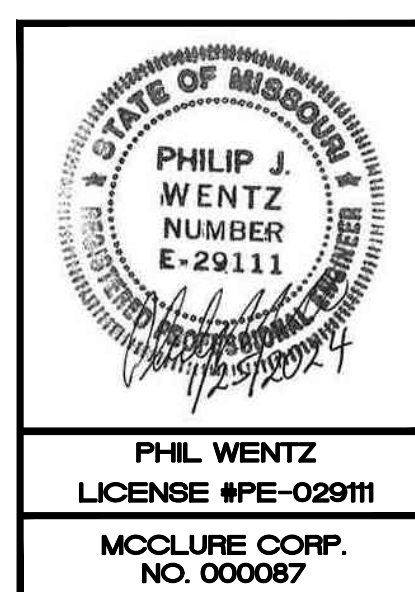
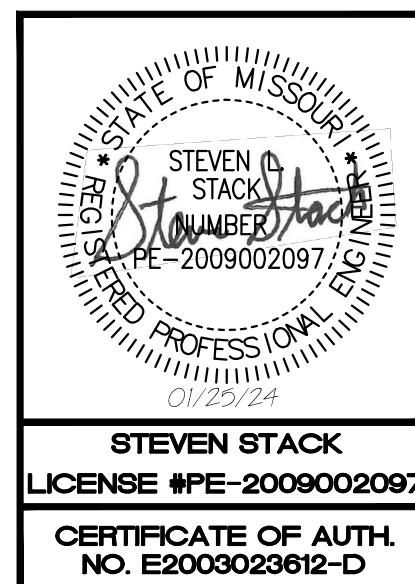


REPLACE HVAC SYSTEM - TROOP G HEADQUARTERS BUILDING MISSOURI STATE HIGHWAY PATROL WILLOW SPRINGS, MISSOURI

SITE LOCATION MAP



MCCLURE ENGINEERING
1000 Clark Avenue Saint Louis, Missouri 63102
T 314-645-6232 F 314-645-4128 www.McClureeng.com



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S2	ROOF FRAMING PLAN

OWNER: STATE OF MISSOURI
MICHAEL L. PARSON, GOVERNOR

DEPARTMENT OF PUBLIC SAFETY
MISSOURI STATE HIGHWAY PATROL

PROJECT MANAGEMENT: OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

DESIGNER: MCCLURE ENGINEERING

PROJECT NUMBER: R2313-01

SITE NUMBER: 6008
FACILITY NUMBER: 8136008002

ISSUED FOR BID: JANUARY 25, 2024



PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 00087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

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HIGHWAY PATROL

REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

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FACILITY# 8136008002

REVISION: _____
DATE: _____
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ISSUE DATE: 07/27/2023

DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**MECHANICAL
SYMBOLS,
ABBREVIATIONS,
AND DETAILS**

SHEET NUMBER:

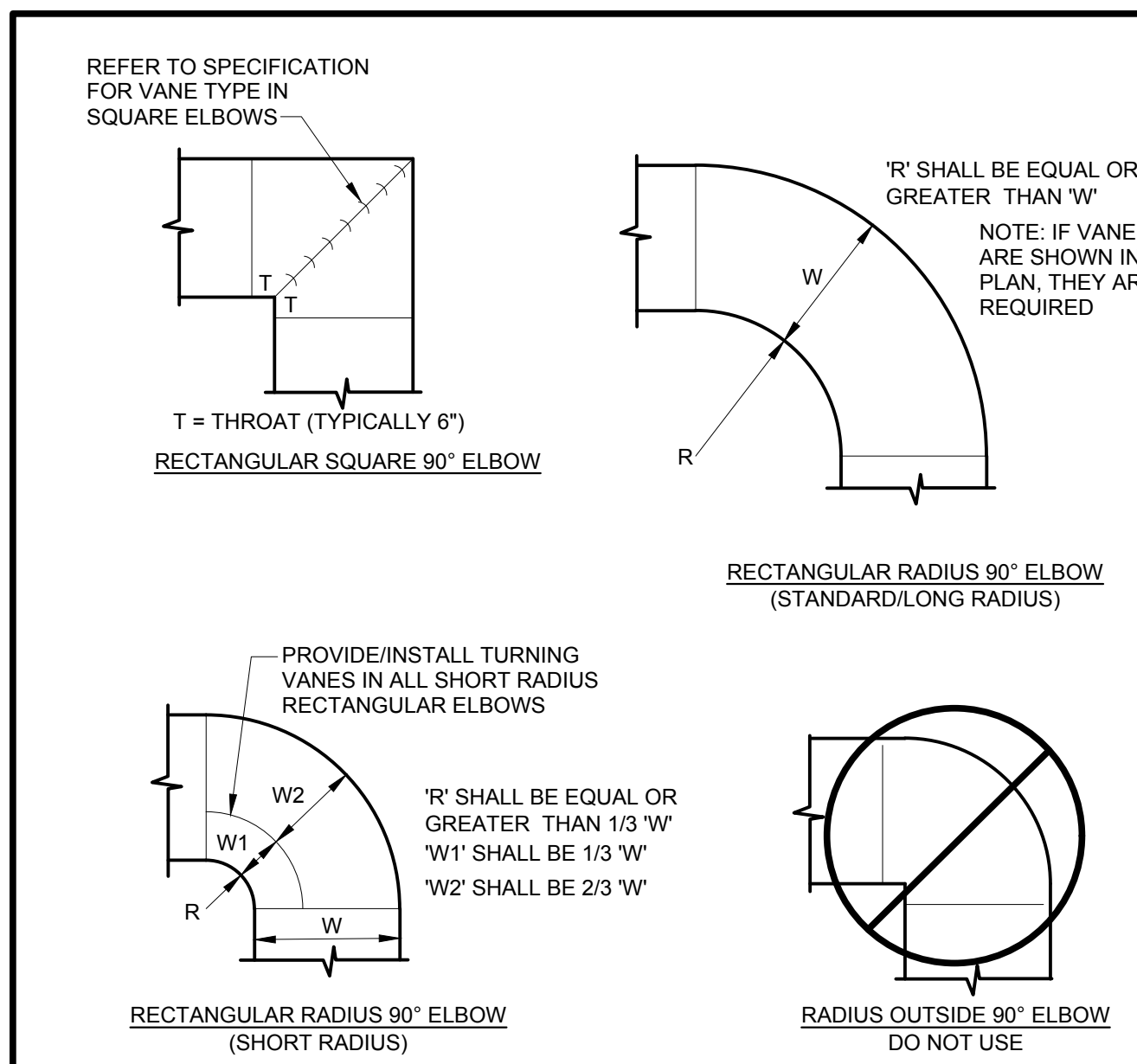
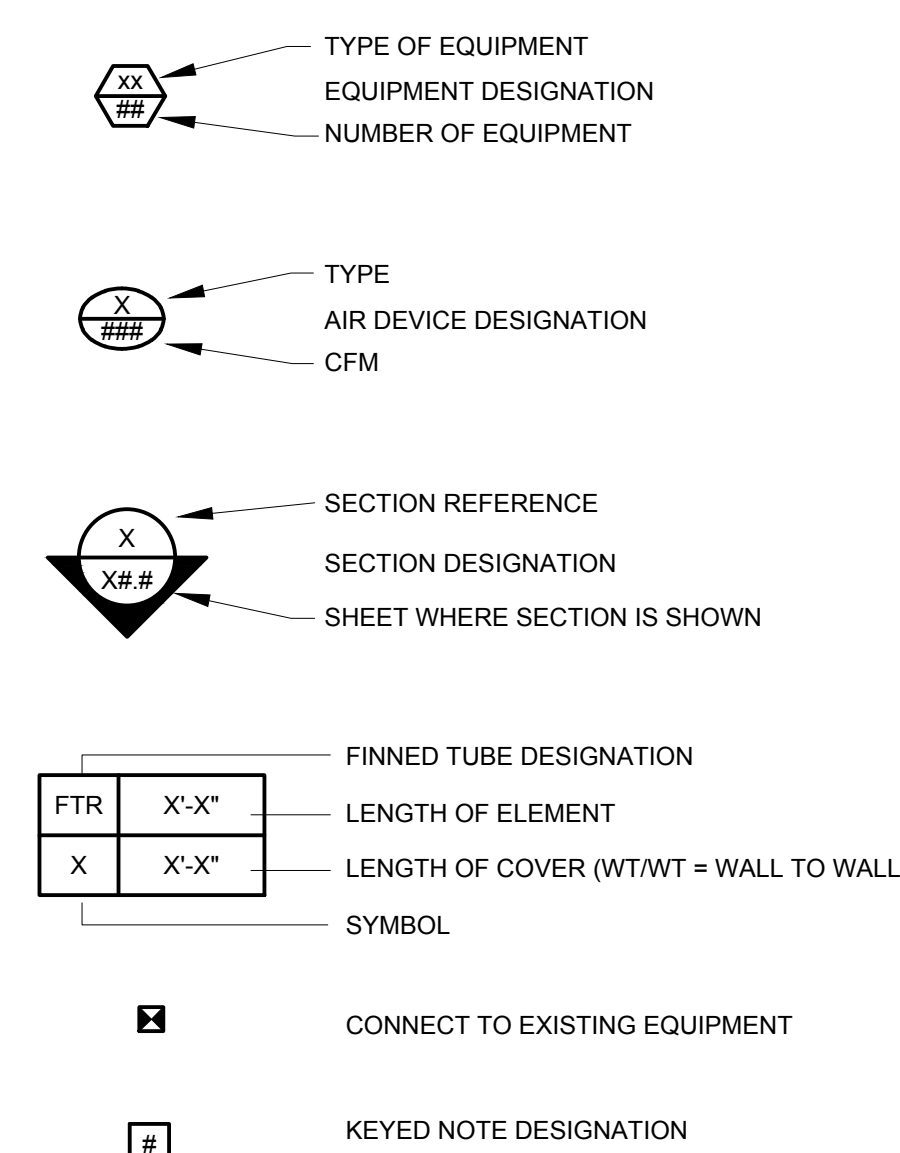
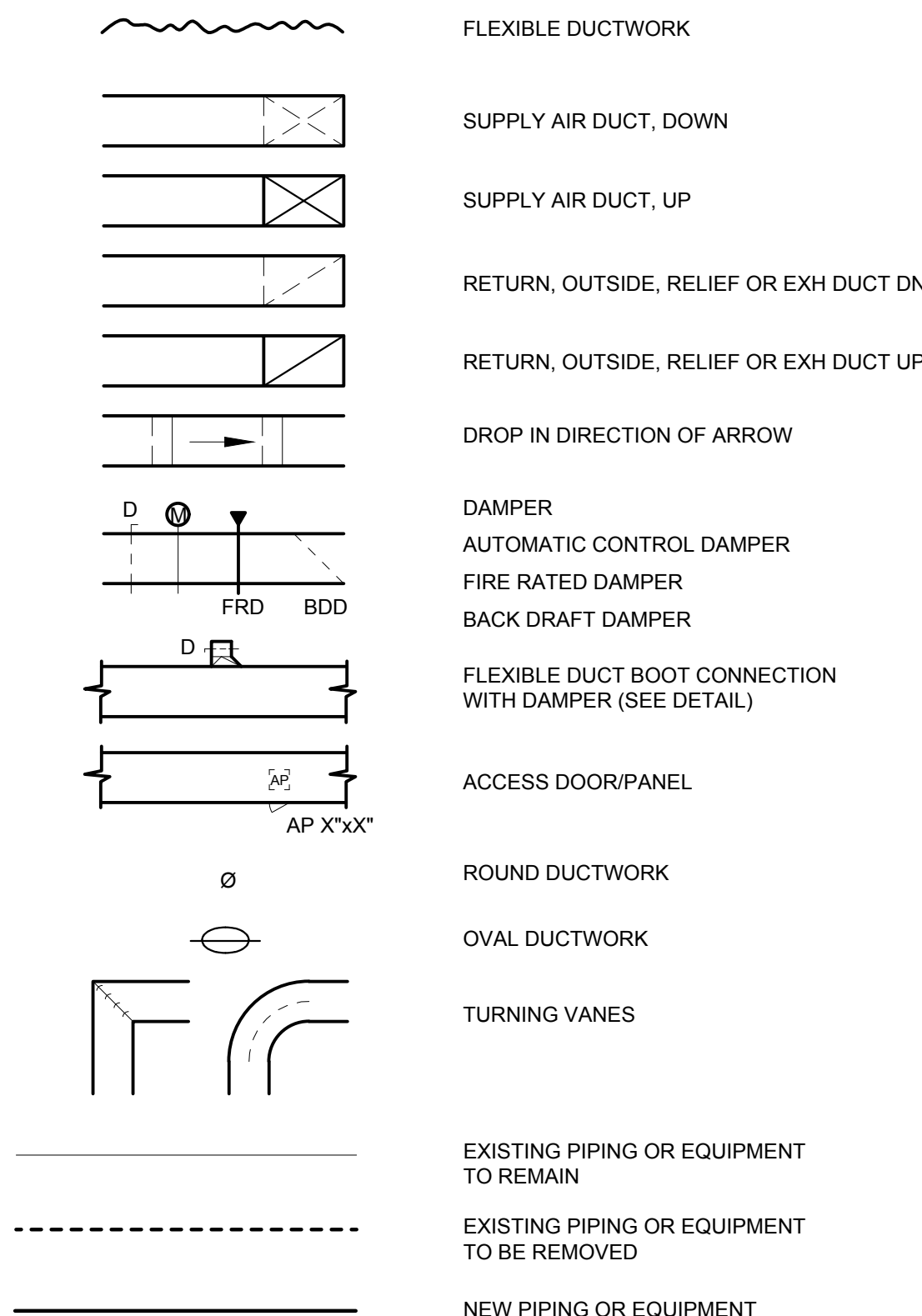
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2 OF 24 SHEETS
01/25/2024

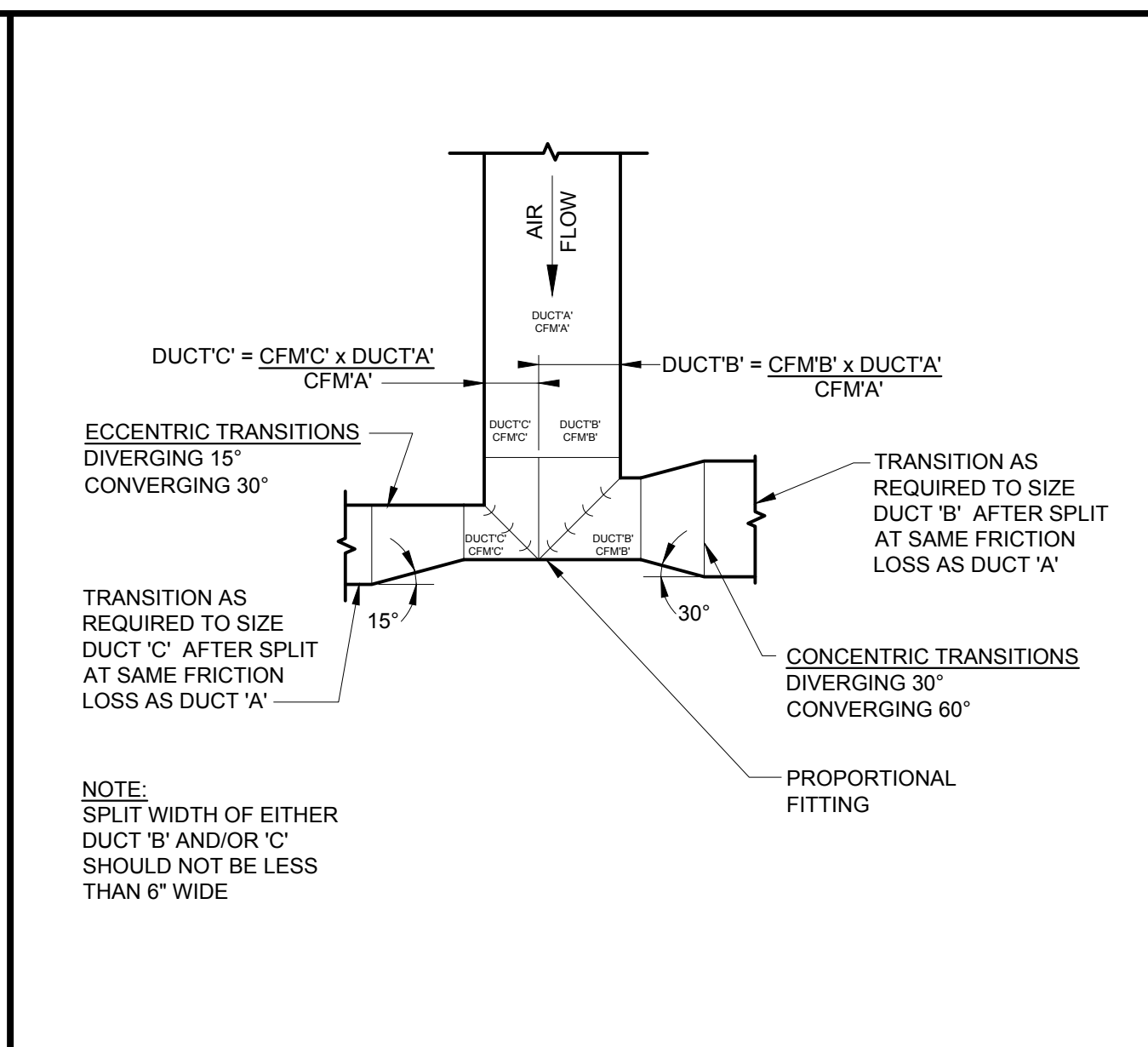
MECHANICAL

AD	ACCESS DOOR
AHU	AIR HANDLING UNIT
AP	ACCESS PANEL
BV	BALANCE VALVE
COM	COMMON
CHV	CHECK VALVE
CU	CONDENSER UNIT
CV	CONTROL VALVE
D	DAMPER
DISCH	DISCHARGE
DN	DOWN
DR	DRAIN LINE
DV	DRAIN VALVE
EBH	ELECTRIC BASE BOARD HEATER
EF	EXHAUST FAN
ET	EXPANSION TANK
EX	EXISTING
EXH	EXHAUST
FC	FLEXIBLE CONNECTION
FCU	FAN COIL UNIT
F.O.T.	FLAT ON TOP
FRD	FIRE RATED DAMPER
FTR	FIN TUBE RADIATION
G	GAS
GA	GAUGE
GC	GAUGE COCK
H	HUMIDIFIER
MA	MAKE-UP AIR
MBH	1000 BTU/HR
MXA	MIXED AIR
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
PR	PRESSURE REGULATOR
PRV	PRESSURE REDUCING VALVE
RA	RETURN AIR
RF	RETURN FAN
RLA	RELIEF AIR
RLF	RELIEF FAN
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
SD	SMOKE DAMPER
SF	SUPPLY FAN
STR	STRAINER
SUC	SUCTION
SUD	SUCTION DIFFUSER
SV	SERVICE VALVE
TH	THERMOMETER
TW	THERMOMETER WELL
U	UNION
U	UNIT HEATER
UH	UNIT HEATER
VAV	VARIABLE AIR VOLUME UNIT

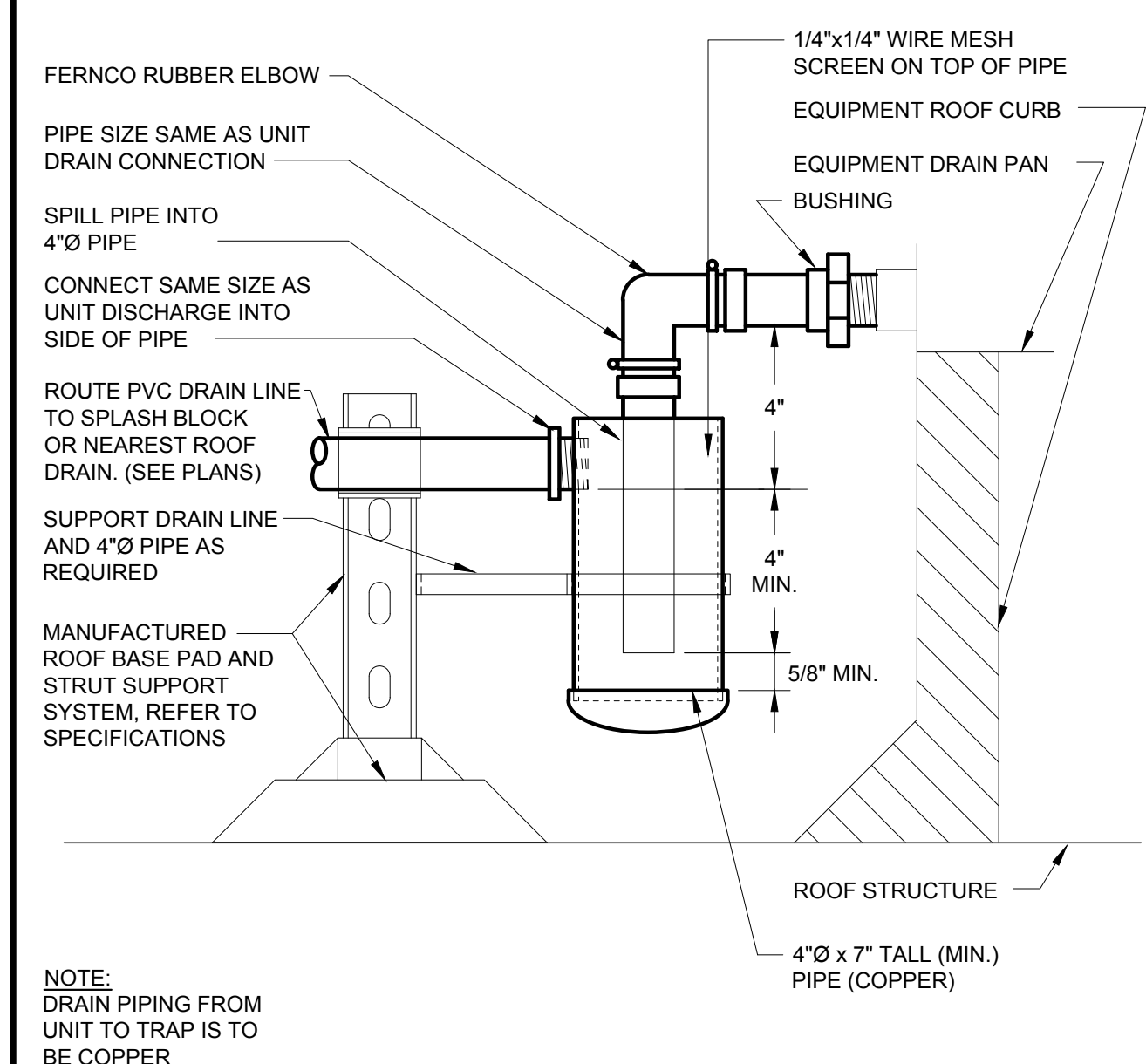
DR	DR	DRAIN LINE
RSUC	RSUC	REFRIGERANT SUCTION
RLIQ	RLIQ	REFRIGERANT LIQUID
UP	PIPE LINE, TURNED UP	
DN	PIPE LINE, TURNED DOWN	
BV	BALANCE VALVE	
CV	2 WAY CONTROL VALVE	
3CV	3 WAY CONTROL VALVE	
CHV	CHECK VALVE	
DV	DRAIN VALVE	
F	FLANGE CONNECTION	
GA	GAUGE AND GAUGE COCK	
MC	MECHANICAL COUPLING	
P	PETE'S PLUG	
PFC	PRESSURE REGULATOR	
PR	PRESSURE REDUCING VALVE	
PRV	RELIEF VALVE	
RV	RELIEF VALVE	
SV	SERVICE VALVE	
STR	STRAINER	
T	STEAM TRAP	
TH	THERMOMETER	
TW	THERMOMETER WELL	
U	UNION	
M	METER	
CAP	CAP	
CONC	CONCENTRIC REDUCER	
ECC	ECCENTRIC REDUCER (BOTTOM & TOP LEVEL)	
PA	PIPE ANCHOR	
PG	PIPE GUIDE	



