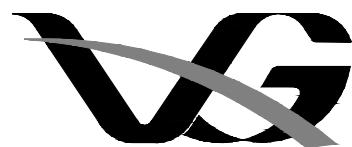


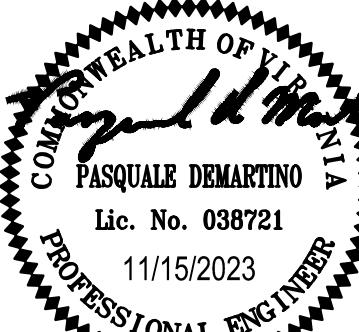
# COMMUNITY UNITED METHODIST CHURCH

## CLASSROOM HVAC REPLACEMENT

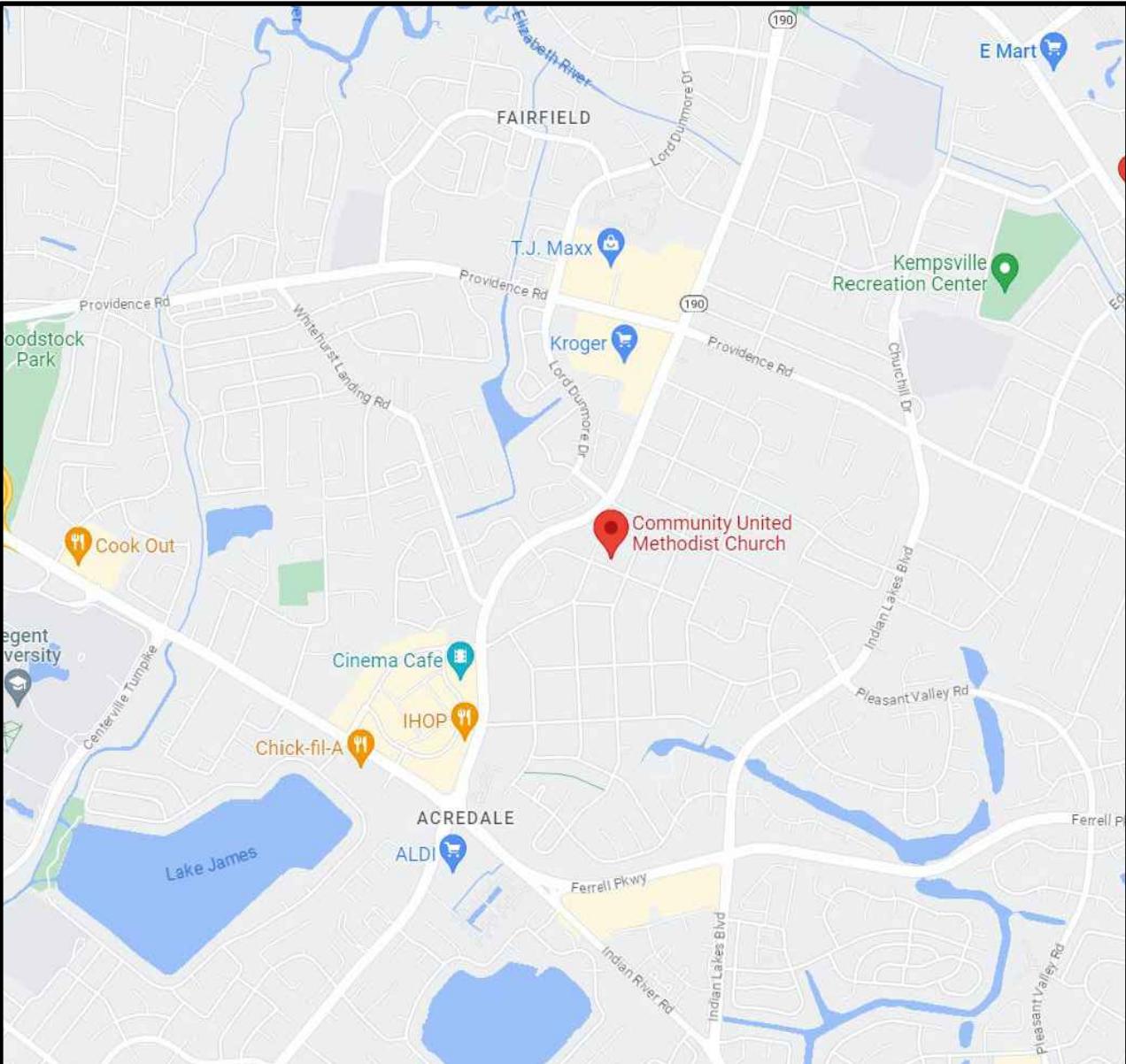
1072 Old Kempsville Rd  
Virginia Beach, VA 23464



VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTOWN ROAD, SUITE 400, NORFOLK, VA 23502



PASQUALE DEMARTINO  
Lie. No. 036721  
11/15/2023  
PROFESSIONAL ENGINEER  
SEAL



VICINITY MAP

### BUILDING CODE DATA

APPLICABLE CODE: VUSBC 2018

OCCUPANCY: 38

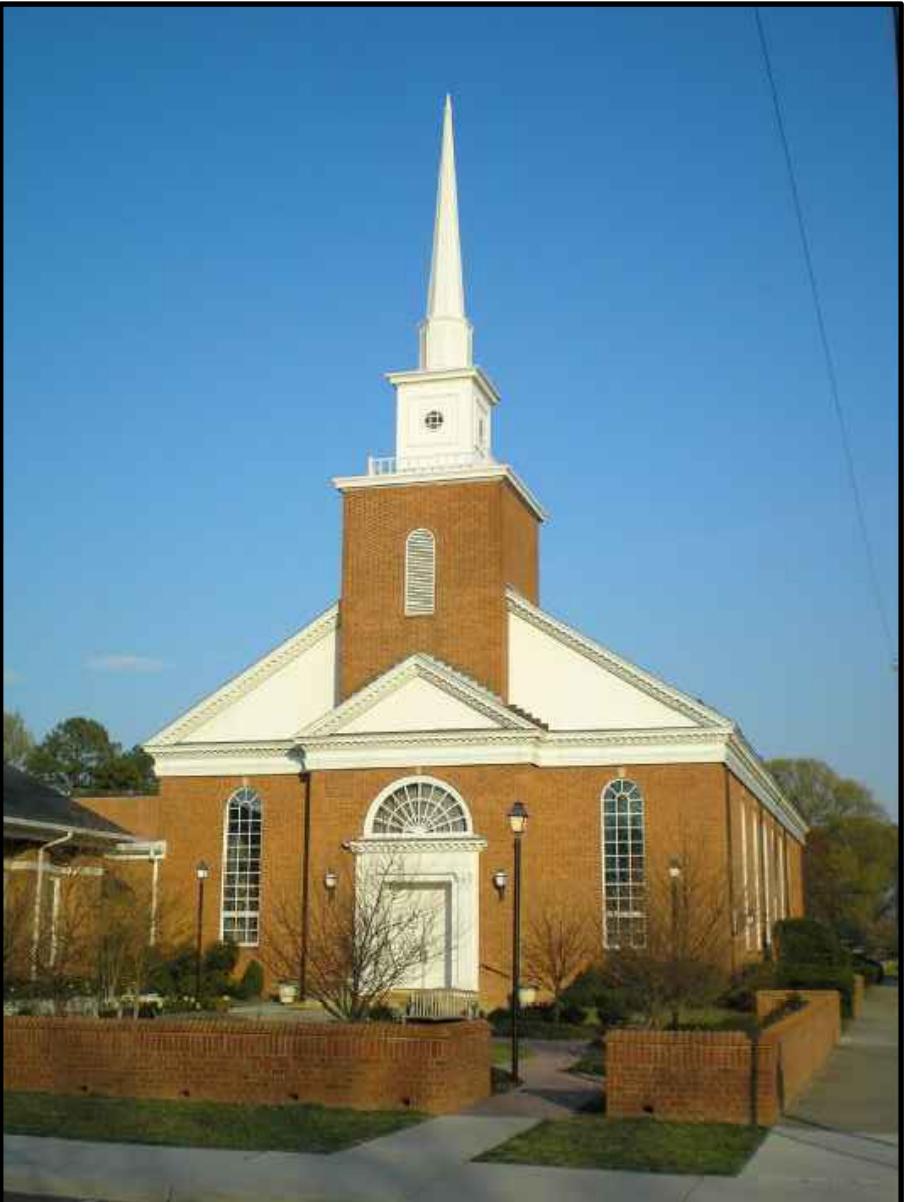
CONSTRUCTION TYPE: TYPE VB

TOTAL GROSS AREA (FT<sup>2</sup>): 1900

DESIGN CONDITIONS								
SPACE	INDOOR		OUTDOOR					
	SUMMER		WINTER		SUMMER		WINTER	
	FDB	%RH	FDB	%RH	FDB	FWB	FDB	FWB
CLASSROOMS	75	50	70	50	93	77	20	16.6
LOUNGE	75	50	70	50	93	77	20	16.6
STORAGE	75	50	70	50	93	77	20	16.6
MEETING ROOM	75	50	70	50	93	77	20	16.6

### MECHANICAL GENERAL DEMOLITION NOTES

- EXISTING HVAC PIPING, DUCTWORK, AND EQUIPMENT SHOWN IS BASED ON EXISTING PLANS AND FIELD OBSERVATION WITHOUT DEMOLITION. AFTER DEMOLITION, ANY CLARIFICATION REQUIRED TO DETERMINE SCOPE OF WORK SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
- THE CONTRACTOR SHALL VISIT THE JOB SITE AND THOROUGHLY FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS.
- DRAWINGS DO NOT SHOW EVERY EXISTING PIPE, CONDUIT, DUCT, ETC. CONTRACTOR SHALL TAKE CARE TO REMOVE ONLY ITEMS REQUIRED TO BE REMOVED AND VERIFY PIPES, DUCTS, ETC. BEFORE REMOVAL.
- BUILDING IS TO REMAIN OCCUPIED DURING CONSTRUCTION. REMOVAL OR SHUT-DOWN OF EQUIPMENT THAT AFFECTS AN OCCUPIED AREA'S AIR CONDITIONING OR HEATING SHALL ONLY BE DONE AS APPROVED OR TEMPORARY AIR CONDITIONING OR HEATING SHALL BE PROVIDED AT CONTRACTOR'S EXPENSE. THIS MAY REQUIRE NIGHT AND WEEKEND WORK TO KEEP BUILDING IN OPERATION.
- REMOVE EXISTING EXPOSED DUCTWORK AND PIPING NOT TO BE REUSED. ABANDON IN PLACE UNUSED DUCTWORK AND PIPING CONCEALED ABOVE CEILINGS, IN WALLS OR BELOW FLOORS.



### CONTRACT GENERAL CONDITIONS

- CONTRACTOR WILL VERIFY ALL SIZES AND EXISTING CONDITIONS PRIOR TO SUBMITTING A BID FOR THE PROJECT.
- CONTRACTOR WILL BE RESPONSIBLE FOR OBTAINING AND POSTING ALL APPLICABLE PERMITS.
- CONTRACTOR WILL NOT INTERRUPT OR DISTURB THE NORMAL OPERATIONS OF THE BUILDING.
- COORDINATE WITH THE OWNER FOR LOCATION OF ANY CONSTRUCTION OFFICE OR STORAGE TRAILER. CONTRACTOR WILL NOT BLOCK ANY PARKING AREAS/DRIVeways OR INTERFERE WITH THE TRAFFIC FLOW AROUND THE BUILDING.
- CONTRACTOR WILL NOT INTERRUPT ANY UTILITIES OR SERVICE PROVIDED TO THE BUILDING WITHOUT PRIOR PERMISSION.
- CONTRACTOR MUST PROVIDE SAFETY TAPE AND BARRIERS AROUND AREAS OF WORK. ALL EQUIPMENT AND MATERIALS MUST BE SECURED FROM THEFT AND VANDALISM.
- CONTRACTOR WILL CONTROL WORKERS ON SITE AT ALL TIMES. WORKERS WILL BE RESTRICTED TO THE WORKING AREAS ONLY. WORKERS WILL NOT USE BUILDING LOUNGES, VENDING MACHINES OR TELEPHONES.
- CONTRACTOR WILL NOT ALLOW TRASH TO ACCUMULATE OVER 1 DAY. ALL CONSTRUCTION DEBRIS AND TRASH MUST BE DISPOSED OF IN CONTRACTOR'S DISPOSAL BIN. CONTRACTOR WILL NOT USE BUILDING DUMPSTER FOR DISPOSAL OF DEBRIS OR TRASH.
- NO SMOKING AT ANY TIME IN THE BUILDINGS.
- THE BUILDINGS MUST BE IN OPERATION DURING CONSTRUCTION. PHASING AND SCHEDULING IS REQUIRED AS SPECIFIED. CONTRACTOR SHALL SCHEDULE HIS WORK AND COORDINATE HIS ACTIVITIES SO AS TO CAUSE THE LEAST INTERFERENCE WITH THE NORMAL OPERATIONS OF THE BUILDING. WORK THAT RESULTS IN EXCESSIVE NOISE OR FUMES SHALL BE SCHEDULED DURING WEEKENDS OR AFTER NORMAL WORKING HOURS.
- ROOF SUPPORTS SHALL BE PROVIDED WITH STRUCTURAL ANALYSIS INDICATING THAT SUPPORTS PROVIDED DO NOT COMPROMISE EXISTING ROOF AND JOIST INTEGRITY.
- DISCONNECT AND REMOVE THE EXISTING ABOVE GROUND 500 GALLON FUEL OIL TANK. THE CONTRACTOR SHALL COORDINATE WITH THE CHURCH'S FUEL DELIVERY COMPANY TO REMOVE EXISTING FUEL AND RELOCATE TO ONE OF THE OTHER CHURCH'S FUEL TANKS AND ASSOCIATED WORK COMPLETE AS INDICATED ON THE CONTRACT DRAWINGS.

### GENERAL MECHANICAL NOTES

- PROVIDE ALL NECESSARY LABOR, EQUIPMENT, ETC. FOR ALL WORK INDICATED AND REQUIRED FOR A COMPLETE INSTALLATION.
- MECHANICAL CONTRACTOR SHALL PROVIDE ALL STARTERS FOR MECHANICAL EQUIPMENT AND ELECTRICAL CONTRACTOR SHALL INSTALL STARTERS.
- CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND PROPER RELATION OF THE MECHANICAL WORK TO THE BUILDING STRUCTURE AND THE WORK OF OTHER TRADES.
- PROTECT WORK AGAINST THEFT, INJURY OR DAMAGE. CAREFULLY STORE MATERIAL AND EQUIPMENT OFF THE GROUND AND UNDER COVER. CLOSE OPEN ENDS OF WORK OR EQUIPMENT WITH TEMPORARY COVERS OR PLUGS DURING STORAGE AND CONSTRUCTION TO PREVENT ENTRY OF OBSTRUCTING MATERIAL.
- CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD.
- DRAWINGS:
  - DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED IN THE CONTRACT.
  - THE CONTRACTOR SHALL, WITHOUT EXTRA CHARGES, MAKE REASONABLE MODIFICATIONS IN THE LAYOUT. BECAUSE OF THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS AND ACCESSORIES THAT MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE EXISTING PLUMBING, ELECTRICAL, STRUCTURAL, ARCHITECTURAL AND NEW ELECTRICAL CONDITIONS THAT WOULD AFFECT THE WORK TO BE PERFORMED AND SHALL ARRANGE SUCH WORK ACCORDINGLY, FURNISHING REQUIRED DUCTWORK OFFSETS, FITTINGS, ACCESSORIES, AND MODIFY CONFIGURATION TO MEET SUCH CONDITIONS.
- SHOULD DISCREPANCIES OCCUR BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, OR WITHIN EITHER DOCUMENT ITSELF, THE ITEM ARRANGEMENT OF BETTER QUALITY, GREATER QUANTITY, OR HIGHER COST SHALL BE INCLUDED IN THE CONTRACT PRICE. THE ENGINEER SHALL DECIDE ON THE ITEM AND MANNER IN WHICH THE WORK SHALL BE INSTALLED.
- CONTRACTOR SHALL FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECKING SHOP DRAWINGS OF OTHER TRADES TO VERIFY SPACE IN WHICH WORK WILL BE INSTALLED. MAINTAIN HEADROOM AND SPACE CONDITIONS AT ALL POINTS. WHERE HEADROOM AND SPACE CONDITIONS APPEAR INADEQUATE, THE ENGINEER SHALL BE NOTIFIED BEFORE PROCEEDING WITH INSTALLATION. SUBMITTAL OF SHOP DRAWINGS INDICATE THAT THE CONTRACTOR HAS COORDINATED THEIR WORK WITH OTHER TRADES AND ACCEPTS EXISTING CONDITIONS.
- SUBCONTRACTORS SHALL PROVIDE ALL CUTTING, PATCHING, AND FIRE STOPPING AS REQUIRED FOR HIS WORK.

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### BASIS BID AND ALTERNATIVE BID ITEMS

#### BASE BID

REMOVE EXISTING AND PROVIDE NEW HVAC EQUIPMENT AND MINOR ASSOCIATED DUCTWORK MODIFICATIONS SERVING THE FIRST FLOOR CLASSROOMS (ROOMS 112, 113, 114, 115, 116, 117, 118, 119, AND 120) INCLUDING BUT NOT LIMITED TO TESTING, AND ASSOCIATED ELECTRICAL WORK, COMPLETE AND READY FOR OCCUPANCY.

#### ADDITIONAL BID ITEM NO. 1:

REMOVE EXISTING AND PROVIDE NEW HVAC SYSTEM SERVING THE FIRST FLOOR CLASSROOMS (ROOMS 108, 109, 110 AND 111) AND SECOND FLOOR STORAGE ROOMS, LOBBY AND CONFERENCE ROOM, INCLUDING BUT NOT LIMITED TO TESTING, ASSOCIATED ROOF WORK, AND ASSOCIATED ELECTRICAL WORK, COMPLETE AND READY FOR OCCUPANCY.

