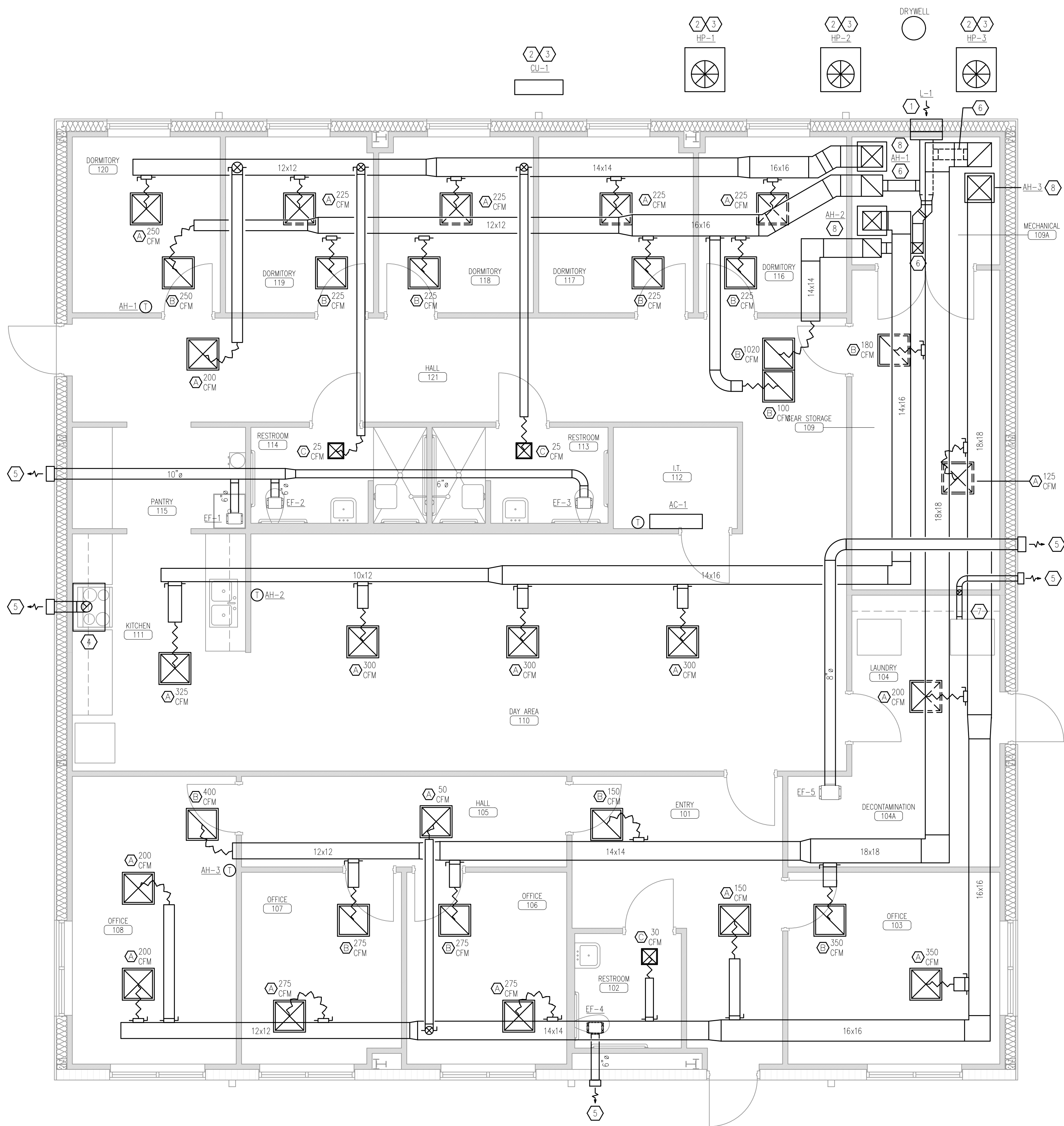
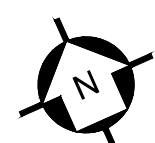


HVAC GENERAL NOTES		HVAC SYMBOL LEGEND		HVAC ABBREVIATIONS	
<div>1. CONNECTION TO EQUIPMENT SHALL BE VERIFIED WITH MANUFACTURER'S CERTIFIED DRAWINGS. TRANSITIONS TO ALL EQUIPMENT SHALL BE VERIFIED AND PROVIDED FOR EQUIPMENT FURNISHED.</div> <div>2. DIMENSIONS SHALL BE FIELD-VERIFIED AND COORDINATED PRIOR TO PROCUREMENT OR FABRICATION. COORDINATE ALL WORK WITH OTHER TRADES INVOLVED. FIELD MODIFICATIONS SUCH AS OFFSETS IN PIPING OR DUCTWORK (INCLUDING DIVIDED DUCTWORK) NEEDED DUE TO OBSTRUCTIONS OR INTERFERENCES SHALL BE PROVIDED AT NO ADDITIONAL COST. FOR RENOVATION PROJECTS, COORDINATE NEW WORK WITH EXISTING ELEMENTS SUCH AS THE BUILDING STRUCTURE, ARCHITECTURAL FEATURES, SPRINKLER PIPING, LIGHTS, PLUMBING, AND ELECTRICAL CONDUIT.</div> <div>3. DUCTWORK CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA HVAC DUCTWORK CONSTRUCTION STANDARD.</div> <div>4. INSTALL ALL FIRE DAMPERS, SMOKE DAMPERS, AND COMBINATION FIRE/SMOKE DAMPERS IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE ACCESS DOORS TO ALLOW COMPLETE INSPECTION AND MAINTENANCE OF ALL DEVICES.</div> <div>5. PROVIDE 1.5R ELBOWS IN DUCTWORK AS INDICATED ON DRAWING. IF 1.5R ELBOWS DO NOT FIT, PROVIDE 1.0R ELBOWS. IF 1.0R ELBOWS DO NOT FIT, PROVIDE 90 DEGREE RECTANGULAR DUCT ELBOWS WITH TURNING VANES.</div> <div>6. COORDINATE DIFFUSER, GRILLE, AND REGISTER LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND EQUIPMENT OF ALL TRADES.</div> <div>7. LOCATE THERMOSTATS, TEMPERATURE SENSORS, HUMIDISTATS, AND HUMIDITY SENSORS AT 48" ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE. COORDINATE LOCATIONS WITH OTHER EQUIPMENT, FURNITURE, AND DOOR SWINGS.</div> <div>8. ALL EQUIPMENT, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED AND/OR SPECIFIED. PROVIDE ADDITIONAL SUPPORTS AS REQUIRED TO PROVIDE A VIBRATION-FREE, RIGID INSTALLATION.</div> <div>9. ALL DUCTWORK SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS.</div> <div>10. DAMPERS AND INSIDES OF DUCTWORK VISIBLE THROUGH GRILLES, REGISTERS, AND DIFFUSERS SHALL BE PAINTED FLAT BLACK.</div> <div>11. ACCESS PANELS IN DUCTWORK AND CEILINGS SHALL BE PROVIDED WHERE REQUIRED FOR OPERATION, BALANCING, OR MAINTENANCE OF ALL MECHANICAL EQUIPMENT.</div> <div>12. ALL DUCTWORK AND PIPING IS SHOWN SCHEMATICALLY. PROVIDE ALL TRANSITIONS, TURNING VANES, ELBOWS, FITTINGS, ETC., TO ALLOW SMOOTH FLOW. ALL SPLIT DUCTWORK FITTINGS SHALL TRANSITION TO FULL SIZE OF THE SUM OF BOTH BRANCHES, UPSTREAM OF SPLIT.</div> <div>13. COORDINATE SIZE REQUIREMENTS OF ALL CONCRETE HOUSEKEEPING PADS UNDER ALL FLOOR MOUNTED EQUIPMENT.</div> <div>14. PROVIDE TRANSITIONS AT DIFFUSER NECKS AS REQUIRED TO MATCH SIZES OF FLEX DUCTWORK TO BE CONNECTED.</div> <div>15. SLEEVE AND SEAL ALL PIPING PENETRATIONS THROUGH BUILDING PARTITIONS.</div> <div>16. MAINTAIN CLEARANCE OF A MINIMUM OF 6" BETWEEN DUCTWORK, PIPING, EQUIPMENT, ETC., AND ALL FIRE RATED AND FIRE/SMOKE RATED PARTITIONS, TO ALLOW FOR INSPECTIONS OF RATED WALLS.</div> <div>17. LOCATE ALL OUTSIDE AIR INTAKES A MINIMUM OF 10'-0" CLEAR FROM ALL PLUMBING VENTS AND EXHAUST AIR DISCHARGE LOCATIONS. LOWEST POINTS OF EACH OUTSIDE AIR ON ROOF SHALL BE A MINIMUM OF 24" ABOVE ROOF.</div> <div>18. DUCTWORK RUNOUTS TO DIFFUSERS SHALL MATCH THE SIZE OF THE DIFFUSER NECK.</div> <div>19. UNLESS OTHERWISE NOTED, ALL EQUIPMENT AND VALVE DRAINS SHALL BE INDEPENDENTLY PIPED FULL SIZE TO THE NEAREST PLUMBING DRAIN.</div> <div>20. ALL EQUIPMENT, DUCTWORK, ETC., TO BE REMOVED SHALL REMAIN PROPERTY OF THE OWNER OR DISPOSED OF LEGALLY, AS DIRECTED BY THE OWNER.</div> <div>21. ALL ROOFTOP MECHANICAL EQUIPMENT SHALL MAINTAIN A MINIMUM DISTANCE OF 10'-0" FROM ROOF EDGE. WHERE REQUIRED, A 42" GUARDRAIL OR STRUCTURALLY DESIGN TIE-OFF POINT FOR FALL PROTECTION CAN BE PROVIDED IN ACCORDANCE WITH THE MECHANICAL CODE.</div> <div>22. DUCTWORK AND PIPING INSTALLED INSIDE THE BUILDING SHALL BE KEPT A MINIMUM OF THREE FEET (MEASURE HORIZONTALLY) FROM THE FACE OF ALL ELECTRICAL PANELS, SWITCH GEAR, AND TRANSFORMERS REGARDLESS OF THE DIFFERENCE IN ELEVATION BETWEEN THE UTILITIES AND THE ELECTRICAL EQUIPMENT.</div>		<div><div><div><div><div><div></div></div></div><div><div></div></div></div><div><div></div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div></div><div><div></div>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 **HVAC FLOOR PLAN**  
SCALE: 1/4" = 1'-0"

