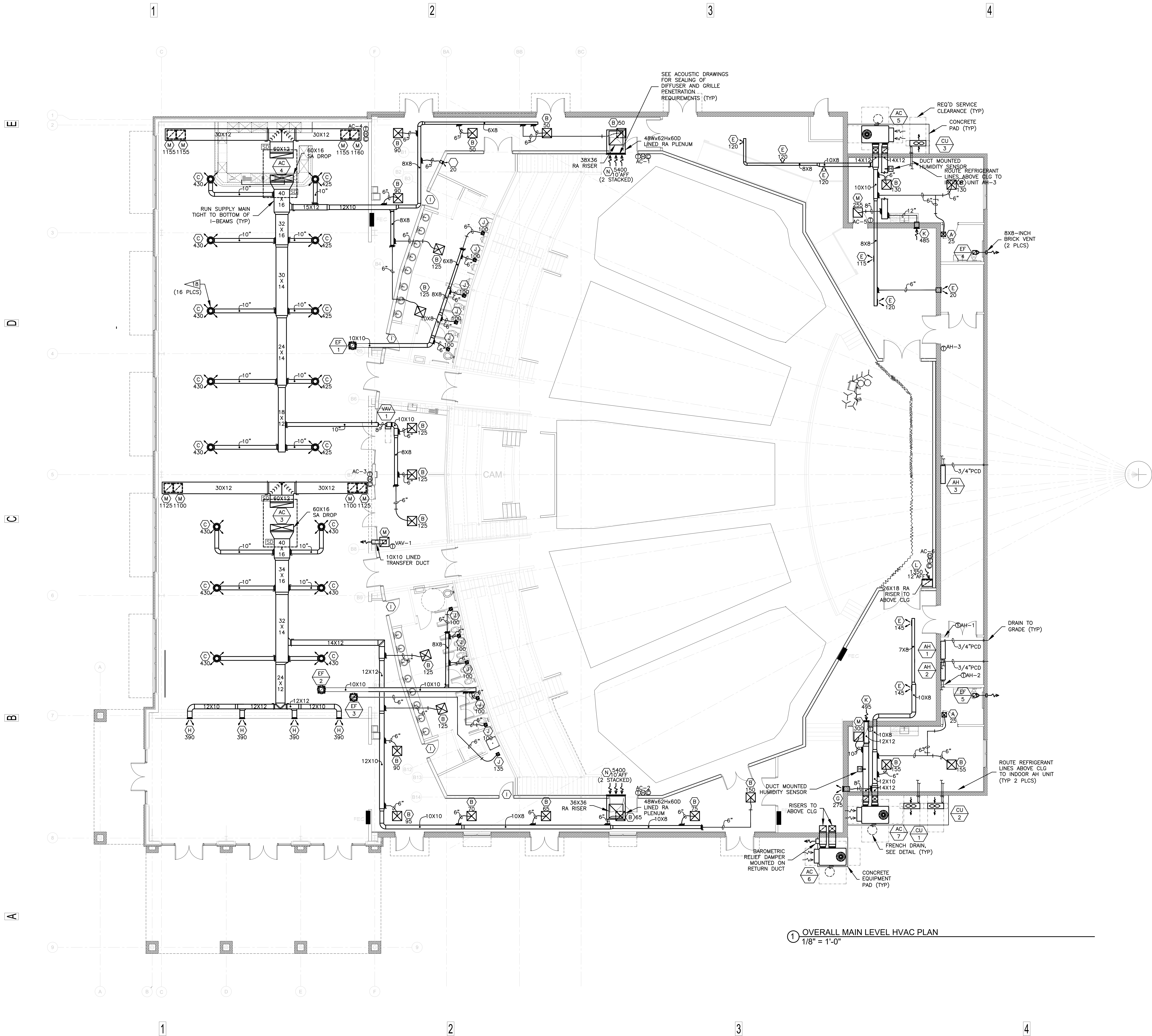




1 OVERALL MAIN LEVEL HVAC PLAN
1/8" = 1'-0"



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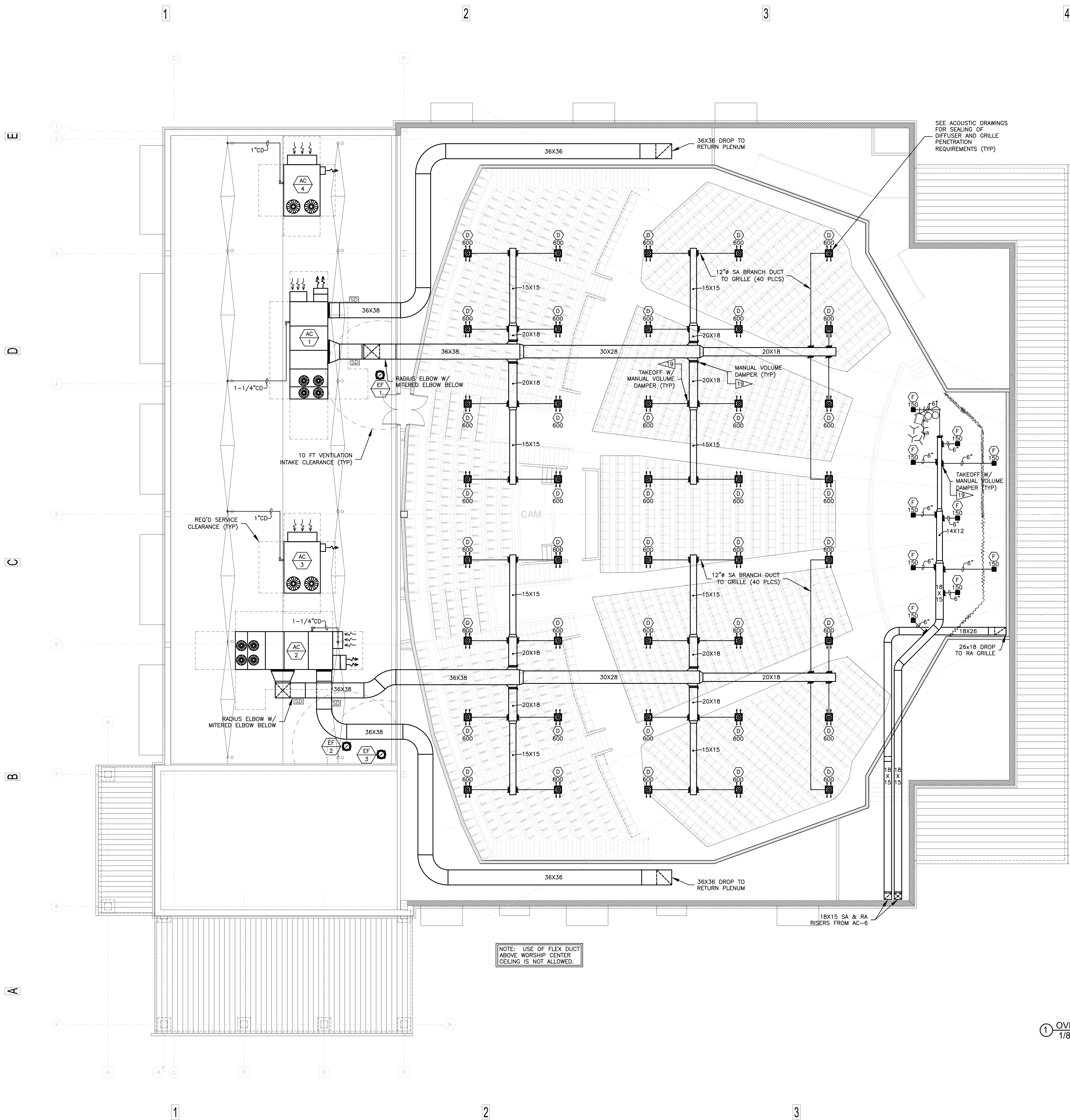
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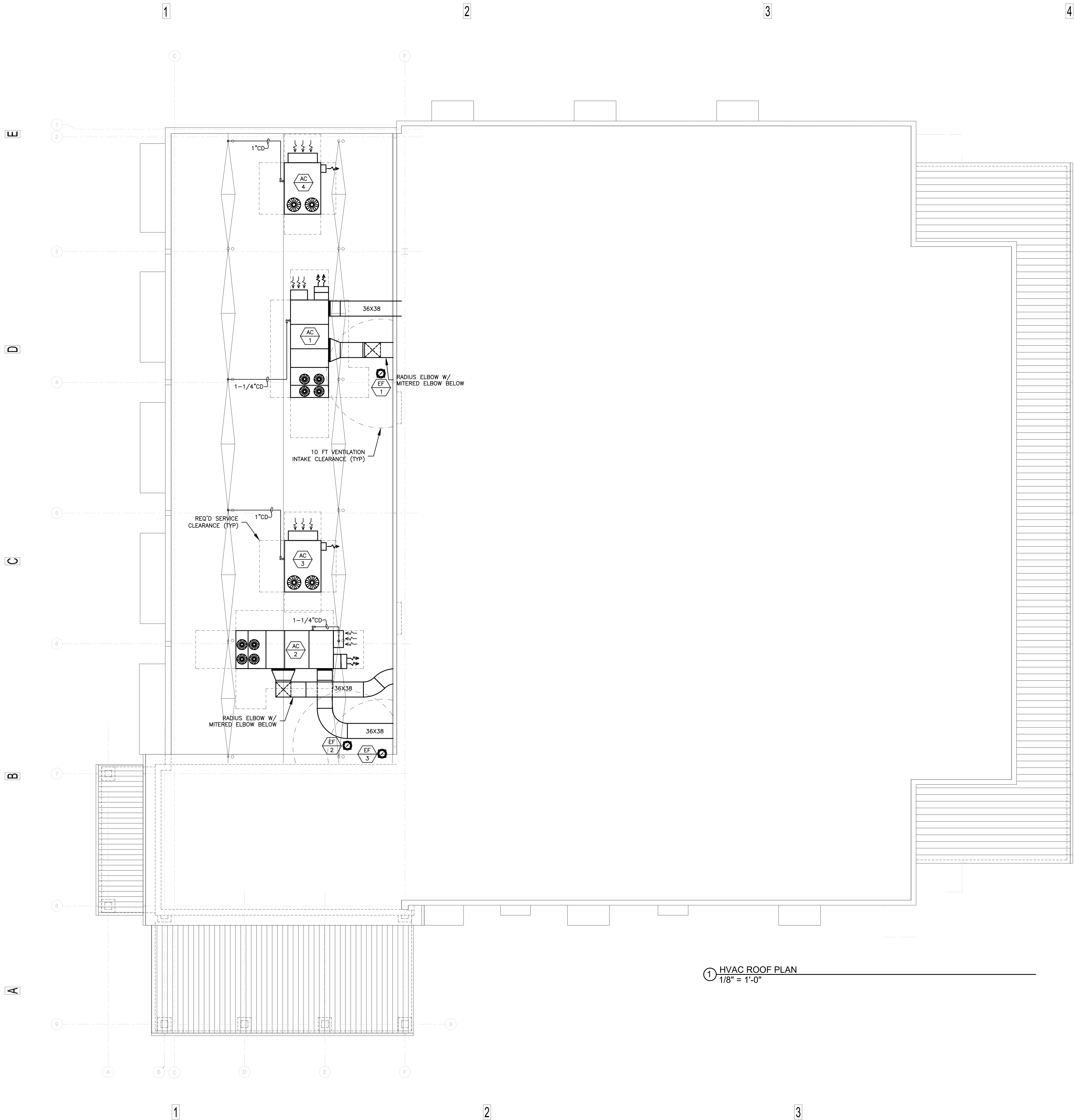
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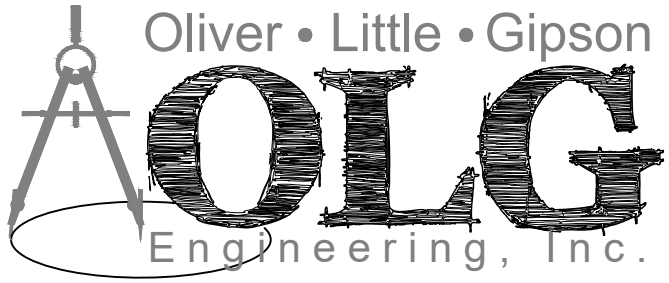
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M1-1



① HVAC ROOF PLAN
1/8" = 1'-0"



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SHEET TITLE: HVAC ROOF PLAN

M1-2



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REMOTE OPERATED DAMPER DETAIL

NOT TO SCALE

NOTES:

- 1) REMOTE ACTUATORS SHALL BE YOUNG REGULATOR MODEL 270-301 BOWDEN CABLE CONTROLLERS OR APPROVED EQUAL.
- 2) COORDINATE EXACT LOCATION OF CEILING MOUNTED CONCEALED REGULATORS WITH ARCHITECT PRIOR TO INSTALLATION.
- 3) CABLE SHALL CONSIST OF BOWDEN CABLE 0.054" STAINLESS STEEL CONTROL WIRE ENCAPSULATED IN 1/16" FLEXIBLE GALVANIZED SPIRAL WIRE SHEATH.