#### ADDITIONAL BID ITEM NO. 2:

DISCONNECT AND REMOVE THE EXISTING ABOVE GROUND 500 GALLON FUEL OIL TANK. THE CONTRACTOR SHALL COORDINATE WITH THE CHURCH'S FUEL DELIVERY COMPANY TO REMOVE EXISTING FUEL AND RELOCATE TO ONE OF THE OTHER CHURCH'S FUEL TANKS AND ASSOCIATED WORK COMPLETE AS INDICATED ON THE CONTRACT DRAWINGS.

Project #:	23041
Date:	11/15/2023
Project Manager:	PCS
Designed By:	PCS
Drawn By:	BAC
Checked By:	PCS
COMMUNITY UNITED METHODIST CHURCH CLASSROOM HVAC REPLACEMENT	
TITLE SHEET	
1072 OLD KEMPSVILLE RD	
VIRGINIA BEACH, VA 23464	
G-001	
SHEET 1 OF 18	

## MECHANICAL SPECIFICATIONS

### PART 1 - GENERAL

- THE SCOPE OF THE WORK INCLUDES FURNISHING AND INSTALLING A FIRST CLASS WORKING MECHANICAL SYSTEM, TESTED AND READY FOR OPERATION, COMPLETE WITH LABOR, MATERIALS, APPARATUS, TRANSPORTATION, TESTING, BALANCING AND TOOLS REQUIRED FOR THE INSTALLATION IN CONFORMANCE WITH DRAWINGS, THESE SPECIFICATIONS, AND EQUIPMENT INSTALLATION.
- THE CONTRACTOR SHALL DELIVER AND INSTALL THE MECHANICAL MATERIALS AND EQUIPMENT COVERED BY THE PLANS AND SPECIFICATIONS COMPLETE AND IN FIRST CLASS CONDITION IN EVERY RESPECT. THEY SHALL GUARANTEE THAT THE MATERIALS, EQUIPMENT AND WORKMANSHIP PROVIDED BY THEM SHALL BE ENTIRELY FREE FROM DEFECTS, AND THAT THEY WILL REPAIR AND REPLACE AT THEIR OWN EXPENSE AS MAY BE DIRECTED BY THE OWNER, ANY MATERIAL, EQUIPMENT OR WORKMANSHIP IN WHICH DEFECTS MAY DEVELOP. PROVIDE A WRITTEN WARRANTY FOR A PERIOD OF 12 MONTHS AGAINST DEFECTIVE WORKMANSHIP AND MATERIAL AFTER FINAL ACCEPTANCE AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE OPERATION AND MAINTENANCE, AND INSTALLATION MANUAL FOR ALL NEW HVAC EQUIPMENT AND CONTROL SYSTEM.
- PROVIDE ON SITE OWNER MAINTENANCE STAFF TRAINING FOR NEW HVAC EQUIPMENT AND CONTROLS. PROVIDE 2 DAYS (8 HOURS EACH) OF COMBINED CLASSROOM AND HANDS ON SERVICE TRAINING FOR NEW HVAC AND CONTROLS. COORDINATE TRAINING SCHEDULE WITH OWNER.

### PART 2 - PRODUCTS

- THE CONTRACTOR SHALL PROVIDE LG AND AAON EQUIPMENT AS SCHEDULED ON THE CONTRACT DRAWINGS. SUBMIT BAS DRAWINGS TO ENGINEER AS A SHOP DRAWING FOR REVIEW.
  - PROVIDE EACH RTU WITH A UV LAMP INSTALLED IN THE COIL SECTION, LUMALIER PART NUMBER: AR95-2x3-24.
- METAL DUCT SYSTEM
  - PROVIDE SHOP FABRICATED GALVANIZED STEEL DUCTS CONFORMING TO ASTM A653 WITH G90 GALVANIZED COATING. FABRICATE, CONSTRUCT, BRACE, REINFORCE, INSTALL, SUPPORT AND SEAL DUCTS IN DIRECTION OF FLOW. PROVIDE DUCTS STRAIGHT AND SMOOTH ON THE INSIDE WITH NEATLY FINISHED AIR TIGHT JOINTS.
  - RECTANGULAR DUCTS AND FITTINGS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" BASED ON INDICATED STATIC PRESSURE CLASS UNLESS OTHERWISE INDICATED.
  - ROUND DUCTS AND FITTINGS: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE", CHAPTER 3, "ROUND, OVAL AND FLEXIBLE DUCT" BASED ON INDICATED STATIC PRESSURE CLASS UNLESS OTHERWISE NOTED. TURNING VENES - SMACNA DCS FOR VANCED ELBOWS.
- PIPING
  - NATURAL GAS PIPING: ASTM A120 BLACK STEEL, PLAIN END, SEAMLESS, GRADE B SCHEDULE 40. CLASS 150 MALLEABLE IRON FITTINGS.
  - CONDENSATE DRAIN PIPING: SCHEDULE 40 PVC.
  - FIELD REFRIGERANT PIPING FOR DIRECT EXPANSION HVAC SYSTEMS: REFRIGERANT PIPING SHALL BE SIZED, SELECTED AND DESIGNED BY EQUIPMENT MANUFACTURER. PIPING SHALL MEET ASRM 280 AND MBE MARKED ACR. REFRIGERANT TUBING SHALL HAVE BRAZED JOINTS, CADMIUM FREE, 45% SILVER BRAZING ALLOY.
- INSULATION

## MECHANICAL NOTES

- INSULATE SUPPLY DUCTWORK WITH 2.2" THICK, 3/4# DENSITY WITH AN INSTALLED R-VALUE OF 6.0. MINERAL FIBER BLANKET INSULATION AND JACKET, COMPLY WITH ASTM C553, TYPE II.
  - REFRIGERANT PIPE INSULATION SHALL BE 1/2" THICKNESS FOR PIPE SIZES UP TO 1 1/2" DIAMETER. INSULATION SHALL BE 0.21 TO 0.27 BTU. IN (HxTxF) WITH A MEAN TEMPERATURE OF 75°. FOR EXTERIOR WEATHERPROOFING APPLY A MULTI-PLY, LAMINATED FOIL/FILM FACING FOR EXTERIOR APPLICATION. FOLLOW MANUFACTURER'S INSTRUCTION FOR INSTALLATION OF WEATHER PROOFING.
  - SPLIT SYSTEM UNITS:
    - SPLIT SYSTEM EQUIPMENT SHALL BE PROVIDED.
    - TERMINAL UNITS AIR FLOWS SHALL BE RE-BALANCED AS PART OF TAB WORK. TERMINAL UNITS SHALL BE BALANCED USING THE CRITICAL ZONE RESET METHOD.
    - CONTRACTOR SHALL PROVIDE NEW FILTERS FOR ALL FAN-POWERED VAV BOXES.
  - CONTROLS
    - CONTROLS SHALL BE A MODIFIED LG BUILDING AUTOMATION SYSTEM TO CAPTURE BOTH LG EQUIPMENT AND AAON EQUIPMENT.
    - BUILDING AUTOMATION SYSTEM SHALL BE ACCESSIBLE THROUGH WEB BROWSER.
- PART 3 - EXECUTION
- COORDINATE WORK CLOSELY WITH OTHER TRADES AND THE COMMUNITY CHURCH MAINTENANCE STAFF.
  - INSTALL INSULATION AFTER TESTING IS COMPLETE.
  - THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR, AND BE REQUIRED TO MAKE GOOD AT THEIR OWN EXPENSE, ANY AND ALL DAMAGES TO ANY WORK OR MATERIALS IN PLACE ON THE PREMISES, OR INCLUDED IN THIS CONTRACT, DURING THE EXECUTION OF THEIR CONTRACT.
  - PROVIDE ALL MATERIALS, TOOLS, LABOR, AND OTHER RELATED ITEMS TO COMPLETE ALL WORK, INCLUDING CONNECTIONS TO ALL EQUIPMENT.
  - WIRING AND ELECTRICAL EQUIPMENT FROM SOURCE UP TO AND INCLUDING JUNCTION BOX OR CIRCUIT BREAKER SHALL BE BY ELECTRICAL CONTRACTOR. POWER WIRING FROM JUNCTION BOX, DISCONNECT SWITCH OR CIRCUIT BREAKER INCLUDING CONTROL WIRING AND FINAL CONNECTIONS SHALL BE BY MECHANICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL PROVIDE INDIVIDUAL COMPONENT FUSIBLE PROTECTION FOR EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S NAMEPLATE.
  - EQUIPMENT WHICH IS REQUIRED BY CODE OR IS SPECIFIED TO HAVE UL OR SIMILAR LISTING, SHALL BE INSTALLED AS REQUIRED TO MEET THAT LISTING.
  - TESTING, ADJUSTING AND BALANCING HVAC SYSTEM. SCOPE OF WORK: WORK INCLUDES TAB OF THE HVAC SYSTEM AFTER REPLACEMENT. TESTING AND BALANCING CONTRACTOR SHALL BE NEEB OR AACB CERTIFIED.
  - FINAL TAB REQUIREMENTS: PERFORM SPACE AIRFLOW READINGS AT SCHEDULED MAXIMUM AIRFLOW VALUES INDICATED IN RECORD DRAWINGS. SUBMIT ELECTRONIC (PDF) COPY OF TEST RESULTS FOR REVIEW BY THE ENGINEER.
  - SUBMITTAL REQUIREMENTS:
    - TAB AGENCY AND TESTER QUALIFICATIONS AND CERTIFICATION.

- PROVIDE COMPLETE SYSTEM OF OPERATING AND SAFETY CONTROLS AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. ALL WORK AND EQUIPMENT SHALL BE PER ALL APPLICABLE CODES AND ORDINANCES. ALL WORK SHALL BE PERFORMED PER THE INTERNATIONAL MECHANICAL CODE 2018.
- DUCTWORK AND INSULATION: ALL SHEETMETAL SHALL BE CONSTRUCTED PER SMACNA STANDARDS FOR 1" LOW PRESSURE DUCT WITH SEAL CLASS C. PROVIDE DUCT SEALANT PER IMC 2018.
  - ALL DUCTWORK SHALL BE INSTALLED TIGHT TO THE UNDERSIDE OF STRUCTURE (ABOVE LIGHTS) AND COORDINATED WITH LIGHTS.
  - FLEXIBLE DUCTS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE AND CONNECTED WITH PLASTIC DRAW BANDS TIGHTENED WITH MANUFACTURER'S TOOL. FLEXIBLE DUCTS LOCATED OUTSIDE THE MECHANICAL ROOM SHALL BE UN-INSULATED TYPE, MANUFACTURED BY COREFLEX, MODEL NO. F090. THE LENGTH OF FLEX DUCT SHALL AS SHOWN ON THE CONTRACT DRAWINGS. FLEXIBLE DUCT LOCATED INSIDE THE MECHANICAL ROOM SHALL BE THE INSULATED TYPE.
- SPLIT SYSTEM HEAT PUMPS
  - PROVIDE AS SCHEDULED ON DRAWINGS
- AIR DISTRIBUTION DEVICES:
  - PROVIDE AS SCHEDULED ON DRAWINGS OR EQUIVALENT.
  - FILTERS:
    - PROVIDE MERV 8 FILTERS.
- CONDENSATE PIPING:
  - SCHEDULE 40 PVC
- PROVIDE COMPLETE SYSTEM OF TEMPERATURE CONTROL, INCLUDING LOW VOLTAGE CONTROL WIRING AND INSTRUMENTATION FOR HVAC UNITS. SEE SEQUENCE OF OPERATION FOR ADDITIONAL INFORMATION.
- SUPPORT DUCTWORK WITH GALVANIZED STEEL STRAP IN CONCEALED LOCATIONS.
- PROVIDE A COMPLETE SYSTEM, TESTED AND READY FOR OPERATION.
- ADJUST CONTROLS AND EQUIPMENT SO AS TO GIVE SATISFACTORY OPERATION.
- PROVIDE ELECTRICAL DISCONNECTS, POWER WIRING AND FINAL CONNECTIONS.

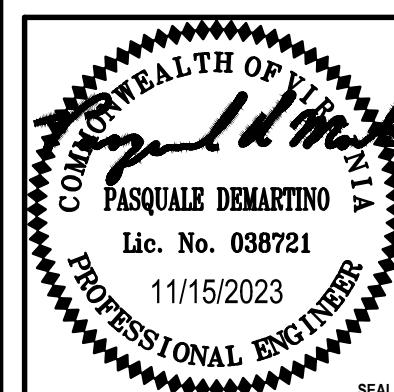
## LEGEND

(X)	GRILLE, REGISTER OR DIFFUSER TAG (CFM AS NOTED)
XXX	BALANCE EXISTING TERMINAL DEVICE TO INDICATED VALUE
	SUPPLY AIR CEILING DIFFUSER
	RETURN AIR GRILLE / REGISTER
	EXHAUST AIR GRILLE / REGISTER
	SURFACE MOUNTED SUPPLY DIFFUSER
	SURFACE MOUNTED RETURN/EXHAUST GRILLE
	SUPPLY AIR DUCT TURNING DOWN
	SUPPLY AIR DUCT TURNING UP
	RETURN AIR DUCT TURNING DOWN
	RETURN AIR DUCT TURNING UP
	EXHAUST AIR DUCT TURNING DOWN
	EXHAUST AIR DUCT TURNING UP
	VOLUME DAMPER
FD	FIRE DAMPER
	MOTORIZED DAMPER
	SMOKE DETECTOR
(T)	THERMOSTAT, WALL MOUNTED
(H)	HUMIDITY SENSOR, WALL MOUNTED
(P)	POINT OF CONNECTION NEW TO EXISTING
(L)	POINT OF DEMOLITION LIMIT
(?)	KEYNOTE
D	CONDENSATE DRAIN PIPING
RS/L	REFRIGERANT SUCTION AND LIQUID PIPING
	DEMOLISH MATERIAL AS NOTED
ACCU-#	AIR COOLED CONDENSING UNIT DESIGNATION
AHU-#	AIR HANDLING UNIT DESIGNATION
HP-#	HEAT PUMP DESIGNATION
L#	LOUVER DESIGNATION

## ABBREVIATIONS

AD	ACCESS DOOR (DUCT)
AFF	ABOVE FINISHED FLOOR
AP	ACCESS PANEL
APPROX	APPROXIMATELY
CD	CEILING DIFFUSER
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB TEMPERATURE
DN	DOWN
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EDB	ENTERING DRY BULB TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
EWB	ENTERING WET BULB TEMPERATURE
FA	FREE AREA
FLA	FULL LOAD AMPS
HP	HORSEPOWER
LAT	LEAVING AIR TEMPERATURE
LDB	LEAVING DRY BULB TEMPERATURE
LWB	LEAVING WET BULB TEMPERATURE
LWT	LEAVING WATER TEMPERATURE
MBH	1000 BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPACITY
MIN	MINIMUM
MOPC	MAXIMUM OVER CURRENT PROTECTION
OA	OUTSIDE AIR
PD	PRESSURE DROP
RA	RETURN AIR
RH	RELATIVE HUMIDITY
SA	SUPPLY AIR
SC	SENSIBLE COOLING
SD	SMOKE DETECTOR
SF	SQUARE FEET
SP	STATIC PRESSURE
TC	TOTAL COOLING
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VRF	VARIABLE REFRIGERANT FLOW
WB	WET BULB TEMPERATURE
WC	WATER COLUMN
WG	WATER GAUGE
Ø	ROUND DUCT/PHASE

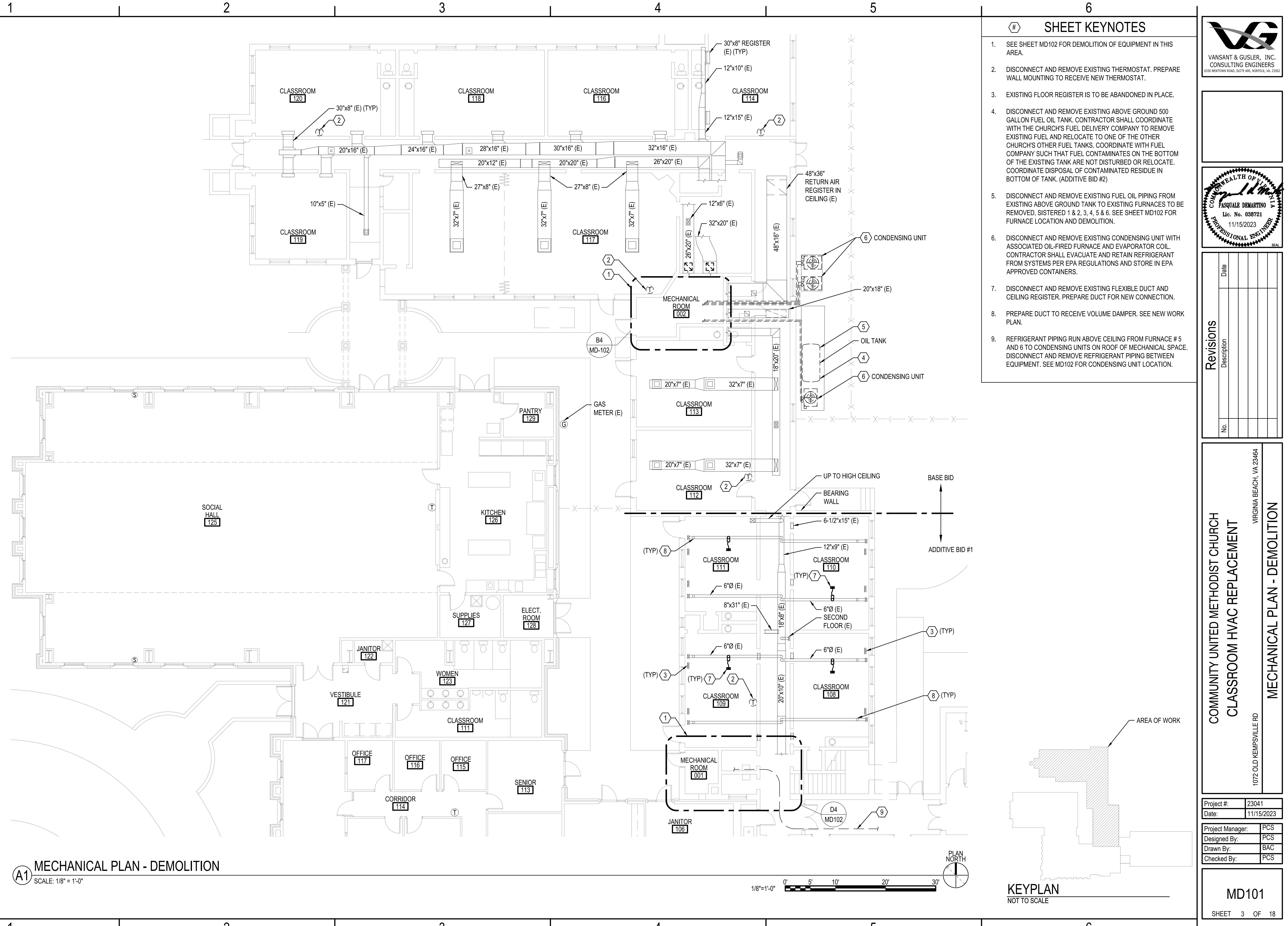
**VG**  
VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTON ROAD, SUITE 400, NORFOLK, VA 23502



