

ABBREVIATIONS

(A)	ABANDON	DTR	DUAL TEMPERATURE WATER RETURN	IN	INCHES	RHS	REHEAT WATER SUPPLY
AAV	AUTOMATIC AIR VENT	DTS	DUAL TEMPERATURE WATER SUPPLY	INCL	INCLUD(E), (ING)	RL	REFRIGERANT LIQUID
AC	AIR CONDITIONER	DWG	DRAWING	INSL	INSULAT(E), (ED), (ION)	RP	RADIANT PANEL
ABS	ABSOLUTE	(E)	EXISTING	INT	INTERIOR	RFM	REVOLUTIONS PER MINUTE
ABV	ABOVE	EA	EXHAUST AIR	I/O	INPUT/OUTPUT	RS	REFRIGERANT SUCTION
AD	ACCESS DOOR	EAT	ENTERING AIR TEMPERATURE	IPS	INTERNATIONAL PIPE STANDARD	RTU	ROOFTOP UNIT
AF	ABOVE FINISHED FLOOR	EBH	ELECTRIC BASEBOARD HEATER	KW	KILOWATT	RV	RELIEF VALVE
AFS	AIR FLOW STATION	EC	ELECTRICAL CONTRACTOR	L	LOUVER OR LENGTH	SA	SUPPLY AIR
AHU	AIR HANDLING UNIT	EER	ENERGY EFFICIENCY RATIO	LAT	LEAVING AIR TEMP	SD	SUPPLY DIFFUSER
AI	ANALOG INPUT	EF	EXHAUST FAN	LB	POUND	SEC	SECONDS
AO	ANALOG OUTPUT	EG	EXHAUST AIR GRILLE	LD	LINEAR DIFFUSER	SF	SUPPLY FAN
AP	ACCESS PANEL	EHC	ELECTRIC HEATING COIL	LF	LINEAR FEET	SG	SUPPLY GRILLE
APD	AIR PRESSURE DROP	ELEC	ELECTRICAL	LPG	LIQUEFIED PETROLEUM GAS	SP	STATIC PRESSURE
ATC	AUTOMATIC TEMPERATURE CONTROL	ELEV	ELEVATION	LPR	LOW PRESSURE STEAM CONDENSATE RETURN	SQ	SQUARE
ATM	ATMOSPHERE	ENT	ENTERING	LPS	LOW PRESSURE STEAM	SR	SUPPLY REGISTER
AS	AIR SEPARATOR	EQUIP	EQUIPMENT	LVG	LEAVING	ST	SOUND TRAP
AVG	AVERAGE	ER	EXHAUST REGISTER	LVR	LOUVER	STC	STEAM CONDENSATE
AWT	AVERAGE WATER TEMPERATURE	ERU	ENERGY RECOVERY UNIT	LWT	LEAVING WATER TEMP	STM	STEAM
BCU	BLOWER COIL UNIT	ESP	EXTERNAL STATIC PRESSURE	MAU	MAKEUP AIR UNIT	TDH	TOTAL DYNAMIC HEAD
BDD	BACK DRAFT DAMPER	ET	EXPANSION TANK	MAV	MANUAL AIR VENT	TDV	TRIPLE DUTY VALVE
BFP	BACKFLOW PREVENTER	EW	ELECTRIC WALL HEATER	MBX	MAXIMUM	TG	TRANSFER GRILLE
BFW	BOILER FEEDWATER	EWT	ENTERING WATER TEMPERATURE	MBH	1,000 BTUH	TSP	TOTAL STATIC PRESSURE
BFWP	BOILER FEEDWATER PUMP	EXP	EXPANSION	MC	MECHANICAL CONTRACTOR	TYP	TYPICAL
BI	BINARY INPUT	F	FAHRENHEIT	MECH	MECHANICAL	UC	UNDER CUT
BLR	BOILER	FA	FACE AREA	MIN	MINIMUM	UH	UNIT HEATER
BLW	BELOW	FBD	FACE & BYPASS DAMPER	MISC	MISCELLANEOUS	UNO	UNLESS NOTED OTHERWISE
BNR	BURNER	F&T	FLOAT & THERMOSTATIC	(N)	NEW	UV	UNIT VENTILATOR
BO	BINARY OUTPUT	FC	FLEXIBLE CONNECTION	NC	NOISE CRITERIA	VA	VOLT AMPERE
BOD	BOTTOM OF DUCT	FCU	FAN COIL UNIT	NK	NECK	VAV	VARIABLE AIR VOLUME
BOP	BOTTOM OF PIPE	FD	FIRE DAMPER	NTS	NOT TO SCALE	VB	VACUUM BREAKER
BTU	BRITISH THERMAL UNIT	FF	FINAL FILTER	OA	OUTSIDE AIR	VD	VOLUME DAMPER
BTUH	BTU PER HOUR	FIN	FINISH	OAD	OUTSIDE AIR DAMPER	VEL	VELOCITY
BYP	BYPASS	FLR	FLOOR	OAI	OUTSIDE AIR INTAKE	VFD	VARIABLE FREQUENCY DRIVE
C	CONNECTOR	FO	FUEL OIL	OAT	OUTSIDE AIR TEMPERATURE	VP	VELOCITY PRESSURE
CAP	CAPACITY	FOP	FUEL OIL PUMP	OD	OUTSIDE DIMENSIONS OR OUTSIDE DIAMETER	W	WIDTH
CAV	CONSTANT AIR VOLUME	FOR	FUEL OIL RETURN	OED	OPEN END DUCT	W/	WITHOUT
CC	COOLING COIL	FOS	FUEL OIL SUPPLY	OS&Y	OUTSIDE SCREW & YOKE	WB	WET BULB
CD	CONDENSATE DRAIN	FOV	FUEL OIL VENT	P	PUMP	W/O	WITHOUT
CFM	CUBIC FEET PER MINUTE	FTR	FINNED TUBE RADIATION	PD	PRESSURE DROP	WC	WATER COLUMN
CH	CHILLER	G	NATURAL GAS	PF	PRE FILTER	WH	WATER HEATER
CHWP	CHILLED WATER PUMP	GAL	GALLON	PH	PHASE	WMS	WIRE MESH SCREEN
CHWR	CHILLED WATER RETURN	GC	GENERAL CONTRACTOR	PHC	PREHEAT COIL	WT	WEIGHT
CHWS	CHILLED WATER SUPPLY	GPH	GALLONS PER HOUR	PHR	PREHEAT WATER RETURN		
CKT	CIRCUIT	GPM	GALLONS PER MINUTE	PHS	PREHEAT WATER SUPPLY		
CLG	CEILING	GRV	GRAVITY RELIEF VENTILATOR	PLMB	PLUMBING		
CONC	CONCRETE	H	HUMIDIFIER	PPM	PARTS PER MILLION		
COP	COEFFICIENT OF PERFORMANCE	HC	HEATING COIL	PRV	PRESSURE REDUCING VALVE		
CP	CONDENSATE PUMP	HOA	HAND OFF AUTO	PSI	POUNDS PER SQUARE INCH		
CRP	CONDENSATE RETURN PUMP	HORIZ	HORIZONTAL	PSIA	POUNDS PER SQUARE INCH ABSOLUTE		
CT	COOLING TOWER	HP	HEAT PUMP OR HORSEPOWER	PSIG	POUNDS PER SQUARE INCH GAUGE		
CU	CONDENSING UNIT	HPLR	HEAT PUMP WATER LOOP RETURN	PTAC	PACKAGED TERMINAL AIR CONDITIONER		
CUH	CABINET UNIT HEATER	HPLS	HEAT PUMP WATER LOOP SUPPLY	PUH	PROPPELLER UNIT HEATER		
CW	COLD WATER (DOMESTIC)	HPR	HIGH PRESSURE STEAM CONDENSATE RETURN	PVC	POLYVINYL CHLORIDE		
CWP	CONDENSER WATER PUMP	HPS	HIGH PRESSURE STEAM	QTY	QUANTITY		
CWR	CONDENSER WATER RETURN	HR	HOUR	(R)	REMOVE		
CWS	CONDENSER WATER SUPPLY	HT	HEIGHT	RA	RETURN AIR		
DB	DRY BULB TEMPERATURE	HW	HOT WATER	RAG	RELIEF AIR GRILLE		
DDC	DIRECT DIGITAL CONTROL	HWP	HOT WATER PUMP	RAV	RELIEF AIR VENT		
DEG	DEGREE	HWR	HEATING HOT WATER RETURN	(REL)	RELOCATE		
DIA	DIAMETER	HWS	HEATING HOT WATER SUPPLY	RF	RETURN FAN		
DN	DOWN	HZ	HERTZ	RG	RETURN GRILLE		
DOAS	DEDICATED OUTSIDE AIR SYSTEM	ID	INSIDE DIMENSIONS OR INSIDE DIAMETER	RH	RELATIVE HUMIDITY		
DS	DUCT SILENCER	IH	INFRARED HEATER	RHR	REHEAT WATER RETURN		

GENERAL NOTES

- THE FOLLOWING NOTES APPLY TO ALL MECHANICAL DRAWINGS.
- ALL WORK SHALL BE IN ACCORDANCE WITH THE INTERNATIONAL MECHANICAL CODE 2018 AND ALL OTHER APPLICABLE CODES AND STANDARDS.
- MECHANICAL CONTRACTOR SHALL ENSURE 36" MIN. CLEARANCE IN FRONT OF ALL ACCESS PANELS.
- ALL DRAWINGS ARE DIAGRAMMATIC. MECHANICAL CONTRACTOR SHALL CAREFULLY EXAMINE EXISTING CONDITIONS PRIOR TO STARTING WORK.
- CONTRACTOR TO FIELD VERIFY ALL DIMENSIONS, SIZES, CLEARANCES AND LOCATIONS PRIOR TO THE START OF CONSTRUCTION. WHEN CONFLICTS ARISE, MAKE ANY NECESSARY CHANGES TO ROUTING OF DUCTWORK AND PIPING AT NO ADDITIONAL COST.
- ALL FLOOR MOUNTED HVAC EQUIPMENT SHALL BE INSTALLED ON 4" HIGH CONCRETE HOUSEKEEPING PADS PROVIDED BY THE MECHANICAL CONTRACTOR.
- MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING COORDINATION DRAWINGS SHOWING ALL TRADES, NO EQUIPMENT, PIPING, DUCTWORK, ETC. IS TO BE INSTALLED WITHOUT APPROVAL BY THE ENGINEER.
- ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.
- SCHEDULES DO NOT REPRESENT EQUIPMENT QUANTITIES. REFER TO THE PLANS FOR ACTUAL QUANTITIES.
- DUCT SIZES SHOWN ON DRAWINGS REFER TO INSIDE CLEAR DIMENSIONS UNLESS OTHERWISE NOTED.
- ALL BRANCH DUCTS TO SUPPLY/RETURN/EXHAUST REGISTERS AND DIFFUSERS SHALL BE 2" LARGER (WIDER) THAN REGISTER/DIFFUSER NECK SIZE, UNLESS NOTED OTHERWISE.
- MECHANICAL CONTRACTOR SHALL PROVIDE FLEXIBLE CONNECTIONS AT ALL DUCTWORK TO EQUIPMENT CONNECTIONS.
- PROVIDE SUPPLY, RETURN AND EXHAUST DUCTWORK TRANSITIONS AS REQUIRED BY THE PLANS, SPECIFICATIONS, AND ACTUAL JOB CONDITIONS.
- COORDINATE ALL THERMOSTAT/TEMPERATURE SENSOR LOCATIONS WITH THE ARCHITECT PRIOR TO INSTALLATION.
- COORDINATE ALL HUMIDISTAT/HUMIDITY SENSOR LOCATIONS WITH THE ARCHITECT PRIOR TO INSTALLATION.
- MECHANICAL CONTRACTOR SHALL PROVIDE "UL" LISTED FIRE DAMPERS FOR ALL DUCTWORK PENETRATIONS THROUGH FIRE RATED SURFACES AND "UL" LISTED FIRE/SMOKE DAMPERS FOR ALL DUCTWORK PENETRATIONS THROUGH FIRE/SMOKE RATED SURFACES.
- MECHANICAL CONTRACTOR SHALL PROVIDE "UL" LISTED THROUGH PENETRATION FIRESTOP SYSTEMS WITH FIREPROOF SLEEVES AT ALL NEW PIPING PENETRATIONS THRU FIRE RATED WALLS AND FLOORS.
- INDICATED DUCT AND PIPING ARE DIAGRAMMATIC. MECHANICAL CONTRACTOR SHALL DETERMINE ALL REQUIRED OFFSETS AND DIRECTION CHANGES BEFORE FABRICATION AND INSTALLATION TO AVOID INTERFERENCE WITH OTHER TRADES.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK AND PIPING IS OVERHEAD, TIGHT TO UNDERSIDE OF SLAB/STEEL, WITH SPACE FOR INSULATION.
- MANUFACTURERS AND MODEL NUMBERS INDICATED ON THE PLANS, SCHEDULES AND SKETCHES ARE PROVIDED AS A BASIS OF DESIGN ONLY. BIDDERS SHALL REFER TO THE SPECIFICATIONS FOR A LISTING OF MULTIPLE ACCEPTABLE MANUFACTURERS FOR EACH OF THESE ITEMS. SIMILAR PRODUCTS FROM ANY OF THESE MANUFACTURERS MAY BE FURNISHED PROVIDED THEY MEET THE INTENT OF THE SPECIFICATIONS. ANY CHANGES TO THE DESIGN REQUIRED AS A RESULT OF A SUBSTITUTION ARE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.
- PROVIDE P-TRAP OF SUFFICIENT SEAL DEPTH TO OVERCOME UNIT STATIC PRESSURE ON ALL AIR HANDLING UNITS.
- REFER TO ELECTRICAL DRAWINGS FOR SMOKE DETECTOR LOCATIONS.

