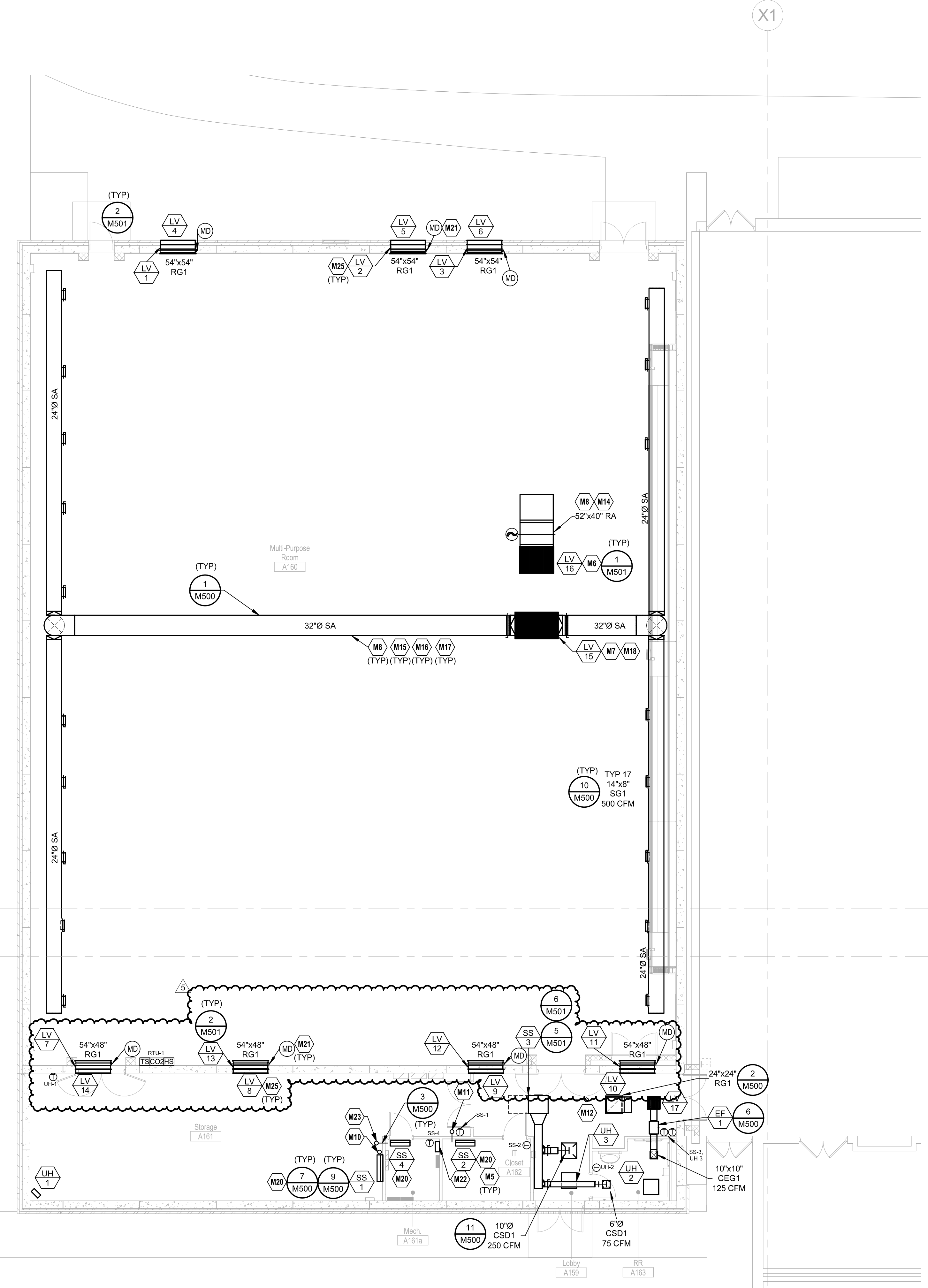


ICC 500 PASSIVE VENTILATION...

SAFE ROOM OCCUPANTS	1455.00 PEOPLE
VENTING AREA PER OCCUPANT	6.00 IN. SQ.
TOTAL VENTING AREA REQUIRED	60.63 FT. SQ.
LOW FREE AREA PROVIDED	28.55 FT. SQ.
HIGH FREE AREA PROVIDED	34.56 FT. SQ.
TOTAL FREE AREA PROVIDED	63.11 FT. SQ.

MECHANICAL PLAN NOTES:

- M5 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL PANELS OR SERVER RACKS.
- M6 54"x40" RA DUCT UP TO RTU-1 PLENUM ROOF CURB.
- M7 66"x40" SA DUCT UP TO RTU-1 PLENUM ROOF CURB.
- M8 ROUTE DUCT TIGHT TO STRUCTURE.
- M10 REFRIGERANT PIPING UP TO CU-1 ON THE ROOF. SIZE AND ROUTE PIPING PER MANUFACTURER'S RECOMMENDATION.
- M11 REFRIGERANT PIPING UP TO CU-2 ON THE ROOF. ROUTE REFRIGERANT PIPE OUT OF THE IT ROOM IMMEDIATELY AND PENETRATE ROOF ABOVE THE STORAGE ROOM. SIZE AND ROUTE PIPING PER MANUFACTURER'S RECOMMENDATION.
- M12 REFRIGERANT PIPING UP TO CU-3 ON THE ROOF. SIZE AND ROUTE PIPING PER MANUFACTURER'S RECOMMENDATION.
- M14 PROVIDE 1" ACOUSTICAL INTERNAL DUCT LINER IN ENTIRE LENGTH OF RETURN DUCTWORK.
- M15 PROVIDE 1" ACOUSTICAL INTERNAL DUCT LINER IN SUPPLY DUCT FROM UNIT DISCHARGE TO FIRST TAKEOFF.
- M16 EXPOSED DUCTWORK IN GYM SHALL BE FIELD PAINTED. REFER TO SPECIFICATIONS FOR DUCT FINISH FOR FIELD PAINTING. COLOR TO BE SELECTED BY ARCHITECT.
- M17 DUCTWORK IN GYM SHALL BE FULLY LINED. DIMENSIONS SHOWN ARE CLEAR INTERNAL DIMENSIONS. INCREASE SHEET METAL SIZE TO ACCOUNT FOR SPECIFIED LINER THICKNESS. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- M18 INSTALL ICC 500 LOUVER IN ROOF PENETRATION. REFER TO SHEET M501/1 FOR DETAIL. TRANSITION DUCT INSIDE PLENUM CURB TO CONNECT TO RTU.
- M20 MOUNT SS AT ROOF TO THE BOTTOM OF THE UNIT.
- M21 PROVIDE PASSIVE VENTILATION CONTROL DAMPER, RUSKIN CD-40 OR EQUIVALENT. PROVIDE WITH 24-DC POWER OPEN POWER CLOSED ACTUATOR. ACTUATOR SHALL BE COMPATIBLE WITH PASSIVE VENTILATION DAMPER CONTROL PANEL. TYPICAL FOR (7) PASSIVE VENTILATION LOUVERS.
- M22 FURNISH AND INSTALL A PASSIVE VENTILATION DAMPER CONTROL PANEL IN THIS APPROXIMATE LOCATION. PANEL SHALL BE SUPPLIED BY HVAC MANUFACTURING AND TECHNOLOGY. CONTACT LEN KOBYLUS AT 903-681-0067, LKOBYLUS@HVACMFG.COM. INSTALL LOW VOLTAGE CONTROL WIRING FROM CONTROL PANEL TO PASSIVE VENTILATION DAMPER ACTUATORS. TORQUE REQUIREMENTS TO OPEN DAMPERS SHALL BE VERIFIED PRIOR TO PROCUREMENT OF CONTROL PANEL.
- M23 REFRIGERANT PIPING UP TO CU-4 ON THE ROOF. ROUTE REFRIGERANT PIPE OUT OF THE ELECTRICAL ROOM IMMEDIATELY AND PENETRATE ROOF ABOVE THE STORAGE ROOM. SIZE AND ROUTE PIPING PER MANUFACTURER'S RECOMMENDATION.
- M25 REFER TO ARCHITECTURAL SHEETS FOR INFORMATION ON THE LOUVER ASSEMBLY'S EXACT INSTALLATION LOCATION.



1 HVAC LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

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Architecture # 000001

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Aubry Bend MS Multi-Purpose Addition

Blue Valley School District
12501 W. 175th St.
Overland Park, Kansas 66221

BVSD Project Number: #ABM-2301

REVISIONS:

#	Description	Date
1	Addendum G2	03.09.2023
2	PKT 02	04.08.2023



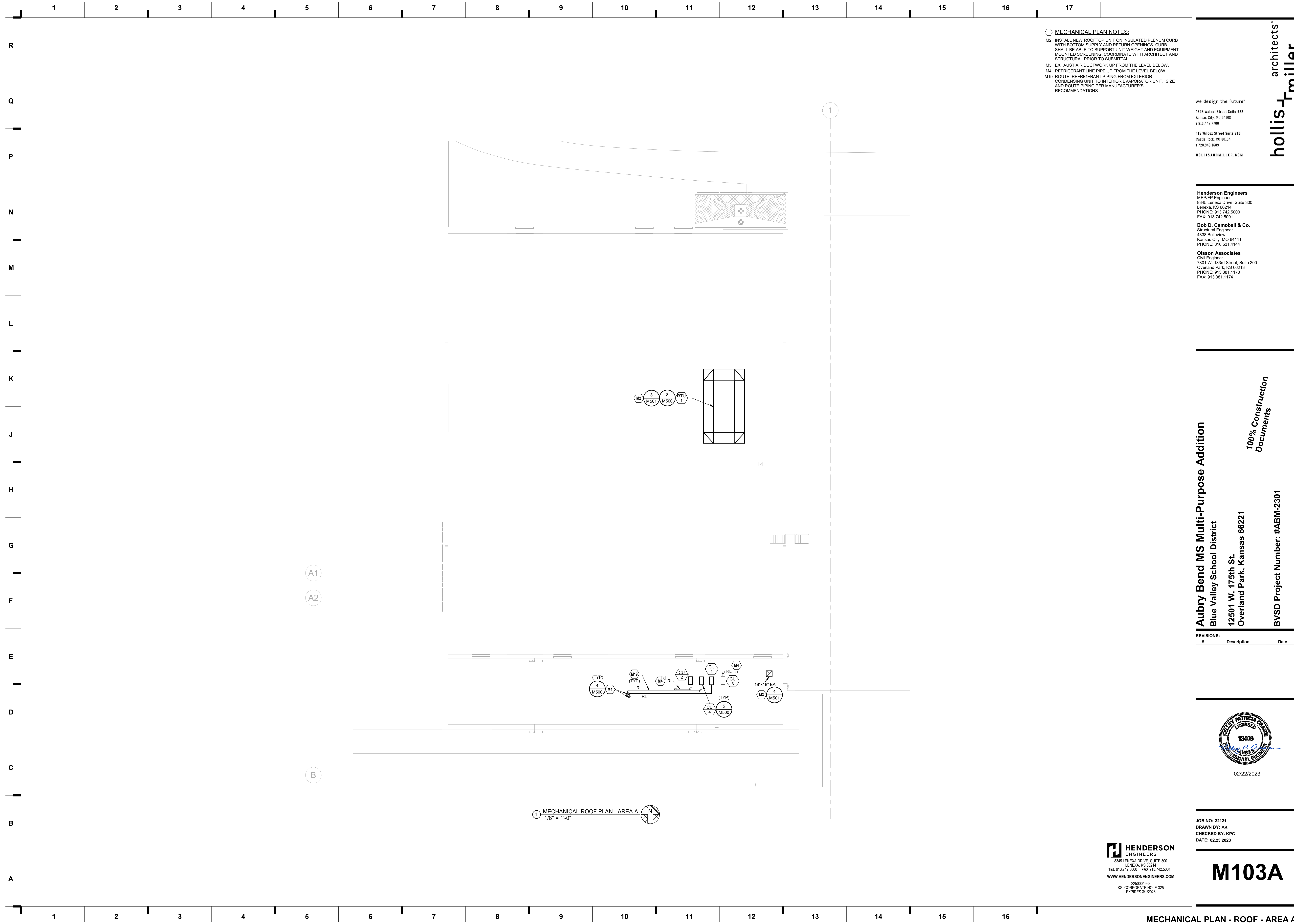
09/07/2023

JOB NO: 22121
DRAWN BY: AK
CHECKED BY: KPC
DATE: 04.07.2023

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225004693
KS. CORPORATE NO. E-325
EXPIRES 12/31/2024

M101A



MECHANICAL PLAN NOTES:
 M2 INSTALL NEW ROOFTOP UNIT ON INSULATED PLENUM CURB WITH BOTTOM SUPPLY AND RETURN OPENINGS. CURB SHALL BE ABLE TO SUPPORT UNIT WEIGHT AND EQUIPMENT MOUNTED SCREENING. COORDINATE WITH ARCHITECT AND STRUCTURAL PRIOR TO SUBMITTAL.
 M3 EXHAUST AIR DUCTWORK UP FROM THE LEVEL BELOW.
 M4 REFRIGERANT LINE PIPE UP FROM THE LEVEL BELOW.
 M19 ROUTE REFRIGERANT PIPING FROM EXTERIOR CONDENSING UNIT TO INTERIOR EVAPORATOR UNIT. SIZE AND ROUTE PIPING PER MANUFACTURER'S RECOMMENDATIONS.

