

			Al	HU-1-S VE	NTILATION S	SUMMARY						
			,							Calculations		I
Room Name	AZ Floor Area (ft²)		Occupancy Category	Occupant Density (#/1000 ft²)	RP People OA Rate (cfm/person)	RA Area OA Rate (CFM/ft²)	by Code	People Outdoor Airflow (cfm)	Area Outdoor Airflow (cfm)	VBZ Breathing Zone Outdoor Airflow (cfm)	EZ Zone Air Dsitribution Effectiveness	VOZ Zone Outdoor Airflow (cfm)
CLASSROOM 2108	580	14	Classroom	65	7.5	0.06	38	217	35	252	0.80	315
CLASSROOM 2109	572	14	Classroom	65	7.5	0.06	37	214	34	249	0.80	311
CLASSROOM 2114	626	14	Classroom	65	7.5	0.06	41	235	38	272	0.80	340
CLASSROOM 2111	685	14	Classroom	65	7.5	0.06	45	263	41	304	0.8	380
CLASSROOM 2116	685	14	Classroom	65	7.5	0.06	45	263	41	304	0.8	380
CLASSROOM 2113	578	14	Classroom	65	7.5	0.06	38	165	35	200	0.8	250
CLASSROOM 2118	637	14	Classroom	65	7.5	0.06	41	165	38	203	0.8	254
CLASSROOM 2115	580	14	Classroom	65	7.5	0.06	38	217	35	252	0.8	315
CLASSROOM 2120	678	14	Classroom	65	7.5	0.06	44	263	41	303	0.8	379
CLASSROOM 3108	578	14	Classroom	65	7.5	0.06	38	217	35	251	0.8	314
CLASSROOM 3109	578	14	Classroom	65	7.5	0.06	38	217	35	251	0.8	314
CLASSROOM 3114	635	14	Classroom	65	7.5	0.06	41	238	38	276	0.8	345
CLASSROOM 3111	685	14	Classroom	65	7.5	0.06	45	263	41	304	0.8	380
CLASSROOM 3116	685	14	Classroom	65	7.5	0.06	45	263	41	304	0.8	380
CLASSROOM 3113	580	14	Classroom	65	7.5	0.06	38	217	35	252	0.8	315
CLASSROOM 3118	641	14	Classroom	65	7.5	0.06	42	240	38	279	0.8	348
CLASSROOM 3115	582	14	Classroom	65	7.5	0.06	38	218	35	253	0.8	316
CLASSROOM 3120	685	14	Classroom	65	7.5	0.06	45	263	41	304	0.8	380
IT 2110	109	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
IT 3110	112	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
LECTURE 1104	1311	14	Classroom	65	7.5	0.06	85	450	79	529	0.8	661
LECTURE 1101	3888	14	Classroom	65	7.5	0.06	253	1680	233	1913	0.8	1913
LECTURE 2104	1311	14	Classroom	65	7.5	0.06	85	450	79	529	0.8	661
LECTURE 3104	1311	14	Classroom	65	7.5	0.06	85	450	79	529	0.8	661
MECH 0102	3075	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
MENS 2107	450	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
MENS 3107	444	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
WOMENS 2112	521	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
WOMENS 3112	508	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
IT 1110	130	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
ALL GENDER 1108	90	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
BREAKOUT 1101.01	899	14	Office spaces	5	5.0	0.06	4	30	54	84	0.8	105
JC 2112.01	33	14	Storage	0	0.0	0.06	0	0	2	2	0.8	2
JC 3112.01	30	14	Storage	0	0.0	0.06	0	0	2	2	0.8	2
OPEN LEARNING SPACE 4102	2112	14	Office spaces	5	5.0	0.06	11	70	127	197	0.8	246
VENDING 1118	169	14	Corridors	0	0.0	0.06	0	0	10	10	0.8	13
CLASSROOM 1113	1173	14	Classroom	65	7.5	0.06	76	450	70	520	0.8	650
CLASSROOM 1109	1361	14	Classroom	65	7.5	0.06	88	569	82	651	0.8	814
CLASSROOM 1116	1085	14	Classroom	65	7.5	0.06	71	452	65	517	0.8	646
CLASSROOM 1114	1260	14	Classroom	65	7.5	0.06	82	570	76	646	0.8	807
MENS 1107	421	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
ELECT 1105	279	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
WOMENS 1112	518	14	Toilet rooms - public	0	0.0	0	U U	0	0	0	0.8	0
FOOT WASH 1102.02	111	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.8	0
REFLECTION ROOM 1102.01	399	14	Office spaces	5	5.0	0.06	2	40	24	64	0.8	80
CORRIDOR 1090.06	5280	14	Corridors Machanical/Floatrical	0	0.0	0.06	0	0	317	317	0.8	396
ELECT 2105	288	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.8	0
CORRIDOR 2090.06	5139 1023	14 14	Corridors	5	0.0	0.06 0.06	5	0 34	308 61	308 96	0.8	385 119
OPEN COLLABORATION 2103 ELEC 3105	289	14	Office spaces Mechanical/Electrical	0	5.0 0.0	0.06	0	0	0	96	0.8	
	163			5		0.06	1	16	10	26	0.8	33
WELLNESS ROOM 3101	4211	14	Office spaces Corridors	0	5.0	0.06	0	16	253		0.8	33
CORRIDOR 3090.07 OPEN COLLABORATION 3103	878	14	Office spaces	U	0.0 5.0	0.06	<i>U</i>	29	253 53	253 82	0.8	102
ELEC 4101	231	14	Mechanical/Electrical	0	0.0	0.06	0	0	0	0	0.8	0
Required Total OA for ur		CFM	ivieci iai iical/Liecti ical	U	0.0	U	U	U	U	U	0.0	U
required rotal or for all		O1 1V1										

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	۸.7	Cailing		Occupant	RP	RA Area OA Dete	# of Doomlo	Danala Outdan	A O tala	VBZ	Zone Air	VOZ
Room Name	AZ Floor Area (ft²)	Ceiling Height (ft)	Occupancy Category	Density (#/1000 ft²)	People OA Rate (cfm/person)	Area OA Rate (CFM/ft²)	by Code	People Outdoor Airflow (cfm)	Area Outdoor Airflow (cfm)	Breathing Zone Outdoor Airflow (cfm)	Dsitribution Effectiveness	Zone Outdoor Airflow (cfm)
STUDY ROOM 1208	193	14	Conference rooms	50	5.0	0.06	10	24	12	36	0.80	45
STUDY ROOM 2208	196	14	Conference rooms	50	5.0	0.06	10	24	12	36	0.80	45
STUDY ROOM 3208	196	14	Conference rooms	50	5.0	0.06	10	25	12	36	0.80	45
STUDY ROOM 4201 STUDY ROOM 4203	223 218	14 14	Conference rooms Conference rooms	50 50	5.0 5.0	0.06 0.06	11	28 27	13 13	41 40	0.80	51 50
STUDY ROOM 4209	207	14	Conference rooms	50	5.0	0.06	10	26	12	38	0.80	48
STUDY ROOM 4215	217	14	Conference rooms	50	5.0	0.06	11	27	13	40	0.80	50
STUDY ROOM 4221	271	14	Conference rooms	50	5.0	0.06	14	34	16	50	0.80	63
CLASSROOM 0211	784	14	Classroom	65	7.5	0.06	51	263	47	310	0.80	387
CLASSROOM 0209	601	14	Classroom	65	7.5	0.06	39	225	36	261	0.80	327
CLASSROOM 0207	763 806	14	Classroom	65 65	7.5 7.5	0.06 0.06	50	263 302	46	308 351	0.80	385 438
CLASSROOM 0205 CLASSROOM 0203	620	14 14	Classroom Classroom	65	7.5	0.06	52 40	232	48 37	270	0.80	337
CLASSROOM 1117	1036	14	Classroom	65	7.5	0.06	67	413	62	475	0.80	593
CLASSROOM 1205	1477	14	Classroom	65	7.5	0.06	96	450	89	539	0.80	673
CLASSROOM 1209	1300	14	Classroom	65	7.5	0.06	85	450	78	528	0.80	660
CLASSROOM 2117	1050	14	Classroom	65	7.5	0.06	68	413	63	476	0.80	594
CLASSROOM 2205	754	14	Classroom	65	7.5	0.06	49	263	45	308	0.80	385
CLASSROOM 2207 CLASSROOM 2209	742 652	14 14	Classroom Classroom	65 65	7.5 7.5	0.06 0.06	48 42	263 245	45 39	307 284	0.80	384 355
CLASSROOM 2209 CLASSROOM 2211	770	14	Classroom	65	7.5	0.06	50	263	46	309	0.80	386
CLASSROOM 3117	1036	14	Classroom	65	7.5	0.06	67	413	62	475	0.80	593
CLASSROOM 3205	730	14	Classroom	65	7.5	0.06	47	263	44	306	0.80	383
CLASSROOM 3207	730	14	Classroom	65	7.5	0.06	47	263	44	306	0.80	383
CLASSROOM 3209	613	14	Classroom	65	7.5	0.06	40	230	37	267	0.80	333
CLASSROOM 3211	748	14	Classroom	65	7.5	0.06	49	263	45	307	0.80	384
SEMINAR 4222 ELECT CLOSET 1202.01	367 111	14	Classroom Mechanical/Electrical	65	7.5 0.0	0.06	24	138	22 0	160	0.80	200
ELECT CLOSET 1202.01 ELECT CLOSET 2202.01	133	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
ELECT CLOSET 3202.01	128	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
JC 0206.01	68	14	Storage	0	0.0	0.06	0	0	4	4	0.80	5
JC 1212.01	84	14	Storage	0	0.0	0.06	0	0	5	5	0.80	6
JC 2212.01	85	14	Storage	0	0.0	0.06	0	0	5	5	0.80	6
JC 3212.01	85	14	Storage	0	0.0	0.06	0	0	5	5	0.80	6
LEARNING LOUNGE 1121 LEARNING LOUNGE 2021	544 552	14 14	Classroom Classroom	65 65	7.5 7.5	0.06 0.06	35 36	188 188	33 33	220 221	0.80	275 276
LEARNING LOUNGE 2021 LEARNING LOUNGE 3121	548	14	Classroom	65	7.5	0.06	36	188	33	220	0.80	275
FACILITY 0087.11	114	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
WOMEN 0208	305	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
MENS 1214	521	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
MENS 2214	517 517	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
MENS 3214 OPEN ALCOVE 4211	218	14	Toilet rooms - public Office spaces	5	0.0 5.0	0.06	1	7	0 13	20	0.80	0 25
OPEN ALCOVE 4211 OPEN ALCOVE 4213	217	14	Office spaces	5	5.0	0.06	1	7	13	20	0.80	25
OPEN LEARNING LOUNGE 1202	1100	14	Office spaces	5	5.0	0.06	6	37	66	103	0.80	128
OPEN LEARNING LOUNGE 2202	1090	14	Office spaces	5	5.0	0.06	5	36	65	102	0.80	127
OPEN LEARNING LOUNGE 3202	1091	14	Office spaces	5	5.0	0.06	5	36	65	102	0.80	127
SEMINAR 1206	774	14	Classroom	65	7.5	0.06	50	290	46	336	0.80	421
MEN 0206 WOMENS 2212	285 583	14	Toilet rooms - public Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
WOMENS 3212	588	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
STORAGE 414-A	26	14	Storage	0	0.0	0.06	0	0	2	2	0.80	2
OFFICE 4122.03	105	14	Office spaces	5	5.0	0.06	1	10	6	17	0.80	21
OFFICE 4122.02	104	14	Office spaces	5	5.0	0.06	1	10	6	17	0.80	21
OFFICE 4122.04	112	14	Office spaces	5	5.0	0.06	1	11	7	18	0.80	22
IDF 4124	112 272	14	Mechanical/Electrical	0	0.0	0.06	0	27	0 16	0 44	0.80	54
C&IT OFFICE 4122 OFFICE 4122.01	100	14 14	Office spaces Office spaces	5	5.0 5.0	0.06	1	10	6	16	0.80	20
OPEN LEARNING LOUNGE 4126	2125	14	Office spaces	5	5.0	0.06	11	71	127	198	0.80	248
CORRIDOR 4090.06	1637	14	Corridors	0	0.0	0.06	0	0	98	98	0.80	123
FOCUS ROOM 4217	110	14	Conference rooms	50	5.0	0.06	5	14	7	20	0.80	25
FOCUS ROOM 4219	109	14	Conference rooms	50	5.0	0.06	5	14	7	20	0.80	25
FOCUS ROOM 4205	110	14	Conference rooms	50	5.0	0.06	6	14	7	20	0.80	26
FOCUS ROOM 4207 ELECT 0210.02	117 106	14 14	Conference rooms Mechanical/Electrical	50	5.0 0.0	0.06	6	15 0	7	22	0.80	27 0
IT 0210.03	123	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
STUDY ROOM 0212	265	14	Conference rooms	50	5.0	0.06	13	40	16	56	0.80	70
ELECT GEN 0210.01	314	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
ACCESSORY STORAGE 0201.01	85	14	Storage	0	0.0	0.06	0	0	5	5	0.80	6
FACILITY 0087.10	83 157	14 14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
FACILITY 0087.09 CORRIDOR 0090.06	3691	14	Mechanical/Electrical Corridors	0	0.0	0.06	0	0	221	221	0.80	277
CLASSROOM 0201	577	14	Classroom	65	7.5	0.06	37	188	35	222	0.80	278
WOMENS 1212	583	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
ALL GENDER 1210.01	133	14	Toilet rooms - public	0	0.0	0	0	0	0	0	0.80	0
MDF 1210.03	230	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
ELECT 1210.02 LECTURE 1216	125 2200	14 14	Mechanical/Electrical Classroom	0 65	0.0 7.5	0.06	143	638	0 132	770	0.80	962
CORRIDOR 1090.08	4973	14	Classroom	0	0.0	0.06	0	030	298	298	0.80	373
LECTURE 2216	2200	14	Classroom	65	7.5	0.06	143	638	132	770	0.80	962
ELECT 2210.02	132	14	Mechanical/Electrical	0	0.0	0	0	0	0	0_	0.80	0
IT 2210.03	166	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
SEMINAR 2206	833	14	Classroom	65	7.5	0.06	54	312	50	362	0.80	453
ALL GENDER 2210.01 ELEV MACHINE ROOM 1201.01	103 73	14	Toilet rooms - public Mechanical/Electrical	0	0.0	<u>U</u>	0	0	0	U	0.80	0
CLASSROOM 1201.01	1075	14	Niecnanicai/Electricai Classroom	65	7.5	0.06	70	413	65	477	0.80	596
ACCESSORY STORAGE 2202.1	68	14	Storage	00	0.0	0.06	0	0	4	4	0.80	5
CLASSROOM 2201	1100	14	Classroom	65	7.5	0.06	72	413	66	479	0.80	598
STUDY ROOM 2122	243	14	Conference rooms	50	5.0	0.06	12	30	15	45	0.80	56
MECH 0202	5119	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
CORRIDOR 2090.06	5139	14	Classroom	0	0.0	0.06	0	0	308	308	0.80	385
LECTURE 3216 ACCESSORY STORAGE 3201.01	2200 80	14	Classroom Storage	65	7.5 0.0	0.06 0.06	143	638	132 5	770	0.80	962 6
MCCESSON I STONAGE SZULIUI	1070	14	Classroom	65	7.5	0.06	70	413	64	477	0.80	596
CLASSROOM 3201	207	14	Conference rooms	50	5.0	0.06	10	26	12	38	0.80	48
CLASSROOM 3201 STUDY ROOM 3122				0	0.0	0	0	0	0	0	0.80	0
	131	14	Mechanical/Electrical	•				<u> </u>		<u> </u>		
STUDY ROOM 3122 ELECT 3210.02 IT 3210.03	131 163	14	Mechanical/Electrical	0	0.0	0	0	0	0	0	0.80	0
STUDY ROOM 3122 ELECT 3210.02 IT 3210.03 SEMINAR 3206	131 163 831	14 14	Mechanical/Electrical Classroom	0 65	0.0 7.5	0 0.06	54	312	0 50	0 362	0.80	452
STUDY ROOM 3122 ELECT 3210.02 IT 3210.03	131 163	14	Mechanical/Electrical	0	0.0			•	0 50 0 322	0 362 0 322		

AHU-2-S VENTILATION SUMMARY

Calculations



WSU State Hall Renovation

5143 Cass Ave, Detroit, MI 48202

SMITHGROUP

500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

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DDENDUM NO.2	3	20MAY22
AN REVIEW	- 2	13MAY22
DS	_ 1	28APR22
EALS AND SIGNATURES		
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REV DATE

ISSUED FOR

SHEET TITLE

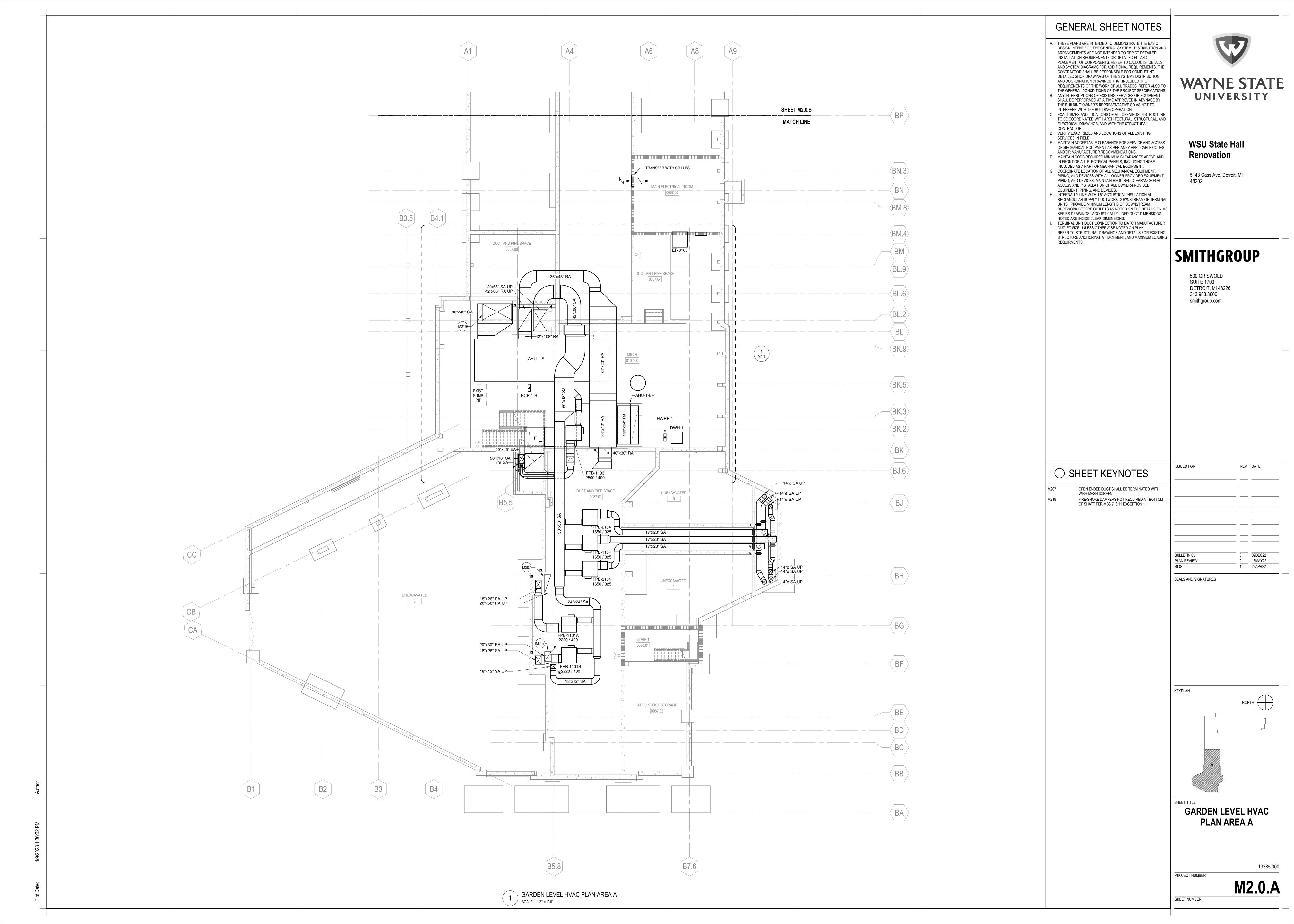
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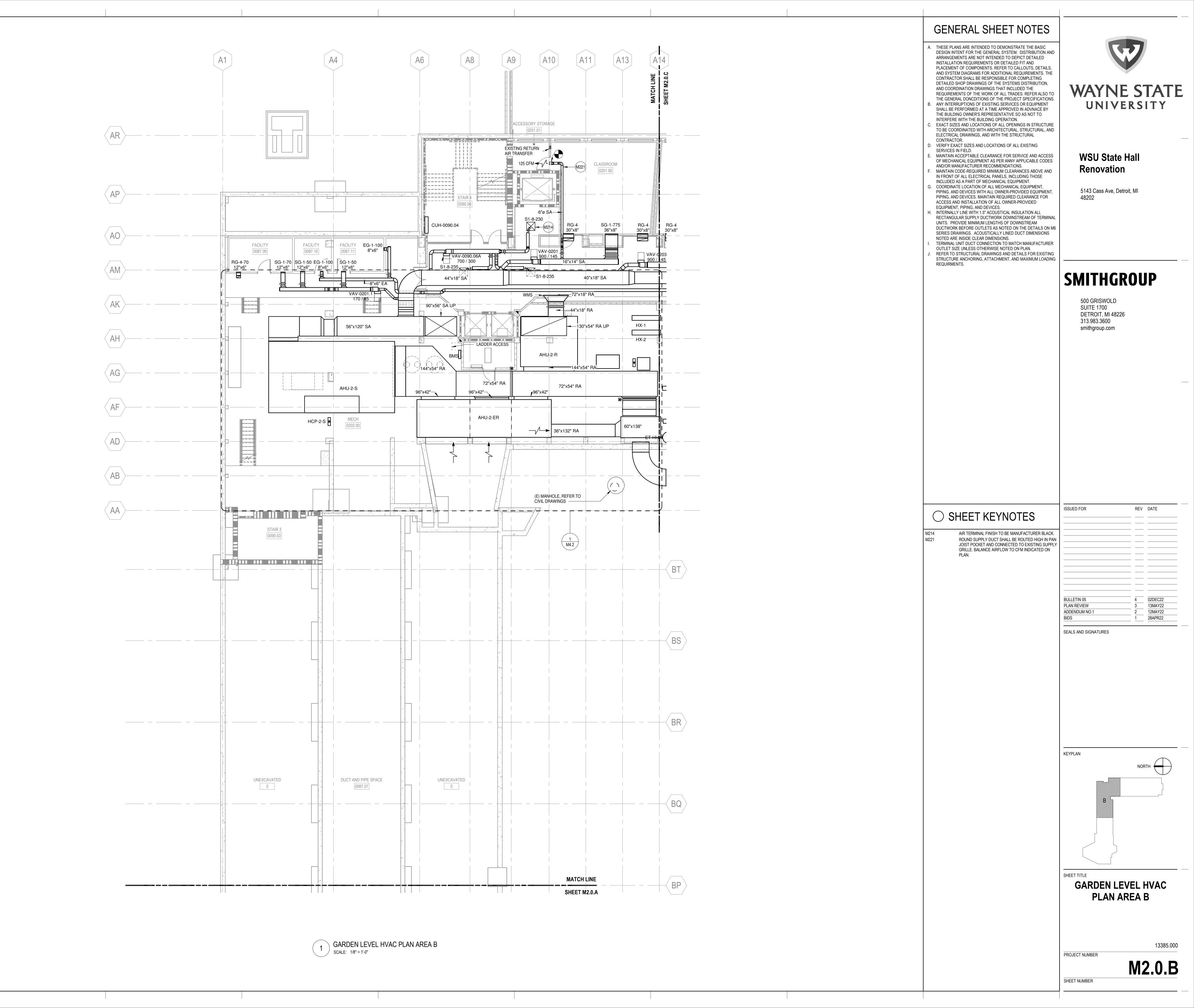
MECHANICAL VENTILATION SCHEDULES

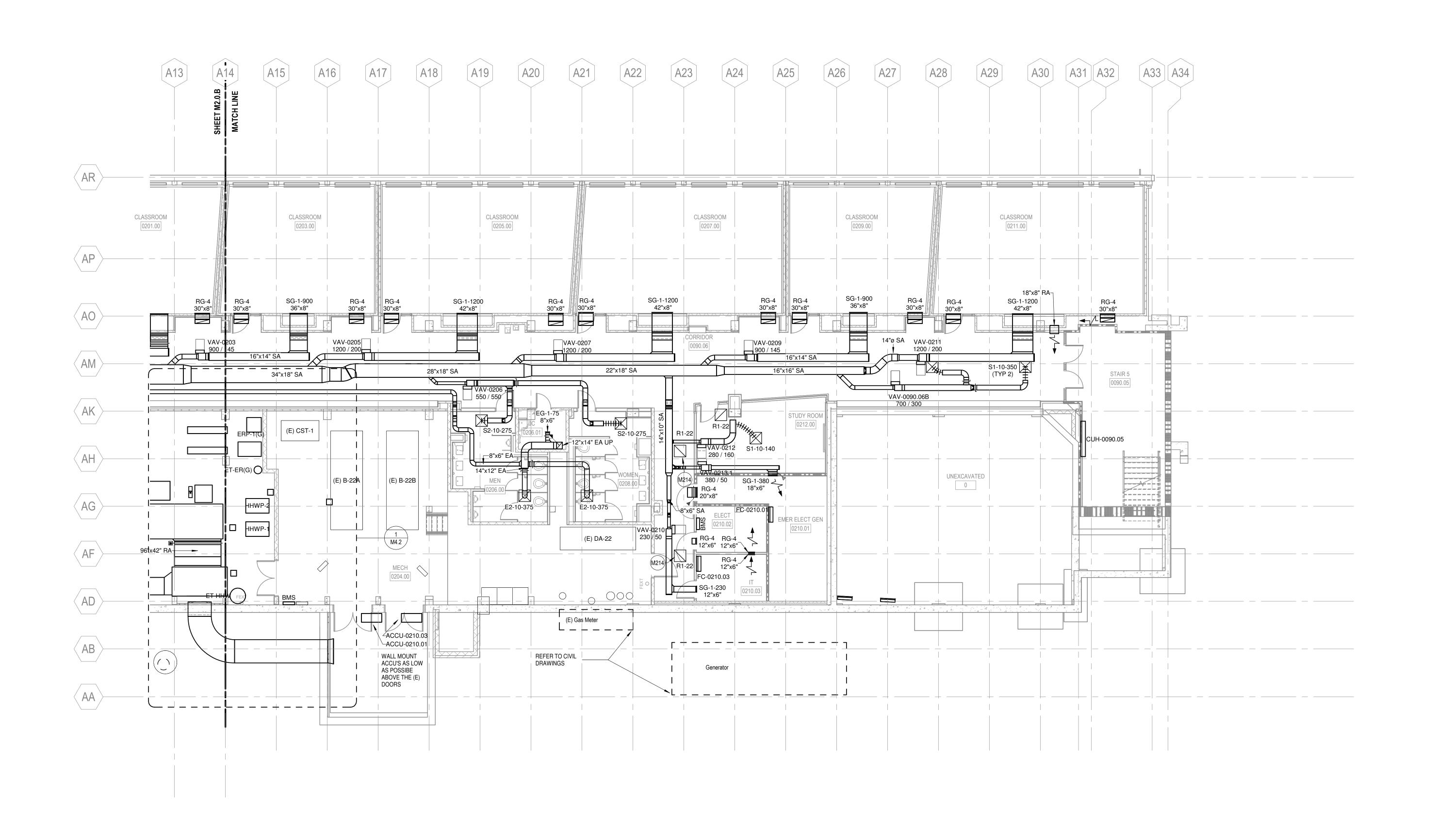
13385.000

PROJECT NUMBER

M0.2







1 GARDEN LEVEL HVAC PLAN AREA C SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES

- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.
- AND COORDINATION DRAWINGS THAT INCLUDED THE
 REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO
 THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.
 ANY INTERRUPTIONS OF EXISTING SERVICES OR EQUIPMENT
 SHALL BE PERFORMED AT A TIME APPROVED IN ADVNACE BY
 THE BUILDING OWNER'S REPRESENTATIVE SO AS NOT TO
- INTERFERE WITH THE BUILDING OPERATION.
 EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE
 TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND
 ELECTRICAL DRAWINGS, AND WITH THE STRUCTURAL
- CONTRACTOR.

 VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING SERVICES IN FIELD.
- E. MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS.
- F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.

 G. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT,
- PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES.

 I. INTERNALLY LINE WITH 1.5" ACOUSTICAL INSULATION ALL RECTANGULAR SUPPLY DUCTWORK DOWNSTREAM OF TERMINAL UNITS. PROVIDE MINIMUM LENGTHS OF DOWNSTREAM DUCTWORK BEFORE OUTLETS AS NOTED ON THE DETAILS ON M6 SERIES DRAWINGS. ACOUSTICALLY LINED DUCT DIMENSIONS
- NOTED ARE INSIDE CLEAR DIMENSIONS.
 TERMINAL UNIT DUCT CONNECTION TO MATCH MANUFACTURER
 OUTLET SIZE UNLESS OTHERWISE NOTED ON PLAN.
 REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING
 STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING
 REQUIRMENTS.

WAYNE STATE UNIVERSITY

WSU State Hall Renovation

5143 Cass Ave, Detroit, MI 48202

SMITHGROUP

500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

SHEET KEYNOTES

AIR TERMINAL FINISH TO BE MANUFACTURER BLACK.

ISSUED FOR REV DATE

SEALS AND SIGNATURES

BULLETIN 05

PLAN REVIEW

KEYPLAN

NORTH

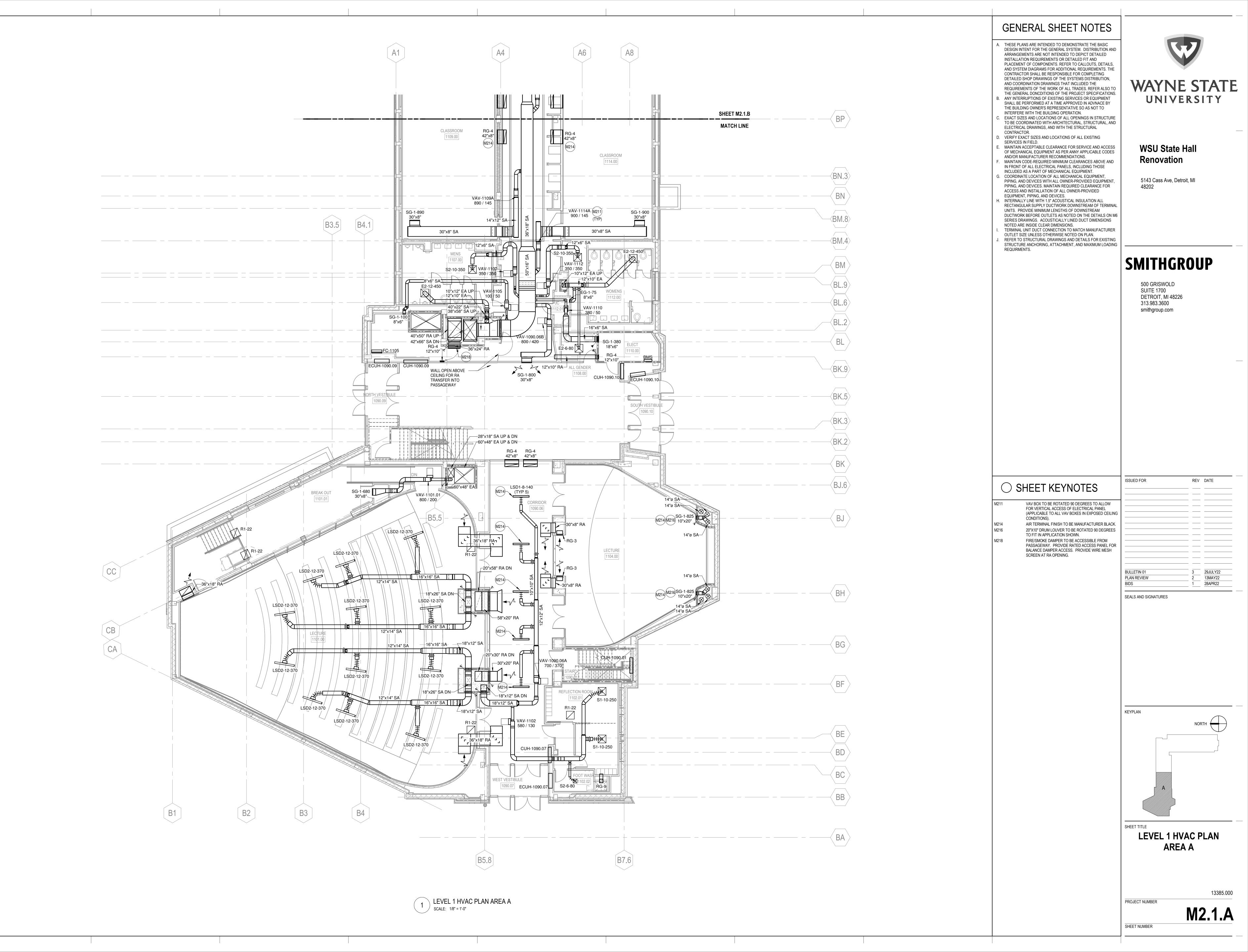
GARDEN LEVEL HVAC
PLAN AREA C

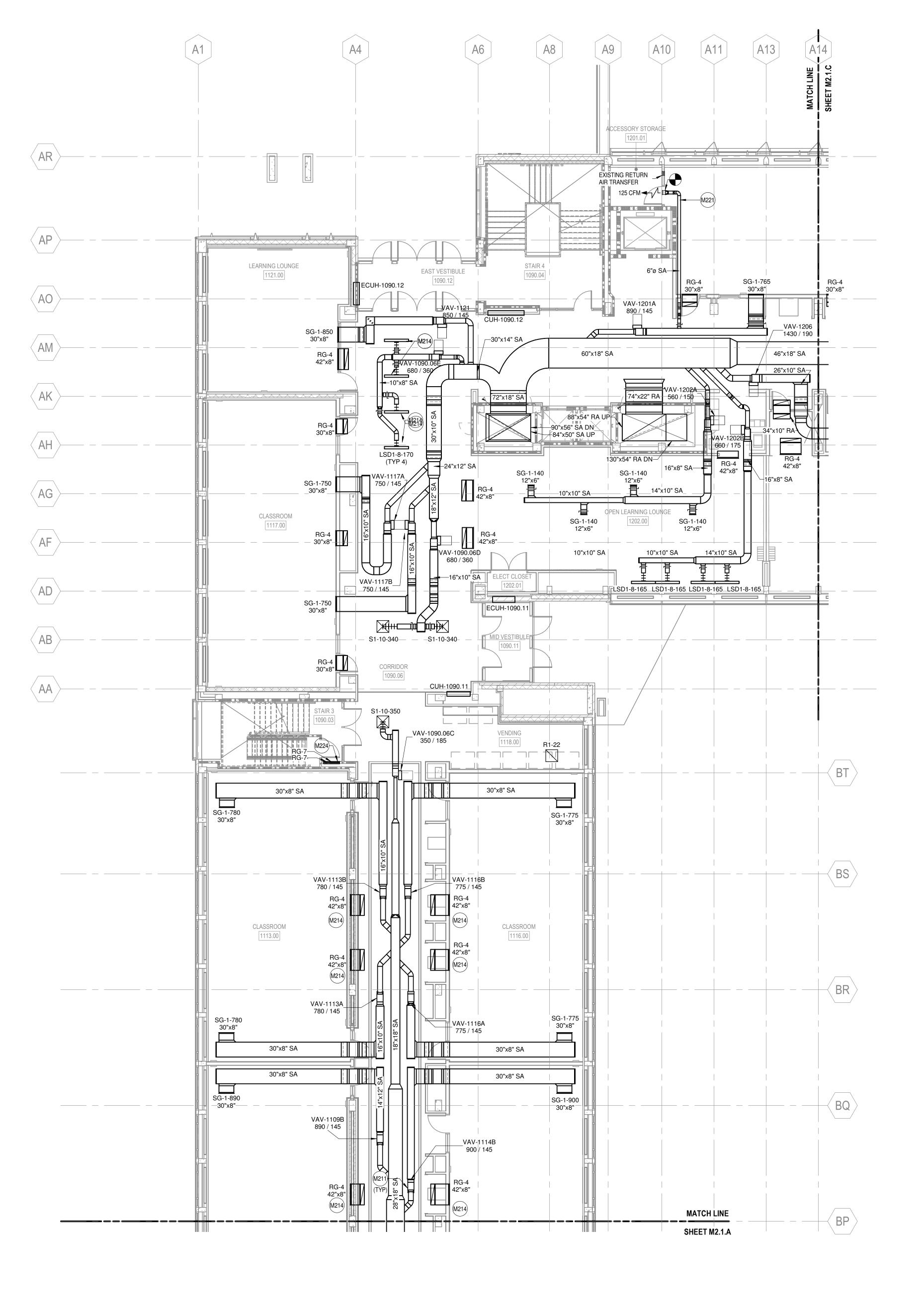
SHEET NUMBER

PROJECT NUMBER

M2.0.C

Plot Date:





- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS
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 - EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS, AND WITH THE STRUCTURAL CONTRACTOR.
 - VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING SERVICES IN FIELD.
 MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS
- OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS.

 F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.
- G. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES.
 H. INTERNALLY LINE WITH 1.5" ACOUSTICAL INSULATION ALL

RECTANGULAR SUPPLY DUCTWORK DOWNSTREAM OF TERMINAL

UNITS. PROVIDE MINIMUM LENGTHS OF DOWNSTREAM
DUCTWORK BEFORE OUTLETS AS NOTED ON THE DETAILS ON M6
SERIES DRAWINGS. ACOUSTICALLY LINED DUCT DIMENSIONS
NOTED ARE INSIDE CLEAR DIMENSIONS.

I. TERMINAL UNIT DUCT CONNECTION TO MATCH MANUFACTURER
OUTLET SIZE UNLESS OTHERWISE NOTED ON PLAN.

J. REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING
STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING
REQUIRMENTS.

AND LS, THE WAYNE STATE UNIVERSITY

WSU State Hall Renovation

5143 Cass Ave, Detroit, MI

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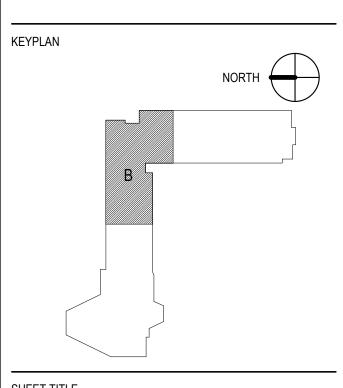
500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

REV DATE

○ SHEET KEYNOTES PAN JOIST ENCLOSURE FOR RETURN AIR PATH TO BE COORDINATED WITH ARCHITECT. VAV BOX TO BE ROTATED 90 DEGREES TO ALLOW FOR VERTICAL ACCESS OF ELECTRICAL PANEL (APPLICABLE TO ALL VAV BOXES IN EXPOSED CEILING AIR TERMINAL FINISH TO BE MANUFACTURER BLACK. ROUND SUPPLY DUCT SHALL BE ROUTED HIGH IN PAN JOIST POCKET AND CONNECTED TO EXISTING SUPPLY GRILLE. BALANCE AIRFLOW TO CFM INDICATED ON TWO RG-7 GRILLES TO BE INSTALLED AT +-6" AFF AND BULLETIN 05 +-36" AFF FOR AIRFLOW OVER FIN TUBE. CLOSE OFF BULLETIN 01 29JULY22 WALL CAVITY ABOVE THE OUTLET GRILLE. PLAN REVIEW

SEALS AND SIGNATURES

ADDENDUM NO.



LEVEL 1 HVAC PLAN
AREA B

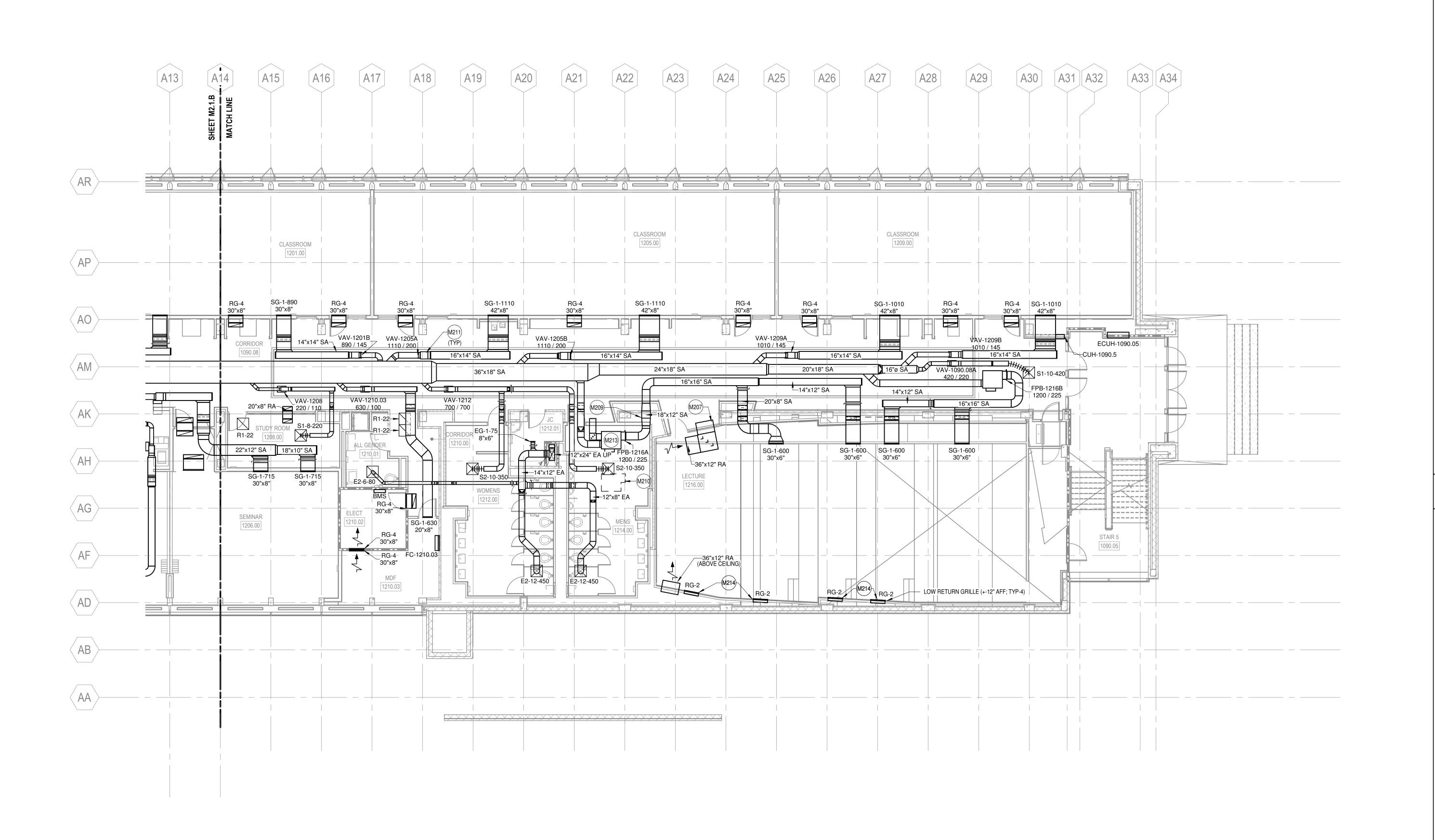
PROJECT NUMBER

SHEET NUMBER

M2.1.B

13385.000

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



LEVEL 1 HVAC PLAN AREA C

GENERAL SHEET NOTES

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EQUIPMENT, PIPING, AND DEVICES.

REQUIRMENTS.

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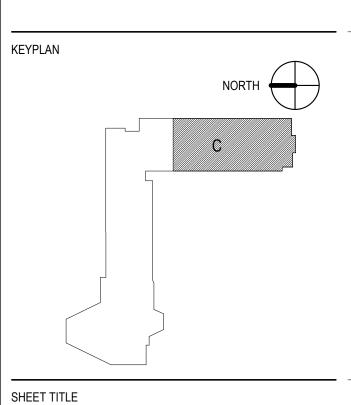
\bigcirc	SHEET KEYNOTES			
1	PAN JOIST ENCLOSURE FOR RETURN AIR PATH TO BE COORDINATED WITH ARCHITECT.			
7	OPEN ENDED DUCT SHALL BE TERMINATED WITH WISH MESH SCREEN.			
9	FIELD VERIFY EXACT LOCATION OF EXISTING CHW PIPING AND ADJUST DUCT SIZE AND ROUTE TO AVOID.			
0	ALTERNATIVE LOCATION FOR FPB-1216A. REFERENCE NOTE M209 AND REROUTE DUCT EAST OF COLUMN LINE A22 IF SUFFICIENT SPACE IS NOT AVAILABLE.			
1	VAV BOX TO BE ROTATED 90 DEGREES TO ALLOW FOR VERTICAL ACCESS OF ELECTRICAL PANEL (APPLICABLE TO ALL VAV BOXES IN EXPOSED CEILING CONDITIONS).		<u> </u>	
3	ACCESS PANEL IN GYP CEILING TO BE PROVIDED FOR FPB UPON INSTALLATION.	BULLETIN 05	3	02DEC22

AIR TERMINAL FINISH TO BE MANUFACTURER BLACK.

