HVAC SPECIFICATIONS

1. GENERAL

1.1 DESCRIPTION OF WORK:

A. ALL FIXTURES, EQUIPMENT, ACCESSORIES, MATERIALS, AND LABOR REQUIRED TO PROVIDE COMPLETE, COORDINATED, AND FULLY FUNCTIONAL HVAC SYSTEMS GENERALLY AS INDICATED ON THE DRAWINGS AND AS SPECIFIED HEREIN.
1. HEATING SYSTEM
2. COOLING SYSTEM
3. VENTILATION SYSTEM
4. EXHAUST SYSTEMS

1.2 RELATED DOCUMENTS:

A. THE REQUIREMENTS OF THE CIVIL, ARCHITECTURAL, STRUCTURAL, PLUMBING AND ELECTRICAL DRAWINGS AND SPECIFICATIONS SHALL APPLY TO AND BE CONSIDERED A PART OF THE HVAC WORK IN-SO-FAR AS THEY APPLY TO THE HVAC WORK AND ARE REQUIRED FOR COORDINATION.

1.3 JOB CONDITIONS:

A. DUE TO THE SMALL SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS AND ACCESSORIES WHICH MAY BE REQUIRED TO PROVIDE A COMPLETE INSTALLATION OF THE WORK DESCRIBED AND INDICATED.

B. PROVIDE FITTINGS, OFFSETS, TRANSITIONS, CONTROL TRANSFORMERS AND ACCESSORIES REQUIRED TO MEET CONDITIONS OF THE PROJECT.

C. PROVIDE SERVICE ACCESS FOR EQUIPMENT, CONTROL COMPONENTS, VALVES, FILTERS AND SPECIALTIES.

D. PROVIDE ACCESS PANELS FOR VALVES, ACCESS DOORS, ETC. CONCEALED BEHIND FINISHED SURFACES.

E. MODIFY DUCT DIMENSIONS AS REQUIRED BY BUILDING STRUCTURE OR OTHER WORK AT NO ADDITIONAL COSTS TO THE OWNER. MAINTAIN EQUIVALENT FREE AREA SIZES.

1.4 CONFORMANCE TO REGULATIONS:

A. WORK SHALL CONFORM WITH VIRGINIA UNIFORM STATEWIDE BUILDING CODE, NFPA, AND LOCAL ORDINANCES.

1.5 QUALITY ASSURANCE:

A. COMPLY WITH MANUFACTURER'S REQUIREMENTS AND NOTES AND DETAILS SHOWN HEREIN FOR INSTALLATION OF EQUIPMENT.

B. COMPLY WITH RECOMMENDATIONS OF SMACNA AND ASHRAE.

1.6 MATERIALS AND EQUIPMENT:

A. EQUIPMENT PROVIDED FOR THIS PROJECT SHALL BE EQUIVALENT TO PRODUCTS SPECIFIED.

B. CONTRACTOR SHALL GUARANTEE EQUIVALENCE AND IS RESPONSIBLE FOR MODIFICATIONS REQUIRED AND COORDINATION WITH OTHER TRADES TO FIT SUBSTITUTED PRODUCT INTO THE PROJECT.

C. MATERIALS AND EQUIPMENT OF THE SAME TYPE AND USE SHALL BE FROM A SINGLE MANUFACTURER.

D. PROTECT STORED MATERIALS AND EQUIPMENT FROM WEATHER.

E. IF HVAC EQUIPMENT IS OPERATED DURING CONSTRUCTION, PROVIDE TEMPORARY FILTERS TO PROTECT AIR HANDLING EQUIPMENT.

1.7 SUBMITTALS:

A. SUBMIT SHOP DRAWINGS AND PRODUCT DATA FOR EQUIPMENT SPECIFIED HEREIN AND ON THE DRAWINGS. SHOP DRAWINGS AND PRODUCT DATA SHALL BE IDENTIFIED PER INDICATIONS ON DRAWINGS, SHALL BE MARKED TO INDICATED SPECIFIC ITEM BE PROPOSED, AND SHALL BE ORGANIZED IN AN ORDERLY MANNER. SUBMIT IN .PDF FORMAT VIA EMAIL.

B. SUBMIT OPERATING AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT INSTALLED IN THIS PROJECT. INCLUDE COPIES OF SPECIFIC EQUIPMENT WARRANTIES IN MANUAL.