1 MECHANICAL ROOF PLAN - AREA A
 1/8" = 1'-0"

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 Overland Park, Kansas 66221

100% Construction Documents

BVSD Project Number: #ABM-2301

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 KS. CORPORATE NO. E-325
 EXPIRES 3/1/2023

M103A

ROOFTOP UNIT SCHEDULE (DX COOLING, ELECTRIC HEATING)

MARK	MANUFACTURER	MODEL	SUPPLY FAN										EXHAUST AIR				WHEEL DESIGN CFM		SUMMER HEAT RECOVERY						WINTER HEAT RECOVERY						COOLING COIL						HEATING COIL						HOT GAS REHEAT COIL						ELECTRICAL						WEIGHT (LBS)	NOTES		
			NOMINAL TONS	UNIT TYPE	FAN TYPE	CFM	ESP (IN)	TSP (IN)	BHP	NOM HP	VFD (Y/N)	CFM	ESP (IN)	TSP (IN)	BHP	NOM HP	VFD (Y/N)	OA (CFM)	EA (CFM)	MAX WHEEL PRESSURE DROP (IN)	OAT	EXHAUST EAT	WHEEL SA LAT	OAT	EXHAUST EAT	WHEEL SA LAT	TH (MBH)	SH (MBH)	EAT	LAT	REFR TYPE	MIN EFF (EER)	MIN NO STAGES	MIN OUT (MBH)	NOM (KW)	EAT	LAT	MIN NO STAGES (SCR)	TH (MBH)	EAT	LAT	MIN O/A CFM	ABS MIN O/A	V/PH	MCA	MOC	MOC	DISC TYPE										
RTU 1	AOA	RN-030	30	SZ-VAV	PLENUM	8500	0.8	1.92	9.08	10.00	Yes	8500	0.66	2.04	6.42	7.50	Yes	5700	7700	.7	105.0	78.0	75.0	62.0	81.6	66.0	4.0	2.0	70	58.0	54.1	47.0	314.4	240.5	79.5	64.9	53.7	52.4	R410A	10.8	13.2	10	284.8	100.0	54 F	85.0	10	156.1	55	72	5700	1700	480/3	152	175	NF	5000	ALL

MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER, MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
 A. REFER TO ROOFTOP UNIT CONTROL MATRIX FOR CONTROL FEATURES, MODULES, AND ACCESSORIES THAT SHALL BE PROVIDED WITH THE EQUIPMENT.
 B. EQUIPMENT SIZED FOR 105 °F AMBIENT TEMPERATURE.
 C. PROVIDE 2 INCH MERV 8 PLEATED THROWAWAY PREFILTERS IN THE OUTSIDE AIR AND EXHAUST AIRSTREAMS UPSTREAM OF THE ENERGY RECOVERY WHEEL. PROVIDE 4" MERV 13 PLEATED THROWAWAY FILTERS IN THE SUPPLY AIRSTREAM.
 D. PROVIDE INSULATED PLENUM ROOF CURB WITH MINIMUM HEIGHT OF 24 INCHES WITH BOTTOM SUPPLY AND RETURN ALIGNED WITH STRUCTURAL ROOF OPENING. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
 E. PROVIDE MODULATING HOT GAS REHEAT COIL FOR DEHUMIDIFICATION CONTROL SEQUENCE.
 F. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE TO FACILITATE MODULATING FAN SPEED CONTROL.
 G. PROVIDE SHUNT GROUNDING SYSTEM ON MOTOR. REFER TO MOTOR SPECIFICATION FOR ADDITIONAL INFORMATION.
 H. PROVIDE SINGLE POINT POWER CONNECTION.
 I. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
 J. PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE FACTORY WIRING AND MOUNTED TO UNIT WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
 K. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
 L. SPECIFIED FAN TSP INCLUDES EXTERNAL DUCT AND INTERNAL FILTER, COIL, AND CASING LOSSES. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
 M. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
 N. PROVIDE WITH DIGITAL SCROLL OR VARIABLE SPEED LEAD COMPRESSOR.
 O. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT, CURB, AND FILL.
 P. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
 Q. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
 R. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT POWER SUPPLY WITH ELECTRICAL CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED.
 S. SELECT EQUIPMENT FOR ELEVATION OF 100 FEET ABOVE SEA LEVEL.
 T. W. ABS. MIN. O/A IS THE ABSOLUTE MINIMUM OUTSIDE AIR CFM USING VENTILATION RESET OR DEMAND CONTROL VENTILATION.
 U. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
 V. PROVIDE BYPASS DAMPERS AROUND THE WHEEL. SIZE WHEEL FOR DESIGN SUPPLY CFM. PROVIDE BYPASS DAMPERS AROUND THE WHEEL. SIZE WHEEL FOR DESIGN SUPPLY CFM.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	AREA SERVED	MANUFACTURER	MODEL	MIN OUT (MBH)	MIN OUT (KW)	CFM	V/PH	DISC TYPE	NOTES
UH 1	VESTIBULE	Q-MARK	CU935	10.2	3.0	250	480/3	NF	B,E
UH 2	RESTROOM	Q-MARK	CUF-547	6.8	2.0	300	277/1	NF	B,D,F
UH 3	ENTRY	Q-MARK	CUF-557	18.1	5.0	300	277/1	NF	B,D,F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
 A. MOUNT 7'-6" FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
 B. PROVIDE WITH WALL MOUNTED THERMOSTAT.
 C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR WALL MOUNTING.
 D. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.
 E. MOUNT 0'-6" FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
 F. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR WALL MOUNTING.

ALTERNATE #1

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
CGE1	PRICE	EXHAUST	85	EGGGRATE	CEILING	12X12	25	0.08	B,C,F,J,L
CSD1	PRICE	SUPPLY	SPD	PLAQUE	CEILING	REFER TO PLANS	25	0.08	B,C,H,F,J,K,L
RG1	PRICE	RETURN	500	85	CEILING	REFER TO PLANS	25	0.05	F,J,K
SG1	PRICE	SUPPLY	520	LOUVERED	DUCT	REFER TO PLANS	25	0.07	B,D,E,H,J,K,L

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NOTES:
 B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
 C. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
 D. FRONT BLADES PARALLEL TO LONG DIMENSION.
 E. DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE.
 F. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
 G. MINIMUM THROW IN FEET AT VELOCITY OF 50 FPM SHALL BE 25 FT.
 H. PROVIDE BORDER TYPE TO MATCH CEILING CONSTRUCTION WITH CONCEALED MOUNTING, AND INSULATED PLENUM BOX WITH NECK.
 I. PROVIDE DIFFUSERS, LINEAR SLOTS, AND GRILLES WITH NO EXPOSED MOUNTING SCREWS.
 J. PAINT ALL INTERIOR SURFACES SLOTS, GRILLES AND PLENUMS FLAT BLACK.

FAN SCHEDULE

MARK	SERVICE DESCRIPTION	MANUFACTURER	MOUNTING	MODEL	CFM	ESP (IN)	BHP	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	VFD (Y/N)	ELECTRICAL	WEIGHT (LBS)	NOTES
EF 1	RESTROOM	GREENHECK	INLINE	SQ-97-VG	125	0.3	0.03	0.25	1118	DIRECT	No	V/PH	50	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
 A. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER.
 B. PROVIDE WITH SPRING VIBRATION ISOLATION AND ALL-THREAD HANGING RODS.
 C. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH.
 D. PROVIDE WITH MANUFACTURER'S FAN SPEED CONTROLLER FOR BALANCING PURPOSES.
 E. PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.
 F. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE BHP.

SPLIT SYSTEM SCHEDULE

MARK	ASSOCIATED UNIT	MANUFACTURER	MODEL	REFR TYPE	EVAPORATOR SECTION						CONDENSING SECTION				NOTES	
					CFM	TC (MBH)	EAT (°F DB)	EAT (°F WB)	TH (MBH)	EAT (°F DB)	EAT (°F WB)	AMB (°F)	V/PH	MCA		MOC
SS 1	CU 1	MITSUBISHI	PKA-A12PUY-A12	R410A	425	12.0	75.0	63.0	-	-	100 F	208/1	11	28	A-F	
SS 2	CU 2	MITSUBISHI	PKA-A12PUY-A12	R410A	425	12.0	75.0	63.0	12.0	70.0	59.0	100 F	208/1	11	28	A-F
SS 3	CU 3	MITSUBISHI	SEZ-KD09/SUZ-KA09	R410A	300	9.0	75.0	63.0	9.0	70.0	59.0	100 F	208/1	14	24	A-G
SS 4	CU 4	MITSUBISHI	PKA-A12PUY-A12	R410A	425	12.0	75.0	63.0	12.0	70.0	59.0	100 F	208/1	11	28	A-F

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:
 A. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
 B. DIVISION 08 CONTRACTOR TO PROVIDE DISCONNECT SWITCH FOR EVAPORATOR SECTION AND CONDENSING SECTION.
 C. PROVIDE WITH WALL MOUNTED THERMOSTAT BY UNIT MANUFACTURER.
 D. PROVIDE WITH INTEGRAL CONDENSATE PUMP.
 E. PROVIDE CONDENSER COIL HAIL GUARDS.
 F. INSTALL CONDENSING UNIT ON PRE-ENGINEERED ROOF EQUIPMENT SUPPORTS WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 16 INCHES ABOVE FINISHED ROOF SURFACE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION.
 G. PROVIDE AUXILIARY DRAIN PAN WITH FLOOD DETECTOR SWITCH TO SHUT OFF UNIT WHEN WATER IS PRESENT IN DRAIN PAN.

LOUVER SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	WIDTH (IN)	LENGTH (IN)	AIRFLOW (CFM)	MIN FREE AREA (SF)	MAX VEL (FPM)	MAX SPD (IN W.C.)	NOTES
LV 1	STORM VENTILATION	RUSKIN	XP500	54"	54"	-	9.63	-	0.03	B,C
LV 2	STORM VENTILATION	RUSKIN	XP500	54"	54"	-	9.63	-	0.03	B,C
LV 3	STORM VENTILATION	RUSKIN	XP500	54"	54"	-	9.63	-	0.03	B,C
LV 4	STORM VENTILATION	RUSKIN	EMES20DD	54"	54"	-	9.71	-	0.02	A,D
LV 5	STORM VENTILATION	RUSKIN	EMES20DD	54"	54"	-	9.71	-	0.02	A,D
LV 6	STORM VENTILATION	RUSKIN	EMES20DD	54"	54"	-	9.71	-	0.02	A,D
LV 7	STORM VENTILATION	RUSKIN	EMES20DD	54"	48"	-	8.59	-	0.02	A,D
LV 8	STORM VENTILATION	RUSKIN	EMES20DD	54"	48"	-	8.59	-	0.02	A,D
LV 9	STORM VENTILATION	RUSKIN	EMES20DD	54"	48"	-	8.59	-	0.02	A,D
LV 10	STORM VENTILATION	RUSKIN	EMES20DD	54"	48"	-	8.59	-	0.02	A,D
LV 11	STORM VENTILATION	RUSKIN	XP500	54"	48"	-	8.52	-	0.04	B,C
LV 12	STORM VENTILATION	RUSKIN	XP500	54"	48"	-	8.52	-	0.04	B,C
LV 13	STORM VENTILATION	RUSKIN	XP500	54"	48"	-	8.52	-	0.04	B,C
LV 14	STORM VENTILATION	RUSKIN	XP500	54"	48"	-	8.52	-	0.04	B,C
LV 15	STORM VENTILATION	RUSKIN	XP500	40"	66"	8500	667	968	0.31	E
LV 16	STORM VENTILATION	RUSKIN	XP500	40"	52"	8500	673	1262	0.48	E
LV 17	STORM VENTILATION	RUSKIN	XP500	18"	18"	125	0.69	148	0.01	E

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NOTES:
 A. DRAINABLE FIXED LOUVER.
 B. WALL MOUNTED FEMA 361 AND ICC 500 RATED LOUVER.
 C. MANUFACTURER TO PROVIDE STRUCTURAL MULLIONS BETWEEN LOUVER INSTALLED IN TANDEM.
 D. PROVIDE MULTIPLE LOUVER SECTIONS AS NEEDED TO PROVIDE SCHEDULED LOUVER SIZE.
 E. ROOF MOUNTED FEMA 361 AND ICC 500 RATED LOUVER.

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REVISIONS:

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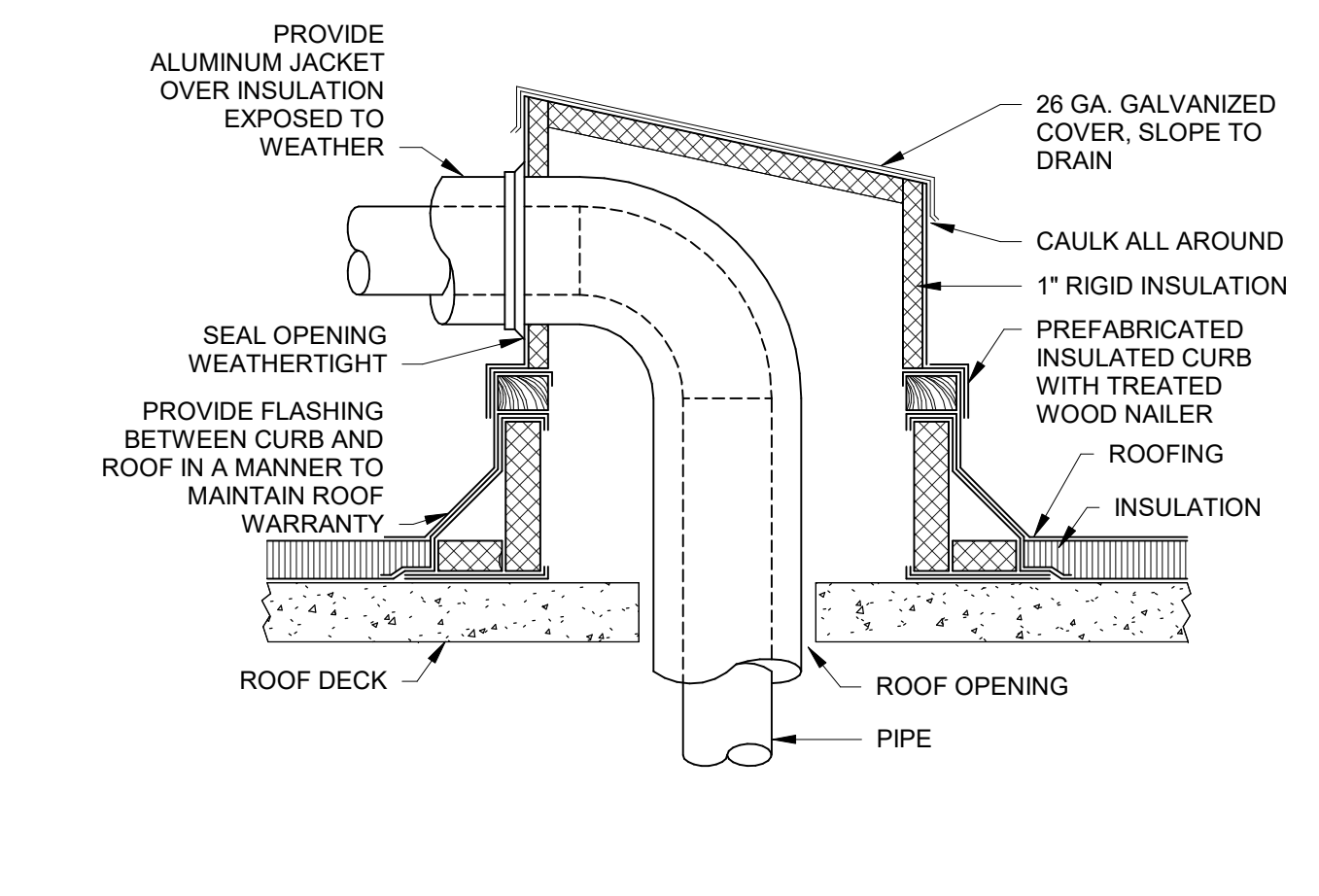
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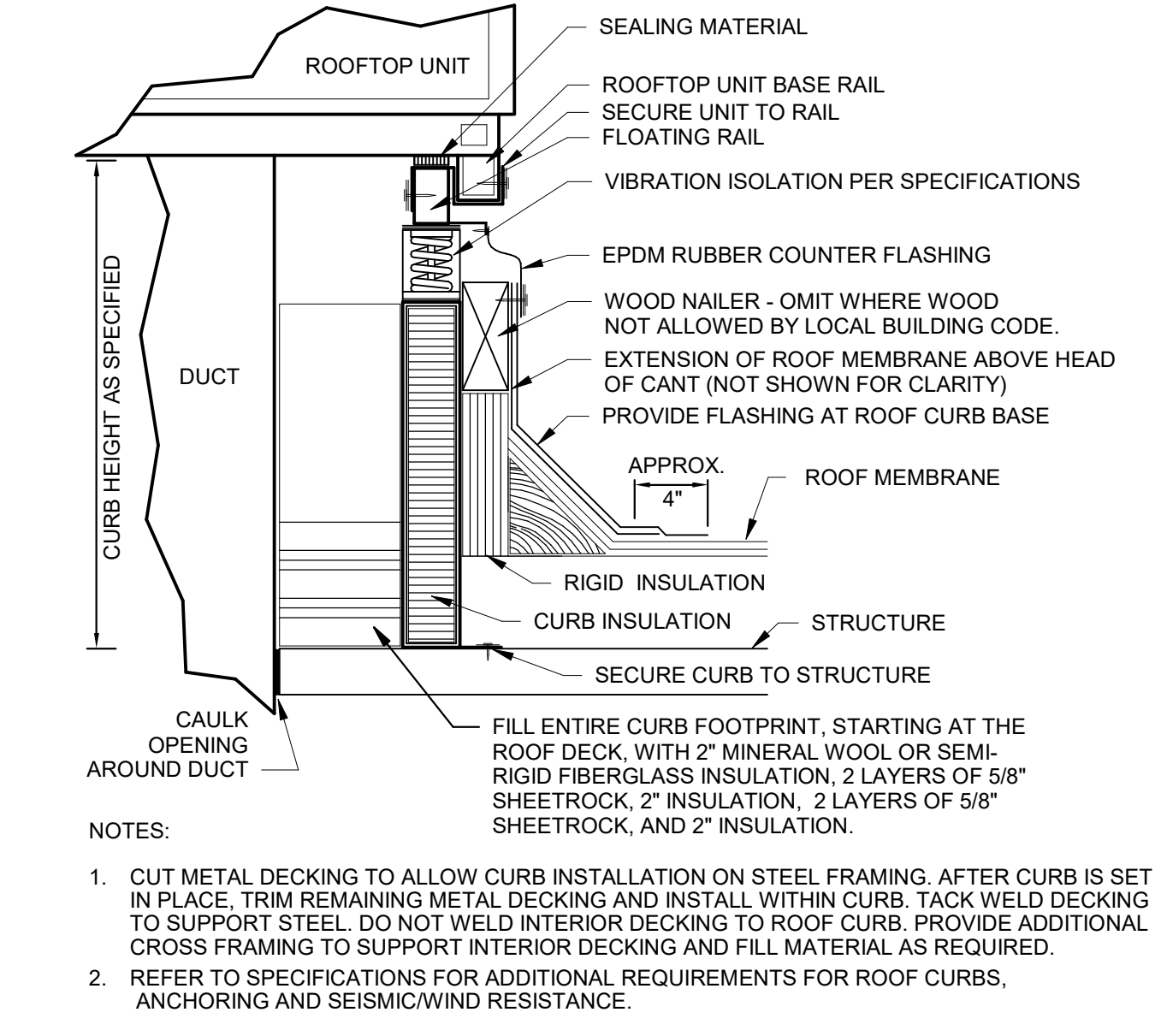
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KS. CONTRACT NO. E-325
EXPIRES 3/1/2023