SEALS AND SIGNATURES

ISSUED FOR

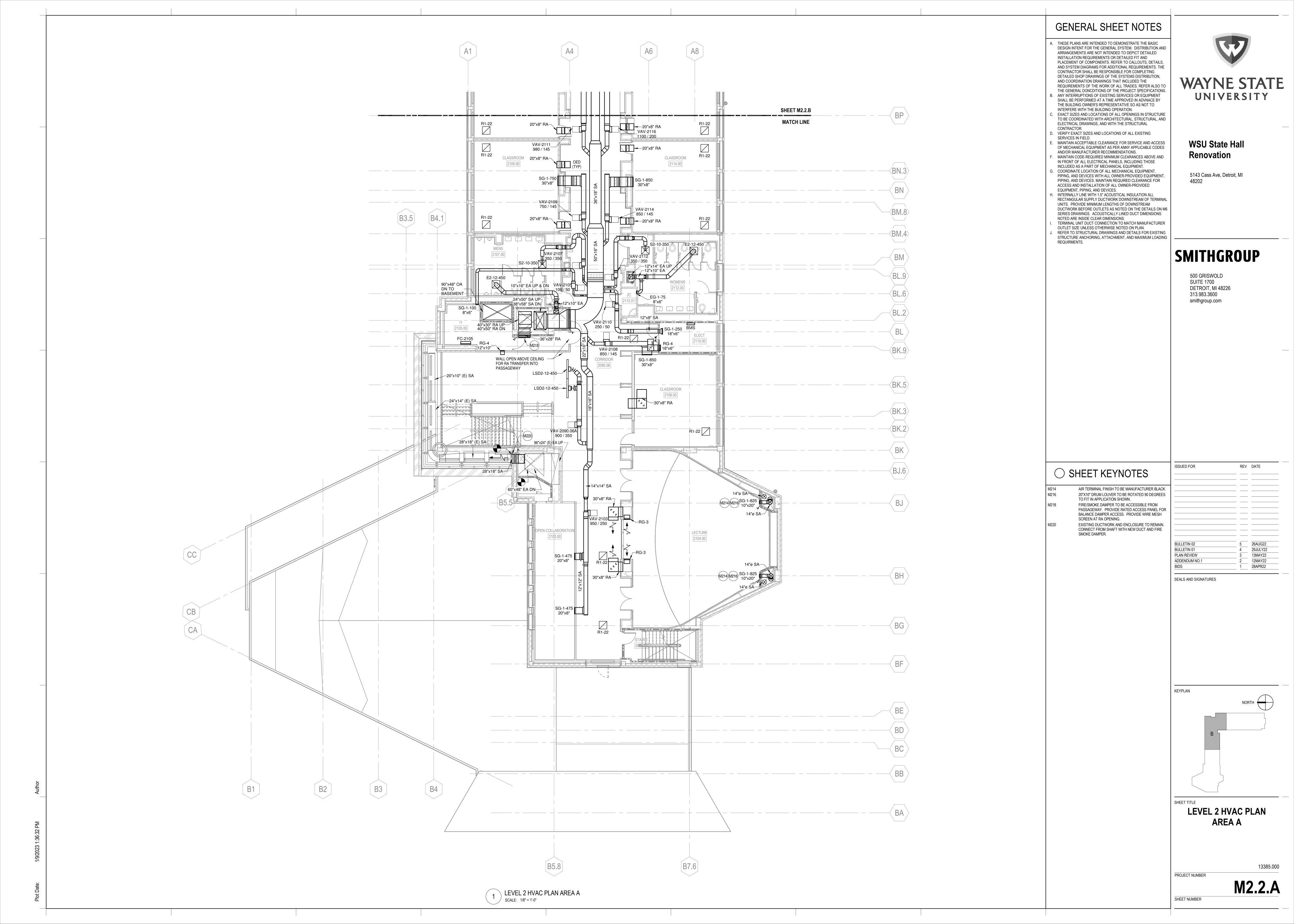
REV DATE

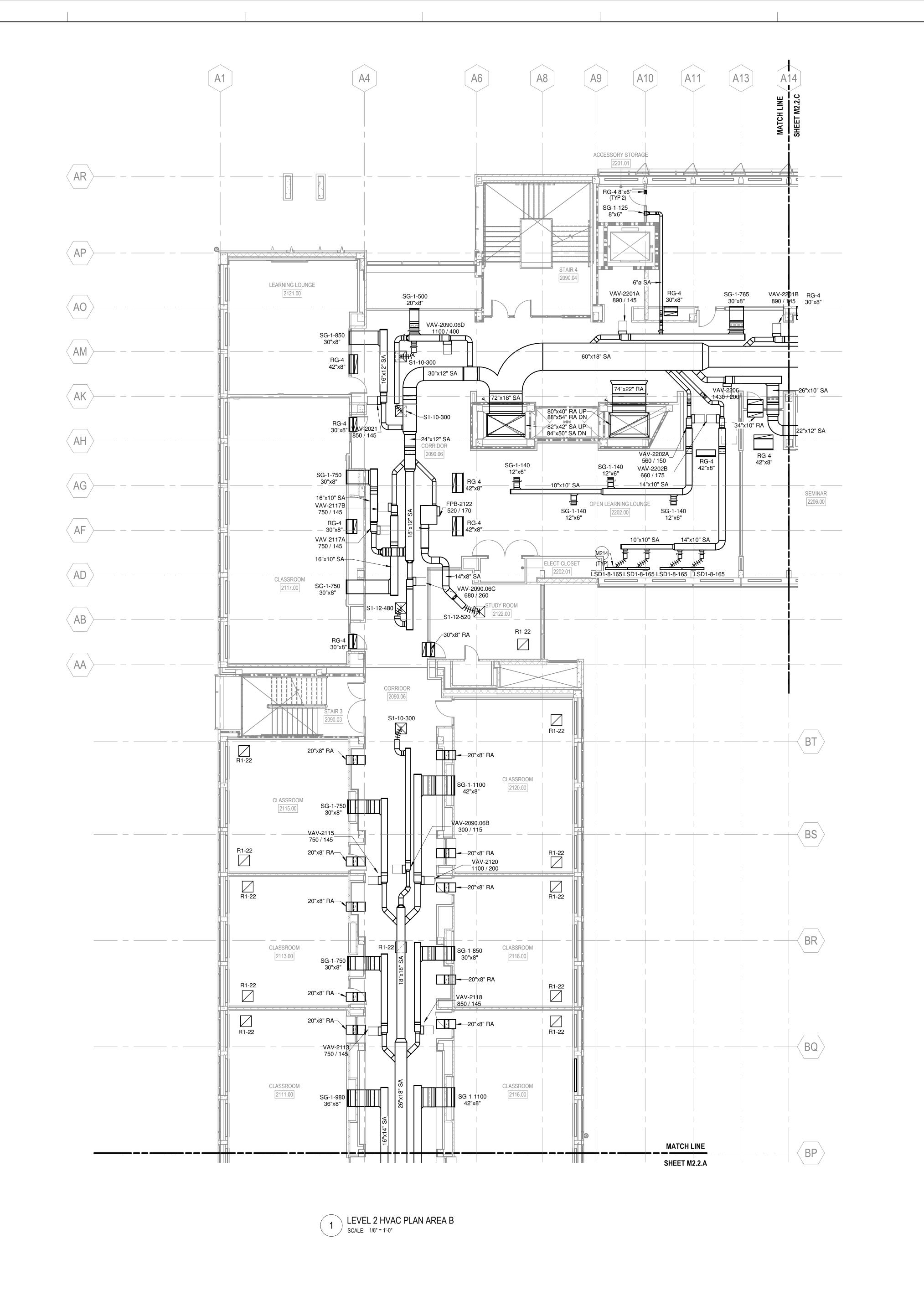


LEVEL 1 HVAC PLAN AREA C

PROJECT NUMBER

M2.1.C





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○ SHEET KEYNOTES

AIR TERMINAL FINISH TO BE MANUFACTURER BLACK.

RFI 035 PLAN REVIEW ADDENDUM NO.

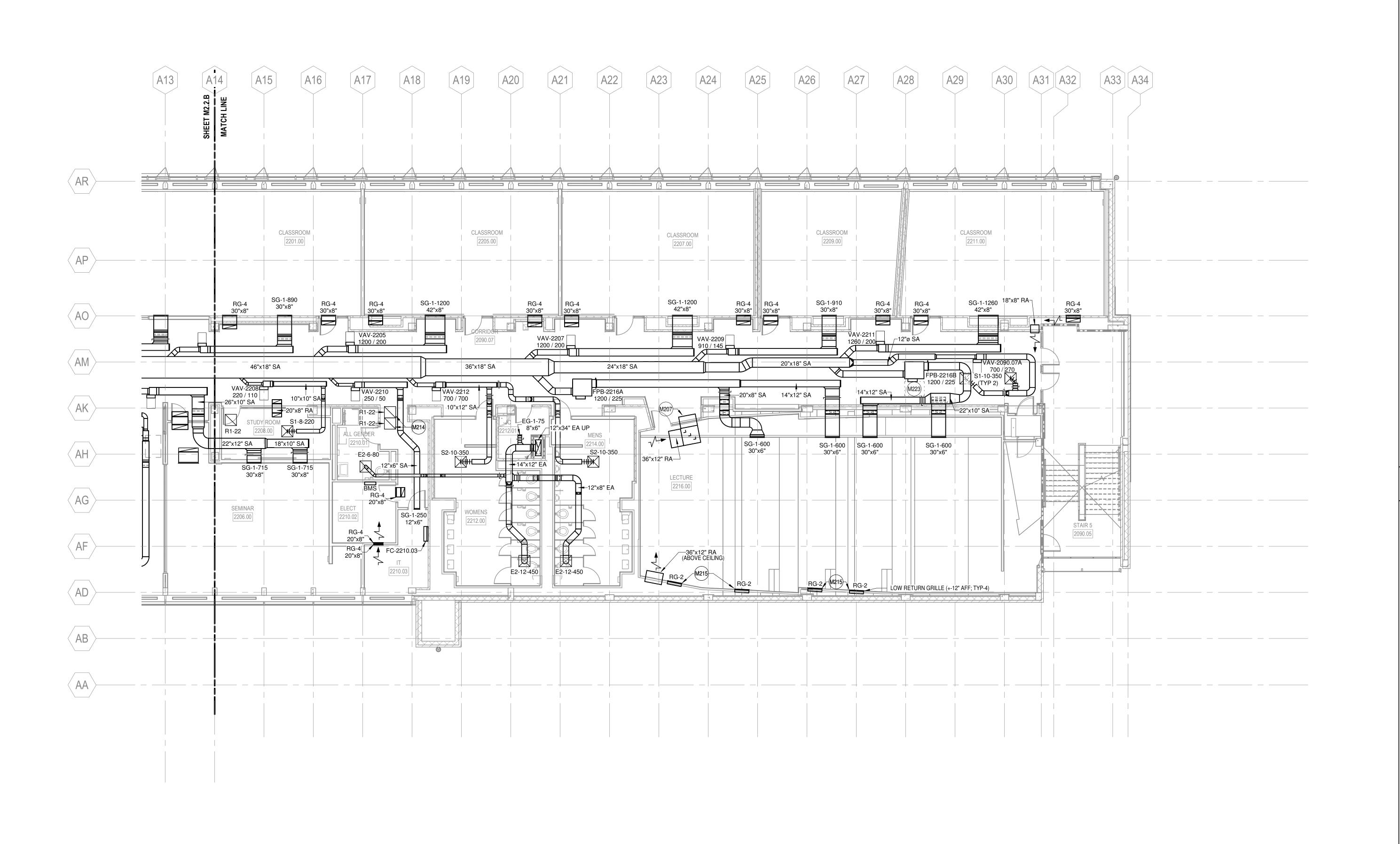
REV DATE

SEALS AND SIGNATURES

KEYPLAN

LEVEL 2 HVAC PLAN AREA B

13385.000 PROJECT NUMBER M2.2.B



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

GENERAL SHEET NOTES

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○ SHEET KEYNOTES

OPEN ENDED DUCT SHALL BE TERMINATED WITH WISH MESH SCREEN. AIR TERMINAL FINISH TO BE MANUFACTURER BLACK.

DISCONNECT SWITCH.

30"X42" CLEARANCE FOR REMOTE MOUNTED

AIR TERMINAL FINISH TO BE MANUFACTURER GREY. BULLETIN 05 PLAN REVIEW

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

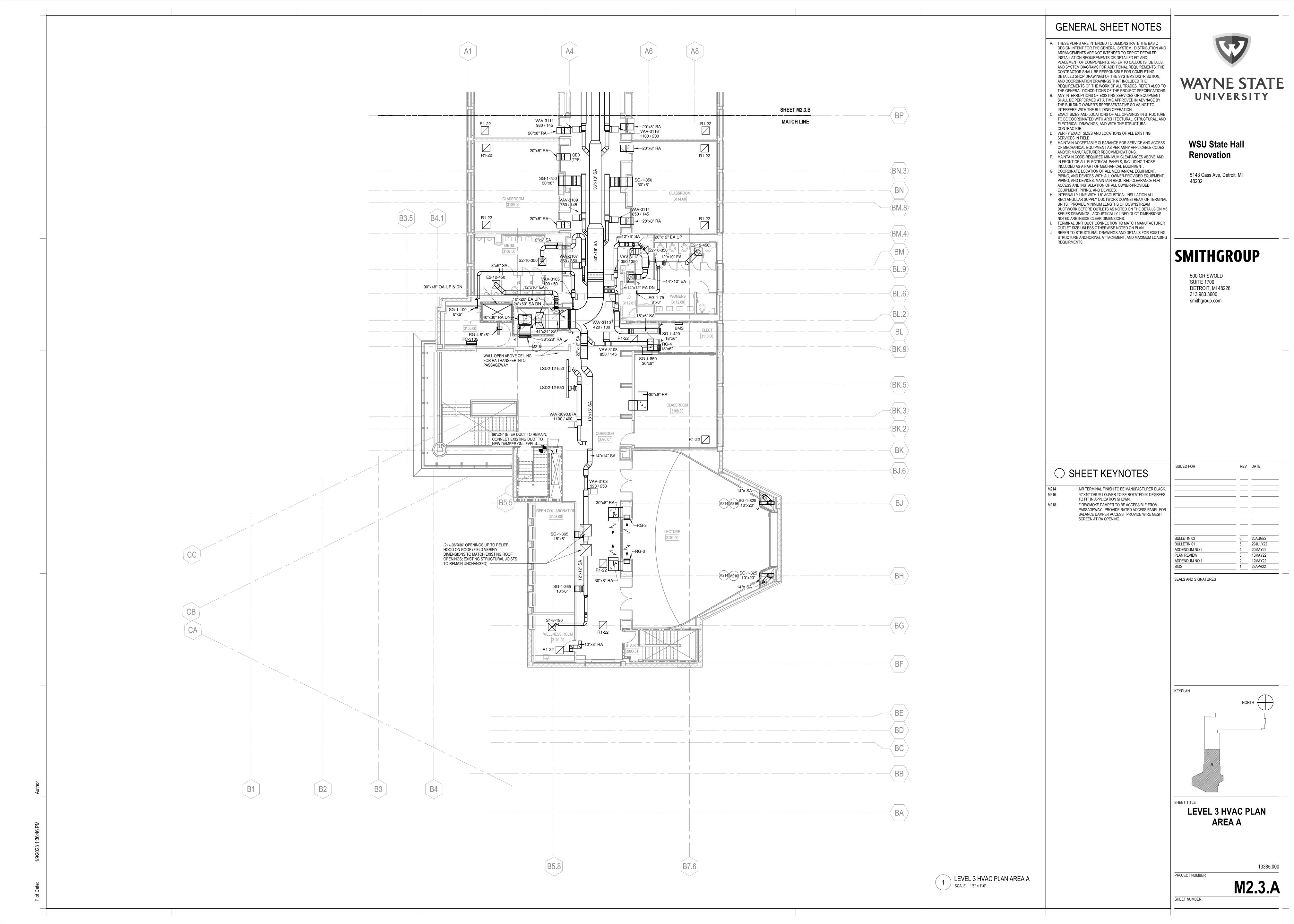
KEYPLAN

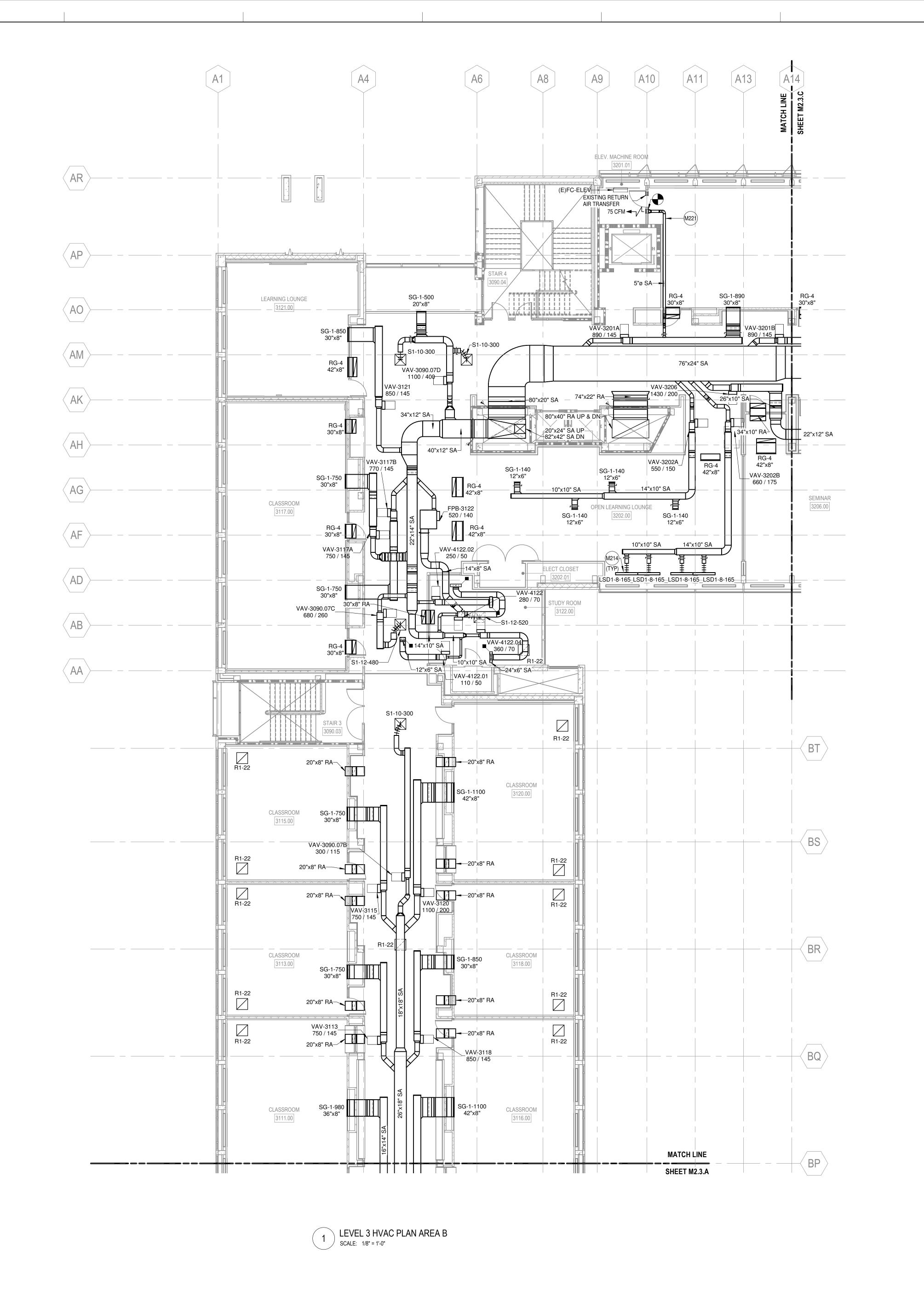
LEVEL 2 HVAC PLAN AREA C

PROJECT NUMBER

SHEET NUMBER

M2.2.C





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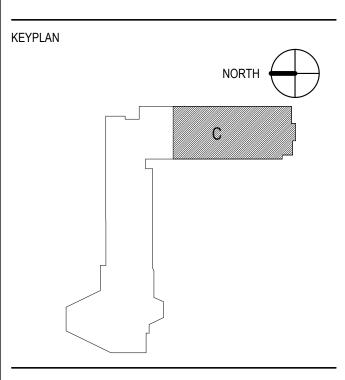
○ SHEET KEYNOTES

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		· -
ULLETIN 05	8	02DEC22
FI 145	7	26SEPT22
FI 143	6	26SEPT22
ULLETIN 01	5	29JULY22
FI 035	4	11JUL22
LAN REVIEW	3	13MAY22
DDENDUM NO.1	2	12MAY22
IDS	<u>1</u>	28APR22

REV DATE

SEALS AND SIGNATURES

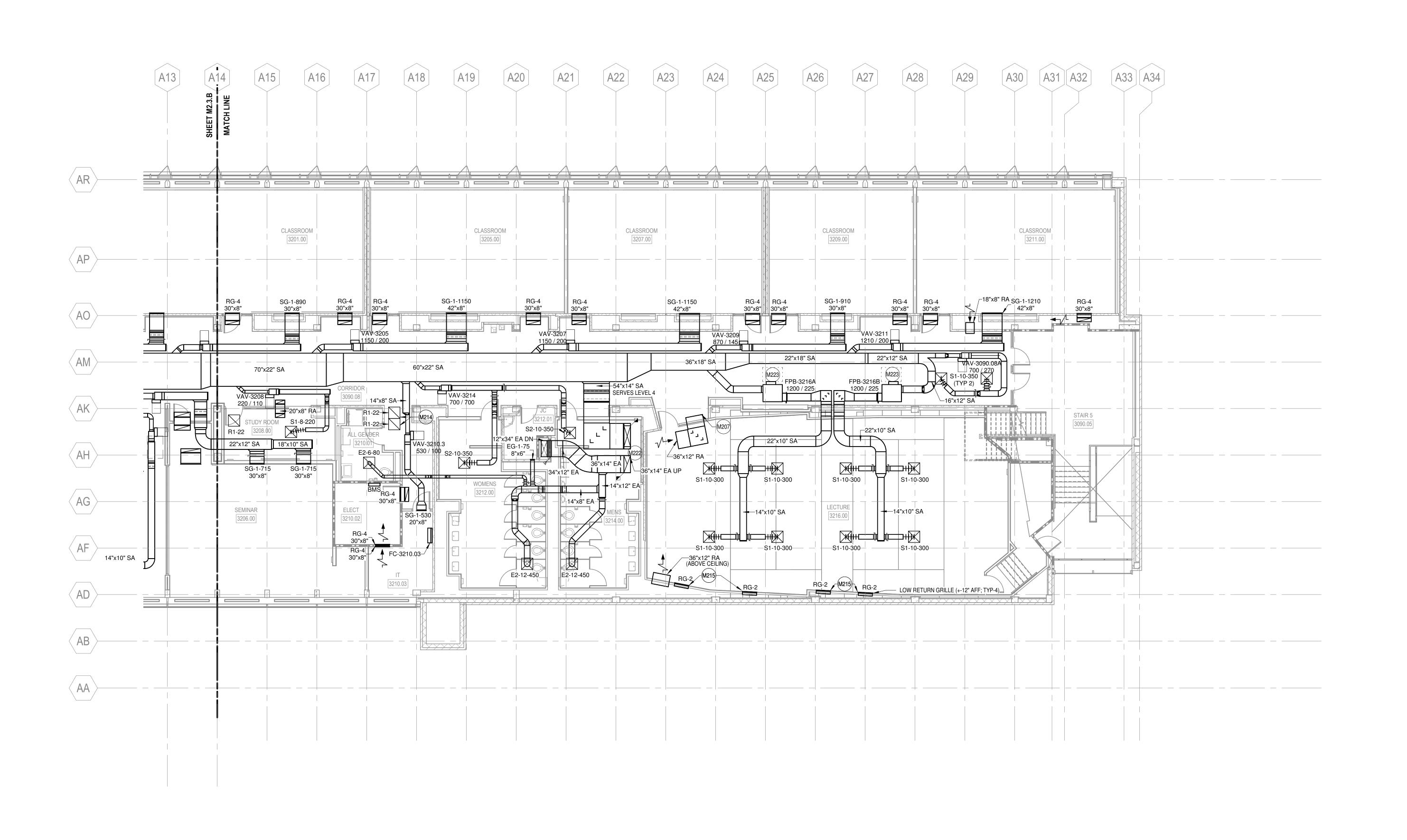


LEVEL 3 HVAC PLAN AREA B

PROJECT NUMBER

SHEET NUMBER

M2.3.B



1 LEVEL 3 HVAC PLAN AREA C SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES

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○ SHEET KEYNOTES

FIRE/SMOKE DAMPERS TO BE ACCESSED FROM

OPEN ENDED DUCT SHALL BE TERMINATED WITH WISH MESH SCREEN. AIR TERMINAL FINISH TO BE MANUFACTURER BLACK. AIR TERMINAL FINISH TO BE MANUFACTURER GREY.

DISCONNECT SWITCH.

FLOOR ABOVE

30"X42" CLEARANCE FOR REMOTE MOUNTED BULLETIN 05 BULLETIN 02 BULLETIN 01

PLAN REVIEW

ISSUED FOR

REV DATE

14OCT22

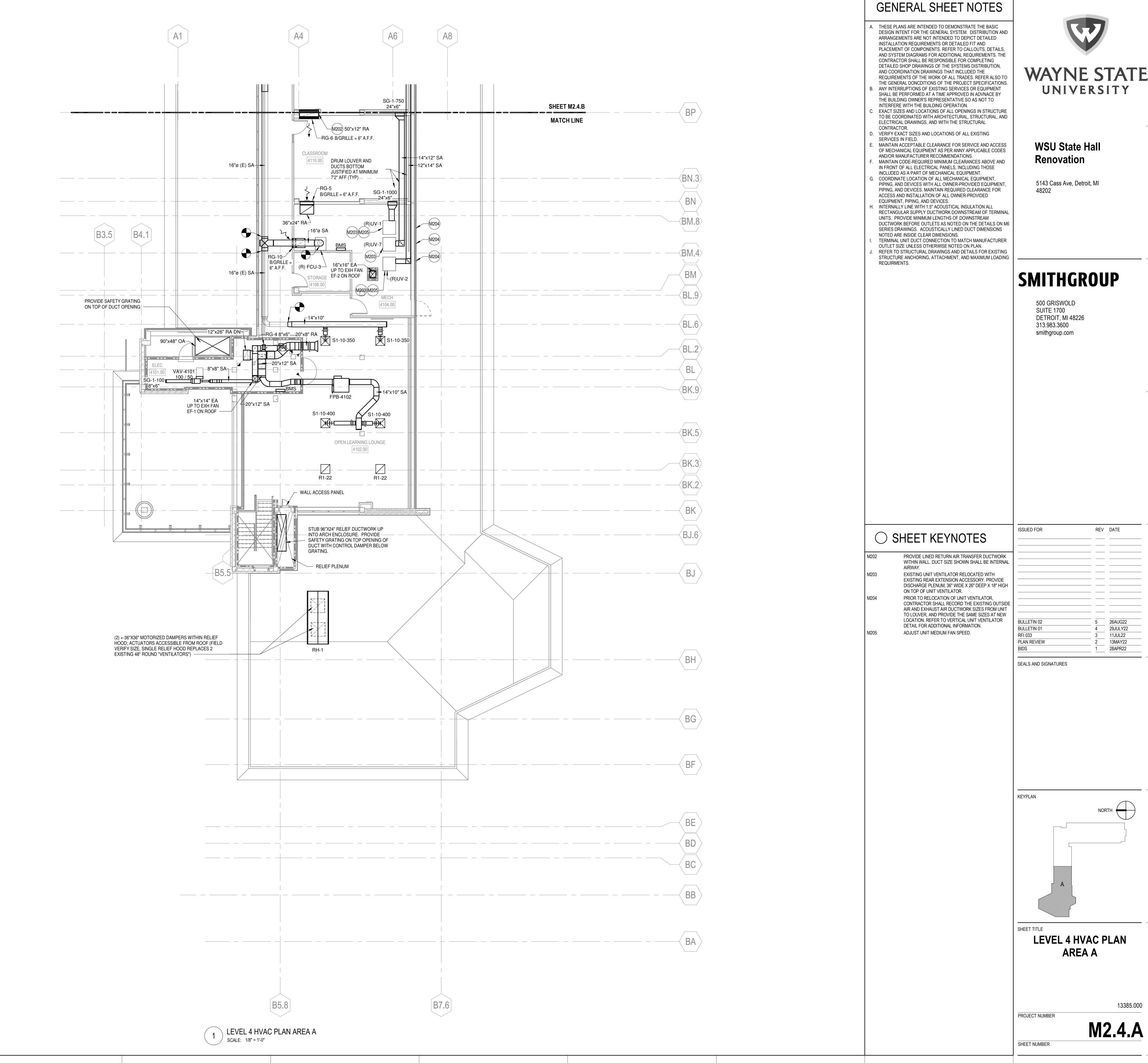
SEALS AND SIGNATURES

KEYPLAN

LEVEL 3 HVAC PLAN AREA C

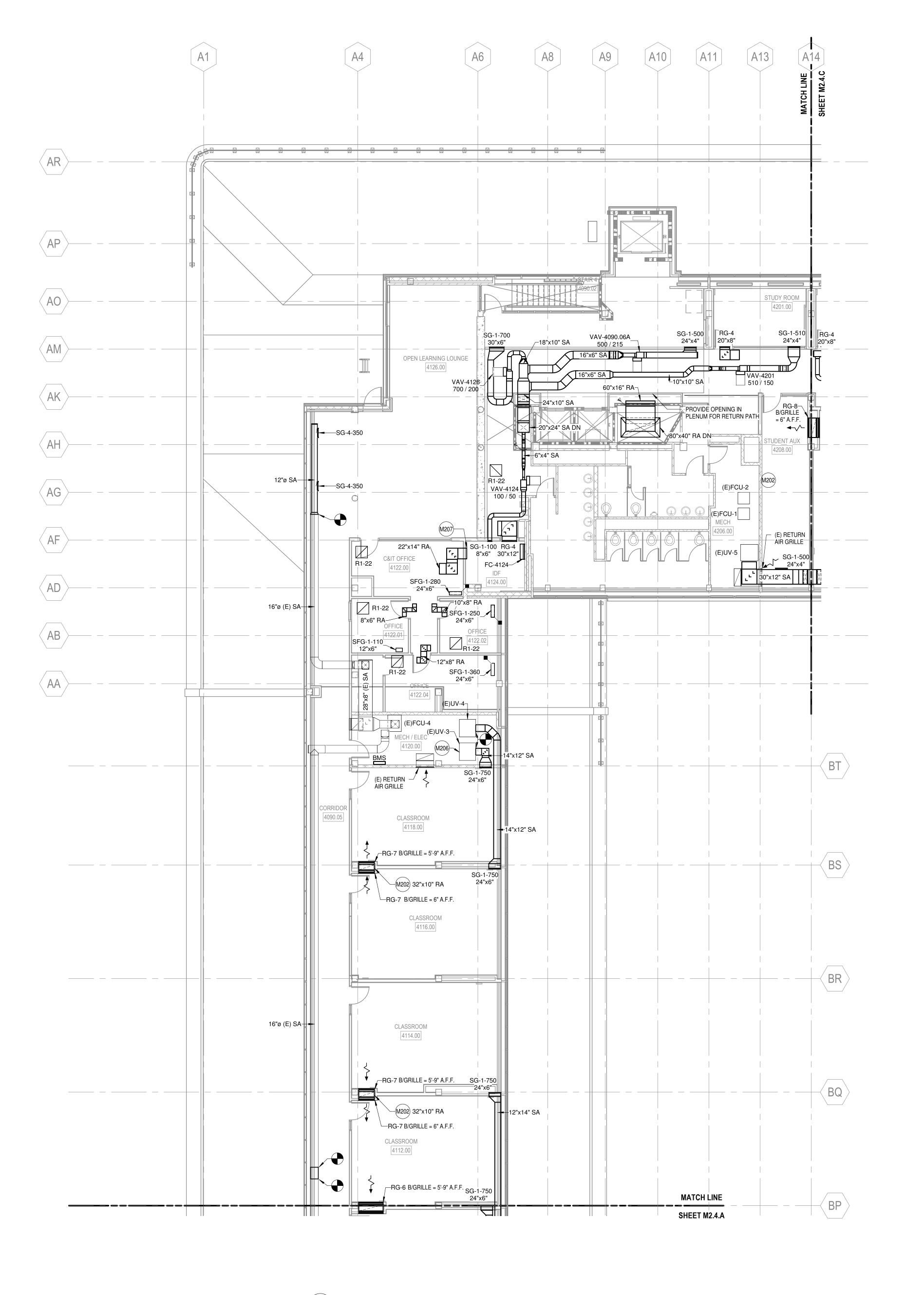
PROJECT NUMBER

M2.3.C SHEET NUMBER



WAYNE STATE UNIVERSITY

LEVEL 4 HVAC PLAN



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\bigcirc	SHEET	KEYNOTES	
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PROVIDE LINED RETURN AIR TRANSFER DUCTWORK WITHIN WALL. DUCT SIZE SHOWN SHALL BE INTERNAL ADJUST UNIT TO LOW FAN SPEED. OPEN ENDED DUCT SHALL BE TERMINATED WITH

WISH MESH SCREEN.

BULLETIN 01 RFI PB004 17JUN22 PLAN REVIEW

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

KEYPLAN

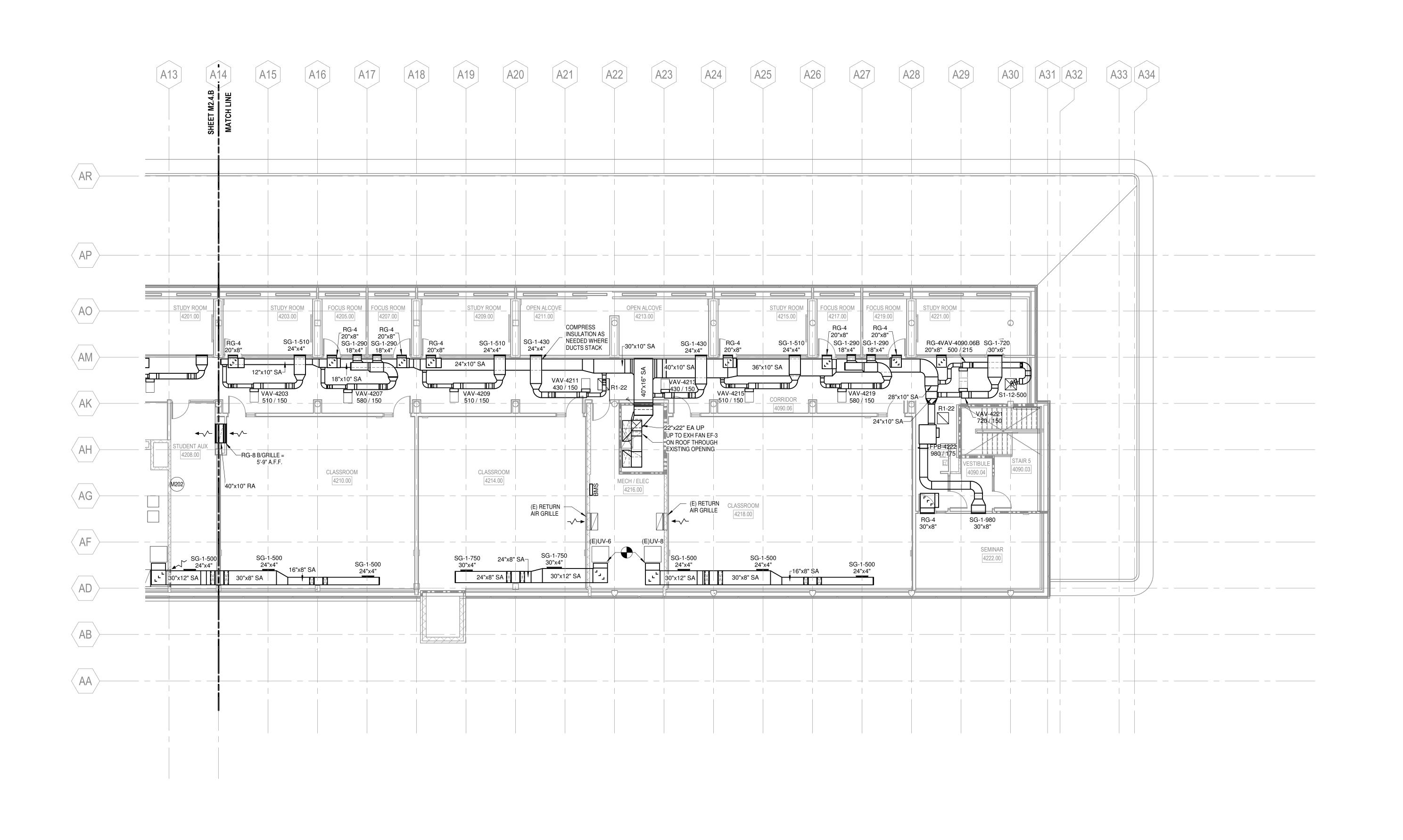
LEVEL 4 HVAC PLAN AREA B

PROJECT NUMBER

M2.4.B SHEET NUMBER

13385.000

1 LEVEL 4 HVAC PLAN AREA B SCALE: 1/8" = 1'-0"



1 LEVEL 4 HVAC PLAN AREA C SCALE: 1/8" = 1'-0"

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- CONTRACTOR. VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING
- SERVICES IN FIELD. MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES
- AND/OR MANUFACTURER RECOMMENDATIONS. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT,
- PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. INTERNALLY LINE WITH 1.5" ACOUSTICAL INSULATION ALL RECTANGULAR SUPPLY DUCTWORK DOWNSTREAM OF TERMINAL

UNITS. PROVIDE MINIMUM LENGTHS OF DOWNSTREAM

DUCTWORK BEFORE OUTLETS AS NOTED ON THE DETAILS ON M6

SERIES DRAWINGS. ACOUSTICALLY LINED DUCT DIMENSIONS NOTED ARE INSIDE CLEAR DIMENSIONS. TERMINAL UNIT DUCT CONNECTION TO MATCH MANUFACTURER OUTLET SIZE UNLESS OTHERWISE NOTED ON PLAN. REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING REQUIRMENTS.

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○ SHEET KEYNOTES

PROVIDE LINED RETURN AIR TRANSFER DUCTWORK WITHIN WALL. DUCT SIZE SHOWN SHALL BE INTERNAL

		_
		_
BULLETIN 02		26AUG22
BULLETIN 01	4	29JULY22
RFI PB004	3	17JUN22
PLAN REVIEW	2	13MAY22
. —		28APR22

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

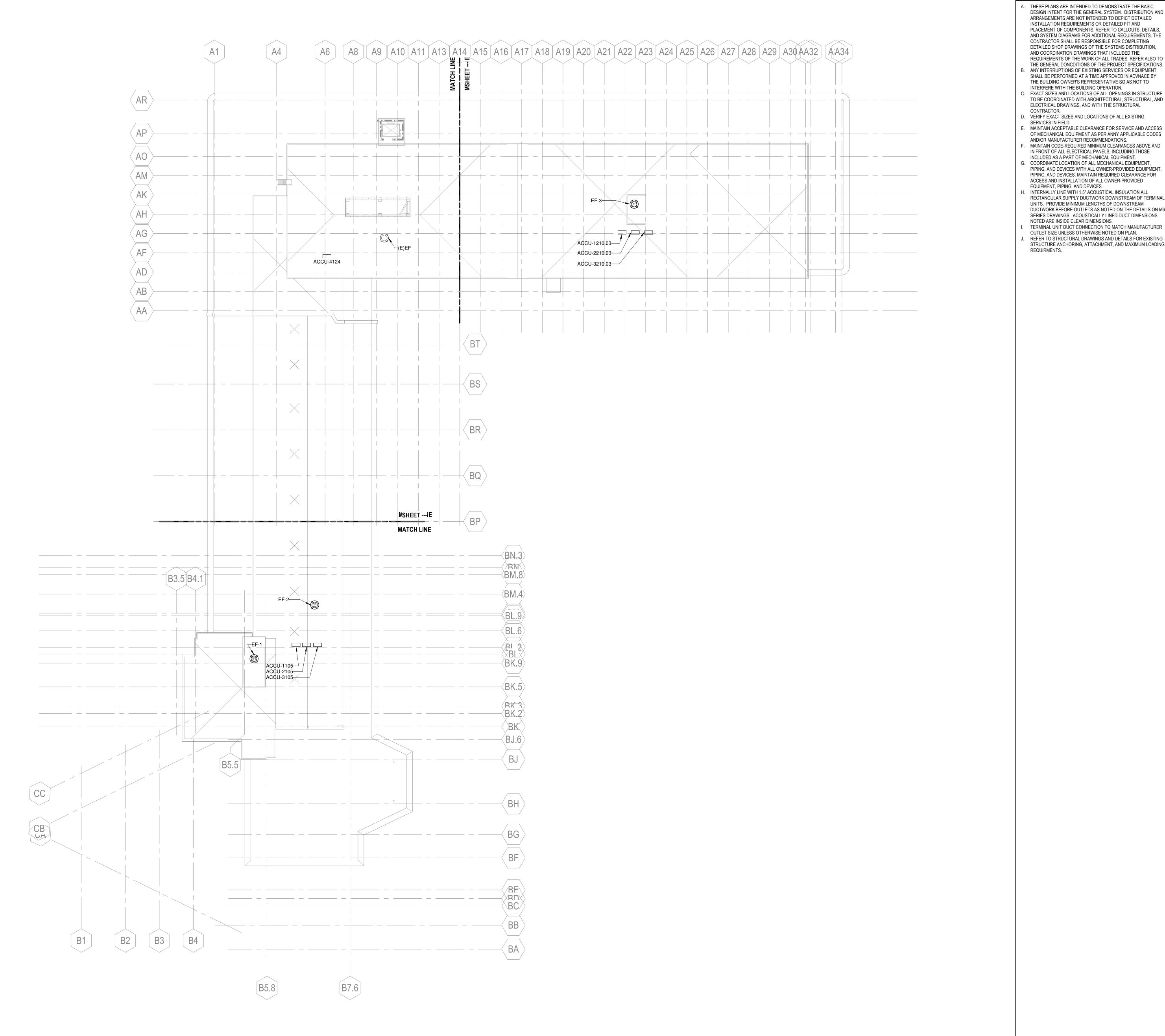
KEYPLAN

LEVEL 4 HVAC PLAN AREA C

PROJECT NUMBER

SHEET NUMBER

M2.4.C



- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE
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- EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS, AND WITH THE STRUCTURAL CONTRACTOR.
- SERVICES IN FIELD. MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS
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- COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. INTERNALLY LINE WITH 1.5" ACOUSTICAL INSULATION ALL
- UNITS. PROVIDE MINIMUM LENGTHS OF DOWNSTREAM DUCTWORK BEFORE OUTLETS AS NOTED ON THE DETAILS ON M6 SERIES DRAWINGS. ACOUSTICALLY LINED DUCT DIMENSIONS NOTED ARE INSIDE CLEAR DIMENSIONS. TERMINAL UNIT DUCT CONNECTION TO MATCH MANUFACTURER OUTLET SIZE UNLESS OTHERWISE NOTED ON PLAN. REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING REQUIRMENTS.

