

Packaged VAV Rooftop Unit Schedule																											
Mark	Manufacturer	Model	Refrigerant	Nominal Tonnage	Cooling Coil					Supply Fan					Outdoor Air (CFM)	Heating Section		Power Exhaust		EER @ AHRI	IEER @ AHRI	Volt/Ph	MCA	MOCP	Min. SCCR (Amps)	Weight (LBS)	Remarks
					Total Cooling (MBH)	Sensible Cooling (MBH)	Coil EAT DB / WB (°F)	Coil LAT DB / WB (°F)	Outdoor Design (°F)	Airflow (CFM)	ESP (in. W.G.)	HP	BHP	Operating Speed (RPM)		Electric Heat (kW)	Stages	Total Airflow (CFM)	Fan Qty.								
RTU-1	Trane	TED480D4B	R-454B	40.0	450.6	350.9	78.4 / 64.4	51.5 / 51.5	95.0	12300	1.75	15.0	9.8	625	1650	54.0	2	12300	2	11.3	16.0	460/3	100.0	110	5000	5571	1,2,3,4,5,6,7,8

1. Provide complete packaged air conditioning unit utilizing R-454B with downflow supply and return, setup for multi-zone VAV application. Provide unit with 100% outdoor air, comparative enthalpy controlled economizer with 100% power exhaust with "Statitrac" modulating active building pressure control. Provide unit with 2" filter rack with MERV 8 filters, clogged filter switch, hinged access panels, condenser coil guards, compressor attenuator sound blankets, stainless steel condensate drain pan, condensate drain pan overflow switch, three compressors with five stages of cooling down to 25% maximum, and staged electric heat. Provide supply air fan with variable frequency drive with bypass and shaft grounding ring. Compressor(s), supply fan(s) and exhaust fan(s) shall have rubber isolators.

2. Provide unit with BACnet IP communications card as necessary for connecting to building automation system. Install controller within rooftop unit integral controls cabinet.

3. Provide unit with manufacturer's factory startup and first year whole unit parts and labor warranty. Compressor(s) shall be provided with 2nd-5th year parts warranty.

4. Unit shall shut down upon signal from fire alarm system. Controls by the fire alarm contractor. Smoke detectors and arrays at return air openings shall be furnished by the fire alarm contractor as required. Mechanical Contractor shall install duct mounted smoke detectors as required and Fire Alarm Contractor shall install arrays as required. The fire alarm contractor shall provide all wiring.

5. Provide factory installed outside airflow station and dampers to allow modulation of outside airflow to maintain minimum setting during non-economizer, occupied mode of operation.

6. Provide unit with unit mounted factory installed disconnect, GFCI convenience outlet, and 65,000 Amp SCCR. All power wiring shall be provided by the electrical contractor.

7. Provide with 24" vibration isolation roof curb by "MGM Products" or equivalent. Roof curb shall be rated for local wind loading requirements (130 MPH). Provide shop drawings of curbs and attachments to roof for Structural and Mechanical Engineer review.

8. Refer to MEP seismic details for mechanical equipment restraint requirements.

High-Volume Low-Speed Fan Schedule											
Mark	Manufacturer	Model	Diameter (ft)	Number of Blades	Maximum RPM	Motor	Drive	Volt/Ph	FLA	Weight (LBS)	Remarks
HVLS-1	Greenheck	DS-6-24-170HV	24	6	61	1100 W	Direct	460/3	3.5	254	1,2,3,4,5

1. Fan to be installed with a minimum 3'-6" clearance from the underside of the roof deck and on all sides. Verify extension tube length and mounting bracket with manufacturer prior to ordering. Coordinate mounting height to match light fixture heights.

2. Electrical contractor shall provide power wiring to variable frequency drive (VFD) and whip to fan.

3. Provide fan with relay to shutdown upon signal from fire alarm system. Wiring by Fire Alarm Contractor.

4. Provide fan with manufacturer's wall mounted advanced touchscreen control with BACnet. Controller shall have the ability to communicate with the building automation system through BACnet MS/TIP. Provide touchscreen with temperature and humidity sensors for automatic operation.

5. Refer to MEP seismic details for mechanical equipment restraint requirements.

Air Distribution Schedule							
Mark	Manufacturer	Model	Description	Panel Size	Type	Neck Size	Remarks
SA1	Titus	OMNI	Steel, Plaque Face, Square Cone	24x24	Lay-In	6"Ø	1
SA2	Titus	OMNI	Steel, Plaque Face, Square Cone	24x24	Lay-In	8"Ø	1
SA3	Titus	OMNI	Steel, Plaque Face, Square Cone	24x24	Lay-In	10"Ø	1
SA4	Titus	OMNI	Steel, Plaque Face, Square Cone	24x24	Lay-In	12"Ø	1
SB1	Titus	TBD1-30	Linear Slot, Integral Insulated Plenum, Ice Tong Controller, 4 - 1" Slots	48" Long	Lay-In	10"Ø	1
SC1	Titus	ML-39	Linear Slot, Accessory Insulated Plenum, Ice Tong Controller, 2 - 1" Slots	24" Long	Surface Mount	8"Ø	1,3
SC2	Titus	ML-39	Linear Slot, Accessory Insulated Plenum, Ice Tong Controller, 2 - 1" Slots	48" Long	Surface Mount	10"Ø	1,3,4
SD1	Titus	ML-39	Linear Slot, Accessory Insulated Plenum, Curved (15' Radius), 2 - 1" Slots	48" Long	Surface Mount	10"Ø	1,3,4
SE1	Titus	ML-39	Linear Slot, Accessory Insulated Plenum, Ice Tong Controller, 2 - 1" Slots	84" Long	Suspended	10"Ø	1,3,4
SF1	Titus	S300FS	Aluminum, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Spiral Duct Mount	16x4	1,6
SF2	Titus	S300FS	Aluminum, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Spiral Duct Mount	18x4	1,6
SF3	Titus	S300FS	Aluminum, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Spiral Duct Mount	20x4	1,6
SF4	Titus	S300FS	Aluminum, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Spiral Duct Mount	18x6	1,6
SG1	Titus	300RS	Steel, Double Deflection, Short Front Blades, 3/4" Blade Spacing	NA	Duct Mount	10x4	1,5
RA1	Titus	PAR	Steel, Perforated, Duct Collar	24x24	Lay-In	8"Ø	1,2
RA2	Titus	PAR	Steel, Perforated, Duct Collar	24x24	Lay-In	10"Ø	1

1. Verify all ceiling and wall types with architectural plans. Coordinate color with Architect. Refer to MEP seismic details for mechanical equipment restraint requirements.

2. Provide return air grille with flexible return air boot for sound attenuation. Refer to "Return Air Boot Detail" for installation. Flex duct boot shall be the same size as the grille connection specified.

3. Provide with tape & spackle border and hard celling clip.

4. Provide with manufacturer's cable-operated damper.

5. Provide with integral opposed blade balancing damper.

6. Provide with integral balancing damper extractor. Duct sizes listed on mechanical drawings are inside clear dimension of double-wall spiral duct.

7. Provide with accessory insulated plenum with full length return opening.

Ductless Split System Schedule																				
Outdoor Unit Mark	Indoor Unit Mark	Manufacturer	Refrigerant	Outdoor Unit								Indoor Unit								Remarks
Tonnage	Model	ARI Cooling (MBH)	ARI Heating (MBH)	SEER2	HSPF2	Volt/Ph	MCA	MOCP	Weight (LBS)	Model	Type	SA (CFM)	Volt/Ph	Weight (LBS)						
DHP-1	DAHU-1	Mitsubishi	R-454B	2.0	PUZ-AH24NL	24.0	28.0	21.1	9.2	208/1	22.0	35	155	PKA-AK24NL	Wall Hung	775	208/1	46	1,2,3,4,5,6	

1. Cooling capacity based on indoor entering air condition of 80°F dry bulb, 67°F wet bulb and outdoor air condition of 95°F dry bulb. Heating capacity based on indoor entering air condition of 70°F dry bulb and outdoor air condition of 47°F dry bulb.

2. Provide unit with manufacturer's accessory Blue Diamond (Advanced), Model: X87-721, 208/230 volt condensate pump with reservoir and sensor. Pump shall be powered through air handling unit. Refer to mechanical drawing for condensate termination location.

3. Indoor unit shall be powered from outdoor unit. All power wiring by the electrical contractor.

4. Provide unit with BACnet IP communicating controller as necessary for connecting to building automation system. Provide with "Distech: Resense Air Display" wall mounted combination temperature, relative humidity, and carbon dioxide sensor. Sensor shall communicate via RS-485 to controller.

5. Equipment rails shall be rated for local wind loading requirements (130 MPH). Provide shop drawings of rails and attachments to roof for Structural and Mechanical Engineer review.

6. Refer to MEP seismic details for mechanical equipment restraint requirements.

Fan Schedule												
Mark	Manufacturer	Model	Service	Type	Airflow (CFM)	ESP (in. W.G.)	Motor Size	RPM	Drive	Volt/Ph	Weight (LBS)	Remarks
EF-1	Greenheck	G-090-VG	Restroom	Roof, Downblast	560	0.50	1/10 HP	1668	Direct	120/1	41	1,2,3,4
EF-2	Greenheck	G-090-VG	Restroom	Roof, Downblast	330	0.50	1/10 HP	1408	Direct	120/1	41	1,2,3,4

1. Provide fan with birdscreen, roof curb, and gravity backdraft damper. Roof curb shall be rated for local wind loading requirements (130 MPH). Provide shop drawings of curbs and attachments to roof for Structural and Mechanical Engineer review.

2. Provide fan with speed controller for balancing.

3. Provide unit with BACnet IP communicating controller as necessary for connecting to building automation system. Fan shall be programmed to operate during occupied hours.

4. Refer to MEP seismic details for mechanical equipment restraint requirements.

Terminal Unit Schedule																	
Mark	Status	Manufacturer	Model	Type	Flow	Inlet Size (in.)	Max. Primary Airflow (CFM)	Min. Primary Airflow (CFM)	Fan Airflow (CFM)	Heating Airflow (CFM)	Fan ESP (in. W.G.)	Fan (HP)	Motor Type	Heat (KW)	Heat Stages	Volt/Ph	Remarks
FPB-1	New	Titus	DTQP	Fan Powered	Parallel	8	650	130	320	650	0.3	1/2	ECM	6.0	SCR	480/3	1,2,3,4,5,6,8
FPB-2	New	Titus	DTQP	Fan Powered	Parallel	6	400	80	320	400	0.3	1/2	ECM	4.0	SCR	277/1	1,2,3,4,5,6,8
FPB-3	New	Titus	DTQP	Fan Powered	Parallel	6	320	65	255	320	0.3	1/2	ECM	3.0	SCR	277/1	1,2,3,4,5,6,8
FPB-4	New	Titus	DTQP	Fan Powered	Parallel	8	480	100	380	480	0.3	1/2	ECM	4.5	SCR	277/1	1,2,3,4,5,6,8
FPB-5	New	Titus	DTQP	Fan Powered	Parallel	10	700	145	555	700	0.3	1/2	ECM	6.5	SCR	480/3	1,2,3,4,5,6,8
FPB-6	New	Titus	DTQP	Fan Powered	Parallel	12	1540	310	1230	1540	0.3	1.0	ECM	19.0	SCR	480/3	1,2,3,4,5,7,8
FPB-7	New	Titus	DTQP	Fan Powered	Parallel	8	510	105	405	510	0.3	1/2	ECM	5.0	SCR	480/3	1,2,3,4,5,6,8
FPB-8	New	Titus	DTQP	Fan Powered	Parallel	10	1100	220	880	1100	0.3	1/2	ECM	10.0	SCR	480/3	1,2,3,4,5,6,8
FPB-9	New	Titus	DTQP	Fan Powered	Parallel	10	1095	220	875	1095	0.3	1/2	ECM	10.0	SCR	480/3	1,2,3,4,5,6,8
FPB-10	New	Titus	DTQP	Fan Powered	Parallel	14	2100	420	1680	2100	0.3	1.0	ECM	19.0	SCR	480/3	1,2,3,4,5,7,8

1. Provide unit with multi-point averaging diamond flow sensor, top hanging brackets, and 1/2" internal fiberglass insulation.