C. UPON COMPLETION OF THE INSTALLATION, AND PRIOR TO ACCEPTANCE BY THE OWNER, CONTRACTOR SHALL FURNISH TWO COPIES OF AS-BUILT DOCUMENTATION. ALL CHANGES TO THE BIDDING DOCUMENTS SHALL BE NEATLY AND CLEARLY IDENTIFIED ON THE AS-BUILT DOCUMENTATION.

1.8 PROJECT CLOSEOUT:

A. REPLACE OR REPAIR DAMAGED EQUIPMENT AND CLEAN ALL EXPOSED SURFACES.

B. TOUCH-UP SHOP APPLIED FINISHES TO RESTORE DAMAGED OR SOILED AREAS.

C. INSTRUCT OWNER'S REPRESENTATIVE IN OPERATION AND MAINTENANCE OF EQUIPMENT UTILIZING OPERATION AND MAINTENANCE MANUAL. MINIMUM INSTRUCTION PERIOD SHALL BE TWO HOURS.

D. REPLACE FILTERS IN AIR HANDLING EQUIPMENT AT TIME OF PROJECT TURNOVER TO OWNER.

E. VACUUM INTERIORS OF DUCTWORK AND EQUIPMENT WHICH BECOMES DIRTY, PRIOR TO PROJECT TURNOVER TO OWNER. CLEAN ANY DIRTY EQUIPMENT COILS.

2. PRODUCTS

2.1 PIPING SYSTEMS:

A. CONDENSATE DRAIN – SCH. 40 PVC WITH SOLVENT WELD FITTINGS

B. REFRIGERANT – TYPE C&C OR ARC COPPER, SILVER SOLDER FITTINGS.

2.2 HVAC EQUIPMENT:

A. REFER TO SCHEDULE SHEETS AND EQUIPMENT LIST FOR MANUFACTURERS AND MODEL NUMBERS.

B. ALTERNATE MANUFACTURER'S ARE: LENNOX, YORK, DAIKIN, TITUS, CARRIER, PANASONIC, MITSUBISHI, TRANE, COOK, CARNES, TWIN CITY, ACME, METALAIRE

C. PROVIDE MINIMUM MERV 8 RETURN AIR FILTERS FOR AIR HANDLING EQUIPMENT.

2.3 AIR DISTRIBUTION:

A. METAL DUCTWORK: SHOP FABRICATED AS FOLLOWS.
1. MATERIALS: GALVANIZED STEEL SHEET, ASTM A 527-85.
2. CONSTRUCTION: PER SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR LOW PRESSURE SYSTEM UP TO 2" W.C. CONSTRUCTION.
3. JOINT SEALANT: UL LISTED FOSTER MASTIC, HARDCAST FTA-20, KINGCO 18-136.
4. SUPPLY AIR BRANCH DUCTS RUN IN CONCEALED AREAS MAY BE PRE-INSULATED, UL CLASS 1, FLEXIBLE DUCT – LIMIT LENGTH TO TEN FEET – USE RIGID DUCT FOR REMAINDER OF RUNOUT.

B. DAMPERS – AS MANUF. BY RUSKIN, CESCO, ARROW, CREATIVE METALS, PREFCO
1. VOLUME DAMPERS SHALL BE GALVANIZED STEEL, 16 GAUGE, BLADE HEIGHT SHALL NOT EXCEED 12". DAMPER LINKAGE AND LOCKING QUADRANT SHALL BE OUTSIDE OF AIRSTREAM.
2. MOTORIZED DAMPERS – REFER TO EQUIPMENT LIST ON DRAWINGS.

C. ACCESS DOORS –
1. FACTORY BUILT WITH SASH LOCKS, BUTT HINGE, GASKET, 24 GA. DOOR AND 22 GA. FRAME.
2. ACCESS DOOR IN INSULATED DUCT SHALL BE DOUBLE CONSTRUCTION, WITH INSULATION ENCASED.
3. MINIMUM SIZE TO BE 75% SIZE OF DUCT IN WHICH INSTALLED, OR 10" X 10".
4. CESCO MODEL HAD-10, LOUVERS AND DAMPERS, KEES, INC. OR AIR BALANCE.