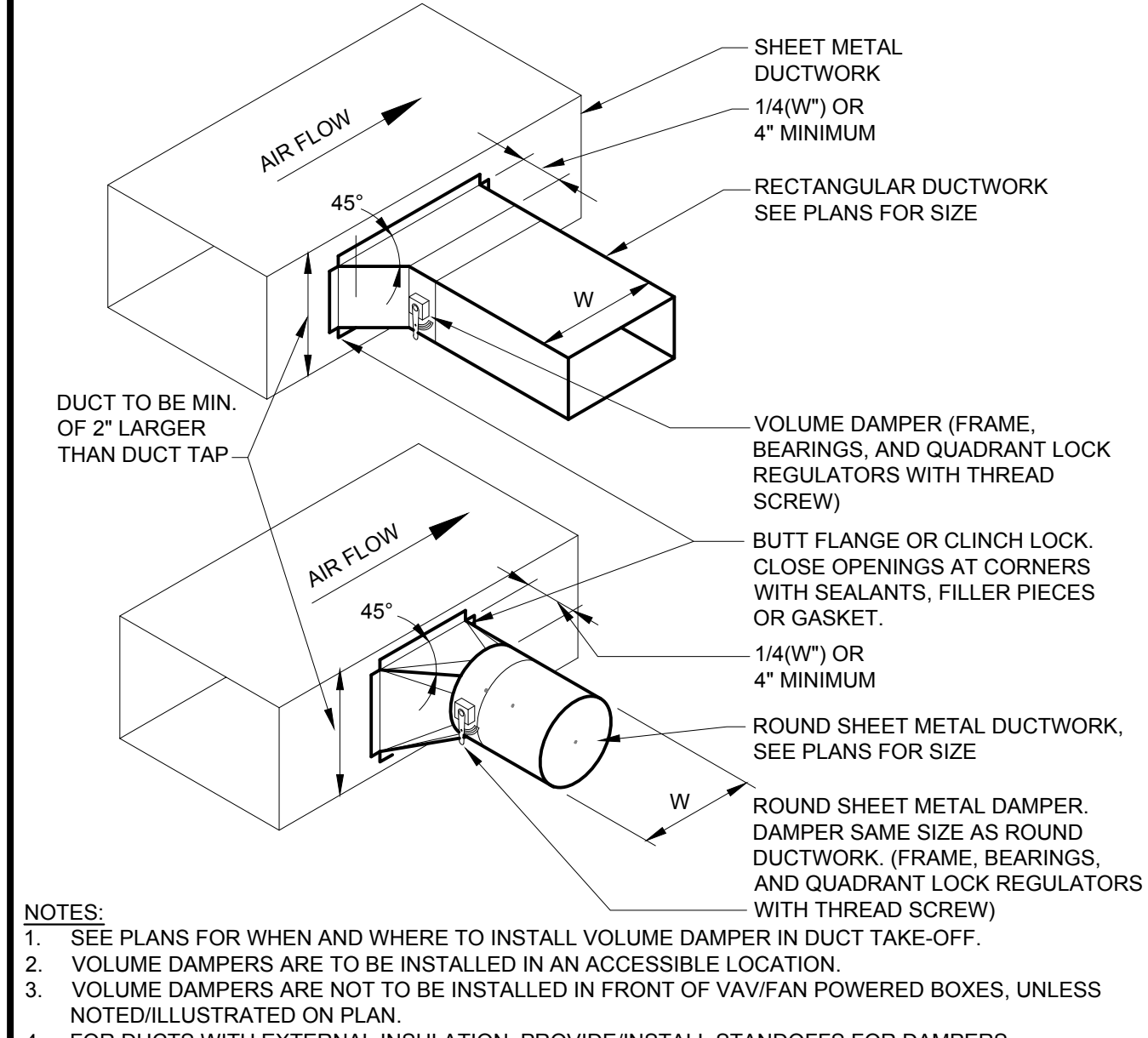
FILE NAME: M-0006B
SCALE: NONE
DUCTWORK
BRANCH RECTANGULAR 90° ELBOWS



FILE NAME: M-0006A
SCALE: NONE
DUCTWORK
PROPORTIONAL FITTING & TRANSITIONS



FILE NAME: M-0018
SCALE: NONE
ROOF TOP UNIT
CONDENSATE DRAIN



FILE NAME: M-0025A
SCALE: NONE
45 DEGREE TAKE-OFF
(RECTANGULAR DUCT MAIN)

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PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin

310 East 6th Street

Rolla, MO 65401

P: 573-364-6362

www.archer-elgin.com

MEP:

McClure Engineering

1000 Clark Avenue

Fifth Floor

St. Louis, MO 63102

P: 314-645-6232

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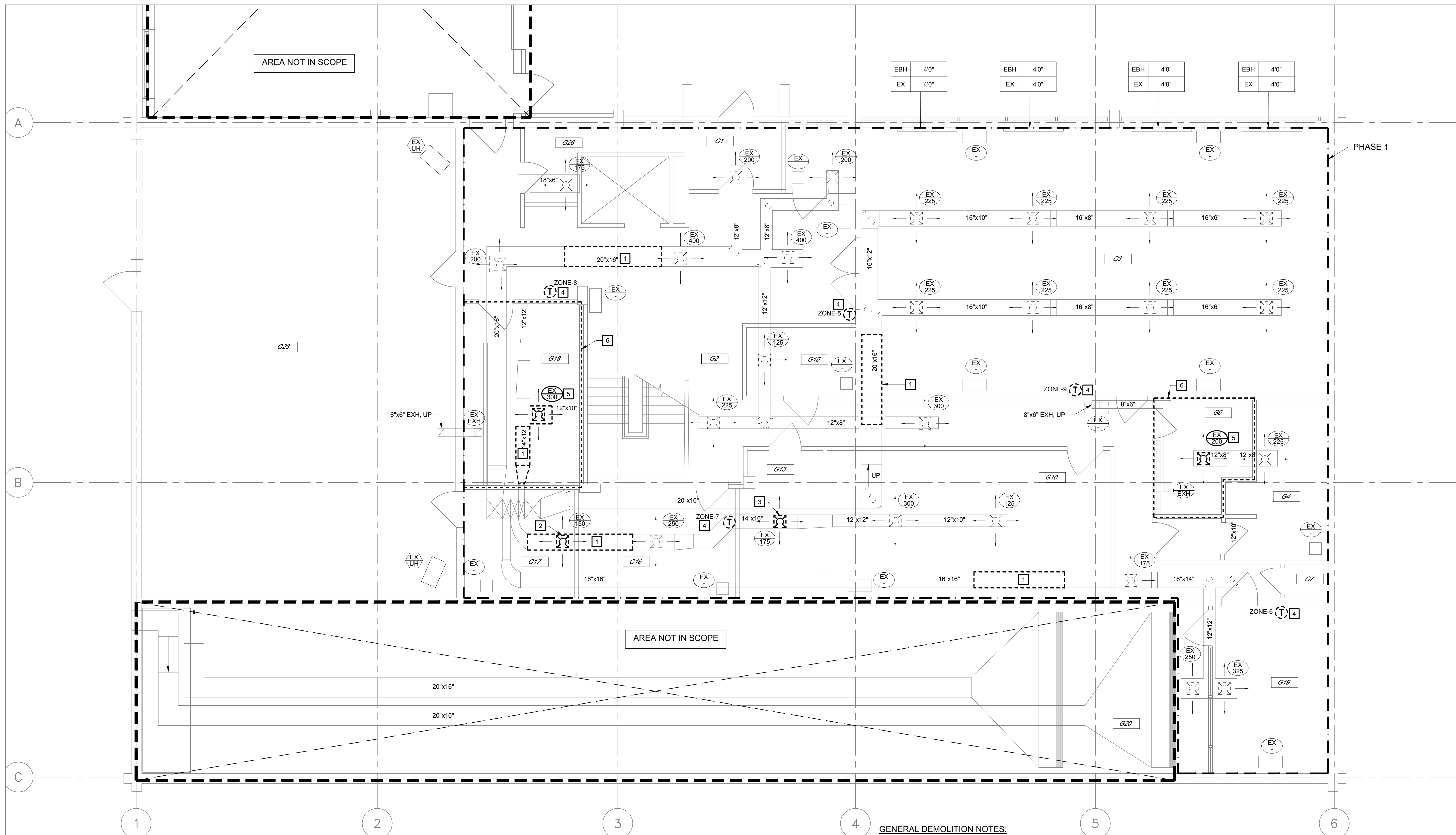
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CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**GROUND FLOOR
MECHANICAL
DEMOLITION PLAN**

SHEET NUMBER:

DM3.0

3 OF 24 SHEETS
01/25/2024



N
GROUND FLOOR MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 10"
0 1 2 4 1/4"=1"

- GENERAL DEMOLITION NOTES:**
1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
 2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
 3. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
 4. CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
 5. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
 6. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
 7. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
 8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
 9. CONTRACTOR IS RESPONSIBLE FOR REMOVING EXISTING CEILING AS REQUIRED TO COMPLETE WORK. CEILING TO BE REINSTALLED AFTER WORK IS COMPLETE IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY TILES DAMAGED DURING CONSTRUCTION.

- KEYED NOTES**
- 1 DEMOLISH EXISTING SEGMENT OF SUPPLY AIR DUCTWORK. NEW VAV AND DUCTWORK TO BE INSTALLED IN ITS PLACE. REFER TO NEW WORK DRAWINGS FOR MORE INFORMATION.
 - 2 DEMOLISH EXISTING SUPPLY AIR BRANCH AND EXISTING AIR DEVICE.
 - 3 DEMOLISH EXISTING SUPPLY AIR BRANCH AND EXISTING AIR DEVICE. EXISTING HOLE IN DUCT MAIN TO BE SEALED AIR TIGHT.
 - 4 DEMOLISH EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING. NEW THERMOSTAT TO BE INSTALLED DURING NEW WORK. REFER TO NEW WORK FOR MORE INFORMATION.
 - 5 DEMOLISH EXISTING AIR DEVICE AND EXISTING SUPPLY AIR BRANCH. NEW AIR DEVICE AND SUPPLY AIR BRANCH TO BE INSTALLED IN ITS PLACE DURING NEW WORK. REFER TO NEW WORK FOR MORE INFORMATION.
 - 6 DEMOLISH EXISTING CEILING TILE AND CEILING TILE GRID WITHIN BOUNDARY SHOWN.

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PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
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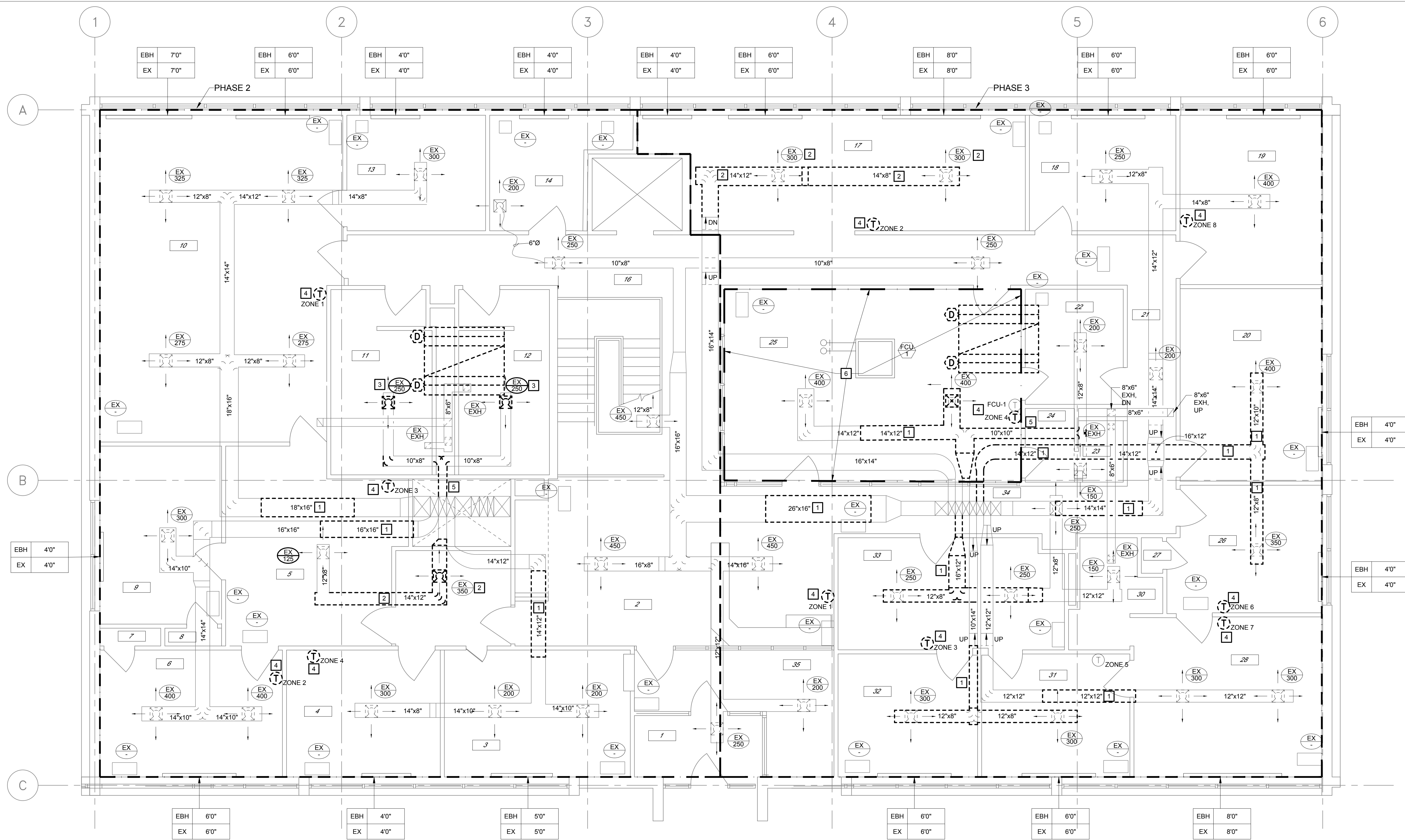
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CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**FIRST FLOOR
MECHANICAL
DEMOLITION PLAN**

SHEET NUMBER:

DM3.1

4 OF 24 SHEETS
01/25/2024



GENERAL DEMOLITION NOTES:

1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
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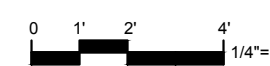
KEYED NOTES

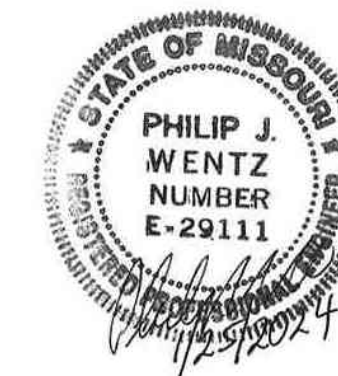
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- 2 DEMOLISH EXISTING SUPPLY AIR BRANCH AND EXISTING AIR DEVICE.
- 3 DEMOLISH EXISTING AIR DEVICE. EXISTING SUPPLY AIR BRANCH TO REMAIN. NEW AIR DEVICE TO BE INSTALLED DURING NEW WORK. REFER TO NEW WORK FOR MORE INFORMATION.
- 4 DEMOLISH EXISTING THERMOSTAT AND ALL ASSOCIATED WIRING. NEW THERMOSTAT TO BE INSTALLED DURING NEW WORK. REFER TO NEW WORK FOR MORE INFORMATION.
- 5 DEMOLISH DUCT BACK TO DUCT BRANCH SHOWN. SEAL EXISTING HOLE IN DUCT AIR TIGHT.
- 6 ROOM #25 - RADIO ROOM ALWAYS OCCUPIED. ADDITIONAL COORDINATION WITH OWNER AND OCCUPANTS REQUIRED.



FIRST FLOOR MECHANICAL DEMOLITION PLAN

SCALE: 1/4" = 10"





PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

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Fifth Floor
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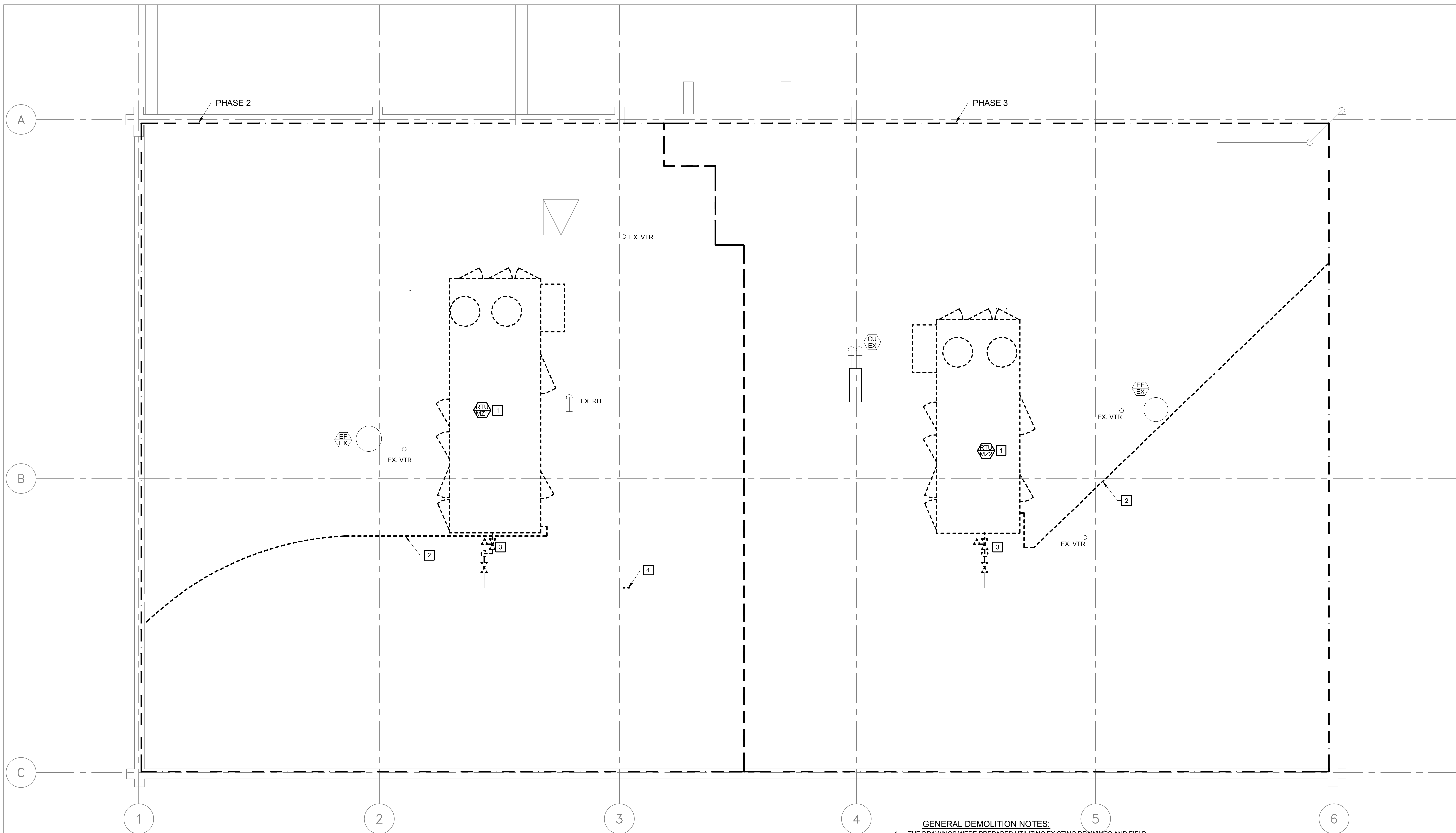
DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**ROOF MECHANICAL
DEMOLITION PLAN**

SHEET NUMBER:

DM3.2

5 OF 24 SHEETS
01/25/2024



- GENERAL DEMOLITION NOTES:**
1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
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 7. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
 8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
 9. CONTRACTOR IS RESPONSIBLE FOR REMOVING EXISTING CEILING AS REQUIRED TO COMPLETE WORK. CEILING TO BE REINSTALLED AFTER WORK IS COMPLETE IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY TILES DAMAGED DURING CONSTRUCTION.

- KEYED NOTES**
- 1 EXISTING RTU'S TO BE DEMOLISHED IN THEIR ENTIRETY. EXISTING ROOF CURBS TO REMAIN FOR NEW RTU'S. EXISTING ROOF DECK TO BE PATCHED AS REQUIRED. EXISTING ROOF MEMBRANE TO BE PATCHED AND SEALED WATER TIGHT TO MATCH EXISTING CONDITIONS.
 - 2 DEMOLISH EXISTING DRAIN PIPING IN ITS ENTIRETY.
 - 3 DEMOLISH EXISTING NATURAL GAS PIPING AND PRESSURE REDUCING VALVE BACK TO EXISTING SERVICE VALVE. NEW PIPING TO BE INSTALLED DURING NEW WORK. REFER TO NEW WORK FOR MORE INFORMATION.
 - 4 DEMOLISH SEGMENT OF EXISTING NATURAL GAS PIPING TO ALLOW FOR INSTALLATION OF PIPING TEE. REFER TO NEW WORK FOR MORE INFORMATION.

N
 ROOF MECHANICAL DEMOLITION PLAN
SCALE: 1/4" = 10"



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PHILIP WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
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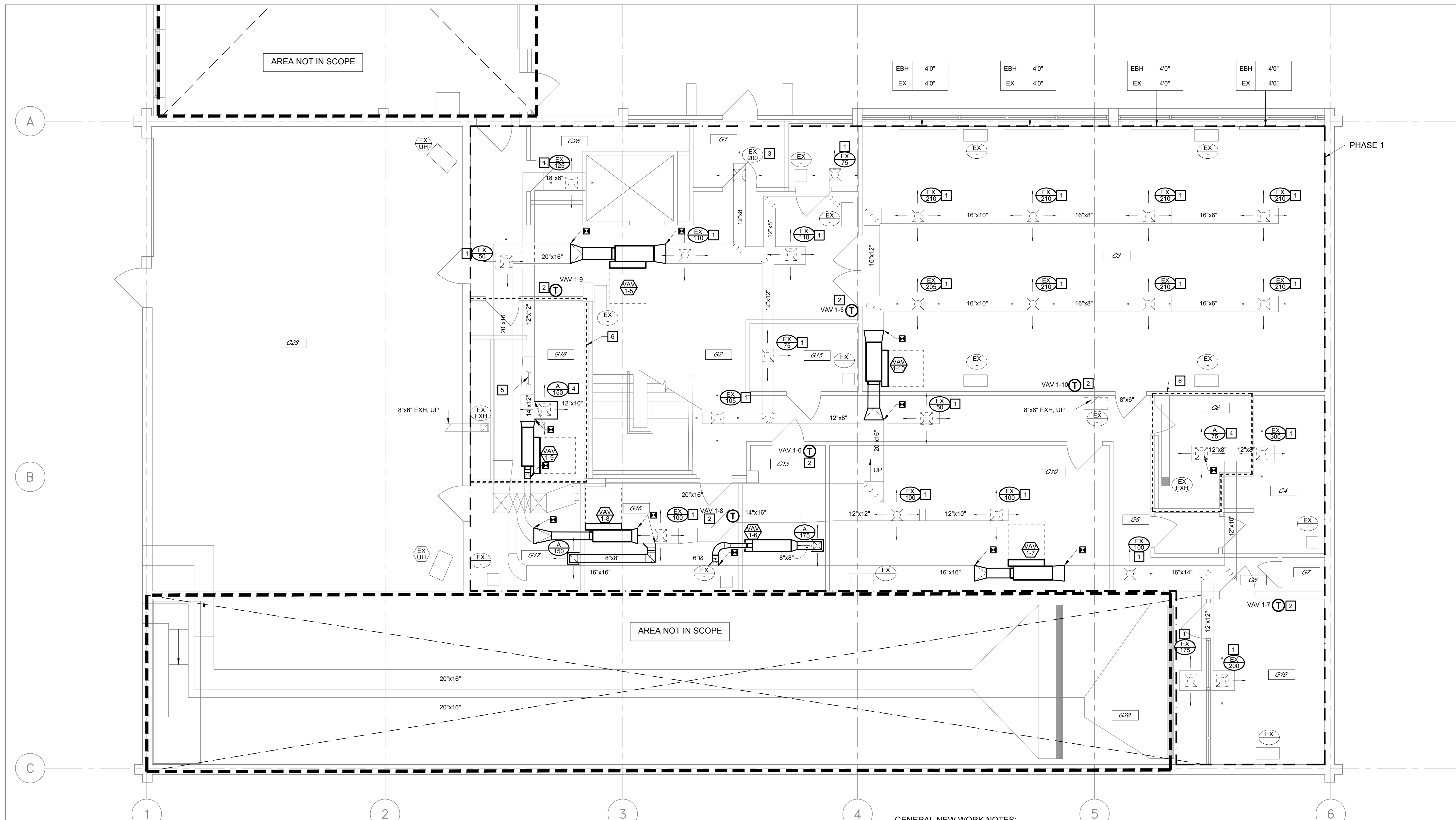
DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**GROUND FLOOR
MECHANICAL NEW
WORK PLAN**

SHEET NUMBER:

M3.0

6 OF 24 SHEETS
01/25/2024



N
GROUND FLOOR MECHANICAL NEW WORK PLAN
SCALE: 1/4" = 1'0"

CEILING TILE NOTES:

- PROJECT IS SEISMIC DESIGN CATEGORY "D".
- ACOUSTICAL TILE SHALL BE DESIGNED AND INSTALLED IN ACCORDANCE WITH ASTM C635, ASTM C636, AND ASTM E580.
- WIDTH OF PERIMETER SUPPORTING CLOSURE ANGLE OR CHANNEL SHALL NOT BE LESS THAN 2 INCHES.
- PERIMETER CLOSURE ANGLES / CHANNELS SHALL BE SCREWED TO WALL STUDS ON TWO ADJACENT WALLS. PROVIDE 3/4" CLEARANCE AT PERIMETER ON UNATTACHED WALLS AND STABILIZER BARS TO PREVENT THE SPREAD OF MAIN BEAMS AND CROSS TEES.
- USE HEAVY DUTY SUSPENSION SYSTEM.
- 12 GA. HANGER WIRES ARE REQUIRED ON PERIMETER MAINS AND TEES WITHIN 8" OF WALL.
- INSTALL CLUSTERS OF FOUR 12-GAUGE WIRES ARRAYED 90 DEGREES FROM ONE ANOTHER, SPACED AT 48" O.C. EACH WAY.
- REPLACE ALL ACT AND GRID. NEW ACT SHALL BE 2x2.