2. Provide unit with solid state SCR fan speed controller, filter frame, and disposable filter for induction air.

3. Provide unit with single point electrical connection, access door interlock disconnect switch, and factory installed step down transformer for 24 volt controls.

4. The fans in all fan powered terminal units shall be signaled to shut down through the building automation system upon a signal from the building fire alarm system.

5. Provide unit with BACnet IP communicating controller as necessary for connecting to building automation system. Provide with "Distech: Resense Air Display" wall mounted combination temperature, relative humidity, and carbon dioxide sensor. Sensor shall communicate via RS-485 to controller.

6. Provide unit with "BRD: HUSHCORE Supreme-I" noise reduction system with "PWA-500 HUSH GUARD" black panels rated for plenum installation and induced air sound attenuator.

7. Provide unit with "BRD: HUSHCORE Supreme-I" noise reduction system with "PHD-800 HUSH GUARD" panels with galvanized steel finish for painting by General Contractor and induced air sound attenuator.

8. Refer to MEP seismic details for mechanical equipment restraint requirements.

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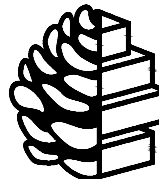
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MECHANICAL
SCHEDULES

DRAWING NUMBER

M-101

These drawings will be at the scale indicated when plotted at 24" x 36"



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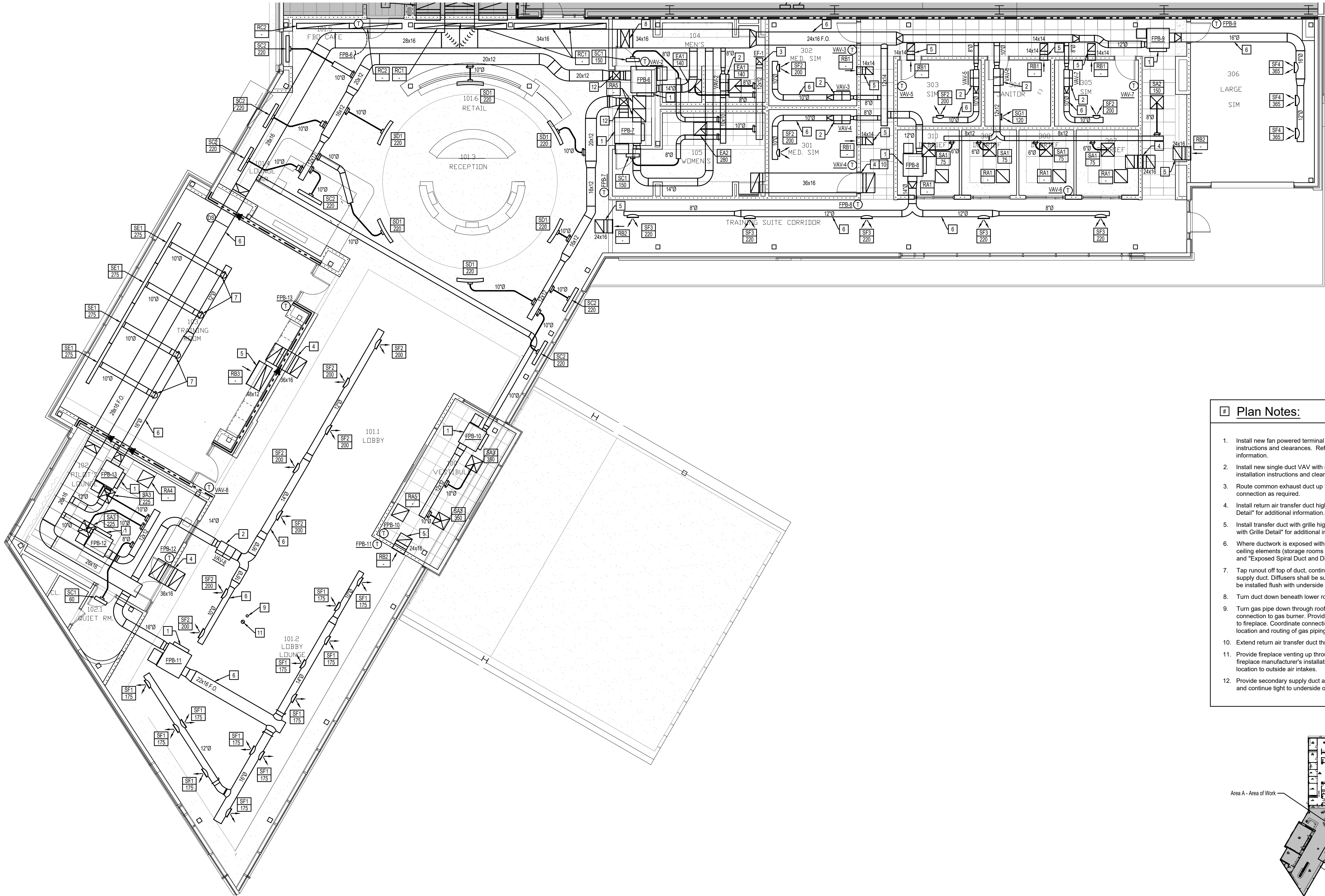
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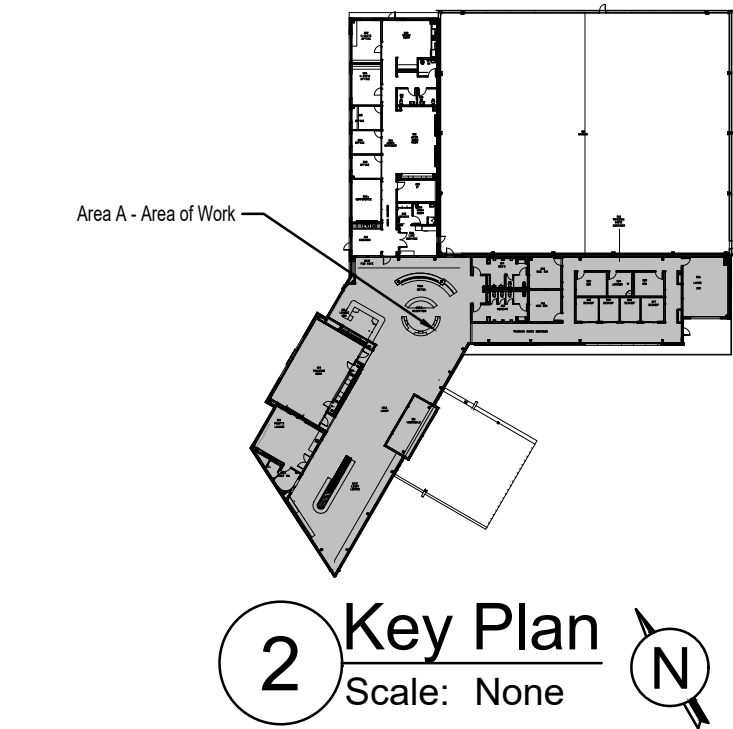
DRAWING TITLE
**PARTIAL
FLOOR PLAN -
AREA A -
MECHANICAL**

DRAWING NUMBER
M-111A

These drawings will be at the scale indicated when plotted at 24" x 36"



1 Partial Floor Plan - Area A - Mechanical
Scale: 1/8" = 1' - 0"



Wall Ratings and Types Legend	
See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.	
New Wall being Constructed	
New 1/2 Height Wall being Constructed	
Wall to Deck	
One Hour Fire Barrier	
Two Hour Fire Barrier	



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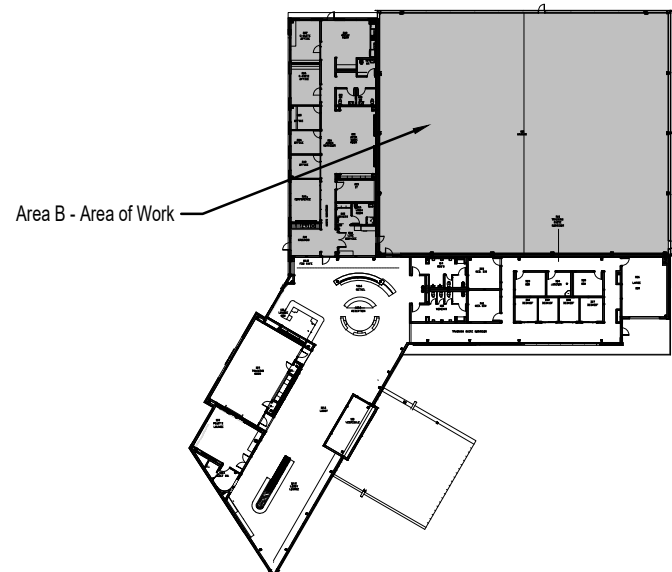
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DRAWING TITLE
PARTIAL
FLOOR PLAN -
AREA B -
MECHANICAL

DRAWING NUMBER
M-111B

These drawings will be at the scale indicated when plotted at 24" x 36"

- Plan Notes:**
- Route supply and return ducts up to packaged rooftop unit. Transition ducts to rooftop unit connections as required. Extend return duct down even with roof structure, end of duct shall remain open to plenum space. Supply duct shall continue down and be accessible through lay-in ceiling.
 - Install new fan powered terminal unit above ceiling per manufacturer's installation instructions and clearances. Refer to "Fan Powered Terminal Unit Detail" for additional information.
 - Install new single duct VAV with reheat terminal unit above ceiling per manufacturer's installation instructions and clearances.
 - Install wall mounted air handler centered above door per manufacturer's installation instructions and clearances. Route refrigerant piping up to roof mounted heat pump. Pump condensate adjacent to refrigerant piping and spill onto roof deck.
 - Route common exhaust duct up to roof mounted exhaust fan. Transition duct to fan connection as required.
 - Install return air transfer duct high in wall to deck above ceiling. Refer to "Transfer Duct Detail" for additional information.
 - Install return air transfer duct high in wall to deck above ceiling. Refer to "Single Side Transfer Duct Detail" for additional information.
 - Route primary supply duct up within elevated roof structure and continue into reception area ceiling space tight to underside of structure.
 - Install diffuser in lay-in ceiling above baffles.
 - Install "Vibro-Acoustics, Model: RD-HV-FJ" or equivalent, 120" long, 24x14 duct silencer at location noted.
 - Install "Vibro-Acoustics, Model: RD-HV-FJ" or equivalent, 96" long, 16x16 duct silencer at location noted.
 - Install high-volume low-speed fan per manufacturer's installation instructions and clearances. Coordinate final fan location and mounting height with General Contractor.
 - Install natural gas infrared heater per manufacturer's installation instructions and clearances. Coordinate final heater mounting height with the General Contractor. Route intake duct and flue duct up through roof and terminate with manufacturer approved roof cap. Maintain 10'-0" between outside air intakes and exhaust terminations.
 - Coordinate installation of new 2 PSI gas meter with gas company. Gas meter shall be provided with pulse output for connection to building automation system. Route piping through wall low, turn up, and continue tight to underside of structure. Refer to gas riser for pipe sizing.
 - Continue gas pipe through hangar wall on to adjacent roof. Refer to "Partial Roof Plan - Area B - Mechanical" for continuation.
 - Provide control panel(s) for installation of infrared heater and restroom exhaust fan (EF-1 & EF-2) controllers. Panel(s) shall be ventilated and lockable.
 - Provide control panel(s) for installation of "DisTech: ECY-S1000 Series" connected system controller. Panel(s) shall be ventilated and lockable.
 - Where ductwork is visible above metal perforated ceiling provide ductwork with foil-faced duct wrap insulation. Coordinate painting of duct with the General Contractor. (Typical)
 - Install wall mounted HVLS fan communicating controller adjacent to controls panel.
 - Provide "The Dryer Box, Model: 425" in wall (located high where stacked washer/dryer is used). Tap 4"0 (Min 28 ga.) rigid dryer duct from top of dryer box, up within laundry room wall. Route dryer duct through ceiling space as indicated and turn up through roof. Terminate with roof vent cap. Maintain 17'-0" between outside air intakes and exhaust outlets. Maintain 3'-0" between exhaust outlets and operable openings into the building. Provide final connection of dryer box to dryer with minimal length 4"0 metallic, flexible dryer duct. The general contractor shall be responsible for installing dryer and the mechanical contractor shall be responsible for making final connection of dryer duct. Refer to "Dryer Length Placard Detail" for additional requirements.
 - Provide BACnet compatible duct mounted air quality sensor "Senva Inc: TotalSense Series Duct Air Quality Sensor" capable of sensing carbon dioxide, total volatile organic compounds, and particulate matter. Install in return air duct and supply air duct.
 - Provide return air plenum, centered within joist space, tight to underside of roof deck. Tap return air duct, same size as unit connection, into top of return air plenum. Provide return air plenum duct with 2" duct liner insulation for sound attenuation. Each end of return air plenum shall be 40"x20" and open to ceiling space. Supply duct shall route beneath return duct, tight to underside of joists.

