

HVAC PIPING LEGEND

(NOTE: NOT ALL SYMBOLS ARE USED IN THIS PROJECT)

SYMBOL	DESCRIPTION
	GAS - LOW PRESSURE
	GAS - MEDIUM PRESSURE
	GAS - HIGH PRESSURE
	GAS - LIQUEFIED PETROLEUM
	COMPRESSED AIR
	VACUUM
	OXYGEN
	HOT WATER SUPPLY, HEATING
	HOT WATER RETURN, HEATING
	CHILLED WATER SUPPLY
	CHILLED WATER RETURN
	HOT-CHILLED SUPPLY
	HOT-CHILLED RETURN
	CONDENSER WATER SUPPLY
	CONDENSER WATER RETURN
	STEAM (NO. INDICATES PRESSURE)
	CONDENSATE RETURN (NO. INDICATES PRESSURE OF SUPPLY)
	CONDENSATE PUMP DISCHARGE
	BOILER FEED WATER
	BLOW DOWN
	FUEL OIL SUPPLY
	FUEL OIL RETURN
	HEAT TRANSFER SUPPLY
	HEAT TRANSFER RETURN
	REFRIGERANT DISCHARGE
	REFRIGERANT SUCTION
	REFRIGERANT LIQUID
	LOW PRESSURE STEAM
	EXISTING PIPING
	EXISTING PIPING TO BE REMOVED
	FLOW DIRECTION
	CONCENTRIC REDUCER
	90° ELBOW
	45° ELBOW
	BRANCH CONNECTION OUT OF SIDE
	BRANCH CONNECTION OUT OF TWO SIDES
	RISER DOWN (ELBOW)
	RISER UP (ELBOW)

SYMBOL	DESCRIPTION
	RISER UP (ELBOW)
	BRANCH CONNECTION OUT OF TOP
	TO 90° ELBOW
	BRANCH CONNECTION OUT OF TOP TO 90° ELBOW
	RISER DOWN TO 90° ELBOW
	STRAINER-VERTICAL BASKET TYPE
	THERMOMETER (STRAIGHT SCALE)
	AUTOMATIC AIR VENT
	AIR CHAMBER
	TRAP, STEAM OR MOISTURE
	SIGHT GLASS
	TEST PLUG
	2-WAY MOTORIZED VALVE
	3-WAY MOTORIZED VALVE
	3-WAY VALVE
	BALL VALVE
	BUTTERFLY VALVE
	CHECK VALVE
	GATE VALVE
	GLOBE VALVE
	NEEDLE VALVE
	PLUG VALVE
	PRESSURE REDUCING VALVE
	SOLENOID VALVE
	SWING CHECK VALVE
	UNION
	CAP ON END OF PIPE
	CLEAN OUT

HVAC GENERAL, DUCTWORK, AND CONTROLS LEGEND

(NOTE: NOT ALL SYMBOLS ARE USED IN THIS PROJECT)

SYMBOL	DESCRIPTION
	SUPPLY AIR DEVICE
	RETURN AIR DEVICE
	EXHAUST AIR DEVICE
	SIDEWALL GRILLE
	SIDEWALL TRANSFER GRILLE
	DOOR TRANSFER GRILLE
	SLOT DIFFUSER
	ROUND DIFFUSER
	SUPPLY UP
	RETURN UP
	EXHAUST UP
	SUPPLY DOWN
	RETURN DOWN
	EXHAUST DOWN
	ROUND UP
	ROUND DOWN
	ROUND DUCT BREAK
	RECTANGULAR DUCT BREAK
	OPPOSED BLADE DAMPER
	PARALLEL BLADE DAMPER
	MANUAL DAMPER
	MOTORIZED, OPPOSED BLADE DAMPER
	FLEXIBLE CONNECTION
	DOUBLE-WALL DUCT EQUAL TO: MCGILL ACOUSTI-K27 FOR OVAL DUCT, MCGILL RECTANGULAR K27 FOR RECTANGULAR DUCT
	90° ELBOW W/ TURNING VANE
	FIRE DAMPER
	SMOKE DAMPER
	COMBINATION FIRE/SMOKE DAMPER

SYMBOL	DESCRIPTION
	SPLITTER DAMPER AT BRANCH OFF
	SPLITTER DAMPER AT TEE
	BULL HEAD TEE W/TURNING VANES & DAMPERS
	TAKE OFF W/ EXTRACTOR & MANUAL DAMPER
	90° BEND, ROUND DUCT
	45° BEND, ROUND DUCT
	45° RECTANGULAR DUCT
	DUCT SMOKE DETECTOR
	THERMOSTAT
	THERMOSTAT W/LOCKING COVER
	TEMPERATURE SENSOR
	REMOTE THERMOSTAT
	HUMIDISTAT
	CARBON DIOXIDE SENSOR
	CARBON MONOXIDE SENSOR
	DUCT PRESSURE SENSOR
	WALL SWITCH MOUNTED WITHIN 48" A.F.F. CONNECT TO EXISTING AT THIS POINT
	POINT OF DEMOLITION
	KEY NOTE
	REVISION SYMBOL
	DIFFUSER CALL-OUT = ID PER SCHEDULE / NECK SIZE DIFFUSER CFM
	AIR TERMINAL DESIGNATION AIR TERMINAL DESIGNATION ID PER SCHEDULE

HVAC DEMOLITION / RENOVATION NOTES

- CONTRACTOR SHALL VERIFY EXISTING SITE CONDITIONS INCLUDING, BUT NOT LIMITED TO:
* PIPE SIZES AND ROUTING.
* DUCT SIZES AND ROUTING.
* EQUIPMENT CONNECTIONS AND LOCATIONS.
* CONTROLS.
- PROVIDE NECESSARY MODIFICATIONS TO NEW AND EXISTING SYSTEMS TO FACILITATE THE INSTALLATION OF NEW SYSTEMS TO FACILITATE THE INSTALLATION OF NEW SYSTEMS AND INTERFACE OF EXISTING AND NEW SYSTEMS COMPLETE.
- EXISTING SYSTEMS AND INFORMATION SHOWN ON THESE PLANS WERE DEVELOPED USING EXISTING BUILDING DRAWINGS. CONTRACTOR SHALL VERIFY AT SITE ALL EXISTING SYSTEMS. REMOVE ALL PORTIONS OF DUCT AND PIPING SYSTEMS BEING REMOVED. TERMINATE EXISTING SYSTEMS ABOVE CEILINGS AND BELOW FLOOR SLABS IN A MANNER THAT WILL NOT CONFLICT WITH NEW WORK. CLOSELY COORDINATE NEW WORK WITH EXISTING SYSTEMS. PROVIDE OFFSETS IN EXISTING AND NEW SYSTEMS AS REQUIRED TO AVOID CONFLICTS.
- COORDINATE AND SCHEDULE ALL CONNECTIONS TO EXISTING SYSTEMS AND SYSTEM SHUT-DOWNS WITH MAINTENANCE PERSONNEL.
- MAINTAIN EXISTING BUILDING SYSTEMS WITH PHASED DEMOLITION AND INSTALLATION OF NEW WORK, PROVIDING TEMPORARY SERVICES AS REQUIRED.
- USE EXISTING PIPING SYSTEM VALVES WHERE POSSIBLE TO ISOLATE SYSTEMS AND TO CAP EXISTING PIPING. REPLACE EXISTING VALVES WHERE NECESSARY WHEN EXISTING VALVES WILL NOT HOLD.
- EXISTING EQUIPMENT BEING REMOVED AND DESIGNATED TO REMAIN THE PROPERTY OF THE OWNER SHALL BE DELIVERED UPON REMOVAL TO LOCATION DESIGNATED BY OWNER. ALL OTHER SYSTEM COMPONENTS REMOVED SHALL BECOME THE PROPERTY OF THE CONTRACTOR.
- REMOVE AND RELOCATE SMALL CONDUIT, CABLE, PIPE AND DUCT, PIPE AND CEILING HANGERS ETC. AS NECESSARY TO ACHIEVE A COMPLETE INSTALLED MECHANICAL SYSTEM AS SHOWN ON DRAWINGS.
- PATCH ALL WALLS, FLOORS, ROOFS AND CEILINGS TO MATCH EXISTING OR NEW (IF APPLIED) FOR ALL OPENINGS CREATED BY DEMOLITION WORK OF EQUIPMENT AND HVAC SERVICE PENETRATIONS.
- REPLACE AND/OR PATCH TO MATCH EXISTING; ANY EXISTING PIPE AND/OR DUCT INSULATION THAT IS TO REMAIN EXISTING AND IS DAMAGED OR REMOVED DURING CONSTRUCTION.
- REFER TO ELECTRICAL PLANS FOR EXTENT OF DEMOLITION WORK RELATING TO WIRING FOR SUPPORT OF HVAC EQUIPMENT TO BE REMOVED.

HVAC GENERAL NOTES

- ALL WORK SHALL COMPLY WITH THE 2010 EDITION OF THE "ARKANSAS MECHANICAL CODE", THE 2009 EDITION OF THE "ARKANSAS RULES AND REGULATIONS FOR ENERGY EFFICIENCY STANDARDS FOR NEW CONSTRUCTION", NFPA 90A, AND ALL CITY, STATE, AND LOCAL REQUIREMENTS.
- REFER TO THE PROJECT MANUAL FOR ALL REQUIREMENTS.
- REFER TO ARCHITECTURAL PLANS FOR:
* REFLECTED CEILING PLAN FOR EXACT LOCATION OF AIR DEVICES AND CEILING TYPES.
* EXACT LOCATIONS AND MOUNTING HEIGHTS OF EXTERIOR LOUVERS
* FIRE RATED WALLS AND PARTITIONS. PROVIDE FIRE DAMPERS IN DUCT PENETRATIONS OF ALL FIRE RATED WALLS AND PARTITIONS AS NECESSARY TO MEET CITY AND STATE REQUIREMENTS.
* ALL WALL AND ROOF PENETRATIONS AND EQUIPMENT MOUNTING DETAILS.
- ALL DUCTWORK SHALL BE CONSTRUCTED FROM GALVANIZED STEEL IN CONFORMANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION.
- U.L. LISTED FLEXIBLE DUCT RUN-OUTS MAY BE USED, BUT SHALL NOT EXCEED 3'-0" IN LENGTH. ALL FLEXIBLE DUCT TO BE PROPERLY SUPPORTED WITH NO KINKS OR HARD BENDS.
- DUCT FITTINGS:
* SUPPLY TAKE-OFFS TO CEILING SUPPLY DIFFUSERS TO BE CONICAL TAP OR 45° SIDE TAP.
* ALL DUCT RUN-OUTS TO HAVE LOCKING QUADRANT VOLUME DAMPERS. PROVIDE STAND-OFF BRACKET TO ACCOMMODATE INSULATION THICKNESS.
* ALL 90° ROUND ELBOWS TO HAVE R/D=1.5 (UNLESS OTHERWISE NOTED).
* ALL 90° RECTANGULAR ELBOWS TO HAVE TURNING VANES (UNLESS OTHERWISE NOTED).
* PROVIDE HARD ELBOW WHEN TRANSITIONING FROM RIGID TO FLEXIBLE DUCT WHEN CONNECTING TO AIR DEVICES. REFER TO DETAIL.
- DUCTWORK TO BE COORDINATED WITH STRUCTURAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION, COMPONENTS AND SYSTEMS. ALL DUCTWORK THAT HAS TO BE OFFSET DUE TO AN OBSTRUCTION SHALL BE SLOPED WITH 2-30° ELBOWS UNLESS OTHERWISE NOTED.
- PROVIDE ACCESS PANELS IN CEILINGS OTHER THAN LAY-IN TYPE WHERE NECESSARY.
* CLOSELY COORDINATE LOCATIONS AND SIZE OF ACCESS PANELS TO ACHIEVE GREATEST ACCESSIBILITY FOR MAINTENANCE PURPOSES.
* PROVIDE ACCESS PANEL AT BALANCING DAMPERS, FIRE DAMPERS, CONTROLS, VALVES, TRAPS, CLEAN OUTS, ETC.
- COMPLETELY INSULATE THE TOPS OF ALL CEILING DIFFUSERS.
- CLOSELY COORDINATE LOCATIONS OF INSTALLED EQUIPMENT TO ACHIEVE THE GREATEST ACCESSIBILITY.
- MAINTAIN 25'-0" MINIMUM CLEARANCE BETWEEN OUTSIDE AIR INTAKES AND ALL EXHAUST FANS, FLUES, PLUMBING VENTS, ETC.
- ALL ROOF MOUNTED HVAC EQUIPMENT, INCLUDING BUT NOT LIMITED TO EXHAUST FANS, CONDENSING UNITS, AND ROOF-TOP UNITS, SHALL BE A MINIMUM OF 10' FROM THE ROOF'S EDGE, OR PARAPET, UNLESS OTHERWISE NOTED ON PLANS. IN SUCH CASE, CONTRACTOR SHALL COORDINATE WITH ARCHITECT TO PROVIDE SAFETY HANDRAILS AROUND ROOF MOUNTED HVAC EQUIPMENT THAT IS LOCATED LESS THAN 10' FROM ROOF'S EDGE, OR PARAPET.
- ROOF MOUNTED CONDENSING UNITS SHALL BE PLACED ON PATE OR APPROVE EQUAL EQUIPMENT SUPPORTS, MODEL ES-2B W/ INSULATION, FIBER CANT, AND METAL CAP, MINIMUM 11" HIGH ABOVE ROOF DECK. MAKE WEATHER TIGHT.
- ALL EXTERIOR EXPOSED PIPING SUSCEPTIBLE TO FREEZING, SUCH AS CONDENSATE PIPING, SHALL BE INSULATED WITH 1" FIBERGLASS PIPING INSULATION WITH 0.020" ALUMINUM JACKET AND HEAT TRACED AT 5 WATTS/FOOT. SEAL JACKET WATER-TIGHT.
- FOR EACH ROOF-TOP UNIT, CONDENSATE PIPE ROUTED ALONG THE ROOF (AND SUPPORTED ABOVE ROOF) SHALL SPILL INTO NEAREST ROOF DRAIN, OR GUTTER. SPILLING CONDENSATE ONTO THE ROOF SURFACE IS UNACCEPTABLE.
- ALL WALL-MOUNTED, OCCUPANT-CONTROLLED HVAC DEVICES, I.E., THERMOSTATS, HUMIDISTATS, CO2 CONTROLLERS, CONTROL PANELS, ETC., SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR.
- COORDINATE WORK CLOSELY WITH CONTROL CONTRACTOR. PROVIDE ALL NECESSARY DUCT, PIPE TAPS, TEES, WELLS, CONTROL DAMPERS, AIR MEASURING STATIONS, AND OTHER ACCESSORIES REQUIRED BY CONTROL SYSTEM
- A DUCT MOUNTED PHOTOELECTRONIC TYPE SMOKE DETECTOR SHALL BE MOUNTED IN THE SUPPLY AND RETURN DUCTS, WHERE INDICATED, BEFORE THE FIRST TAKEOFF. PROVIDE AN ACCESS DOOR AT EACH DETECTOR. UPON DETECTION OF SMOKE, THE DUCT SMOKE DETECTOR SHALL SHUT DOWN ITS ASSOCIATED AIR HANDLING UNIT AND PROVIDE A SIGNAL TO THE FIRE ALARM SYSTEM. SMOKE DETECTORS TO BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR AND MOUNTED BY THE MECHANICAL CONTRACTOR.
- CONTRACTOR SHALL STORE AND PROTECT ALL EQUIPMENT THAT IS BEING RELOCATED. CONTRACTOR SHALL REPLACE ALL DAMAGED EQUIPMENT AT CONTRACTOR'S EXPENSE.

SEISMIC INFORMATION

SEISMIC RESTRAINTS ARE REQUIRED FOR ALL MECHANICAL COMPONENTS AND SYSTEMS PER THE REQUIREMENTS OF THE 2012 EDITION OF THE INTERNATIONAL BUILDING CODE (IBC) AS DEFINED IN ASCE 7-10. REFER TO THE STRUCTURAL DRAWINGS.

