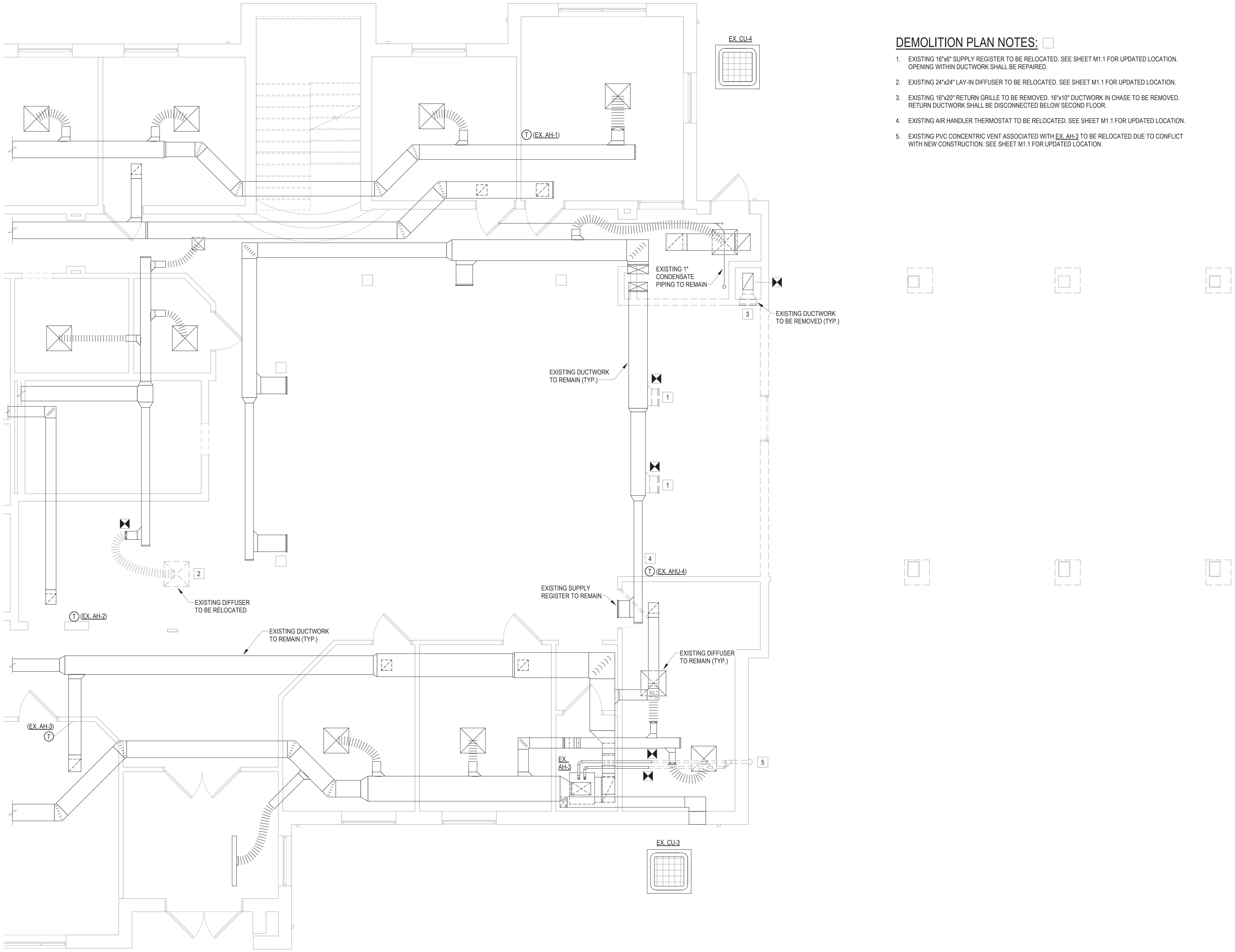

PARTIAL FIRST FLOOR DEMOLITION PLAN - HVAC

SCALE 1/4" = 1'-0"

DEMOLITION PLAN NOTES: ☐

1. EXISTING 16"x6" SUPPLY REGISTER TO BE RELOCATED. SEE SHEET M1.1 FOR UPDATED LOCATION. OPENING WITHIN DUCTWORK SHALL BE REPAIRED.
2. EXISTING 24"x24" LAY-IN DIFFUSER TO BE RELOCATED. SEE SHEET M1.1 FOR UPDATED LOCATION.
3. EXISTING 16"x20" RETURN GRILLE TO BE REMOVED. 16"x10" DUCTWORK IN CHASE TO BE REMOVED. RETURN DUCTWORK SHALL BE DISCONNECTED BELOW SECOND FLOOR.
4. EXISTING AIR HANDLER THERMOSTAT TO BE RELOCATED. SEE SHEET M1.1 FOR UPDATED LOCATION.
5. EXISTING PVC CONCENTRIC VENT ASSOCIATED WITH EX. AH-3 TO BE RELOCATED DUE TO CONFLICT WITH NEW CONSTRUCTION. SEE SHEET M1.1 FOR UPDATED LOCATION.

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7/11/2025
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REVISIONS	DATE

PARTIAL FIRST FLOOR DEMOLITION PLAN - HVAC

RENOVATIONS TO

NRV REGIONAL COMMISSION OFFICE

2950 MARKET ST NE, CHRISTIANSBURG, VIRGINIA

NRVRC
new river valley regional commission

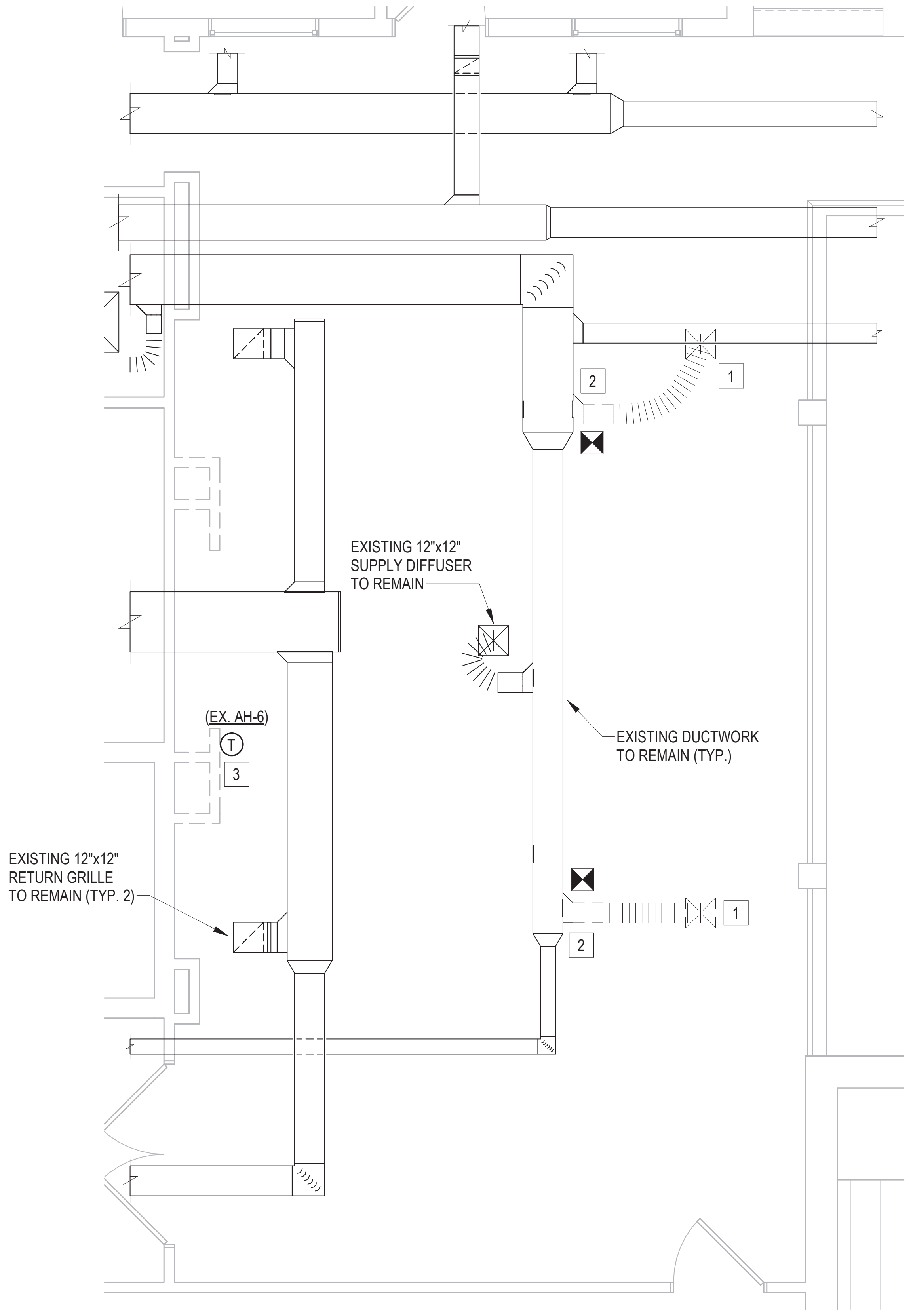
DATE	07.11.2025
SCALE	AS NOTED
DRAWN	BCR
JOB	2423
IFB #	XXXX
PROJECT CODE	XX-XXXX
SHEET	

FORMATTED FOR
A 24" X 36" PRINT

MD1.1

DEMOLITION PLAN NOTES: ☐

1. EXISTING 12"x12" SUPPLY DIFFUSER TO BE RELOCATED. SEE SHEET M1.2 FOR UPDATED LOCATION.
2. OPENING WITHIN DUCTWORK SHALL BE REPAIRED.
3. EXISTING AIR HANDLER THERMOSTAT TO BE RELOCATED. SEE SHEET M1.2 FOR UPDATED LOCATION.



PARTIAL SECOND FLOOR DEMOLITION PLAN - HVAC

SCALE 1/4" = 1'-0"

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REVISIONS	DATE

PARTIAL SECOND
FLOOR DEMOLITION
PLAN - HVAC

RENOVATIONS TO

NRV REGIONAL
COMMISSION OFFICE

2950 MARKET ST NE, CHRISTIANSBURG, VIRGINIA

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MD1.2

EQUIPMENT SCHEDULES:

SPLIT SYSTEM HEAT PUMP: TRANE	
INDOOR UNIT MARK	AH-8
OUTDOOR UNIT MARK	CU-8
SUPPLY AIRFLOW, CFM	1,400
ESP, IN. W.C.	0.8
OUTSIDE AIRFLOW, CFM	465
RETURN AIRFLOW CFM	935
COOLING	
NOMINAL CAPACITY, MBH	48.0
TOTAL CAPACITY, MBH	44.2
SENSIBLE CAPACITY, MBH	34.8
SEER2 / EER2	17.1 / 12.5
EAT, °F DB / WB	80.0 / 65.6
LAT, °F DB	56.6
PRIMARY HEATING (HEAT PUMP)	
NOMINAL CAPACITY, MBH	35.6
EAT, °F DB	60.0
LAT, °F DB	83.5
SECONDARY HEATING	
TOTAL CAPACITY, kW	10.8
STAGES OF HEATING	2
UNIT ELECTRICAL (V / Hz / Ph)	208 / 60 / 1
MCA (INDOOR/OUTDOOR), A	9 / 36
MOP (INDOOR/OUTDOOR), A	15 / 50
REFRIGERANT	R-454B
INDOOR UNIT WEIGHT, LBS	174
INDOOR UNIT MODEL	5TEM6D06AV41
OUTDOOR UNIT WEIGHT, LBS	241
OUTDOOR UNIT MODEL	5TWR7048A1

NOTES:
1. INDOOR UNIT SHALL BE INSTALLED IN VERTICAL UPFLOW CONFIGURATION.
2. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S INSTRUCTIONS.
3. POWER SUPPLY FOR INDOOR UNIT SHALL BE SINGLE SOURCE WITH UNIT MOUNTED DISCONNECT SWITCH.
4. PROVIDE WITH PROGRAMMABLE THERMOSTAT.
5. PROVIDE UNIT WITH SECONDARY ELECTRIC HEAT.
6. PROVIDE LITTLE GIANT CONDENSATE PUMP MODEL VCMA-15 OR EQUAL.

