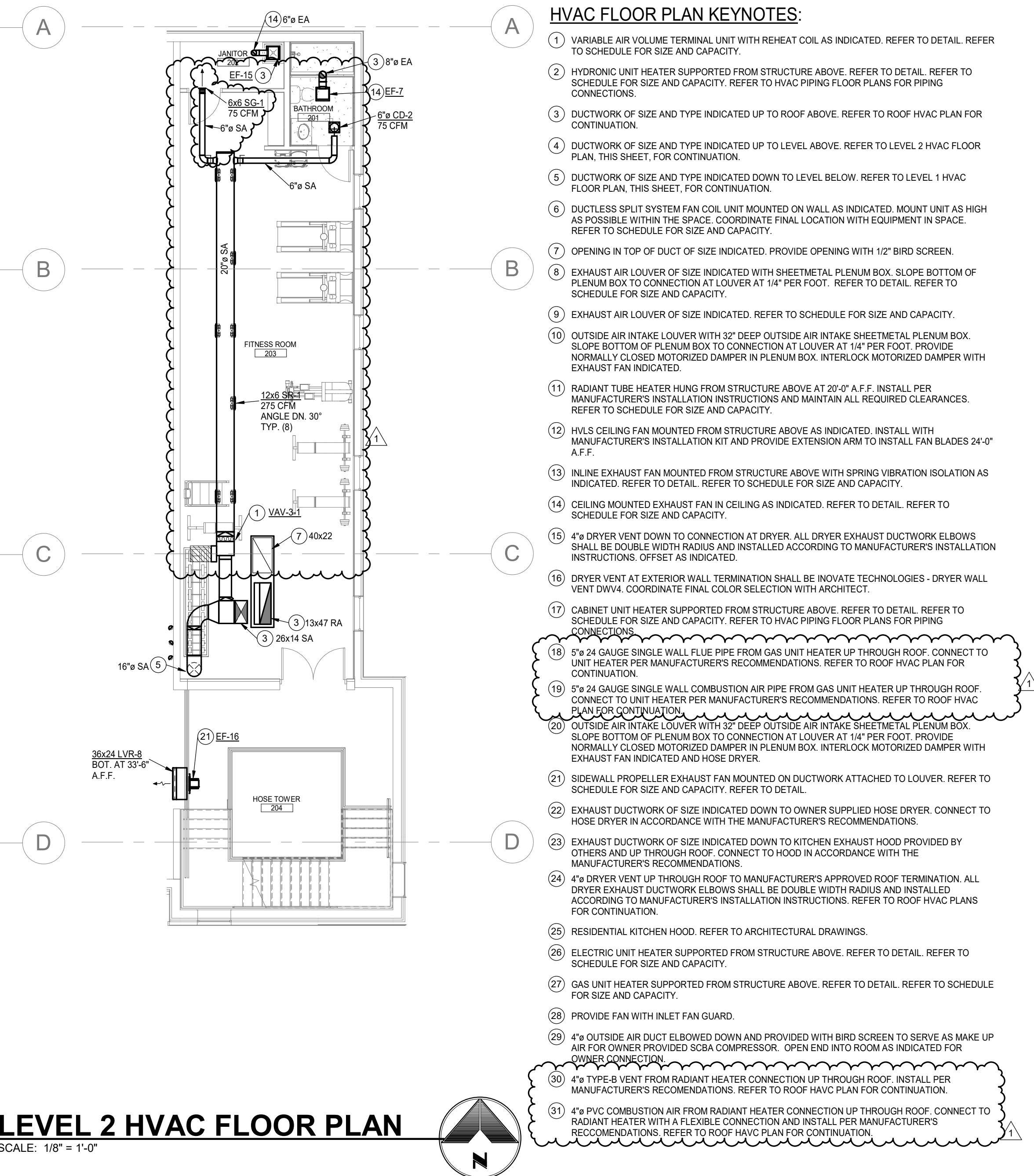


LEVEL 1 HVAC FLOOR PLAN
SCALE: 1/8" = 1'-0"



LEVEL 2 HVAC FLOOR PLAN
SCALE: 1/8" = 1'-0"

HVAC FLOOR PLAN KEYNOTES:

- VARIABLE AIR VOLUME TERMINAL UNIT WITH REHEAT COIL AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- HYDRONIC UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY. REFER TO HVAC PIPING FLOOR PLANS FOR PIPING CONNECTIONS.
- DUCTWORK OF SIZE AND TYPE INDICATED UP TO ROOF ABOVE. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- DUCTWORK OF SIZE AND TYPE INDICATED UP TO LEVEL ABOVE. REFER TO LEVEL 2 HVAC FLOOR PLAN. THIS SHEET, FOR CONTINUATION.
- DUCTWORK OF SIZE AND TYPE INDICATED DOWN TO LEVEL BELOW. REFER TO LEVEL 1 HVAC FLOOR PLAN. THIS SHEET, FOR CONTINUATION.
- DUCTLESS SPLIT SYSTEM FAN COIL UNIT MOUNTED ON WALL AS INDICATED. MOUNT UNIT AS HIGH AS POSSIBLE WITHIN THE SPACE. COORDINATE FINAL LOCATION WITH EQUIPMENT IN SPACE. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- OPENING IN TOP OF DUCT OF SIZE INDICATED. PROVIDE OPENING WITH 1/2" BIRD SCREEN.
- EXHAUST AIR LOUVER OF SIZE INDICATED WITH SHEETMETAL PLENUM BOX. SLOPE BOTTOM OF PLENUM BOX TO CONNECTION AT LOUVER AT 1/4" PER FOOT. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- EXHAUST AIR LOUVER OF SIZE INDICATED. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- OUTSIDE AIR INTAKE LOUVER WITH 32" DEEP OUTSIDE AIR INTAKE SHEETMETAL PLENUM BOX. SLOPE BOTTOM OF PLENUM BOX TO CONNECTION AT LOUVER AT 1/4" PER FOOT. PROVIDE NORMALLY CLOSED MOTORIZED DAMPER IN PLENUM BOX. INTERLOCK MOTORIZED DAMPER WITH EXHAUST FAN INDICATED.
- RADIANT TUBE HEATER HUNG FROM STRUCTURE ABOVE AT 20'-0" A.F.F. INSTALL PER MANUFACTURER'S INSTALLATION INSTRUCTIONS AND MAINTAIN ALL REQUIRED CLEARANCES. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- HVLS CEILING FAN MOUNTED FROM STRUCTURE ABOVE AS INDICATED. INSTALL WITH MANUFACTURER'S INSTALLATION KIT AND PROVIDE EXTENSION ARM TO INSTALL FAN BLADES 24'-0" A.F.F.
- INLINE EXHAUST FAN MOUNTED FROM STRUCTURE ABOVE WITH SPRING VIBRATION ISOLATION AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- CEILING MOUNTED EXHAUST FAN IN CEILING AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 4" DRYER VENT DOWN TO CONNECTION AT DRYER. ALL DRYER EXHAUST DUCTWORK ELBOWS SHALL BE DOUBLE WIDTH RADIUS AND INSTALLED ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. OFFSET AS INDICATED.
- DRYER VENT AT EXTERIOR WALL TERMINATION SHALL BE INOVATE TECHNOLOGIES - DRYER WALL VENT DWV4. COORDINATE FINAL COLOR SELECTION WITH ARCHITECT.
- CABINET UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY. REFER TO HVAC PIPING FLOOR PLANS FOR PIPING CONNECTIONS.
- 5" x 24 GAUGE SINGLE WALL FLUE PIPE FROM GAS UNIT HEATER UP THROUGH ROOF. CONNECT TO UNIT HEATER PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- 5" x 24 GAUGE SINGLE WALL COMBUSTION AIR PIPE FROM GAS UNIT HEATER UP THROUGH ROOF. CONNECT TO UNIT HEATER PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- OUTSIDE AIR INTAKE LOUVER WITH 32" DEEP OUTSIDE AIR INTAKE SHEETMETAL PLENUM BOX. SLOPE BOTTOM OF PLENUM BOX TO CONNECTION AT LOUVER AT 1/4" PER FOOT. PROVIDE NORMALLY CLOSED MOTORIZED DAMPER IN PLENUM BOX. INTERLOCK MOTORIZED DAMPER WITH EXHAUST FAN INDICATED AND HOSE DRYER.
- SIDEWALL PROPELLER EXHAUST FAN MOUNTED ON DUCTWORK ATTACHED TO LOUVER. REFER TO SCHEDULE FOR SIZE AND CAPACITY. REFER TO DETAIL.
- EXHAUST DUCTWORK OF SIZE INDICATED DOWN TO OWNER SUPPLIED HOSE DRYER. CONNECT TO HOSE DRYER IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- EXHAUST DUCTWORK OF SIZE INDICATED DOWN TO KITCHEN EXHAUST HOOD PROVIDED BY OTHERS AND UP THROUGH ROOF. CONNECT TO HOOD IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
- 4" DRYER VENT UP THROUGH ROOF TO MANUFACTURER'S APPROVED ROOF TERMINATION. ALL DRYER EXHAUST DUCTWORK ELBOWS SHALL BE DOUBLE WIDTH RADIUS AND INSTALLED ACCORDING TO MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO ROOF HVAC PLANS FOR CONTINUATION.
- RESIDENTIAL KITCHEN HOOD. REFER TO ARCHITECTURAL DRAWINGS.
- ELECTRIC UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- GAS UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- PROVIDE FAN WITH INLET FAN GUARD.
- 4" x 4" OUTSIDE AIR DUCT ELBOWED DOWN AND PROVIDED WITH BIRD SCREEN TO SERVE AS MAKE UP AIR FOR OWNER PROVIDED SCBA COMPRESSOR. OPEN END INTO ROOM AS INDICATED FOR OWNER CONNECTION.
- 4" x 4" TYPE-S VENT FROM RADIANT HEATER CONNECTION UP THROUGH ROOF. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- 4" x 4" PVC COMBUSTION AIR FROM RADIANT HEATER CONNECTION UP THROUGH ROOF. CONNECT TO RADIANT HEATER WITH A FLEXIBLE CONNECTION AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS. REFER TO ROOF HVAC PLAN FOR CONTINUATION.

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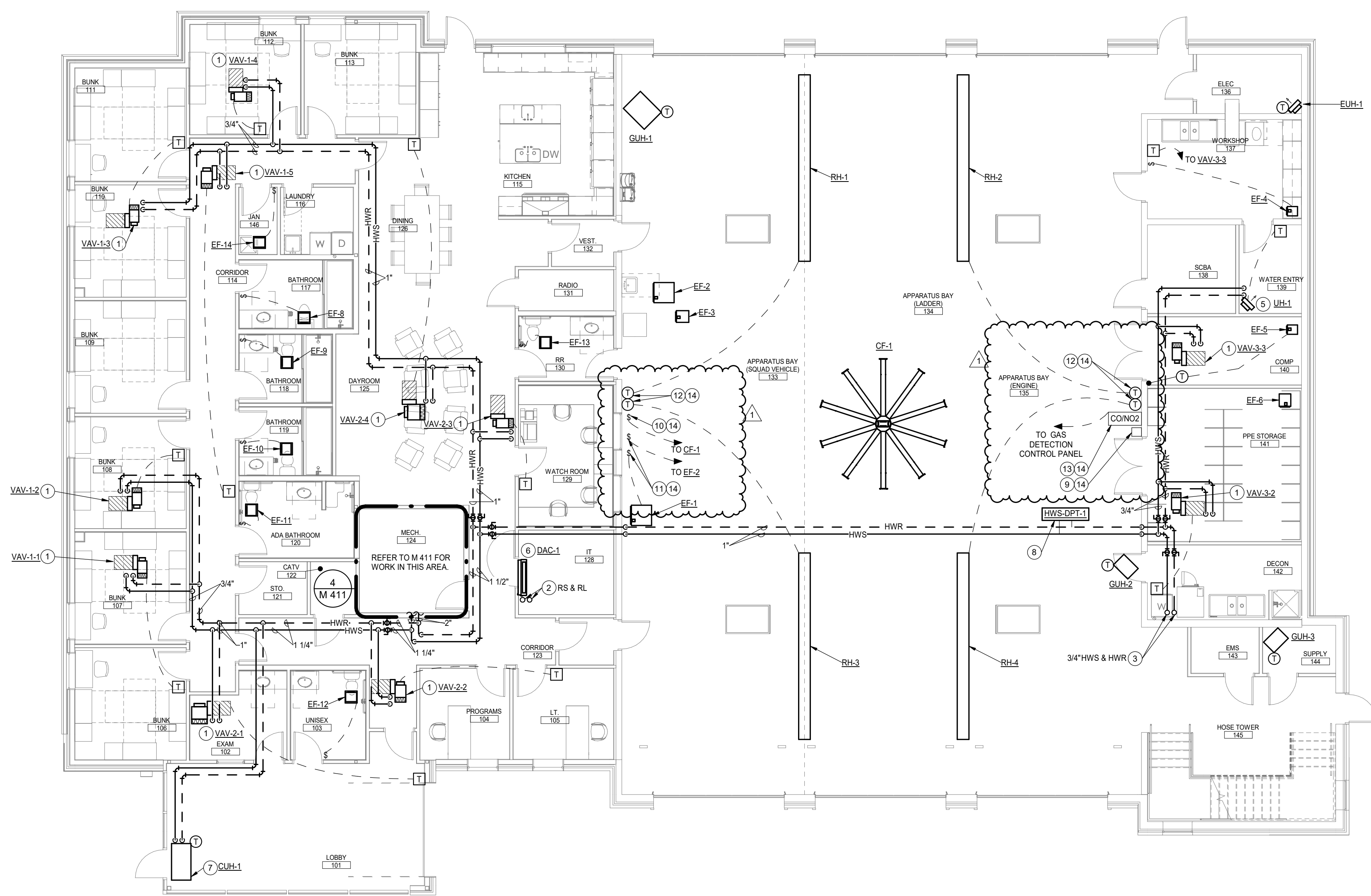
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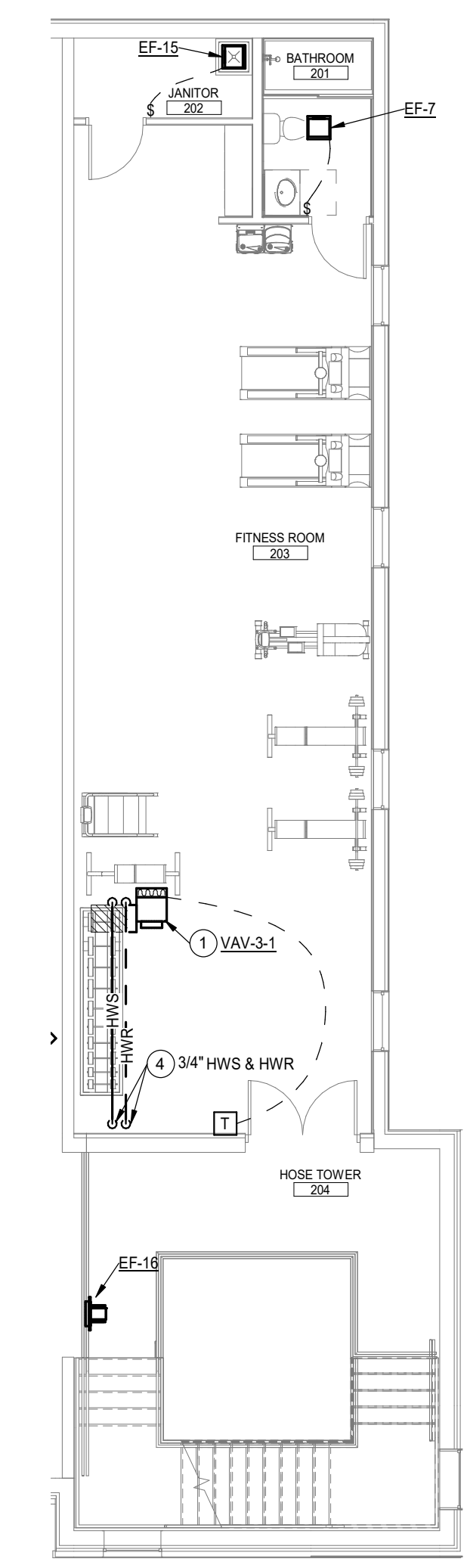
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1	ADDENDUM 2	10/18/2019

HVAC PIPING FLOOR PLANS



LEVEL 1 HVAC PIPING FLOOR PLAN

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



LEVEL 2 HVAC PIPING FLOOR PLAN

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



HVAC PIPING FLOOR PLAN KEYNOTES:

- 1 VARIABLE AIR VOLUME TERMINAL UNIT WITH REHEAT COIL AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 2 REFRIGERANT LIQUID AND REFRIGERANT SUCTION LINES SET UP TO ROOF ABOVE. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- 3 PIPING OF SIZE AND TYPE INDICATED UP TO LEVEL ABOVE. REFER TO LEVEL 2 HVAC PIPING FLOOR PLAN, THIS SHEET, FOR CONTINUATION.
- 4 PIPING OF SIZE AND TYPE INDICATED DOWN TO LEVEL BELOW. REFER TO LEVEL 1 HVAC PIPING FLOOR PLAN, THIS SHEET, FOR CONTINUATION.
- 5 UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 6 DUCTLESS SPLIT SYSTEM FAN COIL UNIT MOUNTED ON WALL AS INDICATED. MOUNT UNIT AS HIGH AS POSSIBLE WITHIN THE SPACE. COORDINATE FINAL LOCATION WITH EQUIPMENT IN SPACE. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 7 CABINET UNIT HEATER SUPPORTED FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 8 HEATING WATER SYSTEM DIFFERENTIAL PRESSURE TRANSMITTER HWS-DPT-1 AS INDICATED. REFER TO CONTROL DRAWINGS FOR REQUIREMENTS.
- 9 GAS MONITORING CONTROL PANEL AS INDICATED MOUNTED ON WALL. PROVIDE ARMSTRONG AMC-140 OR EQUIVALENT. PROVIDE 120V POWER AND FIRE ALARM CONNECTIONS TO PANEL. REFER TO ELECTRICAL DRAWINGS FOR REQUIREMENTS. PANEL SHALL RECEIVE INPUTS FROM COIN02 SENSOR AND OVERRIDE (2) GENERAL EXHAUST FANS TO FULL AIRFLOW IN PURGE MODE.
- 10 CEILING FAN WALL ON/OFF SWITCH AND SPEED CONTROLLER. PROVIDE 120V POWER TO CONTROLLER.
- 11 ADJUSTABLE SPIN TIMER MOUNTED ON WALL WIRED TO GENERAL EXHAUST FAN INDICATED. FAN SHALL BE OVERRIDDEN BY GAS DETECTION SYSTEM CONTROL PANEL.
- 12 MANUFACTURER PROVIDED THERMOSTAT FOR RADIANT HEATER INDICATED.
- 13 COMBINATION CO AND NO2 GAS SENSOR MODULES MOUNTED ON WALL AS INDICATED. PROVIDE ARMSTRONG AMC-1222 OR EQUIVALENT. MOUNT SENSORS AT ELEVATION IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR THE SPECIFIC GAS DETECTED AND APPLICATION. INTERLOCK TO FIRE PANEL.
- 14 PROVIDE NEMA WATERPROOF ENCLOSURE FOR SWITCH INDICATED.
- 15 ADJUSTABLE SPIN TIMER MOUNTED ON WALL WIRED TO GENERAL EXHAUST FAN INDICATED.