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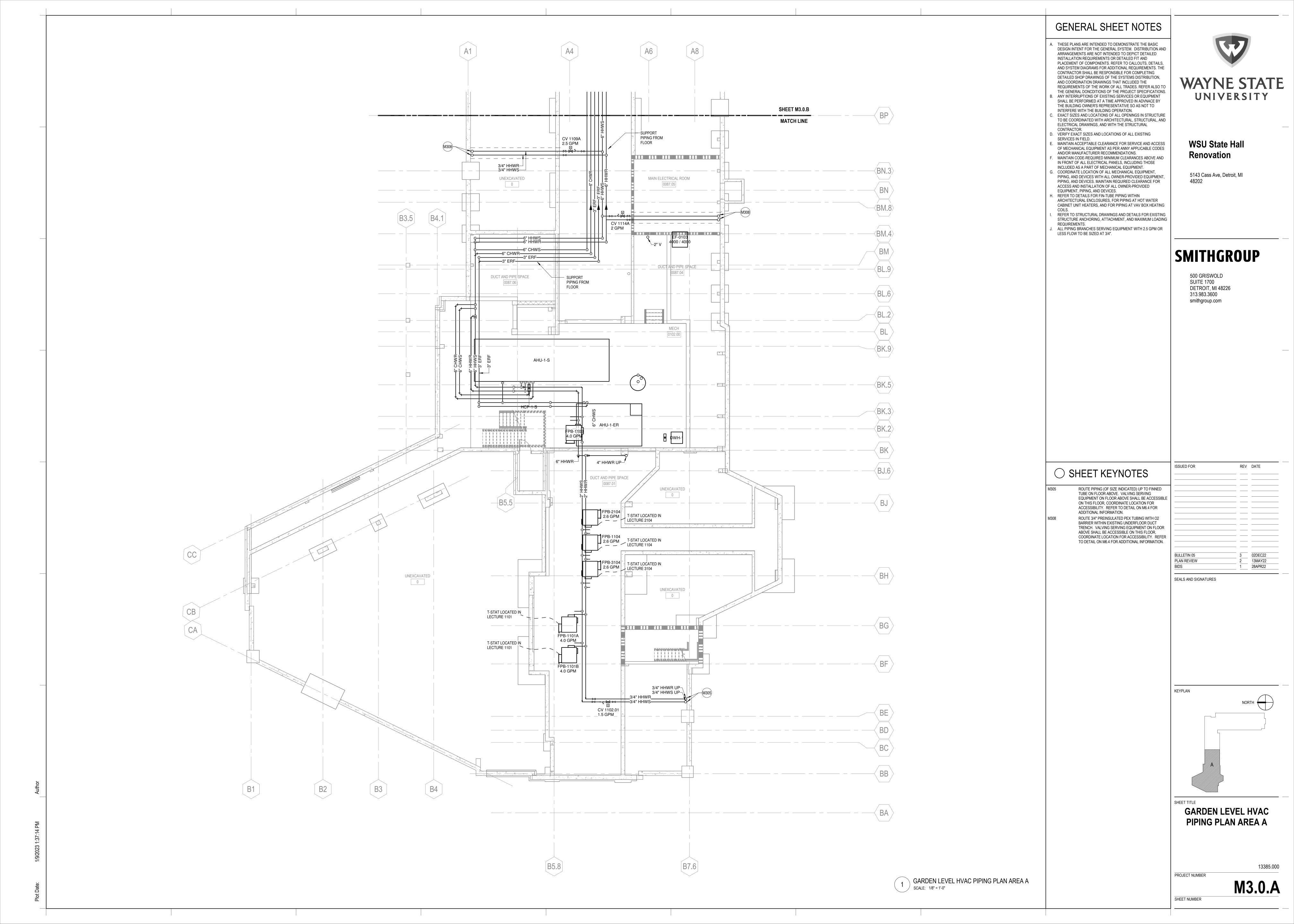
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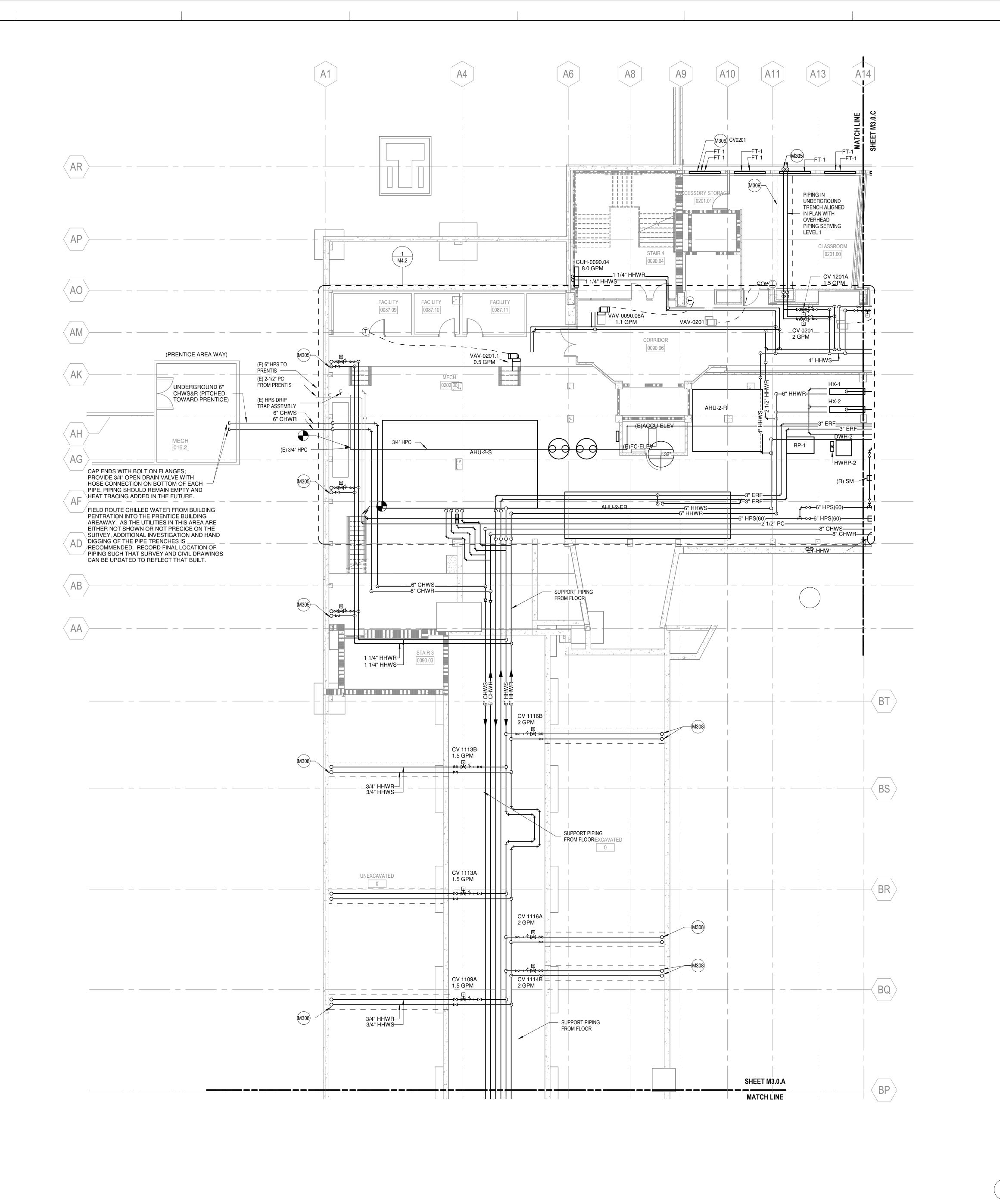
SEALS AND SIGNATURES

ROOF LEVEL HVAC PLAN

13385.000 PROJECT NUMBER

M2.5





CONTRACTOR.

- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO
- REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.

 B. ANY INTERRUPTIONS OF EXISTING SERVICES OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVNACE BY THE BUILDING OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH THE BUILDING OPERATION.
- INTERFERE WITH THE BUILDING OPERATION.

 EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE
 TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND
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- VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING SERVICES IN FIELD.
 MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS
- OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS.

 F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.

 G. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT,

PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT,

PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES.

H. REFER TO DETAILS FOR FIN-TUBE PIPING WITHIN ARCHITECTURAL ENCLOSURES, FOR PIPING AT HOT WATER CABINET UNIT HEATERS, AND FOR PIPING AT VAV BOX HEATING COILS

REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING

STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING REQUIREMENTS.

J. ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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○ SHEET KEYNOTES ROUTE PIPING (OF SIZE INDICATED) UP TO FINNED TUBE ON FLOOR ABOVE. VALVING SERVING EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION. FINNED TUBE SECTION TO BE CONTROLLED FROM CONTROL VALVE INDICATED. ROUTE 3/4" PREINSULATED PEX TUBING WITH O2 BARRIER WITHIN EXISTING UNDERFLOOR DUCT TRENCH. VALVING SERVING EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION. PLAN REVIEW ROUTE 3/4" PREINSULATED PEX TUBING WITH O2 BARRIER WITHIN EXISTING UNDERFLOOR DUCT TRENCH. VALVING SERVING EQUIPMENT SHALL BE

ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR

ADDITIONAL INFORMATION.

ISSUED FOR

SEALS AND SIGNATURES

REV DATE

KEYPLAN

NORTH

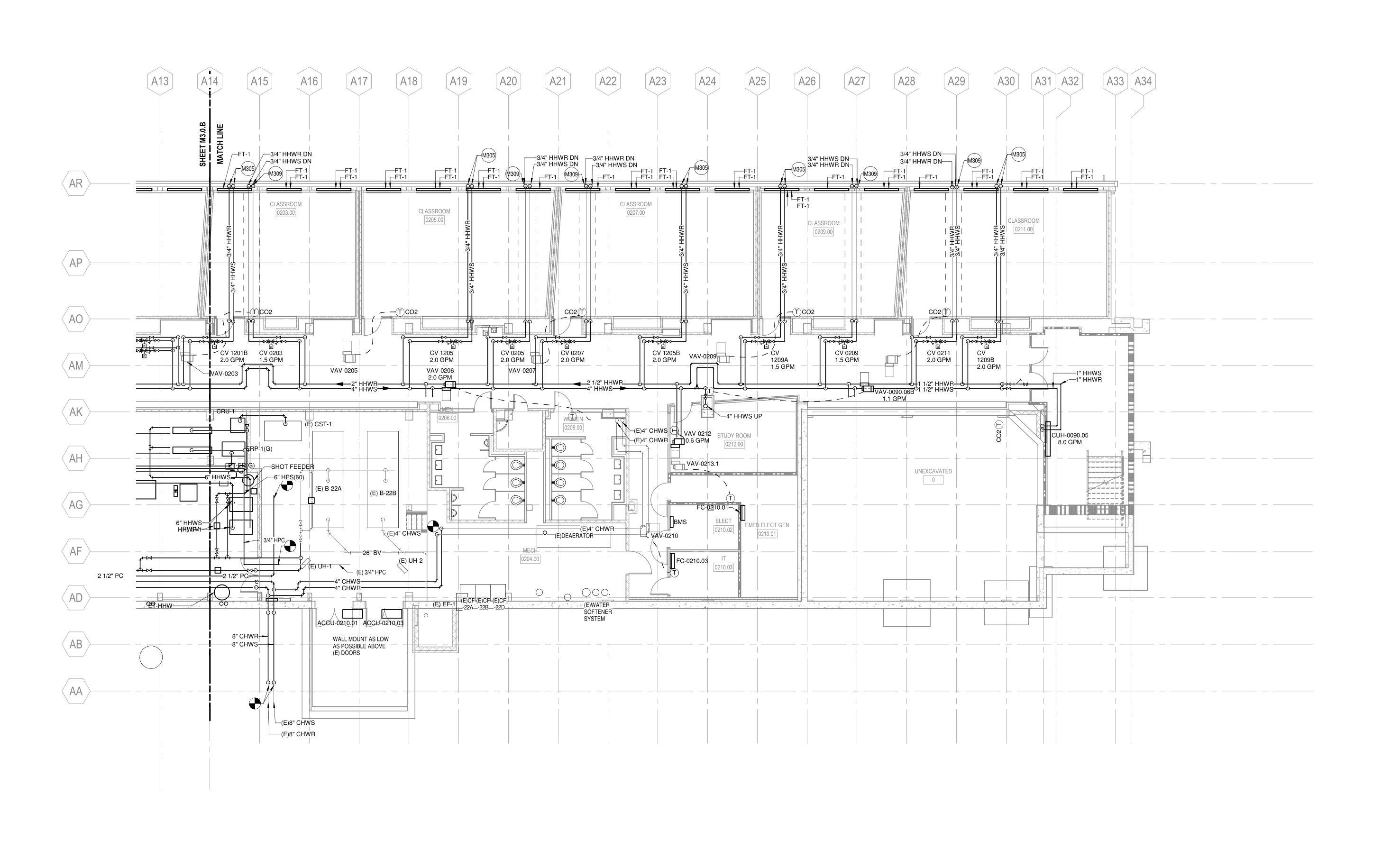
GARDEN LEVEL HVAC
PIPING PLAN AREA B

PROJECT NUMBER

M3.0.B

SHEET NUMBER

1 GARDEN LEVEL HVAC PIPING PLAN AREA B
SCALE: 1/8" = 1'-0"



- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.
- REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.

 B. ANY INTERRUPTIONS OF EXISTING SERVICES OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVNACE BY THE BUILDING OWNER'S REPRESENTATIVE SO AS NOT TO
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 F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL FLECTRICAL PANELS. INCLUDING THOSE
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- EQUIPMENT, PIPING, AND DEVICES.

 H. REFER TO DETAILS FOR FIN-TUBE PIPING WITHIN ARCHITECTURAL ENCLOSURES, FOR PIPING AT HOT WATER CABINET UNIT HEATERS, AND FOR PIPING AT VAV BOX HEATING COILS.

 I. REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING
- REQUIREMENTS.

 J. ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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O SHEET KEYNOTES

TRENCH. VALVING SERVING EQUIPMENT SHALL BE ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION

FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR

M305

ROUTE PIPING (OF SIZE INDICATED) UP TO FINNED TUBE ON FLOOR ABOVE. VALVING SERVING EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLI ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION.

M309

ROUTE 3/4" PREINSULATED PEX TUBING WITH O2 BARRIER WITHIN EXISTING UNDERFLOOR DUCT

ADDITIONAL INFORMATION.

BULLETIN 05 3 02DEC22
PLAN REVIEW 2 13MAY22
BIDS 1 28APR22

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

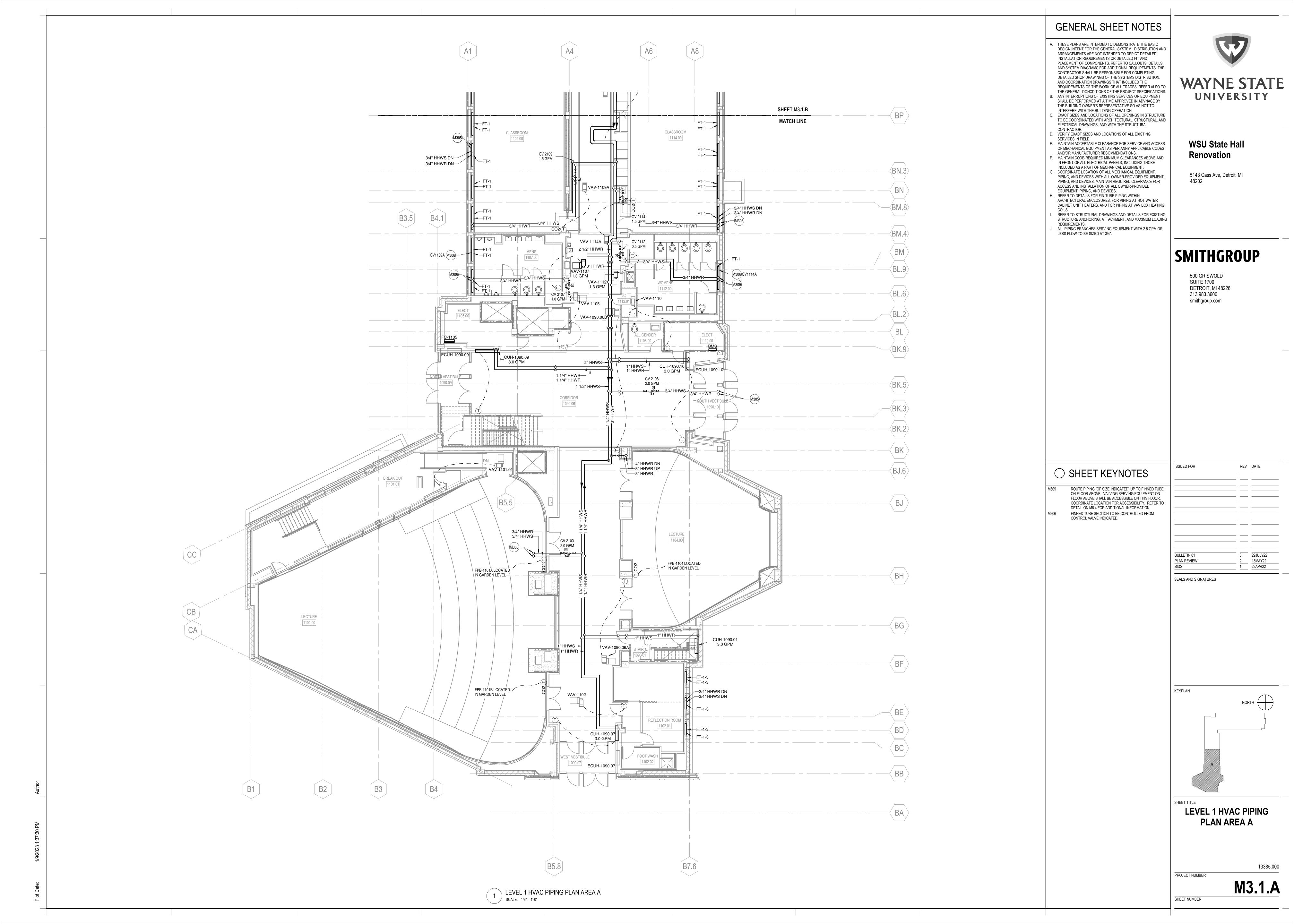
KEYPLAN NORTH SHEFT TITLE

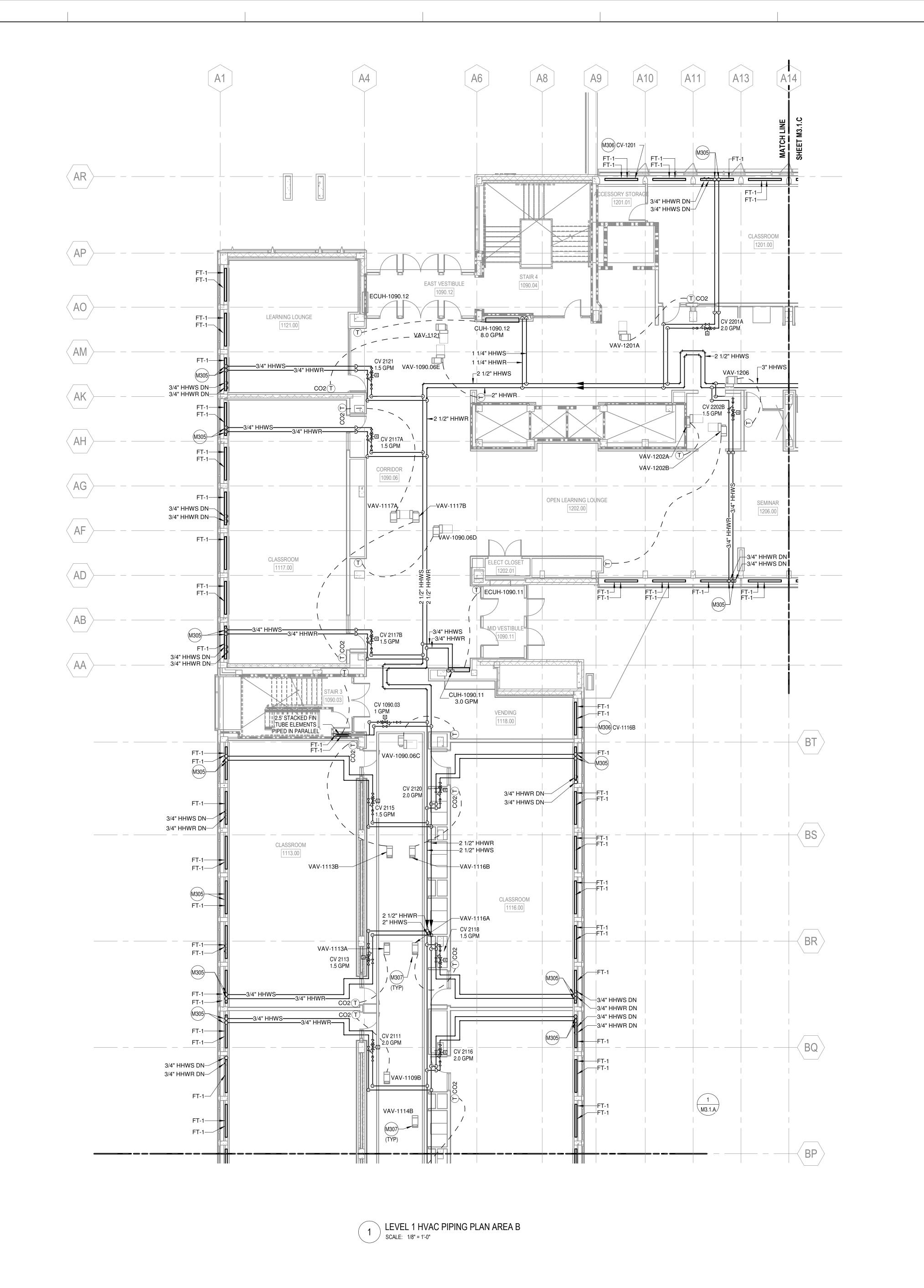
GARDEN LEVEL HVAC
PIPING PLAN AREA C

PROJECT NUMBER

M3.0.C
SHEET NUMBER

1 GARDEN LEVEL HVAC PIPING PLAN AREA C
SCALE: 1/8" = 1'-0"





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CONTRACTOR.

- OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE
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- REQUIREMENTS. ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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○ SHEET KEYNOTES

ROUTE PIPING (OF SIZE INDICATED) UP TO FINNED TUBE ON FLOOR ABOVE. VALVING SERVING EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION. FINNED TUBE SECTION TO BE CONTROLLED FROM

FOR VERTICAL ACCESS OF ELECTRICAL PANEL

CONTROL VALVE INDICATED.

CONDITIONS).

VAV BOX TO BE ROTATED 90 DEGREES TO ALLOW (APPLICABLE TO ALL VAV BOXES IN EXPOSED CEILING BULLETIN 01 PLAN REVIEW

ISSUED FOR

REV DATE

SEALS AND SIGNATURES

KEYPLAN

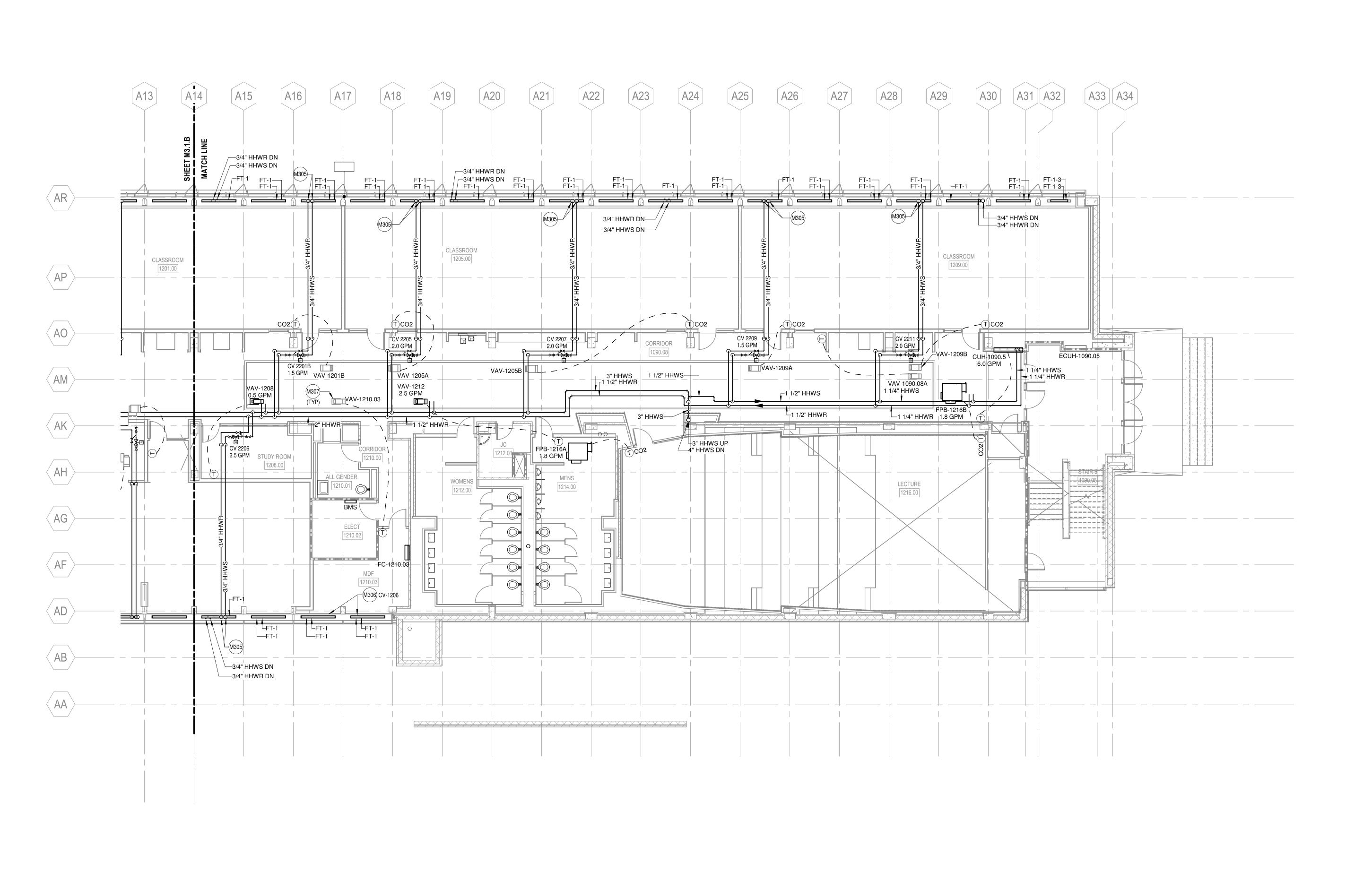
LEVEL 1 HVAC PIPING PLAN AREA B

PROJECT NUMBER

SHEET NUMBER

M3.1.B

13385.000



1 LEVEL 1 HVAC PIPING PLAN AREA C SCALE: 1/8" = 1'-0"

GENERAL SHEET NOTES

CONTRACTOR.

- THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO
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○ SHEET KEYNOTES

ROUTE PIPING (OF SIZE INDICATED) UP TO FINNED TUBE ON FLOOR ABOVE. VALVING SERVING **EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLE** ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION. FINNED TUBE SECTION TO BE CONTROLLED FROM

CONTROL VALVE INDICATED.

CONDITIONS).

VAV BOX TO BE ROTATED 90 DEGREES TO ALLOW FOR VERTICAL ACCESS OF ELECTRICAL PANEL (APPLICABLE TO ALL VAV BOXES IN EXPOSED CEILING

BULLETIN 03 PLAN REVIEW

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

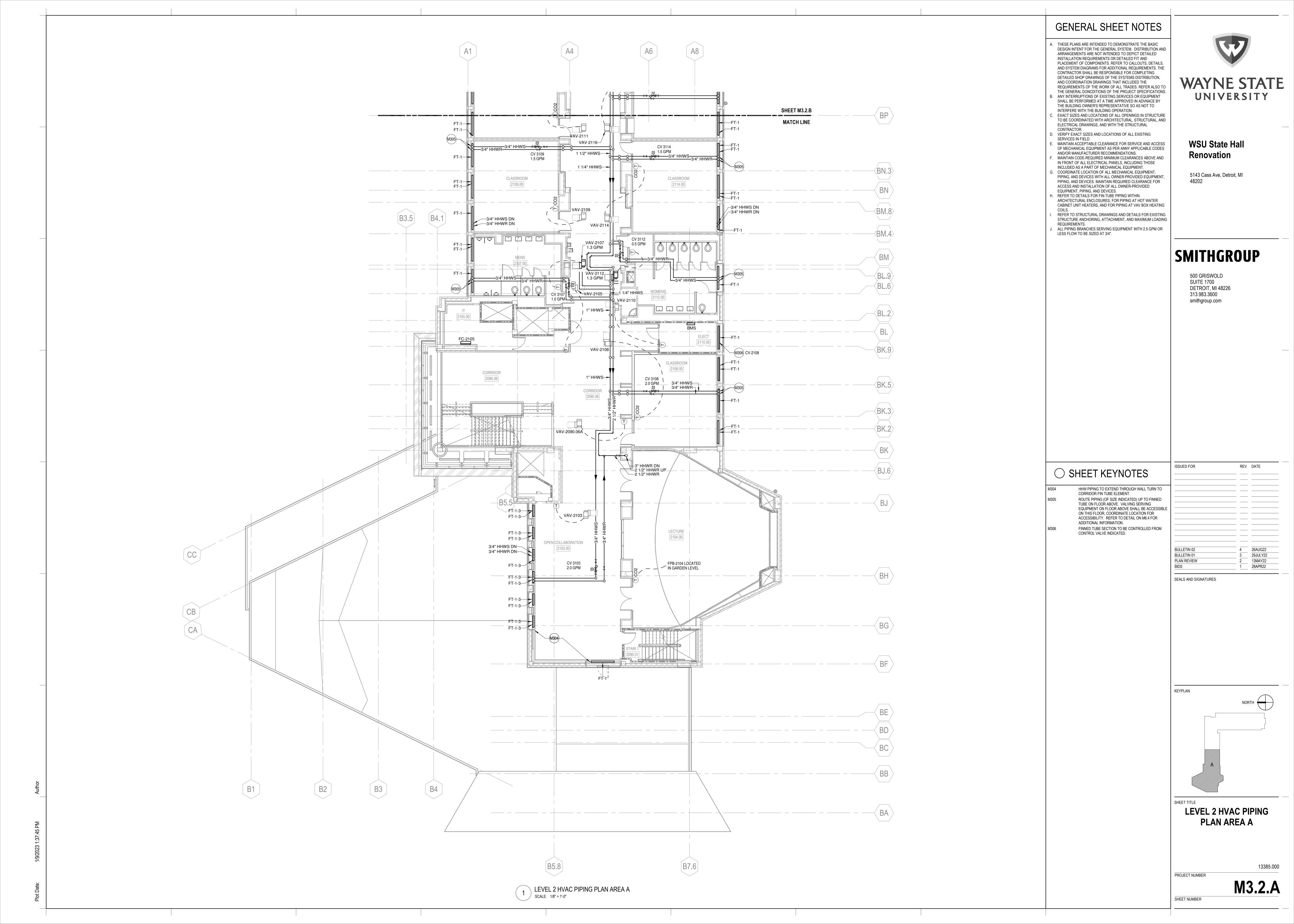
KEYPLAN

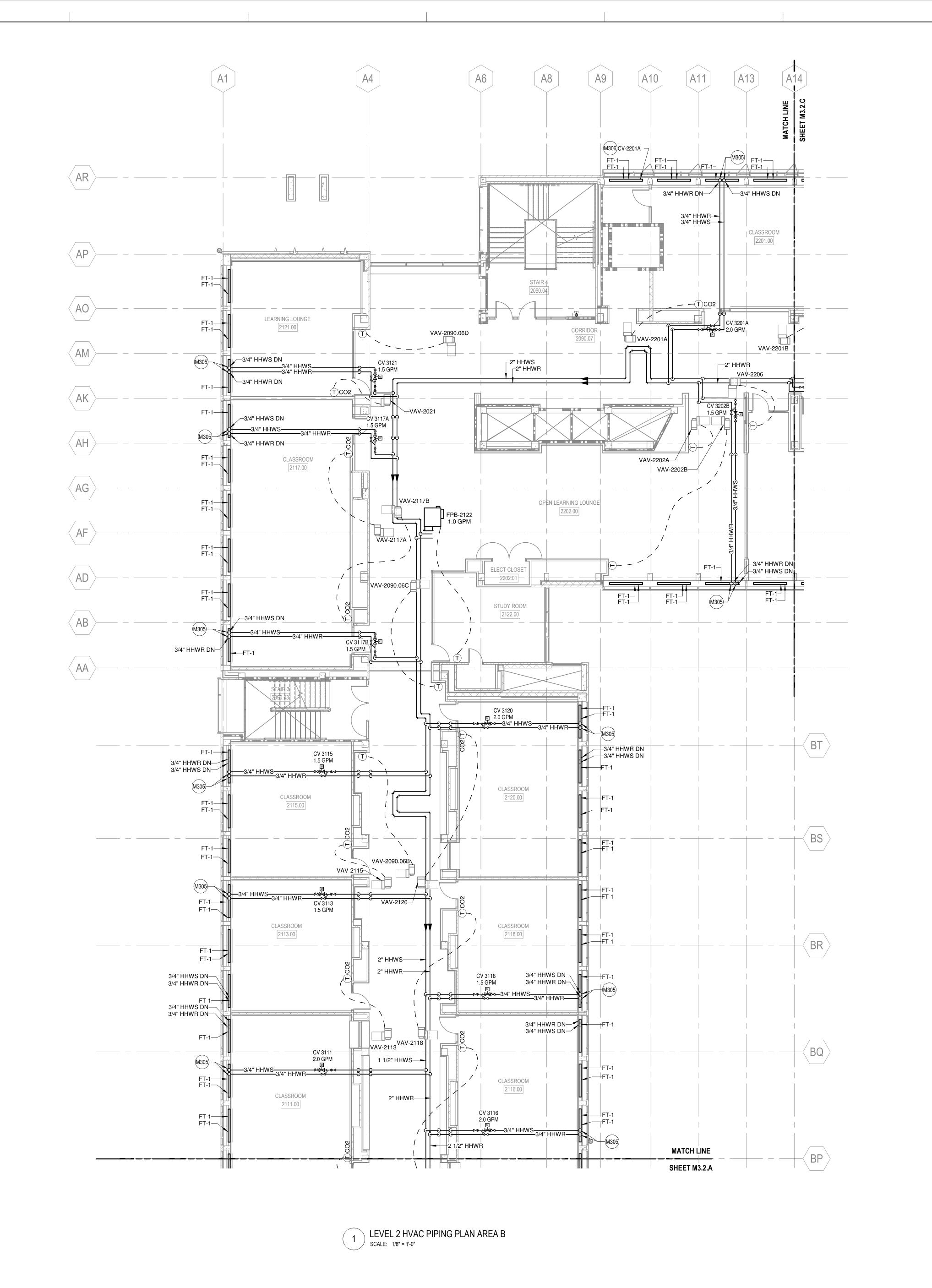
LEVEL 1 HVAC PIPING PLAN AREA C

PROJECT NUMBER

SHEET NUMBER

M3.1.C





- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO
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 EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL DRAWINGS, AND WITH THE STRUCTURAL
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 F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL FOLLOWER.
- IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.

 COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED
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 H. REFER TO DETAILS FOR FIN-TUBE PIPING WITHIN ARCHITECTURAL ENCLOSURES, FOR PIPING AT HOT WATER CABINET UNIT HEATERS, AND FOR PIPING AT VAV BOX HEATING COILS.

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- J. ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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SHEET KEYNOTES

CONTROL VALVE INDICATED.

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FINNED TUBE SECTION TO BE CONTROLLED FROM

BULLETIN 05
BULLETIN 01
PLAN REVIEW
BIDS

BULLETIN 01
28APR22

REV DATE

SEALS AND SIGNATURES

ISSUED FOR

KEYPLAN NORTH

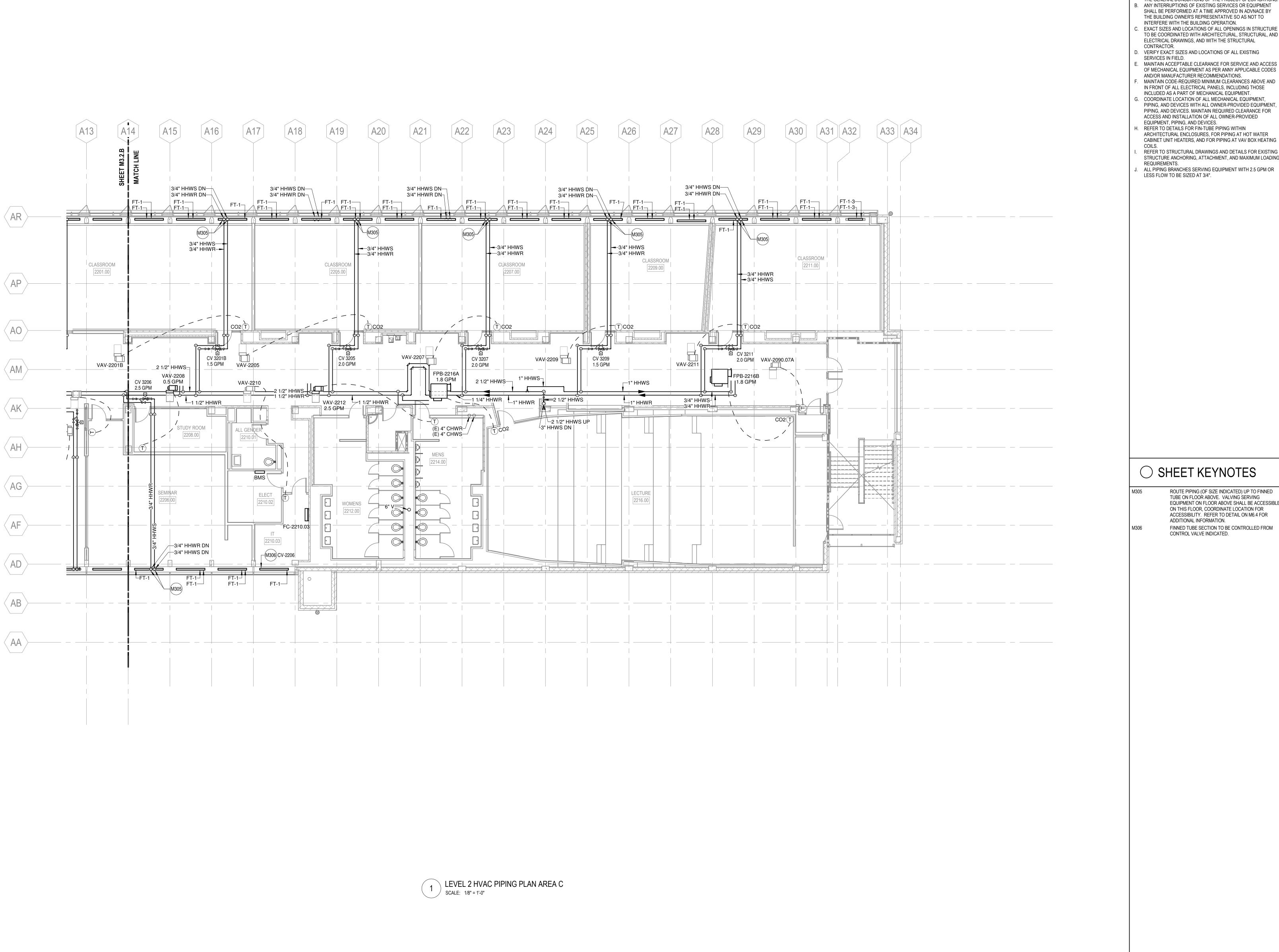
LEVEL 2 HVAC PIPING
PLAN AREA B

PROJECT NUMBER

M3.2.B
SHEET NUMBER

13385.000

ot Date:



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- OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE
- INCLUDED AS A PART OF MECHANICAL EQUIPMENT. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR
- EQUIPMENT, PIPING, AND DEVICES. REFER TO DETAILS FOR FIN-TUBE PIPING WITHIN ARCHITECTURAL ENCLOSURES, FOR PIPING AT HOT WATER CABINET UNIT HEATERS, AND FOR PIPING AT VAV BOX HEATING REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING
- ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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○ SHEET KEYNOTES

ROUTE PIPING (OF SIZE INDICATED) UP TO FINNED TUBE ON FLOOR ABOVE. VALVING SERVING EQUIPMENT ON FLOOR ABOVE SHALL BE ACCESSIBLE ON THIS FLOOR, COORDINATE LOCATION FOR ACCESSIBILITY. REFER TO DETAIL ON M6.4 FOR ADDITIONAL INFORMATION. FINNED TUBE SECTION TO BE CONTROLLED FROM

-		
BULLETIN 03	3	20SEPT22
PLAN REVIEW	2	13MAY22

REV DATE

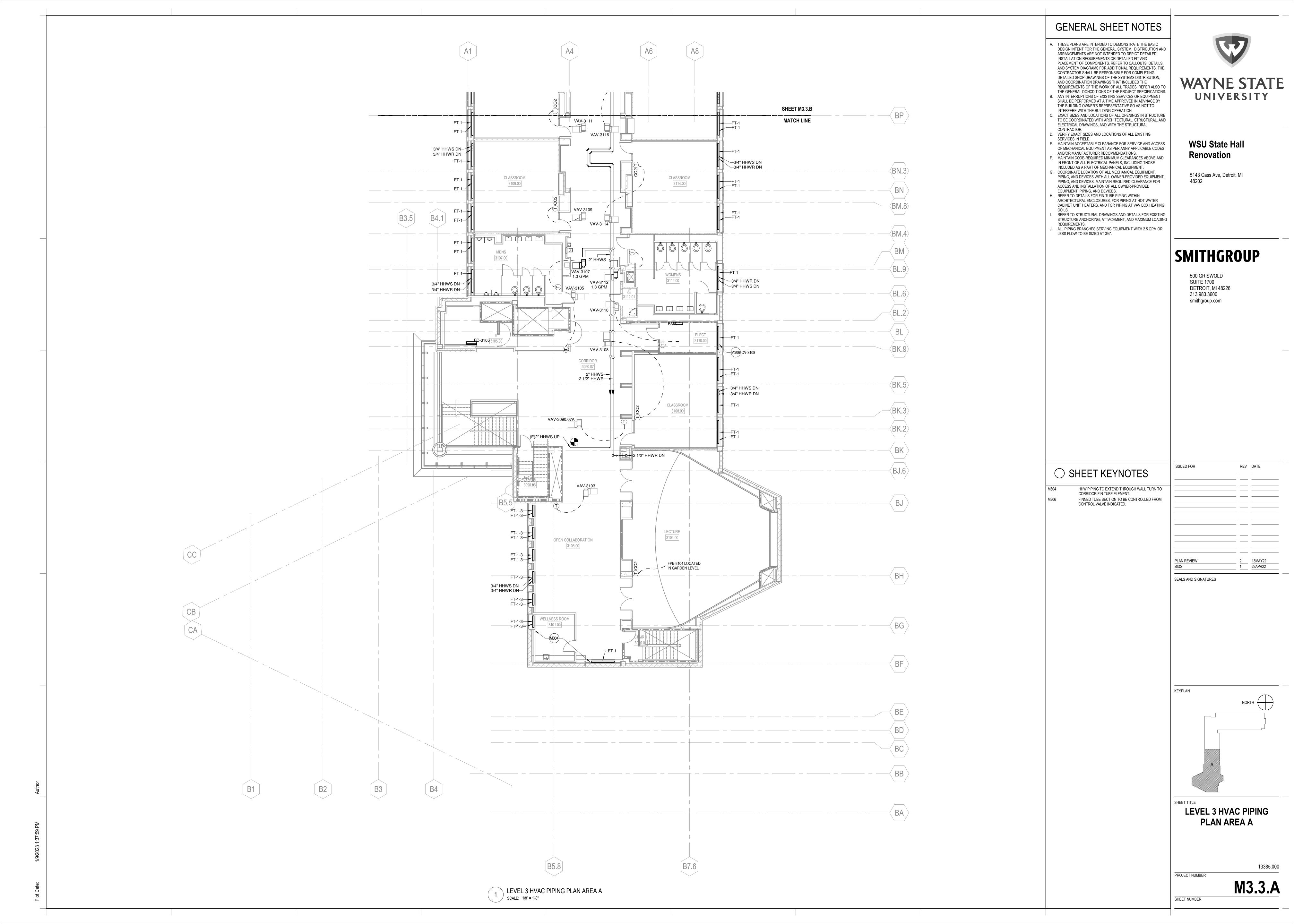
SEALS AND SIGNATURES

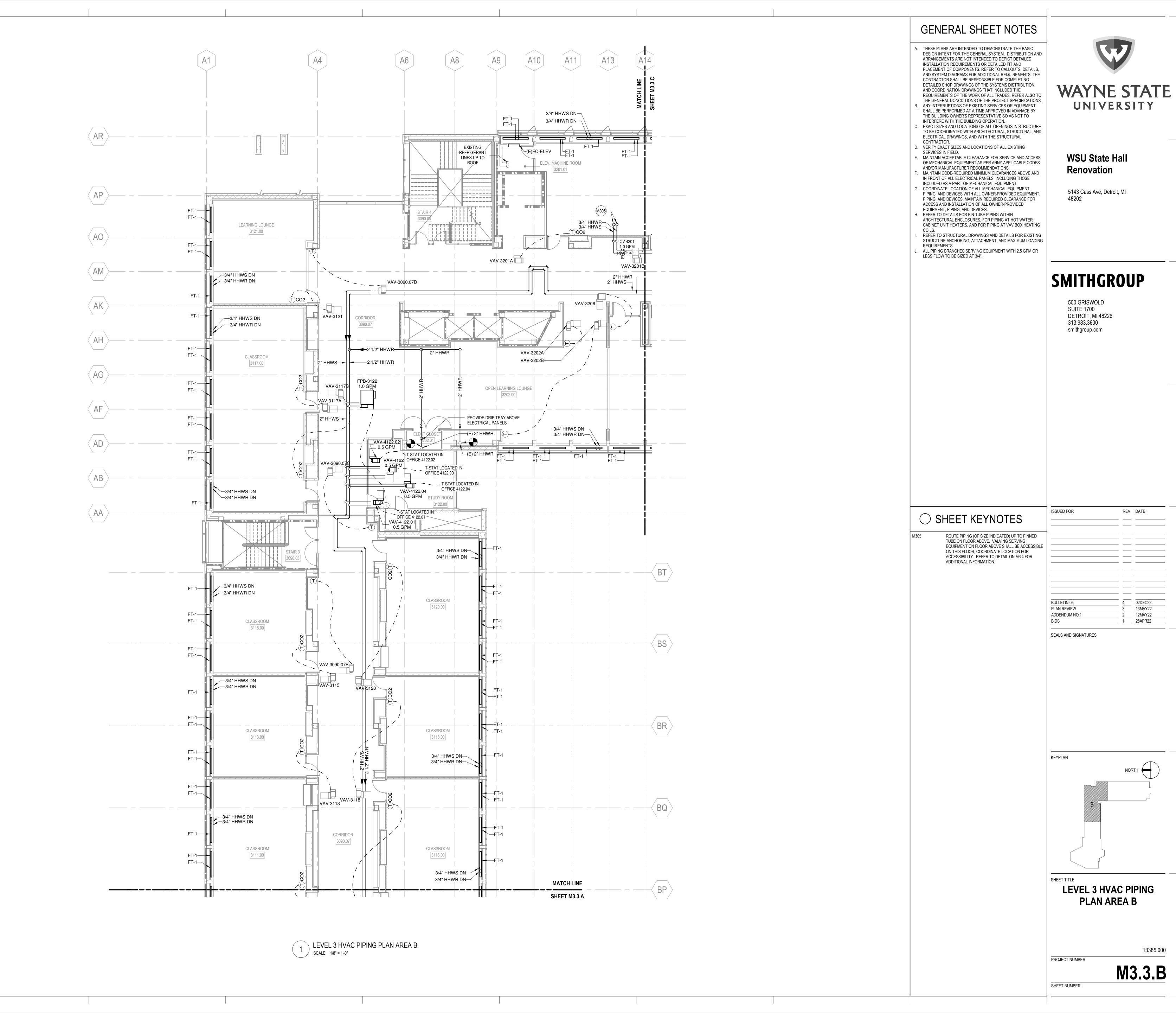
ISSUED FOR

KEYPLAN

LEVEL 2 HVAC PIPING PLAN AREA C

PROJECT NUMBER M3.2.C

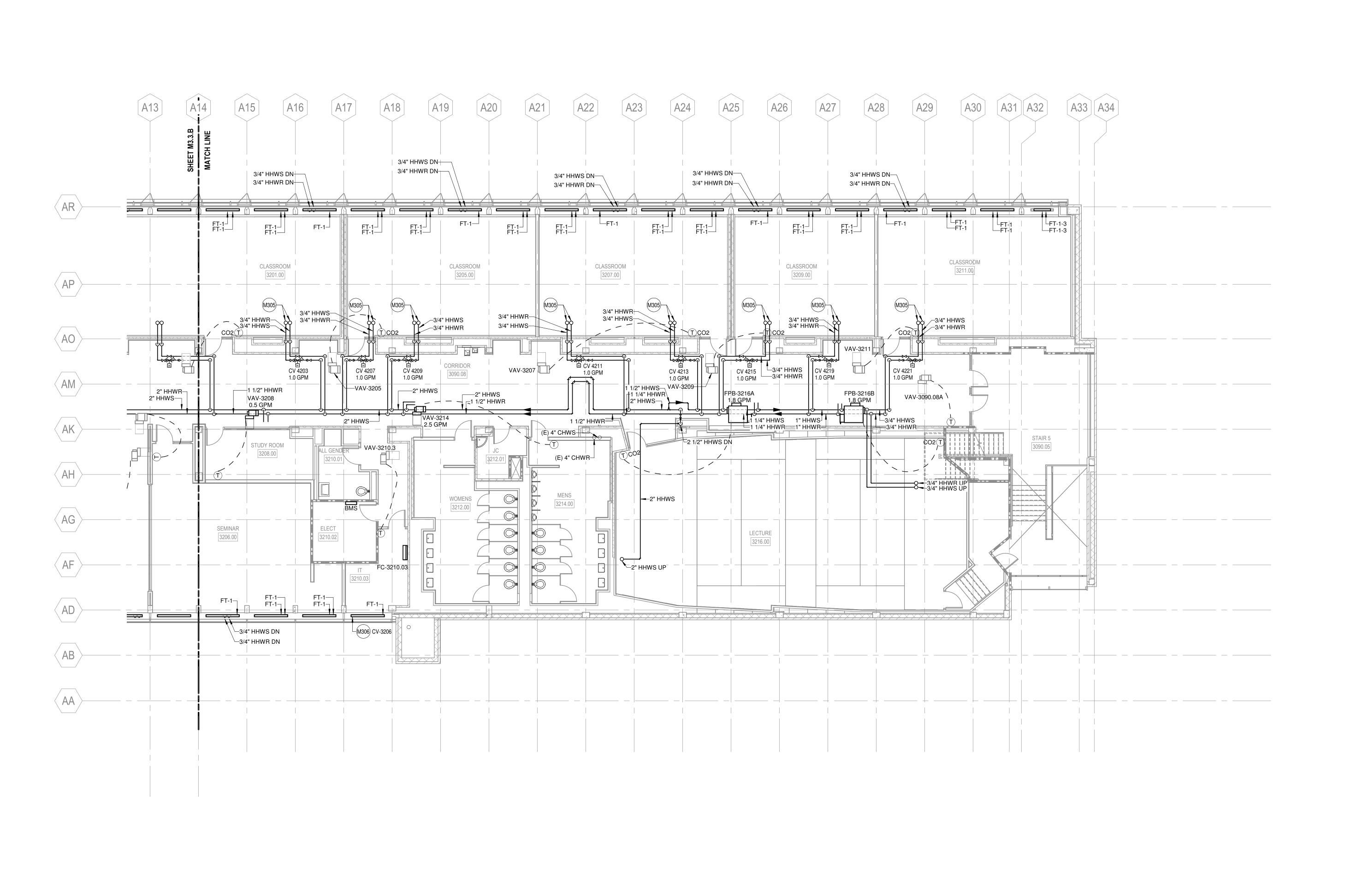




REV DATE

13385.000

M3.3.B



- A. THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.
- THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS.

