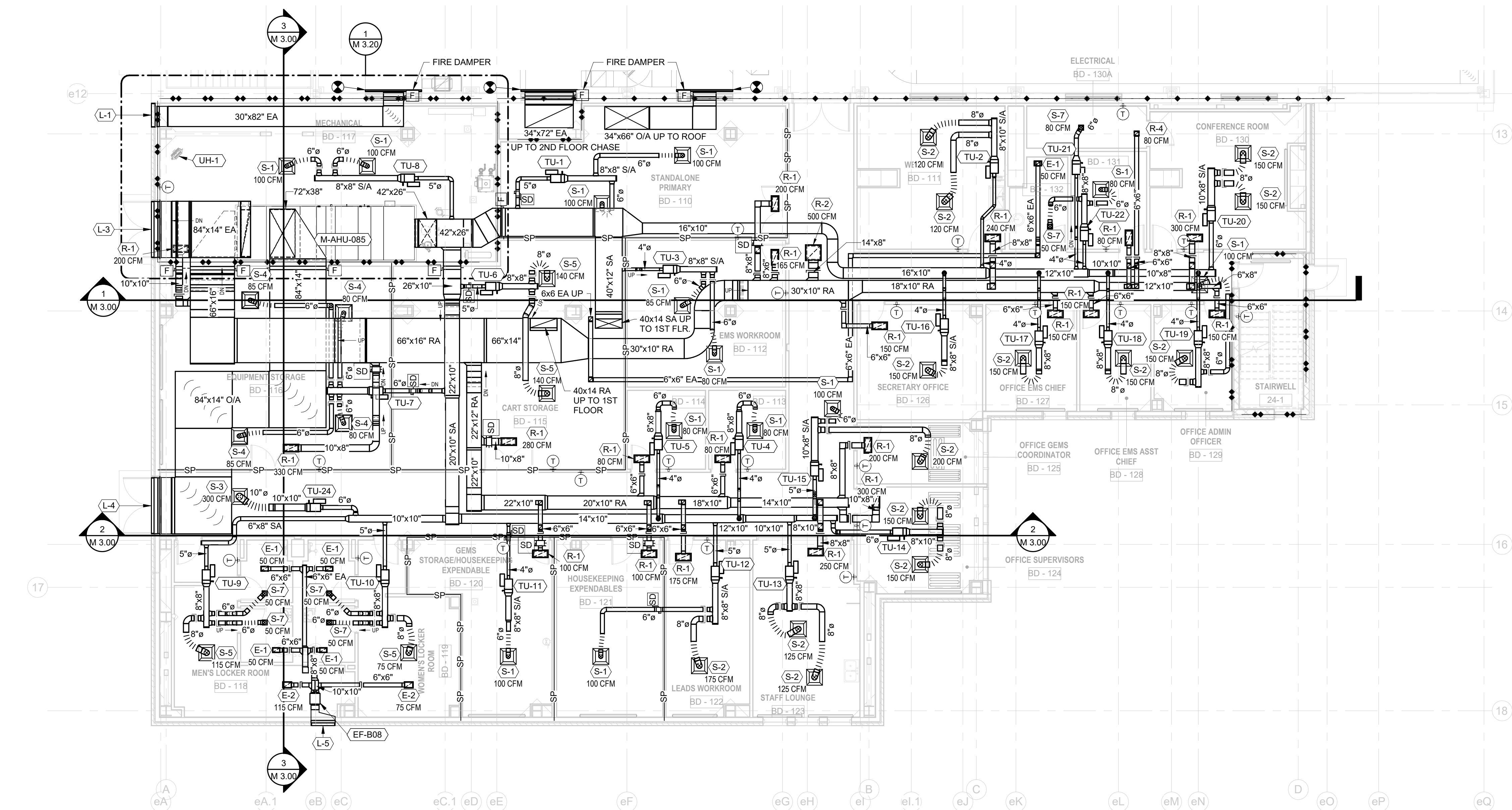


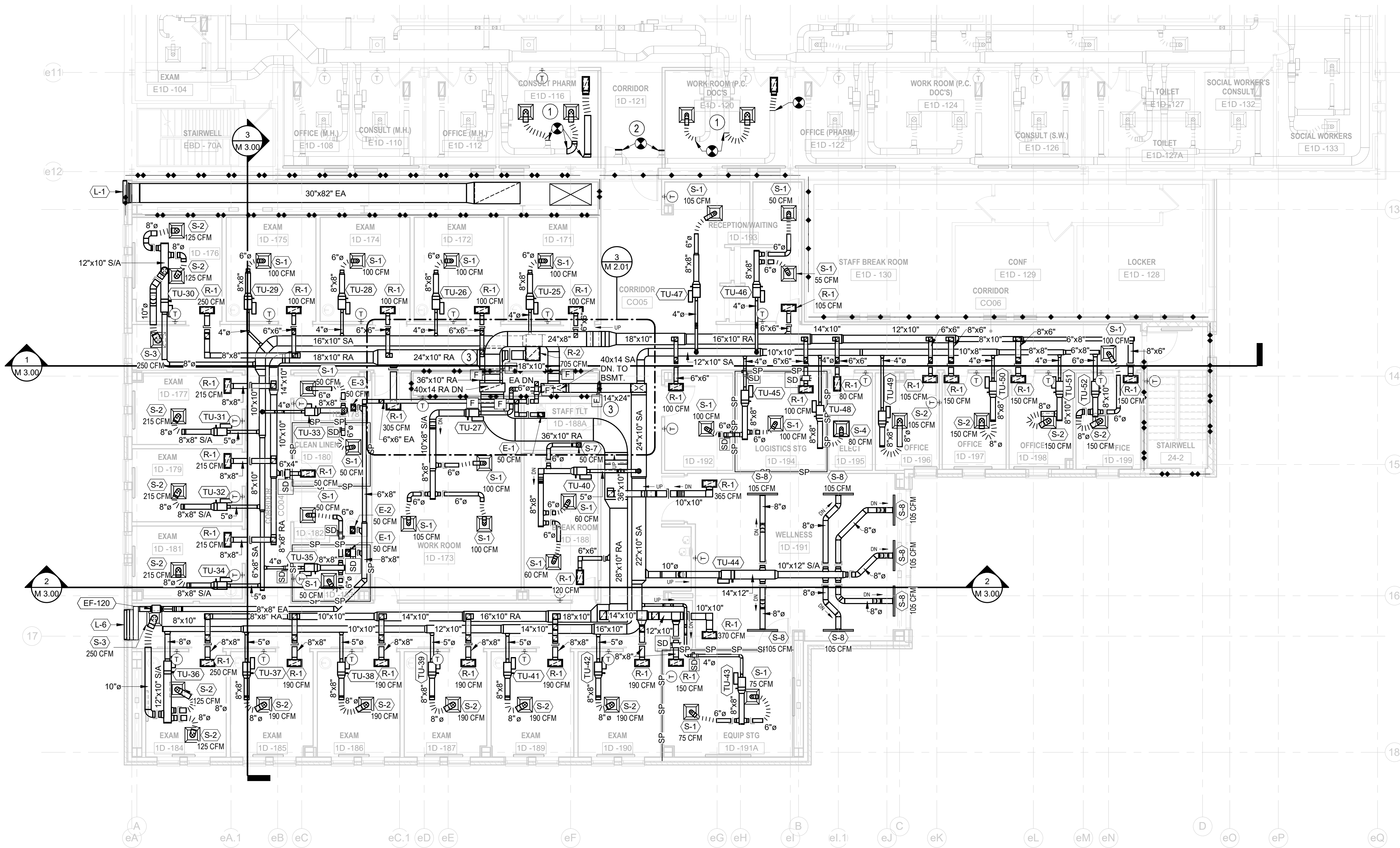
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one eighth inch = one foot  
one quarter inch = one foot  
three eighths inch = one foot  
one half inch = one foot  
three quarters inch = one foot  
one and one half inches = one foot  
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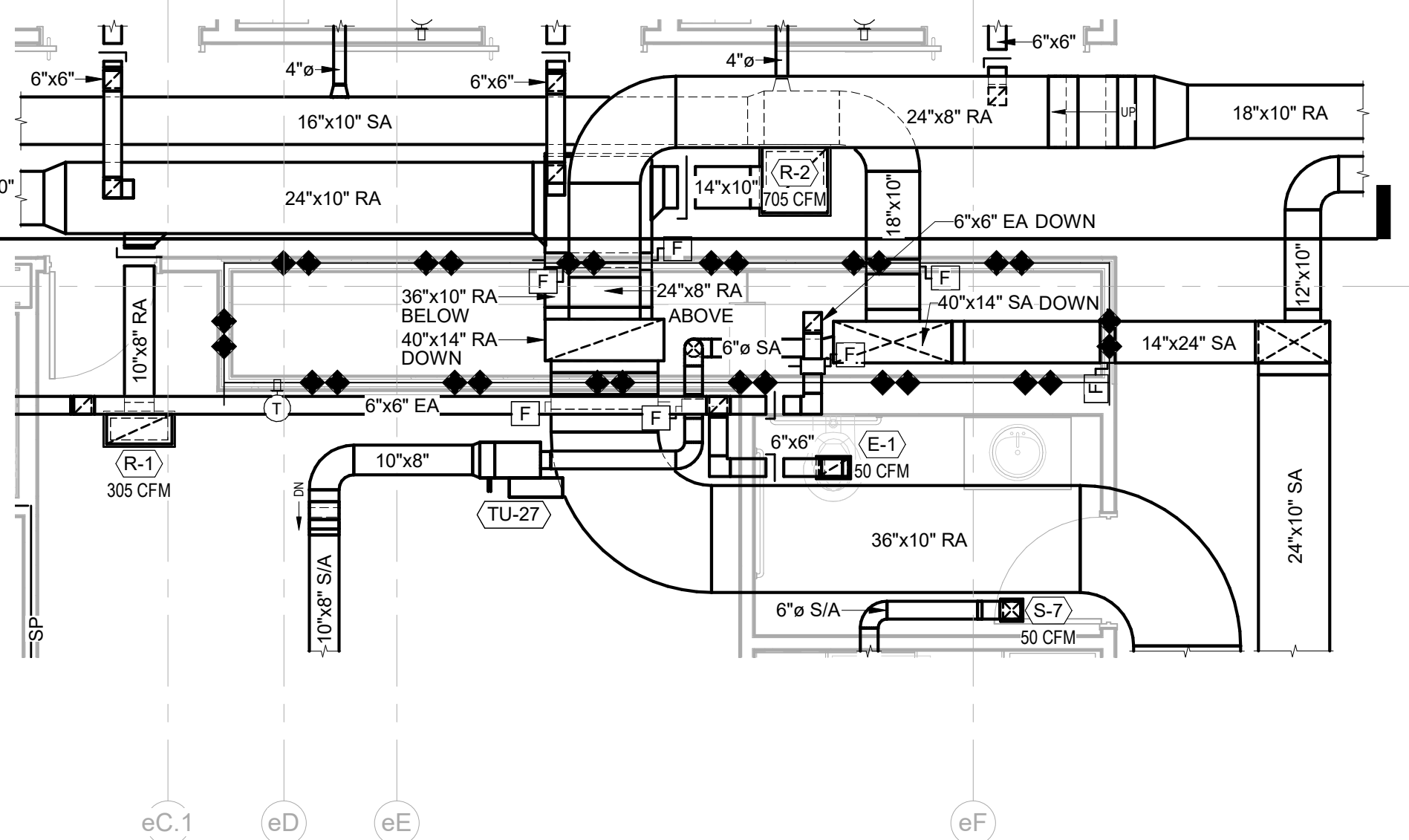


SPECIFIC NOTES

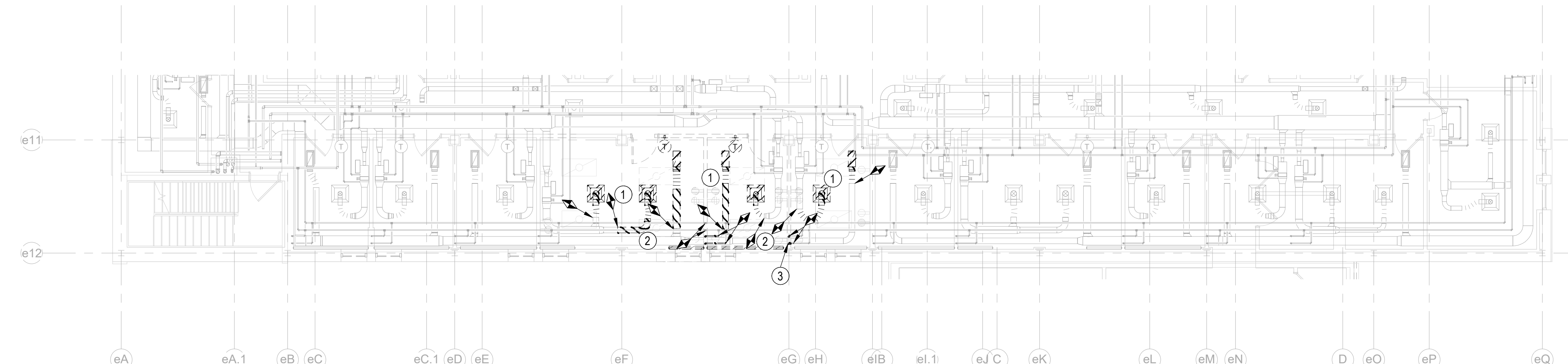
- RELOCATE EXISTING CEILING DIFFUSERS AND DUCTS AS SHOWN. RECONNECT TO EXISTING TU'S (VAV'S).
- CAP OPEN DUCTS.
- LOCATE MECHANICAL CHASE FIRE DAMPERS ABOVE ACT IN AN ACCESSIBLE / MAINTAINABLE LOCATION.



1 FIRST FLOOR HVAC PLAN  
1/8" = 1'-0"



3 ENLARGED HVAC PLAN AT CHASE  
1/4" = 1'-0"



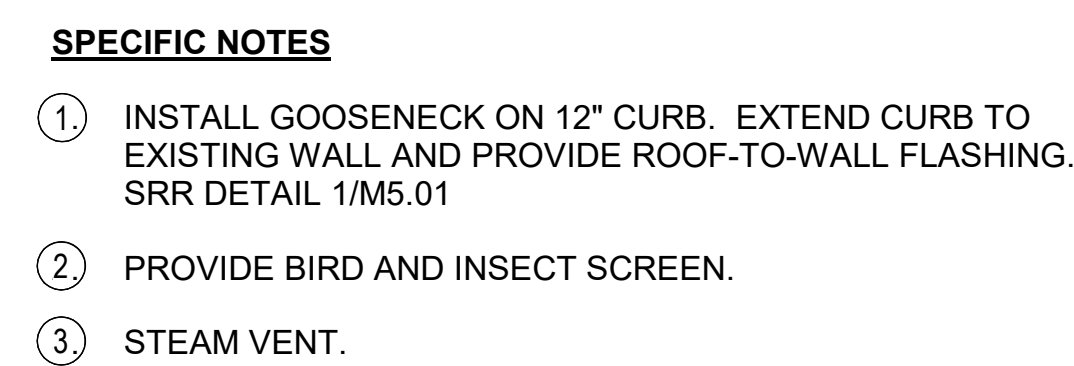
2 FIRST FLOOR MECHANICAL DEMOLITION PLAN  
1/8" = 1'-0"

DEMOLITION NOTES

- CAREFULLY REMOVE EXISTING DIFFUSERS AND DUCTS AS SHOWN FOR RE-INSTALLATION IN NEW CEILINGS. SEE REMODEL PLAN ABOVE AND ARCHITECTURAL PLANS.
- REMOVE EXISTING FIN-TUBE RADIATORS IN PATH OF NEW WALLS AND CORRIDOR. DEMOLISH PIPING BACK TO MAINS IN CEILING AND CAP AT MAINS. SEE ARCHITECTURAL PLANS FOR LIMITS OF REMODEL IN EXISTING BUILDING. SEAL HOLES AND PATCH FINISHES.
- REROUTE PIPING IN DEMOLISHED WALL AS NEEDED AND RECONNECT TO EXISTING FIN-TUBE RADIATOR.

