REPLACE BOILERS PHASE 2 - BUILDING 29, MISSOURI NATIONAL GUARD, AVCRAD

1107th Aviation Group

5250 W Depot Road
Springfield, Missouri 65801

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April 13th, 2026

OWNER: STATE OF MISSOURI
MIKE KEHOE, GOVERNOR

MISSOURI NATIONAL GUARD
OFFICE OF THE ADJUTANT GENERAL
FACILITIES MANAGEMENT OFFICE

PROJECT MANAGEMENT: STATE OF MISSOURI
DIVISION OF FACILITIES MANAGEMENT
DESIGN AND CONSTRUCTION (FMDC)
OFFICES OF THE ADJUTANT GENERAL FACILITIES MANAGEMENT OFFICE

PROJECT LOCATION

DESIGNER:

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GENERAL NOTES

1. ALL WORK SHALL CONFORM WITH THE APPLICABLE BUILDING CODES, REGULATIONS, OCCUPANCY PERMITS AND ORDINANCES. CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE WITH ORDERS OF ANY PUBLIC AUTHORITY BEARING ON THE PERFORMANCE OF THE WORK. THE CONTRACTOR SHALL APPLY FOR, OBTAIN AND PAY FOR ALL PERMITS, FEES, INSPECTIONS AND APPROVALS BY LOCAL AUTHORITIES HAVING JURISDICTION OVER THE PROJECT. IN THE EVENT OF A CONFLICT BETWEEN THE CONSTRUCTION DOCUMENTS AND AN APPLICABLE CODE, CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND THE ARCHITECT FOR DIRECTION AND RESOLUTION. FAILURE TO NOTIFY EITHER OF THESE PARTIES PRIOR TO COMMENCEMENT OF THE WORK, SHALL MAKE THE CONTRACTOR RESPONSIBLE FOR ANY CORRECTIVE MEASURES NEEDED TO BRING THE PROBLEM INTO PROPER CONFORMANCE, WITHOUT ADDITIONAL COSTS OR CHARGES TO THE OWNER. PROVIDE COPIES OF ALL TRANSACTIONS TO OWNER.
2. CONTRACTOR SHALL PROVIDE & MAINTAIN A REDLINED AS-BUILT CONSTRUCTION DOCUMENT SET AT THE SITE. THE OWNER OR THE ARCHITECT RESERVES THE RIGHT TO REVIEW THESE DOCUMENTS ON A WEEKLY BASIS.
3. PROVIDE THE ARCHITECT WITH A COMPLETE COPY OF AS-BUILT DRAWINGS AT THE COMPLETION OF THE PROJECT.
4. GENERAL CONTRACTOR SHALL FURNISH A COMPLETE LIST OF CHEMICALS TO BE USED IN THE PROJECT ALONG WITH THE MATERIAL DATA SAFETY SHEET ON EACH PRODUCT TO THE ARCHITECT. A COPY SHALL BE KEPT ON SITE FOR REFERENCE.
5. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR, AND HAVE CONTROL OVER, ALL CONSTRUCTION MEANS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR COORDINATING ALL PORTIONS OF THE WORK REQUIRED BY THE CONTRACT DOCUMENTS.
6. NO EQUIP., MATERIALS, OR VEHICLES ARE TO BE STORED OR PARKED ON AREAS NOT WITHIN THE AREAS INDICATED AS BEING DEMOLISHED ON THE DRAWINGS. IF AREAS ARE DISTURBED OR DAMAGED THE CONTRACTOR IS RESPONSIBLE FOR REPLACEMENT AT CONTRACTORS EXPENSE.
7. PRIOR TO LEAVING THE SITE DAILY, THE CONTRACTOR IS TO LEAVE THE FACILITY SECURABLE.
8. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE SAFETY OF CONSTRUCTION PERSONNEL AND AUTHORIZED VISITORS.
9. SCOPE OF WORK OF ALL TRADES IS TO INCLUDE ALL MATERIALS AND LABOR AS REQUIRED TO TOTALLY COMPLETE THE PROJECT. ALL WORK SHALL BE COMPLETE, CONSISTENT WITH THE DESIGN INTENT AS EXPRESSED IN THESE DOCUMENTS, WHETHER SPECIFICALLY ADDRESSED IN THESE DOCUMENTS OR NOT. ANY QUESTIONS CONCERNING THE COMPLETENESS OF THE WORK SHALL BE ADDRESSED TO THE ARCHITECT.
10. ALL WORK SHALL BE PERFORMED BY THE GENERAL CONTRACTOR UNLESS OTHERWISE NOTED. ALL REFERENCES TO THE "CONTRACTOR" INCLUDE THE GENERAL CONTRACTOR AND THE SUBCONTRACTORS.
11. THE GENERAL CONTRACTOR SHALL SEE THAT ALL SUBCONTRACTORS RECEIVE COMPLETE SETS OF WORKING DRAWINGS FOR COORDINATION OF THEIR WORK AND DESCRIPTION OF SCOPE.
12. CONTRACTOR SHALL NOT MAKE, CAUSED TO BE MADE, OR PERMIT A SUBCONTRACTOR TO MAKE ANY CHANGE TO WHAT IS SPECIFIED ON THE PLAN WITHOUT SPECIFIC AUTHORIZATION OF THE ARCHITECT.
13. THE ARCHITECT IS NOT RESPONSIBLE FOR ERRORS, OMISSIONS OR DELAYS BY THE CONTRACTOR.
14. DO NOT SCALE DRAWINGS, FOLLOW WRITTEN DIMENSIONS OR KEYED NOTES ONLY. CONTACT ARCHITECT IMMEDIATELY FOR CLARIFICATION IF REQUIRED. VERIFY DIMENSIONS IN THE FIELD. LARGE SCALE DETAILS GOVERN OVER SMALL SCALE DETAILS.
15. ALL WALL DIMENSIONS ARE FOR GENERAL REFERENCE ONLY AND MAY VARY.
16. "MINIMUM" OR "MIN" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS SLIGHTLY ADJUSTABLE BUT MAY NOT VARY TO A DIMENSION OR QUANTITY LESS THAN THAT SHOWN WITHOUT THE APPROVAL OF THE ARCHITECT.
17. "MAXIMUM" OR "MAX" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION IS SLIGHTLY ADJUSTABLE BUT MAY NOT VARY TO A DIMENSION OR QUANTITY GREATER THAN THAT SHOWN WITHOUT THE APPROVAL OF THE ARCHITECT.
18. "±" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE DIMENSION OR QUANTITY IS SLIGHTLY ADJUSTABLE TO ACCOMMODATE ACTUAL CONDITIONS. VERIFY THE EXACT DIMENSION IN THE FIELD PRIOR TO FABRICATION.
19. "TYPICAL" OR "TYP." AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE CONDITION OR DIMENSION IS THE SAME OR REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT.
20. "MATCH EXIST." AS USED IN THE DOCUMENTS SHALL MEAN THAT THE CONDITION OR MATERIAL IS TO SEAMLESSLY MATCH THE SURROUNDING OR PRESCRIBE MATERIAL IN STYLE, PROFILE, COLOR, TEXTURE & WHERE POSSIBLE MANUFACTURE.
21. "CLEAR" AS USED IN THESE DOCUMENTS SHALL MEAN THAT THE DIMENSION IS NOT ADJUSTABLE WITHOUT THE APPROVAL OF THE ARCHITECT. CLEAR DIMENSIONS SHALL BE ACCURATE TO FINISH WALL MATERIAL. CONTACT ARCHITECT PRIOR TO CONSTRUCTION IF FIELD CONDITIONS DO NOT ACCOMMODATE SAID DIMENSION.
22. "ALIGN" AS USED IN THESE DOCUMENTS SHALL MEAN TO ACCURATELY LOCATE AND FINISH FACES IN THE SAME PLANE; AND/OR TO INSTALL NEW CONSTRUCTION ADJACENT TO EXISTING CONSTRUCTION WITHOUT ANY VISIBLE JOINTS OR SURFACE IRREGULARITIES.
23. ANY DISCREPANCIES AS TO LOCATION BETWEEN THE ARCHITECTURAL AND ENGINEERING DRAWINGS OR BETWEEN THE DRAWINGS AND EXISTING FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR CLARIFICATIONS. WORK INSTALLED IN CONFLICT WITH THE CONTRACT DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE AND SHALL NOT IMPACT THE SCHEDULE.
24. THE ARCHITECT SHALL HAVE THE RIGHT TO MAKE FIELD ADJUSTMENTS IN ORDER TO MAINTAIN DESIGN INTENT.
25. CONTRACTOR SHALL FULLY ACQUAINT HIMSELF WITH THE CONDITIONS OF THE CONTRACT. LOCAL CONDITIONS RELATING TO LOCATION, ACCESSIBILITY AND GENERAL CHARACTER OF THE CONSTRUCTION SITE AND LOCAL LABOR CONDITIONS SO THAT HE UNDERSTANDS THE NATURE, EXTENT, DIFFICULTIES AND RESTRICTIONS RELATED TO THE EXECUTION OF THE WORK.
26. INVESTIGATE JOB SITE TO COMPARE CONTRACT DOCUMENTS AND EXISTING CONDITIONS. INCLUDE COST FOR ALL WORK DESCRIBED IN CONTRACT DOCUMENTS AND REQUIRED OR IMPLIED BY EXISTING CONDITIONS. NOTIFY ARCHITECT OF ANY CONFLICTS BETWEEN EXISTING CONDITIONS AND NEW WORK, OMISSIONS OR CONFLICTS IN THE DRAWINGS AND ANY RESTRICTIONS RELATED TO THE EXECUTION OF THE WORK.
27. CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR VERIFYING AND LOCATING ALL UNDERGROUND UTILITIES, ETC. PRIOR TO START OF CONSTRUCTION.
28. OBTAIN THE OWNER'S WRITTEN AUTHORIZATION BEFORE ANY WORK IS PERFORMED OR MATERIAL ORDERED WHICH INVOLVES EXTRA COST OVER AND ABOVE CONTRACT PRICE.
29. INSTALL AND MAINTAIN ALL NECESSARY COVERINGS. PROTECTIVE ENCLOSURES, TEMPORARY DOORS AND PARTITIONS AND DUST BARRIERS TO PROTECT ALL OCCUPANTS AND REPLACE ANY DAMAGES CAUSED BY IMPROPER PROTECTION AT NO ADDITIONAL CHARGE TO OWNER.
30. SUBMIT FOR APPROVAL TO THE ARCHITECT FINISHES LISTED AS MATCH EXISTING.
31. WHERE WALLS, CEILINGS, OR FLOORS ARE PATCHED, EXTENDED, OR REPAIRED, MATCH EXISTING MATERIALS, SIZE, PATTERN, TEXTURE, & COLOR UNLESS INDICATED OTHERWISE.
32. MATERIALS INDICATED TO BE REINSTALLED IN PROJECT ARE TO BE CLEANED, PAINTED, REPAIRED AS APPROPRIATE FOR REINSTALLATION IN "LIKE NEW" CONDITION.
33. CONTRACTOR TO PROTECT SITE FROM DAMAGE TO VEGETATION, DRIVES, PAVEMENT, AND WALKS. CONTRACTOR TO REPAIR OR REPLACE DISTURBED OR DAMAGED AREAS.

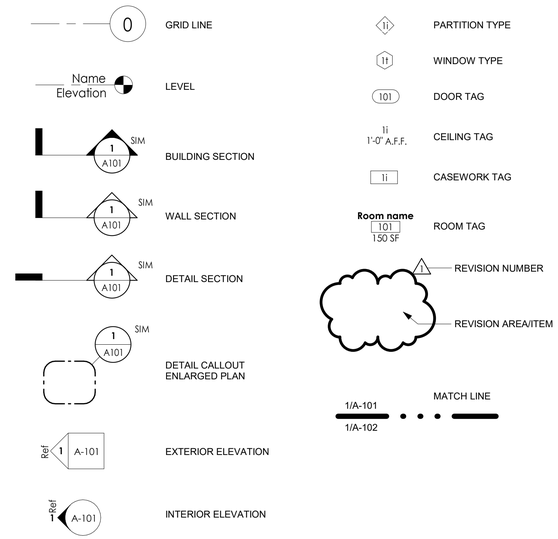
ABBREVIATIONS

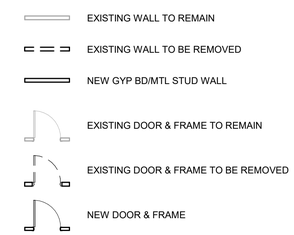
ADJ	ADJACENT
A.F.F.	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
ALT	ALTERNATE
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL
A.S.	ABOVE SLAB
BB	BASE BID
BD	BOARD
BL	BORROWED LITE
BLDG	BUILDING
BLKG	BLOCKING
BRG	BEARING
BOT	BOTTOM
B.O.	BOTTOM OF
B.O.S.	BOTTOM OF STEEL
CJ	CONTROL JOINT
CL	CLOSET
CLNG	CEILING
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
C.O.	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRCTION
CONT	CONTINUOUS
CONTR	CONTRACTOR
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
DBL	DOUBLE
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DIM	DIMENSION
DN	DOWN
DR	DOOR
DTL	DETAIL
DW	DISHWASHER
DWG(S)	DRAWING/DRAWINGS
E	EAST
EA	EACH
EJ	EXPANSION JOINT
EL, ELEV	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
ENCL	ENCLOSURE
E.O.S.	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
E.T.R.	EXISTING TO REMAIN
E.W.	EACH WAY
EXIST.	EXISTING
EXT	EXTERIOR
FAP	FIRE ALARM PANEL
FD	FLOOR DRAIN
FDN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FIN.	FINISH
FIX, FIXT	FIXTURE
FL, FLR	FLOOR
FLASH	FLASHING
F.O.C.	FACE OF CONCRETE
F.O.F.	FACE OF FINISH
F.O.S.	FACE OF STUD
F.O.W.	FACE OF WALL
FR	FIRE RATED, FIRE RETARDANT
FT	FOOT, FEET
FTG	FOOTING
FURR	FURRING
F.V.	FIELD VERIFY
FVC	FIRE VALVE CABINET
GA	GAUGE
GALV	GALVANIZED
G.C.	GENERAL CONTRACTOR
GRND	GROUND
GL	GLASS, GRID LINE
G.S.F.	GROSS SQUARE FOOTAGE
GYP BD	GYPSUM WALLBOARD
GYP	GYPSUM
H.B.	HOSE BIB
HC	HANDICAPPED
HD	HEAD
HDWR	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HR	HOUR
HT	HEIGHT
HVAC	HEATING, VENTILATION, AIR CONDITIONING
ID	INSIDE DIAMETER
IN	INCH
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR
JST	JOIST
JT/ JNT	JOINT
KEC	KITCHEN EQUIPMENT CONTRACTOR
KIT	KITCHEN
L	LONG / LENGTH
LAM	LAMINATE, LAMINATED
LAV	LAVATORY
LT	LIGHT
M&MR	MOLD & MOISTURE RESISTANT
MAT'L	MATERIAL
MAS	MASONRY
MAX	MAXIMUM
MECH	MECHANICAL
MEMB	MEMBRANE
MTL	METAL
MEZZ	MEZZANINE
MFR, MANUF.	MANUFACTURER
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MR	MOISTURE RESISTANT
MTD	MOUNTED
MWS	MOVABLE WALL SYSTEM
N	NORTH
N.I.C.	NOT IN CONTRACT
NO, NUM	NUMBER
NOM	NOMINAL
N.S.F.	NET SQUARE FEET
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OD	OUTSIDE DIAMETER
OFF.	OFFICE
OFD	OVERFLOW DRAIN
OGPP	OPERABLE GLASS PANEL PARTITION
OPNG	OPENING
OPP	OPPOSITE
OSF	OFFICE SYSTEMS FURNITURE
PERP.	PERPENDICULAR
PL	PLATE
PLAM	PLASTICAL LAMINATE
PLYWD	PLYWOOD
PNL, PANEL	PANELBOARD
PR	PAIR
PROJ	PROJECT
PROP.	PROPERTY
P.T.	PRESSURE TREATED
PT	PAINT
QT	QUARRY TILE
QTY	QUANTITY
R	RISER
RCP	REFLECTED CEILING PLAN
RAD, R	RADIUS
RD	ROOF DRAIN
REINF. R.I.	REINFORCED
REQ, REQ'D	REQUIRED
REV	REVISION
RM	ROOM
R.O.	ROUGH OPENING
S	SOUTH
SC	SOLID CORE
SCHED	SCHEDULE
SECT	SECTION
S.F.	SQUARE FEET
SGD	SAFETY GLASSES DISPENSER
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
S.S.	STAINLESS STEEL
ST	STAIR
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT.	STRUCTURAL
SUSP	SUSPENDED
SYM	SYMMETRICAL
TRD	TREAD
T.C.	THEATER CONSULTANT
TEMP.	TEMPORARY
THK	THICK
T.O.	TOP OF
T.O.S.	TOP OF STEEL
T.O.M.	TOP OF MASONRY
T.O.W.	TOP OF WALL
TR	TRASH RECEPTACLE
T.S.	TUBE STEEL
TYP	TYPICAL
UNFIN.	UNFINISHED
U.O.N.	UNLESS OTHERWISE NOTED
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST.	VESTIBULE
V.I.F.	VERIFY IN FIELD
VWC	VINYL WALLCOVERING
W	WEST, WIDE, WIDTH
W/, W/O	WITH, WITHOUT
WC	WATER CLOSET
WDW	WINDOW
WH	WATER HEATER
W.R.	WATER RESISTANT