- 4) LOCKING RACK AND PINION GEAR DRIVE SHALL BE CONSTRUCTED OF 14 GAUGE STEEL AND SHALL CONVERT ROTARY MOTION INTO PUSH-PULL MOTION.
- 5) CONTROL SHAFT SHALL BE "D"-STYLE FLATTENED 1/4" DIAMETER WITH 265° ROTATION PROVIDING 1-1/2" LINEAR TRAVEL CAPABILITY.

DUCT HANGER DETAIL

NTS

NOTE: HANGER MINIMUM SIZES, SPACING, AND STRUCTURAL ATTACHMENTS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS AND LOCAL MECHANICAL CODES.

CEILING MOUNTED EXHAUST FAN DETAIL

NTS

ROOFTOP DUCT SUPPORT DETAIL

NTS

UPBLAST ROOF EXHAUST FAN DETAIL

NTS

ROOF PIPE SUPPORT DETAIL

NTS

PIPE SIZE	SUPPORT SPACING
3/4"	6'-0"
1"	6'-0"
1-1/4"	6'-0"
1-1/2"	10'-0"
2"	10'-0"
2-1/2"	10'-0"
3"	12'-0"
4"	12'-0"
PLASTIC PIPE	4'-0"

BLOW THRU UNITS:

1. DRAIN LINES SHALL BE FULL SIZE OF DRAIN PAN OUTLET
2. A = 1/2" + T.S.P.
3. B = MIN. 1/2"

DRAW THRU UNITS:

1. DRAIN LINES SHALL BE FULL SIZE OF DRAIN PAN OUTLET
2. A = 1/2 OF (B)
3. B = T.S.P. + 1"

HVAC CONDENSATE DRAIN DETAIL

NTS

FRENCH DRAIN DETAIL

NTS

REVISION:

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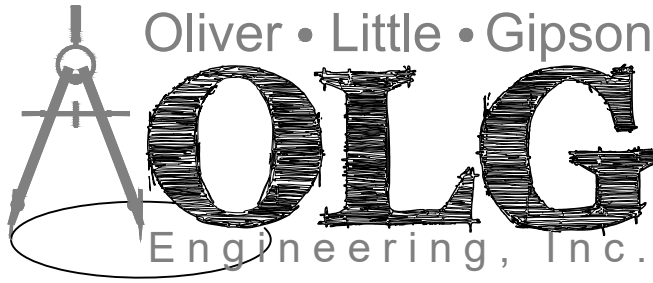
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SHEET TITLE: HVAC DETAILS

M2-1

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PACKAGED ROOFTOP UNIT SCHEDULE						
MARK	AC-1 & 2	AC-3	AC-4	AC-5	AC-6	AC-7
SERVICE	WORSHIP CENTER	LOBBY SOUTH	LOBBYNORTH	BACKSTAGE NORTH	PLATFORM	BACKSTAGE SOUTH
CONFIGURATION	HORIZONTAL	DOWNFLOW	DOWNFLOW	HORIZONTAL	HORIZONTAL	HORIZONTAL
NOMINAL TONNAGE	40	15	17-1/2	3	5	3
SUPPLY AIR DATA						
AIRFLOW (CFM)	12,000	5,000	5,250	900	1,500	900
EXTERNAL SP (IN WC)	1.50	0.75	0.75	0.75	0.50	0.75
CODE MIN OA (CFM)	4,115	885	1,030	160	335	105
DCV MIN OA (CFM)	1,200	570	680	N/A	150	N/A
COOLING						
NET TOTAL MBH	464.4	169.3	194.1	32.1	56.4	32.7
NET SENSIBLE MBH	273.8	124.8	134.5	22.9	39.8	23.0
EAT DB / WB (F)	78.8 / 68.4	75.4 / 63.3	75.6 / 63.9	75.4 / 62.8	77.1 / 64.7	76.2 / 63.6
COIL LAT DB / WB (F)	55.2 / 55.1	51.6 / 51.1	51.2 / 50.6	49.6 / 49.0	51.5 / 51.2	50.3 / 49.7
UNIT LAT DB / WB (F)	58.1 / 56.3	53.2 / 51.8	52.8 / 51.3	52.8 / 50.5	53.5 / 52.1	53.5 / 51.2
AMBIENT AIR TEMP (F)	93	93	93	93	93	93
HEATING						
HEAT SOURCE	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS	NATURAL GAS
INPUT (MBH)	400	250	250	100	100	100
OUTPUT (MBH)	324	202.5	202.5	81	81	81
HEATING STAGES	2	2	2	2	2	2
EFFICIENCY (%)	81	81	81	81	81	81
UNIT DATA						
CONTROL TYPE	MICROPROCESSOR	MICROPROCESSOR	MICROPROCESSOR	MICROPROCESSOR	MICROPROCESSOR	MICROPROCESSOR
FILTERS	2" PLEATED, MERV 8	2" PLEATED, MERV 8	2" PLEATED, MERV 8	MERV 8 PLEATED	MERV 8 PLEATED	MERV 8 PLEATED
REFRIGERANT	R-454B	R-454B	R-454B	R-454B	R-454B	R-454B
COMPRESSOR #	3	2	2	1	1	1
EER / SEER @ AHRI STD	11.2 / 15.4	10.8 / 14.0	10.8 / 14.0	12.0 / 14.0	12.0 / 14.0	12.0 / 14.0
EER2 / SEER2 @ AHRI STD	N/A	N/A	N/A	11.0 / 13.4	11.0 / 13.4	11.0 / 13.4
ELECTRICAL (V/Ph/Hz)	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60	460/3/60
MCA/MOCP	100 / 110	40 / 50	47 / 60	11 / 15	15 / 20	11 / 15
SUPPLY FAN DRIVE / HP	BELT / 15	DIRECT / 3	DIRECT / 3	DIRECT / 3/4	DIRECT / 1	DIRECT / 3/4
UNIT WEIGHT (LBS)	6,350	2,400	2,450	760	811	760
ACCESSORIES / NOTES	MIN. 16-INCH HIGH FULL PERIMETER ROOF CURB W/ VIBRATION ISOLATION RAILS. LOW LEAKAGE DRY BULB ECONOMIZER W/ 100% POWER EXHAUST & "STATI-TRAC" DIRECT BUILDING PRESSURIZATION CONTROL, DCV CONTROLS W/SPACE CO2 SENSOR, SUPPLY FAN VFD, ECONOMIZER FAULT DETECTION & DIAGNOSTICS, LOUVERED CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, SPACE HUMIDITY SENSOR, HINGED ACCESS PANELS, THRU BASE ELECTRICAL W/ NON-FUSED DISCONNECT & UNPOWERED CONVENIENCE OUTLET, FACTORY INSTALLED REFRIGERANT LEAK DETECTION SYSTEM, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT	MIN. 16-INCH HIGH FULL PERIMETER ROOF CURB W/ VIBRATION ISOLATION RAILS. LOW LEAKAGE DRY BULB ECONOMIZER W/ BAROMETRIC RELIEF, DCV CONTROLS W/ SPACE CO2 SENSOR, ECONOMIZER FAULT DETECTION & DIAGNOSTICS, CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, SPACE HUMIDITY SENSOR, HINGED ACCESS PANELS, THRU-BASE ELECTRICAL W/ NON-FUSED DISCONNECT & UNPOWERED CONVENIENCE OUTLET, FACTORY INSTALLED REFRIGERANT LEAK DETECTION, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT	MIN. 16-INCH HIGH FULL PERIMETER ROOF CURB W/ VIBRATION ISOLATION RAILS. LOW LEAKAGE DRY BULB ECONOMIZER W/ BAROMETRIC RELIEF, DCV CONTROLS W/ SPACE CO2 SENSOR, ECONOMIZER FAULT DETECTION & DIAGNOSTICS, CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, SPACE HUMIDITY SENSOR, HINGED ACCESS PANELS, THRU-BASE ELECTRICAL W/ NON-FUSED DISCONNECT & UNPOWERED CONVENIENCE OUTLET, FACTORY INSTALLED REFRIGERANT LEAK DETECTION, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT	MOTORIZED OUTDOOR AIR DAMPER, 40-DEGREE LOW AMBIENT COOLING, CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, DUCT HUMIDITY SENSOR, HINGED ACCESS PANELS, FACTORY INSTALLED REFRIGERANT LEAK DETECTION, UNPOWERED CONVENIENCE OUTLET, LOCKING DISCONNECT, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT	LOW LEAKAGE DRY BULB ECONOMIZER W/ BAROMETRIC RELIEF, DCV CONTROLS W/ SPACE CO2 SENSOR, ECONOMIZER FAULT DETECTION & DIAGNOSTICS, CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, DUCT HUMIDITY SENSOR, HINGED ACCESS PANELS, FACTORY INSTALLED REFRIGERANT LEAK DETECTION, UNPOWERED CONVENIENCE OUTLET, LOCKING DISCONNECT, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT	MOTORIZED OUTDOOR AIR DAMPER, 40-DEGREE LOW AMBIENT COOLING, CONDENSER COIL W/ SALT SPRAY CORROSION PROTECTION & LOUVERED COIL GUARDS, MODULATING HOT GAS REHEAT COIL, DUCT HUMIDITY SENSOR, HINGED ACCESS PANELS, FACTORY INSTALLED REFRIGERANT LEAK DETECTION, UNPOWERED CONVENIENCE OUTLET, LOCKING DISCONNECT, CONDENSATE OVERFLOW SWITCH, PROGRAMMABLE THERMOSTAT
MANUFACTURER	TRANE	TRANE	TRANE	TRANE	TRANE	TRANE
MODEL	YCH480D4L	YSK180	YSK210	YSK036	YSK060	YSK036
*NOTE - ROOF CURBS SHALL BE WELDED CONSTRUCTION WITH INTEGRAL BASE PLATES, INTERNALLY REINFORCED SEISMIC/HIGH WIND STIFFENERS, HOLD DOWN RESTRAINT CLIPS, AND THERMAL/ACOUSTICAL INSULATION. CURBS SHALL BE CERTIFIED FOR THE SEISMIC AND WIND LOADS OF THE PROPOSED INSTALLATION LOCATION (MIAMI-DADE NOA APPROVED); CURBS PLUS, THYBAR, OR APPROVED EQUAL.						
PROVIDE WITH TRANE TECHNOLOGIES FACTORY STARTUP INCLUDING BUT NOT LIMITED CHECK AND VERIFICATION OF THE FOLLOWING ITEMS:						
-ECONOMIZER TEMPERATURE SETPOINT AT 65 DEG -MINIMUM OUTSIDE AIR DAMPER POSITION SET CORRECTLY -OUTSIDE AIR DAMPER CLOSES IN UNOCCUPIED MODE -DEHUMIDIFICATION SETPOINT FOR EACH UNIT IS AT 55% RH -HUMIDITY SENSOR WIRING IS CORRECTLY LANDED ON UNIT -UNIT GOES INTO COOLING PROPERLY WHEN IT RECEIVES A CALL, STAGED CORRECTLY (WHERE APPLICABLE) -UNIT GOES INT HOT GAS REHEAT/DEHUMIDIFICATION MODE WHEN IT RECEIVES A CALL FROM HUMIDISTAT (NOT JUST JUMPERED, BUT AN ACTUAL CALL FROM THE SPACE) -THERMOSTATS SETUP CORRECTLY FOR SCHEDULING AND WHAT HEAT/COOL SETPOINTS THEY ARE USING -UNITS FAN IS SET TO ON DURING OCCUPIED HOURS (NOT AUTOMATIC)						