CONSTRUCTION DOCUMENTS

		CONSULTANTS:				ARCHITECT		Drawing Title		Project Title		Project Number		Office of Construction and Facilities Management  Department of Veterans Affairs			
		 CALIBRE 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH, COLORADO 80129 PHONE (303) 730-0434		 Albertson Engineering Inc.		 FOURFRONT DESIGN INC.		First Floor HVAC Plan		EXPAND BLDG. 1 FOR PRIMARY CARE		437-315					
								Approved: Project Director		Location 2101 ELM STREET FARGO, ND 58102		Building Number 1					
		 SUMMIT FIRE PROTECTION		SUMMIT FIRE CONSULTING 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050				FARGO VAHCS		Date 11 / 16 / 2021		Checked MK				Drawing Number M 2.01	
Revisions:		Date										Drawn JB				Dwg. 107 of 128	



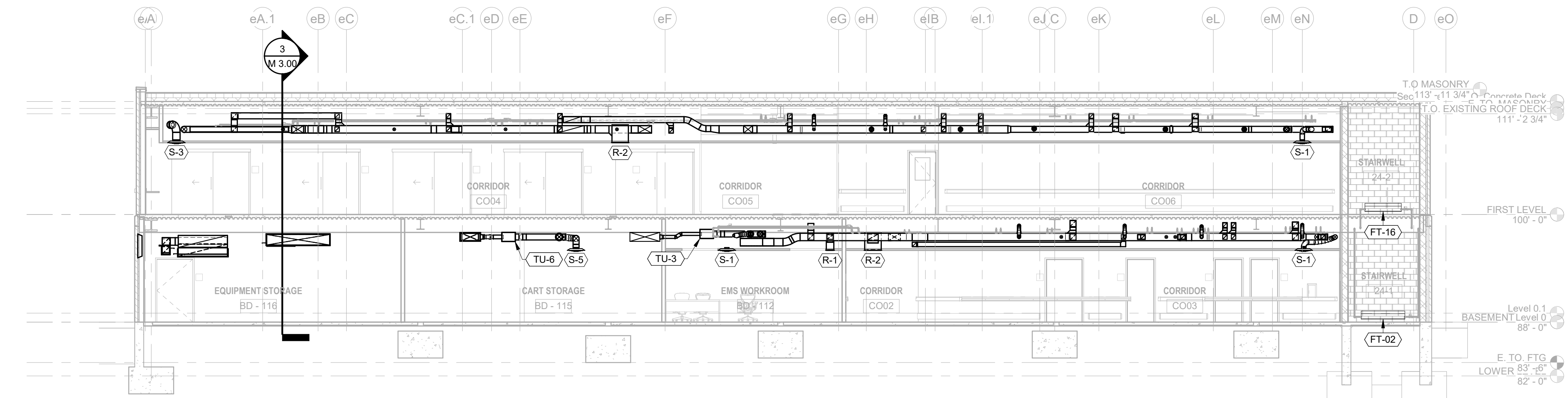
CONSTRUCTION DOCUMENTS

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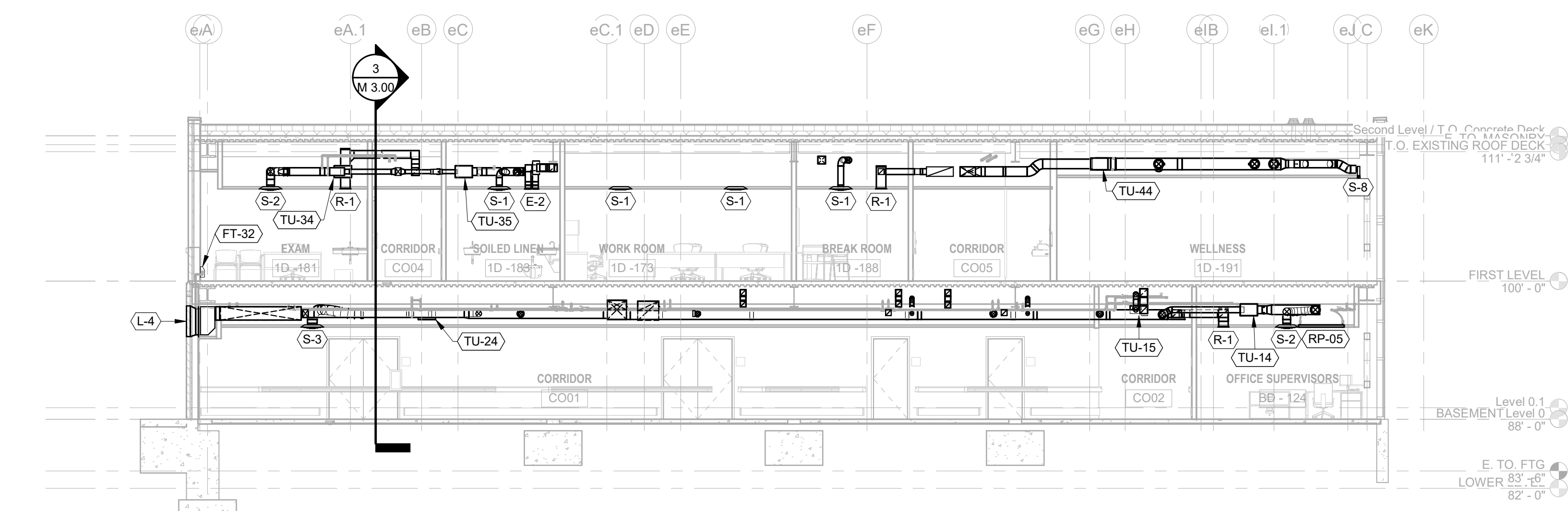


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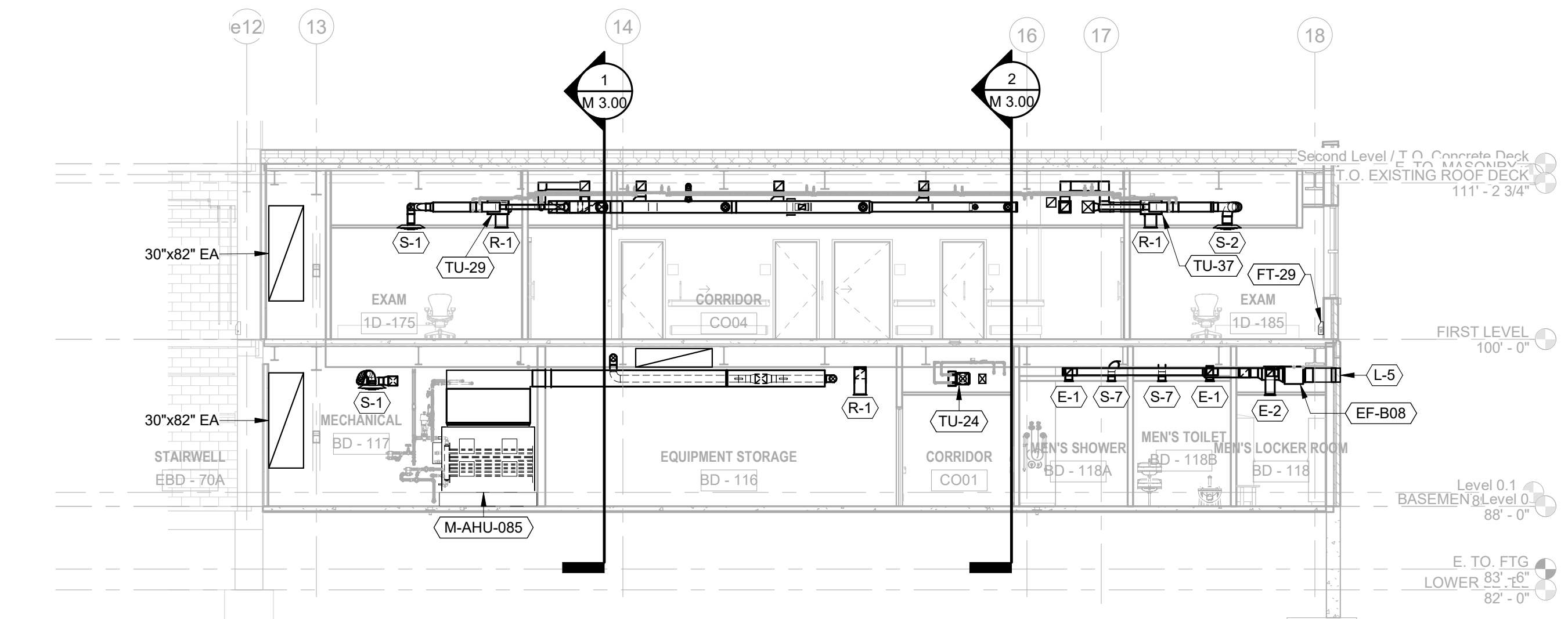
one eighth inch = one foot  
one quarter inch = one foot  
three eighths inch = one foot  
one half inch = one foot  
three quarters inch = one foot  
one inch = one foot  
one and one half inches = one foot  
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three inches = one foot  
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eight inches = one foot  
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ninety two inches = one foot  
ninety three inches = one foot  
ninety four inches = one foot  
ninety five inches = one foot  
ninety six inches = one foot  
ninety seven inches = one foot  
ninety eight inches = one foot  
ninety nine inches = one foot  
one hundred inches = one foot



Section 100  
1/8" = 1'-0"



Section 101  
1/8" = 1'-0"



Section 102  
1/8" = 1'-0"

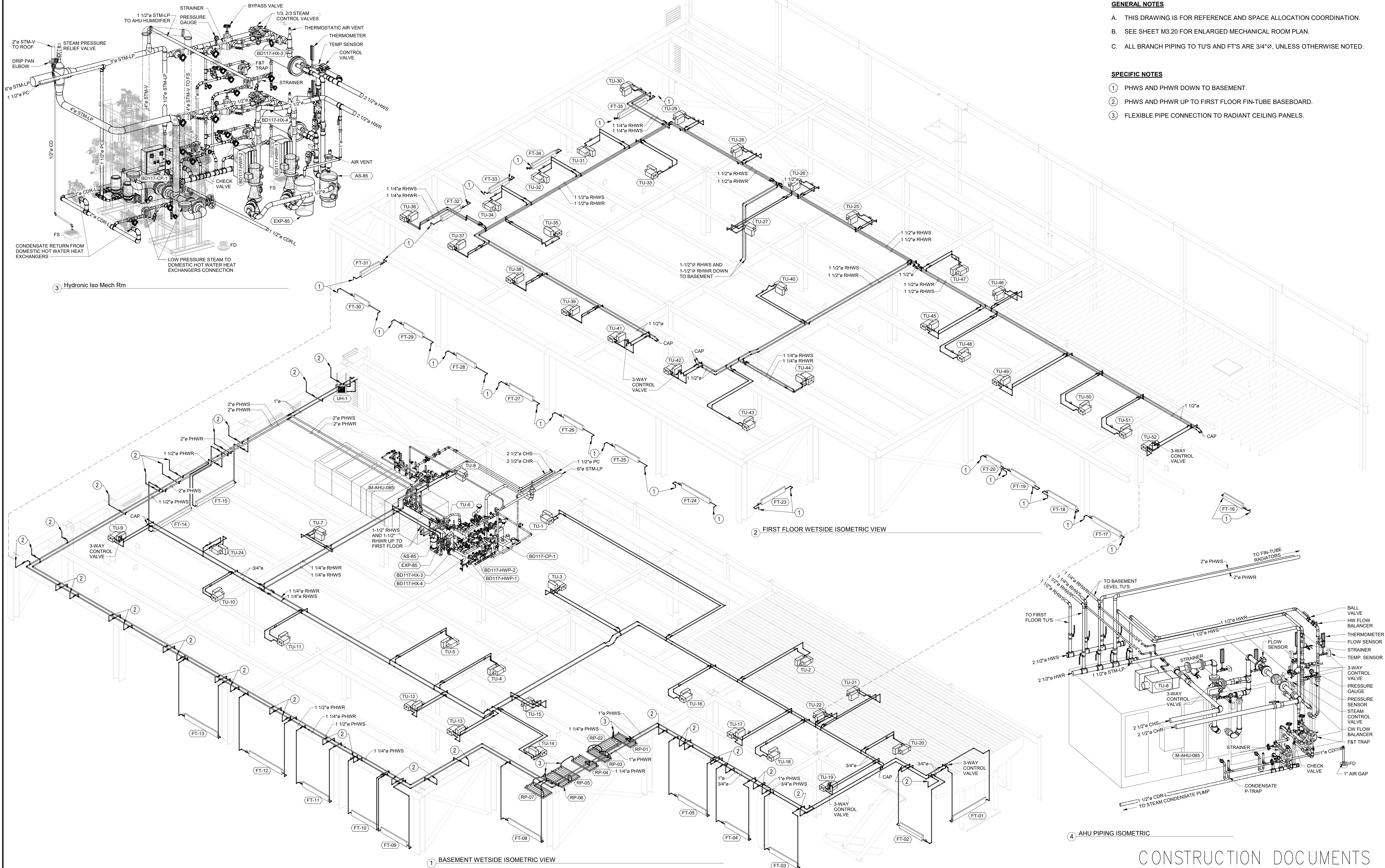
# CONSTRUCTION DOCUMENTS

		CONSULTANTS:				ARCHITECT		Drawing Title		Project Title		Project Number		Office of Construction and Facilities Management					
		Calibre 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH, COLORADO 80129 PHONE (303) 730-0434		Albertson Engineering Inc.		ALBERTSON ENGINEERING, INC. 315 NORTH MAIN AVENUE, SUITE 200 SIOUX FALLS, SOUTH DAKOTA 57104 PH: (605) 274-0880		Mechanical Sections		EXPAND BLDG. 1 FOR PRIMARY CARE		437-315							
		Summit Fire Consulting 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050		SUMMIT FIRE CONSULTING		FOURFRONT DESIGN, INC. 517 7TH STREET RAPID CITY, SOUTH DAKOTA 57701 PH: (605) 342-9470 FAX: (605) 342-2377 WWW.FOURFRONTDESIGN.COM		Approved: Project Director FARGO VAHCS		Location 2101 ELM STREET FARGO, ND 58102		Drawing Number M 3.00							
Revisions:		Date								Date 11 / 16 / 2021		Checked MK		Drawn JB		Dwg. 109 of 128		Department of Veterans Affairs	