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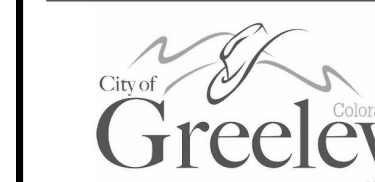
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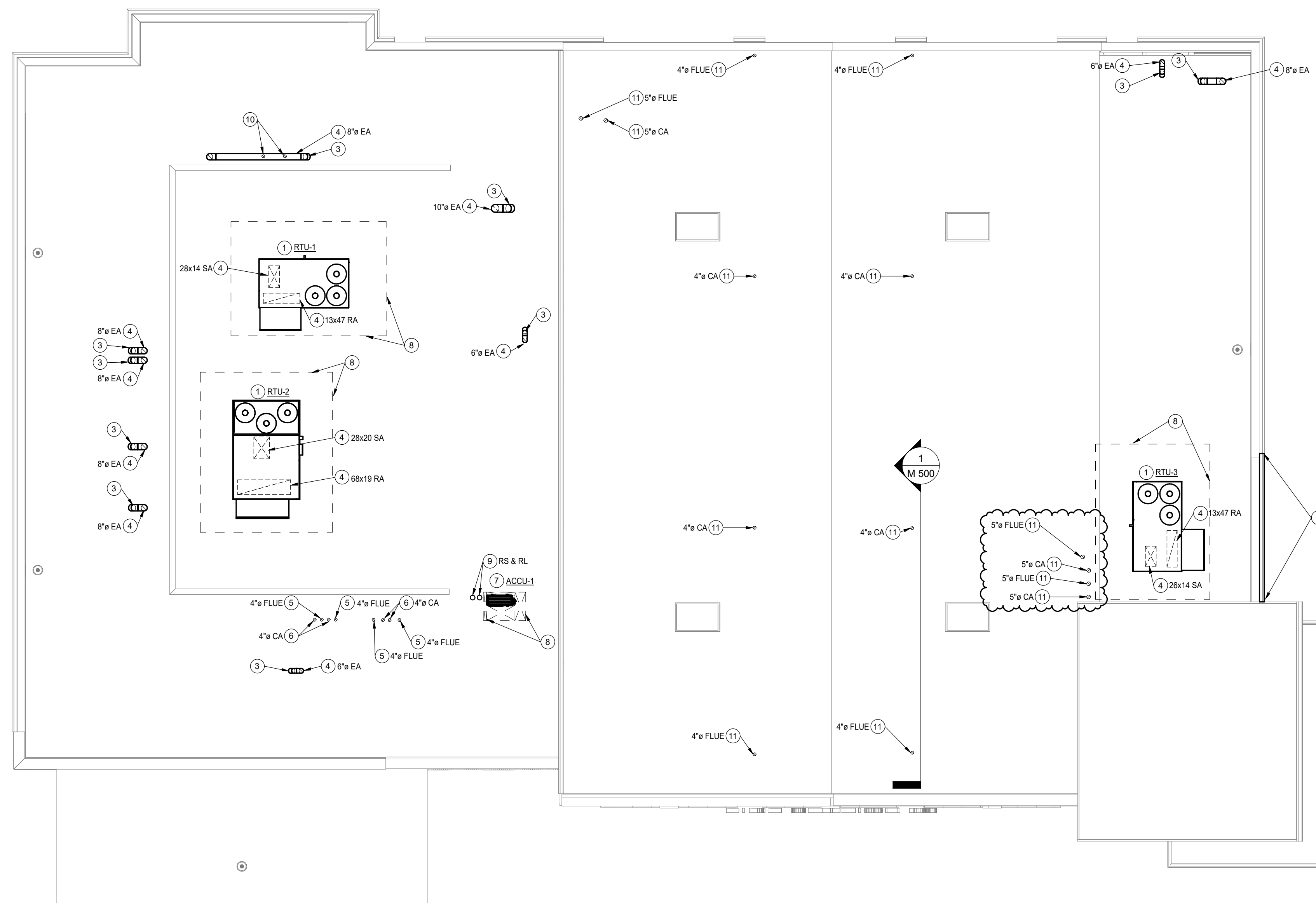
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1	ADDENDUM 2	10/18/2019

ROOF HVAC PLAN

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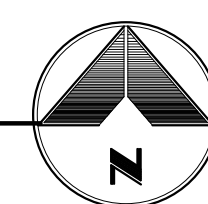
ROOF HVAC KEYNOTES:

- 1 ROOFTOP UNIT MOUNTED ON 14" ROOF CUR AND 6" CONCRETE HOUSEKEEPING PAD. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 2 42" TALL PARAPET WALL OR OSHA APPROVED GUARD RAIL IN THIS LOCATION. EXTEND WALL A MINIMUM OF 3'-0" PAST THE EDGE OF THE ROOFTOP UNIT.
- 3 TERMINATE DUCTWORK WITH GOOSENECK A MINIMUM OF 24" ABOVE ROOF LINE.
- 4 DUCTWORK OF SIZE AND TYPE INDICATED DOWN THROUGH ROOF. REFER TO HVAC FLOOR PLANS FOR CONTINUATION.
- 5 CPVC FLUE OF SIZE INDICATED DOWN THROUGH ROOF. REFER TO ENLARGED MECHANICAL ROOM PLAN FOR CONTINUATION. TERMINATE A MINIMUM OF 3'-0" ABOVE COMBUSTION AIR TERMINATION IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO DETAIL.
- 6 CPVC COMBUSTION AIR OF SIZE INDICATED DOWN THROUGH ROOF. REFER TO ENLARGED MECHANICAL ROOM PLAN FOR CONTINUATION. TERMINATE A MINIMUM OF 3'-0" ABOVE ROOF IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO DETAIL.
- 7 DUCTLESS SPLIT SYSTEM CONDENSING UNIT MOUNTED ON ROOF CURB AS INDICATED. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 8 EQUIPMENT SERVICE ACCESS AND CLEARANCE, TYPICAL.
- 9 REFRIGERANT LIQUID AND REFRIGERANT SUCTION LINESET DOWN THROUGH ROOF TO LEVEL BELOW. REFER TO HVAC PIPING FLOOR PLANS FOR CONTINUATION. PROVIDE ALUMINUM JACKETING ON ALL EXTERIOR REFRIGERANT PIPING INSULATION. REFER TO SPECIFICATION 230700 FOR REQUIREMENTS.
- 10 4" DRYER EXHAUST DOWN THROUGH ROOF. TERMINATE WITH MANUFACTURER'S APPROVED ROOF VENT CAP.
- 11 PIPING OF SIZE ANY TYPE INDICATED DOWN THROUGH ROOF TO EQUIPMENT BELOW. TERMINATE A MINIMUM OF 24" ABOVE ROOFLINE WITH MANUFACTURER'S APPROVED TERMINATION CAP. REFER TO HVAC FLOOR PLANS FOR CONTINUATION.



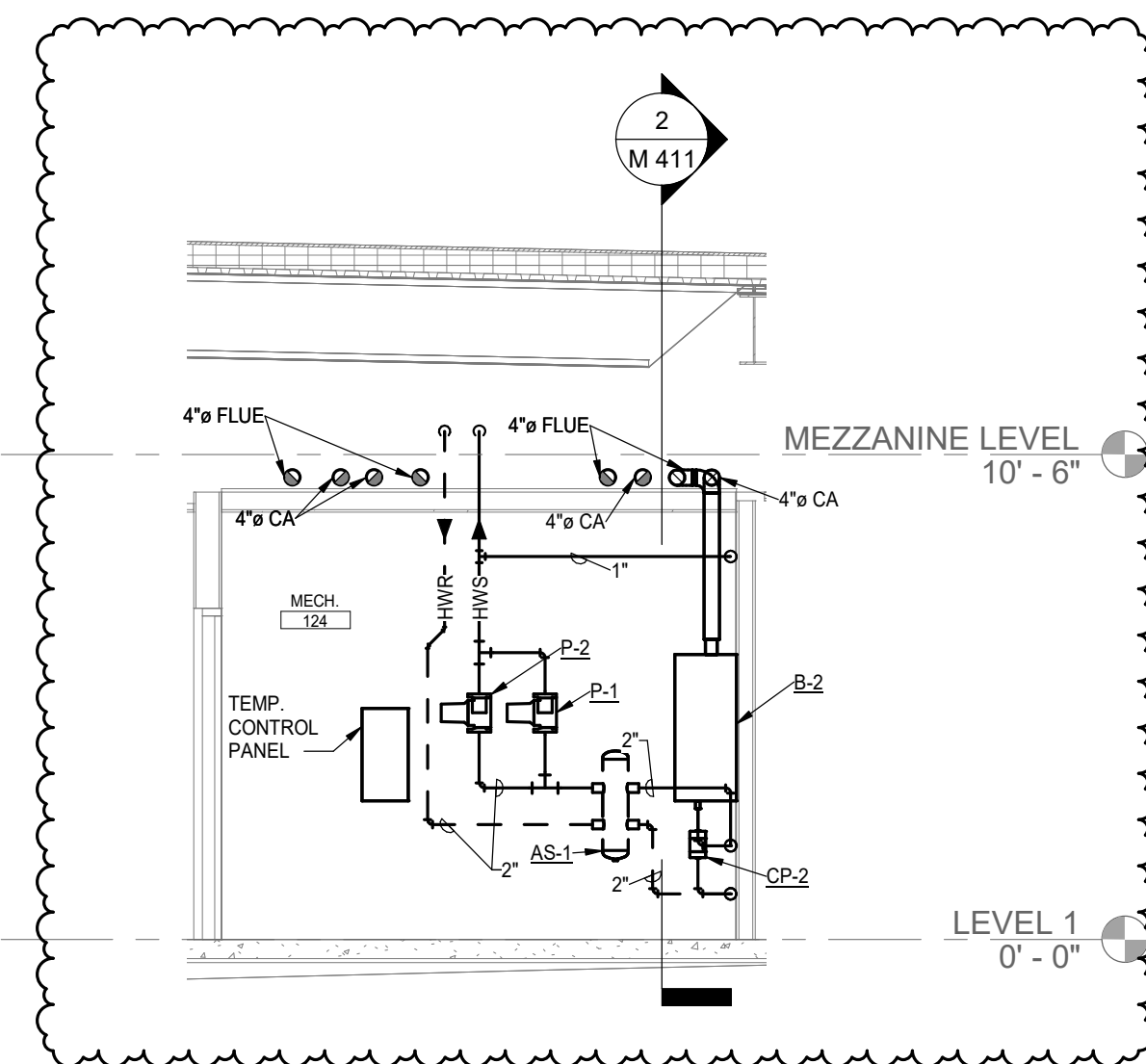
ROOF HVAC PLAN

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

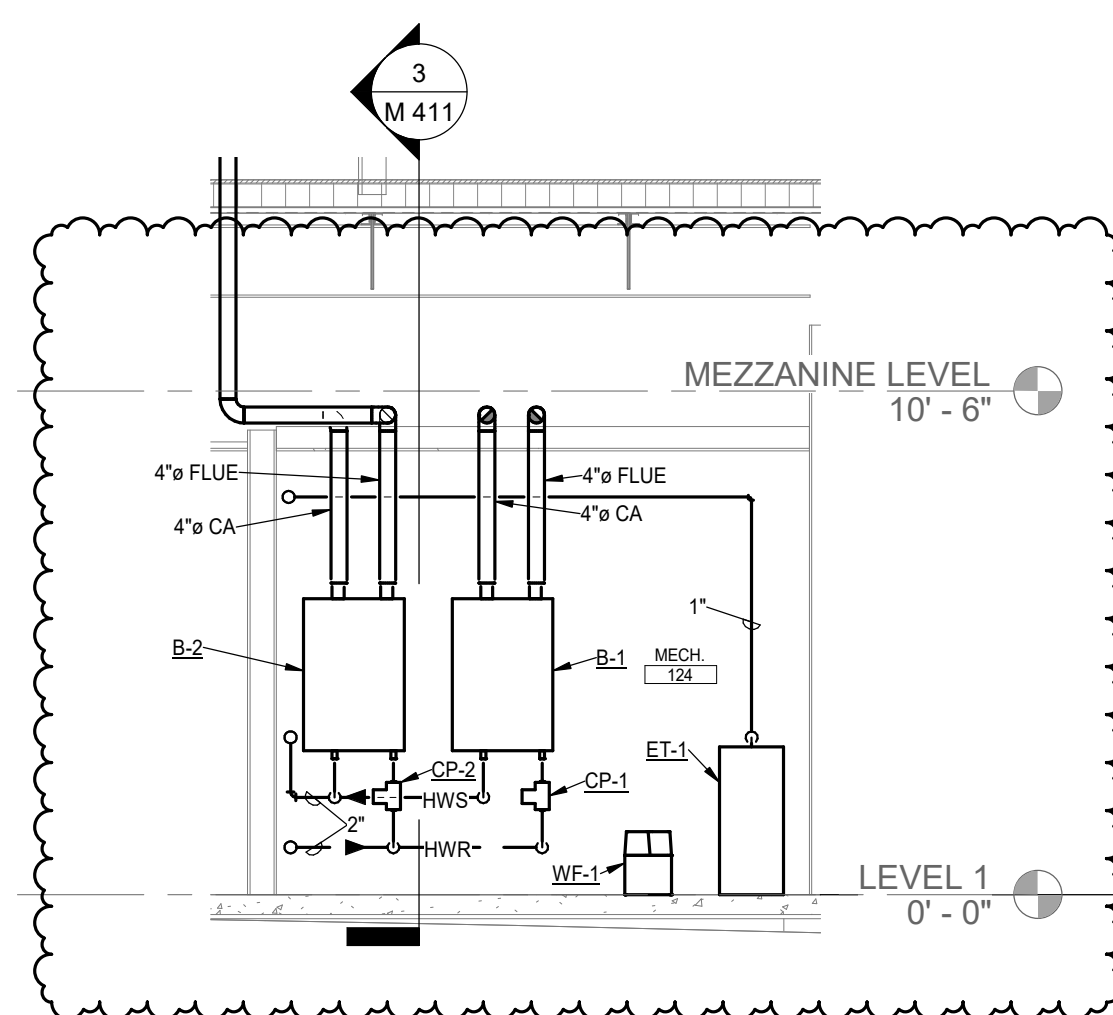


ENLARGED HVAC MECHANICAL ROOM KEYNOTES:

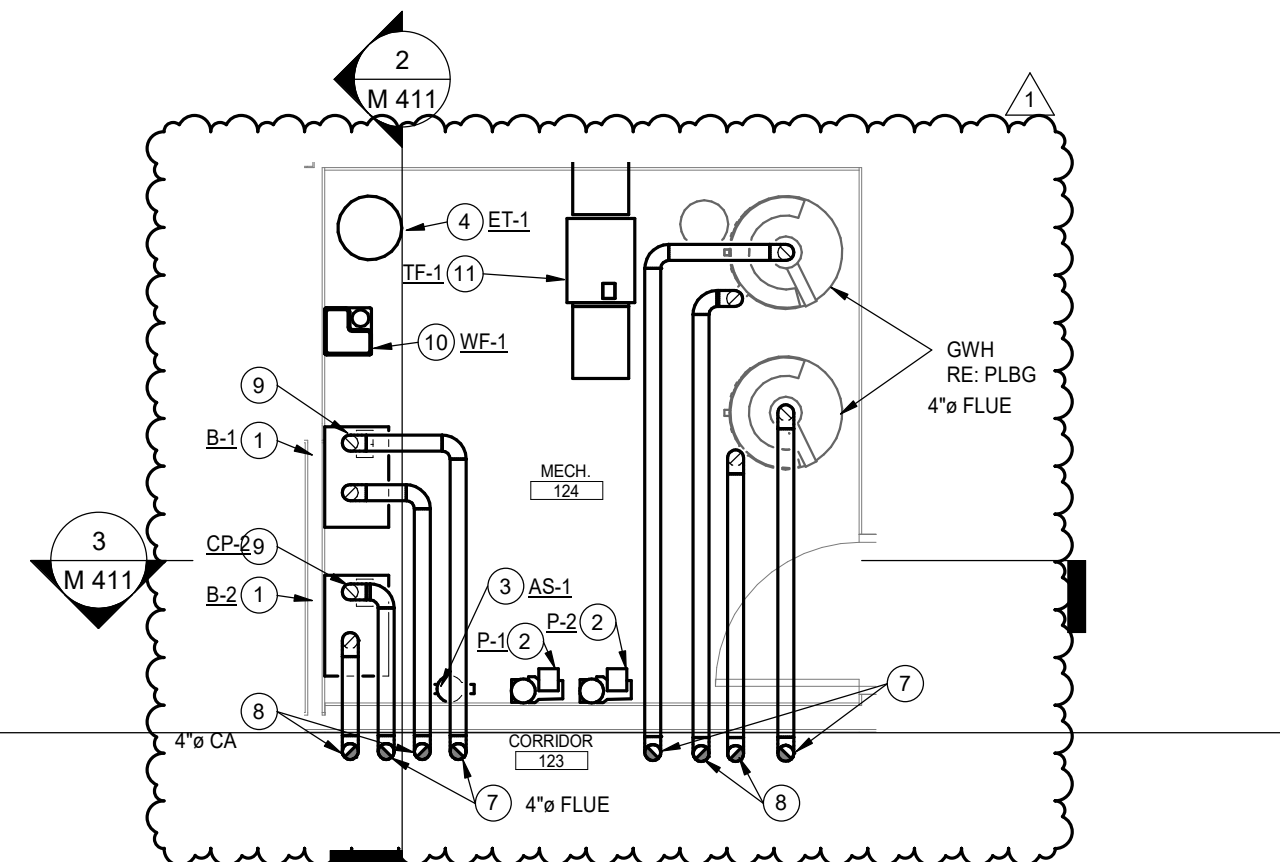
- 1 CONDENSING BOILER MOUNTED ON WALL AS INDICATED WITH BOILER CIRCULATION PUMP SUPPORTED FROM PIPING BELOW. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 2 INLINE HEATING WATER CIRCULATION PUMP AS INDICATED MOUNTED ON WALL. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 3 AIR/DIRT-HYDRAULIC SEPARATOR MOUNTED ON WALL AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 4 EXPANSION TANK MOUNTED ON 4" CONCRETE HOUSEKEEPING PAD AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 5 BOILER EMERGENCY POWER OFF (EPO) SWITCH. REFER TO CONTROL DRAWINGS FOR REQUIREMENTS.
- 6 PIPING OF SIZE AND TYPE INDICATED OUT OF MECHANICAL ROOM TO MAIN BUILDING. REFER TO HVAC PIPING FLOOR PLANS FOR CONTINUATION.
- 7 CPVC FLUE OF SIZE INDICATED UP THROUGH ROOF. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- 8 CPVC COMBUSTION AIR OF SIZE INDICATED UP THROUGH ROOF. REFER TO ROOF HVAC PLAN FOR CONTINUATION.
- 9 INLINE BOILER CIRCULATION PUMP BELOW BOILER AS INDICATED. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 10 WATER FEEDER TO SERVE AS MAKE UP WATER FOR HYDRONIC SYSTEM. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 11 INLINE TRANSFER FAN HUNG FROM STRUCTURE ABOVE. REFER TO DETAIL. REFER TO SCHEDULE FOR SIZE AND CAPACITY.
- 12 HEATING WATER SYSTEM DDC TEMPERATURE CONTROL PANEL ON WALL AS INDICATED. REFER TO CONTROL DRAWINGS FOR REQUIREMENTS.
- 13 DDC BUILDING NETWORK CONTROLLER (JACE) MOUNTED ON WALL AS INDICATED. COORDINATE FINAL LOCATION WITH EQUIPMENT IN SPACE. REFER TO CONTROL DRAWINGS FOR REQUIREMENTS.