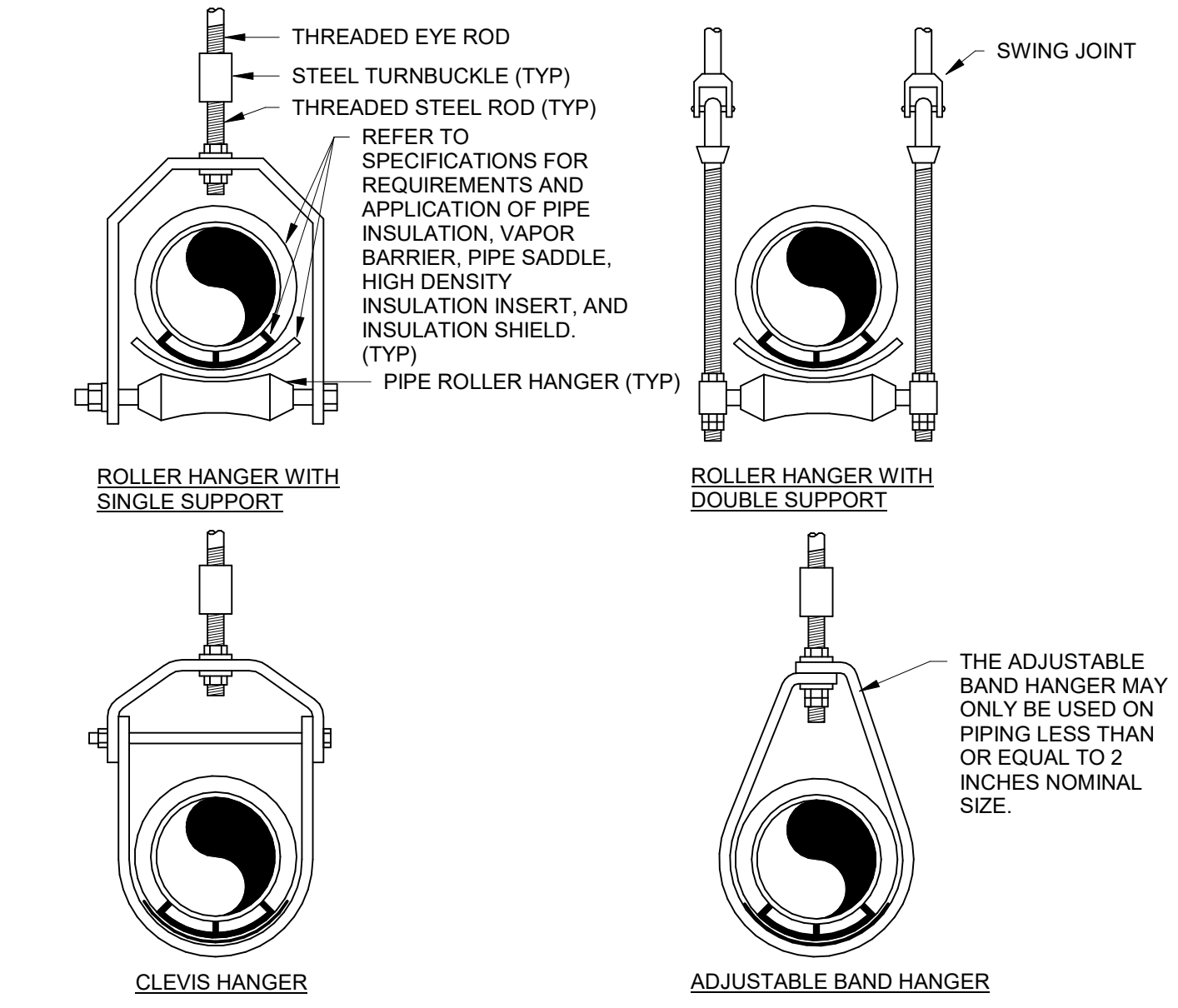
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NTS



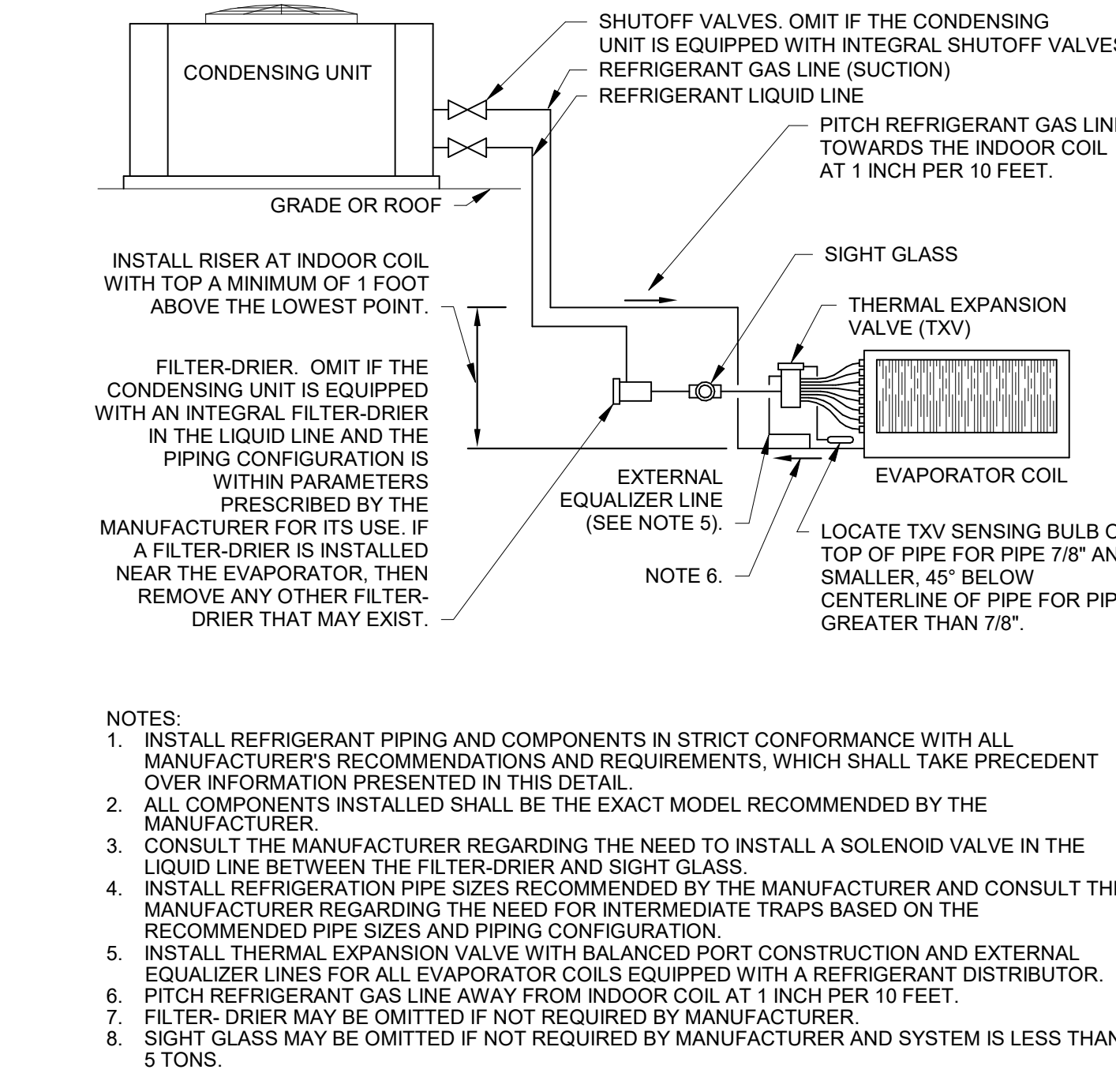
⑧ VIBRATION ISOLATION ROOF CURB DETAIL
NTS