DRAWING NOTES:

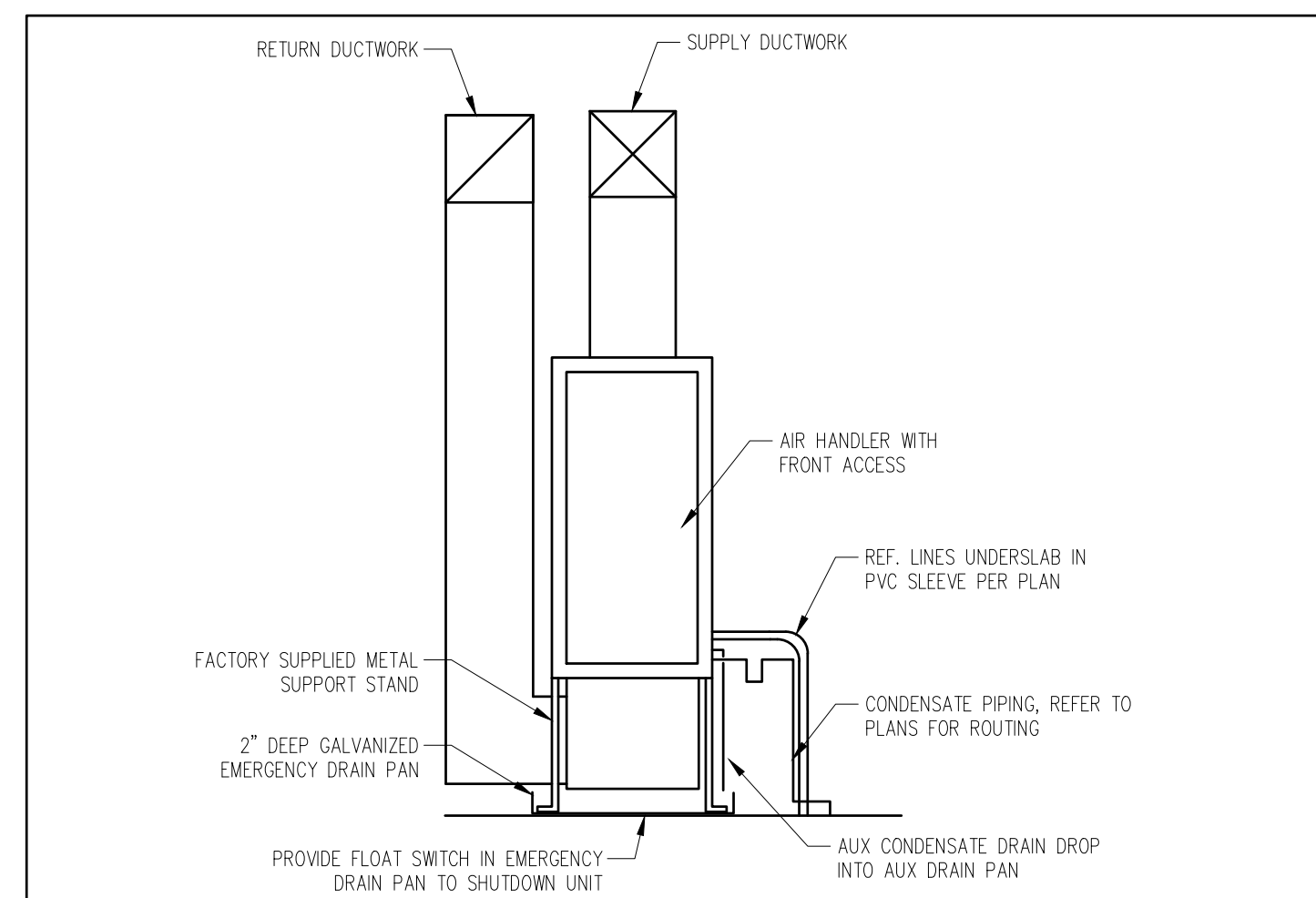
1. PROVIDE FULL SIZE DUCTWORK FOR AIR HANDLER INTAKE AND DISCHARGE. PROVIDE TRANSITION TO DUCTWORK SHOWN ON PLAN. CONFIRM EXACT SIZE OF AIR HANDLER INTAKE / DISCHARGE BASED ON FINAL SUBMITTALS.
2. BRANCH DUCTWORK TO CEILING DEVICES SIZE SHALL MATCH SIZE INDICATED ON AIR DISTRIBUTION SCHEDULE UNLESS OTHERWISE NOTED ON PLAN.

KEY NOTES:

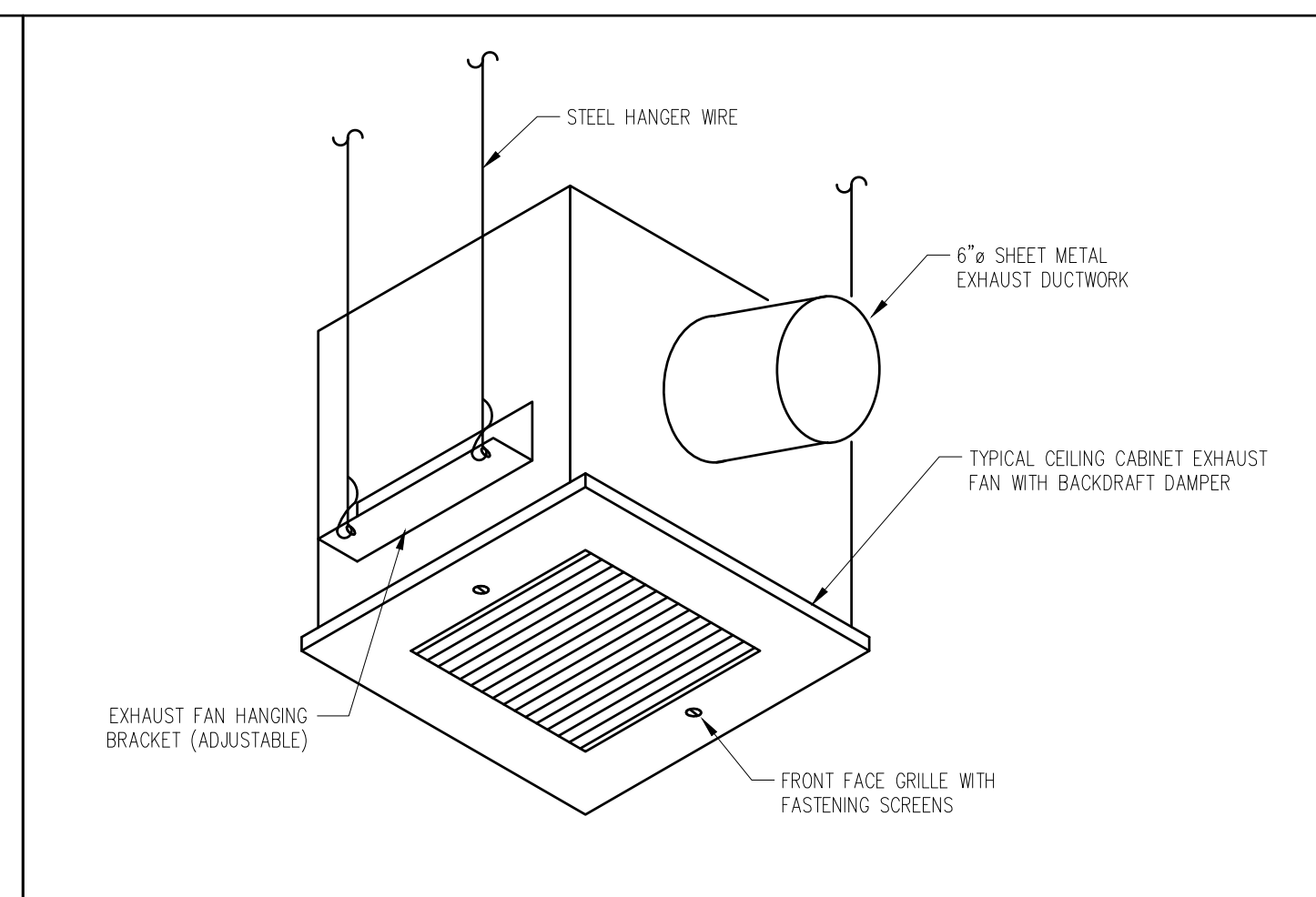
- ① LOUVER WITH PLENUM BOX. REFER TO LOUVER SCHEDULE FOR SIZE AND FREE AREA REQUIREMENTS. REFER TO ARCHITECTURAL EXTERIOR ELEVATIONS FOR LOUVER MOUNTING HEIGHT REQUIREMENTS.
- ② INSTALL NEW OUTDOOR UNITS ON NEW EQUIPMENT PAD.
- ③ ROUTE NEW REFRIGERANT PIPING TO ASSOCIATED INDOOR UNIT. SIZE PER MANUFACTURER'S INSTALLATION REQUIREMENTS. PROVIDE REFRIGERANT LINE SET COVER FOR ANY PIPING ROUTED UP THE SIDE OF THE EXTERIOR WALL.
- ④ WALL MOUNTED EXHAUST HOOD OVER NEW RESIDENTIAL RANGE EQUIVALENT TO CAPTIVEAIRE WRH-36. BALANCE TO 250 CFM AND ROUTE NEW 10" Ø DUCTWORK FROM HOOD TO NEW EXHAUST WALL CAP.
- ⑤ NEW EXHAUST WALL CAP. MATCH EXHAUST DUCTWORK SIZE, PAINT TO MATCH EXTERIOR WALL COLOR.
- ⑥ 8x8 OUTDOOR AIR DUCTWORK EXTENDED FROM OUTDOOR AIR PLENUM TO RETURN AIR PLENUM. PROVIDE MOTORIZED 2-POSITION MOTORIZED OUTDOOR AIR DAMPER. DAMPER SHALL OPEN UPON UNIT STARTUP TO AIRFLOW INDICATED ON BALANCE SCHEDULE AND SHALL CLOSE UPON UNIT SHUTDOWN.
- ⑦ PROVIDE NEW DRYER VENT, EXTEND FROM NEW DRYER VENT BOX TO WALL CAP.
- ⑧ ROUTE NEW 3/4" CONDENSATE PIPING TO NEW DRYWELL.