- SEISMIC DESIGN DATA:
- SEISMIC IMPORTANCE FACTOR $I_e = 1.5$
 - SPECTRAL RESPONSE COEFFICIENTS $S_s = 0.488$
 - SITE CLASS C
 - ADJUSTED SPECTRAL RESPONSE ACCELERATION
 $S_{ms} = 0.586$
 $SM1 = 0.292$
 - DESIGN SPECTRAL RESPONSE ACCELERATION
 $SDS = 0.390$
 $SD1 = 0.194$
 - SEISMIC DESIGN CATEGORY D

PARTITION LEGEND

	EXISTING UNRATED PARTITION
	EXISTING PARTITION TO BE REMOVED
	NEW UNRATED PARTITION
	NEW LEAD SHIELDED PARTITION
	NEW / EXISTING SMOKE BARRIER
	NEW / EXISTING 1 HOUR BARRIER / SMOKE BARRIER SEE PLAN FOR LOCATIONS
	NEW / EXISTING 2 HOUR BARRIER / SMOKE BARRIER SEE PLAN FOR LOCATIONS

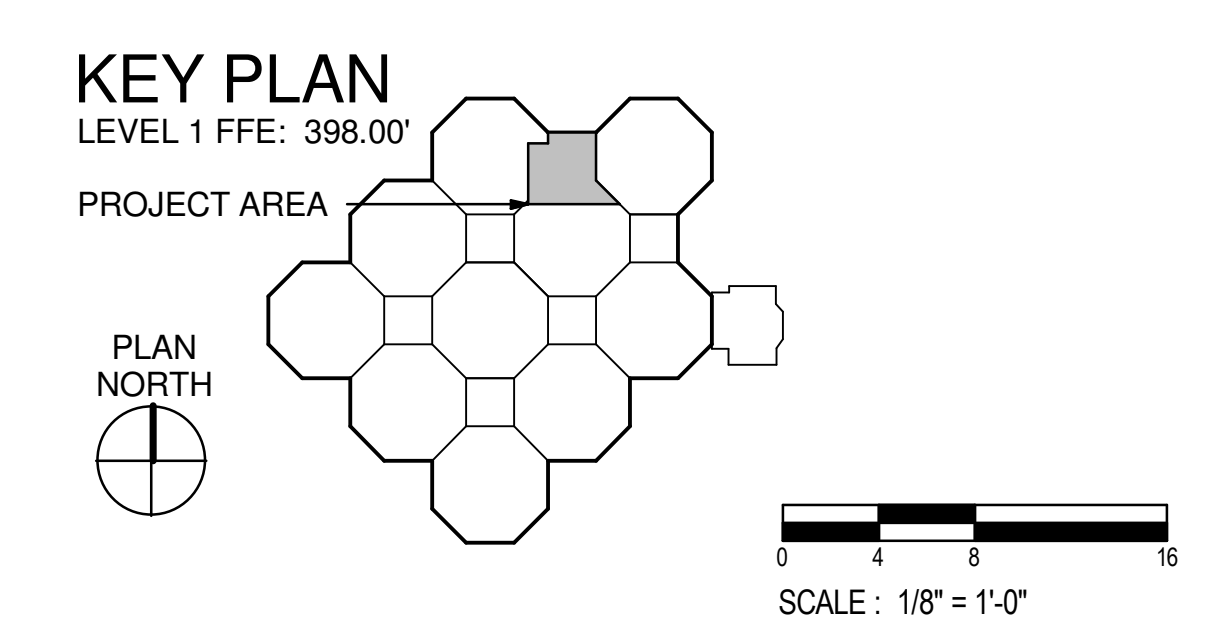
CONSTRUCTION DOCUMENT SUBMISSION
FULLY SPRINKLERED

1 Revision 1 Date 1 Revisions: _____ Date _____	CONSULTANTS: STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603 MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		ARCHITECT/ENGINEERS: BES DESIGN/BUILD, LLC 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716	Drawing Title MECHANICAL LEGEND AND NOTES	Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS	Project Number CSI-111 Building Number 1	CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM
				Approved: Project Director	Location JOHN L. McCLELLAN MEMORIAL VETERANS HOSPITAL; LITTLE ROCK, ARKANSAS Date 10-22-2014 Drawn IMHOFF Checked SEAY	Drawing Number MI001 Dwg. 71 of 99	









1 LEVEL 1 HVAC DEMOLITION PIPING PLAN
1/8" = 1'-0"

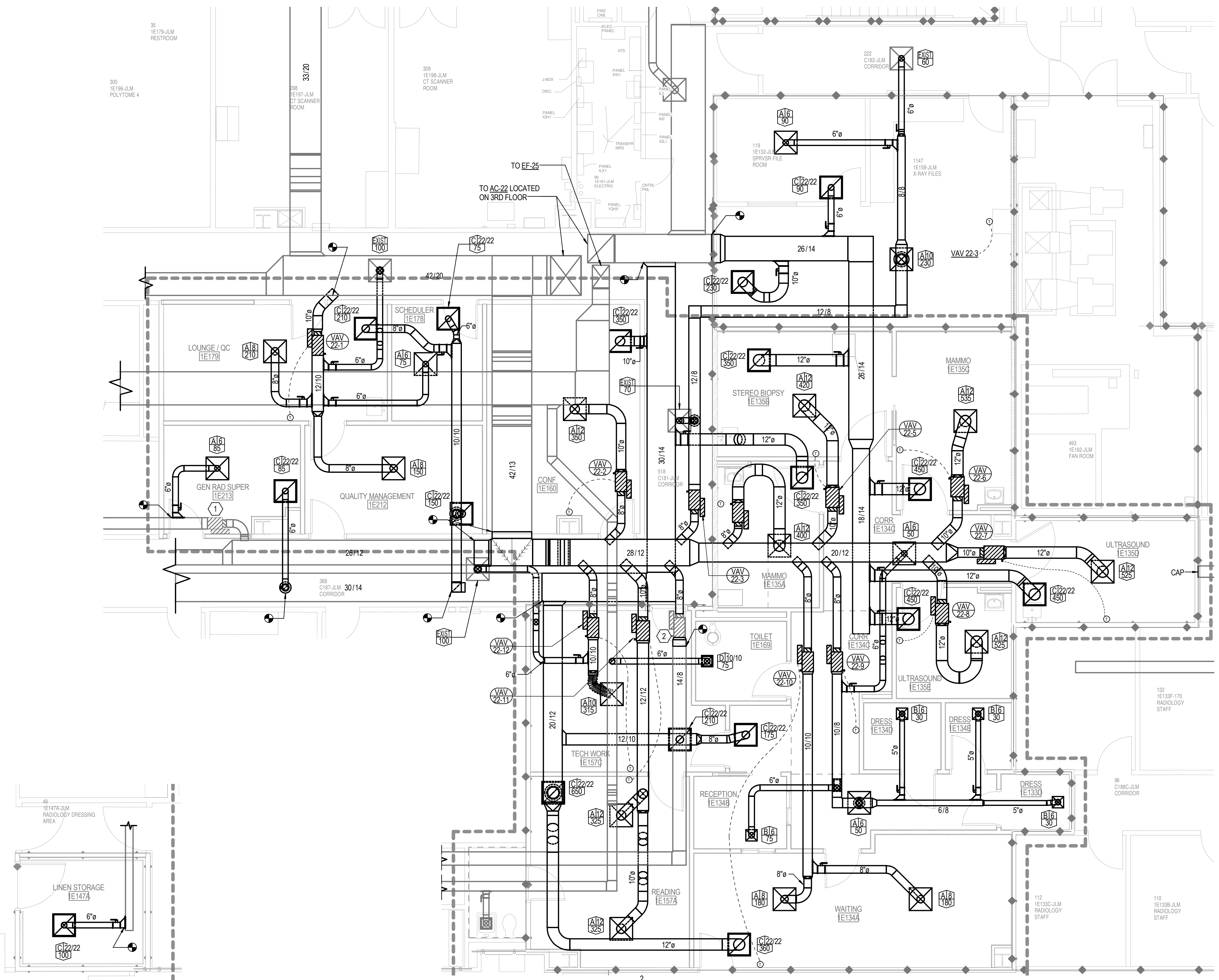


SCALE: 1/8" = 1'-0"

**CONSTRUCTION DOCUMENT SUBMISSION
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CONSULTANTS: STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603 MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900			ARCHITECT/ENGINEERS:  BES DESIGN/BUILD, LLC 766 Middle St. Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716	Drawing Title LEVEL 1 DEMOLITION HVAC PIPING PLAN Approved: Project Director 	Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS Location JOHN L. MCCLELLAN MEMORIAL VETERANS HOSPITAL; LITTLE ROCK, ARKANSAS Date 10-22-2014	Project Number CSI-111 Building Number 1 Drawing Number MD102 Dwg. 76 of 99	CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM  Department of Veterans Affairs
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three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
one quarter inch = one foot
one eighth inch = one foot

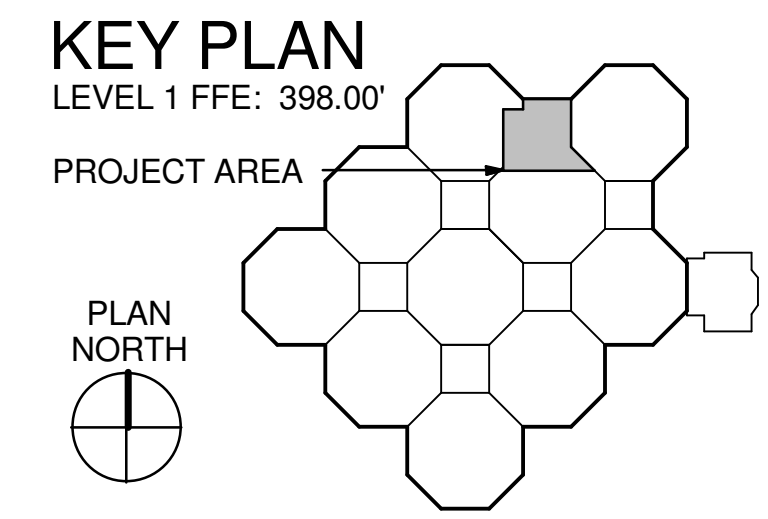


1 LEVEL 1 HVAC PLAN - AREA B1
1/4" = 1'-0"

2 LEVEL 1 HVAC PLAN - AREA B2
1/4" = 1'-0"

HVAC PLAN - KEYED NOTES:

- 1 EXISTING VAV BOX. COORDINATE EXISTING SETPOINTS WITH OWNER.
- 2 RELOCATED VAV BOX. COORDINATE EXISTING SETPOINTS WITH OWNER.



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

CONSTRUCTION DOCUMENT SUBMISSION
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CONSULTANTS: STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603 MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		ARCHITECT/ENGINEERS: BES DESIGN/BUILD, LLC 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716		Drawing Title LEVEL 1 HVAC PLAN - AREA B Approved: Project Director		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS Location JOHN L. McCLELLAN MEMORIAL VETERANS HOSPITAL, LITTLE ROCK, ARKANSAS Date 10-22-2014 Drawn IMHOFF Checked SEAY		Project Number CSI-111 Building Number 1 Drawing Number MH101.B Dwg. 78 of 99		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM 	
Revisions: Date		State of Arkansas Professional Engineer ROBERT L. SEAY No. 5540 06/20/2014									

15
0 4 6
one eighth inch = one foot
10
0 4 6
one quarter inch = one foot
8
0 4
three eighths inch = one foot
4
0 4
one half inch = one foot
2
0 4
three quarters inch = one foot
1
0 4
one inch = one foot
0 6
one and one half inches = one foot
1
0 6
three inches = one foot

6

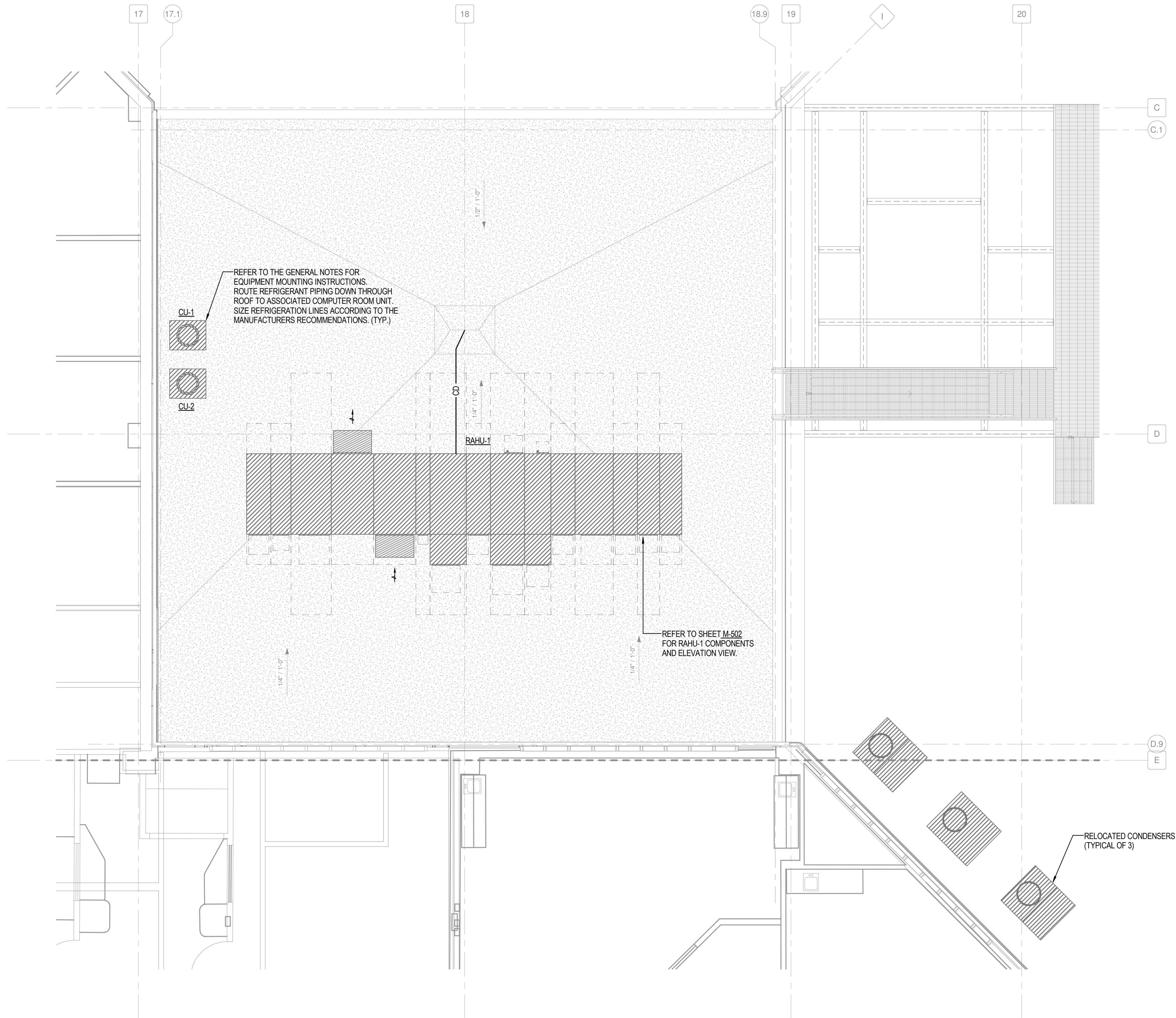
5

4

3

2

1

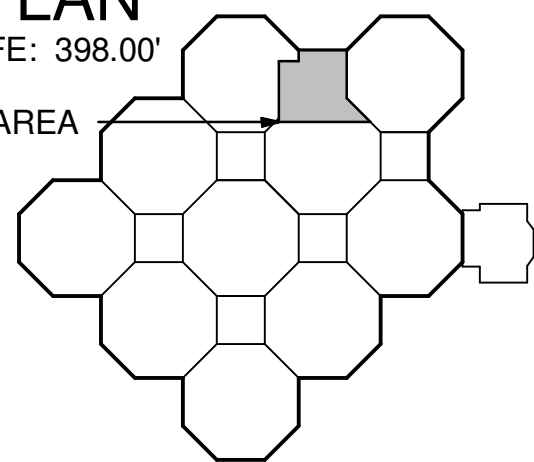


1 LEVEL 2 HVAC ROOF PLAN - AREA A
1/4" = 1'-0"

KEY PLAN

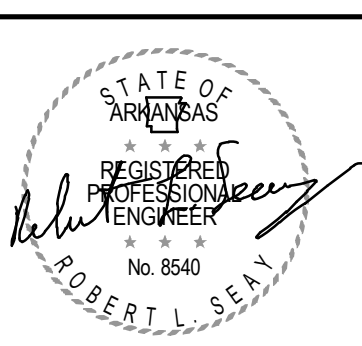


LEVEL 1 FFE: 398.00'

PROJECT AREA



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

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		CONSULTANTS:			ARCHITECT/ENGINEERS:		Drawing Title LEVEL 2 HVAC ROOF PLAN - AREA A		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS		Project Number CSI-111		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM		
		STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603			MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		 BES DESIGN/BUILD, LLC 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716		Approved: Project Director		Location JOHN L. McCLELLAN MEMORIAL VETERANS HOSPITAL; LITTLE ROCK, ARKANSAS			Building Number 1	
														Drawing Number MH102.A Dwg. 79 of 99	
Revisions:		Date		06/20/2014				Date 10-22-2014		Drawn IMHOFF		Checked SEAY			