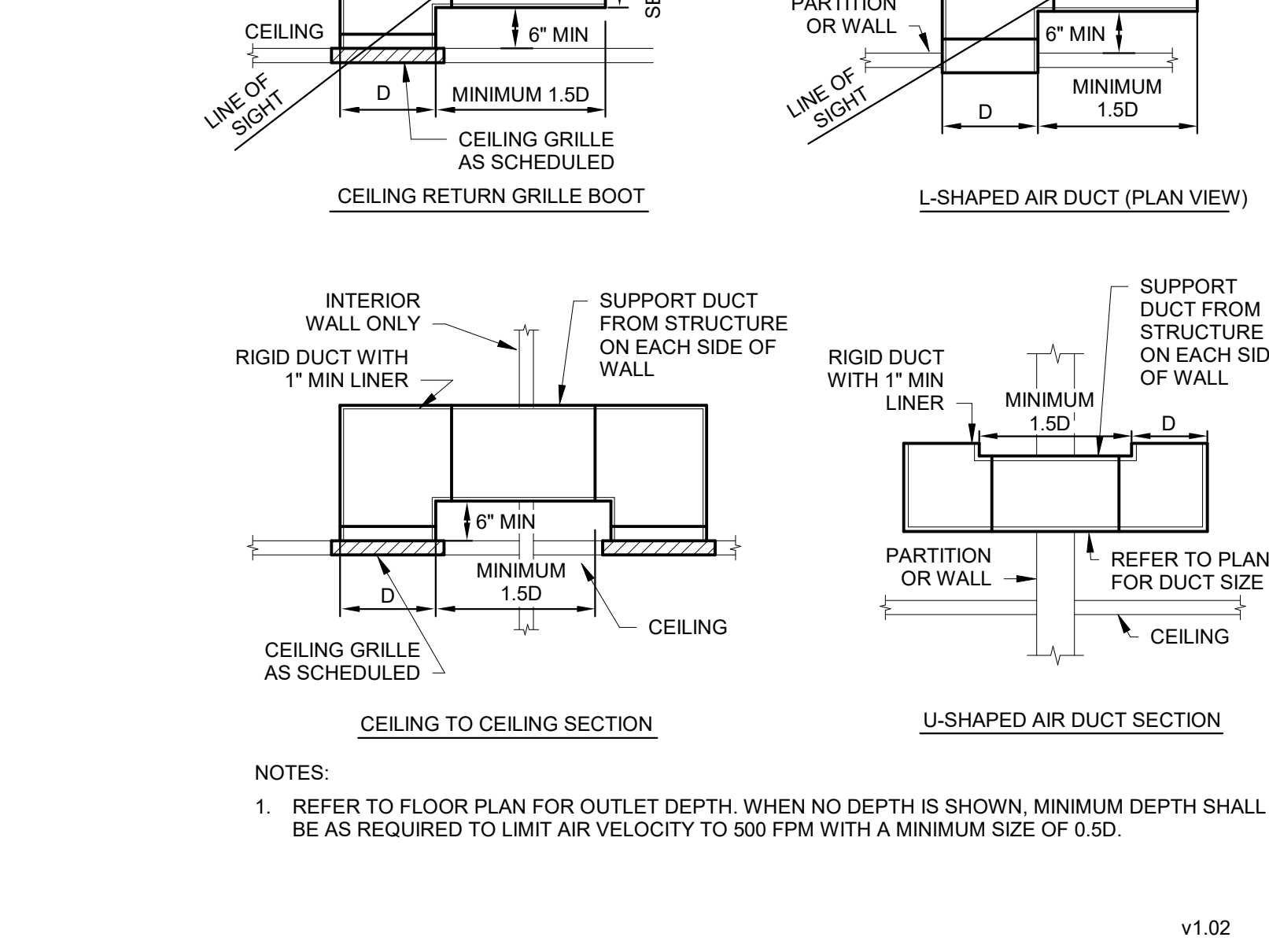
③ PIPE HANGER DETAILS
NTS



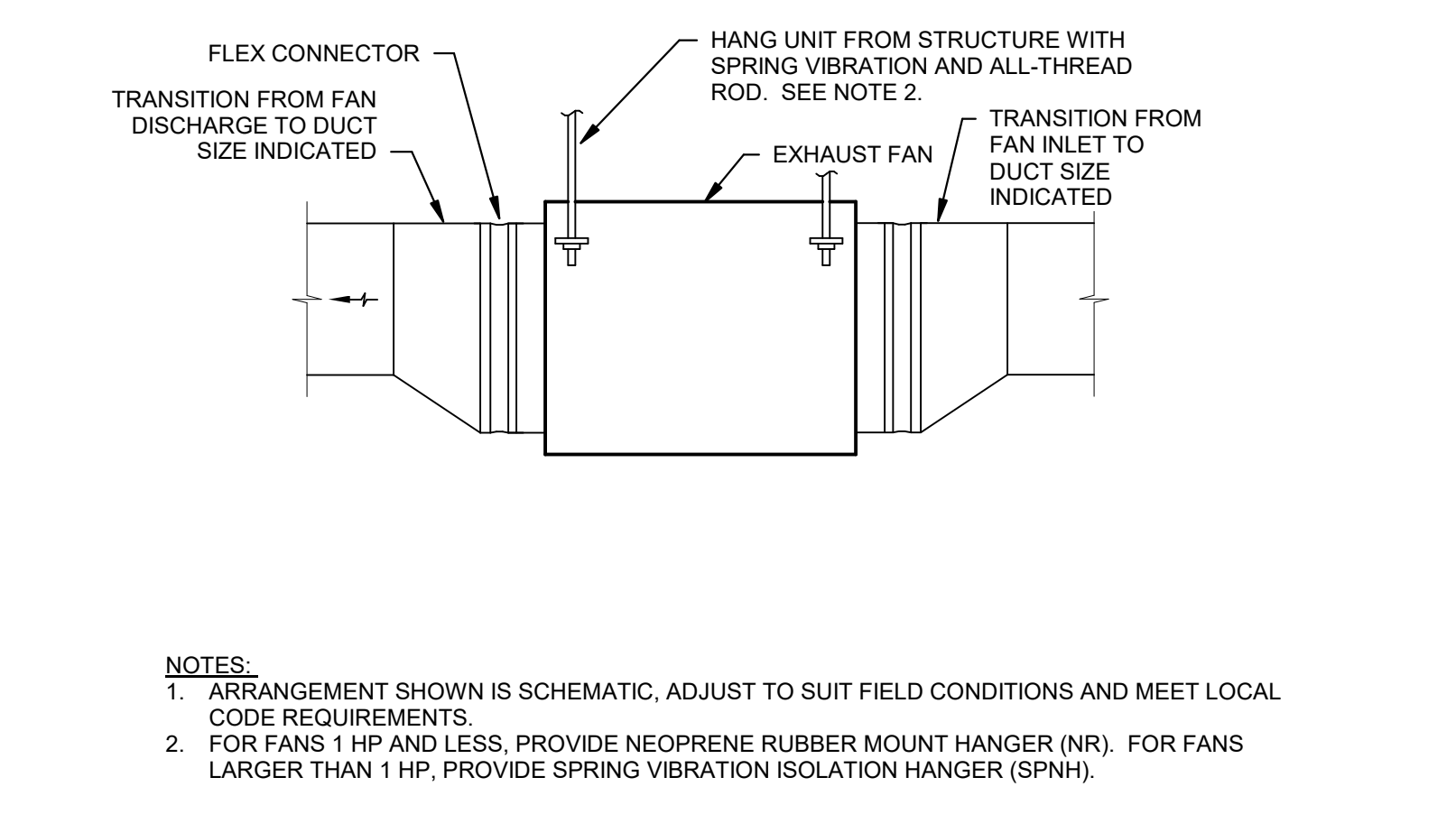
⑦ SPLIT SYSTEM PIPING DETAIL
NTS



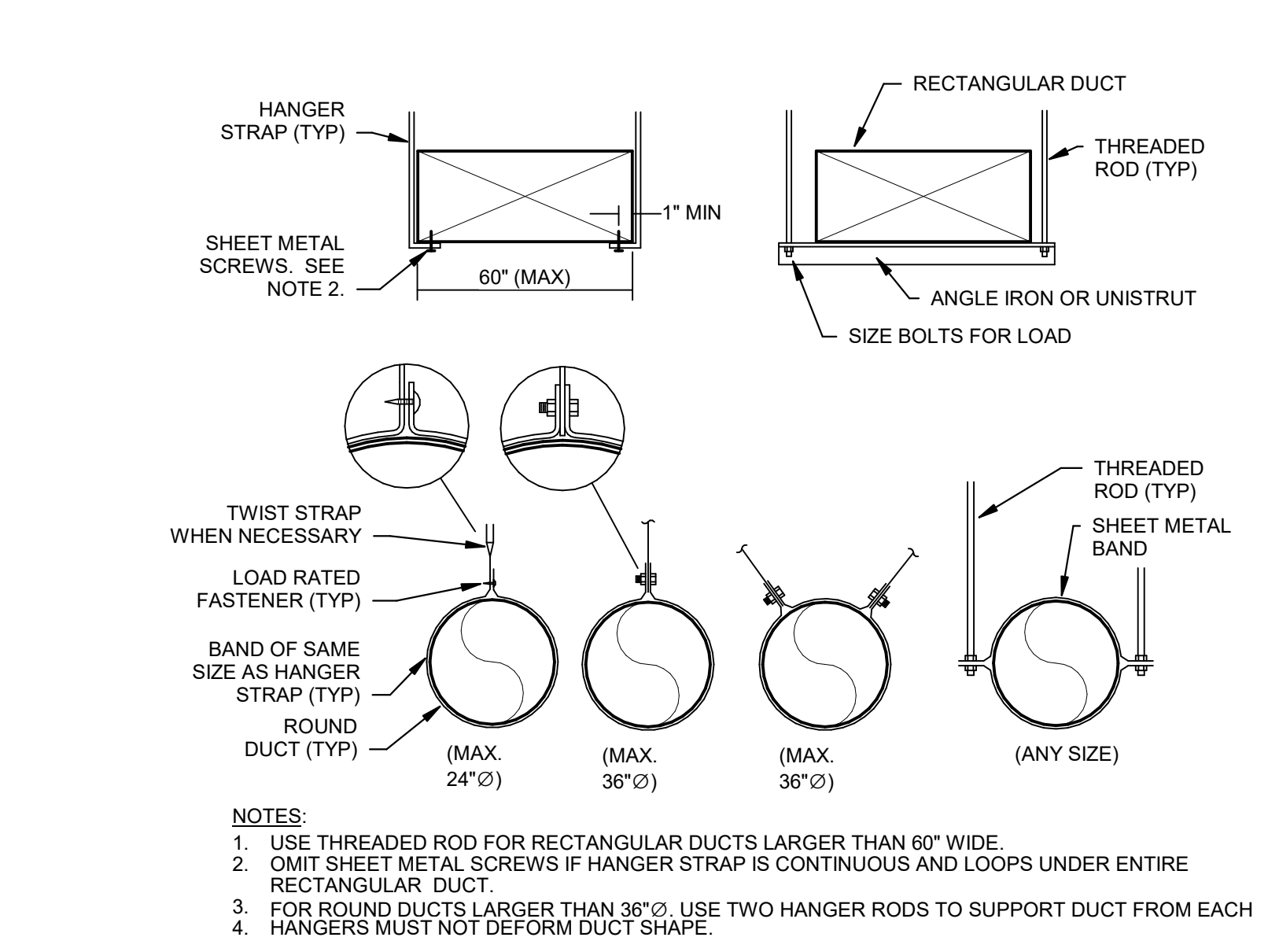
② RETURN TRANSFER AIR DUCT DETAILS
NTS



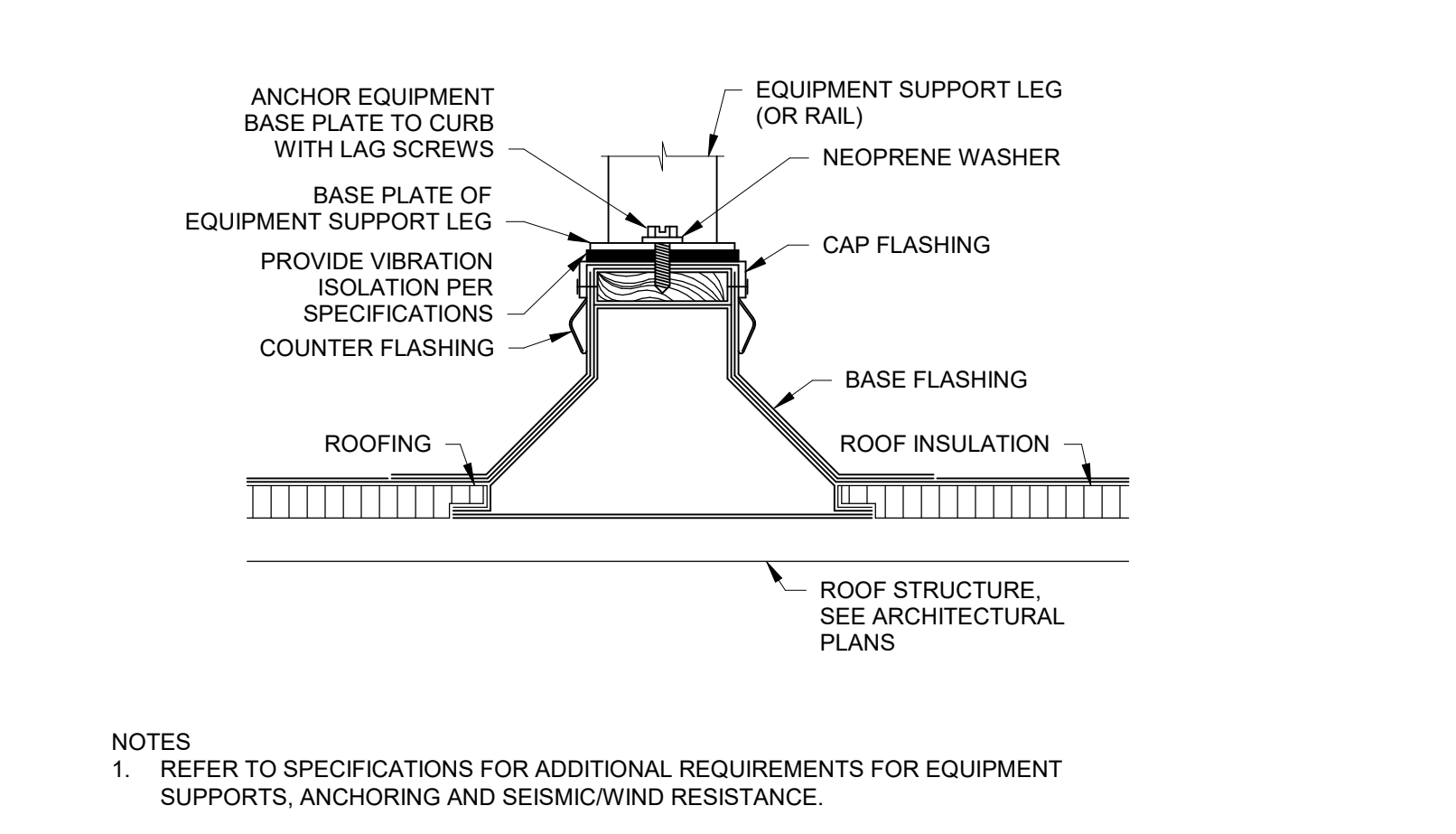
⑥ IN-LINE FAN DETAIL
NTS



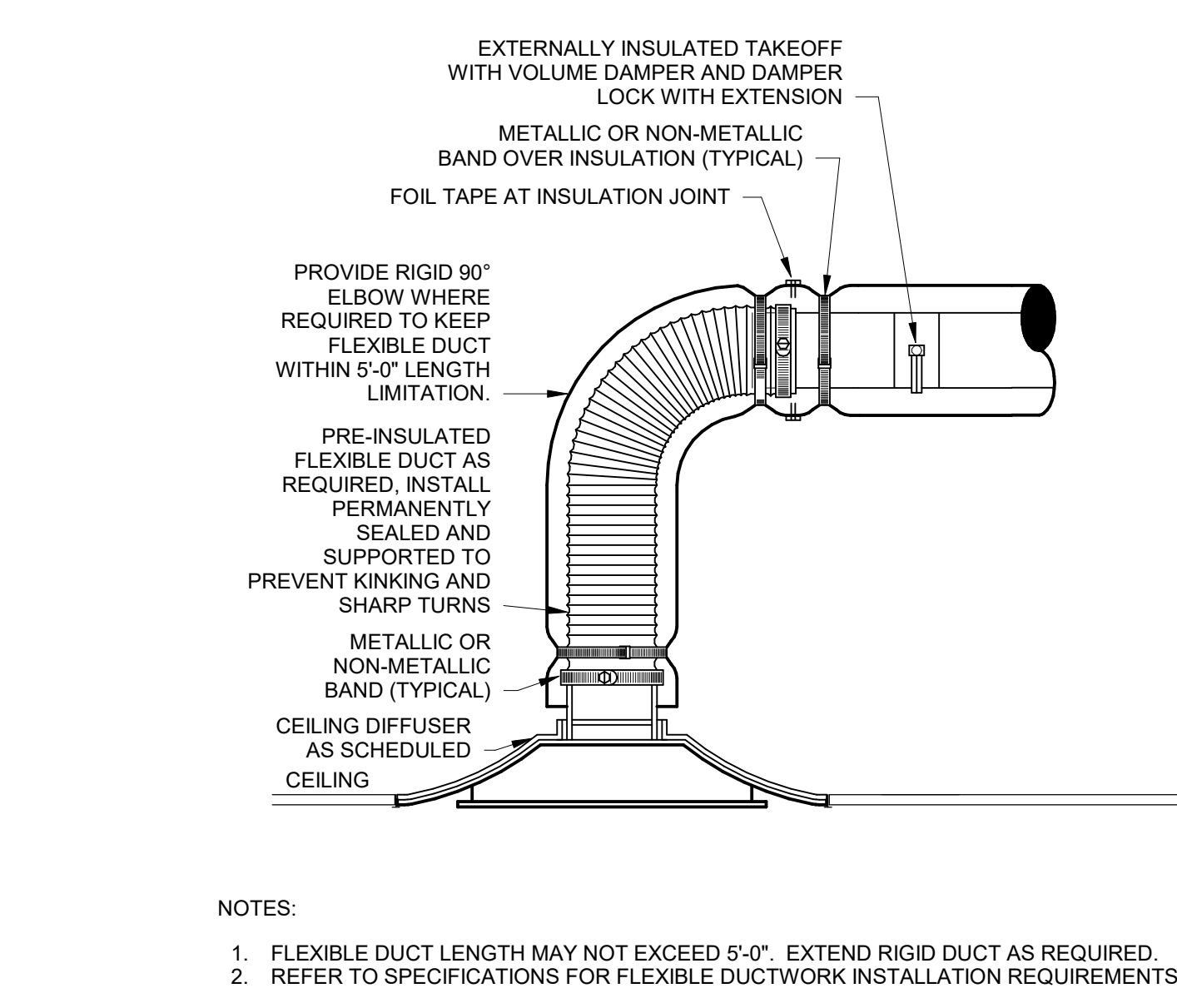
① DUCT HANGER LOWER ATTACHMENT DETAILS
NTS