2.4 CONTROLS:

A. PROVIDE ALL RELAYS, TRANSFORMERS, CONTROL WIRING, TERMINAL BLOCKS, ETC. FOR A COMPLETE SYSTEM.
1. COMPONENT MANUFACTURER'S AND MODEL NUMBERS AS SPECIFIED ON DRAWINGS.

B. THE WARRANTY PERIOD SHALL COMMENCE AFTER 60 DAYS OF BENEFICIAL USE, MEASURED FROM THE DATE OF ACCEPTANCE FROM THE OWNER.

3. EXECUTION

3.1 PIPING SYSTEMS:

A. VERIFY INVERT ELEVATIONS PRIOR TO EXCAVATION.

B. BACKFILL BURIED PIPE IN TRENCHES WITH DIRT FREE OF ROCK, STONE OR DEBRIS.

C. VERIFY EXACT LOCATION OF EQUIPMENT PRIOR TO ROUGH-IN.

D. COORDINATE ROUTING OF WORK WITH OTHER TRADES AND INSTALL TO ALLOW MAXIMUM HEADROOM CLEARANCES, SERVICE ACCESS AND MAINTAIN PROPER PITCH OF SLOPING LINES.

E. INSULATE PIPING SYSTEMS AS FOLLOWS:
1. REFRIGERANT – CLOSED CELLULAR RUBBER TO CODE REQUIRED THICKNESS.
2. HORIZONTAL CONDENSATE DRAIN – 1/2" THICK FIBERGLASS WITH ASJ.
4. SEAL VAPOR BARRIERS. SECURE WITH ADHESIVE AND SEAL JOINTS WITH SEALANT.
5. PROVIDE GALVANIZED STEEL SADDLE AT HANGERS SURROUNDING INSULATED PIPE.
6. DO NOT COMPRESS INSULATION EXCEPT IN AREAS OF STRUCTURAL INTERFERENCE.
7. INSTALL PRE-FITTED PLASTIC ELBOWS OR APPLY CANVAS JACKET IN THREE LAYERS AT ELBOWS.
8. INSULATE FITTINGS, VALVES AND EQUIPMENT BODIES.
9. PROVIDE 2 COATS OF GREY WEATHERPROOF FINISH ON EXTERIOR REFRIGERANT PIPING.

F. PROVIDE SLEEVES FOR PIPING PENETRATING WALLS. INSULATION SHALL BE CONTINUOUS THROUGH SLEEVES.

G. FIRESTOP PIPING PASSING THROUGH FIRE RATED WALLS OR CEILINGS.

H. PATCH FINISHED AREAS DISTURBED BY WORK TO MATCH SURROUNDING AREAS.

I. WELDING SHALL BE DONE BY CERTIFIED WELDERS FOR THE APPROPRIATE SYSTEM BEING WELDED.

J. MAKE CONNECTIONS OF DISSIMILAR METALLIC PIPING WITH DIELECTRIC UNIONS.

K. DO NOT USE PLASTIC PIPING IN RETURN AIR PLENUM SPACES.

L. PROVIDE SHUT OFF VALVES AT EQUIPMENT CONNECTIONS.

M. HANGERS SUPPORTING COPPER PIPING SHALL BE COPPER PLATED OR PLASTIC COVERED. HANGERS SUPPORTING INSULATED PIPING SHALL BE SIZED TO SURROUND INSULATION AND STEEL SADDLE.

N. CLEAN AND FLUSH PIPING THEN TEST PIPING SYSTEMS AS FOLLOWS:
1. REFRIGERANT PIPING – TO 100 PSIG W/ NITROGEN FOR FOUR HOURS AND TEST FITTINGS WITH FREON AND HALIDE LEAK DETECTOR.
2. CONDENSATE DRAIN PIPING – W/ 10 FT. WATER COLUMN OR 5 PSI COMPRESSED AIR FOR 12 HOURS.
3. TESTS SHALL SHOW NO SUBSTANTIAL LOSS IN PRESSURE.
4. PIPING RUN IN CONCEALED AREAS SHALL BE LEAK TESTED PRIOR TO BEING CONCEALED.
5. SUBMIT WRITTEN REPORT OF TEST RESULTS.

3.2 HVAC EQUIPMENT:

A. PROVIDE PERMANENT TAG ON EQUIPMENT INDICATING EXPIRATION DATE OF WARRANTIES. LOCATE TAG IN A READILY VISIBLE LOCATION.