6

5

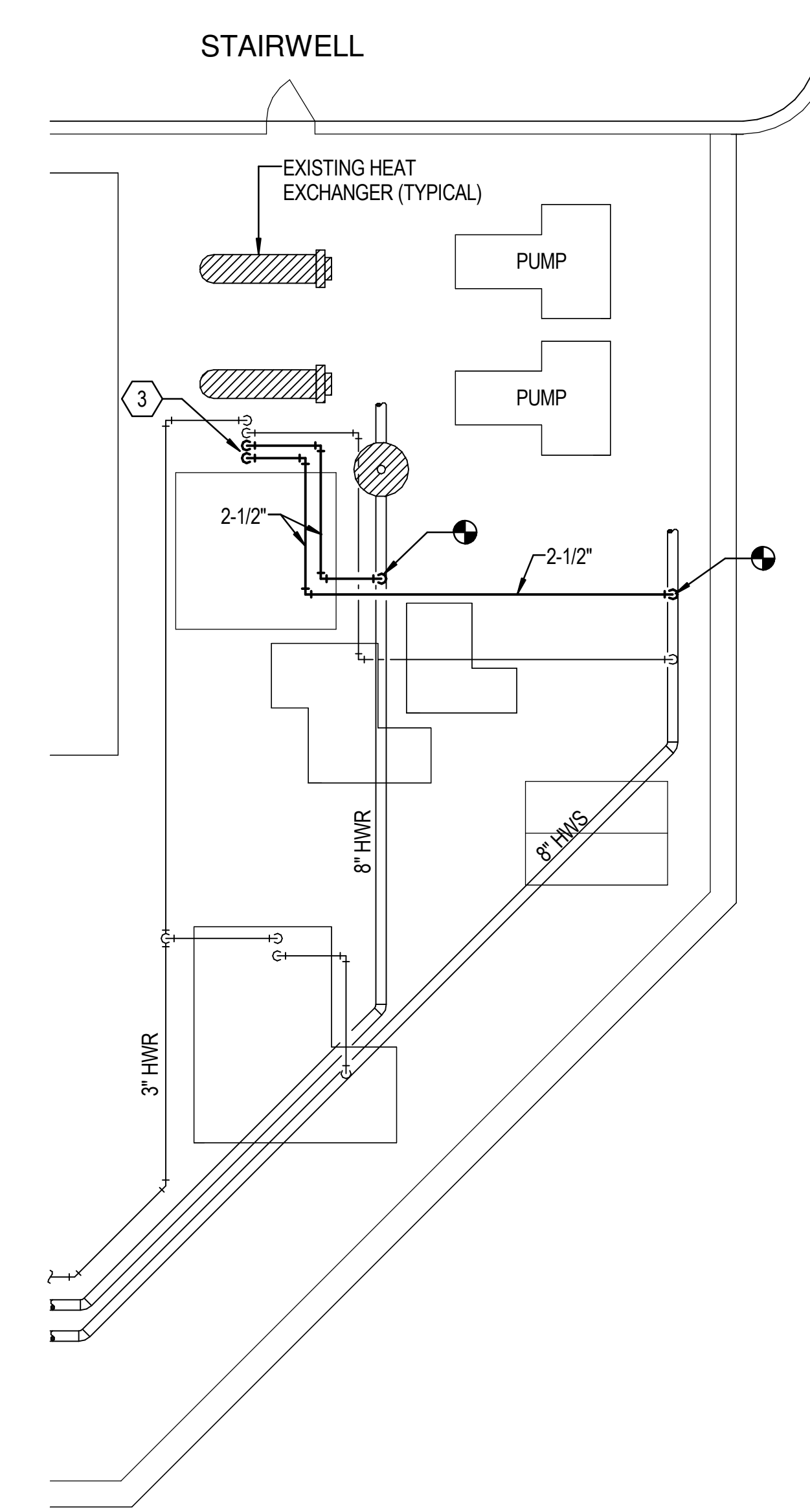
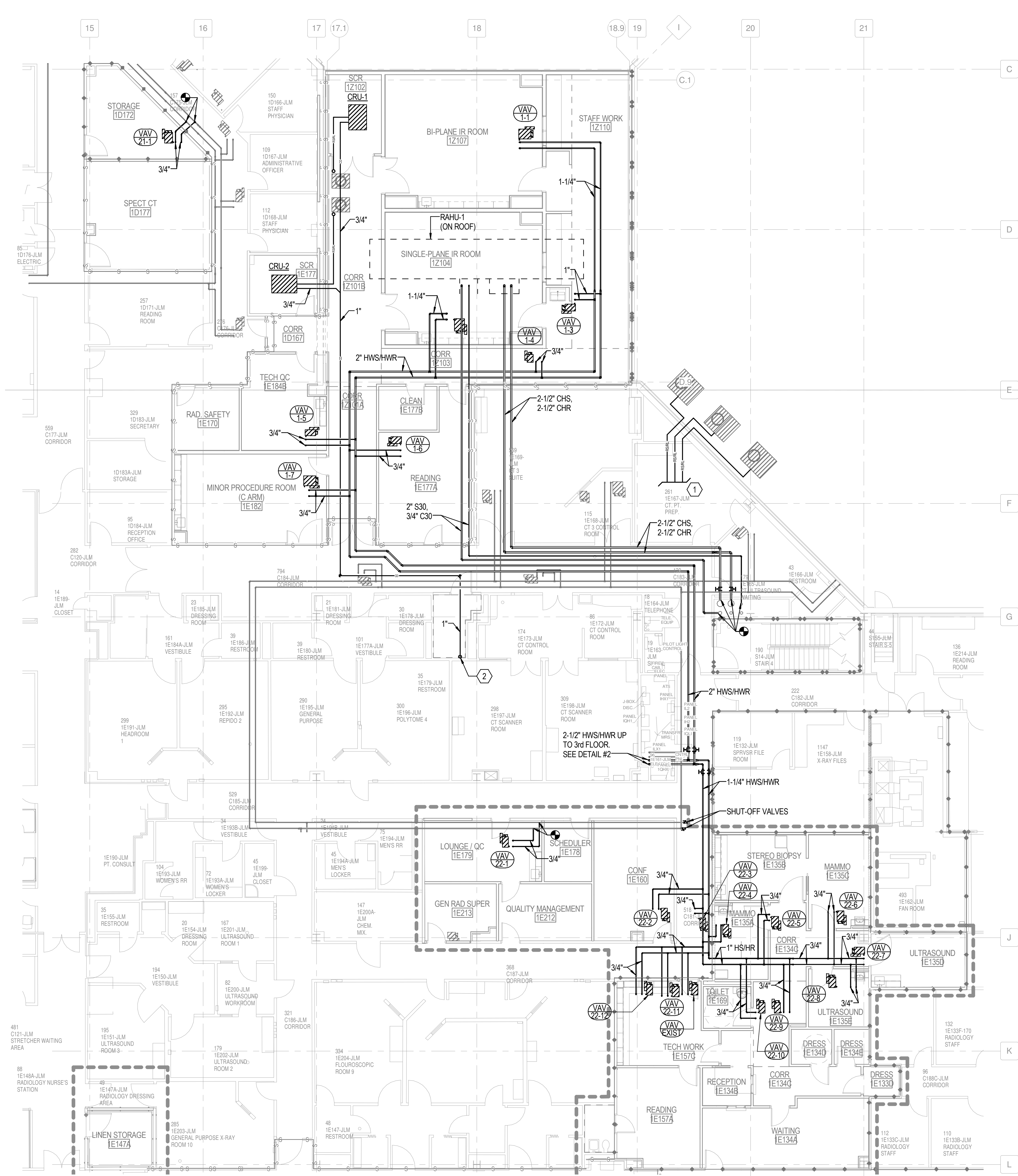
4

3

2

1

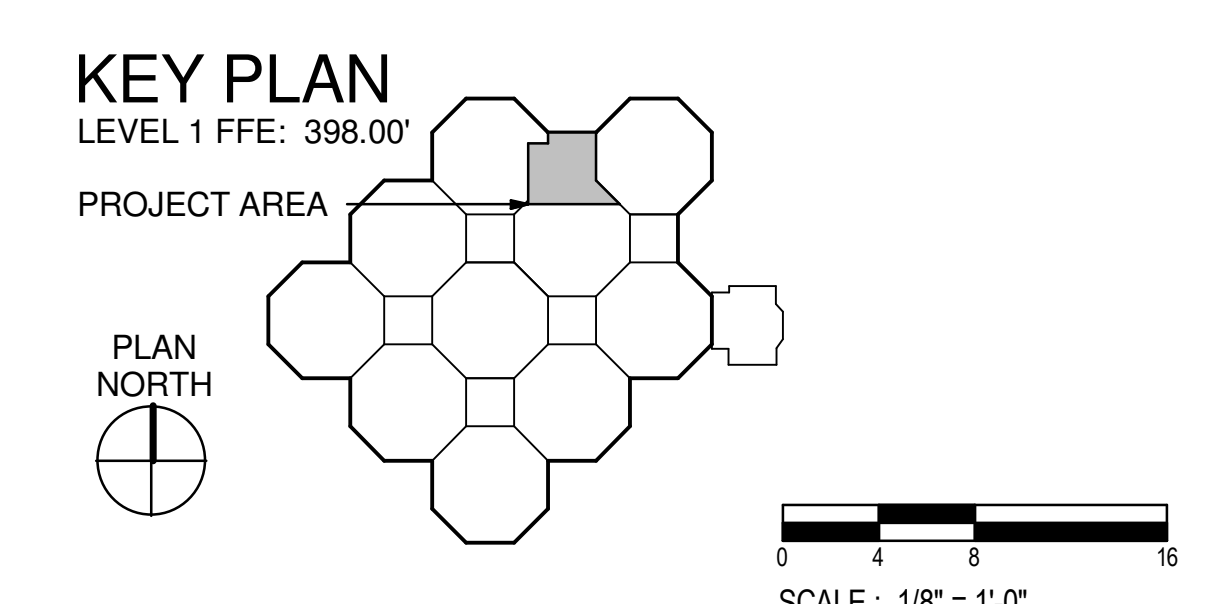
three inches = one foot
one and one half inches = one foot
one inch = one foot
three quarters inch = one foot
one half inch = one foot
three eighths inch = one foot
one quarter inch = one foot
one eighth inch = one foot



- HVAC PIPING PLAN - KEYED NOTES:**
- 1 ROUTE NEW REFRIGERATION LINES TO EXISTING DX AIR HANDLING UNITS. SIZE NEW LINE SETS ACCORDING TO MANUFACTURERS RECOMMENDATIONS. COORDINATE EXISTING DX AIR HANDLING UNIT LOCATIONS WITH THE HOSPITAL.
 - 2 ROUTE CONDENSATE DRAIN LINE DOWN TO EXISTING JANITORS SINK
 - 3 2-1/2" HWS/HWR DOWN TO FIRST FLOOR. SEE DETAIL #1 FOR CONTINUATION.

2 3RD FLOOR PARTIAL HVAC PIPING PLAN
1/8" = 1'-0"

1 LEVEL 1 HVAC PIPING PLAN
1/8" = 1'-0"

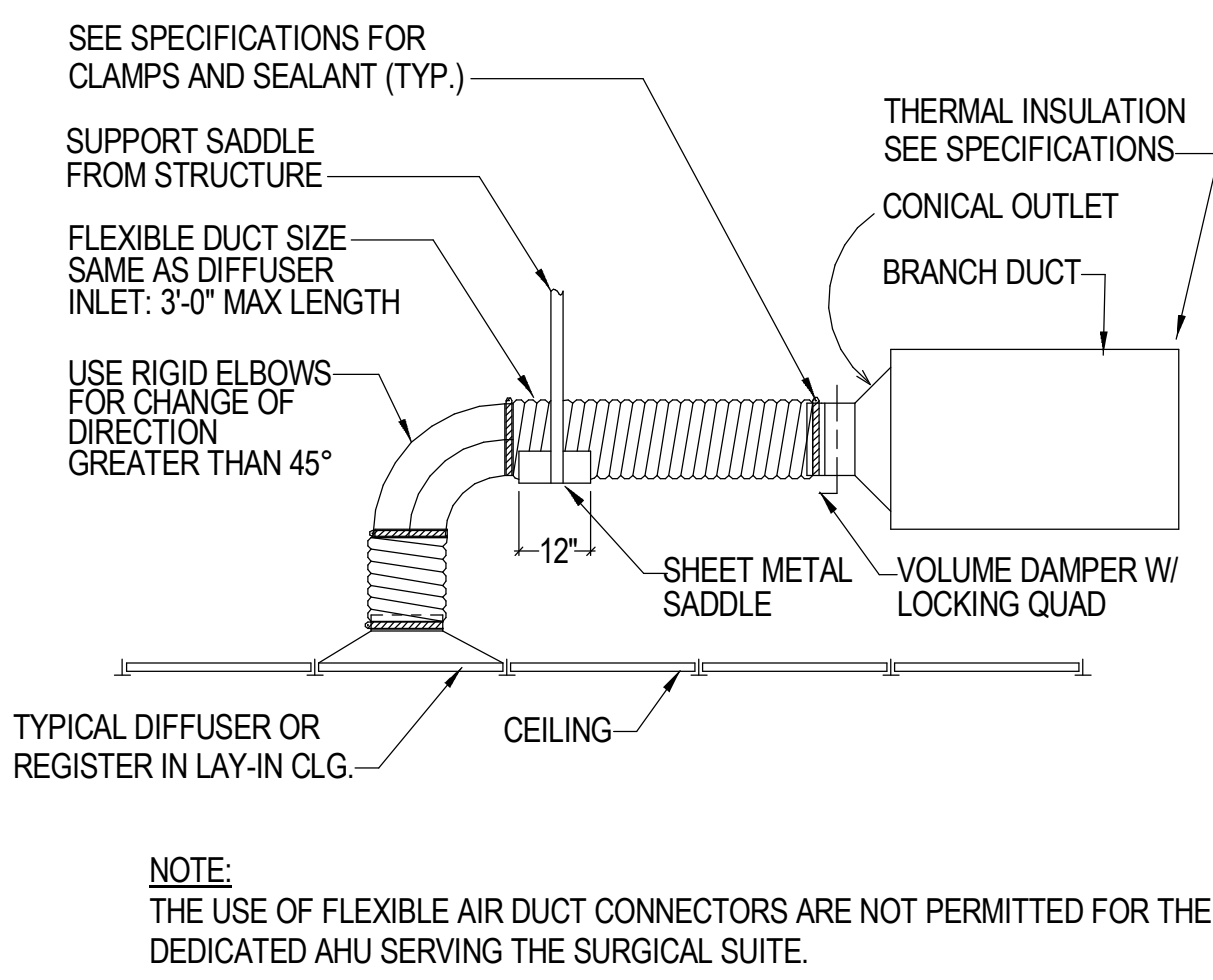


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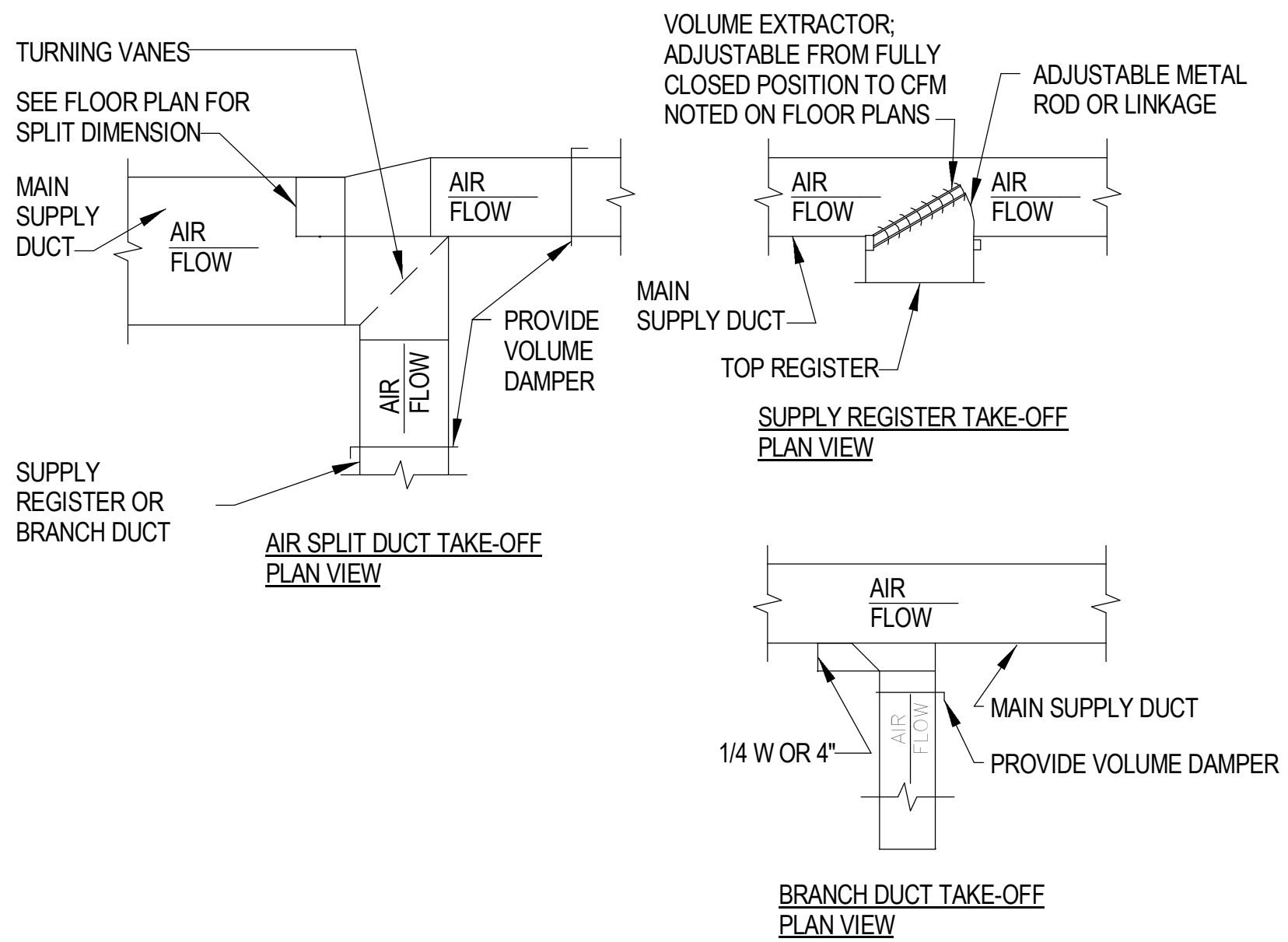
CONSULTANTS: STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603 MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		ARCHITECT/ENGINEERS: BES DESIGN/BUILD, LLC 766 Middle St. Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716		Drawing Title FIRST FLOOR - HVAC PIPING PLAN	Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS	Project Number CSI-111 Building Number 1	CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM
Revisions: Date				Approved: Project Director	Location JOHN L. McCLELLAN MEMORIAL VETERANS HOSPITAL, LITTLE ROCK, ARKANSAS	Drawing Number MP101 Dwg. 60 of 99	
				Date 10-22-2014	Drawn IMHOFF	Checked SEAY	