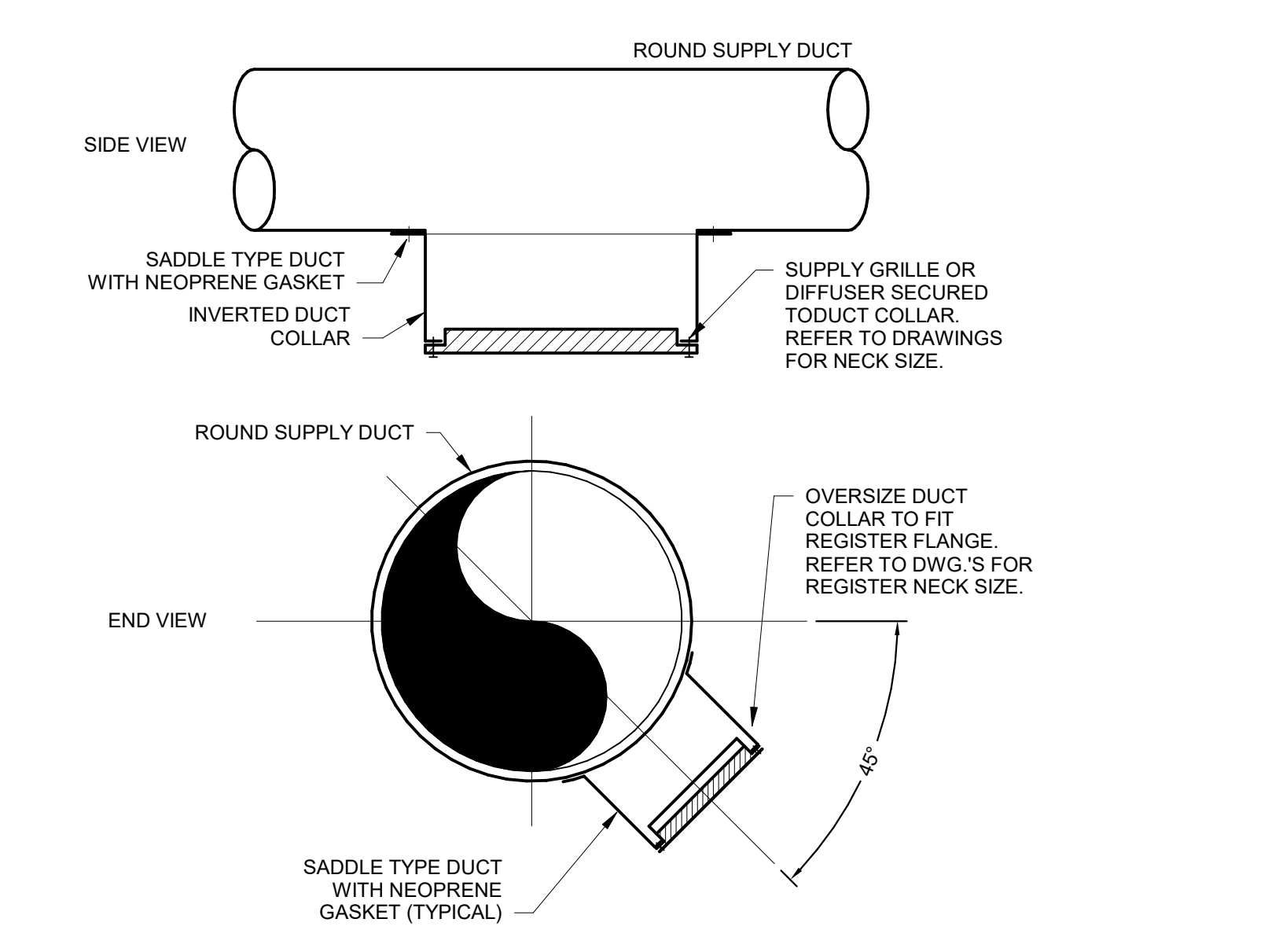
⑤ ROOF EQUIPMENT SUPPORT RAIL DETAIL
NTS



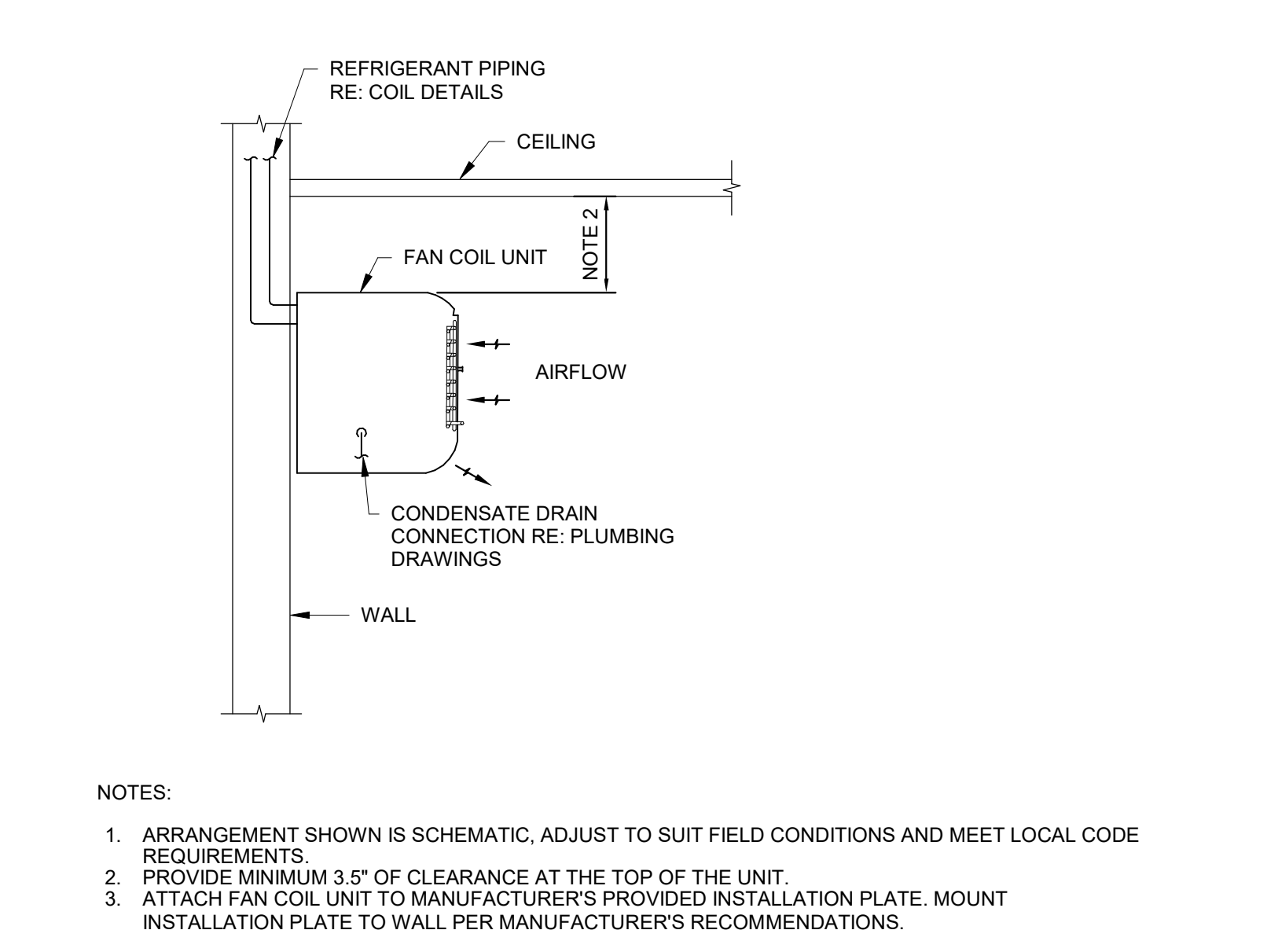
⑪ CEILING DIFFUSER DETAIL
NTS



⑩ REGISTER MOUNTING TO ROUND DUCT DETAIL
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⑨ SPLIT SYSTEM WALL-MOUNTED UNIT DETAIL
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Aubry Bend MS Multi-Purpose Addition
Blue Valley School District
12501 W. 175th St.
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100% Construction Documents

BVSD Project Number: #ABM-2301

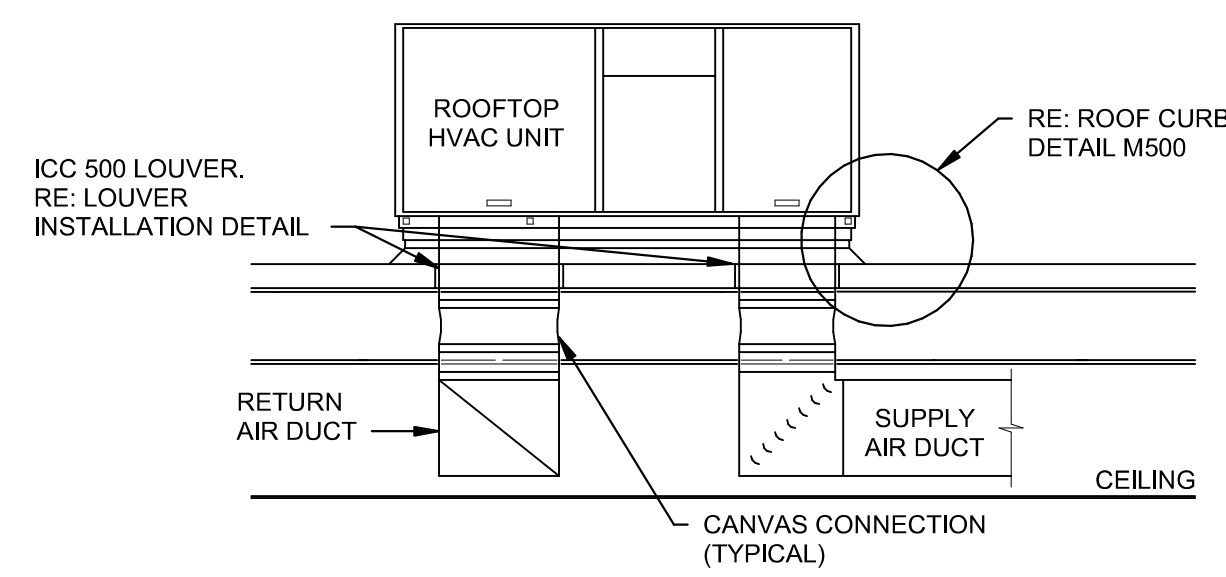
REVISIONS: # Description Date



JOB NO: 22121
DRAWN BY: AK
CHECKED BY: KPC
DATE: 02.23.2023

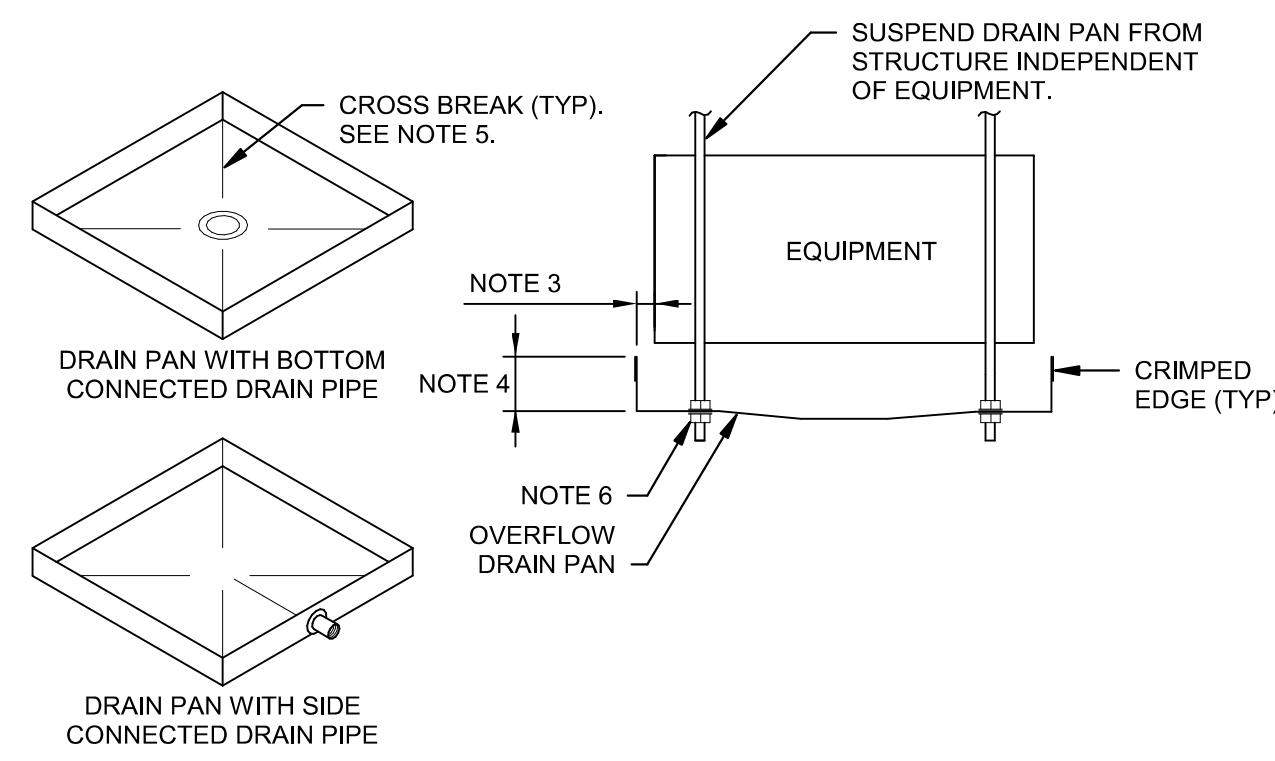
HENDERSON ENGINEERS
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KS. CORPORATE NO. E-325
EXPIRES 3/1/2023