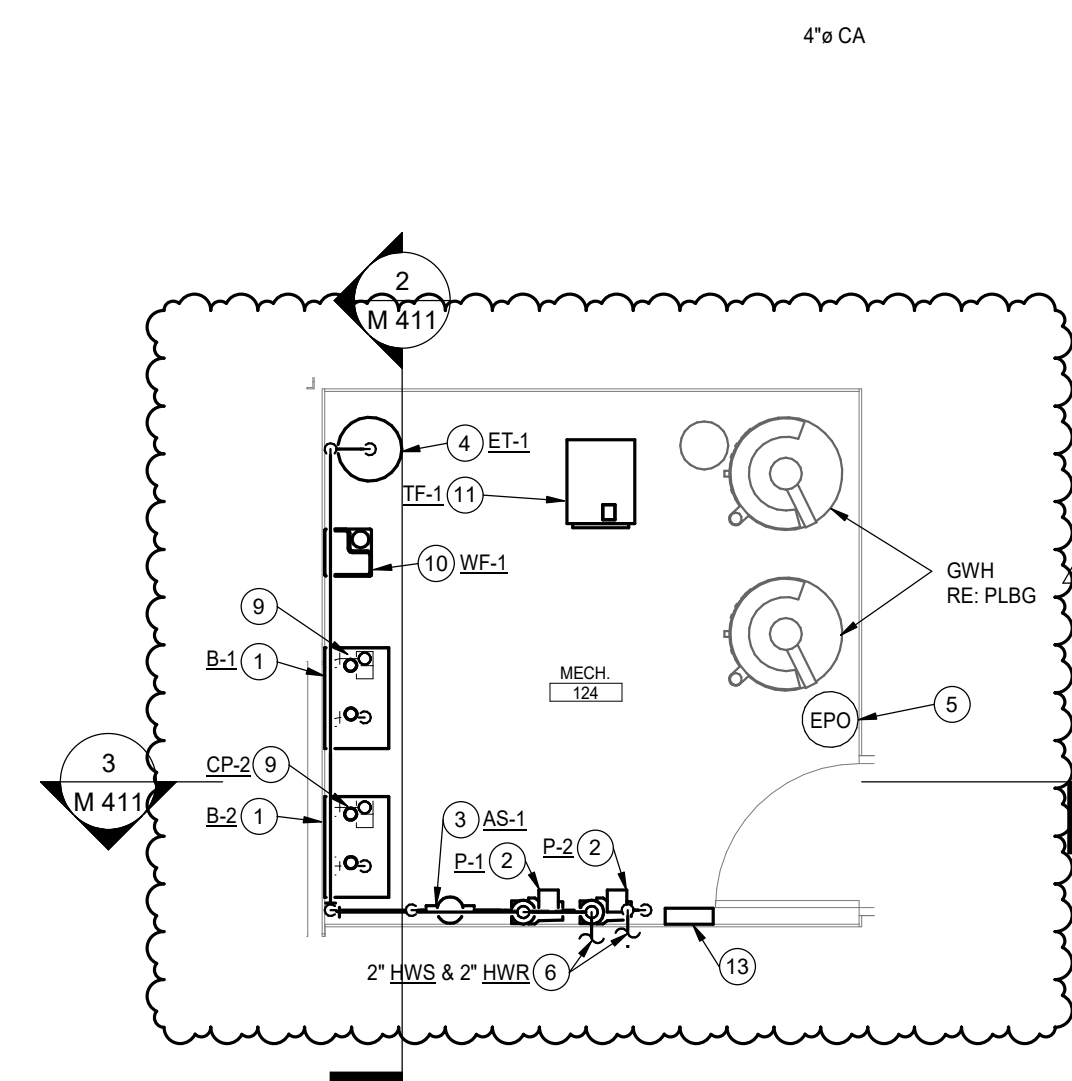
3 ENLARGED BOILER ROOM SECTION 2
M 411 SCALE: 1/4" = 1'-0"



2 ENLARGED BOILER ROOM SECTION 1
M 411 SCALE: 1/4" = 1'-0"



1 ENLARGED HVAC MECHANICAL ROOM PLAN
M 411 SCALE: 1/4" = 1'-0"



4 ENLARGED HVAC MECHANICAL ROOM PIPING PLAN
M 411 SCALE: 1/4" = 1'-0"

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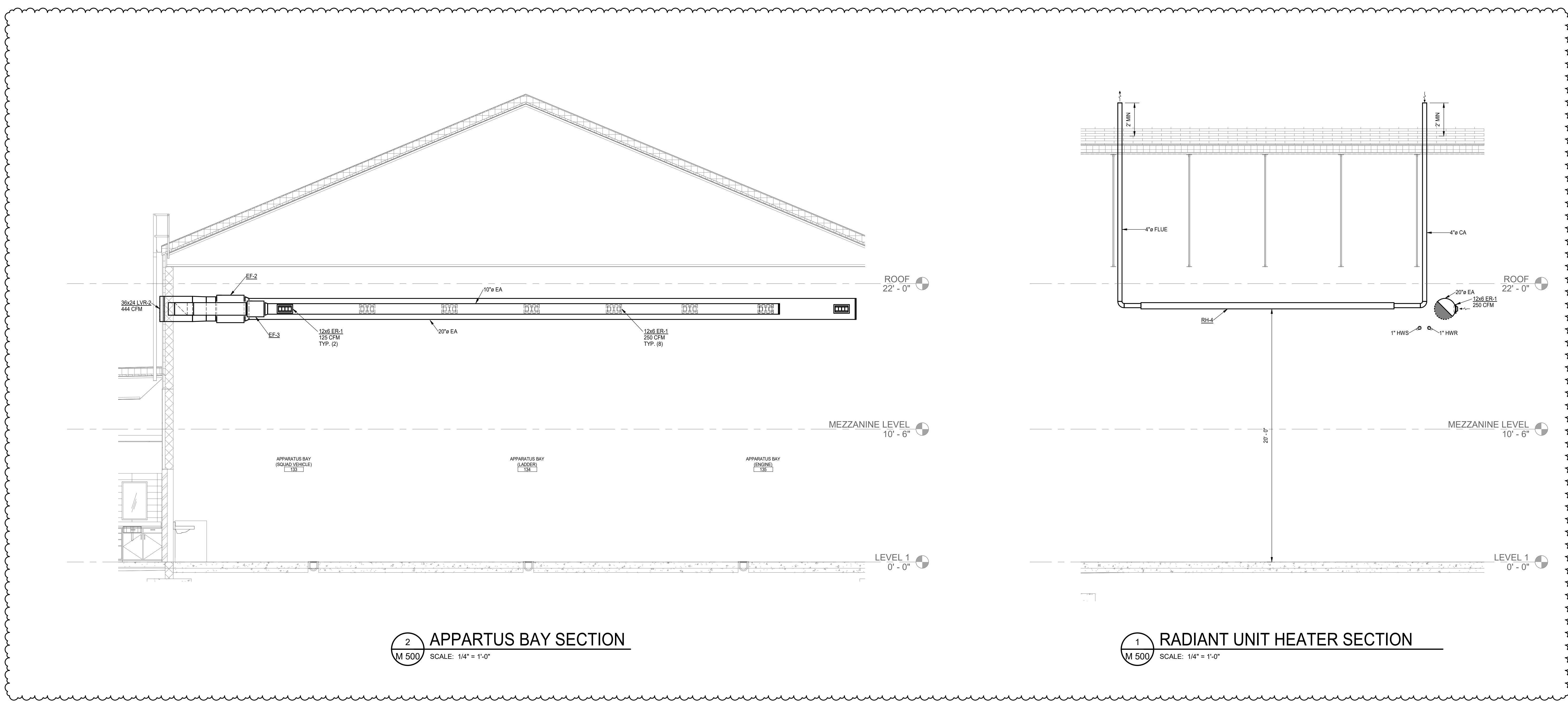
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HVAC SECTIONS