#	Date	Note
Revisions		

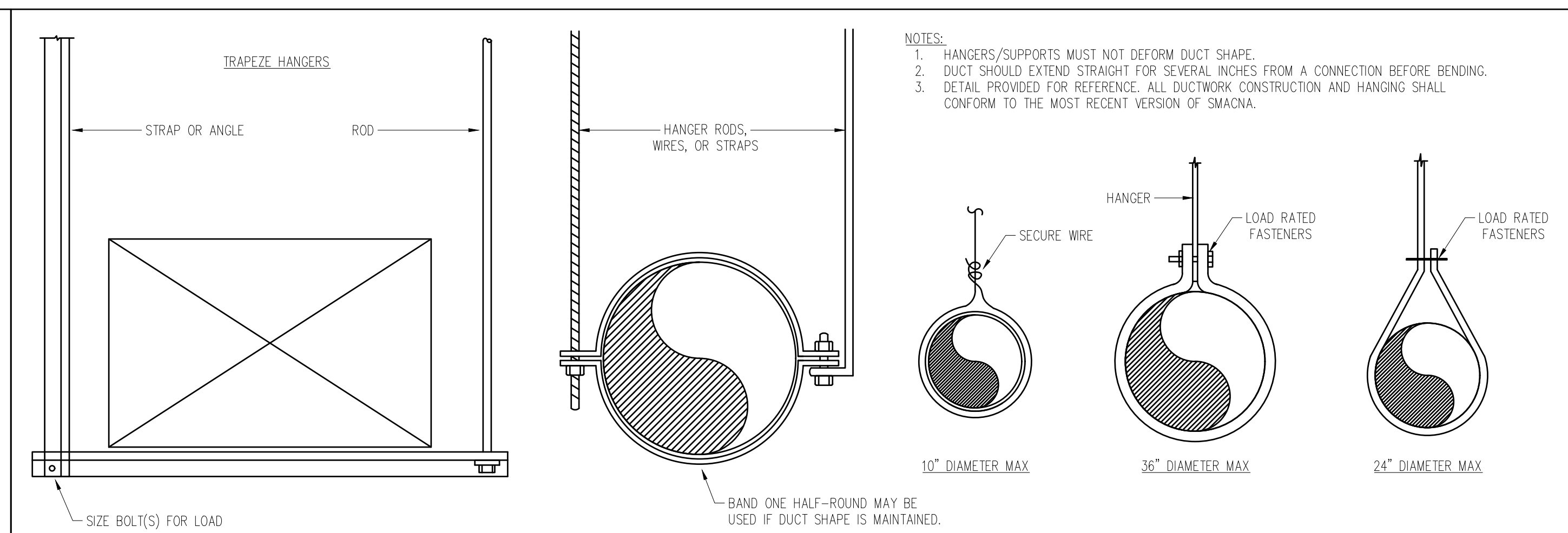




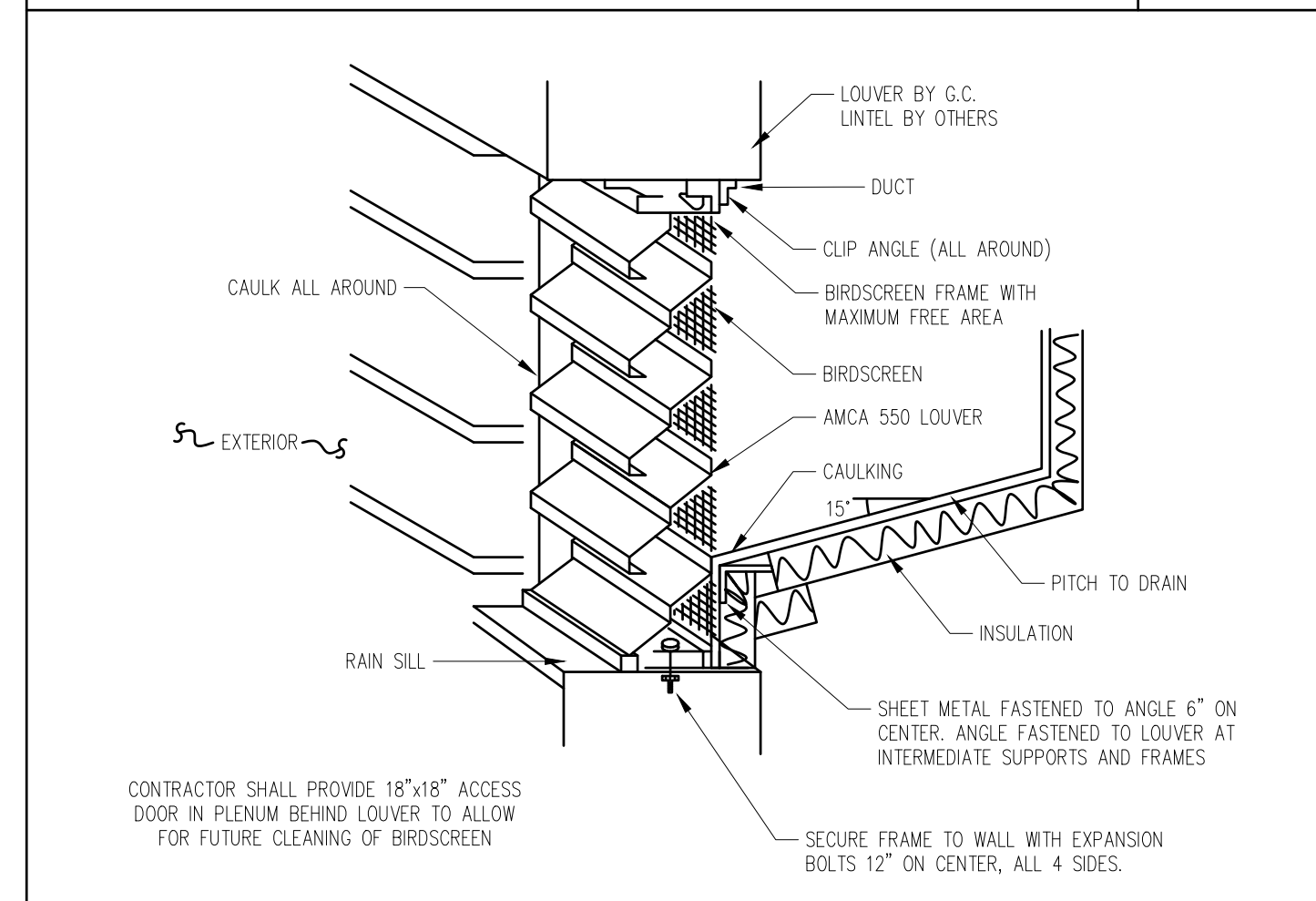
TYPICAL AIR HANDLER DETAIL	NTS	7
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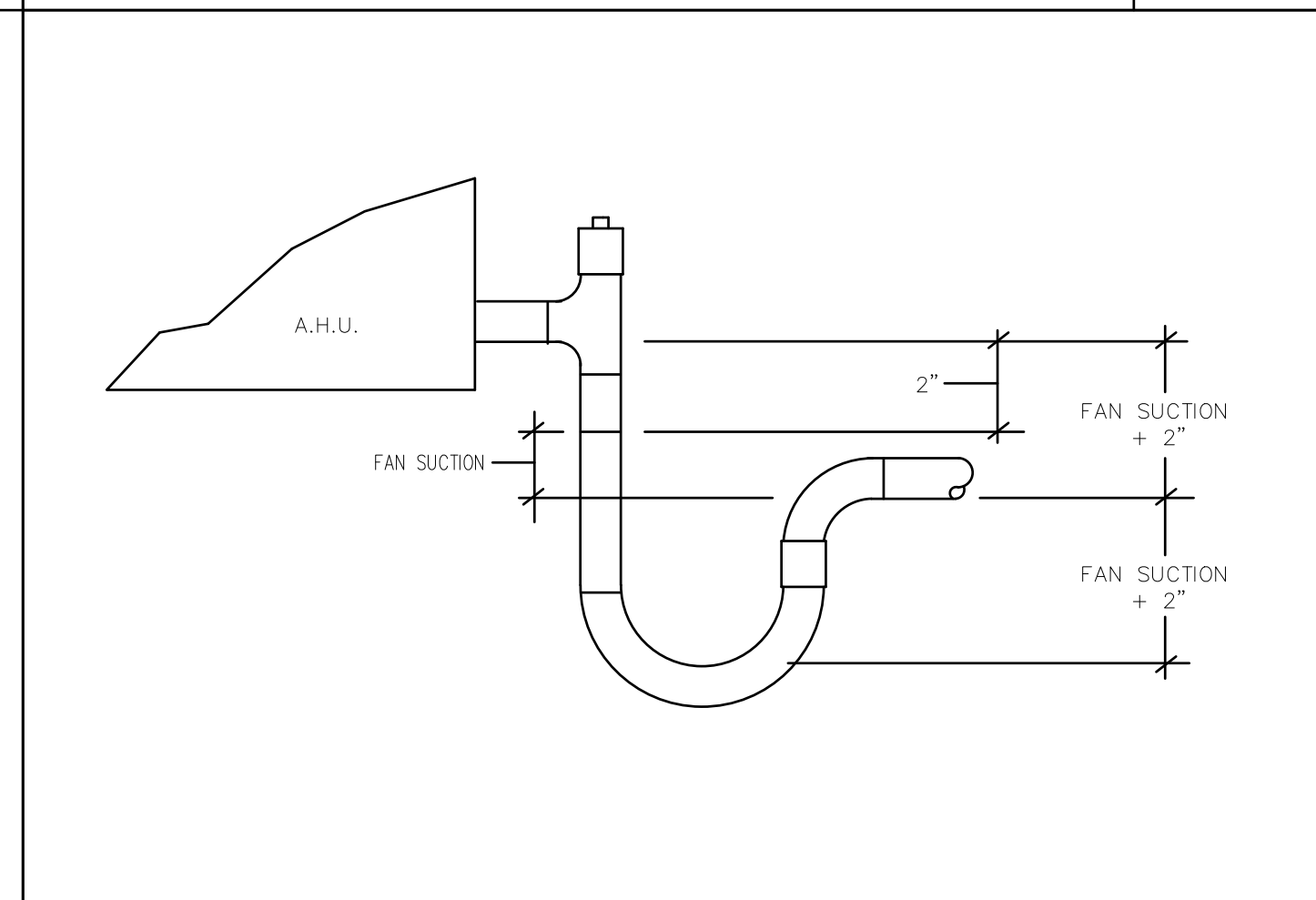
CEILING MOUNTED EXHAUST FAN	NTS	4
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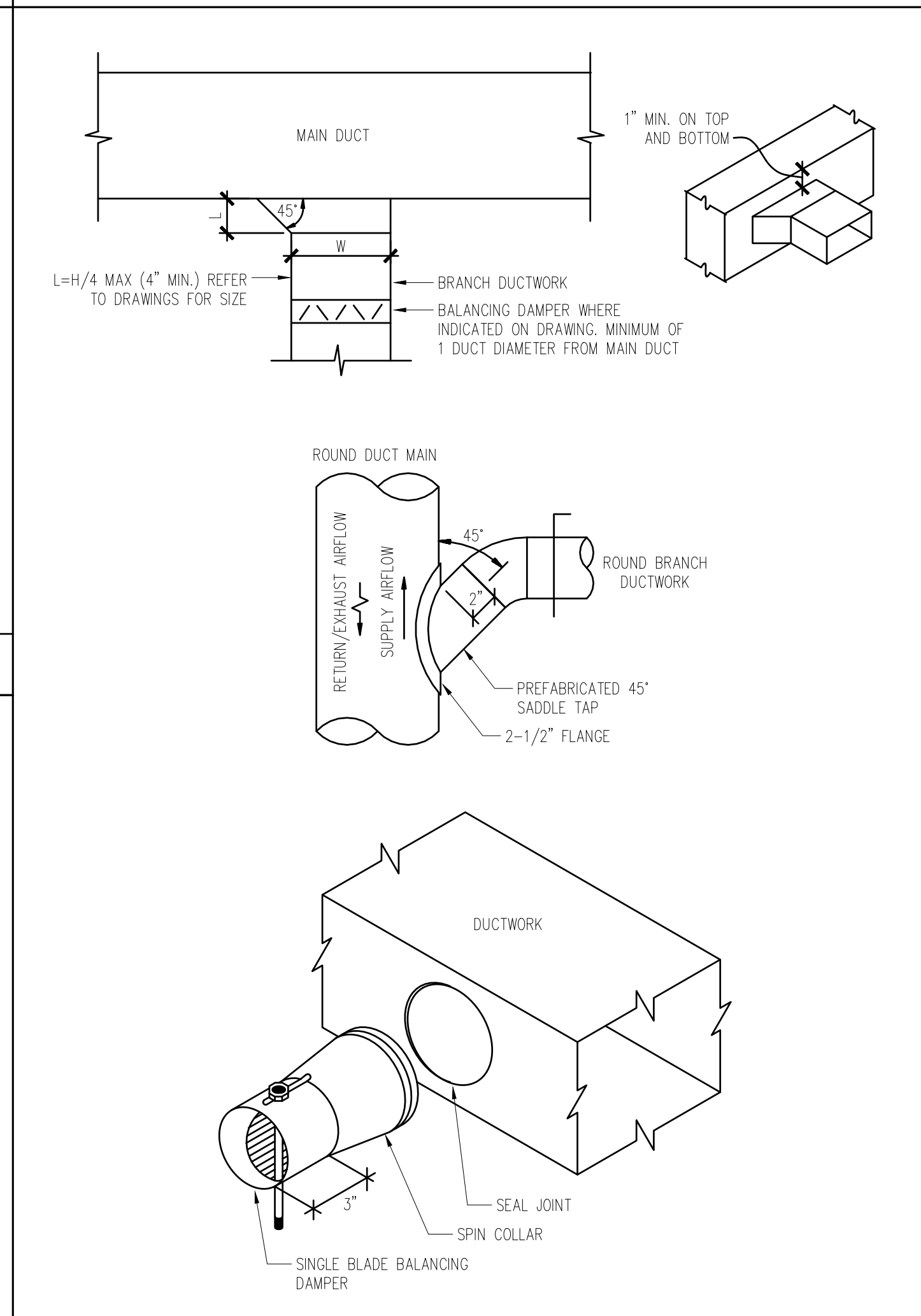
RIGID ROUND + RECTANGULAR DUCT SUPPORT (SMACNA)	NTS	1
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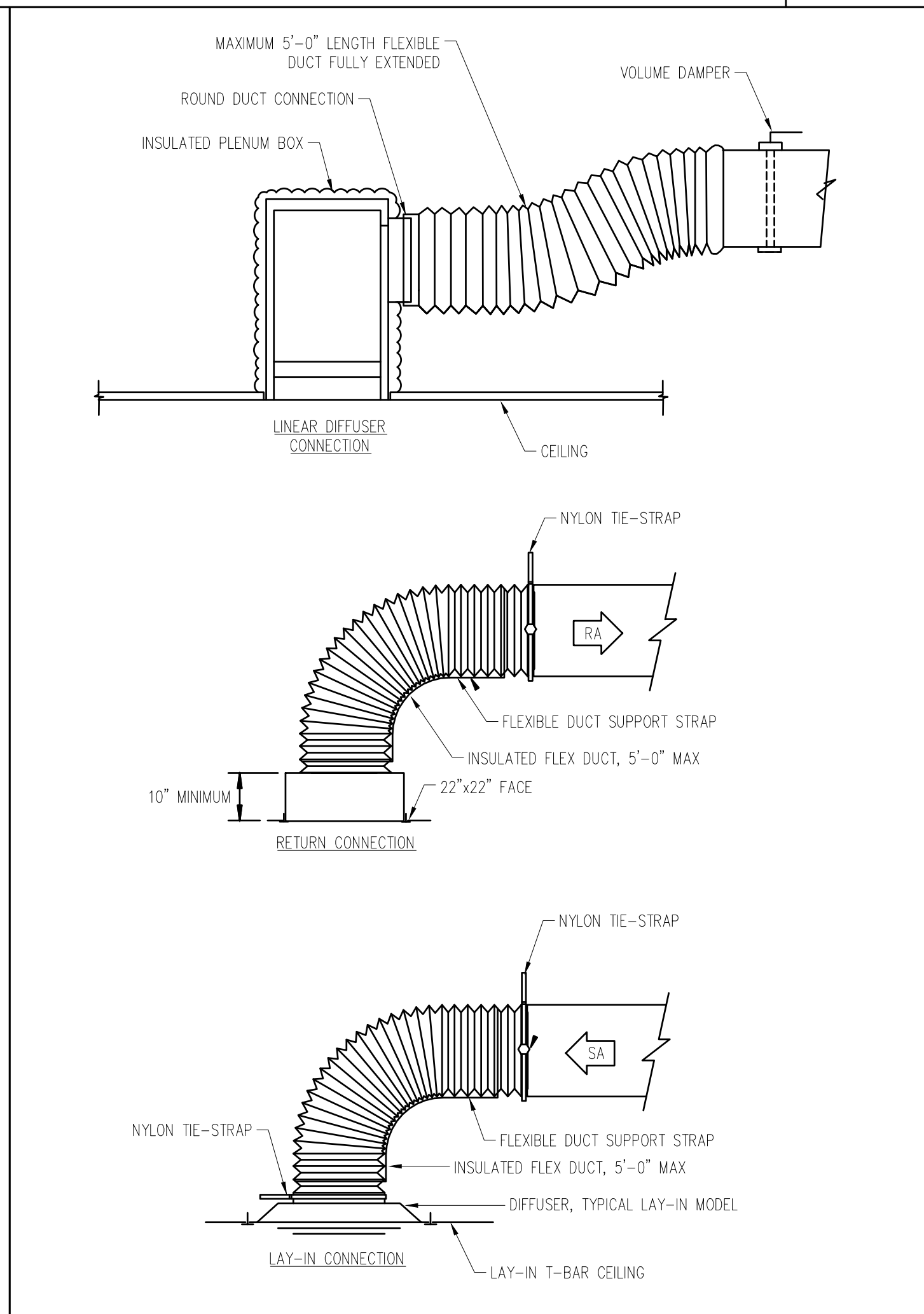
WALL LOUVER W/ PLENUM	NTS	8
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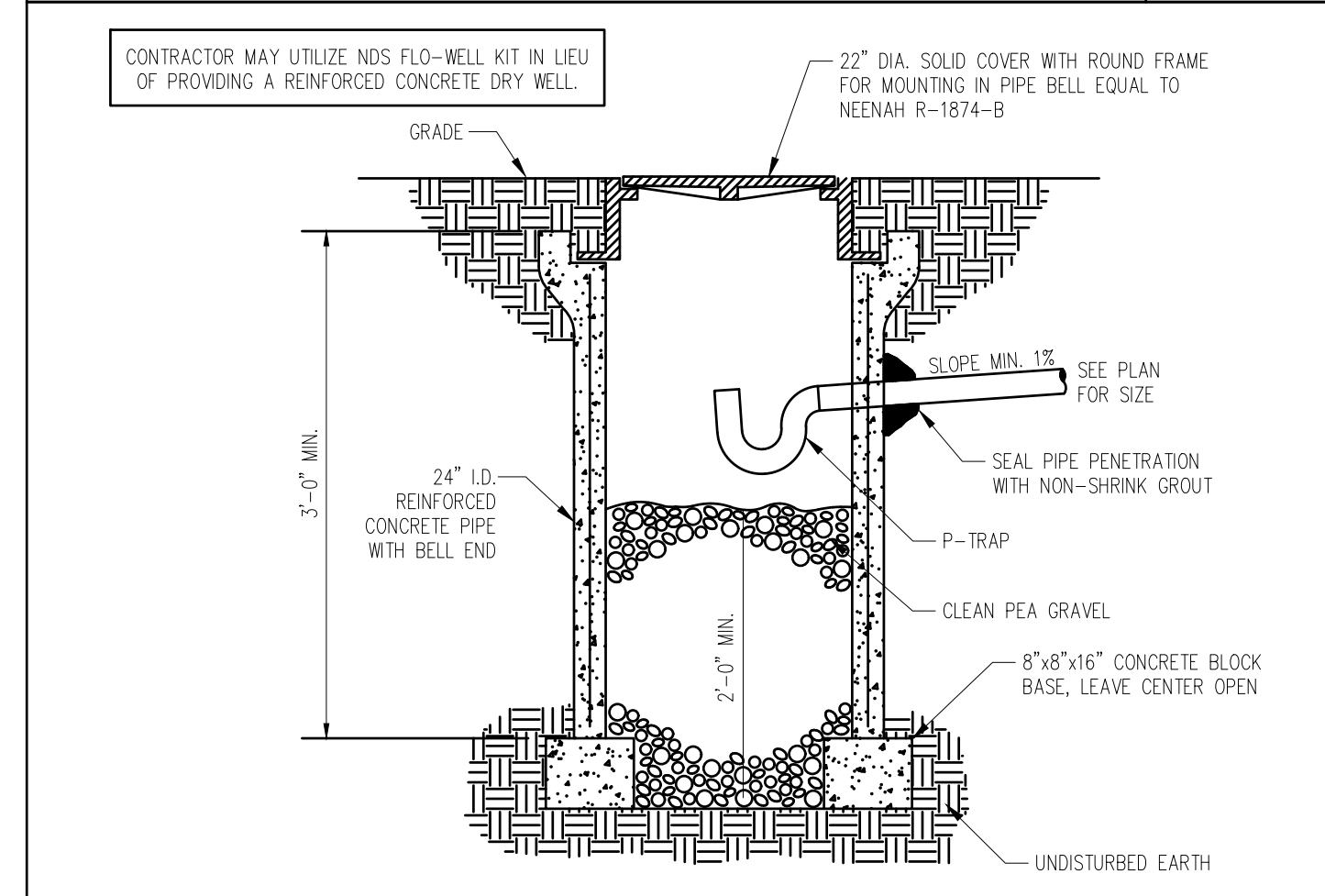
AHU CONDENSATE DRAIN DETAIL NTS	5
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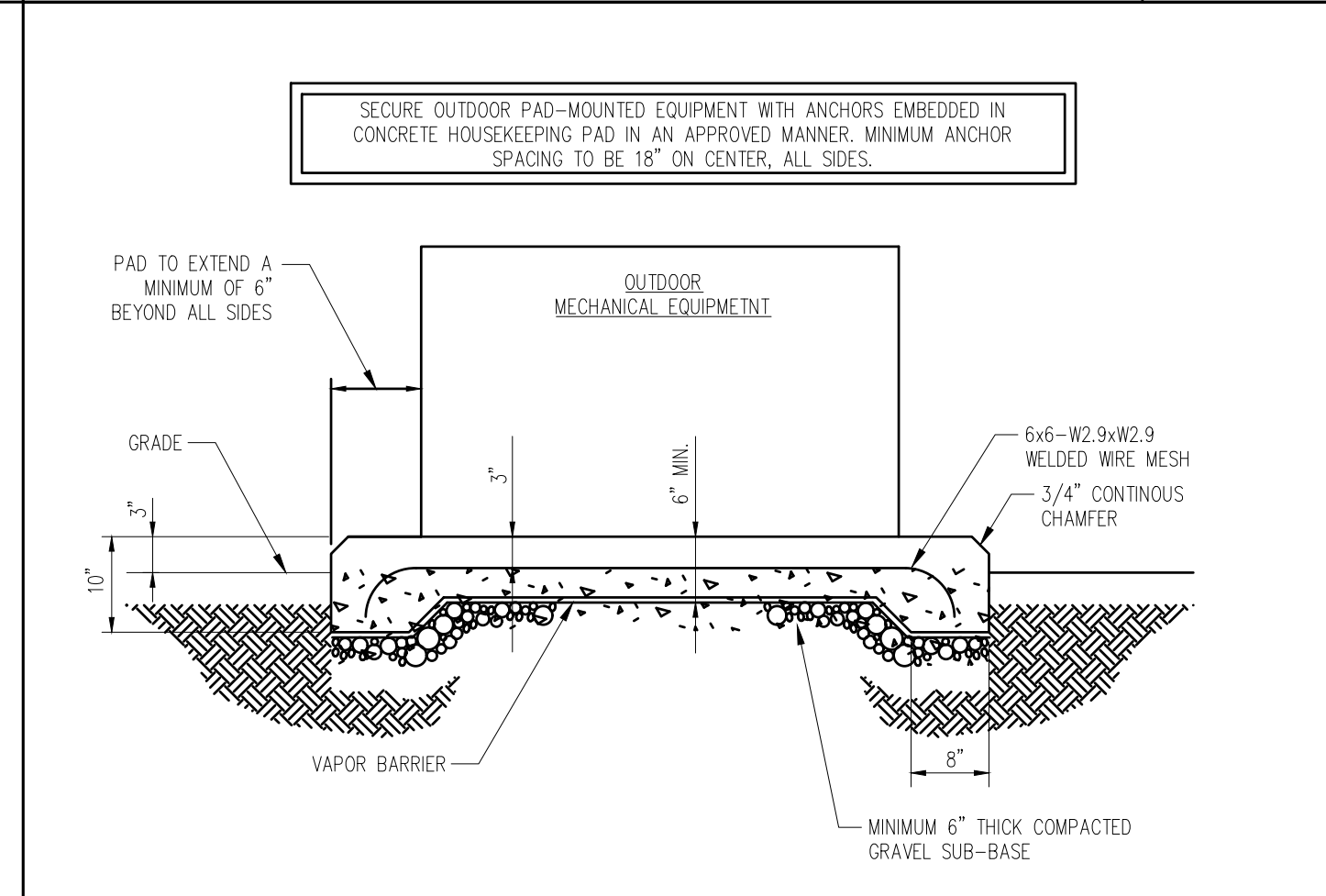
DUCTWORK CONNECTION DETAILS	NTS	3
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DIFFUSER/GRILLE CONNECTION	NTS	2
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DRYWELL DETAIL	NTS	9
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EQUIPMENT PAD DETAIL	NTS	6
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SPLIT SYSTEM AIR CONDITIONING SCHEDULE																																
