

MONTANA STATE UNIVERSITY - BOZEMAN
MARSH 40,41,54 HVAC UPGRADE - PPA#25-1248

BID SET 05 DEC, 2025

MECHANICAL AND ELECTRICAL ENGINEERS:
CONSULTING DESIGN SOLUTIONS, INC.
7540 CHURCHILL RD
MANHATTAN, MT 59741
(406)282-7082

GENERAL PROJECT NOTES

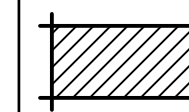
- A. ALL CONSTRUCTION AND CONSTRUCTION METHODS TO BE IN ACCORDANCE WITH APPLICABLE CODES, GOVERNMENTAL AGENCIES, AND LOCAL DESIGN CRITERIA INCLUDING, BUT NOT LIMITED TO, THE FOLLOWING:
- INTERNATIONAL BUILDING CODE, 2021 EDITION
 - INTERNATIONAL MECHANICAL CODE, 2021 EDITION
 - INTERNATIONAL FUEL GAS CODE, 2021 EDITION
 - INTERNATIONAL ENERGY CODE, 2021 EDITION
 - UNIFORM PLUMBING CODE, 2021 EDITION
 - NATIONAL ELECTRIC CODE, 2021 EDITION
 - NATIONAL FIRE PROTECTION ASSOCIATION CODE, LATEST EDITION
- B. ANY AMBIGUITIES OR DISCREPANCIES DISCOVERED BY THE USE OF THESE CONTRACT DOCUMENTS SHALL BE REPORTED TO THE MSU PROJECT MANAGER IMMEDIATELY.
- C. CHANGES OR DEVIATIONS FROM THE CONTRACT DOCUMENTS MADE WITHOUT THE WRITTEN CONSENT OF THE OWNER ARE UNAUTHORIZED. COORDINATE NECESSARY MODIFICATIONS WITH THE MSU PROJECT MANAGER PRIOR TO CONSTRUCTION.
- D. THE CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION AND SCHEDULING OF ALL REQUIRED INSPECTIONS DURING THE COURSE OF THE CONSTRUCTION PROJECT. PARTIES REQUIRED TO ATTEND SHOULD BE GIVEN 48 HOURS MINIMUM NOTICE.
- E. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR SAFETY AND SHALL TAKE WHATEVER MEASURES ARE NECESSARY TO ENSURE THE HEALTH AND SAFETY OF THE CONTRACTOR'S EMPLOYEES, SUBCONTRACTORS, BUILDING OCCUPANTS, PEDESTRIANS AT OR NEAR THE CONSTRUCTION SITE OR ACCESS ROUTES, AND OF ALL OTHER PERSONS IN AREAS AFFECTED BY THE CONTRACTOR'S CONSTRUCTION ACTIVITIES.
- F. THE CONTRACTOR SHALL COORDINATE ALL UTILITY INTERRUPTIONS WITH THE OWNER AND PROVIDE 5 WORKING DAYS NOTIFICATION PRIOR TO AND UTILITY SHUT DOWN.

GENERAL SITE / STAGING NOTES

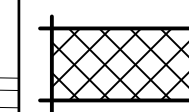
- A. THE CONTRACTOR SHALL MINIMIZE INTERFERENCE WITH ADJOINING STREETS, SIDEWALKS, PARKING AREAS, AND OTHER ADJACENT OCCUPIED OR USED FACILITIES DURING CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL NOT BLOCK STREETS, SIDEWALKS, OR ACCESS TO DUMPSTER LOCATIONS AT ANY TIME.
- B. THE CONTRACTOR SHALL PROTECT EXISTING SITE AND LANDSCAPING FROM DAMAGE CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL RESTORE EXISTING SITE AND LANDSCAPING DAMAGED BY CONSTRUCTION OPERATIONS TO CURRENT MSU STANDARDS OR AS DIRECTED BY THE MSU PROJECT MANAGER PRIOR TO SUBSTANTIAL COMPLETION.
- C. THE CONTRACTOR SHALL PROTECT THE EXISTING BUILDINGS FROM DAMAGE, CONTAMINATION, AND SOILING CAUSED BY CONSTRUCTION OPERATIONS. THE CONTRACTOR SHALL KEEP BUILDING ENTRANCES AND STAIRWELLS CLEAR OF CONSTRUCTION MATERIALS, TOOLS, AND EQUIPMENT AT ALL TIMES.
- D. THE CONTRACTOR SHALL ACCESS THE SITE FROM S. 19TH AVENUE, 11TH AVENUE, COLLEGE STREET OR GRANT STREET. SOME OF THESE ROUTES MAY NOT BE AVAILABLE DURING THE CONSTRUCTION PERIOD.
- E. ALL CONTRACTOR VEHICLES PARKED ON CAMPUS, INCLUDING VEHICLES OWNED BY EMPLOYEES OF THE CONTRACTOR, SHALL BE PARKED IN DESIGNATED PARKING AREAS ONLY. VEHICLES MAKING DELIVERIES TO THE PROJECT SITE MUST BE MOVED TO A DESIGNATED PARKING AREA OR REMOVED FROM CAMPUS IMMEDIATELY AFTER UNLOADING. ALL VEHICLES PARKED IN DESIGNATED PARKING AREAS MUST HAVE A VALID MSU PARKING PERMIT. PERMITS CAN BE PURCHASED FROM THE UNIVERSITY POLICE (994-2121). VIOLATORS OF MSU VEHICLE REGULATIONS MAY BE TICKETED AND / OR TOWED. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- F. CONSTRUCTION STAGING AREA: SHOULD THE CONTRACTOR REQUIRE ON-SITE CONSTRUCTION STAGING, AN AREA FOR THIS PURPOSE WILL BE PROVIDED. THE CONTRACTOR MAY BE REQUIRED TO FENCE THE STAGING AREA TO PREVENT ACCESS FROM UNAUTHORIZED PERSONNEL. THE CONTRACTOR SHALL RESTORE AREAS USED FOR CONSTRUCTION STAGING THAT ARE DAMAGED DURING THE COURSE OF CONSTRUCTION OPERATIONS TO CURRENT MSU STANDARDS OR AS DIRECTED BY THE MSU PROJECT MANAGER PRIOR TO SUBSTANTIAL COMPLETION.

LEGEND

THE CONTRACTOR SHALL LIMIT HIS OPERATIONS TO THE AREAS DEFINED BELOW. AREAS BEYOND THESE LIMITS ARE NOT IN CONTRACT (NIC) AND SHALL NOT BE USED BY THE CONTRACTOR FOR ANY PURPOSE DURING THE COURSE OF CONSTRUCTION.



CONSTRUCTION STAGING AREA: CONTRACTOR MAY UTILIZE THE INDIVIDUAL PARKING SPACES WITHIN THE SCOPE OF THIS PROJECT FOR CONSTRUCTION STAGING. STAGING AREA LOCATIONS INDICATED ON SITE PLAN ARE APPROXIMATE.



PRIMARY ACCESS ROUTE: JOB RELATED VEHICULAR TRAFFIC SHALL ACCESS THE CONSTRUCTION SITE BY THIS ROUTE ONLY



CONTRACT LIMITS (CONSTRUCTION SCOPE OF WORK)

