23 11 23 – Facility Natural Gas Details
Gas Piping
Black Steel

SECTION 231123 – GAS PIPING

GENERAL: Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY: Furnish and install complete system of low pressure gas piping to all items of equipment, including shutoff valve, union and dirt leg at each final connection. Verify special installation and metering requirements with Utility Company.

PIPING: Schedule 40 black steel pipe (ASTM A–53) with welded joints. Screwed malleable iron fittings may be used on piping 2 1/2" and smaller. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B. Malleable–Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern. Wrought–Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding. Unions: ASME B16.39, Class 150, malleable iron with brass–to–iron seat, ground joint, and threaded ends. Protective Coating for Underground Piping: Factory–applied, three–layer coating of epoxy, adhesive, and PE. Joint Cover Kits: Epoxy paint, adhesive, and heat–shrink PE sleeves.

HANGER AND SUPPORT INSTALLATION: Install hangers for horizontal steel piping with the following maximum spacing and minimum rod sizes: NPS 1 and Smaller: Maximum span, 96 inches; minimum rod size, 3/8 inch. NPS 1–1/4: Maximum span, 108 inches; minimum rod size, 3/8 inch. NPS 1–1/2 and NPS 2: Maximum span, 108 inches; minimum rod size, 3/8 inch.

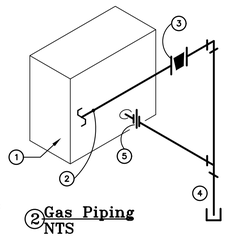
VALVES: 1" and smaller: 125 lb. iron body with bronze plug washer. Crane #320 or Homestead #601. 1 1/4" and larger: Lubricated plug cock. Nordstrum #142 or Homestead #602. Equal valves by Nibco, Lunkenheimer, Stockham or Powell are acceptable.

TESTS: Nitrogen test piping for 24 hours in accordance with Utility Company & NFPA–54 requirements. After testing, purge system completely.

23 11 23 Facility Natural–Gas Piping

General Gas Service Notes

Contractor Must Clearly Identify Natural Gas work price breakout in their bid.
- Coordinate with the local gas service before any work begins.
- All costs associated with this work scope are borne by the this contractor.
- All work done must be within the guidelines of the local gas purveyor and any unique local requirements must be followed.



2 **Gas Piping**
NTS

◯ Detail Notes ◯
1. Gas Fired Equipment
2. Gas Main or Branch. Refer to Plan for Size and Continuation
3. Union
4. 6" Long Dirt Leg with Pipe Cap
5. Lubricated Plug Valve

Natural gas: Verify local utility and code requirements, then provide service equipment, piping, and damage protection accordingly. Submit application(s) with all information and fees necessary to obtain permit and service. Provide internally vented regulators if possible, or if required, extend regulator vents to approved exterior locations. Provide a shut off valve in the main immediately before entering the building (unless noted otherwise), and provide gas valve, union and dirt leg at each gas connection to equipment. Coordinate gas connection size and location with equipment requirements.

Each Gas Appliance shall have a concealed supply line with rigid pipe to space with escutcheon and accessible valve.

Semi–portable appliances such as gas dryers and gas range tops shall have flexible stainless steell supply lines and restraints. Residential appliactions may have residential duty flexible connections.

NOTE: CONNECTIONS MUST BE LISTED FOR THE APPLCIATION THEY ARE USED FOR.

01 78 39 Project Record Documents
As–Built Record

AS–BUILT RECORD

This contractor shall keep on–site a full size set of construction documents, including blueprints, as a field copy of the "as–built" conditions.

These record documents shall be kept up to date with any RFIs and ASIs as well as any additional modifications to the contract documents.

It is this contractor's responsibility to maintain this set of documents in clean and legible condition. Any deviations from the contract documents shall be neatly and concisely recorded in red pen/pencil on the "as–built" documents. Information on these documents shall be scanned at 400 DPI and be turned over to the original author of these documents (the engineer).

01 73 29 Cutting/Patching

1. All fixtures shall be high efficiency style with supporting written documentation.
2. All scope items shall meet current building codes energy conservation code section with a minimum of IECC 2009.

22 00 00 Accessibility Requirements

Coordinate with Architectural Plans

1. Accessibility requirements apply to this facility. See Architectural plans for exact requirements and areas that those requirements apply.
2. It shall be the contractors sole responsibility to ensure all accessibility requirements are met in accordance with the AHJ, including but not limited to application of UFAS, Fair Housing Requirements, HUD, ANSI and state and local codes and requirements.

22 05 00 Common Requirements
312 – Testing of Systems

1. Plumbing Contractor shall test all water supply and DWV (Drain Waste Vent) systems in compliance with the AHJ (Authority having Jurisdiction) in compliance with the governing codes.
2. All cleanouts, inflatable bulb locations etc shall be piped into the system by the PC at appropriate locations as deemed by the PC and the AHJ to ensure compliance with air tests and all other testing. These locations are not shown on the plans and are dependent on the PC's exact piping and field conditions.
3. PC shall test all backflow and isolation devices according to the AHJ and the governing codes, PC shall provide all necessary valves, fittings and appurtenances to perform required tests.

01 10 00 Summary

1. The Scope of this project is as defined on the complete project manual including all plans, specifications and addendums etc.. The work scope cannot be understood by simply reading a portion of the plans or specifications. The contractor is reminded that the following scope summary is simply a portion of the scope.
   - The work shall be to install a new HVAC system to support the new architectural layout.

01 General Requirements
01 11 00 Work Scope

1. The Scope of this project is as defined on the complete project manual including all plans, specifications and addendums etc.. The work scope cannot be understood by simply reading a portion of the plans or specifications. The contractor is reminded that the following scope summary is simply a portion of the scope.
   - The work shall be to make modifications to the plumbing system to support the Architectural changes in the building such as relocation of HVAC and plumbing fixtures/devices.

01 General Requirements

This property is to be constructed in accordance to current State Building Code including: the International Building Code, International Mechanical Code, International Property Maintenance Code, International Energy Conservation Code, the International Residential Code for One and Two–Family Dwellings, and the Handicapped Accessibility Standards, or any corresponding successor Code.

All Local Building Codes to be met or exceeded.

01 00 00 General Conditions
Document Limits

NOTES ARE NOT EXCLUSIVE

DESIGN LIMITS
A. The drawings in this section are diagrammatic and are not intended to define exact quantities, locations, or code requirements. The drawings shall no be scaled. Exact state and local code requirements and other applicable code requirements shall be verified by and are the sole responsibility of this contractor. Any information which directly conflicts with any of these codes or any discrepancies found in the contract documents shall be brought to the attention of the project Architect/engineer. For clarity, certain drafting techniques have been used, these should not be interpreted to reduce the scope of the contract.
B. Equipment sizes and locations are approximate. Actual dimensions to be determined by equipment furnished.
C. Final opening dimensions, concrete pad size and location shall be coordinated during construction with approved equipment.
D. Complete installation shall conform to all applicable city, state, federal and local codes and ordinances, including but not limited to the latest approved edition of NFPA:90a, and NFPA–101. It is the responsibility of the mechanical installer to notify the architect/engineer of any items on the plans and specifications that are not in compliance with the above codes.
E. Drawings indicate the normal standards but, if any work should be indicated to be substandard to any ordinances, laws, codes, rules or regulations bearing on the work. The mechanical installer shall execute the work correctly in accordance with such ordinances, laws, codes, rules or regulations, without increase in cost to owner, architect or general installer.

01 33 00 Submittal Procedures

1. Shop drawings inclusive of specific control locations, sheet metal, piping and exact equipment size and location are to be submitted to engineer for review and comments prior to construction.

2. Submit for approval five (5) copies of 1/4" scale duct layout drawings coordinated with all other trades, structure, ceiling heights, etc. Drawings shall show duct dimensions (outside), elevation to top and bottom of duct from finished floor, volume damper locations, diffusers and grilles, and CFM's.

3. Submit for approval early enough in project to allow three weeks for review without causing time delays or conflicts in the job progress. Submittals shall be in accordance with general conditions and the manufacturers listed on the drawings and shall bear the stamp of the contractor showing that he has reviewed and approved them and that they are in conformance with the contract drawings. Lack of contractor's stamp will be cause for rejection without review.

4. This contractor shall furnish an operating and maintenance manual to be turned over to owner at completion of job. Include a complete set of "as built" prints with modifications to systems clearly called out. Include shop drawings, information on thermostats, control wiring diagrams and other pertinent information.

01 43 23 Installer Qualifications

The drawings in this section are diagrammatic and are not intended to define exact quantities, locations, or code requirements. The drawings shall not be scaled. Exact state and local code requirements and other applicable code requirements shall be verified by and are the sole responsibility of this contractor. Any information which directly conflicts with any of these codes or any discrepancies found in the contract documents shall be brought to the attention of the project Architect/Engineer. For clarity, certain drafting techniques have been used, these should not be interpreted to reduce the scope of the contract.

LINETYPE LEGEND

———	NEW WORK
— — — —	EXISTING TO REMAIN
. . . . .	DEMOLITION WORK
———	ABANDON IN PLACE

Office Facility Alterations and a New Maintenance Building for the:
FAIRFIELD COUNTY BOARD OF DEVELOPMENTAL DISABILITIES
795 College Avenue
Lancaster, Ohio 43130

VPL ARCHITECTS
426 EAST MAIN STREET
LANCASTER, OHIO 43130
phone: (740) 654-4048
facsimile: (740) 654-3009

COMMISSION No.
P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

DRAWN BY:

STATE OF OHIO
LANCE J. DEBENEDICTIS
E–63937
REGISTERED PROFESSIONAL ENGINEER

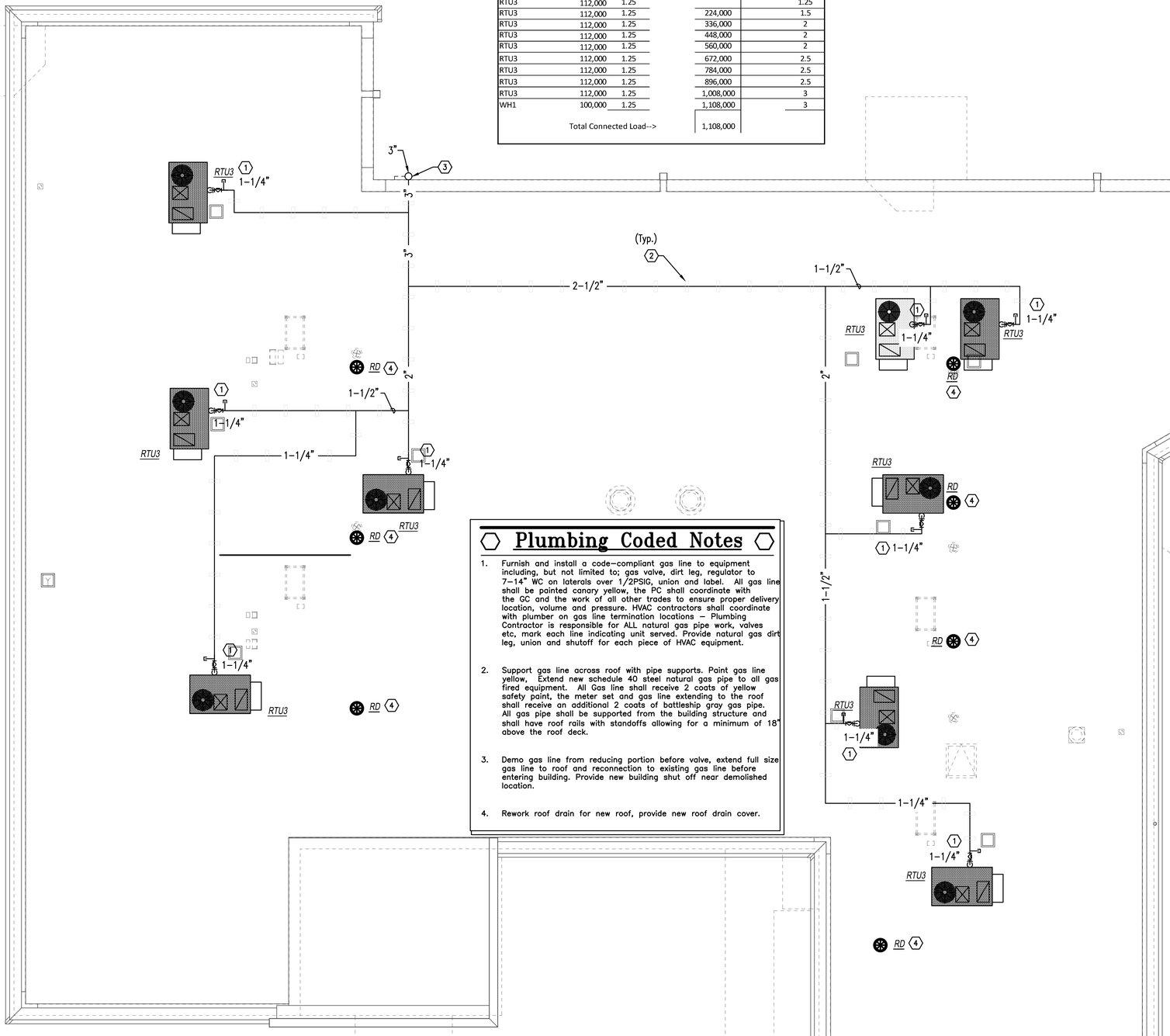
xpert engineering
300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

PLUMBING DETAILS

DRAWING NUMBER
P001

231123 Natural Gas Sizing Schedule

Tag	Equipment Total (MBH)	Equipment Branch (Inches Diameter)	Cumulative Total (MBH)	Maximum Length (Feet)	Pipe Size (Inches Diameter)
				200	
RTU3	112,000	1.25			1.25
RTU3	112,000	1.25	224,000		1.5
RTU3	112,000	1.25	336,000		2
RTU3	112,000	1.25	448,000		2
RTU3	112,000	1.25	560,000		2
RTU3	112,000	1.25	672,000		2.5
RTU3	112,000	1.25	784,000		2.5
RTU3	112,000	1.25	896,000		2.5
RTU3	112,000	1.25	1,008,000		3
WH1	100,000	1.25	1,108,000		3
	Total Connected Load-->		1,108,000		



Plumbing Coded Notes

1. Furnish and install a code–compliant gas line to equipment including, but not limited to; gas valve, dirt leg, regulator to 7–14" WC on laterals over 1/2PSIG, union and label. All gas line shall be painted canary yellow, the PC shall coordinate with the GC and the work of all other trades to ensure proper delivery location, volume and pressure. HVAC contractors shall coordinate with plumber on gas line termination locations – Plumbing Contractor is responsible for ALL natural gas pipe work, valves etc, mark each line indicating unit served. Provide natural gas dirt leg, union and shutoff for each piece of HVAC equipment.
2. Support gas line across roof with pipe supports. Paint gas line yellow, Extend new schedule 40 steel natural gas pipe to all gas fired equipment. All Gas line shall receive 2 coats of yellow safety paint, the meter set and gas line extending to the roof shall receive an additional 2 coats of battleship gray gas pipe. All gas pipe shall be supported from the building structure and shall have roof rails with standoffs allowing for a minimum of 18" above the roof deck.
3. Demo gas line from reducing portion before valve, extend full size gas line to roof and reconnection to existing gas line before entering building. Provide new building shut off near demolished location.
4. Rework roof drain for new roof, provide new roof drain cover.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

Roof Plan

3/16"=1'-0"

22 14 13 Facility Storm Drainage

Roof Slope to Drains & Exteriors

OBC Notes on Roof Slope to Drains & Exteriors

Per OBC 1507.10.1 Slope. Built–up roofs shall have a design slope of not less than one–fourth unit vertical in 12 units horizontal (2–percent slope) for drainage, except for coal–tar built–up roofs that shall have a design slope of not less than one–eighth unit vertical in 12 units horizontal (1–percent slope).

1507.11.1 Slope. Modified bitumen membrane roofs shall have a design slope of not less than one–fourth unit vertical in 12 units horizontal (2–percent slope) for drainage.

1507.12.1 Slope. Thermoset single–ply membrane roofs shall have a design slope of not less than one–fourth unit vertical in 12 units horizontal (2–percent slope) for drainage.

1507.12.3 Ballasted thermoset low–slope roofs. Ballasted thermoset low–slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D 448 or ASTM D 7655.

1507.13.1 Slope. Thermoplastic single–ply membrane roofs shall have a design slope of not less than one–fourth unit vertical in 12 units horizontal (2–percent slope).

1507.13.2 Material standards. Thermoplastic single–ply roof coverings shall comply with ASTM D 4434, ASTM D 6754, ASTM D 6878 or CGSB CAN/CGSB 37–54.

1507.13.3 Ballasted thermoplastic low–slope roofs. Ballasted thermoplastic low–slope roofs (roof slope < 2:12) shall be installed in accordance with this section and Section 1504.4. Stone used as ballast shall comply with ASTM D 448 or ASTM D 7655.

1507.14 Sprayed polyurethane foam roofing. The installation of sprayed polyurethane foam roofing shall comply with the provisions of this section.

1507.14.1 Slope. Sprayed polyurethane foam roofs shall have a design slope of not less than one–fourth unit vertical in 12 units horizontal (2–percent slope) for drainage.

1507.14.2 Material standards. Spray–applied polyurethane foam insulation shall comply with Type III or IV as defined in ASTM C 1029.