09510 SUSPENDED ACOUSTICAL CEILING SPECIFICATIONS:

- A) MATERIALS:
THESE SPECIFICATIONS ARE BASED ON LAY-IN ACOUSTICAL PANELS AS MANUFACTURED BY ARMSTRONG WORLD INDUSTRIES, INC. SIMILAR PRODUCTS OF EQUAL OR GREATER QUALITY BY U.S. GYPSUM OR CELOTEX MAY BE PROVIDED IN LIEU OF THOSE SPECIFIED, SUBJECT TO APPROVAL BY ARCHITECT.
- CIRRUS, 24"x24"x5/8" REGULAR, 15/16" SUSPENSION SYSTEM.
- CEILING SUSPENSION MATERIALS: SAME AS ACOUSTICAL PANEL MANUFACTURER OR CHICAGO METALLIC CORP. COMPLY WITH REQUIREMENTS OF ASTM C 636 FOR INTERMEDIATE-DUTY SYSTEM, AS APPLICABLE TO TYPE OF SUSPENSION SYSTEM REQUIRED FOR THE TYPE OF CEILING UNITS INDICATED. COORDINATE WITH OTHER WORK SUPPORTED BY OR PENETRATING THROUGH THE CEILING, INCLUDING LIGHT FIXTURES, HVAC EQUIPMENT, AND PARTITION SYSTEM.
- ATTACHED DEVICES SHALL BE SIZED FOR FIVE (5) TIMES THE DESIGN LOAD INDICATED IN ASTM C 635, TABLE 1. DIRECT HUNG. HANGER WIRES SHALL BE GALVANIZED CARBON STEEL, ASTM A 641, SOFT TEMPER, PRESTRETCHED, YIELD-STRESS LOAD OF AT LEAST 3 TIMES DESIGN LOAD, BUT NOT LESS THAN 12 GAUGE (0.106").

- B) INSTALLATION:
INSTALLER MUST EXAMINE CONDITIONS UNDER WHICH ACOUSTICAL CEILING WORK IN TO BE PERFORMED AND NOTIFY CONTRACTOR IN WRITING OF UNSATISFACTORY CONDITIONS. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN A MANNER ACCEPTABLE TO INSTALLER.
- MEASURE EACH CEILING AREA AND ESTABLISH LAYOUT OF ACOUSTICAL UNITS TO BALANCE BORDER WIDTHS AT OPPOSITE EDGES OF EACH CEILING. AVOID THE USE OF LESS-THAN-HALF WIDTH UNITS AT BORDER, AND COMPLY WITH REFLECTED CEILING PLANS WHEREVER POSSIBLE.
- INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S PRINTED INSTRUCTIONS, AND TO COMPLY WITH GOVERNING REGULATIONS, FIRE RESISTANCE RATING REQUIREMENTS AS INDICATED, AND INDUSTRY STANDARDS APPLICABLE TO THE WORK.

GENERAL NEW WORK NOTES:

- THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
- CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
- CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
- CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
- CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
- ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
- BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
- WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- CONTRACTOR IS RESPONSIBLE FOR REMOVING EXISTING CEILING AS REQUIRED TO COMPLETE WORK. CEILING TO BE REINSTALLED AFTER WORK IS COMPLETE IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY TILES DAMAGED DURING CONSTRUCTION.

KEYED NOTES

- REBALANCE EXISTING DIFFUSER TO NEW CFM LISTED. EXISTING BALANCE DAMPER LOCATED WITHIN THE EXISTING DIFFUSERS.
- INSTALL NEW THERMOSTAT IN LOCATION SHOWN.
- ENSURE THAT EXISTING AIR DEVICE IS STILL BALANCED TO EXISTING AIRFLOW LISTED.
- INSTALL NEW AIR DEVICE AND NEW EXISTING SUPPLY AIR BRANCH. CONNECT NEW SUPPLY AIR BRANCH TO EXISTING DUCT MAIN. BALANCE NEW AIR DEVICE TO LISTED CFM.
- INSPECT PVC SANITARY LINE ABOVE CEILING FOR ANY ACTIVE LEAKS. REPAIR SANITARY LINE AS REQUIRED TO FIX ANY FOUND LEAKS.
- INSTALL NEW ACT CEILING GRID AND TILE. REFER TO NOTES AND SPECIFICATION SECTION ON THIS SHEET.



PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES
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DEPARTMENT OF
PUBLIC SAFETY
MISSOURI STATE
HIGHWAY PATROL

REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

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ISSUE DATE: 07/27/2023

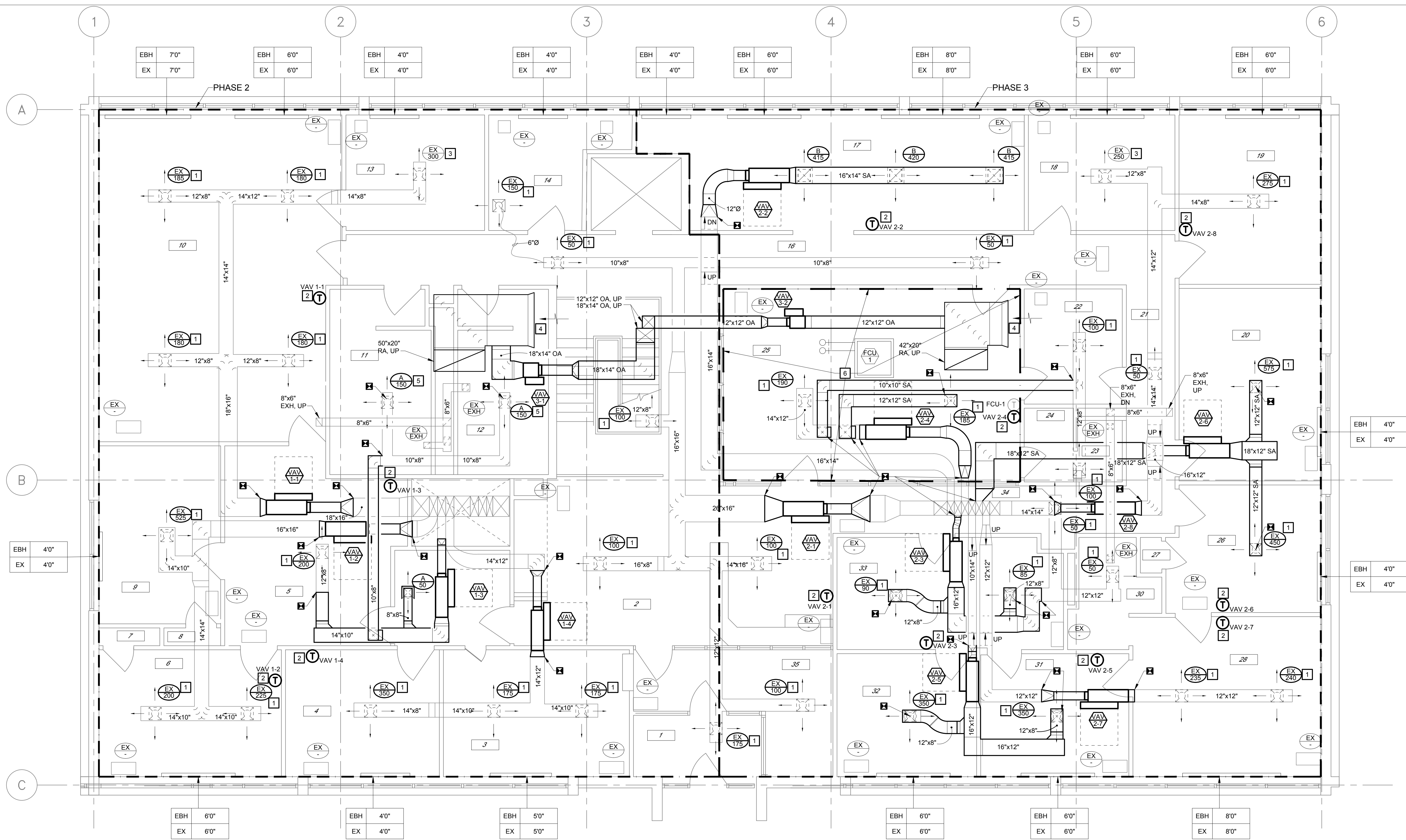
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DESIGNED BY: EMP

SHEET TITLE:
**FIRST FLOOR
MECHANICAL NEW
WORK PLAN**

SHEET NUMBER:

M3.1

7 OF 24 SHEETS
01/25/2024



FIRST FLOOR MECHANICAL NEW WORK PLAN
SCALE: 1/4" = 1'0"

- GENERAL NEW WORK NOTES:**
- THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
 - CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEARED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
 - CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
 - CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
 - CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
 - ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
 - BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
 - WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
 - CONTRACTOR IS RESPONSIBLE FOR REMOVING EXISTING CEILING AS REQUIRED TO COMPLETE WORK. CEILING TO BE REINSTALLED AFTER WORK IS COMPLETE IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY TILES DAMAGED DURING CONSTRUCTION.

- KEYED NOTES**
- REBALANCE EXISTING DIFFUSER TO NEW CFM LISTED. EXISTING BALANCE DAMPER LOCATED WITHIN THE EXISTING DIFFUSERS.
 - INSTALL NEW THERMOSTAT IN LOCATION SHOWN.
 - ENSURE THAT EXISTING AIR DEVICE IS STILL BALANCED TO EXISTING AIRFLOW LISTED.
 - TERMINATE RETURN AIR DUCT WITH BELL MOUTH FITTING OPEN ENDED.
 - INSTALL NEW AIR DEVICE AND CONNECT TO EXISTING SUPPLY AIR BRANCH. BALANCE NEW AIR DEVICE TO LISTED CFM.
 - ROOM #25 - RADIO ROOM ALWAYS OCCUPIED. ADDITIONAL COORDINATION WITH OWNER AND OCCUPANTS REQUIRED.

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PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

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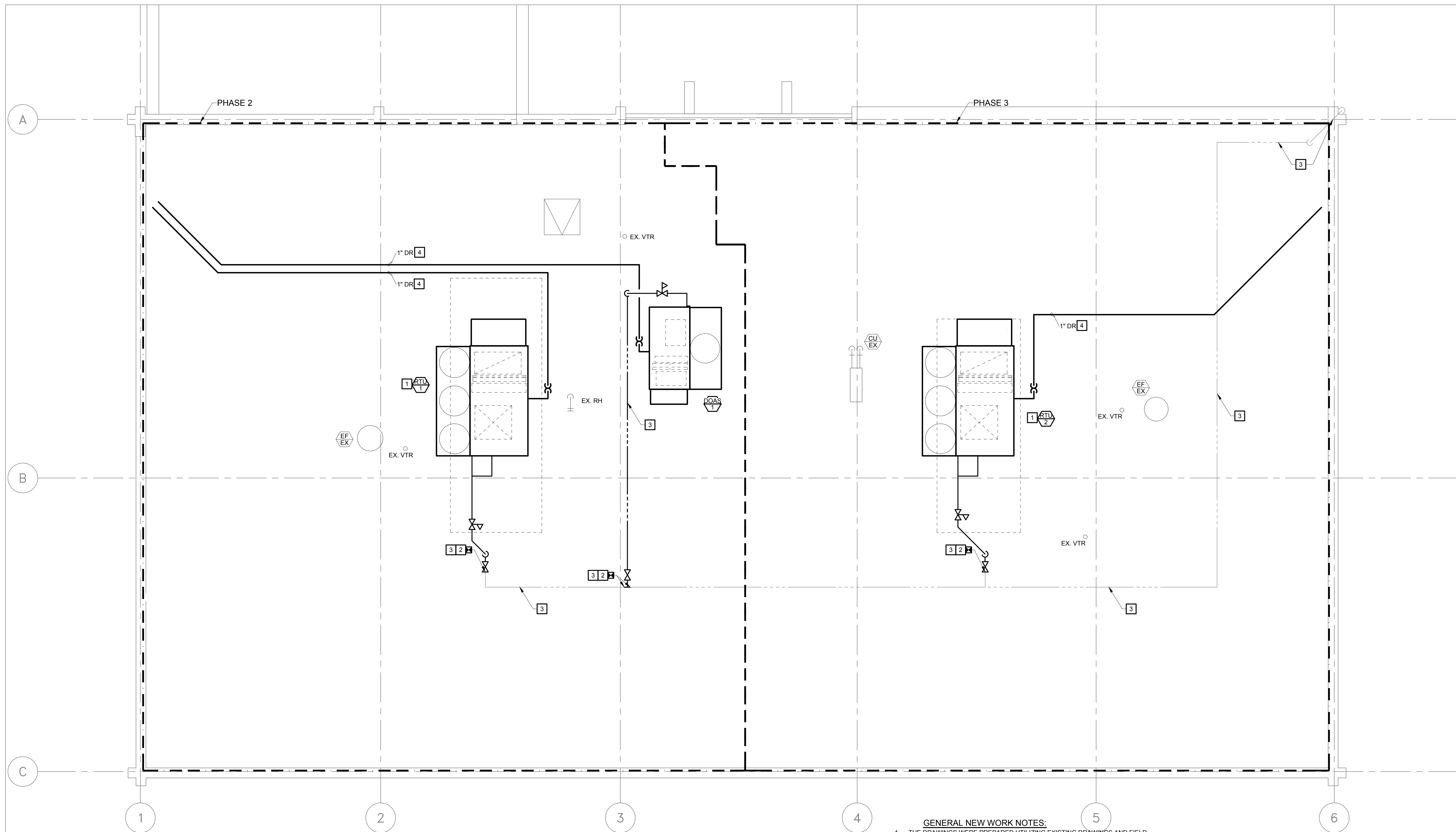
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SHEET TITLE:
**ROOF MECHANICAL
NEW WORK PLAN**

SHEET NUMBER:

M3.2

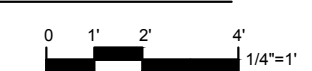
8 OF 24 SHEETS
01/25/2024



- GENERAL NEW WORK NOTES:**
1. THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
 2. CONTRACTOR SHALL TAKE EXTREME CARE HANDLING MATERIAL DEBRIS IN AN EFFORT TO AVOID ANY DISRUPTIONS OF ONGOING BUILDING OPERATIONS. PROJECT SHALL BE CLEANED FREE OF DUST AND DEBRIS AT THE END OF THE WORK DAY.
 3. CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
 4. CONTRACTOR SHALL CHECK-IN EACH DAY WITH THE OWNER'S REP.
 5. CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
 6. ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
 7. BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
 8. WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
 9. CONTRACTOR IS RESPONSIBLE FOR REMOVING EXISTING CEILING AS REQUIRED TO COMPLETE WORK. CEILING TO BE REINSTALLED AFTER WORK IS COMPLETE IN THE AREA. CONTRACTOR IS RESPONSIBLE FOR REPLACING ANY TILES DAMAGED DURING CONSTRUCTION.

- KEYED NOTES**
- 1 CONTRACTOR TO VERIFY EXISTING CURB DIMENSIONS AND PREPARE EXISTING CURB FOR NEW ADAPTER AND ROOF TOP UNIT.
 - 2 INSTALL NEW GAS PIPING AND SPECIALTIES AS SHOWN. REFER TO M5.3 FOR ADDITIONAL NATURAL GAS PIPING DETAILS.
 - 3 CONTRACTOR TO PAINT ALL NEW AND EXISTING NATURAL GAS PIPING.
 - 4 ROUTE CONDENSATE DRAINS FROM ROOFTOP UNITS OVER TO EXISTING ROOF SCUPPERS.

ROOF MECHANICAL NEW WORK PLAN
SCALE: 1/4" = 10"



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PHILIP WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin

310 East 6th Street

Rolla, MO 65401

P: 573-364-6362

www.archer-elgin.com

MEP:

McClure Engineering

1000 Clark Avenue

Fifth Floor

St. Louis, MO 63102

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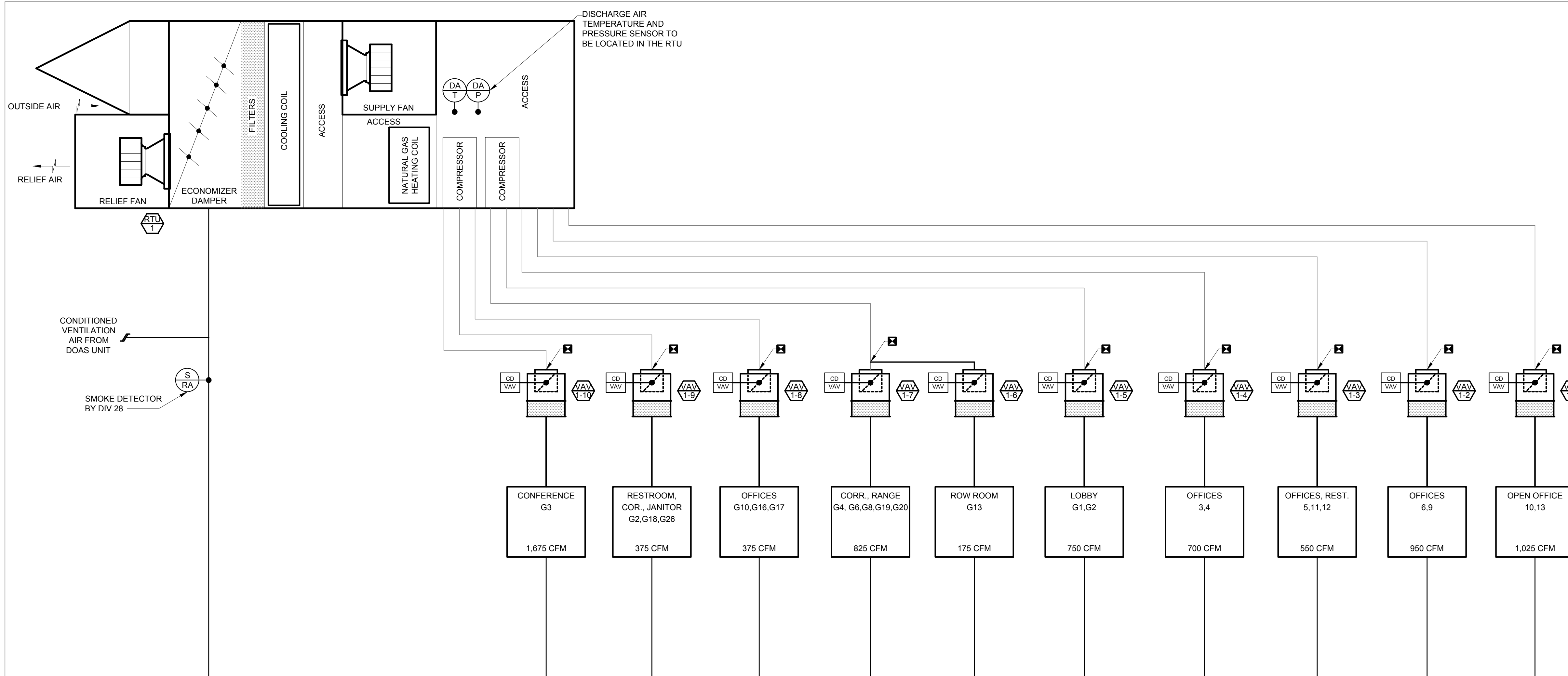
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SHEET TITLE:
**RTU-1 AIR FLOW
DIAGRAM**

SHEET NUMBER:

M5.0

9 OF 24 SHEETS
01/25/2024



RTU-1 AIR FLOW DIAGRAM
NOT TO SCALE

AIR HANDLING UNIT RTU-1 AND RTU-2 SEQUENCE OF OPERATION

OVERVIEW:

THE AIR HANDLER IS A VARIABLE VOLUME UNIT SERVING PRESSURE INDEPENDENT TERMINAL UNITS WITH ELECTRIC REHEAT. VENTILATION IS PROVIDED VIA PRESSURE INDEPENDENT TERMINAL UNIT FROM DOAS-1. A MODULATING DAMPER IS USED FOR ECONOMIZER FUNCTION.

THE RELIEF FAN MODULATES TO MAINTAIN BUILDING PRESSURIZATION INDEPENDENTLY OF VENTILATION AND ECONOMIZER.

THIS AIR HANDLING UNIT INCLUDES A RELIEF FAN AND DAMPER, MIXING BOX, OUTDOOR AIR DAMPERS, RETURN DAMPERS, FILTERS, PREHEAT ELECTRIC HEAT, COOLING COIL, RELIEF FAN, AND SUPPLY FAN.

SAFETIES:

THIS UNIT IS EQUIPPED WITH A SUPPLY AND RETURN AIR SMOKE DETECTOR, HIGH SUPPLY AND RELIEF PRESSURE SAFETIES.

FAN SAFETY CIRCUIT: A SAFETY RELAY SHALL BE INSTALLED IN-LINE WITH THE SPEED CONTROL SIGNAL SUCH THAT IF ANY OF THE SAFETIES TRIP, THE CONTROL SIGNAL TO THE FAN WILL BE INTERRUPTED AND THE FAN WILL BE COMMANDED OFF.

DAMPER SAFETY CIRCUIT: THE DAMPERS SHALL BE COMMANDED CLOSED WHEN THE UNIT IS OFF OR IN ALARM AND NOT SUPPLYING AIR.

SCHEDULES:

THE UNIT OPERATES UNDER THE BUILDING SCHEDULE. BUILDING IS CURRENTLY UTILIZED IN A CONSTANT OCCUPIED MODE, BUT UNOCCUPIED SET POINTS SHALL BE PROGRAMMED AND AVAILABLE FOR USE.

OCCUPIED OPERATION: THE UNIT RUNS CONTINUOUSLY IN THE OCCUPIED MODE.

UNOCCUPIED OPERATION: THE UNIT CYCLES ON AND OFF BASED ON ZONE TEMPERATURE DEMAND.

DISCHARGE AIR TEMPERATURE CONTROL:

DISCHARGE AIR TEMPERATURE SETPOINT: THE DISCHARGE AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND.

UNOCCUPIED OPERATION: DURING UNOCCUPIED HOURS THE UNIT SHALL CYCLE ON/OFF AS REQUIRED WHENEVER THE SPACE DRIFTS PAST THE UNOCCUPIED SETPOINTS. THE DISCHARGE TEMPERATURE SHALL BE SET TO 70°F IF THE SPACE DRIFTS BELOW THE UNOCCUPIED HEATING SETPOINT, OR TO 55°F IF THE SPACE DRIFTS ABOVE THE UNOCCUPIED COOLING SETPOINT.

MIXED AIR TEMPERATURE CONTROL (ECONOMIZER):

OVERVIEW: MIXED AIR TEMPERATURE SETPOINT IS MAINTAINED BY MODULATING THE ECONOMIZER DAMPER WITHOUT CAUSING AN EXTRA HEATING LOAD.

ENABLE: ECONOMIZER IS ENABLED WHEN OUTSIDE AIR DRY-BULB TEMPERATURE IS BELOW 64°F AND THE OUTSIDE AIR DEWPOINT TEMPERATURE IS BELOW 53°F AND THE PREHEAT VALVE IS CLOSED. WHEN THE PREHEAT VALVE IS OPEN MORE THAN 0% OR THE OUTSIDE AIR CONDITIONS ARE ABOVE 65°F DRY-BULB OR 54°F DEWPOINT, THE ECONOMIZER SEQUENCE IS DISABLED.

MIXED AIR TEMPERATURE SETPOINT: THE SETPOINT SHALL BE 2°F LOWER THAN THE CALCULATED DISCHARGE AIR TEMPERATURE SETPOINT.

MIXED AIR TEMPERATURE PID: THE LOOP TAKES THE MIXED AIR TEMPERATURE AVERAGING SENSOR AS AN INPUT AND OUTPUTS A SIGNAL TO THE ECONOMIZER DAMPER. WHEN OUTSIDE AIR CONDITIONS ARE NOT MET OR THE HEATING VALVE IS OPEN THE LOOP IS DISABLED.

DISCHARGE AIR STATIC PRESSURE CONTROL:

OVERVIEW: STATIC PRESSURE IS RESET BASED ON ZONE DEMAND. EACH VAV SENDS PRESSURE REQUESTS TO THE AIR HANDLER, THE AIR HANDLER ANALYZES THE REQUESTS AND RESETS THE PRESSURE SETPOINT. THE SUPPLY FAN SPEED MODULATES TO MAINTAIN STATIC PRESSURE.

DISCHARGE AIR STATIC PRESSURE SETPOINT: THE PRESSURE SHALL BE RESET BETWEEN 0.25 IN.WC. AND 1.25 IN.WC. AS THE VAVS OPEN THEIR DAMPERS PAST 90% AND FLOW SETPOINT REMAINS BELOW 10% OF SETPOINT.

DISCHARGE AIR STATIC PRESSURE PID: THE SUPPLY FAN SPEED MODULATES FROM 30% TO 100% TO MAINTAIN STATIC PRESSURE SETPOINT. WHEN THE FAN IS OFF THE LOOP IS DISABLED.

BUILDING PRESSURE CONTROL:

OVERVIEW: WHEN THE PRESSURE GOES ABOVE SETPOINT THE RELIEF FAN IS ENABLED AND SPEED MODULATE TO MAINTAIN BUILDING PRESSURE.

BUILDING PRESSURE SETPOINT: THE SETPOINT SHALL BE CONSTANT +0.03 IN.WC. AND ADJUSTABLE BY THE OPERATOR.