GENERAL DEMO NOTES

1. ITEMS TO BE REMOVED ARE TO BE DISPOSED OF PROPERLY TO MEET LOCAL, STATE, AND FEDERAL LAWS. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.
2. DO NOT BURN DEMOLISHED MATERIALS.
3. COMPLY WITH GOVERNING EPA NOTIFICATION REGULATIONS BEFORE BEGINNING SELECTIVE DEMOLITION. COMPLY WITH HAULING AND DISPOSAL REGULATIONS OF AUTHORITIES HAVING JURISDICTION.
4. UNLESS OTHERWISE INDICATED, DEMOLITION WASTE BECOMES PROPERTY OF CONTRACTOR.
5. STORAGE OR SALE OF REMOVED ITEMS OR MATERIALS ON-SITE IS PROHIBITED.
6. NOTIFY ARCHITECT OF DISCREPANCIES BETWEEN EXISTING CONDITIONS AND DRAWINGS BEFORE PROCEEDING WITH SELECTIVE DEMOLITION.
7. HAZARDOUS MATERIALS MAY BE PRESENT IN THE LIGHTING BALLAST. REMOVE AND DISPOSE OF PROPERLY.
8. IF SUSPECTED HAZARDOUS MATERIALS ARE ENCOUNTERED, DO NOT DISTURB. IMMEDIATELY NOTIFY ARCHITECT AND OWNER.
9. DESIGN, PROVIDE, AND MAINTAIN SHORING, BRACING, AND STRUCTURAL SUPPORTS AS REQUIRED TO PRESERVE STABILITY AND PREVENT MOVEMENT, SETTLEMENT, OR COLLAPSE OF CONSTRUCTION AND FINISHES TO REMAIN, AND TO PREVENT UNEXPECTED OR UNCONTROLLED MOVEMENT OR COLLAPSE OF CONSTRUCTION BEING DEMOLISHED. STRENGTHEN OR ADD NEW SUPPORTS WHEN REQUIRED DURING PROGRESS OF SELECTIVE DEMOLITION.
10. COORDINATE REMOVAL/RELOCATION OF ALL FURNISHING & EQUIPMENT WITH TENANT.
11. LIGHTING FIXTURES TO BE REMOVED ARE TO BE DISPOSED OF PROPERLY COORDINATE WITH ENGINEERING DOCUMENTS.
12. RECEPTACLES TO BE REMOVED OR RELOCATED WHERE NOTED. ALL ASSOCIATED BRANCH CIRCUIT WIRING IS TO BE REMOVED BACK TO SOURCE. COORDINATE WITH ENGINEERING DOCUMENTS
13. SWITCHES TO BE REMOVED OR RELOCATED WHERE NOTED. ALL ASSOCIATED BRANCH CIRCUIT WIRING IS TO BE REMOVED BACK TO SOURCE. COORDINATE WITH ENGINEERING DOCUMENTS
14. FIRE ALARM DEVICES OBSTRUCTING CONSTRUCTION ARE TO BE REMOVED. ALL ASSOCIATED WIRING IS TO BE REMOVED BACK TO NEAREST JUNCTION BOX SERVING AREA. THE EXISTING FIRE ALARM SYSTEM SHALL REMAIN IN OPERATION AT ALL TIMES. IF ANY OUTAGE IS REQUIRED, CONTRACTOR SHALL NOTIFY OWNER. COORDINATE WITH ENGINEERING DRAWINGS.
15. REMOVE ALL UNUSED WIRING AND CABLE BACK TO PANELBOARD OR NEAREST OUTLET TO REMAIN IN SERVICE. REMOVE ALL UNUSED CONDUIT BACK TO SOURCE OR PERIMETER WALL. PROVIDE CONDUIT CAP AT FLOOR OR PERIMETER WALL LOCATIONS. COORDINATE WITH ENGINEERING DOCUMENTS.
16. DUCTWORK TO BE REMOVED BACK TO SOURCE. COORDINATE WITH ENGINEERING DOCUMENTS.
17. REMOVE ALL TELEPHONE, DATA, SWITCHES, OUTLETS AND ASSOCIATED WIRING CONDUIT AND CONDUCTORS BACK TO SOURCE. COORDINATE WITH ENGINEERING DOCUMENTS.
18. PROCEED WITH SELECTIVE DEMOLITION SYSTEMATICALLY, FROM HIGHER TO LOWER LEVEL. COMPLETE SELECTIVE DEMOLITION OPERATIONS ABOVE EACH FLOOR OR TIER BEFORE DISTURBING SUPPORTING MEMBERS ON THE NEXT LOWER LEVEL.
19. NEATLY CUT OPENINGS AND HOLES PLUMB, SQUARE, AND TRUE TO DIMENSIONS REQUIRED. USE CUTTING METHODS EAST LIKELY TO DAMAGE CONSTRUCTION TO REMAIN OR ADJOINING CONSTRUCTION. USE HAND TOOLS OR SMALL POWER TOOLS DESIGNED FOR SAWING OR GRINDING, NOT HAMMERING AND CHOPPING. TEMPORARILY COVER OPENINGS TO REMAIN.
20. DO NOT USE CUTTING TORCHES UNTIL WORK AREA IS CLEARED OF FLAMMABLE MATERIALS. AT CONCEALED SPACES, SUCH AS DUCT AND PIPE INTERIORS, VERIFY CONDITION AND CONTENTS OF HIDDEN SPACE BEFORE STARTING FLAME-CUTTING OPERATIONS. MAINTAIN PORTABLE FIRE-SUPPRESSION DEVICES DURING FLAME-CUTTING OPERATIONS.
21. MAINTAIN FIRE WATCH DURING AND FOR AT LEAST 24 HOURS AFTER FLAME-CUTTING OPERATIONS.
22. MAINTAIN ADEQUATE VENTILATION WHEN USING CUTTING TORCHES.
23. DISPOSE OF DEMOLISHED ITEMS AND MATERIALS PROMPTLY.
24. CONDUCT SELECTIVE DEMOLITION AND DEBRIS-REMOVAL OPERATIONS TO ENSURE MINIMUM INTERFERENCE WITH ROADS, STREETS, WALKS, WALKWAYS, AND OTHER ADJACENT OCCUPIED AND USED FACILITIES.
25. CLEAN SALVAGED ITEMS. PACK OR CRATE ITEMS AFTER CLEANING. IDENTIFY CONTENTS OF CONTAINERS. STORE ITEMS IN A SECURE AREA UNTIL DELIVERY TO OWNER. PROTECT ITEMS FROM DAMAGE WHILE IN STORAGE.
26. PROTECT CONSTRUCTION INDICATED TO REMAIN AGAINST DAMAGE AND SOILING DURING SELECTIVE DEMOLITION. WHEN PERMITTED BY ARCHITECT, ITEMS MAY BE REMOVED TO A SUITABLE PROTECTED STORAGE LOCATION DURING SELECTIVE DEMOLITION AND CLEANED AND REINSTALLED IN THEIR ORIGINAL LOCATIONS AFTER SELECTIVE DEMOLITION OPERATIONS ARE COMPLETE.

SYMBOLS





A2 OVER 200 TYPE I OR II

MISSOURI BUILDING CODES
2018 IBC
2015 IPC
2015 IEBC
2015 IFC
2016 IPSDC
2015 IMC
2009 IECC

Occupancy Classification:	A2, non sprinkled
Construction Type:	IIB
Number of Exits Required:	2 from each space when >49 people or common path of travel exceeds 75 feet (IBC 1006.2.1)
Exit Separation	Separated by one-half the diagonal (IBC 1007.1.1)
Number of Exits Required:	2 from each space when >49 people or common path of travel exceeds 75 feet (IBC 1006.2.1)
Exit Separation	Separated by one-half the diagonal (IBC 1007.1.1)
Active Fire Protection:	
Automatic Sprinkler System	Required (IBC 903.2.9)
Standpipes	Required (IBC 903.2.2)
Fire Extinguishers	Required (IBC 906.1)
Fire Alarm System	Required (IBC 907)
Emergency Power	
Exit Signs (IBC 1013)	Required
Emergency Lighting (IBC 1008	Required
Occupancy Load (IBC Table 1004.1.2)	

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STATE OF MISSOURI
MIKE KEHOE,
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OFFICE OF THE
ADJUTANT GENERAL

MISSOURI NATIONAL GUARD
FACILITIES DIVISION

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100% Issued for Bid Set

STATE OF MISSOURI
CORY WILSON
04.13.2026
NUMBER
PE-2010009876
PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CORY WILSON
MISSOURI PE # 2010009876

REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD, MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 04.13.2026

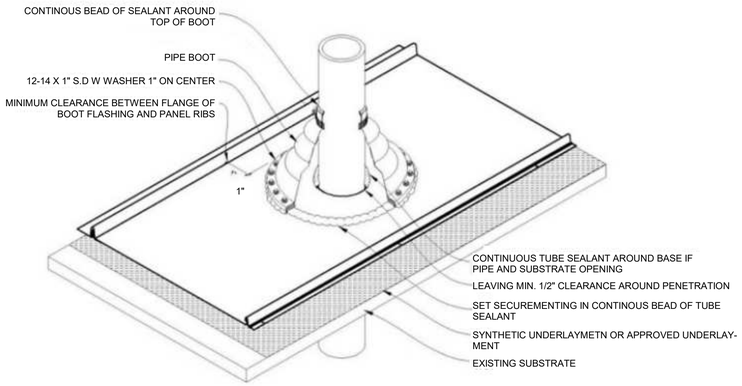
CAD DWG FILE:
DRAWN BY:
CHECKED BY:
DESIGNED BY:

SHEET TITLE:

ARCHITECTURAL GENERAL NOTES

SHEET NUMBER:

A-000

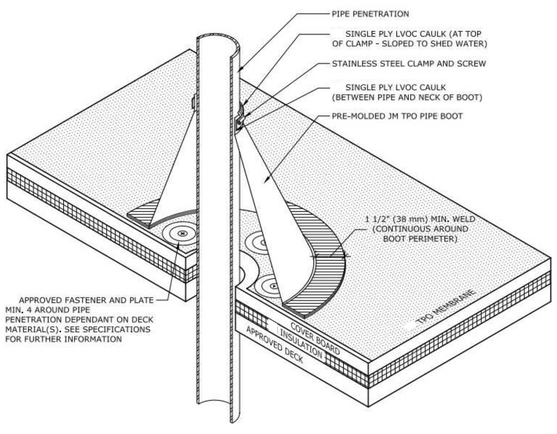


STANDING SEAM METAL ROOF PENETRATION 03
REFERENCED FROM 01 / A-110 1/2" = 1'-0"

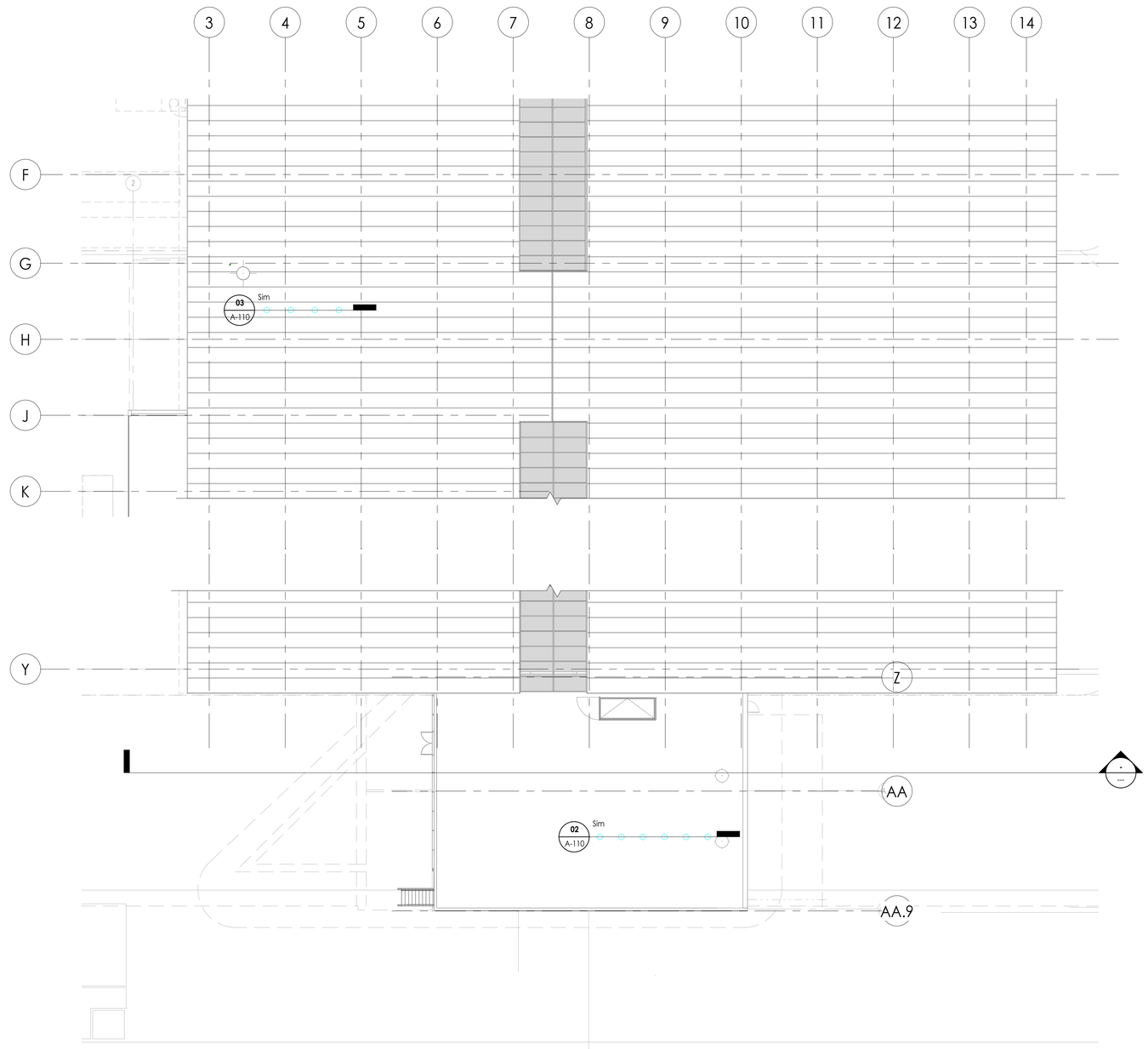
ROOF WARRANTY WORK:

ALL ROOF REPAIR WORK ON STANDING SEAM AND TPO SINGLE-PLY MEMBRANE SHALL BE LIMITED TO EXISTING MANUFACTURER WARRANTY HOLDERS FOR CENTRIA SRS ROOF SYSTEM AND TPO (THERMOPLASTIC POLYOLEFIN) CARLISLE SYSTEM. NO WORK SHALL BE COMPLETED BY INDEPENDENT ROOFING CONTRACTORS THAT ARE NOT LICENSED INSTALLERS FROM THESE TWO MANUFACTURER WARRANTY HOLDERS.

NO SPECIFICATION IS GIVEN FOR THIS WORK AS IT IS LIMITED TO THE CURRENT WARRANT HOLDERS ONLY.



TPO ROOF PENETRATION 02
REFERENCED FROM 01 / A-110 1/2" = 1'-0"



PARTIAL ROOF PLAN CORE 1 01
REFERENCED FROM / 1/16" = 1'-0"

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STATE OF MISSOURI
CORY WILSON
04.13.2026
NUMBER
PE-2010009876
PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CORY WILSON
MISSOURI PE # 2010009876

REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD,
MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

REVISION:
DATE:
REVISION:
DATE:
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PARTIAL ARCHITECTUAL ROOF PLAN

SHEET NUMBER:

A-110

DUCTWORK

SYMBOLS

- EXISTING DUCTWORK
- DUCTWORK TO BE REMOVED
- NEW DUCTWORK SIZE AS INDICATED
- 90° ELBOW DOWN
- 90° ELBOW UP
- SOUND ATTENUATOR, SIZE AS INDICATED
- FLEXIBLE CONNECTION
- LINED DUCTWORK
- FLEXIBLE DUCTWORK
- RECTANGULAR ECCENTRIC DUCT TRANSITION
- RECTANGULAR CONCENTRIC DUCT TRANSITION
- SQUARE TO ROUND DUCT TRANSITION
- SUPPLY AIR
- RETURN AIR
- TURNING VANES
- CD — CONTROL DAMPER
- BD — BACKDRAFT DAMPER
- FD — FIRE DAMPER
- FS — COMBINATION FIRE/SMOKE DAMPER
- MVD — MANUAL VOLUME DAMPER
- M — MOTOR OPERATED DAMPER
- DEVICE
- WALL MOUNTED DEVICE
- S — DUCT MOUNTED SMOKE DETECTOR
- AD — ACCESS DOOR, SIZE AS INDICATED
- DEVICE TYPE / INLET SIZE / FLOW — SUPPLY/EXHAUST AIR DEVICE DESIGNATION
- DEVICE TYPE / DEVICE SIZE — RETURN AIR DEVICE DESIGNATION
- T — THERMOSTAT

GENERAL

- ## — NOTE DESIGNATION - DEMOLITION (ALL)
- ## — NOTE DESIGNATION - MECHANICAL NEW WORK
- ## — NOTE DESIGNATION - ELECTRICAL NEW WORK
- ## — NOTE DESIGNATION - PIPING/PLUMBING NEW WORK
- ## — REVISION FROM ORIGINAL DOCUMENT
- EQUIPMENT / LOCATION &OR NUMBER — ?? / ## — EQUIPMENT TAG DESIGNATION
- DRAWING NUMBER / SHEET NUMBER — # / ## — SECTION CUT DESIGNATION
- DRAWING NUMBER / SHEET NUMBER — RE: 3/M2 — REFERENCE DESIGNATION
- CONNECT TO EXISTING
- SPEC1 SPEC2 — PIPE SPECIFICATION CHANGE
- DOUBLE CONTAINMENT PIPE
- INSULATED EQUIPMENT — # = THICKNESS, XX = TYPE
- INSULATED PIPE — # = THICKNESS, XX = TYPE
- INSULATED PIPE WITH ELECTRIC HEAT TRACING — # = THICKNESS, XX = TYPE
- PIPE SLEEVE/PIPE PENETRATION THRU WALL
- CONNECT TO EXISTING, OPTIONAL NUMBER DESIGNATION
- FLOW ARROW
- SLOPE — DIRECTION OF DOWNWARD SLOPE
- GPM OR CFM — LIQUID OR AIR FLOW RATE

LINE TYPES

- MAIN PROCESS OR UTILITY LINE
- FUTURE LINEWORK
- ASSEMBLY BOUNDARY
- SKID OR PACKAGE BOUNDARY
- SOFTWARE
- DEMOLITION
- MATCHLINE

PIPING/PLUMBING

VALVES

- ANGLE VALVE
- BACKFLOW PREVENTER
- BALL VALVE
- BALANCING VALVE (2-1/2" & SMALLER)
- BALANCING VALVE (3" & LARGER)
- BUTTERFLY VALVE
- CHECK VALVE (2-1/2" & SMALLER)
- CHECK VALVE (3" & LARGER)
- CONTROL VALVE (THREE-WAY, PNEUMATIC)
- CONTROL VALVE (TWO-WAY, PNEUMATIC)
- CONTROL VALVE (TWO-WAY, MOTORIZED)
- CONTROL VALVE (THREE-WAY, MOTORIZED)
- FLEXIBLE CONNECTION (BELLOWS TYPE)
- FLEXIBLE CONNECTION (CONVOLUTE TYPE)
- FLEXIBLE CONNECTION (BRAIDED SS TYPE)
- GAS COCK
- GATE VALVE (2-1/2" & SMALLER)
- GATE VALVE (3" & LARGER)
- GLOBE VALVE (2-1/2" & SMALLER)
- GLOBE VALVE (3" & LARGER)
- PLUG VALVE
- PRESSURE REDUCING VALVE (WATER)
- PRESSURE RELIEF VALVE
- SOLENOID VALVE
- STRAINER (2-1/2" & SMALLER)
- STRAINER (3" & LARGER)
- TRIPLE DUTY VALVE
- STEAM TRAP (INVERTED BUCKET)
- STEAM TRAP (FLOAT & THERMOSTATIC)
- PRESSURE REDUCING VALVE (STEAM)
- BALANCING VALVE
- TRIPLE DUTY BALANCING VALVE
- BALL VALVE
- BUTTERFLY VALVE
- CHECK VALVE
- DIAPHRAGM VALVE
- GATE VALVE
- GAUGE COCK
- GLOBE VALVE
- NEEDLE VALVE
- PLUG VALVE
- 3-WAY VALVE
- PRESSURE/TEMPERATURE RELIEF VALVE
- ANGLE VALVE
- RUPTURE DISC FOR PRESSURE/VACUUM RELIEF
- BFP — BACKFLOW PREVENTER WITH DRAIN
- AV — AUTOMATIC AIR VENT
- MV — MANUAL AIR VENT
- VB — VACUUM BREAKER

CONTROL VALVES

- PRESSURE REGULATOR
- PRESSURE REDUCING VALVE
- S — SOLENOID ACTUATOR
- M — MOTORIZED ACTUATOR
- PNEUMATIC OPERATED ACTUATOR (CYLINDER/PISTON TYPE)
- PNEUMATIC OPERATED ACTUATOR (DIAPHRAGM TYPE)
- DIAPHRAGM VALVE PNEUMATIC OPERATED ACTUATOR
- WYE PNEUMATIC OPERATED ACTUATOR (DIAPHRAGM TYPE)
- S — PANEL MOUNTED SOLENOID VALVE
- TZ — REFER TO INSTRUMENT LOGIC SYMBOLS FOR TRANSDUCER TYPE

FITTINGS & ACCESSORIES

- FLANGED CONNECTION/BLIND FLANGE
- FLUSH SANITARY FITTING
- PIPE CAP
- PIPE DROP/PIPE RISE
- BOTTOM OUTLET TEE
- TOP OUTLET TEE
- UNION
- SANITARY CLAMP
- HIGH PRESSURE SANITARY CLAMP
- SCREWED CONNECTION
- RESTRICTIVE ORIFICE PLATE
- QUICK CONNECT/DISCONNECT
- COMPRESSION FITTING
- INGOLD FITTING
- BEVEL SEAT FITTING
- HOSE BARB FITTING
- FLEXIBLE CONNECTOR
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- SPRAY BALL
- SIGHT GLASS
- STRAINER ("Y" TYPE)
- STRAINER ("Y" TYPE) WITH BLOWDOWN
- MUFFLER/SILENCER
- TI 000 — THERMOMETER
- SANITARY THERMOWELL
- XX 000 — LOCALLY MOUNTED PRESSURE (PI) OR TEMPERATURE (TI) GAUGE
- SANITARY STEAM TRAP
- THERMOSTATIC STEAM TRAP
- FLOAT & THERMOSTATIC STEAM TRAP
- INVERTED BUCKET STEAM TRAP
- PRESSURE POWERED PUMP
- FILTER