MARK	SYSTEM TYPE	AHU MODEL	L/W/H/WT	NOMINAL TONNAGE	COOLING CAPACITY			RATING CONDITIONS		HEAT PUMP CAPACITY		AHU TYPE		FAN				AUXILIARY HEATER			AH W/HEAT(4)		CONDENSING UNIT		COMP	FAN	ELECTRICAL		DIMENSIONS	WT.		
					SENS.	TOTAL	SEER2	AMB	EAT-DB/WB	TOTAL	HSPF2	CONFIG	AIR FLOW	CFM	EXT. SP.	DRIVE	HP	VOLTS/ø/FLA	KW	STAGE	VOLTS	PH	MCA	BKR	MODEL	AMPS	AMPS	MCA	BRKR	V/PH	H/W/D	LBS
AH-1 / HP-1	HEAT PUMP	TEM4A0C49M41	24/22/56/185	4	34,845	46,181	14.3	95	80/67	44,000	7.5	CONV	VERT.	1400	0.7	D	0.75	240/1/6.0	7.7	1	240	1	48	50	4TWR4048N1	18.5	2.8	26	40	240/1	46/38/35	255
AH-2 / HP-2	HEAT PUMP	TEM6A0C42H41	24/22/52/145	3.5	30,318	39,494	14.3	95	80/67	38,500	7.5	CONV	VERT.	1225	0.7	D	0.5	240/1/4.3	7.7	1	240	1	45	45	4TWR4042N1	16.7	2.8	24	40	240/1	46/38/35	230
AH-3 / HP-3	HEAT PUMP	TEM4B0C60S51	24/22/52/185	5	41,982	55,230	14.3	95	80/67	55,000	7.5	CONV	VERT.	1855	0.7	D	0.75	240/1/6.0	7.7	1	240	1	48	50	4TWR4060N1	23.7	2.8	32	50	240/1	46/38/35	255
NOTE: STATIC PRESSURE IN INCHES OF WATER EXTERNAL TO UNIT AND ALL ACCESSORIES. D- DIRECT DRIVE W/ MULTI-SPEED MOTOR B- BELT DRIVE ACCESSORIES: (PROVIDE FOR ALL UNITS) 1. 2" THROWAWAY FILTERS      2. INTEGRAL FUSE DISCONNECT & CONTACTORS      3. VARIABLE SPEED TAPS, REFER TO AH PERFORMANCE DATA      4. SINGLE POINT ELECTRICAL CONNECTION																																