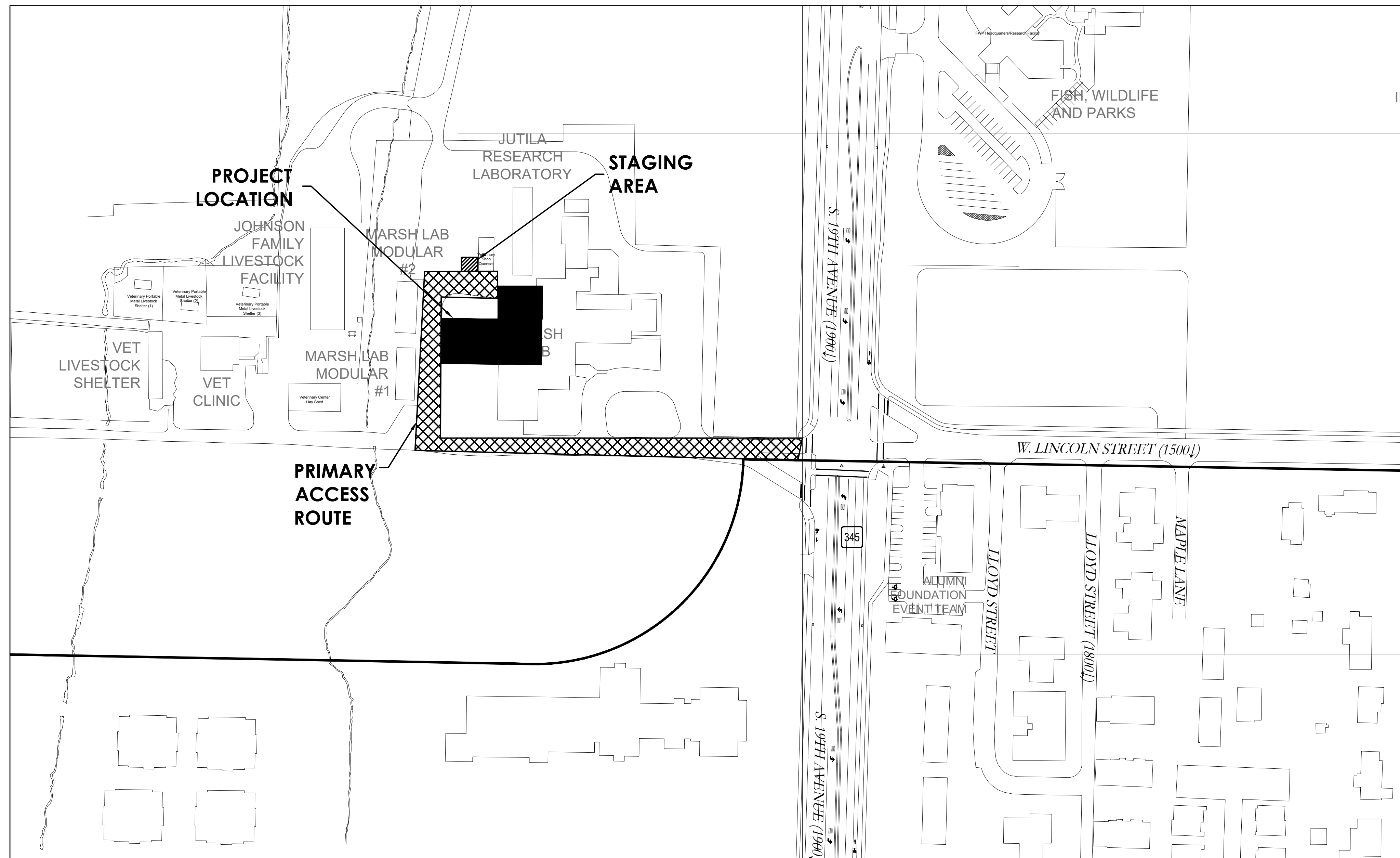
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E2.1	ELECTRICAL LEGEND, DETAILS AND SPECIFICATIONS

PHASING NOTES

- A. CORE DRILLING OF EXISTING BUILDING AT FLOOR AND WALL PENETRATIONS. .
- B. INSTALL NEW MECHANICAL EQUIPMENT, MAKE FINAL CONNECTIONS, COMPLETE PROJECT CONSTRUCTION, AND BRING SYSTEM UP TO FULL OPERATION.

COVER SHEET



1 SITE PLAN
CVR NO SCALE



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40,41,54 HVAC UPGRADES
MONTANA STATE UNIVERSITY

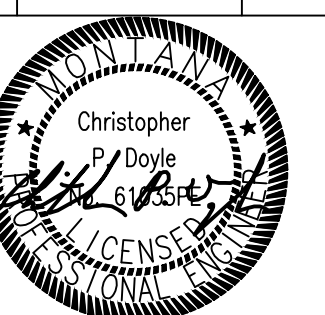
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PA#25-1248

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nsultant #: 2514

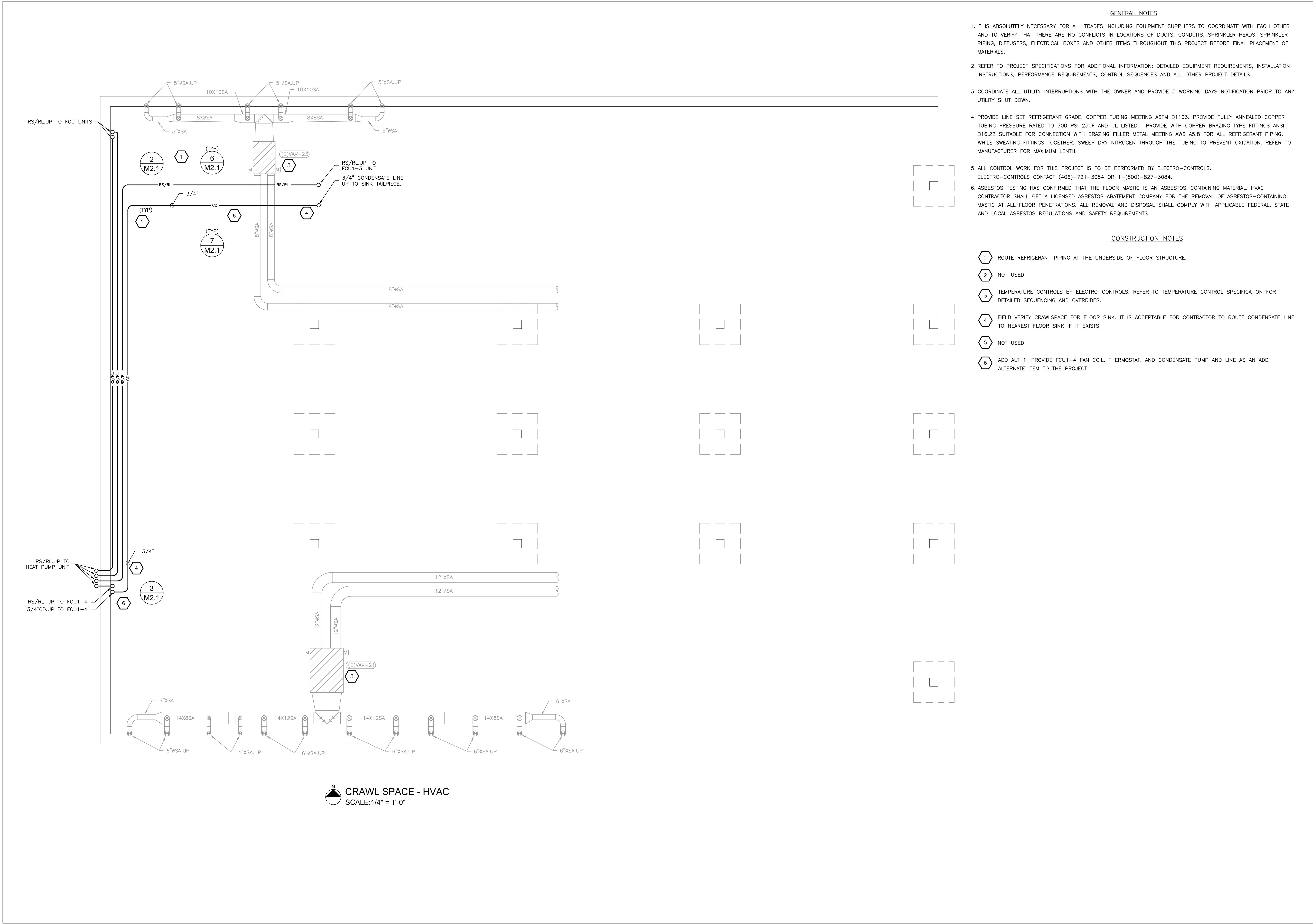
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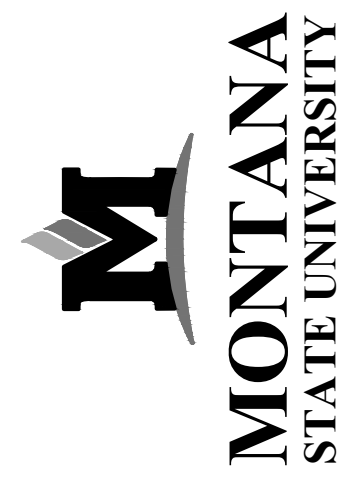


GENERAL NOTES

1. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, SPRINKLER HEADS, SPRINKLER PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.
2. REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION: DETAILED EQUIPMENT REQUIREMENTS, INSTALLATION INSTRUCTIONS, PERFORMANCE REQUIREMENTS, CONTROL SEQUENCES AND ALL OTHER PROJECT DETAILS.
3. COORDINATE ALL UTILITY INTERRUPTIONS WITH THE OWNER AND PROVIDE 5 WORKING DAYS NOTIFICATION PRIOR TO ANY UTILITY SHUT DOWN.
4. PROVIDE LINE SET REFRIGERANT GRADE, COPPER TUBING MEETING ASTM B1103. PROVIDE FULLY ANNEALED COPPER TUBING PRESSURE RATED TO 700 PSI 250F AND UL LISTED. PROVIDE WITH COPPER BRAZING TYPE FITTINGS ANSI B16.22 SUITABLE FOR CONNECTION WITH BRAZING FILLER METAL MEETING AWS A5.8 FOR ALL REFRIGERANT PIPING. WHILE SWEATING FITTINGS TOGETHER, SWEEP DRY NITROGEN THROUGH THE TUBING TO PREVENT OXIDATION. REFER TO MANUFACTURER FOR MAXIMUM LENGTH.
5. ALL CONTROL WORK FOR THIS PROJECT IS TO BE PERFORMED BY ELECTRO-CONTROLS. ELECTRO-CONTROLS CONTACT (406)-721-3084 OR 1-(800)-827-3084.
6. ASBESTOS TESTING HAS CONFIRMED THAT THE FLOOR MASTIC IS AN ASBESTOS-CONTAINING MATERIAL. HVAC CONTRACTOR SHALL GET A LICENSED ASBESTOS ABATEMENT COMPANY FOR THE REMOVAL OF ASBESTOS-CONTAINING MASTIC AT ALL FLOOR PENETRATIONS. ALL REMOVAL AND DISPOSAL SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL ASBESTOS REGULATIONS AND SAFETY REQUIREMENTS.

