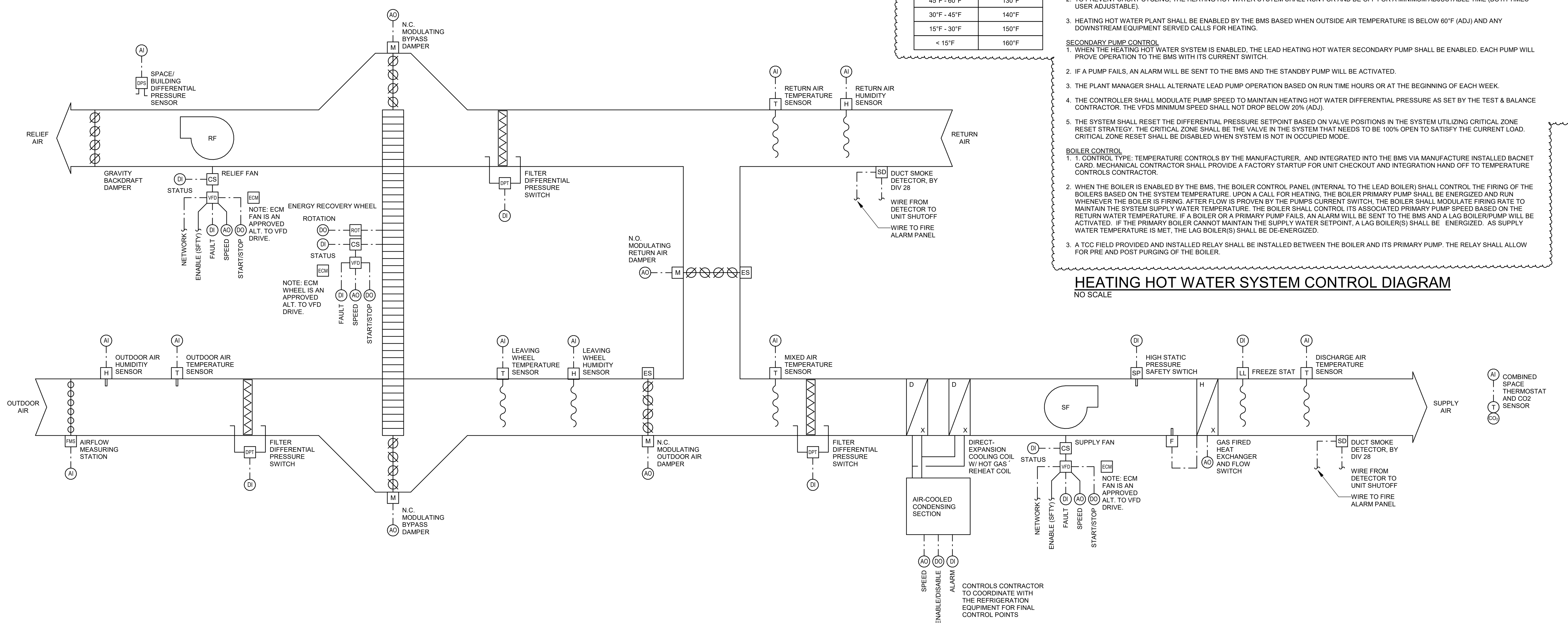
BOILER CONTROL

1. 1. CONTROL TYPE: TEMPERATURE CONTROLS BY THE MANUFACTURER, AND INTEGRATED INTO THE BMS VIA MANUFACTURE INSTALLED BACNET CARD. MECHANICAL CONTRACTOR SHALL PROVIDE A FACTORY STARTUP FOR UNIT CHECKOUT AND INTEGRATION HAND OFF TO TEMPERATURE CONTROLS CONTRACTOR.
2. WHEN THE BOILER IS ENABLED BY THE BMS, THE BOILER CONTROL PANEL (INTERNAL TO THE LEAD BOILER) SHALL CONTROL THE FIRING OF THE BOILERS BASED ON THE SYSTEM TEMPERATURE. UPON A CALL FOR HEATING, THE BOILER PRIMARY PUMP SHALL BE ENERGIZED AND RUN WHENEVER THE BOILER IS FIRING. AFTER FLOW IS PROVEN BY THE PUMPS CURRENT SWITCH, THE BOILER SHALL MODULATE FIRING RATE TO MAINTAIN THE SYSTEM SUPPLY WATER TEMPERATURE. THE BOILER SHALL CONTROL ITS ASSOCIATED PRIMARY PUMP SPEED BASED ON THE RETURN WATER TEMPERATURE. IF A BOILER OR A PRIMARY PUMP FAILS, AN ALARM WILL BE SENT TO THE BMS AND A LAG BOILER/PUMP WILL BE ACTIVATED. IF THE PRIMARY BOILER CANNOT MAINTAIN THE SUPPLY WATER SETPOINT, A LAG BOILER(S) SHALL BE ENERGIZED. AS SUPPLY WATER TEMPERATURE IS MET, THE LAG BOILER(S) SHALL BE DE-ENERGIZED.
3. A TCC FIELD PROVIDED AND INSTALLED RELAY SHALL BE INSTALLED BETWEEN THE BOILER AND ITS PRIMARY PUMP. THE RELAY SHALL ALLOW FOR PRE AND POST PURGING OF THE BOILER.

MONITOR AND ALARM

1. THE BMS SHALL MONITOR AND GRAPHICALLY SHOW, AT A MINIMUM, THE FOLLOWING POINTS. ALL POINTS SHALL BE ALARMED WHEN OUT OF RANGE:
   1. BOILER STATUS AND STAGING
   2. PRIMARY PUMP SPEED, STATUS AND ALARMS
   3. BOILER RUN TIMES AND START/STOPS
   4. BOILER ALARM
   5. BOILER ENTERING AND LEAVING WATER TEMPERATURES (HIGH AND LOW ALARMS)
   6. SYSTEM SUPPLY AND RETURN WATER TEMPERATURES
   7. DIFFERENTIAL PRESSURE
   8. ALL TEMPERATURE POINTS INDICATED
   9. SECONDARY PUMPS SPEED, STATUS AND ALARMS
   10. THE BAS SHALL MONITOR THE BOILER MAKE-UP WATER FLOW METER.
   11. STANDALONE GAS DETECTION SYSTEM (CO SENSOR, STROBE, AND HORN) SHALL MONITOR CO LEVELS IN THE BOILER ROOM. UPON TRIGGER, THE GAS DETECTION SYSTEM SHALL ALERT THE BAS IF SYSTEM IS IN ALARM
2. DATA TRENDS SHALL BE ESTABLISHED TO RECORD AND TREND ALL POINTS INDICATED ABOVE AT INTERVALS DETERMINED BY THE OWNER.
3. ADDITIONAL BOILER INFORMATION AVAILABLE THROUGH THE BMS INTEGRATION SHALL BE ACCESSIBLE THROUGH THE BMS FRONT END SYSTEM, BUT DOES NOT NEED TO BE CONTINUOUSLY PRESENTED ON THE GRAPHIC DISPLAY.
4. AN EMERGENCY STOP BUTTON LOCATED IN THE BOILER ROOM DISABLES THE BOILERS CONTROLS. A SIGNAL IS ALSO SENT TO THE BMS, WHICH DISABLES THE PRIMARY PUMP OPERATION THROUGH AN INTERLOCK.