B. PROVIDE FACTORY AUTHORIZED START-UP OF EQUIPMENT AND SUBMIT TEST REPORTS. (INCLUDE IN O&M MANUAL). COMPLY WITH MANUFACTURER REQUIREMENTS AND NOTES STATED ON THE CONSTRUCTION DOCUMENTS FOR INSTALLATION OF EQUIPMENT. BALANCE THE OUTSIDE AIR CFM TO QUANTITIES LISTED.

C. SPLIT SYSTEM UNITS:
1. SUPPORT INDOOR UNIT FROM STRUCTURE WITH ALL THREAD STEEL RODS AND SPRING TYPE VIBRATION ISOLATORS – INSTALL LEVEL. INSTALL TO ALLOW PROPER SERVICE ACCESS.
2. PROVIDE CONDENSATE DRAIN PIPING AND EXTEND EXISTING CONDENSATE DRAIN SYSTEM.
3. CONNECT REFRIGERANT PIPING AND CONTROL WIRING.

3.3 AIR DISTRIBUTION:

A. DUCTWORK:
1. SEAL JOINTS IN DUCTWORK WITH COATING OF HARDCAST SEALANT OR UL LISTED FSK DUCT TAPE.
2. INSTALL INTERNAL ENDS OF SLIP JOINTS IN DIRECTION OF AIRFLOWS.
3. MAXIMUM ANGLE OF OFFSETS AND TRANSITIONS SHALL NOT EXCEED 30 DEGREES.
4. ADEQUATELY SUPPORT DUCT AS PER CODE REQUIREMENTS –ELIMINATE SAGGING AND COMPRESSION OF DUCT.
5. USE LONG RADIUS RIGID DUCT FITTINGS AT ELBOWS IN FLEXIBLE DUCT EXCEEDING 60 DEGREE ANGLE. ELBOWS IN FLEXIBLE DUCT LESS THAN 60 DEGREE ANGLE SHALL BE LONG SWEEP TYPE.

B. INSULATE DUCT SYSTEMS PER CODE OR AS FOLLOWS, WHICHEVER IS MORE STRINGENT:
1. WITHIN BUILDING STRUCTURE AND INSIDE OF BUILDING INSULATION ENVELOPE (OUTSIDE AIR, SUPPLY AND RETURN AIR DUCTS): ONE LB./CU.FT. DENSITY, 2" THICK FIBERGLASS, WITH FSK JACKET; OR WITH 3/8" THICK FOIL FACED AIR CELL INSULATION, REFLECTIX OR EQUAL.
2. INSULATE SUPPLY AIR AND RETURN AIR DUCTS OUTSIDE OF BUILDING INSULATION WITH 3" THICK FIBERGLASS WITH FSK JACKET – MINIMUM R = 8.0 INSTALLED.

C. DAMPERS: ACTUATORS AND PUSH-RODS SHALL BE ACCESSIBLE.
1. ACTUATORS AND PUSH-RODS SHALL BE ACCESSIBLE.
2. PROVIDE COMBINATION DAMPER/EXTRACTOR/SPIN-IN FOR ROUND DUCT CONNECTIONS TO TRUNK DUCTS. PROVIDE 45 DEGREE BEVEL INLET WITH BALANCE DAMPER FOR RECTANGULAR DUCT CONNECTIONS TO TRUNK DUCT. DAMPER ADJUSTMENT TO BE LOCATED ON BOTTOM SIDE OF DUCT.

D. ACCESS DOORS – PROVIDE IN DUCT FOR ACCESS TO COILS, FILTERS, FIRE & MOTORIZED DAMPERS, AND ALL OTHER EQUIPMENT NOT OTHERWISE ACCESSIBLE. INSTALL TO ALLOW SERVICE ACCESS. PROVIDE LABEL ON ACCESS DOOR INDICATING DEVICE SERVED.

E. BALANCE AIR DISTRIBUTION TO WITHIN 10% OF DESIGN AND SUBMIT REPORT.
1. REPORT SHALL IDENTIFY ZONES, DESIGN AIRFLOWS AND FINAL AIRFLOWS (SUPPLY AIR, RETURN AIR AND OUTSIDE AIR). SUPPLY AND RETURN STATIC PRESSURES, ENTERING AND LEAVING AIR TEMPERATURES.
2. INCLUDE EXHAUST FAN SYSTEMS, AND HVAC EQUIPMENT.
3. COMPLY WITH NEBB AND AABC REQUIREMENTS.