6
5
4
3
2
1
A
B
C
D
E

three inches = one foot
one and one half inches = one foot
one inch = one foot
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three quarters inch = one foot
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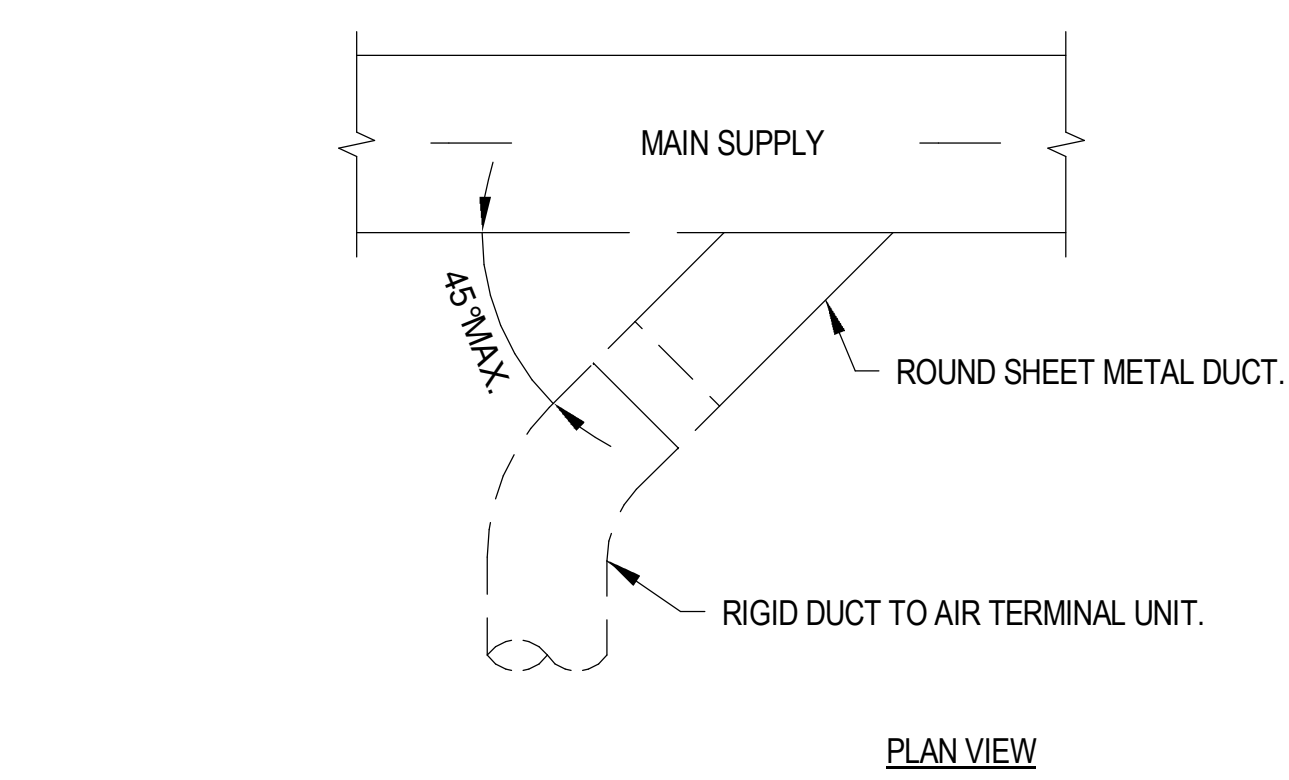
5 FLEXIBLE AIR DUCT CONNECTOR
NO SCALE



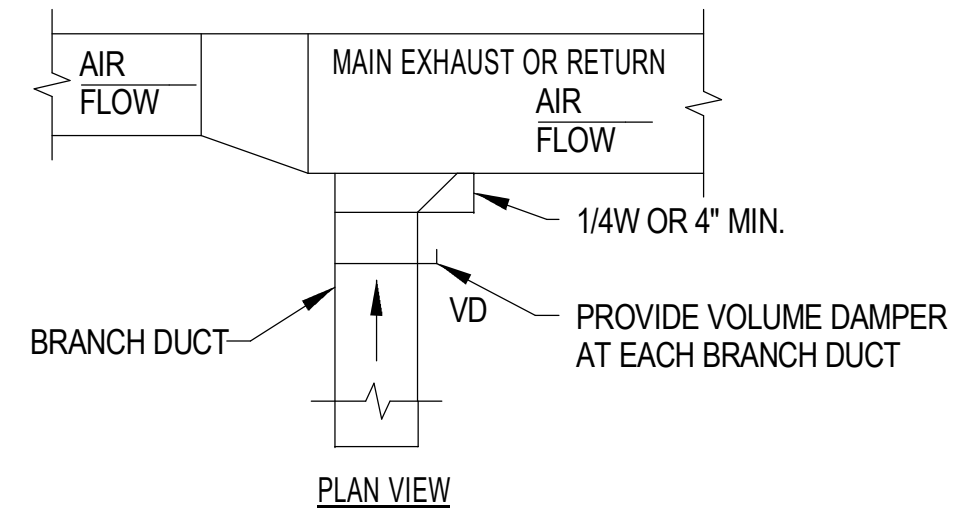
DESIGNER'S NOTES:

1. THE SUPPLY REGISTER TAKE-OFF MAY BE USED FOR UP TO 25% OF THE MAIN DUCT CFM. THE BRANCH DUCT TAKE-OFF MAY BE USED FOR UP TO 15% OF THE MAIN DUCT CFM ANYTIME AND UP TO 40% WHEN THE MAIN DUCT VELOCITY IS 1000 FPM (5.1 M/S) OR LESS. THE AIR SPLIT DUCT TAKE-OFF SHALL BE USED IN ALL OTHER CASES AND MAY BE USED AT ANYTIME.
2. SHOW ALL VOLUME DAMPERS ON FLOOR PLANS.

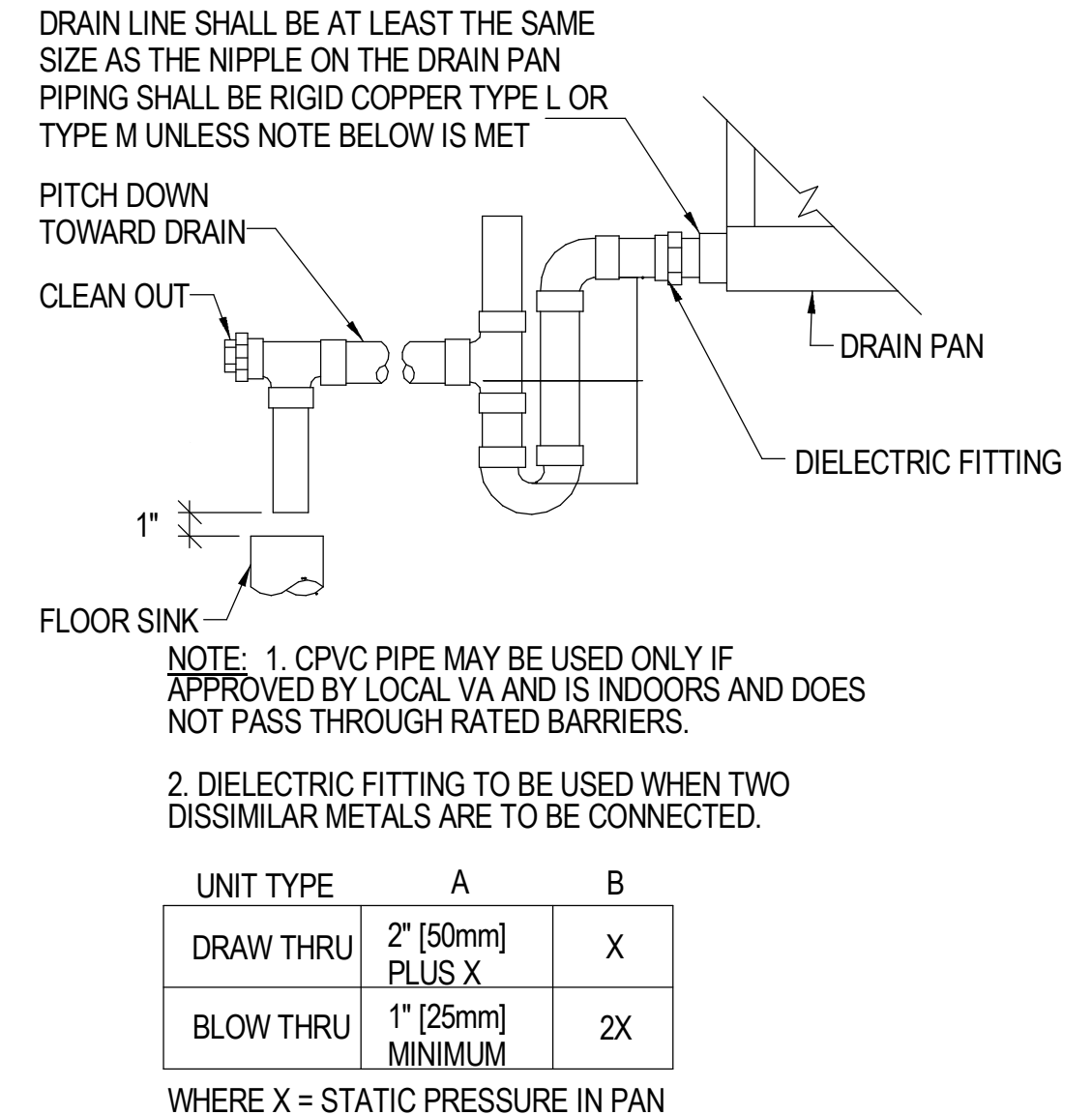
6 SUPPLY DUCT TAKE-OFF DETAIL
NO SCALE



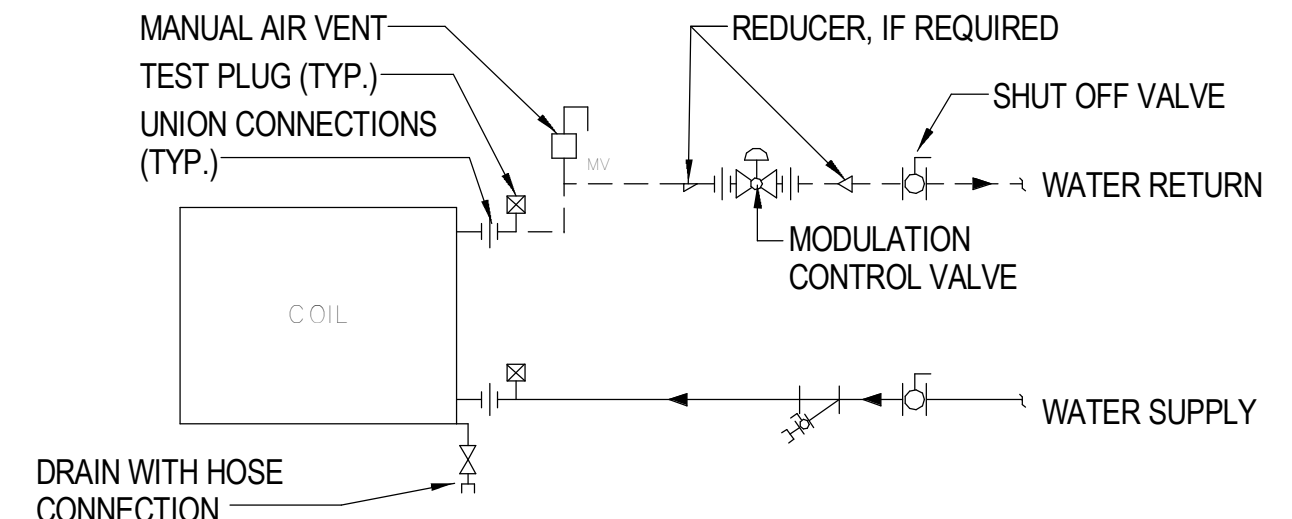
7 SUPPLY DUCT TAKE-OFF - AIR TERMINAL UNIT
NO SCALE



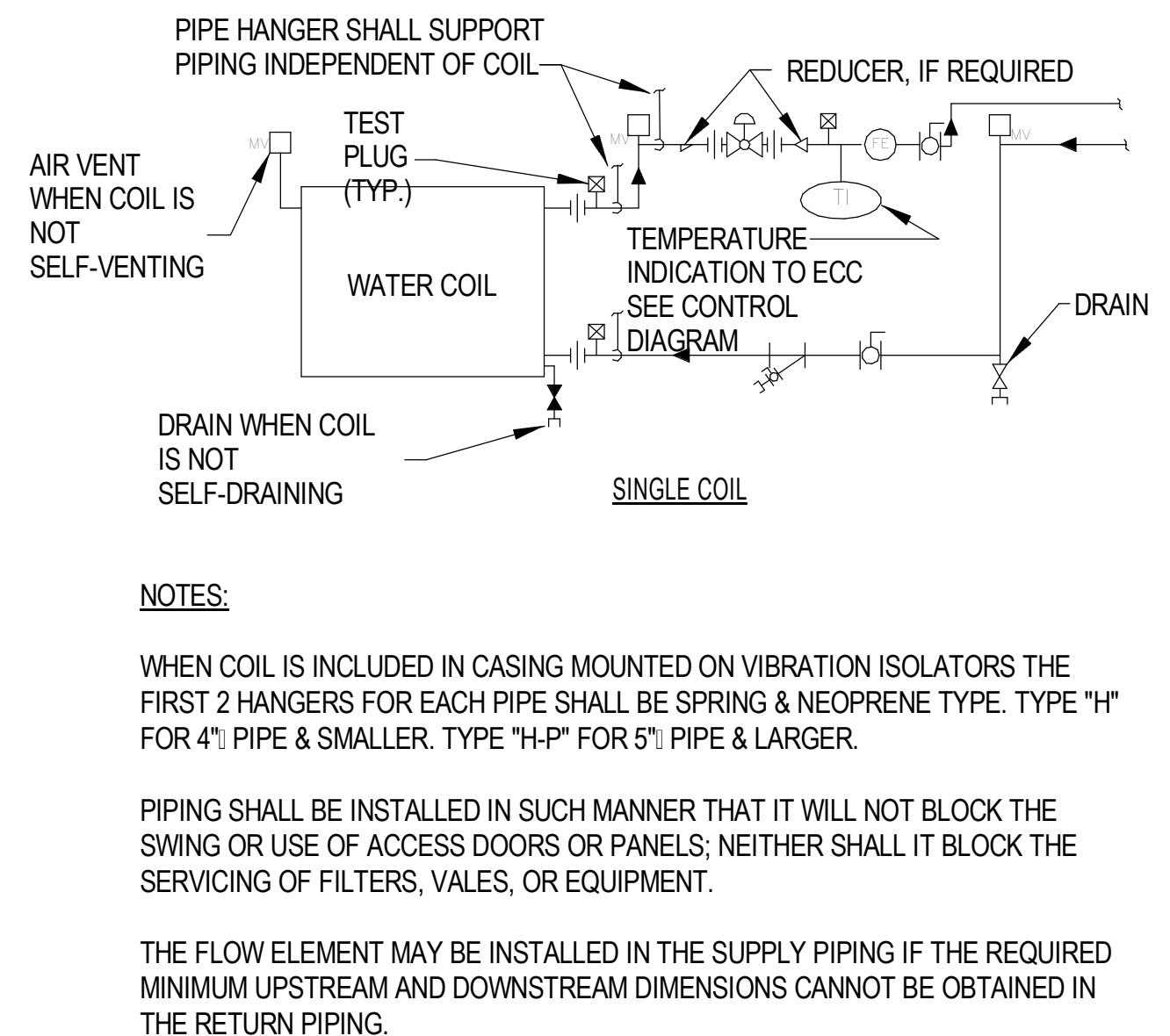
8 EXHAUST OR RETURN BRANCH DUCTWORK
NO SCALE