FANS: GREENHECK

MARK	LOCATION	TYPE	CFM	ESP, IN. W.C.	RPM	MOTOR (W)	ELECTRICAL		WEIGHT (LBS)	MODEL #	NOTES
							V/Ph	NEC FLA (A)			
EF-3	136.1 RESTROOM	CEILING MOUNTED	75	0.2	840	12	115 / 1	0.17	12	SP-A90	1 - 6
EF-4	136.2 RESTROOM	CEILING MOUNTED	75	0.2	840	12	115 / 1	0.17	12	SP-A90	1 - 6

NOTES:
1. PROVIDE SPEED CONTROLLER FOR AIR BALANCE OF FAN.
2. PROVIDE DISCONNECT SWITCH.
3. PROVIDE BACKDRAFT DAMPER.
4. PROVIDE ELECTRONICALLY COMMUTATED (EC) MOTOR.
5. COORDINATE FAN GRILLE COLOR WITH ARCHITECT.
6. FAN CONTROLLED BY SPACE OCCUPANCY SENSOR.

GRILLES, REGISTERS AND DIFFUSERS: PRICE

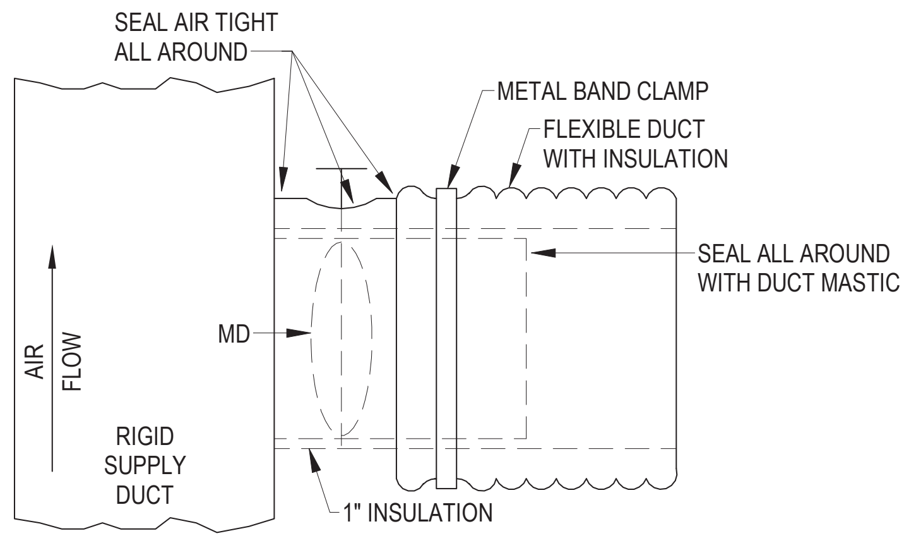
MARK	SERVICE	TYPE	MATERIAL	FACE SIZE, IN. x IN.	NECK SIZE, IN. x IN.	MAX AIR P.D., IN. H2O	MAX N.C.	MODEL #	NOTES
A	SUPPLY	SURFACE MOUNTED DIFFUSER	STEEL	12"x12"	6"∅	0.1	25	SCD	1, 2, 3
B	SUPPLY	LAY-IN DIFFUSER	STEEL	24"x24"	8"∅	0.1	25	SCD	1, 2
--	--	--	--	--	--	--	--	--	--
X	RETURN	SURFACE MOUNTED GRILLE	STEEL	16"x16"	16"x16"	0.05	20	530	3
Y	RETURN	SURFACE MOUNTED GRILLE	STEEL	18"x14"	18"x14"	0.05	20	530	3
Z	RETURN	SURFACE MOUNTED GRILLE	STEEL	22"x22"	20"x20"	0.05	20	530FF	3, 4

NOTES:
1. DIFFUSER SHALL BE 4-WAY UNLESS OTHERWISE NOTED.
2. FLEX DUCT CONNECTION SHALL EQUAL THE DIAMETER OF DIFFUSER CONNECTION.
3. PROVIDE SURFACE MOUNT FRAME AS REQUIRED FOR INSTALLATION IN ACOUSTIC CEILING TILE OR HARD CEILING.
4. FILTER GRILLE. PROVIDE 2" MERV-8 FITLER.

ELECTRIC HEATERS: QMARK

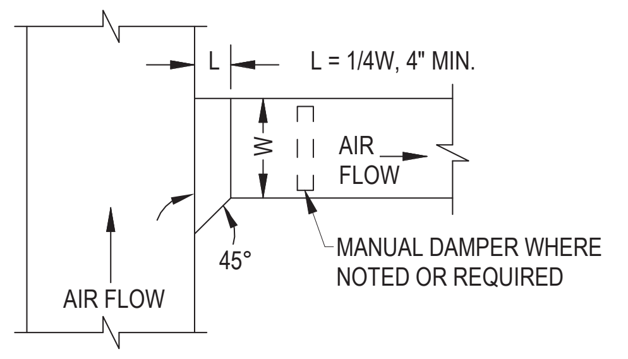
MARK	TYPE	CAPCITY, KW	V / Ph	UNIT WEIGHT, LBS	MODEL #
WH-1	RECESSED	1.5	120 / 1	22	LFK151F

NOTES:
1. PROVIDE DISCONNECT SWITCH.
2. PROVIDE A FACTORY MOUNTED THERMOSTAT.
3. COORDINATE COLOR WITH ARCHITECT.



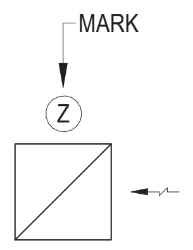
SPIN-IN FITTING DETAIL

NO SCALE



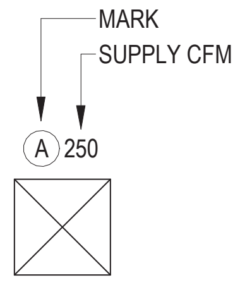
BRANCH DUCT CONNECTION DETAIL

SCHEMATIC



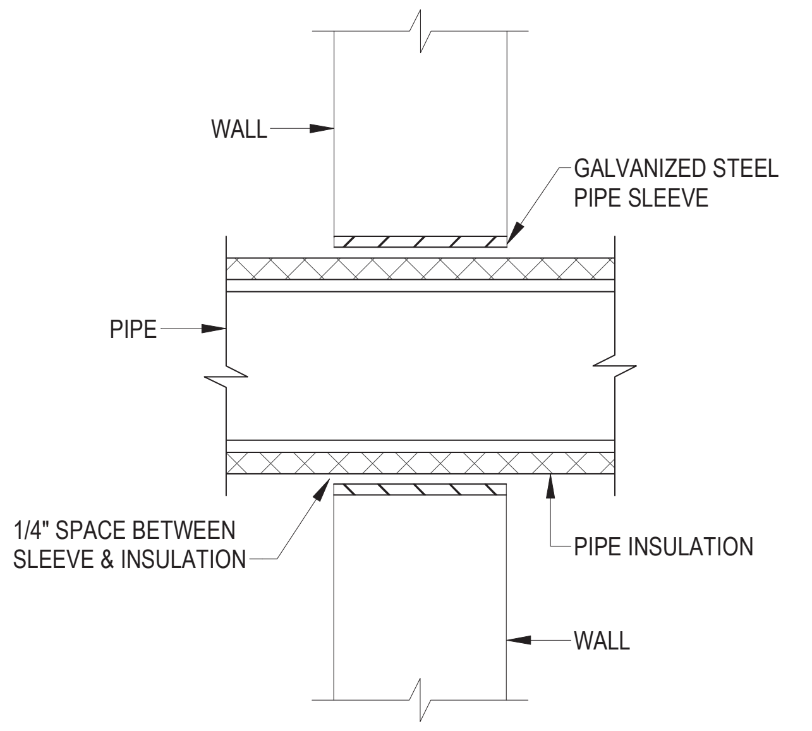
GRILLE SIZING DETAIL

NO SCALE



DIFFUSER SIZING DETAIL

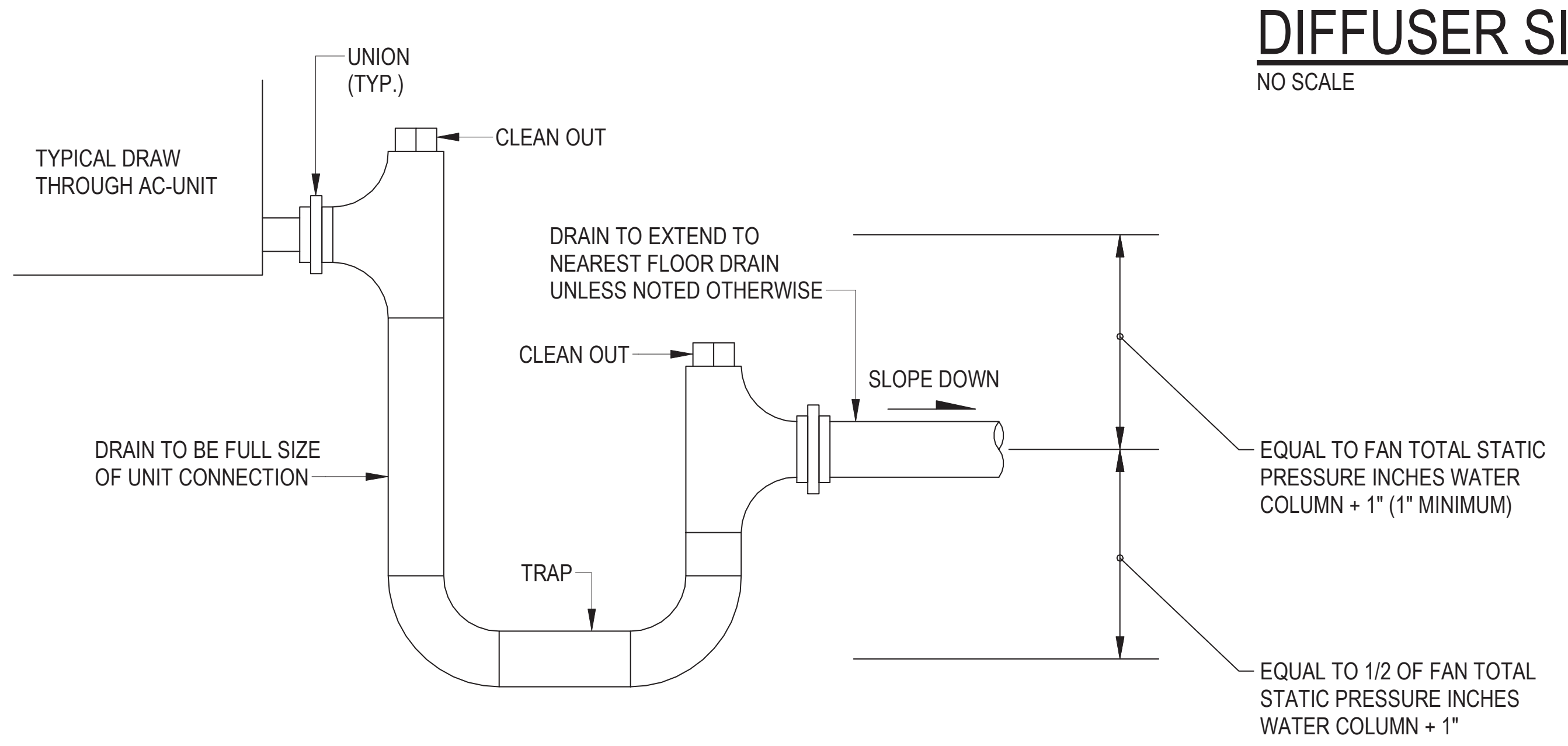
NO SCALE



NOTE:
WHERE PIPES PENETRATE FIRE-RATED WALLS, FILL SPACE BETWEEN PIPE & SLEEVE WITH A FIRE-RESISTANT MATERIAL WITH SUFFICIENT RATING TO MAINTAIN THE FIRE RATING OF THE WALL. WHERE PIPES PENETRATE EXTERIOR WALLS, FILL SPACE BETWEEN PIPE & SLEEVE WITH FIBERGLASS INSULATION.