3.4 CONTROLS:

A. SEAL PROBE PENETRATIONS FOR DUCT MOUNTED SENSORS.

B. PROVIDE JUNCTION BOX HOUSING FOR CONTROL WIRING INTERLOCK TO COMPONENTS.

C. ROUTE CONDUCTORS NEATLY AND PARALLEL OR PERPENDICULAR TO BUILDING CONSTRUCTION. WIRING AND CONDUCTORS IN FINISHED SPACES TO BE RUN CONCEALED.

D. SEQUENCE OF CONTROL
1. ON A CALL FOR COOLING – BLOWER AND COOL COMPRESSOR SHALL BE ENABLED.
2. ON A CALL FOR HEAT – BLOWER AND HEAT COMPRESSOR TO BE ENABLED.
3. OA TO BE INTRODUCED WHEN ERV IS IN OPERATION
4. PROGRAM THERMOSTATS PER OWNER'S SCHEDULING.

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HVAC Specifications

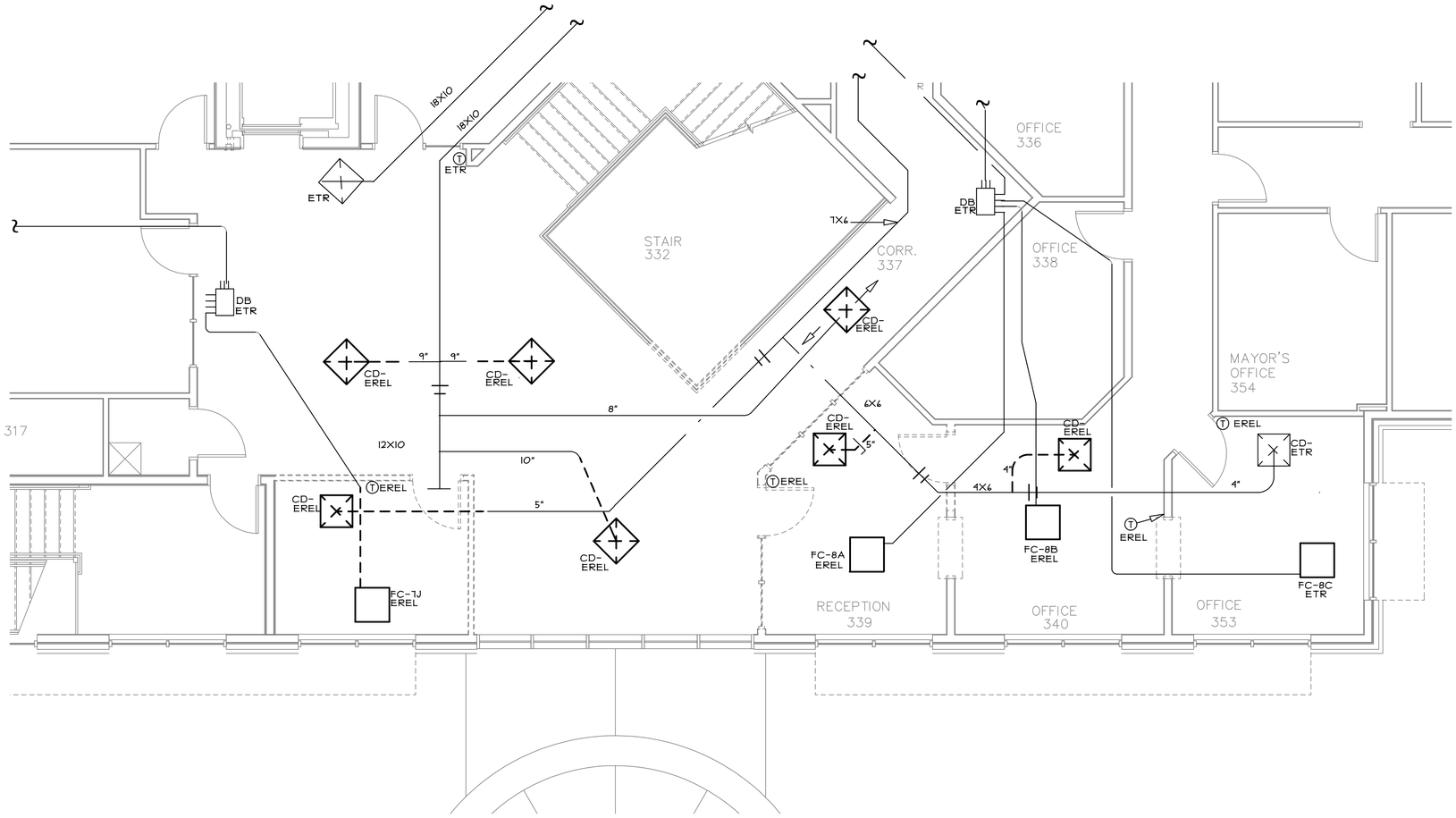
NO SCALE

City Hall Renovations
Harrisonburg, Virginia

COMMONWEALTH OF VIRGINIA
MICHAEL DAVID IRWIN
Lic. No. 0402 043784
3/29/22
PROFESSIONAL ENGINEER

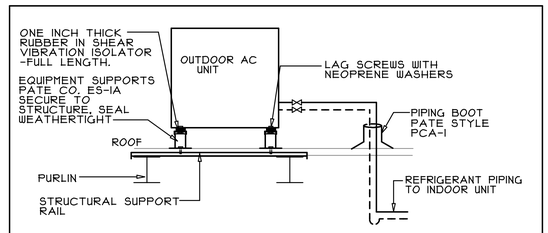
Date:	03/29/2022
Project:	21139
File:	21139-M01
Drawn By:	GSW

M0.1



THIRD FLOOR HVAC DEMOLITION PLAN