Revisions	Date
No.	Description

COMMUNITY UNITED METHODIST CHURCH CLASSROOM HVAC REPLACEMENT	
Project #:	23041
Date:	11/15/2023
Project Manager:	PCS
Designed By:	PCS
Drawn By:	BAC
Checked By:	PCS

M-001  
SHEET 2 OF 18



1

2

3

4

4

# SHEET KEYNOTES



VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTOWN ROAD, SUITE 400, NORFOLK, VA. 23502

1. FURNACE #5 IS A DOWN FLOW UNIT. DISCONNECT AND REMOVE EXISTING FURNACE #5 WITH ASSOCIATED DX COOLING COIL AND FLUE TO CHIMNEY. REMOVE ASSOCIATED FUEL OIL INLINE FILTER AND PIPING BACK TO ABOVE BATHROOM CEILING. REMOVE CONDENSATE PIPING BACK TO EXTERIOR OF EXTERIOR WALL. EXISTING FLOOR SUPPLY DUCTWORK SHALL REMAIN. CONTRACTOR SHALL CLEAN ALL BELOW GROUND DUCTWORK COMPLETE. PREPARE DUCT TO RECEIVE NEW CONNECTION.
  2. REMOVE EXISTING RETURN DUCT AND ASSOCIATED FILTER GRILLE.
  3. DISCONNECT AND REMOVE EXISTING FURNACE #6. REMOVE EXISTING ASSOCIATED DX COOLING COIL AND FLUE TO CHIMNEY. REMOVE ASSOCIATED FUEL OIL INLINE FILTER AND PIPING BACK TO ABOVE GROUND FUEL OIL TANK. REMOVE RETURN DUCTWORK BETWEEN FURNACES AND SUPPLY DUCT UP TO DEMOLITION LIMIT LINE.
  4. DISCONNECT AND REMOVE REFRIGERANT PIPING FROM EXISTING FURNACE #5 AND #6 BACK TO ROOF MOUNTED CONDENSING UNITS. REMOVE REMOTE ROOF MOUNTED CONDENSING UNITS COMPLETE TO INCLUDE ROOF SUPPORTS. CONTRACTOR SHALL EVACUATE AND RETAIN REFRIGERANT FROM SYSTEMS PER EPA REGULATIONS AND STORE IN EPA APPROVED CONTAINERS. REMOVE REFRIGERANT PIPING FROM ABOVE CORRIDOR CEILING BACK TO FURNACES TO INCLUDE ALL HANGERS AND SUPPORTS.
  5. DISCONNECT AND REMOVE EXISTING FLOOR REGISTER. INTERNALLY CLEAN SUPPLY DUCTWORK IN FIRST FLOOR CEILING FROM EACH REGISTER BACK TO DEMOLITION LIMIT LINE IN SUPPLY DUCT SHOWN AT MECHANICAL ROOM 001. CLEAN AND REINSTALL FLOOR REGISTER.
  6. EXISTING ABANDONED FLOOR REGISTER. TO REMAIN.
  7. DISCONNECT AND REMOVE TWINNED ARMSTRONG - 58KU125 AND LENNOX - K6C120 OIL-FIRED FURNACES AND ASSOCIATED COOLING COIL SECTIONS FROM SUPPLY DUCTWORK AND RETURN DUCTWORK. REMOVE REFRIGERANT PIPING FROM COOLING COIL BACK TO EXTERIOR CONDENSING UNIT COMPLETE. SEE SHEET MD101 FOR DEMOLITION OF CONDENSING UNIT.
  8. DISCONNECT AND REMOVE EXISTING OIL-FIRED FURNACE, ARMSTRONG - LUF80 AND ASSOCIATED COOLING COIL SECTION FROM SUPPLY DUCTWORK AND RETURN DUCTWORK. REMOVE REFRIGERANT PIPING FROM COOLING COIL BACK TO EXTERIOR CONDENSING UNIT COMPLETE. SEE SHEET MD101 FOR DEMOLITION OF CONDENSING UNIT.
  9. DISCONNECT AND REMOVE EXISTING OIL-FIRED FURNACE #3. COMFORT AIR - 1G18M AND ASSOCIATED COOLING COIL SECTION FROM SUPPLY DUCTWORK AND RETURN DUCTWORK. REMOVE REFRIGERANT PIPING FROM COOLING COIL BACK TO EXTERIOR CONDENSING UNIT COMPLETE. SEE SHEET MD101 FOR DEMOLITION OF CONDENSING UNIT.
  10. DISCONNECT AND REMOVE EXISTING FLUE PIPE FROM EACH FURNACE UP TO WITHIN 3 INCHES OF CEILING. CAP AND SEAL PIPE AT CEILING TO REMAIN. REMOVE RAIN CAP FROM FLUE PIPE ON ROOF. CAP AND SEAL FLUE PIPE ON ROOF.
  11. DISCONNECT AND REMOVE REFRIGERANT PIPING AND FUEL PIPING FROM EACH EVAPORATOR COIL AND FURNACE BACK TO EXTERIOR CONDENSING UNITS AND OIL TANK COMPLETE.
  12. DISCONNECT AND REMOVE EXISTING THERMOSTAT. PATCH WALL HOLE WITH EXISTING AND PAINT TO MATCH EXISTING.

A large rectangular box occupies the left side of the page. Inside, at the top, is the text "VIRGINIA BEACH, VA 23464". Below this, centered, is a small logo consisting of a stylized letter "H" above a smaller letter "T".

**COMMUNITY UNITED METHODIST CHURCH  
CLASSROOM HVAC REPLACEMENT**

**ENLARGED  
1072 OLD KEMPSVILLE**

Project #:	23041
Date:	11/15/2023
Project Manager:	PCS
Designed By:	PCS
Drawn By:	BAC

Checked By:	PCS		
MD102			
SHEET	4	OF	18

F

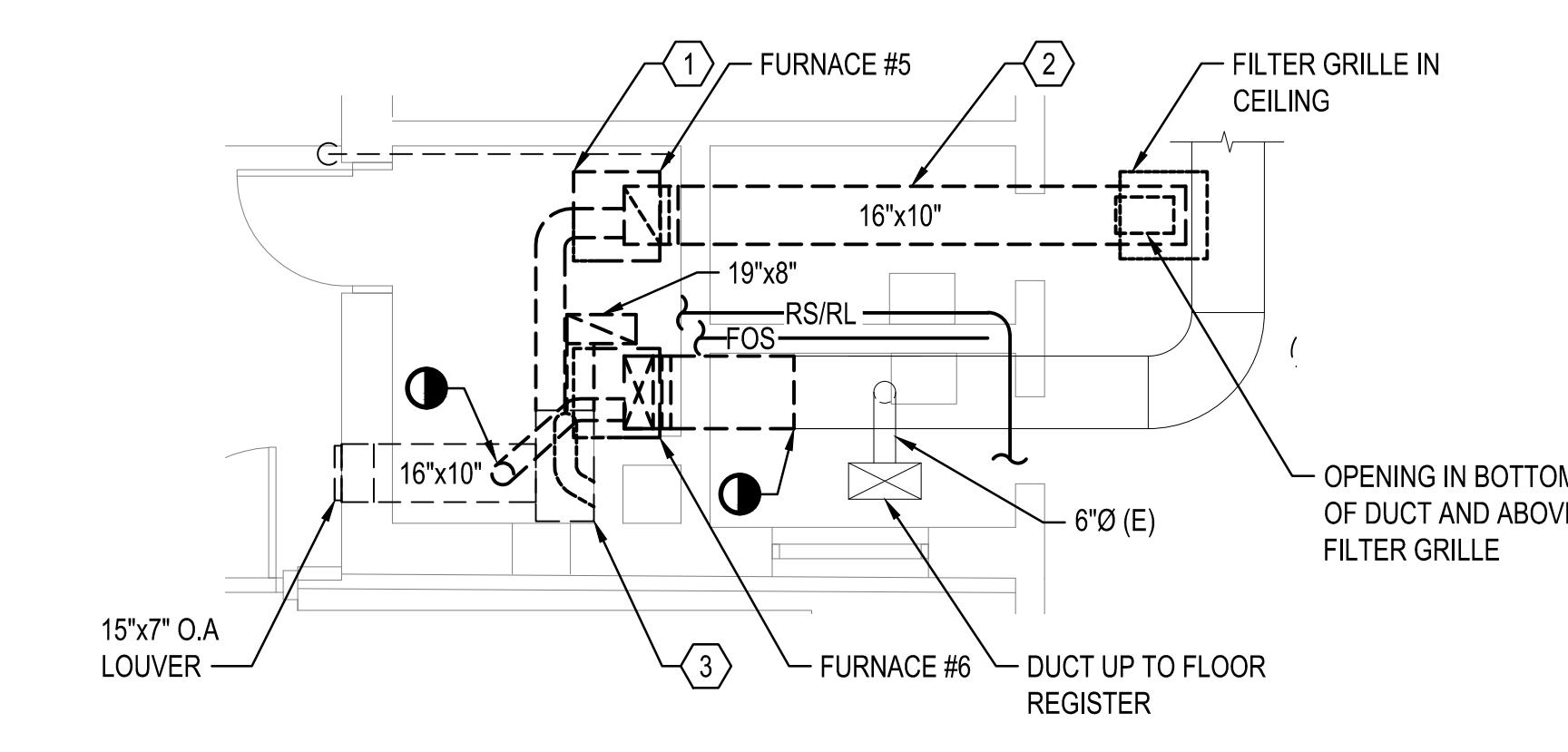
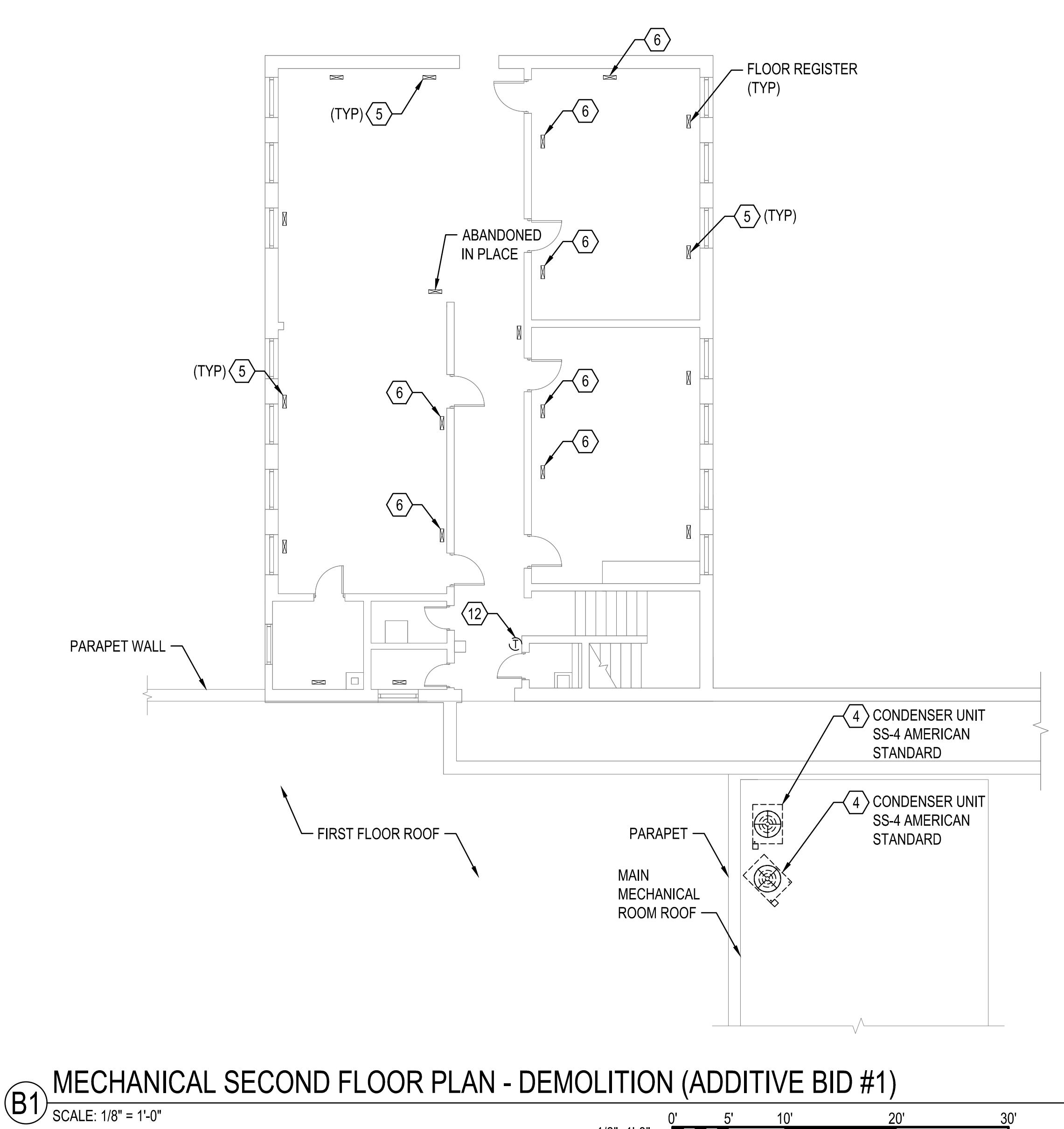
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C

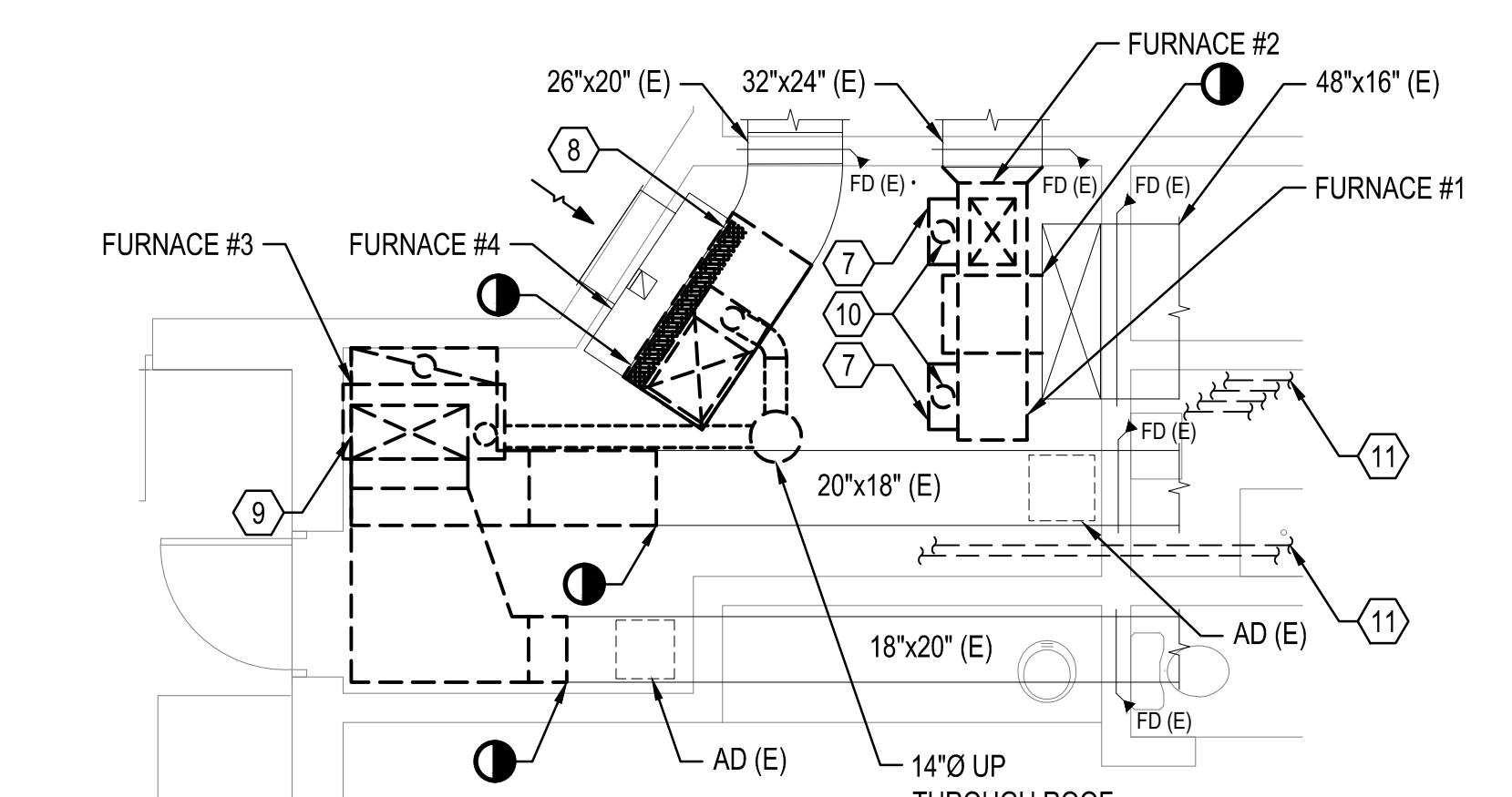
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A