ELECTRICAL

WIRING

- GROUND / NEUTRAL / HOT / "LP1" 2 — HOMERUN TO PANELBOARD. 3/4" CONDUIT. NUMBER OF ARROWS INDICATES NUMBER OF CIRCUITS. "LP1" INDICATES PANEL DESIGNATION; 2 INDICATES PANEL CIRCUIT. TICK MARKS INDICATE #12 WIRING.
- "LP1" 2,4 OR 2/4 — 2,4 INDICATES TWO SEPARATE CIRCUITS. 2/4 INDICATES A SINGLE 2-POLE CIRCUIT. HOMERUN WITHOUT TICK MARKS INDICATES (2)#12 & (1)#12G IN 0.75"C.
- CONCEALED CONDUIT (BELOW FLOOR). CONTINUOUS LINE IS INDICATIVE OF CONDUIT TO BE RUN OVERHEAD.
- "J" HOOK RACEWAY
- CABLE TRAY AS DESCRIBED ON DRAWINGS
- CONDUIT UP
- CONDUIT DOWN

POWER

- 60/3 — NON-FUSED DISCONNECT SWITCH. ### INDICATES AMPACITY AND # OF POLES. PHYSICAL SIZE AS SHOWN ON PLAN.
- 60/40/3 — FUSED DISCONNECT SWITCH. 60/40/3 INDICATES FRAME AMPACITY/FUSE AMPACITY/# POLES. PHYSICAL SIZE AS SHOWN ON PLAN.
- MAGNETIC MOTOR STARTER. 1 INDICATES NEMA STARTER RATING.
- COMBINATION DISCONNECT SWITCH AND MOTOR STARTER. 1 INDICATES NEMA STARTER RATING.
- DUPLEX GROUNDING TYPE RECEPTACLE OUTLET - RATED 20-AMP.
- DOUBLE DUPLEX GROUNDING TYPE RECEPTACLE OUTLET
- DEVICE MOUNTED 6" ABOVE COUNTER (TYPICAL SYMBOL FOR FOR ALL RECEPTACLE SYMBOLS)
- WP — DUPLEX GROUNDING TYPE RECEPTACLE OUTLET WITH WEATHERPROOF COVER.
- GFCI — DUPLEX GROUND FAULT INTERRUPTER CIRCUIT TYPE RECEPTACLE OUTLET
- C — DUPLEX RECEPTACLE OUTLET - "C" INDICATES CEILING MOUNTED
- TV — DUPLEX RECEPTACLE OUTLET FOR TELEVISION. MOUNTING HEIGHT AS NOTED ON PLANS.
- SIMPLEX 125-V., 2-POLE, 3-WIRE RECEPTACLE OUTLET - WALL OR FLOOR MOUNTED
- XP — SAME AS ABOVE - EXPLOSION PROOF
- SPECIAL-PURPOSE RECEPTACLE. AMPERAGE AND VOLTAGE AS INDICATED ON PLANS. VERIFY NEMA CONFIGURATION WTIH EQUIPMENT MANUFACTURER.
- SURFACE RACEWAY WITH OUTLETS AND MOUNTING AS INDICATED ON PLANS.
- J — JUNCTION BOX.
- J — FLOOR OR CEILING MOUNTED JUNCTION BOX.
- B — OUTLET BOX WITH BLANK COVER PLATE
- T — THERMOSTAT ROUGH-IN JUNCTION BOX
- MOTOR
- NEW PANELBOARD
- EXISTING PANELBOARD
- NEW TRANSFORMER. SIZE AS INDICATED ON PLANS.
- EXISTING TRANSFORMER. SIZE AS INDICATED ON PLANS.
- PT P D — POKE THROUGH DEVICE. "P" INDICATES POWER, "D" INDICATES DATA. "T" INDICATES TELEPHONE. INSTALL AS DESCRIBED ON PLANS.
- VARIABLE FREQUENCY DRIVE
- WALL MOUNTED CLOCK

LIGHTING

- A — 2'x4' FLUORESCENT LIGHTING FIXTURE, 'A' INDICATES FIXTURE TYPE
- EMERGENCY FIXTURE - TYPICAL OF ALL CROSSHATCHED FIXTURES
- A — 1'x4' FLUORESCENT LIGHTING FIXTURE, 'A' INDICATES FIXTURE TYPE
- A — 2'x2' FLUORESCENT LIGHTING FIXTURE, 'A' INDICATES FIXTURE TYPE
- 6"x48" FLUORESCENT LINEAR
- A — RECESSED DOWNLIGHT
- A — WALL WASH FIXTURE
- OR A — WALL MOUNTED FIXTURE
- A — FLUORESCENT STRIP LIGHT FIXTURE, 'A' INDICATES FIXTURE TYPE
- OR — PENDANT FIXTURE, CHAIN OR STEM MOUNTED
- EMERGENCY BUGEYE FIXTURE
- CEILING MOUNTED EXIT LIGHT (EMERGENCY POWER)
- WALL MOUNTED EXIT LIGHT (EMERGENCY POWER)

FIRE DETECTION/PROTECTION

- MAGNETIC DOOR HOLDER
- SMOKE DETECTOR (ION, P, EL)
- D — DUCT SMOKE DETECTOR
- F — FIRE ALARM PULL STATION
- F — FIRE AUDIBLE DEVICE
- 75 — FIRE AUDIBLE/VISUAL COMBINATION
- CANDELA NUMBER DESIGNATION (TYP. FOR ALL STROBES)
- 15 — FIRE ALARM VISUAL DEVICE
- 15 — CEILING MOUNTED STROBE
- F — CEILING MOUNTED HORN
- FIRE ALARM CONTROL PANEL
- REMOTE ANNUNCIATOR PANEL

SPECIAL SYSTEMS

- WALL MOUNTED TELEPHONE OUTLET
- COMBINATION TELEPHONE/DATA DEVICE
- DATA JACK
- 6" — DEVICE MOUNTED 6" ABOVE COUNTER
- WAP — WIRELESS ACCESS POINT
- TELEVISION OUTLET - COAX JACK AND DUPLEX RECEPTACLE
- S — CEILING MOUNTED SPEAKER
- S — WALL MOUNTED SPEAKER
- INTERCOM STATION. "M" INDICATES MASTER.
- COAXIAL TV JACK WITH J-BOX, FACEPLATE AND CABLING
- CEILING MOUNTED PROJECTOR WITH DUPLEX RECEPTACLE, A/V J-BOX, WITH FACEPLATE

SPECIAL SYSTEMS INSTALLATION REQUIREMENTS

1. WALL MOUNTED TELEPHONE OUTLET. TELEPHONE OUTLET FURNISHED AND INSTALLED BY OWNER. FOR WALL INSTALLATION, PROVIDE AND INSTALL A FLUSH DEVICE BOX, AND PULLSTRING IN WALL STUD SPACE TO ABOVE CEILING. MOUNT DEVICE BOX CENTERLINE AT ELEVATION NOTED ON THE PLANS.

ONE-LINE/DETAIL

- MOLDED CASE OR INSULTAED CASE CIRCUIT BREAKER
- SURGE PROTECTIVE DEVICE
- INTEGRAL DISCONNECT SWITCH
- FUSE
- DISTRIBUTION TRANSFORMER
- SHIELDED DISTRIBUTION TRANSFORMER
- VFD
- COMBINATION MOTOR STARTER/DISCONNECT
- DISCONNECT SWITCH
- FUSED DISCONNECT SWITCH
- MOTOR STARTER DISCONNECT SWITCH
- MOTOR STARTER
- MOTOR
- TRANSIENT VOLTAGE SURGE SUPPRESSOR
- GROUND
- DELTA
- WYE

SECURITY

- CR — CARD READER
- KP — KEYPAD
- DC — DOOR CONTACT
- ML — MAGNETIC LOCK
- ES — ELECTRIC STRIKE
- ER — EXIT REQUEST
- BR — BIOMETRIC READER
- CEILING MOUNTED DOME STYLE SECURITY CAMERA
- CEILING MOUNTED AISLE STYLE SECURITY CAMERA
- MS — MOTION SENSOR
- EC — EMERGENCY CALL STATION
- CI — COMBINATION CAMERA / INTERCOM

SWITCHES

- S — SINGLE-POLE, SINGLE-THROW WALL SWITCH
- S2 — DOUBLE-POLE, SINGLE-THROW WALL SWITCH
- S3 — THREE-WAY WALL SWITCH
- S4 — FOUR-WAY WALL SWITCH
- SP — SINGLE-POLE SWITCH WITH PILOT LIGHT
- SS — LOW VOLTAGE SCENE SWITCH
- S1B — LOW VOLTAGE 1 BUTTON DIMMING SWITCH
- S1 — LOW VOLTAGE 1 BUTTON SWITCH
- SX — LOW VOLTAGE SWITCH WHERE X INDICATES # OF BUTTONS
- SM — MOTOR SWITCH WITH THERMAL OVERLOAD PROTECTION
- SK — SINGLE-POLE KEYED SWITCH
- SMENU — PROJECTOR SCREEN RAISE/LOWER SWITCH
- SOC — OCCUPANCY SENSOR SWITCH
- PC — PHOTO CELL
- OS — CEILING MOUNTED OCCUPANCY SENSOR
- LC — LIGHTING RELAY ROOM CONTROLLER
- DC D — DIMMING LIGHTING RELAY ROOM CONTROLLER

ANNOTATION

BUILDING SYSTEMS

- CA — COMPRESSED AIR PIPING
- CHWS — CHILLED WATER SUPPLY PIPING
- CHWR — CHILLED WATER RETURN PIPING
- CWFT — CONDENSER WATER FROM TOWER
- CWTT — CONDENSER WATER TO TOWER
- DR — CONDENSATE DRAIN PIPING
- D — DRAIN
- PCHWS — PROCESS CHILLED WATER SUPPLY
- PCHWR — PROCESS CHILLED WATER RETURN
- GCHWS — GLYCOL CHILLLED WATER SUPPLY
- GCHWR — GLYCOL CHILLLED WATER RETURN
- HPS — HIGH PRESSURE STEAM
- HPC — HIGH PRESSURE CONDENSATE
- HHWS — HEATING HOT WATER SUPPLY
- HHWR — HEATING HOT WATER RETURN
- HPS — HIGH PRESSURE STEAM
- HPC — HIGH PRESSURE CONDENSATE
- LPS — LOW PRESSURE STEAM
- LPC — LOW PRESSURE CONDENSATE
- MPS — MEDIUM PRESSURE STEAM
- MPC — MEDIUM PRESSURE CONDENSATE
- NG — NATURAL GAS
- PC — PUMPED CONDENSATE
- RV — REFRIGERANT VENT

PLUMBING

- CW — COLD WATER PIPING
- ICW — INDUSTRIAL COLD WATER
- IW — INDIRECT WASTE OR IRRIGATION WATER
- NPW — NON-POTABLE WATER
- HW — HOT WATER PIPING
- HWC — HOT WATER CIRCULATING PIPING
- SFT — SOFT WATER
- SW — STORM WATER
- TWS — TEMPERED WATER SUPPLY
- TWR — TEMPERED WATER RETURN
- VAC — VACUUM
- V — VENT
- W — WASTE

PROCESS

- AC — ACETYLENE
- AW — ACID WASTE
- AR — ARGON
- CIPS — CLEAN IN PLACE SUPPLY PIPING
- CIPR — CLEAN IN PLACE RETURN PIPING
- CS — CLEAN STEAM
- STM(F) — FILTERED STEAM
- DI — DE-IONIZED WATER
- DS — DISTILLED WATER
- GN — GASEOUS NITROGEN
- HE — HELIUM
- HY — HYDROGEN
- LN — LIQUID NITROGEN

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MEP SYMBOLS LEGEND

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GENERAL ABBREVIATIONS

GENERAL ABBREVIATIONS:

A/C	AIR CONDITIONING(ER)
ADDN	ADDITION OR ADDITIONAL
ADJ	ADJUSTABLE
ADJT	ADJACENT
ADMIN	ADMINISTRATION
A.F.F.	ABOVE FINISHED FLOOR
A.F.G.	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
ALT	ALTERNATE
ALUM	ALUMINUM
AMB	AMBIENT
APPROX	APPROXIMATE
AUTO	AUTOMATIC
BHP	BREAK HORSE POWER
BLDG	BUILDING
BLK	BLOCK
BMS	BUILDING MANAGEMENT SYSTEM
BOF	BOTTOM OF FOOTING
BSMT	BASEMENT
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNIT PER HOUR
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CI	CAST IRON
CIRC	CIRCULATING
CLG	CEILING
CMU	CONCRETE MASONRY UNIT
CO	CLEANOUT
CO2	CARBON DIOXIDE
COL	COLUMN
CONC	CONCRETE
CONF	CONFERENCE
CONFIG	CONFIGURATION
CONST	CONSTRUCTION
CORR	CORRIDOR
CT	CURRENT TRANSFORMER
CU	COPPER
CU	CONDENSING UNTI
CUH	CABINET UNIT HEATER
CW	COLD WATER
DB	DRY BULB
DBA	DECIBEL A-SOUND LEVELS
DD	DIRECT DIGITAL
DEG	DEGREE
DEPT	DEPARTMENT
DI	DUCTILE IRON
DIA	DIAMETER
DIM	DIMENSION
DISC	DISCONNECT
DISCH	DISCHARGE
DISTR	DISTRIBUTION
DN	DOWN
DTL	DETAIL
DWG	DRAWING
EA	EACH
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EEW	EMERGENCY EYEWASH
EWWS	EMERGENCY EYEWASH/SHOWER
EF	EXHAUST FAN
EFF	EFFICIENCY
EL	ELEVATION
ELEC	ELECTRIC(AL)
ELEV	ELEVATOR
ENCL	ENCLOSURE
EQUIP	EQUIPMENT
ESP	EXTERNAL STATIC PRESSURE
EST	ESTIMATE
EWT	ENTERING WATER TEMPERATURE
EXPL	EXPLOSION
EXT	EXTERIOR
F	FAHRENHEIT
FA	FRESH AIR
FD	FIRE DAMPER
FCO	FLOOR CLEANOUT
FCU	FAN COIL UNIT
FDC	FIRE DEPARTMENT CONNECTION
FIG	FIGURE
FL	FLOOR
FM	FACTORY MUTUAL
FPM	FEET PER MINUTE
FT	FEET (FOOT)
FTG	FOOTING
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GCO	GRADE CLEANOUT
GOVT	GOVERNMENT
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HOA	HANDS-OFF-AUTOMATIC
HP	HORSEPOWER
HR	HOUR
HTG	HEATING
HTR	HEATER
HVAC	HEATING, VENTILATING, & AIR CONDITIONING
HW	DOMESTIC HOT WATER
HWC	DOMESTIC HOT WATER CIRCULATING
HX	HEAT EXCHANGER
HZ	HERTZ
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IMC	INNTERNATIONAL MECHANICAL CODE
IN	INCH
INC	INCLUDE(ING)
IPC	INTERNATIONAL PLUMBING CODE
JAN	JANITOR
JST	JOIST
KVA	KILOVOLT AMPERES
KW	KILOWATT
KWH	KILOWATT-HOUR
LAB	LABORATORY
LAT	LEAVING AIR TEMPERATURE
LB	POUND
LBS	POUNDS
LF	LINEAR FOOT (FEET)
LTG	LIGHTING
LWT	LEAVING WATER TEMPERATURE
MA	MIXED AIR
MATL	MATERIAL
MAU	MAKE-UP AIR UNIT
MAX	MAXIUM
MBH	THOUSAND BTU PER HOUR
MBTUH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MFRG	MANUFACTURING
MIN	MINIMUM
MISC	MISCELLANEOUS
N/A	NON APPLICABLE
NC	NORMALLY CLOSED
NC	NOISE CRITERIA
NEC	NATIONAL ELECTRIC CODE
NEMA	NATIONAL ELECT MANUFACTURER'S ASSN
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPP	OPPOSITE
OS&Y	OUTSIDE SCREW & YOKE
P/T	PRESSURE/TEMPERATURE TEST PORT
PCF	POUNDS PER CUBIC FOOT
PF	PRESSURE DROP
PERF	PERFORATED
PERP	PERPENDICULAR
PH	PHASE
PIC	PRESSURE INDEPENDENT CONTROL
PIV	POST INDICATOR VALVE
PLBG	PLUMBING
PNEU	PNEUMATIC
PREFAB	PREFABRICATED
PRV	PRESSURE REDUCING VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVC	POLYVINYL CHLORIDE
RA	RETURN AIR
RCP	REFLECTED CEILING PLAN
REF	REFERENCE
RH	RELATIVE HUMIDITY
RHP	RADIANT HEATING PANEL
RM	ROOM
RPM	ROVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
SAN	SANITARY WASTE
SCW	SOFT COLD WATER
SD	SMOKE DAMPER
SD	SMOKE DETECTOR
SECT	SECTION
SENS	SENSIBLE
SF	SQUARE FOOT (FEET)
SP	STATIC PRESSURE
SPEC	SPECIFICATIONS
SQ	SQUARE
SS	STAINLESS STEEL
STD	STANDARD
STOR	STORAGE
SWP	STEAM WORKING PRESSURE
T	THERMOSTAT
TA	TRANSFER AIR
TDH	TOTAL DYNAMIC HEAD
TEMP	TEMPORARY
TEMP	TEMPERATURE
THK	THICK(NESS)
TOC	TOP OF CONCRETE
TOF	TOP OF FOOTING
TSP	TOTAL STATIC PRESSURE
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UG	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UNO	UNLESS NOTED OTHERWISE
UTIL	UTILITY
V	VOLT
VAV	VARIABLE AIR VOLUME
VCT	VINYL COMPOSITION TILE
VD	VOLUME DAMPER - MANUAL
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
VTR	VENT THROUGH ROOF
W	WIDE, WIDTH
W	WATT
W/	WITH
W/O	WITHOUT
WB	WET BULB
WC	WATER COLUMN
WCO	WALL CLEAN OUT
WH	WALL HYDRANT
WT	WEIGHT
XFMR	TRANSFORMER
YH	YARD HYDRANT
&	AND
@	AT
i.e.	THAT IS
#	NUMBER

ELECTRICAL ABBREVIATIONS:

A OR AMP	AMPER(S)
AC	ALTERNATING CURRENT
A.F.F.	ABOVE FINIS
APPROX.	APPROXIMATELY
ARCH.	ARCHITECT
AWG	AMERICAN WIRE GAUGE
BKR.	BREAKER
C	CONDUIT
COMM.	COMMUNICATIONS
D	DEEP
DISC	DISCONNECT SWITCH
DWGS.	DRAWINGS
ELECT.	ELECTRICAL
EMCS	ENERGY MANAGEMENT SYSTEM
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EQUIP.	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EWH	ELECTRIC WATER HEATER
EX	EXISTING
FLEX	FLEXIBLE METALLIC CONDUIT
GA	GAUGE
GFI	GROUND FAULT INTERRUPTER
GRS	GALVANIZED RIGID STEEL
HZ	HERTZ
INC	INCANDESCENT
ION	IONIZATION SMOKE DETECTOR
JB	JUNCTION BOX (J-BOX)
MCC	MOTOR CONTROL CENTER
N/A	NOT APPLICABLE
N.A.	NON-FUSIBLE
NL	NIGHT LIGHT
PC	PLENUM CABLE
PH	PHASE
P	PHOTOELECTRIC SMOKE DETECTOR
PNL	PANEL
PVC	POLYVINYL CHLORIDE
RM.	ROOM
SYMM.	SYMMETRICAL
SYS.	SYSTEM
TV	TELEVISION
TYP	TYPICAL
V	VOLT
VA	VOLT AMPS
W	WATTS
WP	WEATHER PROOF
XFMR.	TRANSFORMER
XP	EXPLOSION PROOF
Ø	PHASE
RE: 3/E1	RE: = REFER TO 3 = DETAIL NUMBER E1 = SHEET NUMBER