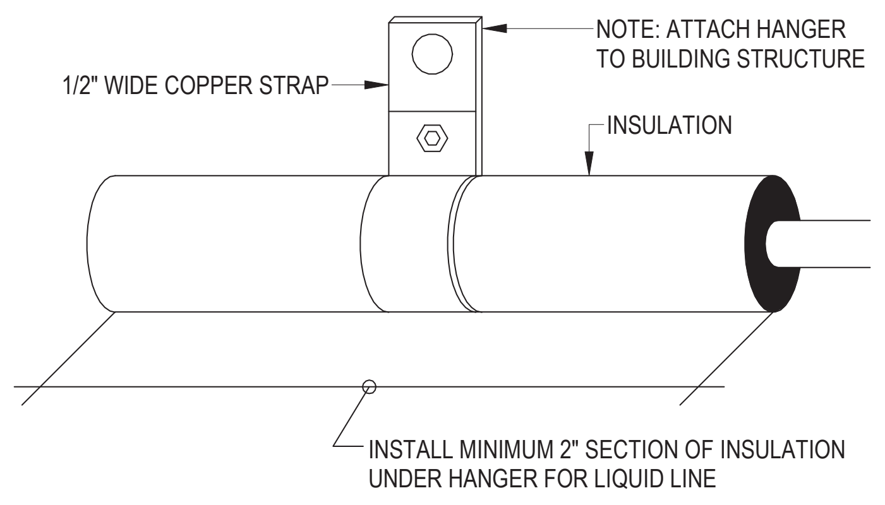
WALL PIPE SLEEVE DETAIL

NO SCALE



COOLING COIL CONDENSATE DRAIN DETAIL

NO SCALE



REFRIGERANT PIPING HANGER DETAIL

NO SCALE

GENERAL NOTES:

1. ALL DUCTWORK AND PIPES SHALL BE COORDINATED WITH OTHER DUCTS, PIPES, LIGHTS, STRUCTURAL SYSTEM, CEILING SUPPORTS AND FRAMING BEFORE INSTALLATION. MINOR DUCT AND PIPE OFFSETS AND MINOR DUCT TRANSITIONS SHALL BE PROVIDED AS REQUIRED. WHERE TRANSITIONS ARE REQUIRED, CROSS SECTIONAL AREA OF DUCT SHALL NOT BE REDUCED. MEASUREMENTS FOR VERTICAL CLEARANCES OF DUCTWORK SHALL BE TAKEN AT THE JOB SITE BEFORE FABRICATION OF ANY DUCTWORK.
2. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S PUBLISHED INSTRUCTIONS.
3. MATERIALS AND INSTALLATION SHALL COMPLY WITH LOCAL CODES, APPLICABLE PROVISIONS OF LATEST EDITION OF NATIONAL FIRE PROTECTION ASSOCIATION, LOCAL UTILITY REGULATIONS AND GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.
4. THE EXISTING SYSTEMS INDICATED ARE FROM CONSTRUCTION DOCUMENTS DATED 09/12/2012. (THESE EXISTING DRAWINGS ARE AVAILABLE AS PDF ELECTRONIC DRAWING FILES.) THE CONTRACTOR IS CAUTIONED THAT THE EXISTING HVAC SYSTEM LAYOUTS ARE INDICATED AS ONLY AN APPROXIMATION OF EXISTING CONDITIONS. NOT ALL EXISTING SYSTEMS ARE SHOWN AND SELECTIVE DEMOLITION IS REQUIRED. THE CONTRACTOR SHALL VERIFY ACTUAL SYSTEM CONFIGURATIONS IN THE FIELD AND SHALL COORDINATE ACCORDINGLY.
5. CONTRACTOR SHALL SEAL AND FLASH ALL PENETRATIONS IN EXISTING WALLS.
6. NEW WALL OPENINGS WITH VERIFIED WITH EXISTING STRUCTURE.
7. VERIFY THE LOCATION OF ALL NEW AND RELOCATED THERMOSTATS, TEMPERATURE SENSORS, PANELS AND CONTROL INSTRUMENTS WITH THE ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
8. VERIFY LOCATIONS OF NEW AND EXISTING EQUIPMENT AND ROUTE OF NEW DUCTWORK AND PIPING WITH EXISTING CONDITIONS.
9. ALL CUTTING AND PATCHING FOR THE INSTALLATION OF NEW WORK IN EXISTING BUILDING SHALL BE DONE BY THE GENERAL CONTRACTOR.
10. REFER TO ARCHITECTURAL AND ELECTRICAL DRAWINGS TO COORDINATE THE EXACT LOCATIONS OF DIFFUSERS, GRILLES, PIPING AND OTHER MECHANICAL EQUIPMENT WITH CEILING GRID, LIGHTS, AND OTHER BUILDING COMPONENTS. SEE REFLECTED CEILING PLAN FOR EXACT LOCATIONS OF CEILING DEVICES.
11. CONTRACTOR SHALL PROVIDE ALL SUPPORTS REQUIRED TO MOUNT MECHANICAL EQUIPMENT, PIPING, AND DUCTWORK.
12. WHERE PIPE AND DUCT CONNECTIONS ARE SHOWN CONNECTING TO EXISTING, CONTRACTOR SHALL DETERMINE EXACT LOCATIONS AND CONNECTION SIZES PRIOR TO INSTALLATION.
13. ALL FLEXIBLE DUCTS CONNECTED TO SUPPLY DIFFUSERS SHALL BE SIZED TO EQUAL THE DIFFUSER NECK DIAMETER.
14. PROVIDE FLEXIBLE DUCT CONNECTIONS BETWEEN THE SUPPLY AND RETURN DUCTS FROM THE AIR UNITS.
15. NEW DUCT AND PIPE INSULATION SHALL MATCH EXISTING. INSULATION THAT IS DAMAGED OR REMOVED FOR NEW WORK SHALL BE REPLACED, REPAIRED AND SEALED AS REQUIRED.
16. EXPOSED PIPING RUNOUTS SHALL BE INSTALLED IN PRACTICAL ALIGNMENT WITH THE BUILDING AND SHALL BE ADEQUATELY SECURED TO THE EXISTING BUILDING STRUCTURE.
17. ALL CEILING DIFFUSERS SHALL BE 4-WAY THROW TYPE UNLESS NOTED OTHERWISE.
18. HVAC CONTRACTOR SHALL ADJUST CFM FOR CEILING DEVICES AND AIR UNITS AS SHOWN ON THE FLOOR PLANS.
19. PROVIDE ACCESS DOORS OF SUFFICIENT SIZE FOR ALL CONCEALED CONTROLS, DAMPERS OR ANY ITEMS REQUIRING ACCESS.
20. AIR DEFLECTORS SHALL BE PROVIDED IN ALL SQUARE ELBOWS.
21. MOUNT WALL HEATERS NOMINAL 16" ABOVE FLOOR.
22. ALL REMOTE MOUNTED TEMPERATURE CONTROL DEVICES AND TEMPERATURE CONTROL WIRING SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
23. PROVIDE DUCT PLENUM FOR AIR UNITS WITH BOTTOM INTAKE. CONSTRUCT PLENUM TO SUPPORT UNIT WEIGHT. PLENUM SHALL BE FULL SIZE OF UNIT AND SHALL BE OF ADEQUATE HEIGHT TO RECEIVE DUCTWORK AS SHOWN ON THE DRAWINGS. PLENUM SHALL BE ACOUSTICALLY LINED AND ACCESS TO FILTERS SHALL BE PROVIDED IF REQUIRED.
24. DUCTWORK AND PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL PANELS. COORDINATE INSTALLATION OF DUCTWORK AND PIPING WITH ELECTRICAL PANELS WHEN SHOWN NEAR PANELS OR OVER ELECTRICAL ROOMS.
25. REFRIGERANT CIRCUIT ACCESS PORTS LOCATED OUTDOORS SHALL BE FITTED WITH LOCKING-TYPE TAMPER-RESISTANT CAPS OR BE OTHERWISE SECURED TO PREVENT UNAUTHORIZED ACCESS.
26. OUTDOOR EQUIPMENT SHALL BE SECURED TO CONCRETE HOUSEKEEPING PADS WITH HOLD-DOWN BOLTS TO PREVENT MOVEMENT.
27. INSTRUCT THE OWNER IN THE PROPER OPERATION AND MAINTENANCE OF THE MECHANICAL SYSTEMS UNTIL THE OWNER IS FULLY PREPARED TO OPERATE AND MAINTAIN THE MECHANICAL SYSTEM. HOWEVER, LENGTH OF INSTRUCTION TIME SHALL BE LIMITED TO ONE-HALF DAY.
28. SYSTEMS SHALL OPERATE UNDER CONDITIONS OF LOAD WITHOUT UNUSUAL OR EXCESSIVE NOISE OR VIBRATION. UNUSUAL OR EXCESSIVE NOISE OR VIBRATION SHALL BE CORRECTED.
29. EQUIPMENT, MATERIALS AND LABOR REQUIRED BY THESE CONTRACT DRAWINGS SHALL BE GUARANTEED TO BE FREE FROM DEFECTIVE MATERIALS OR WORKMANSHIP FOR ONE YEAR AFTER FINAL ACCEPTANCE OF THE PROJECT UNLESS SPECIFIED OTHERWISE. DEFECTIVE MATERIALS OR WORKMANSHIP OCCURRING DURING THIS PERIOD SHALL BE CORRECTED AT NO ADDITIONAL COST.