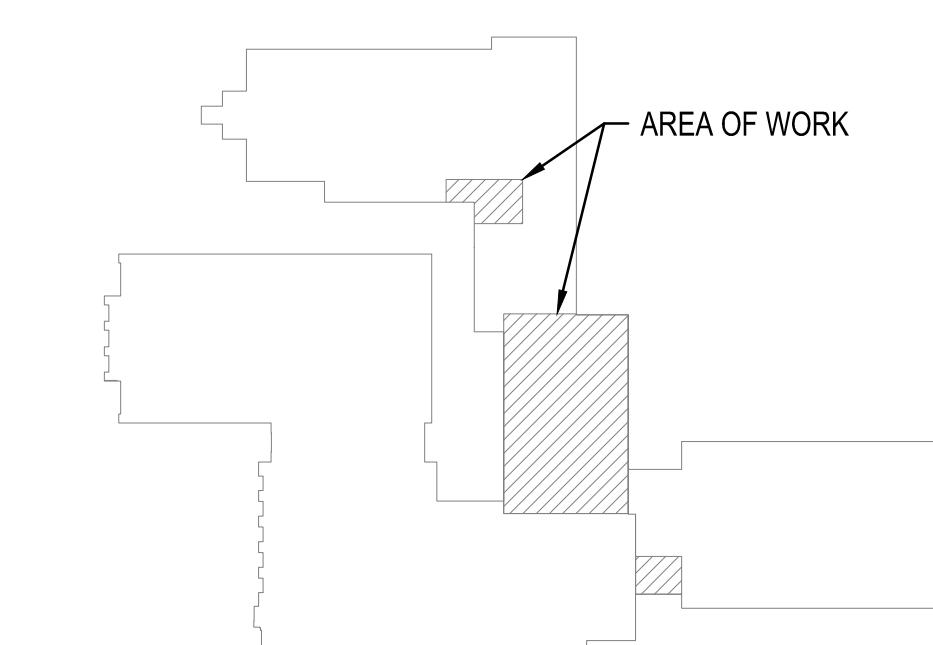
# MECHANICAL ROOM 001 FLOOR PLAN - DEMOLITION (ADDITIVE BID #1)

D4 (ADDITIVE DIM. W/)  
SCALE: 1/4" = 1'-0" 0' 1' 5' 10' 15' 



MECHANICAL ROOM 002 FLOOR PLAN - DEMOLITION  
(BASE BID)

B4 (BASE BID) SCALE: 1/4" = 1'-0" 0' 1' 5' 10' 15' 1/4"=1'-0"



 KEYPLAN  
NOT TO SCALE

SHEET 4 OF 18

1

2

3

4

5

6

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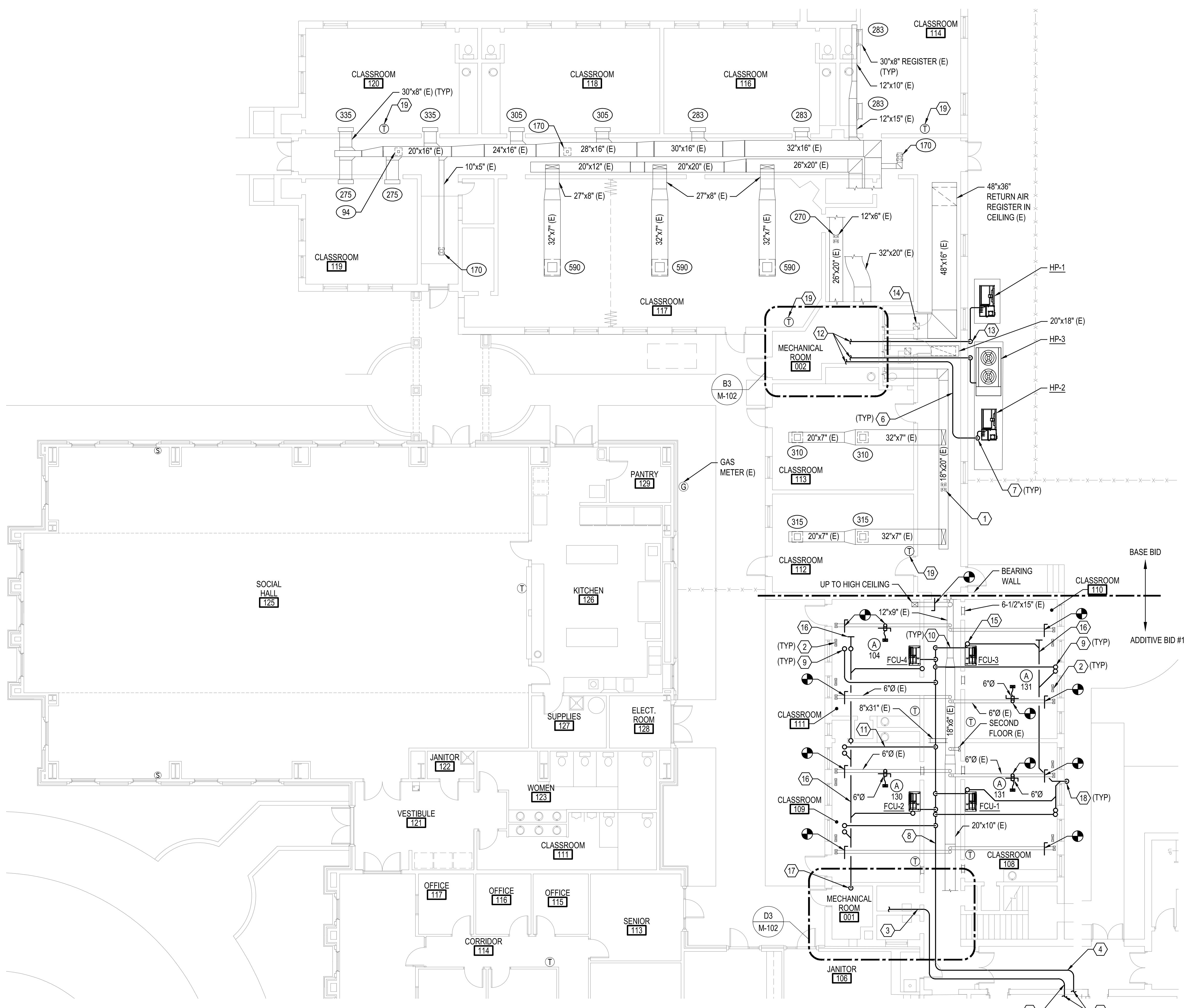
E

D

C

B

A

**SHEET KEYNOTES**

- CLOSE DAMPER IN SUPPLY DIFFUSER NECK OF DIFFUSER LOCATED ABOVE DROPPED CEILING.
- EXISTING FLOOR REGISTER ABANDONED IN PLACE.
- RS, RL AND HOT GAS REFRIGERANT PIPING RUN ABOVE CORRIDOR CEILING FROM DOAS-1 TO DOAS-HP ON MECHANICAL ROOM ROOF.
- RS, RL AND HOT GAS REFRIGERANT PIPING RUN ABOVE CEILING OF EXISTING CORRIDOR FROM VRF UNITS TO VRF-CU-1 ON MECHANICAL ROOM ROOF.
- SEE M102 FOR CONTINUATION OF PIPING UP TO OUTDOOR UNITS ON ROOF.
- REFRIGERANT PIPING RUNS ABOVE THE EXISTING CEILING.
- EXTEND REFRIGERANT PIPING THROUGH EXISTING WALL OPENINGS FROM DEMOLISHED REFRIGERANT PIPING. OPENINGS SHALL BE MODIFIED AS REQUIRED BASED ON NE PIPE SIZES AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER. SEAL WALL OPENING WEATHER TIGHT. PROVIDE WEATHERPROOF INSULATION PROTECTION AS DETAILED.
- REFRIGERANT PIPING RUN ABOVE THE EXISTING CEILING TO SERVE THE FAN COIL UNITS.
- PIPING TURNS UP FROM FIRST FLOOR CEILING TO VRF FAN COIL UNIT ON SECOND FLOOR. COORDINATE WITH SHEET M-102 FOR SECOND FLOOR VRF FAN COIL UNIT LOCATION. VRF FAN COIL UNIT AND PIPING PENETRATIONS SHALL BE COORDINATED WITH EXISTING JOISTS TO AVOID CONFLICTS.
- TYPICAL ROUTING OF REFRIGERANT PIPING TO EXPOSED CEILING MOUNTED VRF FAN COIL UNIT.
- CONTRACTOR SHALL BE AWARE THAT SOME DRILLING OF EXISTING WALL ABOVE THE EXISTING WILL BE REQUIRED FOR ROUTING OF REFRIGERANT PIPING.
- SEE SHEET M-102 FOR LOCATION OF AIR HANDLER UNITS.
- SECURE PIPING TO WALL WITH STAND-OFFS.
- EXISTING OUTDOOR AIR INTAKES ON RETURN AIR DUCTS UP THROUGH ROOF.
- 1/2" CONDENSATE DRAIN LINE. PROVIDE CONNECTION OF EXPOSED CEILING CASSETTE UNIT FLEXIBLE DRAIN LINE TO PVC LINE WITH BARBED FITTING.
- 1" CONDENSATE DRAIN PIPE.
- EXTEND CONDENSATE DRAIN LINE THROUGH WALL ABOVE CEILING. TURN PIPING DOWN AND CONNECT TO DRAIN PIPING FROM DOAS UNIT TO SPILL ON GRADE. PROVIDE 45° PIPE CONNECTION IN DIRECTION OF FLOW. ROUTE PIPE IN MECHANICAL SPACE TO AVOID CONFLICT WITH ELECTRICAL PANEL.
- COMBINE DRAIN PIPING ABOVE CEILING AS SHOWN. EXTEND DRAIN PIPING THROUGH EXTERIOR WALL ABOVE CEILING. TURN PIPING DOWN ALONG WALL AND ALONG SIDE OF EXISTING ROOF DOWN SPOUT AND SPILL ON ROOF DRAIN SPLASH BLOCK. SECURE DRAIN PIPING TO WALL.
- MOUNT THERMOSTAT IN SAME LOCATION AS EXISTING DEMOLISHED WALL THERMOSTAT.

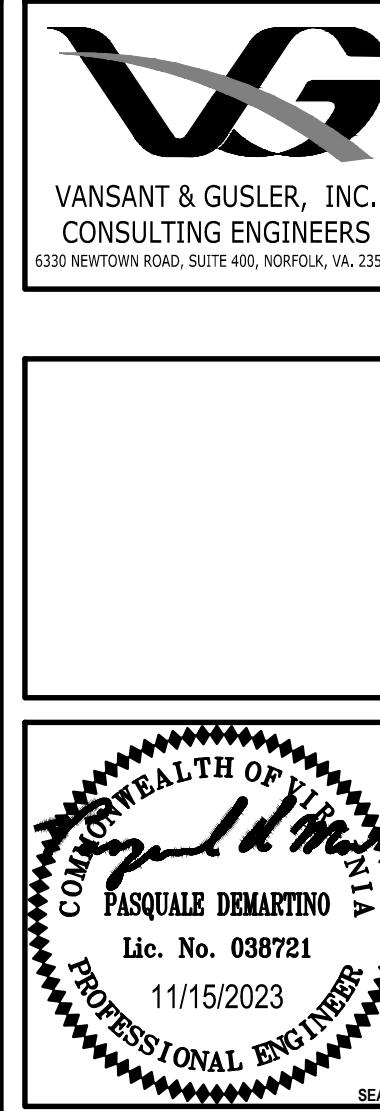
COMMUNITY UNITED METHODIST CHURCH  
CLASSROOM HVAC REPLACEMENT

1072 OLD KEMPSVILLE RD VIRGINIA BEACH, VA 23464

Project #: 23041  
Date: 11/15/2023  
Project Manager: PCS  
Designed By: PCS  
Drawn By: BAC  
Checked By: PCS

M-101

SHEET 5 OF 18

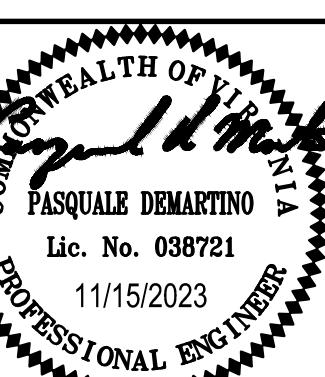


Revisions	Date
No.	Description





VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTOWN ROAD, SUITE 400, NORFOLK, VA 23502



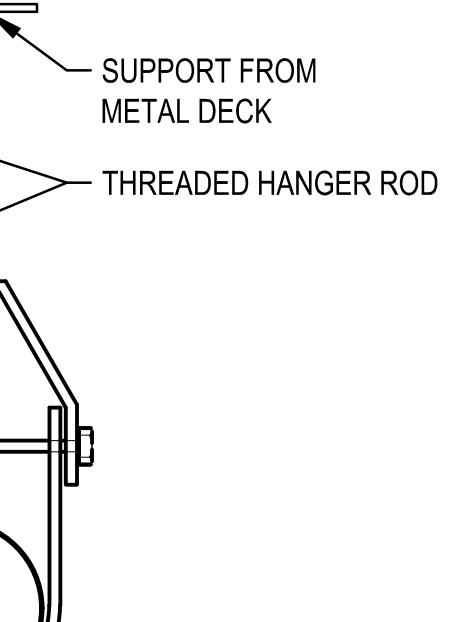
PASQUALE DEMARTINO  
Lic. No. 030721  
11/15/2023  
PROFESSIONAL ENGINEER  
SEAL

Revisions	Date	Date
No.	Description	

1072 OLD KEMPSVILLE RD  
VIRGINIA BEACH, VA 23464  
COMMUNITY UNITED METHODIST CHURCH  
CLASSROOM HVAC REPLACEMENT  
MECHANICAL DETAILS

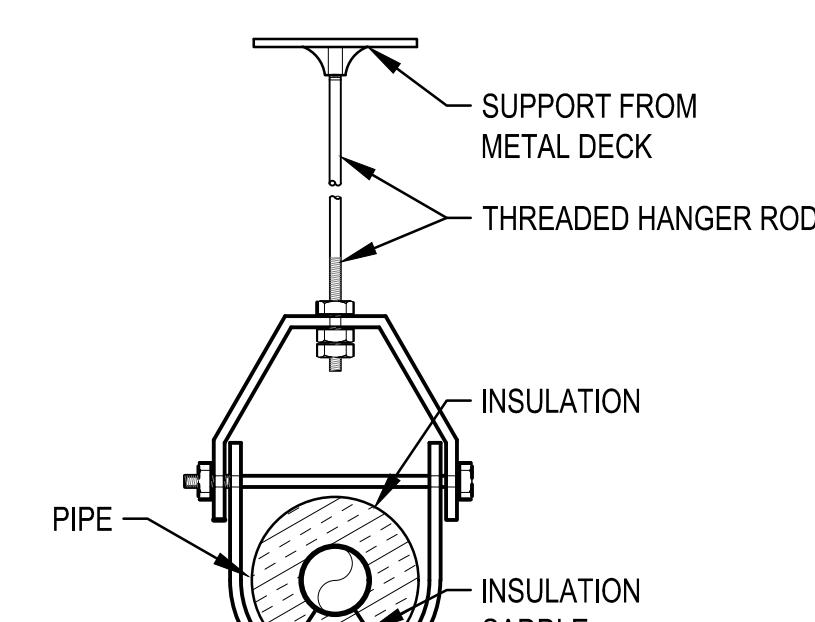
Project #: 23041  
Date: 11/15/2023  
Project Manager: PCS  
Designed By: PCS  
Drawn By: BAC  
Checked By: PCS

M-501  
SHEET 7 OF 18



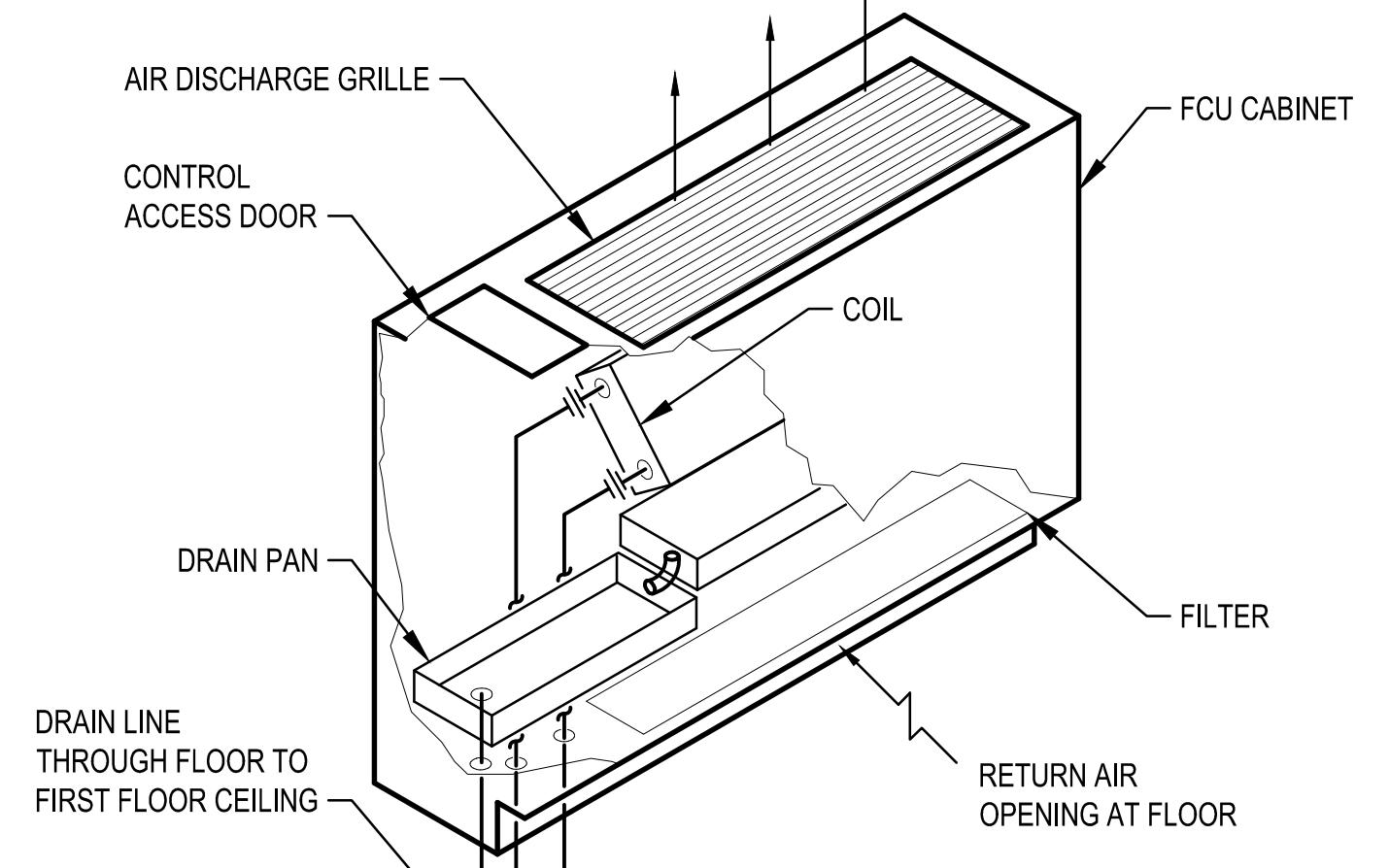
**E1** PIPE HANGER DETAIL - NON INSULATED  
NOT TO SCALE

NOTE:  
1. PROVIDE HANGER AND SPACING AS REQUIRED BY CODE.  
2. DETAIL TYPICAL FOR PVC PIPING.