 ANY INTERRUPTIONS OF EXISTING SERVICES OR EQUIPMENT SHALL BE PERFORMED AT A TIME APPROVED IN ADVNACE BY THE BUILDING OWNER'S REPRESENTATIVE SO AS NOT TO INTERFERE WITH THE BUILDING OPERATION.
- INTERFERE WITH THE BUILDING OPERATION.

 EXACT SIZES AND LOCATIONS OF ALL OPENINGS IN STRUCTURE
 TO BE COORDINATED WITH ARCHITECTURAL, STRUCTURAL, AND
 ELECTRICAL DRAWINGS, AND WITH THE STRUCTURAL
- CONTRACTOR.
 VERIFY EXACT SIZES AND LOCATIONS OF ALL EXISTING
 SERVICES IN FIELD.
 MAINTAIN ACCEPTABLE CLEARANCE FOR SERVICE AND ACCESS
- OF MECHANICAL EQUIPMENT AS PER ANNY APPLICABLE CODES AND/OR MANUFACTURER RECOMMENDATIONS.

 F. MAINTAIN CODE-REQUIRED MINIMUM CLEARANCES ABOVE AND IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE
- IN FRONT OF ALL ELECTRICAL PANELS, INCLUDING THOSE INCLUDED AS A PART OF MECHANICAL EQUIPMENT.

 G. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT, PIPING, AND DEVICES WITH ALL OWNER-PROVIDED EQUIPMENT, PIPING, AND DEVICES. MAINTAIN REQUIRED CLEARANCE FOR ACCESS AND INSTALLATION OF ALL OWNER-PROVIDED
- ARCHITECTURAL ENCLOSURES, FOR PIPING AT HOT WATER CABINET UNIT HEATERS, AND FOR PIPING AT VAV BOX HEATING COILS.

 I. REFER TO STRUCTURAL DRAWINGS AND DETAILS FOR EXISTING STRUCTURE ANCHORING, ATTACHMENT, AND MAXIMUM LOADING REQUIREMENTS.

REFER TO DETAILS FOR FIN-TUBE PIPING WITHIN

EQUIPMENT, PIPING, AND DEVICES.

REQUIREMENTS.

J. ALL PIPING BRANCHES SERVING EQUIPMENT WITH 2.5 GPM OR LESS FLOW TO BE SIZED AT 3/4".

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SHEET KEYNOTES

KEYPLAN

NORTH

LEVEL 3 HVAC PIPING
PLAN AREA C

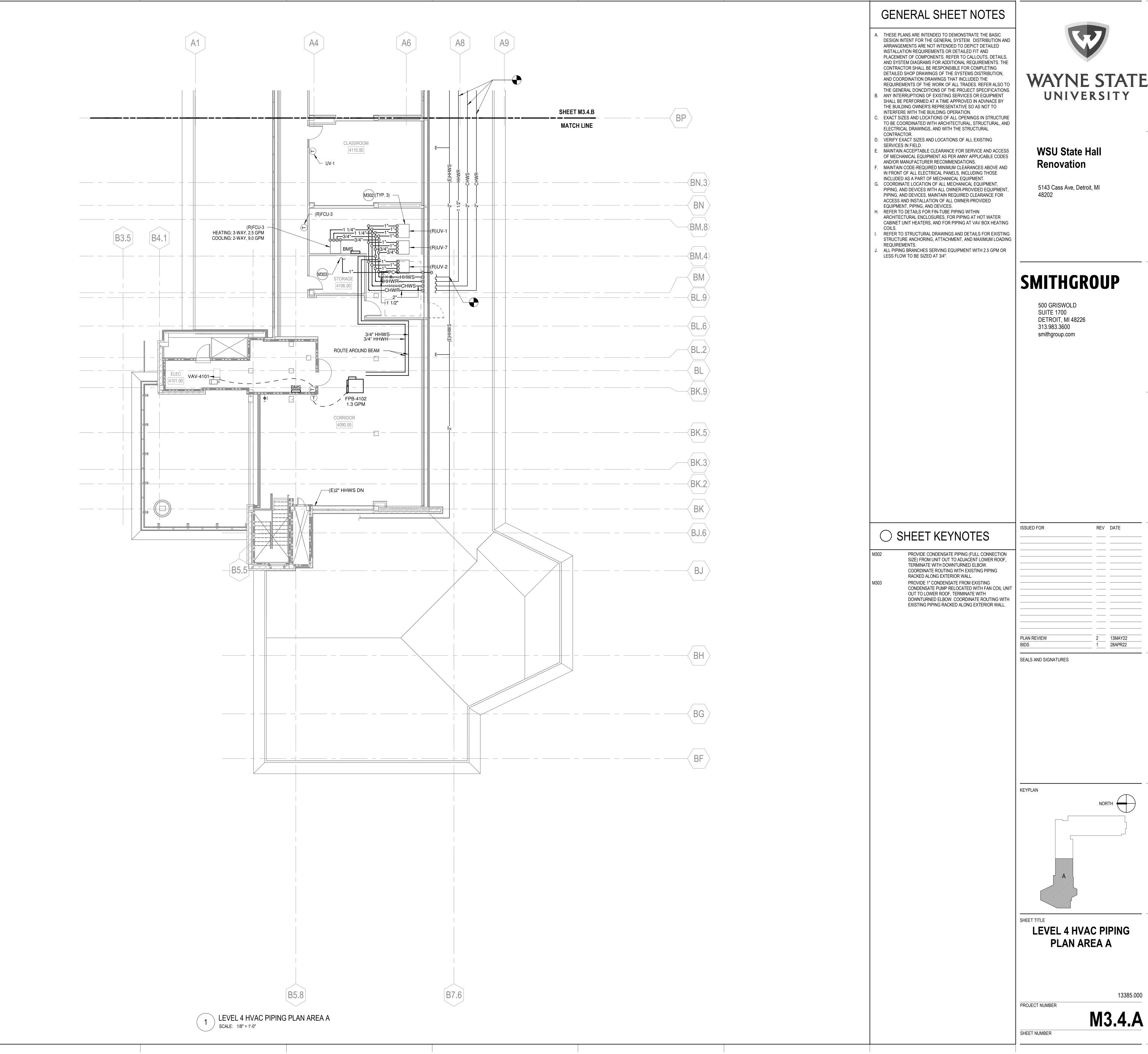
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SHEET NUMBER

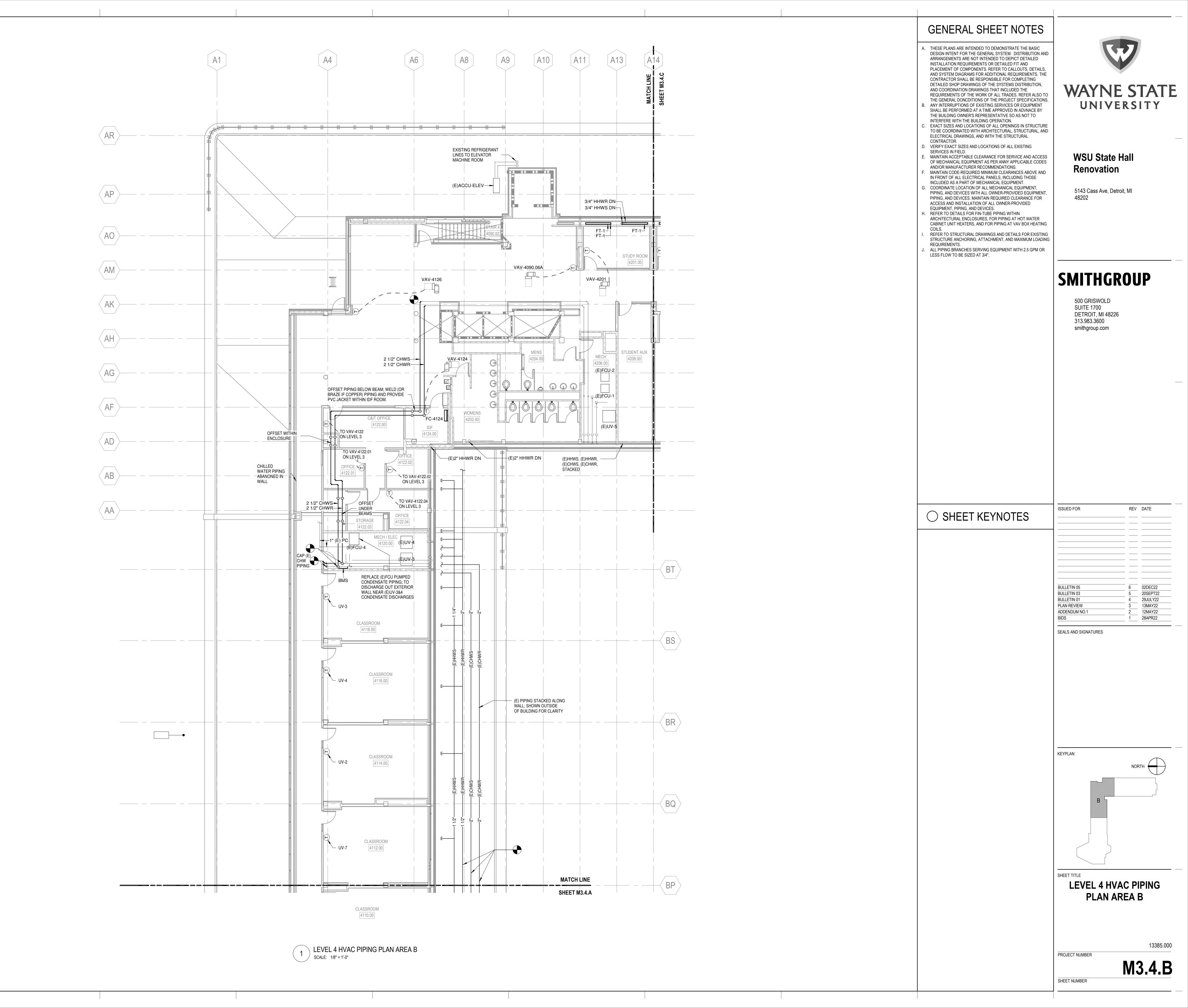
PROJECT NUMBER

M3.3.C

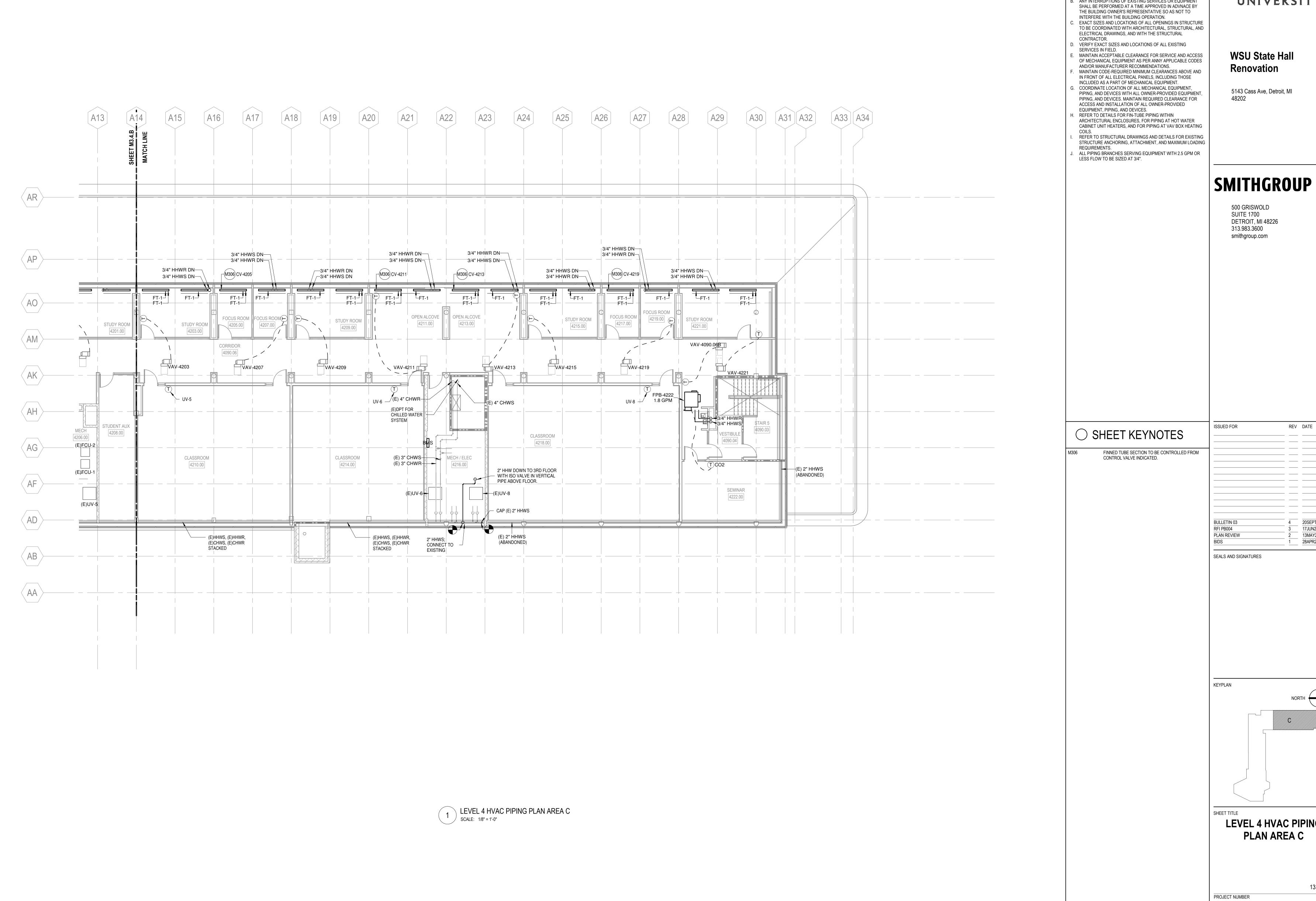
1 LEVEL 3 HVAC PIPING PLAN AREA C
SCALE: 1/8" = 1'-0"



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Plot Date:



THESE PLANS ARE INTENDED TO DEMONSTRATE THE BASIC DESIGN INTENT FOR THE GENERAL SYSTEM. DISTRIBUTION AND ARRANGEMENTS ARE NOT INTENDED TO DEPICT DETAILED INSTALLATION REQUIREMENTS OR DETAILED FIT AND PLACEMENT OF COMPONENTS. REFER TO CALLOUTS, DETAILS, AND SYSTEM DIAGRAMS FOR ADDITIONAL REQUIREMENTS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLETING DETAILED SHOP DRAWINGS OF THE SYSTEMS DISTRIBUTION, AND COORDINATION DRAWINGS THAT INCLUDED THE REQUIREMENTS OF THE WORK OF ALL TRADES. REFER ALSO TO

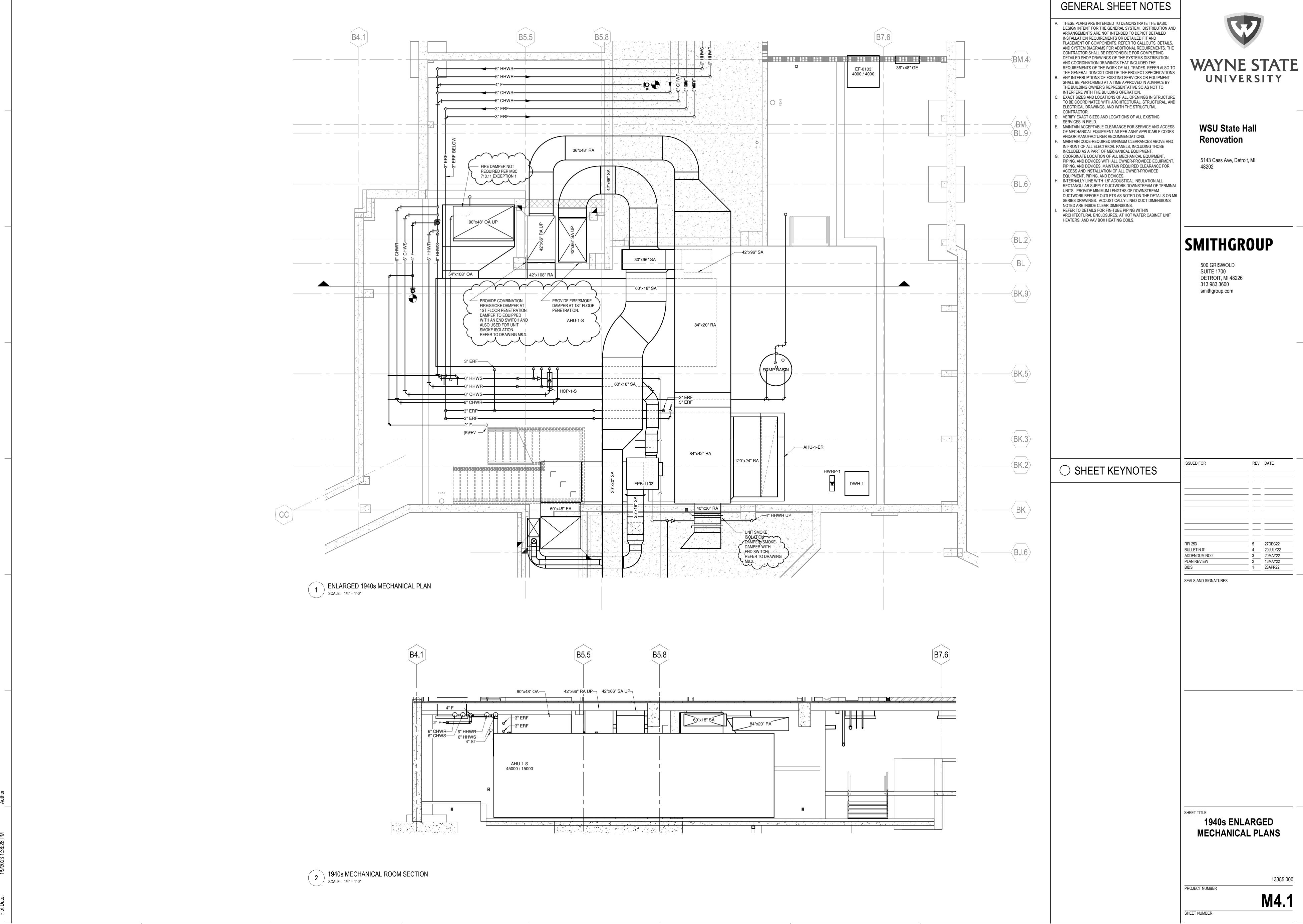
THE GENERAL DONCDITIONS OF THE PROJECT SPECIFICATIONS. ANY INTERRUPTIONS OF EXISTING SERVICES OR EQUIPMENT

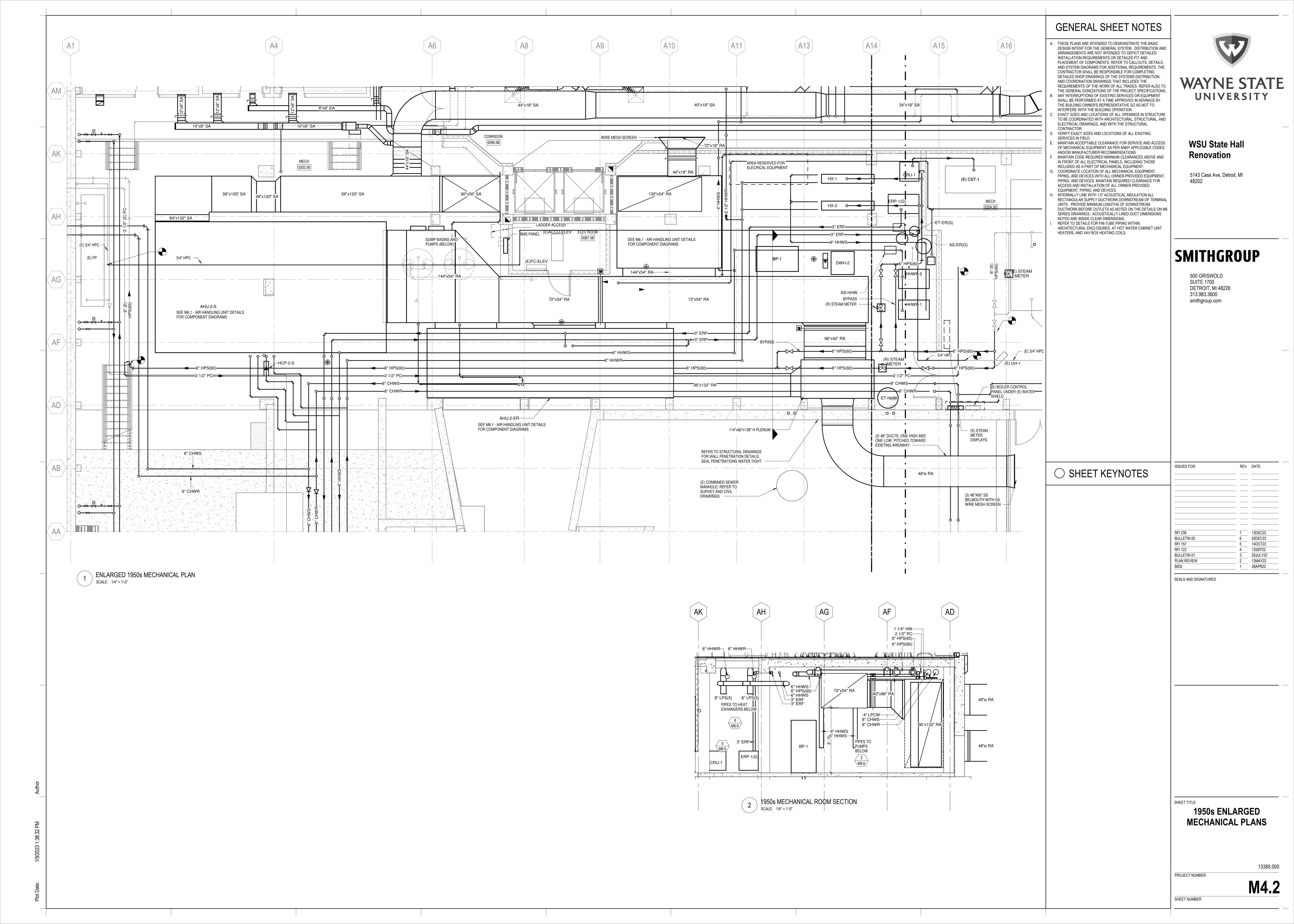
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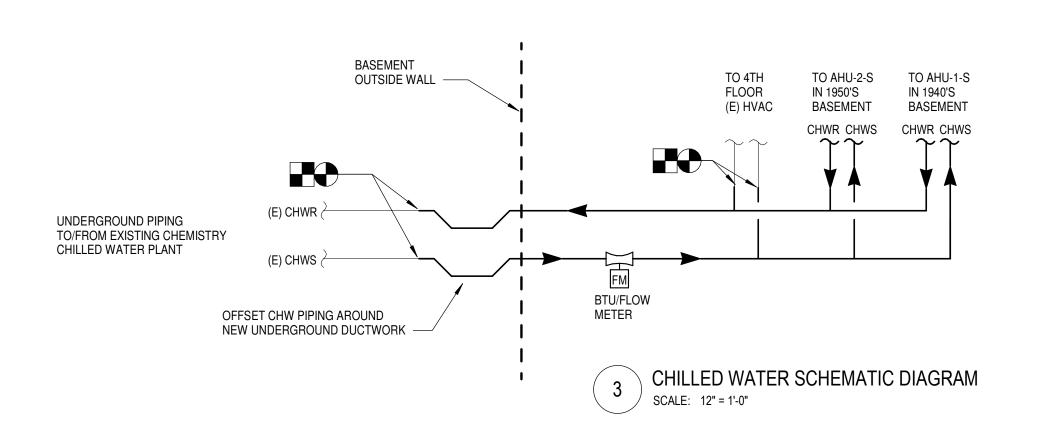
17JUN22

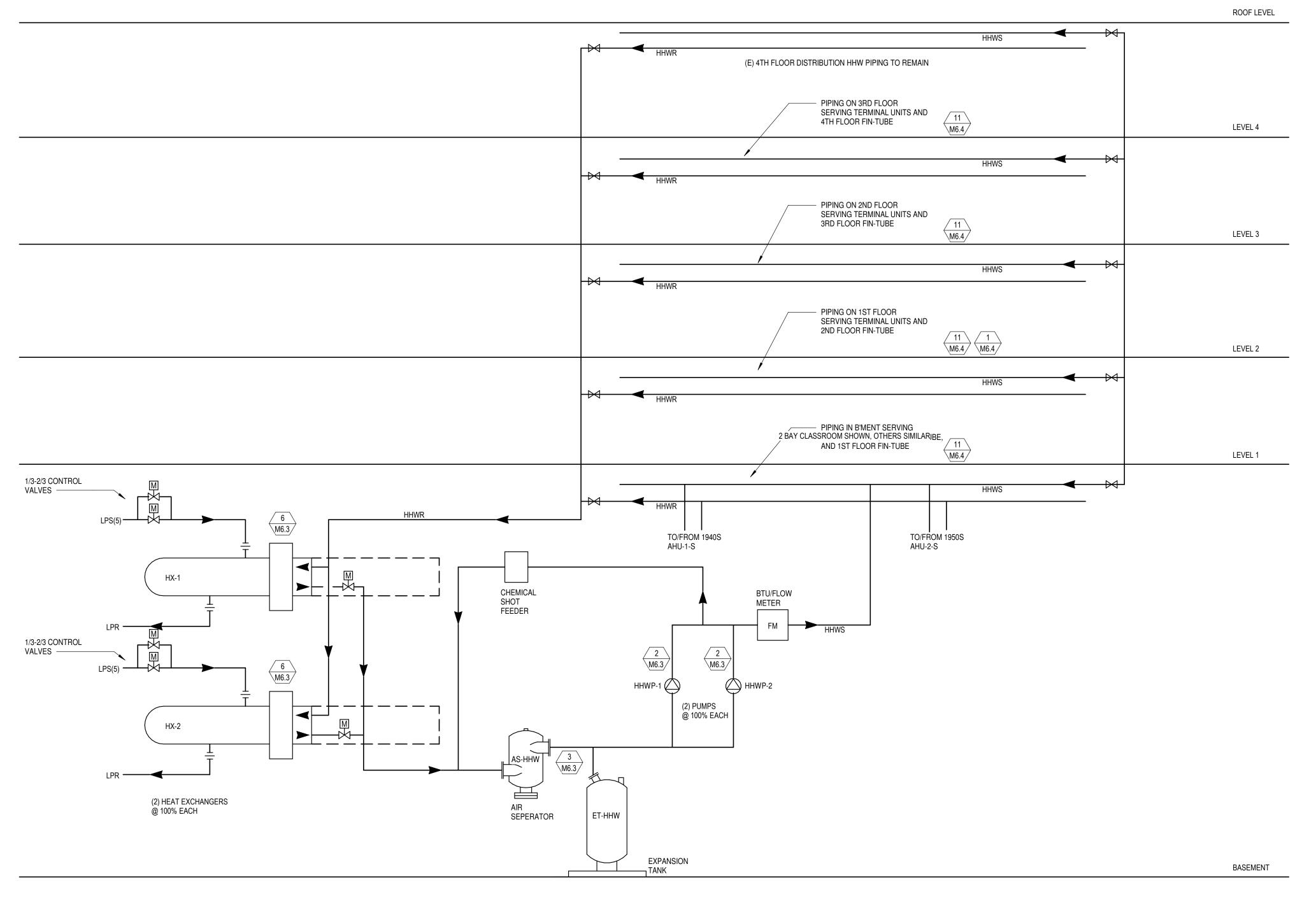
LEVEL 4 HVAC PIPING

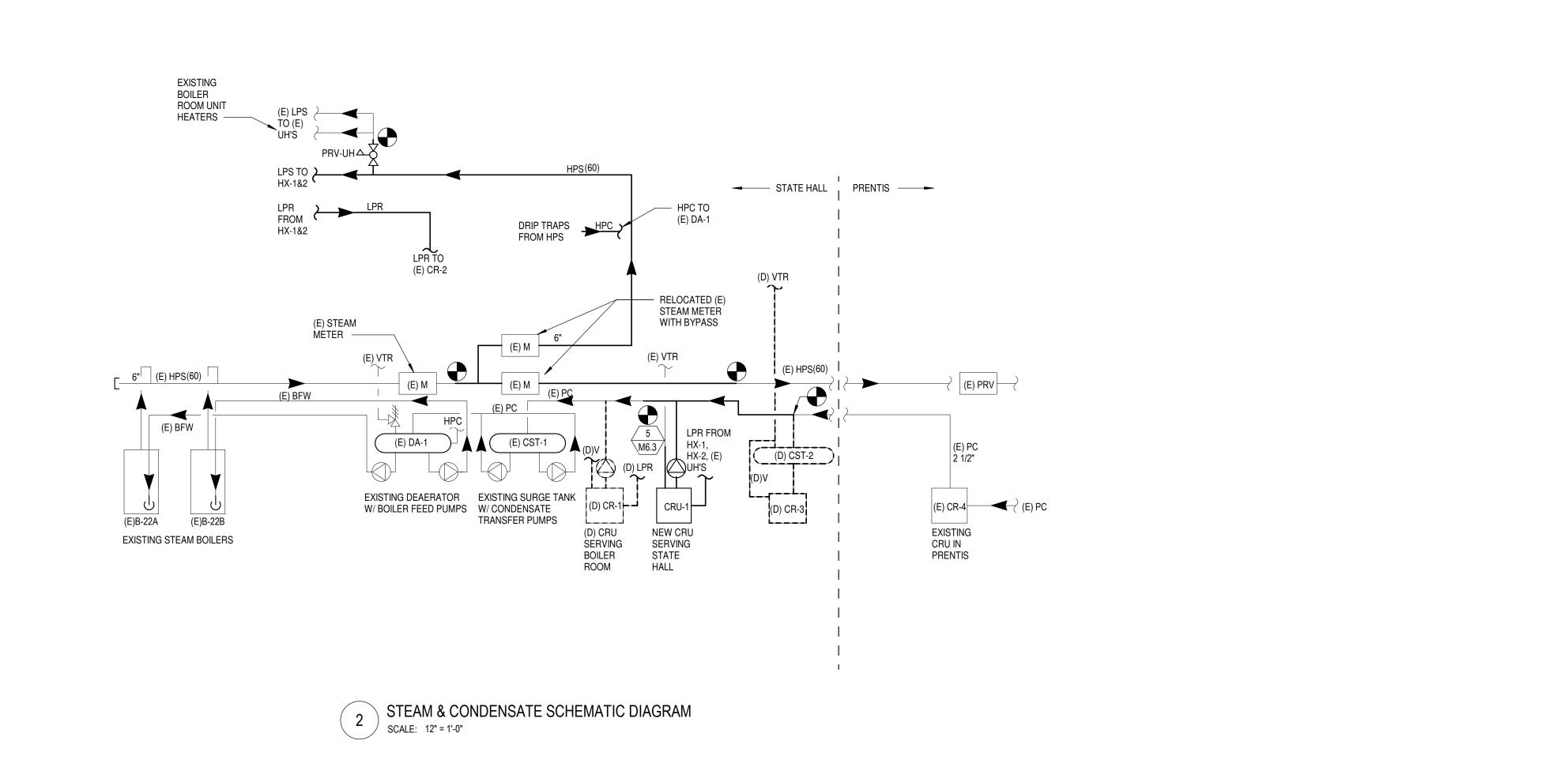
M3.4.C

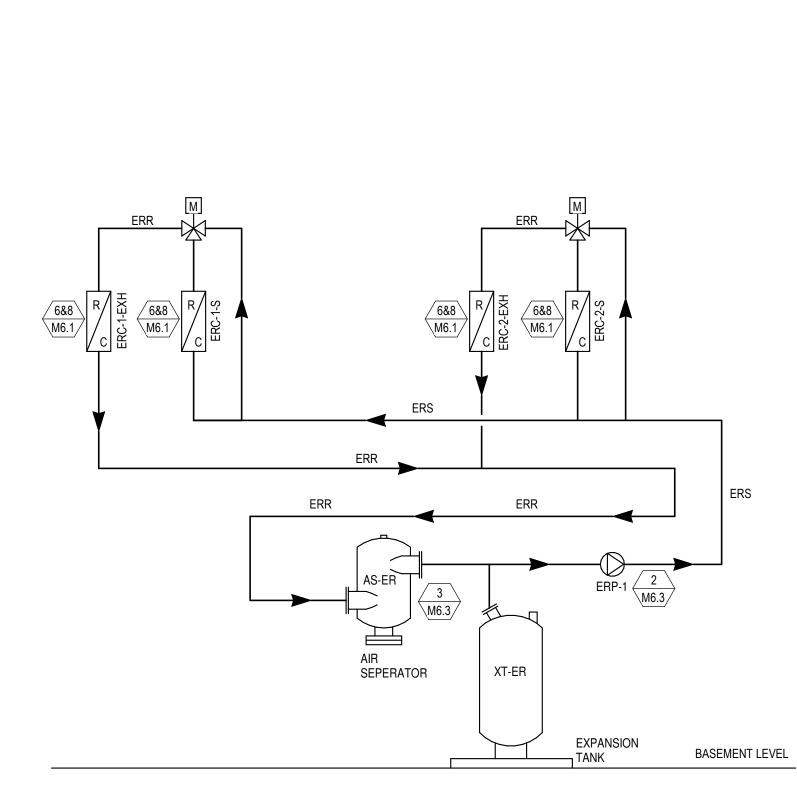












8 RUN-AROUND ENERGY RECOVERY SCHEMATIC DIAGRAM SCALE: NOT TO SCALE

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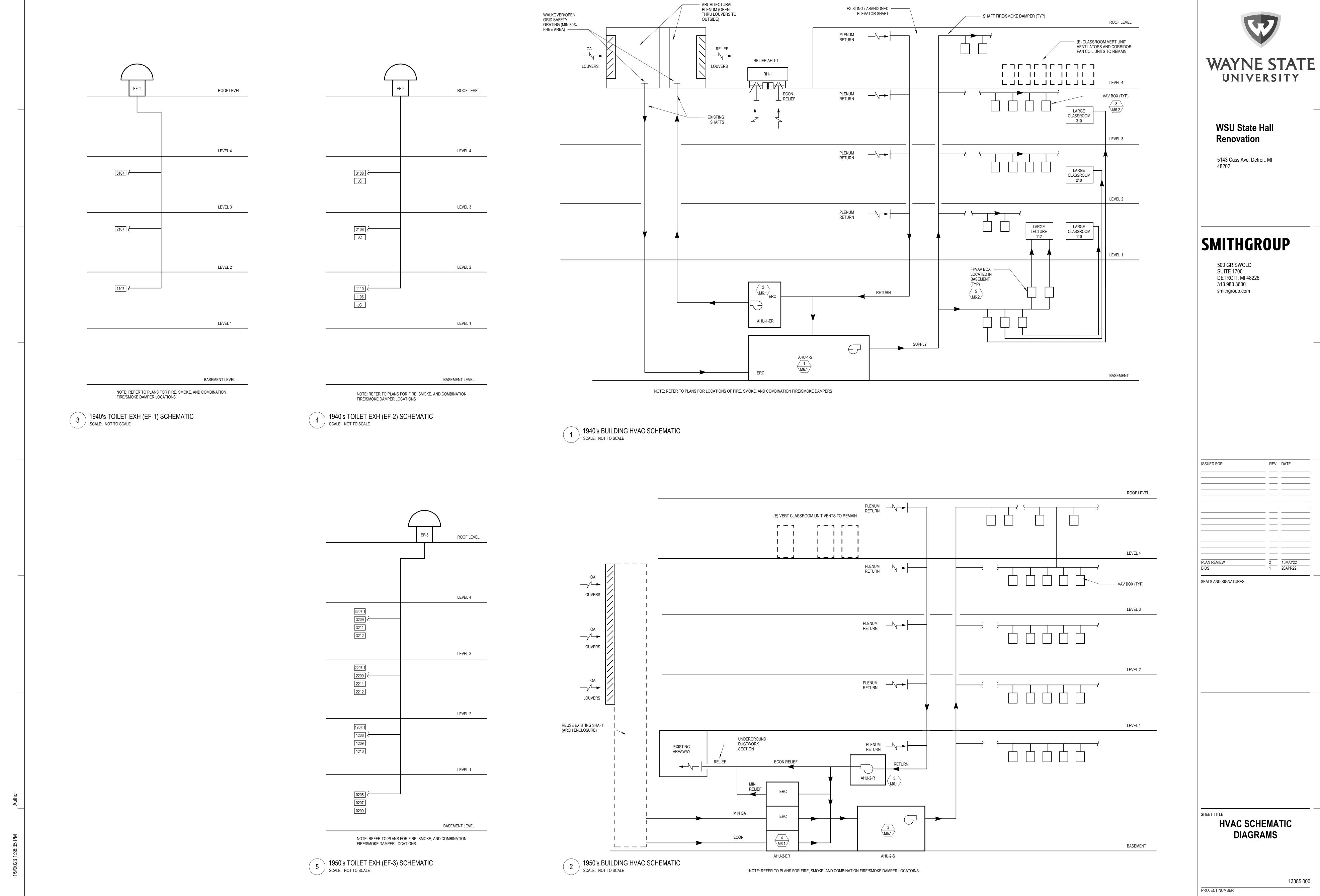
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SHEET TITLE **HVAC SCHEMATIC DIAGRAMS**

13385.000 PROJECT NUMBER M5.1

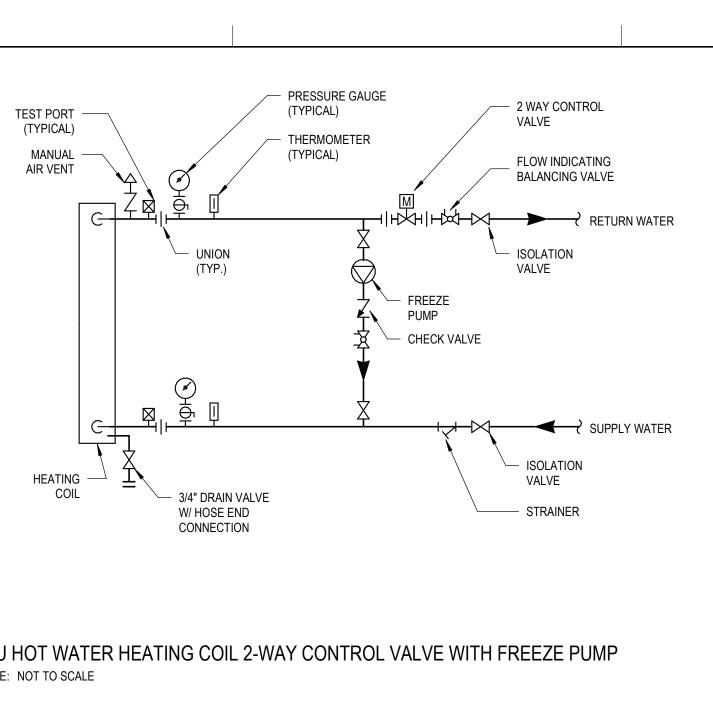


EXISTING / ABANDONED -ELEVATOR SHAFT

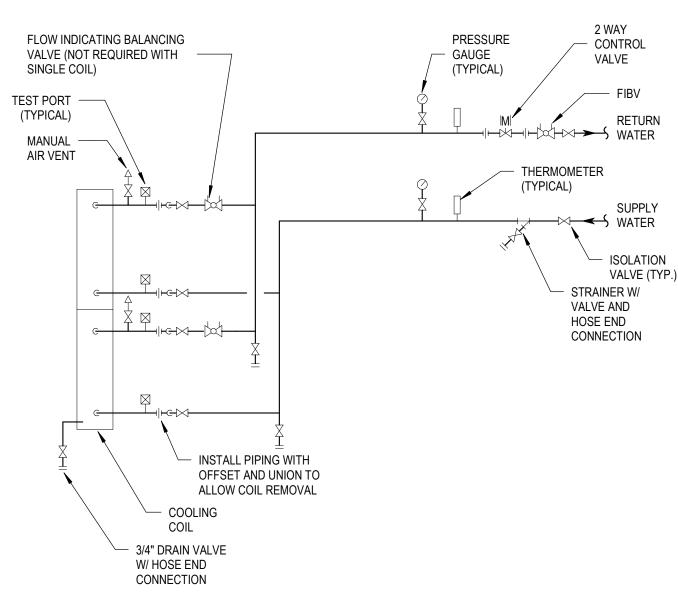
UNIVERSITY

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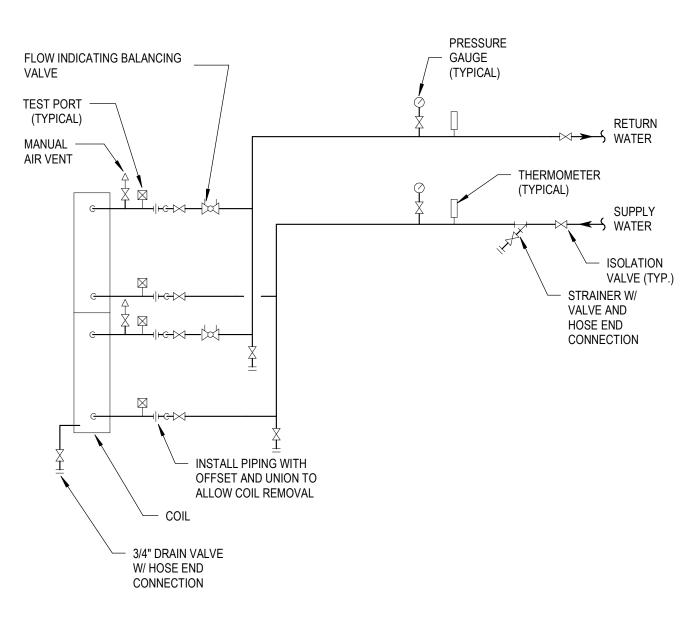
M5.2 SHEET NUMBER



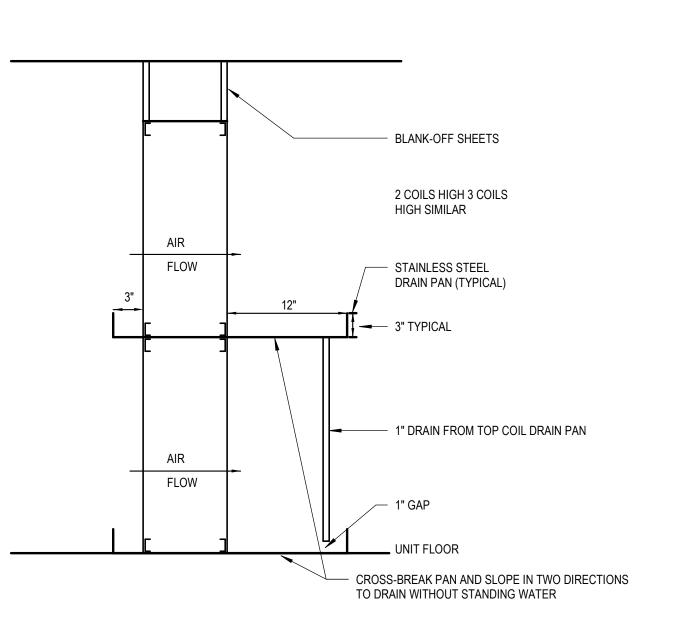
AHU HOT WATER HEATING COIL 2-WAY CONTROL VALVE WITH FREEZE PUMP SCALE: NOT TO SCALE