HVAC LEGEND

ABOVE	ABV	
AIR HANDLING UNIT	AH	
BELOW	BEL	
BETWEEN	BET	
CAPACITY	CAP	
CEILING	CLG	
CEILING DIFFUSER	CD	⊠
CEILING GRILLE	CG	⧄
CLEANOUT	CO	——⊣ CO
CONDENSATE PUMP	CP	
COOLING COIL CONDENSATE DRAIN PIPE	CCCD	—— D ——
CUBIC FEET PER MINUTE	CFM	
DEGREES FAHRENHEIT	°F	
DIAMETER	DIA	Φ
DOOR UNDERCUT	UC	
DOWN	DN	
DUCTWORK (NEW)		
ACOUSTIC LINED		
RETURN & EXHAUST		
SUPPLY		
DUCTWORK (EXISTING TO REMAIN)		
DUCTWORK (EXISTING TO BE REMOVED)		– – – – –
EACH	EA	
ENTERING AIR TEMPERATURE	EAT	
EXISTING, REMOVE FROM THIS POINT		⧗
FEET PER MINUTE	FPM	
FLEXIBLE DUCT RUNOUT		∿
FLOOR	FL	
FROM	FRM	
LEAVING AIR TEMPERATURE	LAT	
LOUVER	LVR	
MANUAL DAMPER	MD	
MOTOR OPERATED DAMPER	MOD	
NEW CONNECTED TO EXISTING		◒
OUTDOOR AIR	OA	
PIPING INDICATION WITH RESPECT TO FLOW		
BOTTOM TAKEOFF		
SIDE CONNECTION		
TOP TAKEOFF		
TURN DOWN OR FROM BELOW		
TURN UP OR DOWN		
TURN UP OR FROM ABOVE		——○
RETURN AIR	RA	
REVOLUTIONS PER MINUTE	RPM	
SUPPLY AIR	SA	
THERMOSTAT OR TEMPERATURE SENSOR	T'STAT	Ⓣ
THOUSAND BTU PER HOUR	MBH	
WALL HEATER (ELECTRIC)	WH	

GENERAL DEMOLITION NOTES:

1. CONTRACTOR SHALL VISIT THE SITE TO REVIEW THE SCOPE OF DEMOLITION WORK AND VERIFY EXISTING CONDITIONS PRIOR TO PRICING.
2. EXISTING MATERIALS TO BE REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND REMOVED FROM THE PREMISES UNLESS DIRECTED OTHERWISE BY THE OWNER OR SHOWN OTHERWISE ON THE PLANS. THE OWNER MAY DIRECT THE CONTRACTOR TO TURN OVER PARTICULAR EQUIPMENT TO THE OWNER AND LOCATE AS DIRECTED BY THE OWNER.
3. INSULATION ON EXISTING PIPING OR DUCT THAT IS DAMAGED OR REMOVED DUE TO THE DEMOLITION WORK SHALL BE REPLACED AND SEALED AS REQUIRED.
4. THE CONTRACTOR SHALL PROTECT EXISTING SYSTEMS TO REMAIN. SYSTEMS THAT ARE DAMAGED OR INCORRECTLY REMOVED DUE TO THE DEMOLITION WORK SHALL BE REPAIRED OR REPLACED.
5. THE CONTRACTOR SHALL PROTECT EXISTING BUILDING SURFACES TO REMAIN. PROTECT EXISTING CEILINGS, FLOORS AND WALLS FROM ALL DEMOLITION WORK.
6. THE CONTRACTOR IS CAUTIONED THAT THE EXISTING HVAC SYSTEM LAYOUTS ARE INDICATED AS ONLY AN APPROXIMATION OF EXISTING CONDITIONS. NOT ALL EXISTING SYSTEMS ARE SHOWN AND SELECTIVE DEMOLITION IS REQUIRED. THE CONTRACTOR SHALL VERIFY ACTUAL SYSTEM CONFIGURATIONS IN THE FIELD AND SHALL COORDINATE ACCORDINGLY.
7. DEMOLITION WORK SHALL BE COORDINATED WITH THE OWNER.

REFRIGERANT PIPING NOTES:

1. ALL REFRIGERANT PIPING SHALL BE SIZED AND INSTALLED PER EQUIPMENT MANUFACTURER'S REQUIREMENTS. SIZES AND QUANTITIES OF REFRIGERANT PIPING SHALL BE DETERMINED BY EQUIPMENT MANUFACTURER. PIPING SHOWN ON DRAWINGS IS DIAGRAMMATIC ONLY AND INTENDED ONLY TO REPRESENT THE SCOPE OF WORK AND PREFERRED ROUTING.

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CONSULTANT

COMMONWEALTH OF VIRGINIA
7/11/2025
RODNEY D. FANNING
Lic. No. 034568
PROFESSIONAL ENGINEER

REVISIONS	DATE

HVAC LEGEND, NOTES, EQUIPMENT SCHEDULES, AND DETAILS

RENOVATIONS TO

NRV REGIONAL COMMISSION OFFICE

2950 MARKET ST NE, CHRISTIANSBURG, VIRGINIA

NRVRC
new river valley regional commission

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PROJECT CODE	XX-XXXX
SHEET	M0.1

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HVAC SPECIFICATIONS:

1. SCOPE OF THE WORK: WORK SHALL INCLUDE COMPLETE HVAC SYSTEMS. PROVIDE SUPERVISION, LABOR, MATERIAL, EQUIPMENT, MACHINERY, PLANT, AND ITEMS NECESSARY FOR COMPLETE SYSTEMS TESTED AND READY FOR OPERATION.

2. REGULATIONS: MATERIALS AND INSTALLATION SHALL COMPLY WITH LOCAL CODES, APPLICABLE PROVISIONS OF LATEST EDITION OF NATIONAL FIRE PROTECTION ASSOCIATION, LOCAL UTILITY REGULATIONS AND GOVERNMENTAL DEPARTMENTS HAVING JURISDICTION.

3. DRAWINGS: THESE DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK INCLUDED. WHERE VARIANCES OCCUR INCLUDE THE ITEMS OF BETTER QUALITY, GREATER QUANTITY OR HIGHER COST.

4. COORDINATION OF WORK: THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COORDINATION AND PROPER RELATION OF HIS WORK TO THE BUILDING STRUCTURE AND TO THE WORK OF OTHER TRADES. CONTRACTOR SHALL PROVIDE DIMENSIONS AND LOCATIONS OF ALL OPENINGS AND SIMILAR ITEMS TO THE PROPER TRADES AND SHALL INSTALL WORK AS REQUIRED SO AS NOT TO DELAY PROJECT COMPLETION. THE CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED BY HIS WORK OR WORKMEN. REPAIRING OF DAMAGED WORK SHALL BE DONE BY THE CONTRACTOR AT NO ADDITIONAL COST.

5. VISITING THE SITE: EACH CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE BEFORE PRICING THE JOB TO FAMILIARIZE HIMSELF WITH ALL EXISTING CONDITIONS TO BE MET IN THE EXECUTION OF THE WORK UNDER THIS CONTRACT. NO ADDITIONAL COMPENSATION WILL BE ALLOWED RELATING TO SITE CONDITIONS.

6. INTERRUPTION OF SERVICES: INTERRUPTIONS OF SERVICE TO EXISTING SYSTEMS SHALL BE COORDINATED WITH THE OWNER AS TO TIME AND DURATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY INTERRUPTIONS TO SERVICE AND SHALL REPAIR ANY DAMAGES TO EXISTING SYSTEMS CAUSED BY HIS OPERATIONS.

7. WORK IN OCCUPIED AREAS: WORK IN OCCUPIED AREAS SHALL BE COORDINATED WITH THE OCCUPANT AND OWNER AS TO TIME AND DURATION. THE CONTRACTOR SHALL PROTECT THE OCCUPIED AREA AND SHALL BE RESPONSIBLE FOR CLEANING AND REPAIRING ANY DAMAGES CAUSED BY HIS WORK. SAFETY OF BUILDING OCCUPANTS SHALL BE ASSURED AT ALL TIMES. TOOLS, MATERIAL, DIRT AND DEBRIS SHALL BE REMOVED FROM OCCUPIED AREAS WHENEVER WORK AREAS ARE LEFT UNATTENDED.

8. ACCESSIBILITY: LOCATE EQUIPMENT WHICH MUST BE SERVICED OR MAINTAINED IN FULLY ACCESSIBLE POSITIONS WHERE POSSIBLE. OTHERWISE, FURNISH ACCESS PANELS OF SUFFICIENT SIZE AND LOCATED SO THAT THE CONCEALED EQUIPMENT CAN BE SERVICED.

9. FOUNDATION PADS: PROVIDE 4-INCH HIGH CONCRETE FOUNDATION PADS FOR OUTDOOR EQUIPMENT.

10. THERMOSTATS: ROUGH-IN OPENINGS SHALL ALIGN VERTICALLY AND HORIZONTALLY WITH BUILDING STRUCTURE. WALL-MOUNTED THERMOSTATS SHALL BE MOUNTED 48" ABOVE FINISHED FLOOR TO THE TOP OF THE THERMOSTAT.

11. SLEEVES: LOCATE SLEEVES DURING NORMAL COURSE OF WORK. PROVIDE SLEEVES FOR PIPING PASSING THROUGH CONCRETE FLOOR SLABS AND CONCRETE, MASONRY, TILE AND GYPSUM WALL CONSTRUCTION. SLEEVES SHALL NOT BE REQUIRED FOR PIPING EMBEDDED IN CONCRETE OR SLAB ON GRADE, EXCEPT THAT COPPER PIPING SHALL REQUIRE SLEEVES THROUGH SLABS ON GRADE. SLEEVES PLACED IN EXTERIOR WALLS BELOW GRADE SHALL BE WATERTIGHT. WHERE SLEEVES ARE LOCATED THROUGH FIRE-RATED WALLS OR FLOORS, THE SLEEVE ASSEMBLIES SHALL MAINTAIN THE FIRE RATING OF THE WALL OR FLOOR. SLEEVES SHALL BE CONSTRUCTED OF 20 GAUGE GALVANIZED STEEL WITH LOCK SEAM JOINTS FOR ALL SLEEVES SET IN CONCRETE FLOOR SLABS. ALL OTHER SLEEVES SHALL BE CONSTRUCTED OF GALVANIZED STEEL PIPE.

12. CUTTING AND PATCHING: THE CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING NECESSARY TO INSTALL HIS WORK. PATCHING SHALL MATCH ADJACENT SURFACES. NO STRUCTURAL MEMBERS SHALL BE CUT WITHOUT THE APPROVAL OF THE ARCHITECT.

13. CLEANING: EQUIPMENT AND PIPING SHALL BE CLEANED TO REMOVE FOREIGN MATERIALS. PROVIDE TEMPORARY FILTERS FOR AIR UNITS THAT ARE OPERATED DURING CONSTRUCTION. PLUG OR CAP OPENINGS IN EQUIPMENT, DUCTWORK, PIPING AND MATERIALS UNTIL CONNECTION IS MADE TO THE SYSTEM. REMOVE FROM THE PREMISES ALL UNUSED MATERIAL AND DEBRIS RESULTING FROM THE PERFORMANCE OF HVAC WORK.

14. WIRING: STARTERS THAT ARE SPECIFIED TO BE FURNISHED AS AN INTEGRAL PART OF THE MECHANICAL EQUIPMENT SHALL BE COMPLETE WITH PROPERLY SIZED OVERLOAD HEATERS. TEMPERATURE CONTROL WIRING, EQUIPMENT CONTROL WIRING AND CONTROL INTERLOCK WIRING FOR MECHANICAL EQUIPMENT SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR. CONTROL WIRING SHALL NOT INCLUDE ANY WIRING WHICH CARRIES MOTOR CURRENT. ALL WIRING SHALL BE IN METAL CONDUIT AND SHALL COMPLY WITH THE ELECTRICAL SPECIFICATIONS.

15. QUIET OPERATION: SYSTEMS SHALL OPERATE UNDER CONDITIONS OF LOAD WITHOUT UNUSUAL OR EXCESSIVE NOISE OR VIBRATION. UNUSUAL OR EXCESSIVE NOISE OR VIBRATION SHALL BE CORRECTED.

16. TESTING AND BALANCING: HVAC CONTRACTOR SHALL TEST ALL HVAC EQUIPMENT TO ASSURE THAT THE PROPER SEQUENCE OF CONTROL IS ESTABLISHED AND OPERATING IN A SAFE MANNER. THE AIR QUANTITIES FOR EQUIPMENT, DIFFUSERS AND REGISTERS SHALL BE BALANCED FOR THE CFM AS INDICATED ON THE DRAWING. ALL PERSONNEL INVOLVED IN THE EXECUTION OF THE WORK SHALL BE EXPERIENCED IN THE BALANCING OF MECHANICAL SYSTEMS.