SCALE: 1/4" = 1'-0"



OUTDOOR AC UNIT ON ROOF DIAGRAM

DEMOLITION NOTES

1. REMOVE MECHANICAL ITEMS AS SHOWN OR AS REQUIRED TO CLEAR AREAS OF NEW CONSTRUCTION.
2. ITEMS TO REMAIN IN USE WHICH ARE DISTURBED BY NEW CONSTRUCTION SHALL BE REMOVED, CLEANED AND REINSTALLED TO ORIGINAL WORKING ORDER.
3. LOCATIONS AND DIMENSIONS OF EXISTING EQUIPMENT AND SYSTEMS INDICATED ON THE PLANS ARE TAKEN FROM DRAWINGS DATED 3-24-14 AND FURNISHED BY THE OWNER. CONFIRM ALL LOCATIONS AND DIMENSIONS ON SITE OF THE EXISTING HVAC SYSTEMS. ADVISE THE ARCHITECT OF ANY CONFLICTS OR DISCREPANCIES BETWEEN THE DRAWINGS AND ACTUAL CONDITIONS.
4. PROPERLY EVACUATE AND CAPTURE REFRIGERANT IN ACCORDANCE WITH APPLICABLE REGULATIONS. STORE OR DISPOSE OF CAPTURED REFRIGERANT AS DIRECTED BY THE OWNER.
5. CAP PIPING SYSTEMS TO BE ABANDONED TO BEYOND FINISHED SURFACES.

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Third Floor HVAC. Demo. Plan

SCALE: 1/4" = 1'-0"