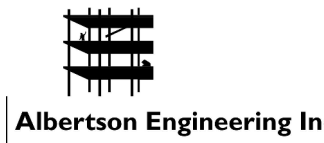










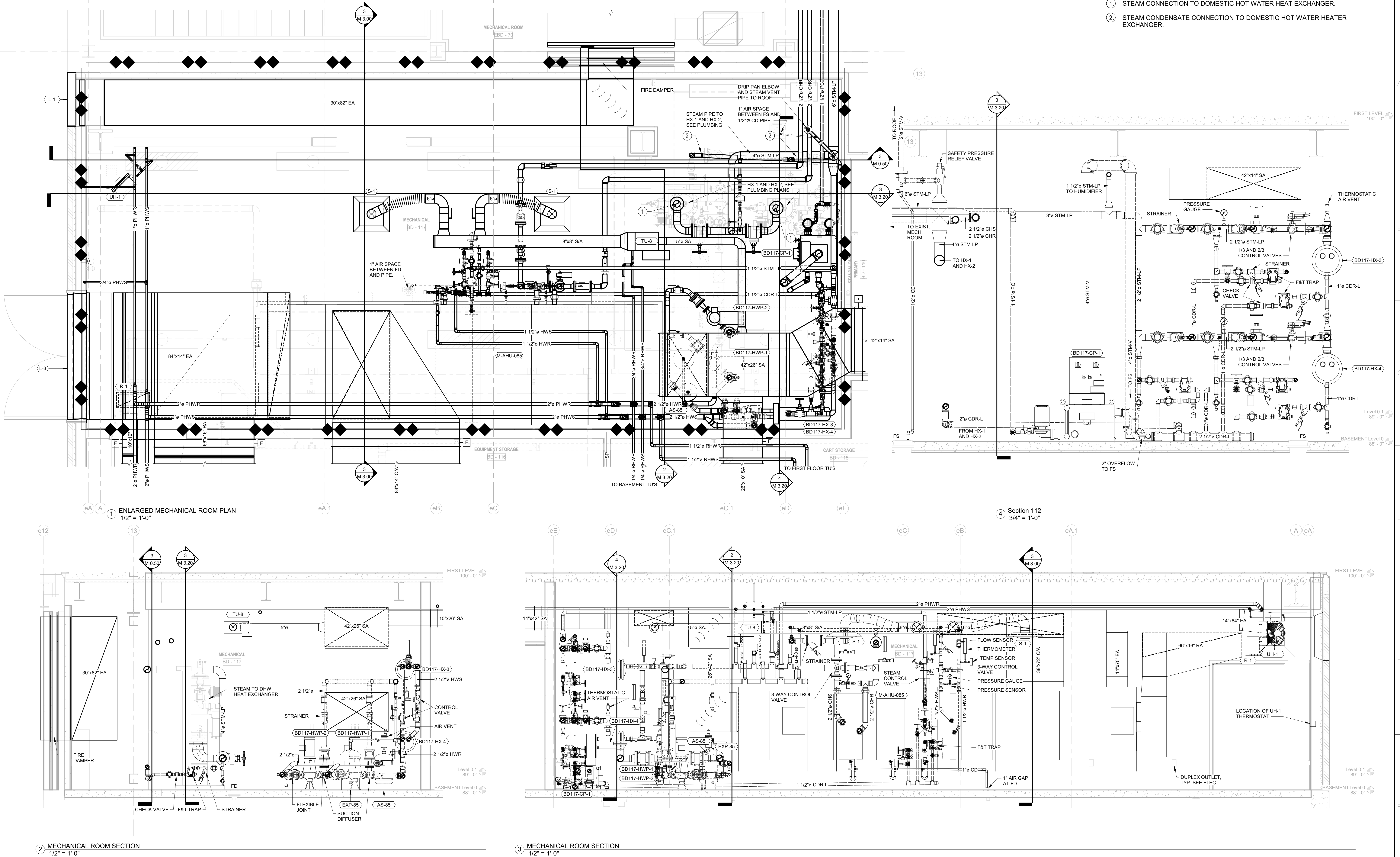
- GENERAL NOTES**
- A. THIS DRAWING IS FOR REFERENCE AND SPACE ALLOCATION COORDINATION.
  - B. SEE SHEET M3.20 FOR ENLARGED MECHANICAL ROOM PLAN.
  - C. ALL BRANCH PIPING TO TU'S AND FT'S ARE 3/4"Ø, UNLESS OTHERWISE NOTED.
- SPECIFIC NOTES**
- ① PHWS AND PHWR DOWN TO BASEMENT.
  - ② PHWS AND PHWR UP TO FIRST FLOOR FIN-TUBE BASEBOARD.
  - ③ FLEXIBLE PIPE CONNECTION TO RADIANT CEILING PANELS.

<b>CONSULTANTS:</b> <b>-Calibre</b> CALIBRE 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH, COLORADO 80129 PHONE (303) 730-0434  ALBERTSON ENGINEERING, INC. 315 NORTH MAIN AVENUE, SUITE 200 SIOUX FALLS, SOUTH DAKOTA 57104 PH: (605) 274-0880  SUMMIT FIRE CONSULTING 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050			<b>ARCHITECT</b>  FOURFRONT DESIGN, INC. 517 7TH STREET RAPID CITY, SOUTH DAKOTA 57701 PH: (605) 342-9470 FAX: (605) 342-2377 WWW.FOURFRONTDESIGN.COM	<b>Drawing Title</b> Hydronic Piping Isometric Views  <b>Approved: Project Director</b> FARGO VAHCS	<b>Project Title</b> EXPAND BLDG. 1 FOR PRIMARY CARE  <b>Location</b> 2101 ELM STREET FARGO, ND 58102  <b>Date</b> 11 / 16 / 2021 <b>Checked</b> MK <b>Drawn</b> JB	<b>Project Number</b> 437-315 <b>Building Number</b> 1  <b>Drawing Number</b> M 3.11 <b>Dwg.</b> 111 of 128	<b>Office of Construction and Facilities Management</b> 
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SPECIFIC NOTES

- 1 STEAM CONNECTION TO DOMESTIC HOT WATER HEAT EXCHANGER.  
2 STEAM CONDENSATE CONNECTION TO DOMESTIC HOT WATER HEATER EXCHANGER.



CONSTRUCTION DOCUMENTS

<p>11/16/2021 1:09:50 AM</p>		<p>Revisions:</p>		<p>Date</p>	
<p>CONSULTANTS:</p>					
<p><b>-Calibre</b></p>		<p>CALIBRE 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH, COLORADO 80129 PHONE (303) 730-0434</p>		<p><b>Albertson Engineering Inc.</b></p>	
<p>ALBERTSON ENGINEERING, INC. 315 NORTH MAIN AVENUE, SUITE 200 SIOUX FALLS, SOUTH DAKOTA 57104 PH: (605) 274-0880</p>		<p>SUMMIT FIRE CONSULTING 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050</p>			
<p><b>ARCHITECT</b></p>		<p>FOURFRONT DESIGN, INC. 517 7TH STREET RAPID CITY, SOUTH DAKOTA 57701 PH: (605) 342-9470 FAX: (605) 342-2377 WWW.FOURFRONTDESIGN.COM</p>			
<p>Drawing Title <b>Enlarged Mechanical Room Plan and Sections</b></p>		<p>Approved: Project Director <b>FARGO VAHCS</b></p>		<p>Project Title <b>EXPAND BLDG. 1 FOR PRIMARY CARE</b></p>	
<p>Project Number 437-315</p>		<p>Building Number <b>1</b></p>		<p>Drawing Number <b>M 3.20</b></p>	
<p>Location <b>2101 ELM STREET FARGO, ND 58102</b></p>		<p>Date 11 / 16 / 2021</p>		<p>Checked MK</p>	<p>Drawn JB</p>
<p>Dwg. 112 of 128</p>		<p>Office of Construction and Facilities Management Department of Veterans Affairs</p>			



RADIANT CEILING PANELS										
EQUIP TAG	MFGR	TYPE	PPG (%)	GPM	MBH	EWT (F)	LWT (F)	ROWS	SIZE (FT)	NOTES
RP-1	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-2	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-3	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-4	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-5	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-6	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3
RP-7	STERLING	MODULAR RADIANT CEILING PANEL	50	0.1	1.27	180	150	6	4/2	1.2,3

NOTES: 1. PROVIDESTANDARD FOIL FACE INSULATION.  
2. UNITS DERATED FOR 50% PPG.  
3. MANUFACTURER IS BASIS OF DESIGN ONLY, OTHER MANUFACTURERS ALLOWED

LOUVERS SCHEDULE											
EQUIP TAG	MFGR	MODEL NUMBER	TYPE	SERVICE	CFM	SP (IN)	WIDTH (IN)	HEIGHT (IN)	DEPTH (IN)	FREE AREA (SF)	NOTES
L-1	ARCHITECTURAL LOUVERS	E6DP	EXTRUDED DRAINABLE BLADE, COLOR BY ARCHITECH	EXHAUST	-	-	36	288	6	34.5	2
L-2	NOT USED	-	-	-	-	-	-	-	-	-	-
L-3	GREENHECK	EDJ-601	EXTRUDED DRAINABLE HEAD	EXHAUST	9,080	0.23	84	26	6	7.5	2
L-4	GREENHECK	ESD-635	EXTRUDED DRAINABLE HEAD	INTAKE	9,080	0.12	84	26	6	10.2	2
L-5	GREENHECK	ESD-635	EXTRUDED DRAINABLE HEAD	EXHAUST	390	0.08	36	12	6	0.5	1.2
L-6	GREENHECK	ESD-202	EXTRUDED DRAINABLE HEAD	EXHAUST	250	0.13	48	6	2	0.3	1.2

NOTES: 1. PROVIDE WITH MOTORIZED DAMPER.  
2. MANUFACTURER IS BASIS OF DESIGN ONLY. OTHER MANUFACTURERS ALLOWED

EXHAUST FAN SCHEDULE												
EQUIP TAG	MFGR	TYPE	MODEL NUMBER	EXHAUST (CFM)	SP (IN)	HP	FAN RPM	VOLTAGE (V/PH,HZ)	SOUND (SONES)	L/W/H (IN)	WEIGHT (LBS)	NOTES
EF-B08	GREENHECK	INLINE	SQ-98-VG	390	1	1/3	1,817	115/1/60	13.7	21/15/15	56	1.2
EF-120	GREENHECK	INLINE	SQ-97	250	1.6	1/2	2,479	208/3/60	22	21/15/15	52	1.2

NOTES: 1. PROVIDE DISCONNECT.  
2. MANUFACTURER IS BASIS OF DESIGN. OTHER MANUFACTURERS ALLOWED.

EXPANSION TANKS									
EQUIP TAG	MFGR	MODEL	TYPE	TANK VOLUME (GAL)	TANK ACCEPT (GAL)	HEIGHT (IN)	DIAMETER (IN)	WEIGHT (LBS)	NOTES
EXP-85	TACO	CBX84-125	BLADDER	22	12	39	16	150	1
NOTES:	1. MANUFACTURER IS BASIS OF DESIGN. OTHER MANUFACTURERS ALLOWED.								

AIR SEPARATOR SCHEDULE								
EQUIP TAG	MFGR	MODEL	SYSTEM	CONNECTION SIZE (IN)	FLOW (GPM)	HEIGHT (IN)	DIAMETER (IN)	NOTES
AS-85	TACO	4902ADT-125	HOT WATER	2	73	17	10	
NOTES:	1. MANUFACTURER IS BASIS OF DESIGN. OTHER MANUFACTURERS ALLOWED.							

IN TUBE RADIATORS															
EQUIP TAG	MFR	FLUID	GPM	MBH	PPG VELOCITY (FT/SEC)	EWT (°F)	LWT (°F)	PRESSURE DROP (FT)	FINS/FOOT	ELEMENT LENGTH (FT)	ROWS	TUBE DIAMETER (IN)	HEIGHT	ALUMINUM FINS	NOTES
FT-01	MODINE	50% PPG	0.43	4.1	3	180	160	0.5	34	7	2	0.75	14	3.25"X2.75"	1
FT-02	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-03	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1
FT-04	MODINE	50% PPG	0.31	2.9	3	180	160	0.5	34	5	2	0.75	14	3.25"X2.75"	1
FT-05	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1
FT-08	MODINE	50% PPG	0.43	4.1	3	180	160	0.5	34	7	2	0.75	14	3.25"X2.75"	1
FT-09	MODINE	50% PPG	0.34	3.2	3	180	160	0.5	34	5 1/2	2	0.75	14	3.25"X2.75"	1
FT-10	MODINE	50% PPG	0.34	3.2	3	180	160	0.5	34	5 1/2	2	0.75	14	3.25"X2.75"	1
FT-11	MODINE	50% PPG	0.34	3.2	3	180	160	0.5	34	5 1/2	2	0.75	14	3.25"X2.75"	1
FT-12	MODINE	50% PPG	0.43	4.1	3	180	160	0.5	34	7	2	0.75	14	3.25"X2.75"	1
FT-13	MODINE	50% PPG	0.43	4.1	3	180	160	0.5	34	7	2	0.75	14	3.25"X2.75"	1
FT-14	MODINE	50% PPG	0.49	4.7	3	180	160	0.5	34	8	2	0.75	14	3.25"X2.75"	1
FT-15	MODINE	50% PPG	0.49	4.7	3	180	160	0.5	34	8	2	0.75	14	3.25"X2.75"	1
FT-16	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-17	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1
FT-18	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1
FT-19	MODINE	50% PPG	0.31	2.9	3	180	160	0.5	34	5	2	0.75	14	3.25"X2.75"	1
FT-20	MODINE	50% PPG	0.19	1.8	3	180	160	0.5	34	3	2	0.75	14	3.25"X2.75"	1
FT-24	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1
FT-25	MODINE	50% PPG	0.31	2.9	3	180	160	0.5	34	5	2	0.75	14	3.25"X2.75"	1
FT-26	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-27	MODINE	50% PPG	0.31	2.9	3	180	160	0.5	34	5	2	0.75	14	3.25"X2.75"	1
FT-28	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-29	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-30	MODINE	50% PPG	0.19	1.8	3	180	160	0.5	34	3	2	0.75	14	3.25"X2.75"	1
FT-31	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-32	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-33	MODINE	50% PPG	0.25	2.3	3	180	160	0.5	34	4	2	0.75	14	3.25"X2.75"	1
FT-34	MODINE	50% PPG	0.31	2.9	3	180	160	0.5	34	5	2	0.75	14	3.25"X2.75"	1
FT-35	MODINE	50% PPG	0.37	3.5	3	180	160	0.5	34	6	2	0.75	14	3.25"X2.75"	1

NOTES: 1. MANUFACTURER IS FOR BASIS OF DESIGN ONLY. OTHER MANUFACTURERS ARE ALLOWED.

HEAT EXCHANGERS											
EQUIP TAG	MFGR	MODEL	CIRCULATING FLUID				MODULATING CONTROL V (LBS/HR)	STEAM PRESSURE	DIAMETER/ LENGTH	NOTES	
			FLUID	GPM	TEMP IN (°F)	TEMP OUT (°F)					PRESSURE DROP
BD117-HX-3	TACO	G08406-S	50% PPG	40	150	180	0.74	619.6	15	8"/40"	1
BD117-HX-4	TACO	G08406-S	50% PPG	40	150	180	0.74	619.6	15	8"/40"	1

NOTES: 1. MANUFACTURER IS FOR BASIS OF DESIGN ONLY. OTHER MANUFACTURERS ARE ALLOWED.

CIRCULATING PUMPS												
BASIS OF DESIGN				SYSTEM	CIRCULATING FLUID				% EFF.	MOTOR		NOTES
EQUIP TAG	MFGR	TYPE	MODEL		FLUID	GPM	PUMP FT HEAD	TEMP (° F)		NOM. HP	VOLT/ PHASE	
BD117-HWP-1	TACO	SELF SENSING VERTICAL CLOSE COUPLED	SKV1509A-A-4P-PD	HEATING	50% PPG	35	40	180	53.6	3	208/3	1.2
BD117-HWP-2	TACO	SELF SENSING VERTICAL CLOSE COUPLED	SKV1509A-A-4P-PD	HEATING	50% PPG	35	40	180	53.6	3	208/3	1.2

NOTES	1. MANUFACTURER IS BASIS OF DESIGN, OTHER MANUFACTURERS WILL BE ALLOWED. 2. PROVIDE WITH DISCONNECT, INTEGRAL VFD, SUCTION DIFFUSER, AND TRIPLE DUTY VALVE.
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UNIT HEATER												
EQUIP TAG	MFGR	MODEL	MBH	GPM	EWT	LWT	PPG%	WPD	CFM	FAN KW	VOLTAGE (V/PH/Hz)	NOTES
UH-01	TRANE	S-A18	16.6	1.92	180	160	50	2.23	500	16	110/1/60	1
NOTES:	1. MANUFACTURER IS BASIS OF DESIGN. OTHER MANUFACTURERS ARE ALLOWED.											