HEATING HOT WATER SYSTEM CONTROL DIAGRAM
NO SCALE



SEQUENCE OF OPERATIONS:

GENERAL

THE SINGLE-ZONE VAV AIR-HANDLING UNIT SEQUENCES HEREIN DEPICT GENERAL INTENT OF OPERATION AND ARE TO BE PERFORMANCE BASED. FOR COMPLETE PROCEDURAL FUNCTIONALITY, THE UNITS SHALL FOLLOW THE GUIDELINES IN ASHRAE 90.1-2013 CHAPTER 6, AHRAE 62.1-2016, AND ASHRAE GUIDELINE 36 CHAPTERS 5.1-5.4, 5.15, AND 5.18 WITHOUT EXPLICIT STATEMENT. IMPLEMENTATIONS THAT PROVIDE THE SAME FUNCTIONAL RESULTS USING DIFFERENT UNDERLYING DETAILED LOGIC WILL BE ACCEPTABLE.

CONTROLS TO BE MANUFACTURER PACKAGED CONTROLS AND FACTORY INSTALLED.

AT MINIMUM, PROVIDE A GRAPHICAL REPRESENTATION OF THE DIAGRAM AND ASSOCIATED POINTS INDICATED ABOVE. ALL ADDITIONAL POINTS NOT STRICTLY REQUIRING GRAPHICAL REPRESENTATION, SHALL STILL BE READ/WRITE ACCESSIBLE AT THE OWS/BAS. ALL SETPOINTS, TIMERS, DEADBANDS, SCHEDULES, ETC. LISTED HEREIN THE SEQUENCE SHALL BE ADJUSTABLE BY THE SYSTEM OPERATOR. VALUES FOR ALL POINTS, INCLUDING HARDWARE POINTS, SHALL BE OVERRIDABLE. EXCEPTIONS CAN BE MADE REGARDING MACHINE OR LIFE SAFETY.

EQUIPMENT MOTORS INTENDED TO BE MODULATED CAN BE PROVIDED WITH EITHER VARIABLE FREQUENCY DRIVES OR ELECTRONIC COMMUTATED MOTOR; SEQUENCE MAY USED INTERCHANGEABLE.

THE ROOFTOP UNIT SHALL BE CAPABLE OF OPERATING IN THE FOLLOWING MODES AS DETERMINED BY THE ZONE GROUPS ASSOCIATED WITH THE UNIT: (1) OCCUPIED, (2) COOLDOWN, (3) UNOCCUPIED COOLING, (4) WARMUP, (5) UNOCCUPIED HEATING, AND (6) UNOCCUPIED MODE.

MINIMUM DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE 55ºF. **MAXIMUM DISCHARGE AIR TEMPERATURE** SHALL BE 95ºF.

UNOCCUPIED CONTROL:

DURING UNOCCUPIED MODE, THE OUTDOOR AIR DAMPER SHALL BE FULLY CLOSED. THE RETURN AIR DAMPER SHALL BE FULLY OPEN. THE SUPPLY FAN SHALL BE OFF. THE TEMPERATURE CONTROL LOOP SHALL BE SET TO DEADBAND.

DURING UNOCCUPIED MODE, THE AHU CONTROLLER OR BAS SHALL CONTINUOUSLY POLL THE ZONE TEMPERATURE SENSOR. IF THE ZONE TEMPERATURE SENSOR FALLS OUTSIDE OF THE UNOCCUPIED SETPOINT RANGES, THE UNIT SHALL BE ENABLED AND RUN IN UNOCCUPIED HEATING OR UNOCCUPIED COOLING MODES UNTILL THE UNOCCUPIED SETPOINTS ARE 1ºF ABOVE OR BELOW UNOCCUPIED SETPOINT RESPECTIVELY.

WHEN UNOCCUPIED COOLING MODE IS INITIATED BY THE AHU CONTROLLER OR BAS, THE SUPPLY AIR TEMPERATURE CONTROL LOOP SHALL BE ENABLED AND OPERATE TO MAINTAIN **MINIMUM DISCHARGE AIR TEMPERATURE** AS MEASURED AT THE DISCHARGE AIR TEMPERATURE SENSOR.

WHEN UNOCCUPIED HEATING MODE IS INITIATED BY THE AHU CONTROLLER OR BAS, THE SUPPLY AIR TEMPERATURE CONTROL LOOP SHALL BE ENABLED AND OPERATE UP TO A **MAXIMUM DISCHARGE AIR TEMPERATURE** AS MEASURED AT THE DISCHARGE AIR TEMPERATURE SENSOR. THE OUTDOOR AIR DAMPER SHALL BE FULLY CLOSED. THE RETURN AIR DAMPER SHALL BE FULLY OPEN.

FACILITY COOLDOWN / WARMUP CONTROL:

THE FACILITY COOLDOWN / WARMUP SEQUENCES SHALL USE A CALCULATED OPTIMIZED START ROUTINE PRIOR TO SCHEDULED OCCUPIED MODE. THE MORNING WARM-UP / COOL-DOWN ROUTINE SHALL BE INITIATED BY THE BAS. DEFAULT FACILITY COOLDOWN / WARMUP START TIME SHALL BE SIXTY MINUTES.

DURING FACILITY COOLDOWN / WARMUP MODE, THE OUTDOOR AIR DAMPER SHALL BE FULLY CLOSED. THE RETURN AIR DAMPER SHALL BE FULLY OPEN. EXCEPTION: IF ECONOMIZER MODE WOULD RESULT IN AN OVERALL MECHANICAL ENERGY SAVINGS, THEN OUTDOOR AIR DAMPER SHALL BE OPENED.