BUILDING PRESSURE PID: THE LOOP USES THE BUILDING PRESSURE SENSOR AND MODULATES THE RELIEF AIR FAN SPEED TO MAINTAIN CONSTANT SETPOINT.

SUPPLY FAN CONTROL:

OVERVIEW: THE FAN OPERATES CONTINUOUSLY DURING OCCUPIED HOURS AND CYCLES DURING UNOCCUPIED HOURS AS THE ZONES REQUEST HEATING AND COOLING TO SATISFY THEIR UNOCCUPIED SETPOINTS. ONCE ENABLED THE FAN MODULATES SPEED TO MAINTAIN DUCT STATIC PRESSURE.

FAN ENABLE: THE SUPPLY FAN IS ENABLED IF THE SCHEDULE IS OCCUPIED, OR IF ANY OF THE ZONES SENDS A COOLING OR A HEATING REQUEST DURING UNOCCUPIED HOURS.

FAN SPEED CONTROL: SUPPLY FAN SPEED MODULATES FROM 30% MINIMUM SPEED WHEN THE DISCHARGE AIR STATIC PRESSURE PID OUTPUT IS 0 TO 100% SPEED WHEN THE LOOP OUTPUT IS 100.

ALARMS:

SUPPLY FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.

RELIEF FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.

COMPRESSOR FAILURE: WHEN COMPRESSOR DOES NOT MATCH PUMP COMMAND FOR MORE THAN 5 MINUTES.

HIGH AND LOW DISCHARGE TEMPERATURE: ALARM IF THE DISCHARGE TEMPERATURE IS 5°F ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

DISCHARGE HIGH AND LOW STATIC: ALARM IF THE DISCHARGE STATIC IS 0.5" ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

SAFETY ALARMS: SEPARATE ALARM FOR EACH SAFETY WHEN THE SAFETY IS ACTIVE.



PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

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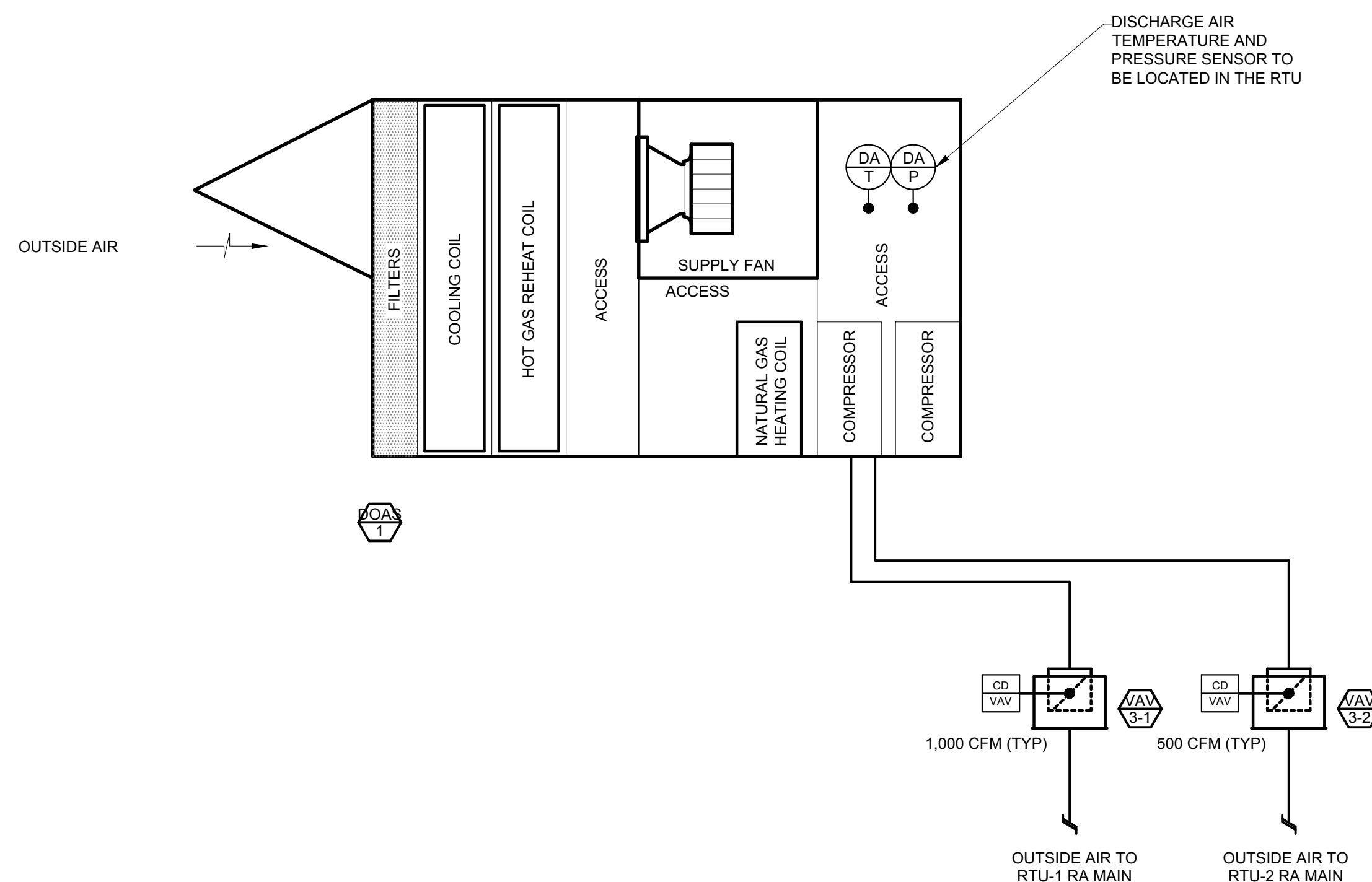
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SHEET TITLE:
**DOAS-1 AIR FLOW
DIAGRAM**

SHEET NUMBER:

M5.2

11 OF 24 SHEETS
01/25/2024



DOAS-1 AIR FLOW DIAGRAM
NOT TO SCALE

SEQUENCE OF OPERATIONS

DOAS-1

OVERVIEW:

THE AIR HANDLER IS A VARIABLE VOLUME AIR HANDLER PROVIDING CONDITIONED VENTILATION AIR TO RTU-1 AND RTU-2. THIS AIR HANDLING UNIT INCLUDES OUTDOOR AIR DAMPERS, FILTERS, PREHEAT ELECTRIC HEAT, COOLING COIL, HOT GAS REHEAT COIL, AND SUPPLY FAN.

SAFETIES:

THIS UNIT IS EQUIPPED WITH A HIGH STATIC PRESSURE SAFETIES. IF EITHER RTU-1 OR RTU-2 DETECT SMOKE SHUT DOWN DOAS. FAN SAFETY CIRCUIT: A SAFETY RELAY SHALL BE INSTALLED IN-LINE WITH THE SPEED CONTROL SIGNAL SUCH THAT IF ANY OF THE SAFETIES TRIP THE CONTROL SIGNAL TO THE FAN WILL BE INTERRUPTED AND THE FAN WILL BE COMMANDED OFF.

DAMPER SAFETY CIRCUIT: THE DAMPERS SHALL BE COMMANDED CLOSED WHEN THE UNIT IS OFF OR IN ALARM AND NOT SUPPLYING AIR.

SCHEDULES:

THE UNIT OPERATES UNDER THE BUILDING SCHEDULE. OCCUPIED OPERATION: THE UNIT RUNS CONTINUOUSLY IN THE OCCUPIED MODE. UNOCCUPIED OPERATION: THE UNIT IF OFF.

COOLING COIL LEAVING AIR TEMPERATURE CONTROL:

COOLING COIL LEAVING AIR SETPOINT: WHEN OUTSIDE AIR DEW POINT IS BELOW 54°F THE COOLING COIL LEAVING AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND. ONCE THE OUTSIDE AIR DEW POINT RISES ABOVE 55°F THE COOLING COIL LEAVING AIR TEMPERATURE SETPOINT IS SET TO 55°F IN ORDER TO PROVIDE ADEQUATE DEHUMIDIFICATION.

DISCHARGE AIR TEMPERATURE CONTROL:

DISCHARGE AIR TEMPERATURE SETPOINT: THE DISCHARGE AIR TEMPERATURE SETPOINT IS RESET BETWEEN 55°F AND 70°F BASED ON ZONE DEMAND.

DISCHARGE AIR STATIC PRESSURE CONTROL:

OVERVIEW: STATIC PRESSURE IS RESET BASED ON ZONE DEMAND. EACH VAV SENDS PRESSURE REQUESTS TO THE AIR HANDLER, THE AIR HANDLER ANALYZES THE REQUESTS AND RESETS THE PRESSURE SETPOINT. THE SUPPLY FAN SPEED MODULATES TO MAINTAIN STATIC PRESSURE.

DISCHARGE AIR STATIC PRESSURE SETPOINT: THE PRESSURE SHALL BE RESET BETWEEN 0.25 IN.W.C. AND 1. IN.W.C. AS THE VAVS OPEN THEIR DAMPERS PAST 90% AND FLOW SETPOINT REMAINS BELOW 10% OF SETPOINT.

DISCHARGE AIR STATIC PRESSURE PID: THE SUPPLY FAN SPEED MODULATES FROM 30% TO 100% TO MAINTAIN STATIC PRESSURE SETPOINT. WHEN THE FAN IS OFF THE LOOP IS DISABLED.

SUPPLY FAN CONTROL:

OVERVIEW: THE FAN OPERATES CONTINUOUSLY DURING OCCUPIED HOURS AND CYCLES DURING UNOCCUPIED HOURS AS THE ZONES REQUEST HEATING AND COOLING TO SATISFY THEIR UNOCCUPIED SETPOINTS. ONCE ENABLED THE FAN MODULATES SPEED TO MAINTAIN DUCT STATIC PRESSURE.

FAN ENABLE: THE SUPPLY FAN IS ENABLED IF THE SCHEDULE IS OCCUPIED AND RTU'S ARE CALLING FOR AIR.

FAN SPEED CONTROL: SUPPLY FAN SPEED MODULATES FROM 30% MINIMUM SPEED WHEN THE DISCHARGE AIR STATIC PRESSURE PID OUTPUT IS 0 TO 100% SPEED WHEN THE LOOP OUTPUT IS 100.

ALARMS:

SUPPLY FAN FAILURE: ALARM WHEN FAN STATUS DOES NOT MATCH FAN COMMAND FOR MORE THAN 5 MINUTES.

COMPRESSOR FAILURE: WHEN COMPRESSOR DOES NOT MATCH PUMP COMMAND FOR MORE THAN 5 MINUTES.

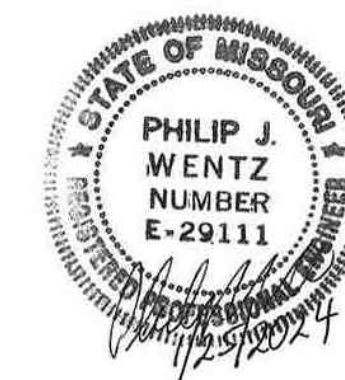
HIGH AND LOW DISCHARGE TEMPERATURE: ALARM IF THE DISCHARGE TEMPERATURE IS 5°F ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

DISCHARGE HIGH STATIC: ALARM IF THE DISCHARGE STATIC IS 0.5" ABOVE OR BELOW SETPOINT FOR MORE THAN 30 MINUTES.

SAFETY ALARMS: SEPARATE ALARM FOR EACH SAFETY WHEN THE SAFETY IS ACTIVE.

DOAS-1 POINTS LIST

TYPE	NAME	POINT DESCRIPTION	UNITS	STARTUP TRENDS		SERVICE TRENDS		FIELD DEVICE DESCRIPTION	NOTES
				FREQ	ARCHIVE	FREQ	ARCHIVE		
AHU UNIT LEVEL CONTROL POINTS - WRITTEN TO PKG. CONTROLLER									
AV	DAT-SP	DISCHARGE AIR TEMPERATURE SETPOINT	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DAP-SP	DISCHARGE AIR PRESSURE SETPOINT	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	OA-T	OUTSIDE AIR TEMPERATURE REFERENCE	°F,1	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOC-CLG	UNOCCUPIED COOLING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
BV	UNOC-HTG	UNOCCUPIED HEATING MODE	OFF / ON	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
MV	OCC-R	OCCUPANCY REQUEST	N/A	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	OCC/UNOCC/BYP/STBY/AUTO
AHU UNIT LEVEL CONTROL POINTS - READ FROM PKG. CONTROLLER									
AV	DA-T	DISCHARGE AIR TEMPERATURE	°F,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	DA-DP	DISCHARGE AIR DIFFERENTIAL PRESSURE	IN. W.C.,1	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	REFERENCE ZONE PRESSURE
AV	OAD-C	OUTSIDE AIR DAMPER POSITION	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CF-SPD	CONDENSER FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	SF-SPD	SUPPLY FAN SPEED	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	CLG-C	COOLING CAPACITY	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	HTG-C	HEATING OUTPUT COMMAND	%,0	1 MIN.	30 MIN	15 MIN.	1 WEEK	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	AL-ST	DIAGNOSTIC ALARM	N/A	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	MAP ALL ALARMS TO BAS
AV	OA-T	OUTSIDE AIR TEMPERATURE	°F,1	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	
AV	OA-H	OUTSIDE AIR RELATIVE HUMIDITY REFERENCE	% RH,1	-	-	-	-	BACNET INTERFACE TO CONTROLLED DEVICE	
<p>GENERAL NOTES</p> <p>1. FOR ANALOG POINTS, UNITS COLUMN HAS TWO COMPONENTS: FIRST VALUE INDICATES ENGINEERING UNITS FOR POINT, SECOND VALUE IS NUMBER OF DECIMAL PLACES TO DISPLAY.</p> <p>2. FOR BINARY POINTS, UNITS COLUMN LISTS "OFF" AND "ON" STATE LABELS FOR POINT.</p>									
BI	BINARY INPUT								
BO	BINARY OUTPUT								
BV	BINARY VIRTUAL POINT								
AI	ANALOG INPUT								
AO	ANALOG OUTPUT								
AV	ANALOG VIRTUAL POINT								
HW	HARD WIRED INTERLOCK/SAFETY								
COS	CHANGE OF STATE								



PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin

310 East 6th Street

Rolla, MO 65401

P: 573-364-6362

www.archer-elgin.com

MEP:

McClure Engineering

1000 Clark Avenue

Fifth Floor

St. Louis, MO 63102

P: 314-645-6232

www.mcclureeng.com

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MISSOURI STATE
HIGHWAY PATROL

REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01

SITE# 6008

FACILITY# 8136008002

REVISION: _____

DATE: _____

REVISION: _____

DATE: _____

REVISION: _____

DATE: _____

ISSUE DATE: 07/27/2023

DRAWN BY: KAA _____

CHECKED BY: EMP _____

DESIGNED BY: EMP _____

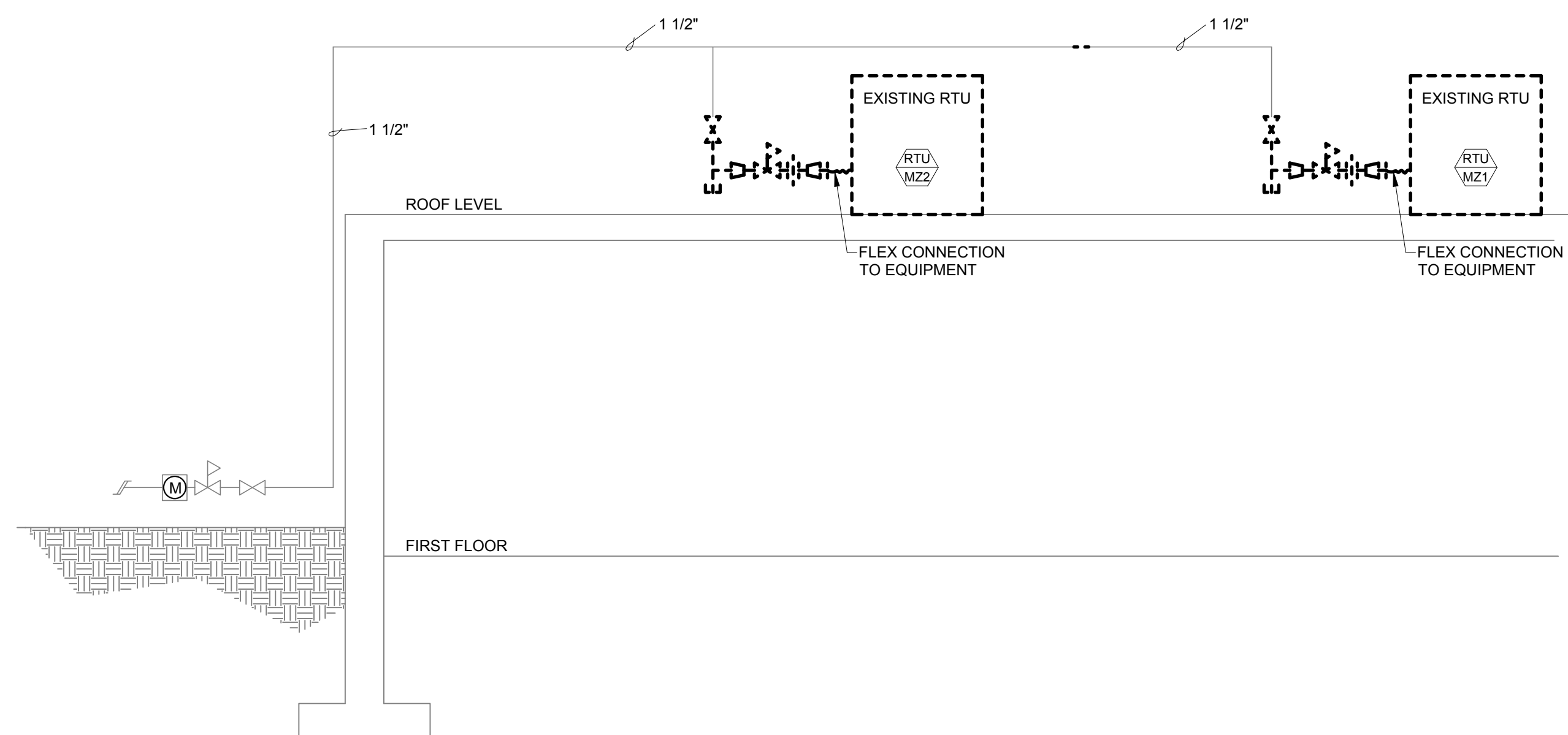
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**NATURAL GAS
FLOW DIAGRAM**

SHEET NUMBER:

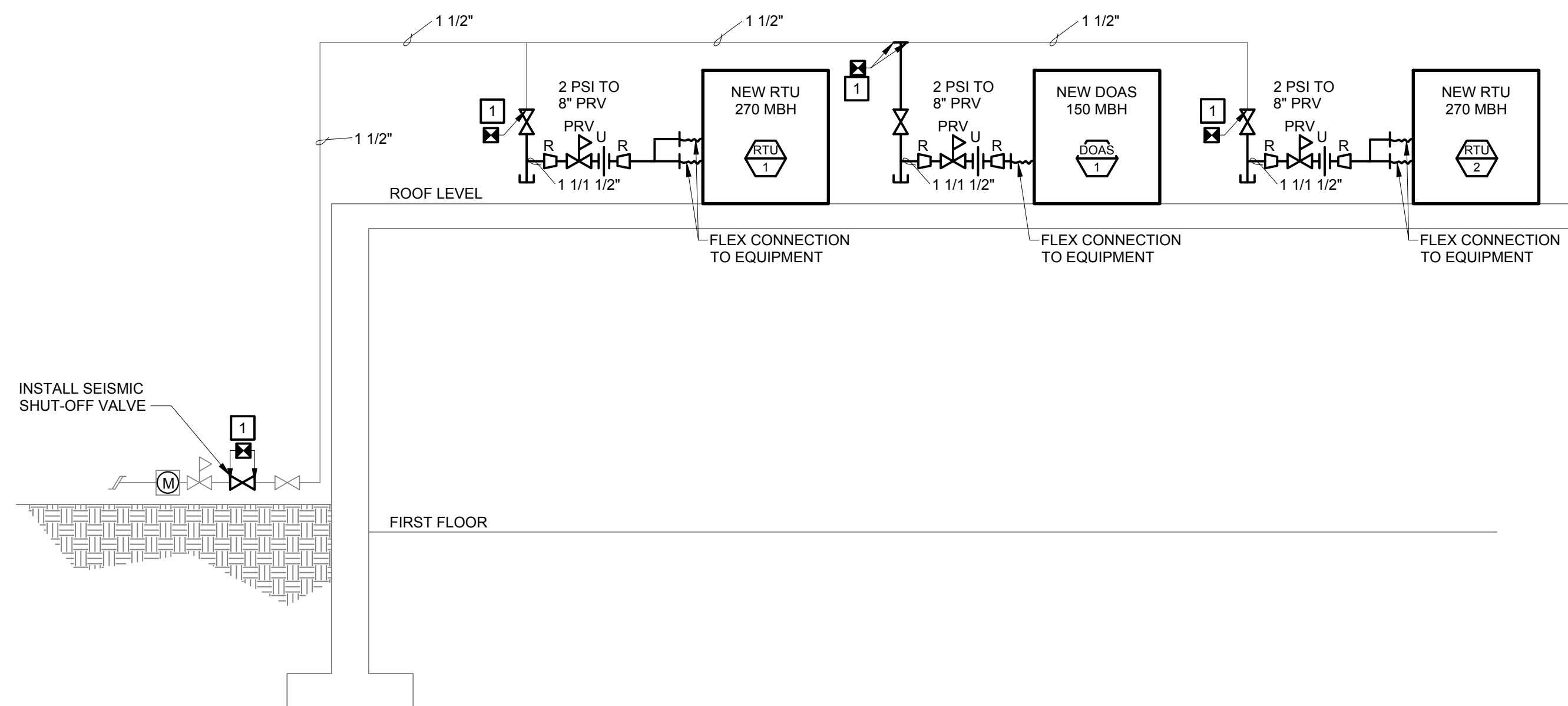
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12 OF 24 SHEETS
01/25/2024



NATURAL GAS FLOW DIAGRAM - DEMOLITION

NOT TO SCALE



NATURAL GAS FLOW DIAGRAM - NEW WORK

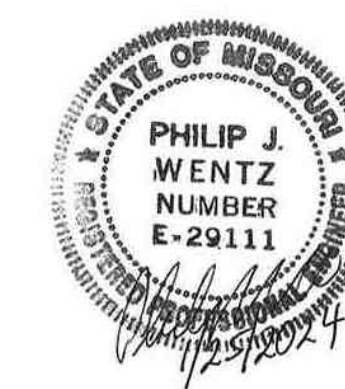
NOT TO SCALE

CONTRACTOR TO PAINT
ALL NEW AND EXISTING
NATURAL GAS PIPING.

KEYED NOTES

- 1 REPLACE SERVICE VALVES, INSTALL SEISMIC VALVE AND TAP LINE FOR DOAS UNIT IN SINGLE SHUTDOWN OUTSIDE OF HEATING SEASON.

INSTALL SEISMIC
SHUT-OFF VALVE



PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
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DRAWN BY: KAA
CHECKED BY: EMP
DESIGNED BY: EMP

SHEET TITLE:
**MECHANICAL
SCHEDULES**

SHEET NUMBER:

M6.0

13 OF 24 SHEETS
01/25/2024

VARIABLE AIR VOLUME UNIT SCHEDULE

UNIT DESIG.	UNIT NO.	AREA SERVED	MANUFACTURER & MODEL NO.	INLET SIZE (IN.)	DESIGN FLOW CONDITIONS			VOLT/PH	MIN. CAPACITY KW	HAND	NOTES
					COOLING		MAX. APD (IN. W.C.)				
					MAX. FLOW (CFM)	MIN. FLOW (CFM)					
VAV 1-1	RTU-1	General Office, Mail Room	TITUS DESV	10	1,025	300	0.25	208/1	5.5	RH	1,2
VAV 1-2	RTU-1	Zone Offices	TITUS DESV	10	950	300	0.25	208/1	4.0	LH	1,2
VAV 1-3	RTU-1	Restrooms, Report Room	TITUS DESV	08	550	190	0.25	208/1	1.5	LH	1,2
VAV 1-4	RTU-1	Motor Vehical Insp., Lieutenant	TITUS DESV	08	700	200	0.25	208/1	3.5	LH	1,2
VAV 1-5	RTU-1	Ground Level Lobby, Fingerprint	TITUS DESV	08	750	250	0.25	208/1	4.0	RH	1,2
VAV 1-6	RTU-1	Workout Room	TITUS DESV	04	175	100	0.25	208/1	1.0	BOTTOM	1,2
VAV 1-7	RTU-1	Breathalyzer, Firing Range, etc.	TITUS DESV	08	825	500	0.25	208/1	5.5	LH	1,2
VAV 1-8	RTU-1	Polygraph, Evidence Tech, Telephone	TITUS DESV	06	375	150	0.25	208/1	1.0	LH	1,2
VAV 1-9	RTU-1	Restroom, Janitor	TITUS DESV	06	375	200	0.25	208/1	2.5	RH	1,2
VAV 1-10	RTU-1	Meeting Room	TITUS DESV	14	1,675	600	0.25	208/1	6.0	RH	1,2
VAV 2-1	RTU-2	1st Floor Lobby	TITUS DESV	08	825	350	0.25	208/1	5.0	LH	1,2
VAV 2-2	RTU-2	Coffee/Break Room	TITUS DESV	14	1,250	250	0.25	208/1	4.0	RH	1,2
VAV 2-3	RTU-2	Outer Office, Toilet	TITUS DESV	06	275	200	0.25	208/1	1.5	RH	1,2
VAV 2-4	RTU-2	Radio Office, Radio Room	TITUS DESV	08	575	275	0.25	208/1	2.0	RH	1,2
VAV 2-5	RTU-2	Lieutenant, Safety Officer	TITUS DESV	08	700	200	0.25	208/1	3.5	RH	1,2
VAV 2-6	RTU-2	Driver Exam, Secretary	TITUS DESV	10	1,025	300	0.25	208/1	3.0	LH	1,2
VAV 2-7	RTU-2	Captain's Office	TITUS DESV	06	475	105	0.25	208/1	3.0	RH	1,2
VAV 2-8	RTU-2	Supply, CMVE	TITUS DESV	08	575	200	0.25	208/1	4.5	BOTTOM	1,2
VAV 3-1	DOAS-1	RTU-1	TITUS DESV	10	1,000						2
VAV 3-2	DOAS-1	RTU-2	TITUS DESV	08	500						2

NOTES:
1. SCR HEAT
2. 1/2" FOIL FACED INSULATION
3. SEE SPECIFICATION FOR ROOM TEMPERATURE SENSOR TYPE.
4. MAXIMUM AIR PRESSURE DROP IS FOR THE ENTIRE ASSEMBLY.
5. HAND DIRECTION IN PERSPECTIVE OF FACING DOWNSREAM. INSTAL ORIENTATION TO BE CONFIRMED BY CONTRACTOR AS SPACEING PERMITS.