City Hall Renovations
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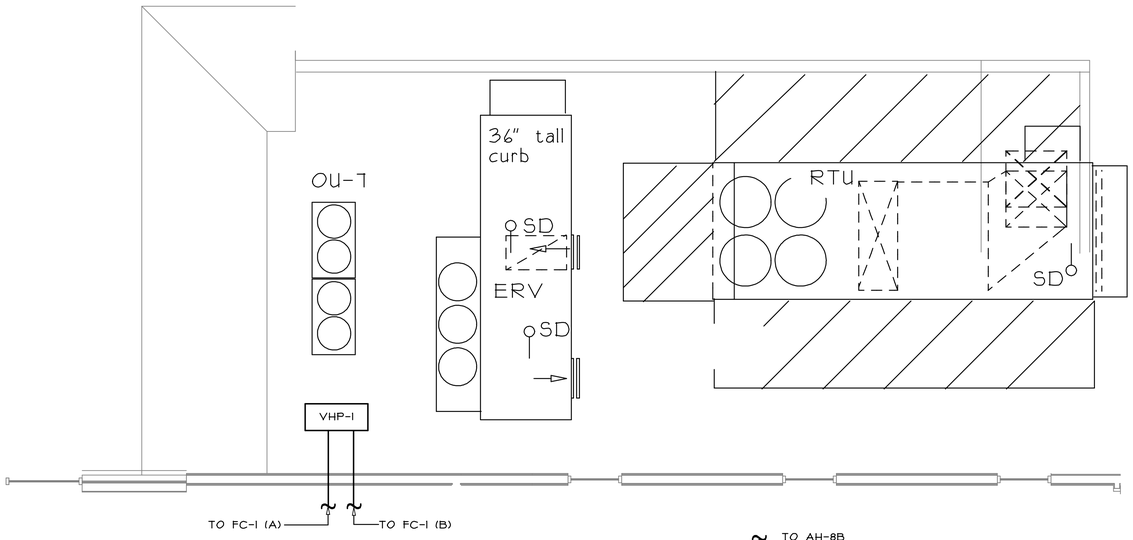
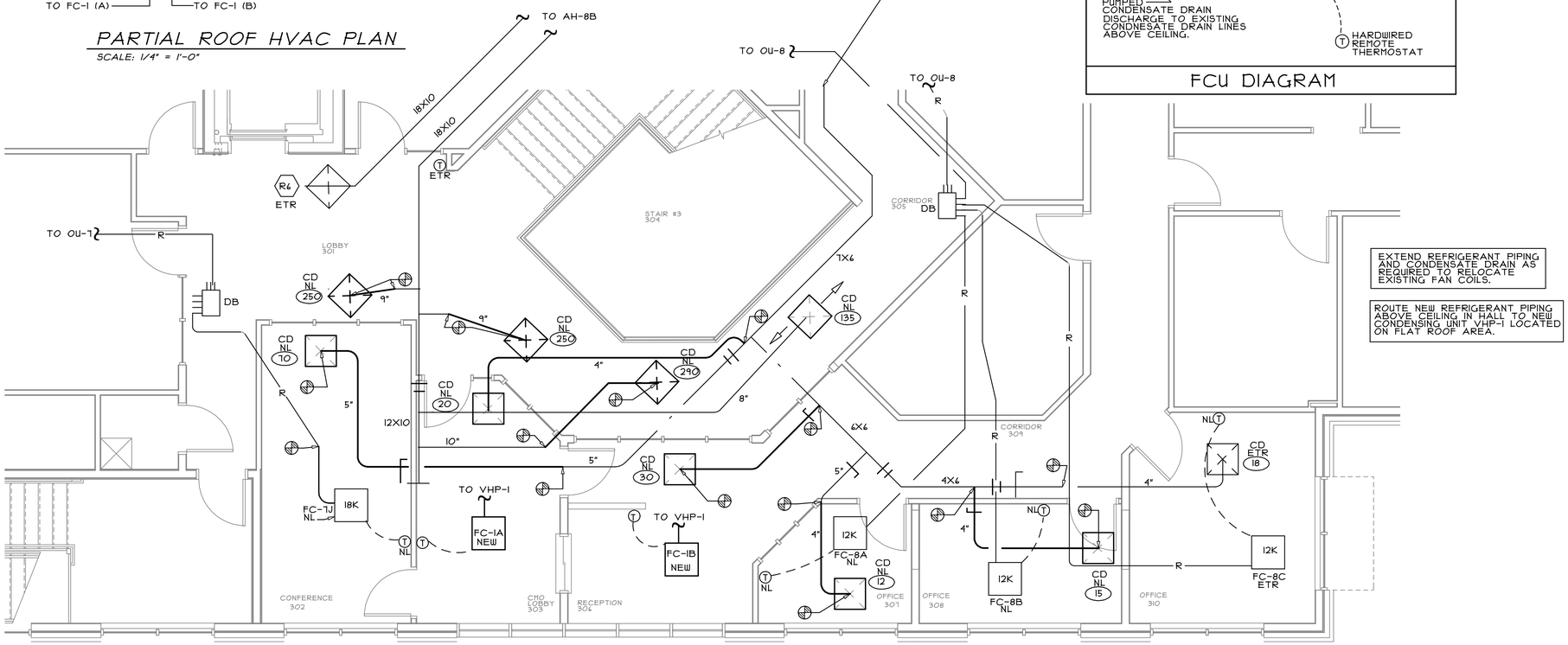