M
500



2 APPARTUS BAY SECTION
M 500 SCALE: 1/4" = 1'-0"

1 RADIANT UNIT HEATER SECTION
M 500 SCALE: 1/4" = 1'-0"

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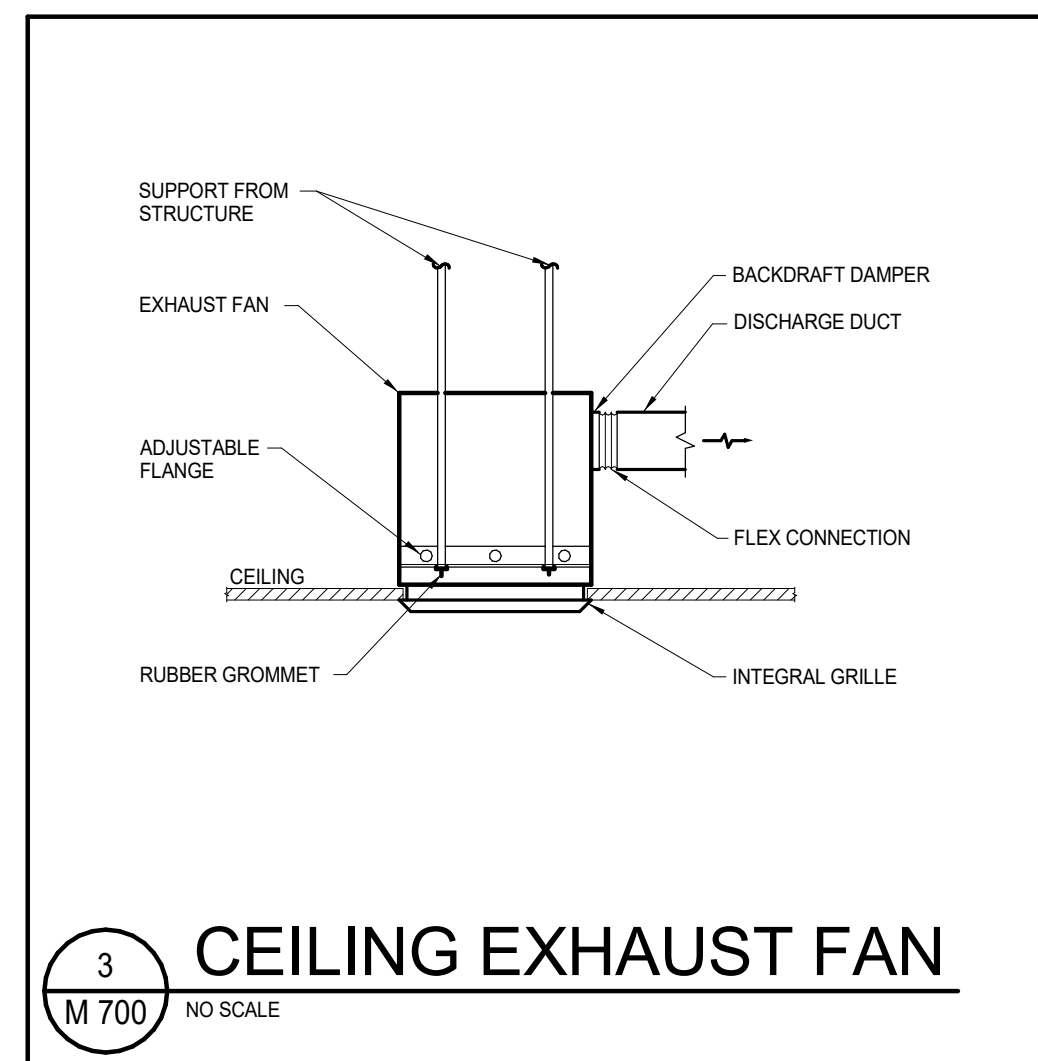
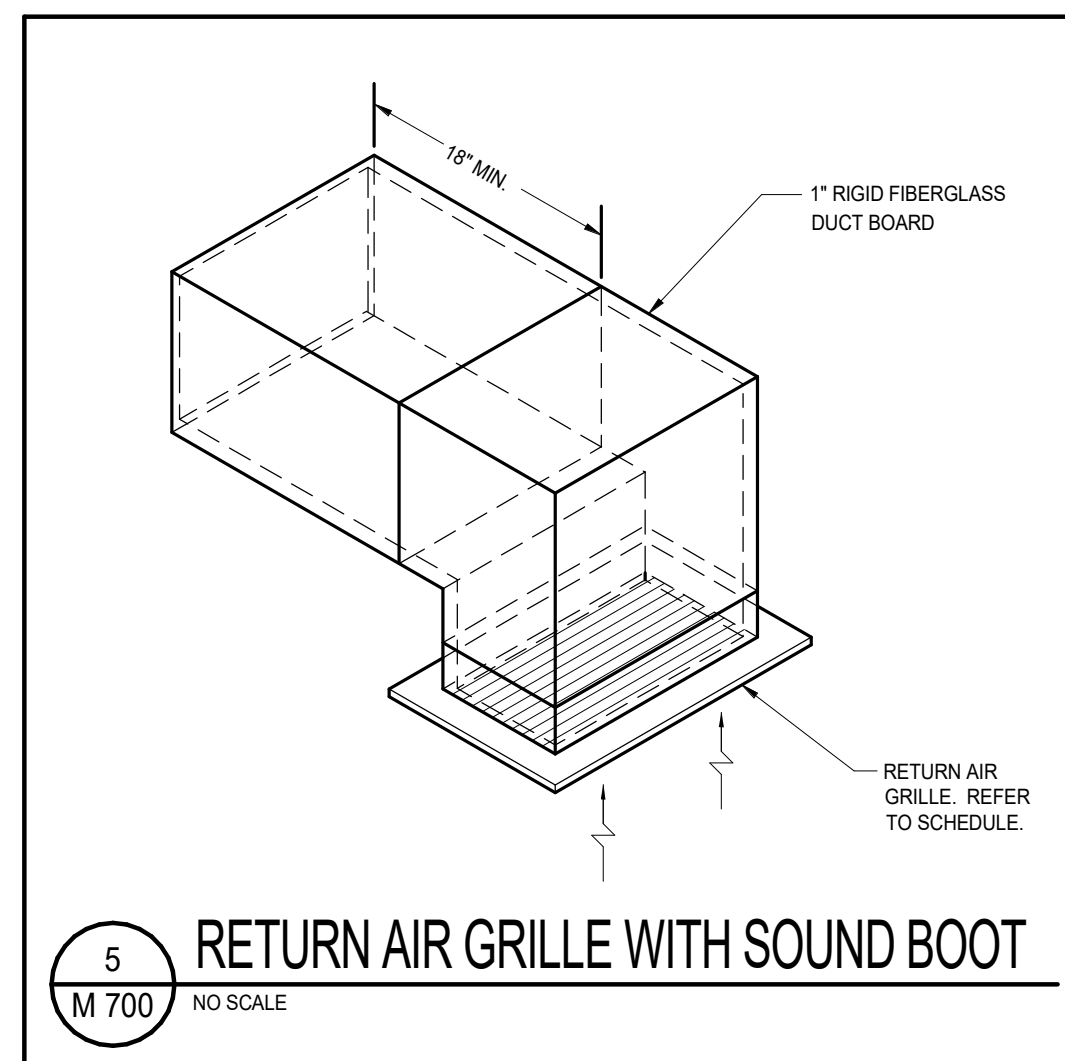
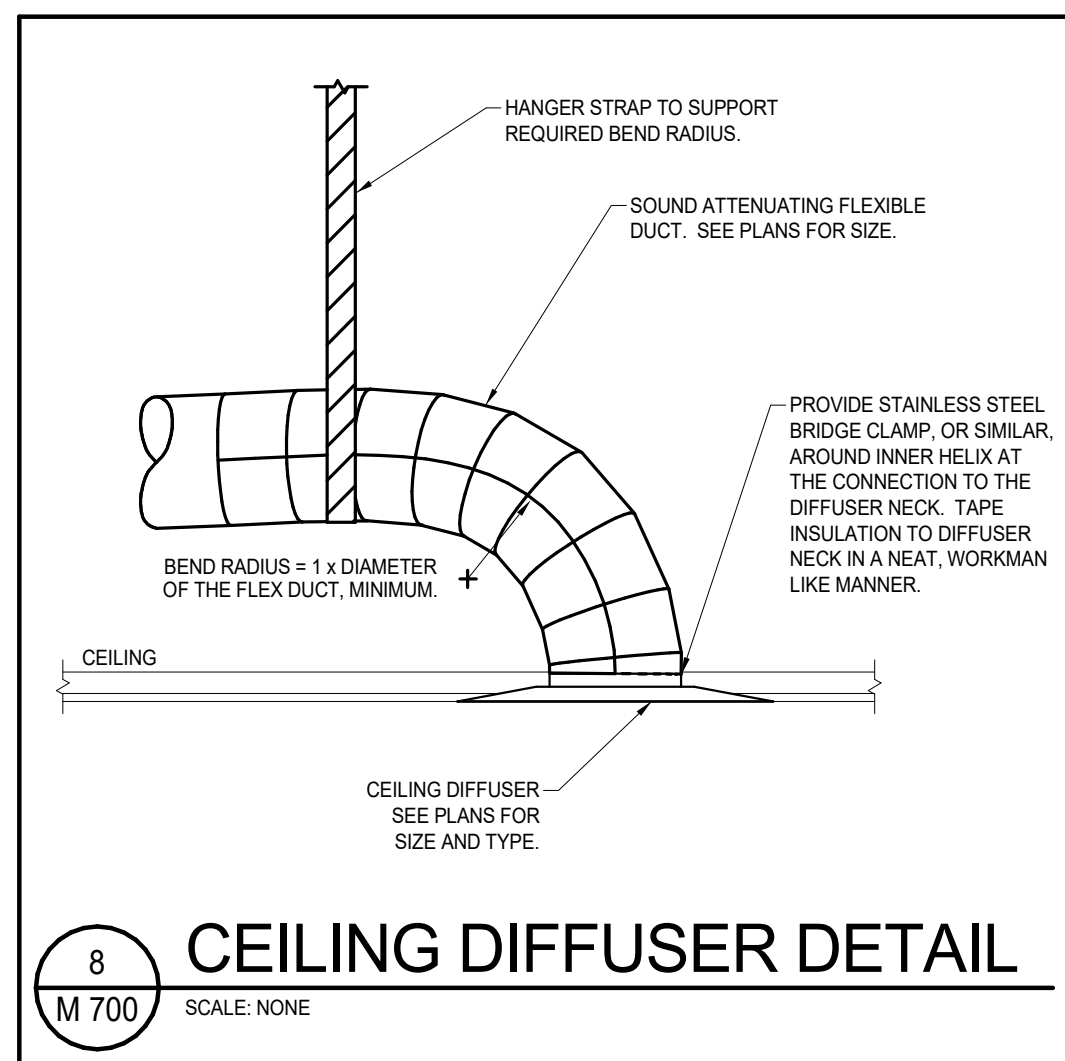
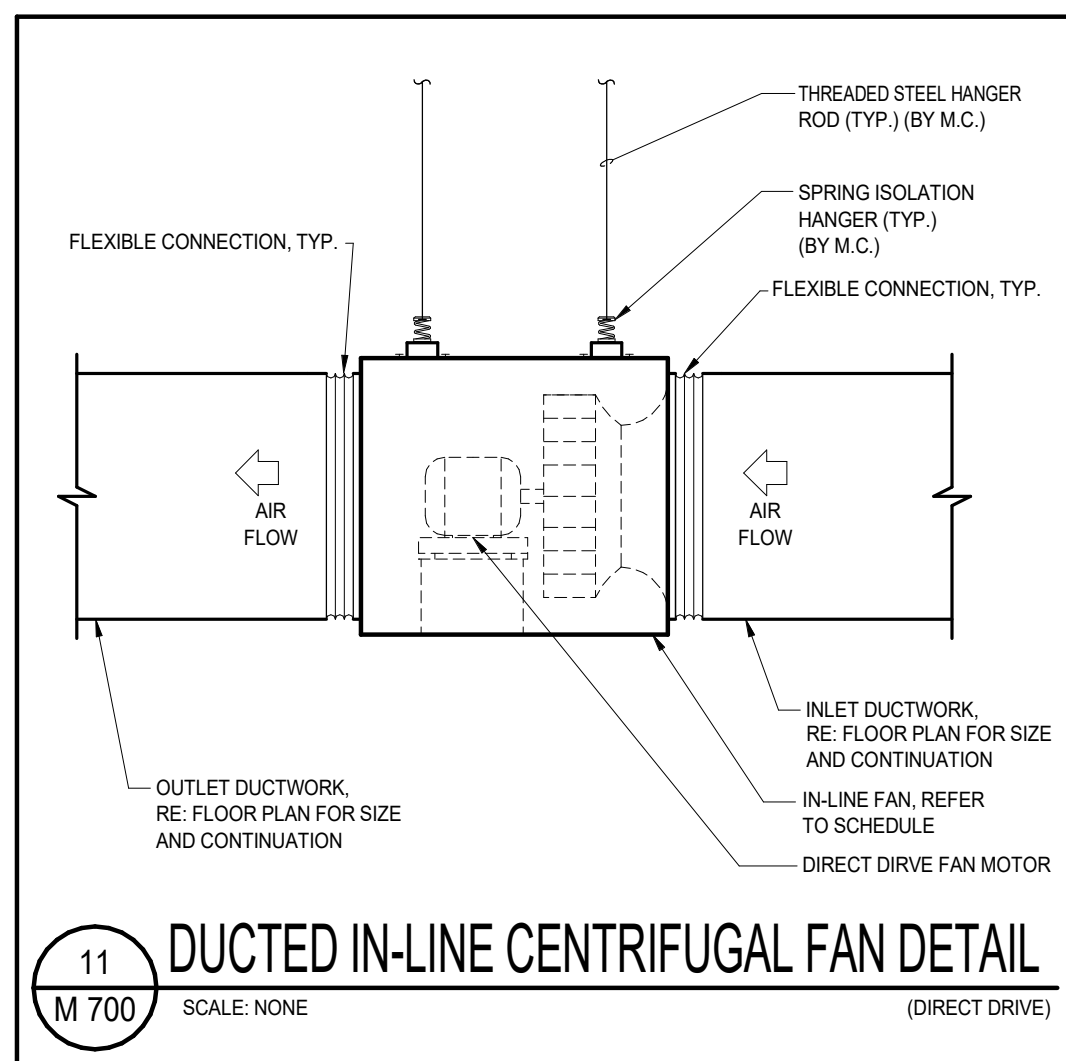
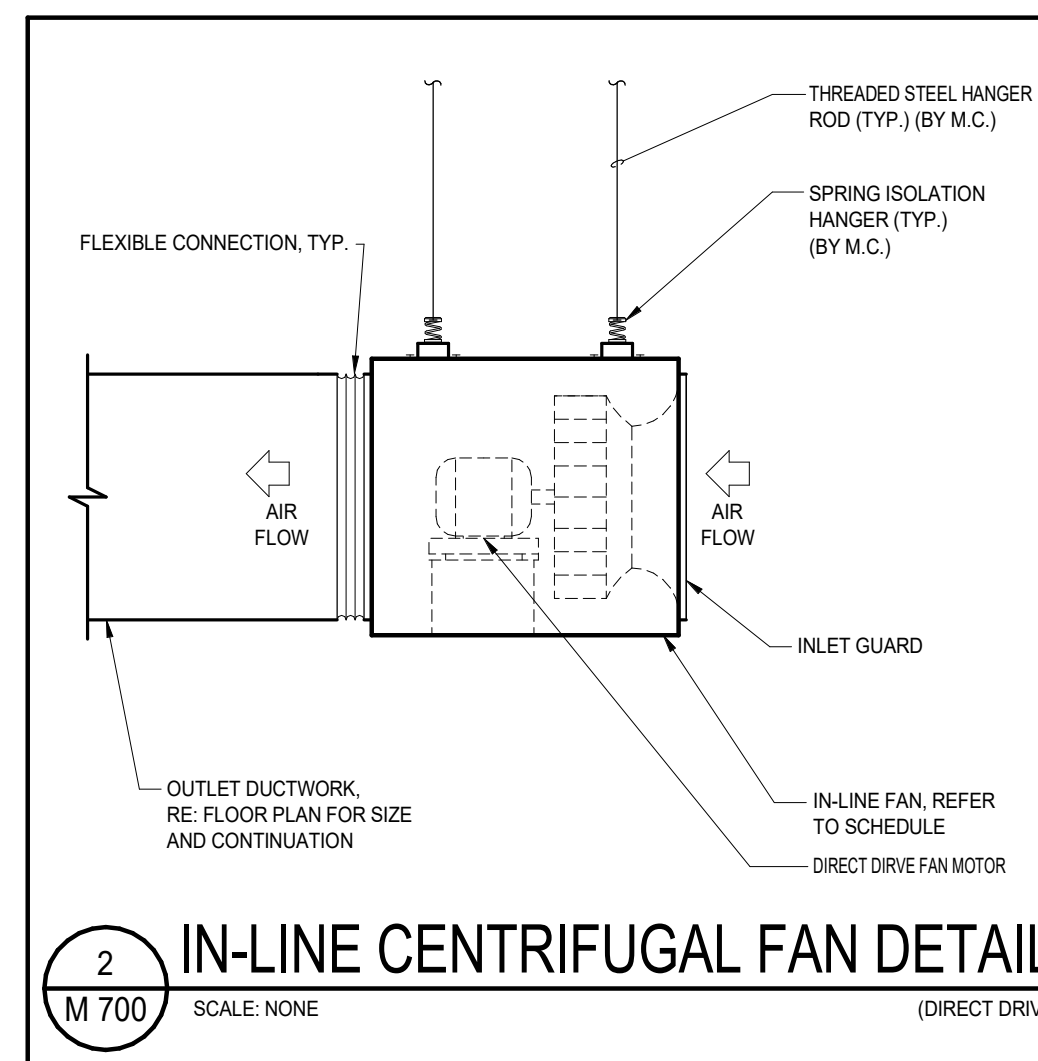
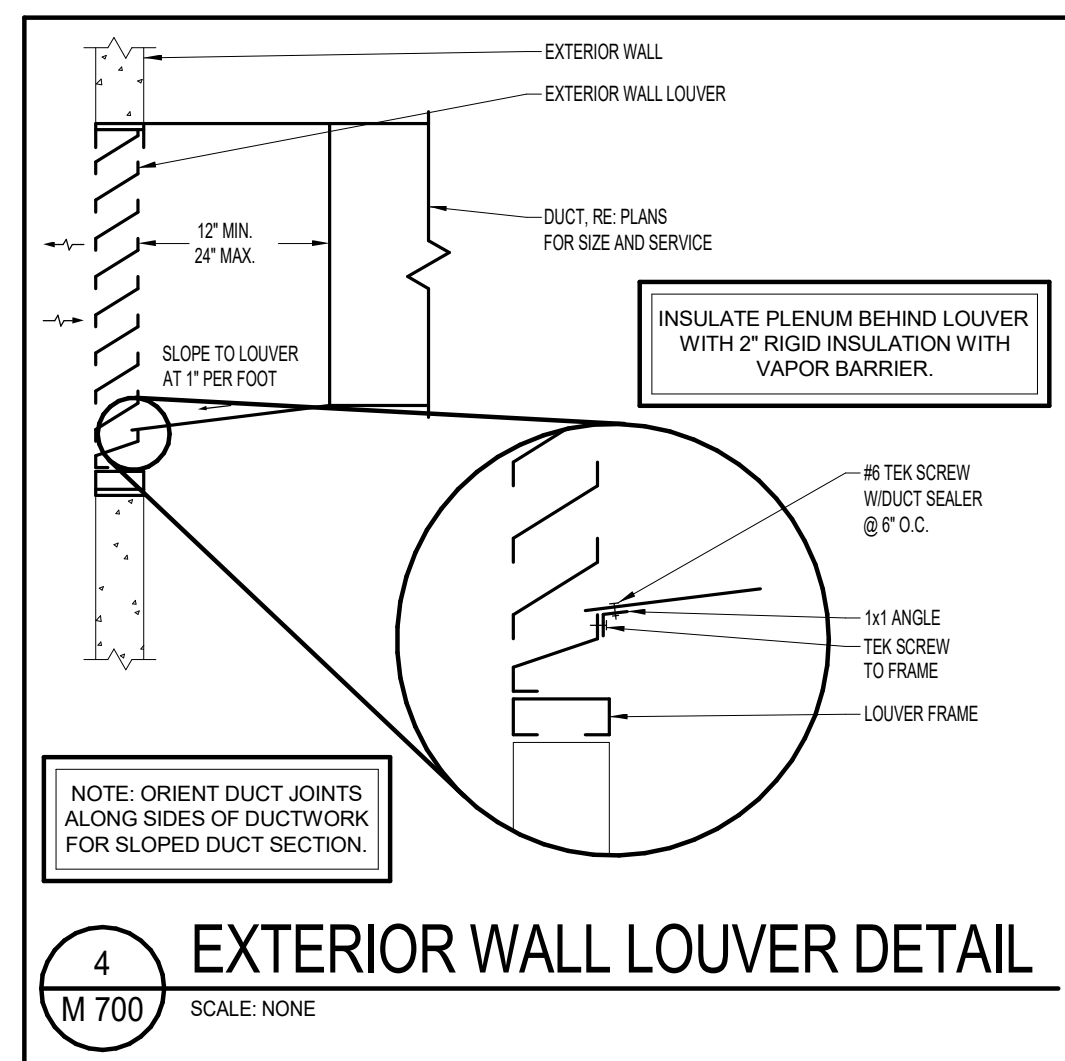
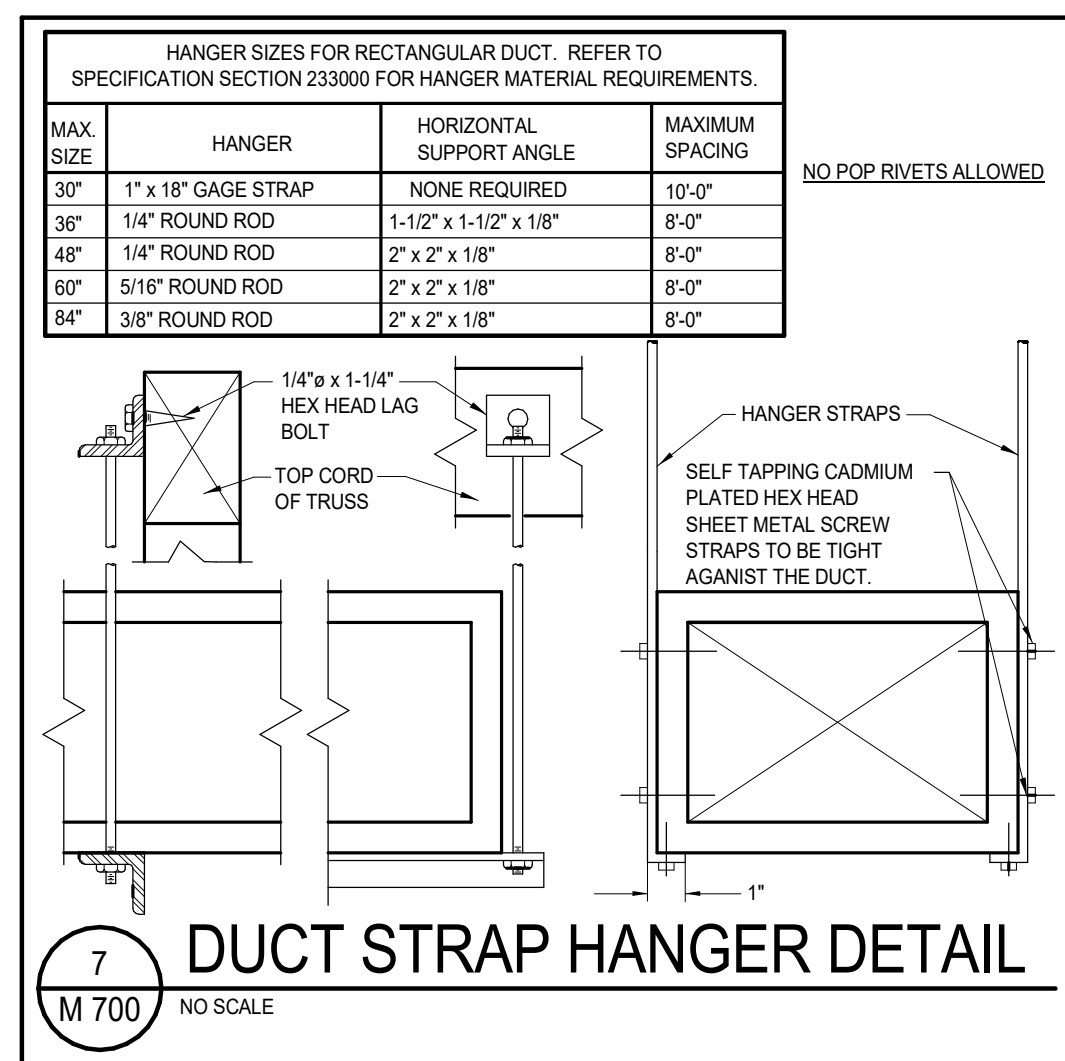
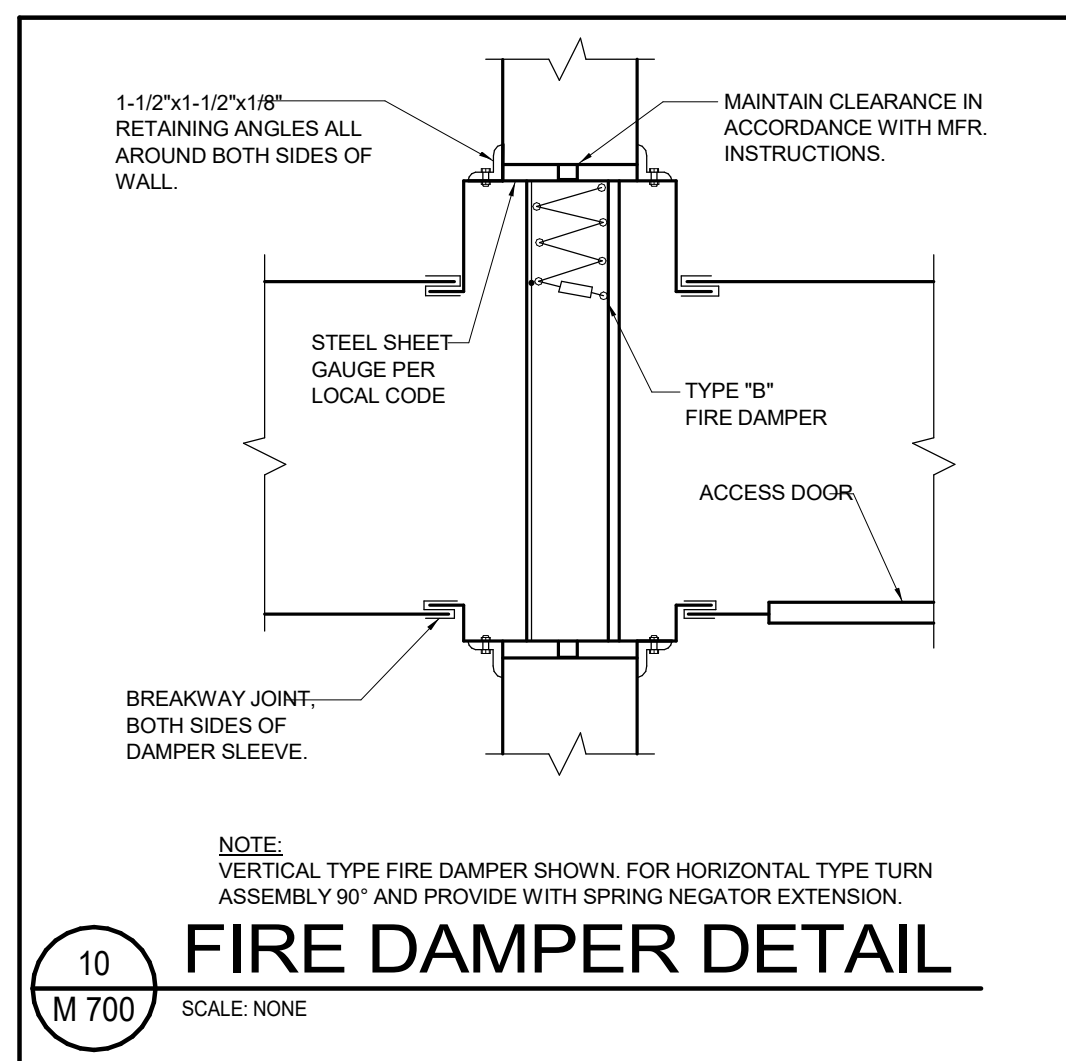
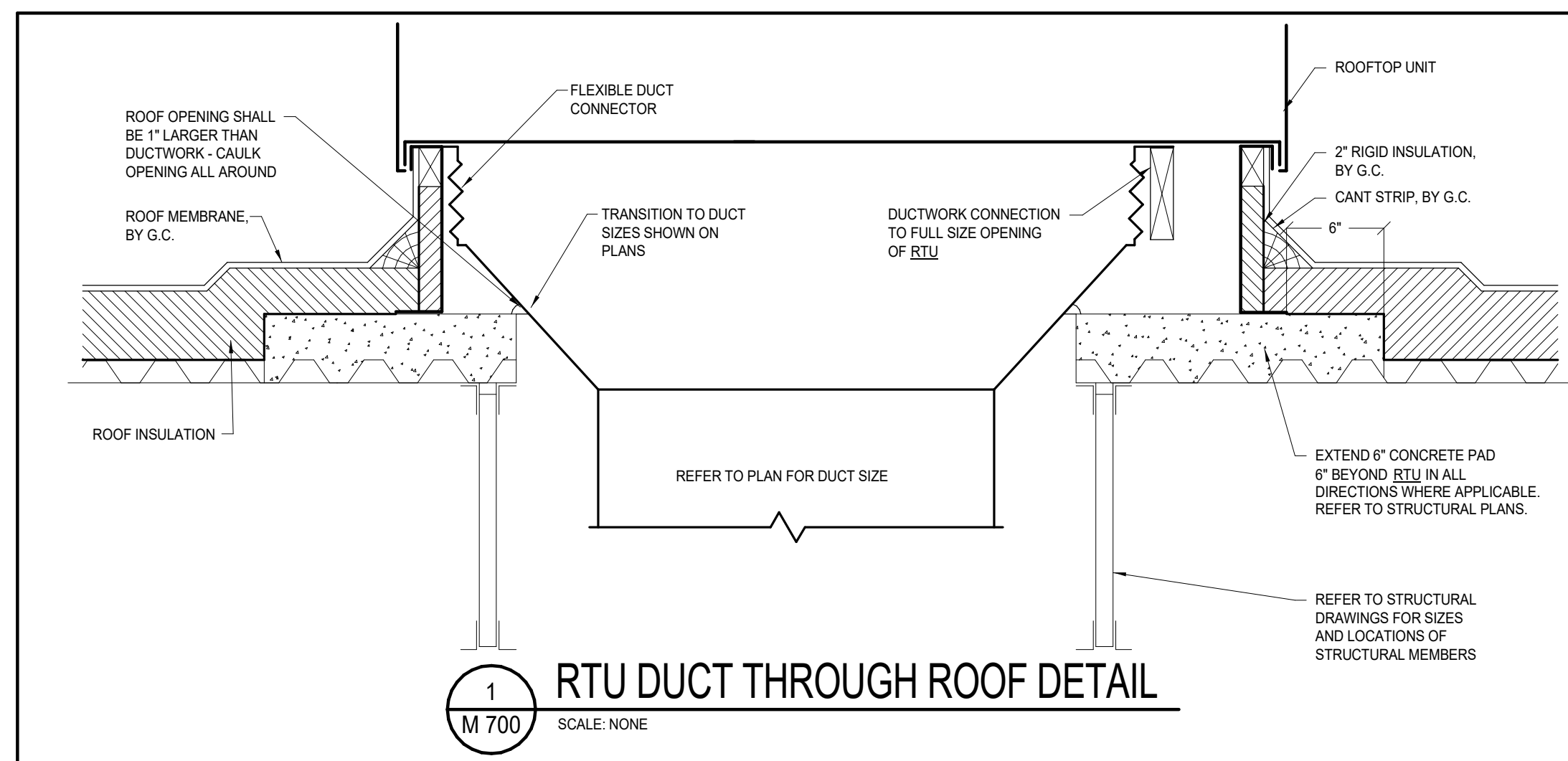
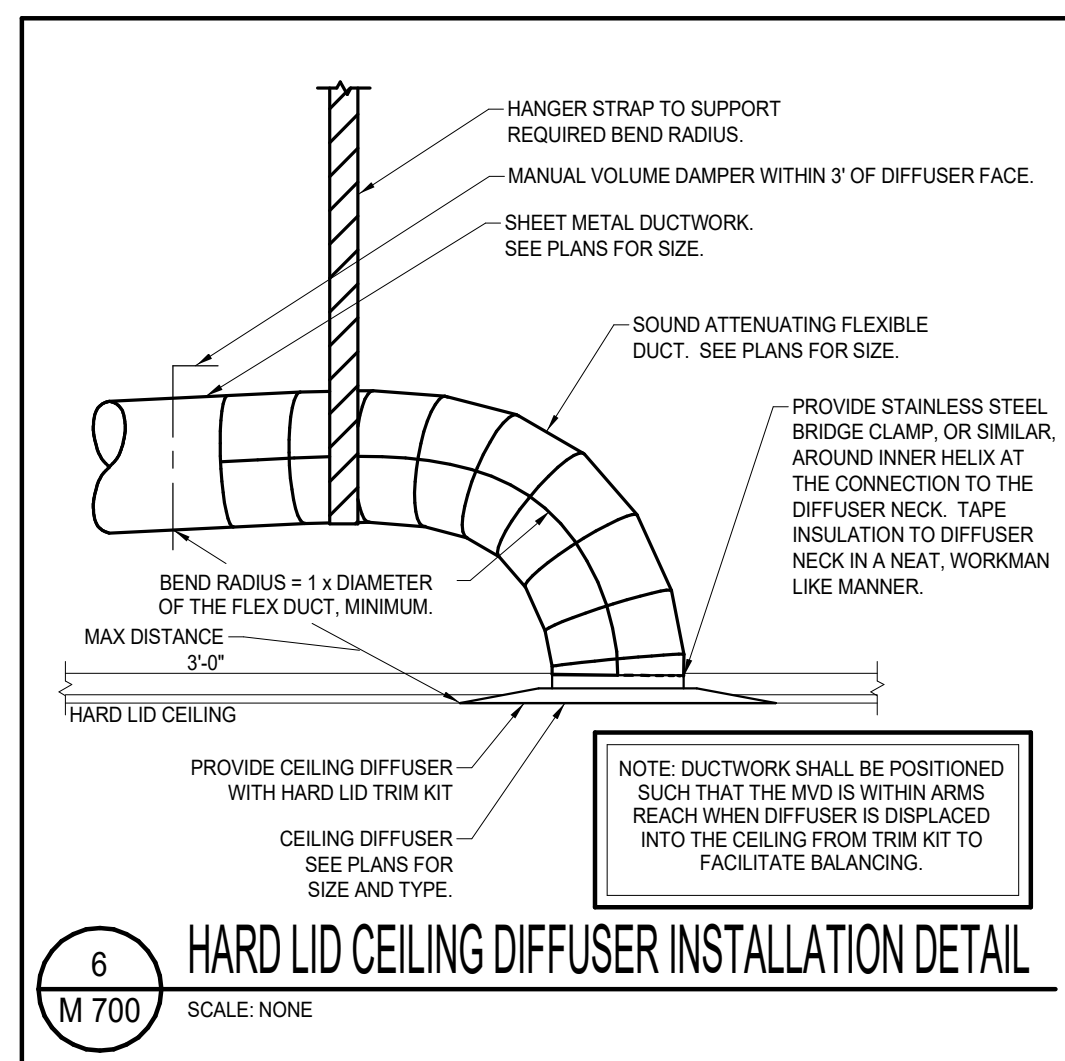