WHEN FACILITY COOLDOWN MODE IS INITIATED BY THE AHU CONTROLLER OR BAS, THE SUPPLY AIR TEMPERATURE CONTROL LOOP SHALL BE ENABLED AND OPERATE TO MAINTAIN **MINIMUM DISCHARGE AIR TEMPERATURE** AS MEASURED AT THE DISCHARGE AIR TEMPERATURE SENSOR.

WHEN FACILITY WARMUP MODE IS INITIATED BY THE AHU CONTROLLER OR BAS, THE SUPPLY AIR TEMPERATURE CONTROL LOOP SHALL BE ENABLED AND OPERATE UP TO THE **MAXIMUM DISCHARGE AIR TEMPERATURE** AS MEASURED AT THE DISCHARGE AIR TEMPERATURE SENSOR. NOTE: ZONE REHEAT SHALL BE THE SECOND STAGE OF HEATING (AS REQUIRED).

FACILITY COOLDOWN/ WARMUP MODES SHALL SWTICH TO OCCUPIED MODE OPPERATION ONCE THE SPACE TEMPERATURE REACHES THE OCCUPIED SETPOINT OR OCCUPIED TIME.

OUTDOOR AIR CONTROL:

WHEN IN OCCUPIED MODE, THE AHU CONTROLLER OR BAS SHALL INCLUDE MEANS TO AUTOMATICALLY REDUCE OUTDOOR AIR INTAKE AIRFLOW BELOW DESIGN RATES IN RESPONSE TO CHANGES IN SPACE CO2 CONCENTRATION LEVELS.

UPON RISING CO2 CONCENTRATION LEVELS, THE OUTDOOR AIR DAMPER ACTUATOR SHALL MODULATE OPEN. THE AHU OUTDOOR DAMPER ACTUATOR SHALL NOT MODULATE BEYOND ITS SCHEDULED MAXIMUM VENTILATION SETPOINT (SEE VENTILATION SCHEDULE) UNLESS IN ECONOMIZER MODE.

INVERSELY, UPON FALLING CO2 CONCENTRATION LEVELS, THE OUTDOOR AIR DAMPER ACTUATOR SHALL MODULATE CLOSED. DAMPER POSITION LIMITED TO NO LESS THAN THE BUILDING COMPONENT OUTDOOR AIRFLOW.

OUTDOOR AIRFLOW RATE SHALL BE MEASURED BY AIRFLOW MEASURING DEVICE.

ECONOMIZER (DRY-BULB):

DURING UNOCCUPIED MODE, THE BYPASS DAMPER(S) SHALL BE CLOSED.

WHILE IN OCCUPIED MODE, IF THE OUTDOOR AIR TEMPERATURE IS LESS THAN THE RETURN AIR TEMPERATURE, THE UNIT SHALL MODULATE THE BYPASS DAMPER TO MAINTAIN THE DISCHARGE AIR TEMPERATURE AND MINIMIZE THE TOTAL MECHANICAL COOLING. THE ECONOMIZER IS THE FIRST STAGE OF COOLING. THE WHEEL SHALL STOP.

IF THE OUTDOOR AIR TEMPERATURE EXCEEDS RETURN AIR TEMPERATURE OR IF THE OUTDOOR AIR TEMPERATURE EXCEEDS 75°F, THE BYPASS DAMPER SHALL CLOSE.

IF THE OUTDOOR AIR TEMPERATURE IS LOWER THAN 45°F, THE BYPASS DAMPER(S) SHALL CLOSE.

ENTHALPY WHEEL CONTROL:

DURING UNOCCUPIED MODE, THE ENTHALPY WHEEL SHALL BE STOPPED.

IN OCCUPIED MODE, IF THE OUTDOOR AIR ENTHALPY (CALCULATED) IS GREATER THAN THE RETURN AIR ENTHALPY (CALCULATED) OR IF THE OUTDOOR AIR TEMPERATURE EXCEEDS 75°F, THE UNIT SHALL MODULATE THE ENTHALPY WHEEL TO MAX SPEED. AT CONDITION, THE ENTHALPY WHEEL SHALL BE THE FIRST STAGE OF COOLING.

IN OCCUPIED MODE, WHENEVER THE OUTDOOR AIR TEMPERATURE IS LESS THAN THE DISCHARGE AIR TEMPERATURE, THE ENTHALPY WHEEL SHALL MODULATE SPEED TO MAINTAIN REQUIRED DISCHARGE TEMPERATURE. THE ENTHALPY WHEEL SHALL BE THE FIRST STAGE OF HEATING.

IF UNIT HAS PACKAGED CONTROLS, MANUFACTURER SEQUENCES SHALL GOVERN.

ENTHALPY WHEEL DEFROST CONTROL:

THE UNITS CONTROLLER SHALL PROVIDE MEANS TO PROTECT WHEEL FROM FROSTING. CONSULT MANUFACTURER LITERATURE.

A FROST/CONDENSATE PREVENTION CRAWL MODE SHALL BE USED TO PREVENT BUILD UP OF ICE. WHEN THE CRAWL MODE IS ENABLED THE BYPASS DAMPERS WILL RAMP TO 100% BYPASS, AND THE ENERGY WHEEL'S VARIABLE FREQUENCY DRIVE WILL BE COMMANDED TO MINIMUM.

FIRE ALARM MODE CONTROL:

THE SUPPLY FAN SHALL SHUT DOWN WHEN ANY AUTOMATIC OR MANUAL FIRE ALARM DEVICE IS PLACED INTO ALARM BY THE BUILDING FIRE ALARM CONTROL PANEL VIA THE FIRE ALARM CONTROL MODULE. NEXT, THE OUTDOOR AIR DAMPER SHALL CLOSE AND THE UNIT SHALL BE DISABLED.

SYSTEM SHALL MANUALLY RESET FOLLOWING AN ALARM EVENT.

RELIEF FAN CONTROL:

PROVIDE OFFSET TO MAINTAIN BUILDING POSITIVE BUILDING PRESSURE (0.03 - 0.05 IN W.C.).

ENABLE, DISABLE, AND MODULATE EXHAUST FAN BASED ON BUILDING PRESSURE CONTROL. REFER TO ASHRAE G36 5.16.9.