GENERAL NOTES

ELECTRICAL DEMOLITION NOTES

1. REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR DEMOLITION/RELOCATION OF MECHANICAL OR PLUMBING EQUIPMENT. THE CONTRACTOR SHALL DISCONNECT AND REMOVE ALL CONDUIT, WIRE, AND ASSOCIATED DEVICES RELATING TO EQUIPMENT BEING REMOVED.
2. ALL ABANDONED CONDUIT AND WIRE SHALL BE REMOVED IN ITS ENTIRETY. ANY CONCEALABLE CONDUITS MADE OBSOLETE DUE TO DEMOLITION SHALL BE CUT FLUSH WITH THE FLOOR, WALL, OR CEILING WITH THE REMAINING ENDS PLUGGED TO ALLOW REFINISHING OF THE SURFACE. EXISTING CONDUITS CURRENTLY INSTALLED IN WALLS OR FLOORS THAT ARE TO REMAIN THAT ARE NOT TO BE USED IN NEW WORK AND WILL NOT INTERFERE WITH THE WORK OF ANY OTHER TRADE MAY REMAIN.
3. CONDUIT RUN IN EXISTING CONCRETE SLAB SHALL BE SAW-CUT OFF AS IT ENTERS THE SLAB, THEN SEALED TO PREVENT MOISTURE ACCESS.
4. CONDUIT AND BOXES IN EXISTING WALLS THAT ARE TO REMAIN SHALL BE ABANDONED IN PLACE (IF NOT REUSED) AND THE BOXES SHALL BE PROVIDED WITH COVERS.
5. FIXTURES DETERMINED TO BE REUSABLE IN NEW OR EXISTING CEILINGS SHALL BE CLEANED, RE-LAMPED, RE-LENSED, AND RE-BALLASTED PRIOR TO BEING PUT BACK TO SERVICE. WHERE EXISTING EXIT SIGNS ARE NON-LED TYPE, THEY SHALL BE REMOVED AND REPLACED WITH AN LED-TYPE FIXTURE.
6. SERVICES PASSING THROUGH AREAS OF REMODELING SHALL BE MAINTAINED THROUGHOUT THE CONSTRUCTION PERIOD.
7. CIRCUITS SERVING AREAS ADJACENT TO THE CONSTRUCTION AREA THAT ARE MODIFIED AS PART OF THE REMOLDING PROJECT, SHALL BE RE-CIRCUITED AS PART OF THE PROJECT.
8. PROVIDE TEMPORARY AND/OR MODIFY EXISTING POWER, EMERGENCY POWER, LIGHTING, FIRE ALARM, TELECOMMUNICATIONS, AND OTHER SERVICES AS REQUIRED FOR CONSTRUCTION-PERIOD INTERIM LIFE SAFETY MEASURES.
9. EXISTING DEVICES AND/OR CIRCUITS SHOWN ARE TAKEN FROM EXISTING DRAWINGS AND SITE VISITS. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH ALL WORK TO BE DONE BY OBSERVATION OF THE SITE. FAILURE TO DO SO WILL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY FOR PERFORMING ALL WORK NECESSARY TO PROVIDE A FULLY FUNCTIONAL AND WORKMANLIKE INSTALLATION.
10. ALL WORK SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THE LATEST NATIONAL ELECTRICAL CODE, OCCUPATIONAL SAFETY AND HEALTH ACT, AND ALL STATE, LOCAL, MUNICIPAL, AND STATUTORY REQUIREMENTS.
11. THE ELECTRICAL CONTRACTOR SHALL MAINTAIN ACCURATE RECORDS OF ANY MODIFICATIONS TO THE EXISTING SYSTEMS WHICH ARE TO REMAIN AND SHALL, UPON COMPLETION OF THIS PROJECT, DELIVER "RECORD" DRAWINGS TO THE ARCHITECT INDICATING ALL SUCH CHANGES. THE CONTRACTOR SHALL MAINTAIN IN THE PROJECT OFFICE, AS WORK PROGRESSES, AN UP-TO-DATE NEATLY MARKED COPY OF THESE DRAWINGS FOR REVIEW BY THE APPROPRIATE PARTIES.
12. THE ELECTRICAL CONTRACTOR SHALL FIELD VERIFY THE LOCATION OF ALL EXISTING UTILITIES, THE CONDITION OF EXISTING BUILDING DEVICES AND MATERIALS, AND SHALL BE RESPONSIBLE FOR THE PROTECTION OF THE SAME DURING THE COURSE OF THIS WORK. EXISTING UTILITIES, EXISTING BUILDING, AND/OR MATERIALS WHICH ARE DAMAGED BY NEGLIGENCE ON THIS CONTRACTOR'S PART OR ANY PARTIES ASSOCIATED WITH THIS CONTRACTOR, SHALL BE REPAIRED OR REPLACED AT THIS CONTRACTORS EXPENSE, IN A TIMELY MANNER, AND TO THE ARCHITECT'S AND OWNER'S WRITTEN ACCEPTANCE.
13. CIRCUIT ROUTINGS SHOWN IN REMODELED AREAS MAY BE MODIFIED TO SUIT FIELD CONDITIONS. HOWEVER, CARE SHOULD BE TAKEN TO KEEP DEVICES AND/OR FIXTURES AND CIRCUITS APPROXIMATELY AS INDICATED TO AVOID OVERLOADING OF THE CIRCUIT.
14. COORDINATE THE REMOVAL OF ALL MECHANICAL AND PLUMBING EQUIPMENT WITH THE MECHANICAL AND PLUMBING CONTRACTORS.
15. WHERE EQUIPMENT IS REMOVED FROM, OR RELOCATED TO, A LOCATION WHICH PENETRATES A FIRE RATED STRUCTURE, THIS CONTRACTOR SHALL PROVIDE THE APPROPRIATE FIRE STOPPING MATERIALS SUCH THAT THE RATING OF THE STRUCTURE WILL BE MAINTAINED.
16. ANY MATERIAL REMOVED THAT THE OWNER DOES NOT WISH TO RETAIN SHALL BE REMOVED FROM PROJECT SITE AND DISPOSED OF BY THE CONTRACTOR.

ELECTRICAL GENERAL NOTES

1. INSTALL ALL WIRING IN RACEWAYS. OPEN WIRING IS PROHIBITED.
2. WHERE SURFACE WIRING IS REQUIRED, SURFACE MOUNTED RACEWAY (WIREMOLD OR APPROVED EQUAL) SHALL BE USED AND PAINTED TO MATCH ADJACENT SURFACES (UNLESS SPECIFIED COLOR WAS PROVIDED). COORDINATE ALL SURFACE MOUNTED CONDUIT AND RACEWAY ROUTING WITH OWNER AND ENGINEER.
3. ALL RACEWAYS SHALL CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR.
4. PROVIDE ALL MOTORS WITH A LOCAL DISCONNECT SWITCH (UNFUSED UNLESS OTHERWISE NOTED) LOCATED AT THE MOTOR OR A MAXIMUM OF 5FT AWAY, WITHIN SIGHT.
5. NO MORE THAN SIX RECEPTACLES SHALL BE INSTALLED ON A SINGLE BRANCH CIRCUIT FOR GENERAL USE. GFCI RECEPTACLES SHALL NOT SERVE OTHER RECEPTACLES FROM THEIR LOADSIDE TERMINALS.
6. TELECOMMUNICATION OUTLET BOXES SHALL BE MINIMUM SIZE AS NEC STANDARD 6"x6"x2.5" THAT COULD CONTAIN DUAL DUPLEX ELECTRICAL OUTLETS, RECESSED TO ALLOW EMT OR FLEXIBLE CONDUIT TO TERMINATE ON THEM.
7. WALL MOUNTED JUNCTION BOXES SHALL BE EQUIPPED WITH FULL COVERED STAINLESS STEEL WALL FACEPLATES THAT SHALL COVER THE ENTIRE BOX WITHOUT TRIM RINGS ADDED.
8. TELECOM J-BOXES SHALL EMPLOY TWO EACH MODULAR CAT 5E (OR BETTER) RJ-45/11 JACKS FOR VOICE, AND TWO EACH MODULAR CAT 5E (OR BETTER) RJ-45 JACKS FOR DATA. VERIFY STANDARD CABLING WITH OWNER PRIOR TO BID.
9. CONTRACTOR SHALL FIELD VERIFY LOCATIONS, SIZES, AND ELEVATIONS OF MECHANICAL, ELECTRICAL, AND PLUMBING COMPONENTS THAT MAY IMPACT IMPLEMENTATION OF THIS WORK PRIOR TO MAKING BIDS.
10. CONTRACTOR SHALL COORDINATE AND EXPEDITE ALL WORK WITH OTHER TRADES AND OWNER.
11. ALL OVERCURRENT PROTECTIVE DEVICES INSTALLED UNDER THIS CONTRACT SHALL MEET THE INTERRUPTING CAPABILITY OF THE EXISTING DEVICES ALREADY INSTALLED. IN NO CASE SHALL "SERIES RATING" BE USED.
12. ALL WIRING TO BE CONTINUOUS WITHOUT SPLICES UNLESS OTHERWISE NOTED.
13. NO POWER AND CONTROL WIRING SHALL BE RUN IN SAME CONDUIT.
14. FINAL ROUTING OF CONDUITS IS TO BE DETERMINED BY THE CONTRACTOR. INFORM ENGINEER OF RECORD OF ANY MAJOR DISCREPANCY PRIOR TO PROCEEDING WITH INSTALLATION.
15. UPDATE ALL AFFECTED PANEL SCHEDULES AND PROVIDE NEW PANEL SCHEDULE WITH TYPE AND POLES.
16. PRIOR TO BID SUBMISSION, THE CONTRACTOR SHALL VISIT THE SITE AND AREA OF WORK TO FAMILIARIZE HIM OR HERSELF WITH THE EXISTING CONDITIONS.

ELECTRICAL GENERAL NOTES (CONT'D)

18. NEW CONDUCTORS SHALL NOT BE INSTALLED IN EXISTING CONDUIT WITH EXISTING CONDUCTORS.
19. ALL NEW RECEPTACLES INSTALLED SHALL BE DUPLEX NEMA 5-20R UNLESS OTHERWISE NOTED OR NOT COMMERCIALLY AVAILABLE IN A PARTICULAR SIZE. ALL RECEPTACLES SHALL BE UL-LISTED AS COMMERCIAL GRADE, WHERE AVAILABLE IN THE SIZE, TYPE, AND CONFIGURATION REQUIRED.
20. PROVIDE GFCI RECEPTACLES WHERE INDICATED ON PLAN. ALL RECEPTACLES INSTALLED IN KITCHEN SHALL BE GFCI. GFCI RECEPTACLES SHALL NOT SERVE OTHER RECEPTACLES FROM THEIR LOAD SIDE TERMINALS. PROVIDE GFCI CIRCUIT BREAKERS AT CONTRACTORS OPTION.
21. EXISTING RECEPTACLES AND SWITCHES TO REMAIN UNLESS THOSE THAT ARE CHIPPED, BROKEN OR DAMAGED IN ANY OTHER WAY SHALL BE REPLACED TO MATCH EXISTING.
22. INSTALL BLANK COVER PLATES ON ALL OPEN OR ABANDONED DEVICE BOXES. VERIFY COLOR WITH ARCHITECT.
23. WIRING SHOWN TO BE REMOVED SHALL BE REMOVED BACK TO THE NEAREST DEVICE TO REMAIN.
24. EXIT AND EMERGENCY LIGHTS SHALL BE CONNECTED TO HOT LEG, NOT SWITCH LEG.
25. ALL POWER MUST BE RAN WITHIN RACEWAY PER CONDUIT APPLICATION SCHEDULE AND SPECS. MC CABLE WILL NOT BE ALLOWED ON PROJECT.
26. PROTECT EXISTING TELECOM EQUIPMENT AND ASSOCIATED POWER/TELEPHONE SERVICE FROM CONSTRUCTION RELATED DAMAGE. ANY DAMAGE SHALL BE REPAIRED TO OWNER'S SATISFACTION AT CONTRACTOR'S EXPENSE.
27. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL STRING.
28. ALL MATERIALS WITHIN A PLENUM SHALL BE NON-COMBUSTIBLE OR HAVE A FLAME SPREAD RATING OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50.
29. ALL LOW VOLTAGE CABLING SHALL BE PLENUM RATED.
30. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COMMUNICATIONS WIRING INCLUDING ALL DATA, TELEPHONE, INTERCOM/P.A., ETC.
31. PROVIDE LEVITON WEATHERPROOF RECEPTACLES AS FOLLOWS: INSTALL DEVICE IN LEVITON NO. 4992 GRAY LIFT COVERPLATE FOR WEATHERPROOF (WP) AS NOTED PLANS. INSTALL DEVICE IN LEVITON NO. 5977-BK BLACK "WHILE-IN-USE" COVER FOR WEATHERPROOF IN USE (WPI) AS NOTED ON PLANS
32. PRIOR TO INSTALLATION, CONTRACTOR SHALL CONFIRM ELECTRICAL REQUIREMENTS FOR OWNER-FURNISHED EQUIPMENT. IF NECESSARY, CONTRACTOR SHALL PROVIDE CORD-AND-PLUG ON OWNER FURNISHED EQUIPMENT. CONFIRM EXACT LOCATION AND MOUNTING HEIGHT OF NEW ELECTRICAL DEVICES WITH OWNER PRIOR TO ROUGH-IN.

LIGHTING GENERAL NOTES

1. PLANS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS.
2. COORDINATE ALL SCHEDULING, ELEVATIONS, SIZES, QUANTITIES, AND ROUTING OF WORK WITH OWNER AND OTHER TRADES.
3. FIELD VERIFY SIZE, LOCATION, ELEVATION AND QUANTITY OF ALL ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PIPING EQUIPMENT AND COMPONENTS THAT MAY IMPACT IMPLEMENTATION OF THIS WORK.
4. REPAIR OR REPLACE ARCHITECTURAL, MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT OR COMPONENTS DAMAGED WHILE EXECUTING THIS WORK. SUCH REPAIRS OR REPLACEMENTS SHALL MATCH OR EXCEED EXISTING EQUIPMENT OR COMPONENT FINISH AND QUALITY.
5. ALL ELECTRICAL BOXES SHALL BE GALVANIZED STEEL. BACK BOXES MOUNTED ON GALVANIZED STUDS SHALL HAVE BETWEEN STUD MOUNTING BRACKETS EQUAL TO 'CADDY' #RBS16 OR #RBS24. PROVIDE 3/4" MUD RINGS WHERE LOCATED IN WALLS WITH 5/8" THICK GYPSUM WALLBOARDS.
6. PROVIDE DEVICE AND EQUIPMENT LABELING PER THE SPECIFICATIONS. ALL PANELBOARDS SHALL BE PROVIDED WITH AN UPDATED TYPED CIRCUIT DIRECTORY WITH CIRCUIT NUMBERS AND EQUIPMENT SERVED.
7. ALL POWER CIRCUITS SHALL HAVE A GROUNDING CONDUCTOR.
8. CONFIRM THAT NO WIRING CIRCUIT EXCEEDS 1800VA (120V).
9. ALL WALL OCCUPANCY SENSORS AND COVERPLATES SHALL BE GREY IN COLOR. ALL STANDARD TOGGLE SWITCHES SHALL BE GREY IN COLOR AN COVERPLATES SHALL BE STAINLESS STEEL. REFERENCE ELECTRICAL PAN SPECIFICATIONS.
10. FOR ANY EMERGENCY OR NIGHT LIGHT FIXTURE, A CONSTANT HOT CONDUCTOR SHALL BE ROUTED TO FIXTURE WHETHER IT IS SHOWN OR NOT.
11. EXIT LIGHT FIXTURES MOUNTED ON WALLS SHALL BE AT LEAST 8" ABOVE DOOR HEADER OR PER DRAWING ELEVATIONS.
12. REFERENCE LIGHTING FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION ON FIXTURE TYPE AND CONTROLS.

MECHANICAL DEMOLITION NOTES

1. REMOVE ALL DEMOLISHED MATERIALS FROM SITE AND DISPOSE IN ACCORDANCE WITH UNIFIED FACILITIES CRITERIA, LOCAL, STATE, AND FEDERAL REGULATIONS.
2. REPAIR OR REPLACE ARCHITECTURAL, MECHANICAL, ELECTRICAL, OR PLUMBING EQUIPMENT OR COMPONENTS DAMAGED WHILE EXECUTING THIS WORK. SUCH REPAIRS OR REPLACEMENTS SHALL MATCH OR EXCEED EXISTING EQUIPMENT OR COMPONENT FINISH AND QUALITY.
3. FIELD VERIFY SIZE, LOCATION, ELEVATION AND QUANTITY OF ALL ARCHITECTURAL, MECHANICAL, ELECTRICAL, AND PIPING EQUIPMENT AND COMPONENTS THAT MAY IMPACT IMPLEMENTATION OF THIS WORK.
4. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL OF ALL EQUIPMENT THAT IS REMOVED.
5. EXISTING CONDITIONS ON THIS SET OF CONSTRUCTION DRAWINGS WERE TAKEN FROM PREVIOUS CONSTRUCTION DRAWINGS AND SITE VISITS. NO AS-BUILT DRAWINGS EXISTS. THESE DRAWINGS MAY NOT REFLECT ACTUAL CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING FINAL BIDS. NO EXTRAS WILL BE PAID DUE TO UNANTICIPATED CONDITIONS.
6. CONTRACTOR SHALL SCHEDULE AND EXECUTE ALL WORK WITH REGARD TO THE OWNER'S USE OF THE BUILDING. ALL WORK ASSOCIATED WITH EXISTING MECHANICAL SYSTEMS THAT WILL REQUIRE DISRUPTION OF SERVICE TO OTHER SPACES OCCUPIED DURING CONSTRUCTION SHALL BE COORDINATED WITH THE OWNER.
7. WHERE DUCTWORK IS SHOWN TO BE REMOVED, REMOVE ALL SUPPORTS, INSULATION WRAP, ETC. WHERE EQUIPMENT IS SHOWN TO BE REMOVED, COORDINATE WITH OTHER TRADES FOR DISCONNECTING UTILITIES, I.E. POWER, GAS, CONDENSATE, ETC.

MECHANICAL DEMOLITION NOTES (CONT'D)

9. WHERE EQUIPMENT IS SCHEDULED FOR DEMOLITION ON THE ROOF, CONTRACTOR SHALL PATCH THE OPENING AND SEAL WEATHERTIGHT. ALL EXISTING ROOFING SYSTEMS SHALL BE PATCHED AND COORDINATED WITH GENERAL CONTRACTOR TO MAINTAIN ANY WARRANTIES. REFER TO ARCHITECTURAL PLANS AND SPECIFICATIONS FOR ALL REQUIREMENTS.
10. CONTRACTOR SHALL IDENTIFY ALL ABANDONED PIPING, DUCTWORK, AND CONDUIT DISCOVERED IN THE EXECUTION OF THIS PROJECT, USING ORANGE PAINT MARKINGS EVERY 20 FEET.
11. WHERE EXISTING BRANCH TAKEOFFS FROM EXISTING SUPPLY, RETURN, OR EXHAUST DUCTS ARE NOTED TO BE DISCONNECTED FROM MAIN AND REMOVED, CONTRACTOR SHALL PATCH AND SEAL OPENING IN EXISTING MAIN DUCTWORK AIRTIGHT. PRIOR TO PATCH/SEAL, COORDINATE WITH NEW WORK PLANS TO RECONNECT TO EXISTING OPENINGS WHERE APPLICABLE.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR HYDRONIC SYSTEMS DRAIN DOWN FOR ANY REQUIRED MODIFICATIONS/CONNECTIONS TO EXISTING HYDRONIC SYSTEM. UPON COMPLETION OF HYDRONIC SYSTEMS WORK, CONTRACTOR SHALL BE RESPONSIBLE FOR SYSTEM FILL AND ANY REQUIRED CHEMICAL TREATMENT. SYSTEM FILL MAY OCCUR ONCE ISOLATION IS PROVIDED ON EACH BRANCH FROM MAIN (WHERE SHOWN/NOTED), TO ALLOW FOR WORK TO BE PERFORMED ON AN INDIVIDUAL AREA WHILE SURROUNDING AREAS REMAIN OPERATIONAL (COORDINATE WITH OWNER'S USE OF BUILDING AND CONSTRUCTION PHASING).