1507.14.3 Application. Foamed–in–place roof insulation shall be installed in accordance with the manufacturer's instructions. A liquid–applied protective coating that complies with Table 1507.14.3 shall be applied no less than 2 hours nor more than 72 hours following the application of the foam.

OPC Notes for Roof Drains:

SECTION 1105

ROOF DRAINS

1105.1 General. Roof drains shall be installed in accordance with the manufacturer's instructions. The inside opening for the roof drain shall not be obstructed by the roofing membrane material.

1105.2 Roof drain flow rate. The published roof drain flow rate, based on the head of water above the roof drain, shall be used to size the storm drainage system in accordance with Section 1106. The flow rate used for sizing the storm drainage piping shall be based on the maximum anticipated ponding at the roof drain.

SECTION 1108

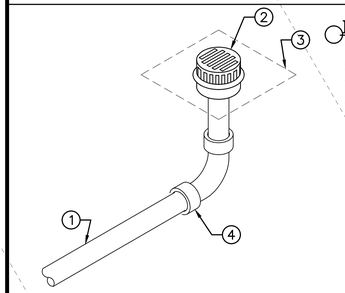
SECONDARY (EMERGENCY) ROOF DRAINS

1108.1 Secondary (emergency overflow) drains or scuppers. Where roof drains are required, secondary (emergency overflow) roof drains or scuppers shall be provided where the roof perimeter construction extends above the roof in such a manner that water will be entrapped if the primary drains allow buildup for any reason. Where primary and secondary roof drains are manufactured as a single assembly, the inlet and outlet for each drain shall be independent.

1108.2 Separate systems required. Secondary roof drain systems shall have the end point of discharge separate from the primary system. Discharge shall be above grade, in a location that would normally be observed by the building occupants or maintenance personnel.

22 14 13 Facility Storm Drainage

Roof Drain Detail

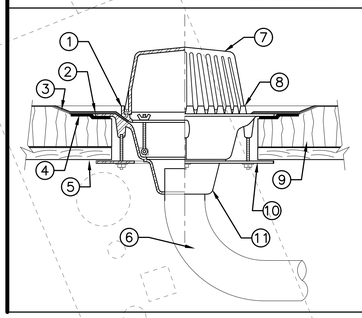


Detail Notes

1. See plans for sizes and continuation
2. Roof drain, see plans for sizes
3. 24"x24" roof sump receiver (typ.)
4. Ab. clg.

22 14 13 Facility Storm Drainage

Roof Drain Detail



Detail Notes

1. Flashing ring
2. Lead flashing
3. Adhered roofing
4. Bearing pan
5. 1/2" ext. OSB. hd.
6. Short elbow for quick turn
7. Roof drain dome
8. Flashing ring
9. Tapered roof insulation
10. Deck clamp
11. Roof drain

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phone: (740) 654-4048
facsimile: (740) 654-3009

COMMISSION No.
P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

DRAWN BY:

STATE OF OHIO
LANCE J. DEBENEDICTIS
PE-63937
REGISTERED PROFESSIONAL ENGINEER

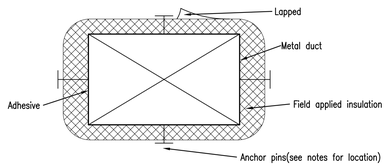
xpert engineering
300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

PLUMBING ROOF NEW WORK PLAN

DRAWING NUMBER
P102N

23 07 00 HVAC Insulation

Blanket Applications for Ducts and Plenums: Secure blanket insulation with adhesive and anchor pins and speed washers.
1. Apply adhesives according to manufacturer's recommended coverage rates per square foot, for 100 percent coverage of duct and plenum surfaces.
2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
3. Install anchor pins and speed washers on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
a. On duct sides with dimensions 18 inches (450 mm) and smaller, along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
b. On duct sides with dimensions larger than 18 inches (450 mm). Space 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) maximum from insulation joints. Apply additional pins and clips to hold insulation tightly against surface at cross bracing.
c. Anchor pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
d. Do not over compress insulation during installation.
4. Impale insulation over anchors and attach speed washers.
5. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
6. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation segment with 1/2–inch (13–mm) staples, 1 inch (25 mm) o.c., and cover with pressure–sensitive tape having same facing as insulation.
7. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. Secure with steel band at end joints and spaced a maximum of 18 inches (450 mm) o.c.
8. Apply insulation on rectangular duct elbows and transitions with a full insulation segment for each surface. Apply insulation on round and flat–oval duct elbows with individually mitered gores cut to fit the elbow.
9. Insulate duct stiffeners, hangers, and flanges that protrude beyond the insulation surface with 6–inch– (150–mm–) wide strips of the same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with anchor pins spaced 6 inches (150 mm) o.c.
10. Apply vapor–retarder mastic to open joints, breaks, and punctures for insulation indicated to receive vapor retarder.
11. OBC 720.3 & OMC 604.3; confirm that exposed insulation has a Fire Spread Index of 25 (max) and Smoke Development Index of 450 (max). Confirm that duct insulation has a Fire Spread Index of 25 (max) and Smoke Development Index of 50 (max)



Duct Wrap Detail(DW)
NTS

23 07 00 HVAC Insulation

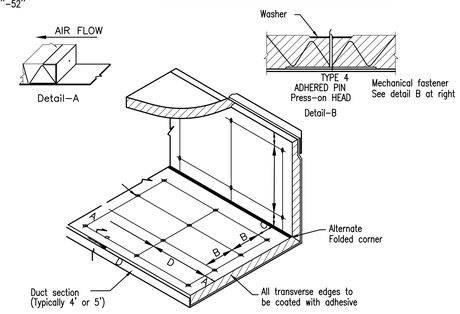
Lining for Rectangular Metal Ducts. All ducts, where shown on the drawings, shall be lined with 1" (25 mm) thick Permacote Linacoustic fiber glass duct liner with factory–applied edge coating or approved equal. The liner shall meet the Life Safety Standards as established by NFPA 90 A and 90B, FHC 25/50 and Limited Combustibility and the air stream surface coating should contain an immobilized, EPA–registered, anti–microbial agent so it will not support microbial growth as tested in accordance with ASTM G21 and G22. The duct liner shall conform to the requirements of ASTM C 1071, with an NRC not less than .70 as tested per ASTM C 423 using a Type "A" mounting, and a thermal conductivity no higher than .25 BTU·in/(hr·ft2·°F) at 75°F [.036 W/m·°C at 24°C] mean temperature.

NO. PINS	LINER INTERIOR WIDTH
0	8" dn
2	9"–16"
3	17"–28"
4	29"–40"
5	41"–52"

Maximum spacing for fasteners, actual intervals are approximate.

Liner

Velocity	Dimensions A	B	C	D
0–2500 FPM	3"	12"	4"	18"
2501–6000 FPM	3"	6"	4"	16"



Duct Liner Detail(DL)
NTS

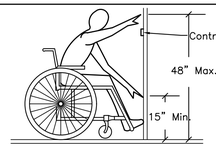
HVAC General Notes

NOTES ARE NOT EXCLUSIVE

DESIGN LIMITS
A. The drawings in this section are diagrammatic and are not intended to define exact quantities, locations, or code requirements. The drawings shall no be scaled. Exact state and local code requirements and other applicable code requirements shall be verified by and are the sole responsibility of this contractor. Any information which directly conflicts with any of these codes or any discrepancies found in the contract documents shall be brought to the attention of the project Architect/engineer. For clarity, certain drafting techniques have been used, these should not be interpreted to reduce the scope of the contract.
B. Equipment sizes and locations are approximate. Actual dimensions to be determined by equipment furnished.
C. Final opening dimensions, concrete pad size and location shall be coordinated during construction with approved equipment.
D. Complete installation shall conform to all applicable city, state, federal and local codes and ordinances, including but not limited to the latest approved edition of NFPA:90a, and NFPA–101. It is the responsibility of the mechanical installer to notify the architect/engineer of any items on the plans and specifications that are not in compliance with the above codes.
E. Drawings indicate the normal standards but, if any work should be indicated to be substandard to any ordinances, laws, codes, rules or regulations bearing on the work. The mechanical installer shall execute the work correctly in accordance with such ordinances, laws, codes, rules or regulations, without increase in cost to owner, architect or general installer.

GENERAL
A. Access panels are required for maintenance and service to all equipment and shall be furnished and installed in accordance with authority having jurisdiction.
B. Provide vibration isolators, filter slide, and gas valve for ALL furnace units.
C. Installer is responsible to insure all diffusers and grilles are air balanced and correctly placed and aligned before and after adjacent construction is in place. All air devices must be coordinated through shop drawings and placed in centerlines of architectural elements and approved with the architect/engineer.
D. Installer shall provide and install all misc. support steel and hangers as required to mount mechanical equipment.
E. Final electrical connections to all mechanical equipment shall be by the electrical installer.
F. Electrical characteristics shown on schedules or drawings are design values only and shall be verified before ordering equipment. It is the mechanical contractors responsibility to notify the E.C. of the electrical characteristics before any work begins.
G. All ducts and pipes above ceiling unless otherwise noted.
H. Install balancing dampers and takeoff dampers as shown and as required for proper balancing of air handling systems.
I. Run all condensate drain lines indirect to nearest floor drain, or out the side wall for perimeter units.

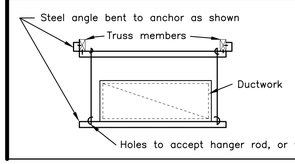
23 09 00 Controls – Mounting



HVAC Control Mounting
NTS

It is the Mechanical contractors responsibility to ensure all mechanical controls shall be mounted to conform with the accessibility standards governing the specific area of the project that the controls are in. This detail describes aspects of the ANSI A117.1–2009 308 Reach Range. Conformance to this detail does not guarantee compliance with accessibility requirements.

23 05 29 Hangers & Supports



Note:
Hanger material must comply with current SMACNA requirements for load use. Strap hangers maybe used.

Duct Hanger Detail
NTS

23 05 29 Hangers & Supports

A. Roof curb shall be of the same manufacturer as unit and shall include an insulated panel under compressor section to prevent condensation forming on the bottom. Dimensions shall be provided to allow for easy duct location and connection to roof curb prior to unit placement. Roof curb shall be a minimum of 14 inches high and shall be fully supporting over it entire length. Curb design shall comply with national roofing contractors associated requirements and must be approved.

B. Verify location of RTU's and existing roof framing conditions and provide any new framing required to support air handling unit. Coordinate all roof work and comply with local regulations and requirements.

01 78 39 Project Record Documents
As–Built Record

AS–BUILT RECORD

This contractor shall keep on–site a full size set of construction documents, including blueprints, as a field copy of the "as–built" conditions.

These record documents shall be kept up to date with any RFIs and ASIs as well as any additional modifications to the contract documents.

It is this contractor's responsibility to maintain this set of documents in clean and legible condition. Any deviations from the contract documents shall be neatly and concisely recorded in red pen/pencil on the "as–built" documents. Information on these documents shall be scanned at 400 DPI and be turned over to the original author of these documents (the engineer).

01 10 00 Summary

1. The Scope of this project is as defined on the complete project manual including all plans, specifications and addendums etc.. The work scope cannot be understood by simply reading a portion of the plans or specifications. The contractor is reminded that the following scope summary is simply a portion of the scope.
   - The work shall be to install a new HVAC system to support the new architectural layout.

01 33 23 Shop Drawings & Product Data

Submit five copies of material lists and shop drawings for all referenced and major equipment to the owner's construction manager for approval prior to ordering equipment. Contractor shall submit shop drawings early enough in the project to allow ample time for owner's review without causing time delays or conflicts in the job progress – a minimum of 14 days shall be allowed for review at the design professional's office. Submittals shall be in accordance with general conditions and the manufacturers listed on the drawings and shall bear the stamp of the contractor showing that he has reviewed and approved them and that they are in conformance with the contract drawings. Lack of such contractor's approval will be cause for rejection without review by the design professional.

Where trade names, brands of manufacturers of equipment or materials are shown on the drawings or specifications the exact equipment shall be used on the project. The use of any unauthorized equipment shall be subject to removal/replacement at the request of the Owner's Construction Manager (at the contractor's expense).
Coordination plans shall be developed by each contractor that show the work of other trades (minimum ¼" = 1'–0") and the required clearance for all trade's work. The design professional has the right to request items be re–aligned, re–hung in areas that demonstrate a lack of coordination and, as determined by the design professional, a situation detrimental to the facility.

01 73 29 Cutting/Patching

Avoid cutting or boring holes through structure or structural members wherever possible. Obtain prior approval of owner and conform to all structural requirements when cutting or boring the structure is necessary and permitted.

01 78 00 Closeout Submittals
Level 1

The contractor shall keep a record set of drawings, updated daily, to be turned over to owners representative upon completion of project.

This contractor shall furnish an operating and maintenance manual to be turned over to owner at completion of job. Include a complete set of "as built" prints with modifications to systems clearly called out. Include shop drawings, information on thermostats, control wiring diagrams and other pertinent information.

01 78 36 Warranties

This contractor shall guarantee all materials and work under this contract to be in perfect condition upon completion and to remain so for a period of one (1) year after final acceptance. This contractor shall agree to make good any defect which may appear within that time.

01 General Requirements

This property is to be constructed in accordance to current State Building Code including: the International Building Code, International Mechanical Code, International Property Maintenance Code, International Energy Conservation Code, the International Residential Code for One and Two–Family Dwellings, and the Handicapped Accessibility Standards, or any corresponding successor Code.

All Local Building Codes to be met or exceeded.

HVAC Abbreviations

AFF — ABOVE FINISHED FLOOR.
AHU — AIR HANDLING UNIT
ARCH — ARCHITECTURAL
BFC — BELOW FINISHED CEILING
CFM — CUBIC FEET MINUTE
CLG — CEILING
COMB — COMBINATION
CU — CONDENSING UNIT
— DAMPER
DOM — DOMESTIC
DWG — DRAWING
EF — EXHAUST FAN
ELEC — ELECTRICAL
ELL — ELBOW
FD — FIRE DAMPER
GALV — GALVANIZED
G.C. — GENERAL CONTRACTOR
MECH — MECHANICAL
MFGR — MANUFACTURER
MT'L — METAL
N.O. — NORMALLY OPEN
NOM — NOMIAL
O/A — OUTSIDE AIR
RD — RADIATION DAMPER
RG — RETURN GRILL
SD — SUPPLY DIFFUSER
TYP — TYPICAL

LINETYPE LEGEND

———	NEW WORK
— — — —	EXISTING TO REMAIN
. . . . .	DEMOLITION WORK
———	ABANDON IN PLACE

Office Facility Alterations and a New Maintenance Building for the:
FAIRFIELD COUNTY BOARD OF DEVELOPMENTAL DISABILITIES
795 College Avenue
Lancaster, Ohio 43130

VPL ARCHITECTS
426 EAST MAIN STREET
LANCASTER, OHIO 43130
phone: (740) 654-4048
facsimile: (740) 654-3009

COMMISSION No.
P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

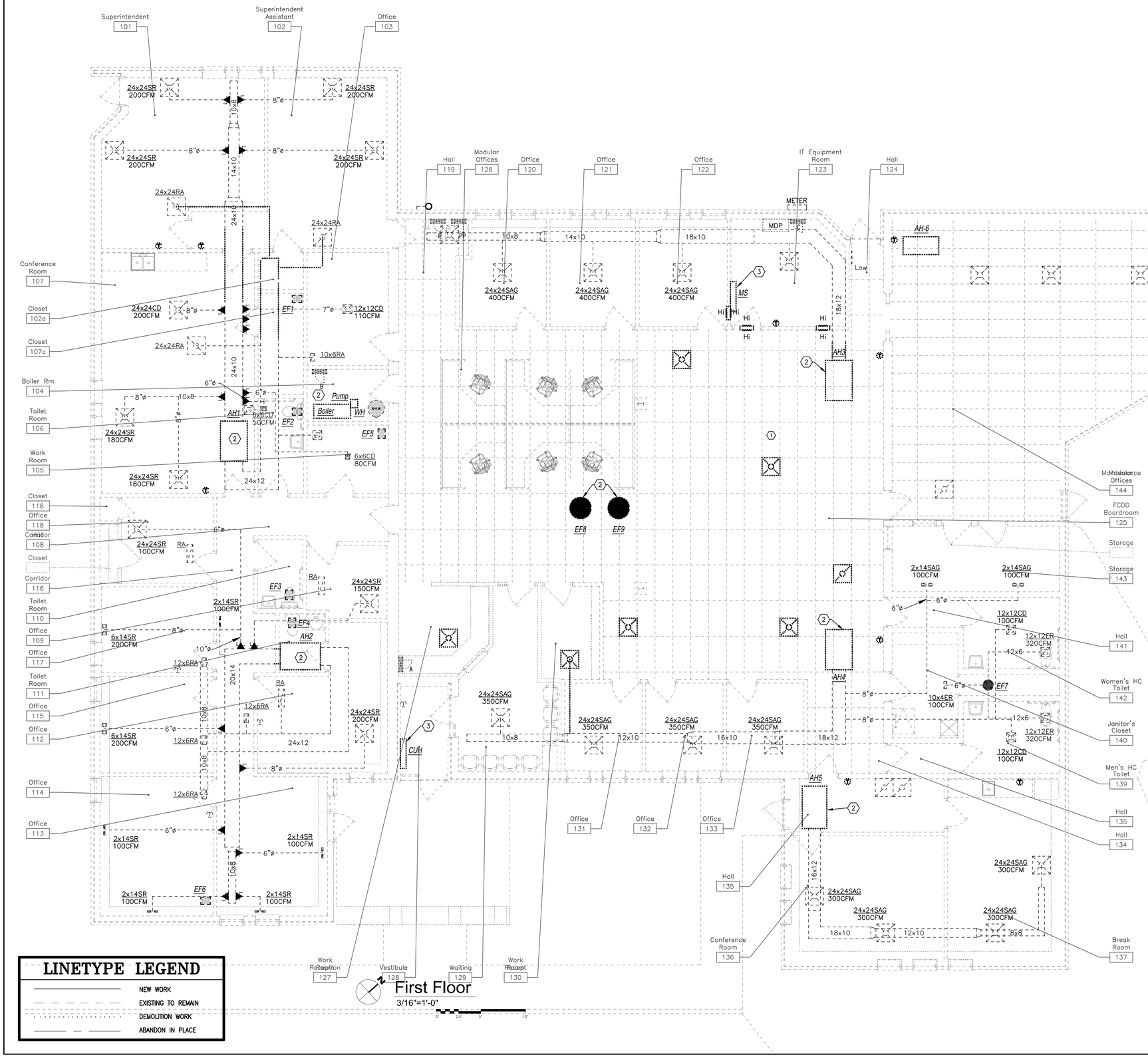
DRAWN BY:

STATE OF OHIO
LANCE J. DEBENEDICTIS
E-63937
REGISTERED
PROFESSIONAL ENGINEER

xpert engineering
300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

HVAC DETAILS

DRAWING NUMBER
H001



LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

HVAC General Notes

A. MC shall provide duct insulation for all duct with a thermal characteristic different from the ambient surroundings in compliance with the OMC and the IECC. Except in acoustically plenums or unit discharges, the duct insulation will be on the exterior of metal duct. Duct board may not be used in lieu of metal ducts. Duct insulation shall be exterior wrapped per manufacturer's written instructions and the wrapped insulation shall be mechanically fastened. Tape or any adhesive product shall not be a substitute for mechanical fastening.