LIST OF DRAWINGS

MECHANICAL DRAWINGS

M001	MECHANICAL COVER SHEET
M101	MECHANICAL FIELD HOUSE DUCTWORK AND ROOF PLANS
M102	MECHANICAL GROUNDS AND FIELD BUILDING PLAN
M201	MECHANICAL FIELD HOUSE PIPING PLAN
M301	MECHANICAL SCHEDULES
M401	MECHANICAL CONTROLS
M501	MECHANICAL DETAILS
M502	MECHANICAL DETAILS
M503	MECHANICAL DETAILS

TESD CONESTOGA ATHLETIC FIELDS

TREDFYFRIN TOWNSHIP
CHESTER COUNTY, PA

HSA PROJECT # :21-019

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SYMBOL LEGEND

	EQUIPMENT MARKER (TYPE SF, NUMBER 1)		OGEE OFFSET		BALL VALVE		PIPE REDUCER		DUAL TEMPERATURE SUPPLY PIPE		DENOTES CONNECT TO EXISTING
	SECTION INDICATOR (SECTION 1 ON DWG M301)		MITRE OFFSET		LOCKSHIELD BALL VALVE		PIPE FLANGE		DUAL TEMPERATURE RETURN PIPE		DENOTES LIMIT OF DEMOLITION
	DETAIL INDICATOR (DETAIL 1 ON DWG M501)		FLEXIBLE DUCT CONNECTION		BUTTERFLY VALVE		PIPE UNION		HEAT PUMP LOOP SUPPLY PIPE		EXISTING WORK TO REMAIN
	KEY NOTE INDICATOR (REFERS TO NOTES ON SAME SHEET)		BELLMOUTH TAKE-OFF		GATE VALVE		Y-TYPE STRAINER		HEAT PUMP LOOP RETURN PIPE		WORK TO BE REMOVED
	INSIDE DUCT DIMENSIONS (IN INCHES, FIRST DIM AS VIEWED) DASHED LINED INDICATES INTERNAL LINING		DUCT TO OFFSET UP IN DIRECTION OF ARROW TO AVOID OBSTRUCTION		OS&Y GATE VALVE		FUNNEL DRAIN		HIGH PRESSURE STEAM SUPPLY PIPE		NEW WORK
	RECTANGULAR SUPPLY DUCT TURNED UP		FLEXIBLE DUCT		GLOBE VALVE		RELIEF VALVE		HIGH PRESSURE STEAM RETURN PIPE		
	RECTANGULAR SUPPLY DUCT TURNED DOWN		BELLMOUTH TAKE-OFF		PLUG VALVE		AIR VENT		HOT WATER SUPPLY PIPE		
	ROUND DUCT TURNED UP		FIRE DAMPER		3-WAY CONTROL VALVE		THERMOMETER IN THERMOWELL		HOT WATER RETURN PIPE		
	ROUND DUCT TURNED DOWN		SMOKE DAMPER		2-WAY CONTROL VALVE		PRESSURE GAUGE W/SHUTOFF COCK		FUEL OIL SUPPLY PIPE		
	RECTANGULAR RETURN/EXHAUST DUCT TURNED UP		BACKDRAFT DAMPER		PRESSURE REDUCING VALVE		PRESSURE GAUGE W/SNUBBER AND SHUTOFF COCK		FUEL OIL RETURN PIPE		
	RECTANGULAR RETURN/EXHAUST DUCT TURNED DOWN		MOTORIZED ATC DAMPER		GAS PRESSURE REGULATOR		PRESSURE GAUGE W/SYPHON AND SHUTOFF COCK		LOW PRESSURE STEAM SUPPLY PIPE		
	SQUARE ELBOW WITH TURNING VANE		COMBINATION FIRE/SMOKE DAMPER		CHECK VALVE		TEMPERATURE AND PRESSURE PORT		LOW PRESSURE STEAM RETURN PIPE		
	ROUND ELBOW OR RADIUS ELBOW		GRILLE, REGISTER, DIFFUSER (GRD) MARKER (TAG A, 8" Ø NECK, 200 CFM) S=SUPPLY R=RETURN E=EXHAUST T=TRANSFER		CALIBRATED BALANCING VALVE		FLEXIBLE PIPE CONNECTION		PUMPED STEAM CONDENSATE		
			SUPPLY AIR DIFFUSER (BLACK TRIANGLE INDICATES BLANK-OFF)		AUTOMATIC FLOW CONTROL VALVE		PIPE CAP		COOLING COIL CONDENSATE DRAIN		
			SUPPLY AIR DIFFUSER W/RIGID ELBOW AT NECK		TRIPLE DUTY VALVE (COMBINATION CHECK, BALANCING, SHUTOFF)		PIPE TURNED DOWN		PREHEAT SUPPLY PIPE		
			RETURN/EXHAUST GRILLE OR REGISTER		PIPE EXPANSION JOINT/EXPANSION COMPENSATOR		PIPE TURNED UP		PREHEAT RETURN PIPE		
					FLOW SWITCH		TEE TURNED DOWN		REHEAT SUPPLY PIPE		
					PRESSURE SWITCH		TEE TURNED UP		REHEAT RETURN PIPE		
					VENTURI FLOW MEASURING DEVICE		CHILLED WATER SUPPLY PIPE		PUMP		
					PITOT DEVICE		CHILLED WATER RETURN PIPE		THERMOSTAT/TEMPERATURE SENSOR		
							CONDENSER WATER SUPPLY PIPE		HUMIDITY SENSOR		
							CONDENSER WATER RETURN PIPE		STATIC PRESSURE SENSOR		
									CARBON DIOXIDE SENSOR		
									DOOR TO BE UNDERCUT 3/4"		

ISSUE HISTORY

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SHEET TITLE
MECHANICAL COVER SHEET

DRAWING NUMBER
M001

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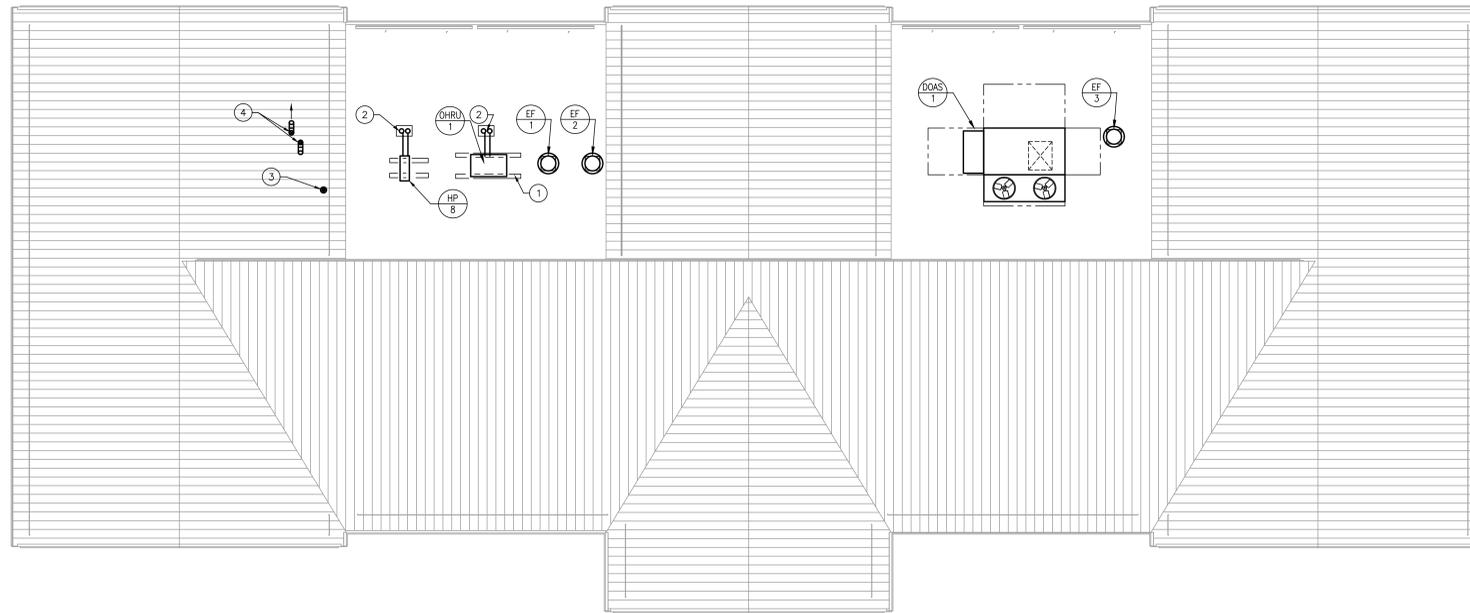
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GENERAL NOTES:

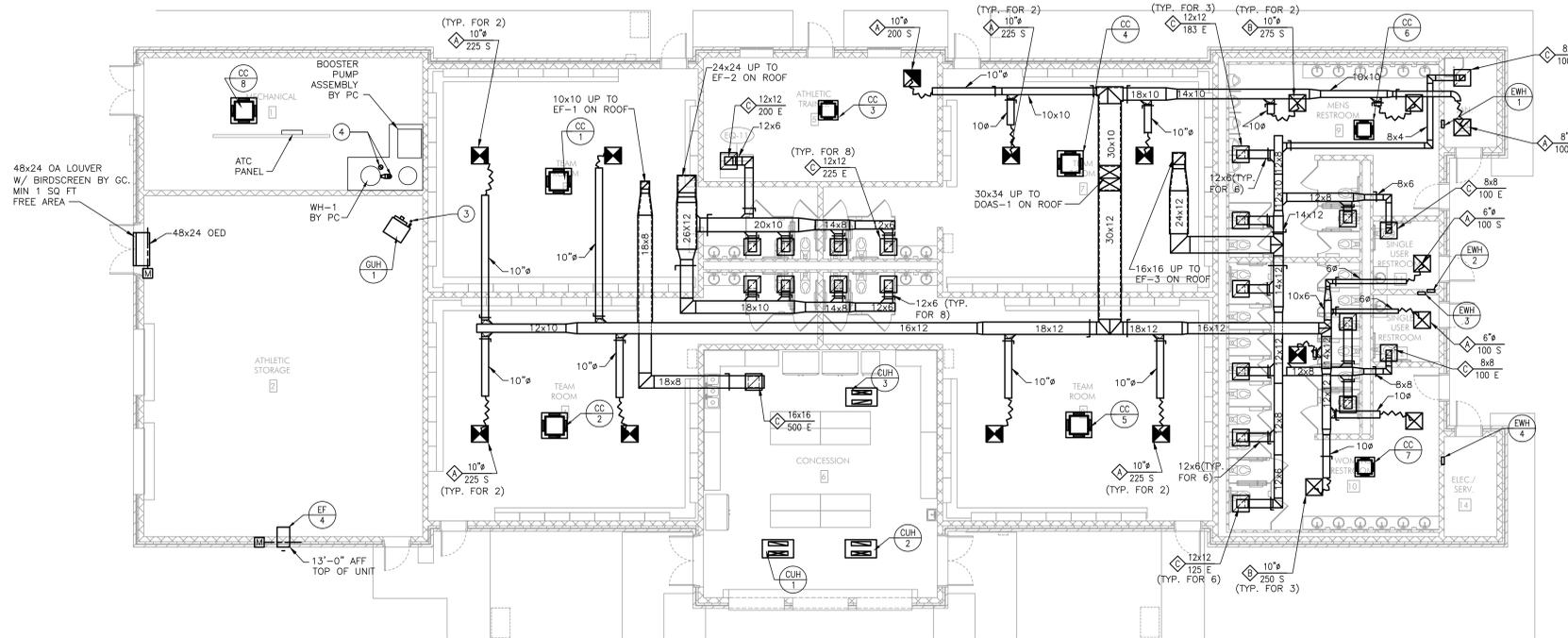
1. REFER TO DRAWING M001 FOR GENERAL NOTES.
2. PROVIDE ACOUSTICAL LINING ON FIRST 10 FT OF SUPPLY DUCT & FIRST 10 FT OF EXHAUST DUCTWORK ON ALL DOAS & EFS. REFER TO SPECIFICATION 233113 FOR ADDITIONAL LINER REQUIREMENTS.

NEW WORK KEY NOTES:

1. PROVIDE AND INSTALL EQUIPMENT SUPPORTS SIMILAR TO PATE MODEL ES AND ANCHOR CU TO CURB. ANCHOR CURB TO STRUCTURE WITH ANCHOR BOLTS. EQUIPMENT SUPPORT TO EXTEND FAST CONDENSING UNIT BY MIN 1' FOR MOUNTING OF RECEPTACLE & DISCONNECT BY EC.
2. REFRIGERANT PIPING DN TO INDOOR UNIT. PROVIDE AND INSTALL NEW PIPE CURB SIMILAR TO ROOF PENETRATION HOUSING AW SERIES WITH WITH ALL BOOTS AND CLAMPS AS REQUIRED FOR NEW REFRIGERANT PIPING AND ELECTRICAL CONDUITS. COORDINATE WITH EC FOR LOCATIONS AND QUANTITY OF CONDUITS. CUT OPENINGS AS REQUIRED. ANCHOR CURB TO STRUCTURE. REFER TO ARCHITECTURAL PLANS FOR FLASHING OF ROOF.
3. WH 2" CPVC INTAKE & EXHAUST UP THRU ROOF W/ CONCENTRIC VENT. REFER TO DETAIL 10, DWG M502 FOR TERMINATION REQUIREMENTS.
4. WH 6" CPVC INTAKE & 6" CPVC EXHAUST UP THRU ROOF. REFER TO DETAIL 9, DWG M502 FOR TERMINATION REQUIREMENTS.