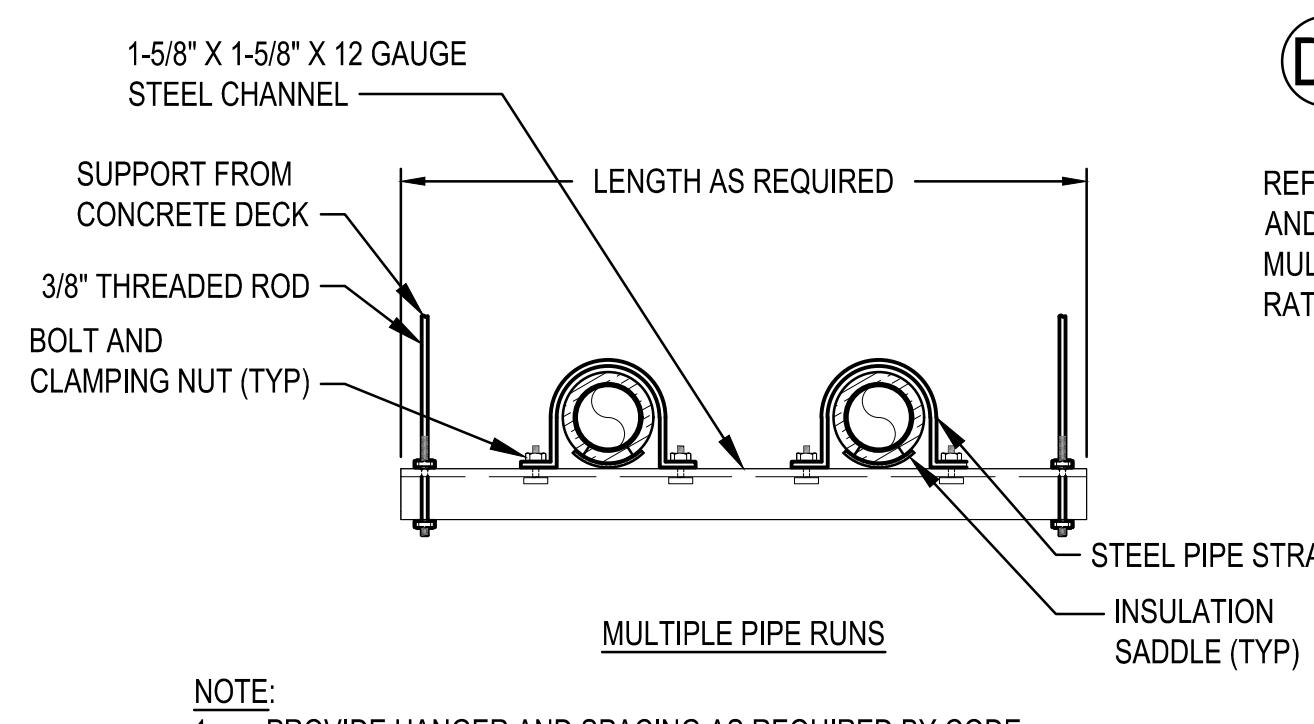
**E2** PIPE HANGER DETAIL - INSULATED  
NOT TO SCALE

NOTE:  
1. PROVIDE HANGER AND SPACING AS REQUIRED BY CODE.



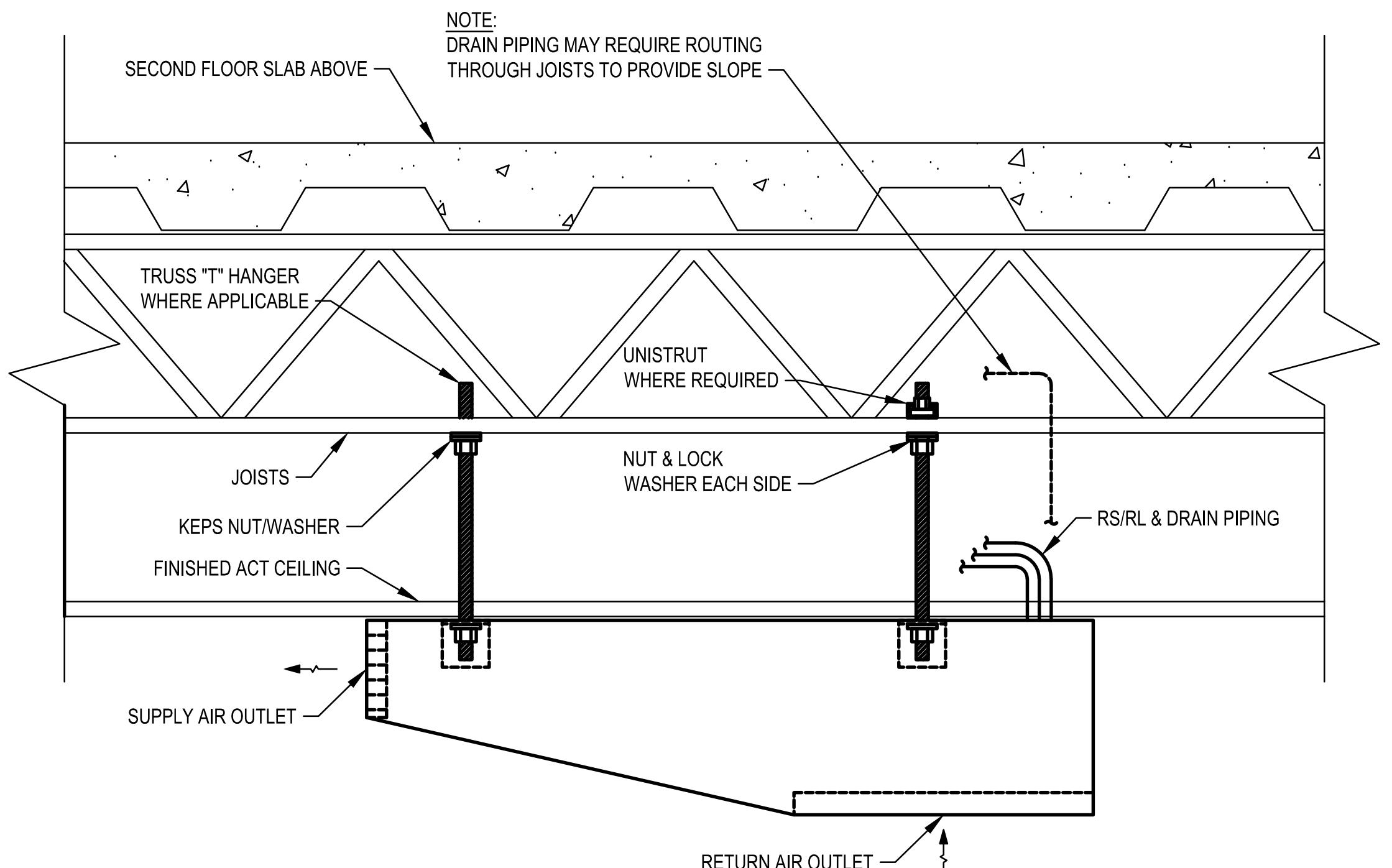
**C1** FAN COIL UNIT PIPING DETAILS  
NOT TO SCALE

AIR DISCHARGE GRILLE  
CONTROL ACCESS DOOR  
COIL  
DRAIN PAN  
DRAIN LINE THROUGH FLOOR TO FIRST FLOOR CEILING  
FILTER  
RETURN AIR OPENING AT FLOOR



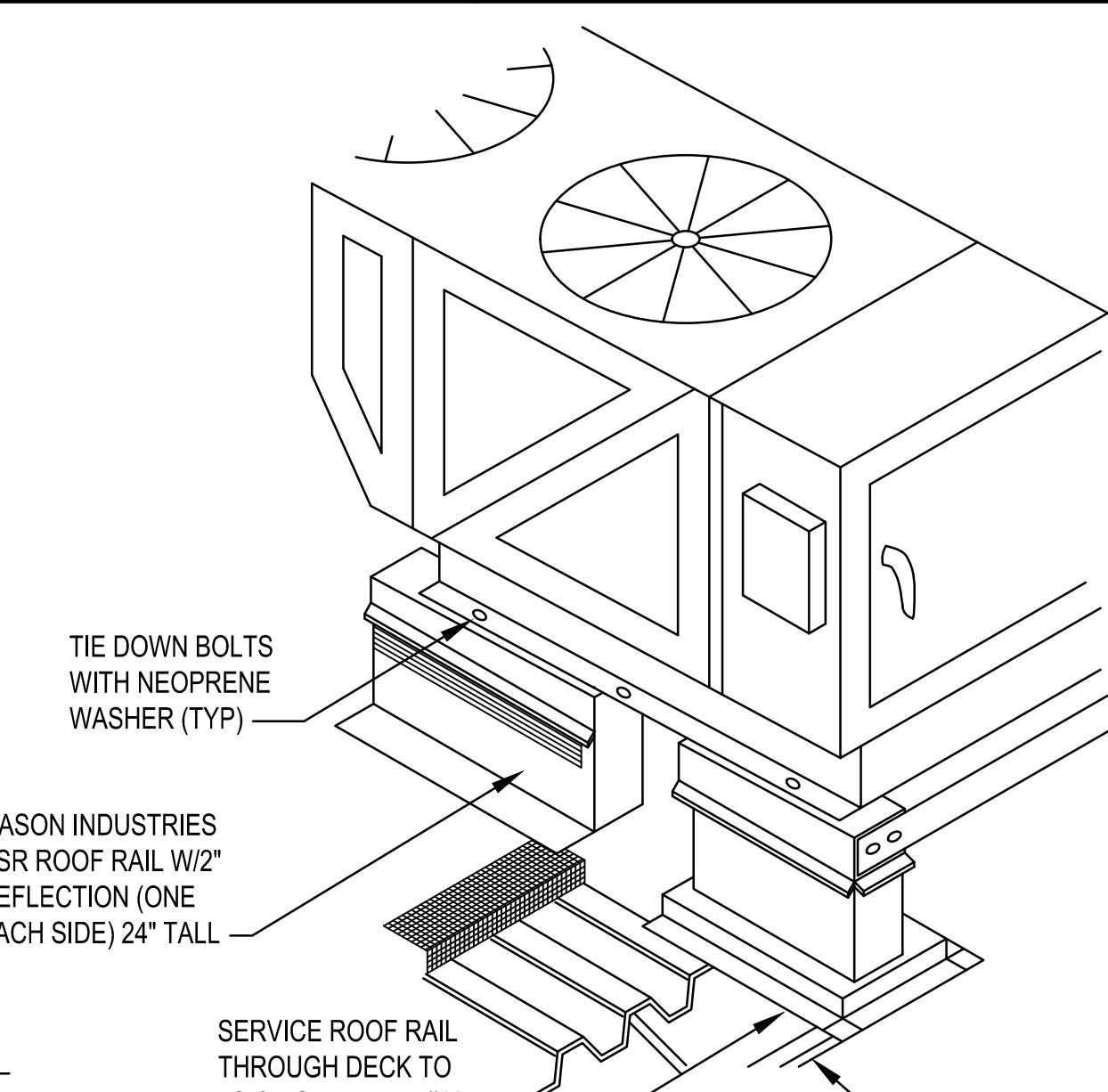
**C2** TYPICAL PIPE SUPPORT DETAILS  
NOT TO SCALE

NOTE:  
1. PROVIDE HANGER AND SPACING AS REQUIRED BY CODE.  
2. DETAIL TYPICAL FOR COPPER, STEEL AND HDPE PIPING.



**A1** CEILING FAN COIL MOUNTING DETAIL  
NOT TO SCALE

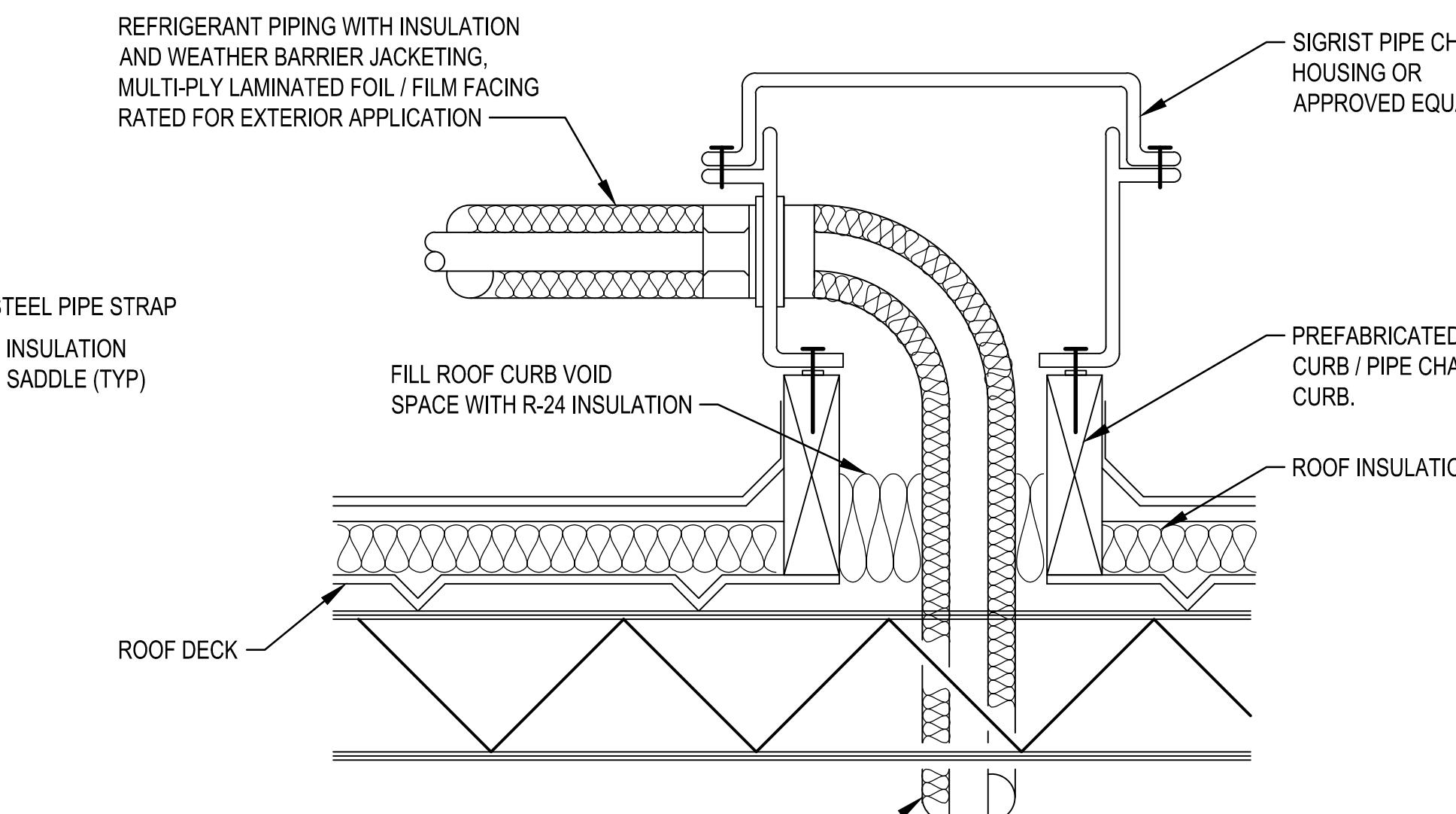
SECOND FLOOR SLAB ABOVE  
TRUSS "T" HANGER WHERE APPLICABLE  
UNISTRUT WHERE REQUIRED  
JOISTS  
KEPS NUT/WASHER  
FINISHED ACT CEILING  
RS/RL & DRAIN PIPING  
SUPPLY AIR OUTLET  
RETURN AIR OUTLET