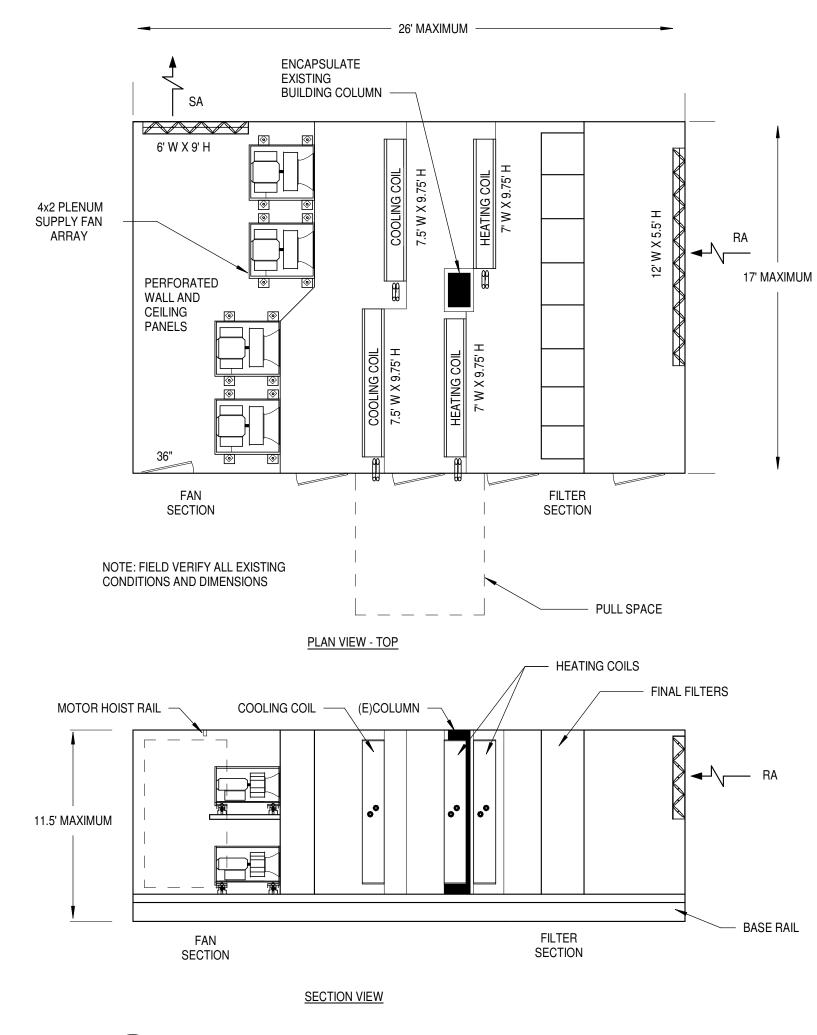
8 AHU CHILLED WATER COIL 2-WAY CONTROL VALVE SCALE: NOT TO SCALE



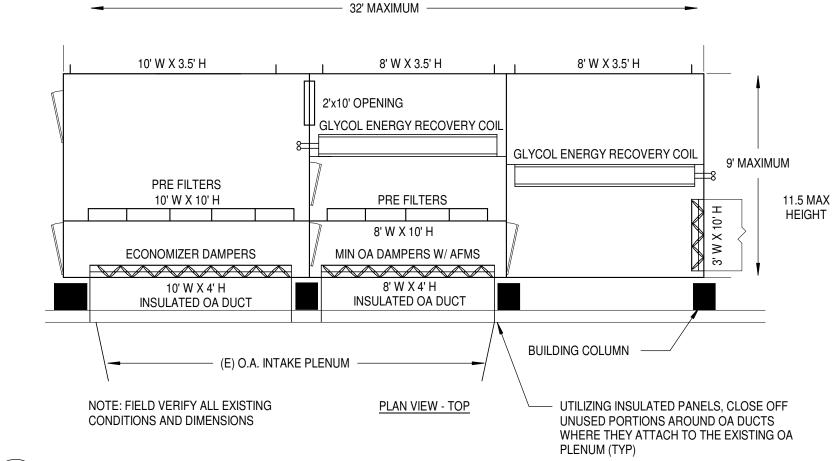
9 ENERGY RECOVERY COIL SCALE: NOT TO SCALE



AHU MULTIPLE COIL DRAIN PAN SCALE: NOT TO SCALE



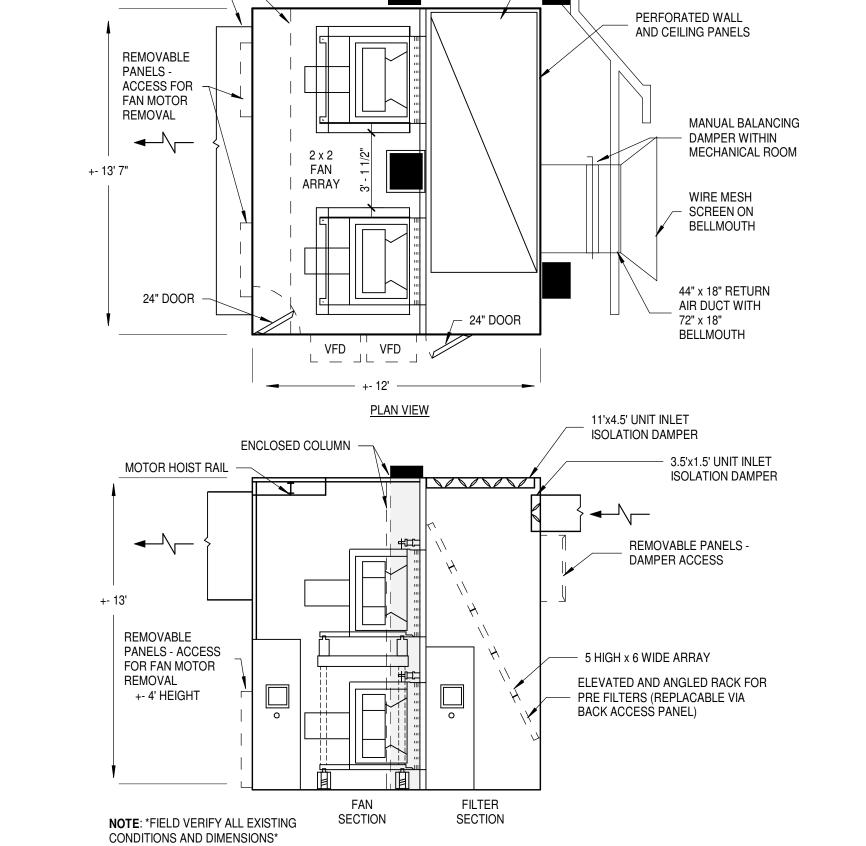
\ '55 WING AHU-2-S SCALE: NOT TO SCALE



'55 WING AHU-2-ER SCALE: NOT TO SCALE

STRUCTURAL COLUMN (TYP)

— 130" X 44" RETURN AIR DUCT



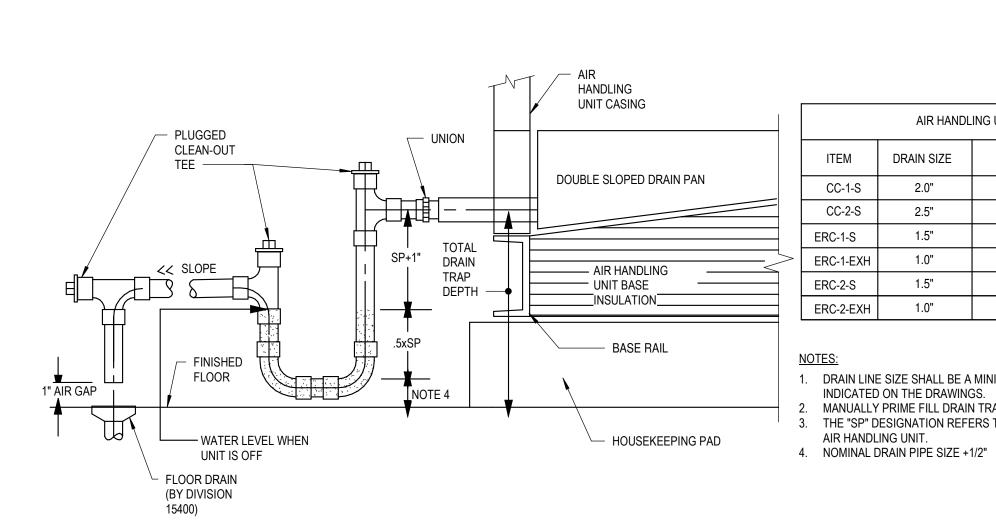
ELEVATION VIEW

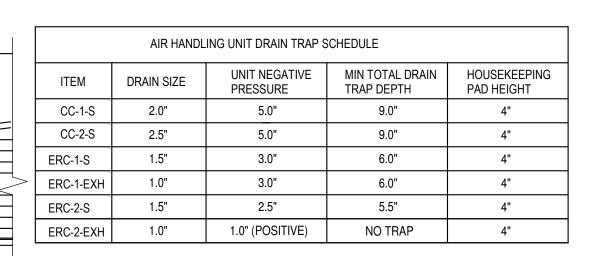
'55 WING AHU-2-R SCALE: NOT TO SCALE

MECHANICAL ROOM WALL -

MOTOR HOIST RAIL

144" x 54 " RETURN AIR DUCT -





- 35' MAXIMUM -

FILTER SECTION

PLAN VIEW - TOP

SECTION VIEW

FILTER

SECTION

PLAN VIEW - TOP NOTE: FIELD VERIFY ALL EXISTING

CONDITIONS AND DIMENSIONS

120"x 24" RETURN AIR

DUCT CONNECTION.

5' W X 9' H

CEILING

11' MAXIMUM

- MOTOR HOIST RAIL

DIRECT DRIVE
 PLENUM SUPPLY FAN

2x2 FAN ARRAY

SECTION

HEATING COIL

FAN SECTION

COILING COIL

3.5' W X 9' H RA

4.5' W X 9' H

PULL SPACE —

NOTE: FIELD VERIFY ALL EXISTING

FINAL FILTERS

CONDITIONS AND DIMENSIONS

\ '48 WING AHU-1-S

PULL SPACE ---

→ 17' MAXIMUM ¹-

SECTION

GLYCOL ENERGY

SECTION

2 '48 WING AHU-1-ER SCALE: NOT TO SCALE

SECTION VIEW

RECOVERY COIL

SCALE: NOT TO SCALE

ARRAY

ARRAY

RECOVERY

COIL -

FILTERS

10.5' MAXIMUM

MOTOR

HOIST RAIL

8.5' MAXIMUM

1. DRAIN LINE SIZE SHALL BE A MINIMUM OF THE UNIT DRAIN PAN CONNECTION OR THE SIZE INDICATED ON THE DRAWINGS. MANUALLY PRIME FILL DRAIN TRAP PRIOR TO START-UP OF AIR HANDLING UNIT. THE "SP" DESIGNATION REFERS TO THE TOTAL NEGATIVE PRESSURE DEVELOPED IN THE AIR HANDLING UNIT.

AHU COOLING COIL DRAIN TRAP DETAIL - DRAW THRU TYPE UNIT SCALE: NOT TO SCALE



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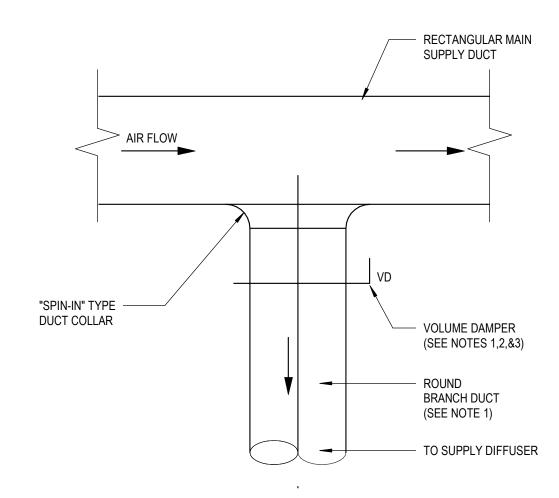
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AIR HANDLING UNIT DETAILS

13385.000 PROJECT NUMBER M6.1

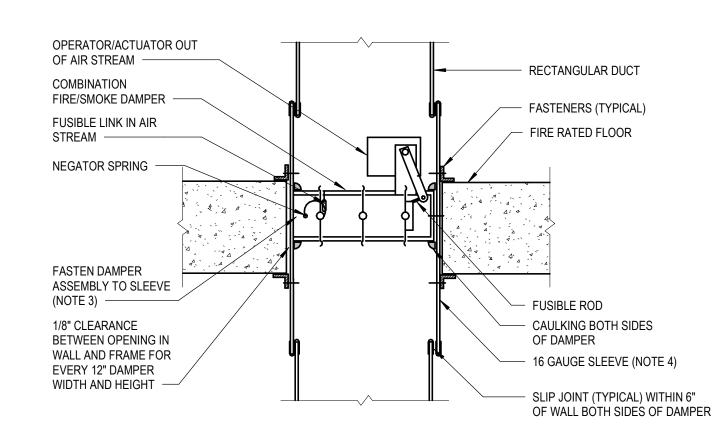
9 STANDARD DUCT TAKEOFF SCALE: NOT TO SCALE



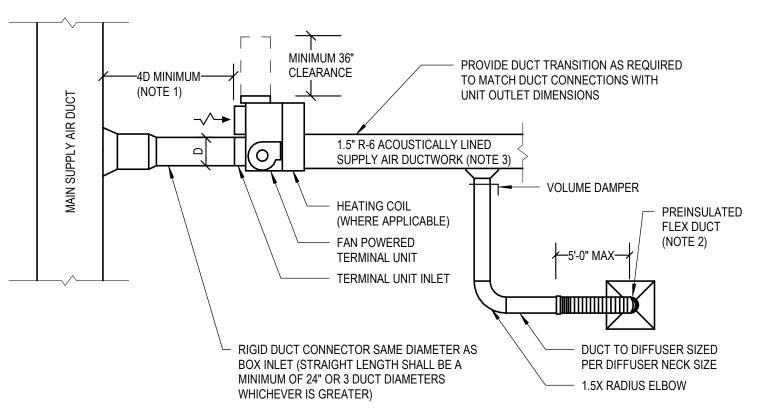
NOTES:

1. MAXIMUM ROUND DUCT SIZE SHALL BE 12" ROUND
REFER TO LOW PRESSURE RECTANGULAR SUPPLY DUCT TAKE-OFF
DETAIL FOR BRANCH TAKE-OFFS GREATER THAN 12" ROUND.

TYPICAL LOW PRESSURE RECTANGULAR TO ROUND SUPPLY DUCT TAKE-OFF DETAIL SCALE: NOT TO SCALE



- INSTALL ACCESS DOOR IN DUCT FOR DAMPER ACCESS.
 INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND NFPA-90A.
 REFER TO SMACNA-"FIRE, SMOKE AND RADIATION DAMPER INSTALLATION GUIDE FOR HVAC SYSTEMS" FOR FIRE DAMPER INSTALLATION DETAILS.
- SLEEVE THICKNESS SHALL NOT BE LESS THAN THE GAUGE OF THE DUCT.
 FIRE DAMPER MODE: HIGH TEMPERATURE MELTS FUSIBLE LINK, CLOSING FIRE DAMPER.
 SMOKE DAMPER MODE: SMOKE DETECTOR UPON SENSING HEAT/SMOKE ACTUATED DAMPER MOTOR TO CLOSE DAMPER.
- HORIZONTAL COMBINATION FIRE SMOKE DAMPER INSTALLATION



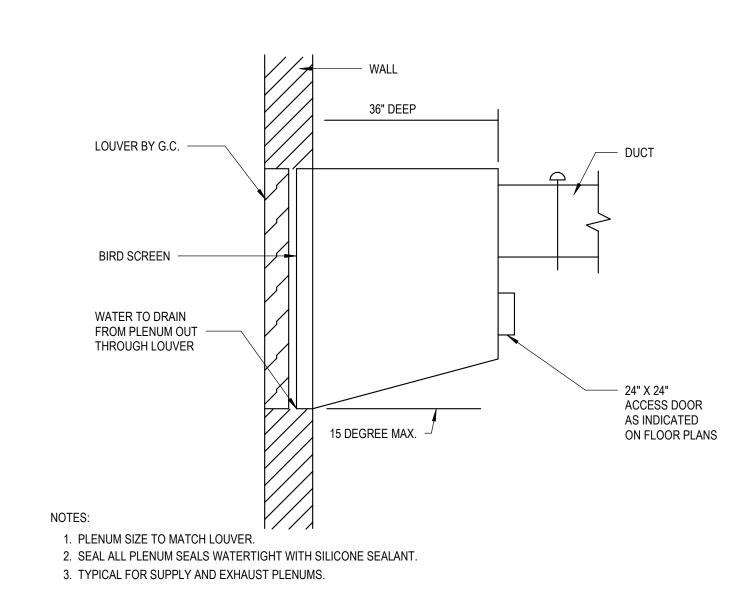
- NOTES:

 1. IF TOTAL LENGTH FROM MAIN TO INLET OF THE TERMINAL UNIT EXCEEDS 10'-0", INCREASE TO NEXT, EVEN SIZED, DUCT DIAMETER.

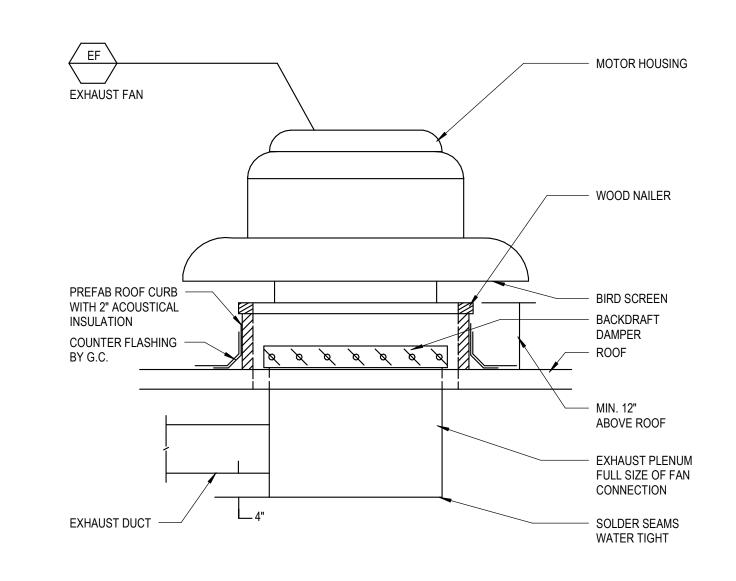
 2. SEE SPECIFICATIONS FOR FLEXIBLE CONNECTION APPLICTION.

 3. ALL RECTANGULAR DUCTWORK DOWNSTREAM OF ERR TO BE INTERNALLY LINED.
- ALL RECTANGULAR DUCTWORK DOWNSTREAM OF FPB TO BE INTERNALLY LINED WITH 1.5" R-6 ACOUSTICAL INSULATION.
 DUCT SIZES SHOWN ON PLANS ARE INSIDE DIMENSIONS; ADD 3" FOR EXTERNAL DIMENSIONS.

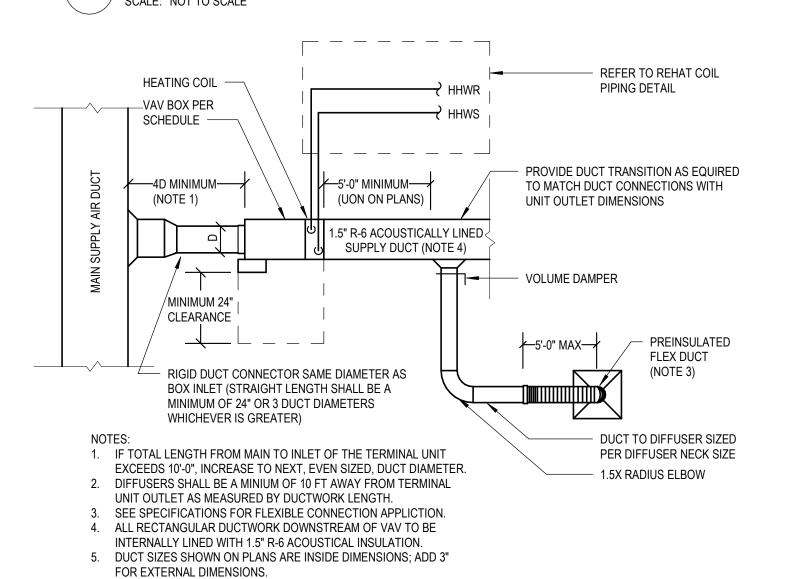
5 FAN POWERED TERMINAL UNIT SCALE: NOT TO SCALE



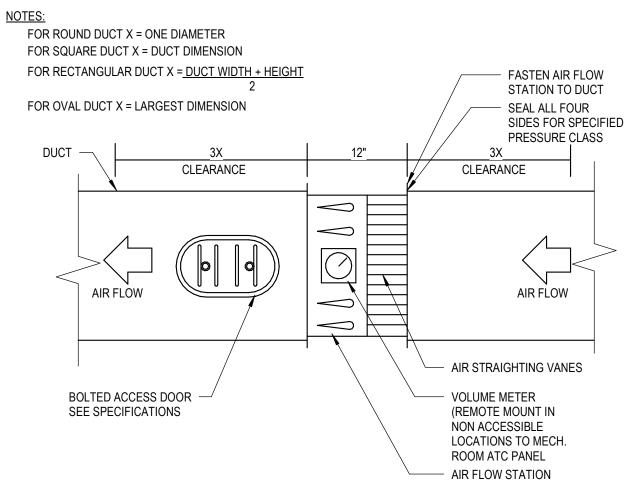
6 LOUVER PLENUM INSTALLATION DETAIL SCALE: NOT TO SCALE



7 ROOF EXHAUST FAN INSTALLATION DETAIL

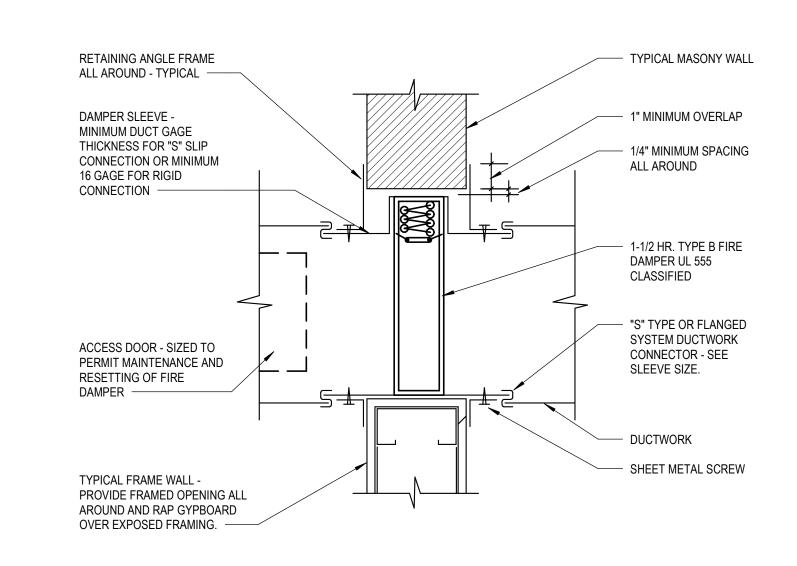


8 TYPICAL VAV TERMINAL UNIT CONNECTION SCALE: NOT TO SCALE

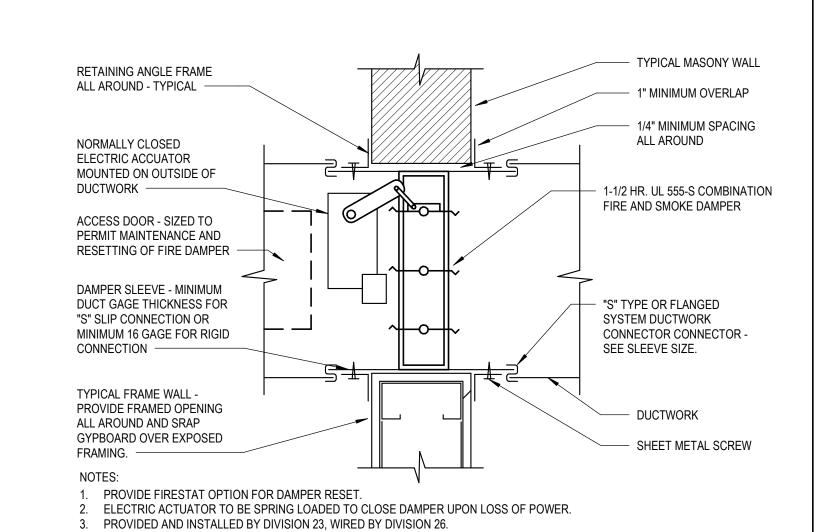


NOTES:
1. INSTALL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND NFPA-90A.
2. LOCATE AIR FLOW STATION TO PROVIDE A MINIMUM UPSTREAM AND DOWNSTREAM CLEARANCE OF 3 DUCT DIAMETERS TO TURBULENCE PRODUCING SOURCES, SUCH AS ELBOWS, DAMPERS, OR SOUND ATTENUATORS.

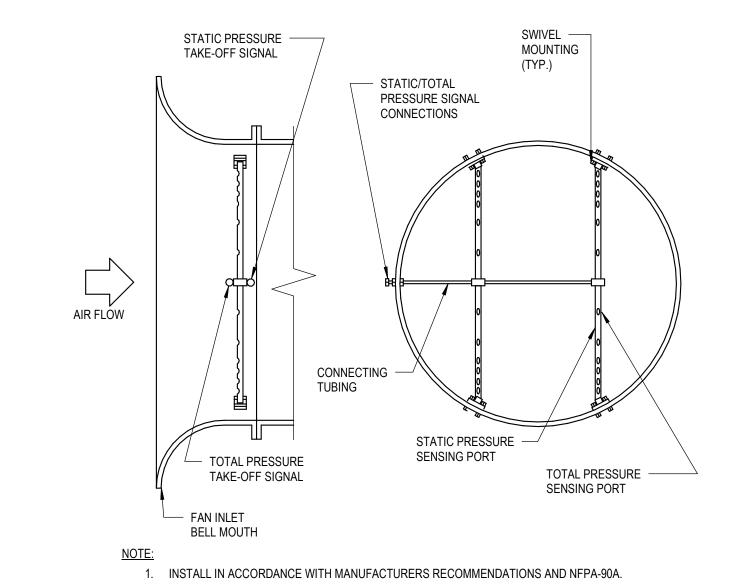
AIR FLOW STATION INSTALLATION DETAIL SCALE: NOT TO SCALE



2 DUCT THRU FIRE PARTITION SCALE: NOT TO SCALE



3 DUCT THRU FIRE/SMOKE PARTITION SCALE: NOT TO SCALE



FAN INLET AIR FLOW STATION INSTALLATION SCALE: NOT TO SCALE



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MECHANICAL DETAILS

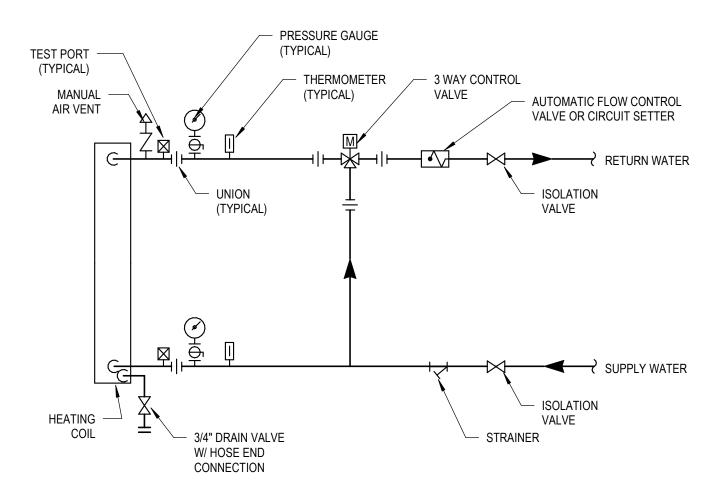
13385.000
PROJECT NUMBER

M6 2

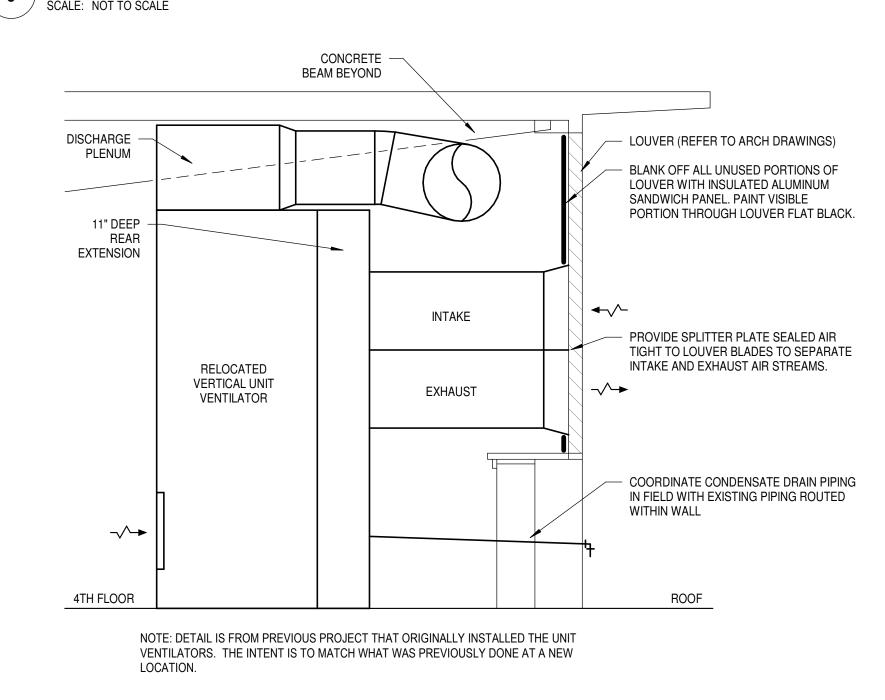
M6.2

SHEET NUMBER

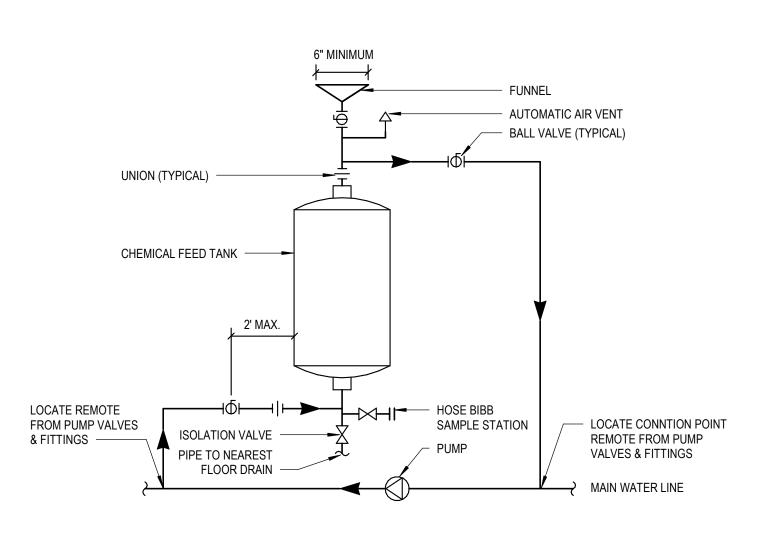
7 GLYCOL SOLUTION FEED SYSTEM SCALE: NOT TO SCALE



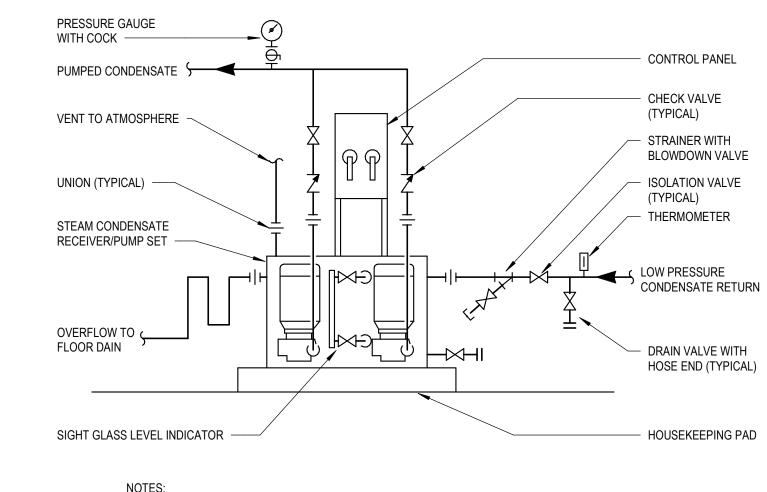
8 HOT WATER HEATING COIL 3-WAY CONTROL VALVE SCALE: NOT TO SCALE



9 VERTICAL UNIT VENTILATOR DETAIL SCALE: NOT TO SCALE

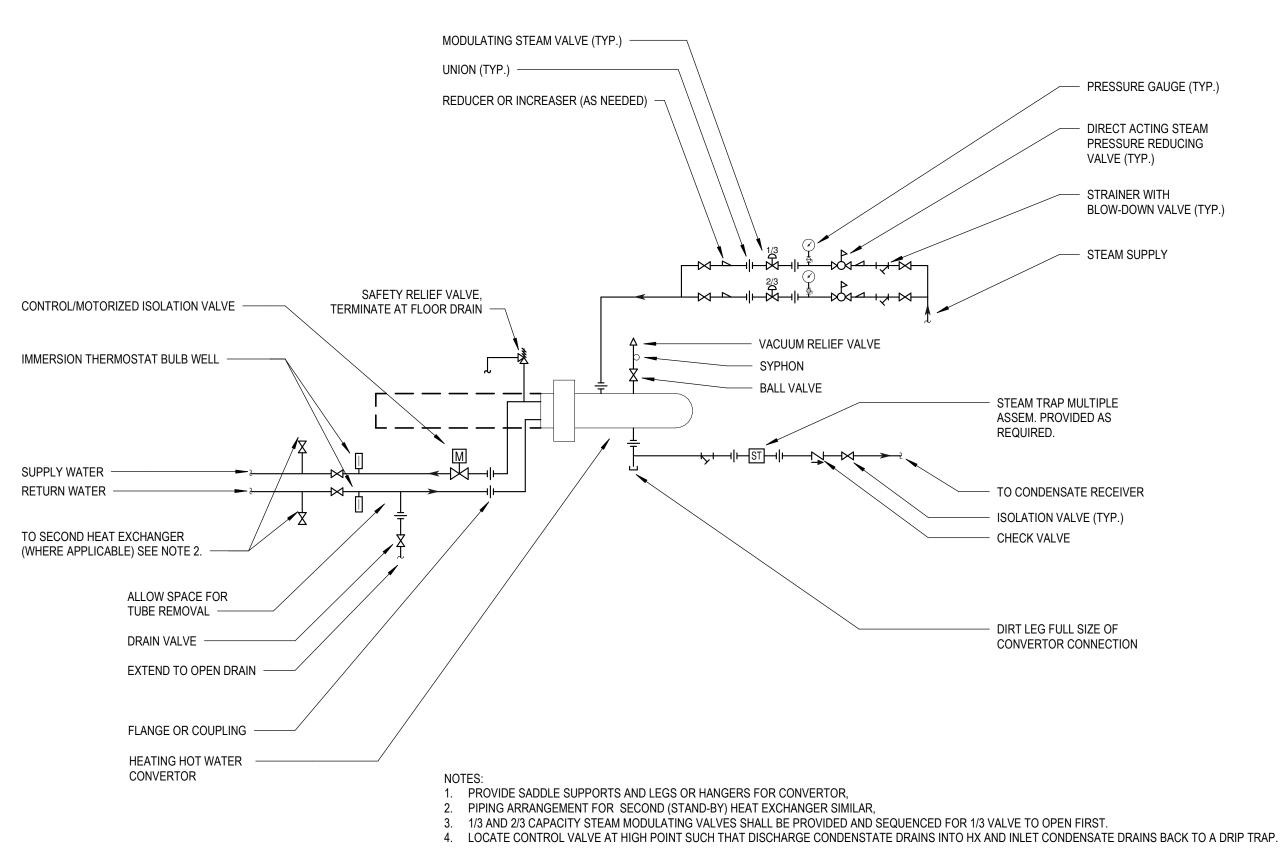


4 SHOT FEEDER SCALE: NOT TO SCALE

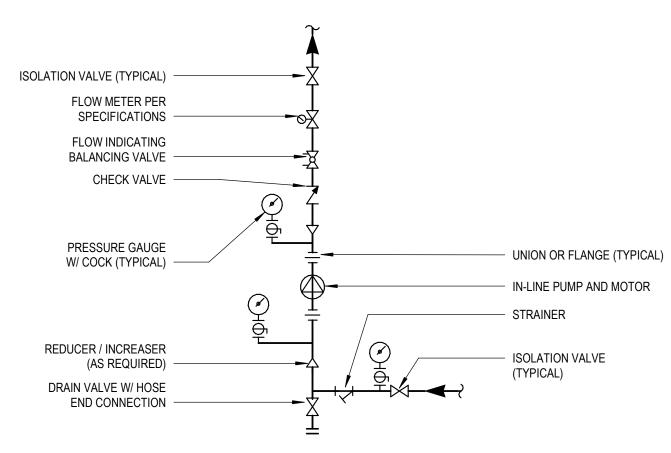


1. HOUSEKEEPING PAD SHALL BE 4" MINIMUM HEIGHT AND 6" WIDER THAN EQUIPMENT BASE ON EACH SIDE.

5 DUPLEX CONDENSATE RECEIVER AND PUMP SET DETAIL

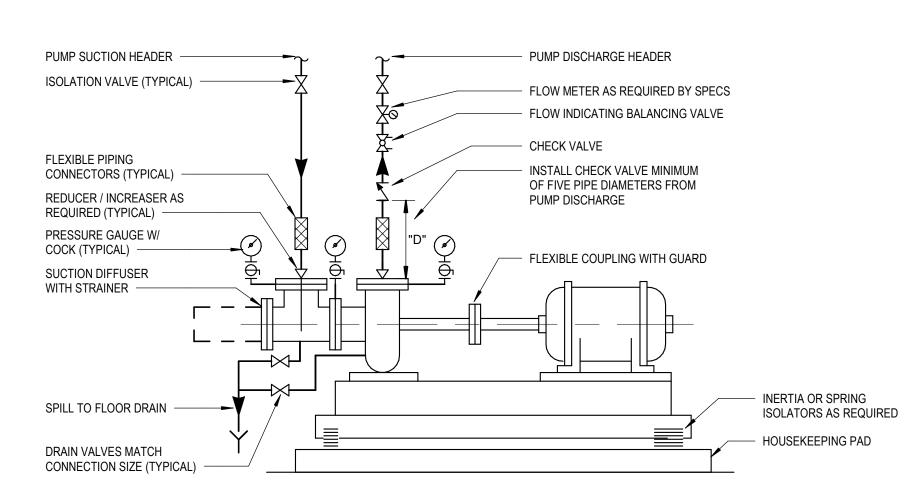


6 HEATING HOT WATER CONVERTOR SCALE: NOT TO SCALE



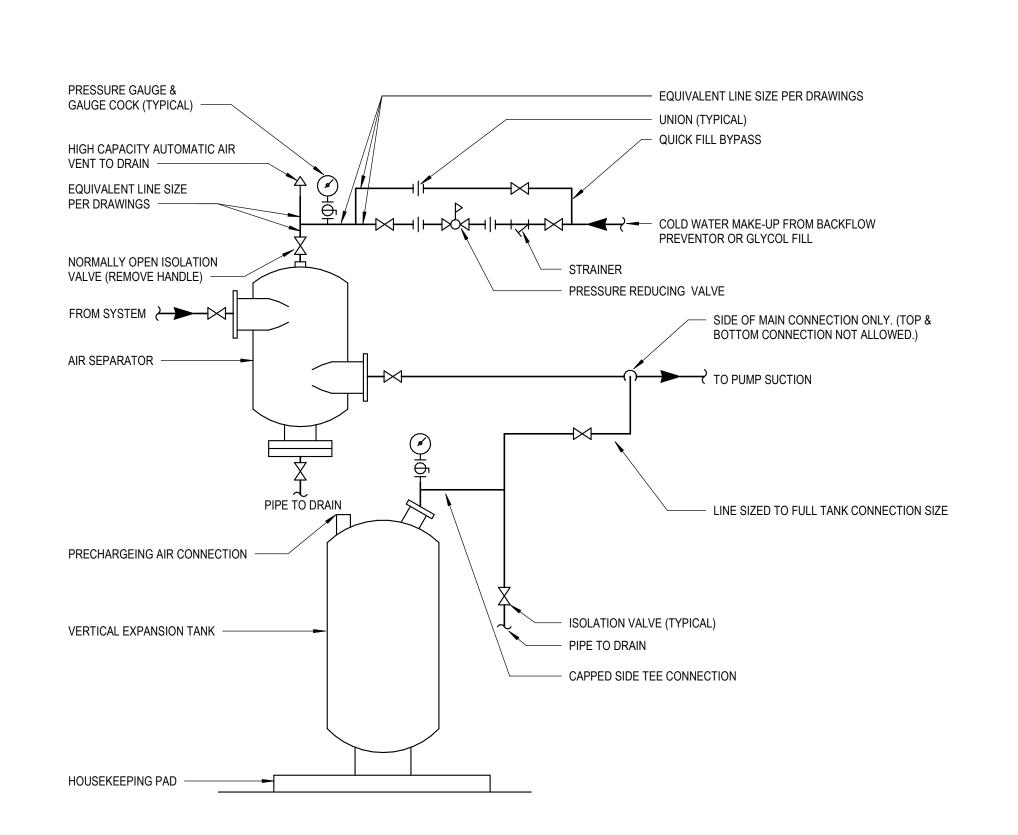
NOTES:
1. CIRULATING PUMP: FOR PUMPS 2 HP AND SMALLER.

- SUPPORT PUMP AND PIPING FROM SUITABLE VIBRATION ISOLATION SUPPORTS.
 PIPING SHALL BE INSTALLED SUCH THAT PUMP MAY BE COMPLETELY REMOVED WITHOUT DISMANTLING PIPE OR FITTINGS, AND WITHOUT FORCING OR SPRINGING THE PIPING.
- BALANCING VALVE IS NOT REQUIRED WHERE PUMP MOTOR IS OPERATED BY VFD.
 INSTALL PRESSURE GAGES AS SHOWN OR INSTALL SINGLE GAGE WITH MULTIPLE INPUT SELECTOR VALVE.
- 1 IN-LINE CIRCULATING PUMP SCALE: NOT TO SCALE



NOTES:
 IF GROOVED PIPING SYSTEM IS UTILIZED, PROVIDE THREE (3) FLEXIBLE TYPE COUPLINGS IN CLOSE PROXIMITY
 TO THE PUMP INLET AND OUTLET IN LIEU OF FLEXIBLE PIPING CONNECTORS.
 BALANCING VALVE IS NOT REQUIRED WHERE PUMP MOTOR IS OPERATED BY VFD.
 INSTALL PRESSURE GAUGES AS SHOWN OR INSTALL SINGLE GAUGE WITH MULTIPLE INPUT SELECTOR VALVE.

BASE MOUNTED END SUCTION PUMP



NOTE:
1. FOR MULTIPLE TANKS WHERE MULTIPLE EXPANSION TANKS ARE REQUIRED. CONNECT TO SIDE TEE AT THIS POINT - CONNECTION LINE SIZE TO BE FULL TANK CONNECTION SIZE.