2 FIELD HOUSE - ROOF
M101 1/8" = 1'-0"



1 FIELD HOUSE FLOOR PLAN- DUCTWORK
M101 1/8" = 1'-0"



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**MECHANICAL FIELD
HOUSE DUCTWORK
AND ROOF PLANS**
DRAWING NUMBER

M101

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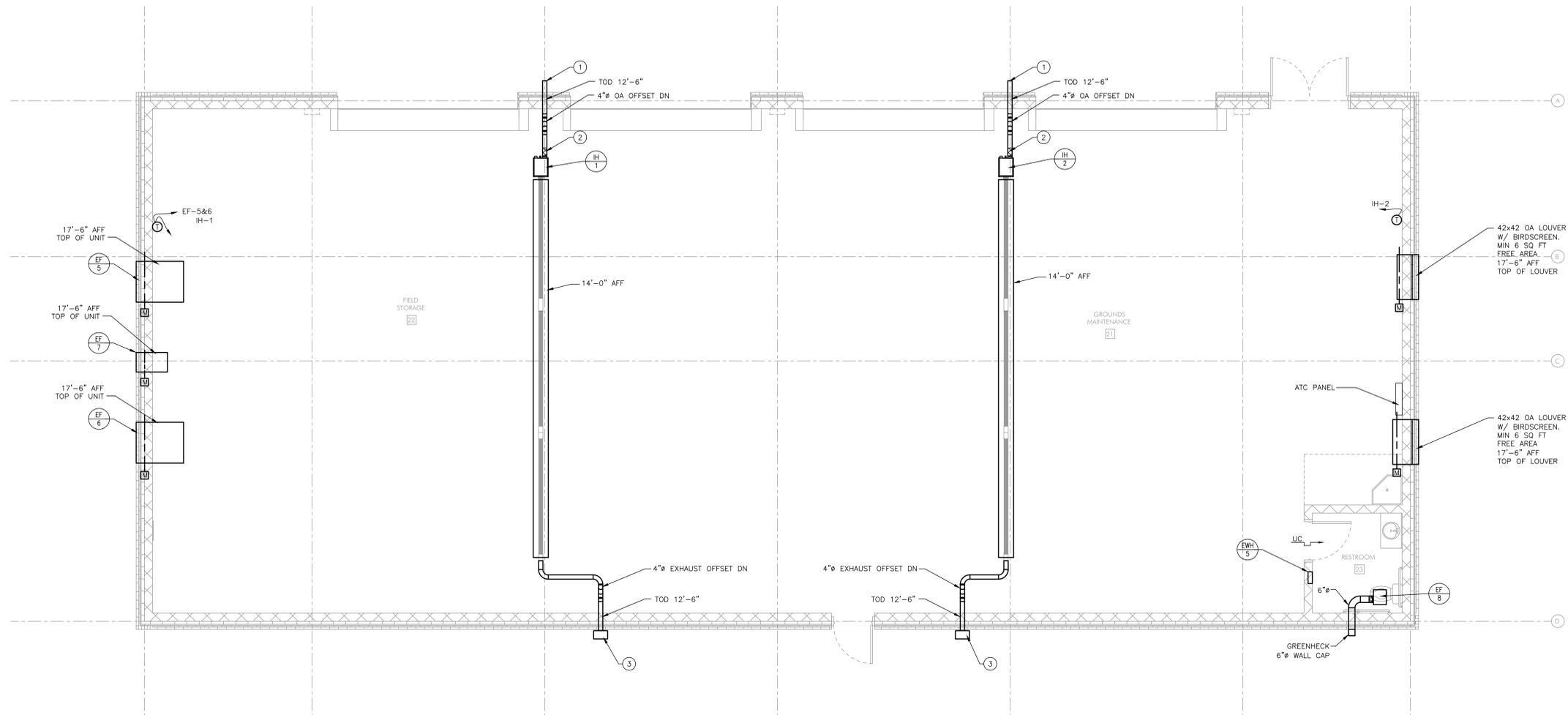
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GENERAL NOTES:

1. REFER TO DRAWING M001 FOR GENERAL NOTES.

NEW WORK KEY NOTES:

- 1 4" INFRARED HEATER INTAKE THRU WALL TO ROBERTS GORDON 4" VENT CAP W/ BIRD SCREEN.
- 2 PROVIDE CORRUGATED 0.006" THICK FLEXIBLE STAINLESS STEEL DUCT CONNECTION.
- 3 PROVIDE 4" INFRARED HEATER EXHAUST PIPING TERMINATION WITH INTEGRAL WALL THIMBLE ROBERTS GORDON P/N 90502100. SEAL AROUND PENETRATION WITH THERMAL INSULATING CAULKING. CENTER TERMINATION BETWEEN WINDOWS. REFER TO SPECIFICATION 235523 FOR ADDITIONAL EXHAUST VENT REQUIREMENTS.



1 GROUND
M102 1/4" = 1'-0"



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**MECHANICAL
GROUNDS & FIELDS
BUILDING PLAN**

DRAWING NUMBER

M102

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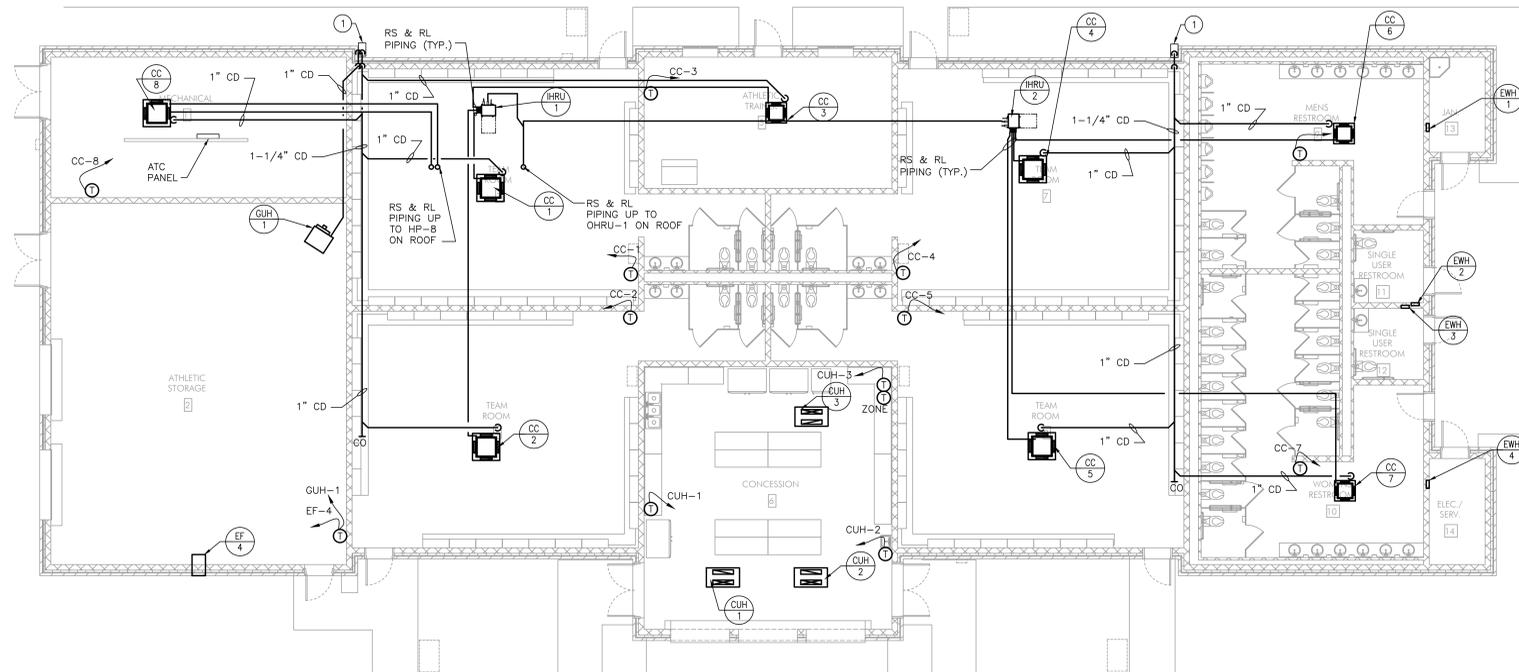
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NOTES:

1. FOR GENERAL NOTES, REFER TO DRAWING M0-1.

NEW WORK KEY NOTES:

① RUN 1-1/4" CONDENSATE DN IN WALL TO EXTERIOR, W/ ELBOW DN AND SPILL 4" ABOVE GRADE ONTO CONCRETE SPLASH BLOCK. MAKE PENETRATION THROUGH WALL WEATHER-TIGHT. CONNECT CONDENSATE PIPING TO UNIT.



1 FIELD HOUSE FLOOR PLAN
M201 1/8" = 1'-0"

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SHEET TITLE

**MECHANICAL FIELD
HOUSE PIPING PLAN**

DRAWING NUMBER

M201

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DOAS UNIT SCHEDULE

DOAS TAG	AREA SERVED	MAX SUPPLY CFM	MINIMUM COOLING CFM	MINIMUM OA CFM	SUPPLY FAN										D/X COOLING @ 95 °F							HOT GAS REHEAT				GAS HEAT					ELECTRICAL CHARACTERISTICS					EER	MAXIMUM DIMENSIONS L x W x H	AIRFLOW ARRANGEMENT	OPERATING WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.			
					ESP IN. WC	TSP IN. WC	BHP	HP	FAN RPM	ENT AIR		LVG AIR		FACE VEL FPM	GROSS TOTAL MBH	GROSS SENSIBLE MBH	NET TOTAL MBH	NET SENSIBLE MBH	CONDENSER FAN MOTOR			COMPRESSOR		LVG AIR		AIR		HEATING MODULATION	INPUT MBH	OUTPUT MBH	MANIFOLD GAS PRESSURE IN. W.C.	VOLTS	PHASE	CYCLE	MCA						MOCP		
										DB °F	WB °F	DB °F	WB °F						NO.	H.P. EA.	FLA EA.	NO.	RLA EA. 1/2	DB °F	WB °F	ENT °F	LVG °F																
DOAS-1	TEAM ROOMS/RESTROOMS	3,600	3,600	3,600	1.5	2.3	2.1	3	1170	93.0	76.0	55.1	56.6	181	246.7	143.0	240.7	137.0	2	1	3.6	2	14.7/14.8	63.4	72	61.3	0.0	84.3	13:1	MODULATING	405	328.1	6-10.5	460	3	60	50	60	12.2	111"x101"x60"	DOWNFLOW	2,900	AAON RN-020-3-0-HA09-38B

- PROVIDE UNIT COMPLETE W/ FACTORY MOUNTED, NON-FUSED DISCONNECT SWITCH.
- PROVIDE UNIT COMPLETE W/VARIABLE CAPACITY LEAD COMPRESSOR.
- PROVIDE UNIT COMPLETE W/ 0-100% OUTSIDE AIR ECONOMIZER DAMPERS AND HOODS.
- PROVIDE UNIT COMPLETE W/SUPPLY FAN WITH VFD DRIVE, & HIGH EFFICIENCY MOTOR.
- PROVIDE UNIT COMPLETE W/ HOT GAS REHEAT COIL WITH RH SENSOR.
- PROVIDE UNIT COMPLETE W/ 2" PLEATED MERV 13 FILTERS.
- PROVIDE UNIT COMPLETE W/ BLOWER PROVING SWITCH.
- PROVIDE UNIT COMPLETE W/ DIRTY FILTER SWITCH.
- PROVIDE UNIT COMPLETE W/ DISCHARGE AIR TEMPERATURE SENSOR.
- PROVIDE UNIT COMPLETE W/ VARIABLE SPEED CONDENSER FAN WITH HEAD PRESSURE CONTROL AND VFD FOR BOTH FANS.
- PROVIDE UNIT COMPLETE W/ TERMINAL STRIP CONTROL INTERFACE. REFER TO SPECIFICATION DWG M401 FOR ADDITIONAL REQUIREMENTS.
- PROVIDE UNIT COMPLETE W/ LED SERVICE LIGHTS & CONVENIENCE OUTLET WIRED TO LINE SIDE OF DISCONNECT.
- PROVIDE UNIT COMPLETE W/ MINIMUM 18" HIGH ROOF CURB.
- PROVIDE UNIT COMPLETE W/ A SHORT CIRCUIT CURRENT RATING OF 35 KAIC.
- PROVIDE UNIT COMPLETE W/ MODULATING GAS HEAT W/ STAINLESS STEEL GAS HEAT EXCHANGER

EXHAUST FAN SCHEDULE

UNIT TAG	LOCATION	SERVICE	CFM	ESP IN. WC	FAN RPM	BHP (WATTS)	MOTOR HP (WATTS)	SONES (dB)	DRIVE: DIRECT/V-BELT	ELECTRICAL CHARACTERISTICS			MAXIMUM DIMENSIONS L x W x H, IN.	WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	REMARKS
										VOLTS	PHASE	CYCLE				
EF-1	ROOF	CONCESSION 6	500	0.4	1337	0.08	1/6	6.7	DIRECT	115	1	60	22# x 17	34	GREENHECK G-095-VG	1
EF-2	ROOF	TRAINING ROOM/BATHROOMS	2,000	0.5	749	0.27	3/4	7.2	DIRECT	115	1	60	37# x 46	158	GREENHECK G-180-VG	1
EF-3	ROOF	RESTROOMS	1,600	0.6	896	0.27	1/2	9.8	DIRECT	115	1	60	29# x 48	123	GREENHECK CUE-160-VG	1
EF-4	WALL	ATHLETIC STORAGE 2	600	0.3	1302	0.09	1/4	7.9	DIRECT	115	1	60	29x18x18	84	GREENHECK SE1-12-432-VG	2
EF-5	WALL	FIELD STORAGE 22	3,500	0.35	749	0.39	3/4	7.2	DIRECT	208	3	60	44x39x39	338	GREENHECK SE2-30-610-B15-VG	3
EF-6	WALL	FIELD STORAGE 22	3,500	0.35	749	0.39	3/4	7.2	DIRECT	208	3	60	44x39x39	338	GREENHECK SE2-30-610-B15-VG	3
EF-7	WALL	FIELD STORAGE 22	600	0.3	1302	0.09	1/4	7.9	DIRECT	115	1	60	29x18x18	84	GREENHECK SE1-12-432-VG	2
EF-8	WALL	RESTROOM 23	70	0.3	698	-	(36)	0.3	DIRECT	115	1	60	14x14x7	14	GREENHECK SP-B110	4

- PROVIDE UNIT COMPLETE WITH 18" ROOF CURB W/ HINGED BASE & DAMPER TRAY, BACKDRAFT DAMPER, UNIT MOUNTED DISCONNECT SWITCH, EC MOTOR W/ MOTOR MOUNTED SPEED DIAL.
- PROVIDE UNIT COMPLETE WITH MOTORIZED WD-320 DAMPER, UNIT MOUNTED DISCONNECT SWITCH, EC MOTOR WITH MOTOR MOUNTED SPEED DIAL, CLOSURE ANGLES AND WALL HOUSING W/ OSHA GUARD.
- PROVIDE UNIT COMPLETE WITH MOTORIZED VCD-23 DAMPER, UNIT MOUNTED DISCONNECT SWITCH, EC MOTOR WITH MOTOR MOUNTED SPEED DIAL, CLOSURE ANGLES AND WALL HOUSING W/ OSHA GUARD.
- PROVIDE UNIT COMPLETE WITH UNIT MOUNTED DISCONNECT SWITCH, BACKDRAFT DAMPER, 6" WALL CAP GREENHECK WC-6 & MOTOR MOUNTED SPEED DIAL.