M500



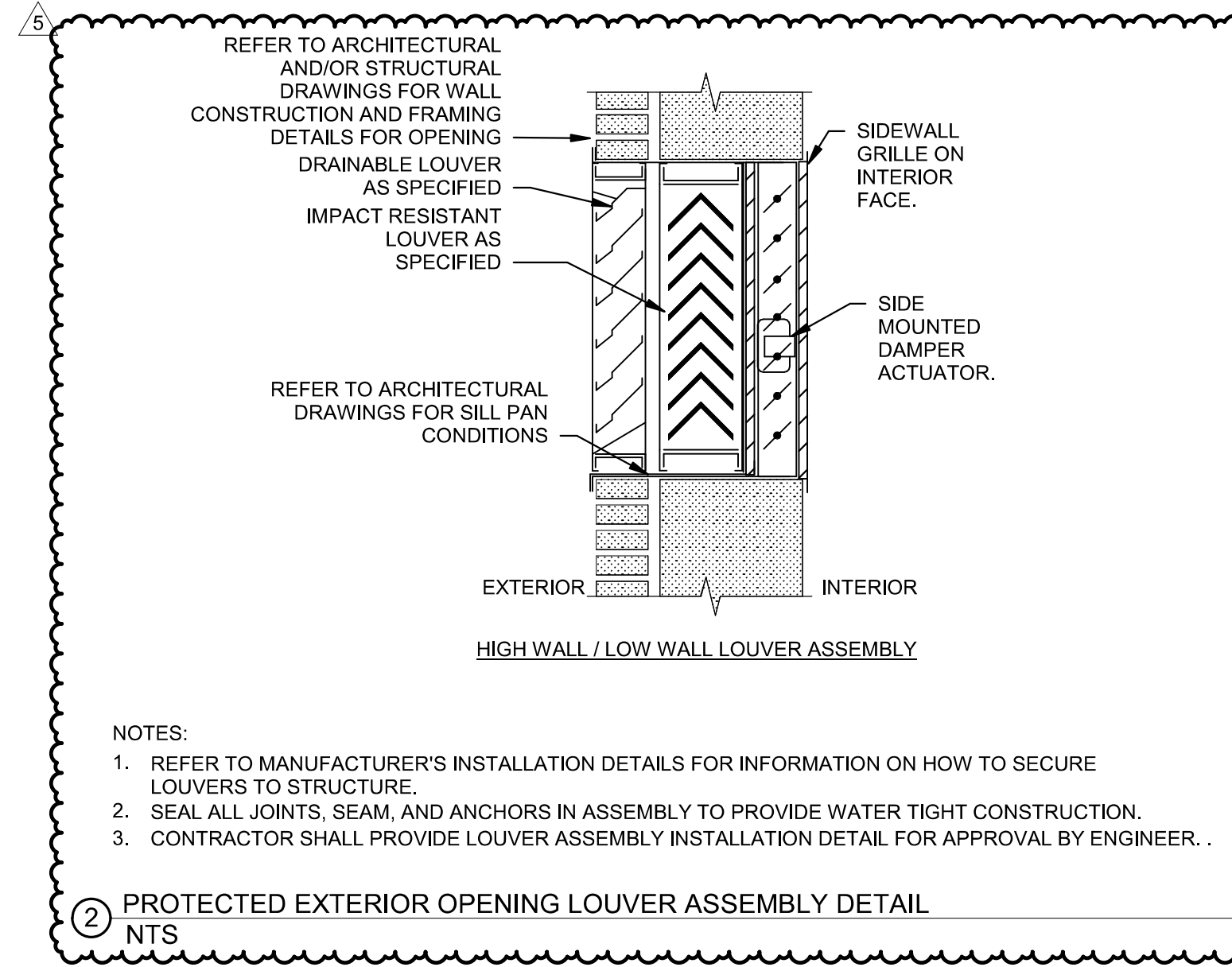
- NOTES:
1. PROVIDE OPENING THROUGH ROOF AND ROOF DECK INSULATION NO LARGER THAN REQUIRED TO ALLOW DUCTS TO PASS THROUGH. REFER TO PLANS FOR DUCT SIZES. TRANSITION AS REQUIRED IN ROOF CURB TO RTU SUPPLY AND RETURN OPENINGS.
 2. PROVIDE SLOPED ROOF CURB TO INSTALL ROOFTOP UNIT LEVEL TO ENSURE PROPER DRAINAGE. COORDINATE ROOF SLOPE WITH ARCHITECTURAL FLASH AND COUNTER FLASH ROOF PENETRATIONS, ETC. TO ENSURE WEATHER TIGHT INSTALLATION.

③ LOUVER IN RTU DUCTWORK DETAIL
NTS



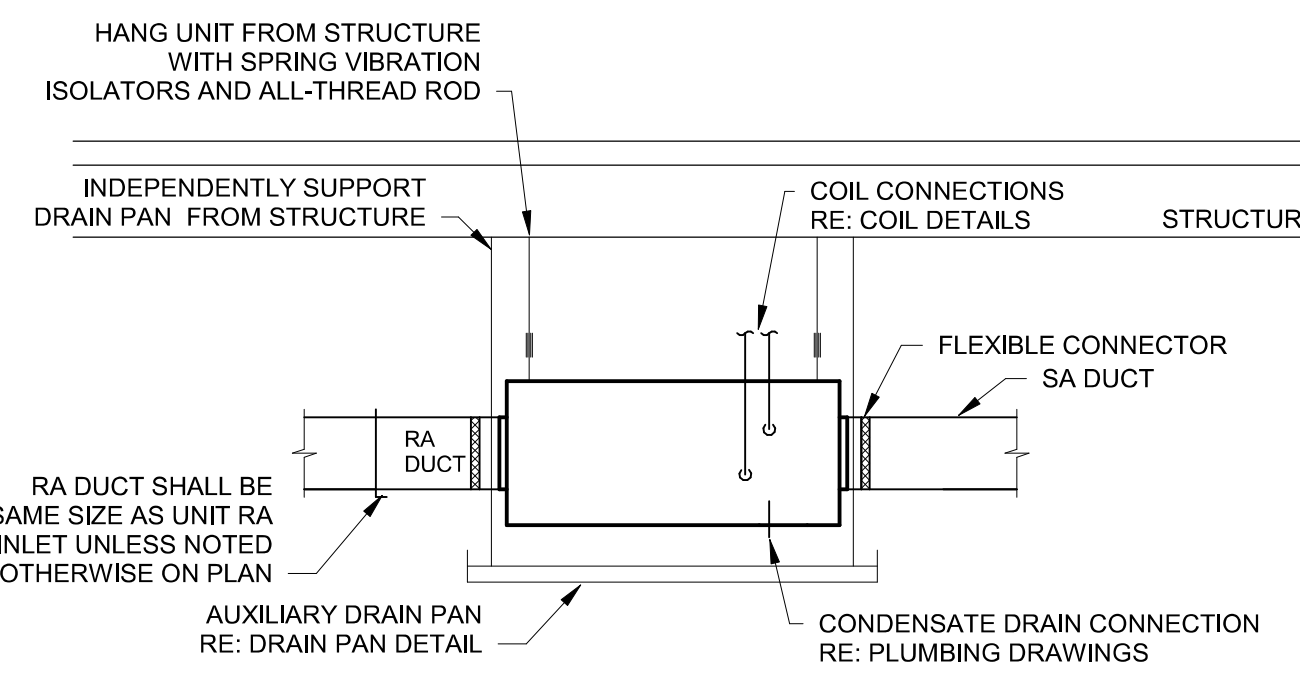
- NOTES:
1. SOLDER ALL JOINTS TO MAKE DRAIN PAN LEAK TIGHT.
 2. FABRICATE DRAIN PAN FROM 20 GAUGE GALVANIZED SHEET METAL.
 3. DRAIN PAN SHALL EXTEND MINIMUM 3" BEYOND EQUIPMENT ON ALL SIDES.
 4. HEIGHT OF DRAIN PAN TO BE MINIMUM 1/2" GREATER THAN DIAMETER OF SIDE-CONNECTED DRAIN PIPE FLANGE OR 1-1/2", WHICHEVER IS GREATER.
 5. CROSS BREAK BOTTOM OF SHEET METAL DRAIN PAN TO PROVIDE SLOPED DRAINAGE TO OUTLET.
 6. SEAL DRAIN PAN WITH NEOPRENE WASHERS AT SUPPORT RODS.

⑥ CONDENSATE OVERFLOW DRAIN PAN DETAIL
NTS



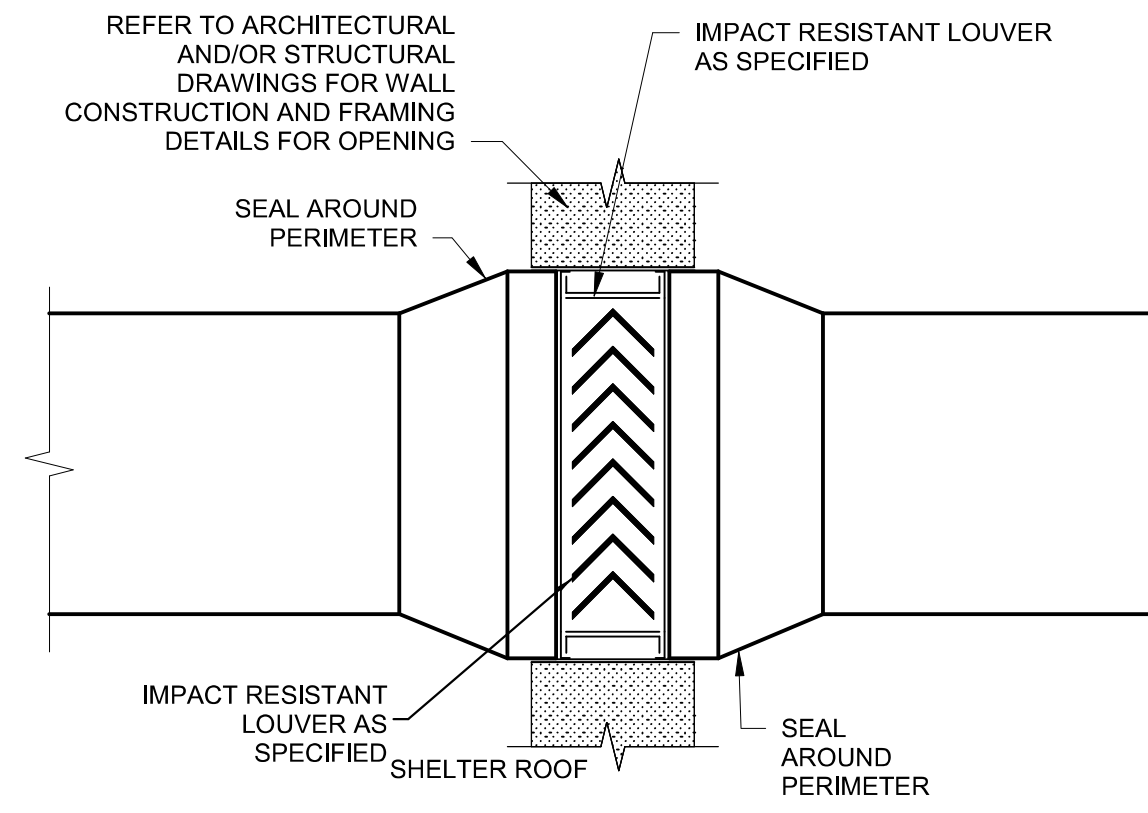
- NOTES:
1. REFER TO MANUFACTURER'S INSTALLATION DETAILS FOR INFORMATION ON HOW TO SECURE LOUVERS TO STRUCTURE.
 2. SEAL ALL JOINTS, SEAM, AND ANCHORS IN ASSEMBLY TO PROVIDE WATER TIGHT CONSTRUCTION.
 3. CONTRACTOR SHALL PROVIDE LOUVER ASSEMBLY INSTALLATION DETAIL FOR APPROVAL BY ENGINEER.

② PROTECTED EXTERIOR OPENING LOUVER ASSEMBLY DETAIL
NTS



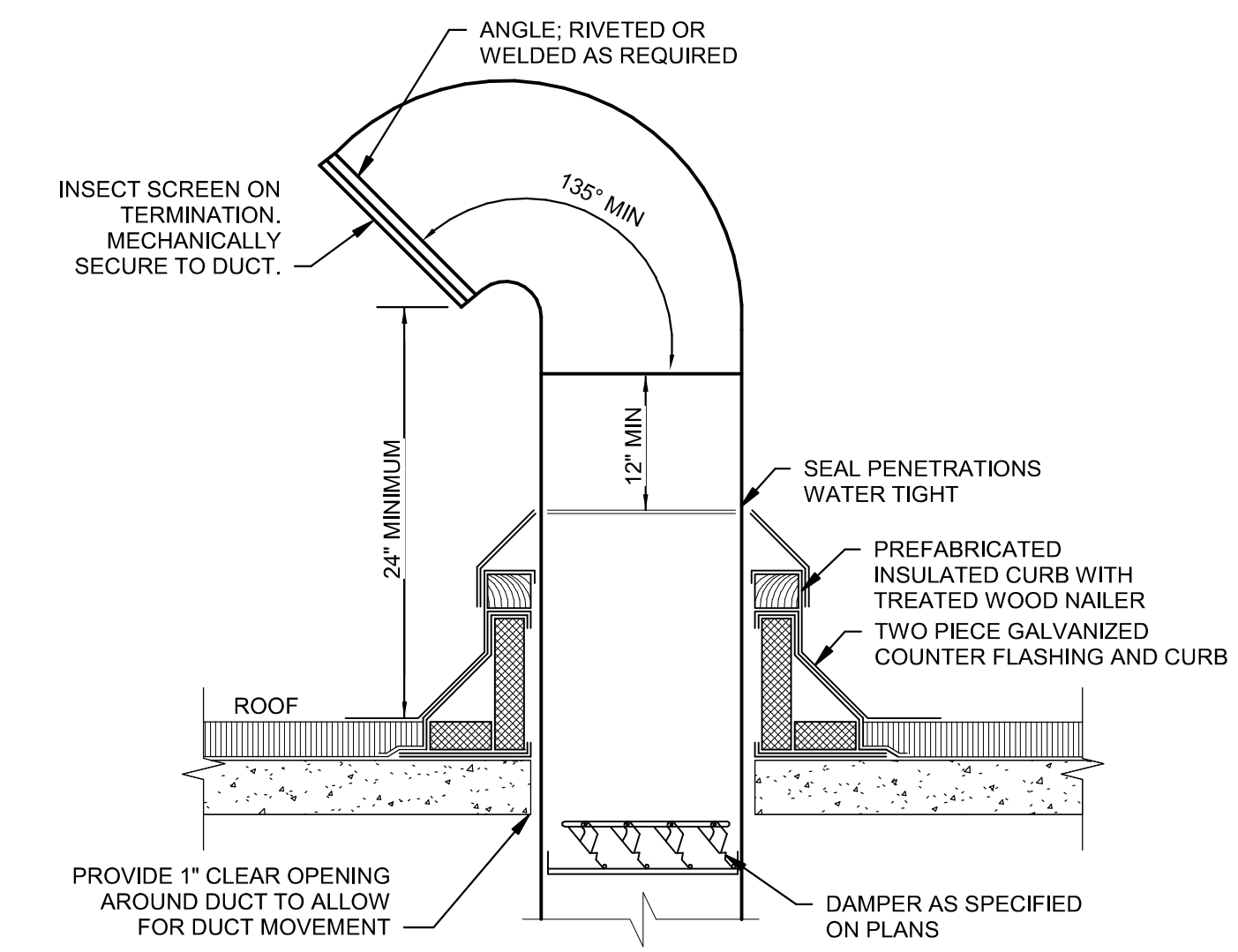
- NOTES:
1. ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS AND MEET LOCAL CODE REQUIREMENTS.