AIR DEVICE SCHEDULE																					
MARK	NECK SIZE (INCHES)	TYPE				MAXIMUM AIRFLOW (CFM)	MOUNTING					AIR PATTERN	DUTY				AIR THROW (FT@50 FPM)	STATIC PRESSURE DROP AT MAX CFM	TITUS MODEL NUMBER	MAX. NC	NOTES
		DIFFUSER	REGISTER	GRILLE	DOOR GRILLE		LAY-IN	SURFACE	WALL	FLOOR	DUCT		ROOF	SUPPLY	RETURN	EXHAUST					
A	6	X				125		X				PLAQUE/4-WAY	X				9	0.09	OMNI	20	1,3,6,11,16
B	6	X				175	X					PLAQUE/4-WAY	X				8	0.01	OMNI	20	1,3,6,12,16
C	10	X				490					X	360 DEGREE	X				14	0.19	TMR	30	2,3,7,8,16
D	16X16		X			600	X					DOUBLE DEFL.	X				35	0.01	272RS	20	1,5,7,9,17,25,26
E	6X6	X				135	X					DBL DEFL.	X				16	0.07	300RS	20	1,3,7,8,16,26
F	8X8		X			150	X					DBL DEFL.	X				17	0.03	300RS	20	1,3,7,8,17,26
G	8X8	X				235	X					DBL DEFL.	X				21	0.06	300RS	20	1,3,7,8,16,17,26
H	12X10	X				425	X					DBL DEFL.	X				30	0.06	300RS	20	1,3,7,8,16,26
I	10X10			X		150	X					-			X		-	0.05	CT700L-AF	25	2,4,19
J	6X6	X				150	X					-			X		-	50F	20	2,3,10,16,17	
K	12X12	X				625	X					-			X		-	0.07	50F	20	2,3,10,16,17
L	12X48		X			1,500	X					-			X		-	0.04	30RS	20	1,3,8,27
M	22X22	X				2,200	X					-			X		-	0.07	50F	20	2,3,10,12,16,17
N	48X30		X			6,000	X					-			X		-	0.06	50F	20	2,3,10
AIR DEVICE NOTES (SOME NOTES MAY NOT BE USED ON THIS PROJECT)																					
1. STEEL											18. PROVIDE PLASTER FRAME IN GYP BOARD OR PLASTER CEILINGS AS REQ'D.										
2. ALUMINUM											19. SELECT THICK CHEVRON BLADE DOOR GRILLE W/AUXILIARY FRAME										
3. WHITE FINISH											20. ADJUSTABLE COUNTERBALANCED BACKDRAFT/RELIEF DAMPER;										
4. MILL FINISH											UNITED NERTECH MODEL HCB-750.										
5. BLACK FINISH											21. 4 INCH DRAINABLE STATIONARY LOUVER WITH BIRD SCREEN;										
6. FIXED PATTERN											UNITED NERTECH MODEL FL-D-4										
7. ADJUSTABLE PATTERN											22. 4 INCH DRAINABLE ADJUSTABLE LOUVER WITH BIRD SCREEN										
8. LOUVERED FACE											AND 120V MOTORIZED OPERATOR WITH SPRING RETURN										
9. AERODYNAMIC BLADES, INDIVIDUALLY ADJUSTABLE											UNITED NERTECH MODEL AFL-D-4										
10. 1/2 X 1/2 X 1/2 INCH EGGORATE FACE											23. NON DUCTED PANEL										
11. 12 X 12 INCH MODULE											24. 4 INCH DRAINABLE STATIONARY BRICK VENT WITH BIRD SCREEN;										
12. 24 X 24 INCH MODULE - FULL FACE											UNITED NERTECH MODEL BY SERIES, VERIFY FILLER ROMTS WITH ARCH.										
13. 24 X 24 INCH MODULE - FILLER PANEL											25. ADJUST FACE AND REAR BLADES FOR 22.5° DEFLECTION. AIRFLOW ARROWS										
14. 48 X 24 INCH MODULE											ON THE PLAN INDICATE THROW DIRECTION FOR FACE BLADES.										
15. 24 X 12 INCH MODULE											UNITED NERTECH MODEL CFL-D-6										
16. OPPOSED BLADE DAMPER (NOT REQUIRED FOR TRANSFER AIR APPLICATIONS)											26. PERFORMANCE RATED Ø22.5° BLADE DEFLECTION										
17. SQUARE TO ROUND ADAPTER AS REQUIRED (FIELD FAB OR FACTORY)											27. HEAVY DUTY RETURN GRILLE, 3/8" BLADE SPACING, 0-DEGREE DEFLECTION, WITH SUPPORT BARS 6" O.C.										
NOTE: SUBMITTALS FOR AIR DEVICES OTHER THAN THE MANUFACTURER AND MODEL NO. SPECIFIED SHALL INCLUDE ALL APPLICABLE PERFORMANCE DATA (THROW, PRESSURE DROP, NC, ETC.).																					