CONSTRUCTION NOTES

- 1 ROUTE REFRIGERANT PIPING AT THE UNDERSIDE OF FLOOR STRUCTURE.
- 2 NOT USED
- 3 TEMPERATURE CONTROLS BY ELECTRO-CONTROLS. REFER TO TEMPERATURE CONTROL SPECIFICATION FOR DETAILED SEQUENCING AND OVERRIDES.
- 4 FIELD VERIFY CRAWLSPACE FOR FLOOR SINK. IT IS ACCEPTABLE FOR CONTRACTOR TO ROUTE CONDENSATE LINE TO NEAREST FLOOR SINK IF IT EXISTS.
- 5 NOT USED
- 6 ADD ALT 1: PROVIDE FCU1-4 FAN COIL, THERMOSTAT, AND CONDENSATE PUMP AND LINE AS AN ADD ALTERNATE ITEM TO THE PROJECT.




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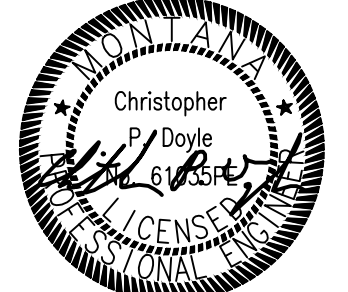
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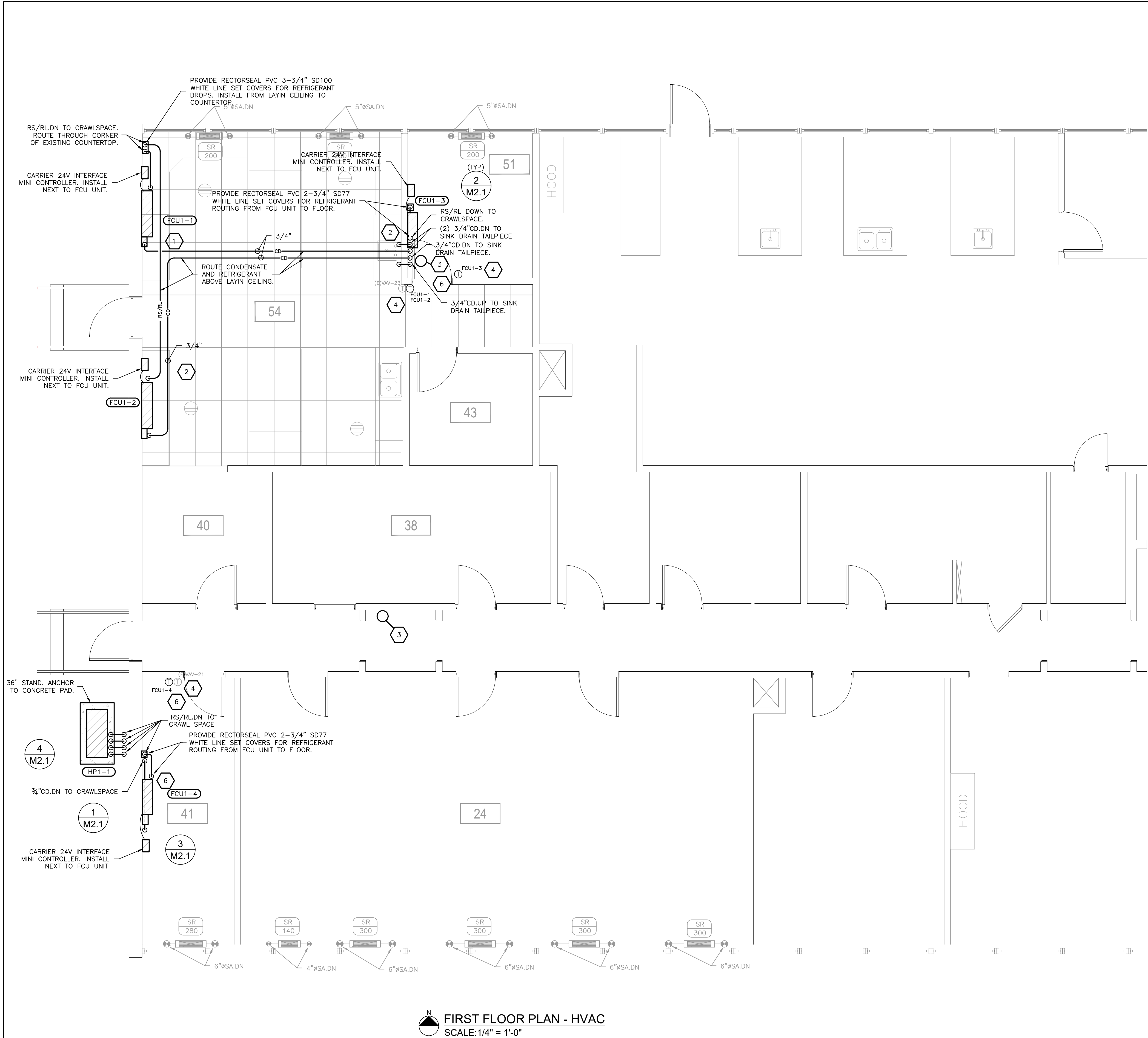
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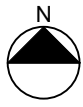
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SHEET TITLE
CRAWL SPACE - HVAC

SHEET
M1.0

DATE
12-5-2025



 **FIRST FLOOR PLAN - HVAC**
SCALE: 1/4" = 1'-0"


GENERAL NOTES

1. IT IS ABSOLUTELY NECESSARY FOR ALL TRADES INCLUDING EQUIPMENT SUPPLIERS TO COORDINATE WITH EACH OTHER AND TO VERIFY THAT THERE ARE NO CONFLICTS IN LOCATIONS OF DUCTS, CONDUITS, SPRINKLER HEADS, SPRINKLER PIPING, DIFFUSERS, ELECTRICAL BOXES AND OTHER ITEMS THROUGHOUT THIS PROJECT BEFORE FINAL PLACEMENT OF MATERIALS.
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3. COORDINATE ALL UTILITY INTERRUPTIONS WITH THE OWNER AND PROVIDE 5 WORKING DAYS NOTIFICATION PRIOR TO ANY UTILITY SHUT DOWN.
4. PROVIDE LINE SET REFRIGERANT GRADE, COPPER TUBING MEETING ASTM B1103. PROVIDE FULLY ANNEALED COPPER TUBING PRESSURE RATED TO 700 PSI 250F AND UL LISTED. PROVIDE WITH COPPER BRAZING TYPE FITTINGS ANSI B16.22 SUITABLE FOR CONNECTION WITH BRAZING FILLER METAL MEETING AWS A5.8 FOR ALL REFRIGERANT PIPING. WHILE SWEATING FITTINGS TOGETHER, SWEEP DRY NITROGEN THROUGH THE TUBING TO PREVENT OXIDATION. REFER TO MANUFACTURER FOR MAXIMUM LENGTH.
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6. ASBESTOS TESTING HAS CONFIRMED THAT THE FLOOR MASTIC IS AN ASBESTOS-CONTAINING MATERIAL. HVAC CONTRACTOR SHALL GET A LICENSED ASBESTOS ABATEMENT COMPANY FOR THE REMOVAL OF ASBESTOS-CONTAINING MASTIC AT ALL FLOOR PENETRATIONS. ALL REMOVAL AND DISPOSAL SHALL COMPLY WITH APPLICABLE FEDERAL, STATE AND LOCAL ASBESTOS REGULATIONS AND SAFETY REQUIREMENTS.

CONSTRUCTION NOTES

1. ROUTE REFRIGERANT PIPING ABOVE LAY-IN CEILING. MOUNT TO ROOF STRUCTURE.
2. ROUTE CONDENSATE DRAIN LINES ABOVE LAY-IN CEILING TO TAILPIECE OF SINK.
3. REFER TO GENERAL NOTE NUMBER 6 ABOVE.
4. TEMPERATURE CONTROLS BY ELECTRO-CONTROLS. REFER TO TEMPERATURE CONTROL SPECIFICATION FOR DETAILED SEQUENCING AND OVERRIDES.
5. NOT USED
6. ADD ALT 1: PROVIDE FCU1-4 FAN COIL, THERMOSTAT, AND CONDENSATE PUMP/PIPING AS AN ADD ALTERNATE ITEM TO THE PROJECT.