SETPOINTS:

UNOCCUPIED SPACE COOLING SETPOINT SHALL BE 85ºF (ADJ.)
UNOCCUPIED SPACE HEATING SETPOINT SHALL BE 65ºF (ADJ.)
OCCUPIED SPACE COOLING SETPOINT SHALL BE 75ºF (ADJ.) 60% RH* (ADJ.)
OCCUPIED SPACE HEATING SETPOINT SHALL BE 70ºF (ADJ.)

*RELATIVE HUMIDITY WILL NOT BE DIRECTLY CONTROLLED. THIS IS A CONDITION THAT CAN BE EXPECTED UNDER NORMAL OPERATING CONDITIONS.

SUPPLY FAN AND SUPPLY AIR TEMPERATURE CONTROL:

SUPPLY FAN SPEED AND TEMPERATURE SEQUENCE SHALL IMPLEMENT ASHRAE G36 SECTION 5.18.4 AND GENERALLY FOLLOW THE LOGIC BELOW:

THE SUPPLY FAN SHALL RUN WHEN THE SYSTEM IS OPERATING IN ALL MODES EXCEPT UNOCCUPIED MODE.

THE SUPPLY FAN SHALL BE AUTOMATICALLY STARTED AND STOPPED BY THE AHU CONTROLLER OR BAS.

UPON PROOF OF SUCCESSFUL START AND OPERATION OF THE SUPPLY FAN, THE OUTDOOR AIR DAMPER SHALL OPEN TO ITS MINIMUM POSITION INITIALLY.

PROVIDE A RAMP FUNCTION TO PREVENT CHANGES IN FAN SPEED OF MORE THAN 10% PER MIN.

AS SPACE TEMPERATURE INCREASES, THE UNIT SHALL MODULATE ECONOMIZER DAMPERS (WHEN ECONOMIZER MODE IS ENABLED) AND/OR SHALL MODULATE THE DX COOLING SYSTEM TO MAINTAIN SPACE TEMPERATURE SETPOINT. THE COOLING SYSTEM WILL CONTINUE TO MODULATE UP UNTIL THE DISCHARGE AIR TEMPERATURE REACHES THE **MINIMUM DISCHARGE AIR TEMPERATURE**. AT WHICH POINT, BOTH THE MECHANICAL COOLING SYSTEM AND THE SUPPLY FAN WILL MODULATE UP TOGETHER TO MAINTAIN SPACE AIR TEMPERATURE SETPOINT AND **MINIMUM DISCHARGE AIR TEMPERATURE**.

AS SPACE TEMPERATURE BEGINS TO DECREASES, THE PROCESS SHALL WORK IN REVERSE ORDER.

AS SPACE TEMPERATURE DECREASES, THE UNIT SHALL MODULATE THE INDIRECT GAS BURNER TO MAINTAIN SPACE TEMPERATURE SETPOINT. THE HEATING SYSTEM WILL CONTINUE TO MODULATE UP UNTIL THE DISCHARGE AIR TEMPERATURE REACHES THE **MAXIMUM DISCHARGE AIR TEMPERATURE**. AT WHICH POINT, BOTH THE MECHANICAL HEATING SYSTEM AND THE SUPPLY FAN WILL MODULATE UP TOGETHER TO MAINTAIN SPACE AIR TEMPERATURE SETPOINT AND **MAXIMUM DISCHARGE AIR TEMPERATURE**.

AS SPACE TEMPERATURE BEGINS TO INCREASE, THE PROCESS SHALL WORK IN REVERSE ORDER.

DEHUMIDIFICATION CONTROL:

DEHUMIDICATION MODE SHALL BE ENABLED DURING NORMAL AHU OPPERATION WHEN THE SUPPLY FAN IS PROVEN ON, THE RETURN AIR HUMIDITIY RAISES ABOVE 60% RH, AND THE OUTDOOR TEMPERATURE IS ABOVE 55°F.

WHEN ENABLED, THE AHU CONTROLLER SHALL DISABLE THE ECONOMIZER. NEXT, THE DX COOLING SYSTEM SHALL MODULATE THE MECHANICAL COOLING SYSTEM TO OVERCOOL THE AIR, LOWERING THE MOISTURE CONTENT. THE MODULATING HOT GAS REHEAT SYSTEM SHALL BE USED TO MAINTIAN THE DISCHRAGE AIR TEMPERATURE SETPOINT. ONCE THE RETURN AIR HUMIDITY LOWERS TO 55% RH DEHUMIDIFICATION MODE SHALL BE DISABLED.

ALARMS AND SAFETIES

PROVIDE ALL RELEVANT ALARMS TO NOTIFY SYSTEM OPERATORS OF MAINTENANCE, PERFORMANCE, EQUIPMENT, OR LIFE-SAFETY ERRORS AND FAULTS. REFER TO MANUFACTURER INFORMATION, CODE REQUIREMENTS, AND ASHRAE 36 RECOMMENDATIONS FOR ADDITIONAL SAFETIES AND ALARMS.

HIGH STATIC PRESSURE SAFETY SWTICH: WHEN THE SAFETY SWITCH IS TRIPPED, DISABLE SUPPLY FAN (HARDWIRED) AND GENERATE AN ALARM AT THE BAS. ALL OTHER COMPONENTS SHALL RETURN TO AN UNOCCUPIED/OFF CONTROL MODE. HIGH PRESSURE SHALL BE SET TO TRIP AT 4" W.G. AND SHALL BE RESET MANUALLY AT THE UNIT.

FREEZE STAT: WHEN A FREEZE CONDITION OCCURS, DISABLE SUPPLY FAN (HARDWIRED) AND GENERATE AN ALARM AT THE BAS. ALL OTHER COMPONENTS SHALL RETURN TO AN UNOCCUPIED/OFF CONTROL MODE. FREEZE STAT SHALL BE SET TO TRIP AT 40°F AND SHALL BE RESET MANUALLY AT THE UNIT.

DUCT SMOKE DETECTOR: WHEN SMOKE IS DETECTED, DISABLE SUPPLY FAN AND RELIEF FAN (HARDWIRED) AND GENERATE AN ALARM AT THE BAS. ALL OTHER COMPONENTS SHALL RETURN TO AN UNOCCUPIED/OFF CONTROL MODE.

FILTER DIFFERENTIAL SWTICH: WHEN DIFFERENTIAL PRESSURE ACCROSS THE FILTERS EXCEEDS ALLOWABLE LIMIT, GENERATE AN ALARM AT THE BAS.