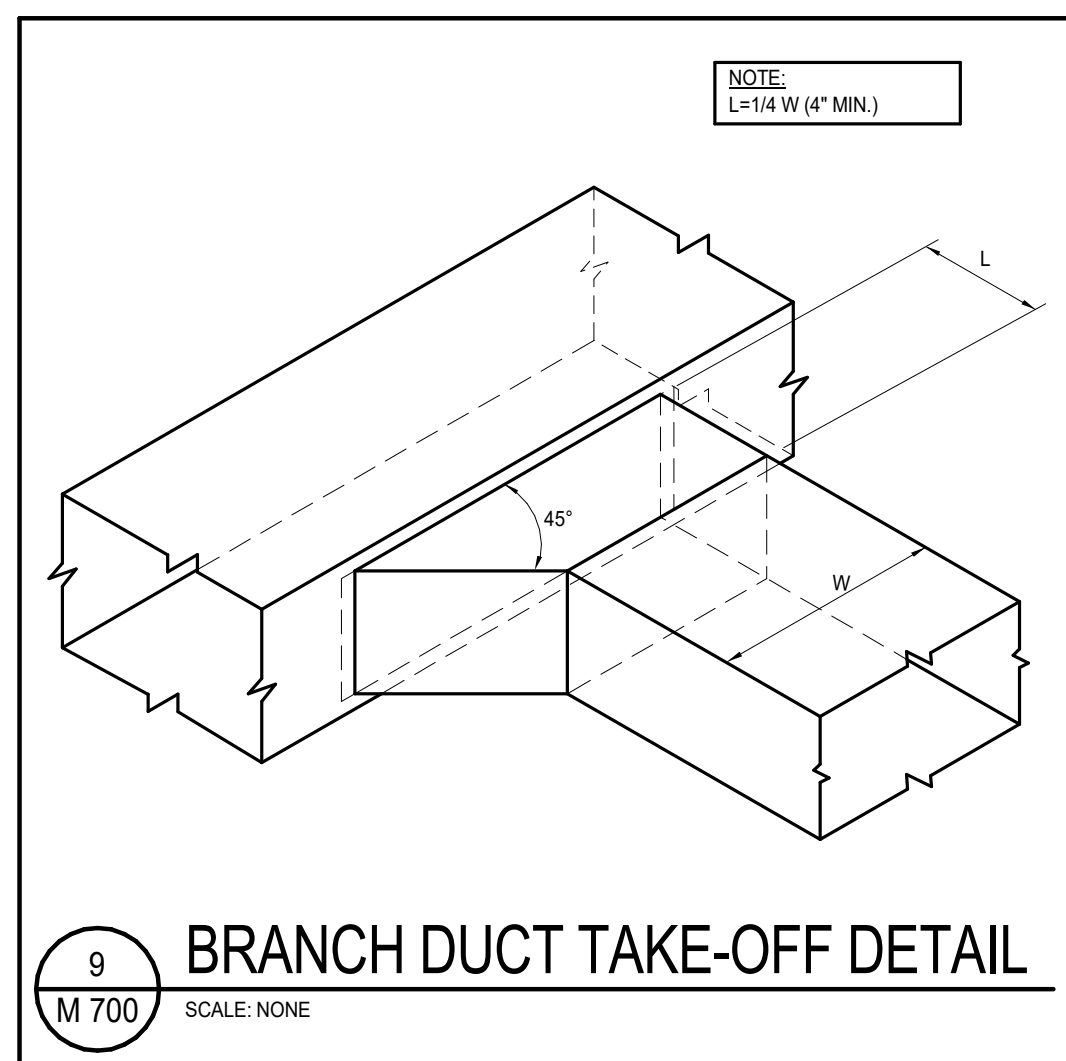
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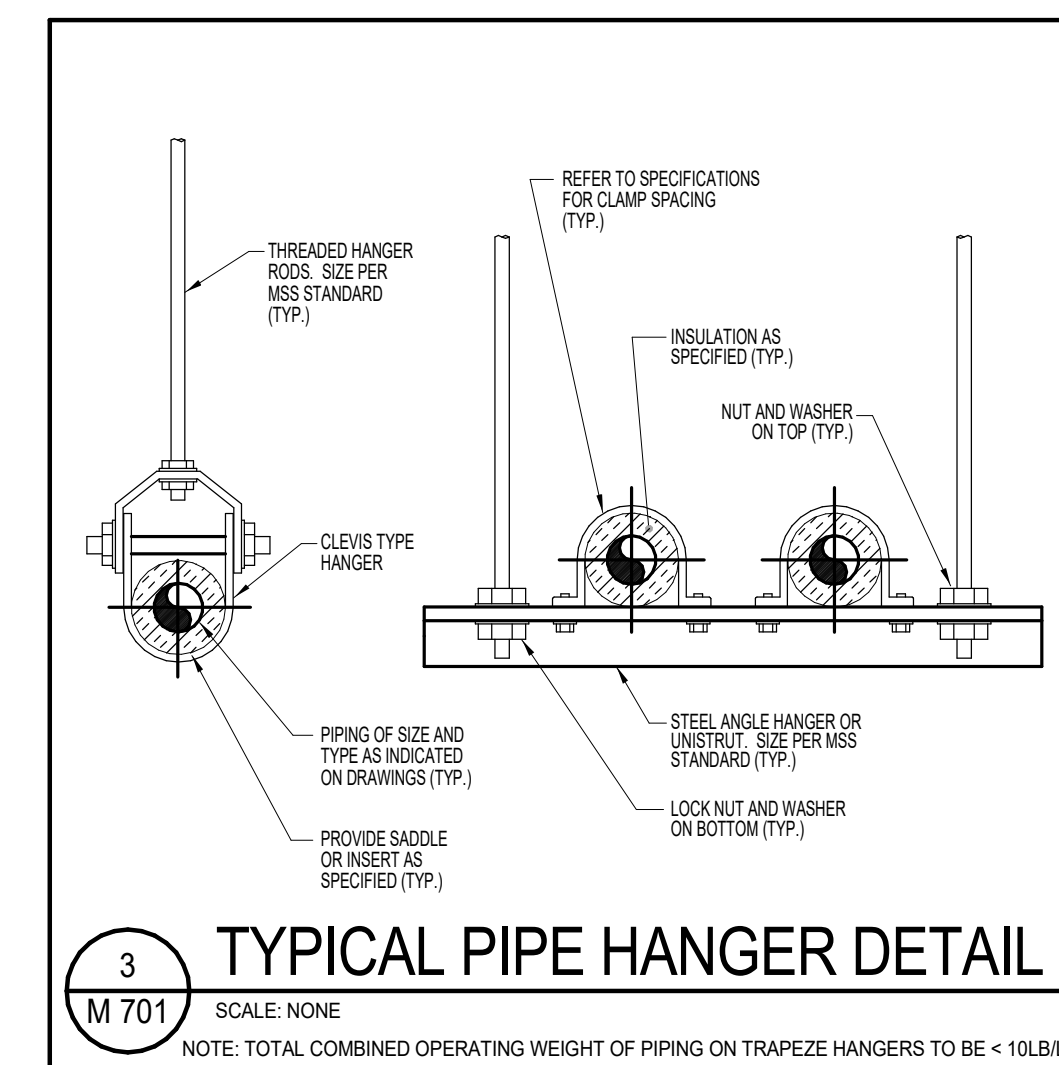
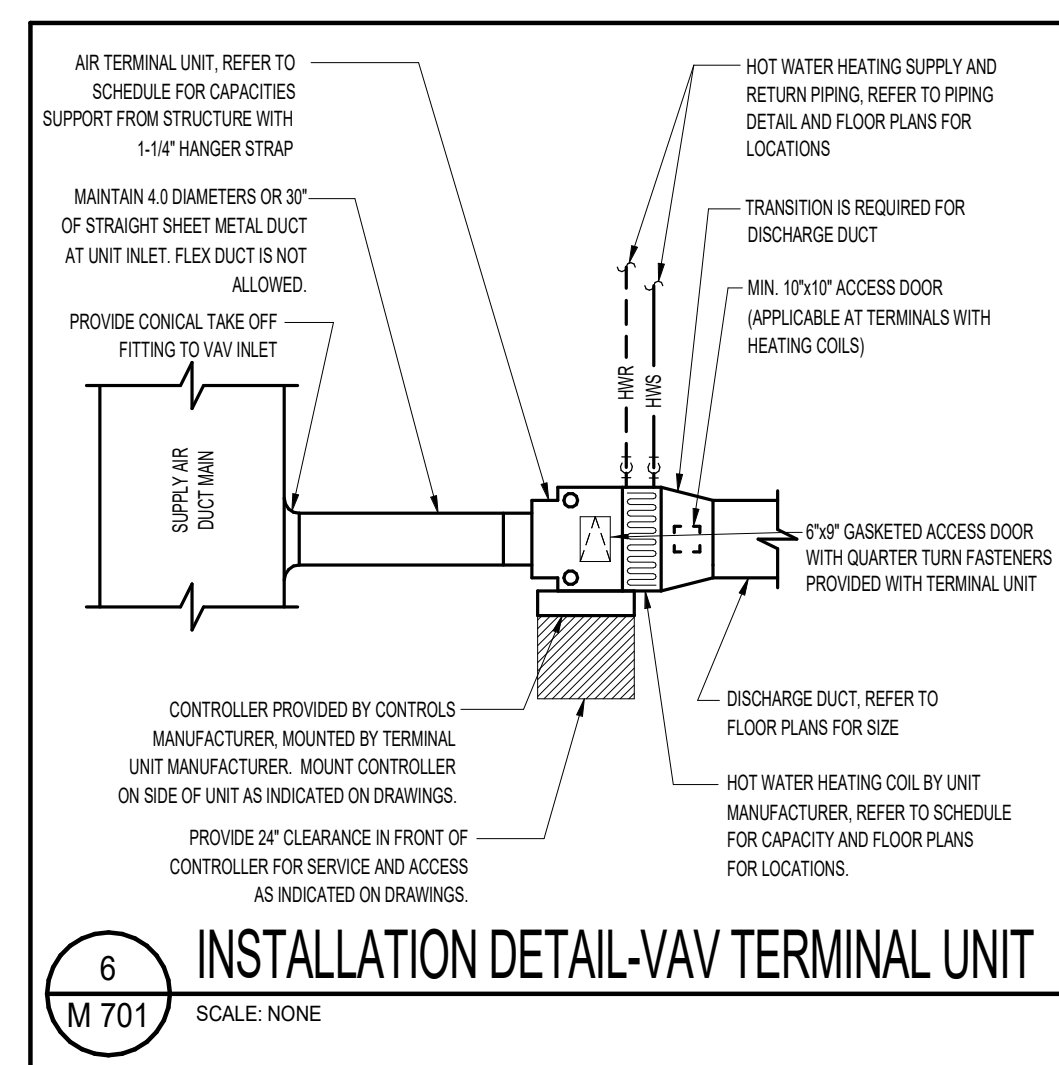
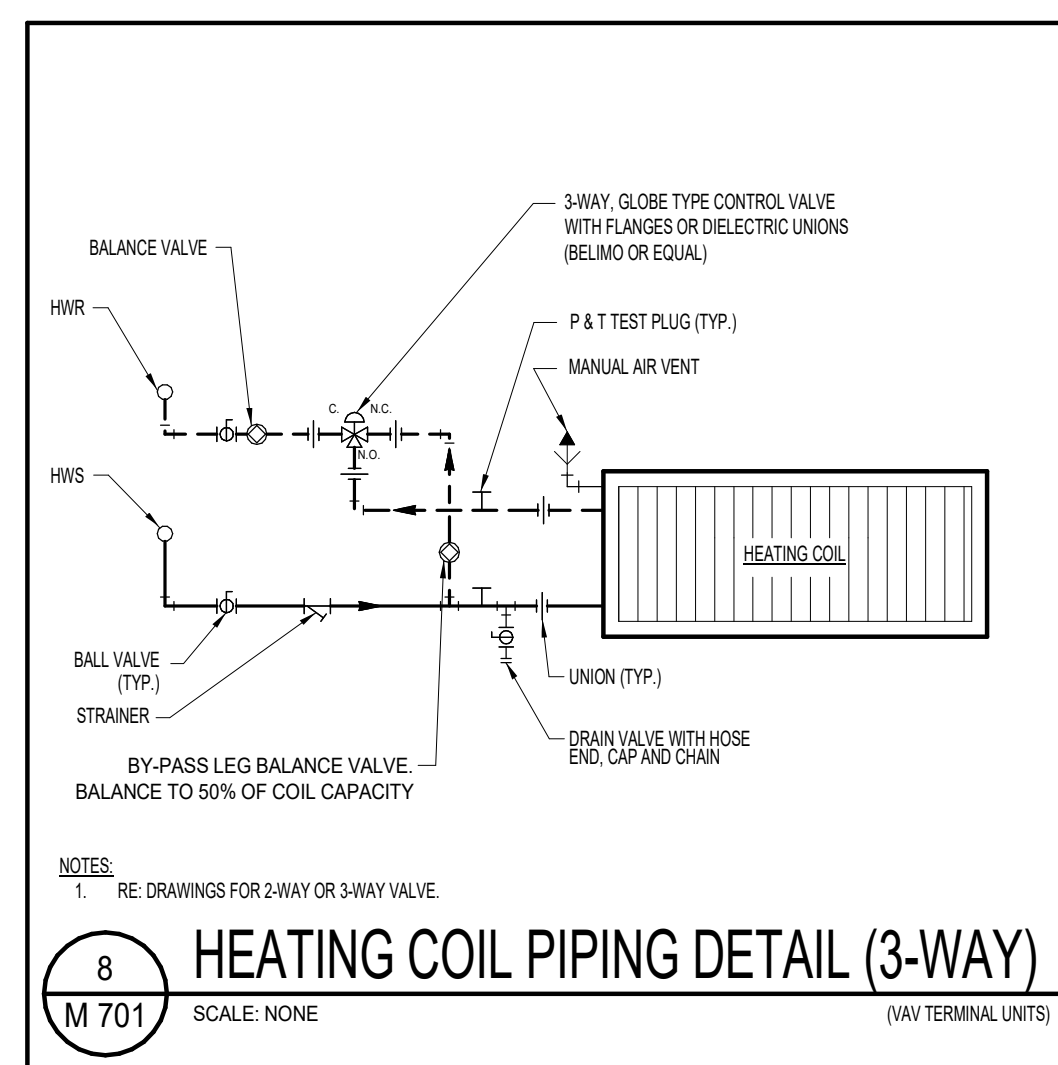
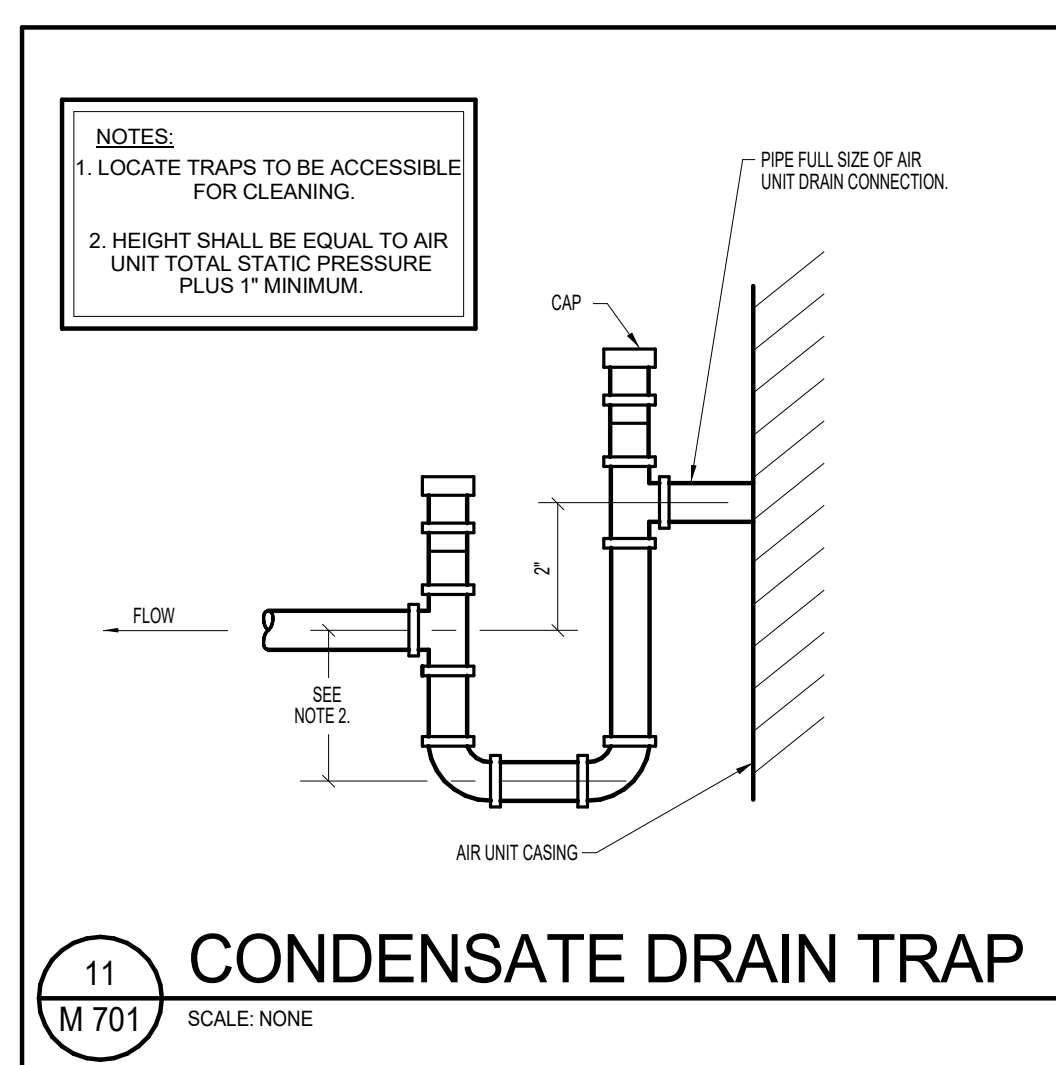
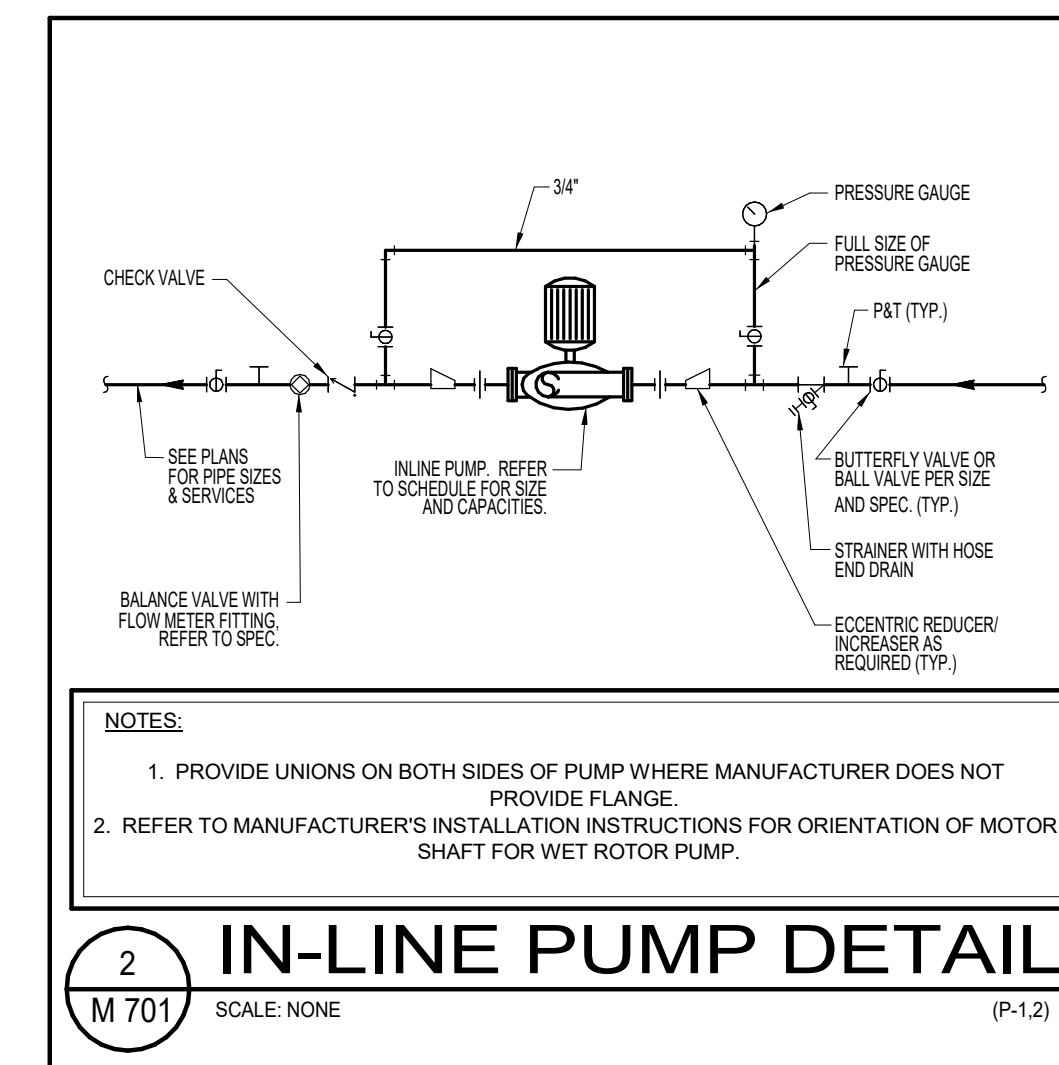
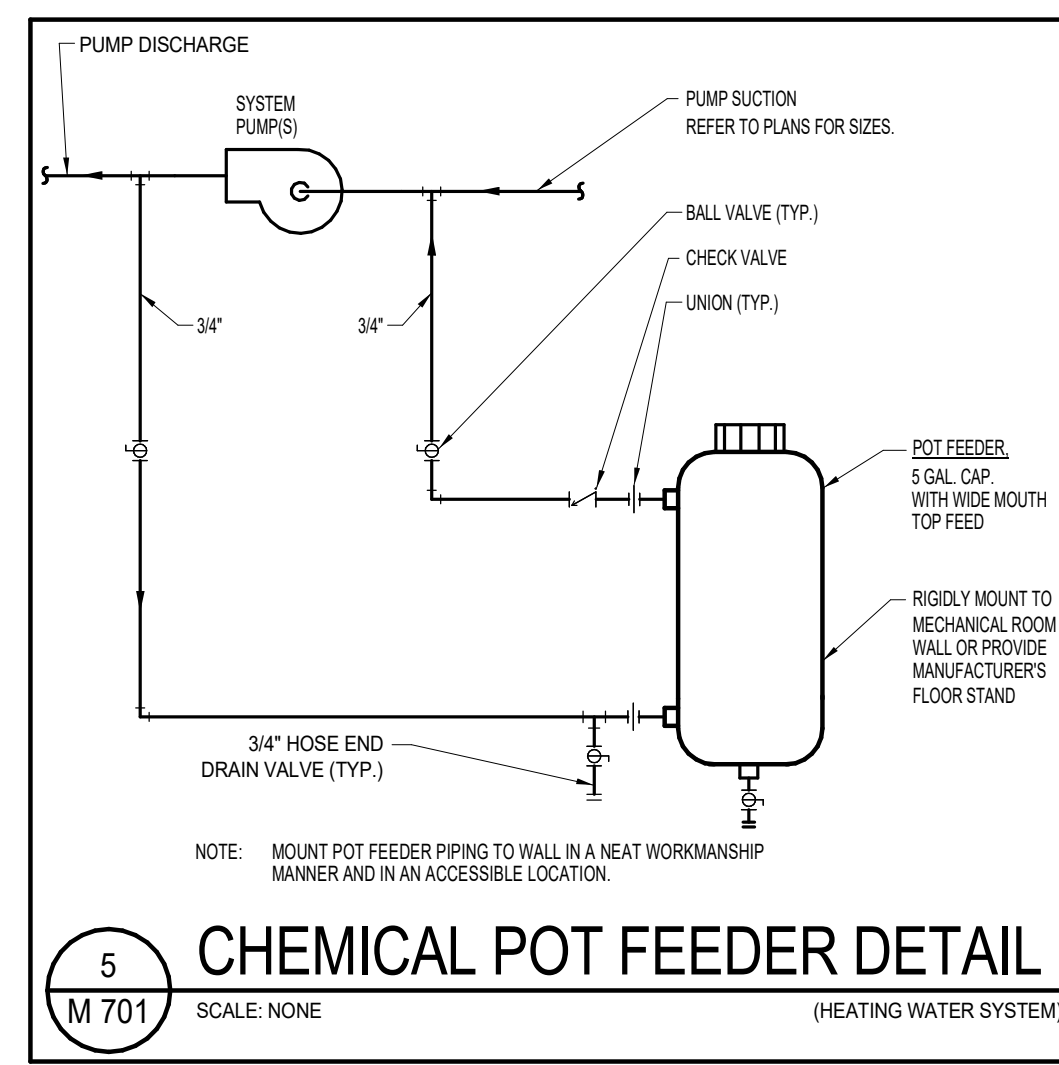
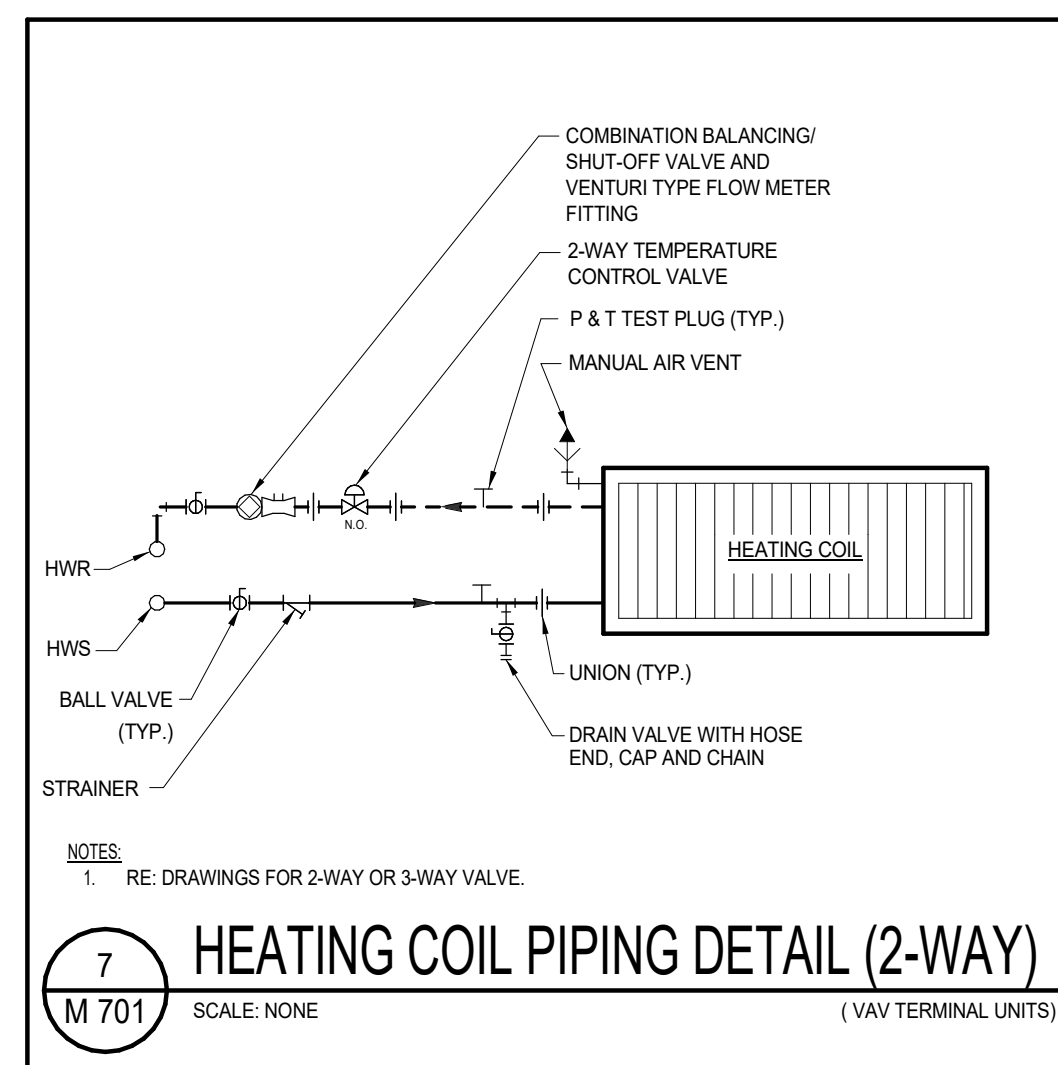
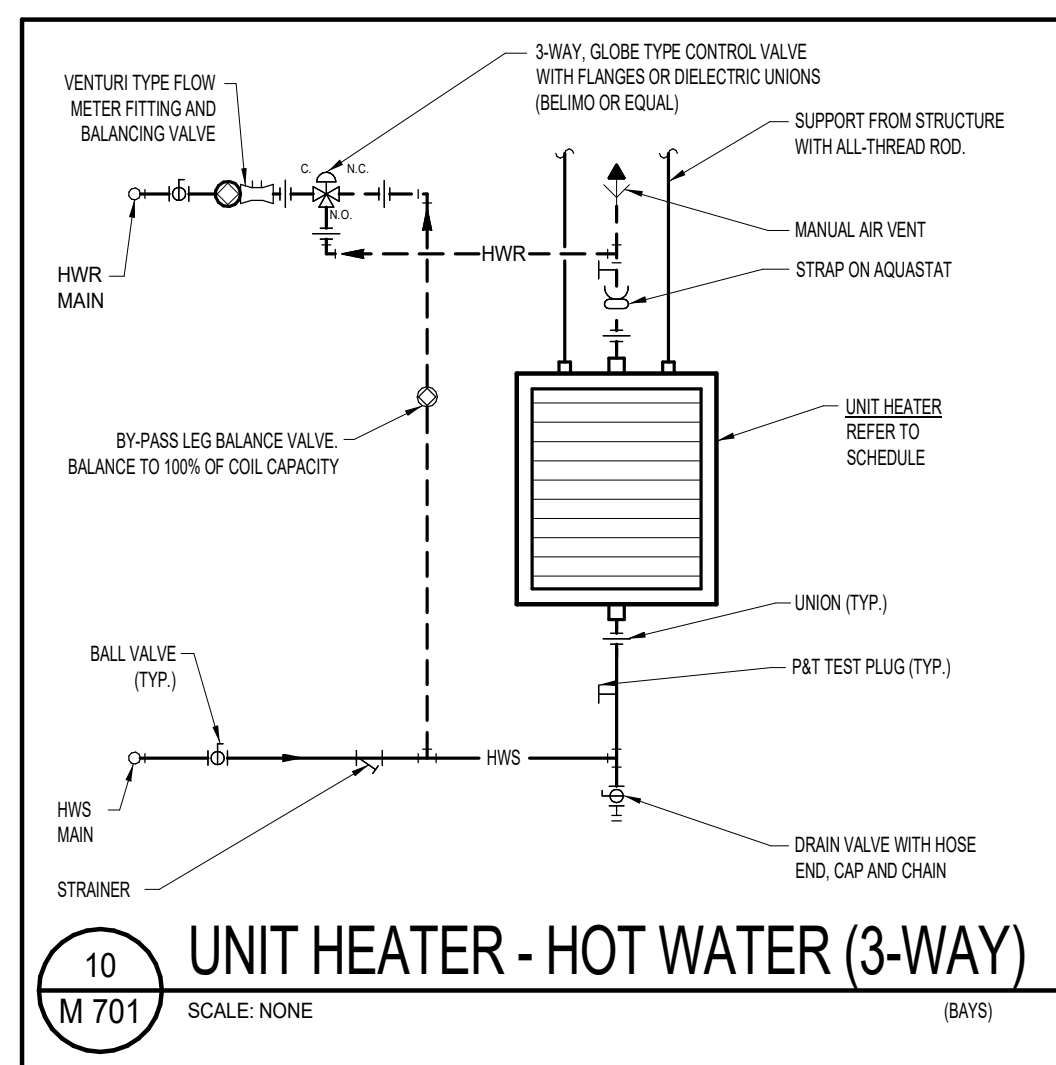
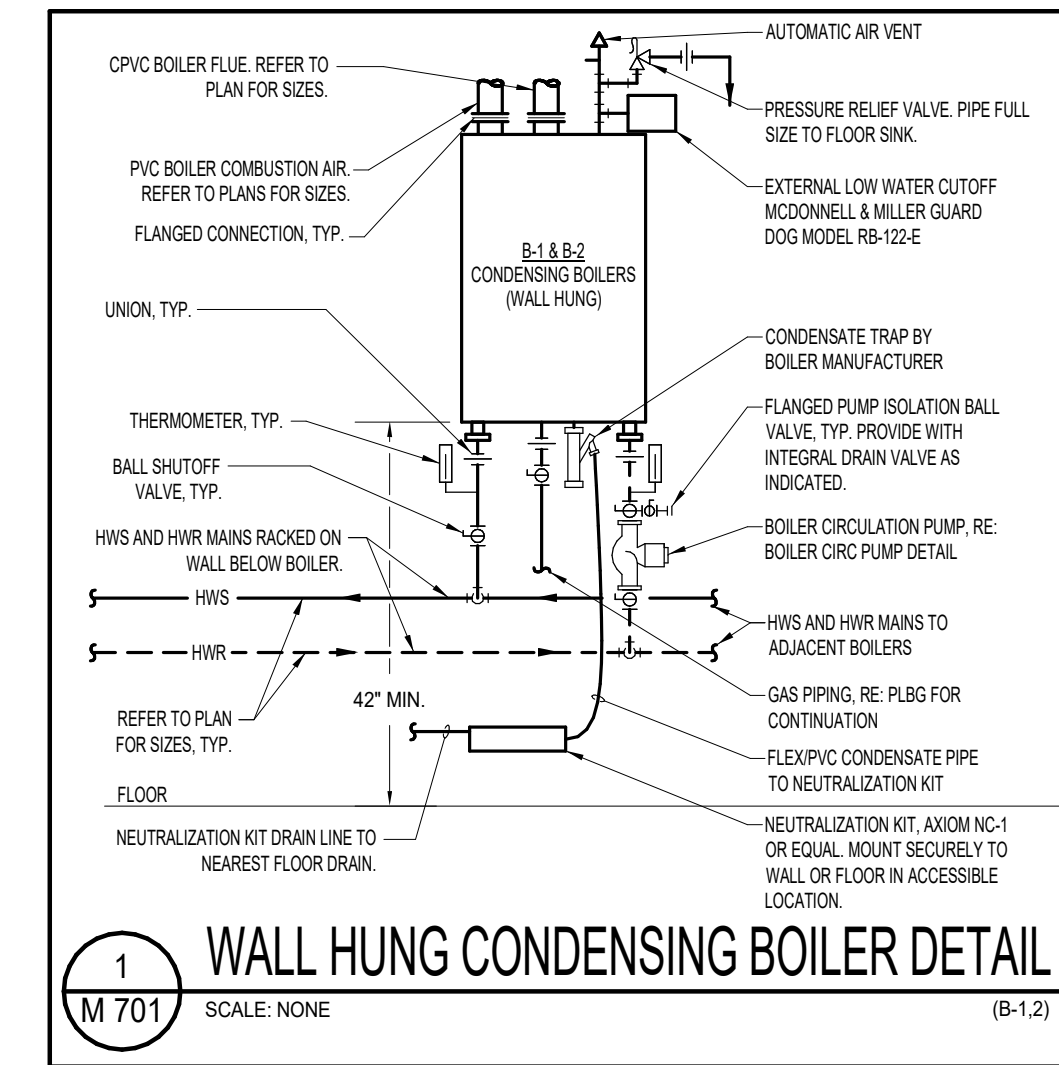
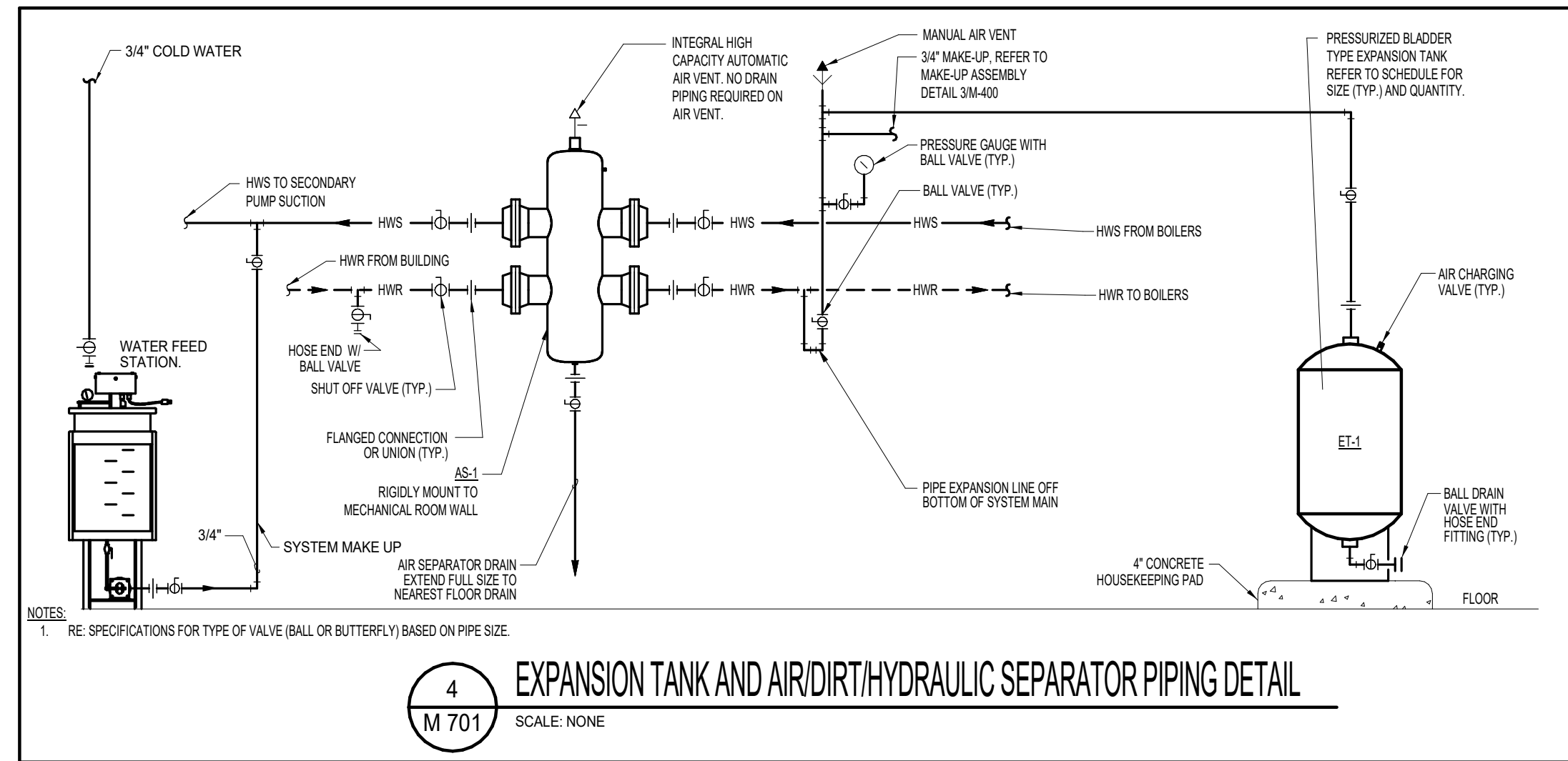
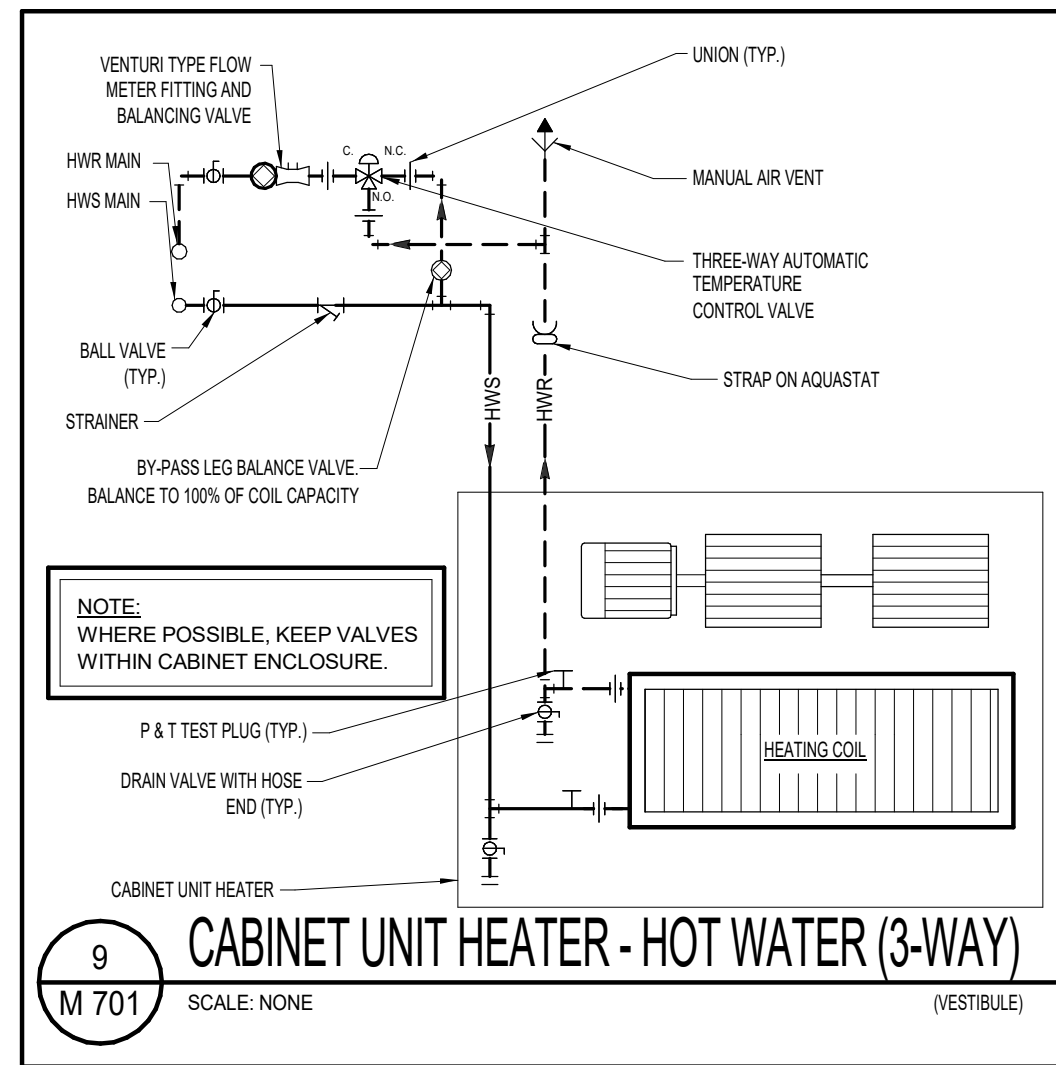
Issue Date
6/26/2019
8/29/2019
10/18/2019