B. Provide control raceway (raceway to be compliant with the NEC for power wiring) from equipment to wall sensor, provide outlet box and cover plate for sensor. Raceway style to match that used for power wiring in the same area.

C. Provide space temperature sensor manufactured as a factory accessory to the main equipment, install per manufacture's recommendations and the parameters of the AHJ.

D. Unit based control system – the MC shall engage a licensed Temperature controls Contractor to provide a unit based temperature control system to overlay above the space control points. Owner required stand alone failsafe control modes for all devices. Controls contractor shall provide a internet accessible, phone app driven control system to access all space sensors and provide setback and scheduling as well as remote monitoring of the space. This controls scheme will be an alternate to the base bid.

HVAC Coded Notes

1. No record of ductwork in this area. MC to record all duct work on as-built set.
2. HVAC contractor to coordinate with the general contractor and roofer to evaluate the existing equipment for demolition. When it is determined in construction that all required elements of this equipment are no longer needed the unit shall be scheduled for demolition. The MC shall coordinate with all other trades to ensure that all utilities and connections to this equipment are disconnected back to the source. The unit shall be offered to the owner and if refused, the MC shall be responsible for removal from the job site. The MC & GC shall evaluate the repair of the surfaces, and when possible shall restore the surfaces, structurally and finish wise to match the surrounding surfaces with matching integrity and weather proof.
3. Existing "Finished-in" equipment to remain in place, but MC shall coordinate with all other trades to disconnect all other utilities, including but not limited to electrical, gas, hydronic, controls etc. For elements that must remain, both end of the utility must be legibly and permanently tagged with an explicit tag identifying both ends of the remaining conduit, pipe etc.. and the openings shall be permanently sealed.

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P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

DRAWN BY:

STATE OF OHIO · LANCE J. DEBENEDICTIS · E-63937 · REGISTERED PROFESSIONAL ENGINEER · 12/15/2022

HVAC FIRST FLOOR DEMO WORK PLAN

DRAWING NUMBER
H101D

xpert engineering
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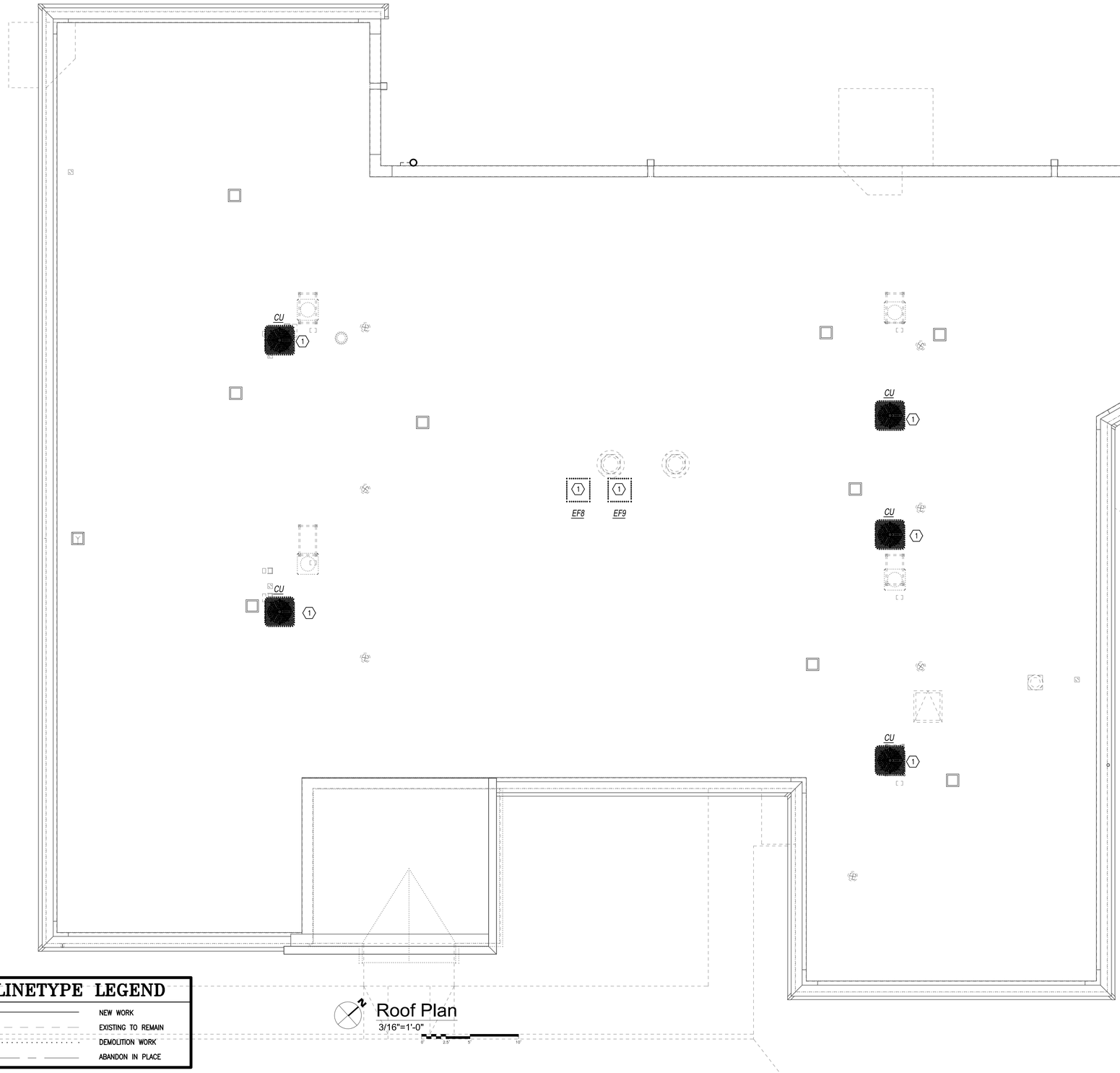
614.764.5000 www.xpert-eng.com



HVAC General Notes

A. MC shall provide duct insulation for all duct with a thermal characteristic different from the ambient surroundings in compliance with the OMC and the IECC. Except in acoustically plenums or unit discharges, the duct insulation will be on the exterior of metal duct. Duct board may not be used in lieu of metal ducts. Duct insulation shall be exterior wrapped per manufacturer's written instructions and the wrapped insulation shall be mechanically fastened. Tape or any adhesive product shall not be a substitute for mechanical fastening.

B. Provide control raceway (raceway to be compliant with the NEC for power wiring) from equipment to wall sensor, provide outlet box and cover plate for sensor. Raceway style to match that used for power wiring in the same area.

C. Provide space temperature sensor manufactured as a factory accessory to the main equipment, install per manufacture's recommendations and the parameters of the AHJ.

D. Unit based control system – the MC shall engage a licensed Temperature controls Contractor to provide a unit based temperature control system to overlay above the space control points. Owner required stand alone failsafe control modes for all devices. Controls contractor shall provide a internet accessible, phone app driven control system to access all space sensors and provide setback and scheduling as well as remote monitoring of the space. This controls scheme will be an alternate to the base bid.

HVAC Coded Notes

1. HVAC contractor to coordinate with the general contractor and roofer to evaluate the existing equipment for demolition. When it is determined in construction that all required elements of this equipment are no longer needed the unit shall be scheduled for demolition. The MC shall coordinate with all other trades to ensure that all utilities and connections to this equipment are disconnected back to the source. The unit shall be offered to the owner and if refused, the MC shall be responsible for removal from the job site. The MC & GC shall evaluate the repair of the surfaces, and when possible shall restore the surfaces, structurally and finish wise to match the surrounding surfaces with matching integrity and weather proof.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

N

Roof Plan

3/16"=1'-0"

0 2.5 5 10

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HVAC ROOF DEMO WORK PLAN

DRAWING NUMBER
H102D

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HVAC General Notes

A. MC shall provide duct insulation for all duct with a thermal characteristic different from the ambient surroundings in compliance with the OMC and the IECC. Except in acoustically plenums or unit discharges, the duct insulation will be on the exterior of metal duct. Duct board may not be used in lieu of metal ducts. Duct insulation shall be exterior wrapped per manufacturer's written instructions and the wrapped insulation shall be mechanically fastened. Tape or any adhesive product shall not be a substitute for mechanical fastening.

B. Provide control raceway (raceway to be compliant with the NEC for power wiring) from equipment to wall sensor, provide outlet box and cover plate for sensor. Raceway style to match that used for power wiring in the same area.

C. Provide space temperature sensor manufactured as a factory accessory to the main equipment, install per manufacture's recommendations and the parameters of the AHJ.

D. Unit based control system – the MC shall engage a licensed Temperature controls Contractor to provide a unit based temperature control system to overlay above the space control points. Owner required stand alone failsafe control modes for all devices. Controls contractor shall provide a internet accessible, phone app driven control system to access all space sensors and provide setback and scheduling as well as remote monitoring of the space. This controls scheme will be an alternate to the base bid.

HVAC Coded Notes

1. Furnish and install metal ductwork, snaplock style, seal all duct joints per the AHJ and manufactueres recommendations.
2. Ductwork lateral fully between joists, ductwork must be below roof deck, but above bottom chord of joists and lateral joist support brace.
3. Provide double thickness turning vanes for all supply duct elbow/change of direction, fabricate per SMACNA standards.
4. MC shall coordinate with the GC and the work of all other trades to properly place and install new air devices in accordance with the reflected ceiling plan and following the device must be mounted symmetrically with the dominant architectural aesthetic of the space and not interfere with any molding, chair rails, wainscot or other finish items. All air devices shall have integral dampers, butterfly for round neck devices and opposed blade dampers for rectangular devices for final air balancing.
5. Mechanical contractor shall coordinate with the general contractor and all other trades to establish the location of the rooftop unit. Location shall be coordinated with the structural elements of the building and the MC shall absorb all structural related items for such installation in including, but not limited to the modification of roof deck, roof deck supports, additional bracing, reinforced joists etc. The Rooftop unit shall be placed on a full perimeter roof curb that bears on the structure of the building and extends such that the rooftop unit will be 20" above the finished roof deck, including insulation.
6. Interior units shall have low ambient controls.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

First Floor
3/16"=1'-0"

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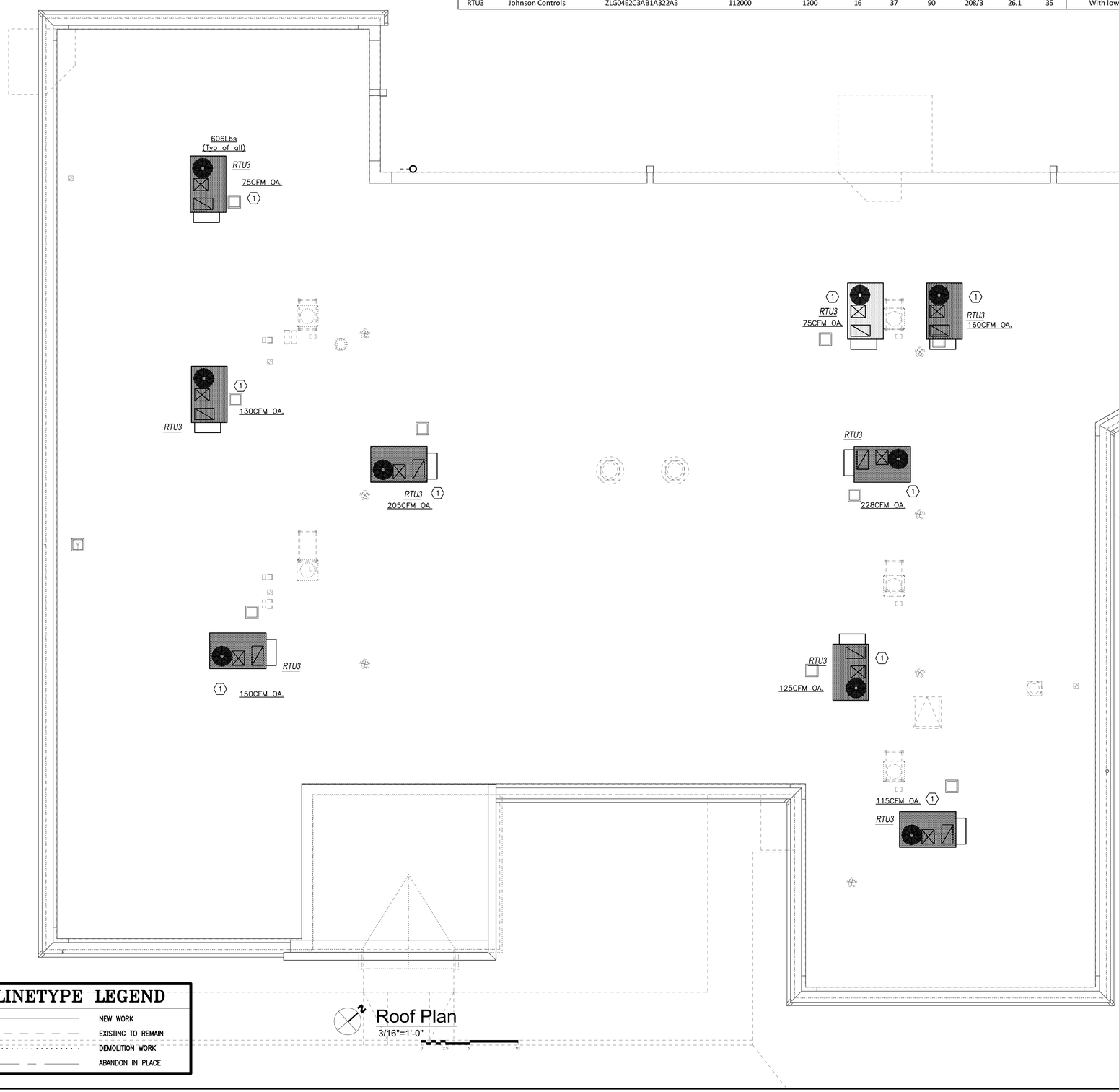
STATE OF OHIO · LANCE J. DEBENEDICTIS · E-63937 · REGISTERED PROFESSIONAL ENGINEER

HVAC FIRST FLOOR NEW WORK PLAN

DRAWING NUMBER
H101N

Rooftop Unit Schedule

TAG	Manufacturer	Model	Input Gas BTU/Hr	Supply Air CFM	SEER	Cool Max MBH	Heat Max MBH	Volts/phase	MCA	MOCP	Comments
RTU3	Johnson Controls	ZLG04E2C3AB1A322A3	112000	1200	16	37	90	208/3	26.1	35	With low ambient kit



HVAC General Notes

A. MC shall provide duct insulation for all duct with a thermal characteristic different from the ambient surroundings in compliance with the OMC and the IECC. Except in acoustically plenums or unit discharges, the duct insulation will be on the exterior of metal duct. Duct board may not be used in lieu of metal ducts. Duct insulation shall be exterior wrapped per manufacturer's written instructions and the wrapped insulation shall be mechanically fastened. Tape or any adhesive product shall not be a substitute for mechanical fastening.

B. Provide control raceway (raceway to be compliant with the NEC for power wiring) from equipment to wall sensor, provide outlet box and cover plate for sensor. Raceway style to match that used for power wiring in the same area.

C. Provide space temperature sensor manufactured as a factory accessory to the main equipment, install per manufacture's recommendations and the parameters of the AHJ.

D. Unit based control system – the MC shall engage a licensed Temperature controls Contractor to provide a unit based temperature control system to overlay above the space control points. Owner required stand alone failsafe control modes for all devices. Controls contractor shall provide a internet accessible, phone app driven control system to access all space sensors and provide setback and scheduling as well as remote monitoring of the space. This controls scheme will be an alternate to the base bid.