**A3** WALL LOUVER DETAIL  
NOT TO SCALE

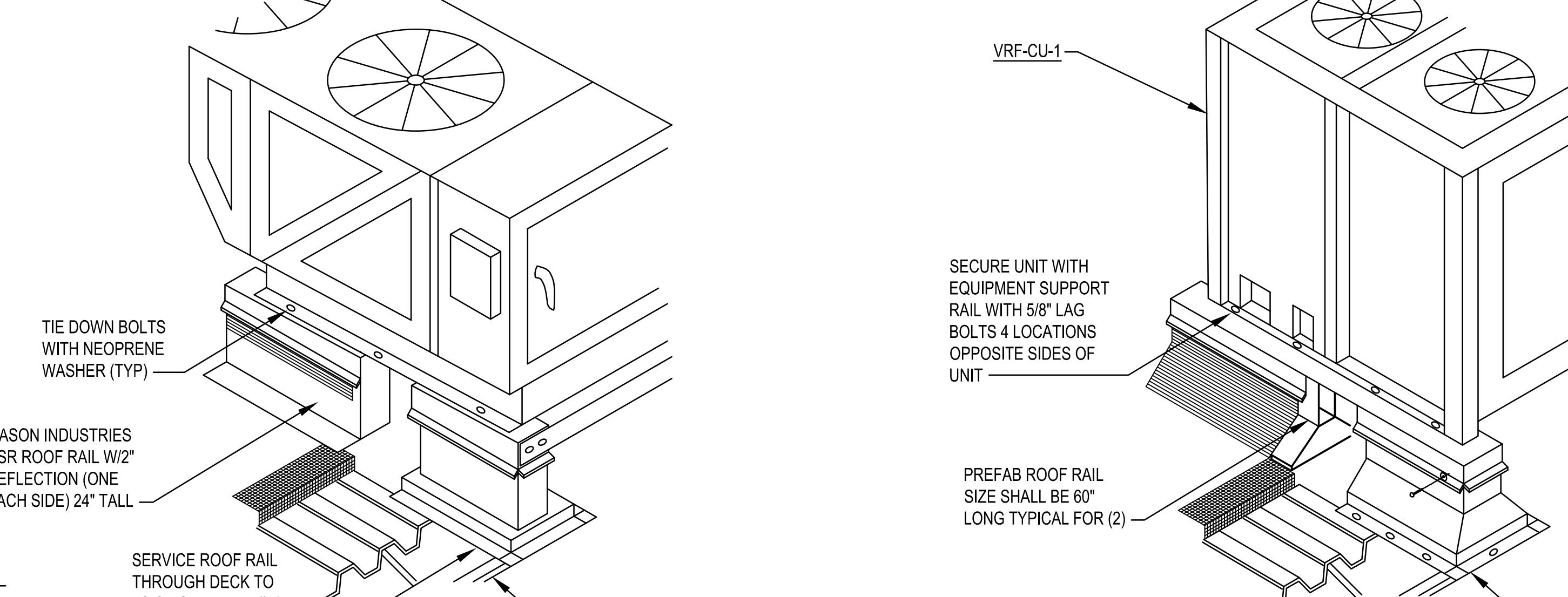
SUPPORT FROM METAL DECK  
THREADED HANGER ROD  
PIPE  
INSULATION  
INSULATION SADDLE  
INSULATION SHIELD  
TIE DOWN BOLTS WITH NEOPRENE WASHER (TYP)  
MASON INDUSTRIES RSR ROOF RAIL W/2" DEFLECTION (ONE EACH SIDE) 24" TALL  
SERVICE ROOF RAIL THROUGH DECK TO JOIST GRIP WITH #12 SCREWS, 1 ON SHORT SIDE, 4 ON LONG SIDE  
PROVIDE CHICAGO JOIST GRIP FRAMING CLAMP BETWEEN JOISTS

**D3** DOAS - HP UNIT SUPPORT DETAIL  
NOT TO SCALE



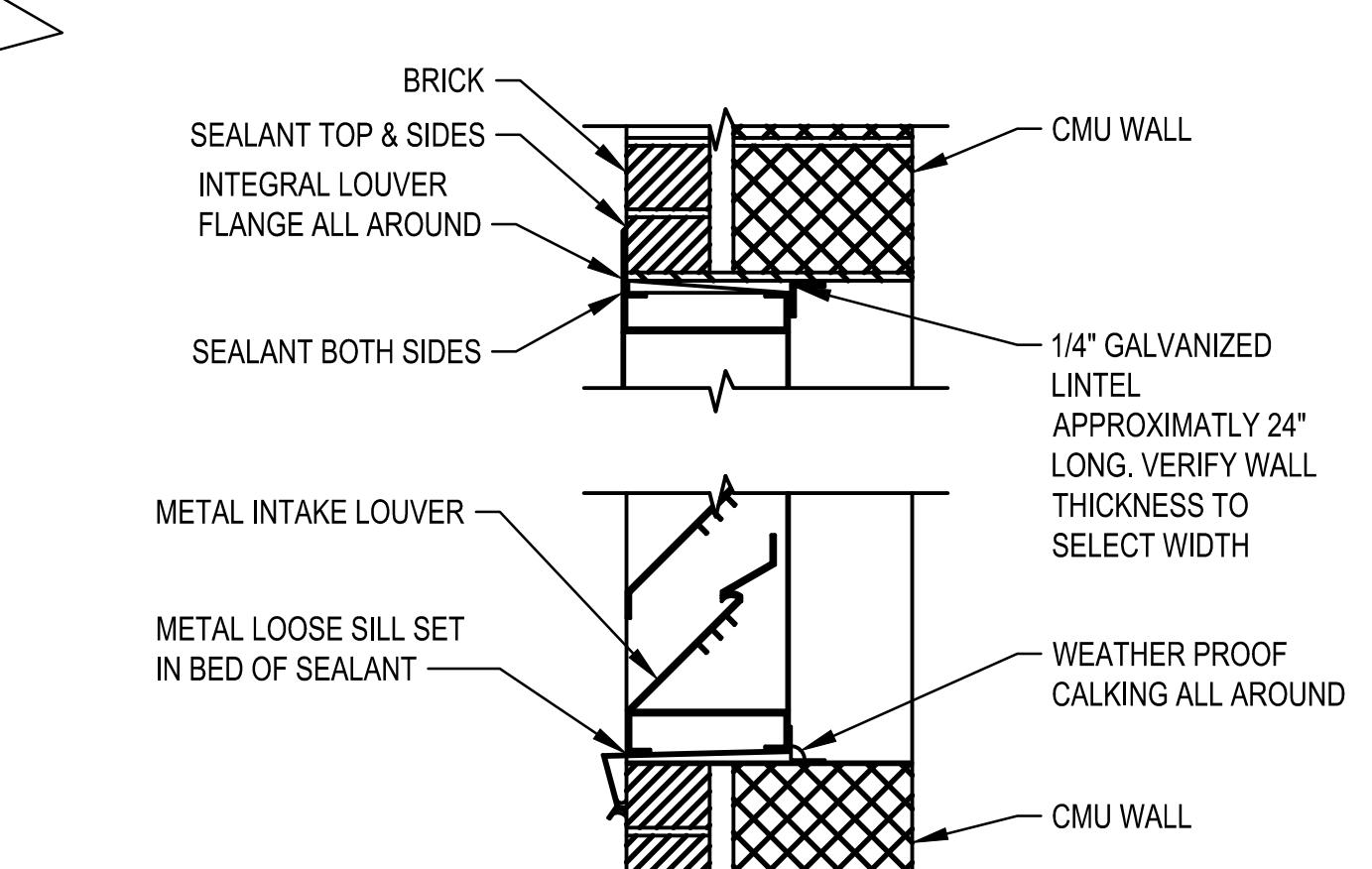
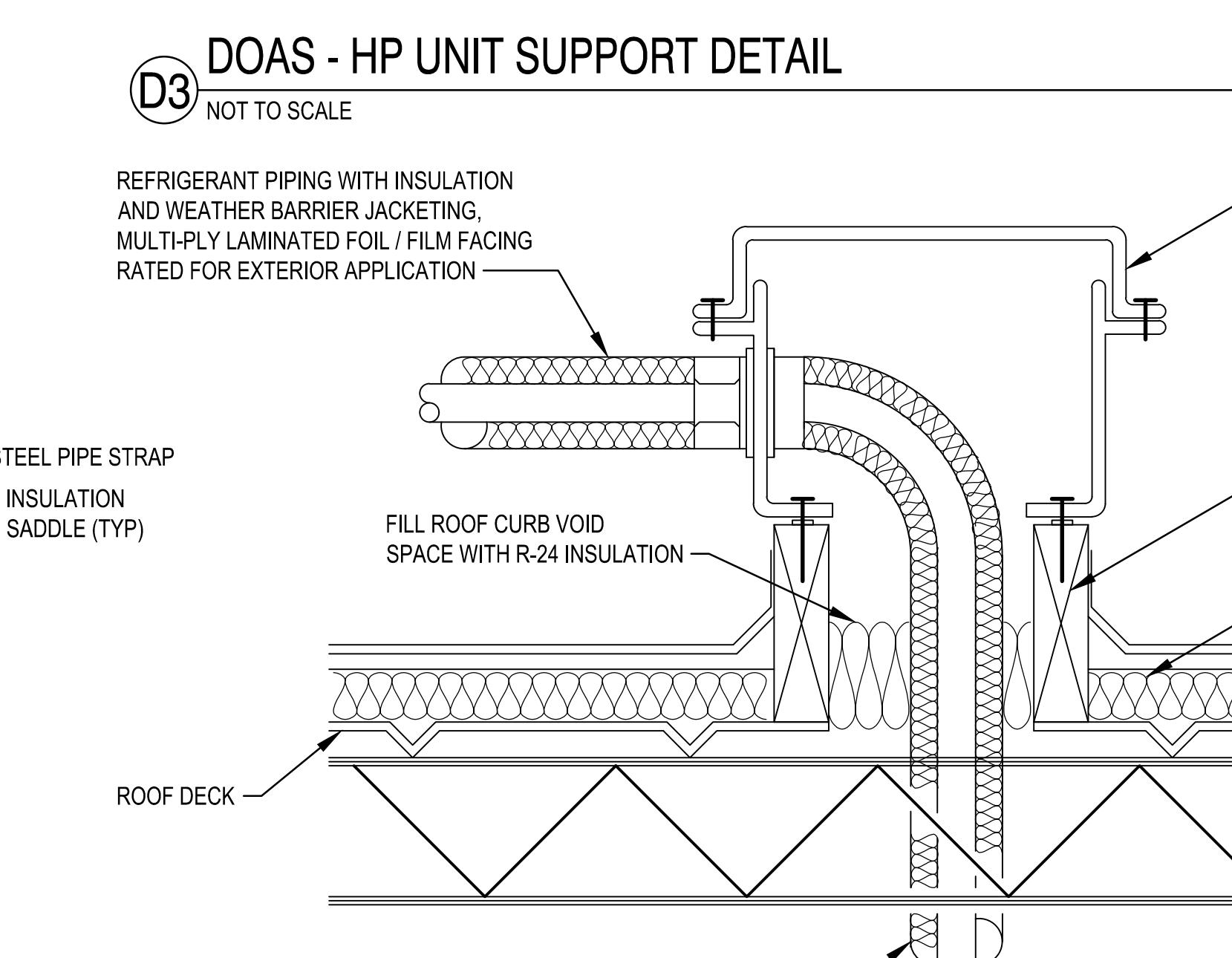
**B3** REFRIGERANT PIPE THRU ROOF DETAIL  
NOT TO SCALE

REFRIGERANT PIPING WITH INSULATION AND WEATHER BARRIER JACKETING, MULTI-PLY LAMINATED FOIL / FILM FACING RATED FOR EXTERIOR APPLICATION  
SIGRIST PIPE CHASE HOUSING OR APPROVED EQUAL  
STEEL CHANNEL  
SUPPORT FROM CONCRETE DECK  
3/8" THREADED ROD  
BOLT AND CLAMPING NUT (TYP)  
LENGTH AS REQUIRED  
MULTIPLE PIPE RUNS  
INSULATION SADDLE (TYP)  
STEEL PIPE STRAP  
NOTE:  
1. PROVIDE HANGER AND SPACING AS REQUIRED BY CODE.



**D5** VRF OUTDOOR UNIT DETAIL  
NOT TO SCALE

SECURE UNIT WITH EQUIPMENT SUPPORT RAIL WITH 5/8" LAG BOLTS 4 LOCATIONS OPPOSITE SIDES OF UNIT  
PREFAB ROOF RAIL SIZE SHALL BE 60" LONG TYPICAL FOR (2)  
DECK ATTACHMENT  
NOTE:  
1. SECURE SUPPORT RAILS TO DECK BY SECURING TO DECK WITH #12 SCREWS OR 1/4" PAN HEAD SCREWS AT 1 PER SHORT SIDE AND 4 PER LONG SIDE



**A5** TYPICAL 90° REGISTER BOOT DETAIL  
NOT TO SCALE

ASTM-A653 CS TYPE B GALVANIZED STEEL  
6" Ø FLEXIBLE DUCT TIE-IN  
DOWN TO CEILING REGISTER  
WEATHER PROOF CALKING ALL AROUND  
METAL LOOSE SILL SET IN BED OF SEALANT  
METAL INTAKE LOUVER  
SEALANT BOTH SIDES  
1/4" GALVANIZED LINTEL APPROXIMATELY 24" LONG, VERIFY WALL THICKNESS TO SELECT WIDTH  
SEALANT TOP & SIDES  
INTEGRAL LOUVER FLANGE ALL AROUND  
CMU WALL  
BRICK



VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTON ROAD, SUITE 400, NORFOLK, VA 23502

TAG NO.	LOCATION	C.F.M.	E.S.P. (IN. WG.)	R.P.M.	DRIVE	H.P.	VOLTS	PHASE	DX COOLING DATA				HEAT PUMP DATA			RE-HEAT COIL DATA			ELECT HEAT DATA				ELECTRICAL DATA			
									TOTAL M.B.H.	SENS. M.B.H.	E.A.T. D.B. (°F)	E.A.T. W.B. (°F)	TOTAL M.B.H.	E.A.T. D.B. (°F)	L.A.T. D.B. (°F)	TOTAL M.B.H.	E.A.T. D.B. (°F)	L.A.T. D.B. (°F)	KW	TOTAL M.B.H.	E.A.T. D.B. (°F)	L.A.T. D.B. (°F)	M.C.A.	M.O.C.P.	VOLTS	PHASE
DOAS-1	MECHANICAL ROOM 001	925	1	1968	VFD	1.00	208	3	80.65	42.50	95.0	78.0	53.90	19.0	72.9	0.00	0.0	0.0	15.8	53.90	19.0	72.9	58.0	60.0	208	3

NOTES:

1. UNIT SELECTION BASED ON AAON V3-BRB-8-0-162C-7C2, TWO CIRCUITS - INTERLACED COIL, 1 BLOWER + 1 PERM MAGNET AC TEFC MOTOR + 1 VFD, HEAT PUMP, 2" PLEATED FILTER AND THERMAL EXPANSION VALVE.
2. UNIT SHALL HAVE SERVICE DISCONNECT SWITCH AND VARIABLE FREQUENCY DRIVE.
3. ADDITIVE BID #1

SPLIT SYSTEM HEAT PUMP AIR HANDLER SCHEDULE																						REMARKS
TAG NO.	FAN DATA				COOLING DATA				HEATING DATA				SUPPLEMENTAL ELECTRIC			HEATER		ELECTRICAL DATA INDOOR UNIT				REMARKS
	TOTAL C.F.M.	O.A. C.F.M.	E.S.P. (IN. WG.)	MOTOR H.P.	TOTAL MBH	SENS. MBH	ENT AIR DB	ENT AIR WB	MIN. EER	TOTAL M.B.H.	ENT AIR	COP.	CALC. KW	SELECTED KW	STAGES	TOTAL FLA	MCA	MOCP	VOLTS	PHASE		
AHU-1	3800	560	1	5	137.3	92.8	77.0	66.0	8.9	106.9	60.6	4.12	21.00	21.00	3	50.5	76.0	80.0	230	3	1, 4, 5, 6	
AHU-2	2040	300	1	2	56.8	43.8	78.1	66.2	11.9	56.9	60.2	4.5	14.00	14.00	2	38.0	48.0	50.0	230	3	2, 4, 5, 6	
AHU-3	1250	250	1	1	40.4	28.9	79.0	67.0	11.8	44.2	57.4	2.8	7.00	7.00	1	19.0	24.0	25.0	230	3	3, 4, 5, 6	

NOTES:

1. UNIT SELECTION BASED ON AAON V3-CLB-2-0-162C-7CS WITH HOT GAS MODULATING REHEAT AND MODULATING SCR ELECTRIC HEAT.
2. UNIT SELECTION BASED ON AAON V3-CRB-2-0-161C-7BS WITH HOT GAS MODULATING REHEAT AND MODULATING SCR ELECTRIC HEAT.
3. UNIT SELECTION BASED ON AAON V3-BRB-2-0-161C-7AS WITH HOT GAS MODULATING HOT GAS REHEAT
4. EXTERNAL STATIC PRESSURE INCLUDES SUPPLY, RETURN AND OUTSIDE AIR DISTRIBUTION SYSTEMS.
5. 1 BLOWER + 1 PERM MAGNET AC TEFC MOTOR + 1 VFD, VCC-X ORION CONTROLS SYSTEM, 2" PLEATED FILTERS, 5" FORK LIFT BASE.
6. BASE BID.