FAN SCHEDULE			
MARK	EF-1 & 2	EF-3	EF-4 & 5
SERVICE	RESTROOMS 111 & 107	JANITORS CLOSET 104	TOILETS 118 & 124
TYPE	UPBLAST CENTRIFUGAL ROOF EXHAUST	UPBLAST CENTRIFUGAL ROOF EXHAUST	CEILING EXHAUST
DRIVE	DIRECT	DIRECT	DIRECT
MOTOR HP / TYPE	1/4 / ECM	1/20 / ECM	31 WATTS
AIRFLOW (CFM)	500	135	75
ESP (IN WC)	0.50	0.50	0.25
ELECTRICAL (V/Ph/Hz)	115/1/60	115/1/60	115/1/60
MANUFACTURER	COOK	COOK	COOK
MODEL	100R17DEC	90R17DL (VF)	GC-146
ACCESSORIES	MIN. 16-INCH HIGH ROOF CURB, HURRICANE RATED CONSTRUCTION, BACKDRAFT DAMPER, DISCONNECT, MOTOR MOUNTED SPEED CONTROL	MIN. 16-INCH HIGH ROOF CURB, HURRICANE RATED CONSTRUCTION, BACKDRAFT DAMPER, DISCONNECT, MOTOR MOUNTED SPEED CONTROL	METAL INLET GRILLE, BACKDRAFT DAMPER, SPEED CONTROL, VIBRATION ISOLATORS, 8x8 BRICK VENT
CONTROL	SWITCH W/ LIGHTS	CONTINUOUS RUN	SWITCH W/ LIGHTS

SHUTOFF VAV BOX SCHEDULE	
MARK	VAV-1
SUPPLY AIR DATA	
MAXIMUM AIRFLOW (CFM)	375
MINIMUM AIRFLOW (CFM)	125
INLET SP (IN OF WATER)	0.50
APD (IN OF WATER)	0.02
MAXIMUM NC	25
INLET DUCT SIZE (INCHES)	8
UNIT DATA	
ACCESSORIES	DISCONNECT, 24 VOLT CONTROL TRANSFORMER, WIRED ZONE CONTROLLER, DUCT TEMPERATURE SENSOR FOR AUTOMATIC HTG/CLS CHANGEOVER
UNIT INSULATION	1" FOIL FACED
CONTROL	DDC
ELECTRICAL (VOLTS/Ph/Hz)	115/1/60
MANUFACTURER	TRANE
MODEL	VCCF08

REVISION: _____
REVISION: _____
DATE: 10/10/2025

DRAWN BY: SWH
CHECKED BY: TWL
Project Number: 2307
HVAC EQUIPMENT
SHEET TITLE: SCHEDULES

System Ventilation Requirements

AHU Location	Description	$\sum$ Vpz cfm	Ps People	$\sum$ Pz People	D Ps / $\sum$ Pz	Vou cfm	Vps cfm	Xs	Ev	Vot cfm	%OA Vot / Vps	
Alternative 1												
Zone	WORSHIP CENTER NORTH	Cooling	9,839	750	750	1.00	4,113	9,839	0.418	1,000	4,113	41.8
		Heating	9,839	750	750	1.00	4,113	9,839	0.418	1,000	4,113	41.8
Zone	LOBBY NORTH	Cooling	4,102	123	123	1.00	876	4,102	0.214	938	935	22.8
		Heating	4,102	123	123	1.00	876	4,102	0.214	989	1,009	24.6
Zone	LOBBY SOUTH	Cooling	4,194	111	111	1.00	808	4,194	0.193	989	834	19.9
		Heating	4,194	111	111	1.00	808	4,194	0.193	0.012	885	21.1
Zone	WORSHIP CENTER SOUTH	Cooling	7,975	750	750	1.00	4,113	9,795	0.420	1,000	4,113	42.0
		Heating	9,795	750	750	1.00	4,113	9,795	0.420	1,000	4,113	42.0
Zone	PLATFORM	Cooling	1,273	50	50	1.00	332	1,273	0.261	1,000	332	26.1
		Heating	1,273	50	50	1.00	332	1,273	0.261	1,000	332	26.1
Zone	BACKSTAGE NORTH	Cooling	794	8	8	1.00	119	794	0.150	0.835	143	16.3
		Heating	794	8	8	1.00	119	794	0.150	0.756	158	19.9
Zone	BACKSTAGE SOUTH	Cooling	653	8	8	1.00	93	653	0.143	0.952	98	15.0
		Heating	653	8	8	1.00	93	653	0.143	0.903	104	15.8
Zone	121 A/V EQUIPMENT	Cooling	2,099	0	0	1.00	0	2,099	0.000	1,000	0	0.0
		Heating	2,099	0	0	1.00	0	2,099	0.000	1,000	0	0.0
Zone	119 ELECTRICAL	Cooling	1,119	0	0	1.00	0	1,119	0.000	1,000	0	0.0
		Heating	1,119	0	0	1.00	0	1,119	0.000	1,000	0	0.0

* Apply Single Zone Ventilation Calculation

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Ventilation Calculations for Cooling Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
WORSHIP CENTER NORTH (AC-1)													
MAIN LOBBY / CAFE NORTH	Single Fan CV	9.839	9.839	9.839	0	4.113	0.418	1.00	0.00	1.00	1.00	1.00	1.000 *
1211N HENDERS	Single Fan CV	9.839	9.839	9.839	0	4.113							1.000
111 MEN'S RESTROOM	Single Fan CV	3.274	3.274	3.274	0	743	0.227	1.00	0.00	1.00	1.00	1.00	0.989 *
109 GUEST SERVICES	Single Fan CV	2.961	2.961	2.961	0	409	0.418	1.00	0.00	1.00	1.00	1.00	1.000
1135N STORAGE	Single Fan CV	219	219	219	0	0	0.00	1.00	0.00	1.00	1.00	1.00	1.000
1085N LOBBY	Single Fan CV	317	317	317	0	88	0.278	1.00	0.00	1.00	1.00	1.00	0.938 *
1135N STORAGE	Single Fan CV	12	12	12	0	0	0.00	1.00	0.00	1.00	1.00	1.00	1.000
LOBBY NORTH (AC-1)													
MAIN LOBBY (AC-1)	Single Fan CV	4.102	4.102	4.102	0	876							0.938
107 WOMEN'S RESTROOM	Single Fan CV	4.102	4.102	4.102	0	876							0.938
1055N HENDERS	Single Fan CV	228	228	228	0	470	0.224	1.00	0.00	1.00	1.00	1.00	0.988 *
1055N HENDERS	Single Fan CV	559	559	559	0	64	0.6	0.115	1.00	0.00	1.00	1.00	1.000
100 ENTRY LOBBY	Single Fan CV	1.308	1.308	1.308	0	273	0.209	1.00	0.00	1.00	1.00	1.00	0.984
1055N LOBBY	Single Fan CV	4.194	4.194	4.194	0	808							0.968
1055N LOBBY	Single Fan CV	4.194	4.194	4.194	0	808							0.968
WORSHIP CENTER SOUTH (AC-2)													
MAIN LOBBY (AC-2)	Single Fan CV	9.795	9.795	9.795	0	4.113	0.421	1.00	0.00	1.00	1.00	1.00	1.000 *
1135N STORAGE	Single Fan CV	9.795	9.795	9.795	0	4.113							1.000
PLATFORM (AC-6)													
115 RAMP	Single Fan CV	1.273	1.273	1.273	0	332							1.000
116 RAMP	Single Fan CV	316	316	316	0	36	0.114	1.00	0.00	1.00	1.00	1.00	1.000
117 GREEN ROOM 1	Single Fan CV	207	207	207	0	315	0.29	1.00	0.00	1.00	1.00	1.00	0.969
117 GREEN ROOM 2	Single Fan CV	228	228	228	0	44	0.194	1.00	0.00	1.00	1.00	1.00	0.956
116 SR 1 TOILET	Single Fan CV	24	24	24	0	0	0.00	1.00	0.00	1.00	1.00	1.00	1.000
100 SMALL STORAGE	Single Fan CV	18	18	18	0	6	0.315	1.00	0.00	1.00	1.00	1.00	0.938 *
BACKSTAGE NORTH (AC-5)													
124 OR 2 TOILET	Single Fan CV	794	794	794	0	119							0.835
123 GREEN ROOM 2	Single Fan CV	22	22	22	0	102							1.000
122 SUPPORT	Single Fan CV	224	224	224	0	44	0.198	1.00	0.00	1.00	1.00	1.00	0.982 *
125 VESTIBULE	Single Fan CV	209	209	209	0	33	0.198	1.00	0.00	1.00	1.00	1.00	0.985
BACKSTAGE SOUTH	Single Fan CV	199	199	199	0	18	0.081	1.00	0.00	1.00	1.00	1.00	0.982
BACKSTAGE SOUTH (AC-7)													
121 AV EQUIPMENT	Single Fan CV	653	653	653	0	93							0.950 *
2000 STORAGE	Single Fan CV	2,959	2,959	2,959	0	0	0.00	1.00	0.00	1.00	1.00	1.00	1.000