GENERAL NOTE
MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

AIR DEVICE SCHEDULE

UNIT DESIG.	SERVICE	MANUFACTURER & MODEL NO.	TYPE	NECK SIZE (IN.)	FACE SIZE (IN.)	FINISH	NOTES
A	SUPPLY	TITUS MDC	SEE PLANS	8"x8"	12"x12"	WHITE	3
B	SUPPLY	TITUS MDC	SEE PLANS	12"x12"	16"x16"	WHITE	3

NOTES:
1. DIFFUSER SHALL BE ALUMINUM
2. PROVIDE BORDER FOR DRYWALL INSTALLATION
3. PROVIDE BORDER FOR LAY-IN INSTALLATION

GENERAL NOTE
MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

AIR HANDLING UNIT SCHEDULE

UNIT DESIG.	LOCATION	SERVICE	MAUFACTURER & MODEL NO.	TOTAL AIRFLOW (CFM)	MINIMUM AIRFLOW (CFM)	GAS HEAT				DX COOLING PERFORMANCE				HOT GAS REHEAT		SUPPLY FAN DATA								RELIEF FAN FAN DATA						VOLTS /PH	MCA	MOCP	SHIPPING WEIGHT (LBS)	NOTES			
						INPUT MBH	OUTPUT MBH	EAT (DB, °F)	LAT (DB, °F)	EAT (DB/WB, °F)	LAT (DB/WB, °F)	OAT (DB/WB, °F)	TOTAL MBH	SENSIBLE MBH	CAPACITY MBH	LAT (DB/WB, °F)	WHEEL DIAM.	WHEEL TYPE	FAN TYPE	ESP (IN. W.C.)	TSP (IN. W.C.)	RPM	BHP	MOTOR HP	RPM	WHEEL DIAM.	WHEEL TYPE	FAN TYPE	ESP (IN. W.C.)						RPM	BHP	MOTOR HP
DOAS-1	ROOF	RTU'S	AAON RN010	1,500	-	150	120	5.0	80.0	95/78	54/54	95-78	115	61	26	70	17.0	AF	PD	1	1.7	1500	0.75	2	1760								208-3	48	70	1,292	1,2,3,4,5,6,7,8,9,10,11,12,
RTU-1	ROOF	GROUND AND 1ST FLOOR	AAON RN025	8,200	1,000	270	218	55.0	80.0	77/66	56.6/54.4	95/78	278	177			27.0	AF	PD	2.1	4.0	1693	8.4	10	1760	22.0	AF	PD	0.25	1683	5.67	7.5	208-3	179	225	3,038	1,2,3,4,5,6,7,8,9,10,11,12,13
RTU-2	ROOF	1ST FLOOR EAST	AAON RN016	5,700	500	270	218	55.0	80.0	77/66	55.5/55	95/78	183	122			24.0	AF	PD	1.5	2.7	1609	4.1	5	1760	22.0	AF	PD	0.25	1202	2.2	3	208-3	100	125	2,684	1,2,3,4,5,6,7,8,9,10,11,12,13

FAN TYPE
CB - CENTRIFUGAL BELT DRIVE
CD - CENTRIFUGAL DIRECT DRIVE
PB - PLENUM BELT DRIVE
PD - PLENUM DIRECT DRIVE
PDD - PLENUM DUAL DIRECT DRIVE

WHEEL TYPE
BI - BACK INCLINE
FC - FORWARD CURVE
AF - AIR FOIL

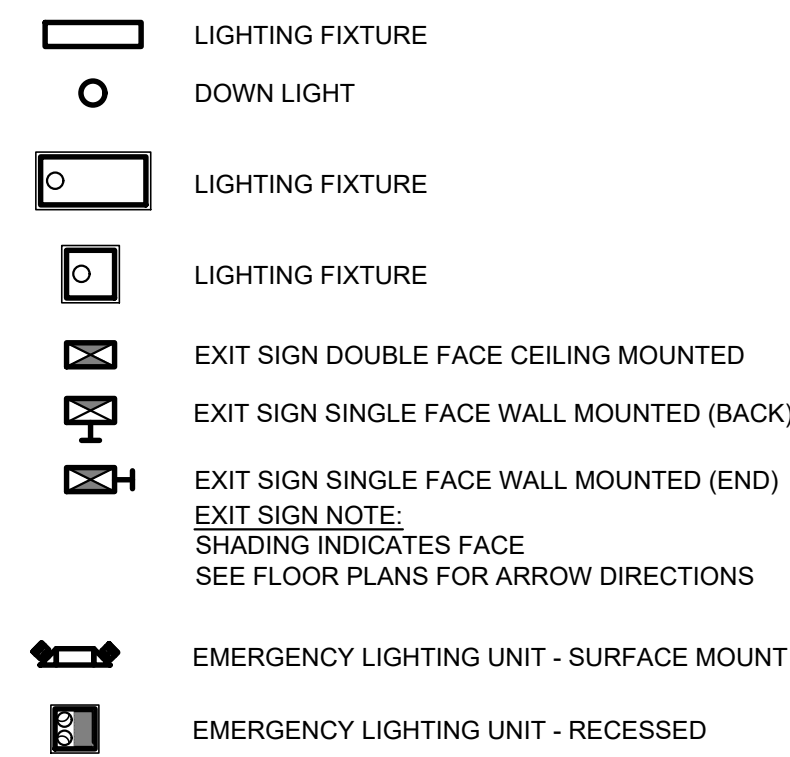
GENERAL NOTE
MANUFACTURER IS BASIS OF DESIGN. SEE SPECIFICATIONS FOR ALTERNATES.

NOTES
1 MODULATING DIGITAL SCROLL
2 35 KAIC SCCR RATING
3 INTEGRAL SUPPLY FAN VFD
4 CONVENIENCE OUTLET
5 DUAL WALL R-13 FOAM INJECTED HOUSING
6 2" MERV 8 PRE FILTERS & 4" MERV 13 FINAL FILTERS
7 1 YEAR PARTS AND LABOR, 5 YEAR COMPRESSOR PARTS WARRANTY
8 FACTORY INSTALLED NON-FUSED DISCONNECT SWITCH
9 CONDENSER HAIL GUARD
10 BACNET COMMUNICATIONS CARD
11 MODULATING HOT GAS REHEAT COIL
12 UNIT TSP INCLUDES .35" FILTER LOADING
13 ADAPTER CURB

ELECTRICAL SYMBOLS

LUMINAIRES

NOTE:
REFER TO LUMINAIRE SCHEDULE



ABBREVIATIONS

AFF ABOVE FINISHED FLOOR
 AFG ABOVE FINISHED GRADE
 AL ALUMINUM
 ARC ALUMINUM RIGID CONDUIT
 AUX AUXILIARY
 BOF BOTTOM OF FIXTURE
 C CONDUIT
 CB CIRCUIT BREAKER
 CKT CIRCUIT
 COF CENTER OF FIXTURE
 EC ELECTRICAL CONTRACTOR
 EMT ELECTRICAL METALLIC TUBING
 EWC ELECTRIC WATER COOLER
 GRC GALVANIZED RIGID CONDUIT
 G GROUND FAULT CIRCUIT INTERRUPTER
 GRD GROUND
 IMC INTERMEDIATE METAL CONDUIT
 MCB MAIN CIRCUIT BREAKER
 MLO MAIN LUG ONLY
 NC NORMALLY CLOSED
 NF NON FUSED
 NL UNSWITCHED NIGHT LIGHT
 NO NORMALLY OPEN
 NTS NOT TO SCALE
 PVC PVC CONDUIT
 TOF TOP OF FIXTURE
 U USB PORT
 UCR UNDER CABINET REFRIGERATOR
 UNO UNLESS NOTED OTHERWISE
 WP WEATHERPROOF COVER
 WPI WEATHERPROOF IN-USE COVER

MOUNTING HEIGHTS

ALL MOUNTING HEIGHTS ARE AS GIVEN UNLESS OTHERWISE NOTED ON PLANS

ALL MOUNTING HEIGHTS ARE TO CENTER OF DEVICE/LIGHT FIXTURE, UNLESS OTHERWISE NOTED

SWITCHES

WALL SWITCH +48" AFF
 LIGHTING CONTROL SUBSCRIPT TAGS

BLANK SINGLE POLE TOGGLE SWITCH
 3 3-WAY TOGGLE SWITCH
 4 4-WAY TOGGLE SWITCH
 CP ROOM CONTROL PANEL
 D DIMMER SWITCH
 3D 3-WAY DIMMER SWITCH
 DT DIGITAL TIMER
 K KEY OPERATED TOGGLE SWITCH
 LV LOW VOLTAGE MOMENTARY SWITCH
 LVD LOW VOLTAGE WITH DIMMING
 OS OCCUPANCY SENSOR
 OSD OCCUPANCY SENSOR WITH DIMMING
 PL PILOT LIGHTED TOGGLE SWITCH
 R SINGLE POLE DOUBLE THROW CENTER OFF MOMENTARY SWITCH
 SC SHADE CONTROLLER
 T MANUAL TIMER SWITCH
 VS VACANCY SENSOR
 VSD VACANCY SENSOR WITH DIMMER
 CSD DIGITAL LIGHTING CONTROL STATION - DIMMING
 CS# DIGITAL LIGHTING CONTROL STATION
 # = NUMBER OF BUTTONS 1-8

OCCUPANCY SENSOR CEILING MOUNTED

RECEPTACLES

SINGLE CONVENIENCE OUTLET, RECESSED WALL MOUNTED +18" AFF, 'UNO' ON FLOOR PLANS
 DUPLEX CONVENIENCE OUTLET, RECESSED WALL MOUNTED +18" AFF, 'UNO' ON FLOOR PLANS
 DUPLEX CONVENIENCE OUTLET, RECESSED WALL MOUNTED ABOVE COUNTER +44" AFF, 'UNO' ON FLOOR PLANS
 DOUBLE DUPLEX CONVENIENCE OUTLET, RECESSED WALL MOUNTED +18" AFF, 'UNO' ON FLOOR PLANS
 DOUBLE DUPLEX CONVENIENCE OUTLET, RECESSED WALL MOUNTED ABOVE COUNTER +44" AFF, 'UNO' ON FLOOR PLANS
 4"x4"x2" JUNCTION BOX WITH FINISHED BLANK COVER RECESSED WALL MOUNTED +18" AFF, 'UNO' ON FLOOR PLANS
 4"x4"x2" JUNCTION BOX WITH FINISHED BLANK COVER MOUNTED ABOVE ACCESSIBLE CEILING UNO
 PULL BOX WITH FINISHED BLANK COVER MOUNTING AND SIZE AS NOTED ON FLOOR PLAN

RECEPTACLE SUB SCRIPT

HG HOSPITAL GRADE
 TR TAMPER RESISTANCE
 IG ISOLATED GROUND
 G GROUND FAULT CIRCUIT INTERRUPTER
 WR WEATHER RESISTANCE
 WP WEATHERPROOF COVER
 WPI WEATHERPROOF IN-USE COVER
 U USB PORT

POWER EQUIPMENT

PANELBOARD
 DISTRIBUTION PANEL
 SWITCHBOARD
 TRANSFORMER, SEE PLAN FOR TYPE AND SIZE
 AUTOMATIC TRANSFER SWITCH
 FACTORY WIRED CONTROL PANEL
 VARIABLE FREQUENCY DRIVE

SINGLE PHASE MANUAL MOTOR STARTER WITH PILOT LIGHT
 RELAY IN BOX
 DISCONNECT SWITCH
 COMBINATION MAGNETIC STARTER/DISCONNECT SWITCH 3 PHASE
 LINE VOLTAGE THERMOSTAT
 VAV JUNCTION BOX WITH TOGGLE SWITCH

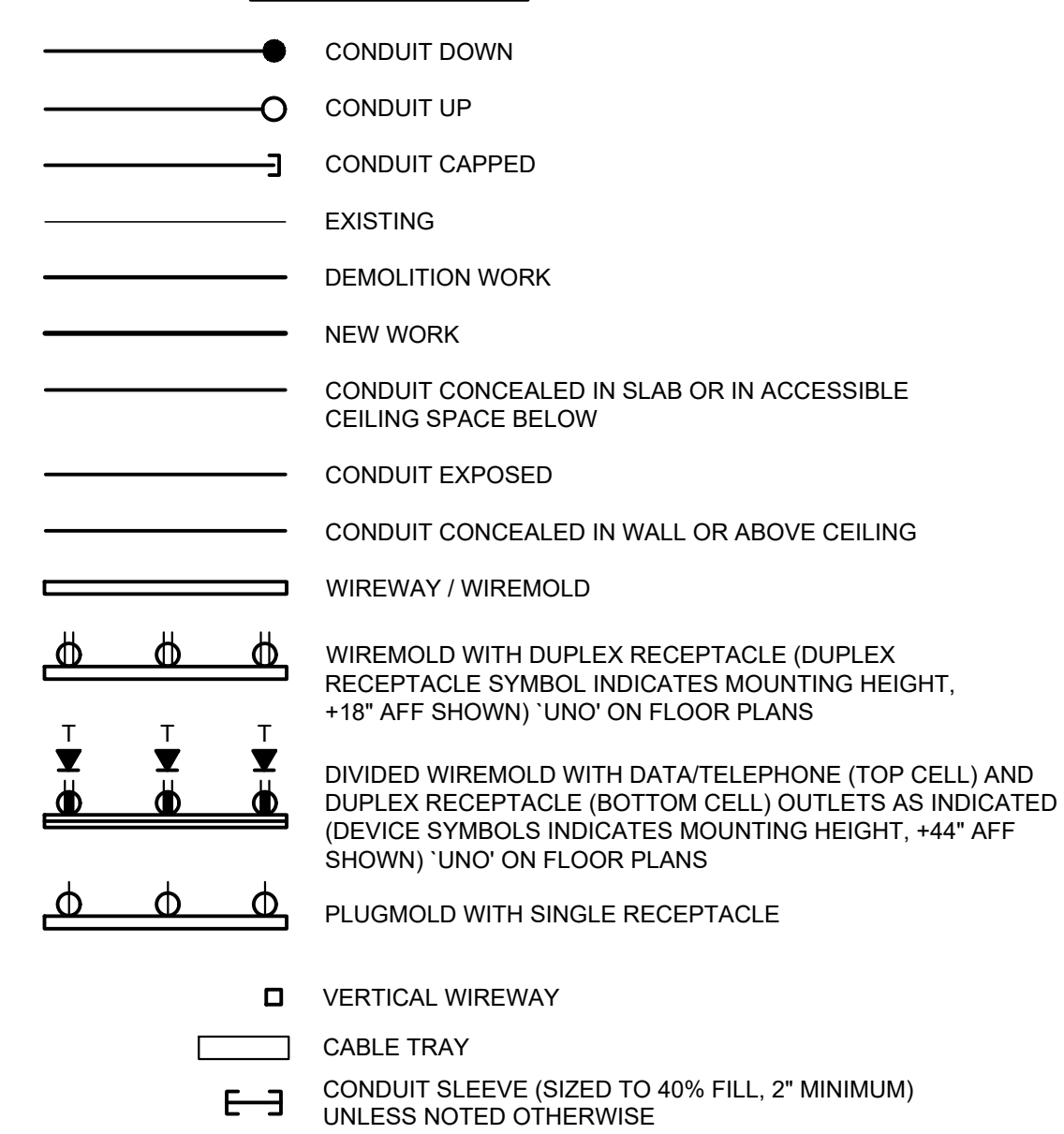
MOTORS

208V, 3 PHASE MOTOR
 480V, 3 PHASE MOTOR
 120V, 1 PHASE MOTOR
 208V, 1 PHASE MOTOR
 DC MOTOR

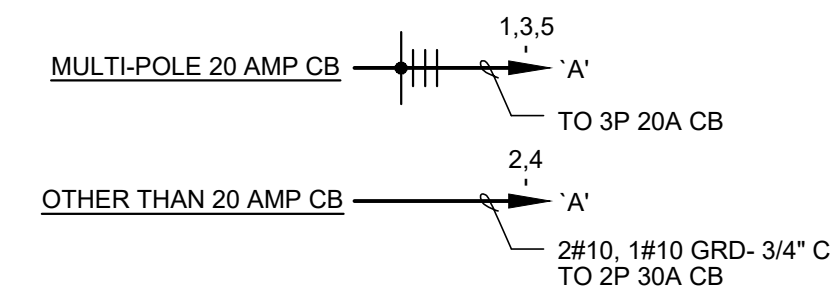
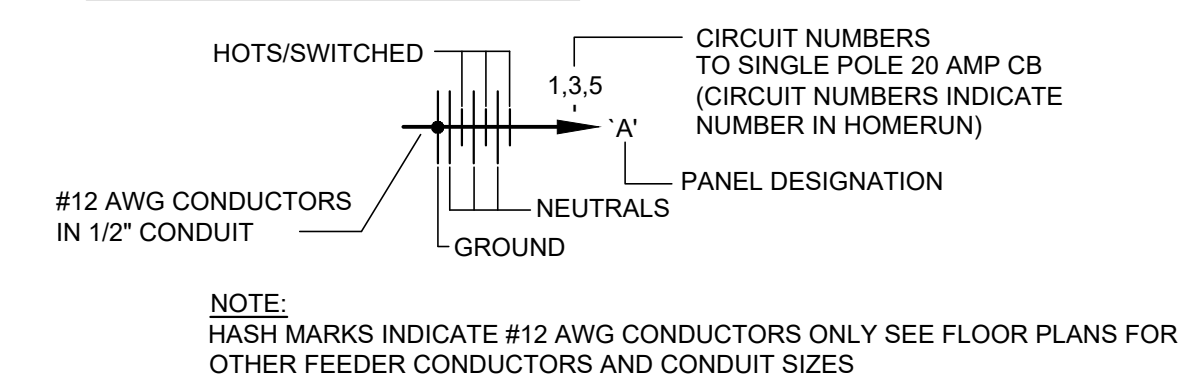
FIRE ALARM

FIRE ALARM CONTROL PANEL (WITH VOICE EVACUATION)
 CONTROL MODULE (PROVIDE RELAY IF CONTACT RATING IS EXCEEDED)
 DUCT MOUNTED SMOKE DETECTOR (R = RETURN / S = SUPPLY)

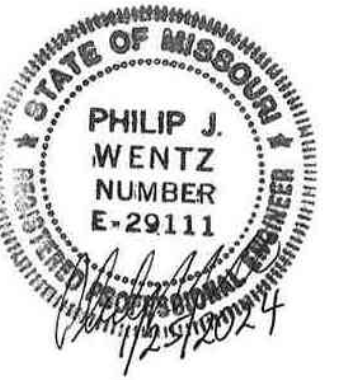
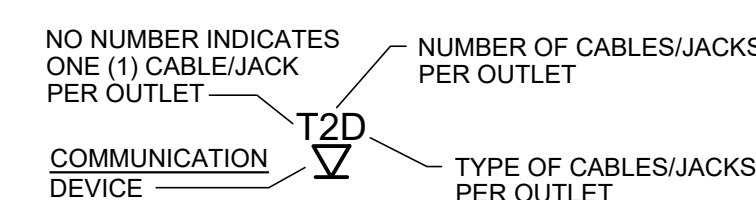
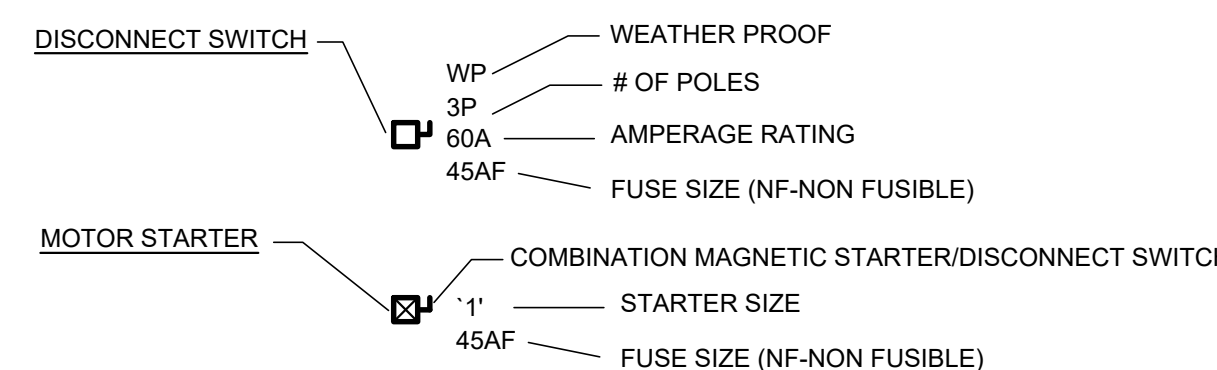
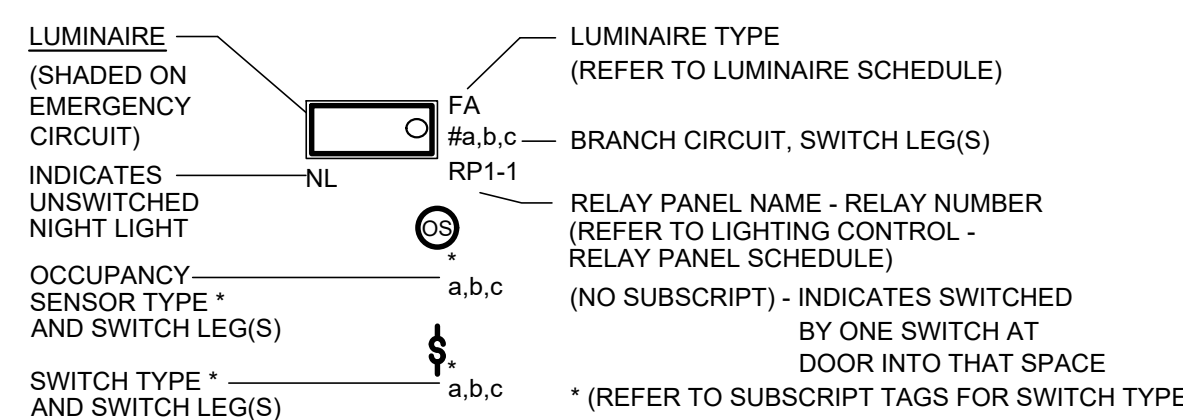
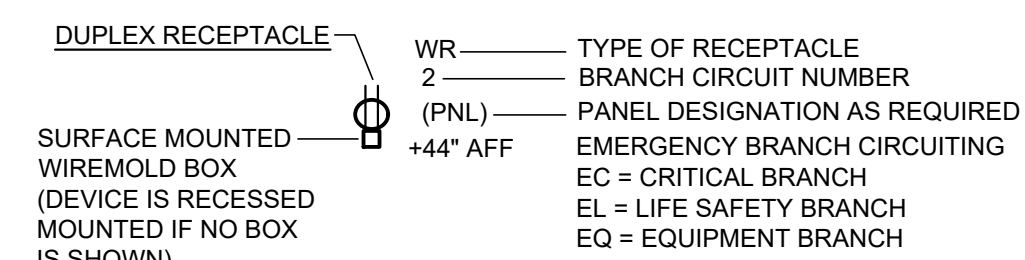
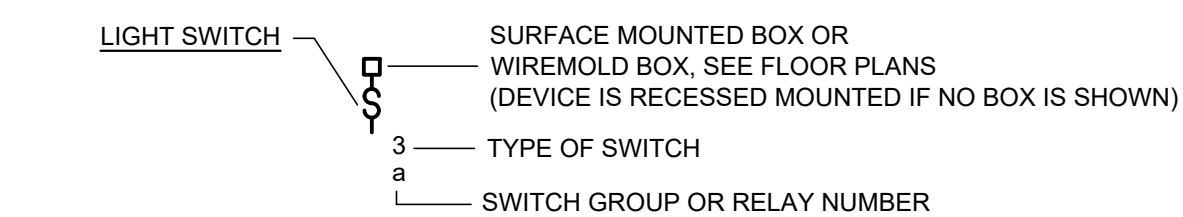
WIRING SYMBOLS