NOTES: 1. MANUFACTURER IS BASIS OF DESIGN. OTHER MANUFACTURERS ARE ALLOWED

GRILLES REGISTERS AND DIFFUSERS SCHEDULE										
EQUIP TAG	MFGR	MODEL NUMBER	BORDER	PANEL SIZE	NECK SIZE	MAX CFM	THROW	NC	SP	NOTES
S-1	KRUEGER	1400	LAY-IN	24/24	6"	110	9	-	0.037	1
S-2	KRUEGER	1400	LAY-IN	24/24	8"	220	12	11	0.029	1
S-3	KRUEGER	1400	LAY-IN	24/24	10"	350	15	17	0.070	1
S-4	KRUEGER	51400	SURFACE	24/24	6"	110	9	-	0.037	2.3
S-5	KRUEGER	51400	SURFACE	24/24	8"	220	12	11	0.029	2.3
S-6	KRUEGER	51400	SURFACE	24/24	10"	350	15	17	0.070	2.3
S-7	KRUEGER	5800	SURFACE	8/8	6/6	100	14	-	0.050	2.3,4
S-8	KRUEGER	5800	SURFACE	10/10	8/8	200	19	18	0.050	2.3,4
S-9	KRUEGER	1975	LINEAR SLOT	4/48	6"	125	17	24	0.050	2.6
R-1	KRUEGER	EG10	LAY-IN	24/12	22/10	1000	-	20	0.050	2.3,4
R-2	KRUEGER	EG10	LAY-IN	24/24	22/22	2000	-	20	0.050	2.3,4
E-1	KRUEGER	580	SURFACE	12/8	10/6	100	-	18	0.035	2.3,5
E-2	KRUEGER	580	SURFACE	14/10	12/8	300	-	18	0.028	2.3,5

NOTES: 1. STEEL CONSTRUCTION. MANUFACTURER IS BASIS OF DESIGN, OTHER MANUFACTURERS ALLOWED.

2. ALUMINUM CONSTRUCTION. MANUFACTURER IS BASIS OF DESIGN, OTHER MANUFACTURERS ALLOWED

3. PROVIDE OBD.

4. DOUBLE DEFLECTION 22.5 DEGREE DEFLECTION.

5. SINGLE DEFLECTION 35 DEGREE DEFLECTION.

6. PROVIDE STRAIGHT, 3/4" SLOT, 2 SLOT, BUTT CUT, END CAP AND BLADES.

[illegible]

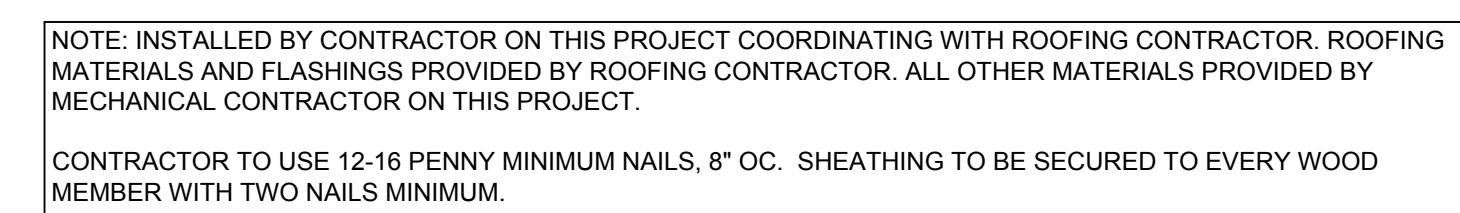
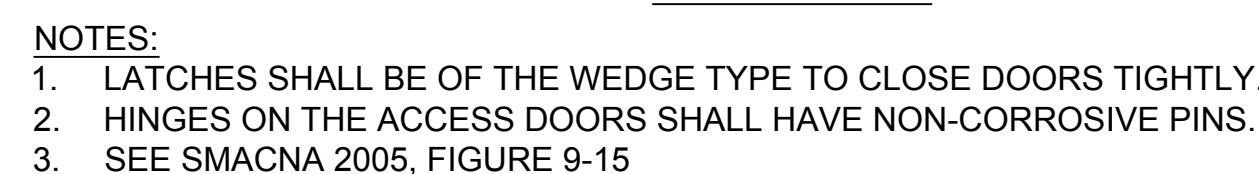










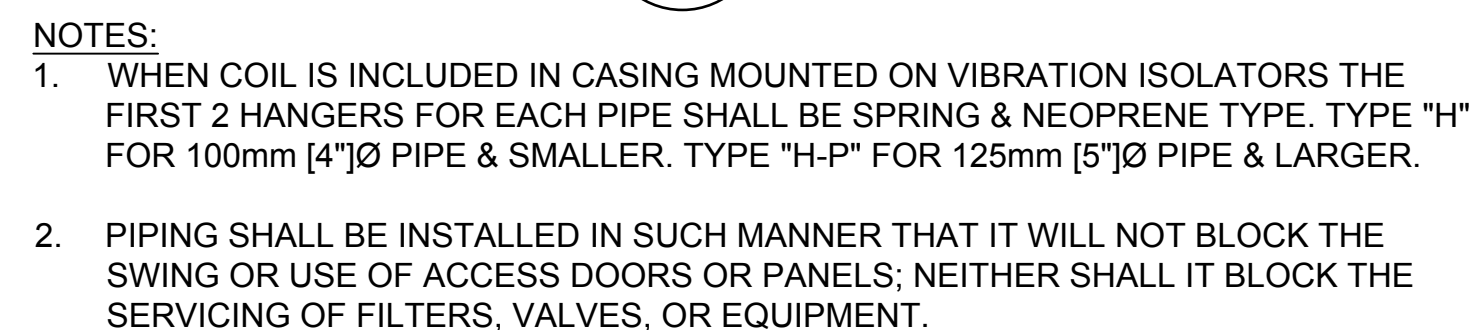


NOTES:

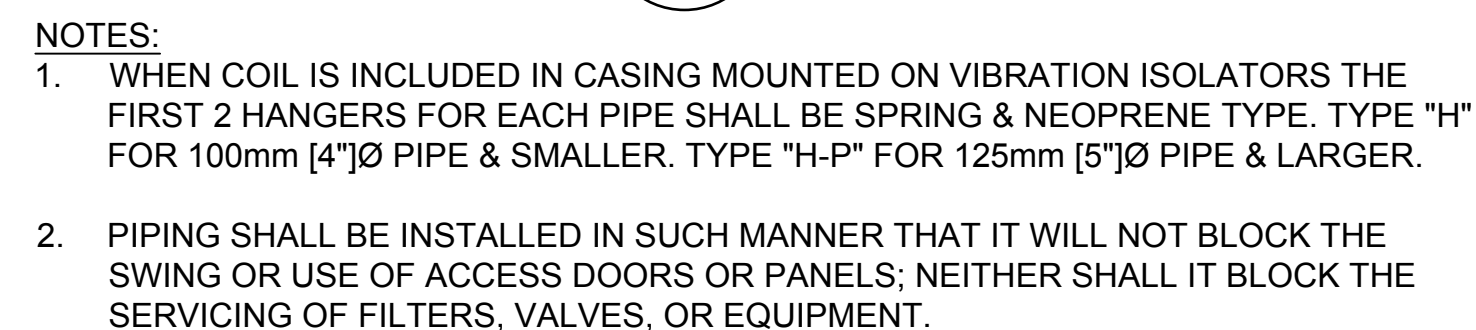
1. PROVIDE ALL STT-1 WITH TT-1.
2. PROVIDE WITH TEE AND INLET SHUT OFF VALVE.
3. MANUFACTURER'S BASIS OF DESIGN ONLY. OTHER MANUFACTURERS ALLOWED.

PLUMBING SPECIALTY MAY BE CALLED OUT ON PLANS AS TAGGED, SPECIFICALLY CALLED FOR IN NOTES/DETAILS, OR NOT AT ALL. IF REFERENCE TO ANY OF THE ABOVE SPECIALTY IS NOT SPECIFICALLY CALLED OUT, THIS SCHEDULE ALSO PROVIDES BASIS OF SPECIFICATION FOR SUPPLY BY THE CONTRACTOR.





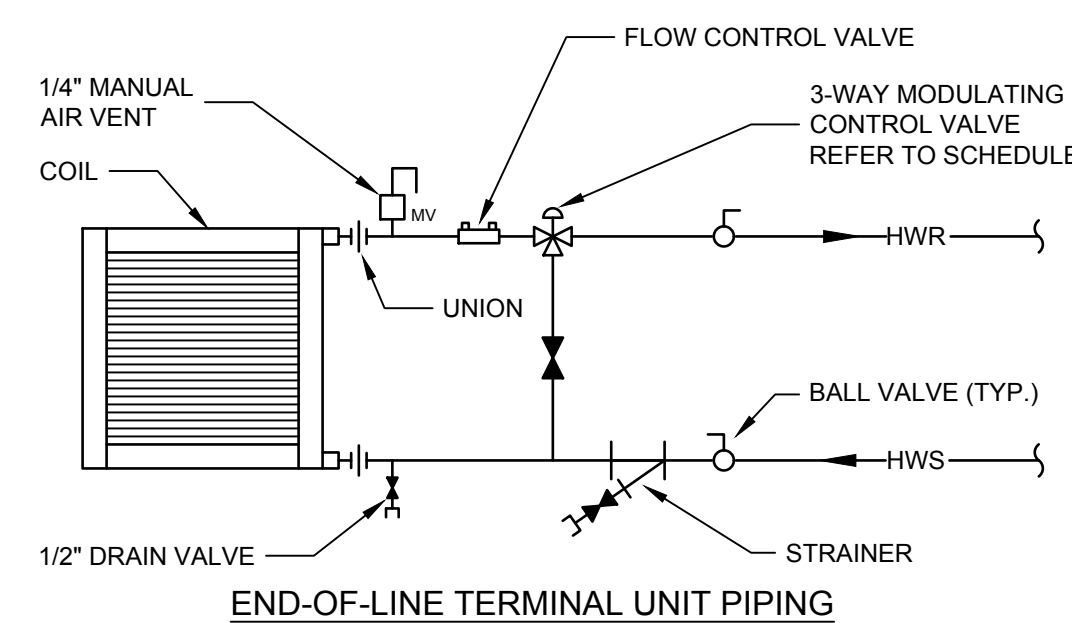
1 WATER COILS - PIPING CONNECTIONS  
SCALE: N.T.S.



2 WATER COILS - PIPING CONNECTIONS  
SCALE: N.T.S.



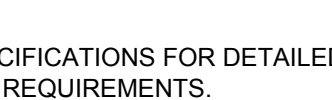
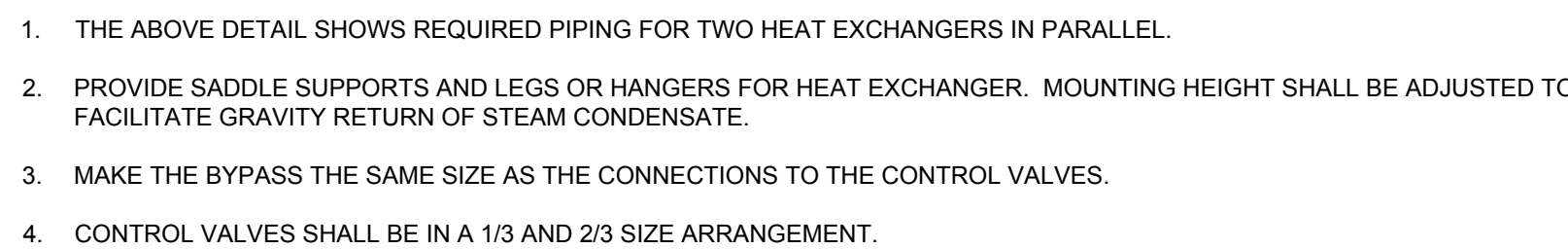
WHERE X = STATIC PRESSURE IN PASCALS



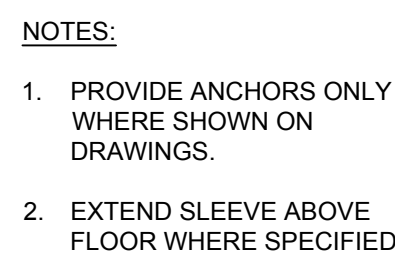
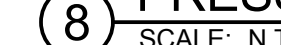
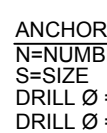
3 REHEAT COIL - PIPING CONNECTIONS  
SCALE: N.T.S.







NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE



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## Revisions

**Calibre**  
 CALIBRE  
 9090 S RIDGELINE BLVD, SUITE 105  
 HIGHLANDS RANCH COLORADO 80129  
 PHONE (303) 730-0434



SUMMIT FIRE CONSULTING  
575 MINNEHAHA AVE WEST  
ST. PAUL, MINNESOTA 55103  
(612) 387-7050



FOURFRONT DESIGN, INC.  
517 7TH STREET  
RAPID CITY, SOUTH DAKOTA  
57701  
PH: (605) 342-9470  
FAX: (605) 342-2377  
[WWW.FOURFRONTDESIGN.COM](http://WWW.FOURFRONTDESIGN.COM)

Approved: Project Director

**FARGO VAHCS**

Location	2101 ELM STREET FARGO, ND 58102
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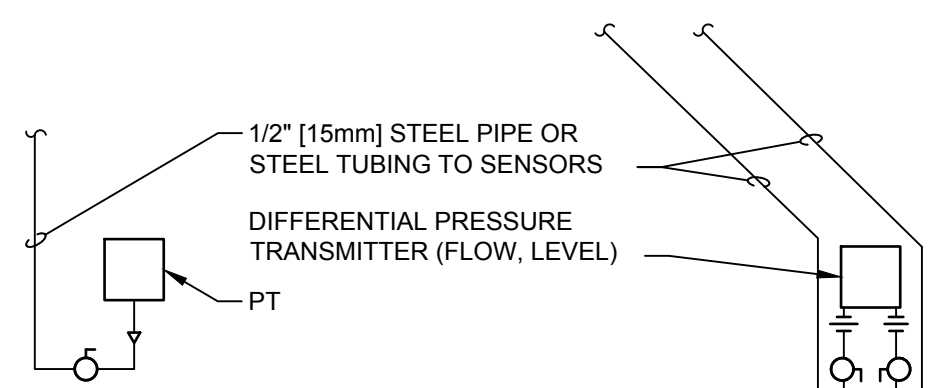
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M 5.11