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Ventilation Parameters

System Zone Room	Occupancy Category	— Cooling —						— Heating —		
		Rp cfm / ft²	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Voz cfm	Ex	Voz cfm	
Alternative 1										
WORKSHOP CENTER NORTH		5.00	750.00	0.08	6,043	4,113	1.00	4,113	1.00	4,113
WORKSHOP CENTER NORTH (AC-1)		5.00	750.00	0.08	6,043	4,113	1.00	4,113	1.00	4,113
MAIN LOBBY / CAFE NORTH		5.00	106.21	0.06	3,540	743	1.00	743	0.80	929
1011A CORRIDORS		0.00	0.00	0.00	752	45	0.00	45	0.00	58
11 MEN RESTROOM		0.00	5.00	0.00	575	0	1.00	0	1.00	1.00
106 SERVICE SERVICES		5.00	12.00	0.06	460	88	1.00	88	1.00	108
113A V AVERAGE		0.00	0.00	0.00	115	0	1.00	0	1.00	0.00
LOBBY NORTH		4.80	123.21	0.05	5,442	876	0.76	876	1.00	1,095
LOBBY NORTH (AC-4)		4.80	123.21	0.05	5,442	876	0.76	876	1.00	1,095
MAIN LOBBY SOUTH		5.00	17.21	0.06	2,240	470	0.80	470	0.80	580
107 WOMEN RESTROOM		0.00	5.00	0.00	575	0	1.00	0	1.00	0.00
10510E CORRIDORS		0.00	0.00	0.00	1073	64	1.00	64	0.80	100
106 ENTRY LOBBY		5.00	39.00	0.06	1,300	273	1.00	273	1.00	341
LOBBY SOUTH		4.78	111.21	0.05	5,188	808	0.80	808	1.00	1,010
LOBBY SOUTH (AC-3)		4.78	111.21	0.05	5,188	808	0.80	808	1.00	1,010
WORKSHOP CENTER SOUTH		5.00	750.00	0.08	6,043	4,113	1.00	4,113	1.00	4,113
WORKSHOP CENTER SOUTH (AC-2)		5.00	750.00	0.08	6,043	4,113	1.00	4,113	1.00	4,113
PLATFORM		5.00	50.00	0.06	1,365	332	1.00	332	1.00	332
PLATFORM (AC-6)		5.00	50.00	0.06	1,365	332	1.00	332	1.00	332
115 RAMP		0.00	2.00	0.00	602	36	1.00	36	0.80	45
116 SUPPORT		0.00	2.00	0.00	561	33	1.00	33	0.80	41
117 GREEN ROOM 1		0.00	4.00	0.00	440	50	1.00	50	1.00	62
118 GR 1 TOILET		0.00	0.00	0.00	75	0	1.00	0	1.00	0.00
120 SMALL STORAGE		0.00	0.00	0.00	96	6	1.00	6	0.80	8
BACKSTAGE NORTH		2.50	8.00	0.06	1,729	119	1.00	119	1.00	149
BACKSTAGE NORTH (AC-5)		2.50	8.00	0.06	1,729	119	1.00	119	1.00	149
124 GR 2 STORAGE		0.00	0.00	0.00	75	0	1.00	0	1.00	0.00
123 GREEN ROOM 2		0.00	4.00	0.00	405	44	1.00	44	0.80	55
122 SUPPORT		0.00	2.00	0.00	551	33	1.00	33	0.80	41
125 VESTIBULE		0.00	2.00	0.00	268	16	1.00	16	0.80	20
BACKSTAGE SOUTH		2.50	8.00	0.06	1,299	93	1.00	93	1.00	117

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Ventilation Calculations for Cooling Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-clg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
121 AV EQUIPMENT (ANCU-1&2)													
119 ELECTRICAL		2,099	2,099	2,099	0	0							1,000
Single Fan CV		1,119	1,119	1,119	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1,000 *
ELECTRICAL ROOM 119 (ANCU-3)													
		1,119	1,119	1,119	0	0							1,000

Ventilation Parameters

System Zone Room		Occupancy Category	Rp cfm / p	Pz People	Ra cfm/ft²	Az ft²	Vbz cfm	Std 170 Min OA ach	—Cooling— Ez	Voz cfm	—Heating— Ez	Voz cfm
Alternative 1			2.50	8.00	0.08	1,209	93		93			117
BACKSTAGE SOUTH (AC-7)												
121 A/V EQUIPMENT		None	0.00	0.00	0.00	96	0	1.00	0	1.00	0	0
121 A/V EQUIPMENT (AHCU-1&2)			0.00	0.00	0.00	96	0		0			0
119 ELECTRICAL		None	0.00	0.00	0.00	644	0	1.00	0	1.00	0	0
ELECTRICAL ROOM 119 (AHCU-3)			0.00	0.00	0.00	644	0		0			0

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Ventilation Calculations for Heating Design

System	Zone	Room	Box Type	Vp2 cfm	Vfan cfm	Vd2 cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative															
WORSHIP CENTER NORTH				9,839	9,839	9,839	0	4,113	0.194	1.00	0.00	1.00	1.00	1.00	1.000 *
WORSHIP CENTER NORTH (AC-1)				9,839	9,839	9,839	0	4,113							1.000 *
MAIN LOBBY SOUTH				3,274	3,274	3,274	0	929	0.298	1.00	0.00	1.00	1.00	1.00	0.930 *
1211A CORRIDORS				280	280	280	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *
1211N RESTROOM				219	219	219	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *
109 CORRIDOR				317	317	317	0	0.345	1.00	0.00	1.00	1.00	1.00	1.00	1.000 *
113A/V STORAGE				12	12	12	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *
LOBBY NORTH				4,102	4,102	4,102	0	1,095							0.869 *
LOBBY NORTH (AC-4)				4,102	4,102	4,102	0	1,095							0.869 *
MAIN LOBBY SOUTH				2,099	2,099	2,099	0	588	0.280	1.00	0.00	1.00	1.00	1.00	0.912 *
10 WOMEN RESTROOM				228	228	228	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *
1010A CORRIDORS				559	559	559	0	80	0.144	1.00	0.00	1.00	1.00	1.00	1.000 *
100 ENTRY LOBBY				1,308	1,308	1,308	0	341	0.261	1.00	0.00	1.00	1.00	1.00	0.932 *
LOBBY SOUTH (AC-3)				4,194	4,194	4,194	0	1,010							0.912 *
WORSHIP CENTER SOUTH				9,795	9,795	9,795	0	4,113	0.260	1.00	0.00	1.00	1.00	1.00	1.000 *
WORSHIP CENTER SOUTH (AC-3)				9,795	9,795	9,795	0	4,113							1.000 *
PLATFORM (AC-6)				1,273	1,273	1,273	0	332	0.421	1.00	0.00	1.00	1.00	1.00	1.000 *
115 RAMP				216	216	216	0	0	0.143	1.00	0.00	1.00	1.00	1.00	1.000 *
116 SUPPORT				207	207	207	0	41	0.199	1.00	0.00	1.00	1.00	1.00	0.951 *
117 GREEN ROOM 1				228	228	228	0	55	0.243	1.00	0.00	1.00	1.00	1.00	0.908 *
120 GR 1 TOILET				24	24	24	0	14	0.340	1.00	0.00	1.00	1.00	1.00	0.756 *
120 SMALL STORAGE				18	18	18	0	7	0.234	1.00	0.00	1.00	1.00	1.00	0.756 *
BACKSTAGE NORTH				794	794	794	0	149							0.756 *
BACKSTAGE NORTH (AC-5)				794	794	794	0	149							0.756 *
124 GR 2 TOILET				22	22	22	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *
123 GREEN ROOM 2				224	224	224	0	55	0.247	1.00	0.00	1.00	1.00	1.00	0.903 *
122 SUPPORT				209	209	209	0	41	0.198	1.00	0.00	1.00	1.00	1.00	0.945 *
125 VESTIBULE				199	199	199	0	20	0.101	1.00	0.00	1.00	1.00	1.00	1.000 *
BACKSTAGE SOUTH				653	653	653	0	117							0.903 *
BACKSTAGE SOUTH (AC-7)				653	653	653	0	117							0.903 *
121 AV EQUIPMENT				2,099	2,099	2,099	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1.000 *