FMC TABLE 403.3.1.1 - OUTSIDE AIR REQUIREMENTS									
AIR HANDLER NUMBER - AH-1									
ROOM NAME	AREA (SQ. FT.)	SPACE REQUIREMENTS		OCCUPANCY REQUIREMENTS				TOTAL O/A CFM	
		CFM/SQFT	CFM	PEOPLE/SQFT	PEOPLE	CFM/PERSON	CFM		
113 - RESTROOM	66	70E/1	70E	--/1000	--	--	--	70E	
114 - RESTROOM	66	70E/1	70E	--/1000	--	--	--	70E	
115 - PANTRY	69	0.12	8	--/1000	--	--	--	8	
116 - DORMITORY	102	0.06	6	20/1000	2	5	10	16	
117 - DORMITORY	106	0.06	6	20/1000	2	5	10	16	
118 - DORMITORY	102	0.06	6	20/1000	2	5	10	16	
119 - DORMITORY	102	0.06	6	20/1000	2	5	10	16	
120 - DORMITORY	102	0.06	6	20/1000	2	5	10	16	
121 - HALL	361	0.06	22	--/1000	--	--	--	22	
TOTAL								110 / 140E	
AIR HANDLER NUMBER - AH-2									
ROOM NAME	AREA (SQ. FT.)	SPACE REQUIREMENTS		OCCUPANCY REQUIREMENTS				TOTAL O/A CFM	
		CFM/SQFT	CFM	PEOPLE/SQFT	PEOPLE	CFM/PERSON	CFM		
110 - DAY AREA	553	0.06	33	30/1000	17	7.5	128	161	
111 - KITCHEN	161	0.12	20	20/1000	3	7.5	23	43	
TOTAL								204	
AIR HANDLER NUMBER - AH-3									
ROOM NAME	AREA (SQ. FT.)	SPACE REQUIREMENTS		OCCUPANCY REQUIREMENTS				TOTAL O/A CFM	
		CFM/SQFT	CFM	PEOPLE/SQFT	PEOPLE	CFM/PERSON	CFM		
101 - ENTRY	177	0.06	11	10/1000	2	5	10	21	
102 - RESTROOM	48	70E/1	70E	--/1000	--	--	--	70E	
103 - OFFICE	159	0.06	10	5/1000	1	5	5	15	
104 - LAUNDRY	105	0.12	13	--/1000	--	--	--	13	
104A - DECONTAMINATION	75	0.12	9	--/1000	--	--	--	9	
105 - HALL	116	0.06	7	--/1000	--	--	--	7	
106 - OFFICE	120	0.06	7	5/1000	1	5	5	12	
107 - OFFICE	118	0.06	7	5/1000	1	5	5	12	
108 - OFFICE	185	0.06	11	5/1000	1	5	5	12	
109 - GEAR STORAGE	185	0.12	22	--/1000	--	--	--	22	
TOTAL								123 / 70E	