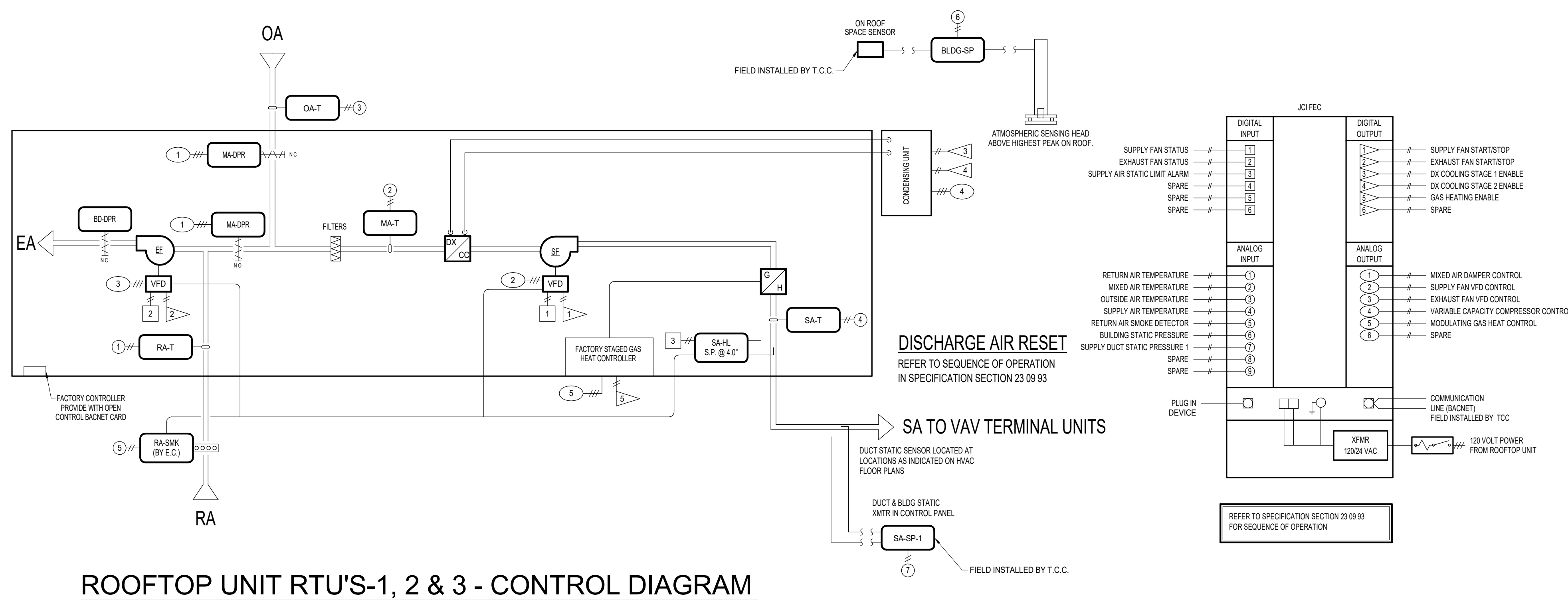
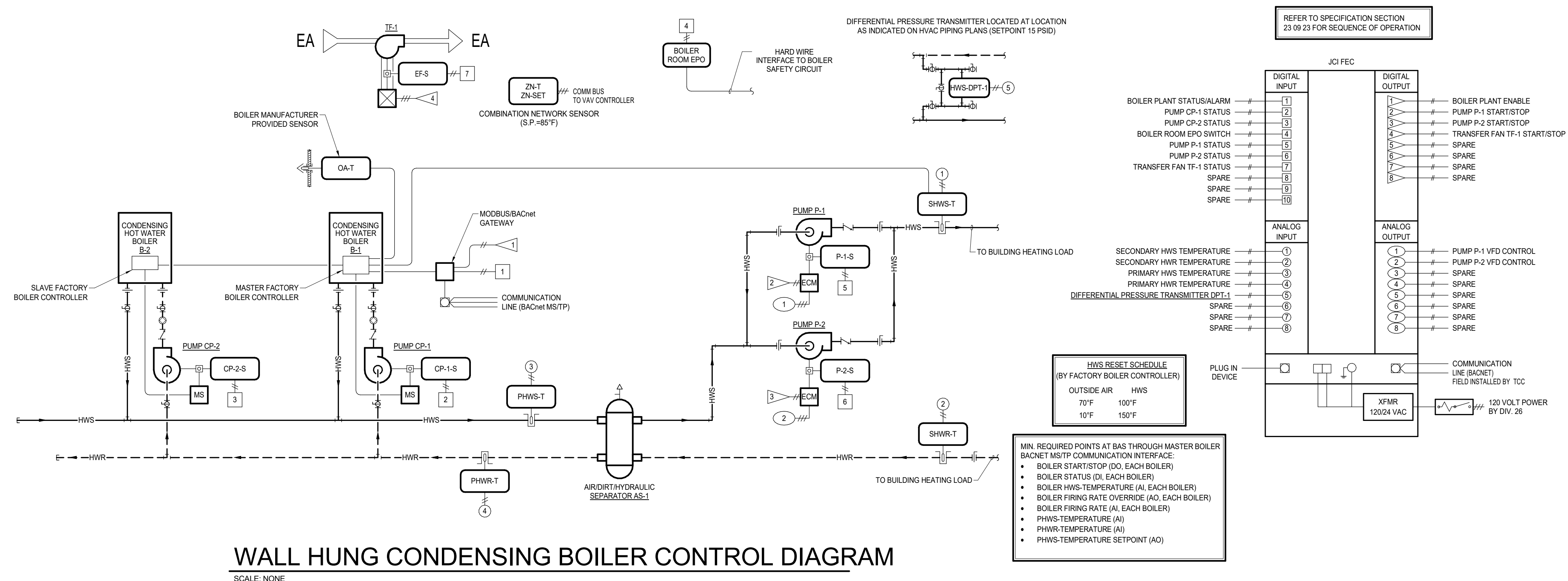
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Rev. # Description Date