HVAC Coded Notes

1. Mechanical contractor shall coordinate with the general contractor and all other trades to establish the location of the rooftop unit. Location shall be coordinated with the structural elements of the building and the MC shall absorb all structural related items for such installation in including, but not limited to the modification of roof deck, roof deck supports, additional bracing, reinforced joists etc. The Rooftop unit shall be placed on a full perimeter roof curb that bears on the structure of the building and extends such that the rooftop unit will be 20" above the finished roof deck, including insulation.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

Roof Plan

3/16"=1'-0"

0 2.5 5 10

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HVAC ROOF NEW WORK PLAN

DRAWING NUMBER
H102N

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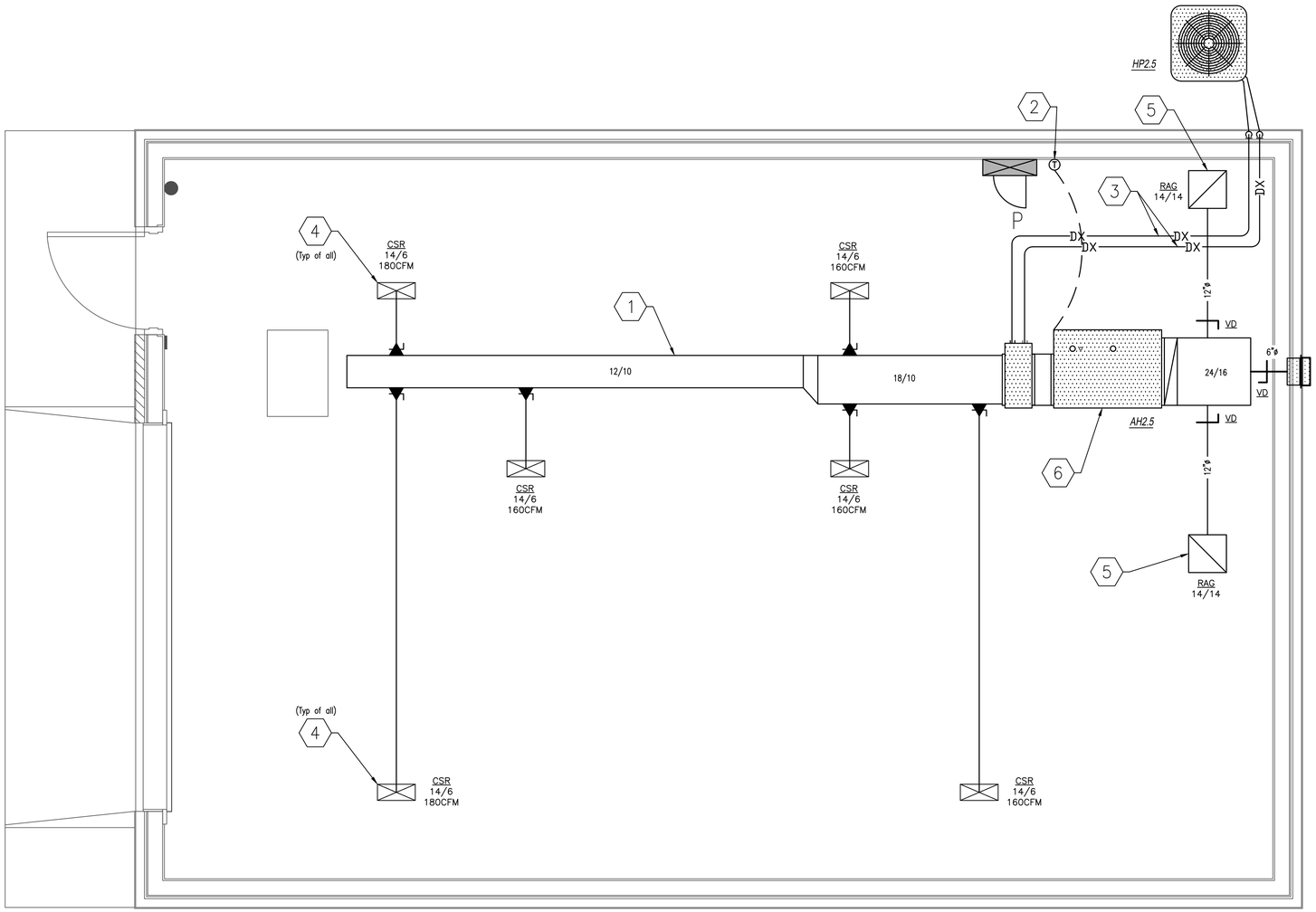
Heat Pump Schedule

Indoor Air Handler								Outdoor Heat Pump									
TAG	Manufacturer	Model	Postion	Supply Air CFM	Volts/Phase	MCA	MOCP	TAG	Manufacturer	Model	Cool Max MBH	Heat Max MBH	Volts/phase	MCA	MOCP	HSPF	SEER	Comments
AH2.5	York	AE30BX21	Vertical	1000	208/1	3.3	3.3	HP2.5	York	YHE30B21S	29000	30000	208/1	20	30	8.5	14	Base Pan Heater, TXV Kit, 5KW heater



N

New Work First Floor Maintenance Building

1/4"=1'-0"

0' 2' 4' 8'

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

HVAC Coded Notes

1. MC shall provide duct insulation for all duct with a thermal characteristic different from the ambient surroundings in compliance with the OMC and the IECC. Except in acoustically plenums or unit discharges, the duct insulation will be on the exterior of metal duct. Duct board may not be used in lieu of metal ducts. Duct insulation shall be exterior wrapped per manufacturer's written instructions and the wrapped insulation shall be mechanically fastened. Tape or any adhesive product shall not be a substitute for mechanical fastening.Provide lined discharge air ductwork, downstream of coil. Furnish and install metal ductwork, snaplock style, seal all duct joints per the AHJ and manufactures recommendations.
2. Provide control raceway (raceway to be compliant with the NEC for power wiring) from equipment to wall sensor, provide outlet box and cover plate for sensor. Raceway style to match that used for power wiring in the same area. Provide space temperature sensor manufactured as a factory accessory to the main equipment, install per manufacture's recommendations and the parameters of the AHJ.
3. Install new Refrigerant piping bundle with matching liquid tight flexible raceway for low voltage cable between indoor and outdoor unit. Support bundle as recommended by the manufacturer and the AHJ. All radius shall be un-crimped and refrigerant pipe shall be continuous with no joints, unions or repairs. Refrigerant lines shall be factory insulated and shall be metal covered on the exterior.Provide new heat pump unit with 5Kw backup heat. Unit to be mounted in attic. Coordinate with G.C. for truss framing and equipment walkway/path.
4. Provide new lima (or similar) white aluminum ceiling 2 way register with volume damper. Coordinate exact location in field with framing.MC shall install duct mounted air devices manufacturer for the duct surface they will attach to. The device must be mounted symmetrically with the dominant architectural aesthetic of the space and not interfere with any smoke detectors or other finish items. All air devices shall have integral dampers, butterfly for round neck devices and opposed blade dampers for rectangular devices for final air balancing.
5. Provide new white aluminum filter return air grille.
6. Split System HVAC unit, heat pump style, all work shall be in accordance with the manufacture's published recommendations and the AHJ. Coordinate with the General Contractor before work begins to ensure that the space required is provided. Mount HVAC equipment as shown with adequate service clearance, accomodate all utilites including electric, drains etc...

HVAC General Notes

A. Coordinate with the GC to ensure there is complete structural framing at the point of duct penetrations through the building surface element. There can be no more than a 1" annular space between the outside of the duct assembly and the building framing. Provisions must be made to provide a metal escutcheon plate on each side of the penetration and insulate per AHJ.

B. Provide metal ductwork installed per SMACNA. Non-Aestich ductwork shall have all joints sealed to prevent air leakage. All ductwork shall be insulated per the IECC.

C. Contractor to install DX (refrigerant) lines in a one piece, non-spliced, soft copper, pre-insulated line set that is a manufacturers accessory to the indoor and outdoor units. Size, install, hang and route per manufacturers written documentation.

D. Mount HVAC equipment on elevated pad - coordinate with G.C. and see detail. Provide masonry poured pad minimum 4" thick with reinforcing mesh.

E. Mechanical Contractor shall coordinate with GC and work of other trades to ensure toilet exhaust fan can be mounted centered in the space. MC shall mount an all-metal fan body, exhaust with an all-metal duct to manufacture's matching discharge device outside the building thermal envelope.

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REGISTERED PROFESSIONAL ENGINEER

HVAC FIRST FLOOR NEW WORK PLAN

DRAWING NUMBER
H201N

403.1 Fresh Air Ventilation System

		Exhaust Air					Fresh Air Vbz=RpPz+RaAz							
		Exhaust Air Flor Rate CFM/SFa	*Exhaust Air Flor Rate CFM/Exhaust Device*	Number of Devices Being Exhausted	*Calculated Exhaust Air (CFM)*	*Declared Exhaust Air*	Rp=People outdoor air rate: the outdoor airflow rate required per person from IMC Table 403.3.	Pz=Declared Zone population: the number of people in the space or spaces in the zone .		Ra=Area outdoor air rate: the outdoor airflow rate required per unit area from Table 403.3.	Az=Zone floor area: the net occupiable floor area of the space or spaces in the zone.		Vbz=Fresh Air Calculated for space.	Air Balance
Area Being Served	**Occupancy Classification**	**(CFM/SF)**	**(CFM/Device)**	**Qty**	**(CFM)**	**(CFM)**	**Rp (CFM/Person)**	**Pz (i)(People)**	**+**	**Ra (a) (CFM/Person)**	**Az (Sq Ft)**	**=**	**Vbz (CFM)**	**(CFM)**
RTU3	-	0	0	0	0		0	0		0			0	0
Superintendant 121	**Office-Office Space**	0	0	0	0		5	3		0.06	294		32.64	32.64
Superintendant Assisant 120	**Office-Office Space**	0	0	0	0		5	2		0.06	293		27.58	27.58
Closet127	**Retail-Storage Room**	0	0	0	0		0	0		0.12	22		2.64	2.64
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Conference Room 128	**Office-Conference Room**	0	0	0	0		5	12		0.06	461		87.66	87.66
Closet 126	**Retail-Storage Room**	0	0	0	0		0	0		0.12	58		6.96	6.96
Office 122	**Office-Office Space**	0	0	0	0		5	2		0.06	117		17.02	17.02
Closet 123	**Office-Office Space**	0	0	0	0		5	0		0.06	54		3.24	3.24
Work Room 124	**Workroom-Copy, Printing Room**	0.5	0	0	35.5		5	2		0.06	71		14.26	14.26
Toilet Room 125	**Public Space-Bathroom/Toilet Room (g) per fixtu**	0	50	0	0		0	0		0	55		0	0
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Closet 129,130	**Retail-Storage Room**	0	0	0	0		0	0		0.12	19		2.28	2.28
Office 131	**Office-Office Space**	0	0	0	0		5	2		0.06	99		15.94	15.94
Hall 100d	**Public Space-Corridor**	0	0	0	0		0	0		0.06	219		13.14	13.14
Toilet Room 138	**Public Space-Bathroom/Toilet Room (g) per fixtu**	0	50	0	0		0	0		0	40		0	0
Office 137	**Office-Office Space**	0	0	0	0		5	2		0.06	73		14.38	14.38
Office 132	**Office-Office Space**	0	0	0	0		5	2		0.06	120		17.2	17.2
Toilet Room 139	**Public Space-Bathroom/Toilet Room (g) per fixtu**	0	50	0	0		0	0		0	34		0	0
Office 133	**Office-Office Space**	0	0	0	0		5	2		0.06	135		18.1	18.1
Office 136	**Office-Office Space**	0	0	0	0		5	2		0.06	196		21.76	21.76
Office 134	**Office-Office Space**	0	0	0	0		5	2		0.06	192		21.52	21.52
Office 135	**Office-Office Space**	0	0	0	0		5	2		0.06	190		21.4	21.4
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Vestibule 100	**Public Space-Corridor**	0	0	0	0		0	0		0.06	54		3.24	3.24
Waiting 102	**Office-Reception Area**	0	0	0	0		5	8		0.06	174		50.44	50.44
Office 104	**Office-Office Space**	0	0	0	0		5	2		0.06	87		15.22	15.22
Office 105	**Office-Office Space**	0	0	0	0		5	2		0.06	87		15.22	15.22
Office 106	**Office-Office Space**	0	0	0	0		5	2		0.06	87		15.22	15.22
Hall 100b	**Public Space-Corridor**	0	0	0	0		0	0		0.06	27		1.62	1.62
Mens HC RR 109	**Public Space-Bathroom/Toilet Room (g) per fixtu**	0	50	0	0		0	0		0	87		0	0
Janitors Closet 110	**Retail-Storage Room**	0	0	0	0		0	0		0.12	87		10.44	10.44
Womens HC RR 111 Hall 100c	**Public Space-Bathroom/Toilet Room (g) per fixtu**	0	50	0	0		0	0		0	87		0	0
Storage 113	**Retail-Storage Room**	0	0	0	0		0	0		0.12	69		8.28	8.28
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Hall 100a	**Public Space-Corridor**	0	0	0	0		0	0		0.06	102		6.12	6.12
Conference Room 107	**Office-Conference Room**	0	0	0	0		5	10		0.06	235		64.1	64.1
Break Room 108	**Office-Reception Area**	0	0	0	0		5	5		0.06	251		40.06	40.06
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Modular Offices 114	**Office-Office Space**	0	0	0	0		5	20		0.06	973		158.38	158.38
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
IT Equipment 115	**Retail-Storage Room**	0	0	0	0		0	0		0.12	149		17.88	17.88
Office 116	**Office-Office Space**	0	0	0	0		5	2		0.06	119		17.14	17.14
Office 117	**Office-Office Space**	0	0	0	0		5	2		0.06	115		16.9	16.9
Office 118	**Office-Office Space**	0	0	0	0		5	2		0.06	111		16.66	16.66
Hall	**Public Space-Corridor**	0	0	0	0		0	0		0.06	100		6	6
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Reception	**Office-Reception Area**	0	0	0	0		5	2		0.06	97		15.82	15.82
Copy Room	**Workroom-Copy, Printing Room**	0.5	0	0	35		5	2		0.06	70		14.2	14.2
Open Office	**Office-Office Space**	0	0	0	0		5	25		0.06	798		172.88	172.88
	-	0	0	0	0		0	0		0			0	0
RTU3	-	0	0	0	0		0	0		0			0	0
Open Office	**Office-Office Space**	0	0	0	0		5	30		0.06	1294		227.64	227.64
	-	0	0	0	0		0	0		0			0	0
Maintenance Building	**Office-Office Space**	0	0	0	0		5	4		0.06	830		69.8	69.8
					70.5	0		153			8832		1300.98	1300.98

*** Based on International Mechanical Code (IMC 2011 Edition)**

a) Based upon net occupiable floor area.
b) Mechanical exhaust required and the recirculation of air from such spaces is prohibited (see Section 403.2.1, Item 3).
c) Spaces unheated or maintained below 50°F are not covered by these requirements unless the occupancy is continuous.
d) Ventilation systems in enclosed parking garages shall comply with Section 404.
e) Rates are per water closet or urinal. The higher rate shall be provided where periods of heavy use are expected to occur, such as toilets in theaters, schools and sports facilities. The lower rate shall be permitted where periods of heavy use are not expected.
f) Rates are per room unless otherwise indicated. The higher rate shall be provided where the exhaust system is designed to operate intermittently. The lower rate shall be permitted where the exhaust system is designed to operate continuously during normal hours of use.
g) Mechanical exhaust is required and recirculation is prohibited except that recirculation shall be permitted where the resulting supply airstream consists of not more than 10 percent air recirculated from these spaces (see Section 403.2.1, Items 2 and 4).
h) For nail salons, the required exhaust shall include ventilation tables or other systems that capture the contaminants and odors at their source and are capable of exhausting a minimum of 50 cfm per station.
i) The occupant load shall not be greater than that determined by section 1004 of the building code.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

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phone: (740) 654-4048
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COMMISSION No.
P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

DRAWN BY:

STATE OF OHIO
LANCE J. DEBENEDICTIS
E-63937
REGISTERED PROFESSIONAL ENGINEER

xpert engineering
300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

HVAC VENTILATION CALCULATION

DRAWING NUMBER
H301

23 31 16 Nonmetal Ducts

ALL DUCT SHALL BE GALVANIZED, INDIVIDUAL BRANCH RUN-OUTS MAY BE FLEXIBLE ROUND DUCT.

Plans indicate galvanized sizes, if flexible ductwork is used, it must be increased one duct size AND be run only in straight line applications – not in place of galvanized fittings, such as 90's or 45's.

All Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1–2004.

Contractor shall provide complete sheetmetal shop Drawings: Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work. Duct layout indicating sizes and pressure classes. Elevation of top of ducts. Dimensions of main duct runs from building grid lines. Fittings. Reinforcement and spacing. Seam and joint construction. Penetrations through fire-rated and other partitions. Equipment installation based on equipment being used on Project. Hangers and supports, including methods for duct and building attachment and vibration isolation.

Provide Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved: Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout. Suspended ceiling components. Structural members to which duct will be attached. Size and location of initial access modules for acoustical tile. Penetrations of smoke barriers and fire-rated construction. Items penetrating finished ceiling including the following: Lighting fixtures. Air outlets and inlets. Speakers. Sprinklers. Access panels. Perimeter moldings.