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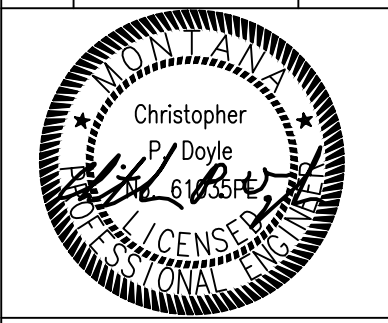
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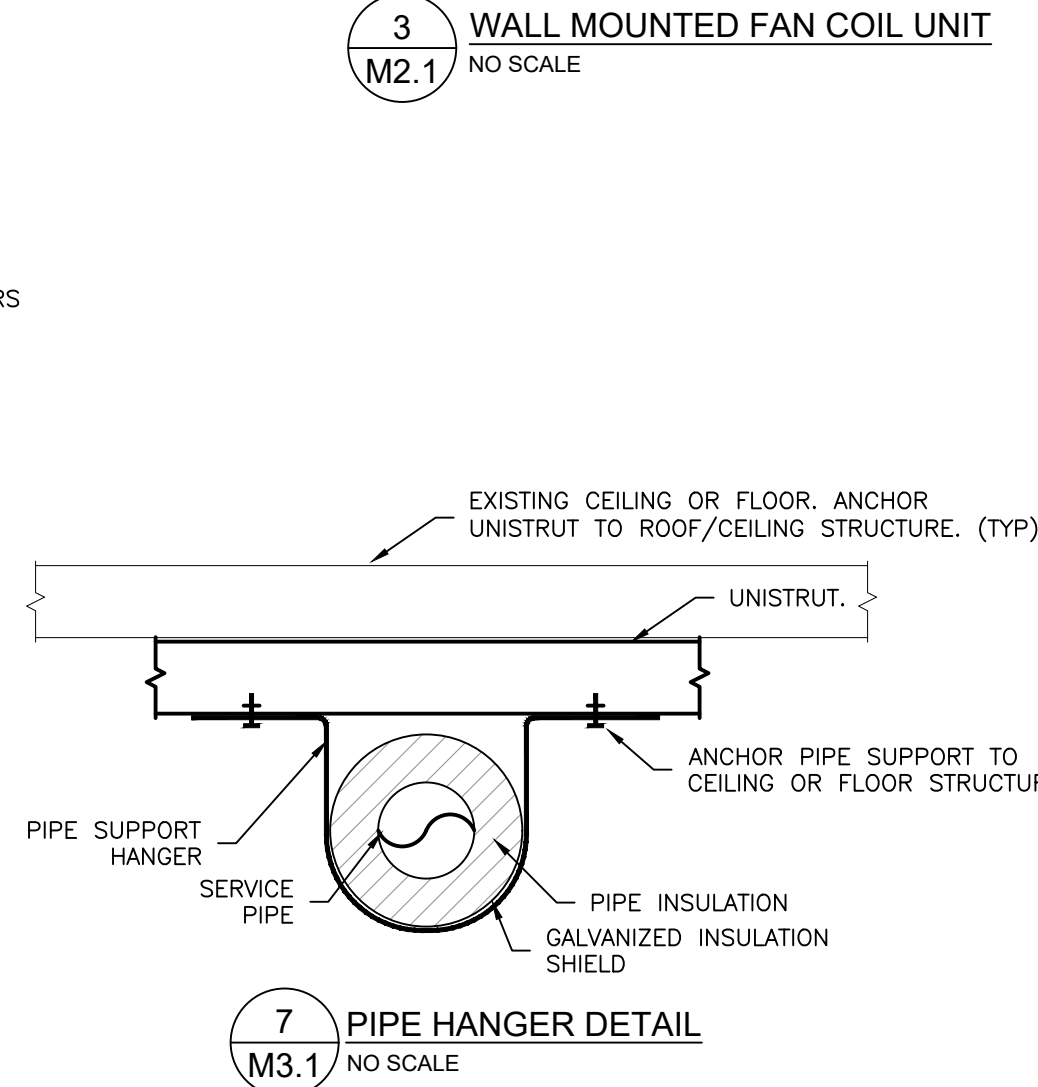
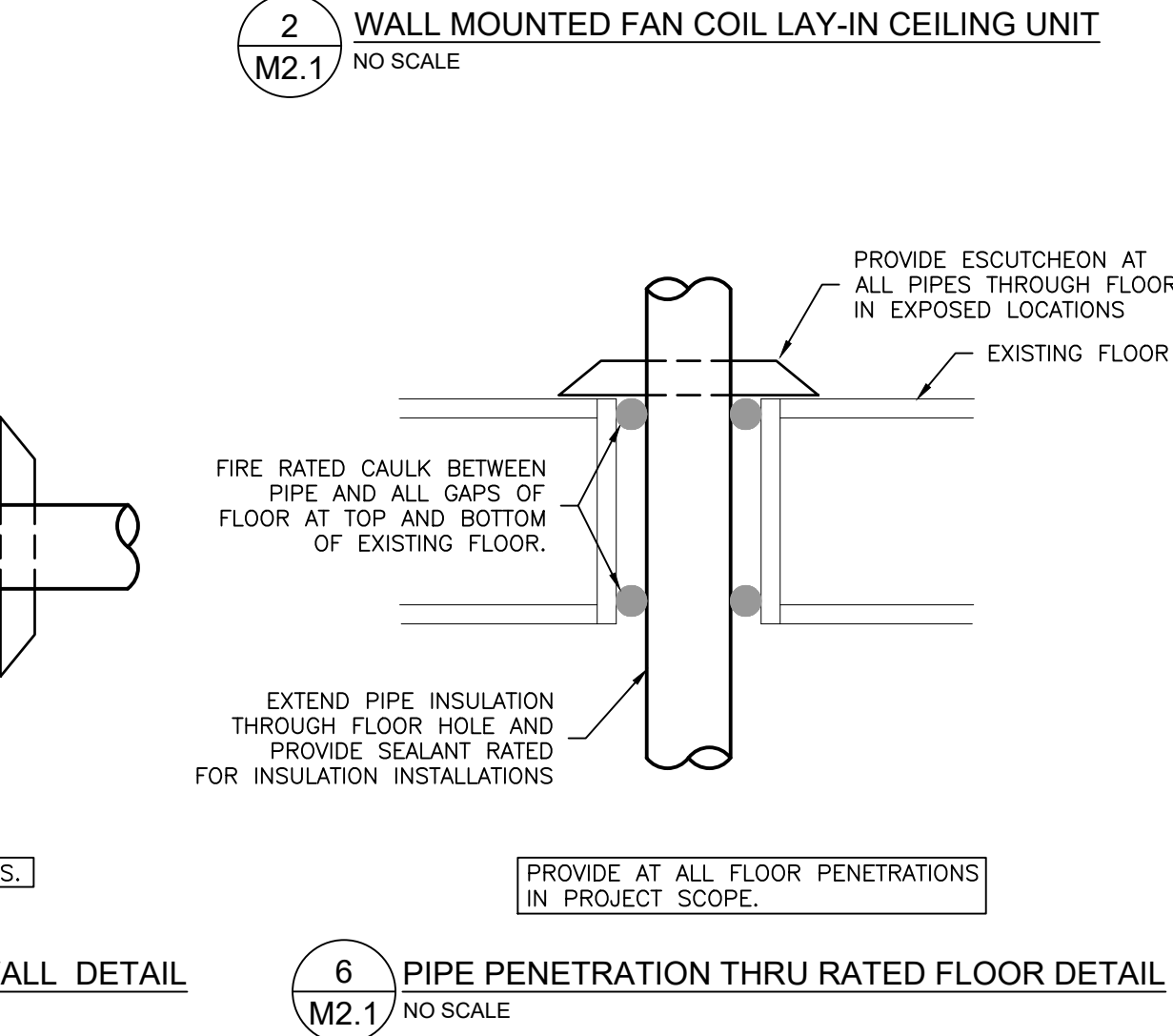
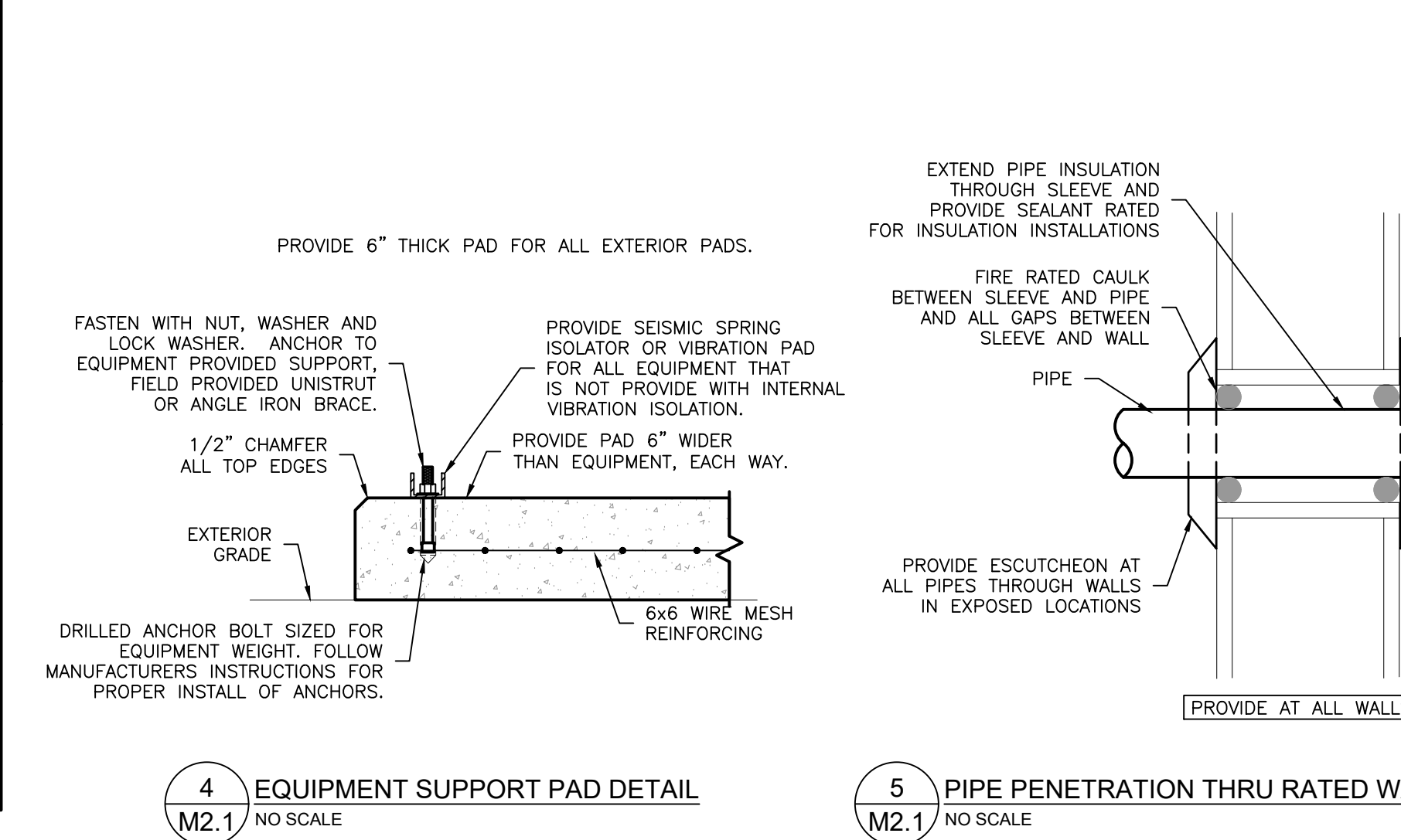
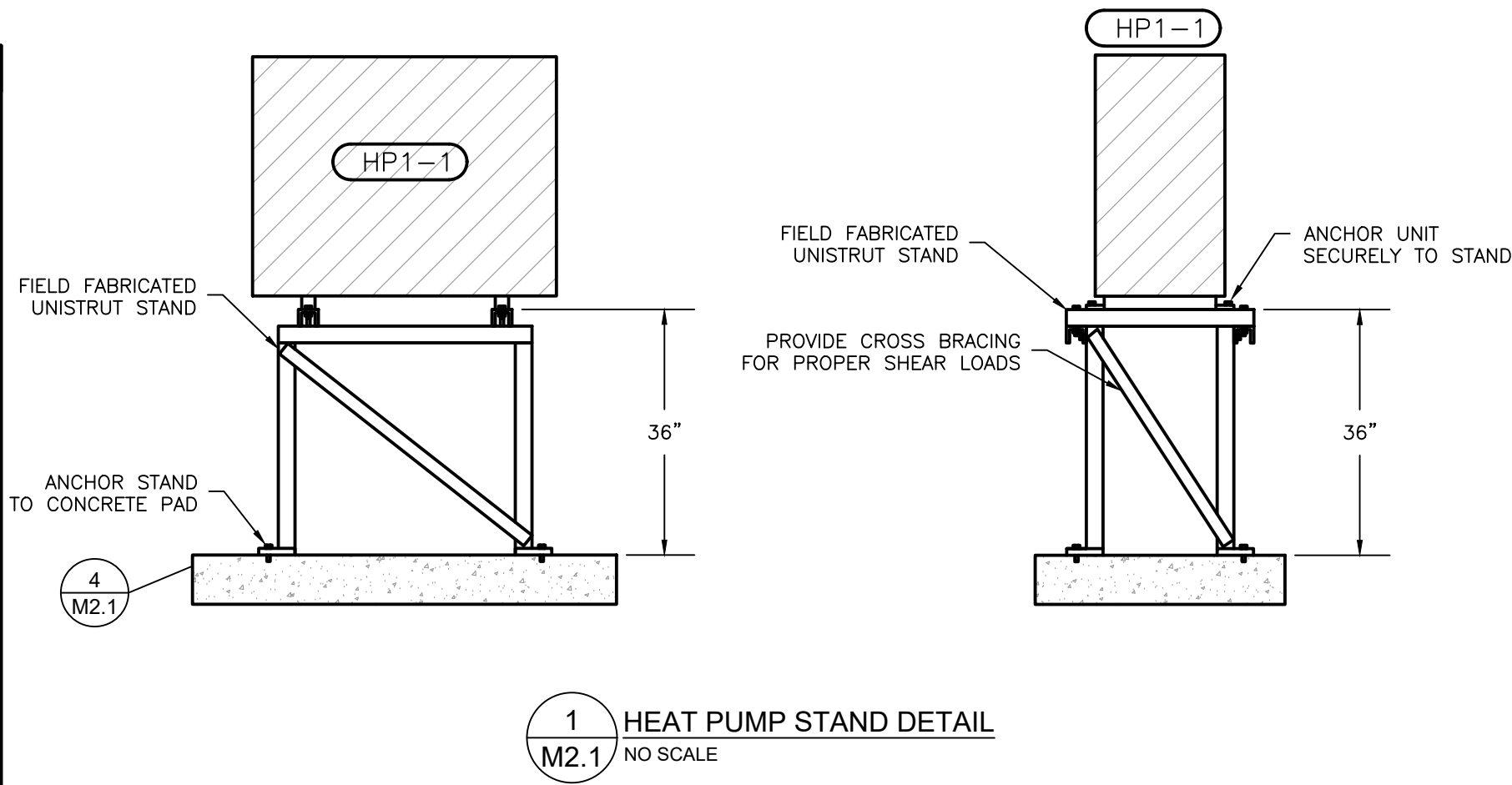
SHEET TITLE
FIRST FLOOR
PLAN - HVAC