⑤ HORIZONTAL HVAC UNIT DETAIL
NTS



- NOTES:
1. SEAL ALL JOINTS AND SEAMS OF DUCT TO PROVIDE WEATHER-TIGHT CONSTRUCTION. PROVIDE INSULATION FOR PLENUMS AND DUCTS PER SPECIFICATIONS.
 2. REFER TO MANUFACTURER'S INSTALLATION DETAILS FOR INFORMATION ON HOW TO SECURE LOUVERS TO STRUCTURE.
 3. INSTALL FIRE DAMPER PER MANUFACTURER'S INSTRUCTIONS/RECOMMENDATIONS.
 4. INSTALL ACCESS DOOR (WHEN REQUIRED) IN AN ACCESSIBLE LOCATION FOR FIRE DAMPER MAINTENANCE IN ACCORDANCE WITH NFPA REQUIREMENTS.
 5. FRAME OUT OPENINGS FOR MULTIPLE SECTION INSTALLATIONS OR PROVIDE FALSE MULLIONS TO SUPPORT MULTIPLE SECTION INSTALLATIONS PER MANUFACTURER'S RECOMMENDATIONS.

① LOUVER INSTALLATION DETAIL
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④ ROOF GOOSENECK DETAIL
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Confirmed
Construction
Documents

BVSD Project Number: #ABM-2301

#	Description	Date
1	PR 02	09.08.2023



09/07/2023

JOB NO: 22121
DRAWN BY: AK
CHECKED BY: KPC
DATE: 04.07.2023

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EXPIRES 12/31/2024

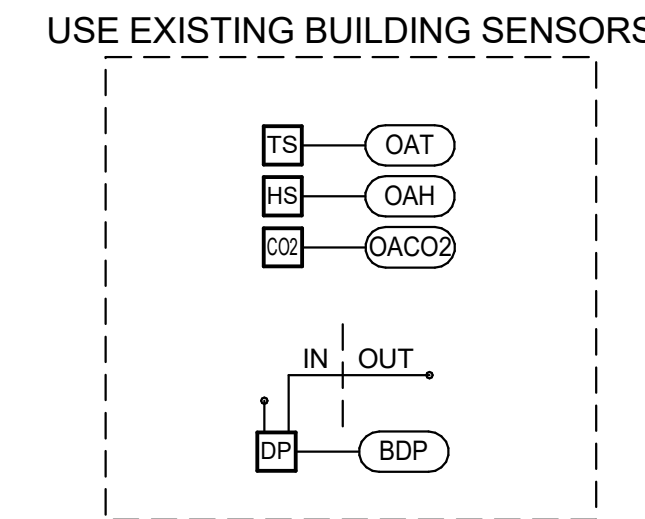
M501

MECHANICAL SYMBOLS (v2.12)		NOTE: THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS, ABBREVIATIONS, ETC. ARE NECESSARILY USED ON THE DRAWINGS.	
CONTROLS SYMBOLS AND NOMENCLATURE			
	FLUE DAMPER (BOILERS)		HOT GAS REHEAT COIL
	BOILER		COOLING COIL
	COOLING TOWER		FURNACE
	CONDENSING UNIT		HEATING COIL
	FLUID COOLER		DAMPER - GENERIC BLADE TYPE
	WATER-COOLED CHILLER		DAMPER - OPPOSED BLADE TYPE
	AIR-COOLED CHILLER		DAMPER - PARALLEL BLADE TYPE
	GENERIC HEAT EXCHANGER		FLEXIBLE SENSING ELEMENT
	SHELL AND TUBE HEAT EXCHANGER		AIRFLOW STATION
	BASIN HEATER		PUMP
	GROUND HEAT EXCHANGER		FAN
	HEAT RECOVERY WHEEL		HUMIDIFIER
	AIR FILTER		3-WAY CONTROL VALVE
	AIR BYPASS DAMPER		2-WAY CONTROL VALVE
	AIRFLOW MEASURING STATION		AIR BYPASS DAMPER
	DIRECT EXPANSION COOLING UNIT CONTROLLER		AIRFLOW MEASURING STATION
	FURNACE BURNER CONTROLLER		DIRECT EXPANSION COOLING UNIT CONTROLLER
	SILICON-CONTROLLED RECTIFIER		FURNACE BURNER CONTROLLER
	ELECTRIC HEATER CONTROL (MODULATING)		SILICON-CONTROLLED RECTIFIER
	ELECTRIC HEATER CONTROLLER (ON/OFF)		ELECTRIC HEATER CONTROL (MODULATING)
	ELECTRONIC COMMUTATED MOTOR		ELECTRIC HEATER CONTROLLER (ON/OFF)
	VARIABLE FREQUENCY DRIVE		ELECTRONIC COMMUTATED MOTOR
	MOTOR STARTER		VARIABLE FREQUENCY DRIVE
	LOW LIMIT TEMPERATURE CONTROLLER (FREEZE/STAT)		MOTOR STARTER
	EMERGENCY PUSH BUTTON		LOW LIMIT TEMPERATURE CONTROLLER (FREEZE/STAT)
	RISER DESIGNATION		EMERGENCY PUSH BUTTON
	FIRE DAMPER		RISER DESIGNATION
	FIRE SMOKE DAMPER		FIRE DAMPER
	SMOKE DETECTOR		FIRE SMOKE DAMPER
	SMOKE DETECTOR (SD-SUPPLY / RD-RETURN)		SMOKE DETECTOR
	MOTORIZED DAMPER		SMOKE DETECTOR (SD-SUPPLY / RD-RETURN)
	BACKDRAFT DAMPER		MOTORIZED DAMPER
	VOLUME DAMPER		BACKDRAFT DAMPER
	HUMIDISTAT		VOLUME DAMPER
	THERMOSTAT		HUMIDISTAT
	BTU METER		THERMOSTAT
	CARBON MONOXIDE SENSOR		BTU METER
	CARBON DIOXIDE SENSOR		CARBON MONOXIDE SENSOR
	CONTROL PANEL		CARBON DIOXIDE SENSOR
	CURRENT CIRCUIT RELAY		CONTROL PANEL
	DIFFERENTIAL PRESSURE SENSOR		CURRENT CIRCUIT RELAY
	ELECTRIC METER		DIFFERENTIAL PRESSURE SENSOR
	FLOW METER; FUEL METER		ELECTRIC METER
	FLOW SWITCH		FLOW METER; FUEL METER
	HUMIDITY SENSOR		FLOW SWITCH
	PRESSURE SENSOR		HUMIDITY SENSOR
	POLLUTANT ALARM		PRESSURE SENSOR
	PULL STATION		POLLUTANT ALARM
	RELAY		PULL STATION
	REFRIGERANT LEAK SENSOR		RELAY
	SENSOR - GENERIC		REFRIGERANT LEAK SENSOR
	STATIC PRESSURE PORT		SENSOR - GENERIC
	SWITCH		STATIC PRESSURE PORT
	TEMPERATURE SENSOR		SWITCH
	WATER METER		TEMPERATURE SENSOR
	ANALOG INPUT (MODULATING)		WATER METER
	ANALOG OUTPUT (MODULATING)		ANALOG INPUT (MODULATING)
	ANALOG VALUE (VIRTUAL)		ANALOG OUTPUT (MODULATING)
	BINARY INPUT (ON/OFF, OPEN/CLOSED, ETC)		ANALOG VALUE (VIRTUAL)
	BINARY OUTPUT (ON/OFF, OPEN/CLOSED, ETC)		BINARY INPUT (ON/OFF, OPEN/CLOSED, ETC)
	BINARY VALUE (VIRTUAL)		BINARY OUTPUT (ON/OFF, OPEN/CLOSED, ETC)
	COMMUNICATION LINK		BINARY VALUE (VIRTUAL)
	MULTI-STATE INPUT		COMMUNICATION LINK
	MULTI-STATE OUTPUT		MULTI-STATE INPUT
	MULTI-STATE VALUE (VIRTUAL)		MULTI-STATE OUTPUT
	GENERIC INDICATOR OF PLAN MARK NUMBER OR QTY		MULTI-STATE VALUE (VIRTUAL)
	NOT EQUAL TO		GENERIC INDICATOR OF PLAN MARK NUMBER OR QTY
	BUILDING AUTOMATION SYSTEM		NOT EQUAL TO
	CHILLED WATER SUPPLY		BUILDING AUTOMATION SYSTEM
	CHILLED WATER RETURN		CHILLED WATER SUPPLY
	COMMAND		CHILLED WATER RETURN
	CONTROL PANEL		COMMAND
	CONTROL VALVE		CONTROL PANEL
	CONDENSER WATER SUPPLY		CONTROL VALVE
	CONDENSER WATER RETURN		CONDENSER WATER SUPPLY
	DOMESTIC COLD WATER		CONDENSER WATER RETURN
	DIRECT DIGITAL CONTROL		DOMESTIC COLD WATER
	ELECTRICAL CONTRACTOR		DIRECT DIGITAL CONTROL
	ECONOMIZER OUTSIDE AIR		ELECTRICAL CONTRACTOR
	EQUALIZER		ECONOMIZER OUTSIDE AIR
	EQUIPMENT MANUFACTURER		EQUALIZER
	FIRE ALARM CONTRACTOR		EQUIPMENT MANUFACTURER
	FAIL IN POSITION		FIRE ALARM CONTRACTOR
	NATURAL GAS		FAIL IN POSITION
	HEATING WATER SUPPLY		NATURAL GAS
	HEATING WATER RETURN		HEATING WATER SUPPLY
	HEAT PUMP WATER SUPPLY		HEATING WATER RETURN
	HEAT PUMP WATER RETURN		HEAT PUMP WATER SUPPLY
	LOW PRESSURE STEAM SUPPLY		HEAT PUMP WATER RETURN
	LOW PRESSURE STEAM CONDENSATE		LOW PRESSURE STEAM SUPPLY
	MECHANICAL CONTRACTOR		LOW PRESSURE STEAM CONDENSATE
	MINIMUM		MECHANICAL CONTRACTOR
	MINUTES		MINIMUM
	MINIMUM OUTSIDE AIR		MINUTES
	NORMALLY CLOSED		MINIMUM OUTSIDE AIR
	NOT IN AUTO (IN HAND)		NORMALLY CLOSED
	NORMALLY OPEN		NOT IN AUTO (IN HAND)
	PROPORTIONAL INTEGRAL DERIVATIVE		NORMALLY OPEN
	RETURN AIR		PROPORTIONAL INTEGRAL DERIVATIVE
	RELIEF/EXHAUST AIR		RETURN AIR
	RELATIVE HUMIDITY		RELIEF/EXHAUST AIR
	SUPPLY AIR		RELATIVE HUMIDITY
	AS SCHEDULED ON DRAWINGS		SUPPLY AIR
	SPECIFIED		AS SCHEDULED ON DRAWINGS
	SETPPOINT		SPECIFIED
	TO BE DETERMINED		SETPPOINT
	TEMPERATURE CONTROLS CONTRACTOR		TO BE DETERMINED
	POWER WIRING		TEMPERATURE CONTROLS CONTRACTOR
	SYSTEM CONTROL WIRING		POWER WIRING
	BUILDING AUTOMATION WIRING		SYSTEM CONTROL WIRING

CONTROL FEATURE	UNITS	RTU-1 SETPOINT OR Y/N	POINT TYPE INTERFACE WITH DDC (READ/WRITE)	NOTES
BUILDING AUTOMATION SYSTEM (BAS)				
BAS MONITORING AND MANAGEMENT INTERFACE		Y	BACNET	A
SETPOINTS				
COOLING - OCCUPIED SETPOINT	"F	75	READWRITE	
COOLING - UNOCCUPIED SETPOINT	"F	80	READWRITE	
COOLING - SUPPLY AIR TEMPERATURE SETPOINT	"F	55	READWRITE	
DEAD BAND - MINIMUM HEATING AND COOLING TEMPERATURE SETPOINT DIFFERENCE	"F	5	READWRITE	
HEATING - OCCUPIED SETPOINT	"F	70	READWRITE	
HEATING - UNOCCUPIED SETPOINT	"F	60	READWRITE	
HEATING - SUPPLY AIR TEMPERATURE SETPOINT	"F	85	READWRITE	
DEHUMIDIFICATION SETPOINT - HUMIDITY SENSOR FEEDBACK	% RH	50%	READWRITE	B
PROGRAMMED CONTROL FEATURES				
HVAC SYSTEM OCCUPIED/UNOCCUPIED MODE - OCCUPANCY SENSOR		Y	READ	C
REMOTE TEMPERATURE SENSOR		Y	READ	B
DEMAND CONTROL VENTILATION - CO2 SENSOR FEEDBACK		Y	READWRITE	B
EQUIPMENT ACCESSORIES AND CONTROL MODULES				
OUTSIDE AIR FLOW MEASURING STATION	CFM	Y	READ	
OUTSIDE AIR DAMPER - MOTOR OPERATED (MODULATING)		Y	READ POSITION	L
INTEGRATED ECONOMIZER - ENTHALPY ENABLE	BTULB	26	READWRITE	E
ECONOMIZER FAULT DETECTION AND DIAGNOSTICS (FDD) SYSTEM		Y	READ	F, G
RELIEF - VARIABLE VOLUME POWERED EXHAUST FAN	IN, W.C.	0, 1	READ STATUS	H
COOLING COIL (DX - VARIABLE SPEED)		Y	READ STATUS	M
DEHUMIDIFICATION - HOT GAS REHEAT		Y	READ STATUS	O
HEATING COIL (ELECTRIC)		Y	READ STATUS	M
ENERGY RECOVERY WHEEL (TOTAL ENTHALPY)		Y	READ STATUS	
SUPPLY FAN CONTROL METHODS				
ON DURING OCCUPIED HOURS		Y		
CYCLE WITH LOADS DURING UNOCCUPIED HOURS		Y		
OPTIMUM START SEQUENCE		Y		
VARIABLE VOLUME - MODULATE FAN SPEED IN RESPONSE TO ZONE TEMPERATURE		Y	READ STATUS	M, R
SAFETIES, INTERLOCKS AND ALARMS				
RETURN AIR SMOKE DETECTOR - SAFETY SHUTDOWN		Y	READ	F
DIFFERENTIAL PRESSURE SWITCH - FILTER CHANGE ALARM		Y	READ	F
FIRE ALARM CONTROL PANEL - SAFETY SHUTDOWN INTERLOCK		Y	READ	F

DIV. 23 CONTRACTOR SHALL PROVIDE CONTROL PANEL(S), WIRING, THERMOSTAT(S), TEMPERATURE SENSOR(S), HUMIDISTAT(S), AND/OR CO2 SENSOR(S) WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO FACILITATE THE SCHEDULED CONTROL MODULES AND SEQUENCES OF OPERATION. EACH UNIT SHALL CONTROL BASED ON ITS OWN INTERNAL SAFETIES, TIME DELAYS, AND SEQUENCES UNLESS NOTED OTHERWISE. COORDINATE WITH OWNER FINAL BUILDING AND EQUIPMENT SCHEDULES DURING STARTUP. REFERENCE DIVISION SPECIFICATIONS FOR INDIVIDUAL DEVICE REQUIREMENTS.