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Ventilation Calculations for Heating Design

System Zone Room	Box Type	Vpz cfm	Vfan cfm	Vdz cfm	Vpz-min cfm	Voz-htg cfm	Zd	Ep	Er	Fa	Fb	Fc	Evz
Alternative 1													
121 AV EQUIPMENT (AHCU-182)		2,099	2,099	2,099	0	0							1,000
119 ELECTRICAL	Single Fan CV	1,119	1,119	1,119	0	0	0.000	1.00	0.00	1.00	1.00	1.00	1,000 *
ELECTRICAL ROOM 119 (ANCU-3)		1,119	1,119	1,119	0	0							1,000

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REVISION: _____
REVISION: _____
DATE: 10/10/2025

DRAWN BY: SWH
CHECKED BY: TWL
Project Number: 2307
SHEET TITLE: VENTILATIONS CALCULATIONS

M4-1

MECHANICAL LEGEND

NOTE: NOT ALL SYMBOLS AND DESCRIPTIONS SHOWN IN THIS LEGEND MAY BE USED IN THIS PACKAGE. REFER TO DRAWINGS FOR ACTUAL SYMBOLS USED.

DEMOLITION - TO BE REMOVED		GATE VALVE	
INDICATES FLAG NOTE		BALL VALVE	
FULL RADIUS ELBOW		CHECK VALVE	
CONCENTRIC REDUCER		PLUG VALVE	
ECCENTRIC REDUCER		BUTTERFLY VALVE	
FLEXIBLE DUCT CONNECTOR		BALANCING VALVE	
FIRE DAMPER (PROVIDE ACCESS DOOR)		SAFETY/RELIEF VALVE	
SMOKE DAMPER (PROVIDE ACCESS DOOR)		THREE-WAY VALVE	
COMBINATION FIRE & SMOKE DAMPER (PROVIDE ACCESS DOOR)			
MANUAL VOLUME DAMPER			
VARIABLE AIR VOLUME (VAV) DAMPER		FLEXIBLE PUMP CONNECTOR (VIBRATION ELIMINATOR)	
FLAT-OVAL DUCT SIZE		PRESSURE GAGE	
MOTORIZED DAMPER (OR LOUVER)		THERMOMETER	
BACKDRAFT DAMPER		SECTION/DETAIL NUMBER	
DUCT SMOKE DETECTOR		DRAWING WHERE SHOWN	
INSULATED FLEX DUCT W/DAMPERED ROUND TAKEOFF FITTING WITH SCOOP			
DUCT RISE AND DROP IN DIRECTION OF AIR FLOW		AC	AIR CONDITIONER
SIDE WALL GRILLE OR REGISTER WITH AIR VOLUME EXTRACTOR		AFF	ABOVE FINISHED FLOOR
DUCT SIZE IN INCHES (CLEAR INSIDE DIMENSIONS)		AFG	ABOVE FINISHED GRADE
MITERED TEE W/TURNING VANES AND SPLITTER DAMPER		AH	AIR HANDLER
45° ENTRY TAKEOFF FITTING		AHU	AIR HANDLER UNIT
MITERED ELBOW W/TURNING VANES		AL	ALUMINUM
RECTANGULAR-TO-ROUND (OR OVAL) TRANSITION		AS	AIR SEPARATOR
90° BRANCH FITTINGS		BC	BLOWER COIL
45° BRANCH FITTINGS		BOD	BOTTOM OF DUCT
CONCENTRIC REDUCER ELBOW DOWN		CD	COIL CONDENSATE DRAIN
EXISTING		CHR	CHILLED WATER RETURN
NEW		CHS	CHILLED WATER SUPPLY
SUPPLY AIR DEVICE		CLG	CEILING
RETURN/EXHAUST AIR DEVICE		CS	CARBON STEEL
SUPPLY AIR DUCT, UP, DOWN		CU	CONDENSING UNIT OR COPPER
RETURN/EXHAUST DUCT UP, DOWN		CWR	CONDENSER WATER RETURN
AIR PATTERN (3-WAY SHOWN, ASSUME 4-WAY IF NOT OTHERWISE INDICATED.)		CWS	CONDENSER WATER SUPPLY
CONNECT TO EXISTING		DBL DEFL	DOUBLE DEFLECTION
AIR DEVICE CALLOUT AND CFM		DF	DUCT FURNACE
EQUIPMENT NUMBER TAG		EDH	ELECTRIC DUCT HEATER
ROOM THERMOSTAT WITH ASSOCIATED EQUIPMENT NUMBER (5' ± AFF)		EF	EXHAUST FAN
ROOM SENSOR WITH ASSOCIATED EQUIPMENT NUMBER (5' ± AFF)		ERV	ENERGY RECOVERY VENTILATOR
HANDICAPPED ROOM THERMOSTAT WITH ASSOCIATED EQUIPMENT NUMBER (4' ± AFF)		ET	EXPANSION TANK
ROOM HUMIDISTAT WITH ASSOCIATED EQUIPMENT NUMBER (5' ± AFF)		F	FURNACE
CARBON DIOXIDE SENSOR WITH EQUIPMENT NUMBER (5' ± AFF)		F	FAN COIL UNIT
DUCT MOUNTED CO2 SENSOR		FD	FLOOR DRAIN
DUCT MOUNTED HUMIDITY SENSOR		FLR	FLOOR
DOOR UNDERCUT SIZE		FOB	FLAT ON BOTTOM
		FOT	FLAT ON TOP
		FP	FAN POWERED VAV BOX
		GALV	GALVANIZED
		GV	GRAVITY VENTILATOR
		H	HEATER
		HG	REFRIGERANT HOT GAS
		HP	HEAT PUMP
		LWR	LOOP WATER RETURN
		LWS	LOOP WATER SUPPLY
		LPG	LIQUIFIED PROPANE GAS
		MFR	MANUFACTURER
		NG	NATURAL GAS
		NIC	NOT IN CONTRACT
		NTS	NOT TO SCALE
		OA	OUTSIDE AIR
		O.C.	ON CENTER
		OFE	OWNER FURNISHED EQUIPMENT
		P	PUMP
		PCD	PUMPED COIL CONDENSATE DRAIN
		PT	PRESSURE TREATED
		RA	RETURN AIR
		RL	REFRIGERANT LIQUID
		RS	REFRIGERANT SUCTION
		RTU	ROOFTOP A/C UNIT
		SA	SUPPLY AIR
		SF	SUPPLY FAN
		SS	STAINLESS STEEL
		STL	STEEL
		SUS	SUSPENDED
		TYP	TYPICAL
		UH	UNIT HEATER
		UNO	UNLESS NOTED OTHERWISE
		V	VARIABLE VOLUME BOX