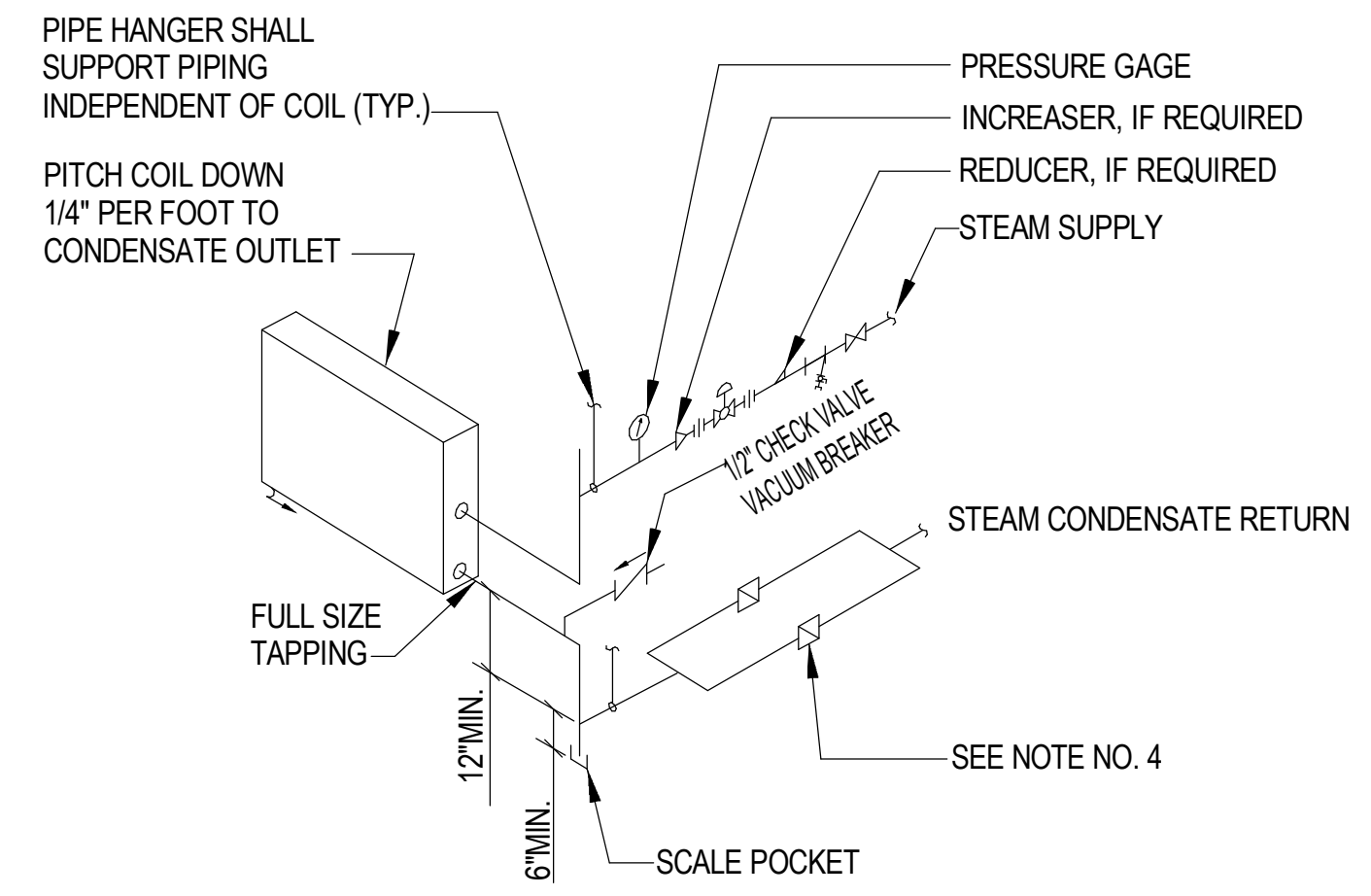
1 AIR HANDLING UNIT DRAIN TRAP DETAIL
NO SCALE



2 VAV WATER COILS - PIPING CONNECTIONS
NO SCALE



3 WATER COILS - PIPING CONNECTION
NO SCALE



NOTES:

1. WHEN COIL IS INCLUDED IN CASING MOUNTED ON VIBRATION ISOLATOR UNITS, THE RUNOUT PIPING FOR CONNECTIONS TO COIL SHALL BE INSTALLED WITH SWING JOINTS TO ALLOW FOR THE VIBRATION.
2. PIPING SHALL BE INSTALLED IN SUCH MANNER THAT IT WILL NOT BLOCK THE SWING OR USE OF ACCESS DOORS OR PANELS; NEITHER SHALL IT BLOCK THE SERVICING OF FILTERS, VALVES, OR EQUIPMENT.
3. TRAP EACH COIL SEPARATELY WHEN INSTALLED IN A BANK OF TWO OR MORE HIGH. ALSO PROVIDE SEPARATE VACUUM BREAKER FOR EACH COIL.
4. TWO TRAP ASSEMBLIES IN PARALLEL ARE SHOWN. TWO TRAPS REQUIRED WHEN CONDENSATE LOAD IS 5,000 LBS/HR (2400 KG/HR) OR GREATER.
5. UPPLY & RETURN PIPES ARE SHOWN FROM SAME END. REHEAT COIL MAY HAVE SUPPLY & RETURN PIPES FROM OPPOSITE ENDS.

4 STEAM COILS - PIPING CONNECTION
NO SCALE

CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title HVAC DETAILS		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS		Project Number CSI-111		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM	
STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603		MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		BES DESIGN/BUILD 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716		Location JOHN L. MCLELLAN MEMORIAL VETERANS HOSPITAL, LITTLE ROCK, ARKANSAS		Building Number 1		Drawing Number MH501	
Revisions:		Date:		Approved: Project Director		Date 10-22-2014		Drawn IMHOFF		Checked SEAY	

VA FORM 08-6231 10/16/2014 9:27:29 AM

three inches = one foot

one and one half inches = one foot

one inch = one foot

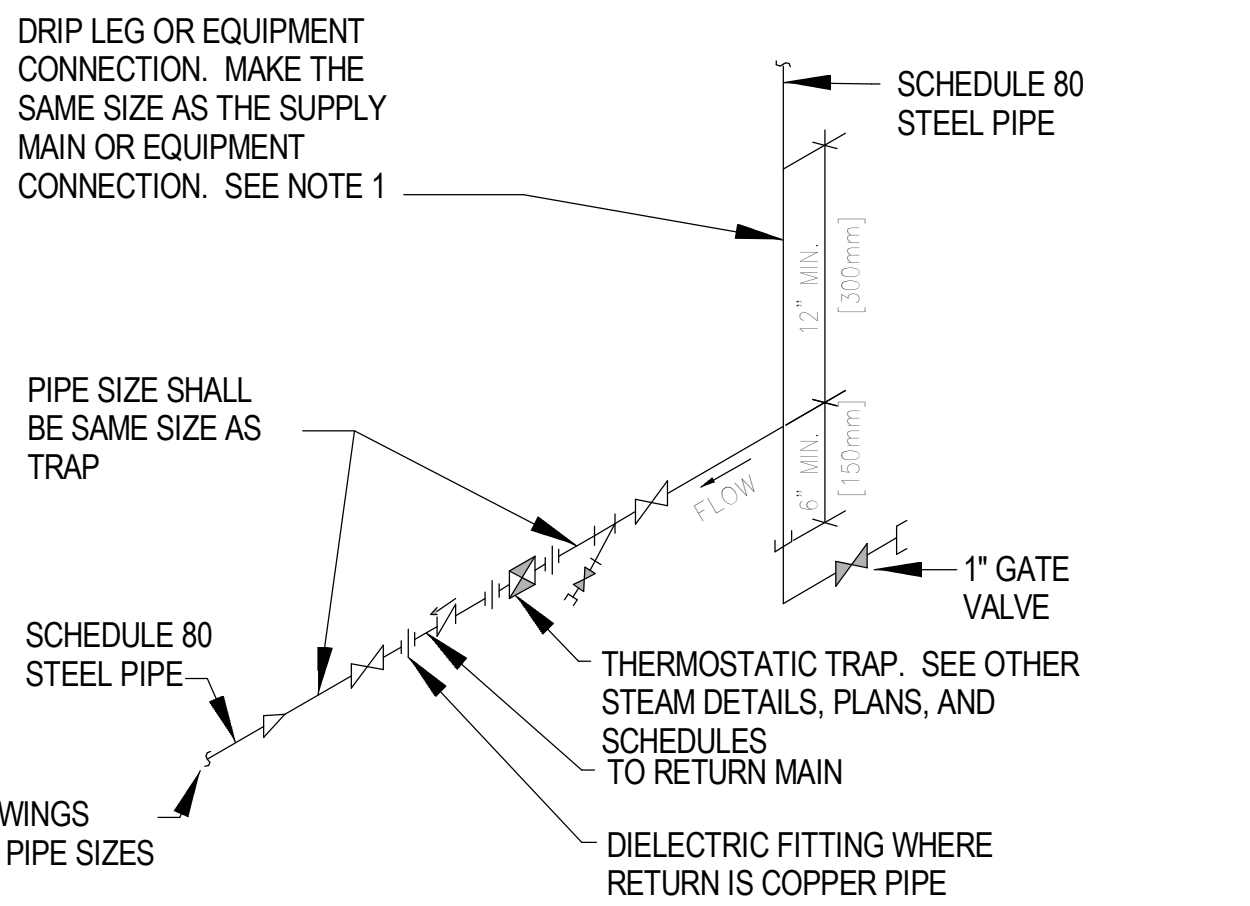
three quarters inch = one foot

one half inch = one foot

three eighths inch = one foot

one quarter inch = one foot

one eighth inch = one foot



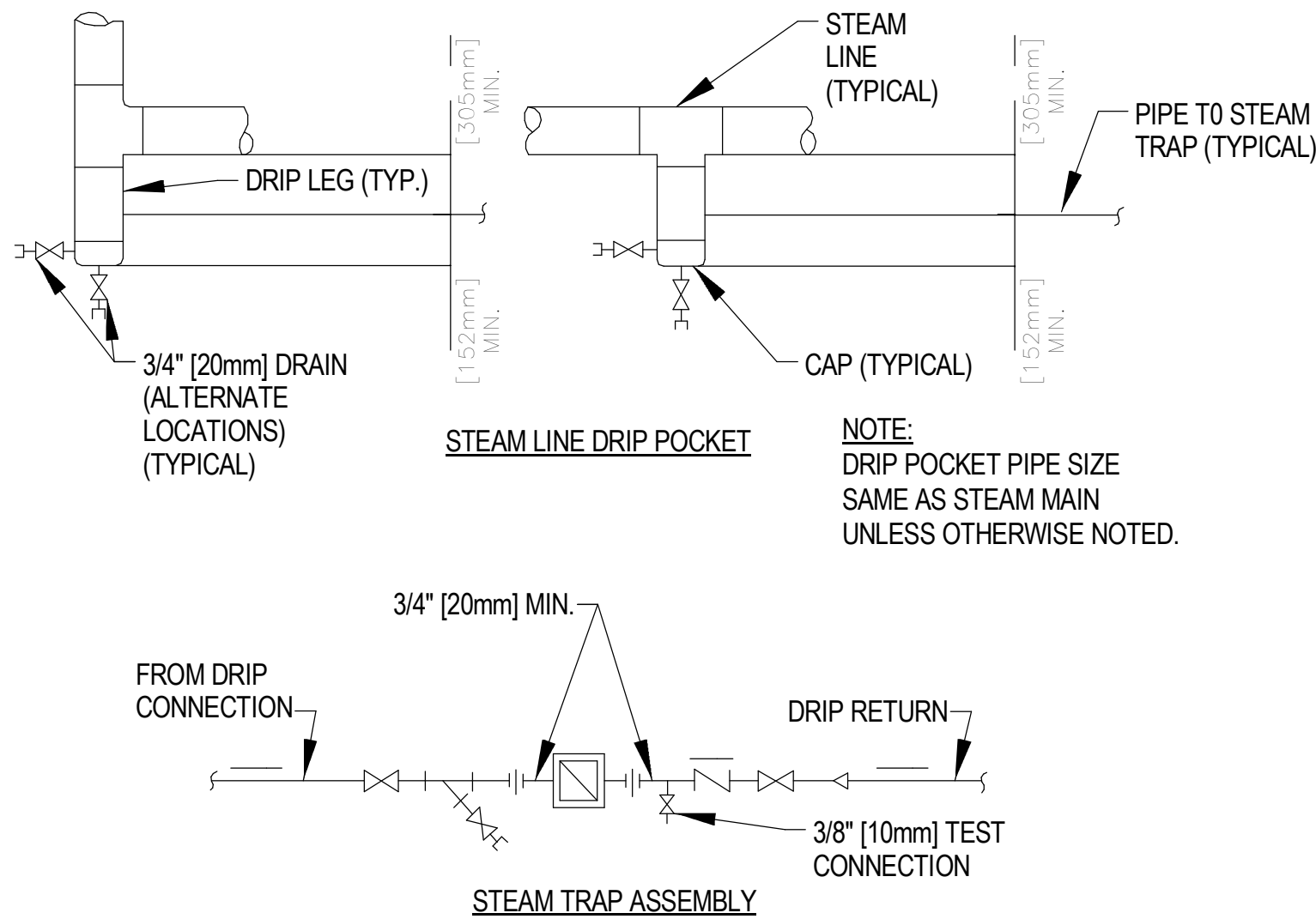
NOTE:

1. ALL DRIP POINTS ON STEAM MAINS SHALL BE PROVIDED WITH A 12" MINIMUM HIGH DRIP LEG FROM BOTTOM OF STEAM MAIN TO TRAP INLET. DRIP LEG SHALL HAVE 6" SCALE POCKET BELOW TRAP INLET.

3

THERMOSTATIC STEAM TRAP ASSEMBLY

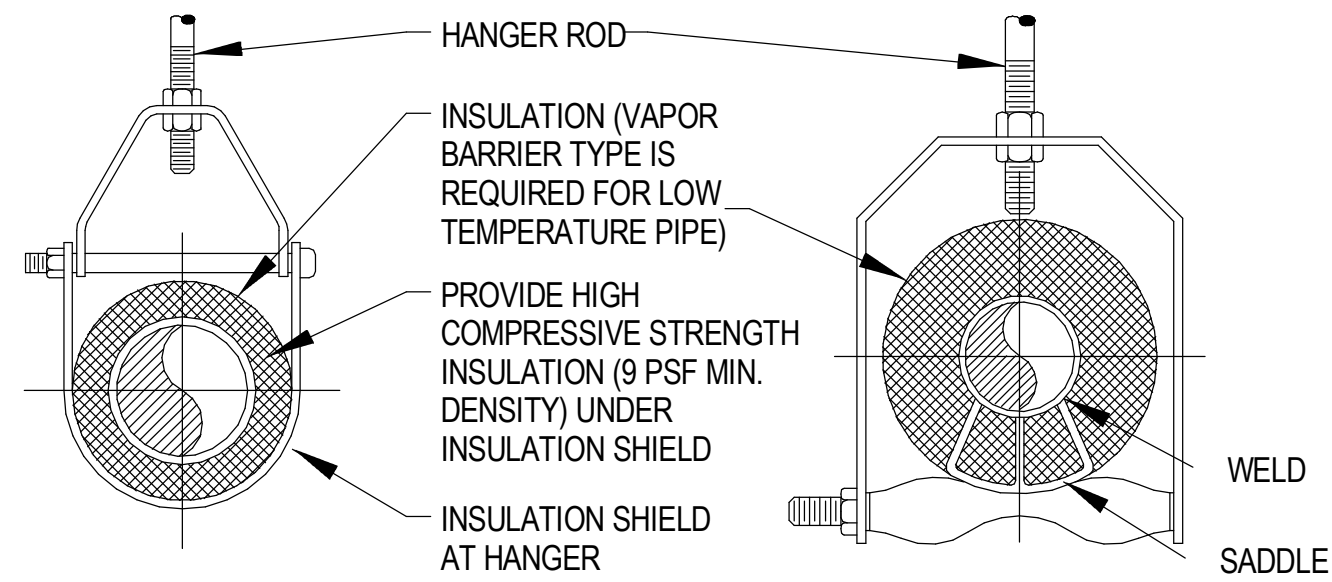
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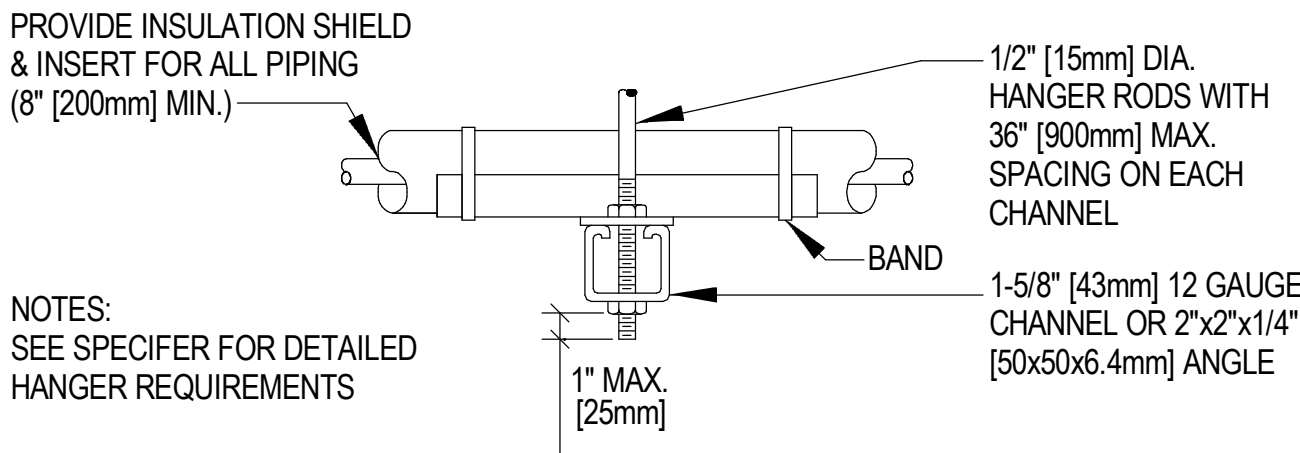
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STEAM LINE DRIP POCKET STEAM TRAP ASSEMBLY