NOTES:
 A. PROVIDE UNIT WITH FACTORY MOUNTED DDC CONTROLS AND INTEGRATE INTO THE BAS. BAS SHALL PROVIDE REMOTE SETPOINT ADJUSTMENT, SCHEDULING, AND MONITORING OF THE POINTS LISTED IN THE SCHEDULE FOR EACH UNIT.
 B. DIVISION 23 CONTRACTOR SHALL PROVIDE DEVICE.
 C. DIVISION 26 CONTRACTOR SHALL PROVIDE DEVICE.
 D. IF SETPOINT VALUE IS LISTED, IT INDICATES ECONOMIZER HIGH LIMIT SHUT/OFF. UNIT SHALL BE IN ECONOMIZER IF CONDITIONS ARE LESS THAN SETPOINT. THE FOLLOWING SENSORS SHALL DETERMINE ECONOMIZER ON POINT.
 OUTSIDE AIR TEMPERATURE; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
 RETURN AIR TEMPERATURE; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
 OUTSIDE AIR HUMIDITY; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
 RETURN AIR HUMIDITY; DIVISION 23 PROVIDED AS PART OF ECONOMIZER CONTROL MODULE.
 F. DEVICE SHALL BE FACTORY MOUNTED AND PRE-WIRED FOR OPERATION SUBJECT TO THE ONBOARD CONTROLLER.
 G. PROVIDE UNIT WITH AN FDD SYSTEM CONSISTING OF PERMANENTLY INSTALLED OUTSIDE AIR, SUPPLY AIR, AND RETURN AIR TEMPERATURE SENSORS. THE UNIT CONTROLLER SHALL AT A MINIMUM BE CAPABLE OF PROVIDING SYSTEM STATUS OF ECONOMIZER, COMPRESSOR, HEATING, MIXED AIR LOW LIMIT ALARM, AND SENSOR VALUES. EACH OPERATING MODE SHALL BE CAPABLE OF INDEPENDENTLY OPERATING FOR TESTING. THE SYSTEM SHALL REPORT FAULTS TO AN APPLICATION ACCESSIBLE BY SERVICE PERSONNEL. THE FOLLOWING FAULTS SHALL BE DETECTED: AIR TEMPERATURE SENSOR FAILURE; ECONOMIZER ENABLED/DISABLED WHEN ECONOMIZER SHOULD BE OFF; RESPECTIVELY, DAMPER NOT MODULATING, AND EXCESS OUTSIDE AIR.
 H. POWERED EXHAUST FAN SHALL STAGE ON AND OFF ACCORDING TO UNIT STATIC PRESSURE SENSOR.
 DIVISION 23 SHALL PROVIDE SENSOR.
 L. EQUIPMENT MANUFACTURER SHALL PROVIDE MODULATING DAMPER AND CONTROLS CAPABLE OF ADJUSTING THE DAMPER POSITION TO MAINTAIN THE SCHEDULED OUTSIDE AIR ON THE DRAWINGS ACROSS ALL FAN SPEEDS. DIV. 23 CONTRACTOR SHALL PROGRAM MULTIPLE DAMPER POSITION SETPOINTS IN THE FIELD DURING TESTING AND BALANCING TO MAINTAIN MINIMUM VENTILATION WHEN NOT IN ECONOMIZER. DAMPER SHALL BE CLOSED DURING UNOCCUPIED HOURS.
 M. UNITARY CONTROLLER SHALL MODULATE AND/OR CYCLE SUPPLY FAN SPEED SETTING AND COIL CAPACITY STAGES SUBJECT TO THE INTERNAL SAFETIES AND SEQUENCES TO MAINTAIN SCHEDULED SETPOINTS.
 O. PROGRAM DEHUMIDIFICATION SEQUENCE BASED ON ZONE AIR HUMIDITY.
 R. PROVIDE MODULATING FAN CONTROL WITH MINIMUM SPEED LESS THAN 50% OF FULL SPEED. AT MINIMUM SPEED THE FAN SHALL DRAW NO MORE THAN 30% OF FULL SPEED POWER.



1 BUILDING GLOBAL WEATHER MONITORING STATION NTS

SEQUENCE OF OPERATIONS MISCELLANEOUS EQUIPMENT

This sequence of operations is organized into the following main categories: safeties, overrides and interlocks, and component control loops either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties and interlocks section outlines the hardware interlocks that will be required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram.

EXHAUST FANS (BAS CONTROLLED)

OPERATING MODES

OCCUPIED MODE:
The units shall be in occupied mode per the project design conditions schedule shown on the control drawings.

UNOCCUPIED MODE:
The units shall be in unoccupied mode for all periods not included in the occupied hours of operation.

COMPONENT CONTROL LOOPS

FAN CONTROL - CONSTANT VOLUME BAS SCHEDULED

When in Occupied Mode:
The fan shall be ON.

When in Unoccupied Mode:
The fan shall be OFF.

ELECTRIC UNIT HEATERS

OPERATING MODES

STANDBY MODE:
The units shall be in standby mode when the zone temperature (Z-T) is above space temperature setpoint.

HEATING MODE:
The units shall be in heating mode when the zone temperature (Z-T) falls below space temperature setpoint.

COMPONENT CONTROL LOOPS

HEATING COIL

When in Standby Mode:
The unit shall remain off.

When in Heating Mode:
The unit fan shall start and the heating coil shall energize as required to maintain space temperature setpoint as measured by the space temperature sensor (Z-T).
If space temperature drops 15 degrees F below setpoint, an alarm shall be generated.

SPLIT SYSTEM ROOM AC UNITS (SS's Cooling Only)

COMPONENT CONTROL LOOPS

The space temperature sensor shall cycle the indoor unit and condensing unit as required to maintain the space temperature as indicated by the space temperature sensor (Z-T).

If space temperature rises 5 degrees F above setpoint, an alarm shall be generated.

SPLIT SYSTEM ROOM AC UNITS (SS's Heat Pump)

OPERATING MODES

COOLING MODE:
The units shall be in cooling mode when the zone temperature (Z-T) rises above space temperature setpoint.

HEATING MODE:
The units shall be in heating mode when the zone temperature (Z-T) falls below space temperature setpoint.

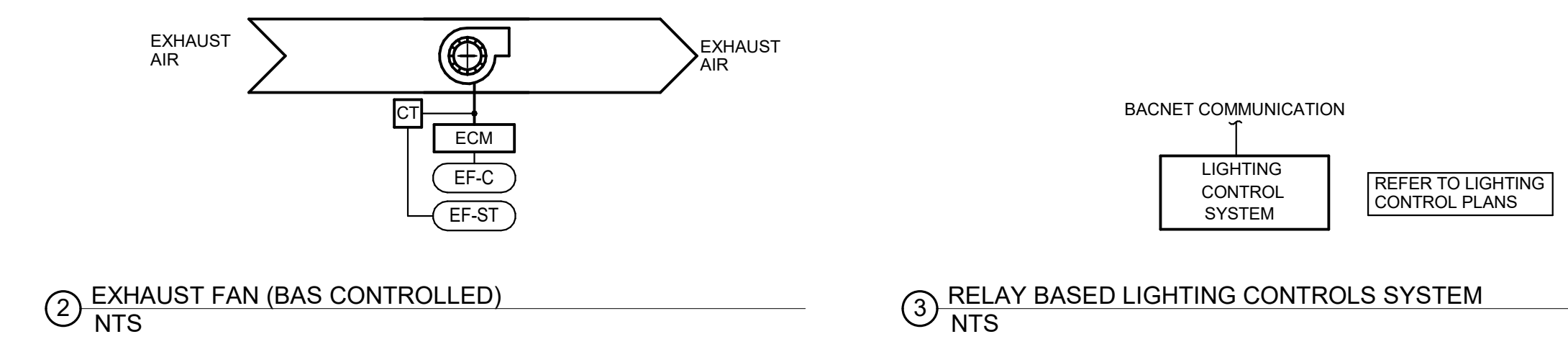
COMPONENT CONTROL LOOPS

The space temperature sensor shall cycle the indoor unit and condensing unit as required to maintain the space temperature as indicated by the space temperature sensor (Z-T).

If space temperature rises 5 degrees F above setpoint, an alarm shall be generated.

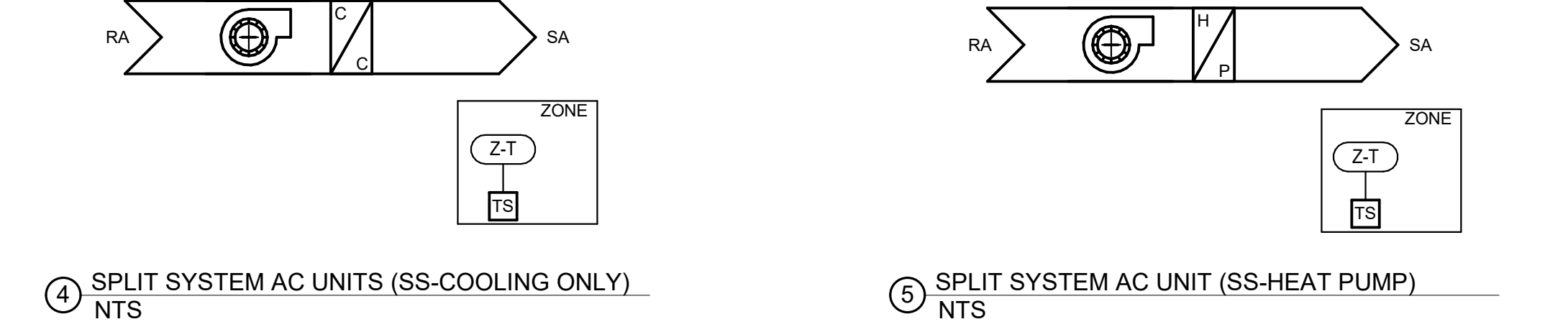
RELAY BASED LIGHTING CONTROL SYSTEM

Fully integrate the relay based lighting control system into the BAS. The relay based lighting control system controls common area lighting and exterior lighting. The relay based lighting control system will be BACnet compatible. (Reference specification 260943 Relay Based Lighting Controls).



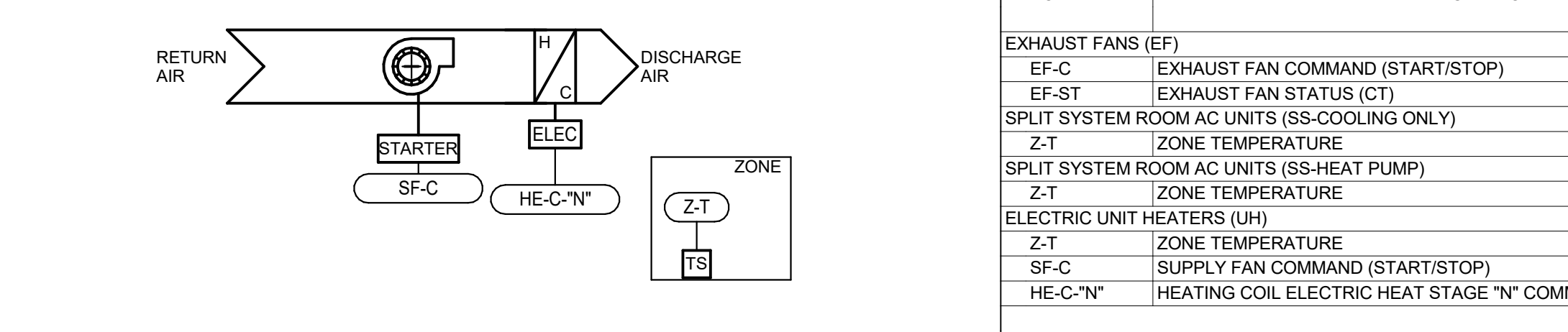
2 EXHAUST FAN (BAS CONTROLLED) NTS

3 RELAY BASED LIGHTING CONTROLS SYSTEM NTS



4 SPLIT SYSTEM AC UNITS (SS-COOLING ONLY) NTS

5 SPLIT SYSTEM AC UNIT (SS-HEAT PUMP) NTS



6 ELECTRIC UNIT HEATERS NTS

PROJECT DESIGN CONDITIONS													
CLIMATE CONDITIONS					BUILDING OPERATING HOURS:								
WEATHER STATION: JOHNSON CO EXECUTIVE, KS					MONDAY - FRIDAY: TBD BY OWNER								
CLIMATE ZONE: 4A					SATURDAY: TBD BY OWNER								
HEATING (DB): 99.8% 4.3 °F					SUNDAY: TBD BY OWNER								
DESIGN HEATING CONDITIONS (DB): 0 °F					HOLIDAY: TBD BY OWNER								
HUMIDIFICATION (DPI/HR/MCDB): 99.6% NA °F/ NA gr/lb NA °F													
COOLING (DB/MCWB): 0.4% 86.5 °F/ 75.5 °F													
DESIGN COOLING CONDITIONS (DB/MCWB): 86.5 °F/ 75.5 °F													
DEHUMIDIFICATION (DPI/HR/MCDB): 0.4% 79.4 °F/ 138.6 gr/lb 85.3 °F													
SPACE / UNIT DESCRIPTION		COOLING / DE-HUMIDIFICATION		HEATING		HUMIDIFICATION		ZONE VENTILATION RESET		SPACE OPERATING HOURS OCCUPIED / UNOCCUPIED		NOTES	
		OCC	UNOCC	MIN	MAX	OCC	UNOCC	MIN	MAX	CONTROL	BASE	MAXIMUM	
		"F	"F	RH %	RH %	"F	"F	RH %	RH %	METHOD	PPM	PPM	M-F
MULTI-PURPOSE ROOM		75	80	50%	NA	70	60	NA	NA	CO2	400	900	TBD
VESTIB													