MINI-SPLIT DUCTLESS HEAT PUMP SCHEDULE														
INDOOR UNIT						OUTDOOR UNIT								
MARK	MODEL NO.	CONFIGURATION	SA CFM (MAX.)	TOTAL COOLING CAPACITY (BTU/H)	TOTAL HEATING CAPACITY (BTU/H)	MARK	MODEL NO.	SEER	NOMINAL TONS	AMBIENT TEMP. (°F)	UNIT ELECTRICAL			
											FAN FLA	MCA	MOCp	V/PH/HZ
AC-1	LSN180HSV5	WALL MOUNT	706	18,000	21,600	CU-1	LSU180HSV5	21.5	1.5	95	0.25	13	20	240/1/60

NOTES:

1. MODEL NUMBERS AND UNIT SELECTIONS ARE BASED ON LG.

2. INDOOR UNIT IS ELECTRICALLY POWERED FROM THE OUTDOOR UNIT.

3. PROVIDE SINGLE POINT ELECTRICAL CONNECTION.

4. PROVIDE LOW AMBIENT KIT FOR OPERATION IN AMBIENT TEMPERATURES DOWN TO 32° F.

5. SIZE REFRIGERANT LINES PER MANUFACTURER RECOMMENDATIONS. PROVIDE OVERSIZE LINES AND/OR REFRIGERATION LINE EXTENSION KIT BASED ON MANUFACTURERS RECOMMENDATION FOR EXTENDED REFRIGERATION LINE RUNS.

6. AMBIENT DESIGN TEMPERATURE IS 95° F.

7. PROVIDE 5 YEAR COMPRESSOR WARRANTY.

8. PROVIDE 7 DAY PROGRAMMABLE THERMOSTAT. UNITS SHALL BE THERMOSTATICALLY CONTROLLED TO CYCLE WITH LOADS. NO ADDITIONAL CONTROLS ARE REQUIRED.

9. MOUNT OUTDOOR UNIT ON EQUIPMENT SUPPORTS OR ON NEW EQUIPMENT PAD BASED ON HVAC PLANS.

10. PROVIDE CLEANABLE ANTIBACTERIAL FILTERS.

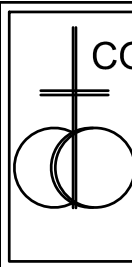
11. PROVIDE VERTICAL AND HORIZONTAL OSCILLATING ADJUSTABLE AIR FLOW.

EQUIPMENT BALANCE			
MARK	SUPPLY AIR CFM	RETURN AIR CFM	OUTDOOR AIR CFM
AH-1	1400	1290	150
AH-2	1225	1020	205
AH-3	1855	1630	225
NOTES: 1. PROVIDE NEW MERV 8 FILTERS PRIOR TO TEST AND BALANCE AND AT SUBSTANTIAL COMPLETION.			

EXHAUST FAN SCHEDULE												
MARK	MFOR.	MODEL	TYPE	WATTS	HP	RPM	CFM	EXT. SP.	VOLT/ø	COMMENTS		
EF-1	GREENHECK	SP-A70	CEILING	13	--	850	50	0.25	120/1	INTERLOCK WITH AH-2		
EF-2	GREENHECK	SP-A125	CEILING	21	--	1100	100	0.25	120/1	INTERLOCK WITH LIGHT SWITCH		
EF-3	GREENHECK	SP-A125	CEILING	21	--	1100	100	0.25	120/1	INTERLOCK WITH LIGHT SWITCH		
EF-4	GREENHECK	SP-A390-V5	CEILING	25	--	968	200	0.25	120/1	INTERLOCK WITH AH-1		
EF-5	GREENHECK	SP-A90	CEILING	16	--	900	70	0.25	120/1	INTERLOCK WITH LIGHT SWITCH		
FURNISH ALL FANS WITH INTEGRAL DISCONNECT, THERMALLY PROTECTED MOTOR, AND BACKDRAFT DAMPER												

LOUVER SCHEDULE									
MARK	MANUFACTURER	MODEL	AREA SERVED	FINISH	WxH(N.)	MIN. FREE AREA (SF)	CFM	MAX. FACE VELOCITY	NOTES
L-1	GREENHECK	EHV-550	OA - AH-1,2,3	CLEAR ANODIZED	24x24	1.2	580	500 FPM	1,2,3,4
NOTES : 1. INSET SCREEN 2. COORDINATE FRAME TYPE WITH WALL CONSTRUCTION 3. COUNTERBALANCED BACKDRAFT DAMPER 4. AMCA 540 & 550 RATED									

AIR DISTRIBUTION SCHEDULE				
MARK	TYPE	NECK	FACE SIZE	DESCRIPTION
A	000-60	60	12x12	SUPPLY DIFFUSER BASIS OF DESIGN: TITUS OMNI COLOR: WHITE / PAINT TO MATCH MATERIAL: ALUMINUM MOUNTING: 24x24 LAY-IN OPPOSED BLADE DAMPERS: NO
	61-110	60	24x24	
	111-240	80	24x24	
	241-420	100	24x24	
	421-550	120	24x24	
B	000-90	60	12x12	RETURN/EXHAUST GRILLE BASIS OF DESIGN: TITUS 50F COLOR: WHITE / PAINT TO MATCH MATERIAL: ALUMINUM MOUNTING: 24x24 LAY-IN OPPOSED BLADE DAMPERS: NO
	91-110	60	24x24	
	111-220	80	24x24	
	221-350	100	24x24	
	351-530	120	24x24	
	531-730	140	24x24	



COBURN AND ASSOCIATES

CONSULTING ENGINEERS

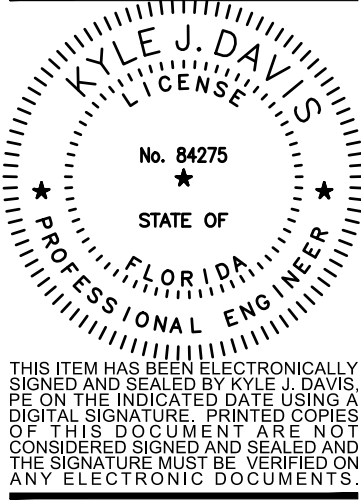
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HIGH SPRINGS, FLORIDA 32655-0577