PARTIAL ROOF HVAC PLAN

SCALE: 1/4" = 1'-0"

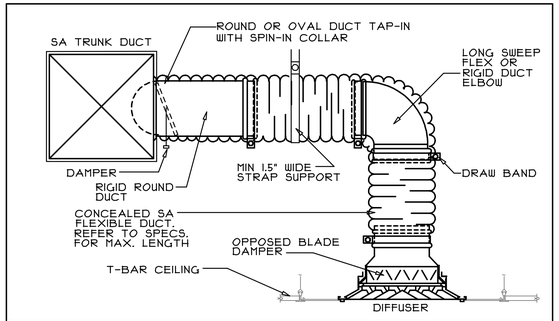


THIRD FLOOR HVAC PLAN

SCALE: 1/4" = 1'-0"

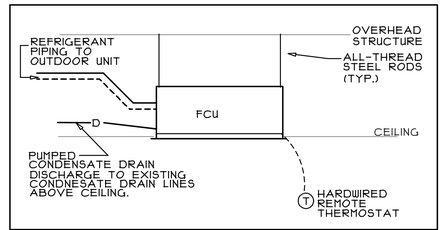
EXTEND REFRIGERANT PIPING AND CONDENSATE DRAIN AS REQUIRED TO RELOCATE EXISTING FAN COILS.

ROUTE NEW REFRIGERANT PIPING ABOVE CEILING IN HALL TO NEW CONDENSING UNIT VHP-1 LOCATED ON FLAT ROOF AREA.



BRANCH DUCT DETAIL

NOT TO SCALE



FCU DIAGRAM

SYMBOLS

	SUPPLY DUCT
	RETURN OR EXHAUST DUCT
T	THERMOSTAT-MTD. 48" AFF
A / 100	INDICATES AIR OUTLET OR INLET TOP LETTER INDICATES GRID TYPE (SEE SCHEDULE); BOTTOM NUMERAL INDICATES CFM FOR BALANCING
	EXISTING MECHANICAL WORK
	REMOVE EXISTING MECHANICAL WORK
	POINT OF CONNECTION OF NEW WORK TO EXISTING
100	NUMERAL INDICATES CFM FOR BALANCING EXISTING CD

ABBREVIATIONS

CD	CEILING DIFFUSER
ER	EXISTING REMOVE
EREL	EXISTING RELOCATE
ETR	EXISTING TO REMAIN
NL	NEW LOCATION
OA	OUTSIDE AIR
RA	RETURN AIR
RG	RETURN GRILLE

VRF EQUIPMENT SCHEDULE

ZONE	OUTDOOR HEAT PUMP	NOMINAL TONS	RATED COOLING	RATED HEATING	EER	O.U. VOLTS	O.U. MCA / MOP	INDOOR UNIT I.U. NAME	I.U. MODEL NO.	CFM	MIN. OA	ESP.	RATED COOLING TOTAL	RATED HEATING	BLOWER SPEED	VOLTS	FLA
VHP-1	LG ARUM048GSS5	4	48,000	54,000	12.5	208/1	24 / 40	FC-1A	LG ARNU183TQD4	395	NA	NA	18,000	18,000	3	208/1	0.2
								FC-1B	LG ARNU243TNA4	741	NA	NA	24,000	24,000	3	208/1	0.56

PROVIDE ALL PIPING, CONDENSATE PUMP W/ WIRED WALL MOUNTED ROOM THERMOSTAT, WYE FITTINGS, ETC. AS REQUIRED FOR OPERATING SYSTEM. SUBMIT REFRIGERANT PIPING, CONTROL AND LINE VOLTAGE WIRING SCHEMATICS FOR APPROVAL.(PUMP CONDESATE TO GRADE.
NO SUBSITUTIONS OF HVAC EQUIPMENT.

NEW EQUIPMENT TO BE INTERGRADED INTO THE EXISTING BUILDING CONTROL SYSTEM. SYSTEM INTEGRATION WILL REQUIRE FACTORY START UP TO RECONFIGURE CONTROL SYSTEM FOR THE NEW HVAC EQUIPMENT.

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Third Floor HVAC Plan

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M2.1