MECHANICAL NOTES

- THESE DRAWINGS HAVE BEEN DEVELOPED FROM THE BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY ALL FIELD CONDITIONS, DIMENSIONS, CLEARANCES, LOCATION OF EXISTING UTILITIES, ETC. PRIOR TO BIDDING, FABRICATION, OR INSTALLATION. DO NOT SCALE FROM THESE DRAWINGS.
- COORDINATE INSTALLATION AMONG TRADES TO AVOID INTERFERENCES. INSTALL ALL MECHANICAL SYSTEM COMPONENTS TO PERMIT INSTALLATION OF CEILINGS AT HEIGHTS INDICATED ON THE ARCHITECTURAL DRAWINGS.
- INSTALL ALL HVAC EQUIPMENT PER MANUFACTURER RECOMMENDATIONS, INCLUDING REQUIRED MAINTENANCE CLEARANCES. PIPING, DUCTWORK, AND CONDUIT ROUTING SHALL NOT BLOCK REQUIRED ACCESS TO EQUIPMENT DOORS OR PANELS.
- VERIFY THE SLOPE OF THE BUILDING ROOF PRIOR TO ORDERING EQUIPMENT CURBS. USE CURBS RECOMMENDED BY THE EQUIPMENT MANUFACTURER FOR THE ACTUAL ROOF SLOPE. INSTALL EQUIPMENT PLUMB AND LEVEL; NOT PITCHED WITH ROOF.
- DESIGN BASIS FOR HVAC SYSTEMS, INCLUDING ASSOCIATED PIPING AND ELECTRICAL WORK, IS THE SCHEDULED EQUIPMENT. OTHER EQUIPMENT MAY BE CONSIDERED FOR SUBSTITUTION IF IT FULLY COMPLIES WITH THE SCHEDULE AND SPECIFICATIONS. SUBSTITUTION OF OTHER EQUIPMENT MAY REQUIRE CHANGES IN PIPING, ELECTRICAL POWER SUPPLY, MAINTENANCE CLEARANCES, STRUCTURAL SUPPORTS, ETC. ALL SUCH CHANGES SHALL BE COORDINATED THROUGHOUT ALL TRADES, AND SHALL BE PERFORMED WITH NO EXTENSION OF SCHEDULE, AND AT NO ADDITIONAL COST TO THE OWNER.
- THE HVAC EQUIPMENT SUPPLIER SHALL HAVE FACTORY SERVICE TECHNICIANS AVAILABLE WITHIN A 100 MILE RADIUS OF THE JOBSITE, AND SHALL OFFER 24 HR/7 DAY SERVICE AND REPAIRS.

EQUIPMENT PURCHASE SHALL BE FACTORY DIRECT FROM THE MANUFACTURER'S COMMERCIAL SALES OFFICE, NOT FROM MANUFACTURER'S DESIGNATED DEALERS/WHOLESALEERS, AND SHALL INCLUDE FACTORY DIRECT WARRANTY AND SUPPORT.

EQUIPMENT SUBMITTALS SHALL INCLUDE MANUFACTURER'S CALCULATED EQUIPMENT PERFORMANCE AT THE SCHEDULED DESIGN CONDITIONS.
- MOUNT OUTDOOR EQUIPMENT INSTALLED AT GRADE ON MINIMUM 4 INCH THICK REINFORCED CONCRETE PADS.

THE INDICATED DUCT ROUTING IS DIAGRAMMATIC. DO NOT FABRICATE FROM THESE DRAWINGS. FIELD VERIFY ROUTING AND AVAILABLE CLEARANCES. WHERE REQUIRED BY FIELD CONDITIONS, DUCTWORK MAY BE RE-SIZED USING ASHRAE/SMACNA EQUIVALENT SIZE CHARTS. NOTIFY ENGINEER AND OBTAIN APPROVAL FOR ROUTING AND SIZE CHANGES PRIOR TO BEGINNING FABRICATION.
- INDICATED DUCT SIZES ARE CLEAR INSIDE DIMENSIONS. WHERE DUCTLINER IS USED, MAKE ALLOWANCE FOR LINER THICKNESS.
- THE DUCTWORK SECTIONS LISTED BELOW SHALL BE EXTERNALLY INSULATED WITH 2 INCH THICK FLEXIBLE FIBERGLASS, MINIMUM R-6, WITH FACTORY-APPLIED REINFORCED FOIL VAPOR BARRIER. SEE SPECIFICATIONS.

AC-1&2: BALANCING DAMPERS IN SUPPLY DUCTWORK ABOVE WORSHIP CENTER CEILING.

AC-3&4: RIGID ROUND DUCTWORK CONCEALED ABOVE CEILINGS

AC-5,6&7: ALL RIGID ROUND DUCTWORK

RECTANGULAR SUPPLY AND RETURN DUCTWORK SHALL BE INTERNALLY INSULATED WITH 1-1/2 INCH THICK FIBERGLASS DUCTLINER, MINIMUM R-6. EXCEPTION: DUCTWORK LOCATED OUTDOORS SHALL BE PROVIDED WITH 2 INCH THICK DUCTLINER, MINIMUM R-8. SEE SPECIFICATIONS.
- SEAL LINED OUTDOOR DUCTWORK WITH SELF-ADHESIVE, WEATHERPROOF MEMBRANE JACKETING; VENTURECLAD, FLEXCLAD, OR APPROVED EQUAL. SEE SPECIFICATIONS.
- THE DUCTWORK LISTED BELOW SHALL BE DOUBLE WALL INSULATED SPIRAL DUCT. SEE SPECIFICATIONS.

ALL RIGID ROUND DUCTWORK FOR AC-1&2

RIGID ROUND DUCTWORK FOR AC-3&4 WHERE EXPOSED IN THE LOBBY AREA.
- MAXIMUM LENGTH OF FLEXIBLE DUCT SHALL BE FIVE FEET, UNLESS OTHERWISE INDICATED. NOTE: USE OF FLEX DUCT ABOVE THE WORSHIP CENTER CEILING IS PROHIBITED.
- PROVIDE DOUBLE THICKNESS TURNING VANES IN ALL MITERED ELBOWS AND TEES.
- EXCEPT AS OTHERWISE NOTED ON THE PLANS, RECTANGULAR DUCT ELBOWS FOR AC-1&2 SHALL BE LONG RADIUS TYPE, WITH MINIMUM CENTERLINE RADIUS EQUAL TO 1.5 TIMES DUCT WIDTH.
- WHERE DUCTWORK IS RUN EXPOSED IN FINISHED AREAS, PROVIDE A "PAINT GRIP" FINISH READY FOR FIELD PAINTING BY OTHERS. THE FINISH PAINT COLOR SHALL BE SELECTED BY THE ARCHITECT.

18-INSTALL ALL DIFFUSERS IN THE LOBBY AT APPROXIMATELY THE SAME HEIGHT ABOVE FINISHED FLOOR.

19-PROVIDE ALL MANUAL BALANCING DAMPERS ABOVE WORSHIP CENTER CEILING WITH REMOTE OPERATORS PER THE DETAIL.



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