NO SCALE



ADJUSTABLE CLEVIS HANGER TYPE 1 - SEE SPECIFICATIONSADJUSTABLE CLEVIS HANGER TYPE 43 - SEE SPECIFICATIONS



SIDE VIEW TRAPEZE HANGER FOR UP TO 1000 LB. (453KG) UNIFORM LOAD

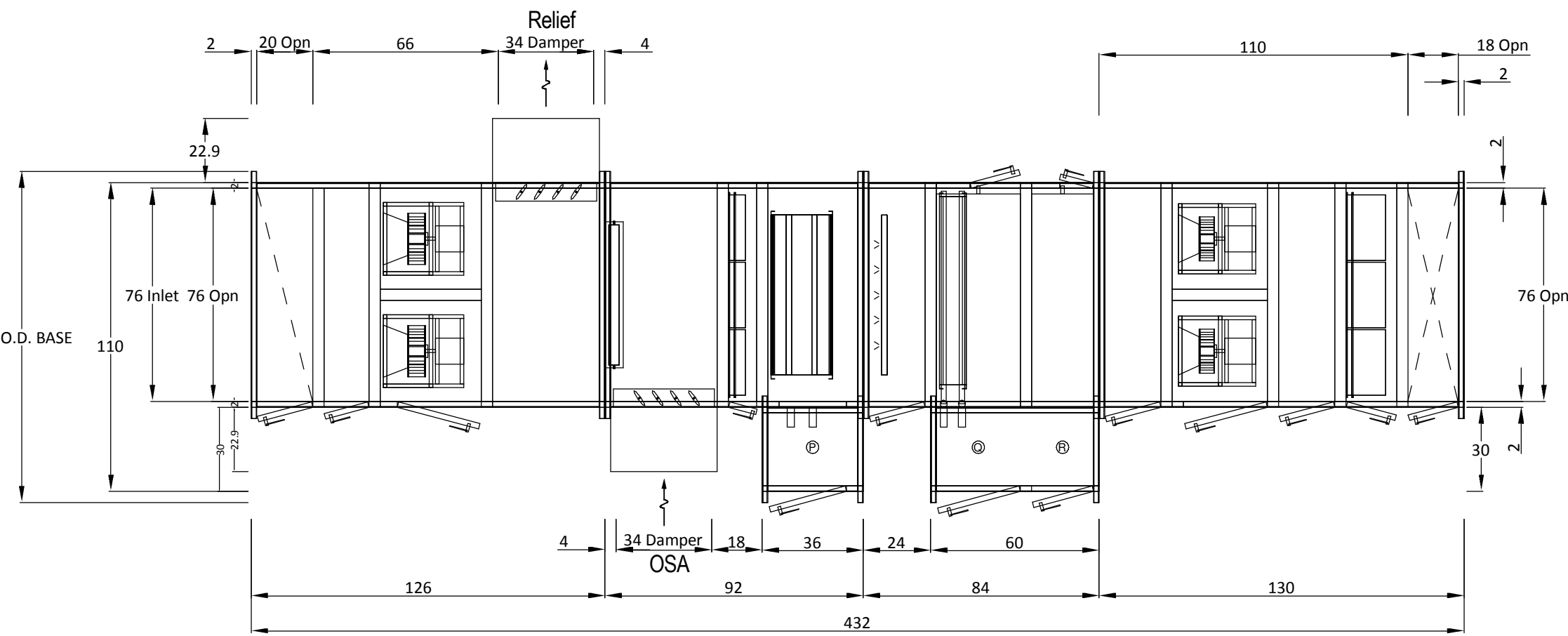
MAXIMUM PIPE/TUBING SUPPORT SPACING																							
NOM. SIZE	IN.	1/8	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	FT.	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100
TUBING	FT.	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500	1500

NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.

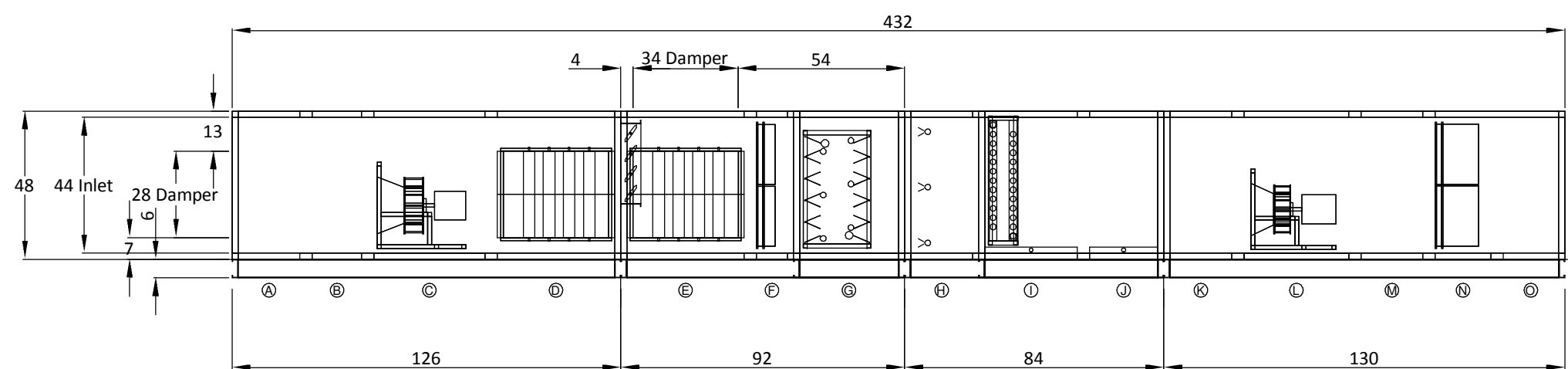
1

PIPING HANGERS

NO SCALE



PLAN VIEW



ELEVATION VIEW

2

RAHU-1 DETAIL

NO SCALE

Component Key			
A	Plenum Section	Supply Fans	
	Opening Location: Bottom	Fan Type: Centrifugal - Plenum	
	Opening Size: 20 ins x 76 ins	Fan Size (Class): 16 (2)	
B	Access Section	Air Flowrate: 4500.0 cfm	
	Right Door Width: 20 ins	T.S.P.: 6.2 insWg	
	Right Door Height: 44 ins	Motor Power: 7.5 HP	
C	Return Fans	Right Door Width: 20 ins	
	Fan Type: Centrifugal - Plenum	Right Door Height: 44 ins	
	Fan Size (Class): 18 (2)	Panel and Bag Filter (MERV 14)	
D	Access Section w/ Humidifier (H-1)	Pre Filter Type: None - Future Filter	
	Right Door Width: 20 ins	Bag Filter Type: Varicel SH	
	Right Door Height: 44 ins	Right Door Width: 18 ins	
E	Chilled Water coil (CC-1a)	Right Door Height: 44 ins	
	Coil Model: SWL1206B		
	Total Capacity: 284419.0 Btu/hr		
F	Access Section w/ Ultraviolet Lights	Opening Location: Bottom	
	Right Door Width: 20 ins	Opening Size: 18 ins x 76 ins	
	Right Door Height: 44 ins	Right Door Width: 18 ins	
G	Chilled Water coil (CC-1b)	Right Door Height: 44 ins	
	Coil Model: SWH0004C		
	Total Capacity: 0.0 Btu/hr		
H	Access Section w/ Ultraviolet Lights	Right Door Width: 22 ins	
	Right Door Width: 20 ins	Right Door Height: 44 ins	
	Right Door Height: 44 ins		

CONSTRUCTION DOCUMENT SUBMISSION
FULLY SPRINKLERED

CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title HVAC DETAILS		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS		Project Number CSI-111		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM	
STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603		MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		BES DESIGN/BUILD		Location JOHN L. MCCLELLAN MEMORIAL VETERANS HOSPITAL, LITTLE ROCK, ARKANSAS		Building Number 1			
Revisions:		Date		Approved: Project Director		Date 10-22-2014		Drawn IMHOFF			
Date		Date		Checked SEAY		Drawing Number MH502		Dwg. 62 of 99			

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one eighth inch = one foot

ROOM NO.	ROOM NAME	FLOOR - AREA SERVED	ROOM CEILING HEIGHT (FT)	ROOM AREA (SQFT)	AIR CHANGES PER HOUR *	OUTSIDE AIR CHANGES PER HOUR *	REQUIRED SUPPLY AIR (CFM)	REQUIRED OUTSIDE AIR (CFM)	REQUIRED RETURN AIR (CFM)	REQUIRED EXHAUST AIR (CFM)	REQUIRED HUMIDITY (RH%)	REQUIRED FILTRATION (PRE / FINAL)	REQUIRED AIR MOVEMENT	DESIGN SUPPLY AIR (CFM)	DESIGN RETURN AIR (CFM)	DESIGN EXHAUST AIR (CFM)	DESIGN AIR MOVEMENT
1Z107	BI-PLANE IR ROOM	1ST FLOOR - INTERVENTIONAL RADIOLOGY	9' - 4"	573	15	2	1336	178	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	1840	1460	N/A	POS
1Z104	SINGLE-PLANE IR ROOM	1ST FLOOR - INTERVENTIONAL RADIOLOGY	9' - 4"	567	15	2	1322	176	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	1460	1200	N/A	POS
1E182	MINOR PROCEDURE ROOM	1ST FLOOR - INTERVENTIONAL RADIOLOGY	9' - 0"	378	15	2	850	113	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	850	700	N/A	POS
1D177	SPECT CT	1ST FLOOR - INTERVENTIONAL RADIOLOGY	9' - 0"	372	12	2	670	113	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	680	600	N/A	POS
1E135A	MAMMO	1ST FLOOR - MAMMOGRAPHY	9' - 0"	115	6	2	104	35	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	400	325	N/A	POS
1E135B	STEREO BIOPSY	1ST FLOOR - MAMMOGRAPHY	9' - 0"	170	6	2	154	52	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	420	350	N/A	POS
1E135C	MAMMO	1ST FLOOR - MAMMOGRAPHY	9' - 0"	158	6	2	143	48	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	525	450	N/A	POS
1E135D	ULTRASOUND	1ST FLOOR - MAMMOGRAPHY	9' - 0"	142	6	2	128	43	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	525	450	N/A	POS
1E135E	ULTRASOUND	1ST FLOOR - MAMMOGRAPHY	9' - 0"	97	6	2	88	30	NA	NA	30% - 60%	MERV 7 & 11 / MERV 14	POS	525	450	N/A	POS

* PER "HVAC DESIGN MANUAL FOR NEW, REPLACEMENT, ADDITION AND RENOVATION OF EXISTING VA FACILITIES - MARCH 2011".

MARK	SERVES	SUPPLY FAN(S)										RETURN/EXHAUST FAN										OSA CFM	COILS		FILTER(S)	TOTAL UNIT WEIGHT (LBS)	MANUFACTURER	MODEL	REMARKS
		TYPE	QTY.	CFM (EA.)	E.S.P.	T.S.P.	RPM	BHP	MHP	VOLTS	Ø	TYPE	QTY.	CFM (EA.)	E.S.P.	T.S.P.	RPM	BHP	MHP	VOLTS	Ø		COOLING	HEATING					
RAHU-1	I.R.	CENT. PLENUM	2	4,500	2.00	6.19	3203	6.6	7.5	460	3	CENT. PLENUM	2	4,500	1.50	1.69	1737	2.06	3	460	3	2,000	CC-1	HC-1	MERV 7, MERV 11, MERV 14	8,752	DAIKIN (McQUAY)	OAH019GDGM	1, 2, 3

MARK	SERVES	CFM	FACE VELOCITY FPM	QTY.	LENGTH	HEIGHT	ROWS	FPI	TOTAL MBH	SENS. MBH	E.A.T.		APD	E.W.T. (°F)	L.W.T. (°F)	GPM	WPD	MANUFACTURER	MODEL
											DB°F / WB°F	DB°F / WB°F							
CC-1	RAHU-1	9,000	496	2	67	39	6	12	284,419	211,953	74.2 / 63.2	52.7 / 52.3	0.79	45.00	55.00	56.9	6.9	DAIKIN	5WL1206B

1. PROVIDE MARINE LIGHTS FOR ALL ACCESSIBLE SECTIONS.
2. PROVIDE GFI RECEPTACLE AT EACH FAN SECTIONS.
3. PROVIDE UV LIGHT DOOR SAFETY SWITCH.

VAV TERMINAL BOX - HOT WATER REHEAT COIL																		
MARK	SERVES	TYPE	INLET SIZE	MAXIMUM CFM	MINIMUM CFM	INLET S.P.	A.P.D.	HOT WATER REHEAT COIL									MANUFACTURER	MODEL
								HEATING CFM	MBH	EAT (°F)	LAT (°F)	EWI (°F)	LWT (°F)	ROWS	GPM	WPD		
1-1	SEE PLANS	SHUT-OFF	14	1840	1350	1.0	0.35	1,350	51.2	55	90	140	129	2	9.60	5.84	TITUS	DESV
1-2	SEE PLANS	SHUT-OFF	14	1460	1325	1.0	0.23	1,325	50.3	55	90	140	128	2	9.00	5.11	TITUS	DESV
1-3	SEE PLANS	SHUT-OFF	9	850	850	1.0	0.45	850	32.3	55	90	140	117	2	2.90	0.19	TITUS	DESV
1-4	SEE PLANS	SHUT-OFF	7	410	125	1.0	0.17	165	7.8	55	98	140	121	2	0.80	0.13	TITUS	DESV
1-5	SEE PLANS	SHUT-OFF	6	310	100	1.0	0.17	150	7.7	55	90	140	121	2	0.80	0.09	TITUS	DESV
1-6	SEE PLANS	SHUT-OFF	8	650	200	1.0	0.36	260	9.9	55	90	140	117	2	0.90	0.14	TITUS	DESV
1-7	SEE PLANS	SHUT-OFF	14	900	900	1.0	0.11	900	34.2	55	90	140	118	2	3.20	0.98	TITUS	DESV
															27.20			
21-1	SEE PLANS	SHUT-OFF	12	740	740	1.5	0.14	740	28.1	55	90	140	123	2	3.50	1.66	TITUS	DESV
22-1	SEE PLANS	SHUT-OFF	7	535	160	1.5	0.26	220	9.1	55	92	140	118	2	0.80	0.13	TITUS	DESV
22-2	SEE PLANS	SHUT-OFF	6	350	105	1.5	0.21	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV
22-3	SEE PLANS	SHUT-OFF	6	450	135	1.5	0.32	180	7.3	55	92	140	122	2	0.80	0.09	TITUS	DESV
22-4	SEE PLANS	SHUT-OFF	6	400	150	1.5	0.26	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV
22-5	SEE PLANS	SHUT-OFF	6	420	150	1.5	0.28	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV
22-6	SEE PLANS	SHUT-OFF	7	535	160	1.5	0.26	225	9.1	55	92	140	118	2	0.80	0.13	TITUS	DESV
22-7	SEE PLANS	SHUT-OFF	7	525	160	1.5	0.25	225	9.1	55	92	140	118	2	0.80	0.13	TITUS	DESV
22-8	SEE PLANS	SHUT-OFF	7	525	160	1.5	0.25	225	9.1	55	92	140	118	2	0.80	0.13	TITUS	DESV
22-9	SEE PLANS	SHUT-OFF	5	265	80	1.5	0.13	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV
22-10	SEE PLANS	SHUT-OFF	6	360	110	1.5	0.22	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV
22-11	SEE PLANS	SHUT-OFF	8	650	200	1.5	0.36	275	10.4	55	90	140	118	2	1.00	0.17	TITUS	DESV
22-12	SEE PLANS	SHUT-OFF	6	415	125	1.5	0.28	175	7.2	55	93	140	122	2	0.80	0.09	TITUS	DESV

COMPUTER ROOM UNIT																									
MARK	SERVES	COOLING CAPACITY				FAN			ELECTRIC HEATING				HUMIDIFICATION		COMPRESSOR DATA			ELECTRICAL DATA				SEER	MANUFACTURER	MODEL	REMARKS
		TOTAL (MBH)	SENSIBLE (MBH)	ENTERING AIR					KW	STEPS	VOLTS	Ø	LB/HR	KW	NO.	TYPE	FLA	MCA	MOC	VOLTS	Ø				
				DB (°F)	WB (°F)	CFM	HP	E.S.P.																	
CRU-1	12102 SCR	56.6	47.2	72.0°	60.0°	2,000	1.50	0.5	---	---	---	---	5	1.70	1	SCROLL	9.00	19	25	460	3	---	DATA AIRE	DAPA-05	1, 2, 3, 4
CRU-2	1E177 SCR	46.6	38.6	72.0°	60.0°	1,600	1.00	0.5	---	---	---	---	5	1.70	1	SCROLL	7.40	16	20	460	3	---	DATA AIRE	DAPA-04	1, 2, 3, 4

1. PROVIDE MERV 8 FILTER
2. PROVIDE HOT GAS REHEAT
3. PROVIDE UNIT MOUNTED DISCONNECT
4. PROVIDE CONDENSATE PUMP[

MECHANICAL EQUIPMENT NOTES:

1. CONTRACTOR SHALL PROVIDE MANUFACTURERS & MODELS SCHEDULED OR APPROVED EQUAL. REFER TO THE SPECIFICATIONS.
2. BY NECESSITY, THESE DRAWINGS REFLECT A SYSTEM DESIGNED AROUND SPECIFIC REFERENCE PRODUCTS, THE SOLUTION OF WHICH HAS IMPACTED THE DESIGNS OF OTHER TRADES (ELECTRICAL, STRUCTURAL, ETC.). IF ALTERNATE MANUFACTURERS, SIZES AND/OR MODEL NUMBERS ARE SUBMITTED, IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND ALL THE SUBCONTRACTORS TO COORDINATE THE DIFFERENCES PRIOR TO INSTALLATION.