17. SHOP DRAWINGS: SHOP DRAWINGS ARE REQUIRED FOR ALL MATERIAL AND EQUIPMENT THAT IS SPECIFIED BY A MANUFACTURER'S NAME OR AS INDICATED IN THE TECHNICAL SPECIFICATIONS. FURNISH ELECTRONIC PDFS AS REVIEWED BY THE CONTRACTOR. SUBMITTAL DATA FOR RELATED EQUIPMENT SHALL BE SUBMITTED AT ONE TIME. IDENTIFY SUBMITTALS WITH PROJECT NAME AND NUMBER, CONTRACTOR'S NAME, MANUFACTURER, MODEL OR STYLE, AND CONTACTOR'S REVIEW STAMP. SUBMITTALS SHALL BE DETAILED, DIMENSIONED DRAWINGS SHOWING CONSTRUCTION, SIZE AND ARRANGEMENT, SERVICE CLEARANCES, PERFORMANCE CHARACTERISTICS, AND CAPACITY. SUBMITTALS NOT PROPERLY IDENTIFIED OR CONTAINING INFORMATION OF A GENERAL NATURE WILL NOT BE REVIEWED AND WILL BE RETURNED UNCHECKED.

18. INSTRUCTIONS TO OWNER: INSTRUCT THE OWNER IN THE PROPER OPERATION AND MAINTENANCE OF THE MECHANICAL SYSTEMS UNTIL THE OWNER IS FULLY PREPARED TO OPERATE AND MAINTAIN THE SYSTEMS. HOWEVER, LENGTH OF INSTRUCTION TIME SHALL BE LIMITED TO ONE-HALF DAY.

19. OPERATING AND MAINTENANCE: PROVIDE THE OWNER WITH TWO (2) BOUND SETS OF OPERATING AND MAINTENANCE INSTRUCTIONS FOR ALL HVAC EQUIPMENT AND CONTROLS.

20. GUARANTEE: EQUIPMENT, MATERIALS AND LABOR REQUIRED BY THESE CONTRACT DRAWINGS SHALL BE GUARANTEED TO BE FREE FROM DEFECTIVE MATERIALS OR WORKMANSHIP FOR ONE (1) YEAR AFTER FINAL ACCEPTANCE OF THE PROJECT UNLESS SPECIFIED FOR A LONGER PERIOD IN OTHER PORTIONS OF THE SPECIFICATIONS. DEFECTIVE MATERIALS OR WORKMANSHIP OCCURRING DURING THIS PERIOD SHALL BE CORRECTED AT NO ADDITIONAL COST.

21. PAINTING: GENERAL – PAINT MECHANICAL EQUIPMENT AND MATERIALS (WHERE NOT CONCEALED). PAINTING (IN CONCEALED SPACES) SHALL BE LIMITED TO EQUIPMENT AND MATERIALS NOT OTHERWISE PROTECTED FROM RUSTING SUCH AS HANGERS AND SUPPORTS. PAINT SHALL BE PRODUCTS OF SHERWIN-WILLIAMS, PITTSBURGH, PRATT-LAMBERT OR EQUAL. SURFACE PREPARATION, PRIMING AND PAINT APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. GALVANIZED SURFACES SHALL BE PRETREATED WITH A PHOSPHORIC ACID CLEANING SOLUTION AND PRIMED. AFTER PREPARATION EACH ITEM SHALL BE PAINTED, EXCEPT COLOR OF PAINT FOR EQUIPMENT AND MATERIAL WHERE NOT CONCEALED SHALL BE AS SELECTED BY THE ARCHITECT. ITEMS NOT CONCEALED IN ROOMS SHALL BE PAINTED OF THE SAME COLOR TO MATCH ADJACENT WALLS OR CEILINGS. PAINTING IS NOT REQUIRED OF ITEMS WITH A FACTORY-FINISH COAT. PATCH PAINTING IS REQUIRED OF ANY DAMAGED AREAS TO MATCH FACTORY-FINISH COAT. NAMEPLATES ON EQUIPMENT SHALL NOT BE PAINTED.

22. IDENTIFICATION OF PIPES AND EQUIPMENT: EACH MAJOR PIECE OF EQUIPMENT, SUCH AS AIR HANDLING UNITS AND PIPING SHALL BE IDENTIFIED BY MARKING THAT WILL READ THE SAME AS THE IDENTIFICATION SHOWN ON THE DRAWINGS. STENCIL LETTERS SHALL BE 2 INCHES HIGH UPPER CASE PAINTED WITH WHITE ENAMEL ON EQUIPMENT AND BLACK ENAMEL ON PIPING AND CONDUIT. IDENTIFICATION SHALL BE PAINTED ON EACH PIPE OR CONDUIT WHERE EXPOSED OR ACCESSIBLE AND SHALL BE PLACED EVERY 15 FEET ALONG THE PIPE OR CONDUIT.

23. AIR DEVICES:

    A. DIFFUSERS AND GRILLES SHALL BE PRICE OR EQUAL UNLESS NOTED OTHERWISE. CEILING DEVICES SHALL HAVE WHITE BAKED ENAMEL FINISH. ALL OTHER DEVICES SHALL HAVE PRIME FINISH.

    B. SUPPLY CEILING DIFFUSERS SHALL BE PRICE MODEL SCD OR EQUAL. DIFFUSER SHALL BE 4-WAY UNLESS NOTED OTHERWISE. CONSTRUCTION SHALL BE STEEL. DIFFUSER TYPE SHALL BE LAY-IN OR SURFACE MOUNTED DEPENDING ON FACE SIZE.

    C. RETURN SURFACE MOUNTED GRILLES SHALL BE PRICE MODEL 530 OR EQUAL. GRILLES SHALL INCLUDE 45° DEFLECTING VANES AND SHALL HAVE FREE AREA NOT LESS THAN 75%. VANE SPACING SHALL BE 3/4".

    D. RETURN AIR FILTER GRILLES SHALL BE MODEL 530FF OR EQUAL. GRILLES SHALL BE STEEL CONSTRUCTION WITH 45° DEFLECTING BLADES SUITABLE FOR SURFACE MOUNTED INSTALLATION. GRILLES SHALL HAVE HINGED FRAME WITH MERV 8 FILTERS OF STANDARD SIZE.

24. DUCTWORK:

    A. GENERAL: DUCTWORK SHALL BE ZINC-COATED SHEET STEEL OR ALUMINUM, CONSTRUCTED AND INSTALLED AS RECOMMENDED BY THE LATEST EDITION OF SMACNA.

    B. DUCT CLEARANCE SHALL BE ESTABLISHED AT THE JOB SITE BEFORE ANY DUCTS ARE FABRICATED. THE CONTRACTOR WILL NOT BE ALLOWED ANY EXTRA COSTS FOR DUCTS FABRICATED AND THEN FOUND NOT TO FIT.

    C. MANUAL VOLUME CONTROL DAMPERS SHALL HAVE ACCESSIBLE OPERATING MECHANISM. BLADE HEIGHT SHALL NOT EXCEED 8 INCHES.

    D. MOTORIZED DAMPERS SHALL BE OPPOSED BLADE CONSTRUCTION FOR MODULATING SERVICE AND PARALLEL BLADE CONSTRUCTION FOR TWO-POSITION SERVICE. MOTORIZED DAMPERS SHALL BE CONSTRUCTED WITH BRASS BEARINGS, CHANNEL IRON FRAME AND INTERLOCKING BLADES WITH AIR-TIGHT FELT SEALS.

    E. AIR DEFLECTORS SHALL BE PROVIDED IN ALL SQUARE ELBOWS AND DUCT-MOUNTED SUPPLY OUTLETS.

    F. HINGED ACCESS DOORS SHALL BE PROVIDED IN ACCORDANCE WITH NFPA 90A AT ALL AUTOMATIC DAMPERS, HEATERS, THERMOSTATS, ON EACH SIDE OF AIR HANDLING UNIT AND OTHER APPARATUS REQUIRING SERVICE AND INSPECTION IN THE DUCT SYSTEM. ACCESS DOORS SHALL BE 24" X 24" OR AS LARGE AS PRACTICAL.

    G. DUCT SUPPORTS SHALL CONSIST OF NOT LESS THAN 1" X 16-GAUGE GALVANIZED STRAP IRON HANGERS SPACED NOT OVER 4'-0" ON CENTER.

    H. FLEXIBLE DUCTS SHALL BE FLEXIBLE METAL OR METAL AND NEOPRENE-COATED CANVAS HOSE INSULATED WITH 1" THICK FIBERGLASS WITH VINYL VAPOR BARRIER. ALL ROUND DUCT TAKE-OFFS SHALL BE MADE WITH SPIN-IN FITTINGS WITH BALANCING DAMPER. THE DUCT DIAMETER SHALL MATCH THE AIR DIFFUSER SIZE UNLESS OTHERWISE INDICATED.

25. FLEXIBLE CONNECTIONS:

    A. INSTALL A NON-COMBUSTIBLE FLEXIBLE CONNECTION OF 29 OUNCE NEOPRENE COATED FIBERGLASS FABRIC WHERE DUCT CONNECTIONS ARE MADE TO AIR HANDLING UNIT. BURNING CHARACTERISTICS SHALL CONFORM TO NFPA 90A. FOR RECTANGULAR CONNECTIONS, CRIMP FABRIC TO SHEET METAL AND FASTEN SHEET METAL TO DUCTS BY SCREWS TWO INCHES ON CENTER. FABRIC SHALL NOT BE STRESSED OTHER THAN BY AIR PRESSURE. ALLOW AT LEAST ONE INCH SLACK TO ENSURE THAT NO VIBRATION IS TRANSMITTED.

26. LOUVERS:

    A. LOUVER SHALL BE GREENHECK MODEL ESD-635 OR EQUAL STATIONARY DRAINABLE BLADE WITH 6" DEEP FRAME AND 0.08" THICK EXTRUDED ALUMINUM CONSTRUCTION. BLADES SHALL BE POSITIONED AT APPROXIMATELY 37 DEGREE ANGLE AND SPACED NOT TO EXCEED 4 INCHES ON CENTER. A CHANNEL IN EACH BLADE SHALL DRAIN WATER TO DOWNSPOUTS IN JAMBS AND MULLIONS TO PREVENT WATER CASCADE FROM BLADE TO BLADE. PROVIDE COMPLETE WITH 1/2" MESH MATCHING BIRD SCREEN IN REMOVABLE FRAME AND EXTENDED SILL. LOUVER SHALL BE AMCA CERTIFIED FOR AIR PERFORMANCE AND WATER PENETRATION. WATER PENETRATION SHALL NOT OCCUR WHILE THE FREE AREA VELOCITY IS MAINTAINED LESS THAN 1,000 FEET PER MINUTE. LOUVERS ARE BASICALLY SIZED AT 400 CFM PER SQUARE FEET OF LOUVER FACE AREA, WITH A STATIC PRESSURE DROP NOT TO EXCEED 0.10 INCHES WATER COLUMN FOR A 48" X 48" LOUVER. FINISH SHALL BE KYNAR AND COLOR SHALL BE SELECTED BY ARCHITECT.

27. PIPING:

    A. COOLING COIL CONDENSATE DRAIN LINES SHALL BE PVC. PROVIDE WATER SEAL FROM AIR HANDLING UNIT OF SUFFICIENT DEPTH TO PREVENT BLOW OUT OR SIPHONING OF WATER. ENSURE SLOPE OF 1/8" PER FOOT IN DIRECTION OF FLOW.