SHEET
M1.1

DATE
12-5-2025

MECHANICAL LEGEND (NOT ALL SYMBOLS ARE USED ON THIS PROJECT)			
—CW—	DOMESTIC COLD WATER	⌵	GATE VALVE
—HW—	DOMESTIC HOT WATER	⌵	BALL VALVE
—RHW—	DOMESTIC HOT RECIRC	⌵	BUTTERFLY VALVE
—W—	WATER SERVICE	⌵	CHECK VALVE
—F—	FIRE SERVICE	⌵	DOUBLE CHECK VALVE
—C—	NATURAL GAS (7"W.C.)	⌵	REDUCED PRESSURE BACKFLOW
—MG—	MEDIUM PRESSURE GAS (2 PSI)	⌵	GAS VALVE
—LPG—	PROPANE GAS	⌵	PRESSURE REDUCING VALVE
—SS—	BELOW GRADE SANITARY SEWER	⌵	THREE-WAY CONTROL VALVE
—V—	SANITARY VENT	⌵	TWO-WAY CONTROL VALVE
—ST—	BELOW GRADE STORM	⌵	STRAINER
—SGO—	STORM OVERFLOW	⌵	BALANCING VALVE
—CD—	CONDENSATE DRAIN	⌵	TEMP/PRESSURE RELIEF VALVE
—AUX—	AUXILIARY CONDENSATE DRAIN	⌵	PRESSURE GAUGE
—RL—	REFRIGERANT LIQUID	⌵	TEMPERATURE GAUGE
—RS—	REFRIGERANT SUCTION	⌵	PETE'S PLUG
—RD—	REFRIGERANT DISCHARGE	⌵	UNION
⌵	SECTION TAG DESIGNATION AND SHEET LOCATION	⌵	PIPE ANCHOR
⌵	DETAIL TAG DESIGNATION AND SHEET LOCATION	⌵	PIPE SLEEVE
⌵	EQUIPMENT AND EQUIPMENT TAG	⌵	EXPANSION JOINT
⌵	DIFFUSER TAG AND OUTLET AIRFLOW (CFM)	⌵	PIPE TURN DOWN
⌵	THERMOSTAT AND UNIT SERVED. INSTALL TOP AT 48" AFF.	⌵	PIPE RISE
⌵		⌵	PIPE BOTTOM CONNECTION
⌵		⌵	PIPE TOP CONNECTION
⌵		⌵	PIPE CONNECTION
⌵		⌵	PIPE CAP
⌵		⌵	PIPE END CLEANOUT FLOOR DRAIN
⌵		⌵	ROOF DRAIN
⌵		⌵	PLUMBING FIXTURE & LABEL
⌵		⌵	POINT OF CONNECTION TO EXISTING PIPING. FIELD VERIFY EXACT SIZE AND LOCATION
⌵		⌵	DUCT TURN WITH R EQUAL TO DIA (MINIMUM)
⌵		⌵	DUCT TURN WITH SINGLE TURNING VANES. SPACING LESS THAN 3". RADIUS GREATER THAN 4"