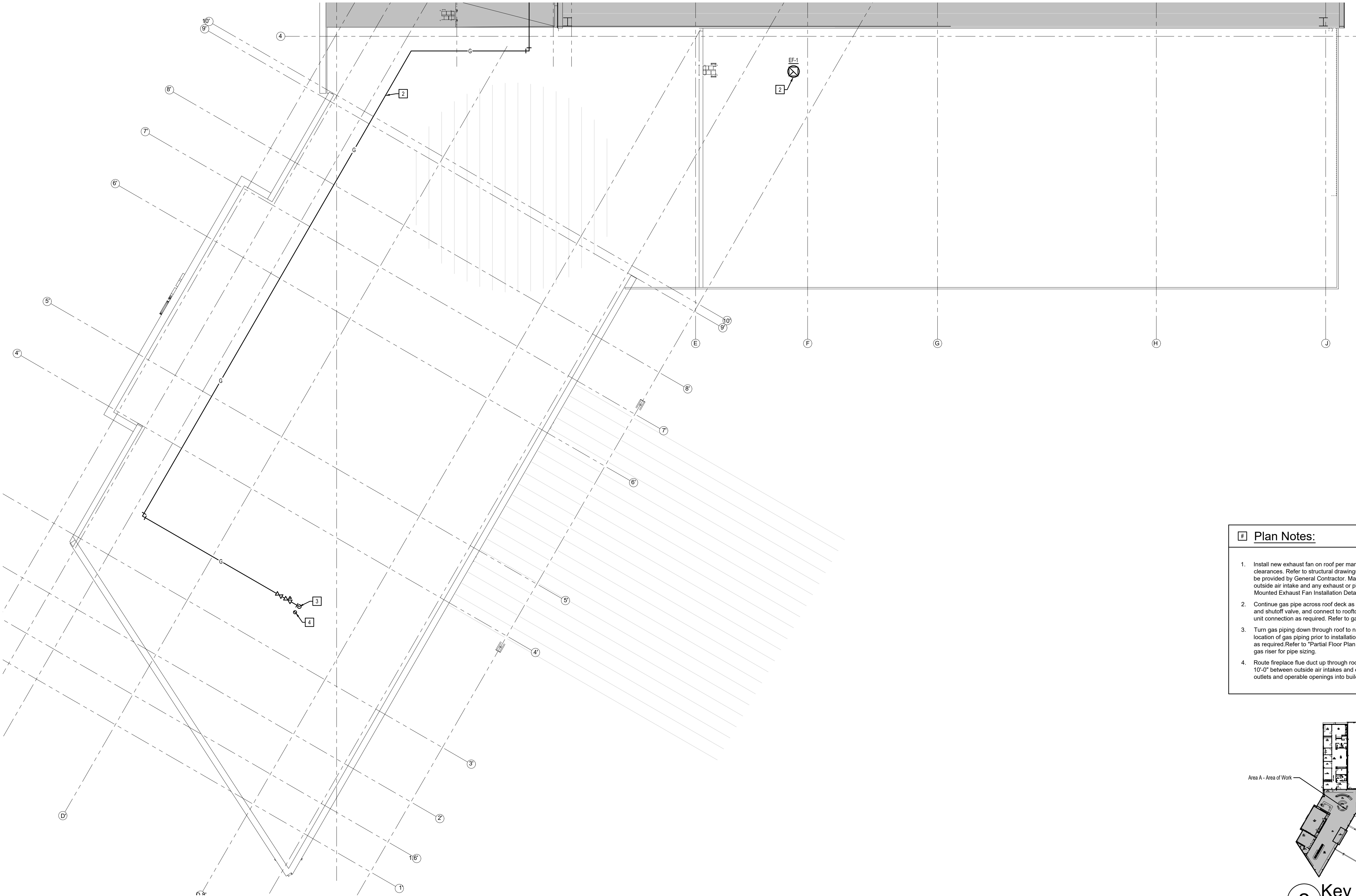


2 Key Plan
Scale: None

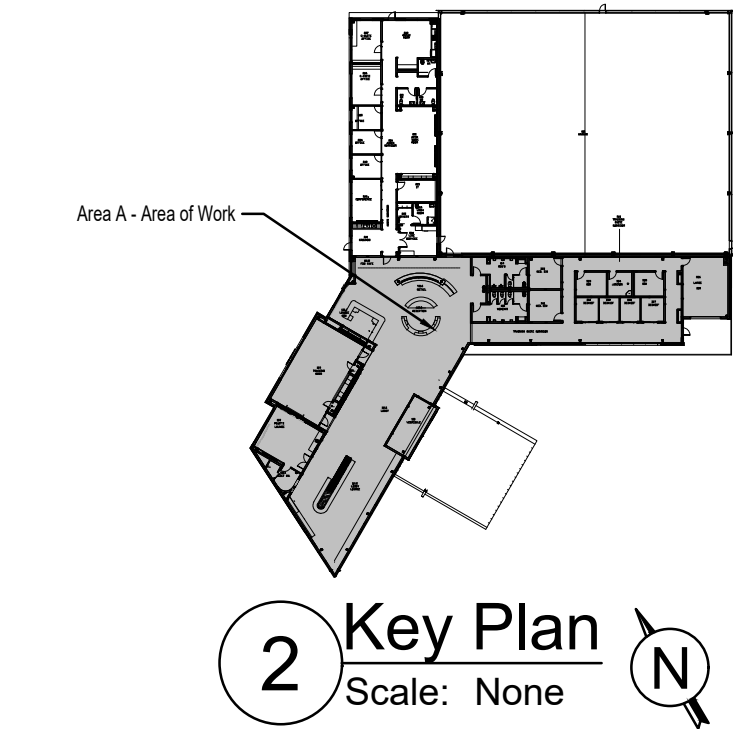
Wall Ratings and Types Legend

See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.

New Wall being Constructed	
New 1/2 Height Wall being Constructed	
Wall to Deck	
One Hour Fire Barrier	
Two Hour Fire Barrier	



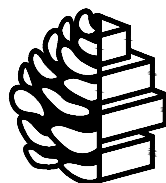
1 Partial Roof Plan - Area A - Mechanical
Scale: 1/8" = 1' - 0"



2 Key Plan
Scale: None

- Plan Notes:**
1. Install new exhaust fan on roof per manufacturer's installation instructions and clearances. Refer to structural drawings for exact location. All structural supports shall be provided by General Contractor. Maintain 6'-0" from roof edge. Maintain 10' between outside air intake and any exhaust or plumbing vent terminations. Refer to "Roof Mounted Exhaust Fan Installation Detail" for additional information.
 2. Continue gas pipe across roof deck as indicated, provide medium pressure regulator and shutoff valve, and connect to rooftop equipment gas input. Transition gas pipe to unit connection as required. Refer to gas riser for pipe sizing and additional information.
 3. Turn gas piping down through roof to natural gas fireplace. Coordinate connection location of gas piping prior to installation and adjust location and routing of gas piping as required. Refer to "Partial Floor Plan - Area A - Mechanical" for continuation. Refer to gas riser for pipe sizing.
 4. Route fireplace flue duct up through roof and provide with approved vent cap. Maintain 10'-0" between outside air intakes and exhaust outlets. Maintain 3'-0" between exhaust outlets and operable openings into building.

Wall Ratings and Types Legend	
See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.	
New Wall being Constructed	
New 1/2 Height Wall being Constructed	
Wall to Deck	
One Hour Fire Barrier	
Two Hour Fire Barrier	



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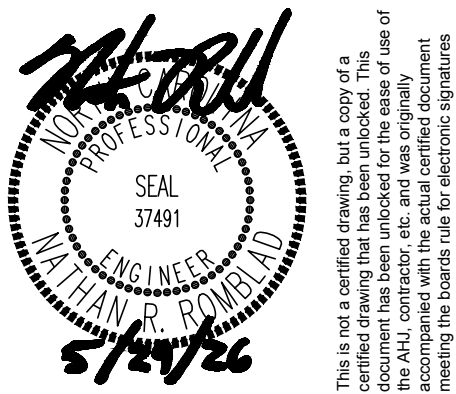
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TD PROJECT #	25-009
SCO ID #	N/A

DRAWING TITLE
**PARTIAL
ROOF PLAN -
AREA A -
MECHANICAL**

DRAWING NUMBER
M-112A

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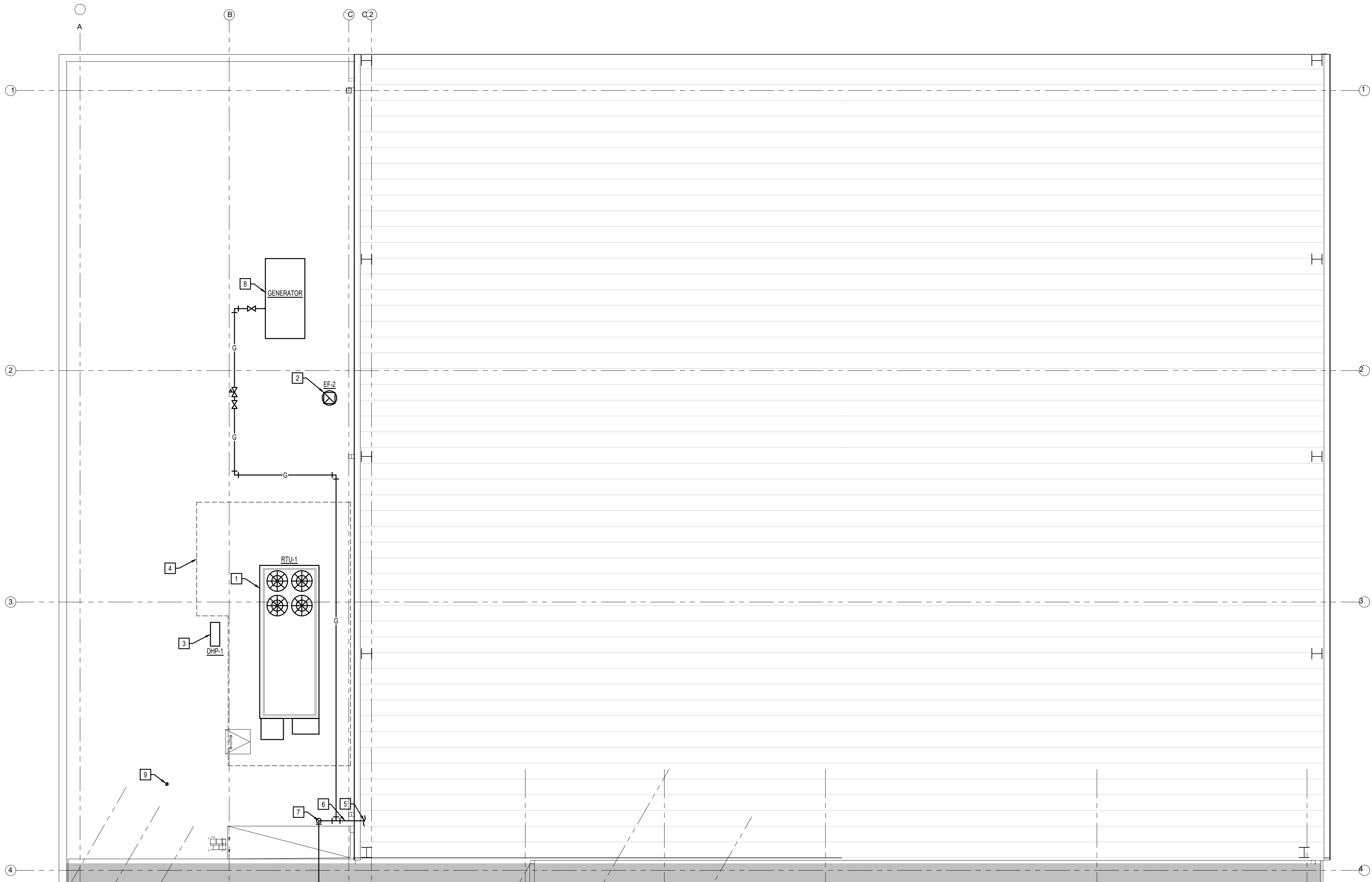
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DRAWING TITLE
**PARTIAL
ROOF PLAN -
AREA B -
MECHANICAL**