BRANCH CIRCUITING LEGEND



20A BRANCH CIRCUIT HOMERUNS SHALL BE SIZED AS FOLLOWS:
 120V: 0-100 FEET SHALL BE #12AWG WIRE MINIMUM
 101-200 FEET SHALL BE #10AWG WIRE MINIMUM
 IN EXCESS OF 200 FEET SHALL BE #8AWG WIRE MINIMUM
 277V: 0-250 FEET SHALL BE #12AWG WIRE MINIMUM
 IN EXCESS OF 250 FEET SHALL BE #10AWG WIRE MINIMUM
 INDICATES SWITCH IN



PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
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www.archer-elgin.com

MEP:

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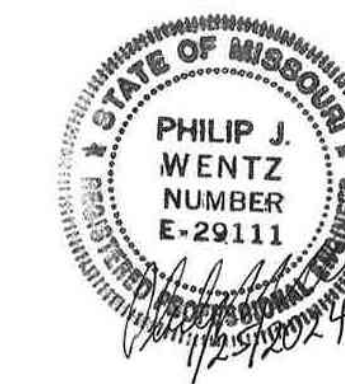
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CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**ELECTRICAL
SYMBOLS AND
ABBREVIATIONS**

SHEET NUMBER:

E0.0

14 OF 24 SHEETS
01/25/2024



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STRUCTURAL ENGINEER:

Archer Elgin
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Rolla, MO 65401
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DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**GROUND FLOOR
ELECTRICAL
DEMOLITION PLAN**

SHEET NUMBER:

DE3.0

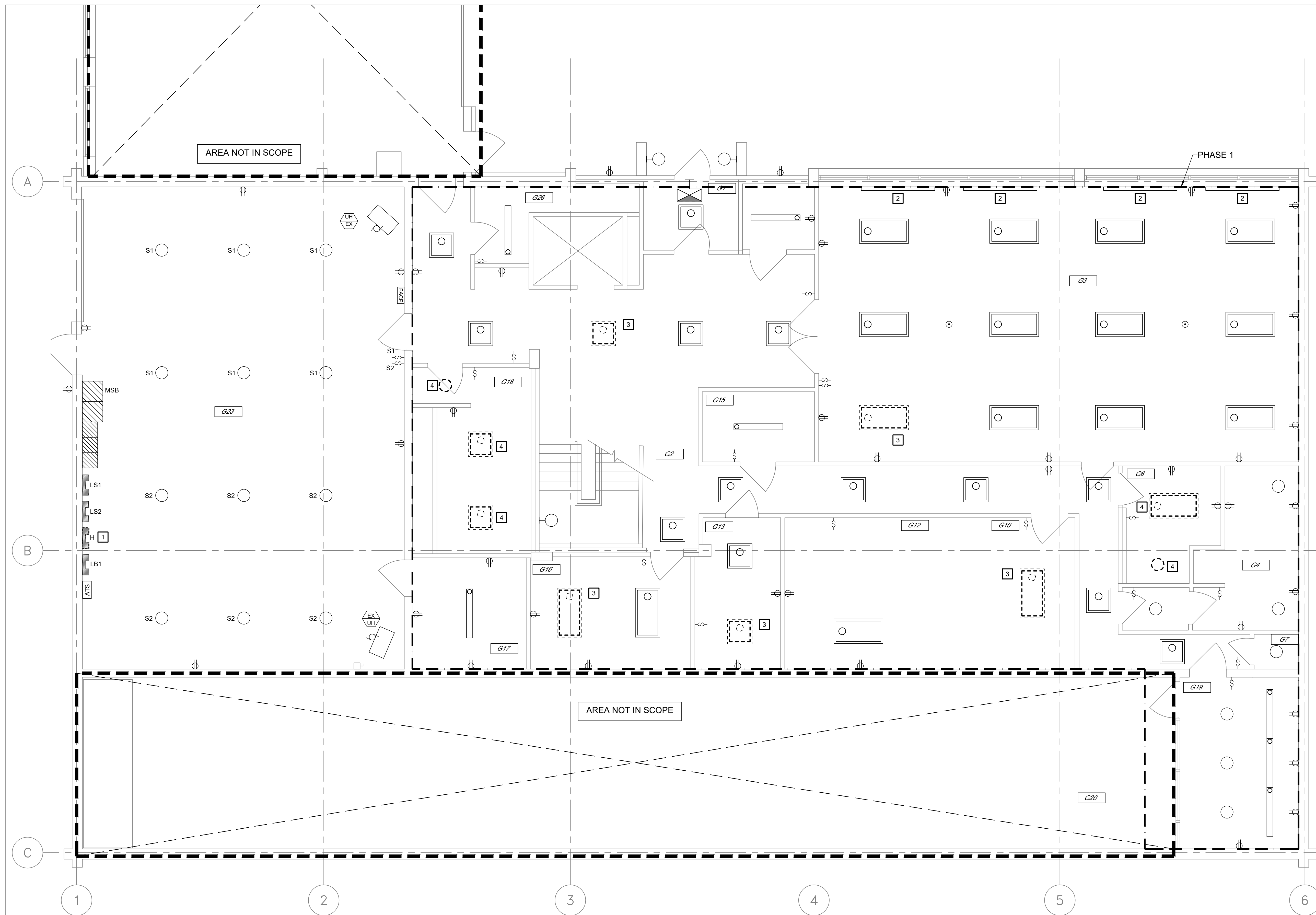
15 OF 24 SHEETS
01/25/2024

GENERAL DEMOLITION NOTES

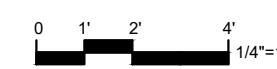
- ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
- FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
- ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
- ANY EXISTING LIGHT FIXTURES THAT ARE DAMAGED OR MADE DIRTY BY THE WORK ASSOCIATED WITH THIS PROJECT SHALL BE REPAIRED, CLEANED AND RELAMPED AS REQUIRED.
- ANY EXISTING LIGHTING FIXTURES THAT ARE NOTED TO BE REINSTALLED WHICH ARE NOT REINSTALLED SHALL BE RETURNED TO THE OWNER.
- BUNDLE AND SUPPORT EXISTING CABLES ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.
- CONTRACTOR IS RESPONSIBLE FOR REPLACING ALL CEILING TILES DAMAGED DURING CONSTRUCTION.
- PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.

KEYED NOTES

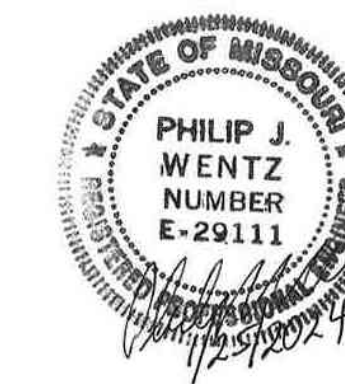
- EXISTING PANEL H AND FEEDER TO BE DEMOLISHED BACK TO SOURCE IN MSB. REFER TO ONE-LINE DIAGRAM SHEET E6.0 FOR MORE INFORMATION. PRESERVE EXISTING BRANCH CIRCUITS FOR RECONNECTION TO NEW PANEL.
- PRESERVE EXISTING BASEBOARD HEATER CIRCUIT FOR RECONNECTION TO NEW INTELLIGENT PANELBOARD.
- TEMPORARILY REMOVE LIGHT FIXTURE TO ACCOMMODATE VAV INSTALLATION. PRESERVE EXISTING CIRCUIT AND SWITCHING FOR RECONNECTION UPON COMPLETION OF ABOVE-CEILING WORK.
- TEMPORARILY REMOVE REMOVE LIGHT FIXTURE TO ACCOMMODATE CEILING REMOVABLE AND REPLACEMENT. PRESERVE EXISTING CIRCUIT AND SWITCHING FOR RECONNECTION UPON COMPLETION OF CEILING REPLACEMENT.



GROUND FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 1/4" = 1'0"



S:\075111.000 TROOP G HQ & CRIME LAB HVAC REPLACEMENT\03 ELECTRICAL\DE3.0-075111.000.dwg 2024-1-26 10:14 SBcrooks



PHILIP WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

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MANAGEMENT,
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DEPARTMENT OF
PUBLIC SAFETY
MISSOURI STATE
HIGHWAY PATROL

REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**FIRST FLOOR
ELECTRICAL
DEMOLITION PLAN**

SHEET NUMBER:

DE3.1

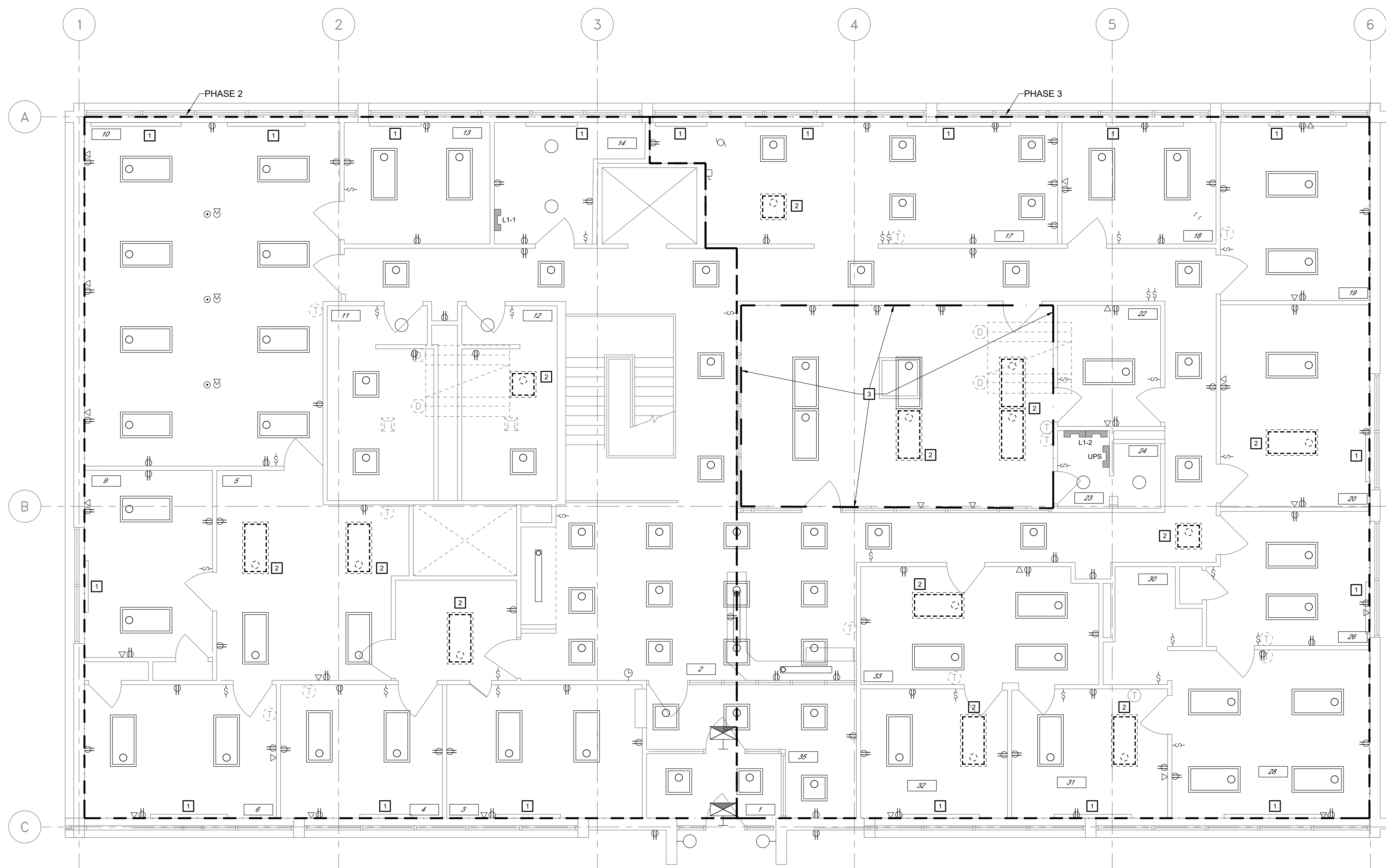
16 OF 24 SHEETS
01/25/2024

GENERAL DEMOLITION NOTES

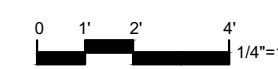
- ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
- FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
- ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
- ANY EXISTING LIGHT FIXTURES THAT ARE DAMAGED OR MADE DIRTY BY THE WORK ASSOCIATED WITH THIS PROJECT SHALL BE REPAIRED, CLEANED AND RELAMPED AS REQUIRED.
- ANY EXISTING LIGHTING FIXTURES THAT ARE NOTED TO BE REINSTALLED WHICH ARE NOT REINSTALLED SHALL BE RETURNED TO THE OWNER.
- BUNDLE AND SUPPORT EXISTING CABLES ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.
- CONTRACTOR IS RESPONSIBLE FOR REPLACING ALL CEILING TILES DAMAGED DURING CONSTRUCTION.
- PROVIDE AND INSTALL SUPPORTS FOR EXISTING CABLES AND CONDUITS ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.

KEYED NOTES

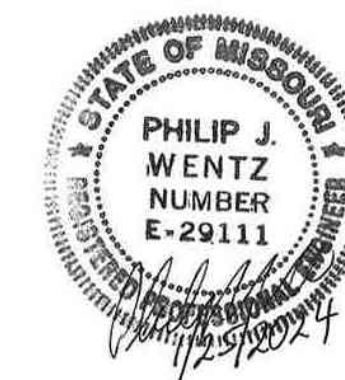
- PRESERVE EXISTING BASEBOARD HEATER CIRCUIT FOR RECONNECTION TO NEW INTELLIGENT PANELBOARD.
- TEMPORARILY REMOVE LIGHT FIXTURE TO ACCOMMODATE VAV INSTALLATION. PRESERVE EXISTING CIRCUIT AND SWITCHING FOR RECONNECTION UPON COMPLETION OF ABOVE-CEILING WORK.
- ROOM #25 - RADIO ROOM ALWAYS OCCUPIED. ADDITIONAL COORDINATION WITH OWNER AND OCCUPANTS REQUIRED.



FIRST FLOOR ELECTRICAL DEMOLITION PLAN
SCALE: 1/4" = 10'



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PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
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1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____

ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**ROOF
ELECTRICAL
DEMOLITION PLAN**

SHEET NUMBER:

DE3.2

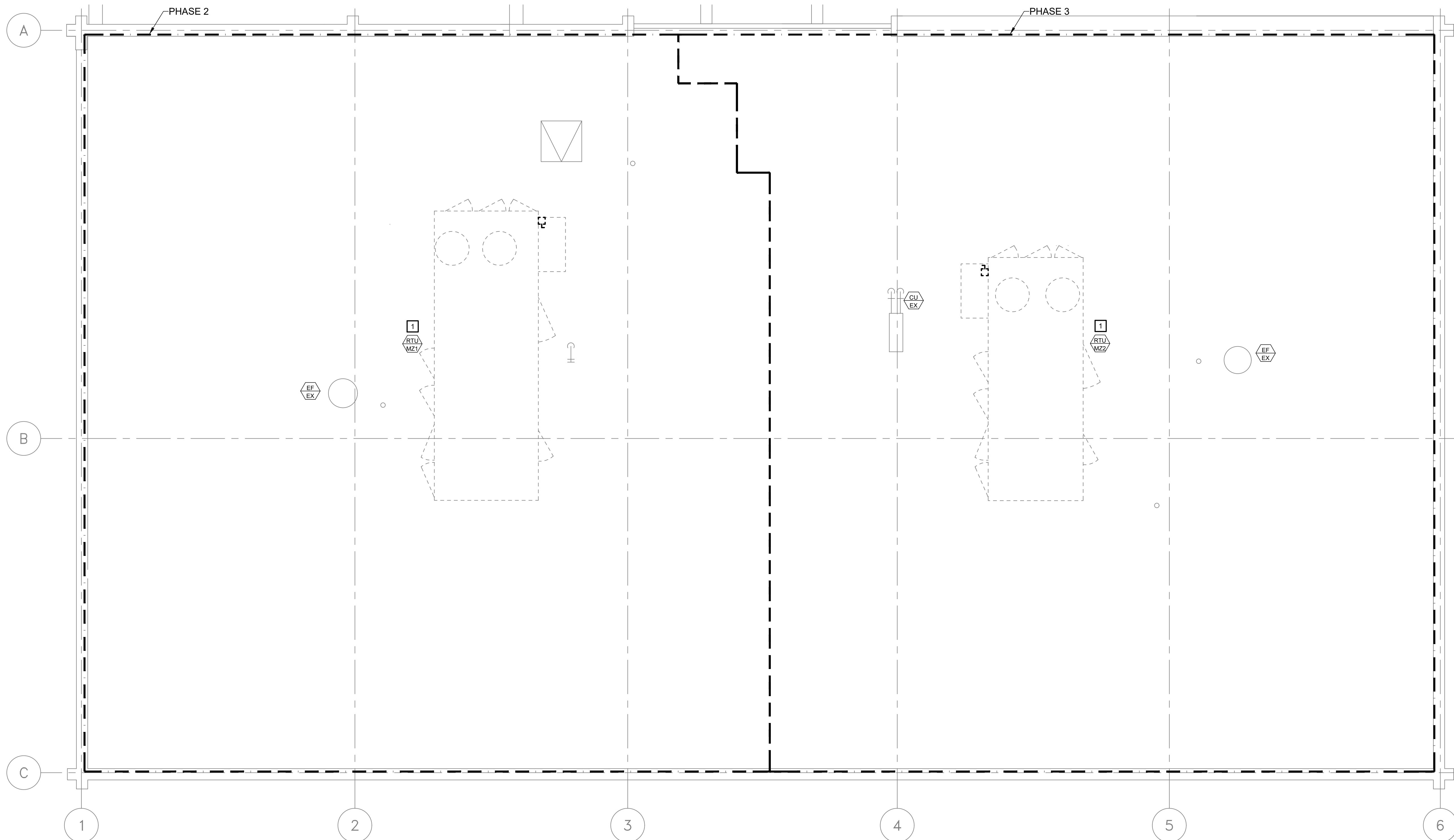
17 OF 24 SHEETS
01/25/2024

GENERAL DEMOLITION NOTES

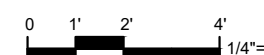
1. ALL SYMBOLS SHOWN DASHED ARE EXISTING ELECTRICAL DEVICES TO BE REMOVED OR AS NOTED. ALL SYMBOLS SHOWN SOLID LIGHT LINE ARE EXISTING ELECTRICAL DEVICES TO REMAIN. EXISTING ELECTRICAL DEVICES WHICH ARE TO REMAIN SHALL BE EXTENDED TO BE FLUSH WITH NEW FINISH ON EXISTING WALLS WHERE REQUIRED.
2. FOR A PORTION OF A CIRCUIT WHICH IS REMOVED OR ABANDONED, RE-ESTABLISH CIRCUIT CONTINUITY FOR THE PORTION OF THE CIRCUIT WHICH IS TO REMAIN.
3. ALL EXISTING CONDUITS, RACEWAYS AND WIRING ROUTED IN EXISTING WALLS AND CEILING SPACES (WHICH ARE TO BE DEMOLISHED) WHICH SERVE OTHER AREAS SHALL BE REROUTED AS REQUIRED.
4. ANY EXISTING LIGHT FIXTURES THAT ARE DAMAGED OR MADE DIRTY BY THE WORK ASSOCIATED WITH THIS PROJECT SHALL BE REPAIRED, CLEANED AND RELAMPED AS REQUIRED.
5. ANY EXISTING LIGHTING FIXTURES THAT ARE NOTED TO BE REINSTALLED WHICH ARE NOT REINSTALLED SHALL BE RETURNED TO THE OWNER.
6. BUNDLE AND SUPPORT EXISTING CABLES ABOVE CEILING THAT ARE CURRENTLY UNSUPPORTED IN ALL AREAS WHERE CEILING IS BEING REMOVED.
7. CONTRACTOR IS RESPONSIBLE FOR REPLACING ALL CEILING TILES DAMAGED DURING CONSTRUCTION.

KEYED NOTES

- 1 EXISTING RTU EQUIPMENT AND ASSOCIATED FEEDERS, DISCONNECTS, AND CONTROLS TO BE MADE SAFE AND COMPLETELY DEMOLISHED BACK TO SOURCE. REFER TO ONE-LINE DIAGRAM SHEET E6.0 FOR MORE INFORMATION.



ROOF ELECTRICAL DEMOLITION PLAN
SCALE: 1/4" = 10'





PHILIP WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
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Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
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1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**GROUND FLOOR
ELECTRICAL
NEW WORK PLAN**

SHEET NUMBER:

E3.0

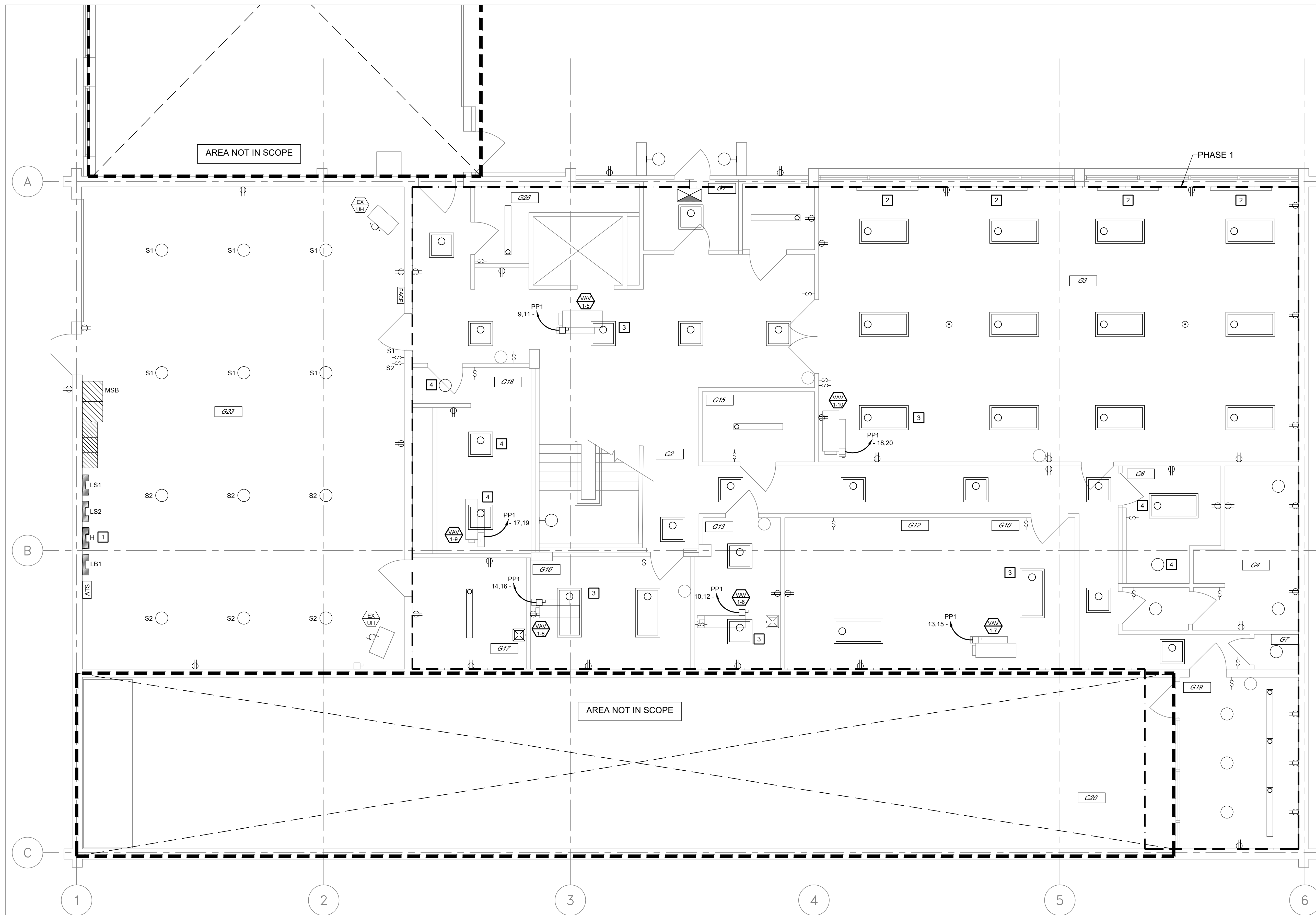
18 OF 24 SHEETS
01/25/2024

GENERAL NOTES

- REFER TO SYMBOL LEGEND ON SHEET E0.00 FOR SYMBOLS AND ABBREVIATIONS.
- ELECTRICAL PANELBOARD DIRECTORIES SHALL BE LABELED WITH FINAL ROOM NUMBERS.
- SEE MECHANICAL-ELECTRICAL INTERFACE SCHEDULE FOR EQUIPMENT FEEDER, UNIT CONTROL, AND DISCONNECT INFORMATION.
- FIRE SEAL ALL PENETRATIONS OF FIRE RATED ASSEMBLIES. SEAL ALL ROOF AND EXTERIOR WALL PENETRATIONS WEATHER TIGHT.
- DISCONNECT SWITCHES SHOWN IN HALF-TONE ARE INTEGRAL TO AND FURNISHED WITH EQUIPMENT BY OTHERS.
- THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
- CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE OWNER'S REPRESENTATIVE. NOTICE FOR SHUTDOWN SHALL BE GIVEN TO THE OWNER AT LEAST ONE WEEK PRIOR TO SHUTDOWN.
- CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
- ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
- BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
- WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
- CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.