HEAT PUMP UNIT SCHEDULE

UNIT TAG	TONS	COOLING CAPACITY BTUH	HEATING CAPACITY BTUH	COMPRESSOR			CONDENSER FAN MOTOR		ELECTRICAL CHARACTERISTICS					MAX. AMBIENT TEMP. °F	SEER (EER)	HSPF (COP)	MAXIMUM DIMENSIONS, IN. LxWxH	MAXIMUM SOUND PRESSURE LEVEL dBA	OPERATING WEIGHT LBS	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	
				QTY.	H.P. EA.	RLA	QTY.	KW EA.	FLA EA.	VOLTS	PHASE	CYCLE	MCA								MOCP
HP-8	2	24,000	27,000	1	-	15.3	1	-	-	208	1	60	16.5	20	95	18.5	10.2	37x13x39	58	172	DAIKEN RZ024TAVJUA

- UNITS TO BE PROVIDED WITH NON-FUSED, UNIT MOUNTED DISCONNECT SWITCH BY THE EC.
- PROVIDE UNIT COMPLETE WITH LOW AMBIENT OPERATION DOWN TO 0°F.

HEAT PUMP UNIT SCHEDULE

UNIT TAG	TONS	COOLING CAPACITY BTUH	HEATING CAPACITY BTUH	HEAT RECOVERY CAPACITY BTUH	COMPRESSOR			CONDENSER FAN MOTOR		ELECTRICAL CHARACTERISTICS					MAX. AMBIENT TEMP. °F	SEER (EER)	HSPF (COP)	MAXIMUM DIMENSIONS, IN. LxWxH	MAXIMUM SOUND PRESSURE LEVEL dBA	OPERATING WEIGHT LBS	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	
					QTY.	H.P. EA.	RLA, COMP.# 1/2/3/4	QTY.	KW EA.	FLA EA.	VOLTS	PHASE	CYCLE	MCA								MOCP
OHRU-1	12	141,000	108,000	108,000	1	-	19.3	1	-	-	460	3	60	21.3	25	95	(12.5)	(3.8)	49x31x66	65	800	DAIKEN REYQ144AAVDA

- ALL UNITS TO BE PROVIDED WITH NON-FUSED, UNIT MOUNTED DISCONNECT SWITCH BY THE EC.
- PROVIDE OHRU-1 WITH HEAT RECOVERY FOR SIMULTANEOUS HEATING & COOLING.
- PROVIDE COMPLETE WITH HERO SIMPLE EDGE CLOUD COMMUNICATION ADAPTOR.
- PROVIDE UNIT COMPLETE WITH OVER/UNDER VOLTAGE AND PHASE LOSS PROTECTION KIT.

VRF INDOOR HEAT RECOVERY UNIT SCHEDULE

UNIT TAG	UNITS SERVED	NO. OF PORTS	MAX PORT CAPACITY BTUH	MAX UNIT CAPACITY BTUH	ELECTRICAL CHARACTERISTICS					MAXIMUM DIMENSIONS, IN. LxWxH	OPERATING WEIGHT LBS	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
					VOLTS	PHASE	CYCLE	AMPS	MOCP			
IHRU-1	CC-1/CC-2/CC-3	4	54,000	144,000	208	1	60	0.4	15	14x24x10	49	DAIKEN BS4Q54TVJ
IHRU-2	CC-4/CC-5/CC-6/CC-7	4	54,000	144,000	208	1	60	0.4	15	14x24x10	49	DAIKEN BS4Q54TVJ

CEILING CASSETTE UNIT SCHEDULE

UNIT TAG	AREA SERVED	TOTAL SUPPLY CFM	TOTAL COOLING BTU/HR	TOTAL HEATING 47 °F AMBIENT BTUH	TOTAL HEATING 10 °F AMBIENT BTUH	ELECTRICAL CHARACTERISTICS					MAXIMUM DIMENSIONS, IN. LxWxH	MAXIMUM WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER & MODEL NO.	SERVED BY
						VOLTS	PHASE	CYCLE	MCA	MOP				
CC-1	TEAM ROOM 3	777	24,000	27,000	18,900	208	1	60	0.7	15	33x33x10	51	DAIKEN FXFQ24TVJU	OHRU-1, IHRU-1
CC-2	TEAM ROOM 4	777	24,000	27,000	18,900	208	1	60	0.7	15	33x33x10	51	DAIKEN FXFQ24TVJU	OHRU-1, IHRU-1
CC-3	ATHLETIC TRAINER 5	512	15,000	16,500	11,550	208	1	60	0.4	15	33x33x10	42	DAIKEN FXFQ15TVJU	OHRU-1, IHRU-1
CC-4	TEAM ROOM 7	777	24,000	27,000	18,900	208	1	60	0.7	15	33x33x10	51	DAIKEN FXFQ24TVJU	OHRU-1, IHRU-2
CC-5	TEAM ROOM 8	777	24,000	27,000	18,900	208	1	60	0.7	15	33x33x10	51	DAIKEN FXFQ24TVJU	OHRU-1, IHRU-2
CC-6	MENS RESTROOM 9	436	12,000	13,500	9,450	208	1	60	0.3	15	33x33x10	42	DAIKEN FXFQ12TVJU	OHRU-1, IHRU-2
CC-7	WOMENS RESTROOM 10	512	15,000	16,500	11,550	208	1	60	0.4	15	33x33x10	42	DAIKEN FXFQ15TVJU	OHRU-1, IHRU-2
CC-8	MECHANICAL 1	777	24,000	27,000	18,900	208	1	60	0.7	15	33x33x10	63	DAIKEN FXFQ24TVJU	HP-8

- PROVIDE COMPLETE W/ WALL MOUNTED HARD-WIRED THERMOSTAT.

GAS-FIRED INFRARED HEATER

UNIT TAG	AREA SERVED	MODULATING GAS HEAT		INLET PRESSURE (IN. W.C.)	RADIANT TUBE REFLECTOR LENGTH (FT)	RADIANT TUBE DIA. (IN.)	ELECTRICAL CHARACTERISTICS				MAXIMUM DIMENSIONS L x W x H	MOUNT HEIGHT (FT.)	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
		HEAT INPUT MBH	MAX INPUT MBH				VOLTS	PHASE	CYCLE	MCA			
IH-1	GROUNDS MAINTENANCE 21	75-115	115	5.5-14	30	4	120	1	60	4.8	378"x21"x10"	14'-0"	RG VANTAGE CTH3-115-30A
IH-2	FIELD STORAGE 22	75-115	115	5.5-14	30	4	120	1	60	4.8	378"x21"x10"	14'-0"	RG VANTAGE CTH3-115-30A

- PROVIDE ALL UNITS COMPLETE WITH WALL-MOUNTED, NON-FUSED DISCONNECT SWITCH PROVIDED AND INSTALLED BY EC.
PROVIDE ALL UNITS COMPLETE WITH HIGH EFFICIENCY REFLECTORS WITH AN INFRARED FACTOR OF 14 OR HIGHER.
PROVIDE ALL UNITS COMPLETE WITH ALUMINIZED STEEL TUBING. COORDINATE EXACT LENGTH OF EXHAUST PIPING REQUIRED.

GAS-FIRED UNIT HEATER SCHEDULE

UNIT TAG	AREA SERVED	CFM	FAN MOTOR				GAS HEAT				MOUNT HEIGHT (FT.)	MAX DIM. LxWxH (IN)	WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER & MODEL NO.	
			ELECTRICAL CHARACTERISTICS				HEAT INPUT MBH	HEAT OUTPUT MBH	INLET PRESSURE (IN. W.C.)	THERMAL EFFICIENCY %					
			VOLTS	PHASE	CYCLE	FLA									
GUH-1	ATHLETIC STORAGE 2	1,206	1/20	120	1	60	2.2	85	79.1	5-14	93	10'-0"	31x21x33	110	REZNR UEZ-085

- PROVIDE UNIT COMPLETE WITH WALL MOUNTED DISCONNECT SWITCH.
PROVIDE UNIT COMPLETE WITH 2"x40" VERTICAL TERMINAL/COMBUSTION AIR KIT.

ELECTRIC CABINET UNIT HEATER SCHEDULE

UNIT TAG	AREA SERVED	SUPPLY FAN		ELECTRICAL CHARACTERISTICS				ELECTRIC RESISTANCE HEATING COIL				MAXIMUM DIMENSIONS LxWxH, IN.	WEIGHT LBS.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
		CFM	HP	VOLTS	PHASE	HZ	FLA	CAPACITY BTUH	ENT AIR °F	LVG AIR °F	KW (277 V)			
CUH-1	CONCESSION 6	500	1/8	277	1	60	16	13,652	60.0	85	4	45x10x27	160	QMARK CU-945
CUH-2	CONCESSION 6	500	1/8	277	1	60	16	13,652	60.0	85	4	45x10x27	160	QMARK CU-945
CUH-3	CONCESSION 6	500	1/8	277	1	60	16	13,652	60.0	85	4	45x10x27	160	QMARK CU-945

- PROVIDE ALL UNITS COMPLETE WITH UNIT MOUNTED DISCONNECT SWITCH, 1" THROWAWAY FILTERS.
PROVIDE ALL UNITS COMPLETE WITH FRONT INLET & OUTLET.
PROVIDE ALL UNITS COMPLETE WITH REMOTE WALL MOUNTED LINE-VOLTAGE THERMOSTAT.

ELECTRIC WALL HEATER SCHEDULE

UNIT TAG	AREA SERVED	ELECTRIC HEATER					MOUNT HT	MAXIMUM DIMENSIONS LxWxH, IN.	BASIS OF DESIGN MANUFACTURER AND MODEL NO.
		BTU/HR CAP.	KW	VOLTS	PHASE	AMPS			
EWH-1	JAN. 13	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF
EWH-2	SINGLE USER RESTROOM 11	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF
EWH-3	SINGLE USER RESTROOM 12	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF
EWH-4	ELEC./SERV. 14	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF
EWH-5	RESTROOM 23	5,120	1.5	120	1	12.5	2' AFF	11"x5"x12"	BERKO SRA1512DSAF

- PROVIDE ALL UNITS COMPLETE WITH BUILT-IN DISCONNECT SWITCH & BUILT-IN INTEGRAL TAMPER RESISTANT THERMOSTAT.
PROVIDE ALL UNITS COMPLETE WITH RECESSED WALL MOUNTING FRAME.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

TAG	STYLE	CFM	MOUNT	FACE	MAX NC	BASIS OF DESIGN MANUFACTURER AND MODEL NO.	REMARKS
A	LOUVERED FACE DIFFUSER	VARIES	AS REQ'D	24x24	24	PRICE SHR	1
B	LOUVERED FACE DIFFUSER	VARIES	AS REQ'D	24x24	24	PRICE SMX	1, 3
C	FIXED FACE BAR GRILLE	VARIES	AS REQ'D	VARIES W/NECK SIZE	25	PRICE 530	1, 2

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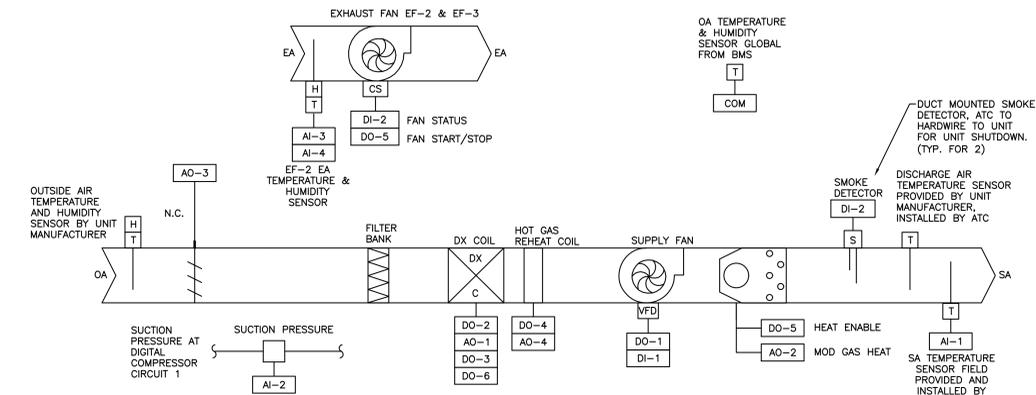
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SEQUENCE OF OPERATION: DOAS-1

NEW CONTROL REQUIREMENTS SHALL INCLUDE THE PLACEMENT OF A NEW UNIT CONTROLLER WITH I/O EXPANSION INSIDE THE UNIT CONTROLLER CABINET FOR CONTROL OF UNIT VIA MANUFACTURER PROVIDED TERMINAL STRIP. THIS UNIT SHALL BE CONNECTED TO THE BUILDING WIDE COMMUNICATION CABLE (BUS) AND SHALL INTEGRATE ALL POINTS BACK TO SUPERVISORY CONTROLLER. MOUNT NEW CONTROLLER IN UNIT ENCLOSURE AND PROVIDE 120/24V TRANSFORMER FOR POWER. PROVIDE DUCT MOUNTED PRESSURE SENSORS FOR FULL UNIT CONTROL. THE ATC CONTRACTOR SHALL INSTALL THE DISCHARGE AIR TEMPERATURE SENSOR FURNISHED BY THE UNIT MANUFACTURER. PROVIDE COMPLETE INDIVIDUAL UNIT SCHEDULING FUNCTION THROUGH BUILDING SUPERVISORY CONTROLLER. THE BAS WILL EARLY START THE UNIT TO ACHIEVE SPACE TEMPERATURE SETPOINT FOR OCCUPANCY. THE OPERATOR WILL BE ABLE TO ADJUST THE UNIT START/STOP USING THE OPERATOR'S WORKSTATION.