BLADDER OR DIAPHRAGM EXPANSION TANK AND AIR SEPARATOR - VERTICAL TANK

TANK
SCALE: NOT TO SCALE



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MECHANICAL DETAILS

PROJECT NUMBER

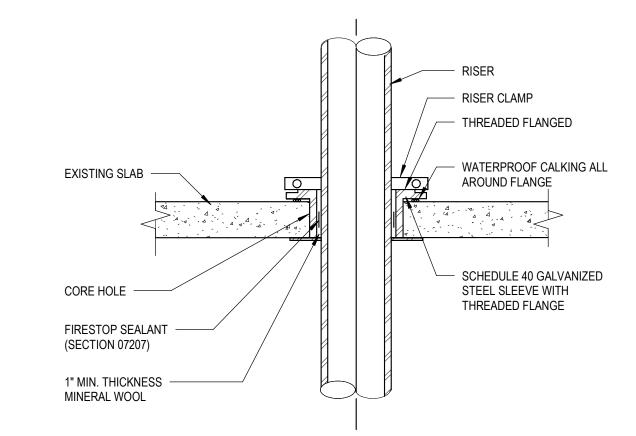
13385.000

M6 3

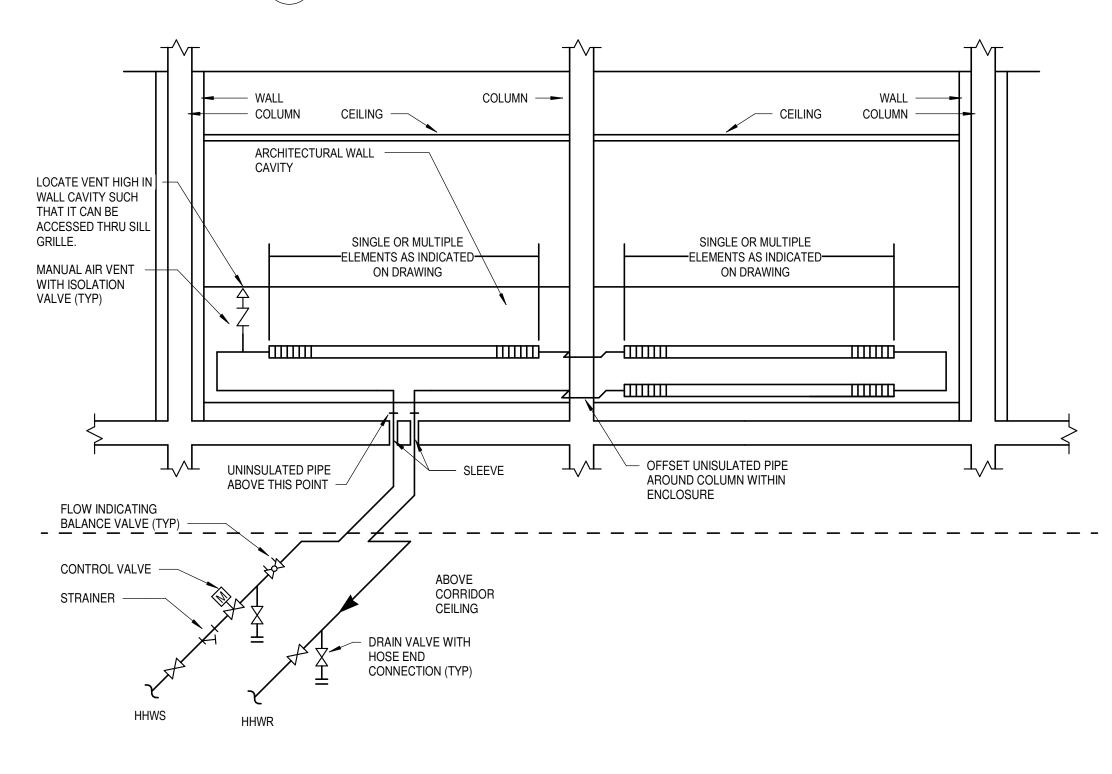
M6.3
SHEET NUMBER

9 PIPING ROOF PENETRATION SCALE: NOT TO SCALE

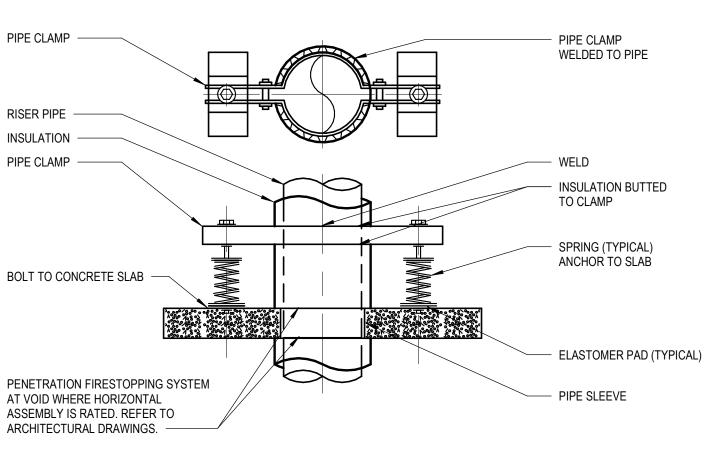
FIRESTOP SEALANTS AND PIPING PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL COMPLY WITH THE UL FIRE RESISTANCE DIRECTORY.



RISER SUPPORT THROUGH EXISTING SLAB



UPFED FIN-TUBE DETAIL SCALE: NOT TO SCALE



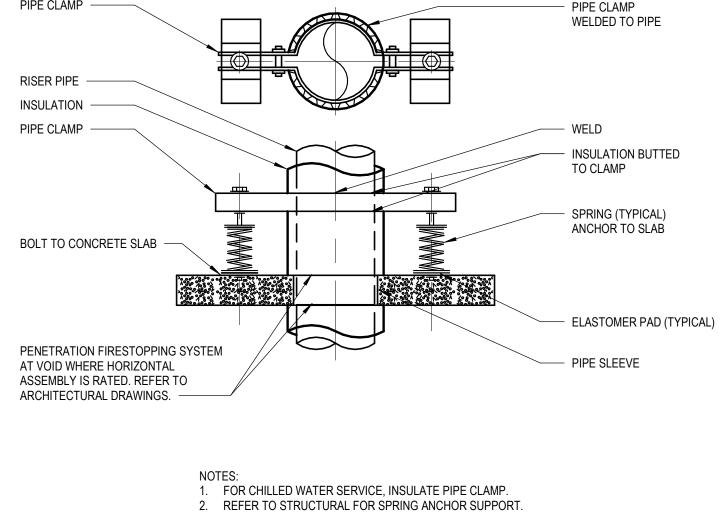
5 VERTICAL RISER SUPPORT SCALE: NOT TO SCALE

TEST PORT — (TYPICAL)

Manual -Air Vent

HEATING — COIL

W/ HOSE END CONNECTION



2 WAY CONTROL

FLOW INDICATING BALANCING VALVE

RETURN WATER

SUPPLY WATER

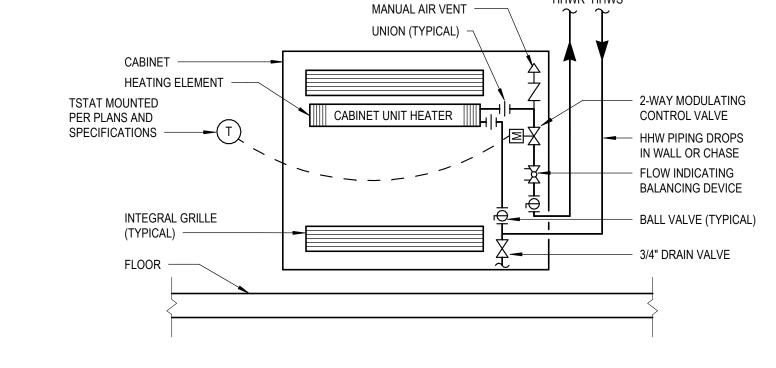
VALVE

ISOLATION

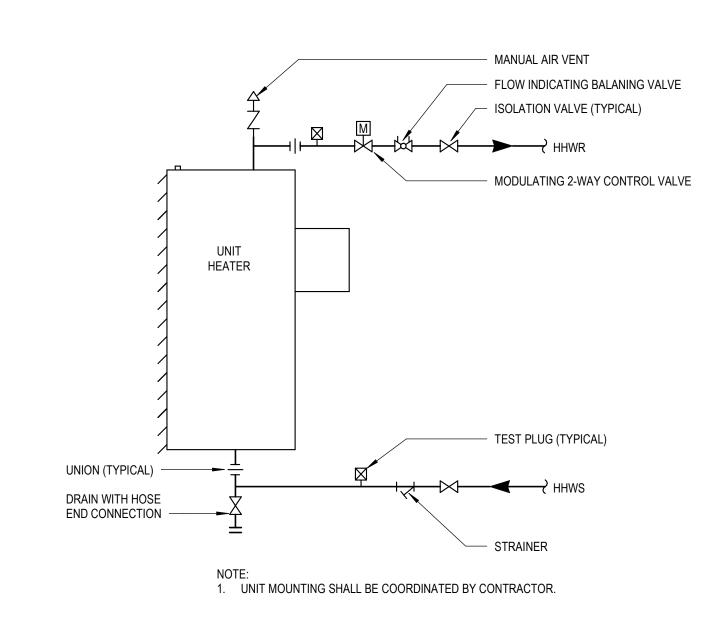
ISOLATION VALVE

- STRAINER

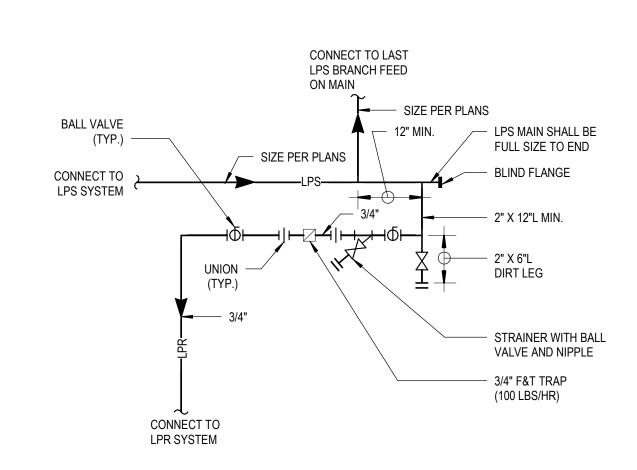
VALVE



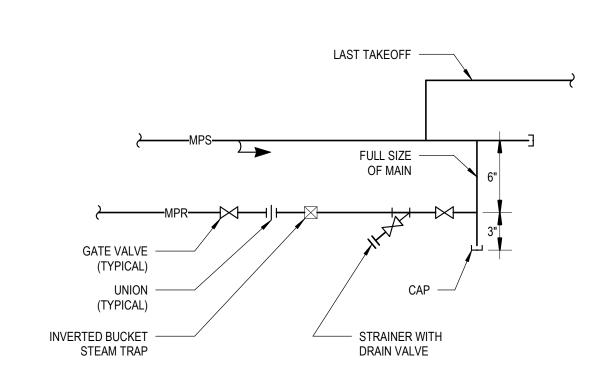
CABINET UNIT HEATER INSTALLATION DETAIL FED FROM ABOVE SCALE: NOT TO SCALE



2 HORIZONTAL HOT WATER UNIT HEATER SCALE: NOT TO SCALE



3 LOW PRESSURE DRIP TRAP ASSEMBLY SCALE: NOT TO SCALE

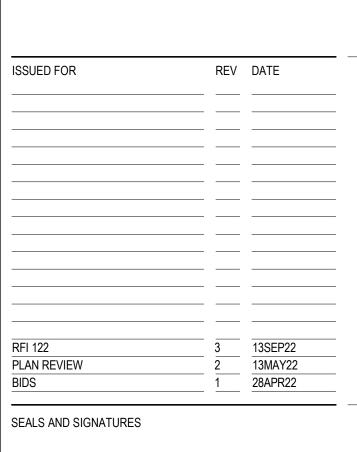




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MECHANICAL DETAILS

13385.000 PROJECT NUMBER M6.4

SHEET NUMBER

8 TERMINAL UNIT HOT WATER HEATING COIL 2-WAY CONTROL VALVE SCALE: NOT TO SCALE 4 HIGH PRESSURE DRIP TRAP ASSEMBLY SCALE: NOT TO SCALE

					STE	AM C	ONDE	NSATE PU	MP & F	RECEIVER	UN	IT S	CHEDU	ILE			
			FLOW PER		DISCHARGE		REC	CEIVER DATA			МО	TOR DA	TA		BASIS OF DES	IGN	
TAG	SYSTEM	LOCATION TYPE	PUMP	TEMPERATURE	HEAD	SIZE	INLET SIZE	DISCHARGE SIZE	VENT SIZE	PUMP QUANTITY	HP	RPM	VOLTAGE	PHASE	MANUFACTURER	MODEL	REMARKS
CRU-1	HHW	1950 B'MENT MER DUPLEX	25 GPM	180 °F	15.00 psi	23.00 gal	0"	0"	0"	2	0.75	0	460 V	3			

									Sh	HELL	& TUBE HE	AT EXCHA	NGER SCHEE	DULE (STEA	M TO W	ATER)				
					MINIM	JM				TUB	E SIDE DATA			SHELL SIDE DATA	_			BASIS OF DES	IGN	
					HEATI	IG								STEAM PRESSURE			RELIEF VALVE			
TAG	SYSTEM	LOCATION	TYPE	CAPACI	ΓY SURFA	CE	EWT	LWT	FLOW	Max PD	NUMBER OF PASSES	FOULING FACTOR	STEAM FLOW (LBS/HR)	(PSIG)	DIAMETER	LENGTH	SETTING (PSIG)	MANUFACTURER	MODEL	REMARKS
HX-1	HHW	1950 B'MENT MER	U TUBE	6000000 Bt	u/h 178 SF		140 °F	160 °F 6	610 GPM	2.16 psi	2	0.0005	6165	2	1' - 2"	6' - 10"	60	B&G	SU-146-2	
HX-2	HHW	1950 B'MENT MER	U TUBE	6000000 Bt	ı/h 178 SF		140 °F	160 °F 6	610 GPM	2.16 psi	2	0.0005	6165	2	1' - 2"	6' - 10"	60	B&G	SU-146-2	

	PRESSU	IRE REDUCIN	IG VALVI	E ASSE	MBLY				
				CAPACITY	PRESSI	JRE		VALVES	
TAG	SYSTEM	TYPE	LOCATION	#/HR	INLET	OUTLET	QUANT	% FLOW	REMARKS
PRV-HX-1A	STEAM	DIRECT ACTING	0202 MECH	2000	45	5	1	33	
PRV-HX-1B	STEAM	DIRECT ACTING	0202 MECH	4000	45	5	1	67	
PRV-HX-2A	STEAM	DIRECT ACTING	0202 MECH	2000	45	5	1	33	
PRV-HX-2B	STEAM	DIRECT ACTING	0202 MECH	4000	45	5	1	67	
PRV-UH	STEAM	DIRECT ACTING	0204 MECH	260	45	5	1	100	

								PUI	MP SCH	HEDULE									
								MINIMUM	PIPE CC	NNECTIONS			MOTO	OR DATA		OPERATING	BASIS OF DES	SIGN	
TAG	SYSTEM	LOCATION	TYPE	FLUID	TEMPERATURE	FLOW	HEAD	EFFICIENCY	SUCTION	DISCHARGE	BHP	HP	RPM	VOLTAGE	PHASE	WEIGHT	MANUFACTURER	MODEL	REMARKS
ERP-1(G)	ERW(G)	1950 B'MENT MER	END SUCTION	40% GLY	50 °F	180 GPM	85 Feet	70	2 5/8"	2"	5.66	15	1741	460 V	3	342.00 lb	BELL & GOSSETT	e-1510 2BD	
HCP-1-S	HHW	MECH - 024	INLINE	WATER	180 °F	25 GPM	23 Feet	0	0"	0"		1.5	1800	460 V	3	0.00 lb	BELL & GOSSETT	PLB	
HCP-2-S	HHW	MECH - 024	INLINE	WATER	180 °F	25 GPM	23 Feet	0	0"	0"		1.5	1800	460 V	3	0.00 lb	BELL & GOSSETT	PLB	
HHWP-1	HHW	1950 B'MENT MER	DOUBLE SUCTION	WATER	180 °F	600 GPM	80 Feet	77	6"	4"	14.3	25	1800	460 V	3	2048.00 lb	BELL & GOSSETT	VSX-VSC	
HHWP-2	HHW	1950 B'MENT MER	DOUBLE SUCTION	WATER	180 °F	600 GPM	80 Feet	77	6"	4"	14.3	25	1800	460 V	3	2048.00 lb	BELL & GOSSETT	VSX-VSC	

				A	IR SEF	PARATO	R SCHE	EDULE			
							MAX WATER		BASIS OF DES	SIGN	
TAG	SYSTEM	LOCATION	TYPE	CONNECTION SIZE	FLOW	STRAINER	PD	OPERATING WEIGHT	MANUFACTURER	MODEL	REMARKS
AS-ER(G)	ER(G)	1950S BMENT MER	AIR/DIRT	4"	150 GPM	No	3.00 psi	0.00 lb			
AS-HHW	HHW	1950S BMENT MER	AIR/DIRT	6"	600 GPM	No	3.00 psi	0.00 lb			

					EX	PANS	ION T	ANK SCHE	DULE				
				TEMPER	RATURE	SYSTEM	TANK	MIN ACCEPTANCE	AIR CHANGE	RELIEF	BASIS OF D	ESIGN	
TAG	SYSTEM	LOCATION	TYPE	MIN	MAX	VOLUME	VOLUME	VOLUME	PRESSURE	VALVE	MANUFACTURER	MODEL	REMARKS
ET-ER(G)	ERW(G)	1950 B'MENT MER	BLADDER	40 °F	100 °F	665.0 gal	23.0 gal	23.0 gal	12.00 psi	60.00 psi	B&G	SERIES B-85	
ET-HHW	HHW	1950 B'MENT MER	BLADDER	40 °F	180 °F	2300.0 gal	211.0 gal	211.0 gal	27.00 psi	60.00 psi	B&G	SERIES B-800	

								FIN TU	JBE RAD	IATIO	N SCHED)ULE	•				
								ENCLOSURE			AVERAGE		NUMBER O	FROWS	BASIS OF	DESIGN	
					FIN	FIN	FINS PER			ACTIVE	WATER						
TAG	SYSTEM	TYPE	MOUNTING	TUBE SIZE	WIDTH	HEIGHT	INCH	TYPE	CAPACITY / FT	LENGTH	TEMPERATURE	EAT	HORIZONTAL	VERTICAL	MANUFACTURER	MODEL	REMARKS
FT-1	HHW	BARE	WALL	3/4"	4.25	4.25	40	NONE/ARCH	900 Btu/h	6' - 0"	140 °F	65 °F	1	2	RITTLING	3/4C-4.25X4.25-40	

						HOT	WA	TER	UNIT	HE	ATER	SCHE	DULE			
			AIRS	SIDE DATA	A	HE/	ATING D	ATA			FAN DATA			BASIS OF DESI	IGN	
			LOW										MOUNTING	_	_	
TAG	SYSTEM	LOCATION	SPEED	EAT	LAT	MIN CAPACITY	EWT	FLOW	MAX PD	HP	VOLTAGE	PHASE	HEIGHT	MANUFACTURER	MODEL	REMARKS
CUH-0090.04	HHW	STAIR 4	970 CFM	65 °F	105 °F	57000 Btu/h	140 °F	8 GPM	2.00 psi	0.25	120 V	1	0' - 6"	STERLING	12	2 ROW HIGH CAP COIL, EXPOSED
CUH-0090.05	HHW	STAIR 5	970 CFM	65 °F	105 °F	57000 Btu/h	140 °F	8 GPM	2.00 psi	0.25	120 V	1	0' - 6"	STERLING	12	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.01	HHW	STAIR 1	335 CFM	65 °F	105 °F	22000 Btu/h	140 °F	3 GPM	1.00 psi	0.1	120 V	1	0' - 6"	STERLING	04	2 ROW HIGH CAP COIL, EXPOSED
CUH-1090.5	HHW	CORRIDOR 12C	675 CFM	65 °F	105 °F	41000 Btu/h	140 °F	6 GPM	1.50 psi	0.1	120 V	1	0' - 6"	STERLING	08	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.07	HHW	CORRIDOR 1XXX	335 CFM	65 °F	105 °F	22000 Btu/h	140 °F	3 GPM	1.00 psi	0.1	120 V	1	0' - 6"	STERLING	04	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.09	HHW	CORRIDOR 11C	970 CFM	65 °F	105 °F	57000 Btu/h	140 °F	8 GPM	2.00 psi	0.25	120 V	1	0' - 6"	STERLING	12	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.10	HHW	CORRIDOR 11C	335 CFM	65 °F	105 °F	22000 Btu/h	140 °F	3 GPM	1.00 psi	0.1	120 V	1	0' - 6"	STERLING	04	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.11	HHW	COFFEE 1115	335 CFM	65 °F	105 °F	22000 Btu/h	140 °F	3 GPM	1.00 psi	0.1	120 V	1	0' - 6"	STERLING	04	2 ROW HIGH CAP COIL, RECESSED
CUH-1090.12	HHW	CORRIDOR 11C	970 CFM	65 °F	105 °F	57000 Btu/h	140 °F	8 GPM	2.00 psi	0.25	120 V	1	0' - 6"	STERLING	12	2 ROW HIGH CAP COIL, RECESSED

						ELI	ECTR	IC UNIT	HEA	TER SCH	HEDULE		
			AIRSIE	E DATA	1		HEATING	DATA		MOUNTING	BASIS OF DES	SIGN	
TAG	LOCATION	TYPE	AIR FLOW	EAT	LAT	MIN CAPACITY	POWER	VOLTAGE	PHASE	HEIGHT	MANUFACTURER	MODEL	REMARKS
ECUH-1090.05	STAIR STAIR #5 VEST	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT
ECUH-1090.07	WEST VESTIBULE	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT
ECUH-1090.09	NORTH VESTIBULE	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT
ECUH-1090.10	SOUTH VESTIBULE	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT
ECUH-1090.11	MID VESTIBULE	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT
ECUH-1090.12	EAST VESTIBULE	ELECT	750 CFM	60 °F	120 °F	40000 Btu/h	12 kW	460 V	3	0' - 6"	BERKO	CUH945	RECESSED, ARCH GRILLE, INTEGRAL 2 STAGE THERMOSTAT

					0 D. 13	F 0) (0 T								
					SPLI	ISYSI	FM FAI	A COL	L SCH	EDULE				
					COOL	ING COIL DAT	Ā		ELE	ECTRICAL DATA	Ą	BASIS OF DE	SIGN	
						TOTAL COOLING	SENSIBLE							
TAG	SERVICE	TYPE	AIRFLOW	EAT DB	EAT WB	CAPACITY	CAPACITY	MAX NC	POWER	VOLTAGE	PHASE	MANUFACTURER	MODEL	REMARKS
FC-0210.01	EMERGENCY POWER	WALL MOUNT	775 CFM	80 °F	67 °F	24000 Btu/h	18000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A24KA7	NOTES 1, 2
FC-0210.03	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-1105	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-1210.03	MDF	WALL MOUNT	775 CFM	80 °F	67 °F	24000 Btu/h	18000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A24KA7	NOTES 1, 2
FC-2105	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-2210.03	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-3105	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-3210.03	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2
FC-4124	IDF	WALL MOUNT	425 CFM	80 °F	67 °F	12000 Btu/h	9000 Btu/h	40	0.05 kW	208 V	1	MITSUBSHI	PKA-A12KA7	NOTES 1, 2

1. PROVIDE CONDENSATE OVERFLOW SAFETY CUTOFF SWITCH
2. PROVIDE SINGLE POINT POWER CONNECTION WITH DISCONNECT SWITCH. COORDINATE POWER AND CONTROLS COORDINATED WITH ASSOCIATED CONDENSING UNIT.

			SPLIT SYS	STEM C	ONDE	NSI	NG UI	NIT SCHED	ULE	
	NOMINAL		COMPRESSORS	E	LECTRICAL	DATA		BASIS OF DE	SIGN	
	CAPACITY	AMBIENT								
TAG	TONS	TEMP	QTY	VOLTAGE	PHASE	MCA	MOCP	MANUFACTURER	MODEL	REMARKS
ACCU-0210.01	2	-10 °F	1	208 V	1	19 A	25 A	MITSUBSHI	PUY-A24NHA7	NOTE 1, 2, 3, 4
ACCU-0210.03	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-1105	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-1210.03	2	-10 °F	1	208 V	1	19 A	25 A	MITSUBSHI	PUY-A24NHA7	NOTE 1. 2. 3. 4
ACCU-2105	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-2210.03	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-3105	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-3210.03	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4
ACCU-4124	1	-10 °F	1	208 V	1	12 A	25 A	MITSUBSHI	PUY-A12NHA7	NOTE 1. 2. 3. 4

WAYNE STATE UNIVERSITY

> **WSU State Hall** Renovation

5143 Cass Ave, Detroit, MI

SMITHGROUP

500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

ISSUED FOR REV DATE _____ ____ ____ ____ _____ _____ ____ _____ ____ _____ 02DEC22 BULLETIN 05 13SEP22 29JULY22 BULLETIN 01 PLAN REVIEW

SEALS AND SIGNATURES

SHEET TITLE MECHANICAL SCHEDULES

13385.000 PROJECT NUMBER

SHEET NUMBER

NOTES:
1. PROVIDE LOW AMBIENT KIT WITH WIND BAFFLES
2. PROVIDE SINGLE POINT POWER CONNECTION WITH DISCONNECT SWITCH, INDOOR UNIT POWER FED FROM OUTDOOR UNIT
3. PROVIDE ROOFTOP SUPPORT
4. PROVIDE BACNET COMMUNICATIONS CARD.

					SEMI-C	CUSTOM	Alf	RHAN	1DL	ING L	JNIT SCH	EDULE				
					AIRFLOW			SF		RF	CO	IL DATA		ACCES	SORIES	
							SF		RF		ENER RECOV	COOLING	PREHEAT	PRE	FINAL	
TAG	SYSTEM	LOCATION	TYPE	MINIMUM	MAXIMUM	OUTSIDE MIN	QTY	SF TAG	QTY	RF TAG	TAG	CHW TAG	HW TAG	FILTER	FILTER	REMARKS
AHU-1-ER	1940S WING	1940 B'MENT MER	SEMI CUSTOM	0 CFM	26000 CFM	0 CFM	0	Х	4	RF-1-ER	ERC-1-EXH	Х	Х	PF-1	X	
AHU-1-S	1940S WING	1940 B'MENT MER	SEMI CUSTOM	15000 CFM	45000 CFM	0 CFM	4	SF-1'-S	0	Х	ERC-1-S	CC-1-S	HC-1-S	PF-1	FF-1	
AHU-2-ER	1950S WING	1950 B'MENT MER	SEMI CUSTOM	0 CFM	65000 CFM	20000 CFM	0	Х	0	Х	ERC-2-EXH	Х	ERC-2-S	PF-1	X	
AHU-2-R	1950S WING	1950 B'MENT MER	SEMI CUSTOM	15000 CFM	58000 CFM	0 CFM	0	Х	4	RF-2-R	Χ	Х	Х	Х	X	
AHU-2-S	1950S WING	1950 B'MENT MER	SEMI CUSTOM	22000 CFM	65000 CFM	30000 CFM	8	SF-2-S	0	Х	Х	CC-2-S	HC-2-S	Х	FF-1	



	HYDRONIC COIL SCHEDULE																						
							QTY OF				CO	IL SIZE DATA	4			AIRSIDE D	ATA			WA	TERSIDI	E DATA	
					TOTAL	SENSIBLE	COILS IN	MIN	MAX FINS	MAX FACE													
TAG	SYSTEM	LOCATION	TYPE	AIRFLOW	CAPACITY	CAPACITY	BANK	ROWS	PER INCH	VELOCITY	FACE AREA	LENGTH	HEIGHT	EAT DB	EAT WB	LAT DB	LAT WB	MAX AIR PD	EWT	LWT	FLOW	WATER MAX PD	REMARKS
CC-1-S	CHW	1940 B'MENT MER	WATER	45000 CFM	2406000 Btu/h	1553000 Btu/h	3	8	10	500	90 SF	10' - 0"	9' - 0"	85 °F	70 °F	54 °F	54 °F	0.85 in-wg	45 °F	57 °F	400 GPM	6.00 psi	
CC-2-S	CHW	1950 B'MENT MER	WATER	65000 CFM	3370000 Btu/h	2200000 Btu/h	6	8	10	500	135 SF	15' - 0"	9' - 0"	85 °F	70 °F	54 °F	54 °F	0.85 in-wg	45 °F	57 °F	560 GPM	6.00 psi	
RC-1-EXH	ERW(G)	1940 B'MENT MER	40% GLY	13000 CFM	614000 Btu/h	534000 Btu/h	6	6	10	250	56 SF	8' - 0"	7' - 0"	75 °F	57 °F	38 °F	37 °F	0.35 in-wg	27 °F	47 °F	80 GPM	8.00 psi	
ERC-1-S	ERW(G)	1940 B'MENT MER	40% GLY	20000 CFM	614000 Btu/h	614000 Btu/h	6	6	10	250	81 SF	9' - 0"	9' - 0"	3 °F	3°F	32 °F	16 °F	0.15 in-wg	47 °F	27 °F	80 GPM	8.00 psi	
RC-2-EXH	ERW(G)	1950 B'MENT MER	40% GLY	22500 CFM	882000 Btu/h	822000 Btu/h	3	6	10	350	67 SF	7' - 6"	9' - 0"	75 °F	57 °F	42 °F	41 °F	0.35 in-wg	27 °F	47 °F	100 GPM	8.00 psi	
ERC-2-S	ERW(G)	1950 B'MENT MER	40% GLY	30000 CFM	882000 Btu/h	882000 Btu/h	3	6	10	450	72 SF	7' - 6"	9' - 0"	3 °F	3°F	30 °F	15 °F	0.50 in-wg	47 °F	27 °F	100 GPM	8.00 psi	
HC-1-S	HHW	1940 B'MENT MER	WATER	20000 CFM	1345400 Btu/h	1345400 Btu/h	3	2	10	250	80 SF	10' - 0"	9' - 0"	3 °F	3°F	65 °F	43 °F	0.25 in-wg	160 °F	120 °F	135 GPM	1 2.00 psi	APD AT FULL FLOW, HEAT AT 100% OA REDUCED FLOW
HC-2-S	HHW	1950 B'MENT MER	WATER	30000 CFM	2050650 Btu/h	2050650 Btu/h	6	2	10	250	120 SF	13' - 0"	9' - 6"	3 °F	3°F	65 °F	43 °F	0.25 in-wg	160 °F	120 °F	200 GPM	1 2.00 psi	APD AT FULL FLOW, HEAT AT 100% OA REDUCED FLOW

	FAN SCHEDULE															
		AIR CAPACITY WHEEL MOTOR DATA														
TAG	SYSTEM	LOCATION	TYPE	MIN	MAX	TYPE	CLASS	TSP	FAN RPM	VOLUME CONTROL	BHP	HP	MAX RPM	VOLTAGE	PHASE	REMARKS
(E)EF	4TH FLOOR TOILET EXHAUST	ROOF	BELT ROOFTOP	1100 CFM	1100 CFM	BI AIR FOIL	1	0.25 in-wg	1000	NONE	.11	0.25	1800	120 V	1	
EF-1	1940S NORTH TOILET EXHAUST	ROOF	BELT ROOFTOP	1500 CFM	1500 CFM	BI AIR FOIL	1	0.75 in-wg	1730	NONE	0.4	0.5	1800	460 V	3	
EF-2	1940S SOUTH TOILET EXHAUST	ROOF	BELT ROOFTOP	1800 CFM	1800 CFM	BI AIR FOIL	1	0.75 in-wg	1100	NONE	0.45	0.5	1800	460 V	3	
EF-3	1950S TOILET EXHAUST	ROOF	BELT ROOFTOP	4500 CFM	4500 CFM	BI AIR FOIL	1	1.10 in-wg	1000	NONE	1.5	2	1800	460 V	3	
EF-0103	PRIMARY ELECT VENT	BMENT	INLINE	4000 CFM	4000 CFM	PROPELLER	1	0.25 in-wg	1040	ECM	0.6	0.75	1800	277 V	1	PROVIDE WITH WALL SLEEVE AND GUARDS
RF-1-ER	1940S RELIEF (TYP. 4)	AHU-1-ER	DD PLENUM	1000 CFM	6500 CFM	BI AIR FOIL	2	4.40 in-wg	1610	(2) VFD'S	6.4	7.5	1800	460 V	3	
RF-2-R	1950S RETURN (TYP. 4)	AHU-2-R	DD PLENUM	1750 CFM	14500 CFM	BI AIR FOIL	1	2.70 in-wg	1010	(2) VFD'S	8.6	10	1200	460 V	3	
SF-1-S	1940S SUPPLY (TYP. 4)	AHU-1-S	DD PLENUM	2250 CFM	11250 CFM	BI AIR FOIL	2	6.20 in-wg	1710	(2) VFD'S	15.5	20	1800	460 V	3	
SF-2-S	1950S SUPPLY (TYP. 8)	AHU-2-S	DD PLENUM	1625 CFM	8125 CFM	BI AIR FOIL	2	7.20 in-wg	1690	(2) VFD'S	12.6	15	1800	460 V	3	

							AIR FIL	TER S	CHED	ULF			
							/ \III \ I IL			OLL			
							HOUSING						
			CELL DATA ASSEMBLY PRESSURE DROP EFFICIENCY BASIS OF DESIGN										
		MAX FACE	DEPT		SI	ZE		INITIAL	FINAL AIR	ASHRAE 52.2			
TAG	TYPE	VELOCITY (FPM)	Н	CAPACITY	Н	W	ACCESS	AIR PD	PD	MERV (#)	MANUFACTURER	MODEL	REMARKS
FF-1	BOX	500 FPM	1' - 0"	2000 CFM	2	2	PER PLANS	0.45 in-wg	1.50 in-wg	13	CAMFIL	RIG-FLO	NOTE 1
PF-1	PLEAT	500 FPM	0' - 2"	2000 CFM	2	2	PER PLANS	0.30 in-wg	1.00 in-wg	8	CAMFIL	30/30	NOTE 1

NOTES: 1. 2'X2' TYPICAL SIZE, 1'X2' ACCEPTABLE ALONG TOP OR ONE SIDE OF FILTER BANK

						IN	TAKE	& REI	LIEF	HOOD	SCHED	JLE		
						ROOF OPENING HOOD SIZE OPERATING BASIS OF DESIGN								
TAG	SYSTEM	LOCATION	TYPE	AIRFLOW	MAX AIR PD	LENGTH	WIDTH	LENGTH	WIDTH	HEIGHT	WEIGHT	MANUFACTURER	MODEL	REMARKS
RH-1	AHU-1	1940S ROOF	HOOD	12000 CFM	0.03 in-wg	36"	102"	10' - 3"	5' - 6"	1' - 7"	300.00 lb	GREENHECK	FGR 36X102	INSULATED BLADE MOTORIZED DAMPER, HINGED ACCESS

	EXISTING	UNIT V	ENTILAT	OR AND FA	NCOIL U	JNIT SCHE	DULE	
			MINIMUM O.A.	CHILLED WATER	HOT WATER			
TAG	SERVES	AIRFLOW	AIRFLOW	FLOW	FLOW	MANUFACTURER	MODEL	REMARKS
(E)FCU-1	MENS TOILET ROOM	600 CFM	0 CFM	6.5 GPM	3.1 GPM	GREENHECK	VFC-600	1, 2
(E)FCU-2	WOMENS TOILET ROOM	600 CFM	0 CFM	6.5 GPM	3.1 GPM	GREENHECK	VFC-600	1, 2
(E)FCU-4	CORRIDOR	2000 CFM	0 CFM	8.9 GPM	2.2 GPM	GREENHECK	VFC-2400	1, 2
(E)UV-3	CLASSROOM 4118	750 CFM	285 CFM	6.5 GPM	3.5 GPM	AIREDALE	UV6CHW4	1, 2
(E)UV-4	CLASSROOM 4116	750 CFM	320 CFM	5.5 GPM	1.5 GPM	AIREDALE	UV3CHW4	1, 2
(E)UV-5	CLASSROOM 4210, STUDENT AUX 4208	1500 CFM	585 CFM	10.5 GPM	4.5 GPM	AIREDALE	UV6CHW4	1, 2
(E)UV-6	CLASSROOM 4214	1500 CFM	400 CFM	10.5 GPM	4.5 GPM	AIREDALE	UV6CHW4	1, 2
(E)UV-8	CLASSROOM 4218	1500 CFM	430 CFM	14.5 GPM	5.0 GPM	AIREDALE	UV6CHW4	1, 2
(R) FCU-3	CORRIDOR	2000 CFM	0 CFM	8.9 GPM	2.2 GPM	GREENHECK	VFC-2400	1, 2
(R)UV-1	CLASSROOM 4110	1000 CFM	315 CFM	6.5 GPM	4.0 GPM	AIREDALE	UV6CHW4	1, 2
(R)UV-2	CLASSROOM 4114	1000 CFM	315 CFM	6.5 GPM	4.0 GPM	AIREDALE	UV6CHW4	1, 2
(R)UV-7	CLASSROOM 4112	750 CFM	315 CFM	5.5 GPM	2.0 GPM	AIREDALE	UV3CHW4	1, 2

NOTES:

1. EXISTING VERTICAL UNIT VENTILATORS AND FAN COIL UNITS TAGGED WITH AN (E) ARE EXISTING TO REMAIN IN THEIR CURRENT LOCATION, (R) ARE BEING RELOCATED, SEE PLANS FOR NEW LOCATIONS.

2. AIR AND WATER FLOW RATES SCHEDULED ARE PREVIOUSLY SCHEDULED VALUES, CONTRACTOR SHALL BALANCE THE EXISTING SYSTEMS TO OBTAIN THESE VALUES.

SMITHGROUP

WSU State Hall

5143 Cass Ave, Detroit, MI 48202

Renovation

500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

SEALS AND SIGNATURES

MECHANICAL SCHEDULES

13385.000
PROJECT NUMBER

M7.2
SHEET NUMBER

1/9/2023 1:38:54 PM

										F/	N POWERE	D TERM	IINAL U	NIT SCH	IEDULE	•						
		AIRFL	OW DATA					HYDI	RONIC HEATING	COIL DATA (AT	Γ FAN CFM)					FA	AN DATA					
	PRIMARY AIR	PRIMARY AIR	INLET	OUTLET	OUTLET								MAX WATER		FAN							
TAG	MINIMUM	MAXIMUM	DIAMETER	LENGTH	HEIGHT	EAT	MIN LAT	EWT	MAX LWT	GPM	MIN CAPACITY	ROWS	WPD	MAX AIR PD	AIRFLOW	HP	VOLTAGE	PHASE	MANUFACTURER	MODEL		REMARKS
-1101A	400 CFM	2220 CFM	16	1' - 4 1/2"	1' - 2"	65 °F	85 °F	140 °F	120 °F	4.0 GPM	39600 Btu	2	2.00 psi	0.50 in-wg	1800 CFM	1	277 V	1	TITUS	DTQP ECM		
-1101B	400 CFM	2220 CFM	16	1' - 4 1/2"	1' - 2"	65 °F	85 °F	140 °F	120 °F	4.0 GPM	39600 Btu	2	2.00 psi	0.50 in-wg	1800 CFM	1	277 V	1	TITUS	DTQP ECM		
-1103	400 CFM	2500 CFM	16	1' - 4 1/2"	1' - 2"	65 °F	85 °F	140 °F	120 °F	4.0 GPM	39600 Btu	2	2.00 psi	0.50 in-wg	1800 CFM	1	277 V	1	TITUS	DTQP ECM		
3-1104	325 CFM	1650 CFM	14	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	2.6 GPM	26400 Btu	2	2.00 psi	0.50 in-wg	1200 CFM	0.5	277 V	1	TITUS	DTQP ECM		
1216A	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
1216B	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
-2104	325 CFM	1650 CFM	14	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	2.6 GPM	26400 Btu	2	2.00 psi	0.50 in-wg	1200 CFM	0.5	277 V	1	TITUS	DTQP ECM		
2122	170 CFM	520 CFM	10	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.0 GPM	8800 Btu	2	2.00 psi	0.50 in-wg	400 CFM	0.5	277 V	1	TITUS	DTQP ECM		
2216A	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
2216B	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
3104	325 CFM	1650 CFM	14	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	2.6 GPM	26400 Btu	2	2.00 psi	0.50 in-wg	1200 CFM	0.5	277 V	1	TITUS	DTQP ECM		
-3122	140 CFM	520 CFM	10	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.0 GPM	8800 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
-3216A	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	400 CFM	0.5	277 V	1	TITUS	DTQP ECM		
-3216B	225 CFM	1200 CFM	12	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		
3-4102	200 CFM	800 CFM	0	1' - 4"	0' - 8"	65 °F	85 °F	140 °F	120 °F	1.3 GPM	13200 Btu	2	2.00 psi	0.50 in-wg	600 CFM	0.3333	277 V	1	TITUS	DFLP ECM	LOW PROFILE, 14X8 INLET	
3-4222	175 CFM	980 CFM	10	1' - 2"	0' - 11"	65 °F	85 °F	140 °F	120 °F	1.8 GPM	17600 Btu	2	2.00 psi	0.50 in-wg	800 CFM	0.5	277 V	1	TITUS	DTQP ECM		

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					VO	LUIVI	E CC	MIKO	IT ROX A	MIIN		NG COIL S	CHEDULE		
		AIRSID	DE DATA					REH	EAT COIL DATA				BASIS OF DES	SIGN	
	INLET						MAX		MIN						
TAG	SIZE	MIN AIRFLOW	MAX AIRFLOW	EAT	LAT	EWT	LWT	FLOW	CAPACITY	ROWS	PIPE SIZE	MAX WATER PD	MANUFACTURER	MODEL	REMARKS
VAV-0090.06A	8	300 CFM	700 CFM	55 °F	80 °F	140 °F	125 °F	1.1 GPM	8250 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-0090.06B	8	300 CFM	700 CFM	55 °F	80 °F	140 °F	125 °F	1.1 GPM	8250 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-0201.1	6	85 CFM	170 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	2350 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-0206	6	550 CFM	550 CFM	55 °F	80 °F	140 °F	125 °F	2.0 GPM	15125 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-0212	6	160 CFM	280 CFM	55 °F	80 °F	140 °F	125 °F	0.6 GPM	4400 Btu	1	3/4"	0.00 psi	TITUS	DESV	
VAV-1107	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-1112	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-1208	6	110 CFM	220 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-1212	8	700 CFM	700 CFM	55 °F	80 °F	140 °F	125 °F	2.5 GPM	19000 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-2107	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-2112	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-2208	6	110 CFM	220 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-2212	8	700 CFM	700 CFM	55 °F	80 °F	140 °F	125 °F	2.5 GPM	19000 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-3107	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-3112	6	350 CFM	350 CFM	55 °F	80 °F	140 °F	125 °F	1.3 GPM	9600 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-3208	6	110 CFM	220 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-3214	8	700 CFM	700 CFM	55 °F	80 °F	140 °F	125 °F	2.5 GPM	19000 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-4122	6	70 CFM	280 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-4122.01	4	50 CFM	110 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-4122.02	6	50 CFM	250 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	
VAV-4122.04	6	70 CFM	360 CFM	55 °F	80 °F	140 °F	125 °F	0.5 GPM	3750 Btu	1	3/4"	2.00 psi	TITUS	DESV	

	GRILLE, REGISTER, AND DIFFUSER SCHEDULE																	
					LIN	IEAR DIFF	USER DATA	\								BASIS OF DE	SIGN	
					SLOT	SLOT	SLOT	BAR	MAX AIR	DISCHARGE								
TAG SYSTEM	TYPE	CFM RANGE	FACE SIZE	NECK SIZE	QUANTITY	WIDTH	LENGTH	WIDTH		SOUND (NC)	THROW	PATTERN	MATERIAL	BORDER	FINISH	MANUFACTURER	MODEL	REMARKS
E2-6 EXHAUST AI	R PLAQUE FACE	0-150	24x24	6"ø					0.08 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	PAR	
E2-10 EXHAUST AI	R PLAQUE FACE	301-425	24x24	10"ø					0.08 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	PAR	
E2-12 EXHAUST AI	R PLAQUE FACE	426-525	24x24	12"ø					0.07 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	PAR	
EG-1 EXHAUST AI	R SIDEWALL GRILLE	0-1400	REFERENCE PLANS	REFERENCE PLANS					0.10 in-wg	25	0' - 0"	N/A	STEEL	FLANGE	WHITE	TITUS	350RL	
LSD1-8 SUPPLY AIF	LINEAR	0-170	48"x3"	8"ø	1	0' - 1"	4' - 0"	0' - 0"	0.08 in-wg	20	0' - 0"	JET THROW	ALUMINUM	LAY-IN	WHITE	TITUS	FL-10	FINISH TO BE WHITE UNLESS NOTED OTHERWISE ON PLAN. WHEN PROVIDING CONTINUOUS FACE, END CONDITION SHALL BE MITERED.
LSD2-12 SUPPLY AIF	LINEAR	0-450	60"x5"	15"x6"	2	0' - 1 1/2"	5' - 0"	0' - 0"	0.10 in-wg	25	0' - 0"	2-WAY HIGH THROW	STEEL	LAY-IN	BLACK	PRICE	TBD4150	WHEN PROVIDING CONTINUOUS FACE, END CONDITION SHALL BE MITERED.
R1-22 RETURN AIR	PERFORATED	0 - 1500	24"x24"	22"x22"					0.10 in-wg	25	0' - 0"	N/A	STEEL	LAY-IN	WHITE	TITUS	PAR	FINISH TO BE WHITE UNLESS NOTED OTHERWISE ON PLAN.
RG-2 RETURN AIR	SIDEWALL GRILLE	0-600	32"x10"	30"x8"					0.10 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	BLACK	TITUS	33RL	HEAVY DUTY LOW RETURN. FINISH TO BE BLACK UNLESS NOTED OTHERWISE ON PLAN.
RG-3 RETURN AIR	SIDEWALL GRILLE	0-900	20"x20"	18"x18"					0.10 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN.
RG-4 RETURN AIR	SIDEWALL GRILLE	0-1400	REFERENCE PLANS	REFERENCE PLANS					0.10 in-wg	25	0' - 0"	N/A	STEEL		WHITE	<varies></varies>	<varies></varies>	SIZES ON PLAN REPRESENT NOMINAL DUCT SIZE. FINISH TO BE WHITE UNLESS NOTED OTHERWISE ON PLAN.
RG-5 RETURN AIR	SIDEWALL GRILLE	0-2750	38"x26"	36"x24"					0.06 in-wg	28	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN.
RG-6 RETURN AIR	SIDEWALL GRILLE	0-1750	52"x14"	50"x12"					0.06 in-wg	26	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN
RG-7 RETURN AIR	SIDEWALL GRILLE	0-1000	34"x12"	32"x10"					0.06 in-wg	20	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN
RG-8 RETURN AIR		0-1200	42"x12"	40"x10"					0.06 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN
RG-9 RETURN AIR	PERFORATED	0-150	12"x12"	10"x10"					0.00 in-wg	25	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	8R	
RG-10 RETURN AIR	SIDEWALL GRILLE	0-2000	26"x26"	24"x24"					0.07 in-wg	29	0' - 0"	N/A	STEEL	SURFACE	WHITE	TITUS	33RL	HEAVY DUTY LOW RETURN
S1-8 SUPPLY AIF	PLAQUE FACE	151-250	24"x24"	8"ø					0.08 in-wg	25	12' - 0"	4-WAY	STEEL	LAY-IN	WHITE	TITUS	OMNI	FINISH TO BE WHITE UNLESS NOTED OTHERWISE ON PLAN.
S1-10 SUPPLY AIF	PLAQUE FACE	250-425	24"x24"	10"ø					0.08 in-wg	25	13' - 0"	4-WAY	STEEL	LAY-IN	WHITE	TITUS	OMNI	
S1-12 SUPPLY AIF	PLAQUE FACE	426-525	24"x24"	12"ø					0.07 in-wg	25	15' - 0"	4-WAY	STEEL	LAY-IN	WHITE	TITUS	OMNI	
S2-6 SUPPLY AIF	PLAQUE FACE	0-150	24"x24"	6"ø					0.11 in-wg	25	11' - 0"	4-WAY	STEEL	SURFACE	WHITE	TITUS	OMNI	
S2-10 SUPPLY AIF	PLAQUE FACE	250-425	24"x24"	10"ø					0.08 in-wg	25	13' - 0"	4-WAY	STEEL	SURFACE	WHITE	TITUS	OMNI	
SFG-1 SUPPLY AIF	FLOOR MOUNTED	0-360	REFERENCE PLANS	REFERENCE PLANS					0.05 in-wg	25	20' - 0"	DOUBLE DEFLECTION	ALUMINUM	FLANGE	BLACK	TITUS	CT-480	SIZES ON PLAN REPRESENT NOMINAL DUCT SIZE.
SG-1 SUPPLY AIF	DUCT MOUNTED	<varies></varies>	REFERENCE PLANS	REFERENCE PLANS					<varies></varies>	<varies></varies>	<varies></varies>	<varies></varies>	<varies></varies>		WHITE	TITUS	DL	<varies></varies>
SG-3 SUPPLY AIF	DUCT MOUNTED	300-615	20"x10"	18"x8"					0.10 in-wg	25	25' - 0"	DOUBLE DEFLECTION	ALUMINUM	DUCT MNT	WHITE	TITUS	S300FL	
SG-4 SUPPLY AIF	DUCT MOUNTED	250-440	20"x8"	18"x6"					0.10 in-wg	25	21' - 0"	DOUBLE DEFLECTION	ALUMINUM	DUCT MNT	WHITE	TITUS	S300FL	