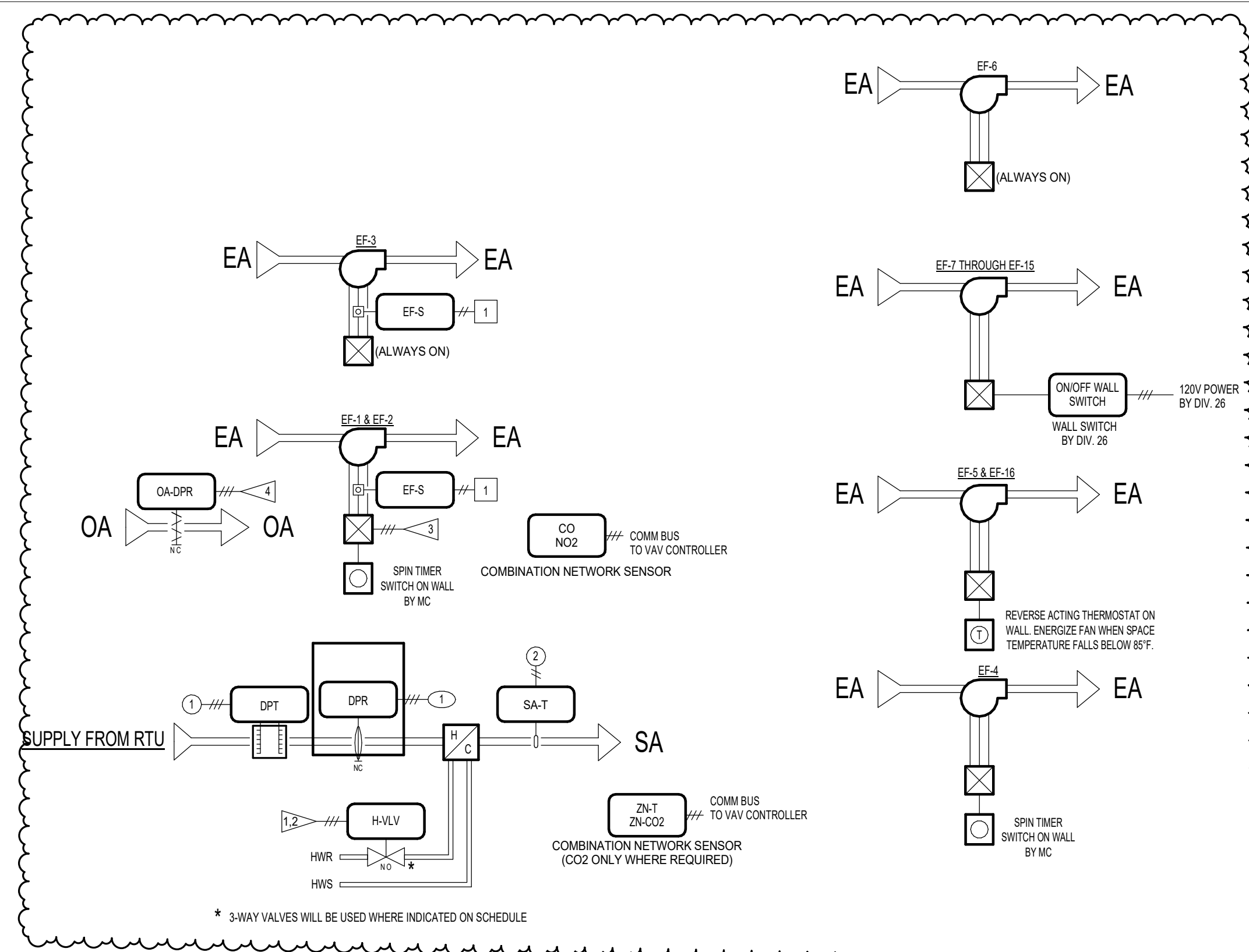
HVAC DETAILS

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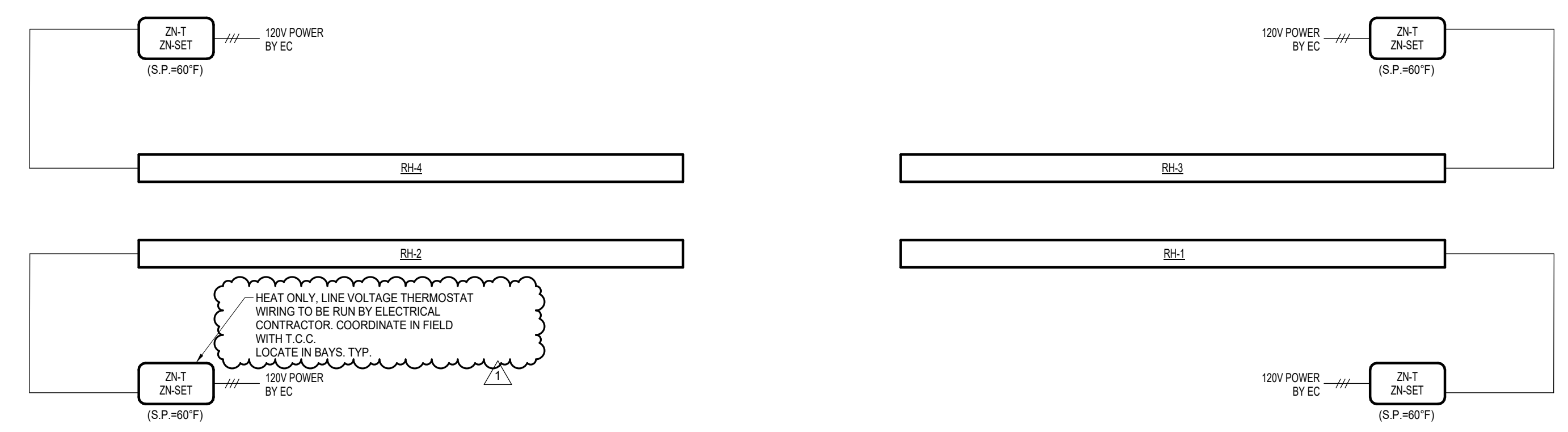
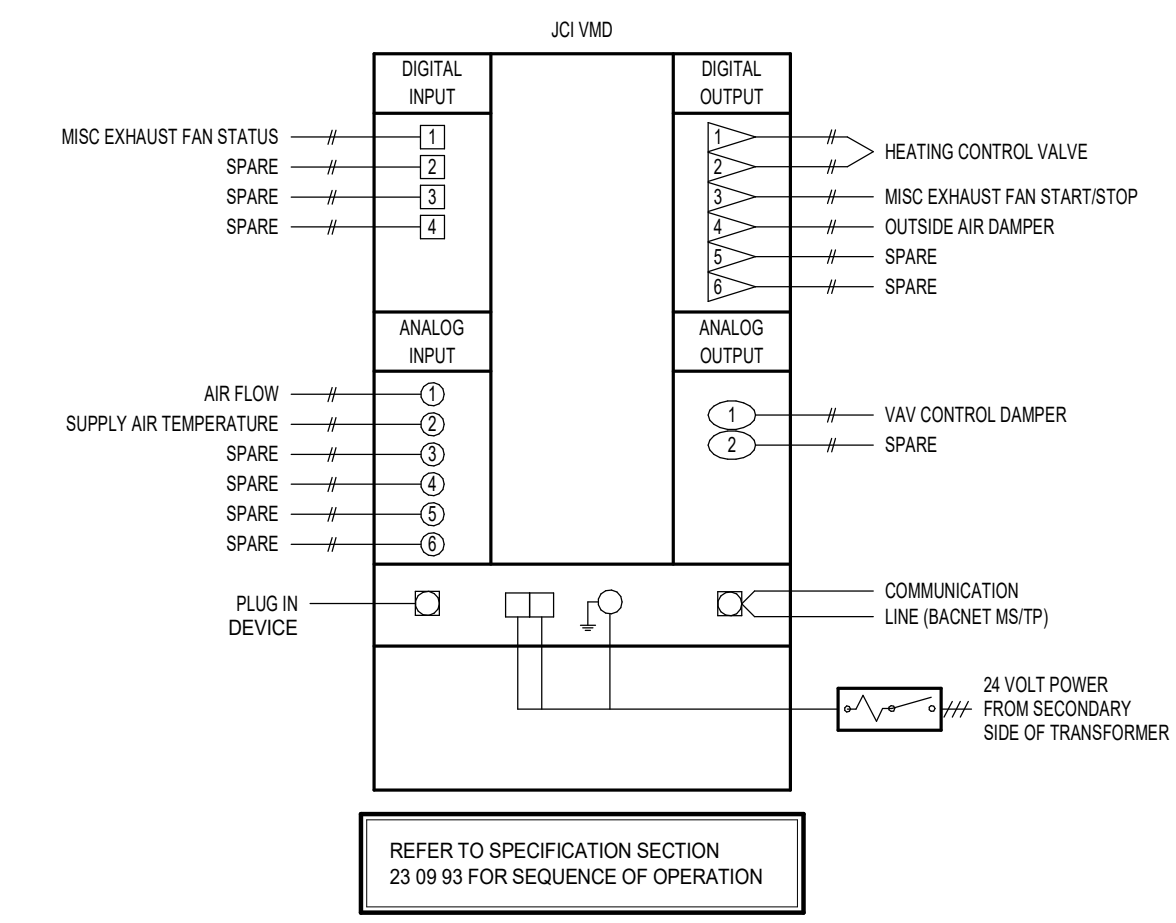