- THE UNIT SHALL BE CONFIGURED FOR CONSTANT VOLUME VAV OPERATION AND SHALL BE PROVIDED WITH VFD DRIVES. ZONE TEMPERATURE SHALL BE CONTROLLED VIA A SEQUENCED DAT RESET. THE UNIT CONTROLLER SHALL USE ZONE TEMPERATURE TO AUTOMATICALLY SELECT HEATING OR COOLING MODE. HEATING AND COOLING DEMAND SHALL BE CALCULATED THROUGH INDEPENDENT HEATING AND COOLING PID OUTPUTS.
- OCCUPIED MODE:** SUPPLY FAN SHALL RUN CONTINUOUSLY AT CONSTANT VOLUME (VFD FOR BALANCING ONLY) WITH OA DAMPER IN ITS OPEN POSITION WHENEVER THE UNIT IS IN OCCUPIED MODE. THE UNIT CONTROLLER SHALL MEASURE THE SUPPLY AIR TEMPERATURE AND MODULATE THE HEATING AND COOLING TO MAINTAIN ITS HEATING AND COOLING SETPOINT. THE OPERATOR WILL BE ABLE TO ADJUST THE UNIT START/STOP TIMES USING THE OPERATOR'S WORKSTATION. THE BAS WILL MONITOR THE STATUS OF THE FAN AND GENERATE AN ALARM IF THE FAN FAILS TO A START/STOP COMMAND.
- OCCUPANCY OVERRIDE:** THE SPACE SENSORS WILL HAVE A PUSHBUTTON WHEN PRESSED DURING THE UNOCCUPIED MODE, WILL INDEX THE EQUIPMENT TO AN OCCUPIED MODE FOR A PERIOD OF 2-HOURS (ADJUSTABLE).
- UNOCCUPIED MODE:** WHEN THE UNIT IS IN UNOCCUPIED MODE OR IS SHUT DOWN BY SYSTEM SAFETY THE UNIT WILL BE SET AS FOLLOWS: SUPPLY FAN WILL BE OFF, OUTDOOR AIR DAMPER CLOSED, AND DX COOLING OFF. UNIT SHALL CYCLE IF SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED SETPOINT IN HEATING MODE (ADJ.) AND ABOVE UNOCCUPIED COOLING MODE (ADJ.) WITH OUTSIDE AIR DAMPERS OPEN. THE UNIT WILL DE-ENERGIZE WHEN THE SPACE TEMPERATURE IS AT LEAST 4 DEGREE F ABOVE THE UNOCCUPIED HEATING SETPOINT. UNOCCUPIED COOLING IS IDENTICAL TO THE OCCUPIED OPERATION.
- TEMPERATURE CONTROL:** TEMPERATURE CONTROL SEQUENCES DETERMINE WHEN THE UNIT IS IN FAN-ONLY, HEATING OR COOLING MODES. THE FOLLOWING CONTROL SEQUENCES SHALL BE AVAILABLE:
 - EXHAUST TEMPERATURE RESET:** THE SUPPLY TEMPERATURE SETPOINT IS CALCULATED BASED ON THE ACTIVE SETPOINT AND THE CURRENT RETURN TEMPERATURE. THE CALCULATED SETPOINT IS SCALED BETWEEN THE SUPPLY TEMPERATURE MINIMUM AND MAXIMUM SETPOINTS DETERMINED BY THE CURRENT MODE OF OPERATION.
 - WHEN THE OUTSIDE AIR TEMPERATURE IS LESS THAN 60°F (ADJ.), THE MINIMUM SUPPLY TEMPERATURE FOR THE DOAS UNIT SHALL BE 70°F (ADJ.) AND THE MAXIMUM SUPPLY TEMPERATURE FOR THE DOAS UNIT SHALL BE 80°F (ADJ.).
 - WHEN THE OUTSIDE AIR TEMPERATURE IS GREATER THAN 65°F (ADJ.), THE MINIMUM SUPPLY TEMPERATURE FOR THE DOAS UNIT SHALL BE 60°F (ADJ.) AND THE MAXIMUM SUPPLY TEMPERATURE FOR THE DOAS UNIT SHALL BE 70°F (ADJ.).
 - ACTIVE SETPOINT:** THE HEATING AND COOLING SETPOINTS ARE DETERMINED BY THE TEMPERATURE SETPOINT AND DEADBAND. THE DEADBAND IS DIVIDED BY TWO(2) AND ADDED TO AND SUBTRACTED FROM THE SETPOINT TO DETERMINE THE COOLING AND HEATING SETPOINTS.
 - DUAL SETPOINT MODE:** WHEN A DEADBAND VALUE IS GREATER THAN ZERO, THE UNIT IS PLACED IN DUAL SETPOINT MODE.
 - COOLING:** IF THE SPACE OR RETURN TEMPERATURE IS ABOVE THE COOLING SETPOINT, THE COOLING SETPOINT IS ACTIVE.
 - HEATING:** IF THE SPACE OR RETURN TEMPERATURE IS BELOW THE HEATING SETPOINT, THE HEATING SETPOINT IS ACTIVE.
 - TRANSITIONING BETWEEN SETPOINTS:** IF THE SPACE OR RETURN TEMPERATURE IS BETWEEN THE HEATING AND COOLING SETPOINT, THE LAST ACTIVE SETPOINT IS USED.
 - START BETWEEN SETPOINTS:** IF THE UNIT STARTS WHILE IN BETWEEN SETPOINTS, THE HEATING SETPOINT IS ACTIVE.
 - HEAT/COOL MODE SWITCH DELAY:** THIS DELAY IS USED IN TRANSITIONING BETWEEN HEATING AND COOLING MODES. THE DELAY TIMER STARTS COUNTING WHEN THE UNIT IS NO LONGER HEATING, COOLING OR ECONOMICIZING.
 - ENABLE COOLING: THE UNIT ENABLES COOLING WHEN THE FOLLOWING OCCURS:
 - ALL HEATING DEVISE ARE OFF; AND
 - THE HEAT COOL MODE SWITCH TIMER HAS EXPIRED; AND
 - COOLING IS NOT LOCKED OUT; AND
 - THERE IS A DEMAND FOR COOLING.
 - FALL BACK: DURING A SENSOR FAILURE THE TEMPERATURE CONTROL MODE REVERTS TO THE PREVIOUS AVAILABLE OPTION BASED ON THE FOLLOWING ORDER:
 - SUPPLY TEMPERATURE CONTROL.
 - OUTSIDE AIR RESET.
 - SPACE/RETURN RESET: IF BOTH SPACE AND RETURN TEMPERATURE SENSORS ARE PRESENT, THE REMAINING SENSOR IS USED DURING A FAILURE.

- COOLING:** MODULATION OF COOLING SHALL BE CONFIGURED SUBJECT TO USER ADJUSTABLE MINIMUM RUN TIMES, MINIMUM OFF TIMES, MODULATING UP AND MODULATING DOWN DELAYS.
 - ONCE IN THE COOLING MODE THE UNIT WILL MAINTAIN THE SUPPLY AIR TEMPERATURE AT THE ACTIVE SUPPLY AIR COOLING SETPOINT BY MODULATING THE DIGITAL COMPRESSOR (1.5 - 5.0 VDC OPERATION). A COOLING RELAY MUST BE CONFIGURED.
 - THE DIGITAL COMPRESSOR CONTINUES TO MODULATE DURING THE ENTIRE COOLING OPERATION.
 - IF ADDITIONAL COOLING IS REQUIRED, FIXED COMPRESSOR STAGES CAN BE STAGED ON WHILE THE DIGITAL COMPRESSOR CONTINUES TO MODULATE. TO STAGE UP THE EXTRA COMPRESSORS, THE SUPPLY AIR TEMPERATURE NEEDS TO BE ABOVE THE ACTIVE SUPPLY AIR SETPOINT AND THE DIGITAL COMPRESSOR NEEDS TO BE AT 100% FOR A PERIOD OF TIME EQUAL TO THE STAGE UP DELAY. TO STAGE DOWN THE EXTRA COMPRESSORS, THE SUPPLY AIR TEMPERATURE NEEDS TO BE BELOW THE ACTIVE SUPPLY AIR SETPOINT AND THE DIGITAL COMPRESSOR NEEDS TO BE AT 0% FOR A PERIOD OF TIME EQUAL TO THE STAGING DOWN DELAY.
- DEHUMIDIFICATION:** WHEN THE EXHAUST HUMIDITY SENSOR RISES ABOVE 55% RH (ADJ.), BAS SHALL ENABLE HOT GAS RE-HEAT AND MODULATE DIGITAL COMPRESSOR TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETTING (ADJ.) LOGIC MUST BE SET TO MAKE COOLING OR DEHUMIDIFICATION THE PRIORITY.
 - ONCE IN DEHUMIDIFICATION, THE UNIT WILL MAINTAIN THE EVAPORATOR COIL SUCTION TEMPERATURE AT THE COIL SUCTION TEMPERATURE SETPOINT BY MODULATING THE DIGITAL COMPRESSOR (1.5 - 5.0 VDC OPERATION).
 - IF ADDITIONAL DEHUMIDIFICATION IS REQUIRED, FIXED COMPRESSOR STAGES SHALL BE STAGED ON WHILE THE DIGITAL COMPRESSOR CONTINUES TO MODULATE. TO STAGE UP THE EXTRA COMPRESSORS, THE EVAPORATOR COIL SUCTION TEMPERATURE NEEDS TO BE ABOVE THE EVAPORATOR COIL SUCTION TEMPERATURE SETPOINT AND THE DIGITAL COMPRESSOR NEEDS TO BE AT 100% FOR A PERIOD OF TIME EQUAL TO THE STAGE UP DELAY.
 - TO STAGE DOWN THE EXTRA COMPRESSORS, THE EVAPORATOR COIL SUCTION TEMPERATURE NEEDS TO BE BELOW THE EVAPORATOR COIL SUCTION TEMPERATURE SETPOINT AND THE DIGITAL COMPRESSOR NEEDS TO BE AT 0% FOR A PERIOD OF TIME EQUAL TO THE STAGING DOWN DELAY.
 - REHEAT IS ALWAYS CONTROLLED TO THE ACTIVE SUPPLY AIR TEMPERATURE SETPOINT.
- COIL SUCTION TEMPERATURE SETPOINT RESET:** DURING DEHUMIDIFICATION THE SYSTEM WILL AUTOMATICALLY RESET THE COIL SUCTION TEMPERATURE SETPOINT WITHIN A ± 5 DEG RANGE BASED ON THE RETURN AIR HUMIDITY SENSOR CONDITION CHANGING ± 5 % FROM THE HUMIDITY SETPOINT.
- MORNING WARM-UP:** THE DOAS UNIT WILL REMAIN OFF DURING MORNING WARM-UP MODE AND THE ZONE UNITS WILL PERFORM ALL MORNING WARM-UP.
- HEATING DEMAND:** ON A FALL IN DISCHARGE AIR TEMPERATURE BELOW THE HEATING SETPOINT (ADJ.), THE GAS VALVE SHALL MODULATE TO MAINTAIN THE ACTIVE HEATING SETPOINT. DURING HEATING MODE, COOLING SHALL BE DISABLED.
- LOW TEMPERATURE PROTECTION:** AN SUPPLY AIR TEMPERATURE SENSOR DIRECTLY AFTER THE HEATING COIL DE-ENERGIZES THE SUPPLY & EXHAUST FAN WHEN TEMPERATURES BELOW 40 DEGREES F ARE SENSED. ALL DAMPERS (OA DAMPER SHALL CLOSED/RA DAMPER SHALL OPEN). AFTER THE TEMPERATURE RISES 5 DEGREES ABOVE THE LOW TEMPERATURE SETTING, THE UNIT WILL RESET AND THE UNIT WILL RESUME ITS NORMAL CONTROL SEQUENCE.
- ACTIVE HEAD PRESSURE CONTROL:** TO MAINTAIN A CONSISTENT CONDENSING TEMPERATURE IN COOLING AND DEHUMIDIFICATION MODE, THE CONTROLLER SHALL ENABLE AND MODULATE ALL CONDENSING FANS WITH EC MOTORS AT THE SAME SPEED TO MAINTAIN A CONDENSING TEMPERATURE OF 110°F.
- DUCT SMOKE DETECTOR:** DUCT MOUNTED SMOKE DETECTORS SHALL BE INTEGRATED TO THE MICROPROCESSOR CONTROLLER AS FOLLOWS: THE MC SHALL WIRE THE DUAL POLE DETECTOR TO THE UNIT CONTROLLER FOR SYSTEM SHUTDOWN AND ALARM.
- EF-2 & 3:** SYSTEM ENABLED IN OCCUPIED MODE, ASSOCIATED EXHAUST FAN EF-2 & 3 SHALL BE ENABLED. MOUNT A CURRENT SENSOR ON THE FAN MOTOR LEADS TO PROVE OPERATION.

POINT TAG	POINT DESCRIPTION	POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ARFLOW		START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED
DI-1	SUPPLY FAN STATUS		X													X	
DO-1	SUPPLY FAN ENABLE											X					1
DO-2	DX COOLING ENABLE											X					1
AO-1	COMPRESSOR SPEED												X				1
DO-3	DX STAGE 2 ENABLE											X					1
DO-4	HOT GAS REHEAT ENABLE											X					1
AI-1	SUPPLY AIR TEMPERATURE	X			X										X		
AO-4	HOT GAS REHEAT RESET SIGNAL												X				1
COM	OUTSIDE AIR TEMPERATURE				X												
AI-2	SUCTION PRESSURE 1				X												1
COM	OUTSIDE AIR HUMIDITY				X												
AO-2	MOD GAS HEAT												X				1
DO-5	GAS HEAT ENABLE											X					1
AI-3	ZONE TEMPERATURE				X												
AI-4	ZONE HUMIDITY				X												
AO-3	OA DAMPER											X					1
DI-2	SMOKE DETECTION	X														X	
DO-6	DX STAGE 3 ENABLE											X					1

1. POINT PROVIDED ON RTU TERMINAL STRIP

DOAS-1 CONTROLS
NO SCALE

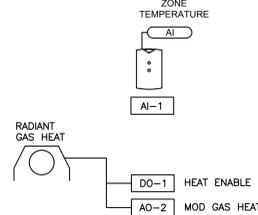
SEQUENCE OF OPERATION: INFRARED RADIANT HEATERS:

NEW CONTROL REQUIREMENTS SHALL INCLUDE THE PLACEMENT OF A NEW UNIT CONTROLLER FOR INTERFACE WITH MANUFACTURER PROVIDED TERMINAL STRIP. THIS UNIT SHALL BE CONNECTED TO THE BUILDING WIDE COMMUNICATION CABLE (BUS) AND SHALL INTEGRATE ALL POINTS BACK TO NEW SUPERVISORY CONTROLLER. MOUNT NEW CONTROLLER IN UNIT ENCLOSURE AND PROVIDE 120/24V TRANSFORMER FOR POWER.