MARK	SERVES	CFM	FACE VELOCITY FPM	LENGTH	HEIGHT	ROWS	FPI	HEATING MBH	E.A.T. (°F)	L.A.T. (°F)	APD	PRESSURE	MANUFACTURER	MODEL
HC-1	RAHU-1	9,000	654	57	35	1	12	488700	40	90.3	0.35	30 PSI	DAIKIN	HMX12AS38.357.0

MARK	SERVES	CFM	FLOW RATE (LBS/HR.)	DUCT SIZE	ABSORPTION DISTANCE	MANUFACTURER	MODEL	REMARKS
H-1	RAHU-1	9000	243.46	67/39	0.45 FT.	NORTEC	LIVESTEAM	

MARK	CAPACITY DATA			CONDENSER FAN		REFRIGERANT	ELECTRICAL DATA				SEER	MANUFACTURER	MODEL	REMARKS
	TOTAL MBH	SENS. MBH	AMBIENT TEMP. (°F)	NO.	HP (EA)		MCA	MOC	VOLTS	Ø				
CU-1	56.6	47.2	95.0°	1	1.5	R-410A	3.8	15	460	3	---	DATA AIRE	DARC-04	1
CU-2	46.6	68.6	95.0°	1	2	R-410A	3.5	15	460	3	---	DATA AIRE	DARC-05	1

1. PROVIDE UNIT MOUNTED DISCONNECT

AIR DEVICES							
MARK	TYPE	DESCRIPTION	SIZE	MAX NOISE	MANUFACTURER	MODEL	NOTES
A	SUPPLY	SQUARE PLAQUE	24" x 24"	30	PRICE	ASPD	
B	SUPPLY	SQUARE PLAQUE	12" x 12"	30	PRICE	ASPD	
C	EXH / RETURN	EGGCRATE	24" x 24"	30	PRICE	81	
D	EXH / RETURN	EGGCRATE	12" x 12"	30	PRICE	81	
E	RETURN	SIDEWALL	10" x 10"	30	PRICE	90L	

Revisions:		Date:	CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title HVAC SCHEDULES		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS		Project Number CSI-111 Building Number 1		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM	
STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603		MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		BES DESIGN/BUILD 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716		Approved: Project Director		Location JOHN L. McCLELLAN MEMORIAL VETERANS HOSPITAL; LITTLE ROCK, ARKANSAS		Drawing Number MH601 Dwg. 63 of 99		Department of Veterans Affairs		
06/20/2019		06/20/2019		06/20/2019		06/20/2019		06/20/2019		06/20/2019		06/20/2019		

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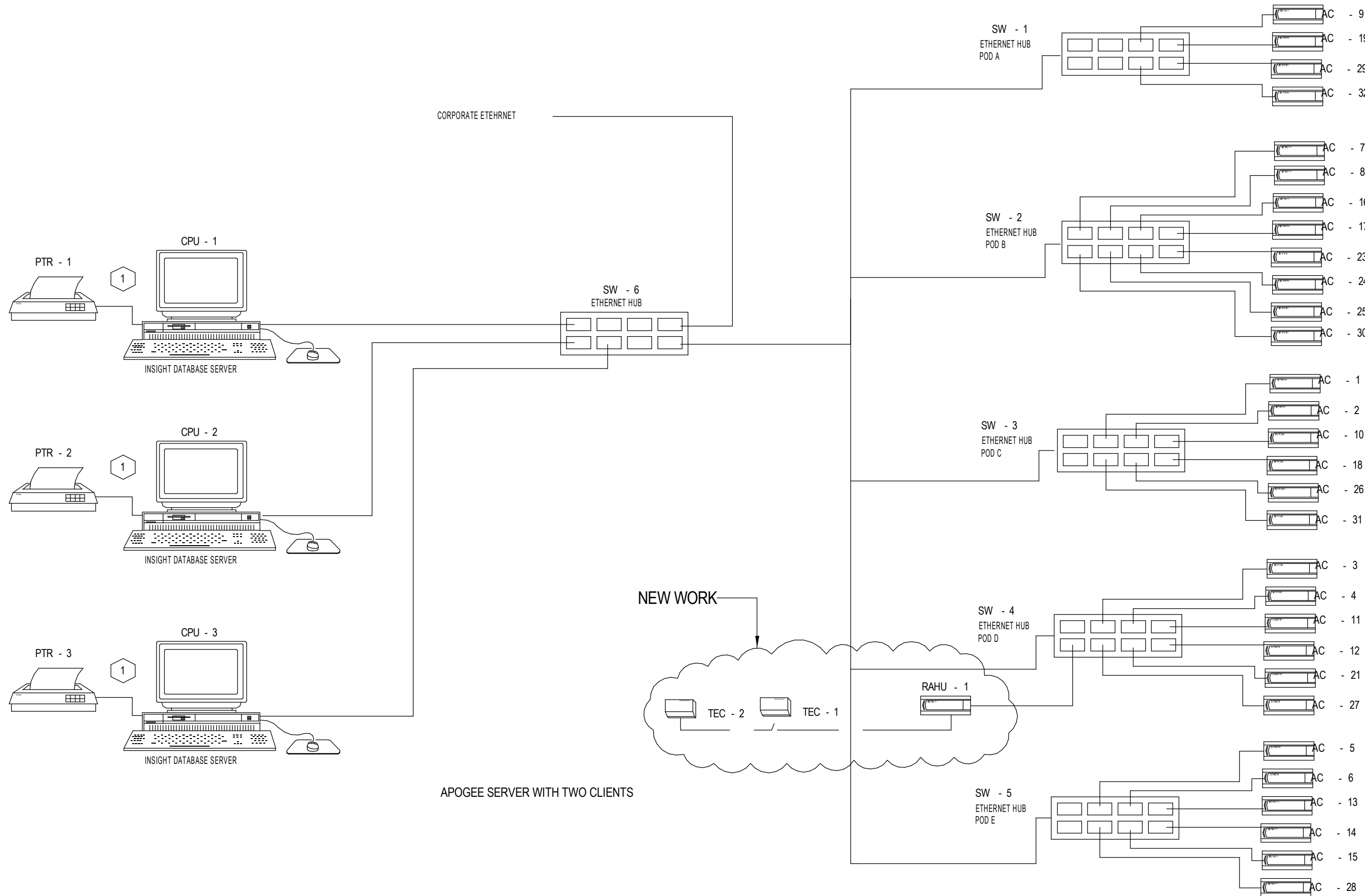
A

B

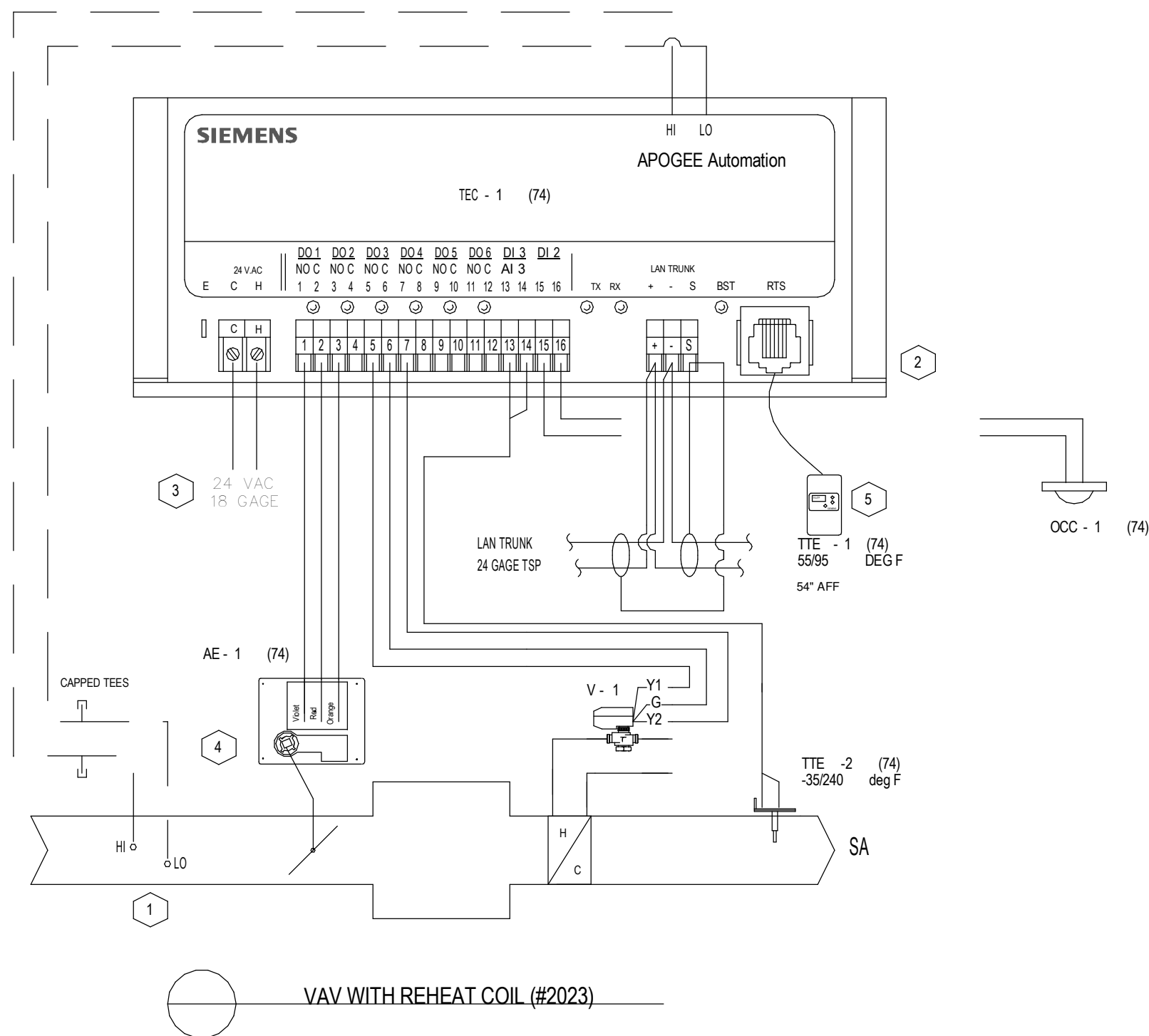
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D

E



1 EXISTING EMCS CONTROL DIAGRAM
NO SCALE



2 VAV BOX WITH HOT WATER REHEAT
NO SCALE

INSTALLATION NOTES:

- VAV BOX INSTALLED BY MECHANICAL CONTRACTOR WITH 3 TO 5 STRAIGHT DUCT DIAMETERS UPSTREAM OF BOX TO PROVIDE PROPER FLOW SENSING
- TEC-1 TO BE MOUNTED IN MANUFACTURER SUPPLIED CONTROLLER ENCLOSURE
- REFER TO BUILDING POWER TRUNK DRAWING FOR 24 VAC POWER
- MOUNT ACTUATOR WITH DAMPER IN FULL OPEN POSITION. VERIFY TEC-1 AND ACTUATOR REQUIREMENT WITH THE BOX MANUFACTURER
- LOCATE AS SHOWN ON FLOOR PLANS/CONTRACT DOCUMENTS

ROOM TEMPERATURE	HEATING SET POINT	COOLING SET POINT
VALVE OPEN	75 DEG F	60 DEG F
MAXIMUM AIR	75 DEG F	60 DEG F
SUPPLY AIR	75 DEG F	60 DEG F
REHEAT COIL	75 DEG F	60 DEG F
VALVE	75 DEG F	60 DEG F
MINIMUM AIR	75 DEG F	60 DEG F
VALVE CLOSED	75 DEG F	60 DEG F

SEQUENCE OF OPERATIONS:

AIR TERMINAL MODE OF OPERATION IS EITHER "OCCUPIED" OR "UNOCCUPIED" BASED UPON STATUS OF ROOM LIGHTING ("OCCUPIED" WHEN LIGHTS ARE "ON" AND "UNOCCUPIED" WHEN LIGHTS ARE "OFF").

DURING THE "OCCUPIED" MODE OF OPERATION, THE SPACE TEMPERATURE SETPOINT SHALL BE ADJUSTABLE BY THE OCCUPANT AT THE THERMOSTAT BETWEEN A MINIMUM OF 68 DEG. F (ADJUSTABLE) AND A MAXIMUM OF 75 DEG. F (ADJUSTABLE). THE COOLING SETPOINT SHALL BE EQUAL TO THE SPACE TEMPERATURE PLUS 1.0 DEG. F (ADJUSTABLE). THE HEATING SETPOINT SHALL BE EQUAL TO THE SPACE TEMPERATURE SETPOINT MINUS 1.0 DEG. F (ADJUSTABLE). ON A CALL FOR COOLING, THE TERMINAL DAMPER SHALL BE MODULATED BETWEEN THE COOLING MINIMUM AND THE COOLING MAXIMUM AIR FLOW SETPOINTS AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT. MINIMUM COOLING AIR FLOW SETPOINT SHALL BE AUTOMATICALLY RESET AS REQUIRED TO MAINTAIN THE SPACE CO2 CONCENTRATION AT SETPOINT OF 1,000 PPM (ADJUSTABLE). ON A CALL FOR HEATING, THE TERMINAL DAMPER SHALL BE MODULATED BETWEEN THE HEATING MINIMUM AND THE HEATING MAXIMUM AIR FLOW SETPOINTS AND THE HEATING WATER CONTROL VALVE SHALL BE MODULATED OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT THE HEATING SETPOINT.

DURING THE "UNOCCUPIED" MODE OF OPERATION, THE HEATING SETPOINT SHALL BE 60 DEG. F (ADJUSTABLE) AND THE COOLING SETPOINT SHALL BE 80 DEG. F (ADJUSTABLE). ON A CALL FOR COOLING, THE TERMINAL DAMPER SHALL BE MODULATED FROM FULLY CLOSED (0 CFM) TO THE MAXIMUM COOLING AIR FLOW SETPOINT AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT THE COOLING SETPOINT. ON A CALL FOR HEATING, THE TERMINAL DAMPER SHALL BE MODULATED BETWEEN THE MINIMUM HEATING AND THE MAXIMUM HEATING AIR FLOW SETPOINTS AND THE HEATING WATER CONTROL VALVE SHALL BE MODULATED OPEN AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE AT THE HEATING SETPOINT.