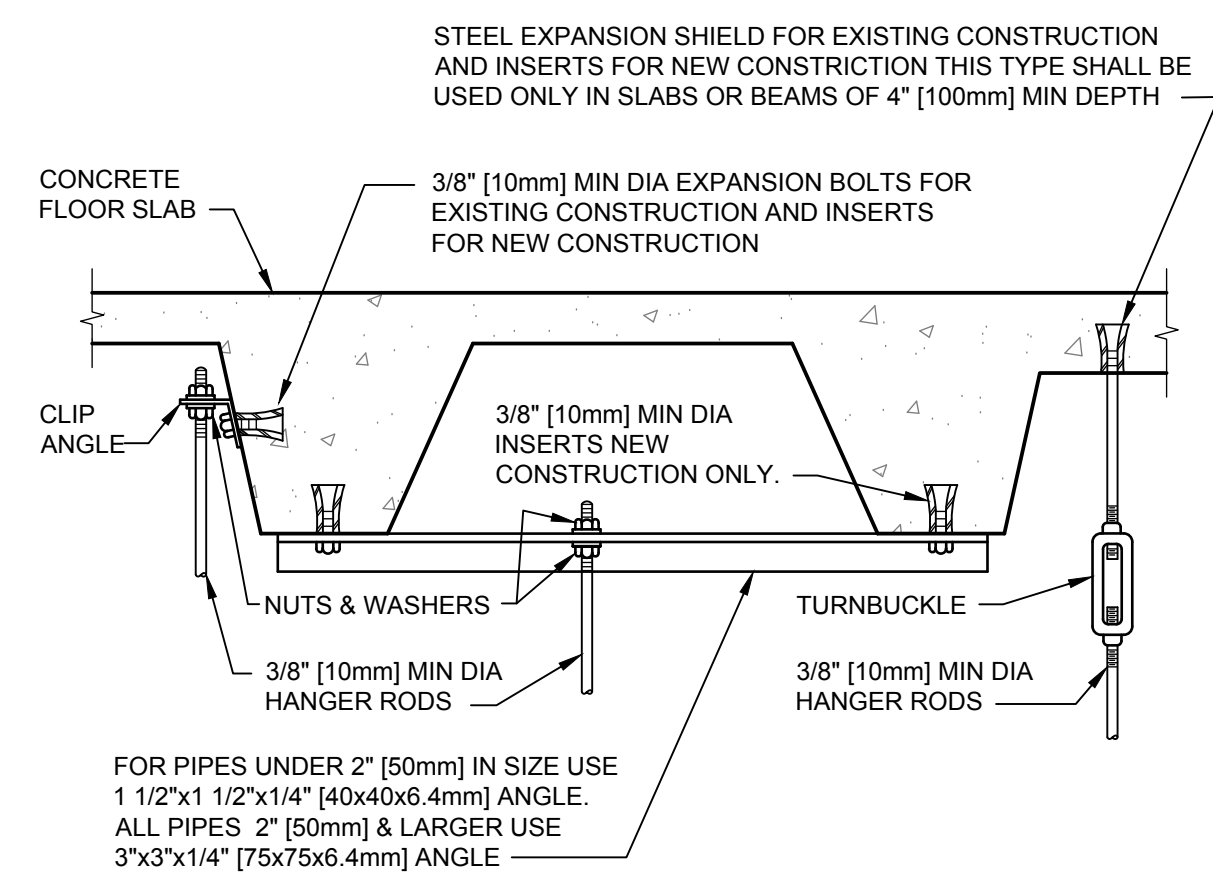
Department of  
Veterans Affairs



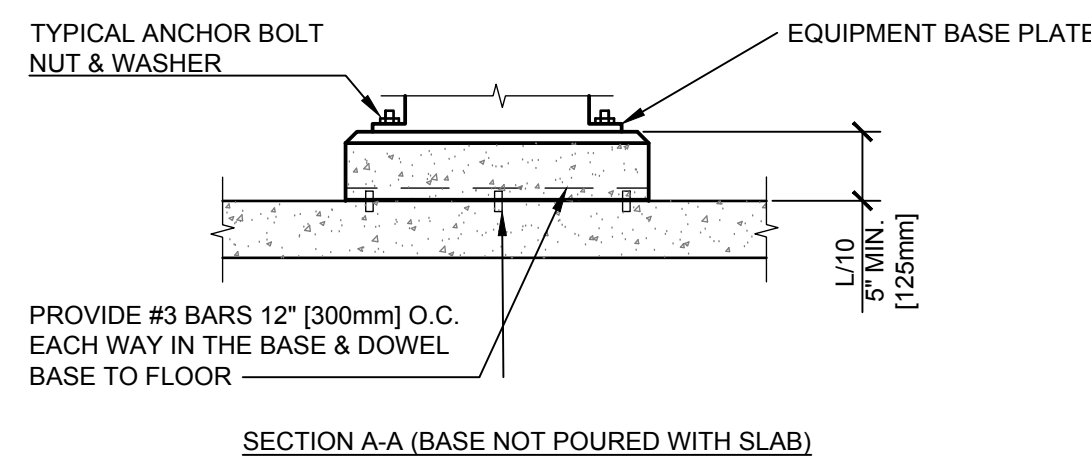
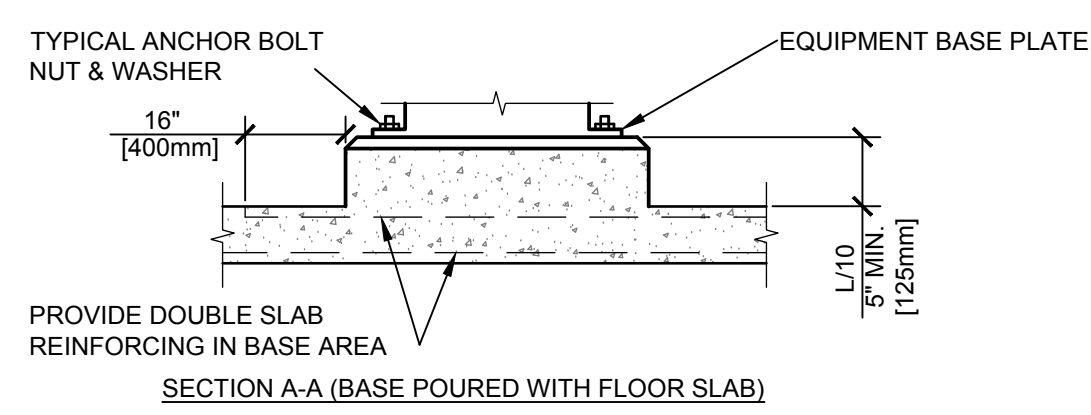
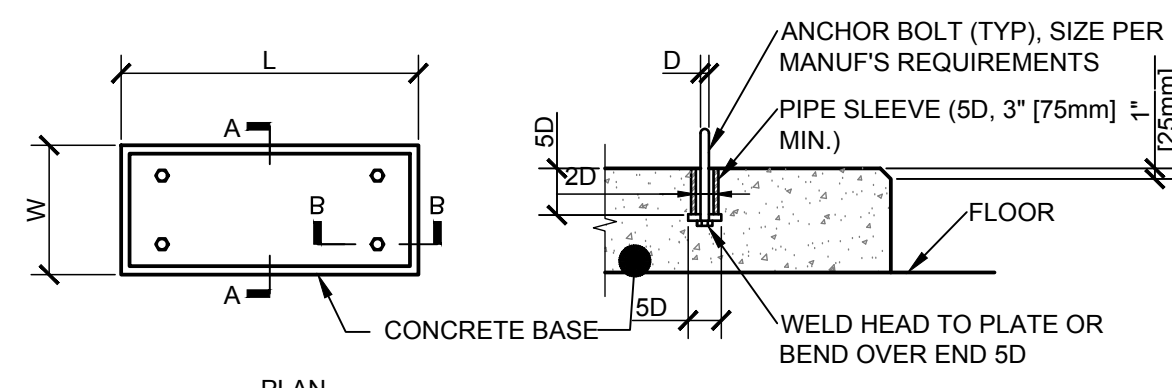


NOTES:  
1. INSTALLATION OF SENSORS AND TRANSMITTERS SHALL CONFORM TO RECOMMENDATIONS OF MANUFACTURERS OF TRANSMITTERS.

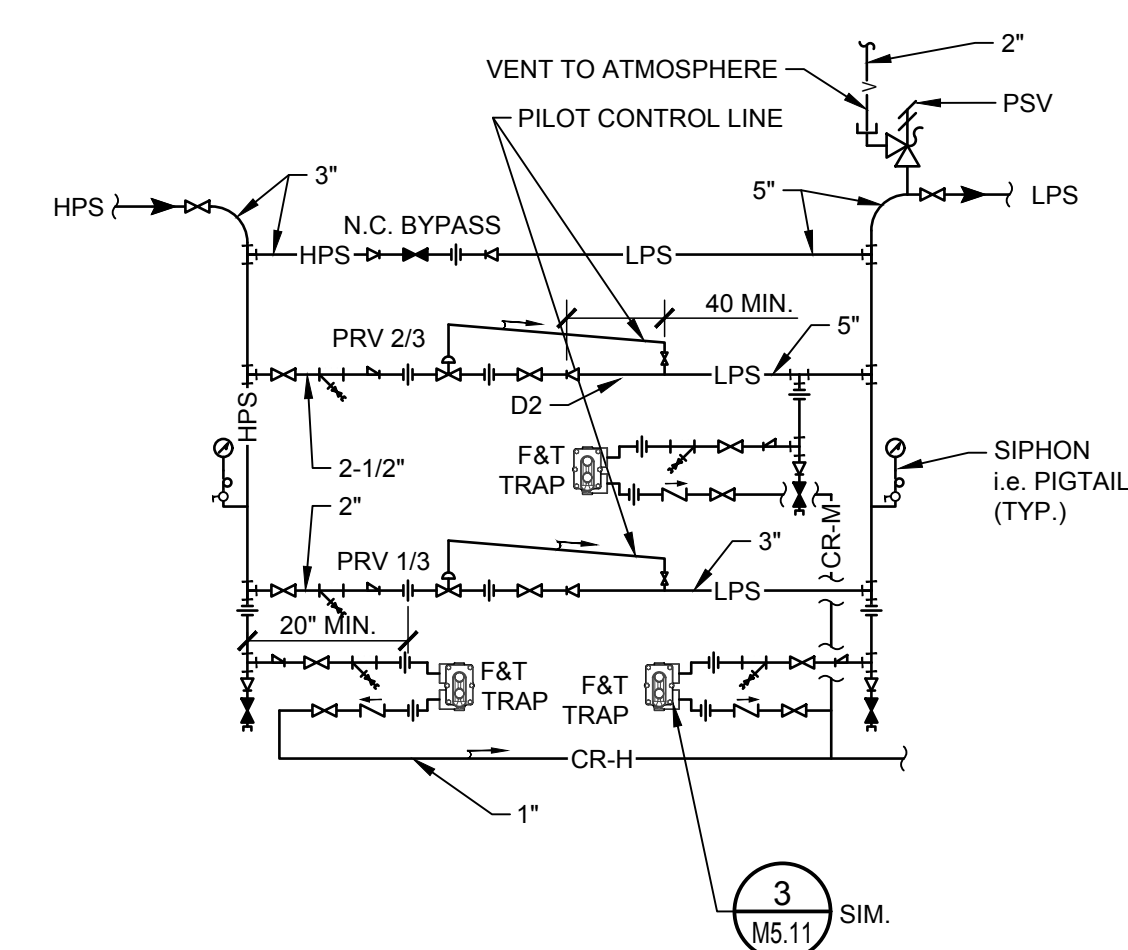
1 PRESSURE TRANSMITTER INSTALLATION  
SCALE: N.T.S.



2 SECURING HANGER RODS IN CONCRETE  
SCALE: N.T.S.

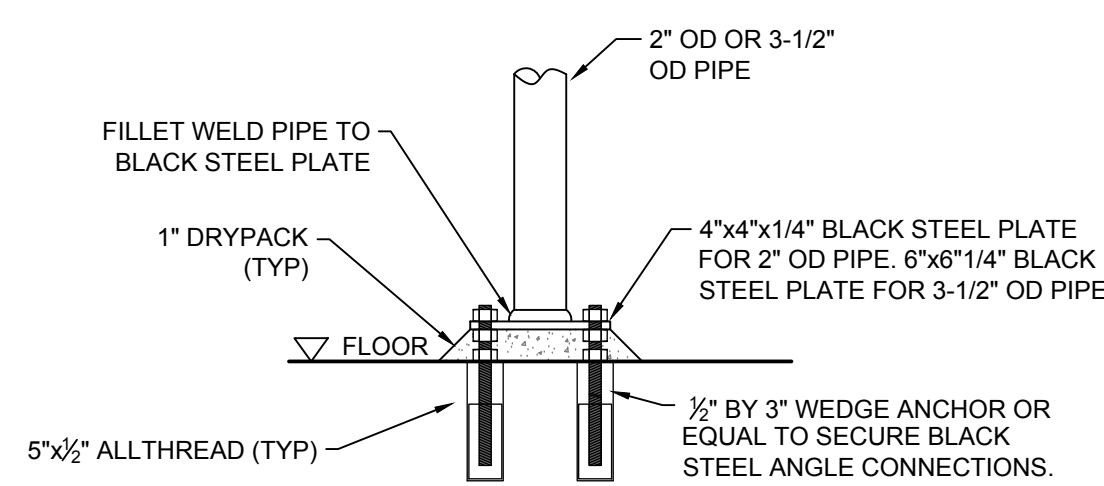


3 CONCRETE EQUIPMENT BASE DETAIL  
SCALE: N.T.S.

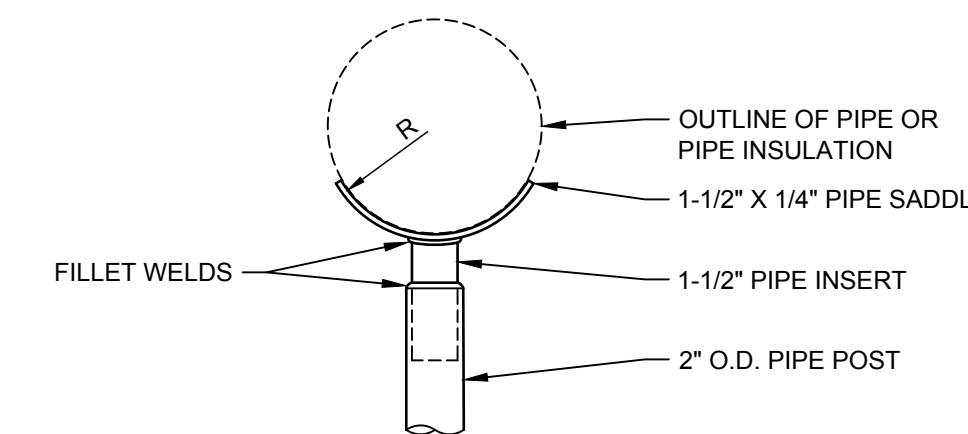


NOTES:  
1. ALL CONDENSATE PIPING SHALL BE 1".  
2. INSTALL VALVES AS RECOMMENDED BY MANUFACTURER.  
3. PROVIDE NECESSARY UNIONS FOR THE REMOVAL OF VALVE WITH SCREWED CONNECTIONS.  
4. SLOPE PILOT CONTROL LINE FROM PRESSURE REDUCING VALVE TO DOWN STREAM STEAM PIPING. MINIMUM SLOPE SHALL BE 25/100'. 25mm/300mm [1/12"]

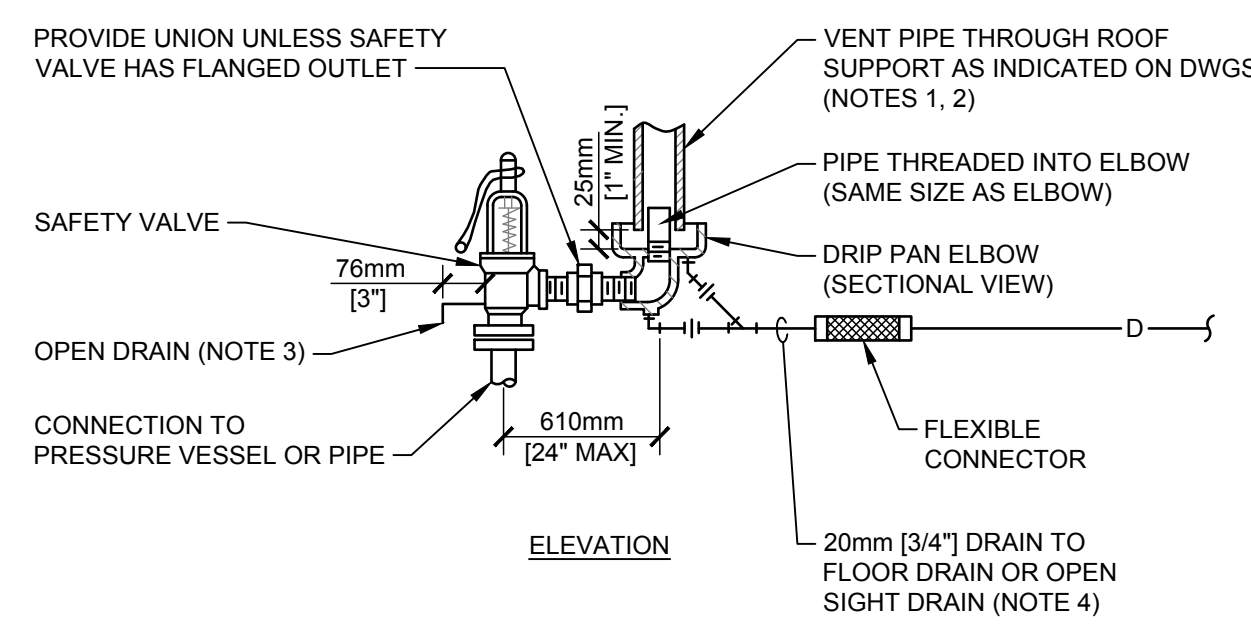
6 STEAM PRESSURE REDUCING STATION  
DOUBLE VALVE (1/3 AND 2/3)  
SCALE: N.T.S.