    B. REFRIGERANT LINES SHALL BE DEHYDRATED AND SEALED COPPER TUBING AND SHALL BE SIZED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. SUCTION LINE SHALL BE INSULATED WITH A MINIMUM OF 1/2" THICK ARMAFLEX VAPOR SEALED. VERIFY ROUTE OF PIPE WITH ARCHITECT BEFORE INSTALLATION.

    C. PIPE SUPPORTS: SUSPENDED HORIZONTAL PIPING SHALL BE SUPPORTED BY ADJUSTABLE WROUGHT STEEL CLEVIS HANGERS. ALL SUPPORTS SHALL BE ATTACHED TO THE BUILDING STRUCTURE SPACED 10'-0" ON CENTER. HANGER RODS SHALL BE 3/8" DIAMETER SIZE FOR PIPES UP THROUGH 2". PIPE HANGER RODS SHALL BE ATTACHED TO THE TOP CHORD ONLY ON STEEL JOISTS AND BEAMS WITH CLAMPS. PIPING SHALL BE INSTALLED IN PRACTICAL ALIGNMENT WITH THE BUILDING.

    D. INSTALLATION: ALL PIPING SHALL BE INSTALLED WITH SUFFICIENT PITCH TO INSURE ADEQUATE DRAINAGE AND VENTING. CONDENSATE DRAIN LINES SHALL SLOPE 1/8" PER FOOT IN DIRECTION OF FLOW.

28. THERMAL COVERING:

    A. INSULATION SHALL BE JOHNS MANVILLE, OWENS CORNING, ARMSTRONG OR EQUAL. INSULATION SHALL NOT BE APPLIED UNTIL AFTER THE EQUIPMENT, PIPES OR DUCTS TO BE INSULATED HAVE PROVEN SATISFACTORY UNDER TESTS. ALL MATERIALS USED SHALL HAVE COMPOSITE FLAME-SPREAD RATING NOT EXCEEDING 25 AND A SMOKE-DEVELOPED RATING NOT EXCEEDING 50.

    B. PIPING: INSULATION SHALL BE INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

    C. FIBERGLASS PIPE INSULATION SHALL HAVE A WHITE KRAFT BONDED TO ALUMINUM FOIL, REINFORCED WITH FIBERGLASS YARN JACKET. ELASTOMERIC INSULATION SHALL BE CONSTRUCTED OF A CLOSED CELL STRUCTURE TO EFFECTIVELY RETARD THE FLOW OF MOISTURE VAPOR AND SERVE AS A VAPOR BARRIER. INSULATION THICKNESS AND TYPE FOR VARIOUS PIPING SYSTEMS SHALL BE AS INDICATED IN THE FOLLOWING TABLE (PIPE SIZE/INSULATION THICKNESS).

PIPE SIZE/INSULATION THICKNESS (1)

SYSTEM	TEMP. RANGE (°F)	LESS THAN 1"	1" TO 1-1/4"	1-1/2" TO 3"	4" TO 6"	8" & UP	INS. TYPE (2)
CONDENSATE DRAIN	45-75	0.5	0.5	1.0	1.0	1.0	A,B
REFRIG.	BELOW 40 (3)	1.0	1.0	1.5	1.5	1.5	B

NOTES:

(1) MINIMUM THICKNESS FOR INSULATION LISTED IN PRECEDING TABLE IS BASED ON THERMAL CONDUCTIVITY, 'K' NOT EXCEEDING 0.27 BTU PER INCH/HR. X SQ. FT. X DEG. F. BASED ON MEAN TEMPERATURE OF 75 DEG. F. INSULATION WITH GREATER THERMAL CONDUCTIVITY SHALL HAVE INCREASED THICKNESS TO PROVIDE SAME PERFORMANCE CHARACTERISTICS AS SPECIFIED.

(2) A - FIBERGLASS TYPE INSULATION; B - ELASTOMERIC TYPE INSULATION.

(3) INSULATE ALL REFRIGERANT PIPES LOCATED IN HOT SPACES SUCH AS ATTICS.

    D. FIBERGLASS PIPE INSULATION FITTINGS SHALL BE COVERED WITH PREMOLDED PVC FITTING COVERS. JACKETS ON FIBERGLASS PIPE INSULATION BELOW 80 DEG. F. SHALL BE VAPOR SEALED USING SELF-SEALING LAP, LAP SEAL GUN OR ADHESIVE. ALL INSULATION JOINTS, LAPS, VOIDS, PUNCTURES AND END TAPERS SHALL BE SEALED WITH 1/32" THICKNESS OF VAPOR ADHESIVE. A 12" LONG, 1/2 SECTION OF HYDROUS CALCIUM SILICATE OR FOAMGLAS INSULATION SHALL BE USED BETWEEN HANGERS AND PIPING. ON PIPE, SIZES 1-1/2" AND BELOW, HYDROUS CALCIUM SILICATE OR FOAMGLAS WILL NOT BE REQUIRED. ALL PIPING SHALL HAVE LOAD-DISTRIBUTING GALVANIZED 16 GAUGE METAL SHIELDS INSTALLED AROUND THE LOWER HALF OF THE INSULATION.

    E. ELASTOMERIC PIPE INSULATION SEAMS, VOIDS AND BUTT JOINTS SHALL BE SEALED WITH A VAPOR BARRIER ADHESIVE OR TAPED WITH 1-1/2 INCH WIDE 3M #471 TAPE. FLEXIBLE ELASTOMERIC INSULATION EXPOSED TO WEATHER SHALL BE COVERED WITH TWO COATS OF ARMSTRONG ARMAFLEX FINISH.

    F. DUCTWORK: INSULATE RETURN DUCTS IN ATTIC SPACES AND EQUIPMENT ROOMS. ALL SUPPLY DUCTS AND OUTDOOR AIR DUCTS SHALL BE INSULATED. ALL EXHAUST DUCTWORK WITHIN 10 FEET OF CONNECTIONS TO OUTDOORS SHALL BE INSULATED. INSULATION WHERE DUCTS ARE NOT CONCEALED SHALL BE RIGID DUCT INSULATION MEETING ASTM C 612. ALL OTHER INSULATION SHALL BE FLEXIBLE DUCT INSULATION MEETING ASTM C 533. INSULATION SHALL HAVE A FACTORY-APPLIED FACING OF FOIL-SCRIM-KRAFT PAPER JACKET REINFORCED WITH FIBERGLASS YARN MESH. INSULATION SHALL BE SECURED TO RECTANGULAR DUCTS BY IMPALING OVER METAL STICK CLIPS SPACED 12" CENTER EACH WAY. ROUND DUCT INSULATION SHALL BE SECURED WITH NO. 18 GAUGE COPPERWELD WIRE SPACED NOT OVER 18" ON CENTER. WHERE INSULATION JOINTS OCCUR, FACING TABS SHALL BE LAPPED NOT LESS THAN 2"; ALL JOINTS, VOIDS AND PUNCTURES IN FACING SHALL BE EFFECTIVELY VAPOR SEALED WITH FOSTER VAPOR-SAFE OR VAPOR-FAS ADHESIVE. INSULATION FOR ALL OUTDOOR AIR, SUPPLY, RETURN, AND EXHAUST DUCTWORK WHERE INSTALLED IN ATTIC SPACES SHALL BE 2" THICK AND SHALL HAVE A MINIMUM TOTAL THERMAL RESISTANCE (R) OF 7.4 AT A MEAN TEMPERATURE OF 75 DEG. F. INSULATION FOR ALL OTHER DUCTWORK SHALL BE 1-1/2" THICK AND SHALL HAVE A MINIMUM TOTAL THERMAL RESISTANCE (R) OF 5.6 AT A MEAN TEMPERATURE OF 75 DEG. F. WHERE DUCTWORK IS PROVIDED WITH ACOUSTIC LINING, EXTERNAL DUCT INSULATION IS NOT REQUIRED. DUCTWORK WITH ACOUSTIC LINING LOCATED IN ATTIC SPACES SHALL ALSO BE EXTERNALLY INSULATED WITH 1-1/2" THICK INSULATION WITH A MINIMUM TOTAL OF THERMAL RESISTANCE (R) OF 5.6 AT A MEAN TEMPERATURE OF 75 DEG. F.

29. SPLIT SYTEM HEAT PUMP (AH-8/CU-8):

    A. GENERAL - EQUIPMENT AND MATERIAL SPECIFIED UNDER THIS HEADING SHALL BE FURNISHED AND INSTALLED BY A CERTIFIED REPRESENTATIVE OF THE UNIT MANUFACTURER. SYSTEM SHALL CONSIST OF TRANE OR EQUAL CONDENSING UNIT, AIR UNIT, REFRIGERANT PIPING, AND SYSTEM CONTROLS. EACH SYSTEM SHALL BE FITTED AND RATED IN ACCORDANCE WITH ARI STANDARD 210.

    B. CONDENSING (OUTDOOR) UNIT SHALL BE COMPLETE WITH COMPRESSOR-MOTOR UNIT, DIRECT EXPANSION CONDENSER-EVAPORATOR COIL, OUTDOOR FANS, STARTERS, CONTROLS, AND CHANGE-OVER PIPING ENCLOSED IN A SHEET STEEL ENCLOSURE RECOMMENDED FOR OUTSIDE INSTALLATION. OUTDOOR FANS SHALL BE VERTICAL DISCHARGE. PROVIDE GUARDS FOR INTAKE AND DISCHARGE TO PROTECT COIL AND FAN. CONDENSING UNIT CONTROLS SHALL PROVIDE FOR LOW AMBIENT OPERATION DOWN TO 0 DEG. F. OUTSIDE AIR TEMPERATURE. CRANKCASE HEATER SHALL BE PROVIDED IN COMPRESSOR BODY. PROVIDE COMPRESSOR ANTI-SHORT CYCLING CONTROL AND LOW AMBIENT CONTROL FOR COOLING OPERATION TO 30 DEG. F. MOUNT UNIT ON CONCRETE PAD FOR PROPER WATER DRAINAGE.

    C. INDOOR FAN SECTION SHALL BE COMPLETE WITH FAN AND MOTOR, HEATING-COOLING COIL WITH EXPANSION DEVICE, AUXILIARY ELECTRIC HEATERS, THROWAWAY FILTERS AND RACK, AND INSULATED STEEL CASING ENCLOSING FAN, MOTOR, STARTERS, DRIVE, COIL, AND FILTER. PROVIDE FAN CURVES WITH SHOP DRAWING SUBMITTALS. DRAIN PAN SHALL BE COMPLETELY WATERTIGHT. AUXILIARY ELECTRIC HEATERS SHALL BE MOUNTED IN DISCHARGE PLENUM SECTION FURNISHED AS PART OF THE UNIT. PROVIDE SINGLE POINT UNIT POWER CONNECTION. PROVIDE AN OUTDOOR THERMOSTAT FOR EACH STAGE OF ELECTRIC HEAT TO LOCK OUT THE AUXILIARY ELECTRIC HEATERS. PROVIDE RUBBER-IN-SHEAR VIBRATION ISOLATORS FOR UNIT. PROVIDE A TRAP IN THE CONDENSATE DRAIN PIPING FROM THE EVAPORATOR COIL DRAIN PAN OF SUFFICIENT DEPTH TO PREVENT BLOWOUT OR SIPHONING OF WATER.