Revisions:

Date:

CONSULTANTS:

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REGISTERED PROFESSIONAL ENGINEER
No. 5540
ROBERT L. SEAY

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Drawing Title
HVAC CONTROLS

Approved: Project Director

Project Title
RADIOLOGY / NUCLEAR
MEDICINE IMPROVEMENTS

Location
JOHN L. McCLELLAN MEMORIAL VETERANS
HOSPITAL; LITTLE ROCK, ARKANSAS

Date
10-22-2014

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Project Number
CSI-111
Building Number
1

Drawing Number
MH701
Dwg. 61 of 99

CENTRAL ARKANSAS
VETERANS AFFAIRS
HEALTHCARE
SYSTEM

Department of
Veterans Affairs

VA FORM 08-6231 10/16/2014 9:27:30 AM

three inches = one foot

one and one half inches = one foot

one inch = one foot

three quarters inch = one foot

one half inch = one foot

three eighths inch = one foot

one quarter inch = one foot

one eighth inch = one foot

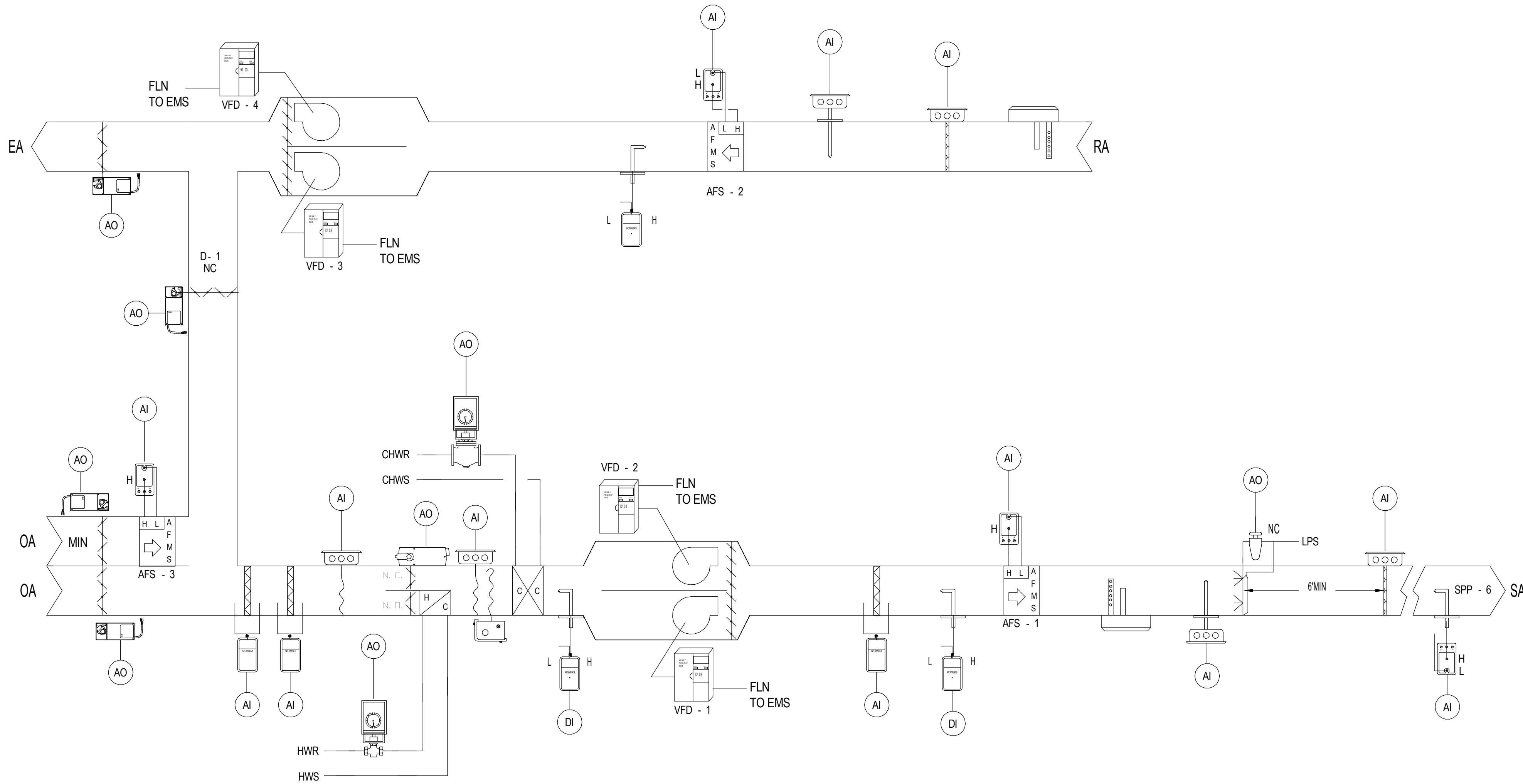
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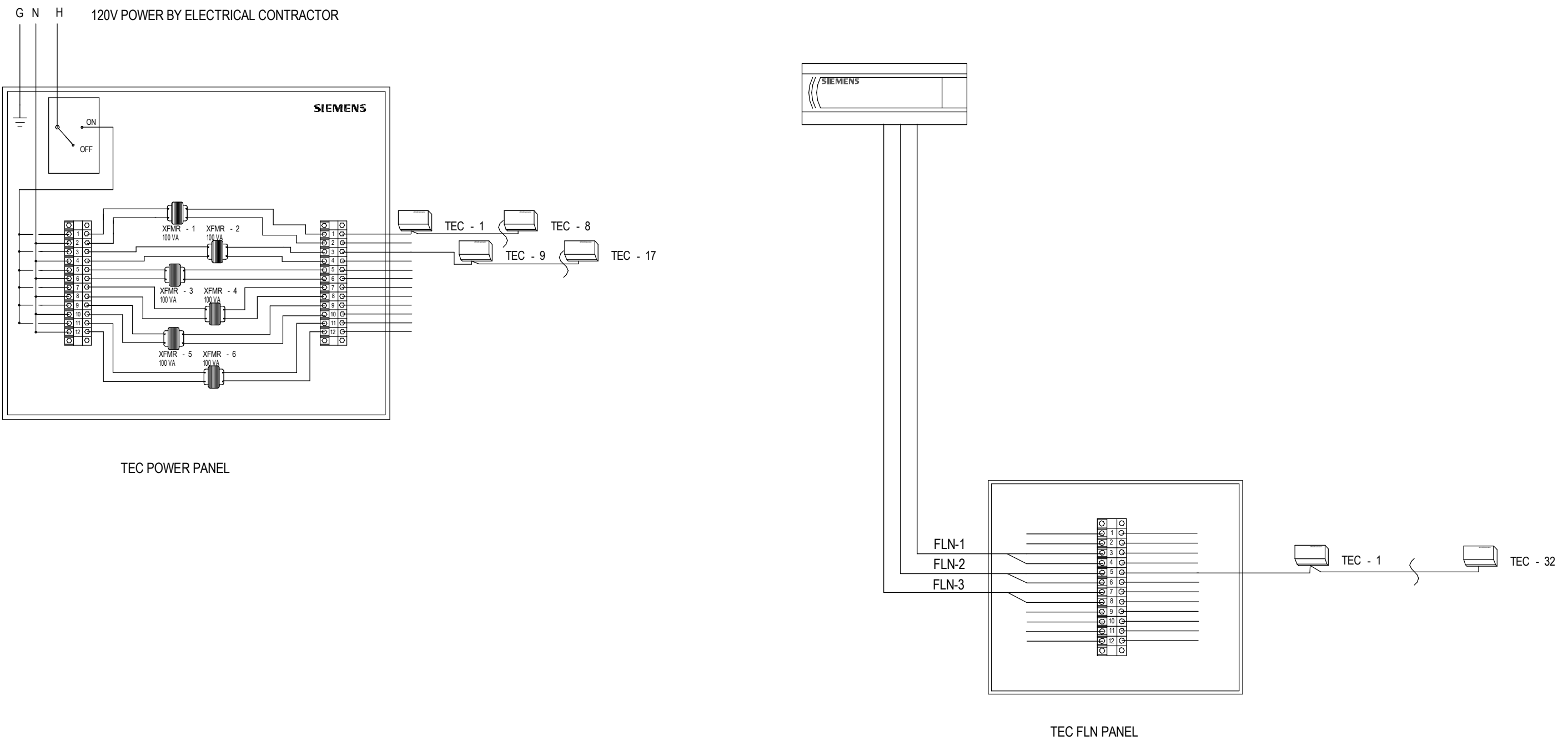
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RAHU - 1



ROOFTOP AIR HANDLING UNIT (RAHU-1)

1 NO SCALE

AIR HANDLING UNIT AHU-1 SEQUENCE OF OPERATION:

MODE OF OPERATION:
THE AIR HANDLING UNIT MODE OF OPERATION SHALL BE EITHER OCCUPIED OR UNOCCUPIED BASED ON A SCHEDULE COMMUNICATED FROM THE EMS, AN OPERATOR OVERRIDE COMMAND FROM THE EMS, OR AN OCCUPANCY OVERRIDE SIGNAL FROM THE SPACE TEMPERATURE SENSOR.

OCCUPIED MODE OF OPERATION:
THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY IN THE OCCUPIED MODE.

ON PROOF OF SUPPLY FAN OPERATION, THE OUTSIDE AND RETURN AIR CONTROL DAMPERS MODULATE AS REQUIRED TO MAINTAIN THE SCHEDULED OUTSIDE AIRFLOW FOR VENTILATION.

THE SUPPLY FAN(S) VARIABLE FREQUENCY DRIVE(S) SHALL MODULATE THE SUPPLY FAN(S) SPEED TO MAINTAIN THE SUPPLY AIR STATIC PRESSURE SETPOINT. INITIAL SETPOINT ON TRANSITION FROM UNOCCUPIED TO OCCUPIED OPERATION SHALL BE 1.5 INCHES WATER GAUGE.

THE SUPPLY STATIC PRESSURE SHALL RESET BASED THE CRITICAL ZONE DAMPER POSITION. THE EMS SHALL MONITOR THE DAMPER POSITION OF ALL VAV TERMINAL UNITS AND DETERMINE THE VAV AHU CRITICAL ZONE VAV TERMINAL UNIT (CZ). THE AHU CRITICAL ZONE (CZ) VAV TERMINAL UNIT IS THE VAV TERMINAL UNIT SERVED BY THE AHU WITH THE MOST OPEN DAMPER. THE STATIC PRESSURE SETPOINT SHALL BE RESET BETWEEN 0.5 TO 2.5 INCHES WATER GAUGE TO OPTIMIZE FAN ENERGY.

WHEN THE CZ DAMPER IS LESS THAN 85% OPEN, THE SUPPLY FAN DISCHARGE STATIC PRESSURE SETPOINT SHALL BE RESET DOWNWARD BY 10% OF THE PREVIOUS SETPOINT AT A FREQUENCY OF 10 MINUTES UNTIL THE CZ DAMPER IS MORE THAN 90% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET DOWNWARD TO THE SYSTEM MINIMUM SETTING.

WHEN THE CZ DAMPER IS MORE THAN 95% OPEN, THE SUPPLY STATIC PRESSURE SETPOINT SHALL BE RESET UPWARD BY 10% OF THE PREVIOUS SETPOINT AT A FREQUENCY OF 5 MINUTES UNTIL THE CZ DAMPER IS MORE THAN 90% OPEN OR THE STATIC PRESSURE SETPOINT HAS RESET UPWARD TO THE SYSTEM MAXIMUM SETTING.

VAV TERMINAL UNIT(S) SERVED BY THE AIR HANDLING UNIT SHALL BE CAPABLE OF BEING EXCLUDED FROM THE STATIC PRESSURE OPTIMIZATION CALCULATIONS TO ALLOW FOR VAV TERMINAL UNITS THAT SERVE AREAS THAT ARE CONSTANT VOLUME OR REQUIRE FULL COOLING AT ALL TIMES.

THE CHILLED WATER CONTROL VALVE SHALL MODULATE TO MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE SUPPLY AIR TEMPERATURE SETPOINT. THE SUPPLY AIR TEMPERATURE SETPOINT SHALL BE RESET BETWEEN 55°F TO 60°F BY THE SUPPLY AIR TEMPERATURE AND STATIC PRESSURE SETPOINT OPTIMIZATION CALCULATIONS. THE INITIAL SUPPLY AIR TEMPERATURE SETPOINT AT TRANSITION FROM UNOCCUPIED TO OCCUPIED OPERATION SHALL BE 55°F.

THE HUMIDIFIER SHALL BE MODULATED TO MAINTAIN RETURN AIR HUMIDITY AT SETPOINT OF 35% RH. THE HUMIDITY HIGH LIMIT SENSOR SHALL MODULATE THE HUMIDIFIER TO MAINTAIN A MAXIMUM OF 90% RH LEAVING AIR HUMIDITY FROM THE HUMIDIFIER. THE HUMIDITY HIGH LIMIT SHALL BE LOCATED THE MANUFACTURER RECOMMENDED DISTANCE DOWNSTREAM OF THE HUMIDIFIERS.

THE PREHEAT CONTROL VALVE SHALL MODULATE TO MAINTAIN THE MINIMUM PREHEAT DISCHARGE AIR TEMPERATURE AT 53°F SETPOINT WHEN MIXED AIR TEMPERATURE IS ABOVE 40°F. WHEN MIXED AIR TEMPERATURE IS BELOW 38°F, THE PREHEAT CONTROL VALVE SHALL BE FULL OPEN TO THE COIL AND THE FACE AND BYPASS DAMPERS SHALL MODULATE TO MAINTAIN THE MINIMUM PREHEAT DISCHARGE AIR TEMPERATURE AT 53°F SETPOINT.

THE CONTROL BANDS, SETPOINT INCREMENT VALUES, SETPOINT DECREMENT VALUES AND ADJUSTMENT FREQUENCIES SHALL BE ADJUSTED TO MAINTAIN MAXIMUM STATIC PRESSURE OPTIMIZATION WITH STABLE SYSTEM CONTROL AND MAXIMUM COMFORT CONTROL. ALL PARAMETERS INCLUDING SETPOINTS LIMITS SHALL BE ADJUSTABLE FROM THE EMS.

SAFETIES IN ALL MODES OF OPERATION:
IN THE EVENT THE FIRE ALARM RELAY INDICATES AN UNSAFE CONDITION, THE SUPPLY FAN(S) SHALL STOP AND AN ALARM SHALL BE GENERATED AT THE EMS OPERATOR WORKSTATION.

IN THE EVENT THE STATIC PRESSURE EXCEEDS THE HIGH STATIC LIMIT SWITCH (HSL) SETPOINT OF 4.0 INCHES WATER GAUGE, THE SUPPLY FAN(S) SHALL STOP AND AN ALARM SHALL BE GENERATED AT THE EMS OPERATOR WORKSTATION. THE SWITCH SHALL REQUIRE MANUAL RESET. THE SETPOINT IS ADJUSTABLE AT THE SWITCH.

IN THE EVENT THE TEMPERATURE DROPS BELOW THE TEMPERATURE LOW LIMIT SAFETY (TLL) SETPOINT OF 40°F, THE SUPPLY FAN SHALL STOP, THE CHILLED WATER CONTROL VALVE SHALL BE FULLY OPEN, AND THE PREHEAT CONTROL VALVE SHALL BE FULLY OPENED TO THE COIL AND THE FACE/BYPASS DAMPERS SHALL BE FULL OPEN TO THE PREHEAT COIL. AN ALARM SHALL BE GENERATED AT THE EMS OPERATOR WORKSTATION INDICATING THE LOW TEMPERATURE CONDITION. THE TEMPERATURE LOW LIMIT SWITCH SHALL REQUIRE MANUAL RESET. THE SETPOINT IS ADJUSTABLE AT THE SWITCH.

FILTERS:
THE DDC PANEL SHALL MONITOR FILTER DIFFERENTIAL PRESSURE AND DISPLAY THE PRESSURE DROP ON THE EMS. AN ALARM SHALL BE GENERATED AT THE EMS WHEN FILTER DIFFERENTIAL PRESSURE EXCEEDS THE DIRTY FILTER ALARM SETPOINT. THE FILTER DIFFERENTIAL PRESSURE ALARM SETPOINT SHALL BE ADJUSTABLE AT THE EMS.

SETPOINTS AND PARAMETERS:
ALL CONTROL BANDS, SETPOINTS, SETPOINT LIMITS, SETPOINT INCREMENT VALUES, SETPOINT DECREMENT VALUES, TIME DELAYS, EQUIPMENT ROTATION SEQUENCES, AND OTHER PARAMETERS SHALL BE ADJUSTABLE FROM THE EMS.

ALL PARAMETERS SHALL BE COMMISSIONED BY THE ATC CONTRACTOR TO PROVIDE STABLE CONTROL OF ALL SYSTEMS.

ALARM MONITORING:
AN ALARM WILL BE GENERATED AT THE EMS PC WORKSTATION IF ANY OF THE FOLLOWING OCCUR:

1. FAN FAILURE
2. LOW SUPPLY AIR TEMPERATURE
3. HIGH SUPPLY AIR TEMPERATURE
4. SPACE HIGH TEMPERATURE
5. SPACE LOW TEMPERATURE
6. LOW RETURN AIR HUMIDITY
7. HIGH RETURN AIR HUMIDITY
8. FILTER PRESSURE DROP HAS EXCEEDED ALLOWABLE LIMITS
9. HIGH STATIC PRESSURE SAFETY ALARM
10. TEMPERATURE LOW LIMIT SAFETY ALARM
11. FIRE ALARMS SAFETY ALARM

CONSULTANTS:		ARCHITECT/ENGINEERS:		CONSTRUCTION DOCUMENT SUBMISSION FULLY SPRINKLERED	
STRUCTURAL: THARPE ENGINEERING GROUP 321 W. CONGRESS STREET SUITE 301-C SAVANNAH, GA 31401 912.349.7603		MECHANICAL, PLUMBING, ELECTRICAL, FIRE PROTECTION: CROMWELL 101 SOUTH SPRING STREET LITTLE ROCK, AR 72201 501.372.2900		BES DESIGN/BUILD 766 Middle St, Fairhope, AL 36532 Phone: 251.990.5778 Fax: 251.990.3716	
Revisions:		Approved: Project Director		Project Title RADIOLOGY / NUCLEAR MEDICINE IMPROVEMENTS	
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		Checker		CENTRAL ARKANSAS VETERANS AFFAIRS HEALTHCARE SYSTEM Department of Veterans Affairs	