4 DRY PACK AT WELDED  
PIPE STAND BASE FOR INTERIOR USE DETAIL  
SCALE: N.T.S.

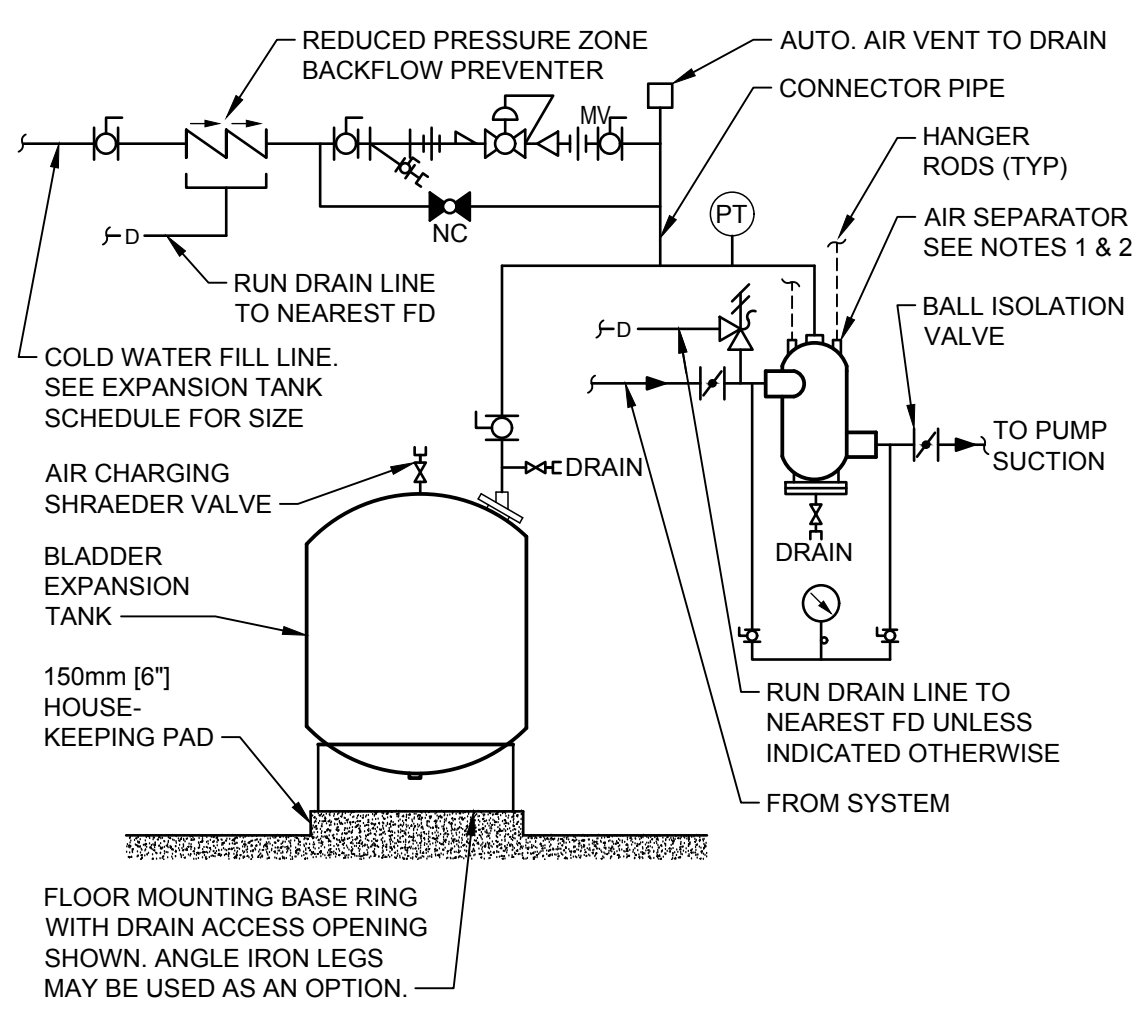


5 WELDED PIPE STAND SADDLE DETAIL  
SCALE: N.T.S.

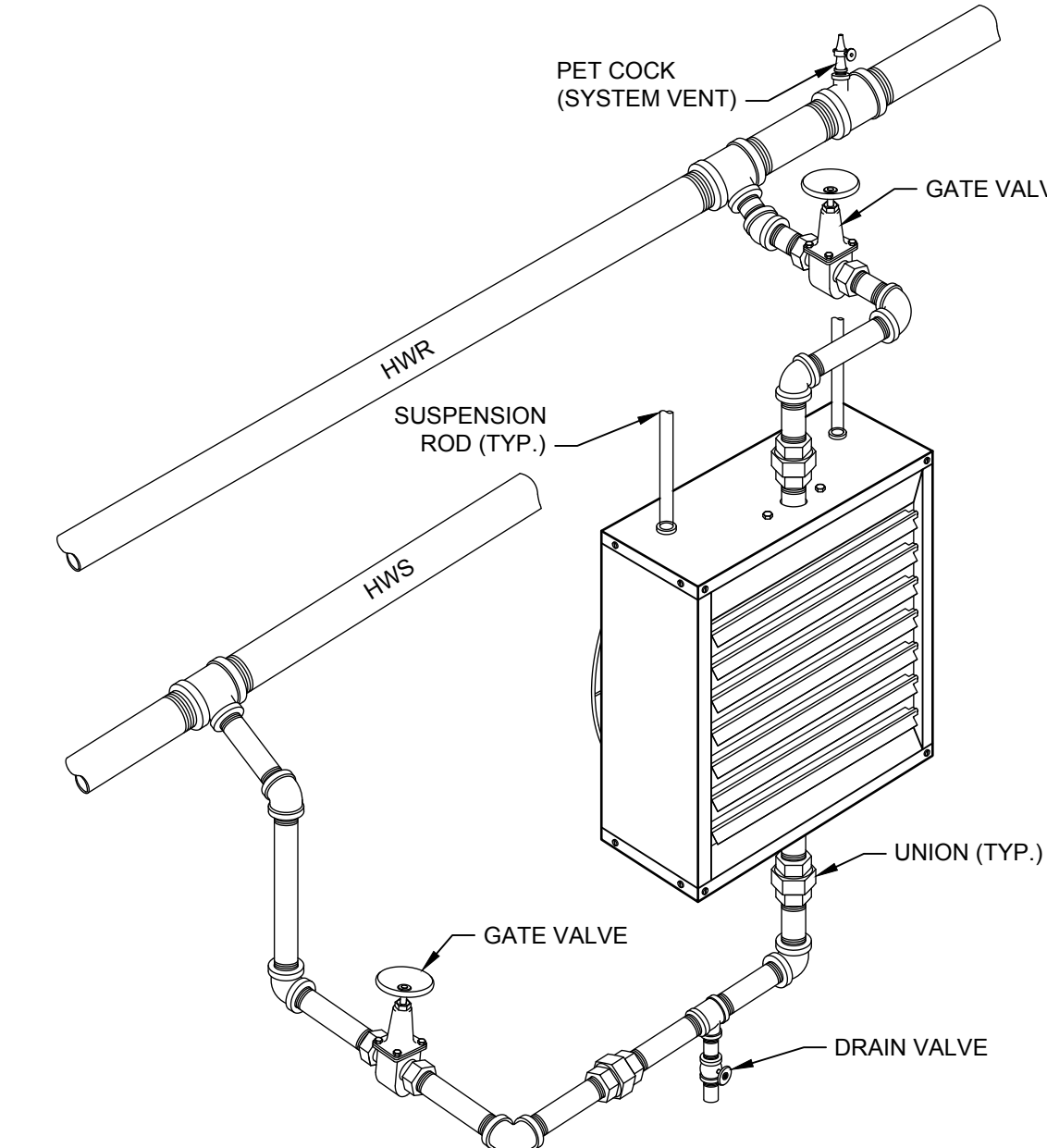


NOTES:  
1. UNLESS OTHERWISE SHOWN ON THE DRAWINGS, SIZE THE VENT PIPE SO THAT STEAM IS NOT BLOWN OUT AT THE VENT PIPE ENTRANCE. UTILIZE THE CALCULATION METHOD CONTAINED IN ANSI B31.1, POWER PIPING CODE, APPENDIX II. THE VENT PIPE SHOULD GO VERTICAL THRU THE ROOF WITH NO TURNS OR ANGLES. WHERE REQUIRED THERE SHALL BE NO MORE THAN A TOTAL OF 180 DEGREES IN DIRECTIONAL CHANGES MADE WITH 45 DEG. ELBOWS.  
2. VENT PIPE SHALL TERMINATE 1829mm [6'] MIN. ABOVE FINISHED ROOF.  
3. DISCHARGE OF DRAIN SHALL BE DIRECTED AWAY FROM PLATFORMS OR OTHER AREAS WHERE PERSONNEL MAY OCCUPY.  
4. DO NOT CONNECT ANY OTHER DRAIN TO THE DRIP PAN ELBOW DRAIN PIPE.  
5. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

7 STEAM SAFETY VALVE  
SCALE: N.T.S.



8 FLOOR MOUNTED EXPANSION TANK -  
PIPING CONNECTIONS  
SCALE: N.T.S.

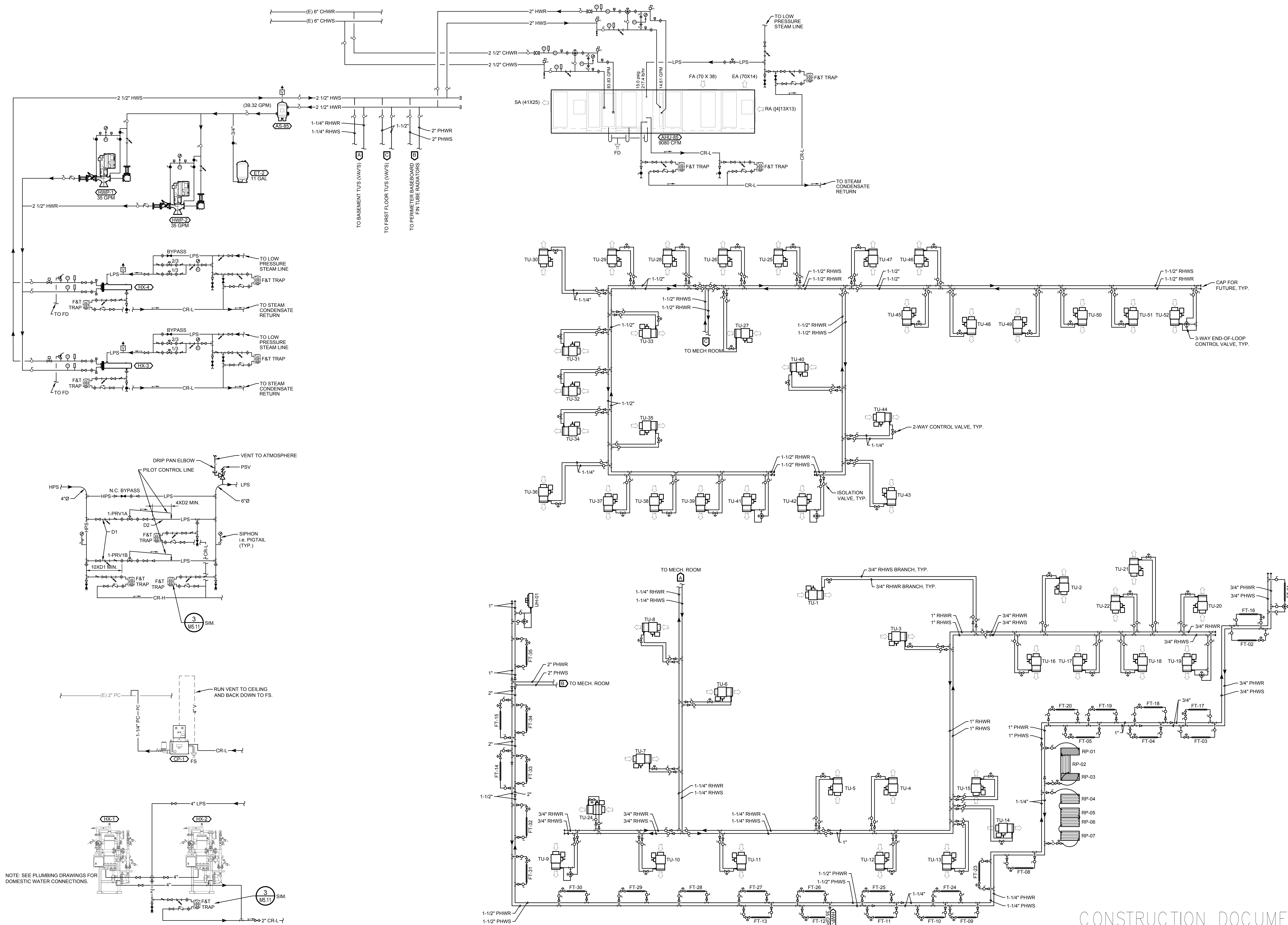


9 SUSPENDED HOT WATER UNIT HEATER DETAIL  
SCALE: N.T.S.

<b>CONSULTANTS:</b> CALIBRE 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH COLORADO 80129 PHONE (303) 730-0434 Albertson Engineering Inc. ALBERTSON ENGINEERING, INC. 315 NORTH MAIN AVENUE, SUITE 200 SIOUX FALLS, SOUTH DAKOTA 57104 PH: (605) 274-0880 SUMMIT FIRE PROTECTION SUMMIT FIRE CONSULTING 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050		<b>ARCHITECT/ENGINEERS:</b> FOURFRONT DESIGN, INC. 517 7TH STREET RAPID CITY, SOUTH DAKOTA 57701 PH: (605) 342-9470 FAX: (605) 342-2377 WWW.FOURFRONTDESIGN.COM		Drawing Title <b>Mechanical Details Building 1 - Wet Side 3</b>		Project Title <b>EXPAND BLDG. 1 FOR PRIMARY CARE</b>		Project Number 437-315 Building Number <b>1</b>		<b>Office of Construction and Facilities Management</b> Department of Veterans Affairs								
Revisions: <table border="1"><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>													Approved: Project Director <b>FARGO VAHCS</b>		Location <b>2101 ELM STREET FARGO, ND 58102</b>		Drawing Number <b>M 5.12</b> Dwg. 119 of 128	
Date 11 / 16 / 2021		Checked MK		Drawn JB		Date 11 / 16 / 2021												



one and one half inches = one foot  
one inch = one foot  
three quarters inch = one foot  
one half inch = one foot  
three eighths inch = one foot  
one quarter inch = one foot  
one eighth inch = one foot



CONSTRUCTION DOCUMENTS

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SEQUENCE OF OPERATION FOR VARIABLE AIR VOLUME AIR HANDLING UNIT WITH MINIMUM OUTSIDE AIR