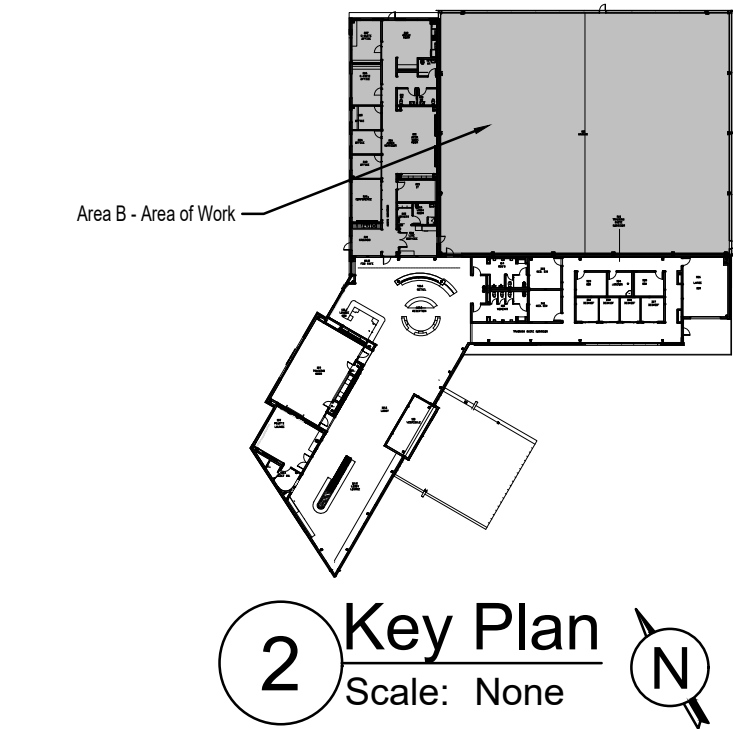
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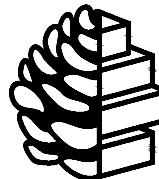


1 Partial Roof Plan - Area B - Mechanical
Scale: 1/8" = 1' - 0"

- Plan Notes:**
1. Install new packaged rooftop unit per manufacturer's installation instructions and clearances. Refer to structural drawings for exact location. All structural supports shall be provided by General Contractor. Split condensate on roof deck in direction of roof slope. Maintain 6'-0" from roof edge. Maintain 10' between outside air intake and any exhaust or plumbing vent terminations. Refer to "Rooftop Unit Installation Detail" for additional information.
 2. Install new exhaust fan on roof per manufacturer's installation instructions and clearances. Refer to structural drawings for exact location. All structural supports shall be provided by General Contractor. Maintain 6'-0" from roof edge. Maintain 10' between outside air intake and any exhaust or plumbing vent terminations. Refer to "Roof Mounted Exhaust Fan Installation Detail" for additional information.
 3. Install new heat pump on roof per manufacturer's installation instructions and clearances. Refer to structural drawings for exact location. All structural supports shall be provided by General Contractor. Split condensate from air handling unit on roof deck in direction of roof slope. Maintain 6'-0" from roof edge. Refer to "Roof Mounted Heat Pump Detail" for additional information.
 4. Manufacturer's required installation clearances.
 5. Continue gas pipe through hangar wall. Refer to "Partial Floor Plan - Area B - Mechanical" for continuation.
 6. Continue gas pipe across roof deck as indicated, provide medium pressure regulator and shutoff valve, and connect to rooftop equipment gas input. Transition gas pipe to unit connection as required. Refer to gas riser for pipe sizing and additional information.
 7. Turn gas pipe up and continue onto high roof.
 8. Generator to be furnished and installed by the electrical contractor. Refer to electrical and civil drawings for exact generator location. Mechanical contractor shall be responsible for final connection of natural gas piping.
 9. Route dryer exhaust duct up through roof and provide with approved vent cap, same size as duct. Refer to "Roof Vent Cap Detail" for additional information. Maintain 10'-0" between outside air intakes and exhaust outlets. Maintain 3'-0" between exhaust outlets and operable openings into building.



Wall Ratings and Types Legend	
See architectural sheets for more information on ratings and additional rated constructions including structure where applicable. Protect all rated constructions as required.	
New Wall being Constructed	
New 1/2 Height Wall being Constructed	
Wall to Deck	
One Hour Fire Barrier	
Two Hour Fire Barrier	



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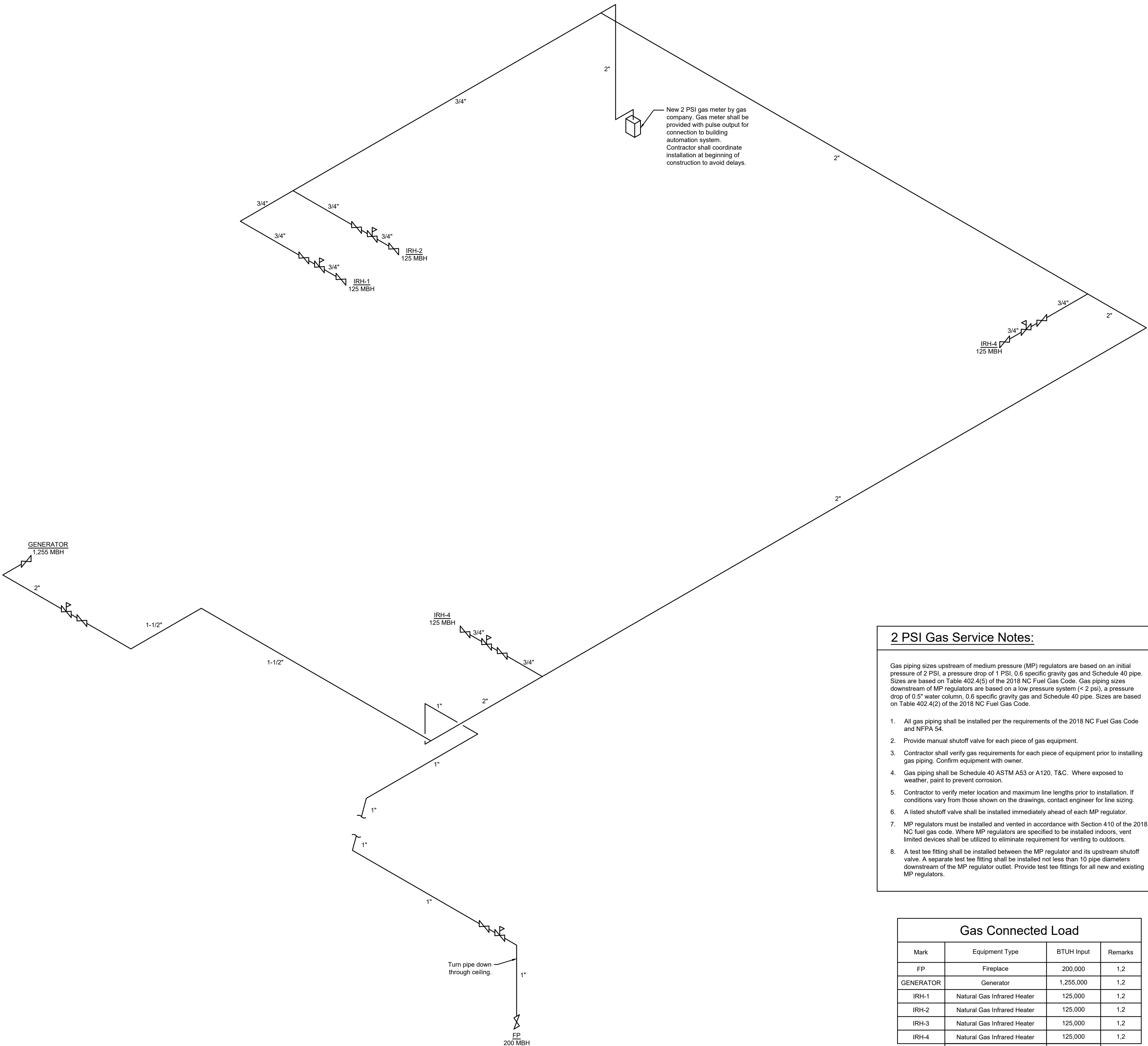
SCO ID # N/A

DRAWING TITLE
NATURAL GAS RISER

DRAWING NUMBER

M-200

These drawings will be at the scale indicated when plotted at 24" x 36"



2 PSI Gas Service Notes:

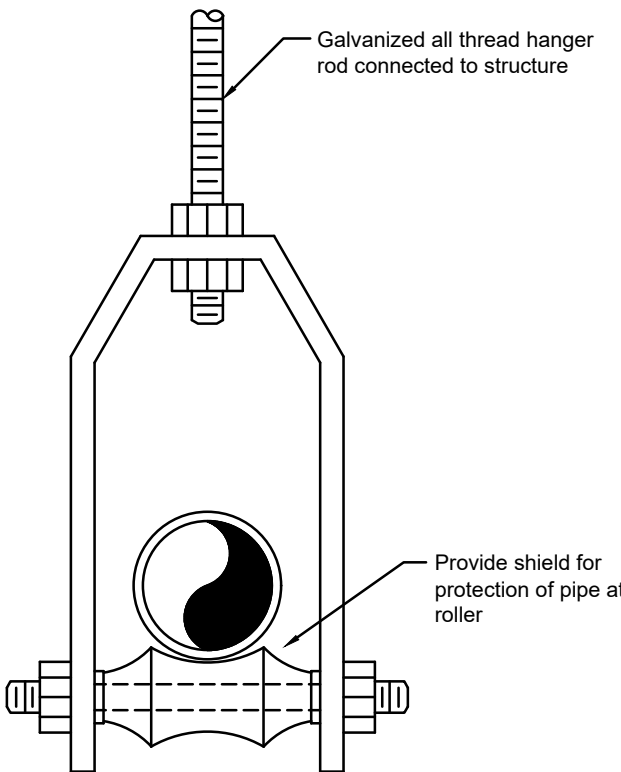
Gas piping sizes upstream of medium pressure (MP) regulators are based on an initial pressure of 2 PSI, a pressure drop of 1 PSI, 0.6 specific gravity gas and Schedule 40 pipe. Sizes are based on Table 402.4(5) of the 2018 NC Fuel Gas Code. Gas piping sizes downstream of MP regulators are based on a low pressure system (< 2 psi), a pressure drop of 0.5" water column, 0.6 specific gravity gas and Schedule 40 pipe. Sizes are based on Table 402.4(2) of the 2018 NC Fuel Gas Code.