(386)454-3748

FLORIDA LICENSED ENGINEERS EB 0003687

CA JOB NUMBER 2390



NEW FIRE DEPARTMENT ADMINISTRATION BUILDING

1579 NW LAKE JEFFERY ROAD

LAKE CITY, FLORIDA

COBCC PROJECT NUMBER

#	Date	Note
Revisions		

HVAC SCHEDULES

CONSTRUCTION DOCUMENTS



HVAC SPECIFICATIONS

- A. It is the intent of these specifications to define the work and materials typically installed by a Mechanical Contractor. However, it is not intended to define a subcontract between the Mechanical Contractor and the General Contractor. The General Contractor is responsible for the entire project and any questions regarding scope of work shall be directed to the General Contractor.
- B. Work shall include all labor, materials, fixtures, equipment, tools and service necessary for installation, testing and adjusting of all mechanical systems shall be furnished and installed in compliance with the Drawings, Specifications, and any Addenda thereto.
- C. Drawings and Specifications shall be understood to cover, according to their intent and meaning, complete mechanical systems. Work shown and not specified, or work specified and not shown shall be performed as though mentioned in both.
- D. Minor items and accessories reasonably inferred as necessary for the complete and proper operation of any system shall be provided by contractor or subcontractor for such system whether or not they are specifically called for.
- E. Before submitting a bid, the Mechanical Contractor is to coordinate with the General Contractor to ascertain, in detail, the division of work, and the extent of performance other subs and the General Contractor.
- F. All work shall be performed or installed in strict accordance with Florida Building Code 2023 – Mechanical, NFPA 101, NFPA 90A and local ordinances.
- G. Fees for permits, inspections, patent use, royalties, etc. shall be paid by the contractor.
- H. All systems shall be tested for proper operation, rotation air supply, water supply, pressures, flows, balance, vibration, and appropriate interlocks as required by these specifications or manufacturers' recommendations.
- I. All work shall be installed in accordance with the appropriate codes and satisfy the local inspector having jurisdiction.
- J. Upon completion of each part of the mechanical system, the contractor shall demonstrate to the Engineer that each item on that system is installed with proper covers, safeties, controls, etc., and that all are in proper working order.
- K. A set of "red-lined" mechanical drawings shall be carefully maintained at the job site. Actual conditions are to be put on the drawings in red on a daily basis so the drawings will continuously show locations and routings of piping, ducts, grilles, equipment, valves, and any equipment specified on the drawings or in these specifications.
- L. Equipment and materials shall be new and meet or exceed specification / schedule requirements.
1. All products shall be current model for which replacement parts are available.
- M. Acceptable manufacturers are listed, additional manufacturers may request approval for their products up to 10 days in advance of bid. Engineer may require supplemental information prior to accepting or rejecting the alternate.
- N. All work shall be performed in compliance with OSHA regulations.
- O. Shop drawings and product data shall be submitted on all equipment, fixtures, etc
1. Submittals shall include all equipment to be installed by the subcontractor and all submittals must be made at same time.
2. Each package must have the General Contractors review stamp prior to submittal.
3. The Engineer will review one submittal and one resubmittal; subsequent resubmittals may require a review charge to be paid by subcontractor.
4. Shop drawings shall be labeled in the same designation as the drawings
- P. Job conditions shall be determined prior to bidding in the following manner:
1. Site visit to determine:
- a. Existing conditions.
- b. How and where materials will be delivered and stored.
- c. Special problems encountered during construction.
2. Examine all Contract Drawings and Specifications to determine:
- a. Type of construction to be used.
- b. How construction or work will affect the work of this Section.
- c. Nature and extent of work of other trades.
- Q. Failure to determine existing conditions or nature of construction will not be considered as a basis for granting additional compensation.
- R. Installation:
1. Contract Drawings show the arrangements and sizes of principal apparatus and devices to be provided under this Contract and connection thereto. These shall be followed as closely as actual building construction will permit.
2. Dimensions of work as indicated on Plans are not guaranteed to be as-built dimensions.
3. No measurements shall be scaled from Drawings and used as definite dimensions for layout or fitting work in place.
4. Layout of equipment, as shown on the plans, shall be checked and exact location determined by dimension if equipment approved by the Architect.
5. Consult the Drawings for all dimensions, locations of partitions, sizes of structural member, foundations, etc.
6. Do not make final layouts until shop or equipment drawings are approved and job conditions verified.
7. Mechanical reference symbols are given on the mechanical legend on the drawings.
- S. Rough-in:
1. Work included:
- a. Contractor shall rough-in for all equipment, fixtures, etc., in building whether or not such equipment is furnished by this Contractor or by Owner.
2. Method:
- a. Determine in advance the location and size of all openings and chases necessary for proper installation of all work and have openings and chases provided during construction.
- b. Install all inserts for hangers and supports of mechanical work and equipment work as general construction progresses.
- c. Rough-in openings in masonry or stud walls shall be cut, not broken or chiseled.
- d. Sleeves shall be required at all points where piping passes through concrete walls, slabs or masonry walls; sleeves installed below grade or where subject to high water conditions shall be installed watertight.
- T. Coordination:
1. Work shall be coordinated between all Contractors, Subcontractors, installers, Suppliers, Trades, etc., to
- a. Insure a neatly fitted installation.
- b. Determine the nature and extent of the work of others.
- c. Eliminate interferences.
- d. Maintain maximum headroom and clearances.
2. Any interference which develops or is foreseen and cannot be resolved by the affected trades, etc. shall be handled as follows:
- a. Cease installation of that portion of the work which is in conflict as no additional compensation will be allowed for any relocation, etc.
- b. Continue work only on other portions of the work which are not in conflict.
- c. Notify the Architect immediately.
- d. Architect's decision shall be final as to any relocation, rerouting, removal, etc.
- e. No additional compensation will be allowed for removal, relocation, repairs or changes required by interferences.
- U. Clear away all debris, surplus materials, etc., resulting from work on operations, leaving job and equipment in clean first-class condition.
- V. Clean all rotating equipment, ducts, piping, etc., and leave them in a ready-to-use condition.
- W. When factory finish is provided on equipment, all marred or damaged surfaces shall be touched-up or refinished hereunder as approved.
- X. Thoroughly clean all items of equipment, leaving them in first-class condition.
- Y. Wipe clean or wash if necessary air surfaces of all coils, fan housings, fan wheels, fan motors, air unit plenums, and all air filters.
- Z. All pumps, motors, fans and other rotating equipment shall be stored at Site with openings, bearing, etc., covered to exclude dust and moisture; all stockpiled conduit shall be placed on dunnage, and protected from weather, from entry of foreign materials.

BALANCING OF AIR SYSTEMS

- A. Balance and adjust each air distribution system shown on the Drawings.
- B. Perform work in accordance with procedures and standards described in SMACNA Balancing and Adjustment Manual."

- C. Fuse sizes and thermal overload heaters shall be checked against each motor nameplate.
- D. The amperage shall be read at each electrical motor to determine the load imposed on it.
- E. Adjustment and Balance:
1. Adjust variable type pulleys, volume dampers, control dampers, etc. to provide correct volumes to main trunk lines.
2. Check and adjust outside air quantities as required.
3. Adjust air extractors and manual balancing dampers to supply correct air volume to each main branch duct from main trunk lines.
4. Adjust manual balancing dampers to supply correct volume to each individual branch duct.
5. Use terminal registers only for minimal adjustment of air flows, i.e. less than 5% of air volume.
6. Adjust grilles and diffusers for proper air flow patterns.
7. Air conditioning units shall be placed in operation and both wet and dry bulb temperature taken at one-hour intervals to determine the amount of cooling being accomplished and to indicate adjustments needed.
8. After spaces have been brought down to design temperatures and equipment is functioning properly, air shall be rebalanced if necessary by means of calibrated thermometers placed in each room and in open spaces not over 20' apart. There shall be no deviation in temperature of more than 3 F throughout the space cooled.
9. A thorough check shall be made, with an anemometer, of air motion in the occupied space. Any air motion exceeding 50 fpm shall be remedied.

HVAC SYSTEMS

- A. Split System or packaged heating and cooling units with reverse cycle and heat strip where specified.
- B. Acceptable Manufacturers
1. Trane
2. Carrier
3. Lennox
- C. BLOWER COIL SECTION
1. Airflow as indicated on drawings.
2. Fan shall be direct – drive, forward-curved, double inlet, statically and dynamically balanced.
3. Fan motor shall be resiliently mounted and shall be easily removable for service.
4. Fan motor shall be permanent –split–capacitor type with integral overload protection, high – efficiency, Florida Energy Code Minimum.
5. Cooling coil shall have aluminum fins mechanically bonded to copper tubing. Coil shall have factory installed refrigerant metering devices.
- D. CONDENSING SECTION
1. Outdoor unit shall be designed for use with Refrigerant 410a and contain sufficient charge (R410a) for complete system. Brass service valves with refrigerant line fittings and service ports shall be located on exterior of unit.
2. Outdoor coil shall be constructed with aluminum fins mechanically bonded to non-ferrous tubing. Factory installed coil refrigerant metering device shall be mounted on unit liquid service valve. Metering device internal components shall be removable for cleaning or replacement.
3. Outdoor unit fan shall be propeller type, direct driven, and arranged for vertical air discharge. Fan motor shall be factory lubricated, inherently protected and resiliently mounted.
4. Compressor shall be of the welded–hermetic type with internal vibration isolation and shall be covered with a shield to muffle operating sound. Compressor motor shall have both thermal and current –sensitive overload device. Compressor shall be equipped with a crank–case heater and have internal high–pressure protection.
5. Controls shall be factory wired and located in a readily accessible location. Controls and protective devices shall include a liquid line low pressure switch, suction line accumulator and pressure relief device. Control wiring terminal board shall be designed to match indoor unit terminal board and accessory thermostat terminals for standardized point–to–point connection.
- E. Refer to Mechanical Equipment Schedule for Model Numbers.

EXHAUST FANS

- A. All exhaust fans mounted in the ceiling inside the building and ducted to the outside.
- B. Meet the specification for air delivery at static pressure as specified on the Equipment schedule.
- C. Meet the noise criteria (if specified on Schedule).
- D. Be of the manufacture and model number specified in the Equipment Schedule or equal.
- E. Shall be UL listed.
- F. Acceptable Manufacturers
1. Bridert
2. Carnes
3. Greenheck
- G. General
1. Acoustically insulated steel housing
2. Baked enamel finish on housing
3. Adjustable mounting brackets
4. Automatic backdraft damper at the discharge duct
5. Lifetime lubricated motor
6. Terminal box on housing with cord, plug and receptacle inside the housing.
7. Fan motor and wheel shall be removable without removing entire fan housing.

DUCTWORK

- A. RECTANGULAR SUPPLY DUCTWORK SHALL INSULATED LOW PRESSURE SHEET METAL
- B. EXPOSED ROUND DUCT SHALL BE GALVANIZED DOUBLE WALL WITH 1" INSULATION BETWEEN THE WALLS.
- C. GENERAL EXHAUST DUCTWORK SHALL BE GALVANIZED SHEETMETAL WITH NO INSULATION.
- D. RETURN DUCTWORK SHALL BE INSULATED LOW PRESSURE GALVANIZED SHEET METAL.
- E. FLEXIBLE DUCTWORK IS ALLOWED ONLY WHERE SHOWN AND SHALL NOT EXCEED 12' FEET IN LENGTH. FLEXIBLE DUCT SHALL MEET UL 181 CLASS 1.
- J. FLEXIBLE DUCTWORK WHERE INSTALLED SHALL BE ATTACHED USING SPIN-IN TAKE-OFFS WITH LOCKING QUADRANT DAMPERS.
- F. LOW – PRESSURE SHEETMETAL DUCTWORK
1. Except as otherwise specified or detailed on the drawings, all ductwork shall be constructed in accordance with the Sheet Metal and Air Conditioning Contractor's National Association (SMACNA)
2. Duct systems shall be complete, including all duct fittings, turning vanes, transverse reinforcing hangers, supports, etc., as detailed on the Drawings or in the standards.
3. Provide and install balancing dampers or adjustable splitters at all branch ducts, and where required for balancing the system.
4. Each damper shall be adjustable with an approved quadrant or regulator. Dampers to be opposed blade type for ducts over 12" in any dimension, for ducts 12" single blade is acceptable except for outdoor air intakes which shall be low-leakage opposed blade.
5. Dimensions shown are net inside dimensions (including insulation).
6. Galvanized sheetmetal duct shall conform to the following thicknesses
- | Largest dimension | Gauge |
|-------------------|-------|
| 0–30 inches       | 24    |
| 30–54 inches      | 22    |
| 55–84 inches      | 20    |
| over 84 inches    | 18    |
7. All joints shall be sealed with tape and coated with mastic.
8. Ductwork shall be seal class – 2" w.c. unless otherwise noted.