MARK	COOLING			HEATING			ELECTRICAL						EER	COP	REMARKS		
	CAPACITY (MBH)	OUT. AIR TEMP. (°F)	CAPACITY (MBH)	OUT. AIR TEMP. (°F)	CAPACITY (MBH)	OUT. AIR TEMP. (°F)	COMPRESSOR		CONDENSER FAN		MCA	MOCP	VOLTS	PHASE	HZ.		
							R.L. AMPS	L.R. AMPS	FLA								
DOAS-HP	80.7	95	57.7	22.0	83.5	47.0	2 @ 16.1	-	2 @ 2.8	42.0	50.0	230	3	60			1, 6, 7
HP-1	137.3	95	85.2	22.0	125.1	47.0	2 @ 20.4	-	2 @ 7.4	61.0	80.0	230	3	60	8.9	2.3	2, 3, 6, 8
HP-2	65.1	95	39.4	22.0	61.4	47.0	16.9	-	1 @ 2.8	24.0	40.0	208	3	60	11.9	2.9	4, 3, 6, 8
HP-3	49.0	95	31	22.0	45.7	47.0	16.1	-	1 @ 2.8	23.0	35.0	208	3	60	11.8	2.8	5, 3, 6, 8

NOTES:

1. UNIT SELECTION BASED ON AAON CFA-009-B-A-8-DJ00L, VARIABLE CAPACITY SCROLL COMPRESSOR, VERTICAL DISCHARGE WITH END CONTROL PANEL.
2. UNIT SELECTION BASED ON AAON CFA-013-B-A-2-DJ00L, VARIABLE CAPACITY SCROLL COMPRESSOR, VERTICAL DISCHARGE WITH END CONTROL PANEL. POLYMER E COAT CONDENSER COIL.
3. 2 VARIABLE REFRIGERANT SYSTEMS, MODULATING HOT GAS REHEAT, CONDENSER COIL GUARD, ECM CONDENSER FAN / HEAD PRESSURE CONTROL.
4. UNIT SELECTION BASED ON AAON CFA-005-A-A-2-DJ00H, VARIABLE CAPACITY SCROLL COMPRESSOR, VERTICAL DISCHARGE WITH END CONTROL PANEL. POLYMER E COAT CONDENSER COIL.
5. UNIT SELECTION BASED ON AAON CFA-004-A-A-2-DJ00H, VARIABLE CAPACITY SCROLL COMPRESSOR, VERTICAL DISCHARGE WITH END CONTROL PANEL. POLYMER E COAT CONDENSER COIL.
6. SINGLE POINT POWER NON-FUSED DISCONNECT, PHAS & BROWN OUT PROTECTION + SUCTION PRESSURE TRANSDUCER ON EACH REFRIG CIRCUIT.
7. ADDITIVE BID #1.
8. BASE BID.

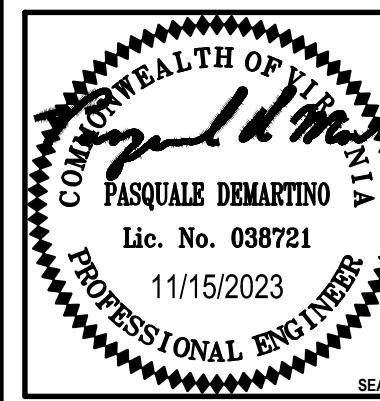
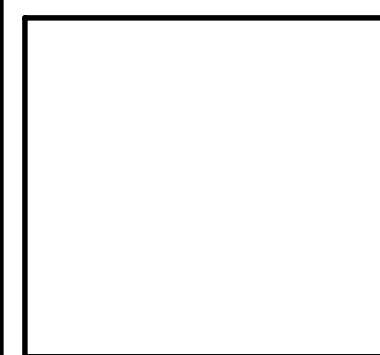
Project #:	23041
Date:	11/15/2023
Project Manager:	PCS
Designed By:	PCS
Drawn By:	BAC
Checked By:	PCS
M-601	
SHEET 8 OF 18	

COMMUNITY UNITED METHODIST CHURCH  
CLASSROOM HVAC REPLACEMENT  
1072 OLD KEMPSVILLE RD VIRGINIA BEACH, VA 23464  
MECHANICAL SCHEDULES

PASQUALE DEMARTINO  
LIC. NO. 030721  
11/15/2023  
PROFESSIONAL ENGINEER  
SEAL



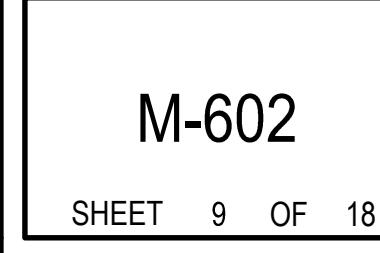
VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTON ROAD, SUITE 400, NORFOLK, VA 23502



Revisions	Date
	Description

COMMUNITY UNITED METHODIST CHURCH CLASSROOM HVAC REPLACEMENT										VIRGINIA BEACH, VA 23464
MECHANICAL SPECIFICATIONS										1072 OLD KEMPSVILLE RD

Project #:	23041
Date:	11/15/2023
Project Manager:	PCS
Designed By:	PCS
Drawn By:	BAC
Checked By:	PCS



SHEET 9 OF 18

### VRF INDOOR FAN COIL UNIT SCHEDULE

TAG	TYPE	AREA SERVED	FAN			COOLING DATA		HEATING DATA		VOLTS	PHASE	MCA	RLA	LG ELECTRONICS MODEL NO	REMARKS
			C.F.M.	S.A.	C.F.M.	O.A.	E.S.P.	TOTAL M.B.H.	SENSIBLE M.B.H.						
FCU-1	CEILING CASSETTE EXPOSED	CLASSROOM 108	477	0	N/A	14.7	12.1	14.7	230	1	1.20	0.97	ARNU183V1A4	1, 3, 4, 5, 6	
FCU-2	CEILING CASSETTE EXPOSED	CLASSROOM 109	477	0	N/A	11.5	8.9	10.6	230	1	1.20	0.97	ARNU183V1A4	1, 3, 4, 5, 6	
FCU-3	CEILING CASSETTE EXPOSED	CLASSROOM 110	477	0	N/A	10.2	7.9	9.1	230	1	1.20	0.97	ARNU183V1A4	1, 3, 4, 5, 6	
FCU-4	CEILING CASSETTE EXPOSED	CLASSROOM 111	477	0	N/A	9.1	6.8	8.1	230	1	1.20	0.97	ARNU183V1A4	1, 3, 4, 5, 6	
FCU-5	FLOOR MOUNT EXPOSED	STORAGE ROOM	335	0	N/A	9.9	9.6	12.2	230	1	1.00	0.76	ARNU093CEU4	2, 4, 5, 6	
FCU-6	FLOOR MOUNT EXPOSED	CONFERENCE ROOM	370	0	N/A	11.9	9.9	12.2	230	1	1.00	0.76	ARNU123CEA4	2, 4, 5, 6	
FCU-7	FLOOR MOUNT EXPOSED	LOBBY	370	0	N/A	10.6	9.6	11.5	230	1	1.00	0.76	ARNU123CEA4	2, 4, 5, 6	
FCU-8	FLOOR MOUNT EXPOSED	LOBBY	370	0	N/A	10.6	9.6	11.5	230	1	1.00	0.76	ARNU123CEA4	2, 4, 5, 6	
FCU-9	FLOOR MOOUNT EXPOSED	LOBBY	370	0	N/A	10.6	9.6	11.5	230	1	1.00	0.76	ARNU123CEA4	2, 4, 5, 6	

NOTES:

1. PROVIDE CEILING CASSETTE EXPOSED UNITS.
2. PROVIDE FLOOR STANDING EXPOSED UNITS WITH LG WIRED CONTROLLER.
3. PROVIDE UNIT WITH INTEGRAL CONDENSATE PUMP.
4. PROVIDE UNIT WITH THERMOSTAT.
5. PROVIDE BRANCH CONNECTION BOXES WHERE RECOMMENDED BY UNIT MANUFACTURER WITH ELECTRICAL CONNECTION AT 208-230 V/60 Hz/1 PHASE, 0.06 AMPS. NO CONDENSATE DRAIN REQUIRED.
6. ADDITIVE BID ITEM #1

### VRF OUTDOOR HEAT RECOVERY CONDENSING UNIT SCHEDULE

MARK	AREA SERVED	EER	TOTAL COOLING MBH	TOTAL HEAT MBH	COMPRESSOR DATA		NO. FANS	ELECTRICAL DATA			WEIGHT (LBS)	MODEL NO.	
					TYPE	NO.		MCA	MOCP	VOLTS			
VRF-CU-1	TWO STORY CLASSROOM WING	12.5	138.0	152.0	HERMETIC SCROLL DC SCROLL	2.0	2	51.1	70.0	208	3	639	ARUM14BTES

NOTES:

1. BASED ON LG.
2. STANDARD FEATURES INCLUDE, ADVANCED SMART LOAD CONTROL, INTELLEGENT HEATING, HIGH PRESSURE OIL RETURN, SMART OIL CONTROL, FAULT PROTECTION AND DIAGNOSIS, ACTIVE REFRIGERANT CONTROL, VARIABLE PATH EXCHANGER, SUBCOOLING AND VAPOR INJECTION CONTROL, LIQUID COOLED INVERTER CONTROLLER AND ADVANCED COMFORT COOLING.
5. PROVIDE MANUFACTURERS HAIL GUARD.
6. PROVIDE WITH BIG FOOT SYSTEM VRF CONDENSER FRAMEWORKS FOR 30 X 48 VRF UNIT.
7. ADDITIVE BID OPTION #1

### LOUVER SCHEDULE

TAG NO.	SERVICE	SIZE (IN.) WxH	FREE AREA	C.F.M.	PRESSURE DROP	REMARKS
LV-1	DOAS-1	18 X 24	1.1 SF	925	0.09" W.C.	PROVIDE WITH FLANGE FRAME

NOTES:

1. SELECTIONS BASED ON NAILOR MODEL 1606D, DRAINABLE.
2. PROVIDE INSECT SCREEN FOR INTAKE SERVICE.
3. PROVIDE ALUMINUM STORMPROOF CONSTRUCTION.
4. PROVIDE CLEAR ANODIZED FINISH.
5. ADDITIVE BID OPTION #1.

POINT NAME	HARDWARE POINTS			SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	SCHED
ON/OFF - SETTING			X				
ON/OFF - STATUS			X				
LOCK - SETTING				X			
LOCK - STATUS		X					
FILTER SIGN		X					
FILTER SIGN RESET				X			
OPERATION MODE - SETTING (MULTI-STATE)	X	X					
OPERATION MODE - STATUS (MULTI-STATE)	X	X					
AIR DISCHARGE DIRECTION - SETTING			X				
AIR DISCHARGE DIRECTION - STATUS		X					
FAN SPEED - SETTING				X			
FAN SPEED - STATUS	X						
ZONE TEMPERATURE - SETTING				X			
ZONE TEMPERATURE - STATUS	X						
ALARM			X				
ERROR CODE (MULTI-STATE)	X	X					
USER MODE - SETTING (MULTI-STATE)	X	X	X		X		
USER MODE - STATUS (MULTI-STATE)	X	X			X		

## VARIABLE REFRIGERANT FLOW SYSTEM

SYSTEM ENABLE:  
THE SYSTEM SHALL RUN UNDER CONTROL OF THE CONTROL SYSTEM PROVIDED WITH THE VRF SYSTEM. THE SYSTEM SHALL BE IN CONTROL OF THE ROOM FAN COIL UNITS, CASSETTE UNITS AND THE CONDENSING UNITS.

RUN CONDITIONS - SCHEDULED:  
THE SYSTEM SHALL RUN ACCORDING TO A USER DEFINABLE TIME SCHEDULE IN THE FOLLOWING MODES:

- OCCUPIED MODE: THE UNIT SHALL MAINTAIN  
A 74°F (ADJ.) COOLING SET POINT  
A 70°F (ADJ.) HEATING SET POINT
- UNOCCUPIED MODE (NIGHT SETBACK): THE UNIT SHALL MAINTAIN  
A 85°F (ADJ.) COOLING SETPOINT.  
A 55°F (ADJ.) HEATING SET POINT.

### ZONE SET POINT ADJUST:

THE OCCUPANT SHALL BE ABLE TO ADJUST THE ZONE TEMPERATURE HEATING AND COOLING SET POINTS AT THE ZONE SENSOR BY +/- 2°F OF SCHEDULED SET POINT.

ZONE OPTIMAL START: THE UNIT SHALL USE AN OPTIMAL START ALGORITHM FOR MORNING START-UP. THIS ALGORITHM SHALL MINIMIZE THE UNOCCUPIED WARM-UP OR COOL-DOWN PERIOD WHILE STILL ACHIEVING COMFORT CONDITIONS BY THE START OF SCHEDULED OCCUPIED PERIOD.

### ZONE UNOCCUPIED OVERRIDE:

A TIMED LOCAL OVERRIDE CONTROL SHALL ALLOW AN OCCUPANT TO OVERRIDE THE SCHEDULE AND PLACE THE UNIT INTO AN OCCUPIED MODE FOR AN ADJUSTABLE PERIOD OF TIME. AT THE EXPIRATION OF THIS TIME, CONTROL OF THE UNIT SHALL AUTOMATICALLY RETURN TO THE SCHEDULE. INITIAL OVERRIDE PERIOD SHALL BE 90 MINUTES.

### COOLING STAGE:

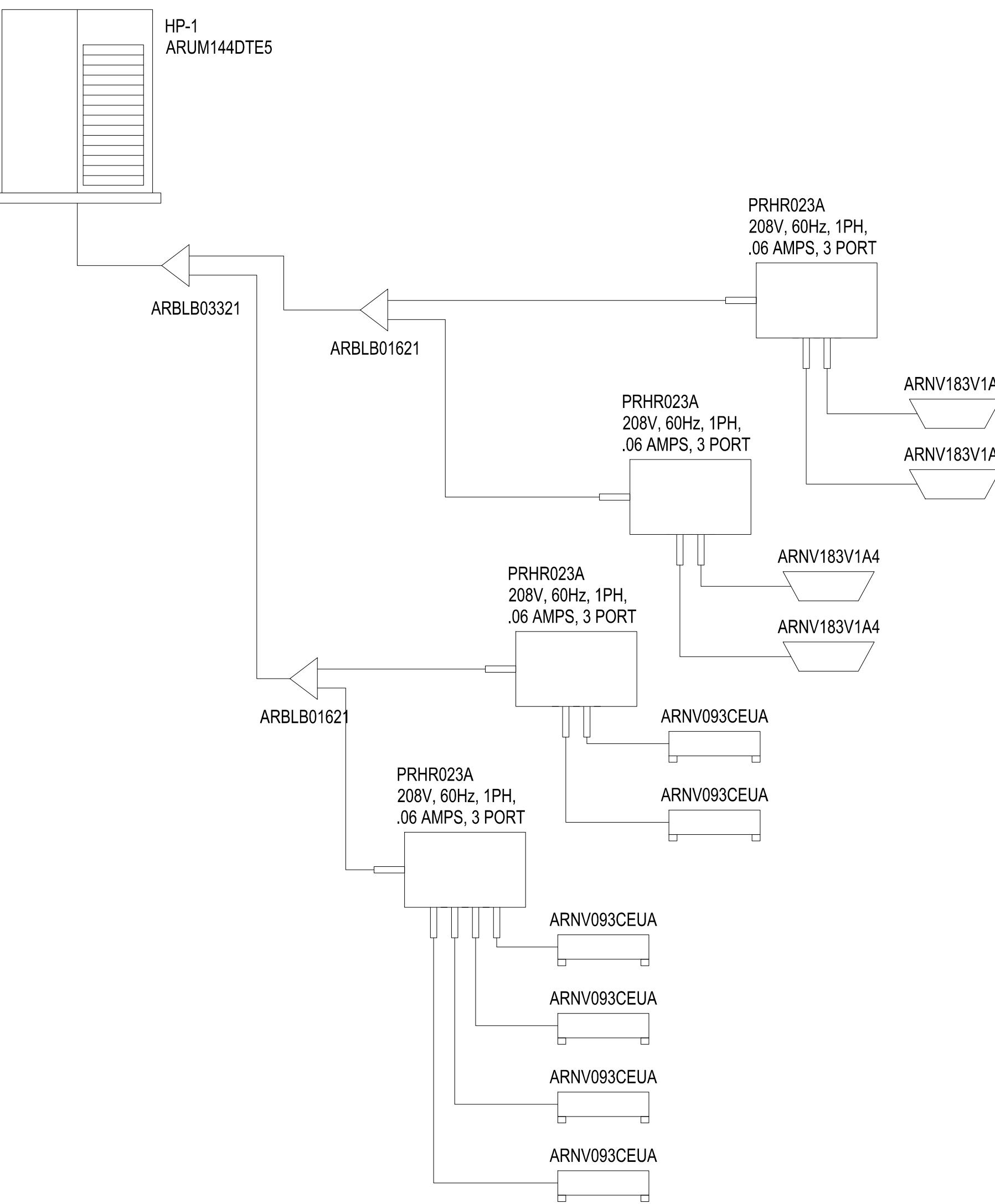
THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE COOLING TO MAINTAIN ITS COOLING SET POINT.

### HEATING STAGE:

THE CONTROLLER SHALL MEASURE THE ZONE TEMPERATURE AND STAGE THE HEATING TO MAINTAIN ITS HEATING SET POINT.

### FAN STATUS:

THE CONTROLLER SHALL MONITOR THE FAN STATUS.