All products shall comply with ASHRAE: Applicable requirements in ASHRAE 62.1–2004, Section 5 – "Systems and Equipment" and Section 7 – "Construction and System Start-Up." and ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1–2004, Section 6.4.4 – "HVAC System Construction and Insulation." as well as NFPA Compliance:

1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

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

1. CertainTeed Corporation; Insulation Group.
2. Johns Manville.
3. Knauf Insulation.

HANGERS AND SUPPORTS

Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Table 4-1, "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

Steel Cables: ASTM A 603, galvanized and ASTM A 492, stainless steel with end connections made of cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.

Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.

Install ducts with fewest possible joints.

Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges. Overlap openings on four sides by at least 1-1/2 inches.

Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements of the code and the Authority Having Jurisdiction and these contract documents.

Install flexible ducts and fittings to comply SMACNA standards.

All duct sizes and r-values shall be per the Authority Having Jurisdiction and the governing code – The international Energy Conservation Code

Flexible ductwork:

Flexible duct shall be galvanized steel wire reinforced, seamless air seal, 1-1/2" insulated (1 lb density), covered with a foil vapor barrier, and rated for the operating pressure of the system.

Flexible duct shall not exceed 5'-0" in length at any one location.

All ductwork sizes indicated on drawings are inside clear dimensions. Allow for duct and insulation thickness when coordinating for installation.

Supply take-off fittings:

Provide conical or "bell-mouth" take-offs from main ductwork to round branches. Install per manufacturer's instructions.

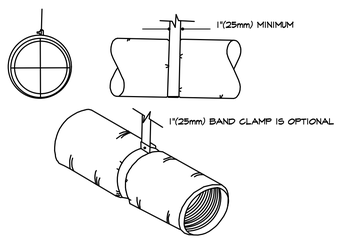
Provide 45 deg. rectangular take-offs from main ductwork to rectangular branches.

A. Flexible connections:

1. Flexible collars shall be provided in all connections between vibrating equipment (fans, rooftop units, air handlers, fan powered VAV boxes, etc.) and ducts, casings, or plenums.

2. Flexible connections shall be constructed of neoprene-coated flameproof fabric. Provide adequate joint flexibility to allow for movement and prevent the transition of vibration.

3. Flexible connections are to be rated for the operating pressure of the system.



Unless otherwise designed, the term "flexible air duct" is used for all other ducts classified by UL as either flexible air ducts or flexible connectors.

These provisions apply to ducts used for indoor comfort heating, ventilating, and air conditioning service. They do not apply to service for conveying, particulates, corrosive fumes and vapors, high temperature air, corrosive or contaminated atmosphere, etc.

When ducts must conform to NFPA Standard 90A or 90B, flexible ducts must be tested in accordance with Underwriters Laboratory's Standard for Factory made Duct Materials, UL-181, and must be installed in accordance with the conditions of their UL listing. Separate installation limitations for flexible connectors and flexible ducts are identified in NFPA Standard 90A.

By UL Standard 181, a flexible connector is defined as a flexible air duct not having certain flame penetration, puncture, and impact tests.

The minimum length of flexible duct should be used.

Bends shall be made with not less than 1 duct diameter centerline radius. Ducts should extend a few inches beyond the end of a sheet metal connection before bending. Ducts should not be compressed.

Illustrations of accessories, sleeves, and collars are representative of classes of items. The use of components not precisely identical to these is acceptable.

If the application guidelines dictated by the flexible duct manufacture are more stringent than the specifications in this manual, those of the manufacturer shall govern.

Maximum air temperature at 250F

Flexible duct shall be supported at the manufacturer's recommended intervals but at least every 5'. Maximum permissible sag is a 1/2-inch per foot of spacing between supports. A connection to another duct or to equipment is considered a support point.

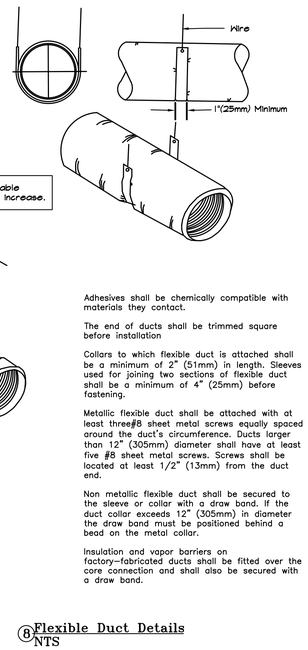
Hanger or saddle material in contact with the flexible duct shall be wide enough so that it does not reduce the internal diameter of the duct when the supported section rests on the hanger or saddle material. In no case will the material contacting the flexible duct be less than 1" wide. Narrower hanger material may be used in conjunction with a sheet metal saddle that meets this specification. This saddle that cover one-half the circumference of the outside diameter of the flexible duct and fit neatly around the lower half of the duct's outer circumference.

Factory-installed suspension system that are integral to the flexible duct are acceptable for hanging when the manufacturer's recommended procedures are followed.

Hangers shall be adequately attached to the building structure.

To avoid tearing the vapor barrier, do not support the entire weight of the flexible duct on any one hanger during installation. Avoid contacting the flexible duct with sharp edges of the hanger material. Damage to the vapor barrier may be repaired with approved tape. If the internal core is penetrated, replace the flexible duct or treat the tear as a connection.

Terminal devices connected by flexible duct shall be supported independently of the flexible duct.



Adhesives shall be chemically compatible with materials they contact.

The end of ducts shall be trimmed square before installation

Collars to which flexible duct is attached shall be a minimum of 2" (51mm) in length. Sleeves used for joining two sections of flexible duct shall be a minimum of 4" (25mm) before fastening.

Metallic flexible duct shall be attached with at least three#8 sheet metal screws equally spaced around the duct's circumference. Ducts larger than 12" (305mm) diameter shall have at least five #8 sheet metal screws. Screws shall be located at least 1/2" (13mm) from the duct end.

Non metallic flexible duct shall be secured to the sleeve or collar with a draw band. If the duct collar exceeds 12" (305mm) in diameter the draw band must be positioned behind a bead on the metal collar.

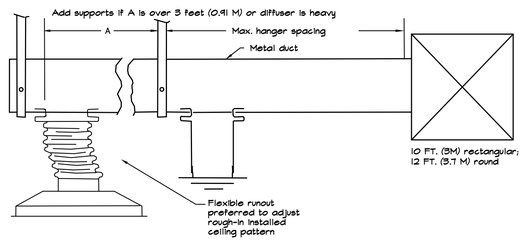
Insulation and vapor barriers on factory-fabricated ducts shall be fitted over the core connection and shall also be secured with a draw band.

8 Flexible Duct Details
NTS

Note:
Non-metallic ducts shall be limited to helical flex duct with mechanical fasteners for branch runs only.

Submit 1/4" Sheet metal plan showing all ductwork.

FOR ALL AIR DEVICES – Submit 1/4" Sheet metal plan showing all ductwork and devices – highlight fire dampers and their penetrations. Also Submittals of all products keyed to plan. Provide Color samples for each device as well as descriptions of all balancing devices.
MC must provide required access to all adjustable dampers. Dampers must be provided for all branch duct runs. Damper locations and access panels must be shown on sheetmetal shop drawings.



LINETYPE LEGEND

NEW WORK
EXISTING TO REMAIN
DEMOLITION WORK
ABANDON IN PLACE

23 31 13 Metal Ducts

Less than 2" WC

A. Metal Ductwork: ALL DUCTWORK SHALL BE METALLIC, GALVANIZED.
B. All ducts dimensions are clear dimensions to inside of duct.
C. Contractor shall submit shop drawings on all specified equipment, and all sheet metal before ordering equipment or duct fabrication.
D. All round elbows to be four (4) piece, all diffuser to have balancing dampers. Throw to be as indicated on drawings.
E. Coordinate all duct and diffuser locations with all other trades.
F. All rectangular and round ducts shall be sized as shown on these drawings, and shall be fabricated and installed according to the most recently published SMACNA standards. All ductwork sizes shown on drawings are inside dimensions.
G. All branch runs to have spin-in fittings with dampers such as Genflex no. sm-series or equal. Supply and r.a. duct connections to air devices shall be isolated with flexible duct connectors.
H. Installer to vacuum out the duct systems prior to final acceptance to remove dust and debris. Install new filters at project close out.
I. Balancing dampers for outside air and return air shall be provided at all air handling units.
J. Exhaust Ducts & Outside Air Intake Ducts: Exhaust air grilles/vents shall be minimum of 10' from any O/A intake.
K. Exhaust fans, dryers, or other means of discharge, shall be ducted to the rear roof face or as otherwise noted by the drawings. Necessary ducting, roof and wall accessories, or other related items, shall be provided for and installed by this contractor. Provide collar flashing at roof penetrations.
Fabricate and install galvanized sheet steel duct in accordance with the latest edition of SMACNA "HVAC duct construction standards." Aluminum duct shall be constructed where indicated.

Construct duct systems to the following pressure classifications (verify positive and negative pressures):

Supply ducts: 2 in. water column positive.
Return and exhaust duct: 2 in. water column negative. Pressure test ducts for leakage. Remake any leaks and apply sealants as required to not exceed 5% leakage or less as stated in SMACNA standards.

Where called for on the drawings, provide double wall insulated United McGill K-27 ductwork.

Install double thickness turning vanes in all rectangular right angle elbows.

Install rigid oval, round, and rectangular metal ductwork with support systems indicated in SMACNA standards. Support horizontal duct within 2ft of each elbow and within 4ft of each branch intersection using all-thread and strap hangers on each side of fitting.

All traverse joints and seams in supply air duct shall be sealed air tight with a duct specific liquid duct sealer. Joints shall also be riveted or connected with sheet metal screws.

An elastomer butyl gasket with adhesive backing shall be used to seal flanged joints.

Duct transitions shall not exceed 30 deg. slope except as specifically noted otherwise.

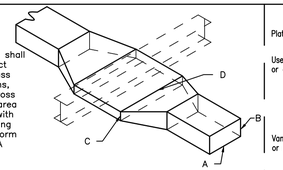
Provide access to all motorized dampers, fire/smoke dampers, controls, and other items in ductwork that require service or inspection. Access doors shall be gasketed reinforced 20 ga. steel with quick opening latch.

Flexible connections:

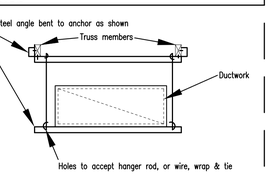
1. Flexible collars shall be provided in all connections between vibrating equipment (fans, rooftop units, air handelers, fan powered vav boxes, etc.) and ducts, casings, or plenums.

2. Flexible connections shall be constructed of neoprene-coated flameproof fabric. Provide adequate joint flexibility to allow for movement and prevent the transition of vibration.

3. Flexible connections are to be rated for the operating pressure of the system.



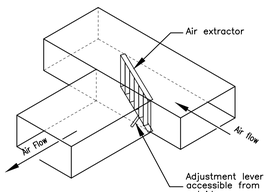
3 Duct obstruction detail
NTS



Note:
Hanger material must comply with current SMACNA requirements for load use. Strap hangers maybe used.

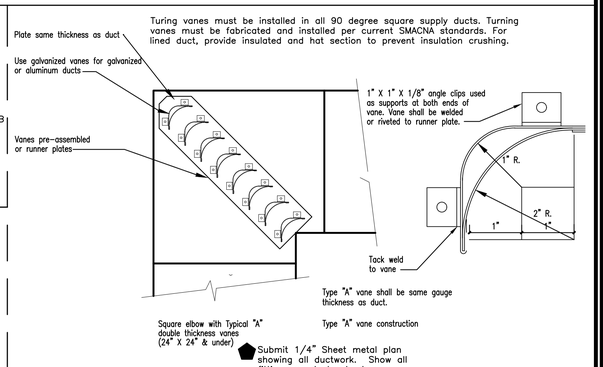
4 Duct Hanger Detail
NTS

Submit 1/4" Sheetmetal plan showing all ductwork. Show all fittings on ductwork plans.



9 Branch Duct Extractor
NTS

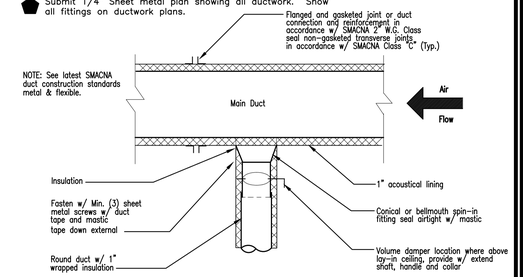
Turing vanes must be installed in all 90 degree square supply ducts. Turning vanes must be fabricated and installed per current SMACNA standards. For lined duct, provide insulated and hat section to prevent insulation crushing.



Submit 1/4" Sheet metal plan showing all ductwork. Show all fittings on ductwork plans.

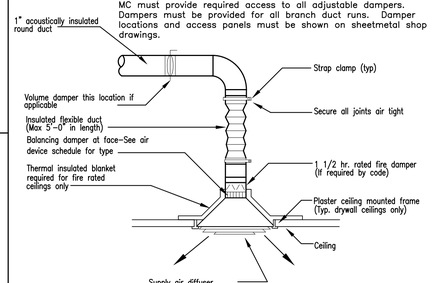
8 Square Duct Elbows
NTS

Submit 1/4" Sheet metal plan showing all ductwork. Show all fittings on ductwork plans.



6 Typcial Round Take-off Detail
NTS

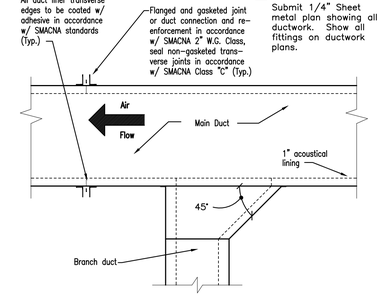
FOR ALL AIR DEVICES – Submit 1/4" Sheet metal plan showing all ductwork and devices – highlight fire dampers and their penetrations. Also Submittals of all products keyed to plan. Provide Color samples for each device as well as descriptions of all balancing devices.
MC must provide required access to all adjustable dampers. Dampers must be provided for all branch duct runs. Damper locations and access panels must be shown on sheetmetal shop drawings.



2 Diffuser Mounting Detail
NTS

All rectangular takeoffs from rectangular ducts must be 45° entries, fabricated and installed per current SMACNA manual. Straight tap and clinch lock are not permitted.

Submit 1/4" Sheet metal plan showing all ductwork. Show all fittings on ductwork plans.



7 Typical Square Duct Take-off Detail
NTS

Office Facility Alterations and a New Maintenance Building for the:
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COMMISSION No.
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ISSUE	MARK	DATE
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DRAWN BY:

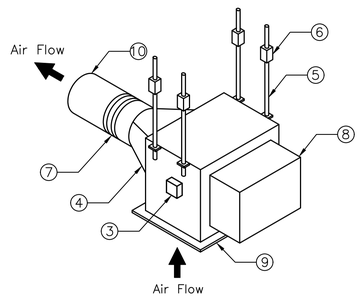
STATE OF OHIO · LANCE J. DEBENEDICTIS · E-63937 · REGISTERED PROFESSIONAL ENGINEER

HVAC DETAILS

DRAWING NUMBER
H302

xpert engineering
300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

23 34 23 Power Ventilators



Detail Notes:

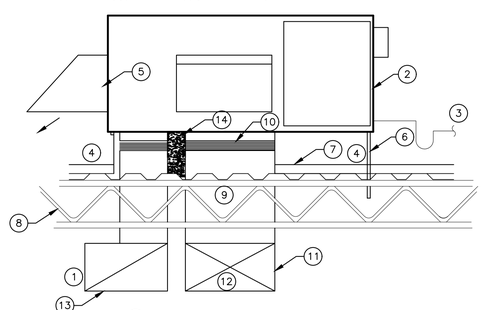
1. Ceiling exhaust fan.
2. Low pressure ductwork, flex allowed, 5' maximum in lieu of straight pipe only.
3. Disconnect, integrate into fan blower.
4. Backdraft damper.
5. 1/4" DIA all thread steel rods supportr from building structure length of rods to suit space available.
6. Vibration isolators, fan accessory by M.C.
7. Flexible connection.
8. See floor plans for exhaust ductwork distribution.
9. Exhaust air device to match existing lay-in.
10. Discharge to outdoors with hardware cloth cover & backdraft damper.

23 74 13 Packaged RTU

Vertical Discharge

Detail Notes:

1. Supply ductwork to space as shown on plans
2. Install RTU as shown on plans.
3. 1" PVC condensate drain to roof drain.
4. Coordinate exact location w/G.C. & show on shop drawings.
5. Power/Relief
6. Factory curb interior partitioning.
7. Roofing to remain under curb.
8. Return plenum.
9. Concentric transition.
10. Flex connector.
11. Vaned elbow.
12. Supply duct. (See plan for size)
13. Return duct distribution box full size of opening.
14. Seal around opening, pack with sound deadening material. (Typical at supply and return)



6 Factory curb interior partitioning.

23 74 13 Packaged RTU

A. Provide complete, UL listed, single zone, rooftop air conditioning unit(s), as indicated on drawings and as scheduled. Unit shall be tested in accordance with ARI testing procedures and shall conform to ANSI Z21.47 and UL 236-M90, as applicable. Provide 5 year extended compressor warranty. Equipment cut sheets, installation instructions, and warranty documents shall be turned over to the owner. Unit shall be completely assembled and tested, complete with refrigerant charge and ready to operate. Unit refrigeration system shall operate between 115 and 0 degrees Fahrenheit ambient temperature. Unit shall be provided with a single-piece foil faced insulated curb. Unit to have outside air inlet with 30% efficient filter, plus factory-supplied one-inch 30% efficient throwaway return air filters. Supply fans shall be belt drive for units over 5 tons. Unit(s) over 300 CFM design capacity shall be furnished with enthalpy economizer package, and power exhaust package (power exhaust on units over 5 tons) with built-in motorized return and outside air dampers for 0% O.A. during unoccupied hours, and 22% during occupied hours. Pipe condensate to splash-block on roof or grade or as indicated on drawings. Minimum EER ratings shall comply with local energy codes. Acceptable manufacturers shall be Carrier, Lennox, McQuay, or York.