ABBREVIATIONS			
ADA	AMERICANS W/ DISABILITIES	(E)	EXISTING TO REMAIN
AD	ACT COMPLAINT EQUIPMENT	EA	EXHAUST AIR
AFF	ACCESS DOOR	EF	EXHAUST FAN
AHU	ABOVE FINISHED FLOOR AIR HANDLING UNIT	EG-##	EXHAUST GRILLE
BDD	BACK DRAFT DAMPER	ELECT	ELECTRICAL
BS/BSU	BRANCH SELECTOR UNIT	FCO	FLOOR CLEANOUT
CA	COMBUSTION AIR	FCU	FAN COIL UNIT
CD	CLEANOUT	FD	FIRE DAMPER
CONT	CONTINUATION	FD/SD	FIRE/SMOKE DAMPER
CW	DOMESTIC COLD WATER	FE	FIRE EXTINGUISHER
CWS	CHILLED WATER	FS	FLOOR SINK
CWR	CHILLED WATER (GLYCOL SUPPLY)	HB	HOSE BIB
CHW	CHILLED WATER (GLYCOL RETURN)	HP/HPU	HEAT PUMP UNIT
DDC	DIRECT DIGITAL CONTROL	HW	DOMESTIC HOT WATER
DF	DRINKING FOUNTAIN	HWS	HEATING WATER (GLYCOL) SUPPLY
SA	SUPPLY AIR	IJS	IN JOINT SPACE
SD	SMOKE DAMPER	L-##	LOUVER
SD/SG	SUPPLY DIFFUSER/GRILLE	LAV	LAVATORY
SH	SUPPLY FAN	MANUF	MANUFACTURER
SK	SINK	MBH	1000 BTU/H
SS	SANITARY SEWER	MECH	MECHANICAL
ST	STORM SEWER	MOP	MOP SINK
TC	TEMPERATURE CONTROL	(N)	NEW
TO	TRANSFER GRILLE	OA	OUTSIDE AIR
TJW	THROUGH JOIST WEBBING	OC	ON CENTER
TYP	TYPICAL	PRV	PRESS. REDUCING VALVE
UR	URINAL	(R)	REMOVE AND RELOCATE
V	SANITARY VENT	RA	RETURN AIR
VTR	VENT THROUGH ROOF	RD	ROOF DRAIN
WC	WATER CLOSET	RG-##	RETURN GRILLE
WCO	WALL CLEANOUT		
(X)	EXISTING TO BE REMOVED		



HEAT PUMP CONDENSING UNIT SCHEDULE																
TAG	MANUF.	MODEL	SERVES	TONS	TOTAL COOLING BTU/HR	SENSIBLE COOLING BTU/HR	TOTAL HEATING BTU/HR	REFRIGERANT	SEER	COP	ELECTRICAL				REMARKS	
											VOLT	PHASE	HZ	UNIT MCA		UNIT MOP
HP1-1	CARRIER	37MGHAQ48FA3	FCU1-1, FCU1-2, FCU1-3, FCU1-4	4	53,046	42,437	27,276	R454B	23	3.7	208	1	60	43	45	1.2
REMARKS:																
1. PROVIDE FOR OPERATION DOWN TO -22 DEG F. PROVIDE HAIL GUARDS. PROVIDE UNIT RATED FOR 4500' ELEVATION, 92/62°F OUTDOOR CONDITIONS. PROVIDE REFRIGERANT PIPING BETWEEN INDOOR AND OUTDOOR UNIT SIZED FOR ACTUAL PIPE ROUTING, ELEVATION CHANGES AND LENGTHS. PROVIDE ALL REFRIGERATION COMPONENTS REQUIRED FOR A COMPLETE INSTALLATION INCLUDING MULTIPLE CIRCUITS, MULTIPLE RISERS AND TRAPS.																
2. PROVIDE REFRIGERANT SIZED FOR EQUIPMENT AND SITE. COORDINATE REFRIGERANT LINE SIZES AND FIELD VERIFIED LENGTHS WITH MANUFACTURER TO MEET THEIR REQUIREMENTS. SUBMIT SHOP DRAWINGS.																

FAN COIL UNIT SCHEDULE																			
TAG	BIDDING	MANUF.	MODEL	ARRANGEMENT	LOCATION	SERVES	ALTITUDE	REFRIGERANT	MAX AIRFLOW (CFM)	OUTDOOR AIR (CFM)	ESP (IN W.C.)	HEATING		TOTAL BTU/H	COOLING		LAT WB	VOLT.	PHASE
												CAPACITY (BTU/HR)	EAT		EAT DB	EAT WB			
FCU1-1	BASE	CARRIER	45MAHAQ18XA3	WALL MOUNTED	SEED ROOM 54	SEED ROOM 54	4500'	R454B	635	N/A	N/A	9,092	70.0	17,682	14,146	80.0	55.2	208	1
FCU1-2	BASE	CARRIER	45MAHAQ18XA3	WALL MOUNTED	SEED ROOM 54	SEED ROOM 54	4500'	R454B	635	N/A	N/A	9,092	70.0	17,682	14,146	80.0	55.2	208	1
FCU1-3	BASE	CARRIER	45MAHAQ09XA3	WALL MOUNTED	OFFICE 51	OFFICE 51	4500'	R454B	441	N/A	N/A	4,546	70.0	8,841	7,073	80.0	61.2	208	1
FCU1-4	ADD ALT	CARRIER	45MAHAQ09XA3	WALL MOUNTED	OFFICE 41	OFFICE 41	4500'	R454B	441	N/A	N/A	4,546	70.0	8,841	7,073	80.0	61.2	208	1
1. PROVIDE WITH FILTER. PROVIDE COMPLETE WIRING, CONTROLS, SENSORS, CONTROLLERS, ADAPTORS AND ACCESSORIES FOR A COMPLETE SYSTEM. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS. PROVIDE WITH FACTORY MOUNTED CONDENSATE PUMP WITH OVERFLOW SAFETY TO TURN OFF UNIT WHEN CONDENSATE IS BLOCKED. PIPE CONDENSATE TO NEAREST FLOOR SINK OR SINK TAIL PIECE.																			
2. PROVIDE ALL REFRIGERANT PIPING, REFINET BRANCH PIPING KITS, INSULATION AND ACCESSORIES BETWEEN INDOOR UNITS, AND OUTDOOR UNITS. COORDINATE WITH MANUFACTURER FOR REFRIGERANT PIPE SIZING AND FINAL LENGTHS FROM UNIT TO FCUS.																			
3. PROVIDE FAN COIL UNIT WITH CARRIER 24V INTERFACE MINI KSAIC0601230 FOR CONNECTION WITH EXISTING DDC SYSTEM.																			
4. PROVIDE ADD ALTERNATE BID FOR FCU1-4.																			