- All gas piping shall be installed per the requirements of the 2018 NC Fuel Gas Code and NFPA 54.
- Provide manual shutoff valve for each piece of gas equipment.
- Contractor shall verify gas requirements for each piece of equipment prior to installing gas piping. Confirm equipment with owner.
- Gas piping shall be Schedule 40 ASTM A53 or A120, T&C. Where exposed to weather, paint to prevent corrosion.
- Contractor to verify meter location and maximum line lengths prior to installation. If conditions vary from those shown on the drawings, contact engineer for line sizing.
- A listed shutoff valve shall be installed immediately ahead of each MP regulator.
- MP regulators must be installed and vented in accordance with Section 410 of the 2018 NC fuel gas code. Where MP regulators are specified to be installed indoors, vent limited devices shall be utilized to eliminate requirement for venting to outdoors.
- A test tee fitting shall be installed between the MP regulator and its upstream shutoff valve. A separate test tee fitting shall be installed not less than 10 pipe diameters downstream of the MP regulator outlet. Provide test tee fittings for all new and existing MP regulators.

Gas Connected Load

Mark	Equipment Type	BTUH Input	Remarks
FP	Fireplace	200,000	1,2
GENERATOR	Generator	1,255,000	1,2
IRH-1	Natural Gas Infrared Heater	125,000	1,2
IRH-2	Natural Gas Infrared Heater	125,000	1,2
IRH-3	Natural Gas Infrared Heater	125,000	1,2
IRH-4	Natural Gas Infrared Heater	125,000	1,2
Total		1,955,000	

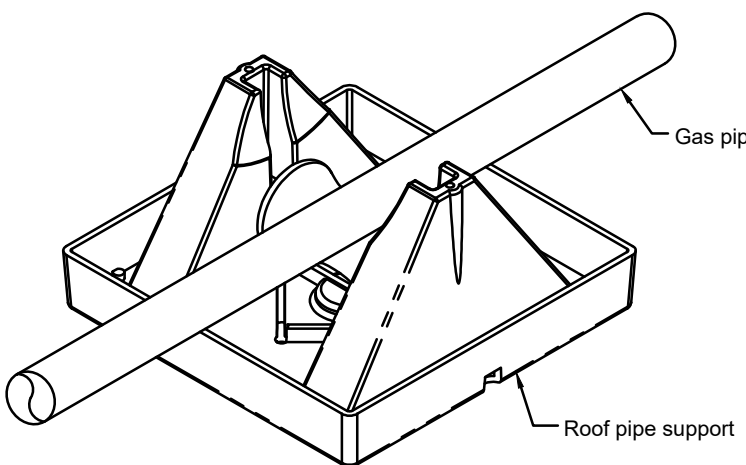
- Maximum equivalent length from the gas meter to the most remote MP regulator = 500'.
- Maximum length from any MP regulator to the equipment served = 20'.



Note: Refer to MEP seismic restraint detail for additional information regarding necessary restraints.

Pipe Hanger
with Roller Detail

Scale: None



Note: Refer to MEP seismic restraint detail for additional information regarding necessary restraints.

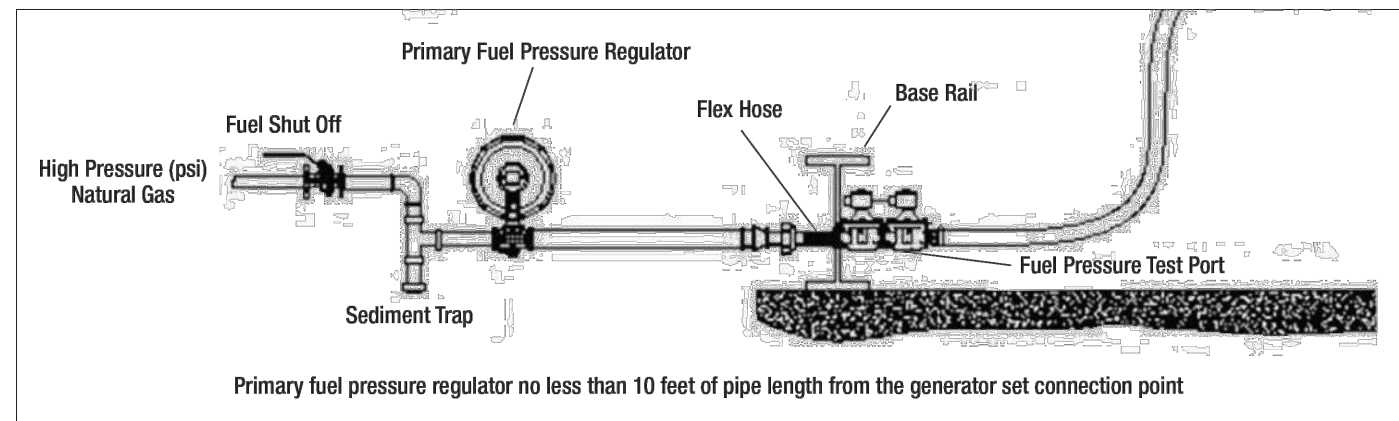
Provide MIRO Industries, Inc. Model 3-R-2 pipe support. Provide accessory pipe straps and support pad at each pipe stand. Install and space per manufacturer's recommendations.

Gas Pipe Roof Support Detail

Scale: None

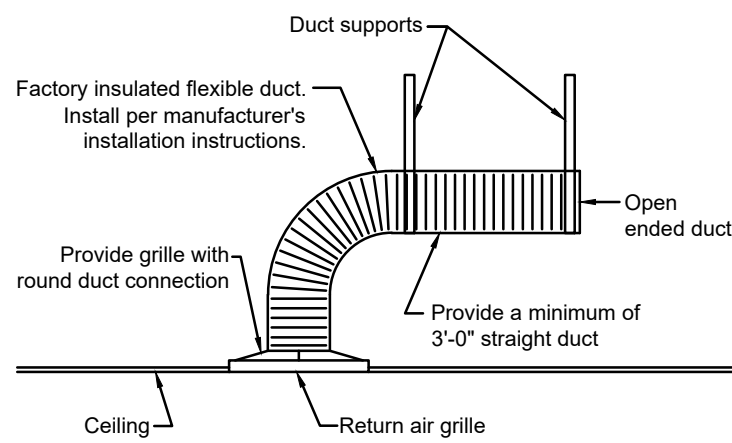
Gas Riser

Scale: None



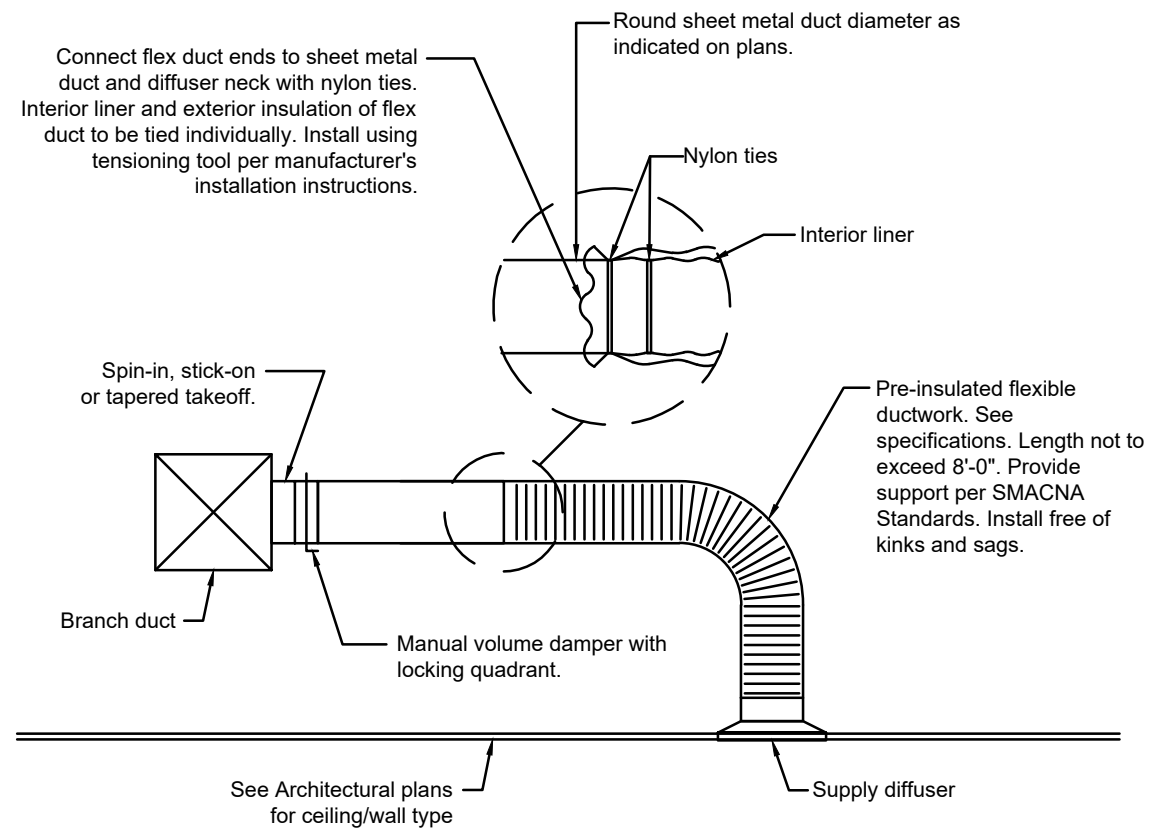
Note: Refer to MEP seismic restraint detail for additional information regarding necessary restraints.

1 Generator Piping Detail
Scale: None

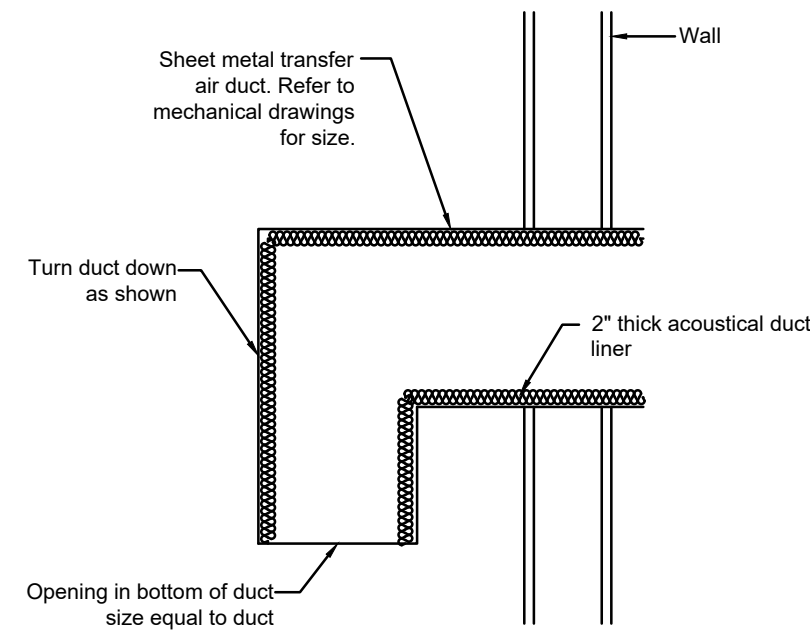


- Notes:
- Locate adjacent boots with duct openings facing opposite directions.
 - Face duct opening towards air handling unit where construction permits.