MECHANICAL GENERAL NOTES

1. ALL MECHANICAL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL MECHANICAL CODE (IMC).
2. COORDINATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION AND AVOID INTERFERENCES AND CONFLICTS. BEFORE ANY PIPING, DUCTWORK CONDUIT, ETC. IS INSTALLED, IT SHALL BE COORDINATED CAREFULLY BETWEEN ALL TRADES.
3. CONTRACTOR SHALL SUBMIT HVAC SHEET METAL PLANS WITH ACTUAL FITTINGS AND LAYOUT PER THE SHOP FABRICATION.
4. REFER TO EXISTING STRUCTURAL PLANS, OR VERIFY IN FIELD, THE LOCATION OF ALL STRUCTURAL MEMBERS. NEW ROOF PENETRATIONS AND ROOF CURBS FOR EQUIPMENT ON ROOF ARE SHOWN SCHEMATICALLY AND SHALL BE COORDINATED WITH EXISTING STRUCTURAL MEMBERS.
5. PROVIDE FLEXIBLE CONNECTION AND DUCT TRANSITIONS AT CONNECTIONS TO ALL DUCTED MECHANICAL EQUIPMENT.
6. COORDINATE ROUTING OF DUCTWORK WITH ALL OTHER TRADES TO AVOID INTERFERENCES IN CEILING PLENUM.
7. MAINTAIN ALL MANUFACTURER'S REQUIRED CLEARANCES FOR ALL HVAC EQUIPMENT.
8. COORDINATE ALL CEILING INSTALLED EQUIPMENT AND DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELECTRICAL LIGHTING PLANS.
9. ROUND BRANCH TAKE-OFF FITTINGS TO DIFFUSERS SHALL BE BELLMOUTH TYPE EXCEPT LOCATIONS WHERE LISTED DUCT HEIGHT DOES NOT ACCOMODATE. IN THIS CASE PROVIDE HIGH EFFICIENCY 45 DEGREE RECTANGULAR TO ROUND (HETO) FITTING. BOTH OF THESE FITTINGS ARE REQUIRED IN ALL CIRCUMSTANCES. ALL ROUND BRANCH TAKE-OFF FITTINGS TO DIFFUSERS SHALL INCLUDE AN INTEGRAL MANUAL VOLUME DAMPER.
10. BRANCH DUCTS TO DIFFUSERS SHALL BE THE SAME SIZE AS THE DIFFUSER NECK UNLESS NOTED OTHERWISE. MAXIMUM LENGTH OF FLEXIBLE DUCT ROUTING TO BE 5'-0" (NO EXCEPTIONS).
11. INSTALL TEMPERATURE SENSORS/THERMOSTATS/CO2 SENSORS AT 48" AFF. COORDINATE LOCATIONS WITH LIGHT SWITCHES. THERMOSTAT BOXES AND CONDUITS TO ABOVE CEILING ARE TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR.
12. CONTRACTOR SHALL REPAIR OR REPLACE LAY-IN OR GYPBOARD CEILINGS AS NECESSARY TO INSTALL NEW DUCTWORK, PIPING AND ELECTRICAL CONDUITS.
13. ALL EXISTING PLUMBING WASTE, WATER, AND VENT PIPING LOCATION AND ROUTING SHALL BE FIELD VERIFIED.
14. FIRE DAMPERS SHALL BE PROVIDED WHERE DUCTWORK PENETRATES ANY RATED ASSEMBLY. REFER TO ARCHITECTURAL CODE PLAN FOR FURTHER DETAILS.

PLUMBING GENERAL NOTES

1. ALL PLUMBING WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL PLUMBING CODE (IPC).
2. COORDINATE CLOSELY WITH ALL OTHER TRADES TO EXPEDITE CONSTRUCTION AND AVOID INTERFERENCES AND CONFLICTS. BEFORE ANY PIPING, DUCTWORK CONDUIT, ETC. IS INSTALLED, IT SHALL BE COORDINATED CAREFULLY BETWEEN ALL TRADES.
3. MAINTAIN MANDATORY 10'-0" SEPARATION FROM ALL VENTS/EXHAUST AND OUTSIDE AIR INTAKES. REFER TO MECHANICAL PLANS PRIOR TO ROUGH-IN.
4. ALL DOMESTIC WATER, WASTE, AND VENT PIPING SHALL BE ROUTED TIGHT TO STRUCTURE. COORDINATE ROUTING WITH ALL TRADES.
5. PLANS ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. REFER TO ARCHITECTURAL PLANS FOR DIMENSIONS. IF ANY DISCREPANCIES OCCUR FROM THESE PLANS, CONTACT A/E IMMEDIATELY.
6. UNLESS NOTED OTHERWISE, MAINTAIN MINIMUM 1/8" PER 1'-0" SLOPE ON ALL DRAINAGE PIPING.
7. EXISTING CONDITIONS ON THIS SET OF CONSTRUCTION DRAWINGS WERE TAKEN FROM PREVIOUS CONSTRUCTION DRAWINGS AND SITE VISITS. NO AS-BUILT DRAWINGS EXIST. THESE DRAWINGS MAY NOT REFLECT ACTUAL CONDITIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO SUBMITTING FINAL BIDS. NO EXTRAS WILL BE PAID DUE TO UNANTICIPATED CONDITIONS.
8. CONTRACTOR SHALL SCHEDULE AND EXECUTE ALL WORK WITH REGARD TO THE OWNER'S USE OF THE BUILDING. ALL WORK ASSOCIATED WITH EXISTING SYSTEMS THAT WILL REQUIRE DISRUPTION OF SERVICE TO OTHER TENANT SPACES OCCUPIED DURING CONSTRUCTION SHALL BE COORDINATED WITH THE OWNER.
9. CONTRACTOR SHALL MEASURE AND SCOPE THE EXISTING WASTE PIPING TO VERIFY THE EXISTING CONDITIONS AND IF THEY DIFFER FROM THOSE SHOWN ON THE PLANS.

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MIKE KEHOE,
GOVERNOR

OFFICE OF THE ADJUTANT GENERAL

MISSOURI NATIONAL GUARD FACILITIES DIVISION

WELLNER ARCHITECTS + engineers

ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION

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PROFESSIONAL ENGINEER
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REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD, MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

REVISION: ____
DATE: ____
REVISION: ____
DATE: ____
REVISION: ____
DATE: ____
ISSUE DATE: 04.13.2026

CAD DWG FILE: ____
DRAWN BY: ____
CHECKED BY: ____
DESIGNED BY: ____

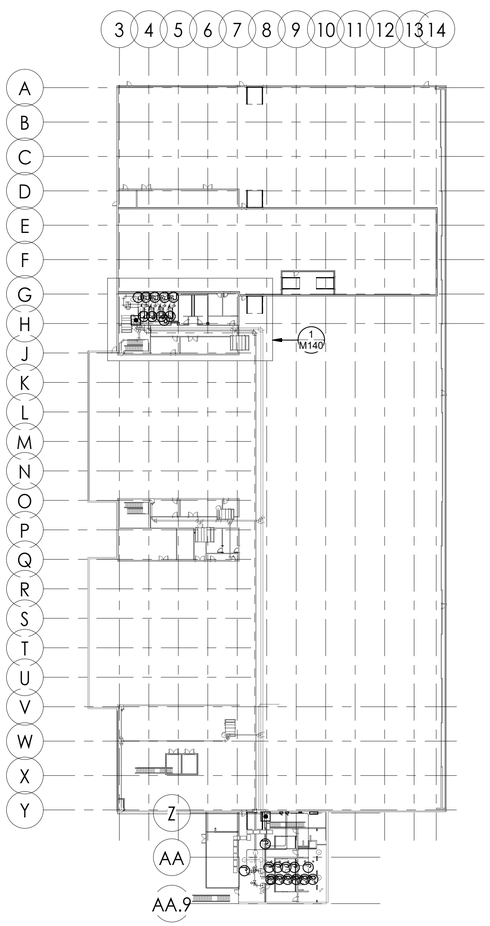
SHEET TITLE:

GENERAL NOTES

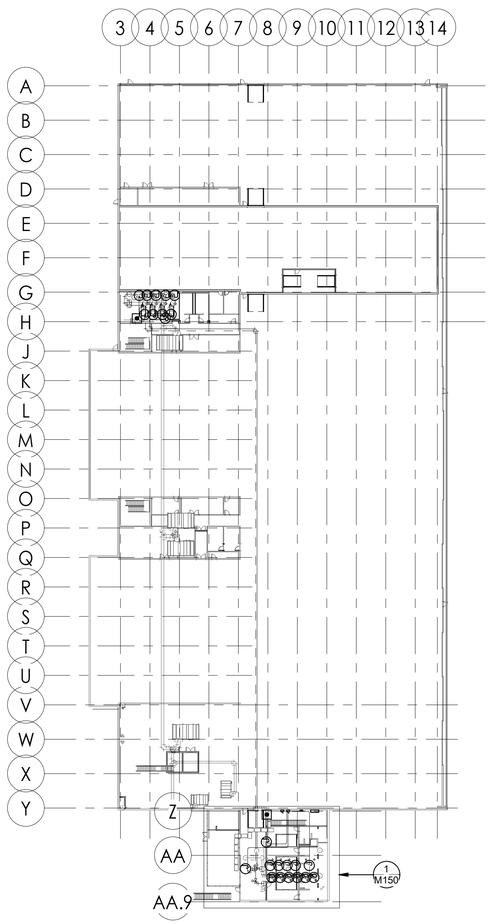
SHEET NUMBER:

ME010

KEYPLAN NOTES



AREA D (ROOF MEZZANINE) 4
1" = 50'-0"



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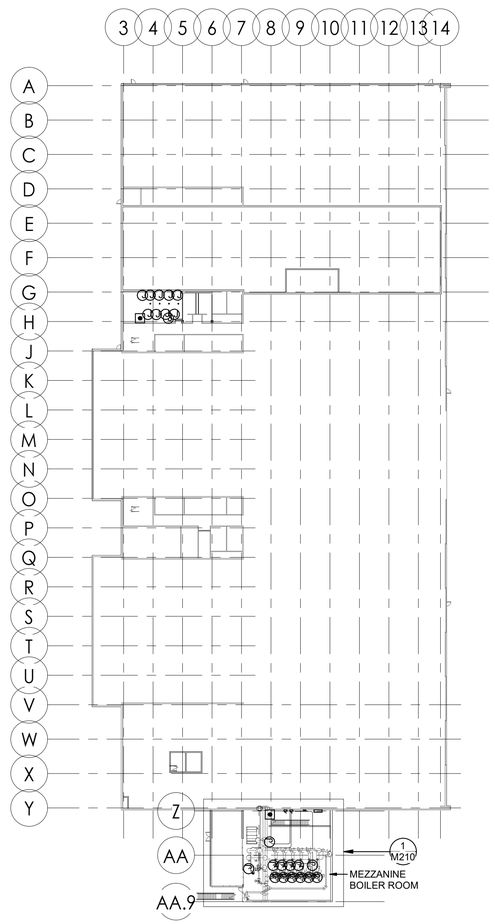

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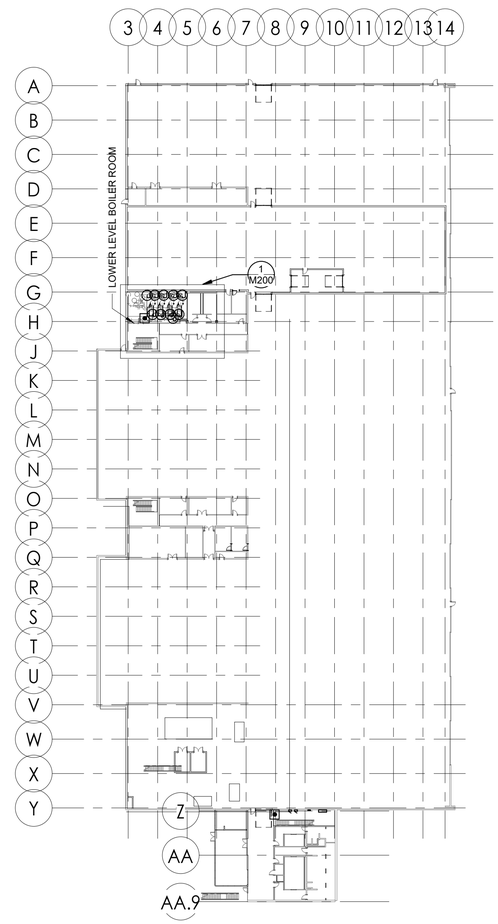
1" = 50'-0"



AREA A (LOWER LEVEL) 1
1" = 50'-0"

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SPRINGFIELD,
MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

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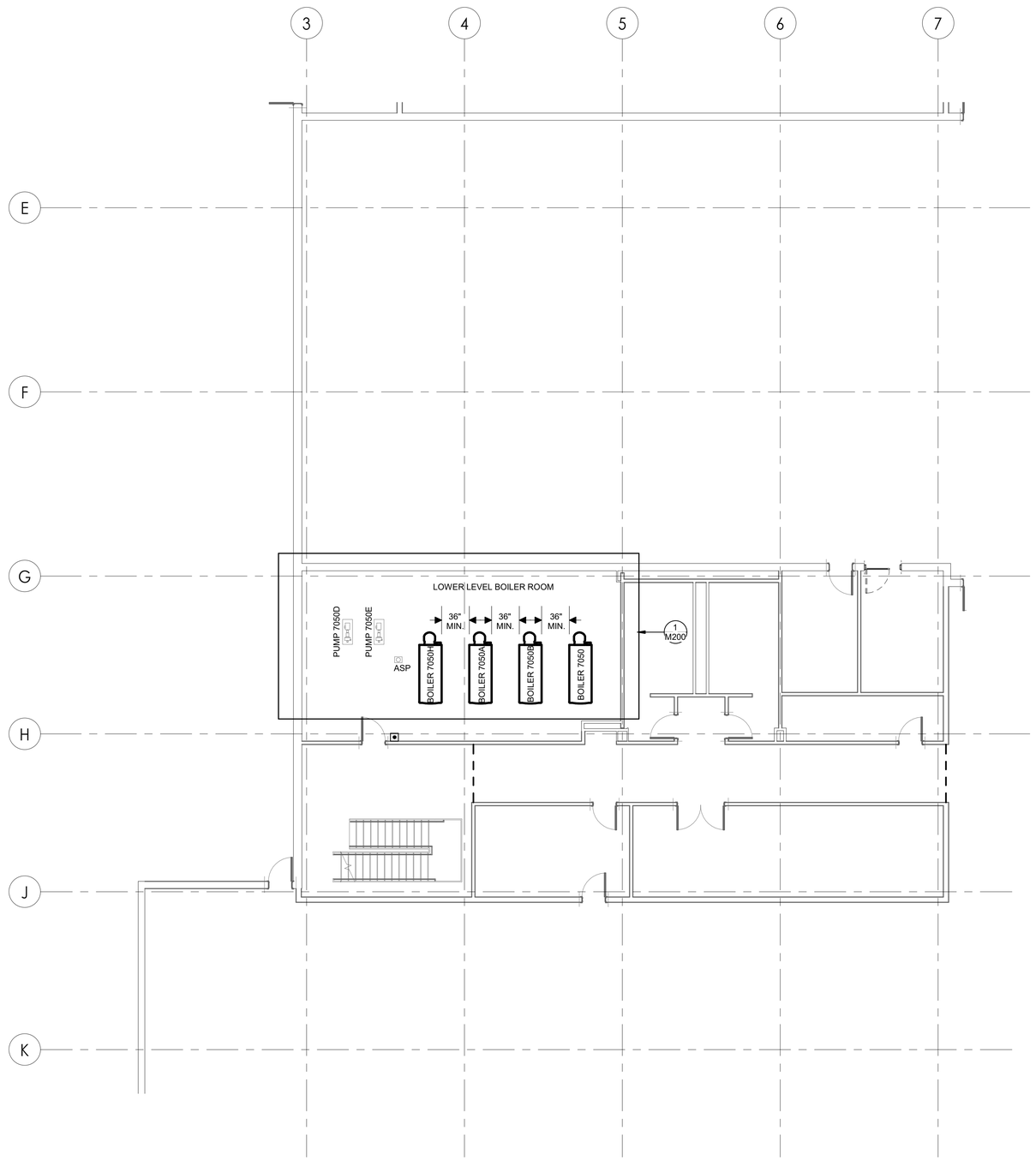
MECHANICAL
OVERALL KEYPLAN

SHEET NUMBER:

M-010



PARTIAL MECHANICAL PLAN - AREA A (1)
1/8" = 1'-0"

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REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD,
MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

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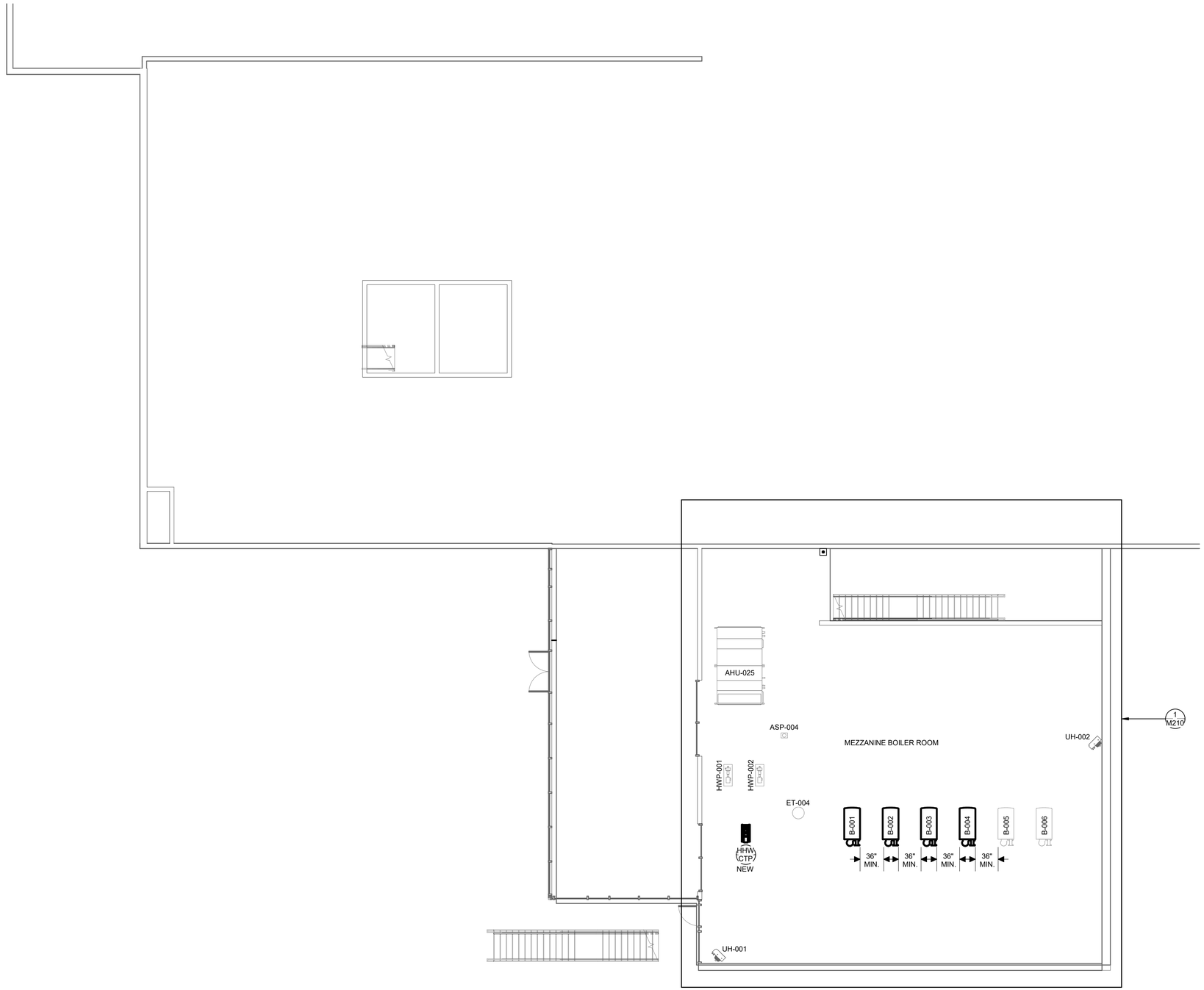
PARTIAL MECHANICAL PLAN - AREA A

SHEET NUMBER:

M-100



PARTIAL MECHANICAL PLAN - AREA B (1)
1/8" = 1'-0"