B. Controls: microprocessor controls (with occupied/unoccupied switch) shall cycle unit from heating to cooling mode based upon temperature sensor set points and measurements. Provide DDC control of unit where indicated on the drawings.

C. Spare parts: Provide two sets of filters for each units, in addition to a clean set of filters installed in the unit at the completion of the project.

LINETYPE LEGEND

———	NEW WORK
— — — —	EXISTING TO REMAIN
. . . . .	DEMOLITION WORK
———	ABANDON IN PLACE

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300 Marconi Blvd., #203 Columbus, Ohio 43215
614.764.5000 www.xpert-eng.com

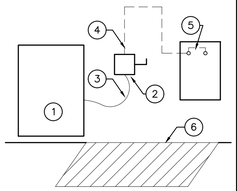
HVAC DETAILS

DRAWING NUMBER
H303

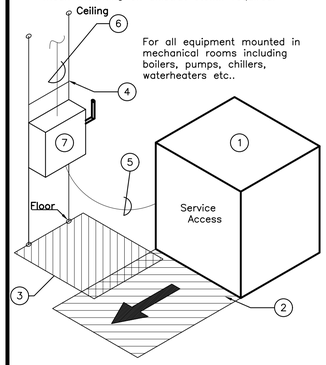
26 05 83 Wiring Connections
AHU Connections

Detail Notes:

1. HVAC equipment.
2. E.C. to provide means of disconnect, E.C. to coordinate with M.C. thru G.C. provide any necessary fusing. Electrical requirements for all equipment of other trades must be verified before any work begins.
3. Provide flexible metal conduit between equipment and means of disconnect.
4. Run feeder concealed in wall to panel board.
5. Coordinate circuit breaker size and poles with M.C. or P.C. before work begins.
6. E.C. to provide required clearance for means of disconnect—it shall be the E.C.'s responsibility to coordinate with G.C. to maintain required clearance. For all mechanical room equipment disconnect must be on path to doorway from all equipment—this may mean mounting on unistrut etc...if required.



Detail Notes:



For all equipment mounted in mechanical rooms including boilers, pumps, chillers, waterheaters etc..

1. Equipment: Coordinate actual size and location with G.C. and other trades.
2. Clear equipment service path.
3. Electrical service clearance for disconnect. Disconnect must be mounted independently from equipment
4. Unistrut offixed to floor and ceiling — coordinate with MC/PC.
5. Flexible Conduit, 2 feet max, support per NEC.
6. Rigid Raceway
7. Code Required means of disconnect and control

Note:
Per NEC 2017 110.26:
The work space shall be clear and extend from the grade, floor or platform to the height required by Section 110.26(E) within the height requirements of third sections, other equipment associated with the electrica installation located above or below the electrical equipment shall be permitted to extend not more than 6" beyond the front of the electrical equipment.

Motor rated snap switch for furnace: furnish and install a 15A, 120V circuit for gas fired furnace. Mount on unit. Provide M.C. cable as connection to furnace Coordinate exact location with mechanical contractor.

26 24 16 Panelboards

Furnish and install, as scheduled and shown on the drawings, power panels for operation on 3ø, 4 wire service.

Each panel shall be connected with a feeder shown in the feeder schedule on the drawings.

The panel shall be Cutler Hammer Pow—R—Line 1A unless otherwise noted, with branch breakers as scheduled on the drawings. Minimum panel & circuit breaker rating shall be 65,000 a/c.

All terminations shall be marked "75° c only", "60/75° c" or listed for use of 75° c insulated wire at full 75° ampacity.

Cabinets shall be of commercial galvanized sheet steel, code gauge and size, surface or flush mounted as called for in the drawings. Doors shall be fitted with chrome plated combination lock and catch, and all keyed alike.

Directory card and frame inside panel door.

Directory cards shall be correctly filled in typewriter for circuits as installed, before final payment is made.

Panel shall have a copper ground bar similar to neutral bar in number, size, and type of anti—turn solderless lugs. Sheet metal terminal strips and connections will be rejected.

The branch breakers shall be molded case, temperature compensated, quick—make, quick—break, with thermal—magnetic trip and permanently bolted (or plug—in) to bus bars.

Breakers that feed heating, air conditioning, and refrigeration equipment shall be listed "hacr" type.

Panels shall be mounted with the top of the panel at 6'—0" above floor.

Flush panelboards shall have (5) additional empty conduits stubbed into the ceiling space for future use. Ream and bush ends.

Acceptable manufacturers: Cutler Hammer, General Electric, Siemens, or Square—D.

Provide an identification nameplate for each panelboard, each main, and each feeder overcurrent protection device. Provide a typewritten directory card indicating load served by type and location for each branch circuit in each branch panelboard. Mount directory in frame on inside of branch panelboard door.

Enclosures shall be corrosion resistant galvanized (zinc finished) sheet steel. Fronts shall be cold rolled steel, finish coated with ANSI 61 gray enamel over a rust inhibitor. Panel locks shall be keyed alike. Recessed flush mounted panels shall have overlapping front.

Doors for branch panelboards shall be one piece bolt on front with a lockable hinged door over the overcurrent protection devices.

Bus bars: Copper. neutral bus shall be full size. Neutral bus shall be 200% rated when supplied from a double neutral feeder. Provide an equipment ground bus in each panelboard. In addition to the equipment ground bus, provide an isolated ground bus when supplied from a feeder which includes an isolated grounding conductor.

Molded Case Circuit Breakers: Thermal—magnetic trip—free, trip—indicating, quick—make, quick—break, with inverse time characteristic. single—handle and common tripping on multi pole breakers. External handle shall be suitable for locking in the off position. Breakers for lighting circuits shall be swd rated. Provide main breaker in panelboards served from transformers.

Recessed Panelboards: Maintain fire integrity of wall. Provide one empty 3/4" emt conduit stubbed up into nearest accessible ceiling location for every three spare or space single pole positions.

LINETYPE LEGEND

———	NEW WORK
— — — — — — — —	EXISTING TO REMAIN
.....	DEMOLITION WORK
——— — ———	ABANDON IN PLACE

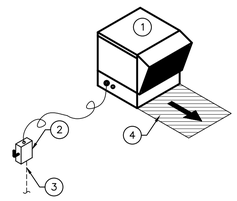
26 05 48 Vibration and Seismic
Lighting General Notes

1. This contractors work scope shall include mandatory site investigation prior to bid. Contractor shall include in all pricing, the labor and materials associated with system modification due to renovation but not limited to that explicitly shown on drawings.

26 05 83 Wiring Connections

Detail Notes:

1. Horizontal Unit Heater.
2. Means of disconnect by E.C. See the power coded notes for exact disconnect size.
3. Concealed Feeder: See the panel schedules for the exact wire sizes.
4. Required clearance.



26 28 16 Enclosed Switches & Breakers
Disconnects

1. The Electrical Contractor shall furnish and install heavy duty fusible disconnect or non—fusible disconnect switches where shown on the drawings, in conformance with N.E.C. requirements for each unit of equipment.
2. Switches shall be wall mounted in general purpose enclosure unless otherwise noted. They shall be nema heavy—duty type and shall have the rating, capacity and number of poles for the service concerned.
3. Switches in exterior locations shall be NEMA 3r.
4. Fusible switches shall have class r fuse clips.
5. Switches for use on motor circuits shall be horsepower rated.
6. Switches shall be installed to provide code required clearance and shall be generally wall mounted at 6'—0" to top.
7. Disconnects mounted on equipment shall be field coordinated and located to clear any access openings or paths.
8. Provide free standing unistrut support frame for switches that cannot be wall or equipment mounted. Frame shall be full height and attached at the floor and ceiling, or angle braced to floor or poured into concrete equipment pad in order to provide rigid structure. Minimum height to top of floor mounted switches shall be 36".

26 05 00 Temporary

E.C. shall provide all temporary lighting & power for all trades as required during construction. Utility cost by Owner.

The E.C. shall also furnish temporary wiring and lighting to provide a minimum of 25 fc in work areas for use of all the trades during construction and the installation of the owner's fixtures. The E.C. is responsible to remove all temporary wiring upon completion of construction of all trades.

All wiring for the emergency lighting and emergency systems shall be installed in accordance with the requirements of the National Electrical Code article 700. Electrical contractor must install permanent feeder conductors from the service distribution point for use as source light and power during construction. All wiring for the emergency lighting and emergency systems shall be installed in accordance with the requirements of the National Electrical Code article 700.

26 05 00 Shop Drawings

Submit five copies of material lists and shop drawings for all referenced and major equipment to the owner's construction manager for approval prior to ordering equipment. Contractor shall submit shop drawings early enough in the project to allow ample time for owner's review without causing time delays or conflicts in the job progress — a minimum of 14 days shall be allowed for review at the design professional's office. Submittals shall be in accordance with general conditions and the manufacturers listed on the drawings and shall bear the stamp of the contractor showing that he has reviewed and approved them and that they are in conformance with the contract drawings. Lack of such contractor's approval will be cause for rejection without review by the design professional.

Where trade names, brands of manufacturers of equipment or materials are shown on the drawings or specifications the exact equipment shall be used on the project. The use of any unauthorized equipment shall be subject to removal/replacement at the request of the Owner's Construction Manager (at the electrical contractor's expense).

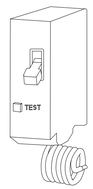
TYPE SUBMITTALS REQUIRED

LIGHTING AND POWER PANELS	FIRE ALARM SYSTEM	CATALOG CUTS
LIGHTING FIXTURES	SHOP DRAWINGS	SEALED SHOP DRAWINGS
LIGHTING CONTROL EQUIPMENT	CATALOG CUTS	

26 05 00 Electrical General Notes

1. See site drawings for additional requirements. E.C. must verify with G.C. if any separate prices are to be generated for site work. All work shown on 'E' sheets to 5' outside building perimeter, shall be considered one scope of work all remaining work shall be on another scope of work.
2. Subcontractor shall verify and comply with all local electric utility requirements as may be appropriate to the scheduled work.
3. The contractor shall visit the project area prior to preparation and submission of their bid. Additionally, before submission of their bid this contractor shall review all other building systems and conditions as they may affect the scope of the electrical work.
4. Electrical subcontractor shall provide a written warranty that all work performed, materials, equipment, etc. be free of defects for a period of not less than one year.
5. All fixture types and manufacturers shall be verified with architect.
6. All wall mounted controls and operating mechanisms: such as wall switches, dispensers, fire alarm pull stations, and circuit breaker panels, shall be mounted at 48" if only a front approach is available, or be mounted at 54" for side approach.
7. Furnish and install a sump pump. Coordinate with general contractor and plumbing contractor prior to rough—in. Run 2/C #12 w/equip. grd. from junction box to a 20A/1P circuit breaker in panel make all final electrical connection.

26 28 16 Enclosed Switches & Breakers
AFCI, GFCI & AFCI/GFCI Combination Circuit Breakers



Detail Notes

1. All circuits as required by the AHJ and the NEC shall be tamperproof, AFCI and GFCI protected. The AFCI & GFCI protection shall be at the "circuit breaker" level — GFCI and AFCI devices shall not be allowed.
2. AFCI—GFCI protections shall be at the circuit breaker and shall be where appropriate a combination "AFCI—GFCI" breaker. The protection breakers shall be coordinated with the entire distribution scheme to be series rated at the Arc Fault level dictated by calculation performed by the electrical contractor based on the EXACT equipment purchased.
3. All AFCI—GFCI and combination devices shall be factory rated and listed and have a internal self—diagnostic method to determine the minimum of: Fault—to—ground or Arc Fault.

01 78 39 Project Record Documents
As—Built Record

AS—BUILT RECORD

This contractor shall keep on—site a full size set of construction documents, including blueprints, as a field copy of the "as—built" conditions.

These record documents shall be kept up to date with any RFIs and ASIs as well as any additional modifications to the contract documents.

It is this contractor's responsibility to maintain this set of documents in clean and legible condition. Any deviations from the contract documents shall be neatly and concisely recorded in red pen/pencil on the "as—built" documents. Information on these documents shall be scanned at 400 DPI and be turned over to the original author of these documents (the engineer).

01 78 00 Closeout Submittals
Multifamily Dwelling / Wood Frame

This contractor shall furnish an operating and maintenance manual to be turned over to owner at completion of job. Include a complete set of "as built" prints with modifications to systems clearly called out. Include shop drawings, information on thermostats, control wiring diagrams and other pertinent information.

01 78 36 Warranties

This contractor shall guarantee all materials and work under this contract to be in perfect condition upon completion and to remain so for a period of one (1) year after final acceptance. This contractor shall agree to make good any defect which may appear within that time.

01 00 00 General Conditions Document Limits

NOTES ARE NOT EXCLUSIVE

DESIGN LIMITS

A. The drawings in this section are diagrammatic and are not intended to define exact quantities, locations, or code requirements. The drawings shall no be scaled. Exact state and local code requirements and other applicable code requirements shall be verified by and are the sole responsibility of this contractor. Any information which directly conflicts with any of these codes or any discrepancies found in the contract documents shall be brought to the attention of the project Architect/engineer. For clarity, certain drafting techniques have been used, these should not be interpreted to reduce the scope of the contract.
B. Equipment sizes and locations are approximate. Actual dimensions to be determined by equipment furnished.
C. Final opening dimensions, concrete pad size and location shall be coordinated during construction with approved equipment.
D. Complete installation shall conform to all applicable city, state, federal and local codes and ordinances, including but not limited to the latest approved edition of NFPA:90a, and NFPA—101. It is the responsibility of the mechanical installer to notify the architect/engineer of any items on the plans and specifications that are not in compliance with the above codes.
E. Drawings indicate the normal standards but, if any work should be indicated to be substandard to any ordinances, laws, codes, rules or regulations bearing on the work. The mechanical installer shall execute the work correctly in accordance with such ordinances, laws, codes, rules or regulations, without increase in cost to owner, architect or general installer.

01 10 00 Summary
Electrical

1. The Scope of this project is as defined on the complete project manual including all plans, specifications and addendums etc.. The work scope cannot be understood by simply reading a portion of the plans or specifications. The contractor is reminded that the following scope summary is simply a portion of the scope.
2. The work shall be to make modifications to the building Electrical, lighting and systems to support the HVAC and Architectural changes in the building such as the expansion of the mechanical room to a larger 2 —story space as well as the creation of upper level mechanical service platforms and access to these platforms.
3. The work scope of this contractor is to fully record and log all the existing electrical systems including pipe sizes and locations and modify these systems as necessary to support the work identified on the complete contract documents.
4. As part of this work extensive field coordination and coordination between disciplines is required. This contractor shall ultimately create a detailed scaled ¼" shop drawing showing switchboard and building layout and coordinate this with the lead contractor as part of a unified submittal process.

26 24 16 Panelboards

Circuit number on the drawings are for identification only and do not indicate the position on the panel board. Connect the circuits with the lightest loads and the receptacle circuits near the top of the panel, and the more heavily loaded circuits near the bottom. Balance all circuits evenly between phases so that feeder wires carry approximately equal current. All phases must be balanced within 10% or less per NEC requirements. E.C. shall re—balance if necessary.

All over circuit protection shall be in compliance with the National Electrical Code section 240.

No "doubling up" on circuit breakers or conductor splices within panel boards shall be permitted. The contractor shall provide junction boxes adjacent to panelboards as required to splice common circuit connectors.

Plans are prepared with required branch circuits indicated by circuit numbers. Provide and install all conduits, conductors, boxes, miscellaneous fittings, etc. for a complete and operable system (home run shown). Branch circuit installation shall comply with specifications and NEC.

Homeruns shown are schematic. Contractor may originate homeruns from different locations. All wire including homeruns shall be delineated on as—built drawings.