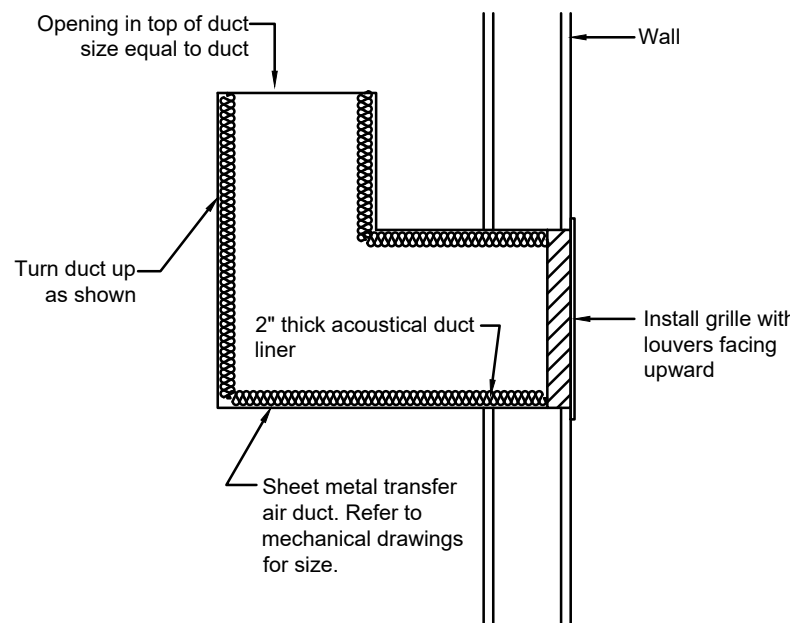
1 Flexible Duct Boot Detail
Scale: None



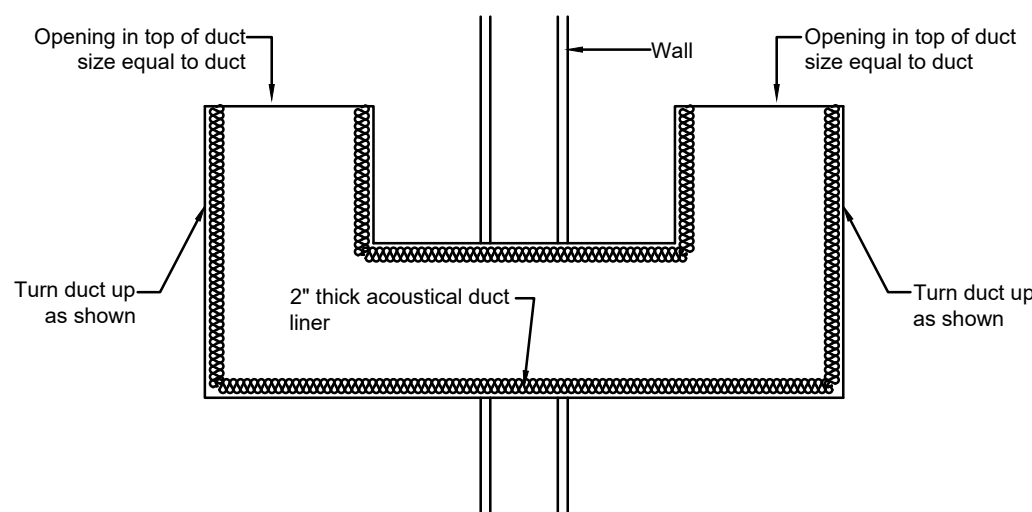
2 Flexible Duct Installation Detail
Scale: None



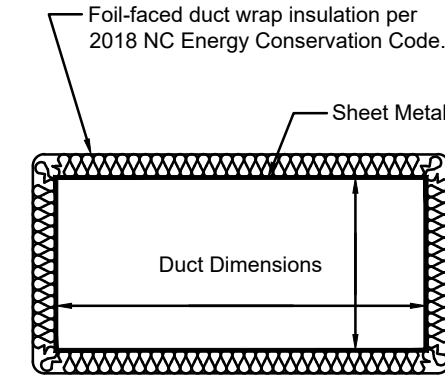
3 Single Side Transfer Duct Detail
Scale: None



4 Single Side Transfer Duct with Grille Detail
Scale: None

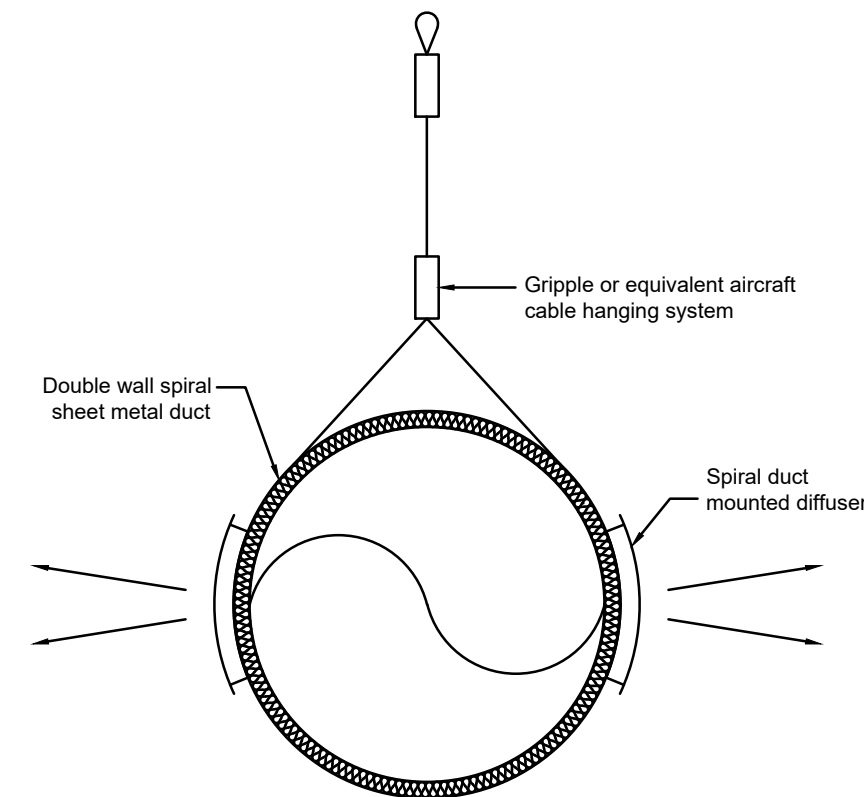


5 Transfer Duct Detail
Scale: None



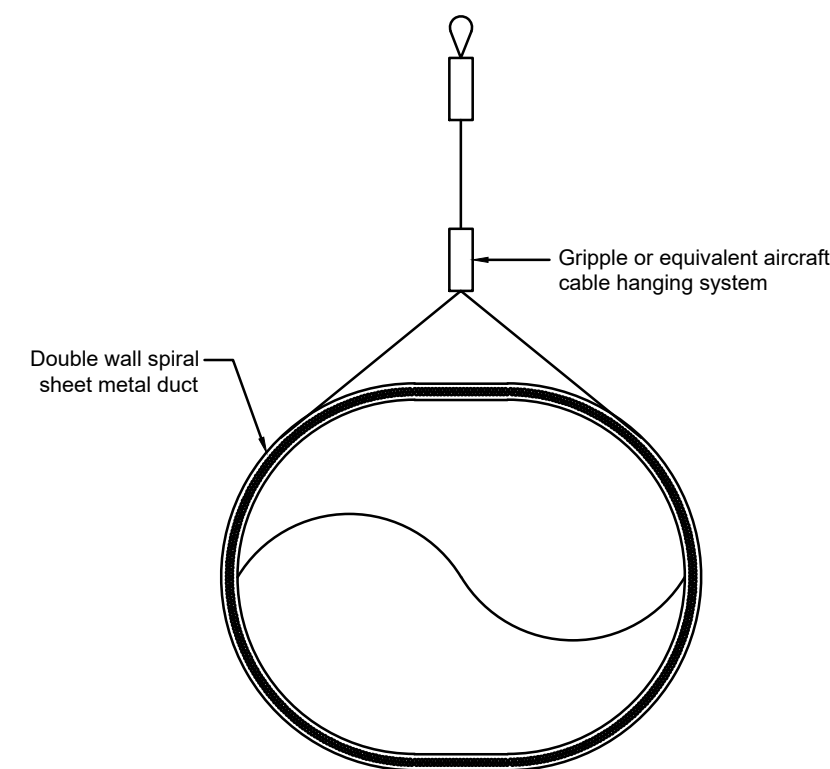
- Notes:
- All duct dimensions shown on these drawings are inside clear.
 - Provide a minimum of R-6 insulation when duct is located in unconditioned space.
 - Provide a minimum of R-8 insulation when duct is located outside the building envelope.

6 Concealed Duct Fabrication Detail
Scale: None



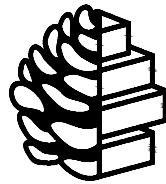
- Notes:
- All duct dimensions shown on these drawings are inside clear.
 - Refer to specifications for duct finish.
 - Route all duct level and parallel to the floor.
 - Space and install duct hangers per latest edition of SMACNA.

7 Exposed Spiral Duct and Diffuser Detail
Scale: None



- Notes:
- All duct dimensions shown on these drawings are inside clear.
 - Refer to specifications for duct finish.
 - Route all duct level and parallel to the floor.
 - Space and install duct hangers per latest edition of SMACNA.

8 Exposed Flat Oval Duct Detail
Scale: None



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TD PROJECT #	25-009

SCO ID #	N/A
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DRAWING TITLE
MECHANICAL DETAILS

DRAWING NUMBER

M-201

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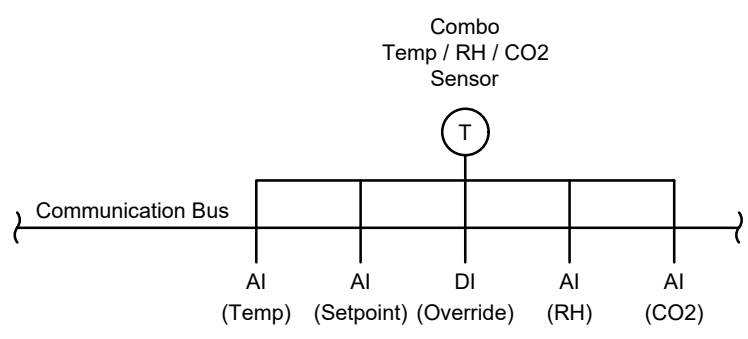
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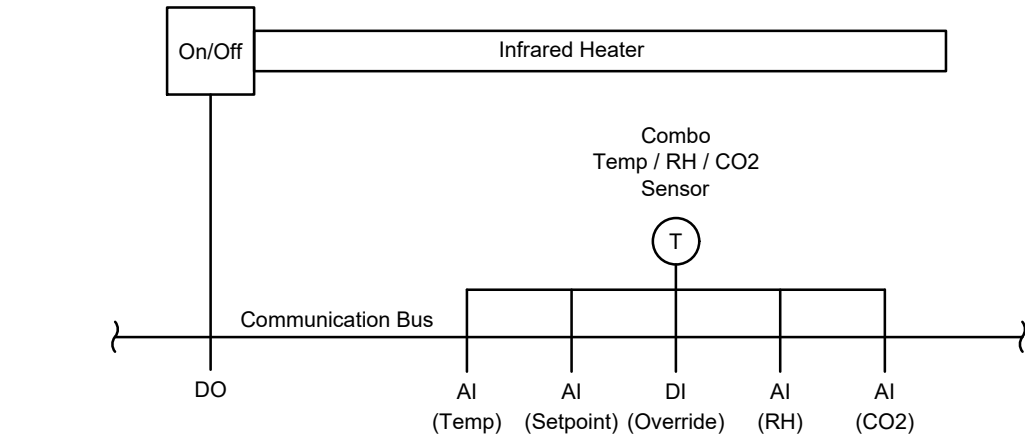
1. Mechanical contractor shall provide a 1/16" thick red plastic placard with white 1/4" high lettering indicating each dryer vent installation. The mechanical contractor shall install the placard prior to ceiling installation, but not before dryer vent installation has been completed. Dryers venting systems exceeding 35'-0", or the maximum distance allowable per the dryer manufacturer's installation instructions, are prohibited from being installed.
2. Placard shall include four pre-drilled holes, to be attached adjacent to the wall adjacent to the dryer connection with four screws.
3. All sections including "XXXXX" must be completed and reflect the dryer vent installation prior to installing placard.
4. Provide placard with pre-drilled holes in each of the four corners. Attach placard to wall within 5'-0" of dryer box with four screws.