FAN STATUS: THE BAS SHALL MONITOR FAN CURRENT SWITCHES. IF STATUS DOES NOT MATCH COMMAND OUTPUT, DISABLE FAN AND GENERATE AN ALARM AT THE BAS. ALL OTHER COMPONENTS SHALL RETURN TO AN UNOCCUPIED/OFF CONTROL MODE.

DAMPER POSITION: KNOWLEDGE OF DAMPER POSITION SHALL BE REQUIRED; A MODULATING (ANALOG) ACTUATOR OR FLOATING ACTUATOR CAN BE USED. IF DAMPER POSITION IS DETERMINED BY THE BAS TO BE INCORRECT, GENERATE AN ALARM AT THE BAS.

OUTDOOR AIR DAMPER POSITION: THE OUTDOOR AIR DAMPER SHALL FAIL CLOSED. IF THE OUTDOOR AIR DAMPER FAILS TO OPEN/MODULATE, AS INDICATED BY THE END SWITCH, GENERATE AN ALARM AT THE BAS.

RETURN AIR DAMPER POSITION: THE RETURN AIR DAMPER SHALL FAIL OPEN. IF THE RETURN AIR DAMPER FAILS TO CLOSE/MODULATE, AS INDICATED BY THE END SWITCH, GENERATE AN ALARM AT THE BAS.

DISCHARGE AIR TEMPERATURE: IF DISCHARGE AIR TEMPERATURE FALLS OUT OF THE ALLOWABLE RANGE OF 5°F FOR A TIME PERIOD 10 MINUTES, GENERATE AN ALARM AT THE BAS.

SINGLE-ZONE VAV AHU W/ DX W/ HGR, GAS, ERW CONTROLS DIAGRAM
NO SCALE

KINGSCOTT
PORTAGE | CHELSEA | GRAND RAPIDS | ROYAL OAK

GIER PARK HVAC IMPROVEMENTS
LANSING SCHOOL DISTRICT
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SES Project # 25 0588 25

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FIRST FLOOR POWER DEMOLITION PLAN - UNIT 100
SCALE: 3/32" = 1'-0"

ELECTRICAL DEMOLITION NOTES

1. VISIT THE SITE PRIOR TO SUBMISSION OF BID TO EXAMINE THE EXISTING CONDITIONS AND THE EXTENT OF DEMOLITION WORK.
2. EXAMINE THE DRAWINGS OF OTHER TRADES, BE FAMILIAR WITH THE DEMOLITION REQUIRED BY OTHER TRADES.
3. PERFORM ALL INCIDENTAL ELECTRICAL DEMOLITION AND/OR RELOCATION OF DEVICES AND EQUIPMENT REQUIRED TO FACILITATE THE DEMOLITION WORK OF OTHER TRADES.
4. COORDINATE WITH NEW WORK PLANS, ONE LINE, AND RISER DIAGRAMS FOR EXTENT OF DEMOLITION WORK.
5. COORDINATE ANY SHUTDOWN OF EXISTING SERVICES AND EQUIPMENT REMAINING IN USE WITH OWNERS REPRESENTATIVE. WHERE EXISTING BUILDING SERVICE IS REQUIRED TO BE SHUT DOWN, INCLUDE ALL ASSOCIATED OVERTIME COST TO PERFORM THIS WORK DURING EVENING AND WEEKENDS. INCLUDE ALL COSTS FOR PROVIDING TEMPORARY POWER.
6. REMOVE ALL CONDUIT AND WIRE BACK TO NEAREST UPSTREAM DEVICE REMAINING IN SERVICE.
7. WHERE DEMOLITION WORK AFFECTS ELECTRICAL SERVICE TO DOWNSTREAM DEVICES TO REMAIN, EXTEND CONDUIT AND WIRE AS REQUIRED TO MAINTAIN ELECTRICAL SERVICE.
8. PROVIDE BLANK COVER PLATES WHERE SWITCHES AND DEVICES ARE REMOVED AND WALL REMAINS INTACT. MARK ALL UNUSED CIRCUIT BREAKERS AS "SPARE".
9. CONTRACTOR TO TAG ALL CIRCUITS AT BOTH ENDS AFFECTED BY THIS SCOPE OF WORK.
10. CONTRACTOR SHALL PROVIDE UPDATED, TYPED-IN DIRECTORIES FOR ALL PANELS AFFECTED BY THIS SCOPE OF WORK.
11. CONTRACTOR SHALL VERIFY ALL UNDERGROUND AND IN-SLAB UTILITIES LOCATIONS PRIOR TO SAW CUTTING OR PENETRATING ANY FLOOR SLABS. CONTRACTOR SHALL REPAIR ALL UTILITIES DAMAGED BY SAW CUTTING.

ELECTRICAL DEMOLITION KEYNOTES

D1 DISCONNECT AND DEMOLISH UNIT HEATER POWER CONNECTION. MAINTAIN EXISTING FEEDER FOR REUSE IN NEW WORK.

D2 DEMOLISH ELECTRICAL DISCONNECT AND ASSOCIATED POWER CONNECTION COMPLETE BACK TO SOURCE FOR DEMOLISHED MECHANICAL EQUIPMENT.

D3 COORDINATE TEMPORARY REMOVAL OF CEILING MOUNTED LIGHTING AND POWER DEVICES, AND FEEDS IN CEILING AS REQUIRED FOR NEW MECHANICAL WORK. SAVE LIGHTING AND POWER DEVICES FOR REINSTALLATION IN NEW WORK. COORDINATE WITH MECHANICAL TRADES FOR EXACT AREA OF SCOPE IN FIELD.