PROVIDE SPACE MOUNTED TEMPERATURE SENSOR FOR FULL UNIT CONTROL. WIRE SENSOR BACK TO UNIT FOR FULL INTEGRATION. SENSOR TO HAVE NO READOUT BUT SHALL HAVE TEMPERATURE ADJUSTMENT AND OCCUPANCY OVERRIDE BUTTON SET FOR 1 HR INCREMENTS. THIS BUTTON WILL ENABLE THE 'OCCUPIED CYCLE' FOR THAT TIME PERIOD. PROVIDE COMPLETE INDIVIDUAL UNIT SCHEDULING FUNCTION THROUGH NEW BUILDING SUPERVISORY CONTROLLER.

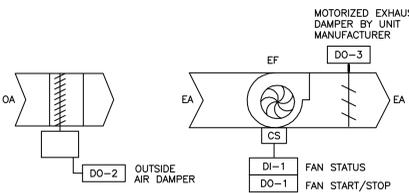
SEQUENCE OF OPERATION:

A HEATING DEMAND: ON A FALL IN DISCHARGE AIR TEMPERATURE BELOW THE HEATING SETPOINT (ADJ.), BAS UNIT CONTROLLER SHALL MODULATE THE GAS BURNER TO MAINTAIN SPACE TEMPERATURE. ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT, DISABLE THE GAS HEAT.



POINT TAG	POINT DESCRIPTION	POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ARFLOW		START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED
AO-1	MOD GAS HEAT																
DO-1	GAS HEAT ENABLE											X					
AI-1	ZONE TEMPERATURE				X											X	

INFRARED RADIANT HEATERS
NO SCALE



EXHAUST FAN SEQUENCE OF OPERATION:

- EXHAUST FAN EF-1:** THE FAN SHALL BE CONTROLLED MANUALLY BY A WALL MOUNTED SWITCH. THE SWITCH SHALL BE PROVIDED BY THE EC. THE ATC CONTRACTOR SHALL PROVIDE A RELAY INTERLOCK TO DISABLE THE EF WHENEVER THE BUILDING IS IN UNOCCUPIED MODE BASED ON UNIT OCCUPANCY SCHEDULE. THE BAS SHALL MONITOR THE STATUS OF THE EXHAUST FAN AND SHALL BE REPRESENTED GRAPHICALLY AND OPERATIONALLY THROUGH THE SERVER.
- EXHAUST FAN EF-4, 5 & 6:** THE EXHAUST FAN SHALL BE OPERATED BY THE SAME THERMOSTAT AS THE HEATER IN THE SAME ZONE. UPON A RISE IN SPACE TEMPERATURE ABOVE 85 DEGREES F. (ADJ.) THE EA & OA DAMPER(S) (EF-5 & 6: TYP. FOR 2 LOUVERS) SHALL OPEN AND THE EF SHALL INDEX ON. UPON A FALL IN SPACE TEMPERATURE BELOW 85 DEGREES F. (ADJUSTABLE) EF SHALL INDEX OFF AND THE DAMPER SHALL CLOSE. THE EF SHALL BE DISABLED BELOW AN OUTSIDE AIR TEMPERATURE OF 50 DEG F (ADJ.) OR GWH-1 IS IN OPERATION. THE BAS SHALL MONITOR THE STATUS OF THE EXHAUST FAN AND GENERATE AN ALARM IF THE FAN FAILS TO RESPOND TO A START/STOP COMMAND. INTEGRATE THERMOSTAT DIRECTLY BACK TO SUPERVISORY CONTROLLER FOR OPERATIONAL INTERFACE AND SHALL BE REPRESENTED GRAPHICALLY AND OPERATIONALLY THROUGH THE SERVER.
- EF-7** TO BE CONTROLLED BY THE OCCUPANCY SENSORS WHICH ARE PROVIDED BY THE EC. ON OCCUPANCY, EXHAUST FAN SHALL ENERGIZE AND MOTORIZED EA DAMPER AND DAMPER ON OUTDOOR AIR LOUVER 1 SHALL OPEN. ATC CONTRACTOR SHALL PROVIDE ALL ASSOCIATED TRANSFORMERS, RELAYS AND CONTROL WIRING TO THE EF's, DAMPERS AND OCCUPANCY SENSORS. THE BAS SHALL MONITOR THE STATUS OF THE EXHAUST FAN ND SHALL BE REPRESENTED GRAPHICALLY AND OPERATIONALLY THROUGH THE SERVER.
- EF-8** TO BE CONTROLLED BY THE OCCUPANCY SENSOR PROVIDED BY THE EC. ON OCCUPANCY, EXHAUST FAN SHALL ENERGIZE. ATC CONTRACTOR SHALL PROVIDE ALL ASSOCIATED TRANSFORMERS, RELAYS AND CONTROL WIRING TO THE EF's, DAMPERS AND OCCUPANCY SENSORS. THE BAS SHALL MONITOR THE STATUS OF THE EXHAUST FAN ND SHALL BE REPRESENTED GRAPHICALLY AND OPERATIONALLY THROUGH THE SERVER.

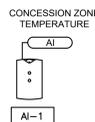
POINT TAG	POINT DESCRIPTION	POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ARFLOW		START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED
DI-1	FAN STATUS		X														X
DO-1	FAN ENABLE											X					
DO-2	OA DAMPER												X				
DO-3	EA DAMPER												X				

EXHAUST FANS
NO SCALE

POINT TAG	POINT DESCRIPTION	POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ARFLOW		START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED
AI-1	CONCESSION 6 ZONE TEMPERATURE				X												X

ELECTRIC CUH, RCP & EWH

- UNITS SHALL BE OPERATED BY MANUFACTURER FURNISHED CONTROLS AND SHALL HAVE NO INTERFACE WITH THE ATC. THE ATC CONTRACTOR SHALL PROVIDE A WALL MOUNTED TEMPERATURE SENSOR TO MONITOR THE TEMPERATURE IN CONCESSION 6.



ELECTRIC CUH, RCP & EWH CONTROLS
NO SCALE

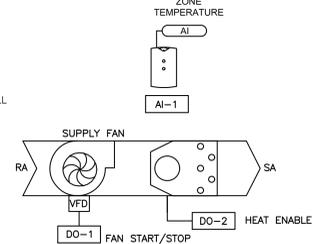
SEQUENCE OF OPERATION: GAS-FIRED UNIT HEATER:

NEW CONTROL REQUIREMENTS SHALL INCLUDE THE PLACEMENT OF A NEW UNIT CONTROLLER FOR INTERFACE WITH MANUFACTURER PROVIDED TERMINAL STRIP. THIS UNIT SHALL BE CONNECTED TO THE BUILDING WIDE COMMUNICATION CABLE (BUS) AND SHALL INTEGRATE ALL POINTS BACK TO NEW SUPERVISORY CONTROLLER. MOUNT NEW CONTROLLER IN UNIT ENCLOSURE AND PROVIDE 120/24V TRANSFORMER FOR POWER.

PROVIDE SPACE MOUNTED BLANK PLATE TEMPERATURE SENSOR FOR FULL UNIT CONTROL. WIRE SENSOR BACK TO UNIT FOR FULL INTEGRATION. PROVIDE COMPLETE INDIVIDUAL UNIT SCHEDULING FUNCTION THROUGH NEW BUILDING SUPERVISORY CONTROLLER.

SEQUENCE OF OPERATION:

A HEATING DEMAND: ON A FALL IN DISCHARGE AIR TEMPERATURE BELOW THE HEATING SETPOINT (ADJ.), BAS UNIT CONTROLLER SHALL INDEX ON THE FAN & GAS BURNER TO MAINTAIN SPACE TEMPERATURE. ON A RISE IN SPACE TEMPERATURE ABOVE SETPOINT, DISABLE THE GAS HEAT.



POINT TAG	POINT DESCRIPTION	POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		SAFETY SHUT DOWN	STATUS	OCC OVERRIDE	PRESSURE	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ARFLOW		START/STOP	ON/OFF	DAMPER ACTUATOR	MODULATE	SPEED
DO-2	GAS HEAT ENABLE																
DO-1	FAN ENABLE											X					
AI-1	ZONE TEMPERATURE				X											X	

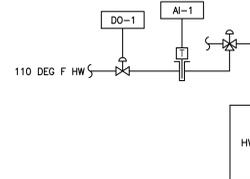
GAS FIRED UNIT HEATER
NO SCALE

VRF & SPLIT SYSTEM SEQUENCE OF OPERATION:

- DUCTLESS SPLIT SYSTEM HEAT PUMP AND VRF SYSTEMS SHALL BE OPERATED BY MANUFACTURER CONTROLS. THE ATC CONTRACTOR SHALL PROVIDE A WALL MOUNTED TEMPERATURE SENSOR TO MONITOR THE TEMPERATURE IN EACH ROOM. AN ALARM SHALL BE GENERATED IF THE TEMPERATURE RISES ABOVE A USER DEFINABLE SETPOINT.
- THE CONDENSATE PUMP SAFETY SWITCH SHALL BE WIRED TO ASSOCIATED UNIT. UPON CONDENSATE PUMP FAILURE VIA PUMP SAFETY SWITCH, UNIT SHALL BE DISABLED.
- DISPLAY/INTERFACE REQUIREMENTS:**
 - ROOM #
 - ZONE TEMPERATURE
 - UNIT OPERATION (MOUNT A CURRENT SENSOR ON THE COMPRESSOR MOTOR LEADS TO PROVE OPERATION)

SPLIT SYSTEM HEAT PUMP & VRF CONTROLS
NO SCALE

HWH-1 AND PIPING BY PC. HWH SUPPLY TEMPERATURE SENSOR IN PC PROVIDED THERMOWELL. HW SOLENOID VALVE, TEMPERATURE SENSOR AND ALL ASSOCIATED WIRING AND DEVICES PROVIDED AND INSTALLED BY ATC. REFER TO WH-1 PIPING DETAIL, DWG P301.



HWH SEQUENCE OF OPERATION:

- HWH-1:** ATC TO FURNISH A NEW 'ANTI-SCALD' SOLENOID VALVE, SENSOR AND ACTUATOR FOR THE 110 DEGREE F DOMESTIC HOT WATER SUPPLY AS SHOWN ON CONTRACT DRAWINGS. VALVE AND SENSORS SHALL BE INSTALLED BY THE PC AND WIRED BY THE ATC CONTRACTOR. THE SOLENOID VALVE SHALL CLOSE WHEN THE WATER TEMPERATURE RISES ABOVE 120 DEGREES F (ADJ.) AND OPEN WHEN THE WATER TEMPERATURE FALLS BELOW 115 DEGREES F (ADJ.) THIS VALVE SHALL BE VIEWABLE IN BOTH VALVE POSITION AND TEMPERATURES (SET POINT AND ACTUAL) ON SYSTEM FRONT END GRAPHIC PACKAGE.

POINT TAG	POINT DESCRIPTION	DOMESTIC HOT WATER SYSTEM POINTS LIST										REMARKS					
		INPUTS					OUTPUTS										
		OPEN/CLOSE	STATUS	PRESSURE	TEMPERATURE	RELATIVE HUMIDITY	START/STOP	ON/OFF	MODE INDEX	OPEN/CLOSE	MODULATE		SPEED	SETPOINT ADJ.	ALARM		
DO-1	HWH SOLENOID VALVE											X					
AI-1	HWH SUPPLY WATER TEMP				X												X

HWH CONTROLS
NO SCALE

OUTDOOR LIGHTING INTEGRATION:

- PROVIDE INTEGRATION INTO THE BUILDINGS EXTERIOR LIGHTING CONTROL SYSTEM W/ (2) DIGITAL OUTPUTS AND DISPLAY LIGHTING CONTROLS GRAPHICALLY ON BAS INTERFACE.

POINT TAG	POINT DESCRIPTION	OUTDOOR LIGHTING POINTS LIST										REMARKS
		INPUTS					OUTPUTS					
		SAFETY SHUT DOWN	STATUS	OCCUPANCY	LIGHT LEVEL	TEMPERATURE	HUMIDITY	SETPOINT	FEEDBACK	SPEED	ON/OFF	

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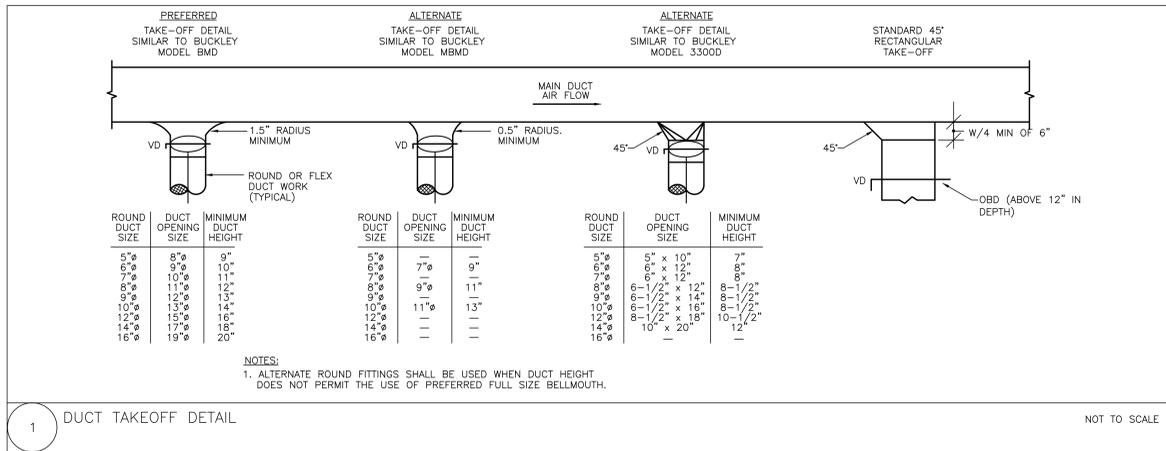
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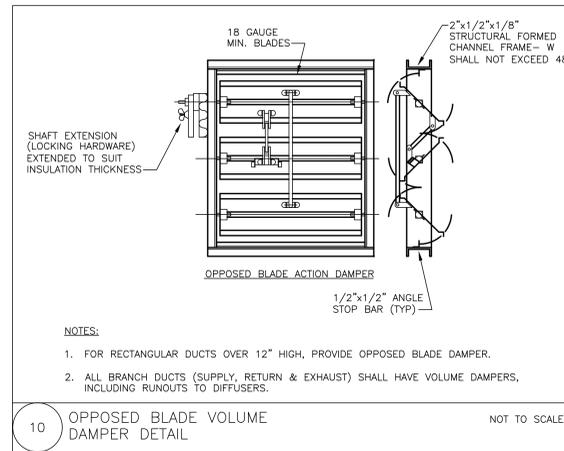
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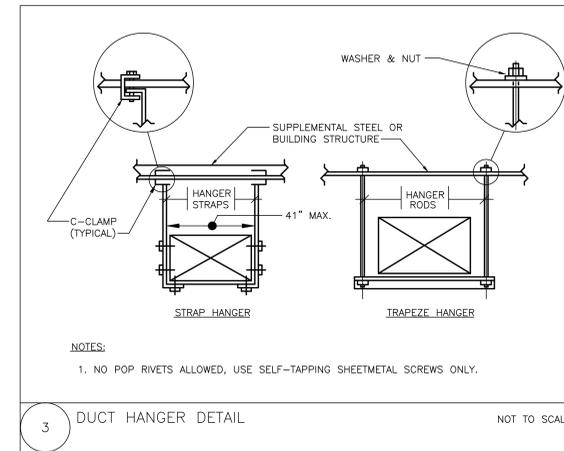
1 DUCT TAKEOFF DETAIL