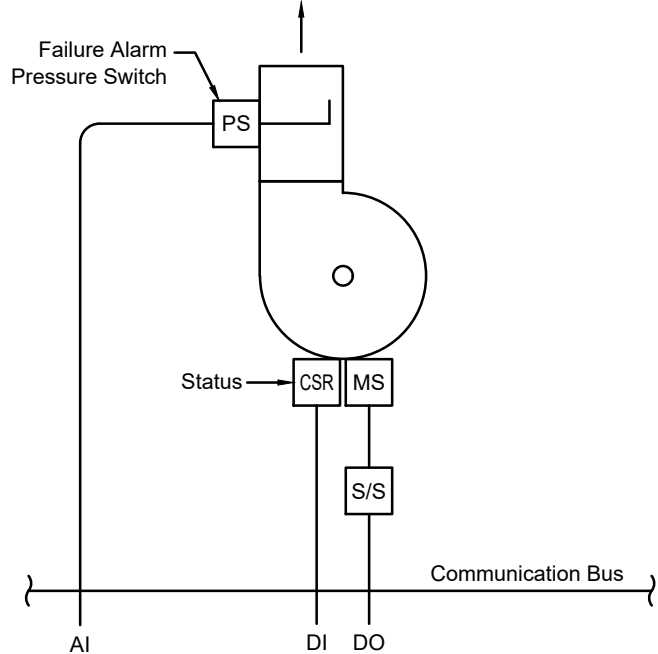
These drawings will be at the scale indicated when plotted at 24" x 36"



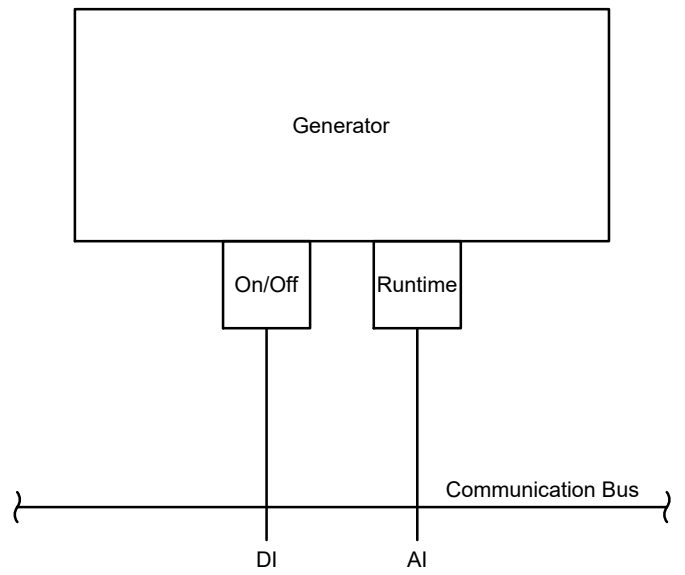
1 Standalone AHU Control Schematic
Scale: None



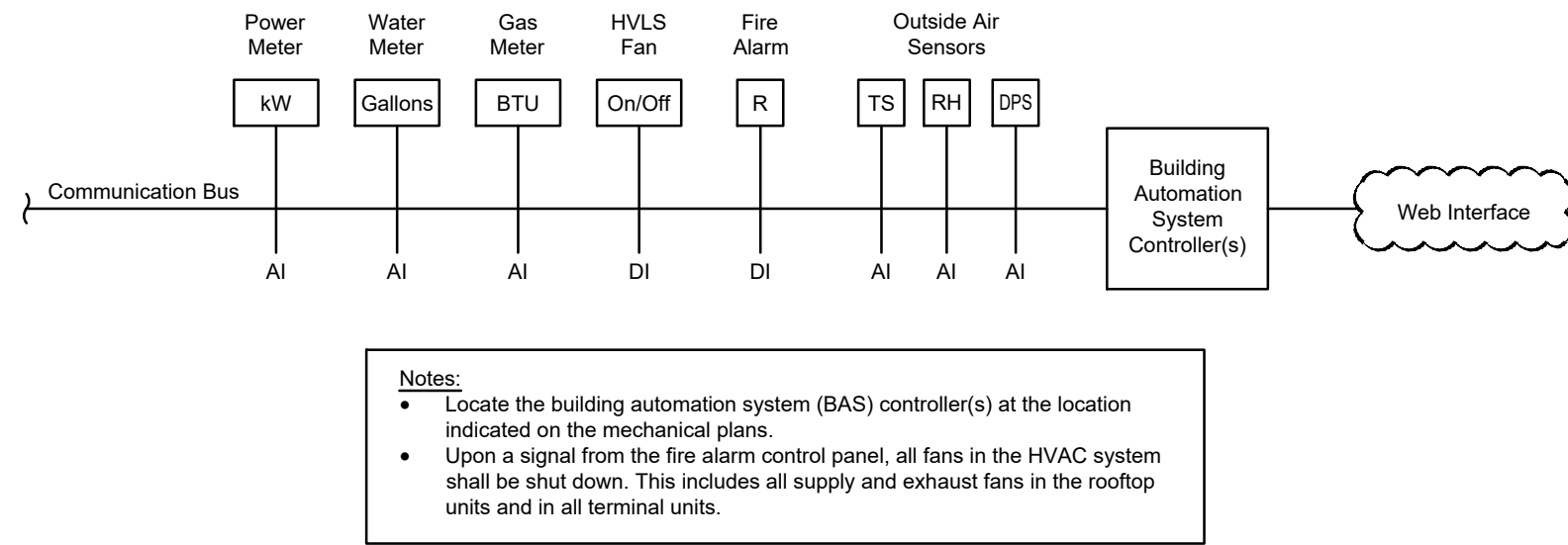
2 Infrared Heater Control Schematic
Scale: None



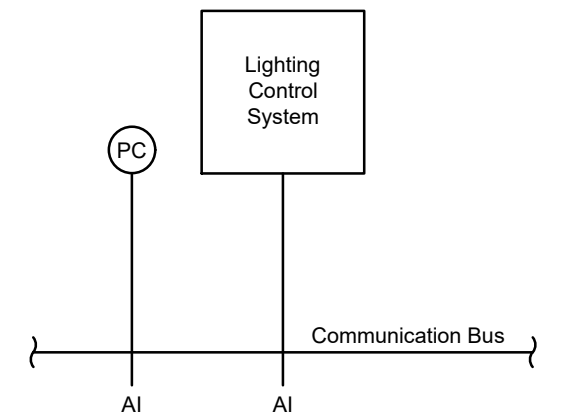
3 Exhaust Fan Control Schematic
Scale: None



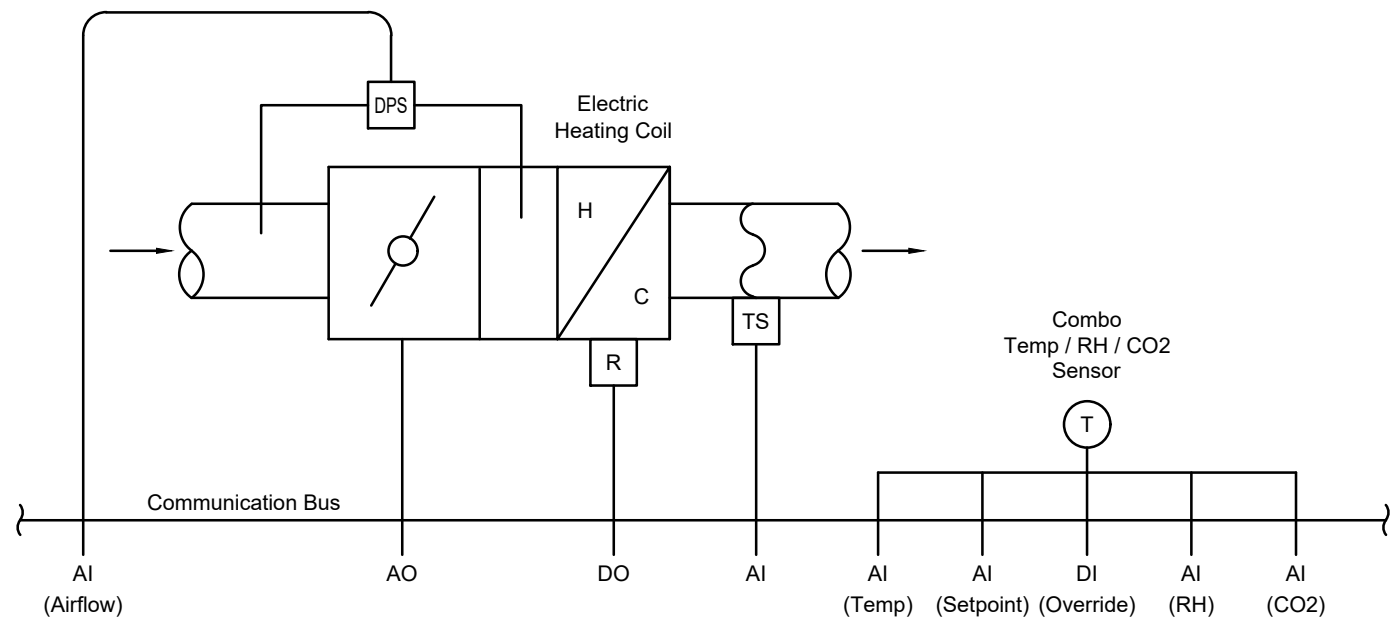
2 Generator Control Schematic
Scale: None