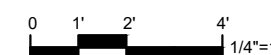
KEYED NOTES

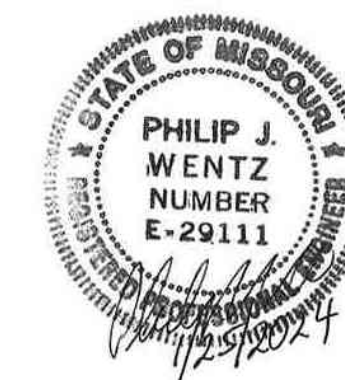
- FURNISH AND INSTALL NEW INTELLIGENT PANELBOARD H WITH BACNET CAPABILITY. FEED NEW FROM 400A SWITCH LOCATED IN EXISTING SWITCHBOARD MSB. REFER ONE-LINE DIAGRAM SHEET E6.0 FOR MORE INFORMATION. RECONNECT EXISTING BRANCH CIRCUITS.
- RECONNECT EXISTING BASEBOARD HEATER CIRCUIT TO NEW INTELLIGENT PANELBOARD H. REFER TO PANEL SCHEDULE ON SHEET E6.1 FOR CIRCUIT INFORMATION.
- REINSTALL LIGHT FIXTURE UPON COMPLETION OF ABOVE-CEILING WORK. RECONNECT TO EXISTING CIRCUIT AND SWITCH LEG.
- REINSTALL LIGHT FIXTURE UPON COMPLETION OF CEILING REPLACEMENT WORK. RECONNECT TO EXISTING CIRCUIT AND SWITCH LEG.



GROUND FLOOR ELECTRICAL NEW WORK PLAN

SCALE: 1/4" = 10'





PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
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P: 314-645-6232
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REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**FIRST FLOOR
ELECTRICAL
NEW WORK PLAN**

SHEET NUMBER:

E3.1

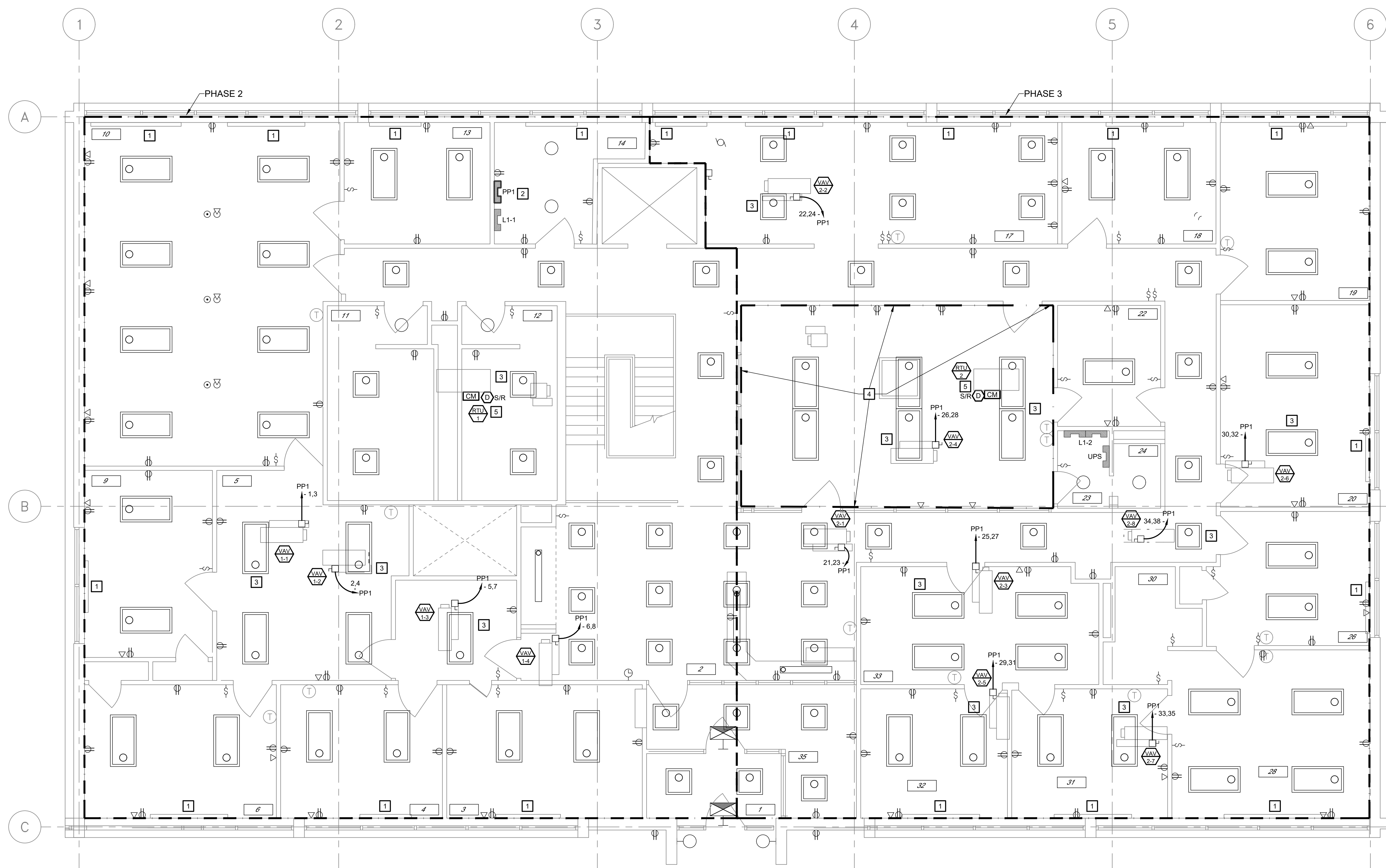
19 OF 24 SHEETS
01/25/2024

GENERAL NOTES

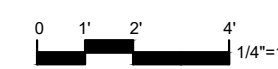
- REFER TO SYMBOL LEGEND ON SHEET E0.00 FOR SYMBOLS AND ABBREVIATIONS.
- ELECTRICAL PANELBOARD DIRECTORIES SHALL BE LABELED WITH FINAL ROOM NUMBERS.
- SEE MECHANICAL-ELECTRICAL INTERFACE SCHEDULE FOR EQUIPMENT FEEDER, UNIT CONTROL, AND DISCONNECT INFORMATION.
- FIRE SEAL ALL PENETRATIONS OF FIRE RATED ASSEMBLIES. SEAL ALL ROOF AND EXTERIOR WALL PENETRATIONS WEATHER TIGHT.
- DISCONNECT SWITCHES SHOWN IN HALF-TONE ARE INTEGRAL TO AND FURNISHED WITH EQUIPMENT BY OTHERS.
- THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
- CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE OWNER'S REPRESENTATIVE. NOTICE FOR SHUTDOWN SHALL BE GIVEN TO THE OWNER AT LEAST ONE WEEK PRIOR TO SHUTDOWN.
- CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL OTHER TRADES PRIOR TO BEGINNING WORK.
- ALL EQUIPMENT AND MATERIAL SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS AND ALL APPLICABLE CODES.
- BUILDING TO BE OCCUPIED DURING CONSTRUCTION. BARRIERS WILL NEED TO BE IN PLACES AS WORK IS PERFORMED.
- WORK WILL NEED TO BE COMPLETED IN PHASES. REFER TO SPECIFICATIONS FOR MORE INFORMATION.
- CONTRACTOR SHALL COORDINATE ANY SHUTDOWN OF UTILITIES WITH THE CONSTRUCTION ADMINISTRATOR. NOTICE FOR SHUTDOWN SHALL BE GIVEN AT LEAST ONE WEEK PRIOR TO SHUTDOWN. DISRUPTIONS OF UTILITIES SHALL BE LIMITED TO FIVE DAYS.
- CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.

KEYED NOTES

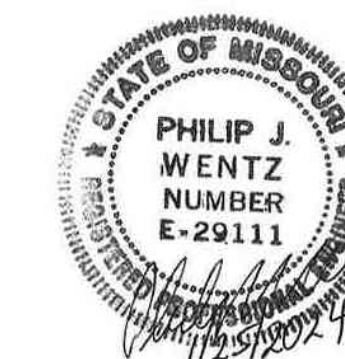
- RECONNECT EXISTING BASEBOARD HEATER CIRCUIT TO NEW INTELLIGENT PANELBOARD H. REFER TO PANEL SCHEDULE ON SHEET E6.1 FOR CIRCUIT INFORMATION.
- REMOVE EXPOSED TEMP CIRCUIT COILED ABOVE CEILING FED FROM L1-1. INSTALL NEW SURFACE MOUNTED PANEL PP1.
- REINSTALL LIGHT FIXTURE UPON COMPLETION OF ABOVE-CEILING WORK. RECONNECT TO EXISTING CIRCUIT AND SWITCH LEG.
- ROOM #25 - RADIO ROOM ALWAYS OCCUPIED. ADDITIONAL COORDINATION WITH OWNER AND OCCUPANTS REQUIRED.
- FURNISH AND INSTALL NEW DUCT MOUNTED SMOKE DETECTOR AND ASSOCIATED CONTROL MODULE. MATCH EXISTING FIRE ALARM DEVICES AND CONNECT TO EXISTING FIRE ALARM CONTROL PANEL.



FIRST FLOOR ELECTRICAL NEW WORK PLAN
SCALE: 1/4" = 10'



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PHIL WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:

McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
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OFFICE OF ADMINISTRATION
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PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
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DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**ROOF
ELECTRICAL
NEW WORK PLAN**

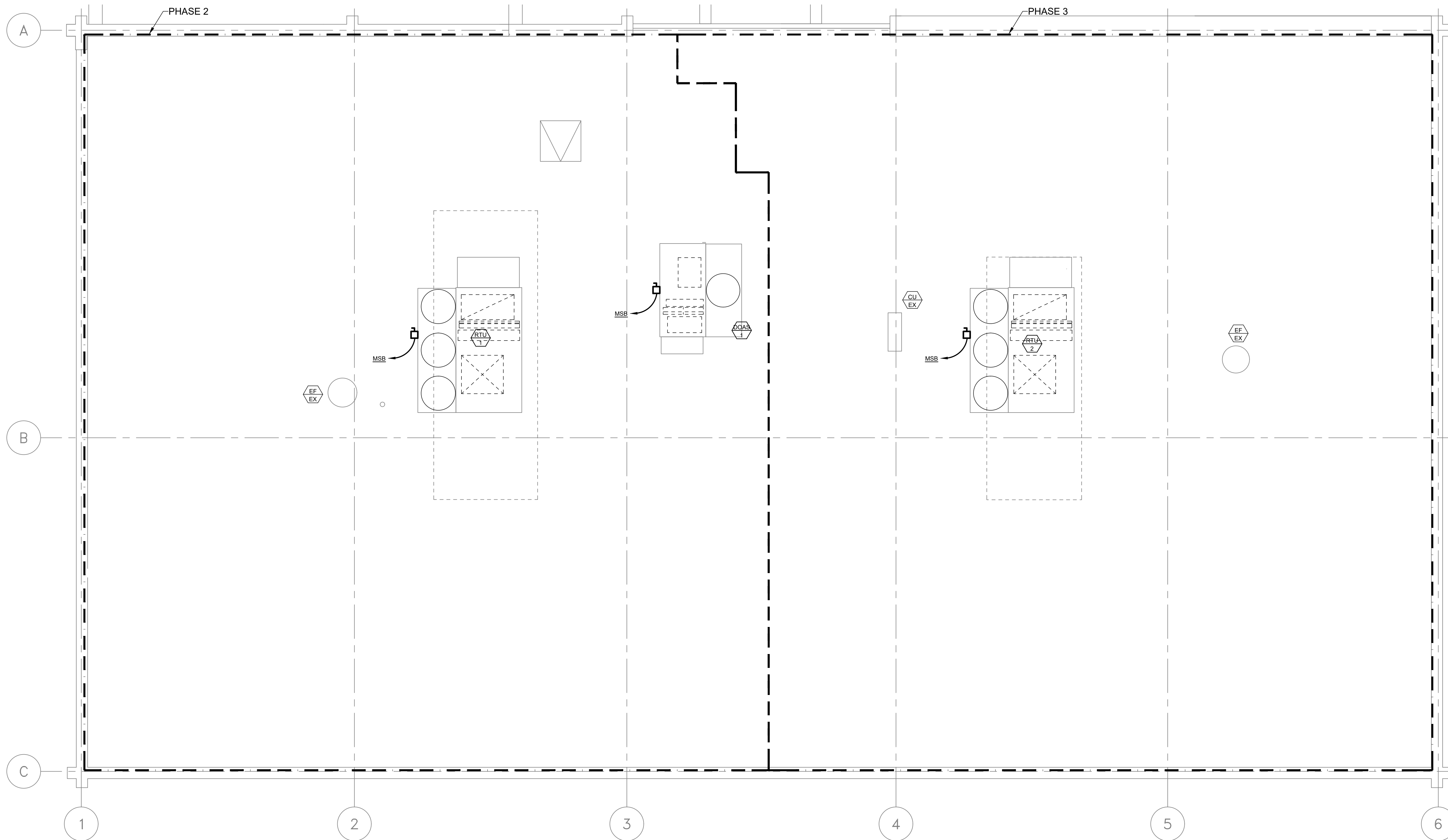
SHEET NUMBER:

E3.2

20 OF 24 SHEETS
01/25/2024

GENERAL NOTES

- SEE SHEETS E6.1 FOR MECHANICAL EQUIPMENT FEEDER, UNIT CONTROL AND DISCONNECT INFORMATION.
- ALL EXTERIOR CONDUITS TO BE RIGID CONDUIT.
- DO NOT ROUTE CONDUIT ON ROOF.
- THE DRAWINGS WERE PREPARED UTILIZING EXISTING DRAWINGS AND FIELD OBSERVATION. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO STARTING WORK. NOTIFY CONSTRUCTION MANAGER IMMEDIATELY OF ANY DISCREPANCIES.
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- CONTRACTOR SHALL CHECK-IN EACH DAY THEY ARE ON SITE.



ROOF ELECTRICAL NEW WORK PLAN
SCALE: 1/4" = 1'0"





PHILIP J. WENTZ
MO Engineering Registration No. PE-029111
MO COA: 000087

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Archer Elgin

310 East 6th Street

Rolla, MO 65401

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FACILITY# 8136008002

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DATE: _____
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DATE: _____

ISSUE DATE: 01/25/2024

DRAWN BY: JPC
CHECKED BY: EMP
DESIGNED BY: EW

SHEET TITLE:
**ELECTRICAL
ONE-LINE**

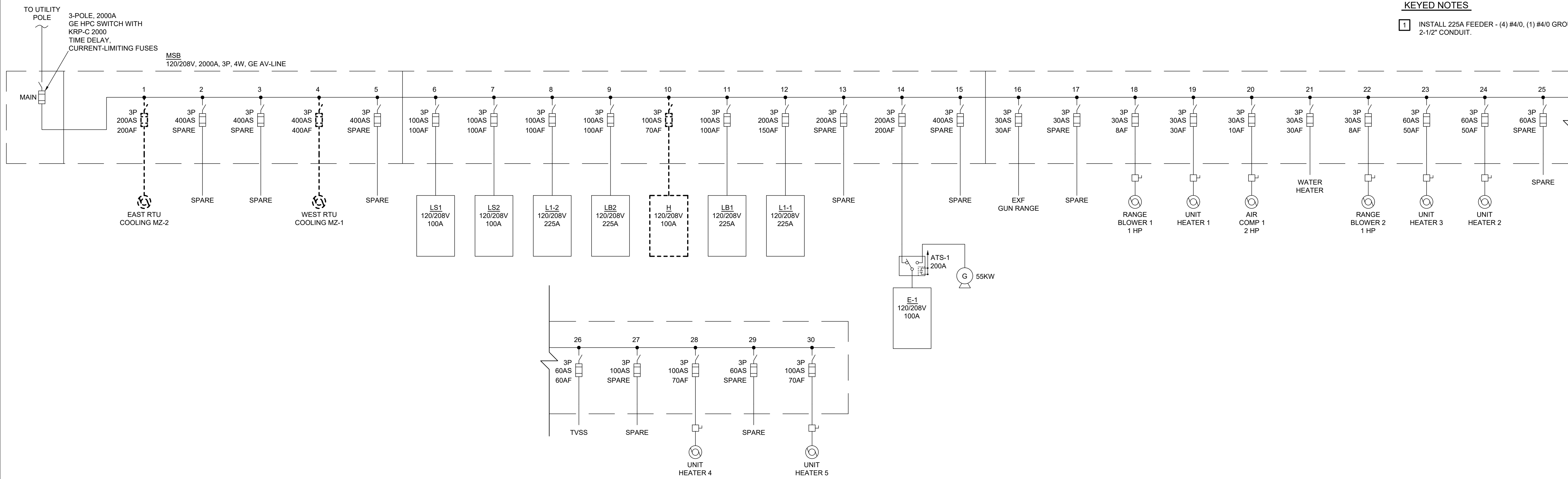
SHEET NUMBER:

E6.0

21 OF 24 SHEETS
01/25/2024

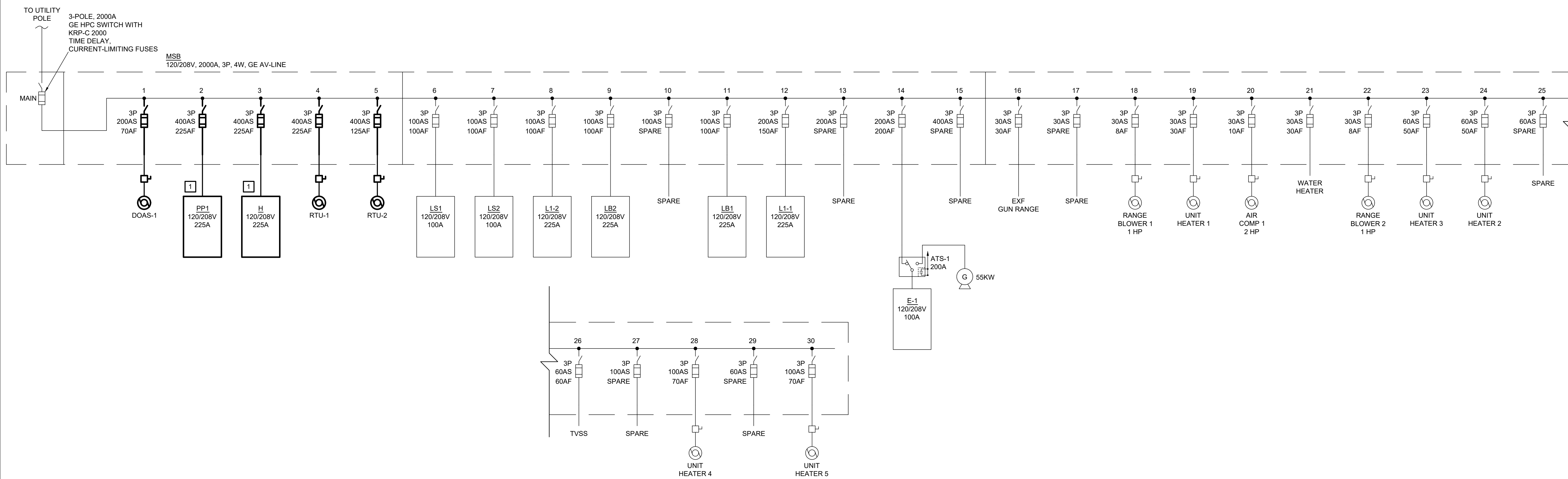
KEYED NOTES

1 INSTALL 225A FEEDER - (4) #4/0, (1) #4/0 GROUND IN 2-1/2" CONDUIT.



ELECTRICAL ONE-LINE DIAGRAM - DEMOLITION

SCALE: N.T.S.



ELECTRICAL ONE-LINE DIAGRAM - NEW WORK

SCALE: N.T.S.

STEEL FRAMING SPECIFICATIONS

SUBMITTALS:

- SHOP DRAWINGS: SHOW FABRICATION OF STRUCTURAL-STEEL COMPONENTS.
 - INCLUDE DETAILS OF CUTS, CONNECTIONS, SPLICES, CAMBER, HOLES, AND OTHER PERTINENT DATA.
 - INCLUDE EMBEDMENT DRAWINGS.
 - INDICATE WELDS BY STANDARD AWS SYMBOLS, DISTINGUISHING BETWEEN SHOP AND FIELD WELDS, AND SHOW SIZE, LENGTH, AND TYPE OF EACH WELD. SHOW BACKING BARS THAT ARE TO BE REMOVED AND SUPPLEMENTAL FILLET WELDS WHERE BACKING BARS ARE TO REMAIN.
 - INDICATE TYPE, SIZE, AND LENGTH OF BOLTS, DISTINGUISHING BETWEEN SHOP AND FIELD BOLTS. IDENTIFY PRETENSIONED AND SLIP-CRITICAL HIGH-STRENGTH BOLTED CONNECTIONS.
- WELDING CERTIFICATES.
- FABRICATOR QUALIFICATIONS: A QUALIFIED FABRICATOR WITH NO LESS THAN 5 YEARS EXPERIENCE IN THE FABRICATION OF STRUCTURAL STEEL.

COORDINATION:

- COORDINATE SELECTION OF SHOP PRIMERS WITH TOPCOATS TO BE APPLIED OVER THEM. COMPLY WITH PAINT AND COATING MANUFACTURER'S RECOMMENDATIONS TO ENSURE THAT SHOP PRIMERS AND TOPCOATS ARE COMPATIBLE WITH ONE ANOTHER.
- COORDINATE INSTALLATION OF ANCHORAGE ITEMS TO BE EMBEDDED IN OR ATTACHED TO OTHER CONSTRUCTION WITHOUT DELAYING THE WORK. PROVIDE SETTING DIAGRAMS, SHEET METAL TEMPLATES, INSTRUCTIONS, AND DIRECTIONS FOR INSTALLATION.

MATERIALS:

- STRUCTURAL-STEEL MATERIALS
 - W-SHAPES: ASTM A 992/A 992M.
 - CHANNELS, ANGLES: ASTM A 36/A 36M.
 - PLATE AND BAR: ASTM A 36/A 36M.
 - COLD-FORMED HOLLOW STRUCTURAL SECTIONS: ASTM A 500, GRADE B, STRUCTURAL TUBING.
 - WELDING ELECTRODES: COMPLY WITH AWS REQUIREMENTS.
- BOLTS, CONNECTORS, AND ANCHORS
 - HIGH-STRENGTH BOLTS, NUTS, AND WASHERS: ASTM A 325, TYPE 1, HEAVY-HEX STEEL STRUCTURAL BOLTS; ASTM A 563, GRADE C, HEAVY-HEX CARBON-STEEL NUTS; AND ASTM F 436, TYPE 1, HARDENED CARBON-STEEL WASHERS; ALL WITH PLAIN FINISH.
 - HEADED ANCHOR RODS: ASTM F 1554, GRADE 36, STRAIGHT.
 - NUTS: ASTM A 563 HEAVY-HEX CARBON STEEL.
 - PLATE WASHERS: ASTM A 36/A 36M CARBON STEEL.
 - WASHERS: ASTM F 436, TYPE 1, HARDENED CARBON STEEL.
 - FINISH: PLAIN
 - THREADED RODS: ASTM A 36/A 36M
 - NUTS: ASTM A 563 HEX CARBON STEEL.
 - WASHERS: ASTM F 436, TYPE 1, HARDENED CARBON STEEL.
 - FINISH: PLAIN
 - HEADED STUD ANCHORS FOR EMBEDDED ASSEMBLIES:
 - STEEL SHALL CONFORM TO ASTM A 108 GRADES C1010-1020, MINIMUM TENSILE STRENGTH OF 60,000 PSI.
 - HEADED FUSION WELDED SHEAR CONNECTORS WITH PROPER FERRULES, AND ACCESSORIES ESPECIALLY DESIGNED TO CREATE COMPOSITE DECK ACTION BY MATING OF SHEAR CONNECTORS, CONCRETE DECK, AND SUPPORTING BEAMS.
 - STUDS SHALL BE OF UNIFORM DIAMETER, HEADS CONCENTRIC AND NORMAL TO SHAFT, AND WELD END CHAMFERED AND SOLID FLUX.
- PRIMER
 - PRIMER: FABRICATOR'S STANDARD LEAD- AND CHROMATE-FREE, NONASPHALTIC, RUST-INHIBITING PRIMER COMPLYING WITH MPI#79 AND COMPATIBLE WITH TOPCOAT.
 - GALVANIZING REPAIR PAINT: MPI#18, MPI#19, OR SSPC-PAINT 20.
 - ASPHALTIC MASTIC: COLD APPLIED ASPHALT EMULSION COMPLYING WITH ASTM D 1187.
- SHRINKAGE-RESISTANT GROUT
 - COMPRESSIVE STRENGTH IN 28 DAYS: 5000 PSI MINIMUM BUT NOT LESS THAN SPECIFIED STRENGTH OF BASE CONCRETE. NON-OXIDIZING, IF GROUT WILL BE PERMANENTLY EXPOSED TO VIEW.
 - NONMETALLIC, SHRINKAGE RESISTANT GROUT: ASTM C 1107, FACTORY-PACKAGED, NONMETALLIC AGGREGATE GROUT, NONCORROSIVE AND NONSTAINING, MIXED WITH WATER TO CONSISTENCY SUITABLE FOR APPLICATION AND A 30-MINUTE WORKING TIME.