MECHANICAL LEGEND, DETAILS, AND SCHEDULES
NO SCALE



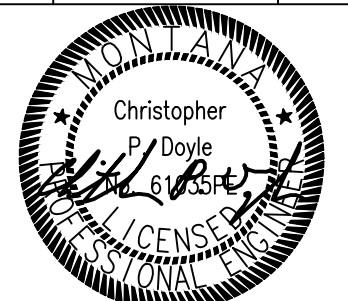
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MSU MARSH
40,41,54 HVAC UPGRADES
MONTANA STATE UNIVERSITY

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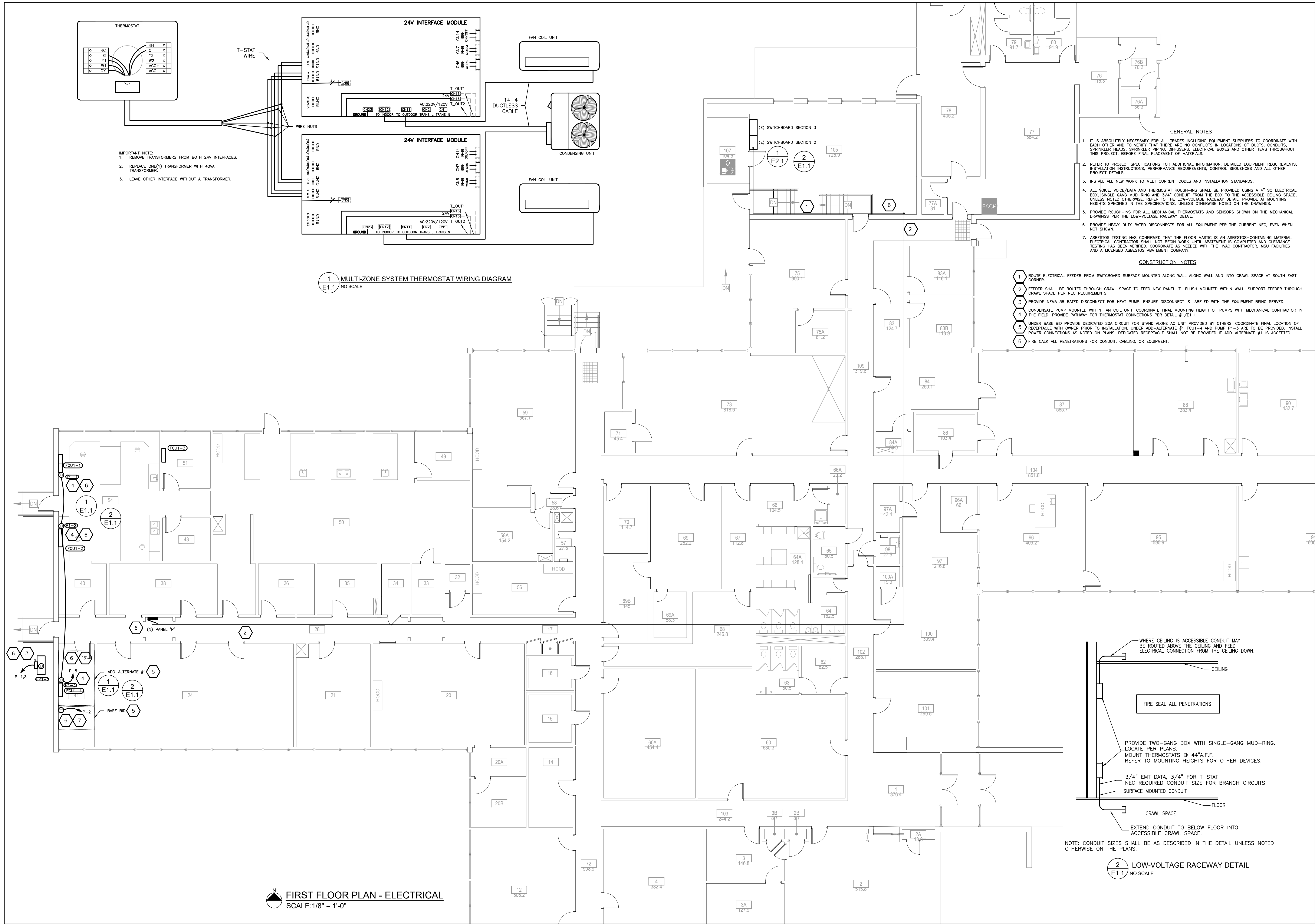
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Consultant #: 2514

SHEET TITLE
MECHANICAL
LEGEND, DETAILS
AND SCHEDULES
SHEET

M2.1
DATE
12-5-2025



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MSU MARSH

40,41,54 HVAC UPGRADES

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REV.	DESCRIPTION	DATE

PPA#25-1248

A/E#00-00-00

Consultant #: 2514

SHEET TITLE
















FIRST FLOOR PLAN - ELEC

SHEET

E1.1

DATE

12-5-2025

ELECTRICAL LEGEND (NOT ALL SYMBOLS ARE USED ON THIS PROJECT)				
	POWER DIRECT CONNECTION		DUPLEX RECEPTACLE	 BRANCH CIRCUIT CONCEALED IN WALL, CEILING OR CRAWL SPACE  LOW VOLTAGE CABLING  EMPTY CONDUIT - 3/4" UNLESS NOTED OTHERWISE  HOME RUN TO PANEL. NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS.
	POWER MOTOR CONNECTION		FILLED CENTER INDICATES GFCI RECEPTACLE	
	ELECTRICAL PANEL - 208Y/120V 3 PHASE 4 WIRE		HORIZONTALLY MOUNTED DUPLEX RECEPTACLE	
	JUNCTION BOX - MINIMUM OF 4" SQUARE ELECTRICAL BOX		30A DRYER RECEPTACLE	
			50A RANGE RECEPTACLE	
			QUADRAPLEX RECEPTACLE	
			CEILING MOUNTED RECEPTACLE	
ABBREVIATIONS				
AC ADA AD AFF AHU BKR, CB CLNG CONT DDC DF DISC E.C., EC	ABOVE COUNTER AMERICANS W/ DISABILITIES ACT COMPLIANT EQUIPMENT ACCESS DOOR ABOVE FINISHED FLOOR AIR HANDLING UNIT CIRCUIT BREAKER CEILING CONTINUATION DIRECT DIGITAL CONTROL DRINKING FOUNTAIN DISCONNECT SWITCH ELECTRICAL CONTRACTOR	(E) EXISTING TO REMAIN EF EXHAUST FAN ELECT ELECTRICAL EPO EMERGENCY POWER OFF EWC ELECTRIC WATER COOLER FCO FLOOR CLEANOUT FCU FAN COIL UNIT FD FLOOR DRAIN FD FIRE DAMPER FD/SD FIRE/SMOKE DAMPER FE FIRE EXTINGUISHER FS FLOOR SINK GFCI, GFI GROUND FAULT CIRCUIT INTERRUPTER GND GROUND HO H.O. HIGH OUTPUT IG INSULATED GROUND	LTS LIGHTS MECH MECHANICAL MC, M.C. MECHANICAL CONTRACTOR MDB MAIN DISTRIBUTION BOARD MDP MAIN DISTRIBUTION PANEL MFR MANUFACTURER MLO MAIN LUGS ONLY (N) NEW NEC NATIONAL ELECTRICAL CODE NL NIGHT LIGHT NO NUMBER OD, O.D. OUTSIDE DIAMETER PB PULL BOX PMR PER MFR'S RECOMMENDATIONS POS POINT OF SALE (CASH REGISTER)	(R) REMOVE AND RELOCATE RECEPTACLE(S) RCPT RECEPTACLE SCH SCHEDULE SF SQUARE FOOT TC TEMPERATURE CONTROLS CONTRACTOR TGB TELECOMMUNICATIONS GROUND BAR TTB TELECOMMUNICATIONS TERMINAL BOARD TYP TYPICAL UH UNIT HEATER UNO UNLESS NOTED OTHERWISE W WALL-MOUNTED DEVICE WG WIRE GUARD WP WEATHERPROOF-IN-USE WR WEATHER-RESISTANT (X) EXISTING TO BE REMOVED

BRANCH CIRCUIT HOMERUN WIRE SIZES, AS SHOWN ON DRAWINGS OR PANEL SCHEDULES, ARE MINIMUM SIZES FOR CURRENT DRAW. ELECTRICAL CONTRACTOR SHALL INCREASE WIRE AND CONDUIT SIZES AS REQUIRED TO LIMIT BRANCH CIRCUIT VOLTAGE DROP TO 3%, BASED ON ACTUAL HOMERUN LENGTHS REQUIRED IN FIELD. BRANCH CIRCUIT VOLTAGE DROP CALCULATIONS SHALL BE PERFORMED IN ACCORDANCE WITH THESE CRITERIA:

TYPE OF LOAD	LOAD CURRENT	DISTANCE
DUPLEX RECEPTACLE	16A	TO FARTHEST RECEPTACLE
OTHER RECEPTABLES	80% OF RATED CURRENT	TO FARTHEST RECEPTACLE
LIGHT FIXTURES	TOTAL VA OF ALL FIXTURES ON CKT	TO FIRST FIXTURE VIA SWITCH(ES) INCLUDING LENGTH OF TRAVELERS
MOTORS	125% OF NAMEPLATE FLA	TO MOTOR/EQUIPMENT
HEATERS	BASED ON TOTAL VA	TO DEVICE/EQUIPMENT
MISCELLANEOUS		

IN GENERAL, BASED ON COPPER WIRES, MINIMUM WIRE SIZES FOR 120V, 20A BRANCH CIRCUITS SHALL BE AS SHOWN IN TABLES BELOW:

20A RECEPT./ EQUIP BRANCH CIRCUITS	
LENGTH (FEET)	WIRE SIZE (AWG)
UP TO 60	#12
UP TO 95	#10
UP TO 150	#8
UP TO 240	#6

ALL DUPLEX AND GFI RECEPTABLES SHALL BE RATED FOR 20A.