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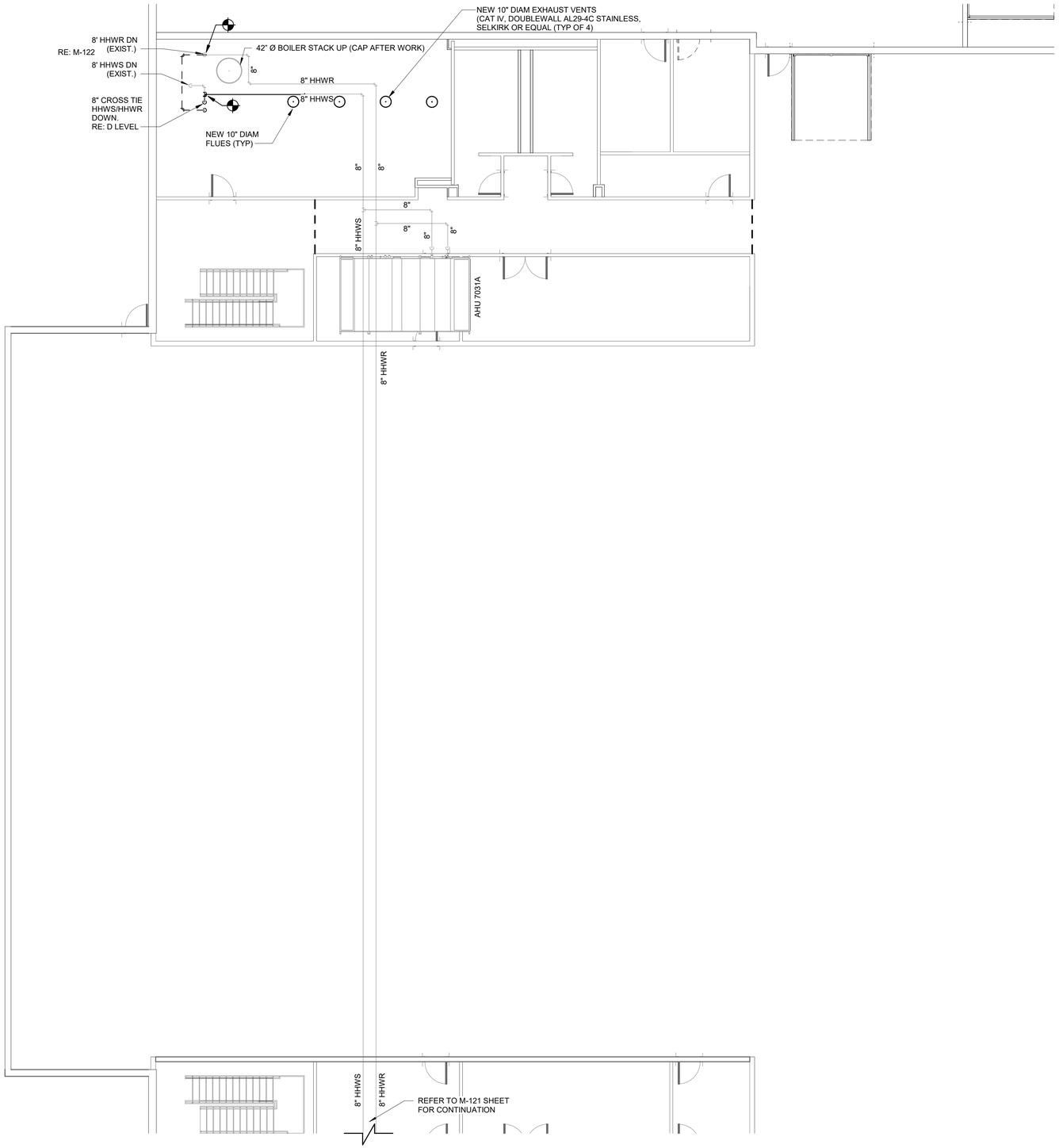
PARTIAL MECHANICAL PLAN - AREA B

SHEET NUMBER:

M-110



PARTIAL MECHANICAL PLAN - AREA C-1 (1)
1/8" = 1'-0"

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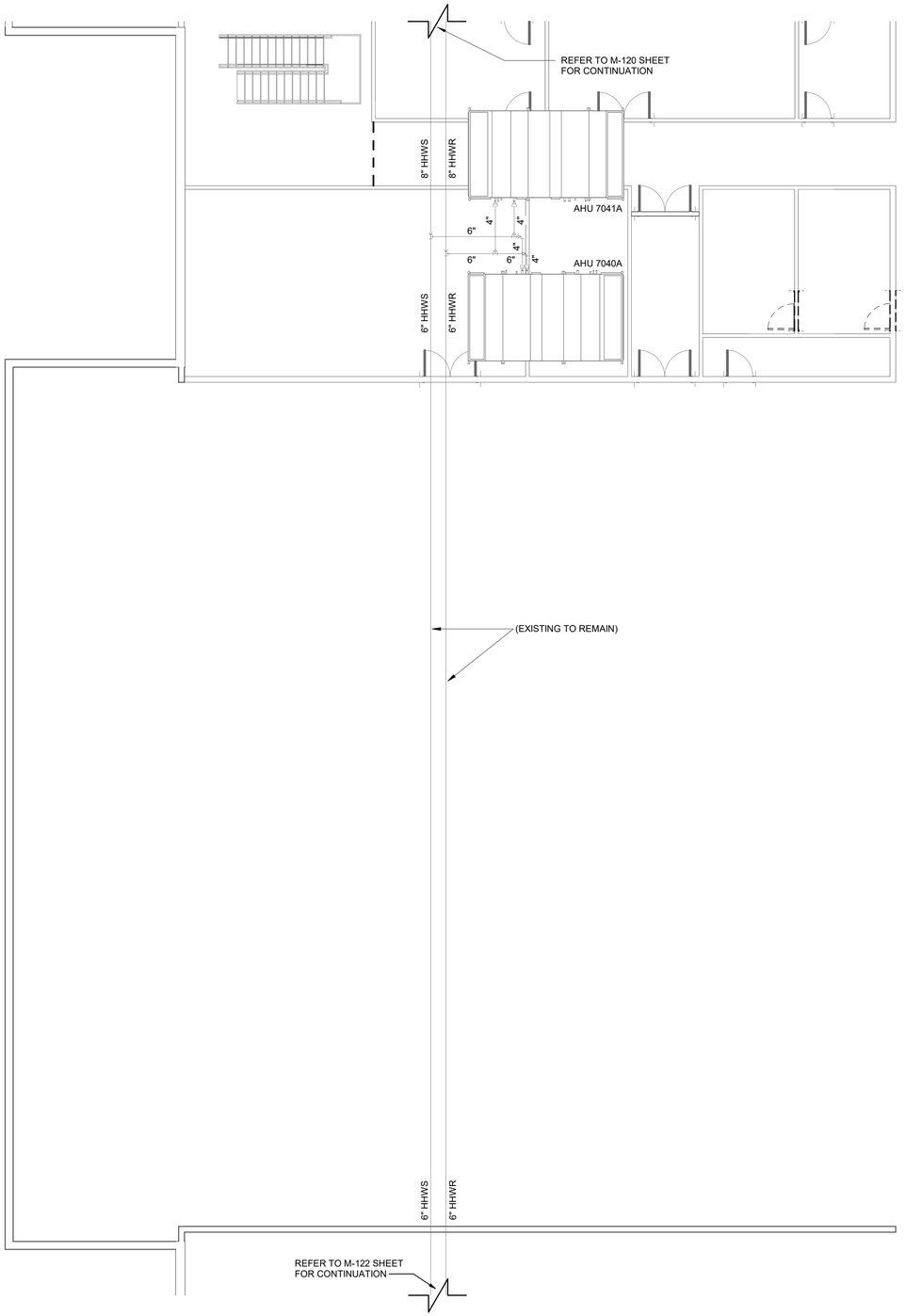
PARTIAL
MECHANICAL PLAN
- AREA C

SHEET NUMBER:

M-120



PARTIAL MECHANICAL PLAN - AREA C-2 (1)
1/8" = 1'-0"

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PARTIAL MECHANICAL PLAN - AREA C-2

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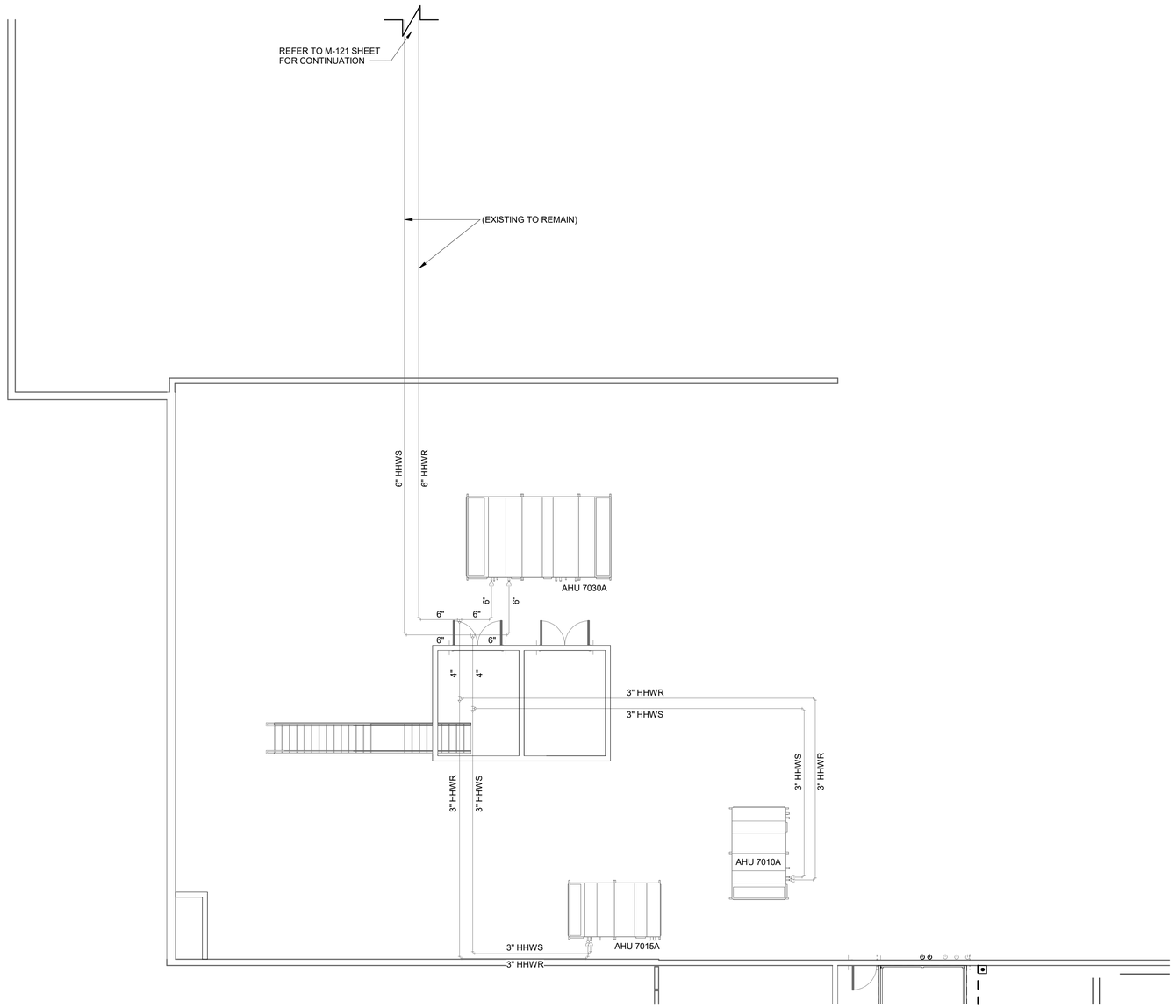
M-121



PARTIAL MECHANICAL PLAN - AREA C-3 (1)

1/8" = 1'-0"

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PARTIAL MECHANICAL PLAN - AREA C-3

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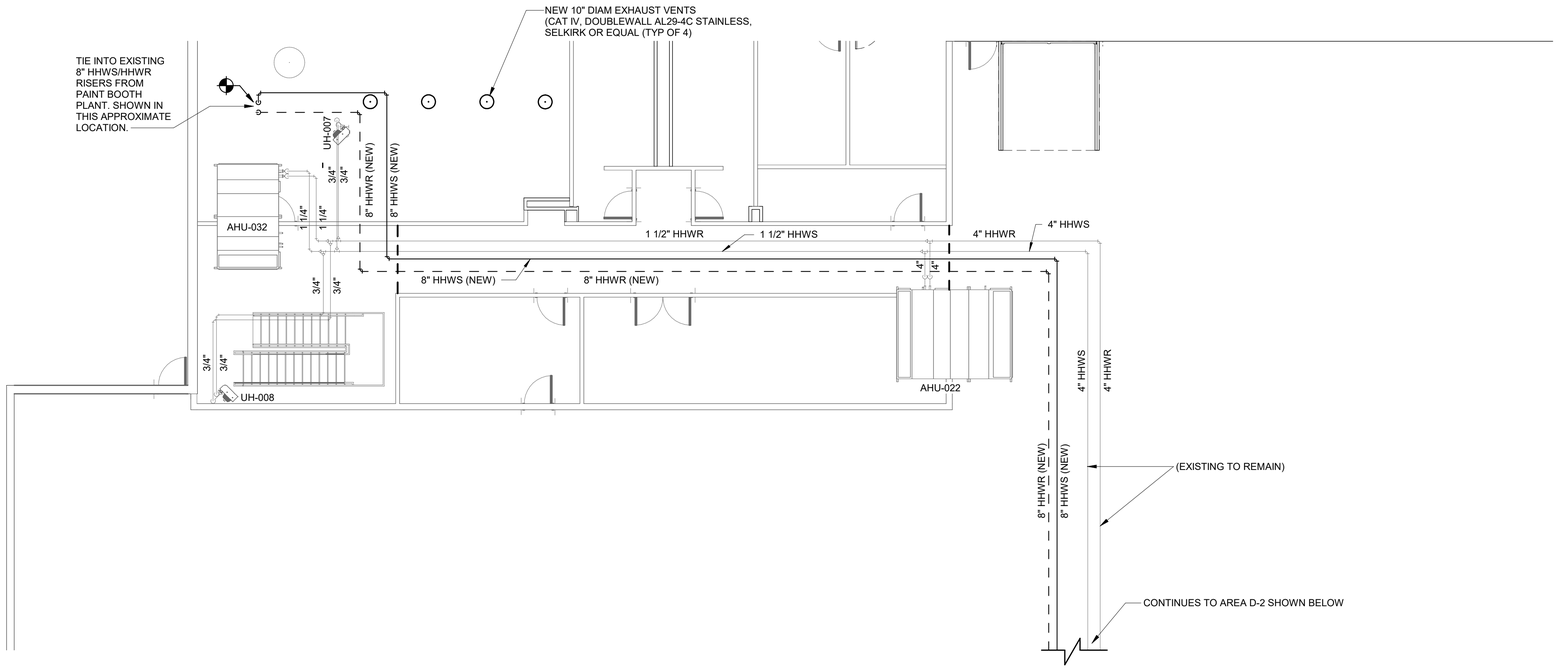
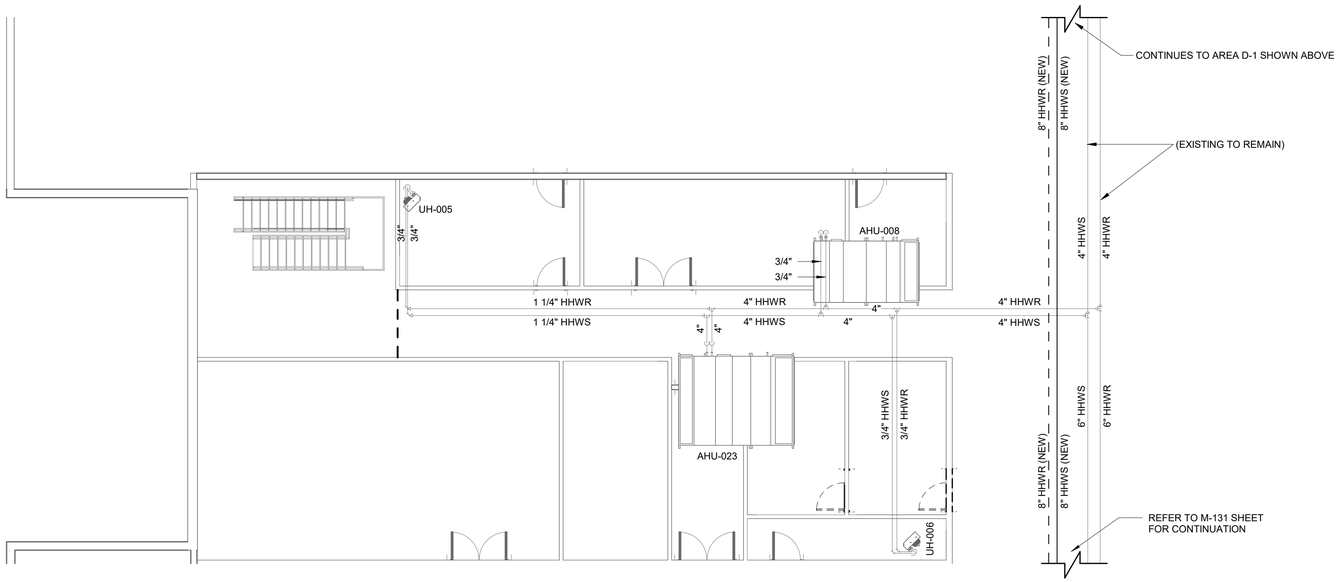
M-122



PARTIAL MECHANICAL PLAN - AREA D-1 (1)

1/8" = 1'-0"



PARTIAL MECHANICAL PLAN - AREA D-2 (2)

1/8" = 1'-0"

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PARTIAL MECHANICAL PLAN - AREA D

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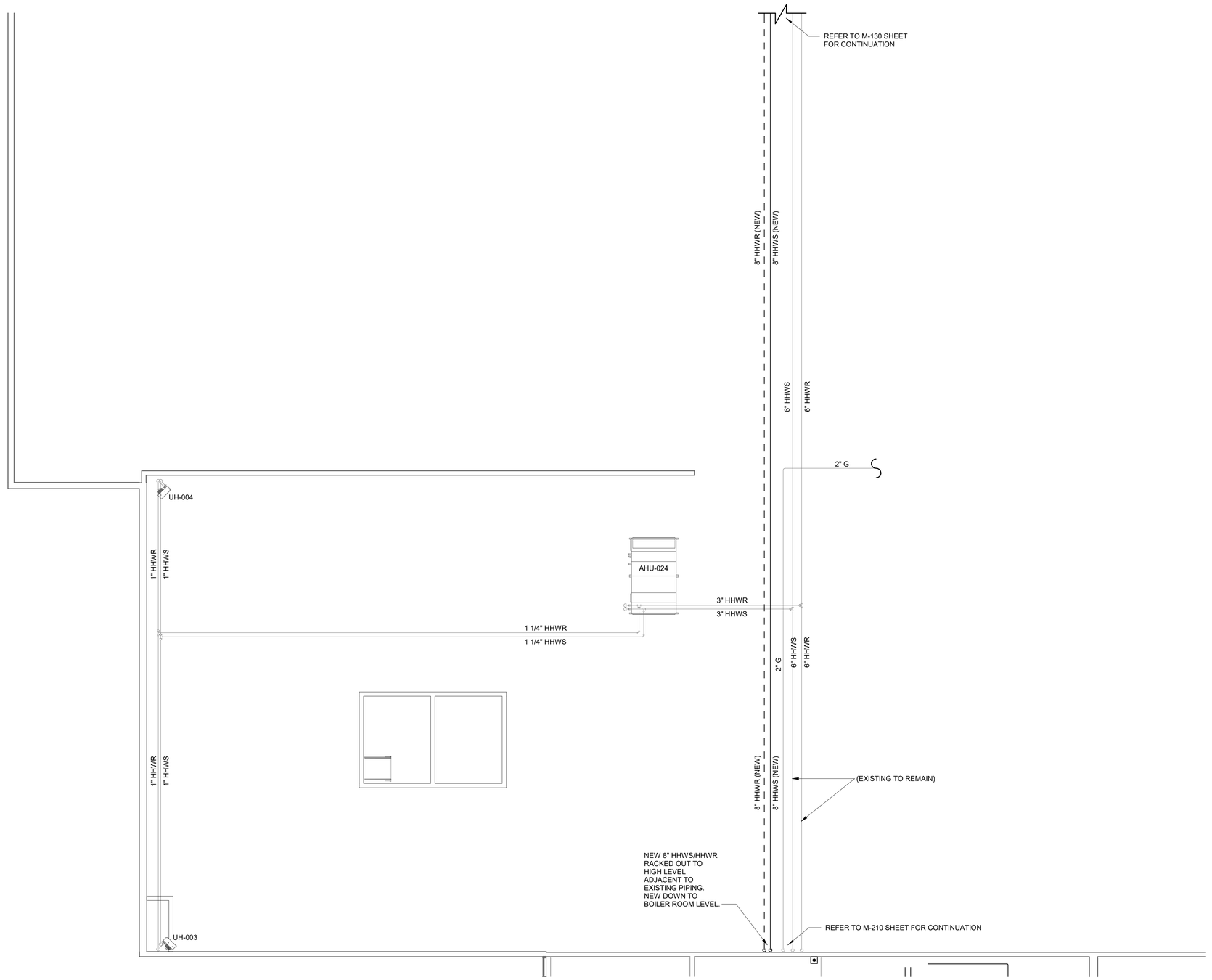
M-130