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GIER PARK HVAC IMPROVEMENTS

LANSING SCHOOL DISTRICT

401 E. Gier St, Lansing, MI 48906

Lansing School District

ISSUANCES	DATE
DESIGN DEVELOPMENT	09.26.2025
CONSTRUCTION DOCUMENTS	11.14.2025
ADDENDUM 02	12.11.2025

KEY PLAN

N

JOB NO. 2616.07

SHEET TITLE
FIRST FLOOR POWER DEMOLITION PLAN - UNIT 100

SHEET NO.
ED1.1

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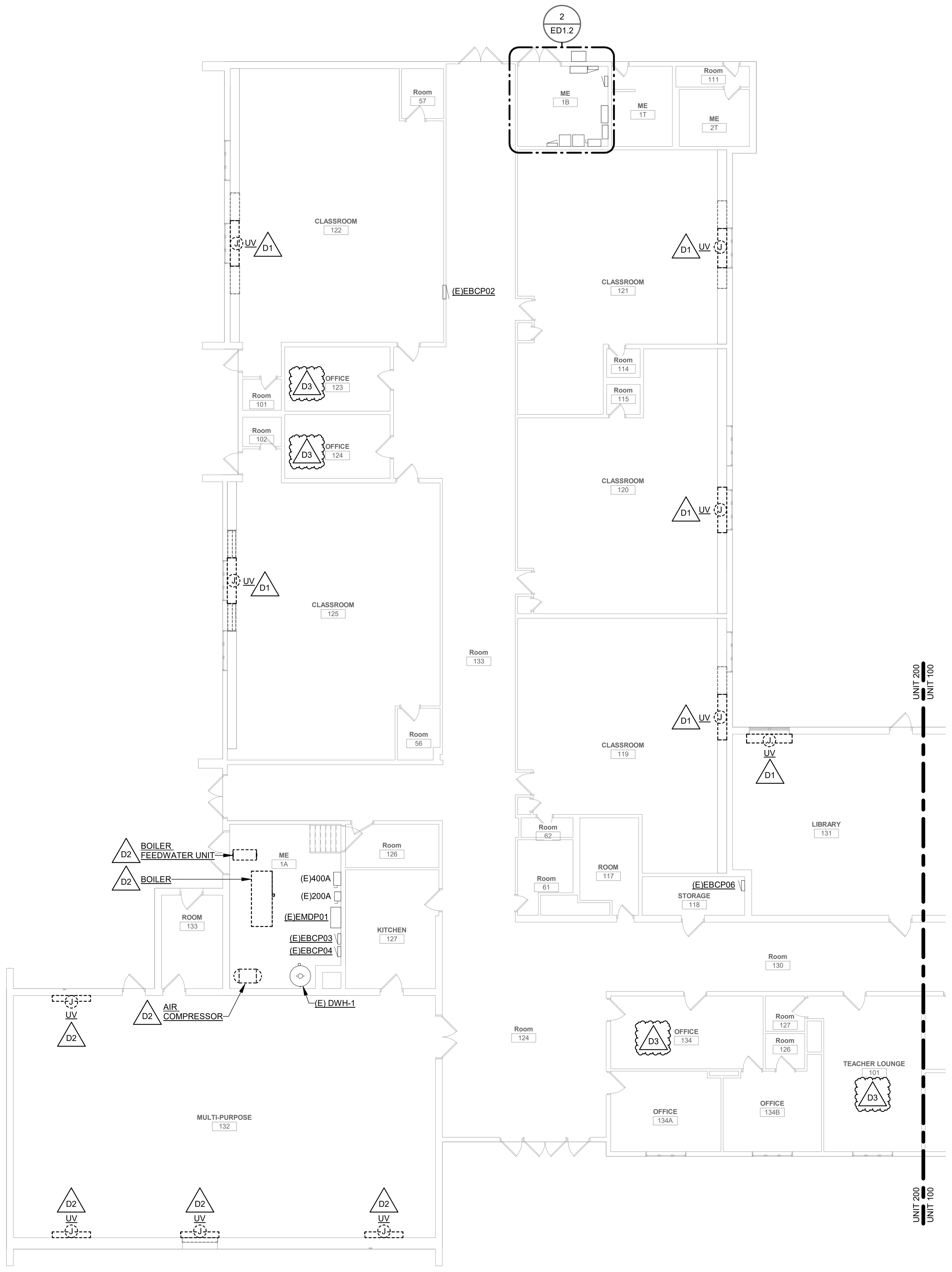
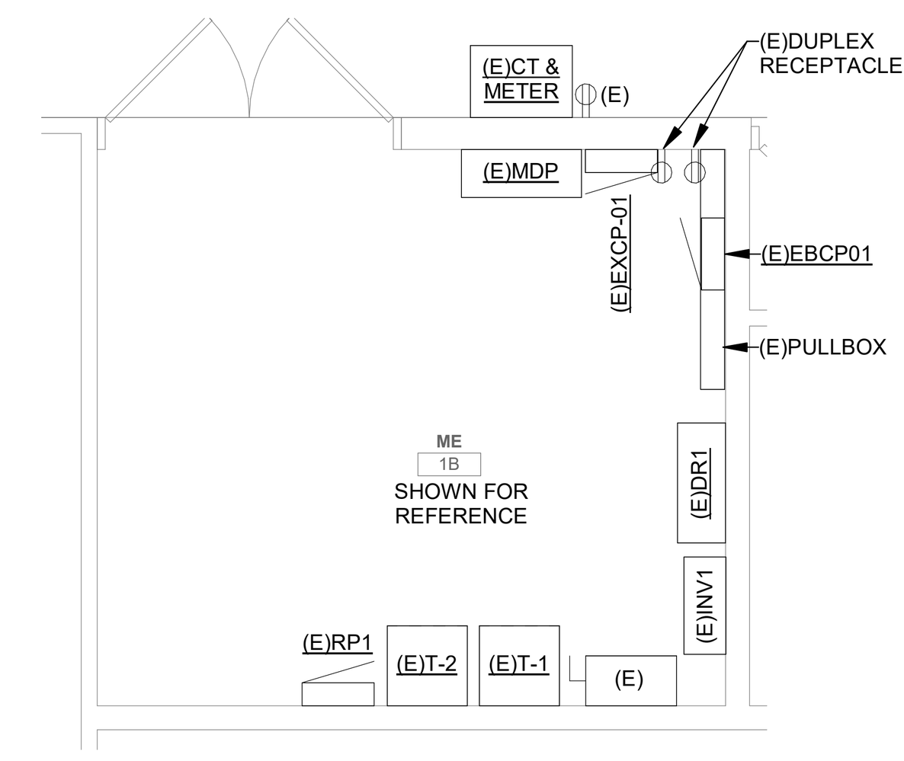


FIRST FLOOR POWER DEMOLITION PLAN - UNIT 200
SCALE: 3/32" = 1'-0"