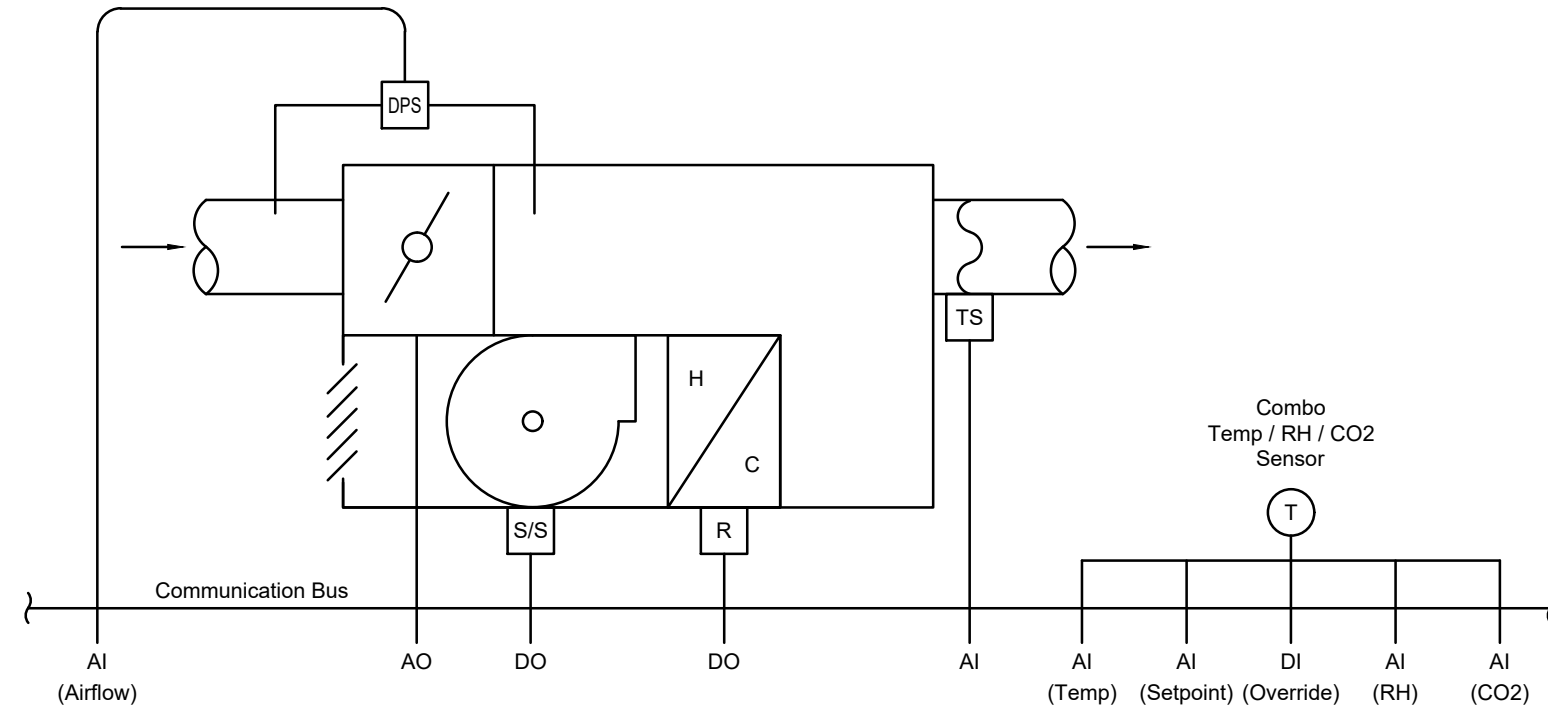
4 Building Automation System Control Schematic
Scale: None



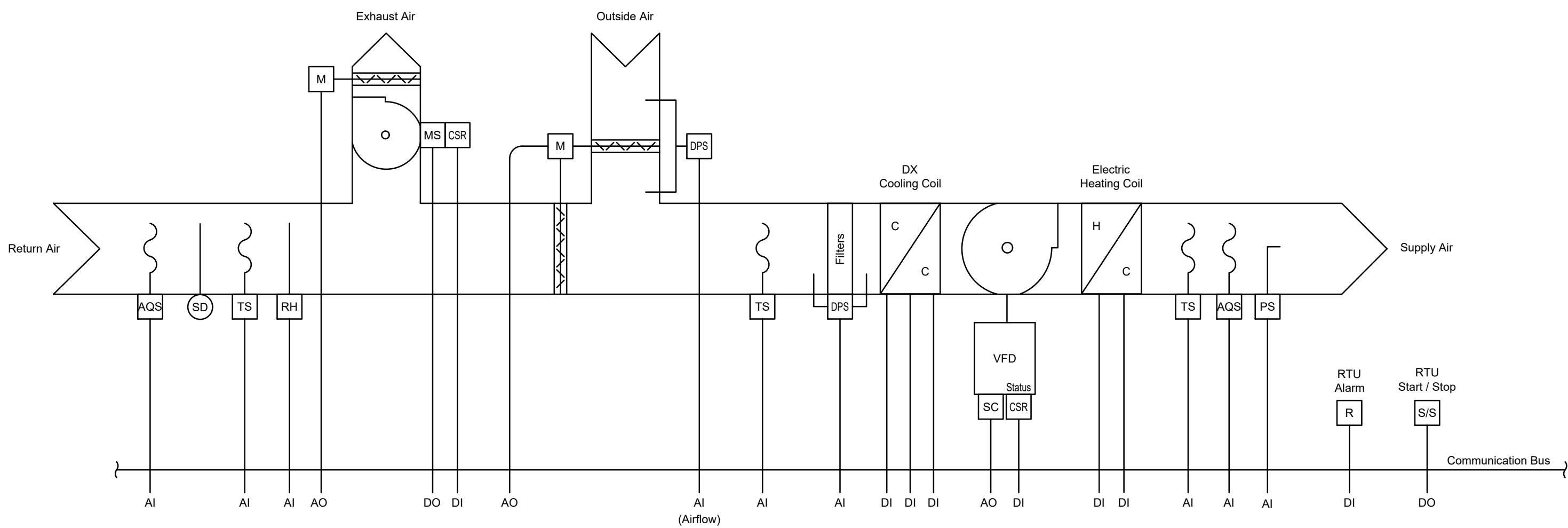
7 Building Lighting Control Schematic
Scale: None



5 Single Duct VAV with Reheat Control Schematic
Scale: None



6 Parallel VAV Fan Box Control Schematic
Scale: None



8 Variable Air Volume Rooftop Unit Control Schematic
Scale: None

Control Legend	
T	Space Temperature Sensor
TC	BACnet Thermostat
SD	Duct Smoke Detector
H	Space Humidistat
PC	Photocell
AQS	Air Quality Sensor
S/S	Start/Stop Relay
TS	Air/Fluid Temperature Sensor (Readings shall average)
PS	Static Pressure Sensor
RH	Relative Humidity Sensor
DPS	Differential Pressure Sensor
AFS	Airflow Station
HZ	Frequency
CSR	Current Sensing Relay
VFD	Variable Frequency Drive
MS	Motor Starter
FZ	Freezestat
SC	Speed Controller
R	Relay
C	Contact
M	Motorized Damper
Control Abbreviations	
AI	Analog Input
AO	Analog Output
BAS	Building Automation System
DI	Digital Input
DO	Digital Output

Building Automation System Overview:

The Building Automation System (BAS) for this facility shall be the Tridium Niagara 4 (N4) platform. All equipment/device controllers shall communicate to the Distech ECV-S1000 Series controllers via BACnet MS/TP, Modbus RTU, Modbus TCP, or M-Bus industry standard protocols.

Access to the BAS shall be through a standard web browser that has access to the building local network or via Internet. Credentials must be required to access the BAS. The BAS will be installed in a manner to allow each mechanical system to operate in a standalone mode in the event of a communication failure. Programming, standard equipment graphics, floor plans with zoning, trending, alarming, routing, and data archiving, shall be provided as required to execute the sequence of operations.

Refer to mechanical controls details for additional information.

Where equipment is supplied with internal control points for system monitoring, all points shall be exposed for integration into BAS.

HVAC Sequence of Operation:

Zones:

- The building is divided into zones. Each zone has a regular schedule of occupied and unoccupied periods. Consult owner for determination of occupied and unoccupied periods.
- During scheduled holidays, the zone operates in unoccupied mode.
- A manual override shall be available (where specified) at the zone sensor to allow temporary cooling or heating during unoccupied periods.
- Upon a loss of communication, all VAV dampers shall maintain the last position at the time of communication loss.

Optimum Start:

- The BAS shall use an "optimum start" algorithm to calculate and modify the start time of the HVAC equipment so that it starts at the latest possible moment prior to occupancy to achieve desired occupancy conditions at the desired time.
- The starting times shall be adjusted with changes in outside air temperature and from historical zone temperature response times.

Single Duct VAV Terminal Units with Electric Reheat:

- In occupied mode, the primary airflow setpoint shall be reset between minimum, heating CFM, and maximum, to maintain the room temperature at the occupied cooling/heating setpoint. The primary air damper shall modulate to maintain the airflow at setpoint. When the room temperature falls below the cooling throttling range, the flow rate shall be set to the minimum position.
- In unoccupied mode, the primary airflow setpoint shall be reset between minimum, heating CFM, and maximum, to maintain the room temperature at the unoccupied cooling setpoint. The primary air damper shall modulate to maintain the airflow at setpoint. When the room temperature falls below the cooling throttling range, the flow rate will be set to zero.
- The electric reheat shall stage on to maintain the room temperature at the heating setpoint. The occupied heating setpoint shall be a set amount below the cooling setpoint (within limits). The control system operator shall determine the unoccupied heating setpoint.
- The terminal unit discharge air temperature shall be monitored.
- For warm-up and cool-down modes, all terminal units shall operate as in occupied mode.

Fan Powered Terminal units:

- For series fan powered terminal units, the fan shall run continuously during occupied periods and shall cycle with a call for heating or cooling during unoccupied periods. The unit shall mix primary and plenum air to maintain a constant volume of supply air.
- For parallel fan powered terminal units, the fan shall cycle with a call for heating during occupied and unoccupied periods.
- In occupied mode, the primary airflow set point shall be reset between minimum and maximum to maintain the room temperature at the occupied cooling setpoint. The primary air damper shall modulate to maintain the air flow at setpoint. When the room temperature falls below the cooling throttling range, the flow rate shall be set to the minimum position.
- In unoccupied mode, the primary airflow setpoint shall be reset between minimum and maximum to maintain the room temperature at the unoccupied cooling setpoint. The primary air damper shall modulate to maintain the air flow at setpoint. When the room temperature falls below the cooling throttling range, the flow rate will be set to zero.
- The electric reheat shall stage on to maintain the room temperature at the heating setpoint and heating airflow. The occupied heating setpoint shall be a set amount below the cooling setpoint (within limits). The control system operator shall determine the unoccupied heating set point.
- The terminal unit discharge air temperature shall be monitored.
- For warm-up and cool-down modes, all terminal units shall operate as in occupied mode.

VAV Rooftop Units:

Occupied Mode

- The fan shall be indexed on and the VFD shall modulate the fan speed to maintain a constant duct static pressure of 1.75" w.c. (adjustable). The final duct static pressure setpoint shall be determined at the completion of test and balancing when all terminal units are operating at their maximum primary airflow setpoint. The fan shall be indexed off if the supply duct high limit static pressure exceeds set point of 3.0" w.c. (adjustable).
- The unit shall operate under internal controls to maintain the supply air temperature at 55°F (adjustable).
- The supply air temperature setpoint shall be reset based on the most critical zone at the time. The BAS shall continuously monitor the zones to determine the critical zone reset value. The maximum supply air temperature shall be 60°F (adjustable).
- The power exhaust fan(s) shall engage as required and modulate damper(s) to maintain a slight positive pressure (0.05" W.C. adjustable) within the building with respect to the outside.
- The supply air, return air, and mixed air temperatures shall be monitored.
- If the RTU unit fails to maintain supply air temperature or pressure within acceptable limits, the BAS shall generate an alarm.
- The BAS shall send a signal to the RTU to enable the outside air economizer based on outside air enthalpy.
- The BAS shall monitor the differential pressure across the filters and generate an alarm when the filters become loaded.
- Upon a loss of communication, all motorized dampers and supply fan shall maintain the last position at the time of communication loss.

Unoccupied Mode

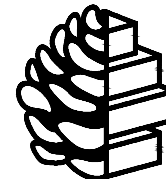
- Upon a call for cooling or on a zone override, the rooftop unit shall enter occupied mode until the zones are satisfied.
- The outside air damper shall remain closed unless there is a zone override.
- The unit shall have a warm-up and cool-down mode for the switch between unoccupied and occupied periods. During warm-up and cool-down modes the outdoor air damper shall modulate to fully closed unless overridden by the economizer.
- Upon a loss of communication, all motorized dampers and supply fan shall maintain the last position at the time of communication loss.

Exhaust Fans:

- The exhaust fans shall stage on during occupied hours and shall run continuously to provide ventilation to the space.

Fire Alarm:

- Upon a signal from the fire alarm control panel, all fans in the HVAC system shall be shut down. This includes supply and exhaust fans in the rooftop unit and all fans in terminal units.



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SCO ID # N/A

DRAWING TITLE

MECHANICAL

CONTROLS DETAILS

DRAWING NUMBER

M-203

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