ACCEPTABLE PRODUCTS:

 - SONDGROUT 10K, MANUFACTURED BY SONNEBORN/CHEMREX, INC.
 - MASTERFLOW 713, MANUFACTURED BY MASTER BUILDERS CO.
 - SUPREME GROUT, MANUFACTURED BY GIFFORD HILL CO.
- FABRICATION
 - STRUCTURAL STEEL: FABRICATE AND ASSEMBLE IN SHOP TO GREATEST EXTENT POSSIBLE. FABRICATE ACCORDING TO AISC'S "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES" AND AISC 360.
 - STEEL BEARING PLATES: FABRICATE STEEL BEARING PLATES WITH HEADED STUD ANCHORS OF SIZES AND THICKNESSES INDICATED ON CONTRACT DRAWINGS. HOT-DIP ZINC COAT ACCORDING TO ASTM A 123/A 123M. DO NOT PAINT SURFACE TO RECEIVE ANCHORS.
 - HEADED STUD ANCHORS:
 - COMPLY WITH AWS D1.1, SECTION 7.
 - CLEAN SURFACES TO BE WELDED OF RUST, OIL, GREASE, PAINT AND DIRT. REMOVE MILL SCALE BY SCRAPING OR SANDBLASTING.
 - WELD HEADED STUDS WITH APPROPRIATE EQUIPMENT PROPERLY ADJUSTED FRO CLIMATIC CONDITIONS.
 - REMOVE CERAMIC FERRULES AFTER WELDING.
 - THERMAL CUTTING: PERFORM THERMAL CUTTING BY MACHINE TO GREATEST EXTENT POSSIBLE.
 - PLANE THERMALLY CUT EDGES TO BE WELDED TO COMPLY WITH REQUIREMENTS IN AWS D1.1/D1.1M.
 - BOLT HOLES: CUT, DRILL OR PUNCH HOLES PERPENDICULAR TO METAL SURFACES. SHORT-SLOTTED HOLES SHALL NOT BE USED FOR PRIMARY FRAME CONNECTIONS (MEMBERS CONNECTION TO COLUMNS), TRUSSES AND WIND BRACING UNLESS SPECIFICALLY ALLOWED BY THE ENGINEER OF RECORD. WHERE USED, SHORT SLOTTED HOLES SHALL BE ORIENTED NORMAL TO THE DIRECTION OF LOAD.
 - FINISHING: ACCURATELY FINISH ENDS OF COLUMNS AND OTHER MEMBERS TRANSMITTING BEARING LOADS.
 - CLEANING: CLEAN AND PREPARE STEEL SURFACES THAT ARE TO REMAIN UNPAINTED ACCORDING TO SSPC-SP-1, "SOLVENT CLEANING".
 - HOLES: PROVIDE HOLES REQUIRED FOR SECURING OTHER WORK TO STRUCTURAL STEEL AND FOR OTHER WORK TO PASS THROUGH STEEL FRAMING MEMBERS.
 - CUT, DRILL, OR PUNCH HOLES PERPENDICULAR TO STEEL SURFACES. DO NOT THERMALLY CUT BOLT HOLES OR ENLARGE HOLES BY BURNING.
 - BASEPLATE HOLES: CUT, DRILL, MECHANICALLY THERMAL CUT, OR PUNCH HOLES PERPENDICULAR TO STEEL SURFACES. HOLES FOR ANCHOR RODS IN BASE PLATES MAY BE OVERSIZED IN ACCORDANCE WITH AISC SPECIFICATIONS. PROVIDE WASHERS AS INDICATED ON CONTRACT DRAWINGS.
 - WELD THREADED NUTS TO FRAMING AND OTHER SPECIALTY ITEMS INDICATED TO RECEIVE OTHER WORK.
- SHOP CONNECTIONS
 - HIGH-STRENGTH BOLTS: SHOP INSTALL HIGH-STRENGTH BOLTS ACCORDING TO RCSC'S "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A 325 OR A 490 BOLTS" FOR TYPE OF BOLT AND TYPE OF JOINT SPECIFIED.
 - JOINT TYPE: SNUG TIGHTENED UNLESS NOTED OTHERWISE ON CONTRACT DRAWINGS.
 - HIGH STRENGTH BOLTS FOR BEARING CONNECTIONS SHALL BE TIGHTENED IN ACCORDANCE WITH RCSC SPECIFICATIONS TO A SNUG-TIGHT CONDITION. PROVIDE HARDENED WASHERS AS REQUIRED BY THE RCSC SPECIFICATION.
 - HIGH STRENGTH BOLTS FOR SLIP-CRITICAL CONNECTIONS, AS NOTED ON THE CONTRACT DRAWINGS, SHALL BE TIGHTENED IN ACCORDANCE WITH RCSC SPECIFICATIONS BY CALIBRATED WRENCH METHOD. PROVIDE HARDENED WASHERS AS REQUIRED BY THE RCSC SPECIFICATIONS.
 - WELD CONNECTIONS: COMPLY WITH AWS D1.1/D1.1M. FOR TOLERANCES, APPEARANCES, WELDING PROCEDURE SPECIFICATIONS, WELD QUALITY, AND METHODS USED IN CORRECTING WELDING WORK.
 - ASSEMBLE AND WELD BUILT-UP SECTIONS BY METHODS THAT WILL MAINTAIN TRUE ALIGNMENT OF AXES WITHOUT EXCEEDING TOLERANCES IN AISC 303 FOR MILL MATERIAL.
- SHOP PRIMING
 - SHOP PRIME STEEL SURFACES EXCEPT THE FOLLOWING:
 - SURFACES EMBEDDED IN CONCRETE OR MORTAR. EXTEND PRIMING OF PARTIALLY EMBEDDED MEMBERS TO A DEPTH OF 2 INCHES.
 - SURFACES TO BE FIELD WELDED.
 - SURFACES TO BE HIGH-STRENGTH BOLTED WITH SLIP-CRITICAL CONNECTIONS.
 - SURFACES TO RECEIVE SPRAYED FIRE-RESISTIVE MATERIALS (APPLIED FIREPROOFING).
 - GALVANIZED SURFACES.
 - SURFACE PREPARATION: CLEAN SURFACES TO BE PAINTED. REMOVE LOOSE RUST AND MILL SCALE AND SPATTER, SLAG, OR FLUX DEPOSITS. PREPARE SURFACES ACCORDING TO THE FOLLOWING SPECIFICATIONS AND STANDARDS:
 - SSPC-SP 3, "POWER TOOL CLEANING".
 - PRIMING: IMMEDIATELY AFTER SURFACE PREPARATION, APPLY PRIMER ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND AT RATE RECOMMENDED BY SSPC TO PROVIDE A MINIMUM DRY FILM THICKNESS OF 1/5 MILS. USE PRIMING METHODS THAT RESULT IN FULL COVERAGE OF JOINTS, CORNERS, EDGES, AND EXPOSED SURFACES.
 - STRIP PAINT CORNERS, CREVICES, BOLTS, WELDS, AND SHARP EDGES.
 - APPLY TWO COATS OF SHOP PAINT TO SURFACES THAT ARE INACCESSIBLE AFTER ASSEMBLY OR ERECTION. CHANGE COLOR OF SECOND COAT TO DISTINGUISH IT FROM FIRST.
 - PAINTING: PREPARE STEEL AND APPLY A ONE-COAT, NOASPHALTIC PRIMER COMPLYING WITH SSPC-PS GUIDE 7.00, "PAINTING SYSTEM GUIDE 7.00: GUIDE FOR SELECTING ONE-COAT SHOP PAINTING SYSTEMS", TO PROVIDE A DRY FILM THICKNESS OF NOT LESS THAN 1.5 MILS.

STRUCTURAL STEEL NOTES

- STRUCTURAL STEEL SHALL MEET THE FOLLOWING MINIMUM YIELD STRENGTHS:

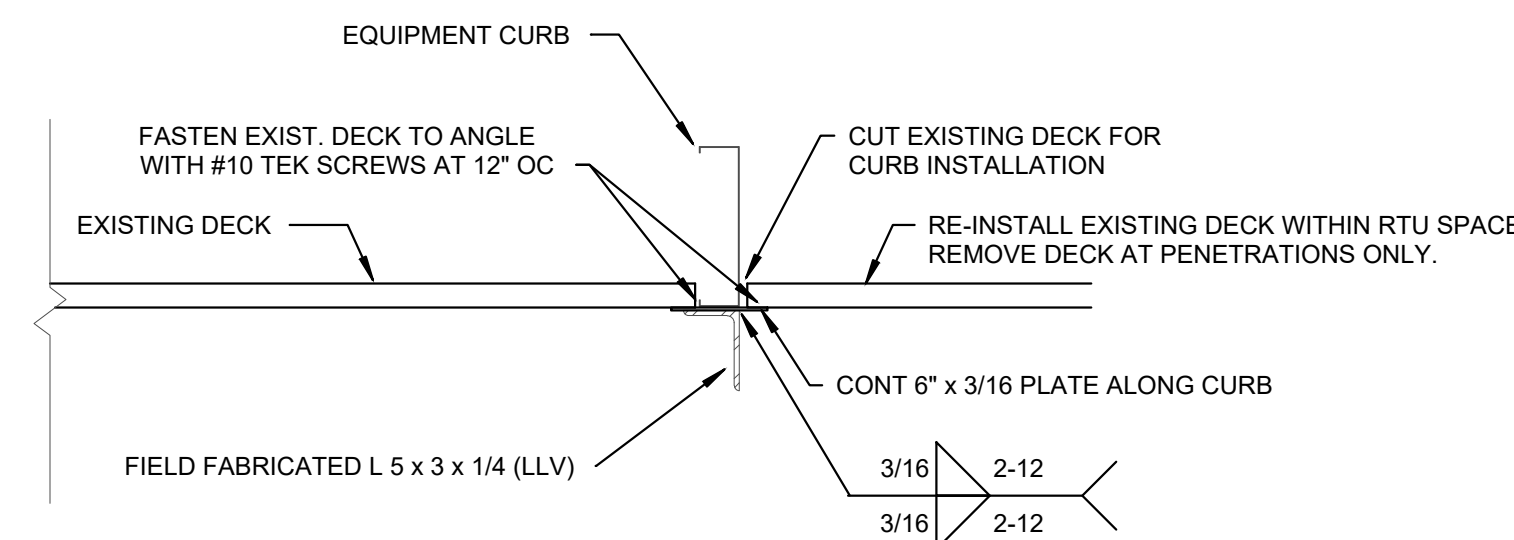
	YIELD STRENGTH	ASTM SPEC
A. W, WT SHAPES:	50 KSI	A992
B. OTHER SHAPES, BARS AND PLATES:	36 KSI	A36
C. SQUARE HSS:	46 KSI	A500, GRADE B
D. STRUCTURAL STEEL PIPE:	35 KSI	A53, GR B, OR A500
E. ANCHOR RODS:	35 KSI	F1554
F. ALL-THREAD RODS:	35 KSI	A36
- BOLTS FOR STEEL BEAM AND COLUMN CONNECTIONS SHALL BE 3/4" DIAMETER ASTM A325 HIGH-STRENGTH BOLTS INSTALLED SNUG TIGHT, UNLESS NOTED OTHERWISE.
- WELDING SHALL MEET ANSI, AWS D1.1, STRUCTURAL WELDING CODE. ELECTRODES FOR WELDING SHALL BE 70 KSI, LOW HYDROGEN.
- ALL STEEL SHALL BE SHOP PRIMED & TOUCHED UP IN THE FIELD AFTER INSTALLATION.

DESIGN PARAMETERS
LOCATION: WILLOW SPRINGS, MO

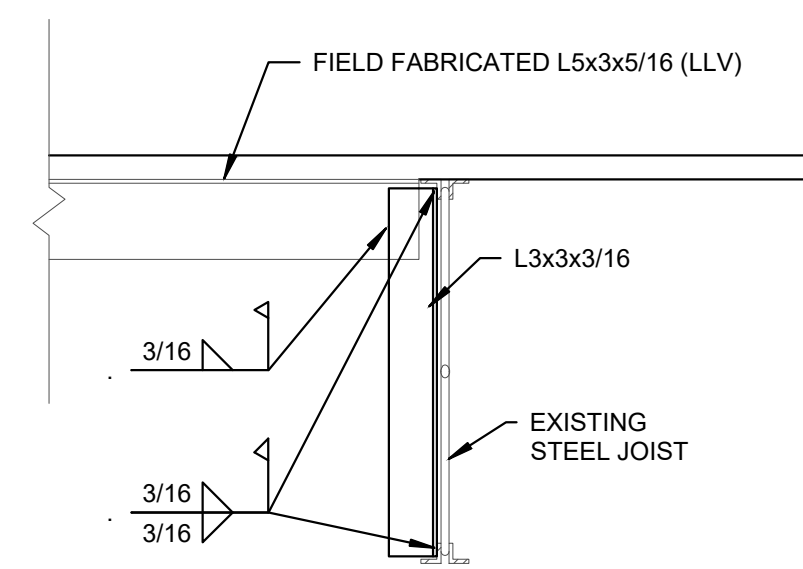
1. BUILDING CODE	2021 IBC
2. LIVE LOADS	
ROOF	20 PSF
3. SNOW LOADS	
A. GROUND SNOW LOAD, P _g	15 PSF
B. SNOW EXPOSURE FACTOR, C _e	1.0
C. SNOW THERMAL FACTOR, C _t	1.0
D. IMPORTANCE FACTOR, I	1.1
4. WIND LOADS	
A. NOMINAL DESIGN WIND SPEED (USD)	114 MPH
B. RISK CATEGORY	III
C. EXPOSURE CATEGORY	C
5. EARTHQUAKE LOADS	
A. SPECTRAL RESPONSE ACCELERATION (SHORT PERIOD), S _s	0.354
B. SPECTRAL RESPONSE ACCELERATION (1-SEC. PERIOD), S ₁	0.159
C. IMPORTANCE FACTOR, I	1.25
D. SEISMIC RISK CATEGORY	III
E. SEISMIC DESIGN CATEGORY (1-SEC PERIOD CONTROLS)	D
F. SOIL SITE CLASS (ASSUMED)	D
G. BASIC STRUCTURAL SYSTEM	N/A
H. BASIC SEISMIC FORCE RESISTING SYSTEM	N/A

GENERAL NOTE:

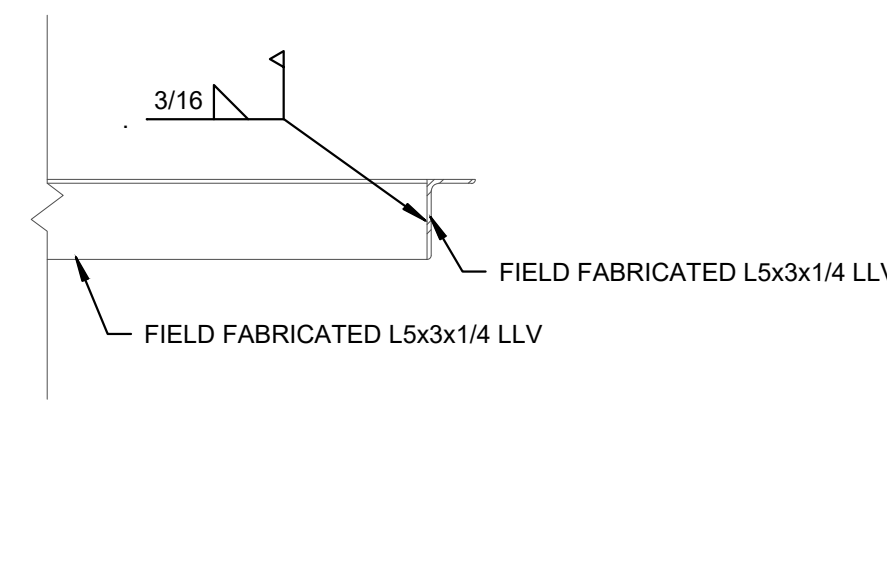
MODIFICATIONS MADE TO ROOF FRAMING TO SUPPORT NEW ROOF TOP UNITS HAVE BEEN DESIGNED FOR THE LOADING DESCRIBED IN THE DESIGN PARAMETERS.



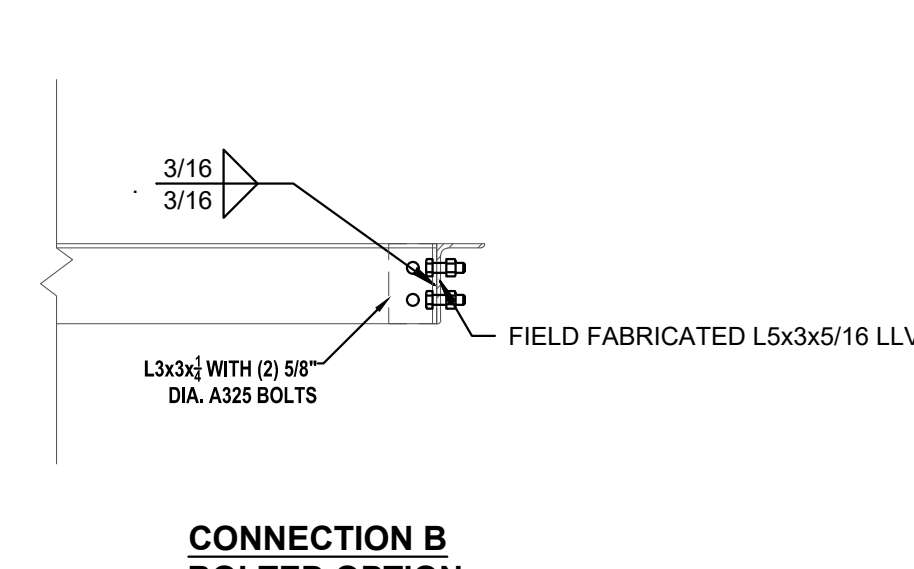
CONNECTION D



CONNECTION A



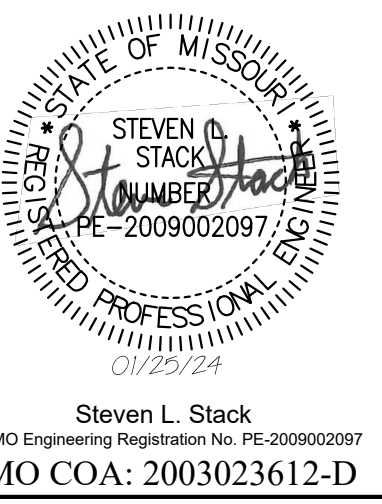
CONNECTION B



CONNECTION B BOLTED OPTION

RTU FRAMING DETAILS
1" = 1'-0"

STATE OF MISSOURI
MICHAEL L. PARSON,
GOVERNOR



STRUCTURAL ENGINEER:

Archer Elgin
310 East 6th Street
Rolla, MO 65401
P: 573-364-6362
www.archer-elgin.com

MEP:
McClure Engineering
1000 Clark Avenue
Fifth Floor
St. Louis, MO 63102
P: 314-645-6232
www.mcclureeng.com

OFFICE OF ADMINISTRATION
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DEPARTMENT OF
PUBLIC SAFETY
MISSOURI STATE
HIGHWAY PATROL

REPLACE HVAC TROOP G
HEADQUARTERS BUILDING

1226 W. BUSINESS US-60/63
WILLOW SPRINGS, MO 65793

PROJECT # R2313-01
SITE# 6008
FACILITY# 8136008002

REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
REVISION: _____
DATE: _____
ISSUE DATE: 01/25/2024

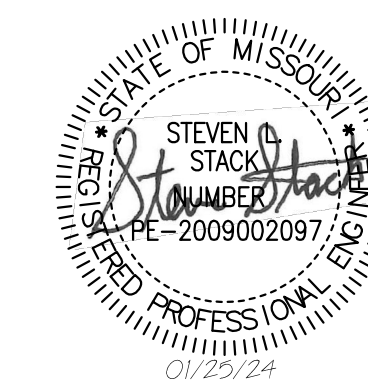
DRAWN BY: JSM
CHECKED BY: SLS
DESIGNED BY: SLS

SHEET TITLE:
**STRUCTURAL
DETAILS**

SHEET NUMBER:

S1

23 OF 24 SHEETS
01/25/2024



Steven L. Stack
MO Engineering Registration No. PE-2009002097
MO COA: 2003023612-D

STRUCTURAL ENGINEER:

Archer Elgin

310 East 6th Street

Rolla, MO 65401

P: 573-364-6362

www.archer-elgin.com

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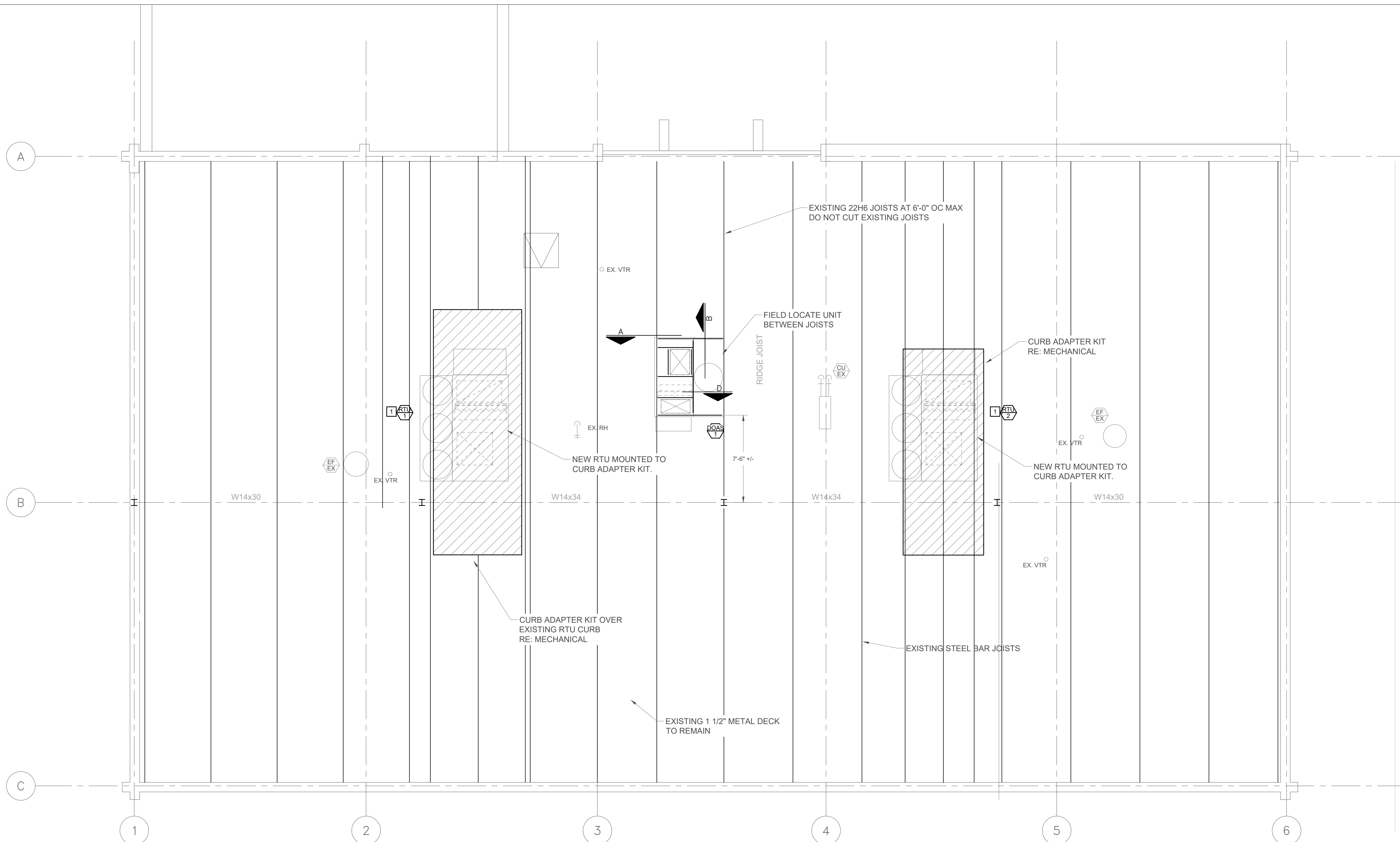
SHEET TITLE:

**ROOF FRAMING
PLAN**

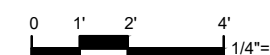
SHEET NUMBER:

S2

24 OF 24 SHEETS
01/25/2024



ROOF FRAMING PLAN
SCALE: 1/4" = 10"



NEW ROOF TOP EQUIPMENT DEAD LOADS:	
1. DOAS #1	1,300 POUNDS
2. RTU #1	3,100 POUNDS
3. RTU #2	2,700 POUNDS