2 ED1.2 ENLARGED MAIN ELECTRICAL ROOM POWER DEMOLITION PLAN
SCALE: 1/4" = 1'-0"

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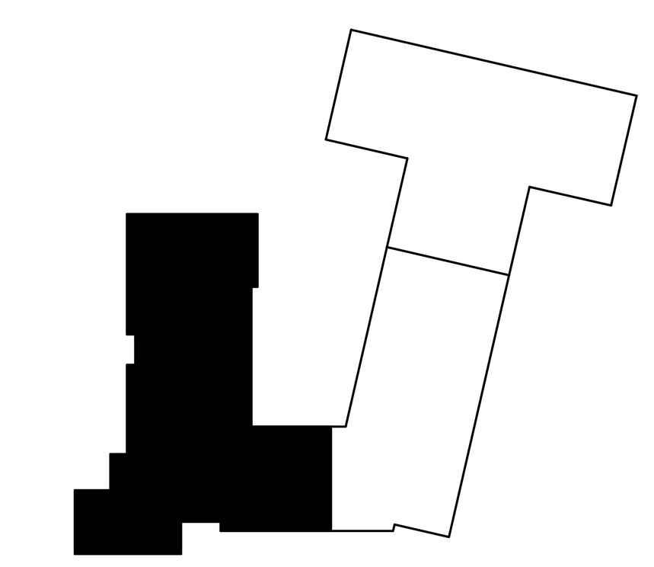

KEY PLAN

JOB NO. 2616.07

SHEET TITLE
FIRST FLOOR POWER DEMOLITION PLAN - UNIT 200

SHEET NO.
ED1.2

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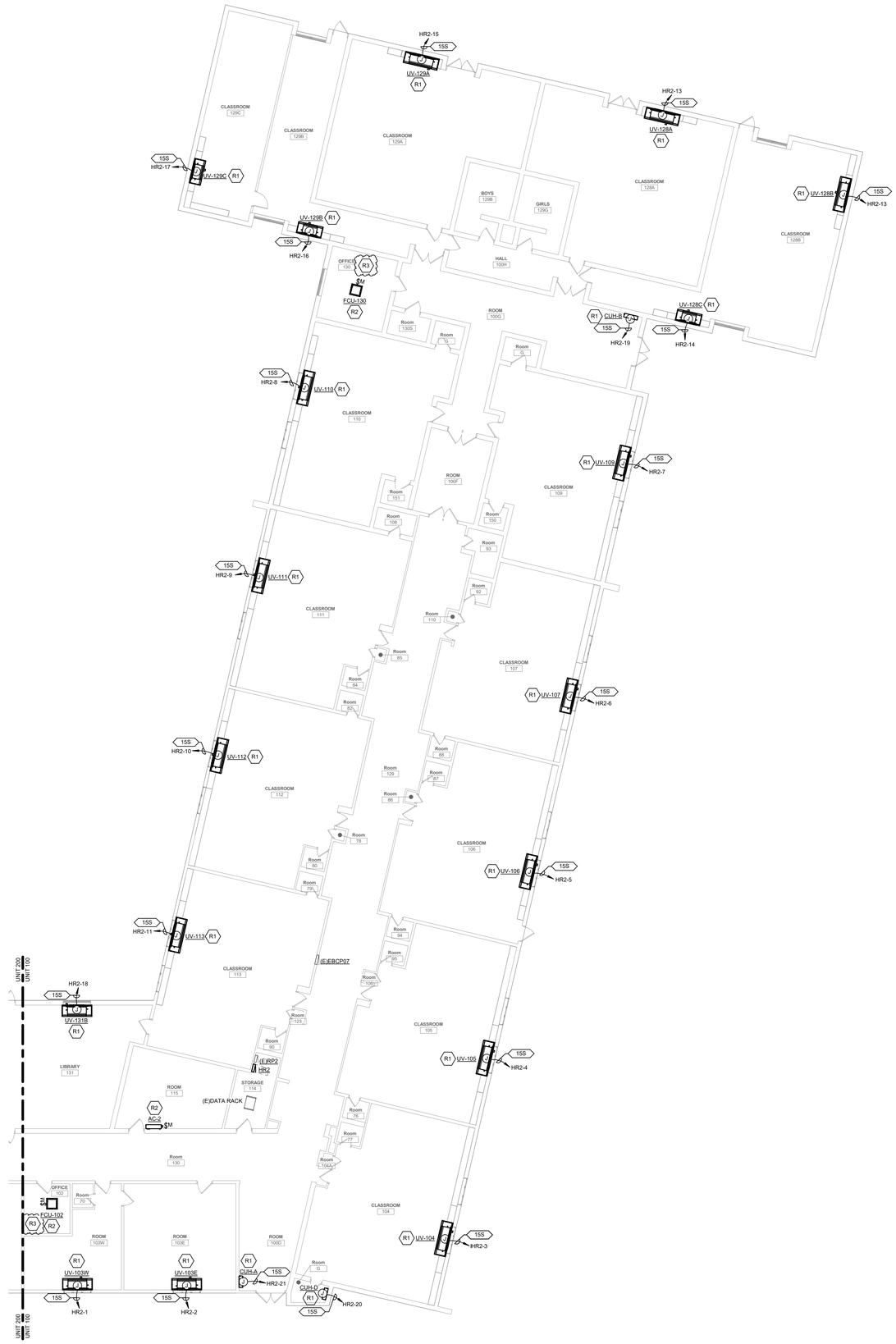

FIRST FLOOR POWER PLAN - UNIT 100
SCALE: 3/32" = 1'-0"