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facsimile: (740) 654-3009

COMMISSION No.
P2118

ISSUE	MARK	DATE
Bidding		02/15/2023

DRAWN BY:

STATE OF OHIO
LANCE J. DEBENEDICTIS
E-63937
REGISTERED PROFESSIONAL ENGINEER

ELECTRICAL DETAILS

DRAWING NUMBER
E001

xpert engineering
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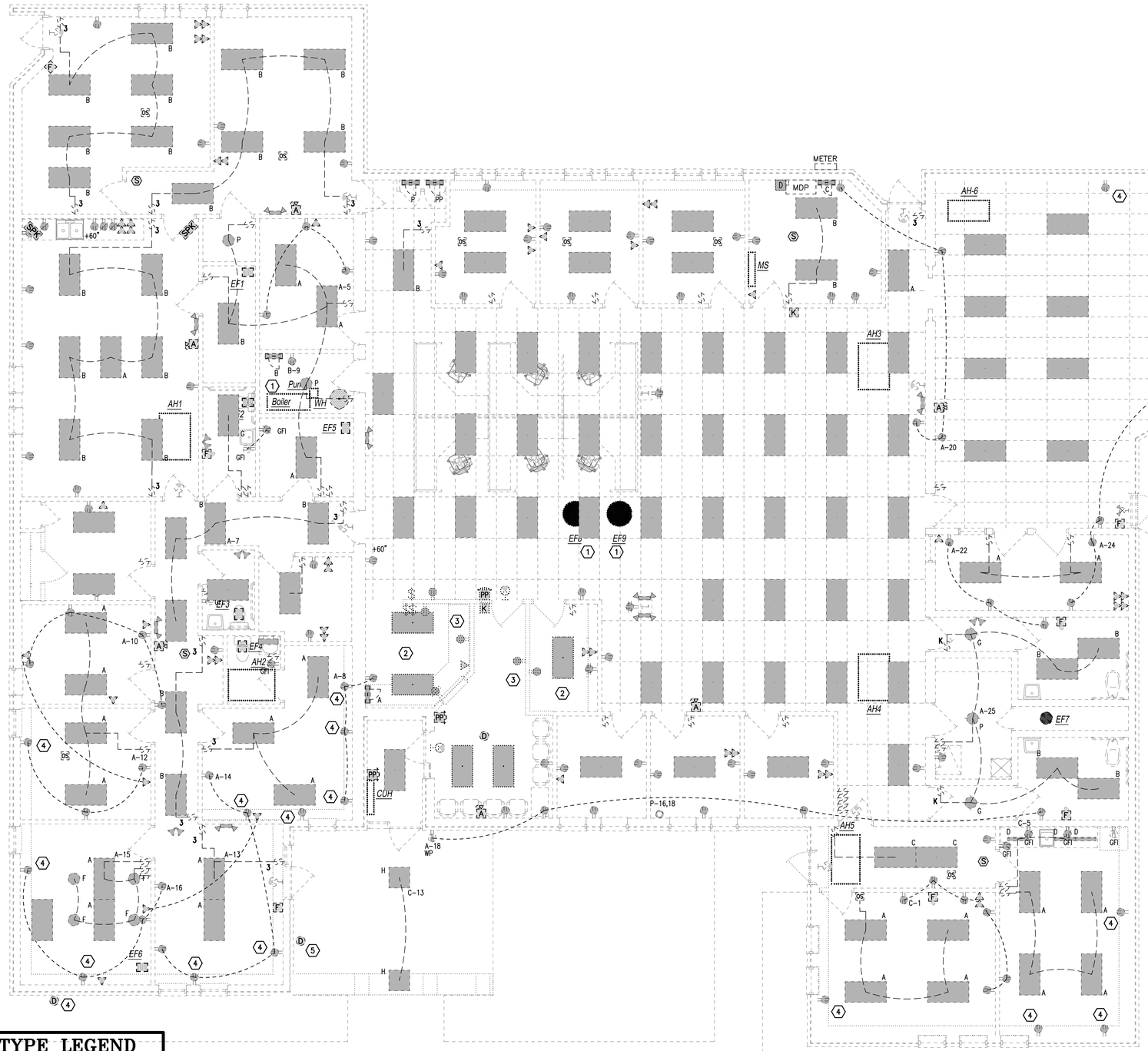

Electrical Coded Notes

1. Electrical contractor shall coordinate with the GC and the work of all other trades to determine the time equipment scheduled for demolition can be removed, the EC shall removed the power feed for scheduled equipment to be demolished back to the origin. Maintain heat to building from boiler until new roof top units are operational.
2. Existing lighting in this area to be demolished, electrical contractor shall evaluate the lighting branch circuit for suitability in re-use for new lighting and only reuse if the work shown on the scope documents is fully compliant with the AHJ, NEC and the intent of these documents.
3. Existing receptacles in this area to be demolished, electrical contractor shall evaluate the receptacle branch circuit for suitability in re-use for new receptacles and only reuse if the work shown on the scope documents is fully compliant with the AHJ, NEC and the intent of these documents.
4. E.C. shall rework receptacles for furred out walls. Coordinate exact requirements in field. Replace with new receptacle.
5. Existing security camera to be remain.
6. Existing security camera to be removed and relocated. Coordinate with owner and security contractor.

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

First Floor
3/16"=1'-0"

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STATE OF OHIO · LANCE J. DEBENEDICTIS · E-63937 · REGISTERED PROFESSIONAL ENGINEER

xpert engineering
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614.764.5000 www.xpert-eng.com

ELECTRICAL FIRST FLOOR DEMO WORK PLAN

DRAWING NUMBER
E101D

Electrical Coded Notes

1. EC shall provide new service receptacle, GFCI & weatherproof with switched light at each exterior equipment location in conjunction with the NEC & AHJ. The service receptacle and light shall be free standing and NOT mounted to the equipment needing service. The EC shall coordinate with the roofer to install utility style full perimeter roof curbs extending a minimum of 14" above the roof surface with schedule 40 round pipe as a back frame for the electrical service receptacle and light. The sch 40 round pipe shall be firmly affixed to the building structure and the light shall be a minimum of 72" above the roof deck.
2. Exterior equipment means of disconnect mounted near, but not attached to equipment. EC shall coordinate with all other trades and provide code compliant equipment disconnect, mount with proper service clearance per the NEC and the AHJ, provide fusing to match the specific equipment delivered to site, the disconnect shall not be mounted on equipment but a stand alone support system originating from the building structure, all penetration shall be with utility curbs roofed in by the roofing contractor..

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

N

Roof Plan

3/16"=1'-0"

0 2' 4' 8' 16'

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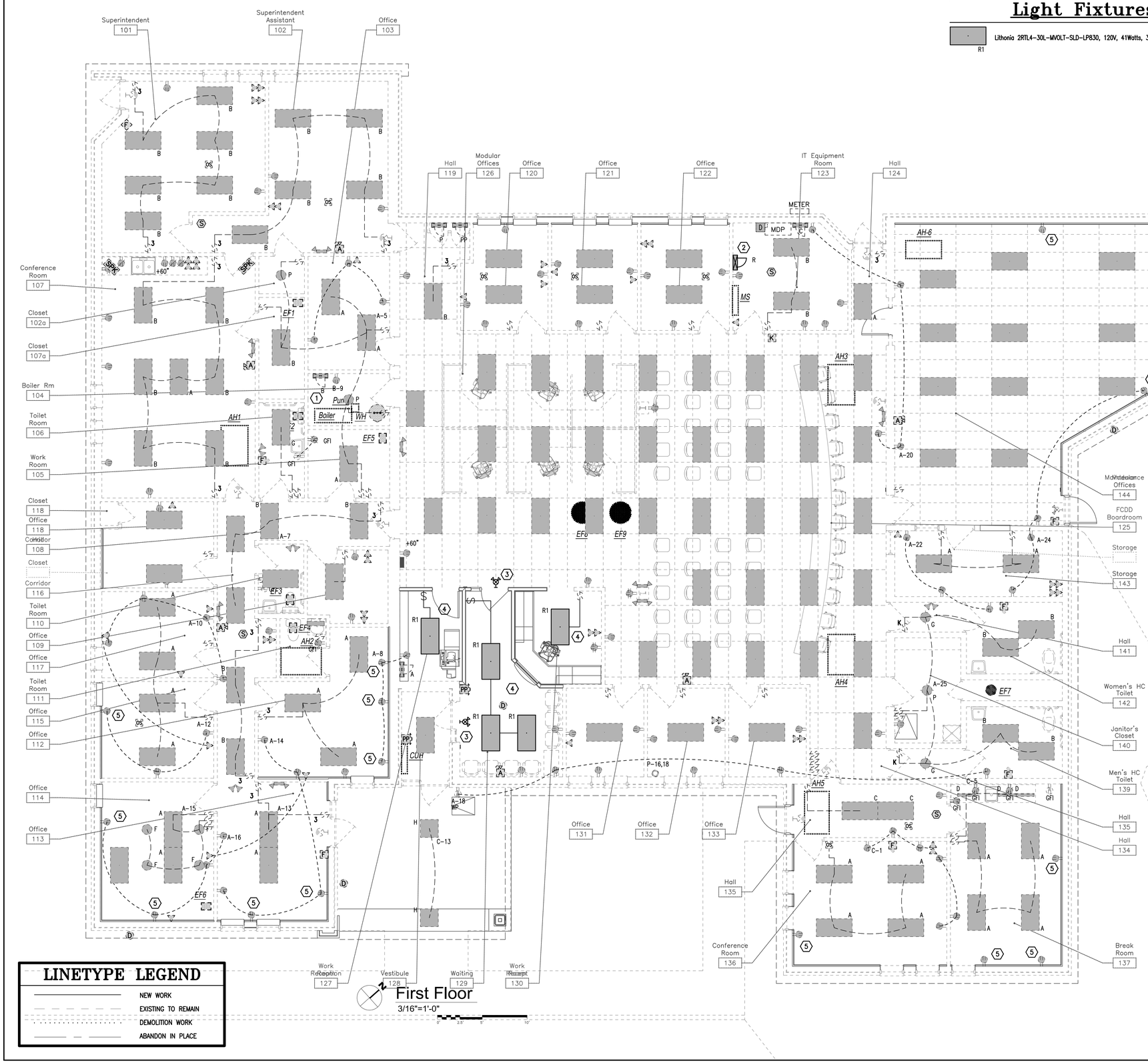
E-63937
REGISTERED
PROFESSIONAL ENGINEER

ELECTRICAL ROOF DEMO WORK PLAN

DRAWING NUMBER
E102D

Light Fixtures

R1 — Lithonia 2RTL4-30L-MVOLT-SLD-LP830, 120V, 41Watts, 3000Lumens, 3000K.



LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

Electrical Coded Notes

1. Electrical contractor shall coordinate with the GC and the work of all other trades to determine the time equipment scheduled for demolition can be removed, the EC shall removed the power feed for scheduled equipment to be demolished back to the origin. Maintain heat to building from boiler until new roof top units are operational. Mark breakers as spare from demolished pump and boiler when removed.
2. EC shall coordinate with the GC and the work of all other trades and install new electrical distribution panel in this area, panel shall have required service clearance in accordance with the NEC, the AHJ and the manufacturers recommendation.
3. Contractor to provide self contained battery backup combination exit and egress lighting per the AHJ and the IBC, NEC. Battery shall be sized for remote emergency heads, and remote emergency heads shall be installed on the building exterior to illuminate the exit discharge to the public way.
4. Install new new LED lighting in renovated area. Connect back to existing circuiting. Coordinate exact requirements in field.
5. Rework receptacle for furred out wall. Coordinate exact requirements in field. Provide extension boxes as required.

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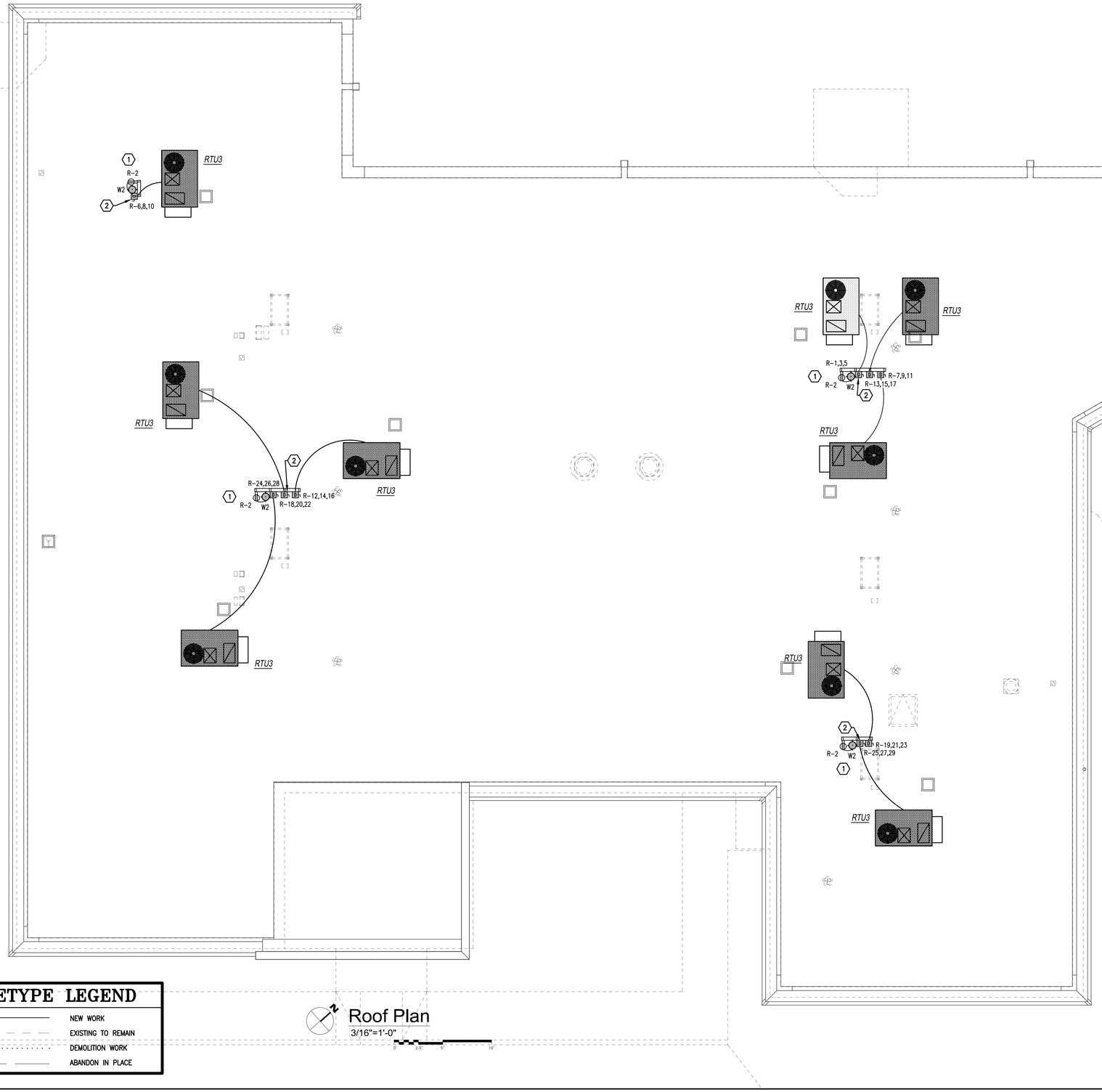
ELECTRICAL FIRST FLOOR NEW WORK PLAN

DRAWING NUMBER
E101N



Electrical Coded Notes

1. EC shall provide new service receptacle, GFCI & weatherproof with switched light at each exterior equipment location in conjunction with the NEC & AHJ. The service receptacle and light shall be free standing and NOT mounted to the equipment needing service. The EC shall coordinate with the roofer to install utility style full perimeter roof curbs extending a minimum of 14" above the roof surface with schedule 40 round pipe as a back frame for the electrical service receptacle and light. The sch 40 round pipe shall be firmly affixed to the building structure and the light shall be a minimum of 72" above the roof deck.
2. Exterior equipment means of disconnect mounted near, but not attached to equipment. EC shall coordinate with all other trades and provide code compliant equipment disconnect, mount with proper service clearance per the NEC and the AHJ, provide fusing to match the specific equipment delivered to site, the disconnect shall not be mounted on equipment but a stand alone support system originating from the building structure, all penetration shall be with utility curbs roofed in by the roofing contractor..