1. GENERAL

- 1.1 UNIT IS NORMALLY STARTED AND STOPPED REMOTELY AT THE ECC. H-O-A SWITCH SHALL BE KEPT IN THE "AUTO" POSITION. "HAND" AND "OFF" POSITIONS SHALL BE USED ONLY FOR MAINTENANCE. IN CASE OF AHU SHUTTING DOWN TO NO POWER, AHU SHALL RESTART WHEN POWER IS RESTORED. WHEN THE UNIT IS "OFF" D-1, D-3, SHALL BE FULLY CLOSED. WHEN THE UNIT IS "ON" D-1, SD-1 AND SD-2 SHALL BE FULLY OPEN. D-2 AND D-3 SHALL MODULATE IN ACCORDANCE WITH THE FOLLOWING SEQUENCE:

2. TEMPERATURE CONTROL

- 2.1 SUPPLY AIR TEMPERATURE, SENSED BY TT-1, SHALL BE MAINTAINED AT 55°F (ADJ.) VIA DIGITAL CONTROL PANEL BY MODULATING V-1 OR D-2 AND D-3 OR V-2 IN SEQUENCE.
- 2.2 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY THE BAS, IS ABOVE 75°F (ADJ.) [23.8°C], THE DIGITAL CONTROL PANEL SHALL PREVENT THE MODULATION OF D-1, D-2 AND D-3 SHALL ASSUME THE MINIMUM OUTSIDE AIR POSITION (D-2 FULLY OPENED, D-3 FULLY CLOSED, AND D-1 IN MINIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.
- 2.3 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY THE BAS, IS BETWEEN 65°F [18.3°C] AND THE SUPPLY AIR TEMPERATURE SENSED BY TT-1, DAMPER D-2 SHALL FULLY CLOSE AND D1 AND D3 SHALL BE FULLY OPEN (MAXIMUM OUTSIDE AIR POSITION). THE DIGITAL CONTROL PANEL SHALL MODULATE V-1 TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.
- 2.4 WHEN THE TEMPERATURE OF THE OUTSIDE AIR, SENSED BY THE BAS, IS BELOW THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1, DAMPERS D1, D-2 AND D-3 SHALL MODULATE TO MAINTAIN THE SCHEDULED SUPPLY AIR TEMPERATURE. IF D-2 IS OPEN AND D-3 IS CLOSED TO MINIMUM OUTSIDE AIR, V-2 SHALL MODULATE OPEN TO MAINTAIN THE SUPPLY AIR TEMPERATURE, SENSED BY TT-1.

3. AIR FLOW CONTROL

- 3.1 THE SUPPLY AIR FLOW SHALL BE CONTROLLED BY THE DIGITAL CONTROL PANEL MODULATING THE SUPPLY FAN VARIABLE SPEED MOTOR CONTROLLER TO MAINTAIN 1.0" [25mm] OF DUCT STATIC PRESSURE (FIELD ADJUSTABLE), SENSED BY SPS-1. RESET STATIC PRESSURE BASED ON ACTUAL BUILDING LOAD BY POLLING ALL ATU.
- 3.2 THE DIGITAL CONTROL PANEL, USING TOTAL SUPPLY AIR AND RETURN AIR FLOW SIGNALS, SHALL RESET THE RETURN AIR FAN VSMC TO MAINTAIN A CONSTANT AIR FLOW DIFFERENCE BETWEEN THE SUPPLY AIR AND THE RETURN AIR EQUAL TO MINIMUM OUTSIDE AIR.
- 3.3 USING HIGH PRESSURE SENSOR SPS-2 LOCATED AT THE SUPPLY FAN DISCHARGE, SHALL PREVENT THE SUPPLY FAN FROM DEVELOPING OVER 3" [75mm] OF STATIC PRESSURE (FIELD ADJUSTABLE). IF STATIC PRESSURE AT SPS-2 DOES EXCEED 3" [75mm] THE SUPPLY AIR FAN SHALL STOP. SPS-2 SHALL BE HARDWIRED TO THE SUPPLY FAN VSMC AND UNIT SHALL BE SHUTDOWN IN HAND/AUTO OR BYPASS MODE. SPS-2 WILL REQUIRE MANUAL RESET AT THE DEVICE.
- 3.4 AHU SHALL RESTART WHEN POWER IS RESTORED AFTER POWER ISSUE BUMPS SHUTS AHU OFF.

4. HUMIDITY CONTROL

- 4.1 WHEN THE DIGITAL CONTROL PANEL IS NOT CALLING FOR HUMIDITY, SENSED BY RETURN AIR HUMIDITY H-1, 2-WAY "ON-OFF" CONTROL VALVE V-3 SHALL REMAIN CLOSED. WHEN THE DIGITAL CONTROL PANEL IS CALLING FOR HUMIDITY, V-3 SHALL REMAIN OPEN.
- 4.2 RETURN AIR HUMIDITY SHALL BE MAINTAINED AT SETPOINT OF 35% RH (ADJ.) VIA DIGITAL CONTROL PANEL BY MODULATING CONTROL VALVE V-4 TO MAINTAIN THE DESIRED HUMIDITY. DCP SHALL CLOSE VALVE V-3 WHENEVER THE SUPPLY FAN IS OFF. VALVE V-4 SHALL BE INTERLOCKED WITH A TEMPERATURE SWITCH TO KEEP THE HUMIDIFIER OFF UNTIL CONDENSATE TEMPERATURE APPROACHES STEAM TEMPERATURE. IF THE HUMIDITY LEVEL RISES ABOVE 60%, TU CONTROL VALVES SHALL BE CALLED UPON TO OPEN AND MODULATE REHEAT WATER TO MAINTAIN TEMPERATURE.

5. FREEZE PROTECTION

- 5.1 IF THE AIR TEMPERATURE AS SENSED BY TT-2 FALLS BELOW 45°F [7°C], AN ALARM SIGNAL SHALL INDICATE AT THE DCP AND ECC. IF THIS TEMPERATURE FALLS BELOW 40°F [4.4°C], AS SENSED BY THE TSL THE SUPPLY AND RETURN FANS SHALL SHUT DOWN AND A CRITICAL ALARM SHALL INDICATE AT THE DIGITAL CONTROL PANEL AND ECC. TSL SHALL BE HARDWIRED TO THE SUPPLY FAN UFD AND UNIT SHALL BE SHUTDOWN IN HAND/AUTO OR BYPASS MODE. TSL WILL REQUIRE MANUAL RESET AT THE DEVICE.

6. AUTOMATIC SHUTDOWN/RESTART

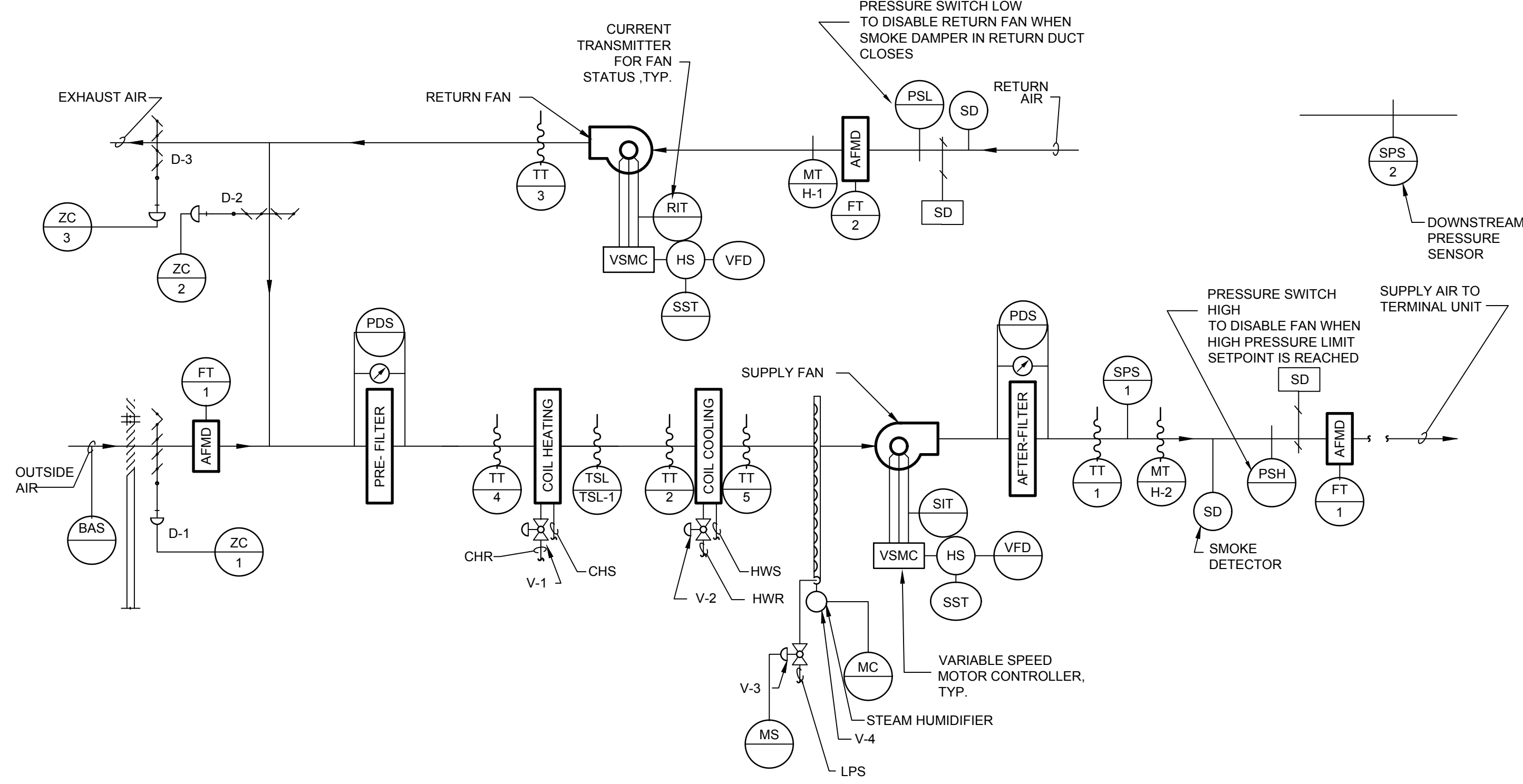
- 6.1 WHEN SMOKE IS DETECTED BY DUCT SMOKE DETECTOR, SD, THE SUPPLY AND RETURN FANS SHALL SHUT "OFF" AND AN ALARM SIGNAL SHALL BE TRANSMITTED TO THE FIRE ALARM SYSTEM.
- 6.2 EXHAUST FANS SERVING AREA OF THE SUPPLY FAN SHALL CONTINUE TO RUN. SUPPLY AND RETURN FANS SHALL RESTART.

7. EMERGENCY CONSTANT SPEED OPERATION

- 7.1 UPON FAILURE OF THE VSMC, THE SUPPLY AND RETURN FANS SHALL BE STARTED/STOPPED MANUALLY AT THE DIGITAL CONTROL PANEL OR THE ECC THROUGH THE BY-PASS STARTER. FANS SHALL THEN BE OPERATED AT CONSTANT SPEED.

CONTROLS SYMBOLS

(T)	ROOM THERMOSTAT/TRANSMITTER - WALL MOUNT	(HS)	HAND SWITCH (HAND-OFF-AUTO SWITCH)	(AT) <sub>OC</sub>	OCCUPANCY SENSOR
(M)	ROOM HUMIDISTAT (MOISTURE)/TRANSMITTER - WALL MOUNT	(ZC)	VALVE OR DAMPER POSITION CONTROLLER	(LTCP)	LOCAL TEMPERATURE CONTROL PANEL
(TT)	TEMPERATURE TRANSMITTER	(KR)	LOCAL RECORDING TIME CLOCK (RUNTIME)	(HVAC)	HVAC CONTROL PANEL
(TT)~~~~	TEMPERATURE TRANSMITTER, AVERAGING ELEMENT	(TSL)	TEMPERATURE SWITCH, LOW (FREEZESTAT)	(VSMC)	VARIABLE SPEED MOTOR CONTROLLER
(MT)	MOISTURE (HUMIDITY) TRANSMITTER	(TSH)	TEMPERATURE SWITCH, HIGH (TEMP. CUTOFF)	(TC)	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION
(PT)	PRESSURE TRANSMITTER	(LC)	LEVEL CONTROLLER	(PC)	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION
(SPS)	STATIC PRESSURE SENSOR	(LT)	LEVEL TRANSMITTER	(SC)	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION
(FT)	FLOW TRANSMITTER	(PSH)	PRESSURE SWITCH HIGH	(SD)	SMOKE DETECTOR
(IT)	CURRENT TRANSMITTER	(PSL)	PRESSURE SWITCH LOW	(FC)	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION
(CT)	CONDUCTIVITY TRANSMITTER	(EPT)	ELECTRONIC TO PNEUMATIC TRANSDUCER	(FSH)	FLOW SWITCH HIGH
(PDT)	PRESSURE DIFFERENTIAL TRANSMITTER	(AT) <sub>CO2</sub>	CARBON DIOXIDE TRANSMITTER	(FSL)	FLOW SWITCH LOW
(PDS)	PRESSURE DIFFERENTIAL SENSOR	(AT) <sub>CO</sub>	CARBON MONOXIDE TRANSMITTER	(KC)	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE
(FS)	FROST SENSOR	(SST)	START/STOP	(AFMD)	AIR FLOW MEASURING DEVICE
(HHL)	HIGH HUMIDITY LIMIT SENSOR	(RAH)	RETURN AIR HUMIDITY TRANSMITTER	(DDC)	DIRECT DIGITAL CONTROLLER
(MAT)	MIXED AIR TEMPERATURE TRANSMITTER	(AFS)	AIR FLOW SWITCH	(SD)	SMOKE DAMPER
(ECC)	ENERGY CONTROL CENTER (INTEGRATE CONTROL POINT ON REMOTE GRAPHICS WORKSTATION)	(BAS)	BUILDING AUTOMATION SYSTEM		



CONTROL DIAGRAM AHU

JOB: FARGO PRIMARY CARE		POINT LEGEND		SYSTEM OUTPUTS		SYSTEM INPUTS				SYSTEM SOFTWARE/CONTROL										PAGE		
SYSTEM: AHU				BINARY		ANALOG		BINARY		ANALOG		ALARM PROCESSING				APPLICATION/FUNCTION						