PARTIAL MECHANICAL PLAN - AREA D-3 (1)

1/8" = 1'-0"

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PARTIAL MECHANICAL PLAN - AREA D

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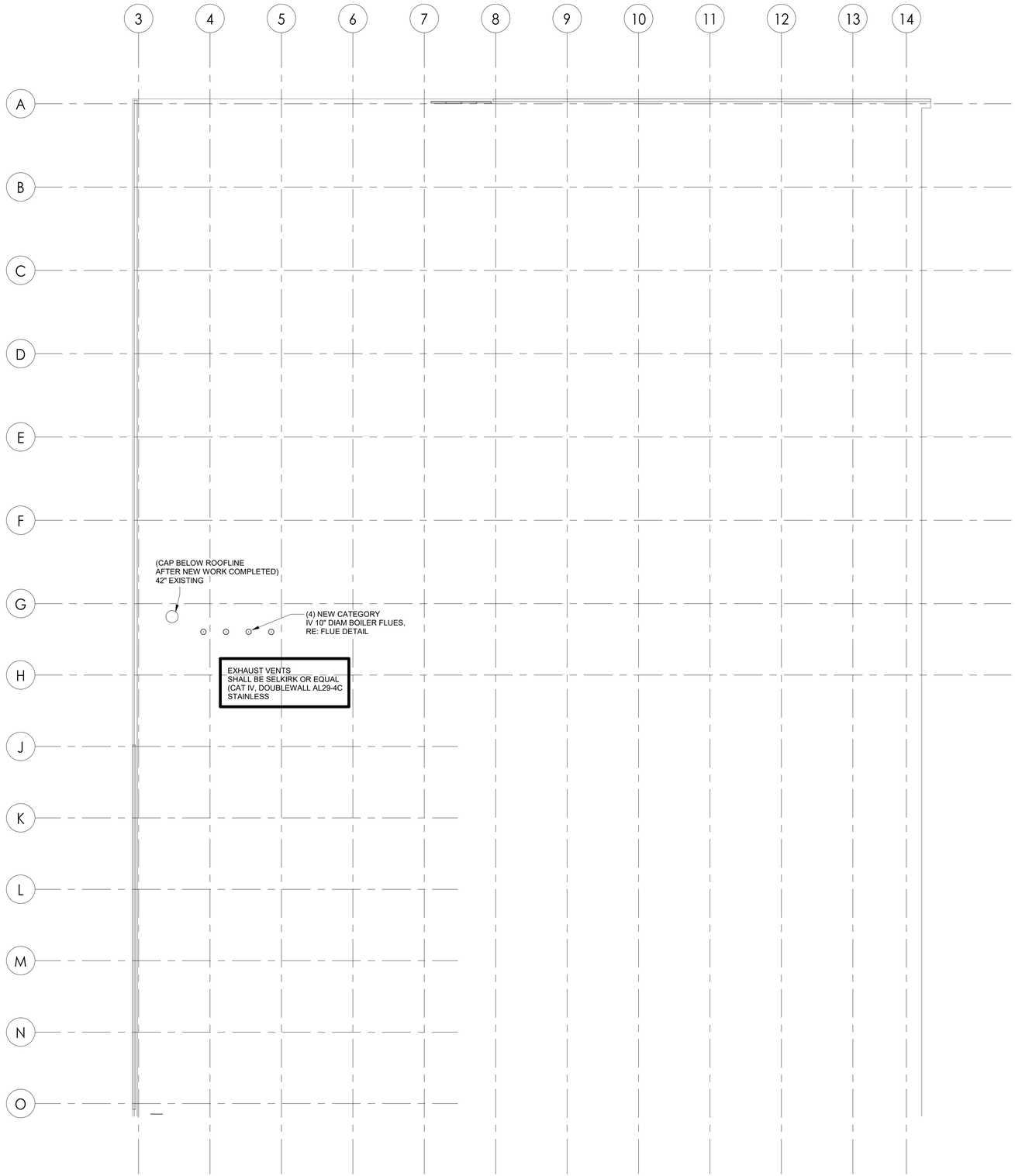
M-131



PARTIAL MECHANICAL ROOF PLAN 1 (1)

1/16" = 1'-0"

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PARTIAL MECHANICAL ROOF PLAN

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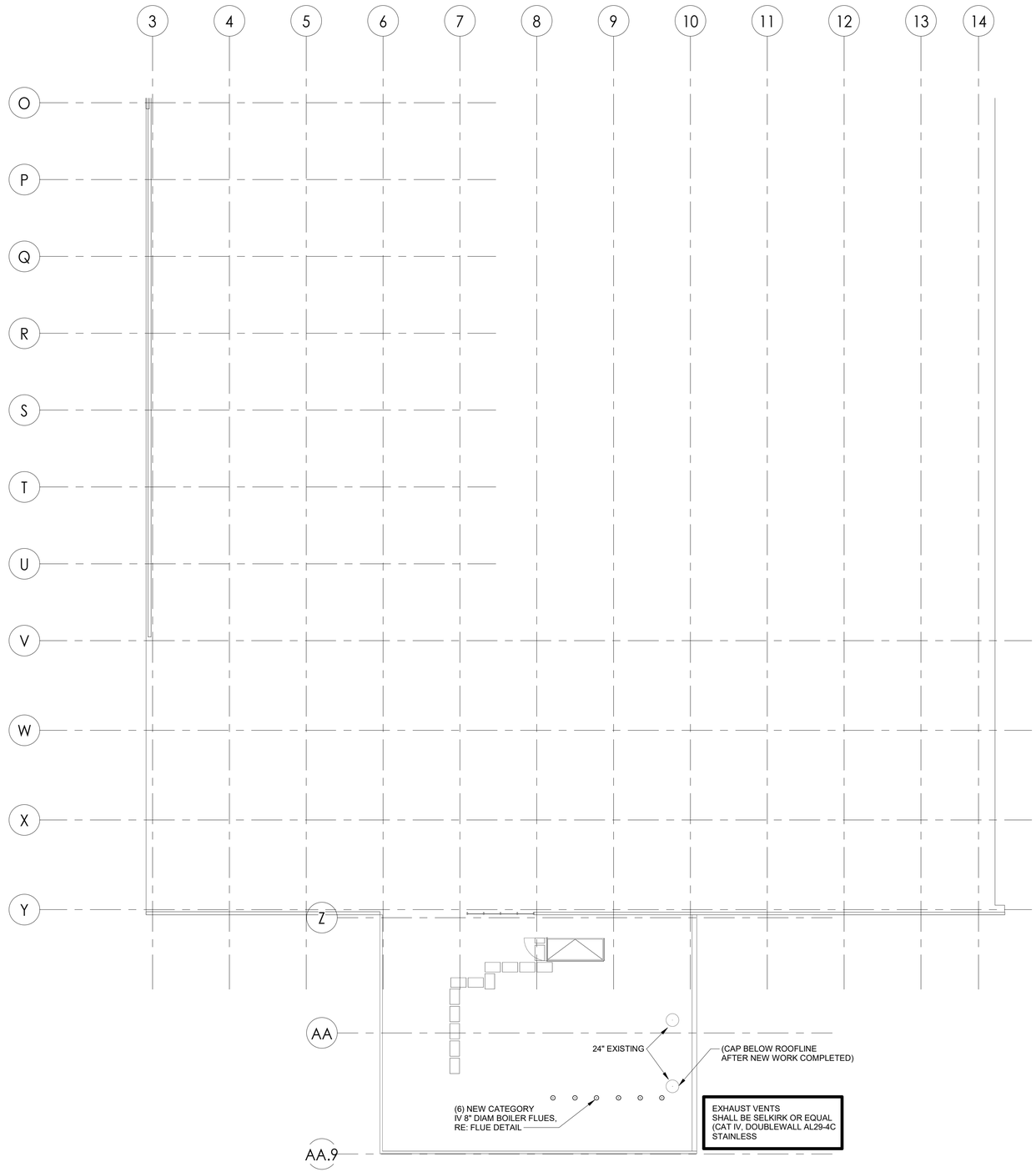
M-140



PARTIAL MECHANICAL ROOF PLAN 2 (1)

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PARTIAL MECHANICAL ROOF PLAN

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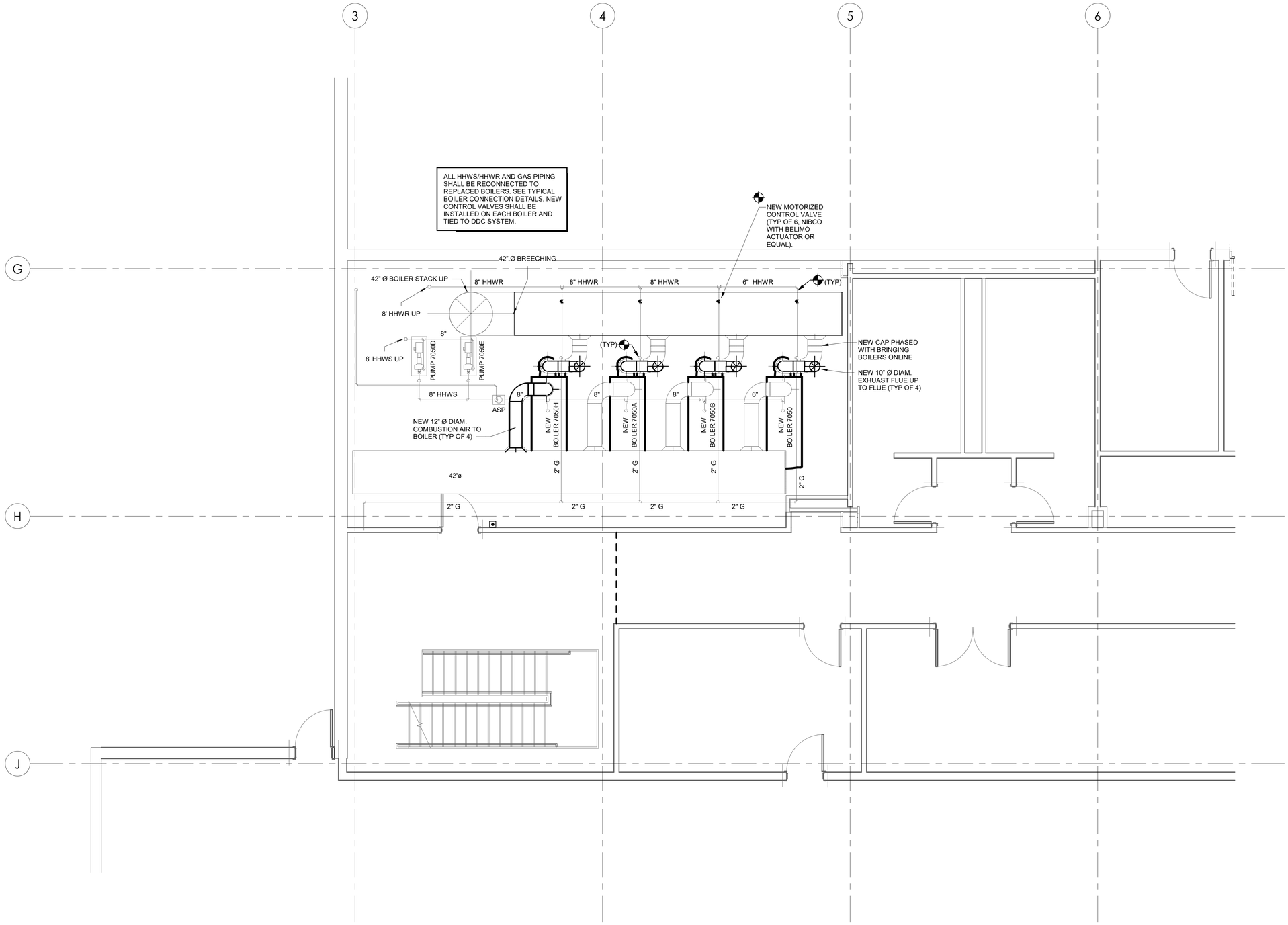
M-150



ENLARGED LOWER LEVEL BOILER ROOM (1)
1/4" = 1'-0"

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ENLARGED LOWER LEVEL BOILER ROOM MECHANICAL PLAN

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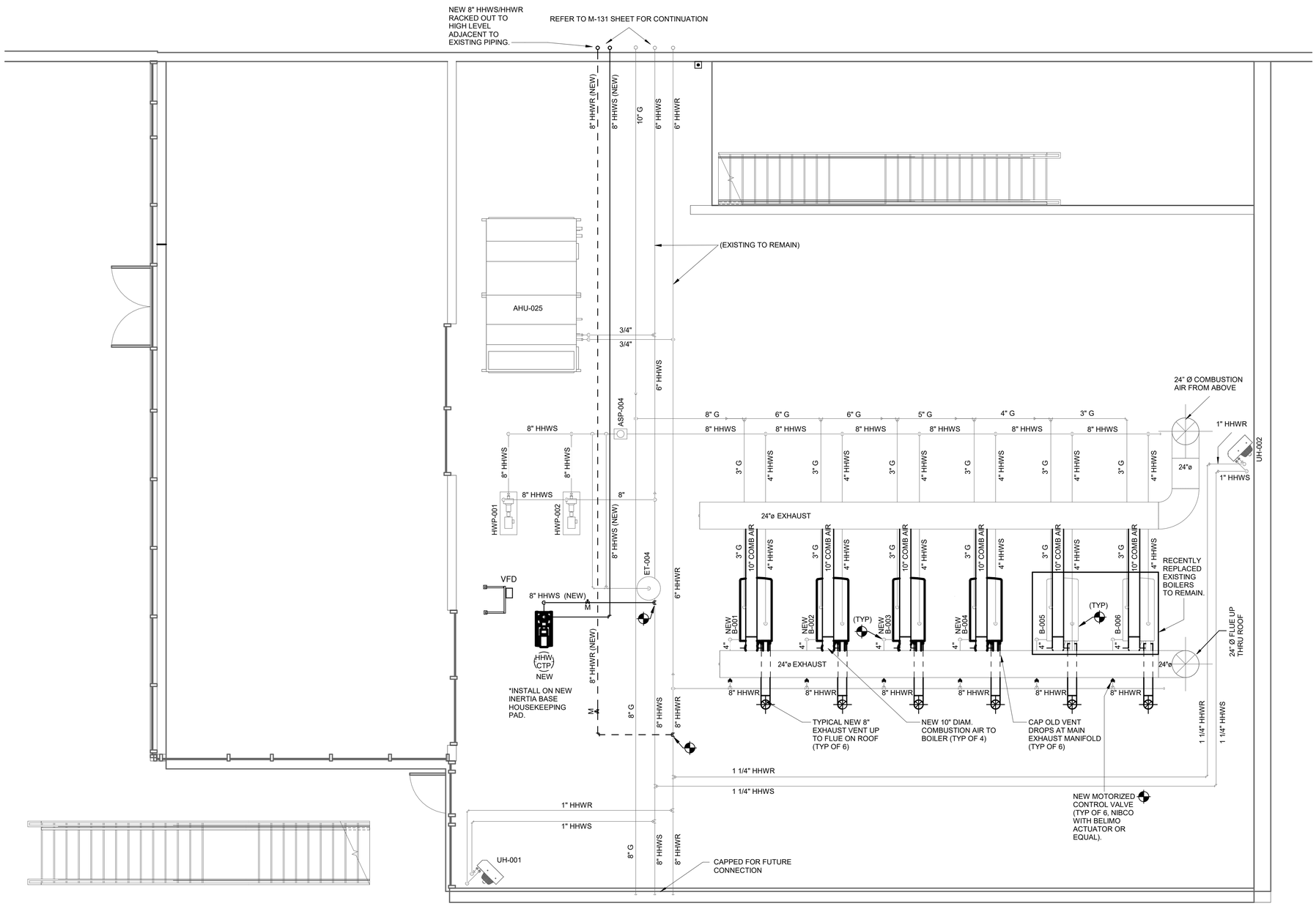

ENLARGED MEZZANINE BOILER ROOM (1)

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ENLARGED MEZZANINE BOILER ROOM MECHANICAL PLAN

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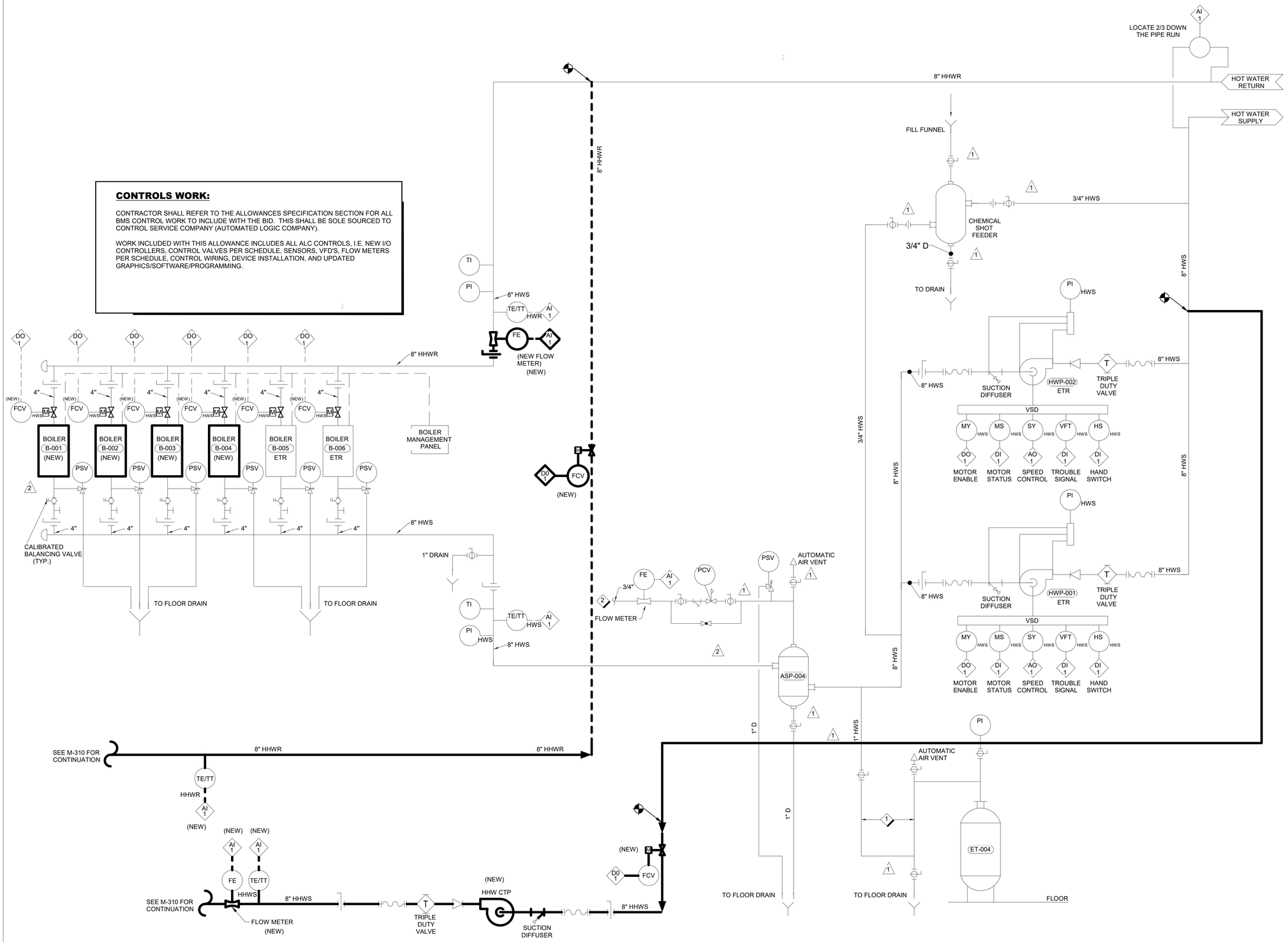
M-210

CONTROLS WORK:

CONTRACTOR SHALL REFER TO THE ALLOWANCES SPECIFICATION SECTION FOR ALL BMS CONTROL WORK TO INCLUDE WITH THE BID. THIS SHALL BE SOLE SOURCED TO CONTROL SERVICE COMPANY (AUTOMATED LOGIC COMPANY).