    D. REFRIGERANT LINES SHALL BE HARD-DRAWN, DEHYDRATED, AND SEALED COPPER TUBING, SIZED AND CONNECTED AS RECOMMENDED BY THE UNIT MANUFACTURER. SUCTION LINE SHALL BE INSULATED AND EFFECTIVELY VAPOR SEALED. REFRIGERANT CIRCUIT ACCESS PORTS SHALL BE FITTED WITH LOCKING TYPE TAMPER RESISTANT CAPS IN STRICT ACCORDANCE WITH THE IMC.

    E. ENERGY EFFICIENCY: UNIT SHALL HAVE A MINIMUM SEER2 RATING OF 17.1.

    F. CONTROLS - WALL THERMOSTAT SHALL BE PROGRAMMABLE TYPE WITH LED DISPLAY, SETBACK MODE, OVERRIDE MODE, HEATING/COOLING SETPOINTS, HEATING/COOLING/AUTO MODES, EMERGENCY HEAT SWITCH AND FAN ON/OFF/AUTO MODES.

    G. THE SYSTEM SHALL BE COMPLETELY CHARGED WITH REFRIGERANT AND OIL AND SHALL BE GUARANTEED TO BE FREE OF LEAKAGE FOR ONE (1) YEAR.

    H. THE SYSTEM SHALL BE TESTED AND CHECKED OUT FOR SAFE, CONTROLLED OPERATION. ONE WEEK BEFORE FINAL INSPECTION, A LETTER FROM THE UNIT MANUFACTURER'S REPRESENTATIVE SHALL BE SUBMITTED TO THE ENGINEER CERTIFYING THAT THE SYSTEM IS PERFORMING SAFELY AND SATISFACTORILY. COMPRESSORS SHALL BE GUARANTEED TO BE FREE FROM DEFECTIVE MATERIALS OR WORKMANSHIP FOR FIVE (5) YEARS AFTER FINAL ACCEPTANCE OF THE PROJECT.

30. CEILING EXHAUST FANS (EF-3 & EF-4):

    A. TYPE: GREENHECK MODEL SP-A90 OR EQUAL DIRECT DRIVE EXHAUST FAN.

    B. CONSTRUCTION: CENTRIFUGAL FORWARD CURVED WHEEL WITHIN GALVANIZED STEEL HOUSING. MOTOR SHALL BE MOUNTED ON RUBBER IN SHEAR VIBRATION ISOLATORS AND DISCONNECT SWITCH WIRED TO MOTOR. HOUSING SHALL BE INTERNALLY AND ACOUSTICALLY LINED WITH 1" THICK FIBERGLASS INSULATION. MOTOR OPERATED DAMPERS SHALL BE PROVIDED WHERE INDICATED FOR 120 V, TWO-POSITION SERVICE. VERIFY DUCT SIZE AT INSTALLATION LOCATION.

    C. MOTOR AND DRIVE: BEARINGS SHALL BE PILLOW BLOCK WITH B-10 AVERAGE LIFE OF 200,000. MOTOR SHALL BE MOUNTED OUT OF THE AIRSTREAM. DRIVE SHALL BE DIRECT DRIVE AS INDICATED ON THE DRAWINGS.

    D. ALL FANS SHALL BEAR THE AMCA CERTIFIED RATINGS SEAL FOR BOTH AIR AND SOUND PERFORMANCE.

    E. FINISH PAINTING: BAKED-ON EPOXY PAINT FOR ENTIRE UNIT.

31. ELECTRIC WALL HEATER (WH-1):

    A. FURNISH AND INSTALL WALL HEATERS WITH CAPACITIES AND VOLTAGE AS INDICATED ON DRAWINGS. ELECTRIC WALL HEATER SHALL BE QMARK MODEL LFK151F OR EQUAL.

    B. WALL HEATERS SHALL BE COMPLETE WITH ENCLOSURE, FRONT PANEL, CAST ALUMINUM HEATING GRID, THERMAL LIMIT SWITCH, FAN AND FAN MOTOR, AND BUILT-IN SWITCH AND THERMOSTAT.

    C. ALL CONTROLS SHALL BE CONCEALED BEHIND A LOCKED DOOR.

    D. EACH UNIT SHALL BE RECESSED TYPE UNLESS SHOWN OTHERWISE. MOUNT UNITS NOMINAL 16" ABOVE FLOOR.

32. TEMPERATURE CONTROL SYSTEM:

    A. GENERAL – THE SYSTEM SHALL BE A COMPLETE SYSTEM OF AUTOMATIC TEMPERATURE REGULATION OF THE ELECTRIC/ ELECTRONIC TYPE. COMPONENT PARTS OF THE SYSTEM SHALL BE MANUFACTURED BY ONE CONTROL MANUFACTURER AND/OR BY THE PARTICULAR HVAC EQUIPMENT MANUFACTURER. IN EITHER CASE, THE TEMPERATURE CONTROL CONTRACTOR SHALL BE RESPONSIBLE FOR ACHIEVING THE "SEQUENCE OF CONTROL". THE SYSTEM SHALL BE INSTALLED BY COMPETENT, TRAINED MECHANICS. ROOM THERMOSTAT LOCATIONS SHALL BE COORDINATED TO ALIGN VERTICALLY OR HORIZONTALLY WITH ADJACENT LIGHT SWITCHES OR CONTROL INSTRUMENTS. PROVIDE ALL EQUIPMENT AND MATERIALS AS REQUIRED TO ACCOMPLISH THE SEQUENCE OF CONTROL.

    B. MATERIALS

        1. THERMOSTATS (AC): HEATING-COOLING THERMOSTATS SHALL BE AS REQUIRED FOR THE SEQUENCE OF CONTROL AND AC EQUIPMENT NOTE. THESE UNIT THERMOSTATS SHALL BE EQUIPPED WITH ADJUSTMENTS FOR HEATING AND COOLING.

        2. DAMPER ACTUATORS SHALL BE PROVIDED FOR ALL AUTOMATIC DAMPERS AND SHALL BE OF SUFFICIENT CAPACITY TO OPERATE THE CONNECTED DAMPER.

    C. COORDINATION OF WORK: ALL WIRING IN CONNECTION WITH THE TEMPERATURE CONTROL SYSTEM SHALL BE FURNISHED AND INSTALLED BY THE CONTROLS SYSTEM CONTRACTOR. WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE ELECTRICAL SPECIFICATION. WIRING WITHOUT CONDUIT ABOVE CEILINGS SHALL BE PROPERLY SUPPORTED WITHOUT SAGS. LOOSE WIRES LAYING ON CEILINGS, LIGHTS, OR PIPES WILL NOT BE ACCEPTABLE AT ANY LOCATION.

    D. SERVICE AND GUARANTEE – THE ENTIRE CONTROL SYSTEM SHALL BE SERVICED AND MAINTAINED IN FIRST-CLASS CONDITION BY THE CONTROL MANUFACTURER FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE AT NO EXTRA COST TO THE OWNER.

    E. SEQUENCE OF CONTROL:

        1. SPLIT SYSTEM HEAT PUMP (AHU-8/CU-8):

            a. UNIT SHALL BE CONTROLLED BY A SPACE-MOUNTED TEMPERATURE SENSOR WIRED TO A CONTROLLER. THE THERMOSTAT AND CONTROLLER SHALL BE FURNISHED WITH THE UNIT. THE QUANTITIES OF CONTROLLERS SHALL BE AS REQUIRED FOR PROPER SYSTEM OPERATION. THE THERMOSTAT AND CONTROLLER SHALL BE INTEGRATED TO WORK AS A COMPLETE SYSTEM TO PROVIDE OCCUPIED/UNOCCUPIED OPERATION, SUPPLY AIR FAN SPEED CONTROL, AND ADJUSTABLE TEMPERATURE RANGE.

            b. OCCUPIED MODE: THE SUPPLY AIR FAN AND CONDENSING UNIT SHALL ENERGIZE TO OPERATE CONTINUOUSLY. THE OUTSIDE AND RELIEF AIR DAMPERS SHALL MODULATE OPEN. ON A CALL FOR COOLING OR HEATING, THE DX COIL SHALL SEQUENCE TO MAINTAIN SPACE TEMPERATURE SETPOINT. THE AUXILLIARY ELECTRIC HEAT SHALL ACTIVATE TO PROVIDE SUPPLEMENTAL HEATING IF THE AIR HANDLER'S LEAVING AIR TEMPERATURE FALLS BELOW HEATING TEMPERATURE SETPOINT.

            c. UNOCCUPIED MODE: THE SUPPLY AIR FAN AND CONDENSING UNIT SHALL DE-ENERGIZE. THE OUTSIDE AND RELIEF AIR DAMPERS SHALL MODULATE CLOSED.

            d. SAFETIES: THE CONDENSATE OVERFLOW DRAIN PAN SWITCH SHALL DE-ENERGIZED THE UNIT IF THE DRAIN LINE BECOMES CLOGGED ON INDOOR UNITS.

        2. CEILING EXHAUST FANS (EF-3 & EF-4):

            a. EF-3 SHALL BE CONTROLLED THROUGH ROOM LIGHTING CIRCUIT.

            b. EF-4 SHALL BE CONTROLLED THROUGH ROOM LIGHTING CIRCUIT.

        3. ELECTRIC WALL HEATER (WH-1):

            a. EACH UNIT SHALL BE CONTROLLED BY A BUILT-IN THERMOSTAT. WHEN THE UNIT IS ENERGIZED, THE UNIT-MOUNTED THERMOSTAT SHALL CYCLE THE UNIT FAN AND CONTROL THE ELECTRIC HEAT TO MAINTAIN THE SPACE TEMPERATURE.