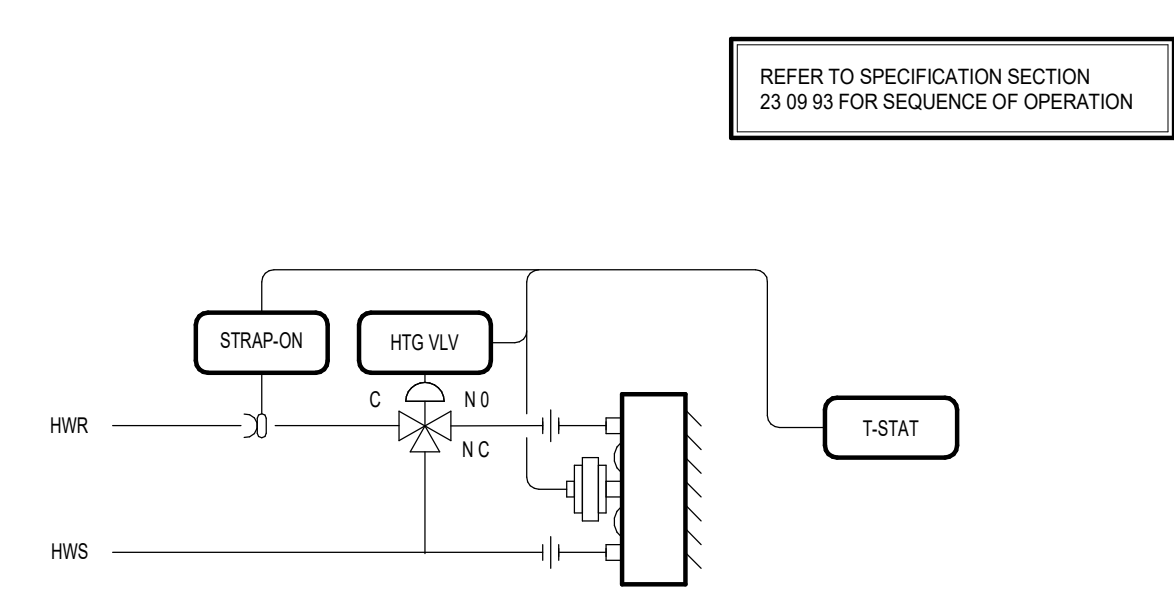




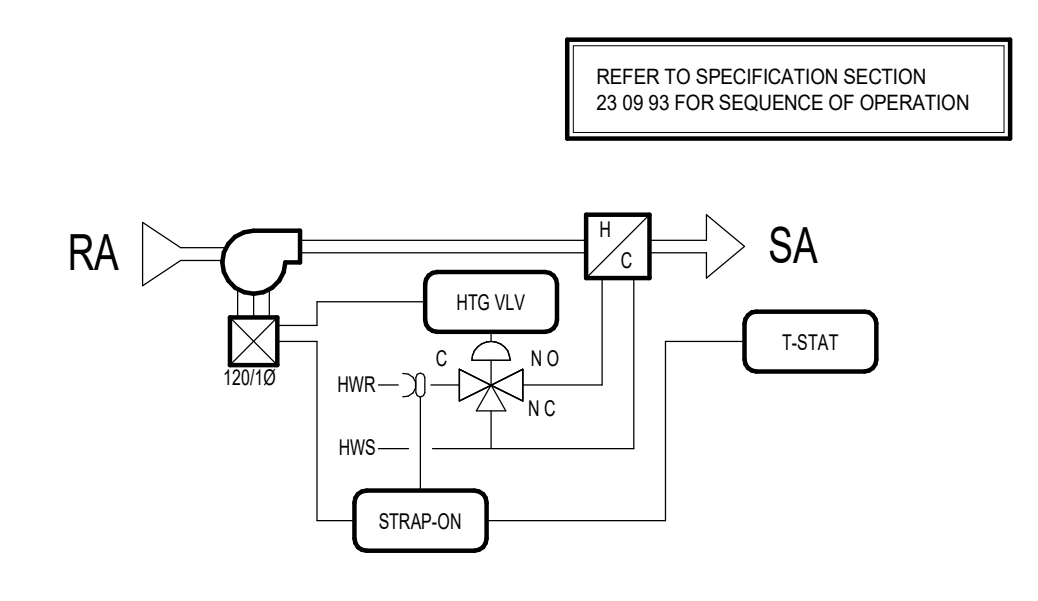
VAV TERMINAL AND MISCELLANEOUS EXHAUST FAN - CONTROL DIAGRAM
SCALE: NONE



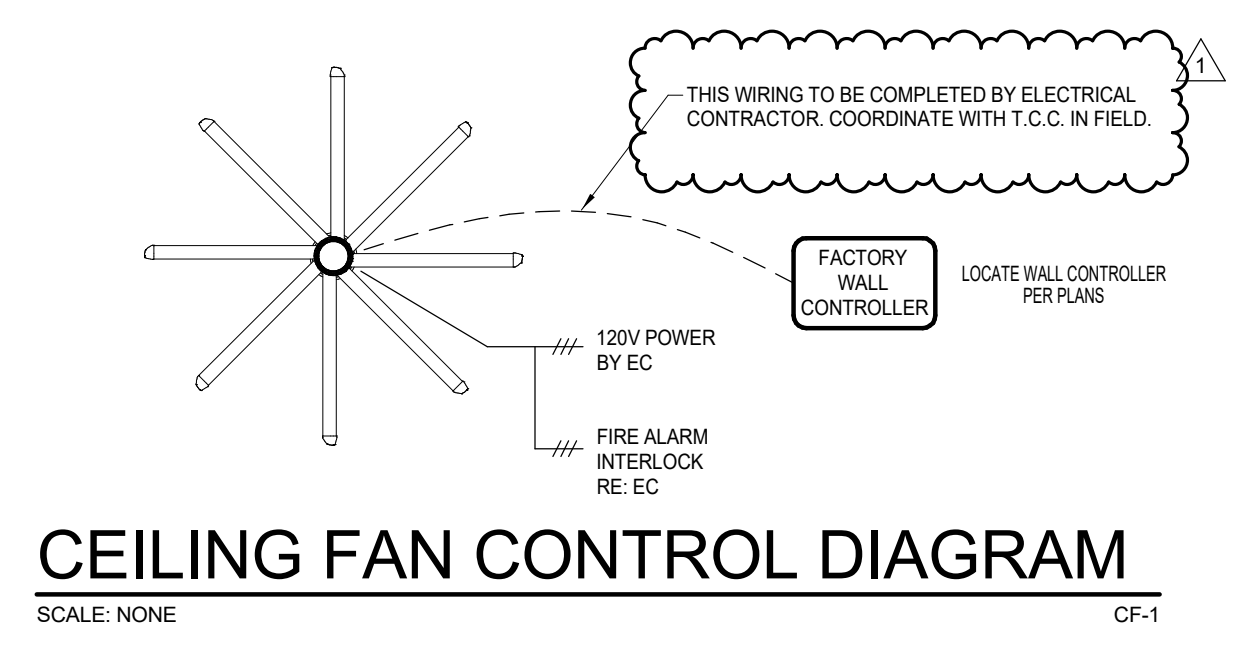
RADIANT HEAT CONTROL DIAGRAM
SCALE: NONE RH-1, RH-2, RH-3, RH-4



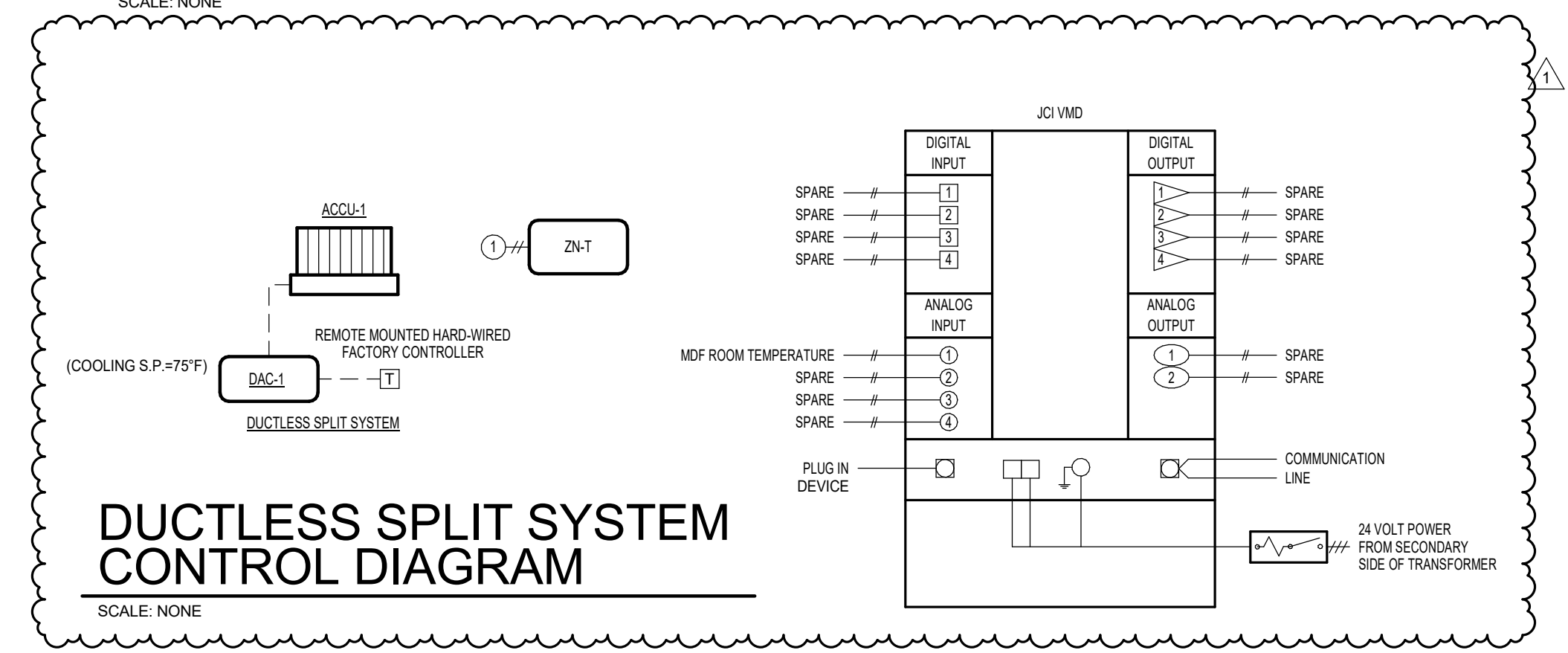
HYDRONIC UNIT HEATER CONTROL DIAGRAM
SCALE: NONE



CABINET UNIT HEATER CONTROL DIAGRAM
SCALE: NONE



CEILING FAN CONTROL DIAGRAM
SCALE: NONE CF-1



DUCTLESS SPLIT SYSTEM CONTROL DIAGRAM
SCALE: NONE



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City of Greeley
GREELEY FIRE STATION #2
2301 Reservoir Rd, Greeley, CO 80634

City of Greeley
Greeley

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Checked By	TVS
Drawn By	JJG
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100% DESIGN	10/18/2019

Rev. #	Description	Date
1	ADDENDUM 2	10/18/2019

HVAC CONTROL DIAGRAMS

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2015 IMC MINIMUM OUTDOOR AIR REQUIREMENTS - MULTIPLE ZONE

Project: GREELY FIRE STATION #2
Project #: 19054

SYSTEM: RTU-2
OPERATING MODE: HEATING

ROOM NAME	ROOM NO.	ZONE TAG	OCCUPANCY CATEGORY	FLOOR AREA (SF)	DESIGN POP.	OA/ PERSON (Rp)	OA/ SF (Ra)	AIR DISTRIBUTION TYPE	ZONE AIR DISTRIBUTION EFFECTIVENESS (Ez)	REQUIRED OA TO ZONE (CFM) (Voz)	SA TO ZONE (CFM) (Zpz)	PRIMARY OUTDOOR AIR FRACTION (Zpz)	ZONE VENT. EFF. (Evz)
LOBBY	101	VAV-2-1	Lobbies	395	59	5.0	0.06	CSCRH	0.8	399.9	1,950	0.21	0.98
EXAM	102	VAV-2-2	Office space	100	1	5.0	0.06	CSCRH	0.8	10.6	150	0.07	1.11
UNISEX	103	VAV-2-2	Corridors	90	0	0.0	0.06	CSCRH	0.8	6.8	50	0.14	1.05
PROGRAMS	104	VAV-2-2	Office space	105	1	5.0	0.06	CSCRH	0.8	11.2	125	0.09	1.09
LT	105	VAV-2-2	Office space	125	1	5.0	0.06	CSCRH	0.8	13.3	125	0.11	1.08
WATCHRM	129	VAV-2-3	Break rooms	185	5	5.0	0.06	CSCRH	0.8	42.8	125	0.34	0.84
RR	130	VAV-2-3	Corridors	85	0	0.0	0.06	CSCRH	0.8	6.4	50	0.13	1.06
DAYROOM	125	VAV-2-4	Dayroom	500	15	5.0	0.06	CSCRH	0.8	131.3	300	0.44	0.75
DINNING	126	VAV-2-4	Restaurant dining rooms	205	14	7.5	0.18	CSCRH	0.8	180.7	450	0.40	0.78
KITCHEN	115	VAV-2-5	Kitchen (cooking)	350	7	7.5	0.12	CSCRH	0.8	118.1	675	0.18	1.01

FLOOR AREA SERVED BY SYSTEM	(As)	2,140	sf
POPULATION OF SYSTEM	(Ps)	102	
OA REQ'D PER UNIT AREA FOR SYSTEM (AVG)	(Ras)	0.08	CFM
OA REQ'D PER PERSON FOR SYSTE AREA (AVG)	(Rps)	5.52	CFM
UNCORRECTED OUTDOOR AIR INTAKE	(Vou)	737	CFM
DESIGN PRIMARY SUPPLY FAN AIRFLOW	(Vps)	4,000	CFM

IMC TABLE 403.3.1.1.2.3.2:

MAX Zp		0.44
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.71

ASHRAE 62.1-2013 NORMATIVE APPENDIX A:

AVERAGE OUTDOOR AIR FRACTION	(Xs)	0.18
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.75

TOTAL REQUIRED OUTDOOR AIR INTAKE FLOW RATE*	(Vot)	987	CFM
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TOTAL OUTDOOR AIR PROVIDED		1,500	CFM
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*PER IMC 403.3.1.1.2.3.2, SYSTEM VENTILATION EFFICIENCY (Ev)

AS CALCULATED BY:

ASHRAE 62.1, APPENDIX A, PER FOOTNOTE 3 ON ASHRAE 62.1 TABLE 6.2.5.2

SYSTEM AVERAGE OUTDOOR AIR FRACTION Xs > 0.15

2015 IMC MINIMUM OUTDOOR AIR REQUIREMENTS - MULTIPLE ZONE

Project: GREELY FIRE STATION #2
Project #: 19054

SYSTEM: RTU-1
OPERATING MODE: HEATING

ROOM NAME	ROOM NO.	ZONE TAG	OCCUPANCY CATEGORY	FLOOR AREA (SF)	DESIGN POP.	OA/ PERSON (Rp)	OA/ SF (Ra)	AIR DISTRIBUTION TYPE	ZONE AIR DISTRIBUTION EFFECTIVENESS (Ez)	REQUIRED OA TO ZONE (CFM) (Voz)	SA TO ZONE (CFM) (Zpz)	PRIMARY OUTDOOR AIR FRACTION (Zpz)	ZONE VENT. EFF. (Evz)
BUNK	107	VAV-1-1	Bedroom/living room	165	2	5.0	0.06	CSCRH	0.8	22.7	350	0.06	1.00
BUNK	108	VAV-1-2	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	300	0.07	1.00
BUNK	109	VAV-1-3	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	300	0.07	1.00
BUNK	110	VAV-1-4	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	300	0.07	1.00
BUNK	111	VAV-1-5	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	300	0.07	1.00
BUNK	112	VAV-1-6	Bedroom/living room	165	2	5.0	0.06	CSCRH	0.8	22.7	400	0.06	1.01
BUNK	114	VAV-1-7	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	275	0.08	0.99
BUNK	115	VAV-1-8	Bedroom/living room	160	2	5.0	0.06	CSCRH	0.8	22.0	275	0.08	0.99
LAUNDRY	116	VAV-1-9	Laundry rooms, central	100	1	5.0	0.12	CSCRH	0.8	21.3	275	0.08	0.99
BATHROOM	117	VAV-1-9	Corridors	100	0	0.0	0.06	CSCRH	0.8	7.5	50	0.15	0.92
BATHROOM	118	VAV-1-9	Corridors	85	0	0.0	0.06	CSCRH	0.8	6.4	50	0.13	0.94
BATHROOM	119	VAV-1-9	Corridors	85	0	0.0	0.06	CSCRH	0.8	6.4	50	0.13	0.94
ADA BATHROOM	120	VAV-1-9	Corridors	110	0	0.0	0.06	CSCRH	0.8	8.3	50	0.17	0.90
CORRIDOR	129	VAV-1-9	Corridors	390	0	0.0	0.06	CSCRH	0.8	29.3	125	0.23	0.84
CORRIDOR	145	VAV-1-9	Corridors	290	0	0.0	0.06	CSCRH	0.8	21.8	125	0.17	0.90
STORAGE	182	VAV-1-9	Storage rooms	50	0	0.0	0.12	CSCRH	0.8	7.5	50	0.15	0.92

FLOOR AREA SERVED BY SYSTEM	(As)	2,500	sf
POPULATION OF SYSTEM	(Ps)	14	
OA REQ'D PER UNIT AREA FOR SYSTEM (AVG)	(Ras)	0.06	CFM
OA REQ'D PER PERSON FOR SYSTE AREA (AVG)	(Rps)	5.00	CFM
UNCORRECTED OUTDOOR AIR INTAKE	(Vou)	229	CFM
DESIGN PRIMARY SUPPLY FAN AIRFLOW	(Vps)	3,275	CFM

IMC TABLE 403.3.1.1.2.3.2:

MAX Zp		0.23
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.92

ASHRAE 62.1-2013 NORMATIVE APPENDIX A:

AVERAGE OUTDOOR AIR FRACTION	(Xs)	0.07
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.84

TOTAL REQUIRED OUTDOOR AIR INTAKE FLOW RATE*	(Vot)	249	CFM
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TOTAL OUTDOOR AIR PROVIDED		650	CFM
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*PER IMC 403.3.1.1.2.3.2, SYSTEM VENTILATION EFFICIENCY (Ev)

AS CALCULATED BY:

IMC, TABLE 403.3.1.1.2.3.2



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City of Greeley
GREELY FIRE STATION #2
2301 Reservoir Rd, Greeley, CO 80634



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Checked By: TWS
Drawn By: JJS

Project Status: 30% DESIGN 6/26/2019
75% DESIGN 8/29/2019
100% DESIGN 10/18/2019

Revision Issue
Rev. # Description Date

HVAC OUTSIDE AIR CALCULATIONS

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2015 IMC MINIMUM OUTDOOR AIR REQUIREMENTS - MULTIPLE ZONE

Project: GREELY FIRE STATION #2
 Project #: 19054

SYSTEM: RTU-3
 OPERATING MODE: HEATING

ROOM NAME	ROOM NO.	ZONE TAG	OCCUPANCY CATEGORY	FLOOR AREA (SF)	DESIGN POP.	OA/ PERSON (Rp)	OA/ SF (Ra)	AIR DISTRIBUTION TYPE	ZONE AIR DISTRIBUTION EFFECTIVENESS (Ez)	REQUIRED OA TO ZONE (CFM) (Voz)	SA TO ZONE (CFM) (CFM)	PRIMARY OUTDOOR AIR FRACTION (Zpz)	ZONE VENT. EFF. (Evz)
FITNESS RM	203	VAV-3-1	Health club/weight rooms	865	9	20.0	0.06	CSCRH	0.8	281.1	1,650	0.17	0.98
BATHROOM	201	VAV-3-1	Corridors	75	0	0.0	0.06	CSCRH	0.8	5.6	50	0.11	1.04
DECON	142	VAV-3-2	Laundry rooms, central	145	1	5.0	0.12	CSCRH	0.8	30.8	200	0.15	1.00
PPE STOR	141	VAV-3-2	Storage rooms	290	0	0.0	0.12	CSCRH	0.8	43.5	275	0.16	1.00
COMP	140	VAV-3-3	Storage rooms	135	0	0.0	0.12	CSCRH	0.8	20.3	75	0.27	0.88
SCBA	138	VAV-3-3	Storage rooms	100	0	0.0	0.12	CSCRH	0.8	15.0	75	0.20	0.95
WORKSHOP	137	VAV-3-3	Wood/metal shop	195	4	10.0	0.18	CSCRH	0.8	92.6	200	0.46	0.69

FLOOR AREA SERVED BY SYSTEM	(As)	1,805	sf
POPULATION OF SYSTEM	(Ps)	14	
OA REQ'D PER UNIT AREA FOR SYSTEM (AVG)	(Ras)	0.10	CFM
OA REQ'D PER PERSON FOR SYSTE AREA (AVG)	(Rps)	15.66	CFM
UNCORRECTED OUTDOOR AIR INTAKE	(Vou)	391	CFM
DESIGN PRIMARY SUPPLY FAN AIRFLOW	(Vps)	2,525	CFM

IMC TABLE 403.3.1.1.2.3.2:

MAX Zp	(Ev)	0.46
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.69

*PER IMC 403.3.1.1.2.3.2, SYSTEM VENTILATION EFFICIENCY (Ev)
 AS CALCULATED BY:
 ASHRAE 62.1, APPENDIX A, PER FOOTNOTE 3 ON ASHRAE 62.1 TABLE 6.2.5.2

ASHRAE 62.1-2013 NORMATIVE APPENDIX A:

AVERAGE OUTDOOR AIR FRACTION	(Xs)	0.15
SYSTEM VENTILATION EFFICIENCY	(Ev)	0.69

TOTAL REQUIRED OUTDOOR AIR INTAKE FLOW RATE*	(Vot)	565	CFM
TOTAL OUTDOOR AIR PROVIDED		900	CFM

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HVAC OUTSIDE AIR CALCULATIONS

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