- G. Plenums shall be constructed and tested in accordance with SMACNA STANDARDS.
- H. FLEXIBLE CONNECTIONS
1. Provide connection between duct system and air moving equipment
2. Connection shall be made with not less than 4" wide flexible collar using "Ventigas" 30-ounce neoprene coated glass fabric.
- I. Where construction methods for various items are not indicated on the Drawings or specified herein, all such work shall be fabricated and installed in strict accordance with the recommended methods, metal gauges, hanging procedures, access door and accessory installation, etc., as outlined, the latest edition of SMACNA'S "Duct Manual" and Sheet Metal Construction for Ventilating and Air Conditioning System.
- J. Leakage:
1. Contractor shall make necessary repair and shall make duct system ready for a leakage test.
2. Test shall be performed by Test and Balance Contractor.
3. Leakage shall not exceed % leakage for high pressure duct and 5% for low pressure duct construction.

DUCT INSULATION

- A. Acceptable Manufacturers
1. Johns-Manville
2. Certainteed
3. Knuf
- B. Duct Wrap:
1. 2" inch thick fiberglass – R6 INSTALLED
2. Flamespread 25 per ASTM E–84
3. Smoke developed 50 per ASTM E–84
4. Factory applied vapor barrier – heavy duty 4 mil vinyl film, class 1, meeting NFPA 90A and 90B, UL rated
5. Product:
- a. Johns-Manville "Microtite"
- C. Accessories:
1. Insulation tape, mastic, adhesives, etc., shall have the same flamespread and smoke rating as the insulation to which they are applied and meet manufacturer's recommendations.
- D. Ductwrap
1. Overlap seams of ductwrap, secure with 4" wide open weave glass fabric and two coats of vapor retarder mastic or tape.
2. Underside of ductwork greater than 24" wide shall also be secured with mechanical fasteners with tape.
3. Pressure tape is not acceptable.
- E. Provide rigid insulation on supply and return ducts inside mechanical rooms or on any exposed ductwork.

DUCT HANGERS AND SUPPORTS

- A. All ductwork for air supply, return, fresh air or exhaust shall be supported by duct hangers, clamps, clips or supports.
- B. Acceptable Manufacturers
- Duct hangers may be a manufacturer item or field fabricated as required.
- C. Galvanized steel straps
1. Minimum 16 gauge and one inch wide
- D. Trapeze hangers
1. Ducts 20 inches to 40 inches largest dimension.
- a. Minimum 1 inch x 1 inch x 1/4 inch steel angles.
- b. Minimum 1/4 inch threaded rod
2. Ducts above 40 inches largest dimension and plenums
- a. Minimum 1-1/2 inch x 1-1/2 inch x 1/4 inch steel angles.
- b. Minimum 5/8 inch threaded rod.
- E. Supports
1. All ductwork shall be supported from structural building members, i.e. block, beams, columns, purlins, joists, etc.
2. Ductwork shall not be supported from ceiling tile or grids, conduit, mechanical equipment, piping or non-structural steel.
3. Ductwork hangers shall be attached to building steel by bolts, screws, clamps or welding.

- F. Hanger Bands
1. Horizontal concealed ductwork up to 20 inches largest dimension shall be supported by one (1) inch x 16 gauge galvanized steel straps at a maximum spacing of 10 ft. and at each elbow or branch takeoff.
2. Bands and spacing shall be at a maximum spacing of 10 feet on horizontal runs and at each elbow or branch takeoff.
- a. No nails shall be driven through any ductwork and into floor joists, trusses, etc.
3. Vertical ductwork, all sizes, shall be supported by bands bolted or screwed to walls, studs, etc.
4. Hanger bands shall be bent over one (1) inch from end and turned under corners of rectangular duct.
5. Duct hanger bands shall be fastened with sheet metal screws at six (6) inch intervals up sides and into bottom.
- a. Sheet metal screws shall be 3/4 inch so as not to penetrate duct liner completely.
- G. Trapeze Hangers
1. Horizontal ductwork larger than 20 inches largest dimension and all exposed ductwork shall be supported by trapeze type hangers.
2. Trapeze hangers shall be at a maximum spacing of 10 feet and at each elbow or branch takeoff.
3. Hanger rods shall be secured to bottom bracing angles with nuts and locknuts.

DUCT ACCESSORIES

- A. Air distribution system shall be furnished complete with duct accessories necessary to allow complete air balancing and adjusting of flow and volume.
- B. All square duct corners and "T" connections shall be fitted with turning vanes.
- C. All branch duct takeoffs shall be fitted with nonadjustable air turning vanes AND manual volume control dampers, OR adjustable volume extractors which are adjustable from outside the duct.
- D. Each grille and diffuser shall be fitted with a manual volume control register at the face of the grille and adjustable from the face of the grille without requiring removal of the grille.
- E. Acceptable Manufacturers
1. Barber Colman
2. Titus
3. Price
4. MetalAire
- F. Air turning vanes:
1. Multiple radius vanes
2. Steel construction
3. Electrocoated white finish
4. Maximum pressure loss = 2% of velocity head
5. Model number – equal to Barber Colman Models A00A and A00F
- G. Volume Extractors:
1. Gang operated parallel blade
2. Fully adjustable from wide open to full closed
3. Supply with supporting foot as required for branch takeoffs not in the same plane as trunk lines.

VOLUME DAMPERS

- A. All return air and fresh air dampers shall be parallel blade pivot dampers with motorized control where noted.
- B. All balancing dampers shall have manual control dampers with positive position locking.
- C. Acceptable Manufacturers
1. Prefco Manufacturing Co.
2. Titus
3. Ruskin
- D. Parallel Blade Pivot Dampers:
1. Low leakage non-degradable
2. Friction free metal to metal seals incorporated into the blade and frame shapes
3. Galvanized steel frame, 16 gauge
4. Galvanized steel blades, 22 gauge with double-wrapped center and edge forming
5. Maximum leakage – 11 CFM per sq. ft. @ 1 inch S.P.
6. The static pressure loss shall not exceed 0.7" W.G. @ 2000 FPM and 50% modulation
7. Model Number
- a. Equal to Prefco Model 5150
8. Classified 1–1/2 hour rating, UL Listed.
9. Fire dampers shall have thermal link.
10. Model
- a. Dampers shall be equal to a Prefco "Low Profile B" or approved equal.
- D. Dampers – mounted horizontally in ceiling:
1. UL Listed ceiling damper
2. Round or square as required
3. 2 hour rated
4. Single or dual blade depending on duct size
5. Model Number
- a. Prefco Model 5650, 5600, or 5660
1. Fusible link rated at 165 Degrees F. release temperature.

DUCT ACCESS PANELS AND TEST HOLES

- A. Provide an access panel at each return air and/or fresh air damper which will allow for inspection and cleaning of dampers.
1. Where return and fresh air dampers are located adjacent, one access door is sufficient, providing each damper is accessible.
- B. Provide an access panel at each fire damper for resetting and maintenance of each fire and smoke damper.
- C. Provide test holes for measurement of air flow, on each branch duct and main trunk line or plenum.
- D. Acceptable Manufacturers
1. Penn Ventilator Co.
2. Ruskin
- E. Access Doors:
1. Insulated hinged duct access door
2. Standard gauge galvanized steel
3. Continuous piano hinge
4. Gasketed at door frame surface and at frame to duct surface
5. Positive acting cam latch handle
6. Doors shall be of sufficient size to allow access to both sides of dampers
7. If duct width is greater than 36 inches, provide access doors on each side of duct for access to entire dampers.
8. Exception
- a. Where access door must be installed in such a position that hinged opening is not possible, provide door that is completely removable.
- b. Removable door shall have cam-locks on both sides
- c. Where noted on drawings fire damper may be accessed through return air grille.
9. Model Numbers:
- a. Hinged doors shall be equal to Penn Ventilator Model DAD
- b. Non-hinged removable door shall be equal to Penn Ventilator Model DAD–RP.
- F. Test Holes
1. Provide a capped access hole in each trunk line or branch duct for insertion of air-flow line or branch duct pilot for flow measurement.

GRILLES & DIFFUSERS

- A. Aluminum fixed blade with air pattern and neck sizes as shown on grille and diffuser schedule.
1. Provide all supply diffusers with opposed blade dampers.

DISPOSABLE FILTERS

- A. Provide 1" pleated with perforated metal back, unless otherwise noted.
- B. MERV–8

CONTROL SYSTEM

PART 1 – GENERAL

DESCRIPTION

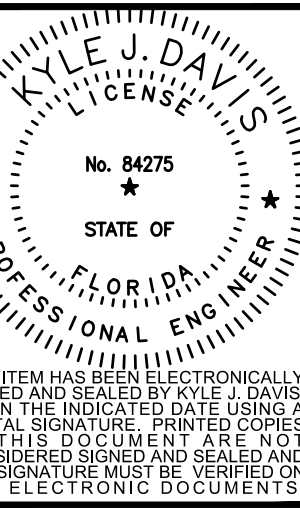
- A. GENERAL
1. Furnish and install all electrical controls and components for all mechanical systems as listed below.
- B. SPLIT SYSTEM / PACKAGED ROOFTOP
1. Provide Heat – Cool – Off. Fan–On–Auto, thermostat, electronic, fully programmable with 4 functions per day, seven day/week programmable, t'stat shall have auxiliary contacts for O.A damper control.
2. Thermostat shall have internal CO2 sensor and dedicated contacts to control O.A. damper.
3. Thermostat shall have wireless capability.

PART 2 – SEQUENCE OF OPERATION

- A. SPLIT SYSTEM / PACKAGED ROOFTOP
1. Occupied Mode–
- a. Air Handler shall run continuously
- b. Compressor shall cycle to maintain space temperature (heating or cooling)
- c. Outside air damper shall open to minimum set point cfm as noted on dwgs.
2. Unoccupied Mode–
- a. Air Handler shall cycle with compressor
- b. Compressor shall cycle to maintain space temperature (heating or cooling)

FIRE STATS

- A. Provide fire stats on each unit as required by code.
1. Firestat shall shut down all unit components including fans, compressors.



#	Date	Note
Revisions		