TAGE		INLET	AIRSID	DE DATA	BASIS OF DES	SIGN	
MACAST 10		SIZE					REMARKS
WACCOST 2							
WORDSTONE 18 18 18 18 18 18 18 1	/AV-0205	12	200 CFM	1200 CFM	TITUS	DESV	
WASCEST 12							
WARRIEST S							
MY (1920) 3 0 00 79	AV-0213.1	6	50 CFM	380 CFM	TITUS	DESV	
## A-90000 B B5 CH S5 CH TH S S5 CH ## A-90000 B S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S5 CH ## A-90000 C S6 CH S6 CH TH S S6 CH ## A-90000 C S6 CH TH S6 CH TH S S6 CH ## A-90000 C S6 CH TH S6 CH TH S S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-90000 C S6 CH TH S6 CH TH S6 CH ## A-900000 C S6 CH TH S6 CH TH S6 CH ## A-900000 C S6 CH TH S6 CH TH S6 CH ## A-9000000 C S6 CH TH S6 CH TH S6 CH ## A-9000000 C S6 CH TH S6 CH TH S6 CH ## A-9000000 C S6 CH TH S6 CH TH S6 CH ## A-90000000 C S6 CH TH S6 CH TH S6 CH ## A-900000000 C S6 CH TH S6 CH TH S6 CH							
## SECTION SECTION SECTION THE SECTION	V-1090.06C	6	185 CFM	350 CFM	TITUS	DESV	
March Marc							
WASTED S	V-1090.08A	8	220 CFM	420 CFM	TITUS	DESV	
WASTERD 10							
MATHERS 0							
WASHIFFED 10	AV-1109B	10	145 CFM	890 CFM	TITUS	DESV	
MACHESIA 10							
WASHINGTON 10	AV-1113B	10	145 CFM	780 CFM	TITUS	DESV	
WASHING 10							
WASHITS 10		10			TITUS	-	
WAM-1211 10	AV-1117A	10	145 CFM	750 CFM	TITUS	DESV	
WAN-1906 10							
WAN-1920A 8	AV-1201A	10	145 CFM	890 CFM	TITUS	DESV	
WAN-12028 8							
WAN-1265	AV-1202B	8	175 CFM	660 CFM	TITUS	DESV	
WAM-1286							
WAR-1200.03	/AV-1206	12	190 CFM	1430 CFM	TITUS	DESV	
WAV-2010 10	AV-1209B	10	145 CFM	1010 CFM	TITUS	DESV	
W.2590.684							
WASSEDSEC 10	V-2090.06A	10	350 CFM	900 CFM	TITUS	DESV	
N.2990.0D 10							
WAV-2103 10	V-2090.06D	10	400 CFM	1100 CFM	TITUS	DESV	
WAM-2009 10	/AV-2103		250 CFM	950 CFM	TITUS	DESV	
WAW-2109 10							
WAV2111 10	/AV-2109	10	145 CFM	750 CFM	TITUS	DESV	
VAV2113							
VAV-2115 10	/AV-2113	10	145 CFM	750 CFM	TITUS	DESV	
\text{VAV216} 12							
VAV-2178	/AV-2116	12	200 CFM	1100 CFM	TITUS	DESV	
VAV-2120		10		750 CFM	TITUS		
\(\text{VAV-2201A} \) 10							
\(\text{VAV-2020A} \) 8	AV-2201A	10	145 CFM	890 CFM	TITUS	DESV	
VAV-2020B 8							
VAV-2206 12	AV-2202B	8	175 CFM	660 CFM	TITUS	DESV	
VAV-2296					TITUS		
VAV-2210 6							
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VAV-4213 8 150 CFM 430 CFM TITUS DESV VAV-4215 8 150 CFM 510 CFM TITUS DESV							
VAV-4219 8 150 CFM 510 CFM TITUS DESV VAV-4219 8 150 CFM 580 CFM TITUS DESV VAV-4221 10 150 CFM 720 CFM TITUS DESV	/AV-4219	8	150 CFM	580 CFM	TITUS	DESV	



WSU State Hall Renovation

5143 Cass Ave, Detroit, MI 48202

SMITHGROUP

500 GRISWOLD SUITE 1700 DETROIT, MI 48226 313.983.3600 smithgroup.com

ISSUED FOR REV DATE _____ _____ ____ ____ ____ _____ ____ _____ ____ _____ _____ _____ ____ 3 29JULY22 2 13MAY22 1 28APR22 BULLETIN 01 PLAN REVIEW

SEALS AND SIGNATURES

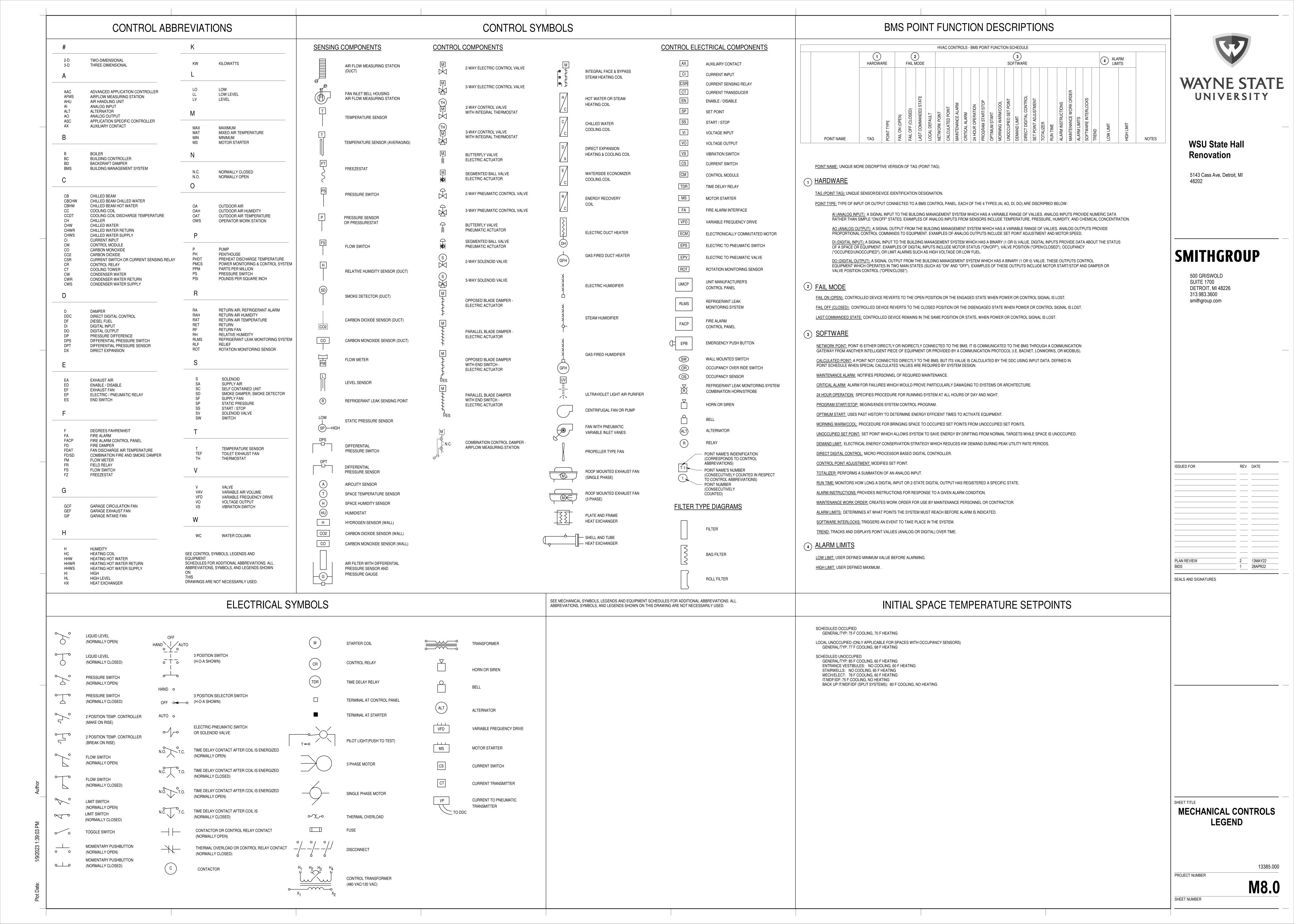
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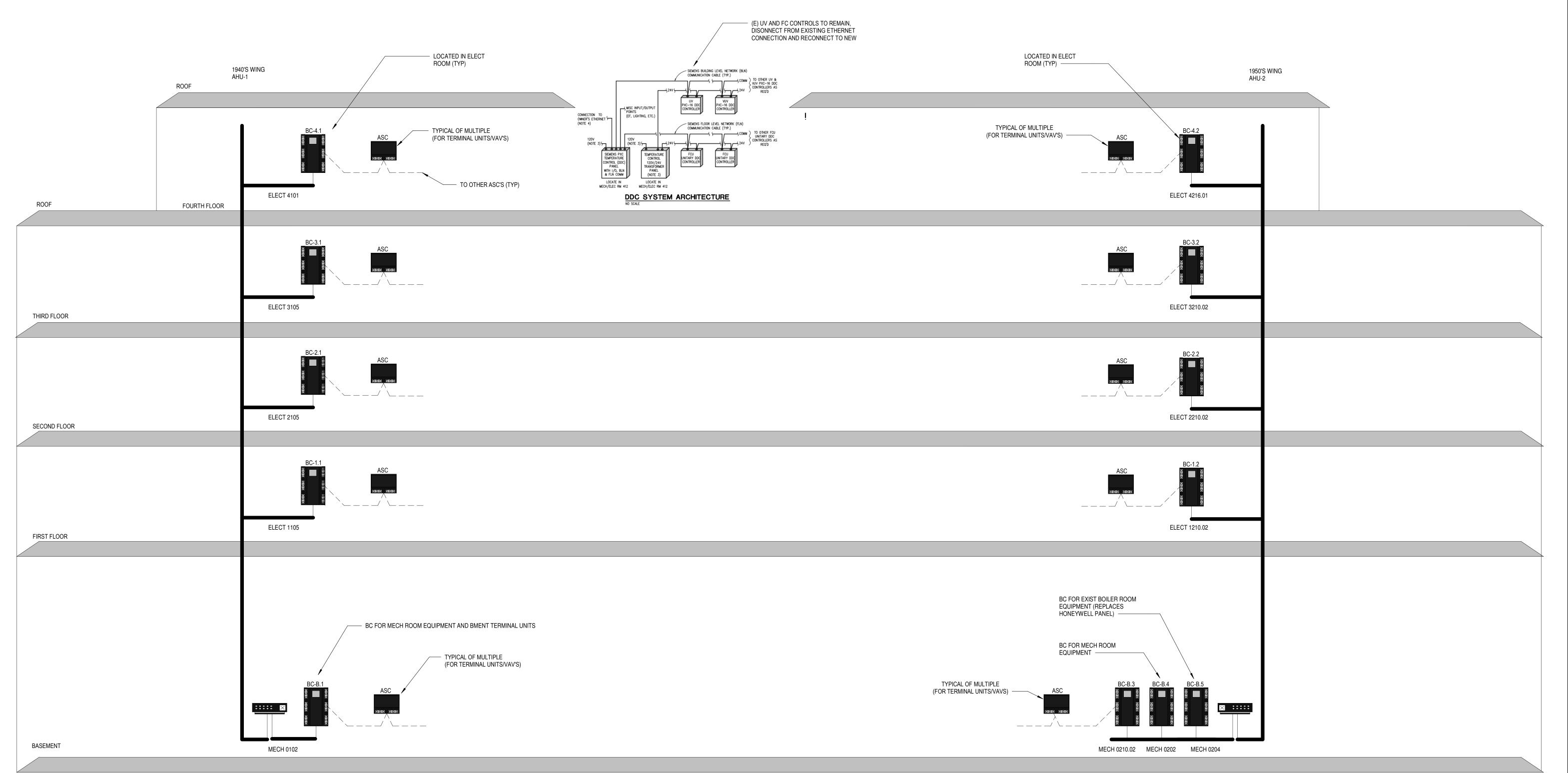
SHEET NUMBER

MECHANICAL SCHEDULES

13385.000

PROJECT NUMBER M7.3





	SYSTEM ARCHITECTURE LEGEND
SYMBOL	DISCRIPTION
	OPERATOR'S WORK STATION (OWS)
	OPERATOR'S WORK STATION (OWS) -VIRTUAL
	LAPTOP - PORTIBLE PROGRAMMER'S TOOL (PPT
	PRINTER
	BUILDING CONTROLLER (BC)
	ADVANCE APPLICATION CONTROLLER (AAC)
	APPLICATION SPECIFIC CONTROLLER (ASC)
	GATEWAY
	ETHERNET (CAT-6)
	RS-485 (TWISTED SHIELDED PAIR)
	RS-232 (TWISTED SHIELDED PAIR)
	SWITCH / HUB
	CLOUD / CAMPUS NETWORK





WSU State Hall Renovation

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SEALS AND SIGNATURES

EET TITLE

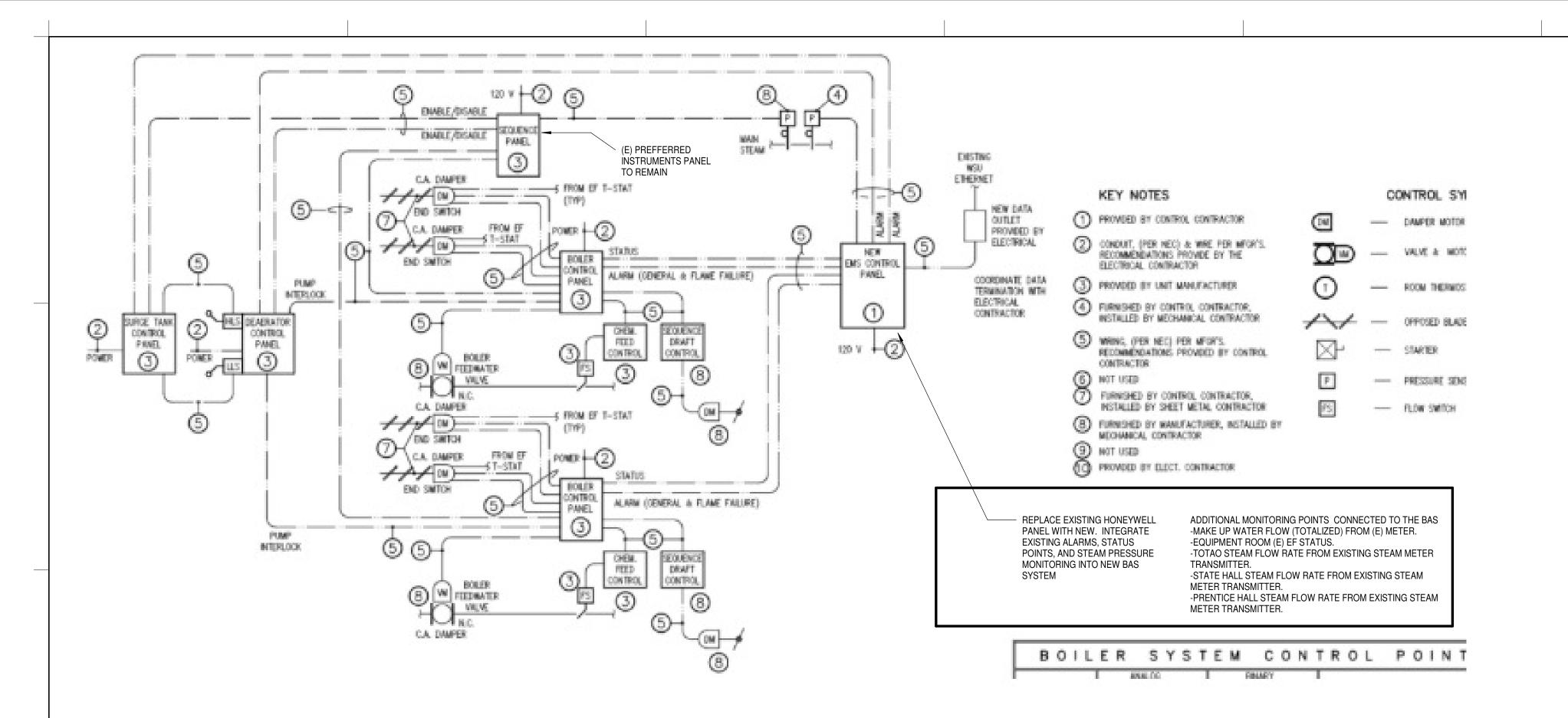
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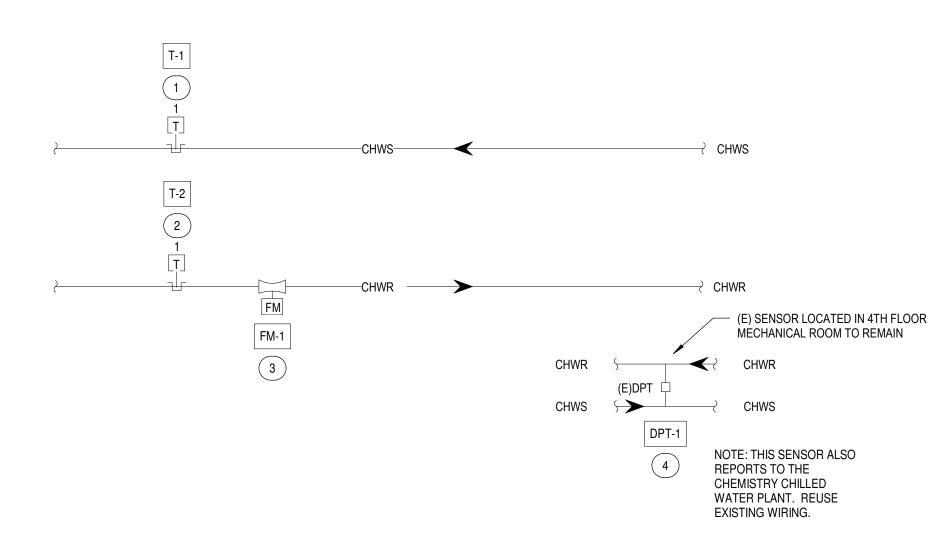
MECHANICAL CONTROLS
- SYSTEM ARCHITECTURE

13385.000

PROJECT NUMBER

M8.1



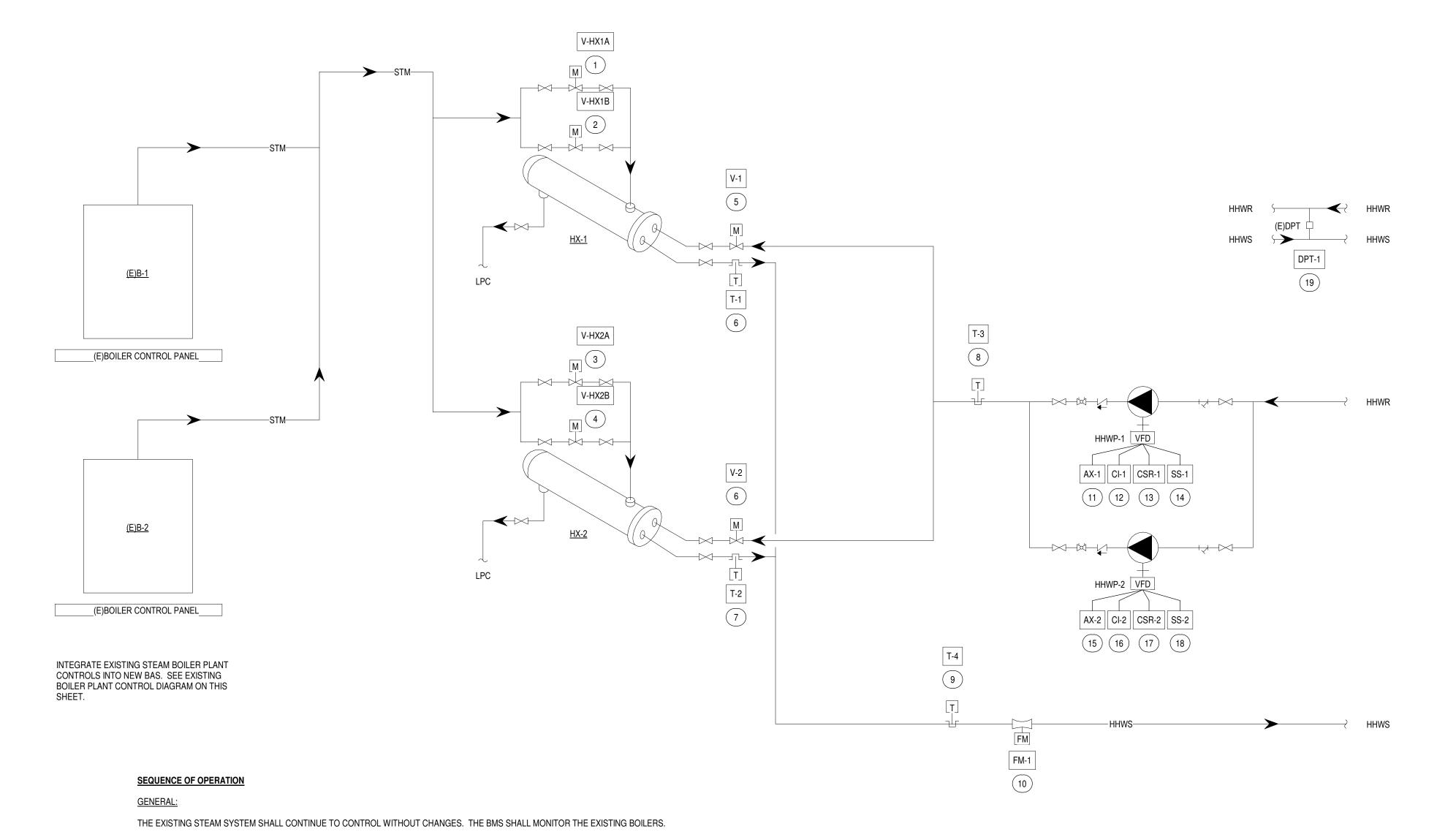


SEQUENCE OF OPERATION

THE CALIBRATED PAIR OF TEMPEATURE SENSOR (T-1 AND T-2) AND FLOW METER (FM-1) SHALL METER BUILDING CHILLED WATER USAGE.

THE EXISTING 4TH FLOOR DIFFERENTIAL TRANSMITTER (E-DPT-1) SHALL REPORT BOTH TO THE EXISTING CHEMISTRY CHILLED WATER PLANT FOR CONTROL PURPOSES AND THE NEW STATE HALL BAS FOR MONITORING PURPOSES.

CHILLED WATER SYSTEM SCALE: NOT TO SCALE



BELOW 20 F OUTSIDE, THE SETPOINT TEMPERATURE SHALL BE RESET HIGHER VIA A RAMP ROUTINE UNTIL 160 F (ADJ) IS REACHED AT 0 F OUTSIDE. IF THE ENERGY RECOVERY SYSTEM IS DISABLED (NOT OPERATIONAL), THIS RAMP ROUTINE SHALL BE OVERRIDEN AND THE TEMPERATURE

SEQUENCE OF OPERATION

ERC-1-EXH /

THE ENERGY RECOVERY SYSTEM SHALL AUTOMATICALLY BE ENABLED AND DISABLED BY THE BMS. THE SYSTEM SHALL BE DISABLED WHEN AHU-1 AND AHU-2 ARE SCHEDULED IN THIER UNOCCUPIED MODE.

-ERWS(G)-

ERC-2-S

WINTER: REFER TO AHU-1 AND AHU-2 SEQUENCE OF OPERATION. WHEN EITHER AHU-1 OR AHU-2 HEATING IS REQUIRED (THE ECONOMIZER OUTDOOR DAMPERS ARE FULLY CLOSED, OUTSIDE AIRFLOW IS AT THE MINIMUM SETPOINT, AND THE COMMAND TO THE HHW VALVE RISES ABOVE 0%), THE ENERGY RECOVERY SYSTEM SHALL BE ENABLED. WHEN EITHER AHU-1 OR AHU-2 COOLING IS REQUIRED (THE ECONOMIZER OUTDOOR DAMPERS ARE FULLY OPEN AND THE COMMAND TO THE CHW VALVE RISES ABOVE 0%), THE ENERGY RECOVERY SYSTEM SHALL BE DISABLED.

SUMMER: IF THE OUTSIDE AIR TEMPERATURE RISES ABOVE 82 F (ADJ), THE ENERGY RECOVERY SYSTEM SHALL BE ENABLED. IF THE OUTSIDE AIR TEMPERATURE FALLS BELOW 80 F (ADJ), THE ENERGY RECOVERY SYSTEM SHALL BE DISABLED.

WHEN THE SYSTEM IS ENABLED, THE CONSTANT SPEED PUMP SHALL START AND RUN CONTINUOUSLY. WHEN THE SYSTEM IS DISABLED, THE PUMP SHALL BE OFF.

FROST CONTROL THE 3-WAY CONTROL VALVE (V-1, V-2) SHALL MODULATE TO MAINTAIN A ERWR(G) 35 F LEAVING TEMPERATURE AT THE ASSOCIATED

ALARMS, SAFETIES, AND MONITORING

THE BMS SHALL MONITOR THE PUMP STATUS. IF THE STATUS DOES NOT MATCH THE COMMANDED OUTPUT FOR MORE THAN 1

MINUTE (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

IF EITHER OF THE EXHAUST COIL ENTERING TEMPERATURES (T-2,T-3) FALLS TO 30 F OR LESS FOR MORE THAN 1 MINUTE (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

ENERGY RECOVERY WATER SYSTEM

SCALE: NOT TO SCALE

THE BMS SHALL MONITOR HEAT ENERGY USAGE THROUGH THE FLOW METER AND CALIBRATED PAIR TEMPERATURE SENSORS. STEAM BOILERS AND HEATING HOT WATER SYSTEM

SAFETIES, ALARMS, AND MONITORING

DEFAULT HEATING HOT WATER SETPOINT SHALL BE 140 F.

TEMPERATURE CONTROL

FLOW CONTROL

SCALE: NOT TO SCALE

THE HEATING HOT WATER SYSTEM SHALL BE ENABLED/DISABLED BY THE BMS.

SETPOINT SET AT 160 F WHEN THE OUTSIDE AIR TEMPERATURE IS 20 F OR LOWER.

HEAT EXCHANGERS ARE SIZED FOR 100% EACH; PRIMARY / STANDBY. EACH ARE EQUIPPED WITH 1/3 - 2/3 STEAM CONTROL VALVES.

THE BMS SHALL ALTERNATE PRIMARY / STANDBY PUMP AND HEAT EXCHANGER OPERATION THE FIRST MONDAY OF EACH MONTH AT 6 AM.

IF THE SYSTEM IS ENABLED, THE PRIMARY HEAT EXCHANGER CONTROL VALVES SHALL MODULATE IN SEQUENCE TO MAINTAIN THE SETPOINT TEMPERATURE.

ABOVE 50 F OUTSIDE, THE SETPOINT TEMPERATURE SHALL BE RESET UPWARD VIA A RAMP ROUTINE UNTIL 110 F (ADJ) IS REACHED AT 70 F OUTSIDE.

WHEN THE SYSTEM IS DISABLED, THE PRIMARY PUMP SHALL CONTINUE TO RUN FOR 1 MINUTE PRIOR TO STOPPING.

PUMPS ARE EACH SIZED FOR 100%; PRIMARY / STANDBY. THE SYSTEM CONSISTS PRIMARILY OF 2-WAY VALVES BUT 3-WAY VALVES ARE USED AT CUH'S TO PREVENT PUMP DEADHEAD IN LOW LOAD CONDITIONS.

WHEN THE OUTSIDE AIR TEMPERATURES FALL BELOW 60 F (ADJ), THE SYSTEM SHALL BE ENABLED. WHEN THE OUTSIDE AIR TEMPERATURES RISE ABOVE 65 F (ADJ), THE SYSTEM SHALL BE DISABLED.

IF THE SYSTEM IS ENABLED, THE PRIMARY HEATING HOT WATER PUMP SHALL MODULATE ITS SPEED TO MAINTAIN THE SYSTEM DIFFERENTIAL PRESSURE SETPOINT (INITIALLY 10 PSI, FINAL SET BY BALANCER).

THE BMS SHALL MONITOR THE DISCHARGE TEMPERATURE OF PRIMARY HEAT EXCHANGER. IF MORE THAN 5 F OFF FROM SET POINT FOR MORE THAN 5 MINUTES, THE STANDBY HEAT EXCHANGER SHALL BE ENABLED AND AN ALARM SENT TO THE BMS.

THE BMS SHALL MONITOR THE PRIMARY PUMP STATUS. IF THE STATUS INDICATED DOES ON MATCH THE COMMANDED OUTPUT FOR 1 MINUTE OR MORE, THE STANDBY PUMP SHALL BE ENABLED AND AN ALARM SENT TO THE BMS.

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CENTRAL HEATING AND COOLING CONTROLS

13385.000 PROJECT NUMBER

SHEET NUMBER

1 AHU-1 SCALE: NOT TO SCALE

SEQUENCE OF OPERATION

GENERAL

AHU-1-S AND CORRESPONDING AHU-1-ER SHALL AUTOMATICALLY BE ENABLED AND DISABLED BY THE BMS PER THE BUILDING OCCUPANCY SCHEDULE COORDINATED WITH THE OWNER. A PREDICTIVE/OPTIMIZED START ROUTINE SHALL UTILITZE WEATHER AND BUILDING CONDITIONS TO ENABLE THE UNITS PRIOR TO SCHEDULED OCCUPANCY.

FAN VFD HOA SWITCHES SHALL NORMALLY BE KEPT IN THE "AUTO" POSITION WITH "ON" OR "OFF" ONLY USED FOR MAINTENANCE PURPOSES.

IF THE UNIT IS OFF OR DISABLED, ALL DAMPERS AND VALVES SHALL RETURN TO THEIR NORMAL POSITION AND ALL ASSOCIATED SUPPLY AND RELIEF FANS SHALL BE OFF.

IF A THE AHU IS ENABLED BY THE BAS OR MANUALLY STARTED, THE OUTSIDE INTAKE DAMPERS (D-1) AND UNIT SMOKE ISOLATION DAMPERS (D-3, D-5, AND D-8) SHALL FULLY OPEN, ONCE PROVEN OPEN, THE SUPPLY FANS SHALL FIRST START AT MINIMUM SPEED, AND THEN SHALL BE PLACED UNDER NORMAL CONTROL.

WHEN UNOCCUPIED PER THE BUILDING SCHEDULE, NORMALLY THE UNIT SHALL BE DISABLED. IF 3 OR MORE ZONES ARE NOT OBTAINING THIER UNOCCUPIED SETPOINT TEMPERATURES, THE UNIT SHALL CYCLE ON (FOR A MINIMUM OF 30 MINUTES) UNTIL ALL ZONES REACH THIER SETPOINT TEMPERATURES.

ALL SETPOINTS AND CONTROLLING VALUES SHALL BE DISPLAYED ON THE GRAPHICS AT THE OPERATOR'S TERMINAL.

REFER TO ENERGY RECOVERY SYSTEM DIAGRAM AND SEQUENCE FOR ENERGY RECOVERY COIL AND ENERGY RECOVERY SYSTEM CONTROL.

SUPPLY AIRFLOW CONTROL

THE SUPPLY FANS SHALL VARY THIER SPEEDS IN UNISON TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT (AT SP-1).

THE SUPPLY DUCT MAXIMUM STATIC PRESSURE SETPOINT SHALL INITIALLY BE SET AT 1.25" WC BUT THEN ADJUSTED DURING TESTING AND BALANCING. THE BAS SHALL POLE ALL CONNECTED VAV BOXES AND RESET THE SETPOINT LOWER IF NONE ARE MORE THAN 80% OPEN BUT NOT LESS THAN 0.75" WC (ADJ). IF ANY BOX REACHES 100% OPEN, THE SETPOINT SHALL BE RESET UPWARD, BUT NOT HIGHER THAN THE MAXIMUM SETPOINT SET BY THE BALANCER.

RELIEF AIRFLOW CONTROL

IF THE RELIEF FANS ARE ENABLED, RELIEF DAMPER (D-6) SHALL FULLY OPEN, ONCE PROVEN OPEN, THE RELIEF FANS SHALL START AT MINIMUM SPEED, AND THEN SHALL BE PLACED UNDER NORMAL CONTROL. RELIEF HOOD DAMPER (D-7) SHALL REMAIN CLOSED.

THE RELIEF FANS SHALL VARY THIER SPEEDS TO MAINTAIN THE SETPOINT RELIEF AIRFLOW RATE AS MEASURED BY AFMS-3.

THE RELIEF SETPOINT AIRFLOW RATE SHALL TRACK THE CALCULATED VENTILATION AIRFLOW RATE, LESS A CONSTANT TOILET EXHAUST RATE (EF-1&2, 4000 CFM), LESS 1000 CFM (ADJ) FOR BUILDING PRESSURIZATION.

IF THE CALUCULATED RELIEF SETPOINT AIRFLOW RATE EXCEEDS THE CAPACITY OF THE RELIEF FANS (26,000 CFM), THE ROOFTOP RELIEF VENT DAMPER (D-7) SHALL MODULATE OPEN AND SHALL BE 100% OPEN IF THE SETPOINT REACHES MAXIMUM (40,000 CFM).

THE RELIEF FANS SHALL BE ENABLED IF THE CALCULATED QUANTITY OF RELIEF AIR IS GREATER THAN THE SCHEDULE RELIEF FAN MINIMUM AIRFLOW RATE (4000 CFM, ADJ), AND SHALL BE DISABLED IF LESS THAN THE SCHEDULED RELIEF FAN MINIMUM AIRFLOW RATE (4000 CFM, ADJ) (IE, THE MIN VENTILATION AIRFLOW RATE IS LESS THAN 9000 CFM).

VENTILATION CONTROL

IF THE OUTSIDE AIR TEMPERATURE IS EITHER 5 F MORE OR 5 F LESS THAN THE RETURN AIR TEMPERATURE, THE VENTILATION RATE SHALL BE CALCULATED BY THE FOLLOWING FORMULA: VENTILATION AIRFLOW RATE = SUPPLY AIRFLOW RATE *

(RETURN AIR TEMPERATURE - MIXED AIR TEMPERATURE) / (RETURN AIR TEMPERATURE - OUTSIDE AIR TEMPERATURE). WHEN THE OUTSIDE AIR TEMPERATURE IS WITHIN 5 F OF THE RETURN AIR TEMPERATURE, THE OUTSIDE AIR AFMS SHALL BE

UTILIZED TO DETERMINE THE VENTILATION RATE. THE BAS OPERATOR SHALL BE CAPABLE OF OVERRIDING AND SWITCHING BETWEEN TEMPERATURE BASED VENTILATION CALCULATION AND AFMS BASED MEASUREMENT AT THE OPERATOR STATION.

THE VENTILATION RATE SETPOINT SHALL BE RESET FROM A MINIMUM OF 10,000 CFM (ADJ) TO A MAXIMUM OF 20,000 CFM (ADJ). EVERY 5 MINS (ADJ), THE BAS SHALL POLE ALL TERMINAL UNITS EQUIPPED WITH CO2 SENSORS. IF ANY OF THESE TERMINAL UNITS HAS CO2 LEVELS GREATER THAN 900 PPM, THE VENTILATION RATE SETPOINT SHALL BE RESET FROM THE MINIMUM UP TOWARD THE MAXIMUM TO LIMIT CO2 LEVELS TO NO MORE THAN 1100 PPM. REFER TO TERMINAL UNIT CONTROL SEQUENCES THAT RESET LOCAL VENTILATION HIGHER WHEN SPACE CO2 LEVELS EXCEED 800 PPM.

IF THE BUILDING IS SCHEDULED TO BE UNOCCUPIED (INCLUDING DURING OPTIMIZED START) OR IF THE UNIT IS OFF FOR ANY OTHER REASON, THE MINIMUM VENTILATTION RATE SETPOINT SHALL BE 0 CFM.

THE OUTSIDE AIR DAMPER (D-2) AND RETURN DAMPER (D-4, REVERSLY) SHALL MODULATE IN UNISON TO CONTROL THE VENTILATION AIRFLOW RATE TO THE SETPOINT RATE

DISCHARGE TEMPERATURE CONTROL

THE DISCHARGE TEMPERATURE SETPOINT SHALL BE 55 F (ADJ) UNLESS RESET HIGHER.

SIMULTANEOUS COOLING COIL AND HEATING COIL OPERATION IS NOT ALLOWED. COOLING SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURES (T-1) ARE LESS THAN THE DISCHARGE AIR TEMPERATURE SETPONT. HEATING SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURES (T-1) ARE GREATER THAN THE DISCHARGE SETPOINT.

IF THE VENTILATION RATES EXCEED THIER REPECTIVE MINIMUM SETPOINTS (WHEN IN ECONOMIZER MODE), HEATING IS DISABLED.

UPON REACHING THE MINIMUM VENTILATION AIRFLOW BUT BEFORE EXITING ECONOMIZER MODE AND BEFORE ENABLING HEATING, THE BAS SHALL FIRST ENABLE THE ENERGY RECOVERY SYSTEM. IF 5 MINUTES (ADJ) AFTER ENABLING THE ENERGY RECOVERY SYSTEM THE DISCHARGE TEMPERATURE IS STILL LESS THAN SETPOINT, HEATING SHALL BE ENABLED.

WHEN ALLOWED, THE HEATING COIL CONTROL VALVE (V-1) AND CHILLED WATER CONTROL VALVE (V-2) SHALL MODULATE TO MAINTAIN THE DISCHARGE TEMPERATURE SETPOINT.

IF THE OUTSIDE AIR DEW POINTS ARE LESS THAN 55 F (ADJ, CALCULATED FROM T-1/H-1), THE DISCHARGE AIR TEMPERATURE SETPOINT MAY BE RESET BETWEEN 55 F AND 65 F. THE BMS SHALL POLE ALL SPACES, AND IF NONE ARE WARMER THAT THE COOLING SETPOINT, THE DISCHARGE AIR TEMPERATURE SHALL BE SLOWLY HIGHER (MAX RATE 1.0 F PER 10 MIN). IF 3 OR MORE SPACES HAVE SPACE TEMPERATURES HIGHER THAN THEIR SETPOINTS, THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET LOWER (MAX RATE 1.0 F PER MINUTE).

THE BMS OPERATOR SHALL HAVE THE CAPABILITY TO NOT UTILZE LOCAL OUTSIDE AIR DEWPOINT DEVICES (T-1/H-1) AND SWITCH TO "GLOBAL" OUTSIDE AIR DEWPOINT VALUES.

ECONOMIZER CONTROL

IF THE OUTDOOR TEMPERATURE (T-1) IS LESS THAN THE RETURN AIR TEMPERATURE (T-4) AND THE OUTSIDE AIR ENTHALPY (CALCULATED FROM T-1/H-1) IS LESS THAN 28.0 BTU/# (ADJ), ECONOMIZER OPERATION IS ALLOWED. VENTILATION AIR FLOW RATES SHALL BE ALLOWED TO EXCEED THAT CALCULATED FOR MINIMUM VENTILATION. THE OUTSIDE AIR DAMPER (D-2) AND RETURN DAMPER (D-4) SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT (AT T-3).

THE BMS OPERATOR SHALL HAVE THE CAPABILITY TO NOT UTILZE LOCAL ENTHALPY DEVICES (T-1/H-1) AND SWITCH TO "GLOBAL" OUTSIDE AIR ENTHALPY VALUES.

MONITORING, SAFETIES, AND ALARMS

THE FANS AND UNIT SMOKE ISOLATION DAMPERS (D-3,D-5, AND D-8) SHALL BE INTERLOCKED WITH THE FIRE ALARM SYSTEM THROUGH A CONTROL MODULE (CM). THIS INTERLOCK SHALL BE HARD WIRED AND SHALL CONTROL THE FANS AND DAMPERS WITH THE UNITS IN EITHER "AUTO" OR "HAND" MODES. THE DUCT DETECTORS ARE MONITORED BY THE FIRE ALARM SYSTEM. IF PRODUCTS OF COMBUSTION ARE SENSED BY ANY DETECTOR IN THE SYSTM, ALL FANS ARE DISABLED, ALL UNIT SMOKE ISOLATION DAMPERS CLOSE, ALL SYSTEM SMOKE AND COMBINATION FIRE/SMOKE DAMPERS CLOSE. AN ALARM SHALL ALSO BE SENT TO THE BMS. A MANUAL RESET REQUIRED.

IF THE HIGH PRESSURE LIMIT SWITCH (PS-1, ADJ AT THE SWITCH) SENSES EXCESSIVE PRESSURE, THE ASSOCIATED FAN ARRAY SHALL BE SHUT DOWN VIA A HARD WIRED INTERLOCK. AN ALARM SHALL ALSO BE SENT TO THE BMS. A MANUAL RESET REQUIRED

IF THE FREEZE STAT SENSES A FREEZING CONDITION (ADJ AT THE SWITCH, FZ-1), THE SUPPLY FANS SHALL BE SHUT DOWN VIA A HARD WIRED INTERLOCK. AN ALARM SHALL BE SENT TO THE BMS. A MANUAL RESET IS REQUIRED.

IF THE OUTSIDE AIR TEMPERATURE (T-1) FALLS BELOW 38 F, THE HHW COIL PUMP (SS-1) SHALL RUN; IF THE OUTSIDE AIR TEMPERATURE RISES ABOVE 42 F, THE HHW COIL PUMP SHALL STOP. IF PUMP STATUS DOES NOT MATCH COMMAND, AN ALARM SHALL BE SENT TO THE BMS.

OUTSIDE AIR, RETURN AIR, AND SUPPLY AIR HUMIDITY (H-1, H-2, AND H-3) IS MONITORED BY THE BMS.

IF THE UNIT IS OFF, THE HHW CONTROL VALVE (V-1) SHALL MODULATE TO MAINTAIN THE HHW COIL ENTERING TEMPERATURE (T-3) AT 50 F (ADJ).

IF THE FILTER DIFFERENTIAL (DPS-1, DPS-2, OR DPS-3) INDICATES A FILTER BANK IS FULLY LOADED, AN ALARM SHALL BE SENT TO THE BMS.

IF THE FAN CURRENT STATUS DEVICES (CSR-1(4), CSR-2(4)) DO NOT ALIGN WITH THE COMMAND STATUS, AN ALARM SHALL BE SENT TO THE BMS. THE FANS HAVE BLANKOFF PLATES THAT ARE MANUALLY INSTALLED WHEN A FAN HAS FAILED OR NEEDS

IF THE DISCHARGE AIR TEMPERATURE (T-3) IS MORE THAN 5 F (ADJ) DIFFERENT THAN SETPOINT FOR OVER 5 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

THE BMS SHALL PERFORM A FAULT ANALYSIS FOR EACH COIL COMPARING THE COIL DISCHARGE TEMPERATURE TO THE VALVE POSITIONS. IF THE DISCHARGE TEMPERATURE IS NOT WITHIN 5 F (ADJ) OF THE THEORITICALLY CALCULATED TEMPERATURE FOR A PERIOD MORE THAN 15 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

IF BOTH THE TEMPERATURE BASED CALCULATED VENTILATION RATE AND MEASURED VENTILATION RATE (AFMS-1) FALL MORE THAN 10% (ADJ) BELOW THE SETPOINT FOR OVER 15 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

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SHEET TITLE

AIR HANDLING UNIT #1
CONTROLS

PROJECT NUMBER

SHEET NUMBER

13385.000

1/9/2023 1-39-07 PM



SEQUENCE OF OPERATION

AHU-2-S AND CORRESPONDING AHU-2-R AND AHU-2-ER SHALL AUTOMATICALLY BE ENABLED AND DISABLED BY THE BMS PER THE BUILDING OCCUPANCY SCHEDULE COORDINATED WITH THE OWNER. A PREDICTIVE/OPTIMIZED START ROUTINE SHALL UTILITZE WEATHER AND BUILDING CONDITIONS TO ENABLE THE UNITS PRIOR TO SCHEDULED OCCUPANCY

FAN VFD HOA SWITCHES SHALL NORMALLY BE KEPT IN THE "AUTO" POSITION WITH "ON" OR "OFF" ONLY USED FOR MAINTENANCE PURPOSES.