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

N

Roof Plan

3/16"=1'-0"

0' 2.5' 5' 10'

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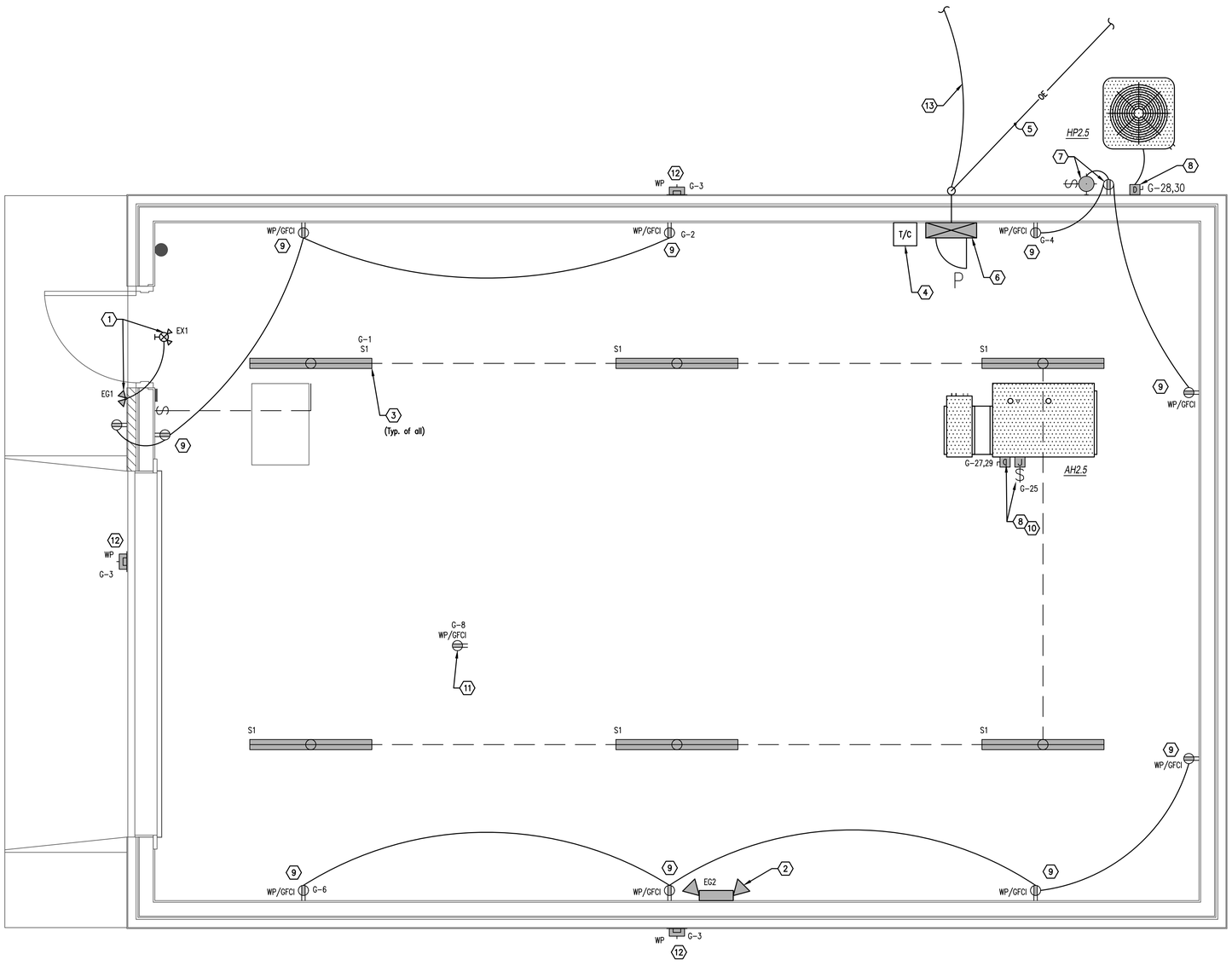
ELECTRICAL ROOF NEW WORK PLAN

DRAWING NUMBER
E102N



Electrical Coded Notes

1. Contractor to provide self contained battery backup comination exit and egress lighting per the AHJ and the IBC, NEC. Battery shall be sized for remote emergency heads, and remote emergency heads shall be installed on the building exterior to illuminate the exit discharge to the public way.
2. EC shall coordinate with space finishes and surfaces to furnish and install emergency egress lighting. Provide self contained battery backup egress lighting per the AHJ and the IBC, NEC, to allow for travel to all exit routes, including hallways, stairwells and corridors, and interior bathrooms, electrical rooms and storage rooms. The emergency lighting must be arranged to provide initial illumination of not less than an average of one foot-candle (10.8-lux) and a minimum at any point of 0.1-foot-candle (1.1-lux) measured along the path of egress at floor level for a minimum of 90 min.
3. Install new LED high ceiling, EC shall provide new branch circuit wiring to relocated panel - do not reuse existing conductors. Fixture selection with owner before new work begins. EC shall install new ceiling mounted lights in locations shown, EC shall fish MC through joists and avoid ductwork for lighting layout as shown.
4. Provide time clock for exterior lighting circuit.
5. Provide new overhead drop, weather head and meter socket in compliance with the local utility purveyor, ground per the NEC – See detail. Provide conduit connection to new service entrance rated panel with overcurrent protection.
6. E.C. shall provide new panel, 200A MCB in existing panel location.
7. EC shall provide new service receptacle, GFCI & weatherproof with switched light at each exterior equipment location in conjunction with the NEC & AHJ. The service receptacle and light shall be free standing and NOT mounted to the equipment needing service. .
8. Disconnect Switch for Equipment – EC shall coordinate with site conditions and the exact delivered equipment to provide a code compliant means of disconnect. EC shall ensure with the GC and the field conditions that clearance requirements required are maintained.
9. New Wall Receptacle, provide new circuit as shown.
10. Provide power for new heat pump unit. Coordinate exact connections with manufactures specifications. Disconnect for electrical backup heat. Coordinate with M.C. for equipment specifications and final connections.
11. Garage Opener Receptacle: Run (2) #12 and (1) #12 ground from circuit breaker in panel indicated to a ceiling receptacle.
12. Provide exterior LED wall pack light and run through timeclock.
13. Electrical contractor to inspect internal wiring service entrance feed and branch circuiting and provide written report to the owner for condition

New Work First Floor Maintenance Building

1/4"=1'-0"

0' 2' 4' 8'

LINETYPE LEGEND

- NEW WORK
- EXISTING TO REMAIN
- DEMOLITION WORK
- ABANDON IN PLACE

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ELECTRICAL FIRST FLOOR NEW WORK PLAN

DRAWING NUMBER
E201N

Panel Schedule

Panel Name -> **R** Location-> **IT Room**

208	Voltage Between Phases	Max Main Lug **250A**	MOUNTING **SURFACE**
120	Voltage Ground to Phase	MAIN BKR **250A**	
3	Phase	Sub/Feed Thru	
4	Wire	AIC Rating	

CKT NO.	CIRCUIT DESCRIPTION	AFCI	GFCI	CODE (R M B K)	LOAD (VA)	CKT BKR	PH	CKT BKR	LOAD (VA)	CODE (R M B K)	AFCI	GFCI	CIRCUIT DESCRIPTION	CKT NO.
1	-				2560	-	-A-	20/1	960				REC/LTG Roof Maintenance	2
3	RTU3				2560	35/3	-B-	20/1	0				Spare	4
5	-				2560	-	-C-	-	2560				-	6
7	-				2560	-	-A-	35/3	2560				RTU3	8
9	RTU3				2560	35/3	-B-	-	2560				-	10
11	-				2560	-	-C-	-	2560				-	12
13	-				2560	-	-A-	35/3	2560				RTU3	14
15	RTU3				2560	35/3	-B-	-	2560				-	16
17	-				2560	-	-C-	-	2560				-	18
19	-				2560	-	-A-	35/3	2560				RTU3	20
21	RTU3				2560	35/3	-B-	-	2560				-	22
23	-				2560	-	-C-	-	2560				-	24
25	-				2560	-	-A-	35/3	2560				RTU3	26
27	RTU3				2560	35/3	-B-	-	2560				-	28
29	-				2560	-	-C-							30
31							-A-							32
33							-B-							34
35							-C-							36
37							-A-							38
39							-B-							40
41							-C-							42

Connected Load - Phase A 24,000 VA
Connected Load - Phase B 23,040 VA
Connected Load - Phase C 23,040 VA
All Phases 70,080 VA

Code	Load Type	Connected kVA	NEC Demand Factor	Demand kVA	Demand Amps	NEC Feeder Factors	NEC Feed Amps
	Undeclared	70.1	x 100%	70.1	195	1	195
R	(R)eceptacle	0.0	10 KVA @ 100%, rest @ 50% Non-D	0.0	0	1	0
M	(M)otors/Mech	0.0	x 100%	0.0	0	1	0
L	(L)argest Motor	0.0	x 125% per NEC 430.24 / 430.6 (A)	0.0	0	1.25	0
K	(K)itchen non dw elling	0.0	For 6 Pieces of Equipment derate up t	0.0	0	1	0
	Total	70.1	kVA Connected	0.0	195		195
	Total	195	Amps Connected				

Contractor to coordinate with local electric purveyor and coordinate transformer(s) and feeders as to calculate accurate fault current for service panel. Contractor to label Panel with accurate fault current and provide adequate Fault-cureent limiting device. Coordinate Fault Current with engineer.

Panel Schedule

Panel Name -> **G** Location-> **New Maintenance Building**

208	Voltage Between Phases	Max Main Lug **100A**	MOUNTING **SURFACE**
120	Voltage Ground to Phase	MAIN BKR **100A**	
3	Phase	Sub/Feed Thru	
4	Wire	AIC Rating	

CKT NO.	CIRCUIT DESCRIPTION	AFCI	GFCI	CODE (R M B K)	LOAD (VA)	CKT BKR	PH	CKT BKR	LOAD (VA)	CODE (R M B K)	AFCI	GFCI	CIRCUIT DESCRIPTION	CKT NO.
1	LTG-Maintenace Interior				192	20/1	-A-	20/1	720			X	REC-Maintenance S & W	2
3	LTG-Exterior				240	20/1	-B-	20/1	540			X	REC-Maintenance W & N	4
5	Timeclock				100	20/1	-C-	20/1	720			X	REC-Maintenance N & E	6
7							-A-	20/1	700				REC-Garage Door	8
9							-B-							10
11							-C-							12
13							-A-							14
15							-B-							16
17							-C-							18
19							-A-							20
21							-B-							22
23							-C-							24
25	AH2.5 Fan				1080	20/1	-A-							26
27	AH2.5 Heater				3000	40/2	-B-	30/2	1900				HP2.5	28
29	-				3000	-	-C-	-	1900				-	30

Connected Load - Phase A 2,692 VA
Connected Load - Phase B 5,680 VA
Connected Load - Phase C 5,720 VA
All Phases 14,092 VA

Code	Load Type	Connected kVA	NEC Demand Factor	Demand kVA	Demand Amps	NEC Feeder Factors	NEC Feed Amps
	Undeclared	14.1	x 100%	14.1	39	1	39
R	(R)eceptacle	0.0	10 KVA @ 100%, rest @ 50% Non-D	0.0	0	1	0
M	(M)otors/Mech	0.0	x 100%	0.0	0	1	0
L	(L)argest Motor	0.0	x 125% per NEC 430.24 / 430.6 (A)	0.0	0	1.25	0
K	(K)itchen non dw elling	0.0	For 6 Pieces of Equipment derate up t	0.0	0	1	0
	Total	14.1	kVA Connected	0.0	39		39
	Total	39	Amps Connected				

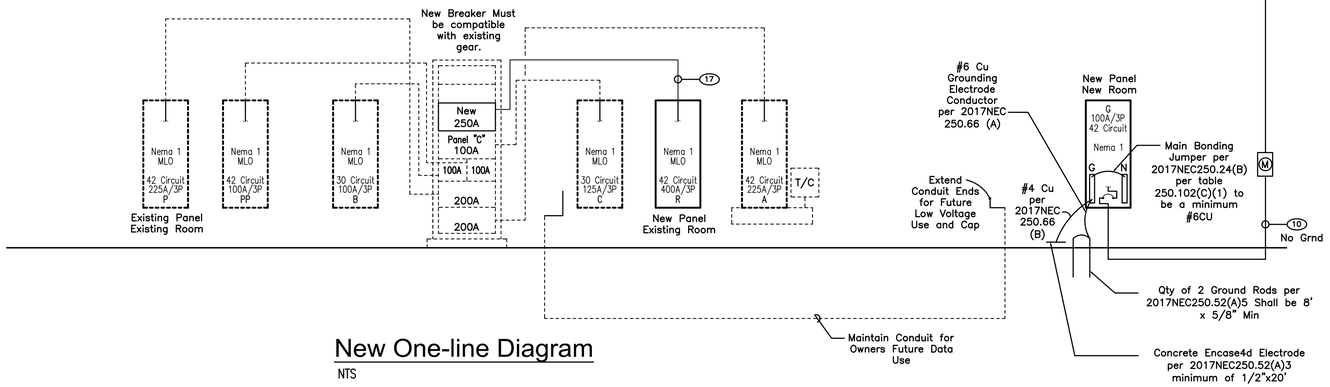
Contractor to coordinate with local electric purveyor and coordinate transformer(s) and feeders as to calculate accurate fault current for service panel. Contractor to label Panel with accurate fault current and provide adequate Fault-cureent limiting device. Coordinate Fault Current with engineer.

LINETYPE LEGEND

———	NEW WORK
— — — — —	EXISTING TO REMAIN
. . . . .	DEMOLITION WORK
——— — ———	ABANDON IN PLACE

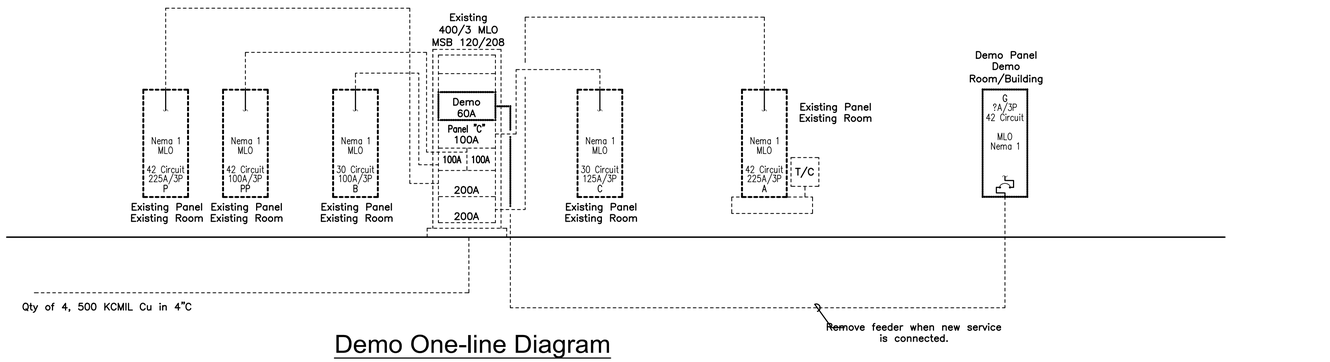
Conductor Ampacity Table THHN/THWN-75°C

	Copper (Basis of Design)							Aluminum						
	Table 310.16		Table 250.122	Table C.9		Table 250.66	Table 310.16		Table 250.122	Table C.9		Table 250.66		
	RATED AMPS	# OF SETS	WIRE SIZE	GROUND SIZE	CONDUIT SIZE 3W+GND	CONDUIT SIZE 4W+GND	GROUNDING ELECTRODE CONDUCTOR	# OF SETS	WIRE SIZE	GROUND SIZE	CONDUIT SIZE 3W+GND	CONDUIT SIZE 4W+GND	GROUNDING ELECTRODE CONDUCTOR
(000)	15	1	14	14	0.75	0.75	8						
(00)	20	1	12	12	0.75	0.75	8						
(0)	25	1	10	10	0.75	0.75	8						
(1)	30	1	10	10	0.75	0.75	8						
(2)	35	1	8	10	1.00	1.00	8						
(3)	40	1	8	10	1.00	1.00	8						
(4)	45	1	8	10	1.00	1.00	8						
(5)	50	1	8	10	1.00	1.00	8						
(6)	60	1	6	10	1.00	1.00	8						
(7)	70	1	6	8	1.25	1.25	8						
(8)	80	1	4	8	1.25	1.25	8						
(9)	90	1	4	8	1.25	1.25	8						
(10)	100	1	1	8	1.25	1.25	8	1	1/0	6	1.50	2.00	6
(11)	110	1	2	6	1.25	1.25	8	1	1/0	4	1.50	2.00	6
(12)	125	1	1	6	1.50	1.50	6	1	2/0	4	2.50	2.50	4
(13)	150	1	1/0	6	2.00	2.00	6	1	3/0	4	2.50	2.50	4
(14)	175	1	2/0	6	2.00	2.00	4	1	4/0	4	2.50	2.50	2
(15)	200	1	3/0	6	2.50	2.50	4	1	250	4	2.50	3.00	2
(16)	225	1	4/0	4	2.50	2.50	2	1	300	2	2.50	3.00	1/0
(17)	250	1	250	4	2.50	2.50	2	1	400	2	3.00	3.00	1/0
(18)	300	1	300	4	3.00	3.00	2	1	500	2	3.00	3.50	1/0
(19)	350	1	400	3	3.00	3.00	1/0	1	700	1	3.50	4.00	3/0
(20)	400	1	500	3	3.50	3.50	1/0	1	800	1	4.00	5.00	3/0
(21)	450	1	4/0	2	2.50	2.50	1/0	2	300	1/0	2.50	3.00	3/0
(22)	500	2	250	2	2.50	2.50	1/0	2	400	1/0	3.00	3.00	4/0
(23)	600	2	350	1	3.00	3.00	2/0	2	500	2/0	3.00	3.50	250
(24)	700	2	400	1/0	3.00	3.00	2/0	2	700	3/0	3.50	4.00	250
(25)	800	2	500	1/0	3.50	3.50	2/0	2	800	3/0	4.00	5.00	250
(26)	1000	3	400	2/0	3.00	3.00	2/0	3	600	4/0	3.50	4.00	250
(27)	1200	3	600	3/0	4.00	4.00	2/0	4	500	250	3.50	4.00	250
(28)	1600	4	600	4/0	4.00	4.00	2/0	5	600	350	3.50	4.00	250
(29)	2000	5	600	250	4.00	5.00	2/0	6	600	400	3.50	4.00	250
(30)	2500	6	600	350	4.00	5.00	2/0	7	700	600	4.00	5.00	250
(31)	3000	8	500	400	4.00	5.00	2/0	10	500	600	4.00	5.00	250
(32)	4000	10	750	500	5.00	5.00	2/0	12	600	800	4.00	5.00	250
(33)	5000	14	750	700	5.00	5.00	2/0	16	600	1200	4.00	5.00	250
(34)	6000	16	750	800	5.00	5.00	2/0	18	600	1200	4.00	5.00	250



New One-line Diagram

NTS



Demo One-line Diagram

NTS

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Office Facility Alterations and a New Maintenance Building for the:
FAIRFIELD COUNTY BOARD OF DEVELOPMENTAL DISABILITIES
795 College Avenue
Lancaster, Ohio 43130

VPL ARCHITECTS
426 EAST MAIN STREET
LANCASTER, OHIO 43130
phone: (740) 654-4048
facsimile: (740) 654-3009

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STATE OF OHIO LANCE J. DEBENEDICTIS E-63937 REGISTERED PROFESSIONAL ENGINEER

ELECTRICAL DETAILS

DRAWING NUMBER
E301