MC CABLE MAY BE USED, BUT ONLY WHERE IT IS FISHED INSIDE EXISTING WALLS OR CEILINGS. UNDER NO CIRCUMSTANCES SHALL MC CABLE BE INSTALLED WHERE IT IS EXPOSED, WHEREVER MC CABLE IS INSTALLED, IT SHALL HAVE ONE SPARE CURRENT CARRYING CONDUCTOR FOR FUTURE USE.

MOUNTING HEIGHTS	
DESCRIPTION	HEIGHT
RECEPTABLES (WALL)	18" A.F.F. TO CENTER
RECEPTABLES (ABOVE COUNTER)	44" A.F.F. TO CENTER
RECEPTABLES (UNFINISHED AREA)	44" A.F.F. TO CENTER
RECEPTABLES (HORIZONTAL)	32" A.F.F. TO CENTER
SURFACE RACEWAY RECEPTACLE STRIPS	42" A.F.F. TO BOTTOM
LIGHT SWITCHES	44" A.F.F. TO CENTER
VOICE OUTLET (WALL)	54" A.F.F. TO CENTER
VOICE/DATA OUTLET	18" A.F.F. TO CENTER
CLOCK OUTLET	96" A.F.F. TO CENTER
EXIT SIGN	CENTER ON DOOR, 12" ABOVE DOOR
FIRE ALARM PULL STATION	44" A.F.F. TO CENTER
FIRE ALARM HORN/STROBE	80" A.F.F. TO BOTTOM OR 6" BELOW CEILING
CARD READERS	38" ACCESS TO EQUIPMENT
SECURITY SYSTEM CONTROLS	44" A.F.F. TO CENTER
THERMOSTATS/ HVAC CONTROLS	44" A.F.F. TO CENTER
ELECTRICAL PANELS	72" A.F.F. TO TOP
SAFETY SWITCHES/MOTOR STARTER/ VFD'S	72" A.F.F. TO TOP (TOP OF HANDLE NOT TO EXCEED 78" A.F.F.)
MOTOR CONTROL PUSHBUTTONS	60" A.F.F. TO CENTER

SUBSCRIPT "AC" BESIDE RECEPTABLES DENOTES THAT RECEPTACLE IS TO BE INSTALLED WITH BOTTOM OF BOX TWO INCHES ABOVE THE COUNTERTOP OR BACKSPASH. COORDINATE WITH THE GENERAL CONTRACTOR AND THE CASEWORK SUPPLIER.

(E) SWITCHBOARD SECTION 2

BREAKER	DESCRIPTION	CIRCUIT	#
225 3	PANEL A	1	1
-	PROVISION	2	4
-	PROVISION	3	4
-	PROVISION	5	6
225 3	PANEL C	7	8
-	PROVISION	9	8
-	M-V METERING POWER	11	12
70 3	WELL	13	14
-	PROVISION	15	16
-	PROVISION	17	17
225 3	(N) PANEL P	19	19
-	EXISTING PROVISION SPACE	21	22
-	PROVISION	23	24
-	PROVISION	25	26
-	PROVISION	27	28
-	PROVISION	29	30
225 3	PANEL I	31	31
-	PROVISION	33	34
-	PROVISION	35	36
225 3	PANEL D	37	38
-	PROVISION	39	40
-	PROVISION	41	42
225 3	PANEL J	43	44
-	PROVISION	45	46
-	PROVISION	47	48
-	PROVISION	49	50
-	PROVISION	51	52
-	PROVISION	53	54
-	PROVISION	55	56
-	PROVISION	57	58
-	PROVISION	59	60
-	PROVISION	61	62
-	PROVISION	63	64
-	PROVISION	65	66
-	PROVISION	67	68
-	PROVISION	69	70
-	PROVISION	71	72
-	PROVISION	73	74
-	PROVISION	75	76
-	PROVISION	77	78
-	PROVISION	79	80
-	PROVISION	81	82
-	PROVISION	83	84

(E) SWITCHBOARD SECTION 3

BREAKER	DESCRIPTION	CIRCUIT	#
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	1	1
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	2	2
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	3	3
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	4	4
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	5	5
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	6	6
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	7	7
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	8	8
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	9	9
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	10	10
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	11	11
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	12	12
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	13	13
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	14	14
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	15	15
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	16	16
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	17	17
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	18	18
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	19	19
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	20	20
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	21	21
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	22	22
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	23	23
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	24	24
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	25	25
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	26	26
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	27	27
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	28	28
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	29	29
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	30	30
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	31	31
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	32	32
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	33	33
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	34	34
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	35	35
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	36	36
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	37	37
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	38	38
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	39	39
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	40	40
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	41	41
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	42	42
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	43	43
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	44	44
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	45	45
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	46	46
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	47	47
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	48	48
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	49	49
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	50	50
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	51	51
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	52	52
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	53	53
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	54	54
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	55	55
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	56	56
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	57	57
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	58	58
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	59	59
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	60	60
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	61	61
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	62	62
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	63	63
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	64	64
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	65	65
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	66	66
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	67	67
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	68	68
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	69	69
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	70	70
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	71	71
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	72	72
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	73	73
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	74	74
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	75	75
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	76	76
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	77	77
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	78	78
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	79	79
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	80	80
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	81	81
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	82	82
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	83	83
1500	AMPS 208Y/120V VOLT 3 PHASE 4 WIRE	84	84

ONE-LINE DIAGRAM NOTES

1 225A FEEDER, (4) #300 KCMIL AL. + (1) #2 AL. GRD. IN A 3" CONDUIT.

2 PROVIDE NEW BREAKER WITH EXISTING ELECTRICAL GEAR TO FEED NEW ELECTRICAL PANEL.

3 DOWNTIME OF EXISTING SERVICES SHALL BE HELD TO A MINIMUM. ALL OUTAGES SHALL BE SCHEDULED WITH THE OWNER NO LATER THAN 30 DAYS PRIOR TO THE OUTAGE. ARRANGEMENTS SHALL BE MADE TO WORK CONTINUOUSLY INCLUDING OVERTIME IF REQUIRED, TO ASSURE THAT SERVICES ARE ONLY INTERRUPTED AS LONG AS REQUIRED TO COMPLETE NECESSARY WORK.

(N) PANEL P

BREAKER	DESCRIPTION	CIRCUIT	#
225 3	PANEL P	1	1
-	PROVISION	2	2
-	PROVISION	3	3
-	PROVISION	4	4
-	PROVISION	5	5
-	PROVISION	6	6
-	PROVISION	7	7
-	PROVISION	8	8
-	PROVISION	9	9
-	PROVISION	10	10
-	PROVISION	11	11
-	PROVISION	12	12
-	PROVISION	13	13
-	PROVISION	14	14
-	PROVISION	15	15
-	PROVISION	16	16
-	PROVISION	17	17
-	PROVISION	18	18
-	PROVISION	19	19
-	PROVISION	20	20
-	PROVISION	21	21
-	PROVISION	22	22
-	PROVISION	23	23
-	PROVISION	24	24
-	PROVISION	25	25
-	PROVISION	26	26
-	PROVISION	27	27
-	PROVISION	28	28
-	PROVISION	29	29
-	PROVISION	30	30
-	PROVISION	31	31
-	PROVISION	32	32
-	PROVISION	33	33
-	PROVISION	34	34
-	PROVISION	35	35
-	PROVISION	36	36
-	PROVISION	37	37
-	PROVISION	38	38
-	PROVISION	39	39
-	PROVISION	40	40
-	PROVISION	41	41
-	PROVISION	42	42
-	PROVISION	43	43
-	PROVISION	44	44
-	PROVISION	45	45
-	PROVISION	46	46
-	PROVISION	47	47
-	PROVISION	48	48
-	PROVISION	49	49
-	PROVISION	50	50
-	PROVISION	51	51
-	PROVISION	52	52
-	PROVISION	53	53
-	PROVISION	54	54
-	PROVISION	55	55
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-	PROVISION	74	74
-	PROVISION	75	75
-	PROVISION	76	76
-	PROVISION	77	77
-	PROVISION	78	78
-	PROVISION	79	79
-	PROVISION	80	80
-	PROVISION	81	81
-	PROVISION	82	82
-	PROVISION	83	83
-	PROVISION	84	84

TOTAL LOADS: 7480 WATTS
DEMAND: 21 AMPS

3640 3640 180

21 AMPS