IF THE UNIT IS OFF OR DISABLED, ALL DAMPERS AND VALVES SHALL RETURN TO THEIR NORMAL POSITION AND ALL ASSOCIATED SUPPLY AND RELIEF FANS SHALL BE OFF.

IF A THE AHU IS ENABLED BY THE BAS OR MANUALLY STARTED, THE UNIT SMOKE ISOLATION DAMPERS (D-3, D-5, AND D-6) SHALL FULLY OPEN, ONCE PROVEN OPEN, THE SUPPLY FANS AND RETURN FANS SHALL FIRST START AT MINIMUM SPEED, AND THEN SHALL BE PLACED UNDER NORMAL CONTROL.

WHEN UNOCCUPIED PER THE BUILDING SCHEDULE, NORMALLY THE UNIT SHALL BE DISABLED. IF 3 OR MORE ZONES ARE NOT OBTAINING THIER UNOCCUPIED SETPOINT TEMPERATURES, THE UNIT SHALL TEMPORARILY CYCLE ON (FOR A MINIMUM OF 30 MINUTES) UNTIL ALL ZONES REACH THIER SETPOINT TEMPERATURES.

ALL SETPOINTS AND CONTROLLING VALUES SHALL BE DISPLAYED ON THE GRAPHICS AT THE OPERATOR'S TERMINAL.

REFER TO ENERGY RECOVERY SYSTEM DIAGRAM AND SEQUENCE FOR ENERGY RECOVERY COIL AND ENERGY RECOVERY SYSTEM CONTROL.

SUPPLY AIRFLOW CONTROL

THE SUPPLY FANS SHALL VARY THIER SPEEDS IN UNISON TO MAINTAIN THE SUPPLY DUCT STATIC PRESSURE SETPOINT (AT SP-1).

THE SUPPLY DUCT MAXIMUM STATIC PRESSURE SETPOINT SHALL INITIALLY BE SET AT 1.25" WC BUT THEN ADJUSTED DURING TESTING AND BALANCING. THE BAS SHALL POLE ALL CONNECTED VAV BOXES AND RESET THE SETPOINT LOWER IF NONE ARE MORE THAN 80% OPEN BUT NOT LESS THAN 0.75" WC (ADJ). IF ANY BOX REACHES 100% OPEN, THE SETPOINT SHALL BE RESET UPWARD, BUT NOT HIGHER THAN THE MAXIMUM SETPOINT SET BY THE BALANCER.

RETURN AIRFLOW CONTROL

THE RETURN FANS SHALL START AND STOP WHEN THE SUPPLY FANS START AND STOP. THEY SHALL VARY THIER SPEEDS IN UNISON BY TRACKING THE SUPPLY AIRFLOW.

THE RETURN SETPOINT AIRFLOW RATE (AT AFMS-3) SHALL TRACK THE CALCULATED SUPPLY AIRFLOW RATE (AFMS-2), LESS A CONSTANT TOILET EXHAUST RATE (EF-3, 5600 CFM), LESS 1000 CFM (ADJ) FOR BUILDING PRESSURIZATION. VENTILATION CONTROL

IF THE OUTSIDE AIR TEMPERATURE IS EITHER 5 F MORE OR 5 F LESS THAN THE RETURN AIR TEMPERATURE, THE VENTILATION RATE SHALL BE CALCULATED BY THE FOLLOWING FORMULA: VENTILATION AIRFLOW RATE = SUPPLY AIRFLOW RATE * (RETURN AIR TEMPERATURE - MIXED AIR TEMPERATURE) / (RETURN AIR TEMPERATURE - OUTSIDE AIR TEMPERATURE). WHEN THE OUTSIDE AIR TEMPERATURE IS WITHIN 5 F OF THE RETURN AIR TEMPERATURE, THE OUTSIDE AIR AFMS SHALL BE UTILIZED TO DETERMINE THE VENTILATION RATE. THE BAS OPERATOR SHALL BE CAPABLE OF OVERRIDING AND SWITCHING BETWEEN TEMPERATURE BASED VENTILATION CALCULATION AND AFMS BASED MEASUREMENT AT THE OPERATOR STATION.

THE VENTILATION RATE SETPOINT SHALL BE RESET FROM A MINIMUM OF 15,000 CFM (ADJ) TO A MAXIMUM OF 30,000 CFM (ADJ). EVERY 5 MINS (ADJ), THE BAS SHALL POLE ALL TERMINAL UNITS EQUIPPED WITH CO2 SENSORS. IF ANY OF THESE TERMINAL UNITS HAS CO2 LEVELS GREATER THAN 900 PPM, THE VENTILATION RATE SETPOINT SHALL BE RESET FROM THE MINIMUM UP TOWARD THE MAXIMUM TO LIMIT CO2 LEVELS TO NO MORE THAN 1100 PPM. REFER TO TERMINAL UNIT CONTROL SEQUENCES THAT RESET LOCAL VENTILATION HIGHER WHEN SPACE CO2 LEVELS EXCEED 800 PPM.

IF THE BUILDING IS SCHEDULED TO BE UNOCCUPIED (INCLUDING DURING OPTIMIZED START) OR IF THE UNIT IS OFF FOR ANY OTHER REASON, THE MINIMUM VENTILATTION RATE SETPOINT SHALL BE 0 CFM.

FIRST THE MINIMUM OUTSIDE AIR DAMPER (D-1), RELIEF AIR DAMPER (D-7) SHALL MODULATE FULLY OPEN, THEN THE RETURN DAMPER (D-4, REVERSLY) SHALL MODULATE TO CONTROL THE VENTILATION AIRFLOW RATE TO THE SETPOINT RATE.

DISCHARGE TEMPERATURE CONTROL

THE DISCHARGE TEMPERATURE SETPOINT SHALL BE 55 F (ADJ) UNLESS RESET HIGHER.

SIMULTANEOUS COOLING COIL AND HEATING COIL OPERATION IS NOT ALLOWED. COOLING SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURES (T-1) ARE LESS THAN THE DISCHARGE AIR TEMPERATURE SETPONT. HEATING SHALL BE DISABLED WHEN OUTSIDE AIR TEMPERATURES (T-1) ARE GREATER THAN THE DISCHARGE SETPOINT.

IF THE VENTILATION RATES EXCEED THIER RESPECTIVE MINIMUM SETPOINTS (WHEN IN ECONOMIZER MODE), HEATING IS DISABLED.

UPON REACHING THE MINIMUM VENTILATION AIRFLOW BUT BEFORE EXITING ECONOMIZER MODE AND BEFORE ENABLING HEATING, THE BAS SHALL FIRST ENABLE THE ENERGY RECOVERY SYSTEM. IF ONE MINUTE (ADJ) AFTER ENABLING THE DISCHARGE TEMPERATURE IS STILL LESS THAN SETPOINT, HEATING SHALL BE ENABLED.

WHEN ALLOWED, THE HEATING COIL CONTROL CONTROL VALVE (V-1) AND CHILLED WATER CONTROL VALVE (V-2) SHALL MODULATE TO MAINTAIN THE DISCHARGE TEMPERATURE SETPOINT.

IF THE OUTSIDE AIR DEW POINTS ARE LESS THAN 55 F (ADJ, CALCULATED FROM T-1/H-1), THE DISCHARGE AIR TEMPERATURE SETPOINT MAY BE RESET BETWEEN 55 F AND 65 F. THE BMS SHALL POLE ALL SPACES, AND IF NONE ARE WARMER THAT THE COOLING SETPOINT, THE DISCHARGE AIR TEMPERATURE SHALL BE SLOWLY HIGHER (MAX RATE 1.0 F PER 10 MINUTES). IF 3 OR MORE SPACES HAVE SPACE TEMPERATURES HIGHER THAN THEIR SETPOINTS, THE DISCHARGE AIR TEMPERATURE SETPOINT SHALL BE RESET LOWER (MAX RATE 1.0 F PER MINUTE).

THE BMS OPERATOR SHALL HAVE THE CAPABILITY TO NOT UTILZE LOCAL OUTSIDE AIR DEWPOINT DEVICES (T-1/H-1) AND SWITCH TO "GLOBAL" OUTSIDE AIR DEWPOINT VALUES.

IF THE OUTDOOR TEMPERATURE (T-1) IS LESS THAN THE RETURN AIR TEMPERATURE (T-6) AND THE OUTSIDE AIR ENTHALPY (CALCULATED FROM T-1/H-1) IS LESS THAN 28.0 BTU/# (ADJ), ECONOMIZER OPERATION IS ALLOWED. VENTILATION AIR FLOW RATES SHALL BE ALLOWED TO EXCEED THAT CALCULATED FOR MINIMUM VENTILATION. WITH MINIMUM OUTSIDE AIR DAMPER (D-1) AND RELIEF DAMPER (D-7) FULLY OPEN, OUTSIDE AIR DAMPER (D-2) AND RELIEF DAMPER (D-8) SHALL MODULATE TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT (AT T-3).

THE BMS OPERATOR SHALL HAVE THE CAPABILITY TO NOT UTILZE LOCAL ENTHALPY DEVICES (T-1/H-1) AND SWITCH TO "GLOBAL" OUTSIDE AIR ENTHALPY VALUES.

SHALL BE SENT TO THE BMS.

THE FANS AND UNIT SMOKE ISOLATION DAMPERS (D-3, D-5, AND D-6) SHALL BE INTERLOCKED WITH THE FIRE ALARM SYSTEM THROUGH A CONTROL MODULE (CM). THIS INTERLOCK SHALL BE HARD WIRED AND SHALL CONTROL THE FANS AND DAMPERS WITH THE UNITS IN EITHER "AUTO" OR "HAND" MODES. THE DUCT DETECTORS ARE MONITORED BY THE FIRE ALARM SYSTEM. IF PRODUCTS OF COMBUSTION ARE SENSED BY ANY DETECTOR IN THE SYSTEM, ALL FANS ARE DISABLED, THE UNIT SMOKE ISOLATION DAMPERS CLOSE, ALL SYSTEM SMOKE AND COMBINATION SMOKE/FIRE DAMPERS CLOSE. AN ALARM SHALL ALSO BE SENT TO THE BMS. A MANUAL RESET REQUIRED.

IF THE LOW PRESSURE LIMIT SWITCH (PS-1, ADJ AT THE SWITCH) SENSES EXCESSIVE NEGATIVE PRESSURE, THE ASSOCIATED FAN ARRAY SHALL BE SHUT DOWN VIA A HARD WIRED INTERLOCK. AN ALARM SHALL ALSO BE SENT TO THE BMS. A MANUAL

IF THE FREEZE STAT SENSES A FREEZING CONDITION (ADJ AT THE SWITCH, FZ-1), THE SUPPLY AND RETURN FANS SHALL BE SHUT DOWN VIA A HARD WIRED INTERLOCK. AN ALARM SHALL BE SENT TO THE BMS. A MANUAL RESET IS REQUIRED.

IF THE OUTSIDE AIR TEMPERATURE (T-1) FALLS BELOW 38 F, THE HHW COIL PUMP (SS-1) SHALL RUN; IF THE OUTSIDE AIR TEMPERATURE RISES ABOVE 42 F, THE HHW COIL PUMP SHALL STOP. IF PUMP STATUS DOES NOT MATCH COMMAND, AN ALARM

OUTSIDE AIR, RETURN AIR, AND SUPPLY AIR HUMIDITY (H-1, H-2, AND H-3) IS MONITORED BY THE BMS.

IF THE UNIT IS OFF, THE HHW CONTROL VALVE (V-1) SHALL MODULATE TO MAINTAIN THE HHW COIL ENTERING TEMPERATURE (T-3) AT 50 F (ADJ).

IF THE FILTER DIFFERENTIAL (DPS-1, DPS-2, OR DPS-3) INDICATES A FILTER BANK IS FULLY LOADED, AN ALARM SHALL BE SENT TO THE BMS.

IF THE FAN CURRENT STATUS DEVICES (CSR-1(4), CSR-2(4)) DO NOT ALIGN WITH THE COMMAND STATUS, AN ALARM SHALL BE SENT TO THE BMS. THE FANS HAVE BLANKOFF PLATES THAT ARE MANUALLY INSTALLED WHEN A FAN HAS FAILED OR NEEDS

IF THE DISCHARGE AIR TEMPERATURE (T-5) IS MORE THAN 5 F (ADJ) DIFFERENT THAN SETPOINT FOR OVER 5 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

THE BMS SHALL PERFORM A FAULT ANALYSIS FOR EACH COIL COMPARING THE COIL DISCHARGE TEMPERATURE TO THE VALVE POSITIONS. IF THE DISCHARGE TEMPERATURE IS NOT WITHIN 5 F (ADJ) OF THE THEORITICALLY CALCULATED TEMPERATURE FOR A PERIOD MORE THAN 15 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

IF BOTH THE TEMPERATURE BASED CALCULATED VENTILATION RATE AND MEASURED VENTILATION RATE (AFMS-1) FALL MORE THAN 10% (ADJ) BELOW THE SETPOINT FOR OVER 15 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.



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ISSUED FOR REV DATE SEALS AND SIGNATURES

AIR HANDLING UNIT #2 CONTROLS

SHEET NUMBER

PROJECT NUMBER

13385.000

		CONTRO	OL SEQUENCE		
ROOM TEMPERATURE	(-°F)	HEATING SETPOINT	COOLING SETPOINT	(+°F)	
		•		. —	DAMPER MAXIMUM POSITION
		•	•		
			cool -		
CONTROL DAMPER		•	<i>J</i> .		
DAMPER MINIMUM POSITION		· — · —	· · ·		

SEQUENCE OF OPERATON

THE VAV TERMINAL UNIT SHALL BE ENABLED AND DISABLED BY THE BMS.

OCCUPANCY MODES SHALL BE DETERMINED BY BUILDING OCCUPANCY SCHEDULES.

IF COMMUNICATION IS LOST BETWEEN THE BAS AND THE UNIT CONTROLLER, THE CONTROLLER SHALL DEFAULT TO THE OCCUPIED MODE

ALL SETPOINTS ARE TO BE ADJUSTABLE THRU THE BAS INTERFACE.

TEMPERATURE CONTROL

SETPOINTS: OCCUPIED MODE = 75 F COOLING; UNOCCUPIED MODE = 85 F COOLING.

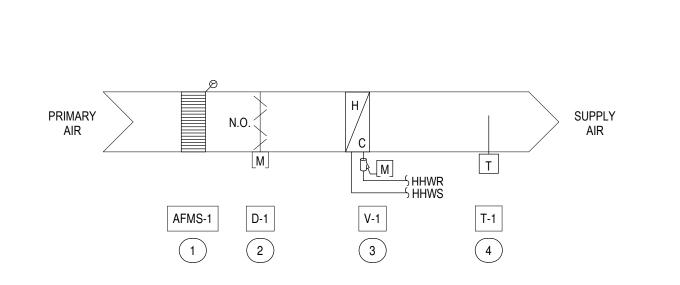
THE PRIMARY DAMPER SHALL MODULATE FROM MAINTAIN THE COOLING SETPOINT SPACE TEMPERATURE. IF IN THE OCCUPIED MODE, THE PRIMARY AIR DAMPER SHALL NOT BE POSITIONED LESS THAN THE SCHEDULED MINIMUM VENTILATION AIRFLOW RATE.

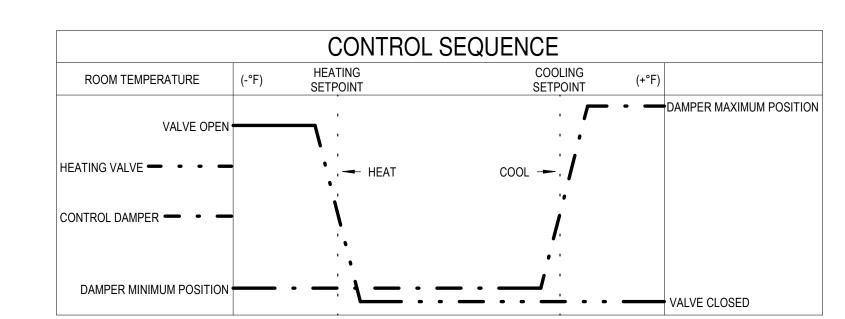
SAFETIES, ALARMS, AND MONITORING

THE COMMANDED DAMPER POSITION SHALL BE REPORTED TO THE BMS FOR STATIC PRESSURE RESET CONTROL. REFER TO THE AIR HANDLING UNIT SEQUENCE

IF THE SPACE TEMPERATURE EXCEEDS THE COOLING SETPOINT BY 5 F FOR MORE THAN 15 MINUTES, AN ALARM SHALL BE SENT TO THE BMS.

VARIABLE VOLUME TERMINAL (VAV) WITHOUT REHEAT





SEQUENCE OF OPERATON

THE VAV TERMINAL UNIT SHALL BE ENABLED AND DISABLED BY THE BMS.

OCCUPANCY MODES SHALL BE DETERMINED BY BUILDING OCCUPANCY SCHEDULES.

IF COMMUNICATION IS LOST BETWEEN THE BAS AND THE UNIT CONTROLLER, THE CONTROLLER SHALL DEFAULT TO THE OCCUPIED MODE

ALL SETPOINTS ARE TO BE ADJUSTABLE THRU THE BAS INTERFACE.

TEMPERATURE CONTROL

SETPOINTS: OCCUPIED MODE = 75 F COOLING, 70 F HEATING; UNOCCUPIED MODE = 85 F COOLING, 60 F HEATING.

THE PRIMARY DAMPER SHALL MODULATE FROM MAINTAIN THE COOLING SETPOINT SPACE TEMPERATURE. IF IN THE OCCUPIED MODE, THE PRIMARY AIR DAMPER SHALL NOT BE POSITIONED LESS THAN THE SCHEDULED MINIMUM VENTILATION AIRFLOW RATE.

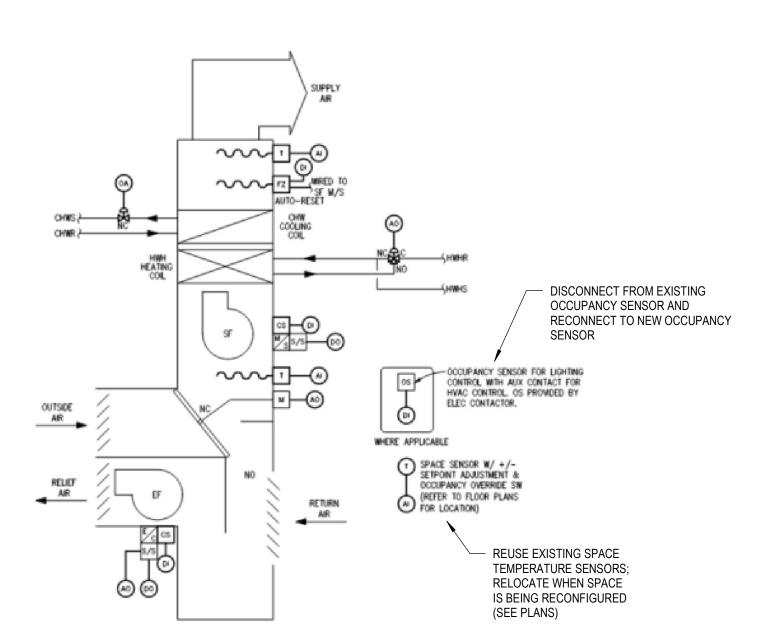
THE HHW CONTROL VALVE MODUATE TO MAINTAIN THE HEATING SETPOINT.

THE COMMANDED DAMPER POSITION SHALL BE REPORTED TO THE BMS FOR STATIC PRESSURE RESET CONTROL. REFER TO THE AIR HANDLING UNIT SEQUENCE

IF THE SPACE TEMPERATURE EXCEEDS THE COOLING SETPOINT BY 5 F OR FALLS SHORT OF THE HEATING SETPOINT BY 5 F FOR MORE THAN 15 MINUTES, AN

VARIABLE VOLUME TERMINAL (VAV)

EXISTING UNIT VENTILATOR



VERTICAL UNIT VENTILATOR (VUV) CONTROL

REFER TO FLOOR PLANS FOR UNIT LOCATIONS.

REQUIREMENTS WITH YUV SUPPLIER.

REUSE EXISTING CONTROL TERMINAL STRIP FOR TO CONTRACTOR INTERFACE. TO CONTRACTOR SHALL INSTALL BUILDING AUTOMATION SYSTEM DOC CONTROLLER AND CONTROL DEVICES (TYP) DEVICES AND CONNECT TO TERMINAL STRIP. COORDINATE ACTUATOR SIGNAL

PARALLEL FPB WITH HOT WATER REHEAT & ECM

CONTROL SEQUENCE COOLING ROOM TEMPERATURE SETPOINT DAMPER MAXIMUM POSITION RADIATOR VALVE OPEN SPACE SPACE SENSOR CONDITIONED AIR (FROM LIGHTING CO2 TEMP HEATING VALVE — • • — COOL -CONTROL) SENSOR SENSOR CO2 CONTROL DAMPER - - -AFMS-1 OCC-1 DAMPER MINIMUM POSITION — 5

SEQUENCE OF OPERATON

THE VAV TERMINAL UNIT SHALL BE ENABLED AND DISABLED BY THE BMS.

OCCUPANCY MODES SHALL BE DETERMINED BY BOTH BUILDING OCCUPANCY SCHEDULES AND LOCAL OCCUPANCY SENSOR. IF THE LOCAL OCCUPANCY SENSOR SENSES OCCUPANCY, THE OCCUPIED MODE SHALL BE ENABLED. IF THE BUILDING IS SCHEDULED AS OCCUPIED BUT THE LOCAL OCCUPANCY SENSOR DOES NOT SENSE OCCUPANCY, THE STANDBY MODE SHALL BE ENABLED. IF THE BUILDING IS SCHEDULED AS UNOCCUPIED AND THE LOCAL OCCUPANCY SENSOR DOES NOT SENSE OCCUPANCY, THE UNOCCUPIED MODE SHALL BE ENABLED.

THE SPACE SHALL IMMEDIATELY SWITCH TO OCCUPIED MODE WHEN OCCUPANCY IS SENSED BY THE LOCAL SENSOR. NO OCCUPANCY MUST BE SENSED FOR 15 MINUTES BEFORE SWITHING FROM OCCUPIED TO EITHER THE STANDBY OR UNOCCUPIED MODES.

IF COMMUNICATION IS LOST BETWEEN THE BAS AND THE UNIT CONTROLLER, THE CONTROLLER SHALL DEFAULT TO THE OCCUPIED MODE.

ALL SETPOINTS ARE TO BE ADJUSTABLE THRU THE BAS INTERFACE.

TEMPERATURE CONTROL

SETPOINTS: OCCUPIED MODE = 75 F COOLING, 70 F HEATING; STANDBY MODE = 77 F COOLING, 68 F HEATING; UNOCCUPIED MODE = 85 F COOLING, 60 F HEATING. THE PRIMARY DAMPER SHALL MODULATE FROM MAINTAIN THE COOLING SETPOINT SPACE TEMPERATURE. IF IN THE OCCUPIED MODE, THE PRIMARY AIR DAMPER SHALL NOT BE POSITIONED LESS THAN THE SCHEDULED MINIMUM VENTILATION AIRFLOW RATE.

THE FINTUBE HHW CONTROL VALVE MODUATE TO MAINTAIN THE HEATING SETPOINT.

DEMAND CONTROL VENTILATION

DEMAND CONTROL VENTILATION SHALL BE DISABLED AND IS 0 CFM WHEN UNOCCUPIED. REFER TO THE VENTILATION SCHEDULES FOR MINIMUM VENTILATION

RATES FOR OCCUPIED AND STANDBY MODES. IF THE SPACE CO2 LEVELS RISE ABOVE 800 PPM, THE MINIMUM VENTILIATION SETPOINT SHALL BEGIN RESETTING UP FROM THE STANDBY MINIMUM RATE. IF CO2

LEVELS REACH 900 PPM, THE MINIMUM VENTILATION SETPOINT SHALL BE AT THE FULLY OCCUPIED RATE. IF THE SPACE CO2 LEVEL RISES ABOVE 900 PPM, THE BAS SHALL SIGNAL THE ASSOCIATED AIR HANDLING UNIT TO INCREASE ITS VENTILATION RATE. REFER TO THE AIR HANDLING UNIT SEQUENCE OF OPERATION.

SAFETIES, ALARMS, AND MONITORING

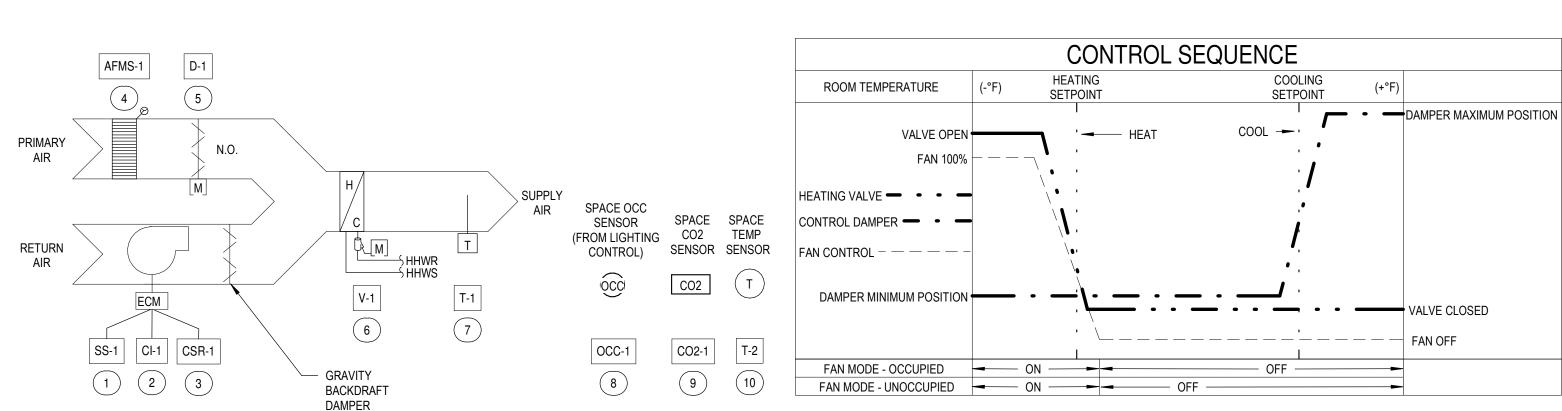
ALARM SHALL BE SENT TO THE BMS.

IF THE CO2 LEVELS EXCEED 1200 PPM, AN ALARM SHALL BE SENT TO THE BMS.

THE COMMANDED DAMPER POSITION SHALL BE REPORTED TO THE BMS FOR STATIC PRESSURE RESET CONTROL. REFER TO THE AIR HANDLING UNIT SEQUENCE

IF THE SPACE TEMPERATURE EXCEEDS THE COOLING SETPOINT BY 5 F OR FALLS SHORT OF THE HEATING SETPOINT BY 5 F FOR MORE THAN 15 MINUTES, AN

WITH FINNED TUBE RADIATOR



SEQUENCE OF OPERATON

THE FAN POWERED VAV TERMINAL UNIT SHALL BE ENABLED AND DISABLED BY THE BMS.

THE HOA SWITCHES SHALL BE KEPT IN THE AUTO POSITION. HAND AND OFF POSITIONS SHALL ONLY BE USED FOR MAINTENANCE.

OCCUPANCY MODES SHALL BE DETERMINED BY BOTH BUILDING OCCUPANCY SCHEDULES AND LOCAL OCCUPANCY SENSOR. IF THE LOCAL OCCUPANCY SENSOR SENSES OCCUPANCY, THE OCCUPIED MODE SHALL BE ENABLED. IF THE BUILDING IS SCHEDULED AS OCCUPIED BUT THE LOCAL OCCUPANCY SENSOR DOES NOT SENSE OCCUPANCY, THE STANDBY MODE SHALL BE ENABLED. IF THE BUILDING IS SCHEDULED AS UNOCCUPIED AND THE LOCAL OCCUPANCY SENSOR DOES NOT SENSE OCCUPANCY, THE UNOCCUPIED MODE SHALL BE ENABLED.

THE SPACE SHALL IMMEDIATELY SWITCH TO OCCUPIED MODE WHEN OCCUPANCY IS SENSED BY THE LOCAL SENSOR. NO OCCUPANCY MUST BE SENSED FOR 15 MINUTES BEFORE SWITHING FROM OCCUPIED TO EITHER THE STANDBY OR UNOCCUPIED MODES.

IF COMMUNICATION IS LOST BETWEEN THE BAS AND THE UNIT CONTROLLER, THE CONTROLLER SHALL DEFAULT TO THE OCCUPIED MODE.

ALL SETPOINTS ARE TO BE ADJUSTABLE THRU THE BAS INTERFACE.

TEMPERATURE CONTROL

SETPOINTS: OCCUPIED MODE = 75 F COOLING, 70 F HEATING; STANDBY MODE = 77 F COOLING, 68 F HEATING; UNOCCUPIED MODE = 85 F COOLING, 60 F HEATING. THE PRIMARY DAMPER SHALL MODULATE FROM MAINTAIN THE COOLING SETPOINT SPACE TEMPERATURE. IF IN THE OCCUPIED MODE, THE PRIMARY AIR DAMPER SHALL NOT BE POSITIONED LESS THAN THE SCHEDULED MINIMUM VENTILATION AIRFLOW RATE.

THE FAN SHALL START AT LOW SPEED WHEN THE SPACE TEMPERATURE FALLS TO WITHIN 0.5 F OF THE HEATING SETPOINT SPACE TEMPERATURE. THE HHW CONTROL VALVE MODUATE TO MAINTAIN THE HEATING SETPOINT. THE FAN SHALL VARY ITS SPEED TO LIMET THE DISCHARGE TEMPERATURE TO 85 F. WHEN THE SPACE TEMPERATURE RISES MORE THAN 1.5 F ABOVE THE HEATING SETPOINT, THE FAN SHALL BE DISABLED AND THE HHW VALVE FULLY CLOSED.

DEMAND CONTROL VENTILATION

DEMAND CONTROL VENTILATION SHALL BE DISABLED AND IS 0 CFM WHEN UNOCCUPIED. REFER TO THE VENTILATION SCHEDULES FOR MINIMUM VENTILATION RATES FOR OCCUPIED AND STANDBY MODES.

IF THE SPACE CO2 LEVELS RISE ABOVE 800 PPM, THE MINIMUM VENTILIATION SETPOINT SHALL BEGIN RESETTING UP FROM THE STANDBY MINIMUM RATE. IF CO2 LEVELS REACH 900 PPM, THE MINIMUM VENTILATION SETPOINT SHALL BE AT THE FULLY OCCUPIED RATE.

IF THE SPACE CO2 LEVEL RISES ABOVE 900 PPM, THE BAS SHALL SIGNAL THE ASSOCIATED AIR HANDLING UNIT TO INCREASE ITS VENTILATION RATE. REFER TO THE AIR HANDLING UNIT SEQUENCE OF OPERATION.

SAFETIES, ALARMS, AND MONITORING

IF THE STATUS VIA THE CURRENT SENSING RELAY DOES MATCH THE COMMANDED OUTPUT, AN ALARM SHALL BE SENT TO THE BMS.

IF THE CO2 LEVELS EXCEED 1200 PPM, AN ALARM SHALL BE SENT TO THE BMS.

THE COMMANDED DAMPER POSITION SHALL BE REPORTED TO THE BMS FOR STATIC PRESSURE RESET CONTROL. REFER TO THE AIR HANDLING UNIT SEQUENCE OF OPERATION.

IF THE SPACE TEMPERATURE EXCEEDS THE COOLING SETPOINT BY 5 F OR FALLS SHORT OF THE HEATING SETPOINT BY 5 F FOR MORE THAN 15 MINUTES, AN ALARM SHALL BE SENT TO THE BMS.

IF THE ASSOCIATED AHU IS SHUT DOWN DUE TO SMOKE DETECTION (REFER TO AHU CONTROL DRAWINGS), THEN THE FAN POWERED TERMINAL UNIT FAN SHALL BE DISABLED.

SHEET TITLE **TERMINAL UNIT**

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ISSUED FOR

PLAN REVIEW ADDENDUM NO.

SEALS AND SIGNATURES

REV DATE

Renovation

PROJECT NUMBER

13385.000

SHEET NUMBER

EXISTING ELEVATOR SHAFT DAMPER CONTROLS SCALE: NOT APPLICABLE

NOTES:

- THE DAMPER SHALL REMAIN CLOSED DURING NORMAL OPERATION AND OPEN UPON LOSS OF POWER ON A SIGNAL FROM THE SMOKE DETECTOR, LOCATED AT THE TOP OF THE HOISTWAY. COORDINATE NUMBER OF CONTACTS WITH THE ELECTRICAL AND FIRE PROTECTION DESIGN.
- REFER TO FOURTH FLOOR PLAN AND SCHEDULES FOR LOCATION OF DAMPER AND FOR LOUVER SIZE.
- B. PROVIDE A BINARY DDC POINT TO SOUND AN ALARM AT ECC.
- . REMOTE ALARM SHALL BE ACTIVATED WHEN THE HOISTWAY SMOKE DETECTOR DETECTS SMOKE.

SEQUENCE OF OPERATIONS

5 MINUTES (ADJ.).

TRANSFER GRILLE OR

WIRE MESH SCREEN —

THE EXHAUST FAN SHALL OPERATE TO MAINTAIN THE SPACE TEMPERATURE SETPOINT.

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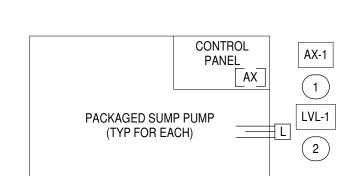
TRANSFER FAN OPERATION: THE TRANSFER FAN SHALL BE SEQUENCED ON AND SHALL MODULATE FROM A MINIMUM SPEED UP TO FULL SPEED TO MAINTAIN THE SPACE TEMPERATURE. THE FAN SHALL BE COMMANDED TO STOP WHENEVER THE FAN HAS BEEN OPERATING AT MINIMUM SPEED AND THE SPACE TEMPERATURE HAS BEEN CONSISTENTLY BELOW THE SETPOINT FOR A PERIOD OF

SPACE TEMPERATURE SETPOINT: 80 DEGREES F (ADJ.)

IF THE STATUS VIA THE CURRENT SENSING RELAY DOES NOT MATCH THE COMMANDED OUTPUT WITHIN 3 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

IF THE SPACE TEMPERATURE EXCEEDS 90 DEGREES F (ADJ.) FOR A PERIOD OF 10 MINUTES (ADJ.), AN ALARM SHALL BE SENT TO THE BMS.

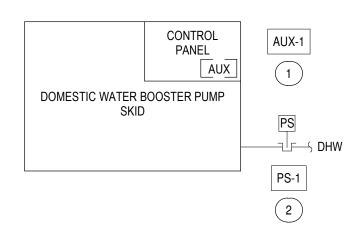
ELECTRICAL ROOM TRANSFER FAN CONTROLS SCALE: NOT TO SCALE



SEQUENCE OF OPERATION

- A. THE PACKAGED SUMP PUMP ASSEMBLY IS MONITORED BY THE
- B. THE HIGH LEVEL TROUBLE ALARM AND ANY FAULT ALARM INITIATED BY THE SUMP PUMP PACKAGE ASSEMBLY CONTROL PANEL SHALL BE REPORTED TO THE BAS.



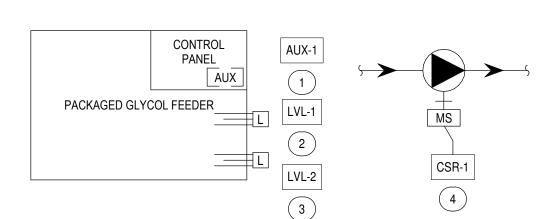


SEQUENCE OF OPERATION

ANY ALARM INITIATED BY THE DOMESTIC WATER BOOSTER PUMP PACKAGE SHALL BE MONITORED THROUGH THE GENERAL ALARM AUXILIARY CONTACT ON THE ASSEMBLY CONTROL PANEL. IN THE EVENT OF AN ALARM, THE ALARM SHALL BE GENERATED THROUGH THE BMS.

A PRESSURE SWITCH SHALL BE PROVIDED ON THE DISCHARGE SIDE OF THE BOOSTER PUMP SKID. THE BMS SHALL MONITOR THE PRESSURE SWITCH AND WHEN THE PRESSURE FALLS BELOW AN ADJUSTABLE LIMIT, AN ALARM SHALL BE GENERATED THROUGH THE BMS.

DOMESTIC WATER BOOSTER PUMP CONTROLS DIAGRAM



SEQUENCE OF OPERATION

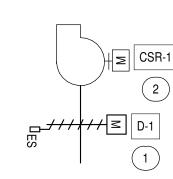
GENERAL

THE PACKAGED GLYCOL FEEDER ASSEMBLY SHALL BE MONITORED BY THE BMS. ANY ALARM INITIATED BY THE GLYCOL FEEDER PACKAGE ASSEMBLY CONTROL PANEL IS REPORTED TO THE BMS. THE BMS SHALL MONITOR THE LOW LEVEL AND CRITICAL LOW LEVEL ALARM FROM THE GLYCOL

WHEN THE LOW LEVEL SWITCH IS TRIPPED, AN ALARM SHALL BE GENERATED AT THE BMS AND CONTINUE NORMAL OPERATION OF THE SNOW MELT SYSTEM. WHEN THE CRITICAL LOW LEVEL SWITCH IS TRIPPED, AN ALARM SHALL BE GENERATED AT THE BMS WHICH SHALL DISABLE THE

A CURRENT SENSING RELAY SHALL BE USED TO MONITOR THE STATUS OF THE GLYCOL FEEDER PUMP. IF THE STATUS INDICATED DOES NOT MATCH THE COMMANDED OUTPUT, AN ALARM SHALL BE

GLYCOL FEEDER CONTROLS DIAGRAM SCALE: NOT APPLICABLE



SEQUENCE OF OPERATIONS

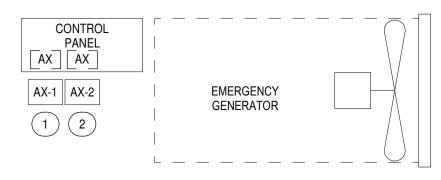
GENERAL:

THE TOILET EXHAUST FAN ENABLED AND DISABLED AUTOMATICALLY THROUGH THE BMS BASED ON THE BUILDING SCHEDULE.

WHEN ENABLED BY THE BMS, THE MOTORIZED DAMPER SHALL OPEN, ONCE THE END SWITCH PROVES THE DAMPER IS OPEN (THRU HARD WIRED INTERLOCK), THE FAN SHALL START. WHEN DISABLED BY THE BMS, THE FAN SHALL STOP AND THE MOTORIZED DAMPER SHALL

IF THE STATUS VIA THE CURRENT SENSING RELAY DOES NOT MATCH THE COMMANDED OUTPUT WITHIN 3 MINUTES (ADJ), AN ALARM SHALL BE SENT TO THE BMS.

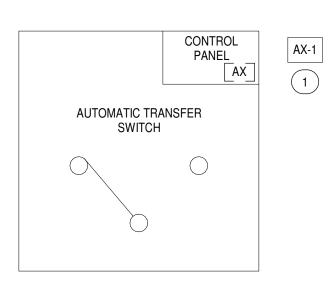




SEQUENCE OF OPERATION

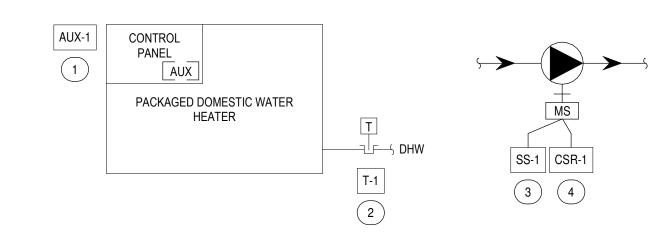
- A. REFER TO ELECTRICAL DOCUMENTS FOR THE ENABLE / DISABLE OPERATION OF THE GENERATOR.
- B. THE PACKAGED GENERATOR UNIT SHALL BE MONITORED BY THE BAS AND ANY ALARM CONDITION (GENERATOR TROUBLE AND GENERATOR RUNNING) SHALL BE SENT TO THE BAS.





SEQUENCE OF OPERATION

- A. THE DDC SHALL MONITOR THE POSITION OF THE AUTOMATIC TRANSFER SWITCH AT NETWORK LEVEL CONTROL PANELS.
- B. THE DDC SHALL GENERATE AN ALARM AT THE BAS IF THE TRANSFER SWITCH TRANSFERS TO EMERGENCY POWER.
- SCALE: NOT TO SCALE



SEQUENCE OF OPERATION

GENERAL

ANY ALARM INITIATED BY THE DOMESTIC WATER HEATER PACKAGES SHALL BE MONITORED THROUGH THE GENERAL ALARM AUXILIARY CONTACTS ON THE ASSEMBLY CONTROL PANELS. IN THE EVENT OF AN ALARM, THE ALARM SHALL BE GENERATED THROUGH THE BMS.

THE DOMESTIC HOT WATER RECIRCULATING PUMP SHALL BE STARTED AND STOPPED AUTOMATICALLY THROUGH THE BMS. THE BMS SHALL START THE RECIRCULATING PUMP WHEN THE BUILDING IS OCCUPIED AND SHUT THE PUMP OFF WHEN THE BUILDING IS UNOCCUPIED. THE BMS SHALL MONITOR THE DOMESTIC HOT WATER TEMPERATURE. IF THE DOMESTIC HOT WATER

TEMPERATURE FALLS BELOW 140 °F (ADJ) FOR MORE THAN 5 MINUTES, AN ALARM SHALL BE GENERATED

DOMESTIC WATER HEATER CONTROLS DIAGRAM SCALE: NOT APPLICABLE



SEQUENCE OF OPERATIONS

RETURN AIR

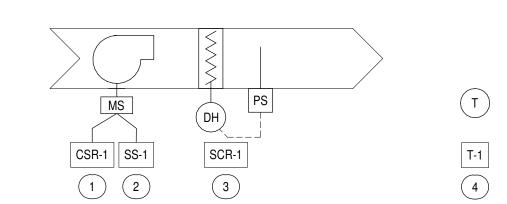
A. WHEN THE SPACE TEMPERATURE, SENSED BY T-1, FALLS BELOW SET POINT, THE DDC SHALL FULLY OPEN THE HEATING HOT WATER VALVE, THEN CYCLE THE FAN.

CSR-1

2

- B. ONCE THE SPACE TEMPERATURE SET-POINT IS SATISFIED, THE HHW COIL VALVE SHALL CLOSE AND AND THE FAN SHALL CYCLE OFF.
- C. ON THE EVENT THAT THE FAN FAILS TO START, AN ALARM SHALL BE SENT TO THE BAS.

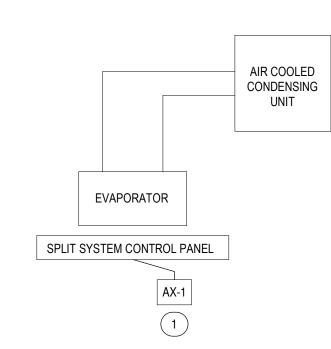




SEQUENCE OF OPERATIONS

- A. WHEN THE SPACE TEMPERATURE, SENSED BY T-1, FALLS BELOW SET POINT, THE DDC SHALL ENABLE THE UNIT AND START THE FAN. ONCE THE PRESSURE SWITCH PROVES THE FAN OPERATING, THE ELECTRIC COIL SHALL ENERGIZE.
- B. ONCE THE SPACE TEMPERATURE SET-POINT IS SATISFIED, THE ELECTRIC COIL SHALL DE-ENERGIZE AND THE FAN SHALL CYCLE OFF AFTER A SHORT COOL DOWN PERIOD.
- C. ON THE EVENT THAT THE FAN FAILS TO START WHEN COMMANDED, AN ALARM SHALL BE SENT TO THE BAS.

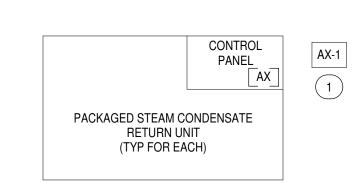




SEQUENCE OF OPERATIONS

- 1. THE SPLIT SYSTEM PROVIDE BACK UP AND COOLING DURING UNOCCUPIED PERIODS WHEN THE CENTRAL HVAC IS SCHEDULED OFF.
- 2. ALL CONTROLS INCLUDING LOCAL THERMOSTAT SHALL BE PROVIDED BY THE SPLIT SYSTEM UNIT MANUFACTURER AND SHALL INTERFACE WITH THE BMS VIA BACNET INTERFACE.
- 3. THE UNIT SHALL CYCLE OPERATION TO MAINTAIN THE SETPOINT SPACE TEMPERATURE OF 85°F (ADJ).
- 4. WITH ANY ABNORMAL OPERATION SENSED BY THE PACKAGED CONTROLLER, A COMMON ALARM SIGNAL SHALL BE SENT TO THE BMS.
- 5. SPACES ARE ALSO TYPICALLY SERVED BY A VAV BOX AND SEPARATE DDC TEMPERATURE SENSOR SET AT LOWER TEMPERATURE. REFER TO VAV CONTROLS.





SEQUENCE OF OPERATION

- A. THE PACKAGED STEAM CONDENSATE RETURN UNIT ASSEMBLY IS MONITORED BY THE BAS.
- B. ANY ALARM INITIATED BY THE PACKAGE ASSEMBLY CONTROL PANEL SHALL BE REPORTED TO THE BAS.

CONDENSATE RETURN UNIT CONTROLS

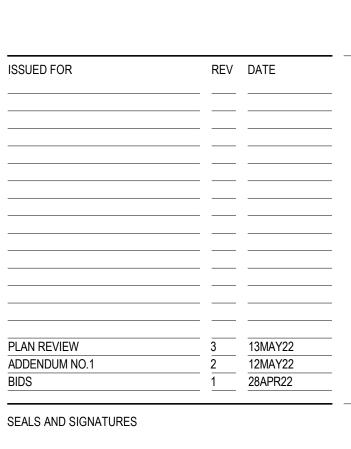


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MISCELLANEOUS

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