NOT TO SCALE



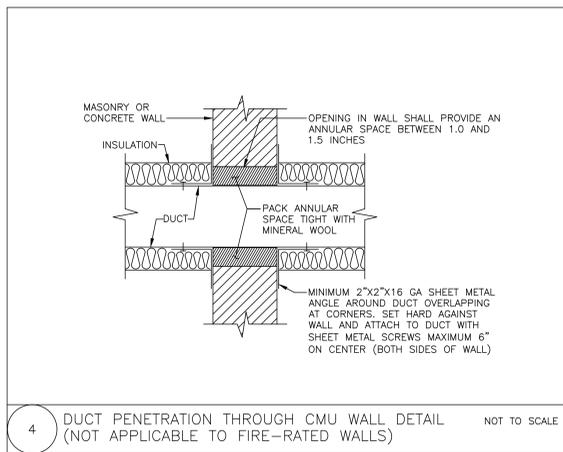
10 OPPOSED BLADE VOLUME DAMPER DETAIL

NOT TO SCALE



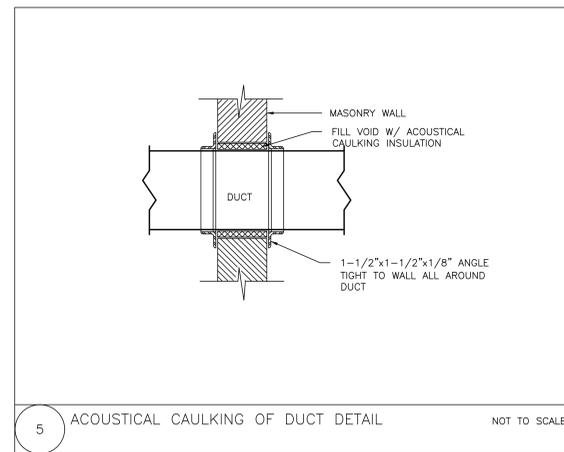
3 DUCT HANGER DETAIL

NOT TO SCALE



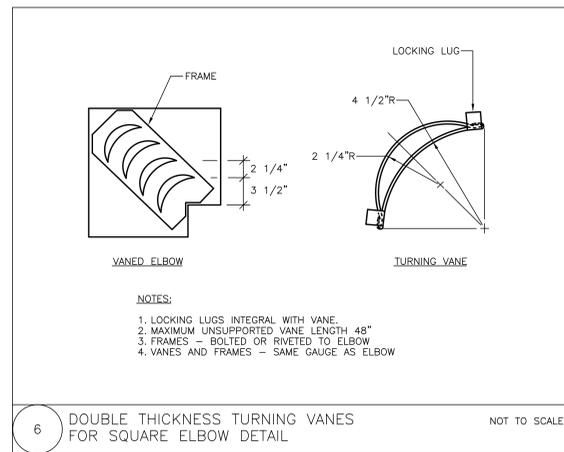
4 DUCT PENETRATION THROUGH CMU WALL DETAIL (NOT APPLICABLE TO FIRE-RATED WALLS)

NOT TO SCALE



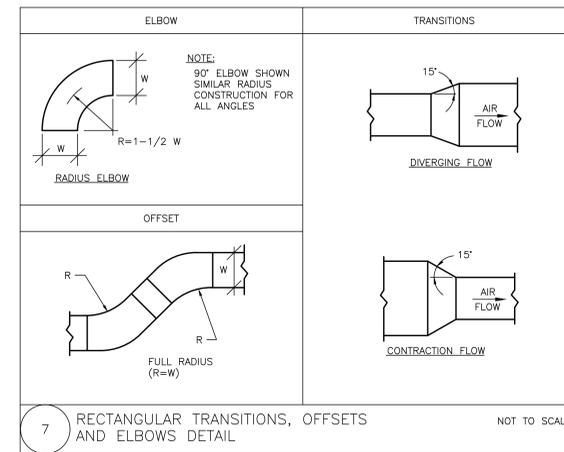
5 ACOUSTICAL CAULKING OF DUCT DETAIL

NOT TO SCALE



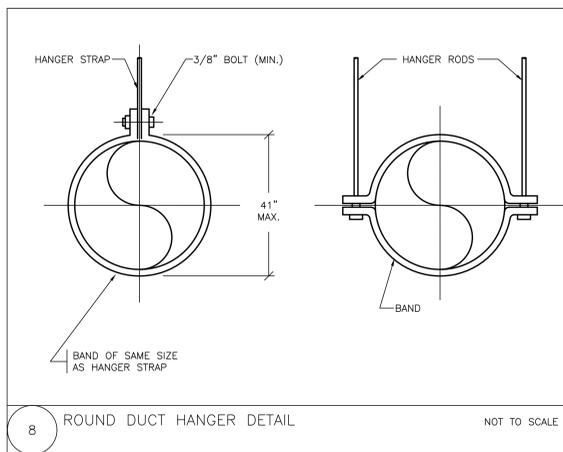
6 DOUBLE THICKNESS TURNING VANES FOR SQUARE ELBOW DETAIL

NOT TO SCALE



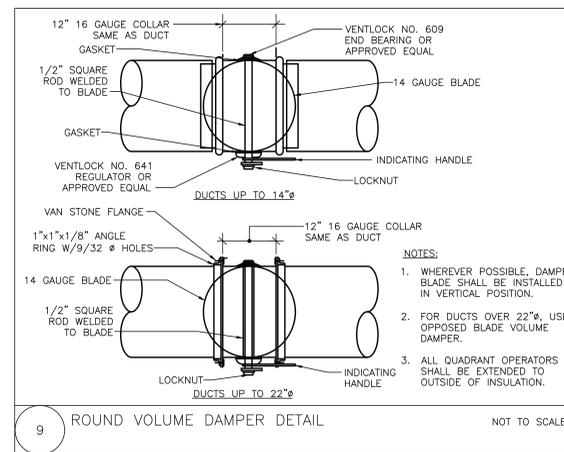
7 RECTANGULAR TRANSITIONS, OFFSETS AND ELBOWS DETAIL

NOT TO SCALE



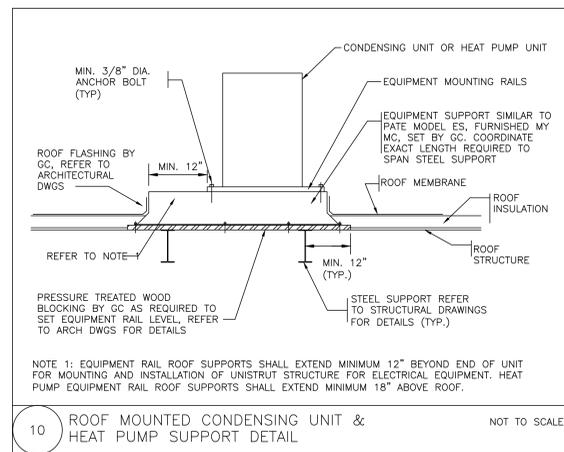
8 ROUND DUCT HANGER DETAIL

NOT TO SCALE



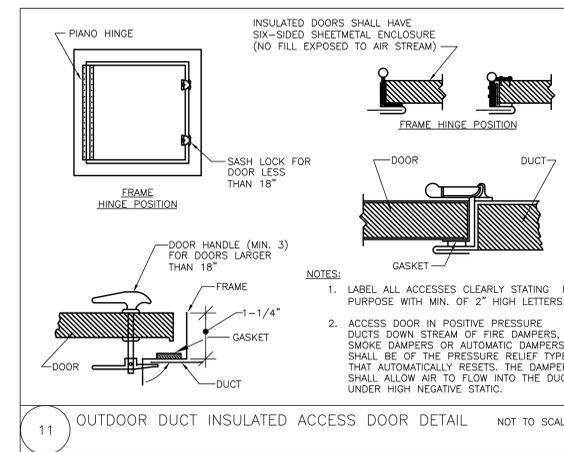
9 ROUND VOLUME DAMPER DETAIL

NOT TO SCALE



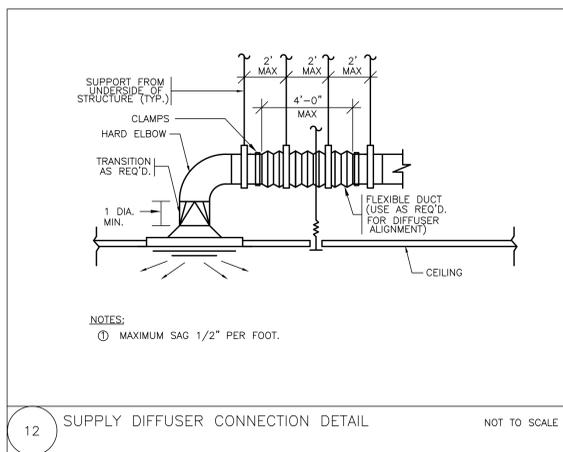
10 ROOF MOUNTED CONDENSING UNIT & HEAT PUMP SUPPORT DETAIL

NOT TO SCALE



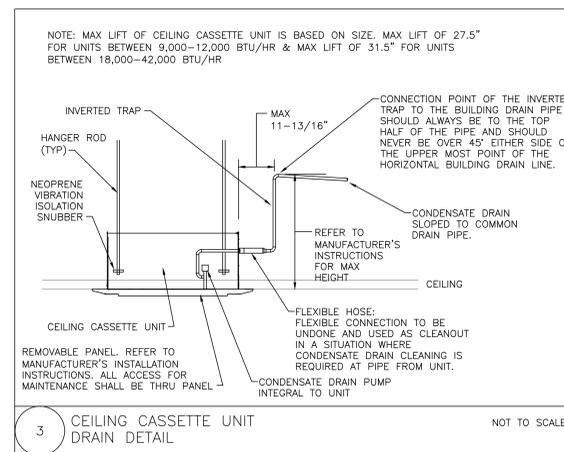
11 OUTDOOR DUCT INSULATED ACCESS DOOR DETAIL