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REVISIONS	DATE

HVAC
SPECIFICATIONS

RENOVATIONS TO

NRV REGIONAL
COMMISSION OFFICE

2950 MARKET ST NE, CHRISTIANSBURG, VIRGINIA

NRVRC
new river valley regional commission

DATE	07.11.2025
SCALE	AS NOTED
DRAWN	BCR
JOB	2423
IFB #	XXXX
PROJECT CODE	XX-XXXX
SHEET	M0.2

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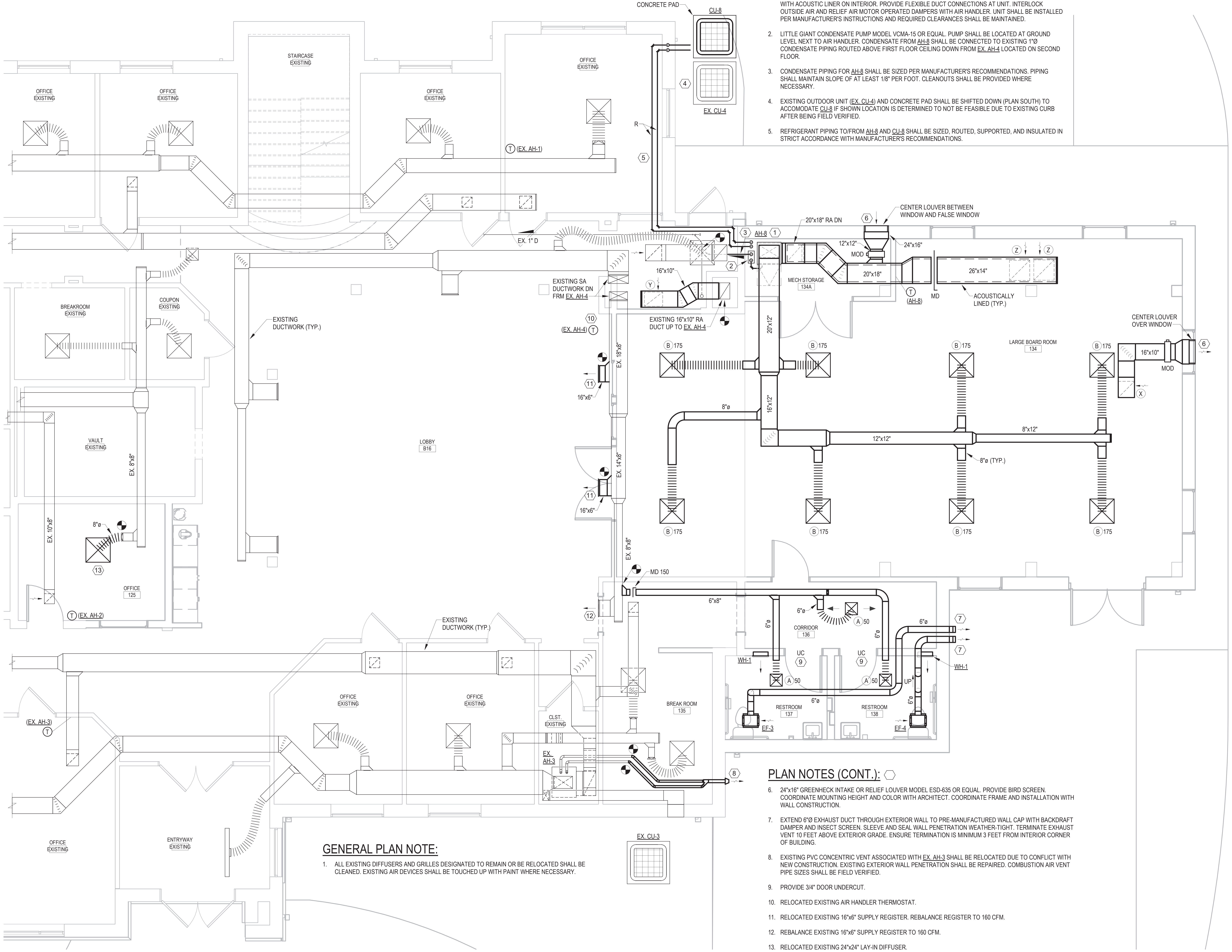

PLAN NOTES: ⬡

1. INSTALL AIR HANDLER (AH-8) IN VERTICAL UPFLOW CONFIGURATION. MOUNT UNIT ON 20" PLENUM BOX WITH ACOUSTIC LINER ON INTERIOR. PROVIDE FLEXIBLE DUCT CONNECTIONS AT UNIT. INTERLOCK OUTSIDE AIR AND RELIEF AIR MOTOR OPERATED DAMPERS WITH AIR HANDLER. UNIT SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS AND REQUIRED CLEARANCES SHALL BE MAINTAINED.
2. LITTLE GIANT CONDENSATE PUMP MODEL VCMA-15 OR EQUAL. PUMP SHALL BE LOCATED AT GROUND LEVEL NEXT TO AIR HANDLER. CONDENSATE FROM AH-8 SHALL BE CONNECTED TO EXISTING 1"Ø CONDENSATE PIPING ROUTED ABOVE FIRST FLOOR CEILING DOWN FROM EX. AH-4 LOCATED ON SECOND FLOOR.
3. CONDENSATE PIPING FOR AH-8 SHALL BE SIZED PER MANUFACTURER'S RECOMMENDATIONS. PIPING SHALL MAINTAIN SLOPE OF AT LEAST 1/8" PER FOOT. CLEANOUTS SHALL BE PROVIDED WHERE NECESSARY.
4. EXISTING OUTDOOR UNIT (EX. CU-4) AND CONCRETE PAD SHALL BE SHIFTED DOWN (PLAN SOUTH) TO ACCOMODATE CU-8 IF SHOWN LOCATION IS DETERMINED TO NOT BE FEASIBLE DUE TO EXISTING CURB AFTER BEING FIELD VERIFIED.
5. REFRIGERANT PIPING TO/FROM AH-8 AND CU-8 SHALL BE SIZED, ROUTED, SUPPORTED, AND INSULATED IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

PLAN NOTES (CONT.): ⬡

6. 24"x16" GREENHECK INTAKE OR RELIEF LOUVER MODEL ESD-635 OR EQUAL. PROVIDE BIRD SCREEN. COORDINATE MOUNTING HEIGHT AND COLOR WITH ARCHITECT. COORDINATE FRAME AND INSTALLATION WITH WALL CONSTRUCTION.
7. EXTEND 6"Ø EXHAUST DUCT THROUGH EXTERIOR WALL TO PRE-MANUFACTURED WALL CAP WITH BACKDRAFT DAMPER AND INSECT SCREEN. SLEEVE AND SEAL WALL PENETRATION WEATHER-TIGHT. TERMINATE EXHAUST VENT 10 FEET ABOVE EXTERIOR GRADE. ENSURE TERMINATION IS MINIMUM 3 FEET FROM INTERIOR CORNER OF BUILDING.
8. EXISTING PVC CONCENTRIC VENT ASSOCIATED WITH EX. AH-3 SHALL BE RELOCATED DUE TO CONFLICT WITH NEW CONSTRUCTION. EXISTING EXTERIOR WALL PENETRATION SHALL BE REPAIRED. COMBUSTION AIR VENT PIPE SIZES SHALL BE FIELD VERIFIED.
9. PROVIDE 3/4" DOOR UNDERCUT.
10. RELOCATED EXISTING AIR HANDLER THERMOSTAT.
11. RELOCATED EXISTING 16"x6" SUPPLY REGISTER. REBALANCE REGISTER TO 160 CFM.
12. REBALANCE EXISTING 16"x6" SUPPLY REGISTER TO 160 CFM.
13. RELOCATED EXISTING 24"x24" LAY-IN DIFFUSER.

GENERAL PLAN NOTE:

1. ALL EXISTING DIFFUSERS AND GRILLES DESIGNATED TO REMAIN OR BE RELOCATED SHALL BE CLEANED. EXISTING AIR DEVICES SHALL BE TOUCHED UP WITH PAINT WHERE NECESSARY.

PARTIAL FIRST FLOOR PLAN - HVAC

SCALE 1/4" = 1'-0"

AGENCY APPROVAL

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7/11/2025
RODNEY D. FANNING
Lic. No. 034568

REVISIONS	DATE

PARTIAL FIRST FLOOR PLAN - HVAC

RENOVATIONS TO

NRV REGIONAL COMMISSION OFFICE

2950 MARKET ST NE, CHRISTIANSBURG, VIRGINIA

NRVRC
new river valley regional commission

DATE	07.11.2025
SCALE	AS NOTED
DRAWN	BCR
JOB	2423
IFB #	XXXX
PROJECT CODE	XX-XXXX
SHEET	M1.1

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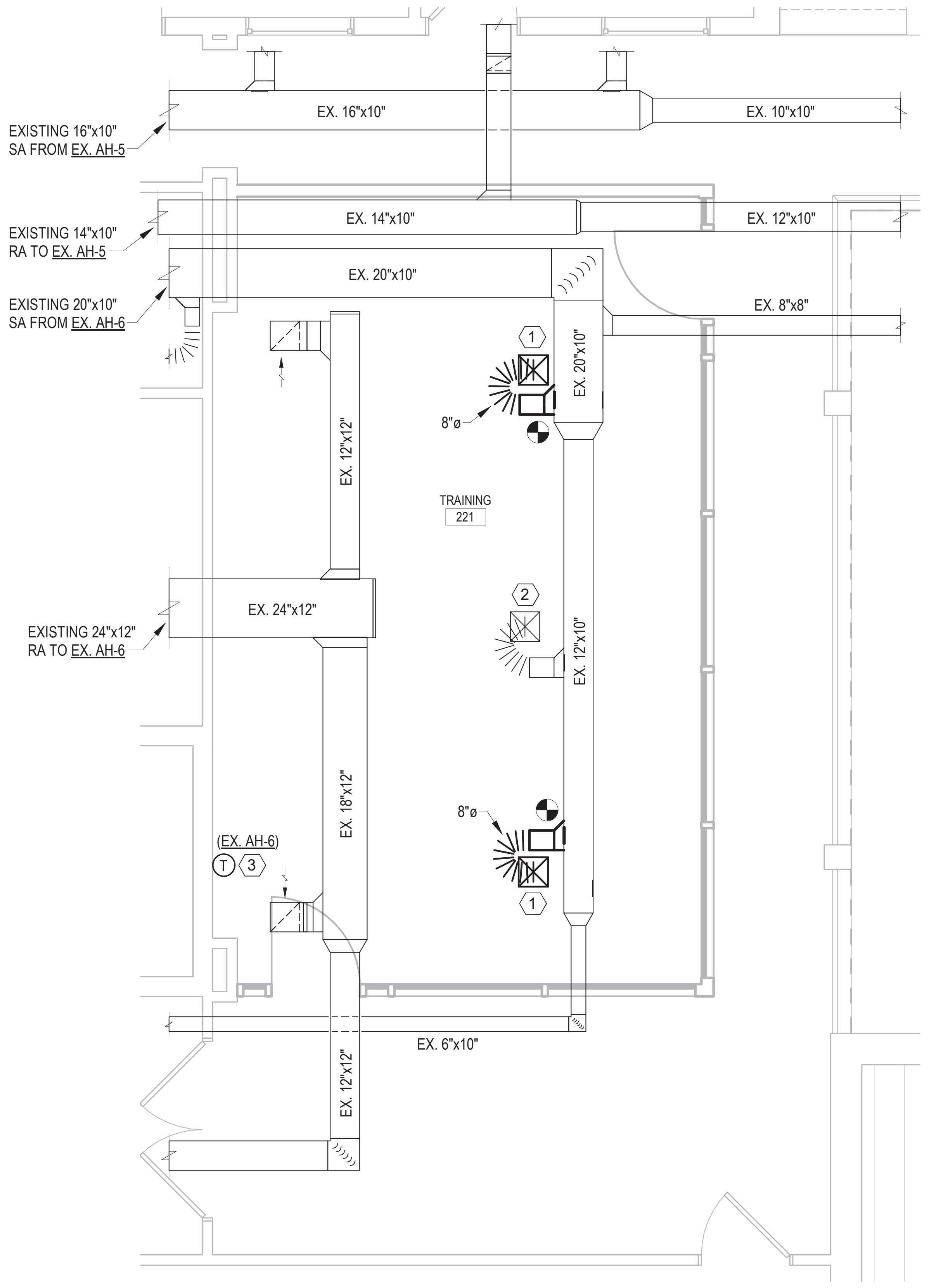
A 24" X 36" PRINT

GENERAL PLAN NOTES:

1. REBALANCE EXISTING OUTSIDE AIR MOTORIZED DAMPER (MOD) CONNECTED TO EX. AH-6 TO 260 CFM. EXISTING MOD LOCATED WITHIN 10"x6" INTAKE DUCTWORK IN ATTIC.
2. ALL EXISTING DIFFUSERS AND GRILLES DESIGNATED TO REMAIN OR BE RELOCATED SHALL BE CLEANED. EXISTING AIR DEVICES SHALL BE TOUCHED UP WITH PAINT WHERE NECESSARY.

PLAN NOTES: ⬡

1. RELOCATED EXISTING 12"x12" SUPPLY DIFFUSER. REBALANCE DIFFUSER TO 220 CFM.
2. EXISTING 12"x12" SUPPLY DIFFUSER BALANCED AT 220 CFM.
3. RELOCATED EXISTING AIR HANDLER THERMOSTAT.



PARTIAL SECOND FLOOR PLAN - DUCTWORK

SCALE 1/4" = 1'-0"

AGENCY APPROVAL

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PARTIAL SECOND FLOOR PLAN - DUCTWORK

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