VRF PIPING DIAGRAM (ADDITIVE BID ITEM #1)

A1  
NOT TO SCALE

## VARIABLE REFRIGERANT FLOW HEATING AND COOLING SYSTEM

UNIT DISCHARGE AIR TEMP SET POINT

ENTERING COIL AIR TEMP

LEAVING COIL AIR TEMP

LEAVING COIL AIR TEMP SET POINT (CLG)

LEAVING COIL AIR TEMP SET POINT (HTG)

ENTERING COIL AIR TEMP SET POINT (EMERGENCY HTG)

SMOKE DETECTOR

SUPPLY FAN STATUS

SUPPLY FAN START/STOP

MODULATING COOLING COMP #1

MODULATING HEATING COMP #1

MODULATING HOT GAS REHEAT

SCR ELECTRIC HEAT

SUPPLY AIR TEMP SET POINT

SUCTION LINE TEMPERATURE COMP #1

SUPPLY FAN FAILURE

SUPPLY FAN RUNTIME EXCEEDED

COMPRESSOR 1 FAULT

FINAL FILTER CHANGE REQUIRED

HIGH SUPPLY AIR TEMP

LOW SUPPLY AIR TEMP

MOISTURE SENSOR

COMPRESSOR #1 STATUS

COMPRESSOR #1 LOW PRESSURE

COMPRESSOR #1 HIGH PRESSURE

## DEDICATED OUTSIDE AIR SYSTEMS

POINT NAME	HARDWARE POINTS				SOFTWARE POINTS				SHOW ON GRAPHIC
	AI	AO	BI	BO	AV	BV	SCHED	TREND	
FINAL FILTER DIFFERENTIAL PRESSURE		X						X	X
UNIT DISCHARGE AIR TEMP		X						X	X
UNIT DISCHARGE AIR TEMP SET POINT								X	X
ENTERING COIL AIR TEMP	X							X	X
LEAVING COIL AIR TEMP	X							X	X
LEAVING COIL AIR TEMP SET POINT (CLG)								X	X
LEAVING COIL AIR TEMP SET POINT (HTG)								X	X
ENTERING COIL AIR TEMP SET POINT (EMERGENCY HTG)								X	X
SMOKE DETECTOR		X						X	X
SUPPLY FAN STATUS		X						X	X
SUPPLY FAN START/STOP				X				X	X
MODULATING COOLING COMP #1	X							X	X
MODULATING HEATING COMP #1	X							X	X
MODULATING HOT GAS REHEAT				X				X	X
SCR ELECTRIC HEAT				X				X	X
SUPPLY AIR TEMP SET POINT				X				X	X
SUCTION LINE TEMPERATURE COMP #1	X							X	X
SUPPLY FAN FAILURE								X	X
SUPPLY FAN RUNTIME EXCEEDED								X	X
COMPRESSOR 1 FAULT								X	X
FINAL FILTER CHANGE REQUIRED								X	X
HIGH SUPPLY AIR TEMP								X	X
LOW SUPPLY AIR TEMP								X	X
MOISTURE SENSOR								X	X
COMPRESSOR #1 STATUS								X	X
COMPRESSOR #1 LOW PRESSURE								X	X
COMPRESSOR #1 HIGH PRESSURE								X	X

## SEQUENCE OF OPERATION

### DEDICATED OUTSIDE AIR UNIT: DOAU-1

UNITS SHALL BE STARTED AND RUN CONTINUOUSLY BASED ON AN OCCUPANCY SCHEDULE.

THE SUPPLY FAN SHALL BE AUTOMATICALLY STARTED AND STOPPED FROM THE AUTO POSITION OF THE HAND-OFF-AUTO. ALL SAFETY DEVICES SHALL OPERATE WITH THE SWITCH IN THE HAND OR AUTO POSITION.

UPON START-UP, THE OUTSIDE AIR DAMPER SHALL OPEN AND THE SUPPLY FAN SHALL START AND RUN AT STATIC PRESSURE SETPOINT.

IN THE EVENT OF A POWER INTERRUPTION OR FAN SHUTDOWN, THE OUTSIDE AIR DAMPER SHALL CLOSE. DOAU SHALL AUTOMATICALLY RESTART AFTER A POWER FAILURE.

THE SYSTEM CONTROLS SHALL MODULATE TO MAINTAIN DISCHARGE AIR TEMPERATURE AS FOLLOWS:

WHEN AMBIENT TEMPERATURE IS BELOW 60 DEGREES F THE ELECTRIC DUCT HEATER SHALL MODULATE TO MAINTAIN A DISCHARGE TEMPERATURE BETWEEN 68 AND 70 DEGREES F (ADJUSTABLE).

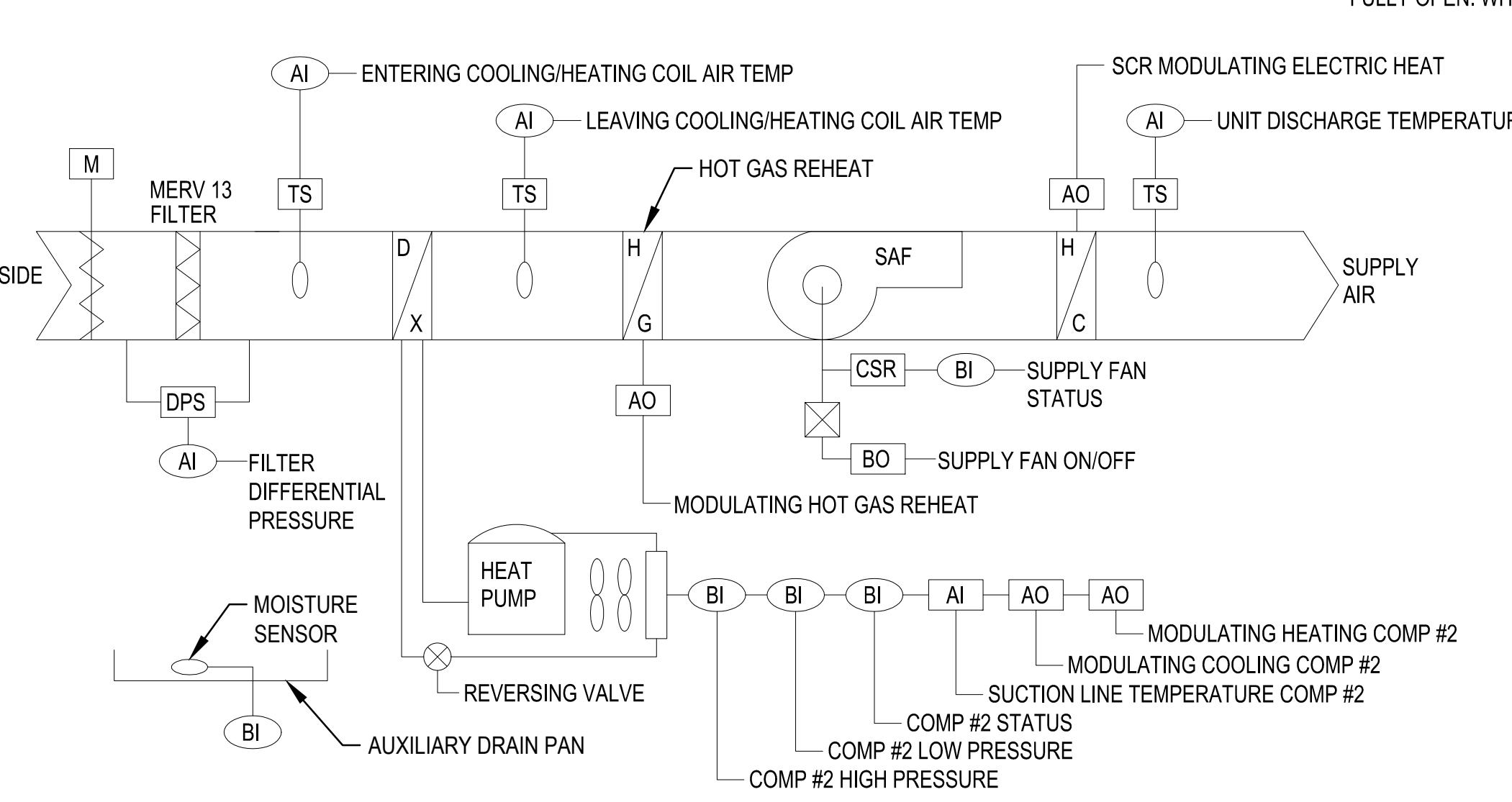
WHEN ENTERING AIR TEMPERATURE IS ABOVE THE LEAVING AIR TEMPERATURE (ADJUSTABLE), THE FIRST STAGE OF MECHANICAL COOLING SHALL ENERGIZE, AND ASSOCIATED CONDENSING UNIT AND MODULATE HOT GAS REHEAT COIL TO DISCHARGE TEMPERATURE +/- 1% (ADJUSTABLE). IF DISCHARGE TEMPERATURE CANNOT BE MAINTAINED WITH THE FIRST STAGE OF COOLING, THE SECOND STAGE OF MECHANICAL COOLING SHALL ENERGIZE. WHEN THE LEAVING AIR TEMPERATURE IS BELOW SET POINT REHEAT SHALL TURN ON AND CYCLE. WHEN THE LEAVING AIR TEMPERATURE IS 2 ABOVE SET POINT THE REHEAT TURNS OFF. COOLING DISCHARGE AIR TEMPERATURE SHALL BE ADJUSTABLE BETWEEN 65 AND 75 DEGREES F.

ACTIVATION OF THE EMERGENCY FAN STOP SWITCH SHALL STOP THE SUPPLY FAN.

UNIT CONTROLLER SHALL MONITOR THE UNITS SUPPLY AND EXHAUST AIR TEMPERATURES AND HUMIDITIES.

### MOTORIZED DAMPER:

MOTORIZED DAMPER SERVING LV-1 SHALL BE INTERLOCKED WITH FAN EF-1 OPERATION. WHEN FAN EF-1 IS ACTIVATED THE MOTORIZED DAMPER SHALL FULLY OPEN. WHEN THE FAN IS DEACTIVATED THE MOTORIZED DAMPER SHALL FULLY CLOSE.



DEDICATED OUTSIDE AIR UNIT CONTROL DIAGRAM (ADDITIVE BID ITEM #1)

A3  
NOT TO SCALE

**VG**  
VANSANT & GUSLER, INC.  
CONSULTING ENGINEERS  
6330 NEWTON ROAD, SUITE 400, NORFOLK, VA 23502

PASQUALE DEMARTINO  
LIC. NO. 036721  
11/15/2023  
PROFESSIONAL ENGINEER  
SEAL

COMMUNITY UNITED METHODIST CHURCH  
CLASSROOM HVAC REPLACEMENT  
1072 OLD KEMPSVILLE RD  
CONTROLS  
VIRGINIA BEACH, VA 23464

Project #: 23041  
Date: 11/15/2023  
Project Manager: PCS  
Designed By: PCS  
Drawn By: BAC  
Checked By: PCS  
  
M-701  
SHEET 10 OF 18

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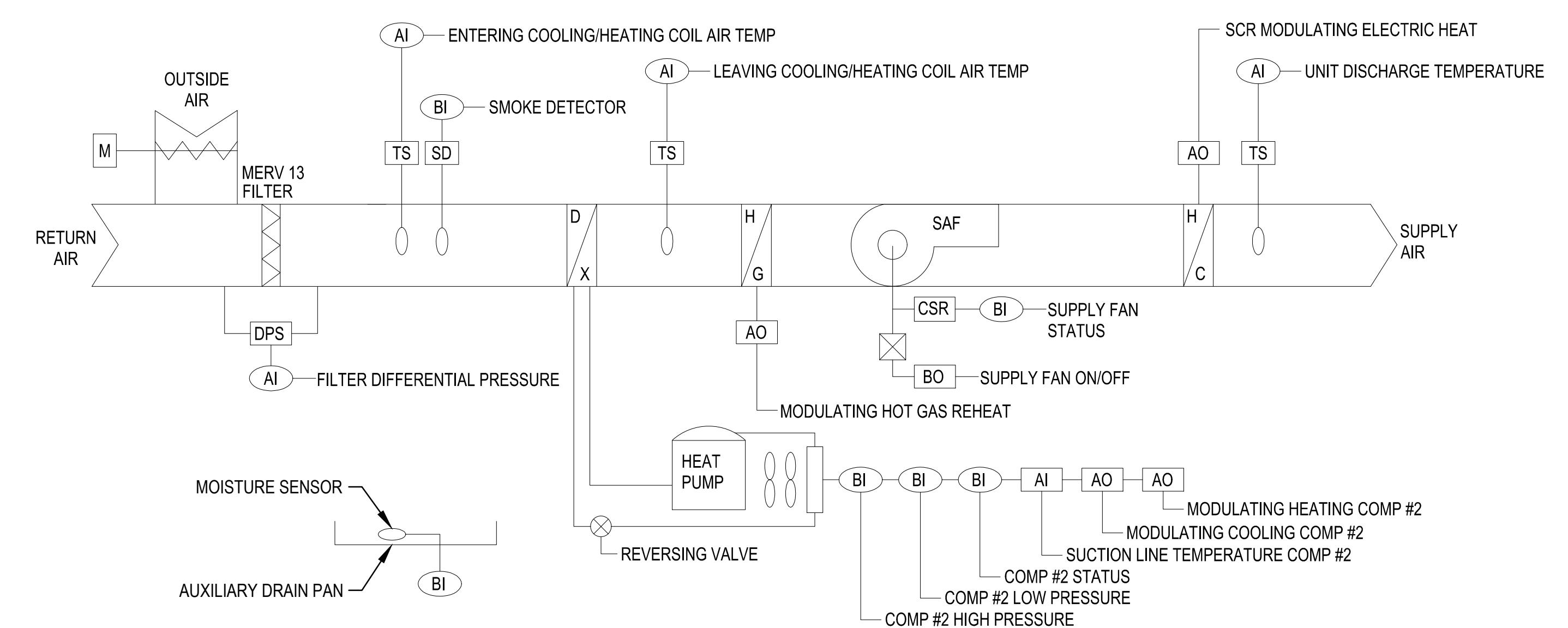
E

D

C

B

A



D2 AIR HANDLING UNIT CONTROL DIAGRAM (AHU-1,2 & 3)

NOT TO SCALE

## SPLIT SYSTEM HEAT PUMP WITH HOT GAS REHEAT

SEQUENCE OF OPERATION FOR SPLIT SYSTEM HEAT PUMP AIR HANDLERS WITH HOT GAS REHEAT FOR HUMIDITY CONTROL.

OCCUPIED COOLING SETPOINT - 75°F  
OCCUPIED HEATING SETPOINT - 70°F  
OCCUPIED FAN POSITION - ON  
UNOCCUPIED FAN SETTING - AUTOMATIC  
UNOCCUPIED COOLING SETPOINT - 78°F  
UNOCCUPIED HEATING SETPOINT - 60°F  
HUMIDITY HIGH LIMIT - 55%

### COOLING OCCUPIED

WITH THE SPACE THERMOSTAT SET FOR COOLING AND THE SPACE CALLING FOR COOLING, THE REVERSING VALVE SHALL BE IN THE COOLING POSITION AND THE MECHANICAL COOLING SHALL BE ENERGIZED. THE OUTSIDE AIR DAMPER SHALL BE MODULATED OPEN. THE COMPRESSOR(S) SHALL BE ENERGIZED AND SHALL MODULATE IN SPEED ALONG WITH THE CONDENSER FAN. THE COMPRESSOR(S) AND CONDENSE FAN SHALL MODULATE TO MAINTAIN A MODULATING DISCHARGE AIR TEMPERATURE TO SATISFY SPACE TEMPERATURE. WHEN THE SPACE TEMPERATURE DROPS BELOW SET POINT THE REVERSE SEQUENCE SHALL OCCUR.

### HEATING OCCUPIED

WITH THE SPACE CALLING FOR HEATING AND THE SPACE THERMOSTAT IN THE HEATING POSITION, THE REVERSING VALVE SHALL BE POSITIONED IN THE HEATING MODE AND THE HEATING SHALL BE ENERGIZED. THE COMPRESSOR AND CONDENSER FAN SHALL MODULATE TO MAINTAIN A MODULATING DISCHARGE AIR TEMPERATURE TO SATISFY SPACE TEMPERATURE. THE OUTSIDE AIR DAMPER SHALL BE OPEN. IN THE EVENT THE SYSTEM CANNOT MAINTAIN SPACE TEMPERATURE THE AUXILIARY ELECTRIC HEAT SHALL BE ENERGIZED, AND THE ELECTRIC HEAT SHALL BE MODULATED THROUGH THE SCR TO MAINTAIN A DISCHARGE AIR TEMPERATURE.

### DEHUMIDIFICATION MODE

A HUMIDITY SENSOR INTEGRAL TO THE THERMOSTAT SHALL SENSE THE SPACE HUMIDITY. IF THE SPACE HUMIDITY RISES ABOVE THE SETTING OF 55% THE HUMIDISTAT SHALL ENERGIZE THE COOLING TO 100% AND ACTIVATE THE HOT GAS REHEAT TO MAINTAIN SPACE TEMPERATURE. ONCE THE HUMIDITY HAS DROPPED BELOW THE SETTING THE HOT GAS REHEAT SHALL BE DE-ENERGIZED AND THE SYSTEM SHALL RETURN TO NORMAL OPERATION.

### UNOCCUPIED COOLING, NIGHT SET BACK

DURING UNOCCUPIED MODE, THE UNIT SHALL MODULATE TO MAINTAIN UNOCCUPIED COOLING SETPOINT. THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED. SYSTEM SHALL OPERATE IN 100% RETURN AIR MODE.

### UNOCCUPIED HEATING, NIGHT SETBACK MODE

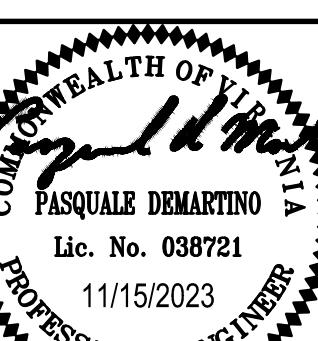
DURING UNOCCUPIED MODE, THE UNIT SHALL MODULATE IN THE HOT PUMP MODE OR AUXILIARY HEAT MODE TO MAINTAIN SPACE SETBACK TEMPERATURE. OUTSIDE AIR DAMPER SHALL BE CLOSED.

### SAFETY DEVICES

A SMOKE DETECTOR SHALL BE LOCATED IN THE RETURN AIR STREAM OF AIR HANDLERS ABOVE 2,000 CFM AND BE INTERLOCKED WITH THE UNIT SUPPLY FAN AND BUILDING FIRE ALARM SYSTEM TO DE-ENERGIZE SUPPLY FAN UPON SENSING SMOKE IN THE RETURN AIR SYSTEM AND SEND A SIGNAL TO THE FIRE ALARM SYSTEM.



VANSANT & GUSLER, INC.  
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Revisions

Date

Description

No.

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CLASSROOM HVAC REPLACEMENT

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1072 OLD KEMPSVILLE RD

CONTROLS

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