NOT TO SCALE



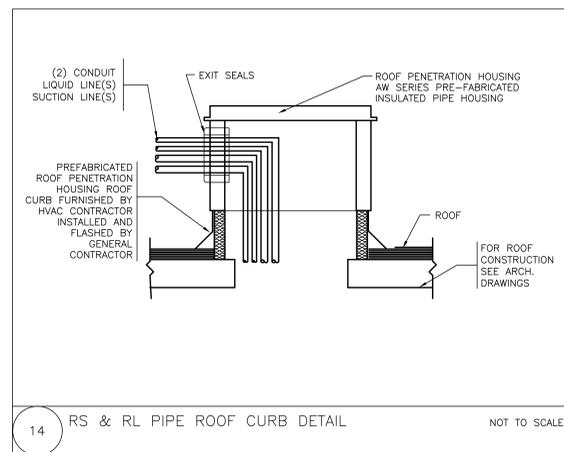
12 SUPPLY DIFFUSER CONNECTION DETAIL

NOT TO SCALE



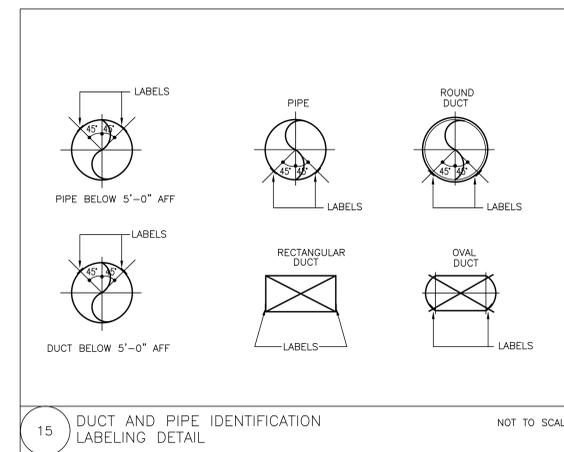
3 CEILING CASSETTE UNIT DRAIN DETAIL

NOT TO SCALE



14 RS & RL PIPE ROOF CURB DETAIL

NOT TO SCALE



15 DUCT AND PIPE IDENTIFICATION LABELING DETAIL

NOT TO SCALE



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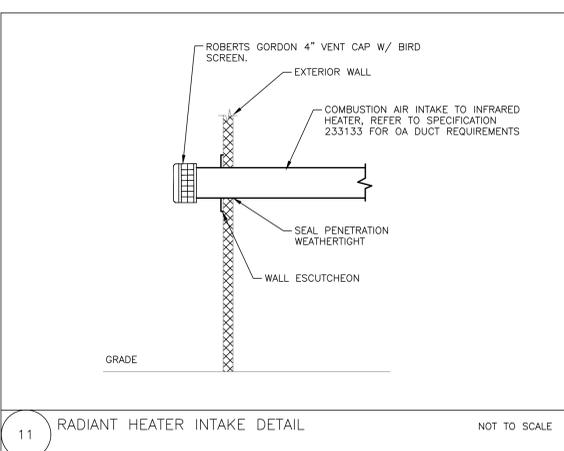
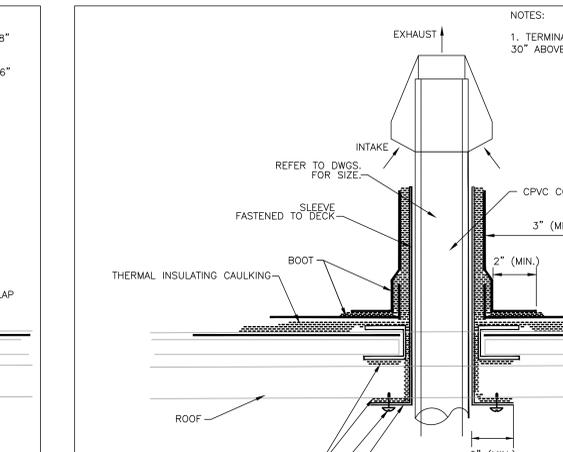
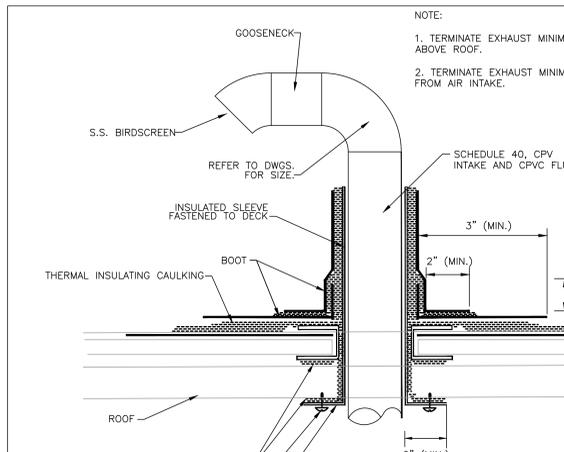
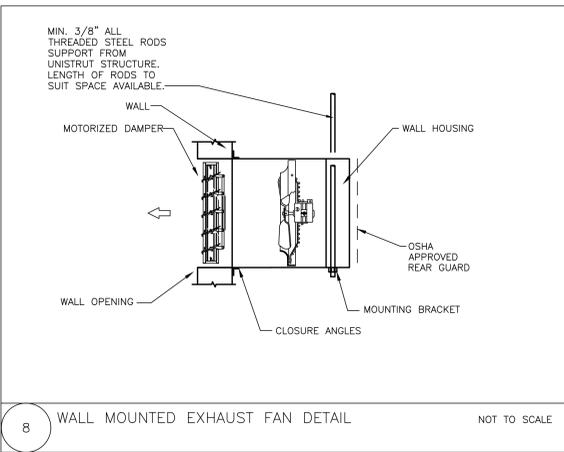
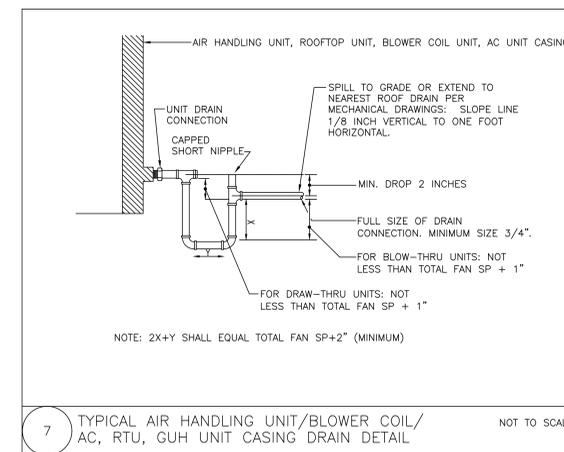
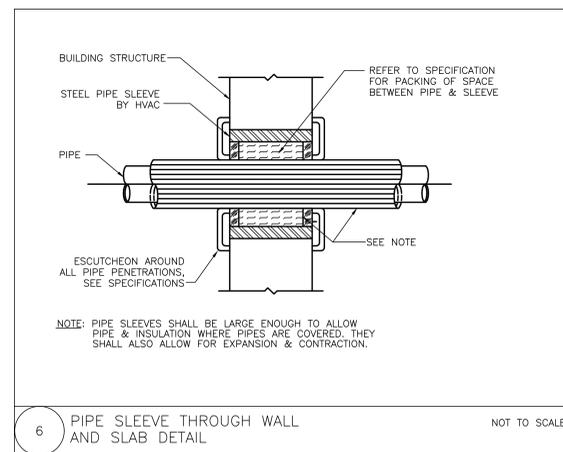
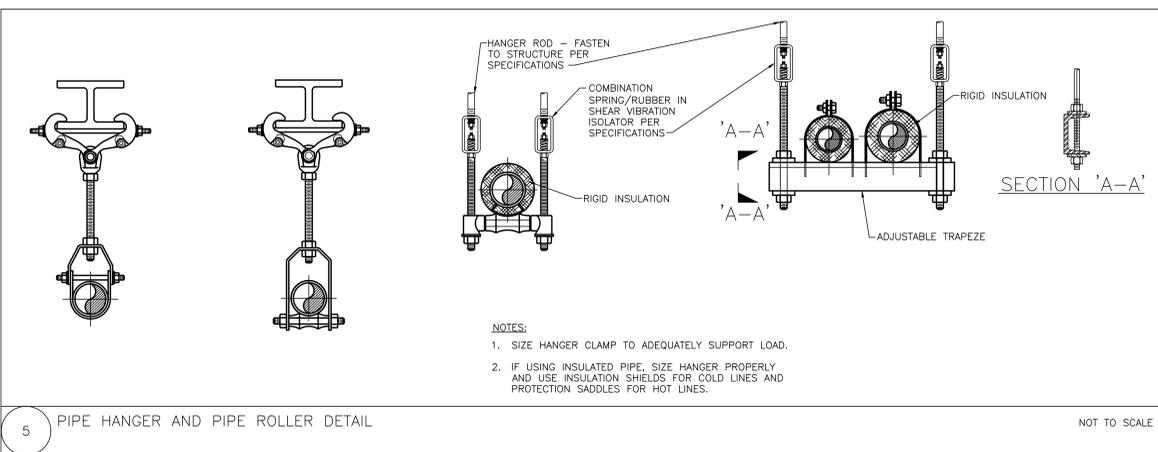
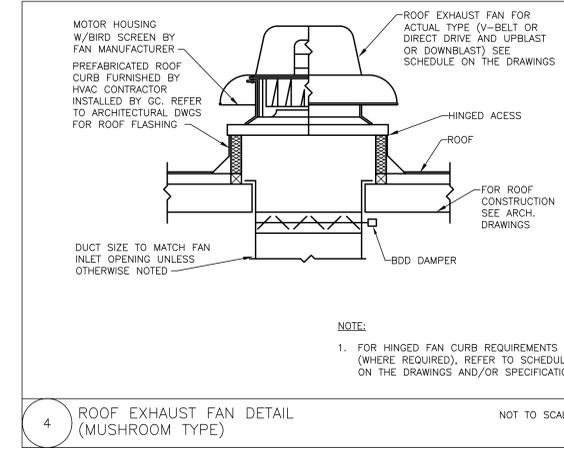
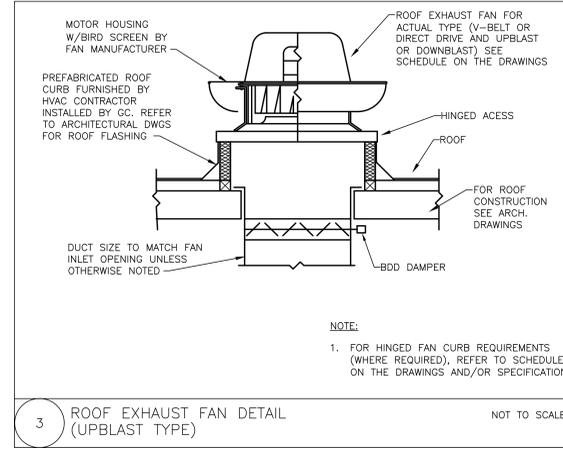
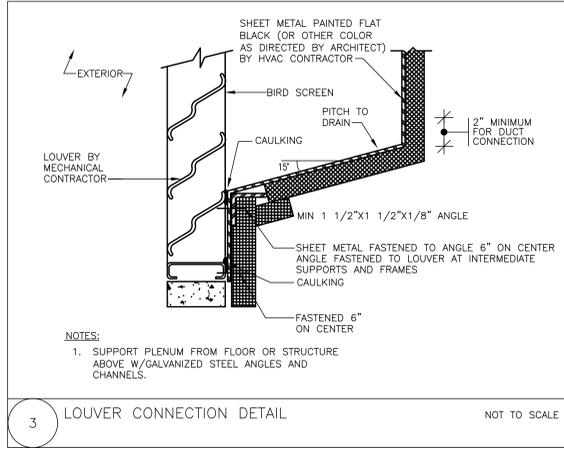
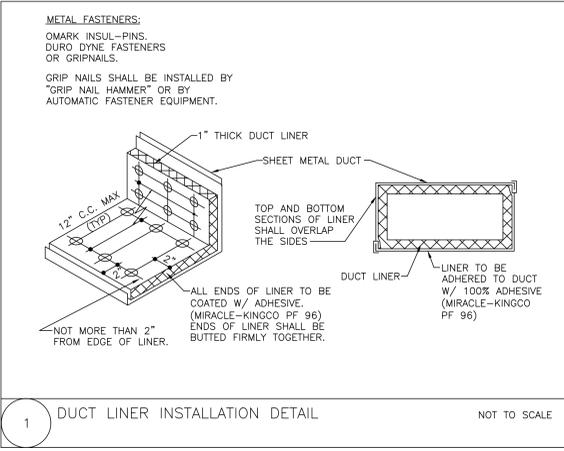
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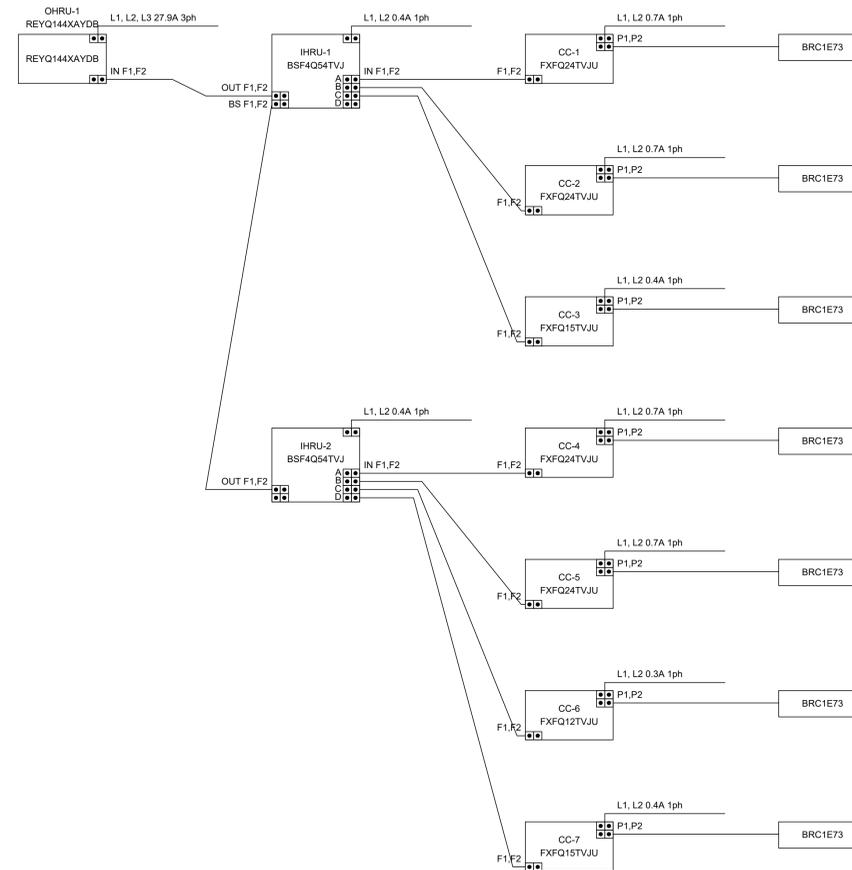
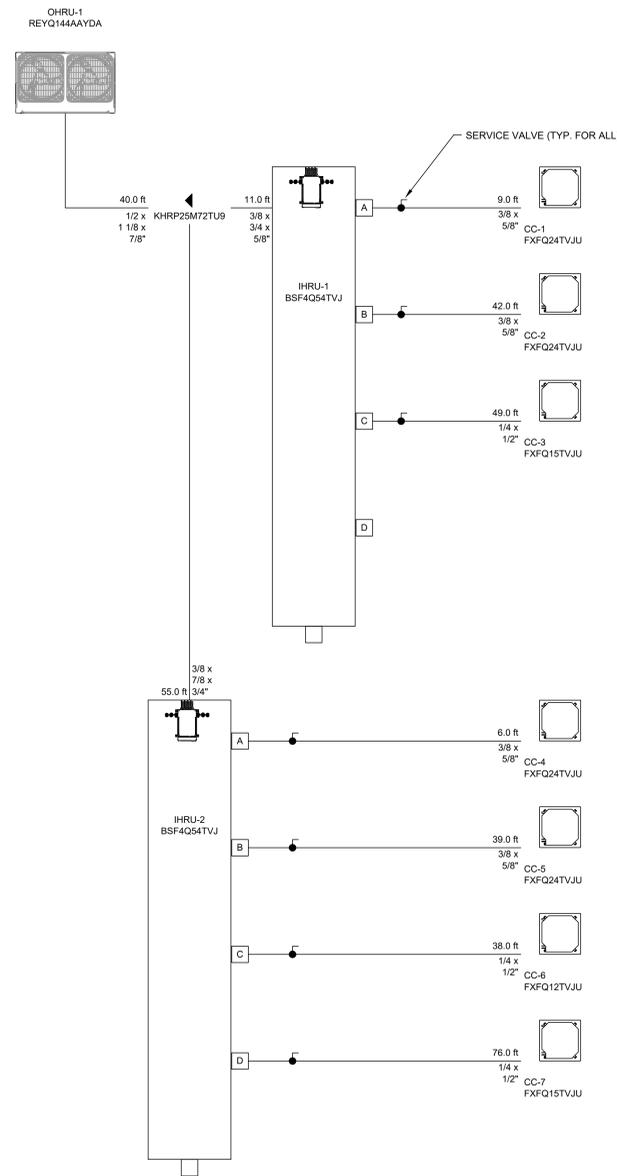
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