ELECTRICAL GENERAL NOTES

1. ALL RECEPTACLES ON EXTERIOR, IN KITCHEN, IN CONCESSION, IN LABORATORY, AND WITHIN 6'-0" OF SINK OR OTHER WATER SUPPLY SHALL BE READILY ACCESSIBLE GFCI TYPE RECEPTACLE.
2. REFER TO ARCHITECTURAL FLOOR PLANS AND ELEVATIONS TO VERIFY LOCATION OF DEVICES.
3. ALL CONDUITS SERVING 120 VOLTS OR GREATER SHALL INCLUDE A GROUND WIRE.
4. ALL CONDUITS SHALL BE ROUTED CONCEALED UNLESS NOTED OTHERWISE.
5. ALL 120 VOLT CIRCUITS SHALL UTILIZE A SEPARATE NEUTRAL.
6. RECEPTACLES INSTALLED IN ELEVATOR HOISTWAY(S), ELEVATOR MACHINE ROOM(S), CONTROL ROOM(S)/SPACE(S) SHALL BE GROUND FAULT CIRCUIT INTERRUPTER TYPE (GFCI) WITH THE EXCEPTION OF A DEDICATED SINGLE PHASE RECEPTACLE SUPPLYING AN ELEVATOR PIT SUMP PUMP SHALL NOT BE A GFCI TYPE RECEPTACLE.
7. ALL BRANCH CIRCUITS THAT SUPPLY 125-V SINGLE PHASE, 15 AND 20 AMP OUTLETS TO BE INSTALLED IN DWELLING UNIT FAMILY ROOMS, DINING ROOMS, LIVING ROOMS, PARLORS, LIBRARIES, RECREATION ROOMS, CLOSETS, HALLWAYS OR SIMILAR ROOMS OR AREAS SHALL BE PROTECTED BY A LISTED ARC-FAULT CIRCUIT INTERRUPTER, COMBINATION-TYPE, INSTALLED TO PROVIDE PROTECTION OF THE BRANCH CIRCUIT.
8. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL LIGHTING FIXTURES UNLESS OTHERWISE NOTED.
9. EXIT LIGHTS AND EMERGENCY BATTERY UNITS SHALL BE UNCONTROLLED AND TIED AHEAD OF LOCAL AREA LIGHTING SWITCH, UNLESS CIRCUITED OTHERWISE.
10. WHERE MORE THAN ONE LIGHT SWITCH IS INDICATED TO BE INSTALLED AT THE SAME LOCATION, THEY SHALL BE GROUPED UNDER ONE COMMON FACEPLATE.
11. ALL POWER PACKS TO BE LOCATED DIRECTLY ABOVE SWITCH.
12. LIGHT FIXTURES ARE LOOPED TOGETHER TO INDICATE CONTROL ZONE GROUPS. CONNECTED FIXTURES ARE TO BE CONTROLLED TOGETHER. CIRCUITS MAY BE SHARED AMONG SEPARATE CONTROL ZONE GROUPS. MULTIPLE ZONES ZONES MAY BE COMBINED IN SOFTWARE TO FORM SCENES. SEE LIGHTING CONTROL MATRIX SCENE SCHEDULE (IF PROVIDED), AND PANEL SCHEDULES FOR ADDITIONAL INFORMATION.
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ELECTRICAL KEYNOTES

R1 EQUIPMENT DISCONNECT OR COMBINATION DISCONNECT/VFD TO PROVIDED BY MANUFACTURER. EC TO PROVIDE ALL POWER CONNECTIONS TO ENERGIZE EQUIPMENT AS INDICATED. COORDINATE INSTALLATION WITH MECHANICAL TRADES AND FINAL EQUIPMENT SUBMITTAL POWER REQUIREMENTS.

R2 INDOOR AC AND FCU MECHANICAL EQUIPMENT POWERED BY OUTDOOR CU OR HP. COORDINATE PLACEMENT OF INTERIOR DISCONNECT IN ACCESSIBLE LOCATION PRIOR TO ROUGH-IN.

R3 COORDINATE REINSTALLATION OF CEILING MOUNTED LIGHTING AND POWER DEVICES, AND FEEDS MAINTAINED DURING DEMOLITION ONCE MECHANICAL SCOPE IS COMPLETED. COORDINATE WITH ARCHITECTURAL TRADES FOR EXACT AREA OF SCOPE IN FIELD.

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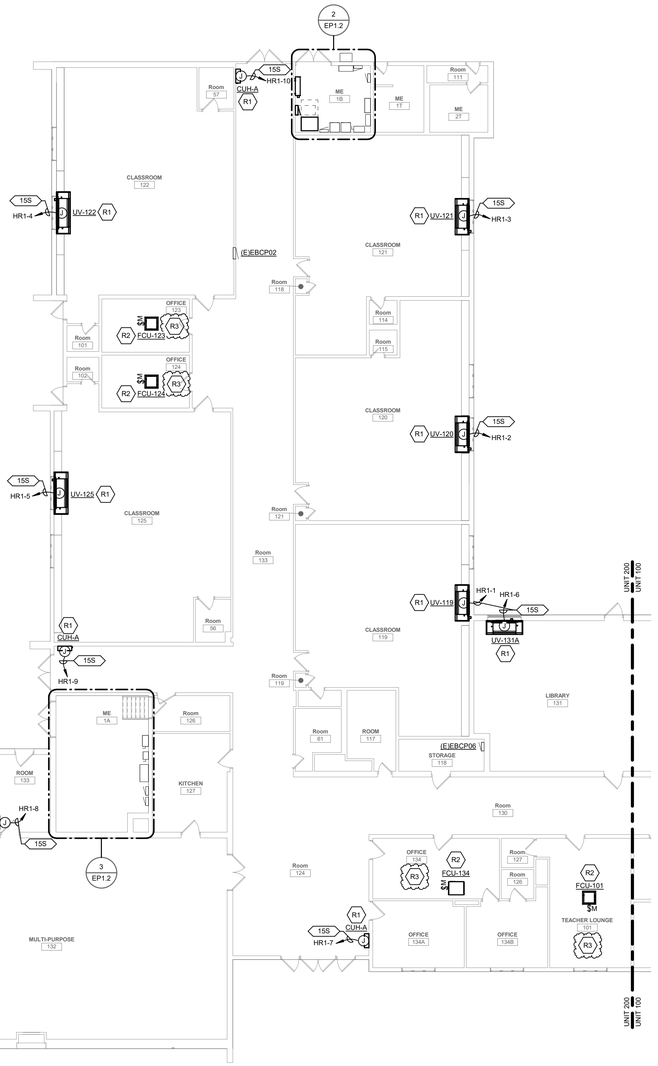

FIRST FLOOR POWER PLAN - UNIT 200
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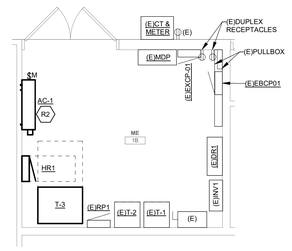
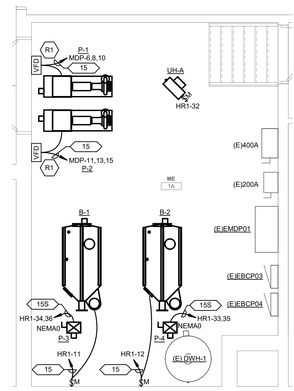


ENLARGED MAIN ELECTRICAL ROOM POWER NEW WORK PLAN
2 EP1.2
SCALE: 1/4" = 1'-0"



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