POINTS LIST FOR AHU

CONSTRUCTION DOCUMENTS

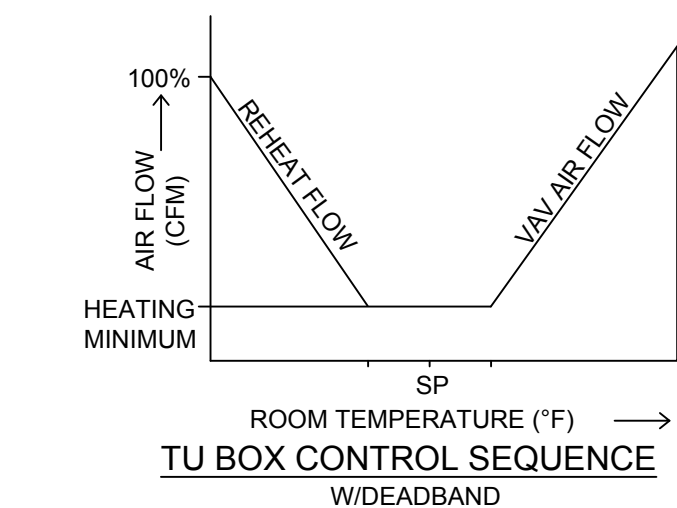
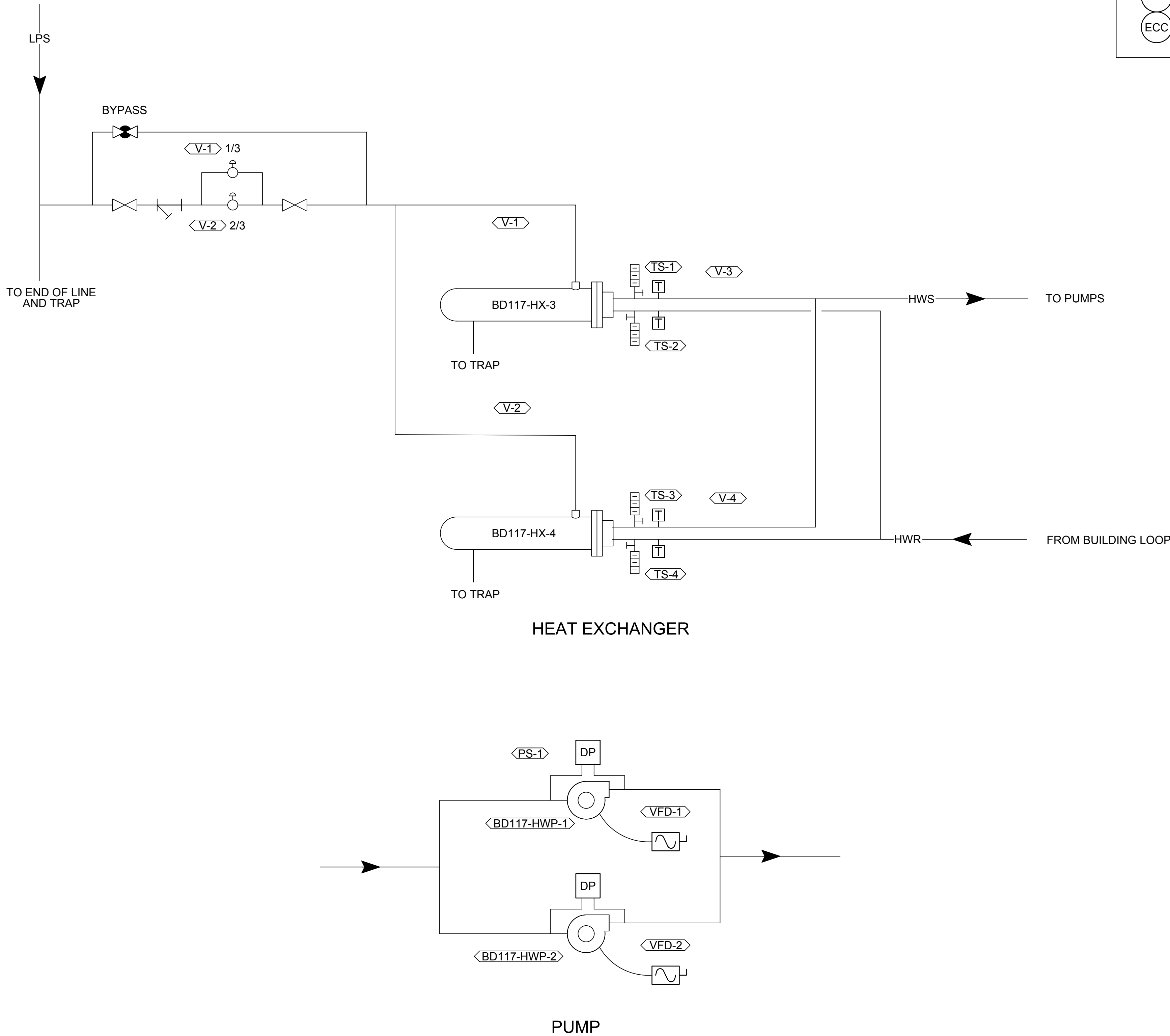
Revisions:		Date:		CONSULTANTS:		ARCHITECT/ENGINEERS:		Drawing Title		Project Title		Project Number		Office of Construction and Facilities Management			
				Calibre		FOURFRONT DESIGN, INC.		CONTROL DIAGRAMS		EXPAND BLDG. 1 FOR PRIMARY CARE		437-315					
				ALBERTSON ENGINEERING, INC.		19.2481.A08		Approved: Project Director		Location		Building Number					
				SUMMIT FIRE CONSULTING		FARGO VAHCS				2101 ELM STREET FARGO, ND 58102		1		M 6.02			
				575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050						Date		Checked				Dwg. 121 of 128	
												11 / 16 / 2021		MK		JB	



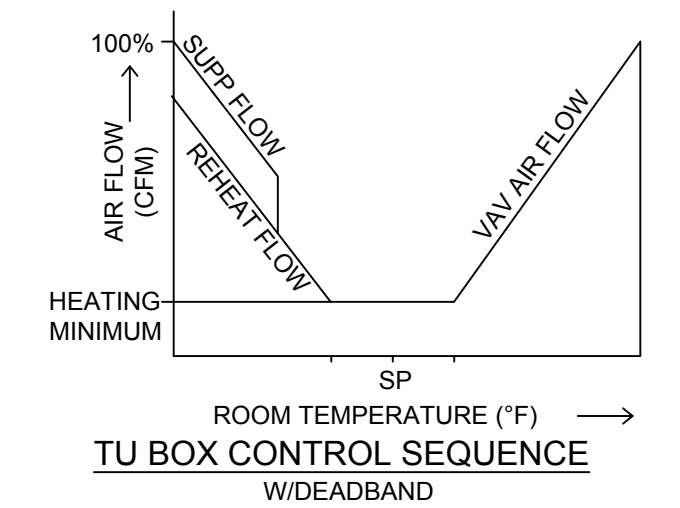
**HYDRONIC HEATING SEQUENCE OF OPERATION**  
DURING ANY PERIOD THAT OUTDOOR AIR TEMPERATURE IS LESS THAN 62 DEGREES, LEAD CIRCULATORS ARE TO BE EMPLOYED FOR DISTRIBUTION. UPON PROOF FAILURE OF DIFFERENTIAL PRESSURE AND MOTOR CURRENT SENSING, LAG CIRCULATOR TO BE EMPLOYED AND BAS AND HMI INTERFACE TO ALERT OPERATION STAFF OF PUMP FAILURE. ROTATE LEAD AND LAG CIRCULATORS EVERY 200 HOURS OF OPERATION.

MAINTAIN HYDRONIC SYSTEM DISCHARGE SETPOINT BASED ON OUTDOOR RESET SCHEME AT 110 DEGREES TO 180 DEGREES WHEN OUTDOOR AIR TEMPERATURE RANGES FROM 55 DEGREES TO 20 DEGREES. ANY OUTDOOR AIR TEMP BELOW 20 DEGREES TO MAINTAIN CONTINUOUS DISCHARGE OF 180 DEGREE TEMP HYDRONICS.

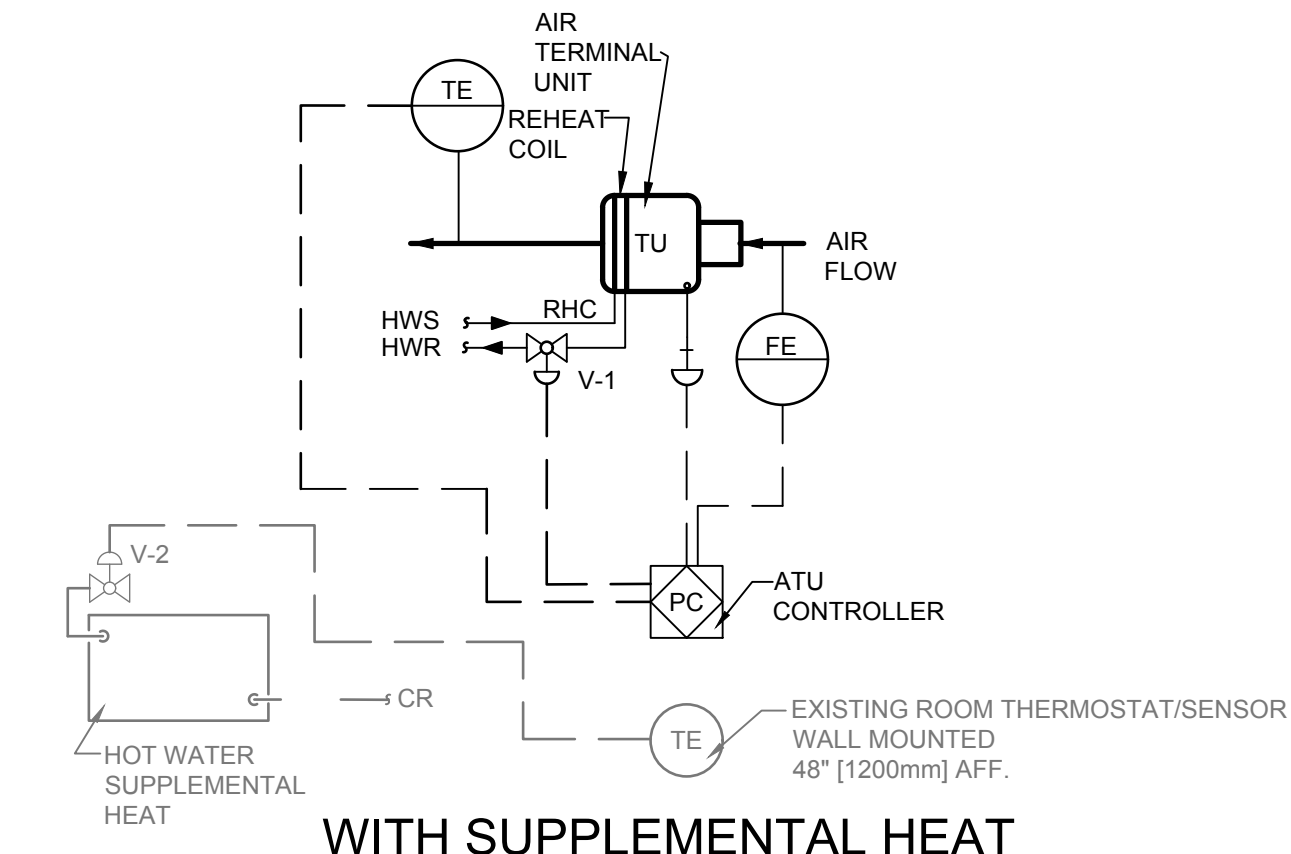
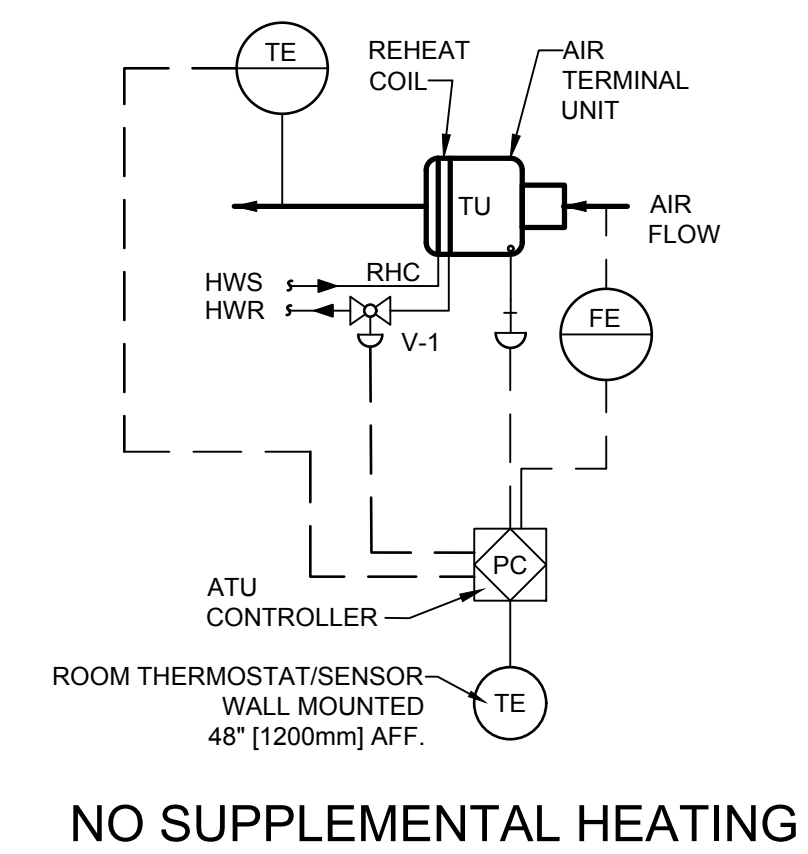
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(VSMC)	VARIABLE SPEED MOTOR CONTROLLER		
(TC)	TEMPERATURE CONTROLLER. SEE SEQUENCE OF OPERATION		
(PC)	PRESSURE CONTROLLER. SEE SEQUENCE OF OPERATION		
(SC)	SPEED CONTROLLER. SEE SEQUENCE OF OPERATION		
(SD)	SMOKE DETECTOR		
(FC)	FLOW CONTROLLER. SEE SEQUENCE OF OPERATION		
(FSH)	FLOW SWITCH HIGH		
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(KC)	TIME CLOCK CONTROLLING EQUIPMENT ON A SCHEDULE		
(AFMD)	AIR FLOW MEASURING DEVICE		
(DDC)	DIRECT DIGITAL CONTROLLER		
(SD)	SMOKE DAMPER		



- A. SET POINTS SHALL BE SET AS FOLLOWS:  
COOLING 75°F (ADJ.)  
HEATING 70°F (ADJ.)  
DEADBAND OF 5° F BETWEEN HEATING AND COOLING SET POINTS WILL BE MAINTAINED.
- B. UPON FALL IN SPACE TEMPERATURE THE VAV DAMPER WILL MODULATE TO MINIMUM POSITION.
- C. UPON FURTHER DROP IN SPACE TEMPERATURE TEMPERATURE VALVE V-1 WILL MODULATE TO MAINTAIN SET POINT ± 5° F. THE ADJUSTABLE TOLERANCE OF ± 5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
- D. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



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- D. VALVE V-2 SHALL BE ENABLED WHEN OUTSIDE AIR FALLS BELOW 40° F (ADJ.) AND VALVE V-1 HAS BEEN MODULATED OPEN ABOVE 30% (ADJ.). VALVE V-2 SHALL MAINTAIN SET POINT ± 5° F. THE ADJUSTABLE TOLERANCE OF ± 5° F HAS BEEN SELECTED TO PREVENT VALVE HUNTING.
- E. THE REVERSE SHALL OCCUR ON THE RISE IN SPACE TEMPERATURE.



Revisions:	Date:	CONSULTANTS:	ARCHITECT/ENGINEERS:	Drawing Title	Project Title	Project Number	Office of Construction and Facilities Management
		<b>Calibre</b> CALIBRE 9090 S RIDGELINE BLVD, SUITE 105 HIGHLANDS RANCH, COLORADO 80129 PHONE: (303) 730-0434	ALBERTSON ENGINEERING, INC. 315 NORTH MAIN AVENUE, SUITE 200 SIOUX FALLS, SOUTH DAKOTA 57104 PH: (605) 274-0880	CONTROL DIAGRAMS	EXPAND BLDG. 1 FOR PRIMARY CARE	437-315	Department of Veterans Affairs
		<b>SUMMIT</b> SUMMIT FIRE CONSULTING 575 MINNEHAHA AVE WEST ST. PAUL, MINNESOTA 55103 (612) 387-7050	<b>FOURFRONT</b> FOURFRONT DESIGN, INC. 517 7TH STREET RAPID CITY, SOUTH DAKOTA 57701 PH: (605) 342-9470 FAX: (605) 342-2377 WWW.FOURFRONTDESIGN.COM	Approved: Project Director FARGO VAHCS	Location 2101 ELM STREET FARGO, ND 58102	Building Number 1	
					Date 11 / 16 / 2021	Checked MK	
						Drawing Number M 6.03	
						Dwg. 122 of 128	