WORK INCLUDED WITH THIS ALLOWANCE INCLUDES ALL ALC CONTROLS, I.E. NEW I/O CONTROLLERS, CONTROL VALVES PER SCHEDULE, SENSORS, VFD'S, FLOW METERS PER SCHEDULE, CONTROL WIRING, DEVICE INSTALLATION, AND UPDATED GRAPHICS/SOFTWARE/PROGRAMMING.



A1 EXISTING HOT WATER FLOW DIAGRAM (CORE #1 PLANT)
NOT TO SCALE

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MIKE KEHOE,
GOVERNOR

OFFICE OF THE ADJUTANT GENERAL

MISSOURI NATIONAL GUARD FACILITIES DIVISION

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ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, FIRE PROTECTION

Wellner Architects + Engineers
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Kansas City, MO 64108
816.221.0017

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STATE OF MISSOURI
CORY WILSON
04.13.2026
NUMBER PE-2010009876
PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CORY WILSON
MISSOURI PE # 2010009876

REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD, MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

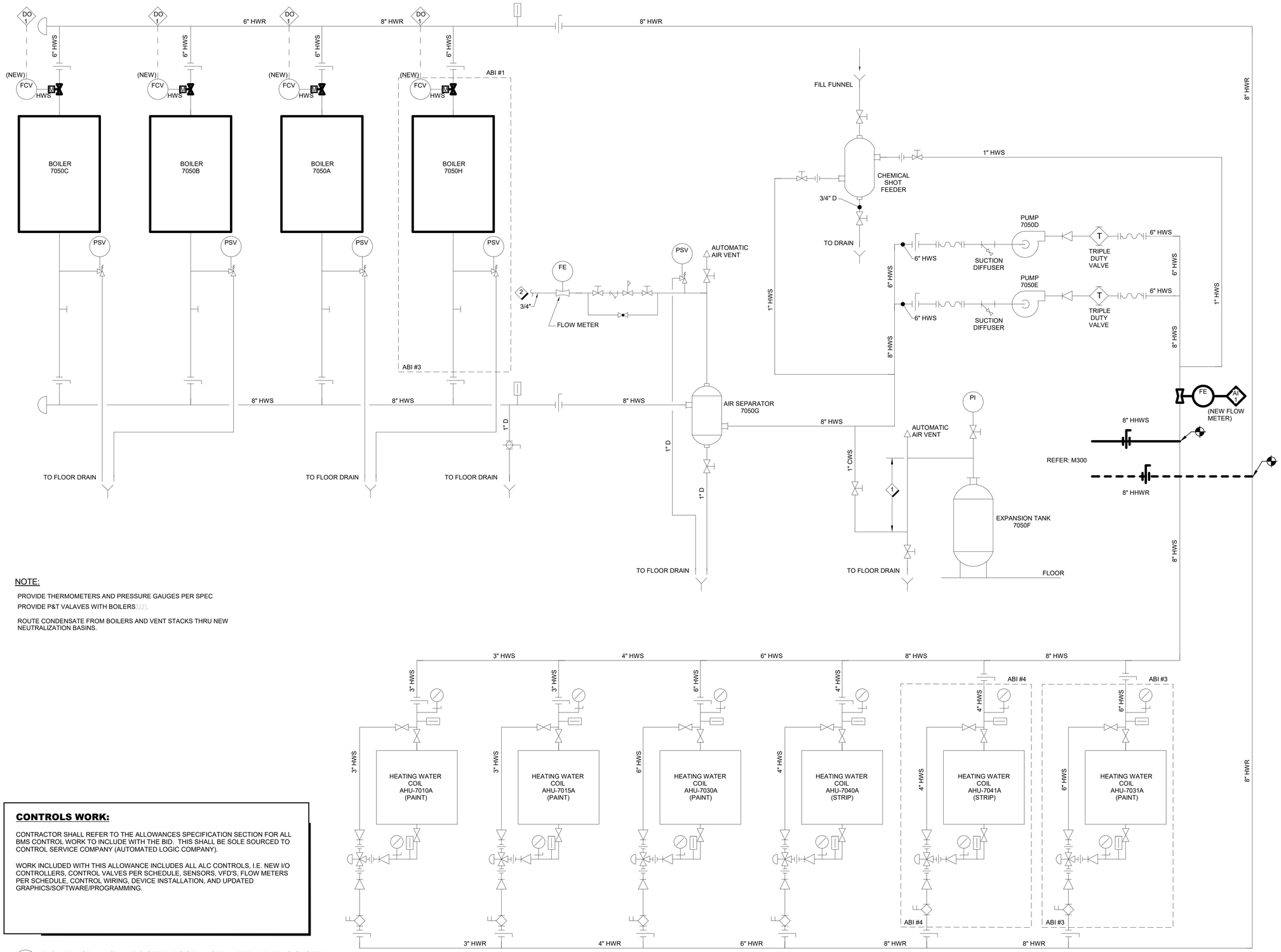
REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 04.13.2026

CAD DWG FILE:
DRAWN BY:
CHECKED BY:
DESIGNED BY:

SHEET TITLE:
MAIN BOILER PLANT EXISTING MECHANICAL FLOW DIAGRAMS

SHEET NUMBER:

M-300



NOTE:

PROVIDE THERMOMETERS AND PRESSURE GAUGES PER SPEC

PROVIDE P&T VALAVES WITH BOILERS (22).

ROUTE CONDENSATE FROM BOILERS AND VENT STACKS THRU NEW NEUTRALIZATION BASINS.

CONTROLS WORK:

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A1 FLOW DIAGRAM - PAINT & STRIP BOOTH HOT WATER HEATING SYSTEM
NOT TO SCALE

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CAD DWG FILE:
DRAWN BY:
CHECKED BY:
DESIGNED BY:

SHEET TITLE:
PAINT BOOTH BOILER PLANT EXISTING MECHANICAL FLOW DIAGRAMS

SHEET NUMBER:

M-310

CONTROL VALVES

TAG	MANUFACTURER	MODEL	EQUIPMENT SERVED	SERVICE	FLOW (gpm)	LINE SIZE	MIN. DES. ΔP (psi)	PRESSURE RTG (psi)	CLOSE-OFF PRESS (psi)	VALVE CONFIG.	ACTUATOR	INPUT VOLTAGE	MODULATION RANGE	NOTES
CV-1 - CV-6	CSC, CONTRACTOR INSTALLED	NIBCO/BELIMO	B-001 THRU 006	HHW/BOILER	-	4"	5	150	150	2-WAY OPEN/CLOSE.	ELECTRONIC	24V	2-10v	1,2
CV-7 - CV-10	CSC, CONTRACTOR INSTALLED	NIBCO/BELIMO	B-7050A,B,C,H	HHW/BOILER	-	4"	5	150	150	2-WAY OPEN/CLOSE.	ELECTRONIC	24V	2-10v	1,2
CV-11,12	CSC, CONTRACTOR INSTALLED	NIBCO/BELIMO	CROSS-TIE HHWS/R	CROSS-TIE ISOLATION	-	8"	5	150	150	2-WAY OPEN/CLOSE.	ELECTRONIC	24V	2-10v	1,2

NOTE:
1. VALVE SHALL BE PROVIDED WITH STAINLESS STEEL TRIM.
2. DESIGN PRESSURE DROP IS MINIMUM ALLOWABLE PRESSURE DROP THROUGH CONTROL VALVE. ACTUAL PRESSURE DROP MAY VARY.

FLOW METER DEVICES

BLDG	MARK	SERVICE	MANUFACTURER	MODEL	SIZE*	TYPE	EQUAL	NOTE	REMARKS
PLANT 1	FM-HHW1	HHWS WATER	ONICON	F-3000 SERIES	8"	ELECTROMAG	-	INSTALL PER P&ID	2
PLANT 2	FM-HHW2	HHWS WATER	ONICON	F-3000 SERIES	8"	ELECTROMAG	-	INSTALL PER P&ID	2
CROSS-TIE	FM-CT1	HHWS WATER	ONICON	F-3000 SERIES	8"	ELECTROMAG	-	INSTALL PER P&ID	2

* SIZE TO BE CONFIRMED IN THE FIELD

REMARKS:
1. FURNISHED WITH VERIS OR EQUAL SPLIT-CORE CT'S RATED FOR THE AMPERAGE OF THE PANEL
2. BACNET INTEGRATION PROTOCOL ONLY
3. FURNISH WITH HOFFMAN/PENTAIR OR EQUAL ENCLOSURE WITH DIN-RAIL MOUNTS OF METER
4.

TYPICAL BOILER BACnet/MSTP SOFTWARE POINTS LIST

BACnet ID	POINT(S)	RANGE	REMARKS
0	MESSAGE FAULT/STATUS CODES	TABLE 6 CODES	
1	UNIT STATUS	0-5	
2	OUTLET TEMP	0-250 F	
3	INLET TEMP	0-250 F	
4	AIR INLET TEMP	-70 - 130F	
5	BOILER SAFETY FLOW SWITCH STATUS	-	
6	EXHAUST AIR TEMP	50-450F	
8	CURRENT VALVE POSITION	0-100%	
9	O2 PERCENTAGE	0-24%	
13	RUN HOURS	---	
15	FLAME STRENGTH	0-100%	
16	ACTIVE SETPOINT TEMP	0-250F	
17	WARM WEATHER SHUTDOWN	30-210	
18	RESET SETPOINT LOW LIMIT	30-210	
17	RESET SETPOINT HIGH LIMIT	30-210	
47	OPEN VLV CONTROL SIGNAL	0-2 (4-20mA)	
48	CLOSE VLV CONTROL SIGNAL	0-2 (4-20mA)	
49	BLOWER SPEED	0-65536	
51-58	O2 TRIM TARGET 1 / 2	3-8%	
59-60	O2 ERROR CODES	---	
62	BST UART3 ERRORS	0-6	
63	NOX REQUIREMENT	0-200	
64	GAS MANIFOLD PRESSURE	0-90	
65-72	O2 AT CALIBRATED POINT 1-8	0-999	
73-80	NOX AT CALIBRATED POINT 1-8	0-999	
81-88	CO AT CALIBRATED POINT 1-8	0-999	

NOTES:
1. BOILER CONTROL PANELS FURNISHED WITH BACnet/MSTP INTERFACE CARDS FOR SOFTWARE INTEGRATON.
2. FURNISH GRAPHICS WITHIN ALC SYSTEM FOR EACH BOILER WITH HARD POINTS AS WELL AS SOFTWARE POINTS LISTED IN THIS SCHEDULE.
3. WITHIN BOILER GRAPHICS INCLUDE FAULT/ALARM/STATUS CODE LIST FOR END USERS.

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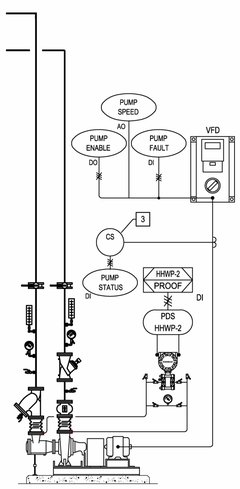
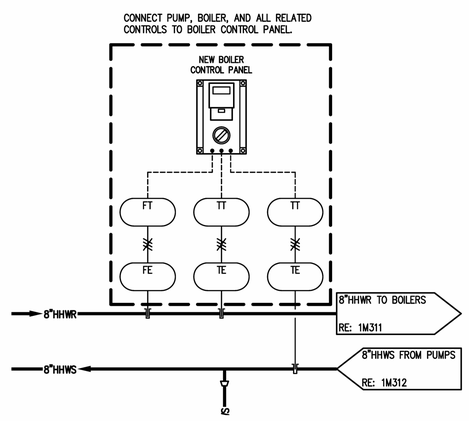


HHW-CTP

PUMP CONTROLS (3)

SCALE: NTS

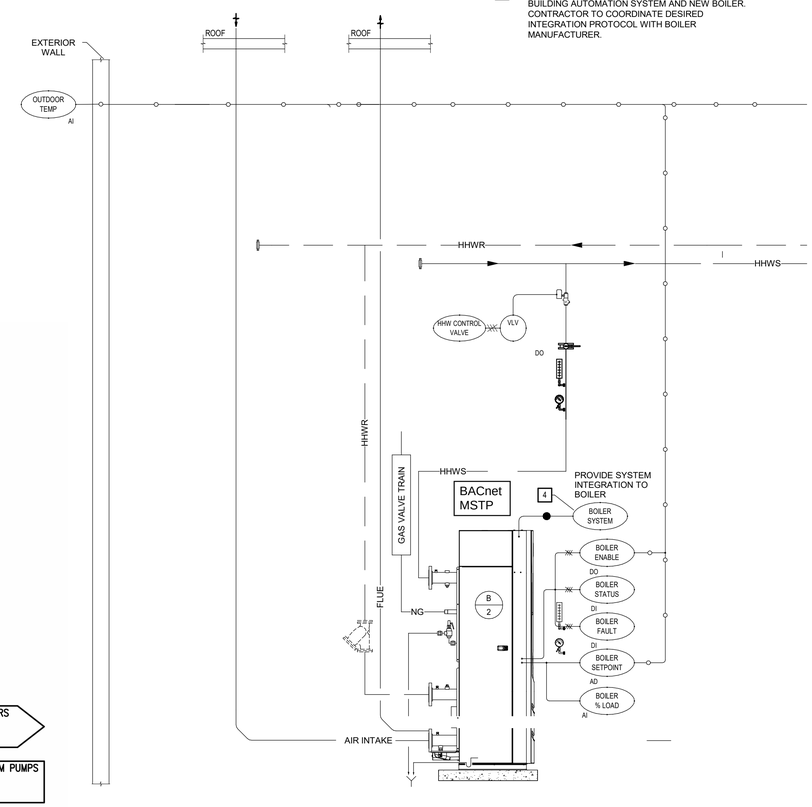


MISC LOOP CONTROLS (2)

SCALE: NTS

NOTES

1. NEW TEMPERATURE SENSOR AND IMMERSION WELL.
2. NEW ISOLATION SWITCH FOR INDIVIDUAL BOILER DISABLE/ENABLE.
3. PROVIDE SYSTEMS INTEGRATION BETWEEN BUILDING AUTOMATION SYSTEM AND NEW BOILER. CONTRACTOR TO COORDINATE DESIRED INTEGRATION PROTOCOL WITH BOILER MANUFACTURER.



TYPICAL BOILER P&ID AND CONNECTIONS (1)

SCALE: NONE

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DRAWN BY:
CHECKED BY:
DESIGNED BY:

SHEET TITLE:

MECHANICAL FLOW DIAGRAMS
MECHANICAL SCHEDULES

SHEET NUMBER:

M-320

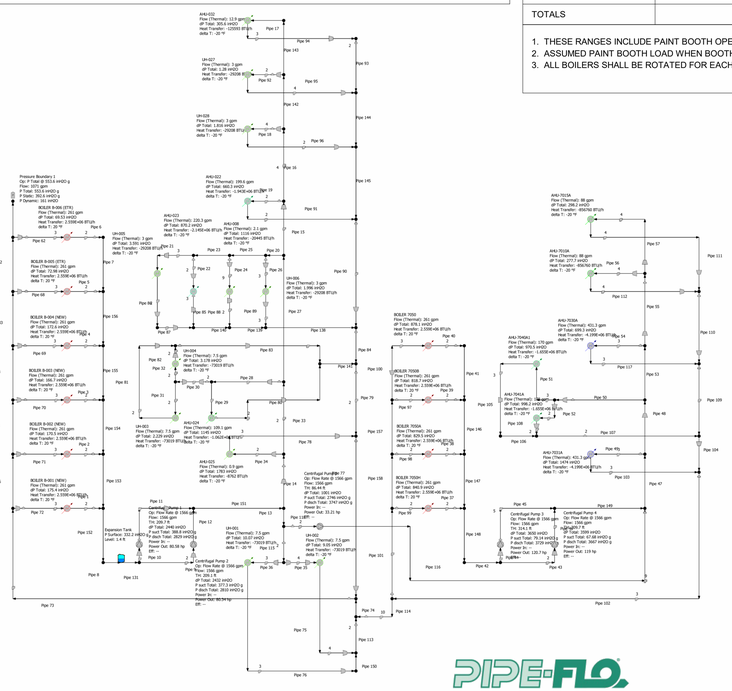
PROJECT LOAD CONDITIONS (MAIN BOILER PLANT #1)

EXISTING EQUIPMENT DESIGNS FROM JACOBS PHASE 2 PROJECT:

CORE BOILER PLANT / EQUIPMENT LOADS

PLANT / UNIT DESCRIPTIONS	LOADS / PARAMETERS								NOTES
	CONDITIONS				CONTROL (EX.)				
	EWT	LWT	LOAD (MBH)	GPM	TYPE	UNOCC °F	CHANGES		
AHU-008	180	160	20.6	2.1	2-WAY	4-20mA	NONE		A
AHU-021	180	160	-	-					
AHU-022	180	160	1996.31	199.6	2-WAY	4-20mA	NONE		
AHU-023	180	160	2203.20	220.3	2-WAY	4-20mA	NONE		B-C
AHU-024	180	160	1091.23	109.1	2-WAY	4-20mA	NONE		
AHU-025	180	160	9.18	0.9	2-WAY	4-20mA	NONE		
AHU-028	180	160	66.27	6.6	2-WAY	4-20mA	NONE		
AHU-031	180	160	75.34	7.5	2-WAY	4-20mA	NONE		
AHU-032	180	160	129.22	12.9	2-WAY	4-20mA	NONE		
RHC 021-01	180	160	236.8	23.6	2-WAY	4-20mA	NONE		
RHC 021-02	180	160	224.2	22.4	2-WAY	4-20mA	NONE		
RHC 021-03	180	160	12.29	1.23	2-WAY	4-20mA	NONE		
RHC 028-01	180	160	1.05	0.11	2-WAY	4-20mA	NONE		
RHC 028-02	180	160	3.65	0.37	2-WAY	4-20mA	NONE		
RHC 028-03	180	160	6.74	0.67	2-WAY	4-20mA	NONE		
RHC 028-04	180	160	10.11	1.01	2-WAY	4-20mA	NONE		
UH-001	180	160	74.6	7.5	2-WAY	4-20mA	NONE		
UH-002	180	160	74.6	7.5	2-WAY	4-20mA	NONE		
UH-003	180	160	74.6	7.5	2-WAY	4-20mA	NONE		
UH-004	180	160	74.6	7.5	2-WAY	4-20mA	NONE		
UH-005	180	160	29.8	3.0	2-WAY	4-20mA	NONE		
UH-006	180	160	29.8	3.0	2-WAY	4-20mA	NONE		
UH-007	180	160	29.8	3.0	2-WAY	4-20mA	NONE		
UH-008	180	160	29.8	3.0	2-WAY	4-20mA	NONE		
VAV 008-01 THRU 06	180	160	18.19	1.82	2-WAY	4-20mA	NONE		
VAV 025-01 THRU 03	180	160	151.73	15.2	2-WAY	4-20mA	NONE		
BOILERS B-001-006	160	180	17,334	1566					B,D,E
HHWP-001	180	180	-	1566 (110')	VFD	0-10V	NONE		B
HHWP-002	180	180	-	1566 (110')	VFD	0-10V	NONE		B

A. SUMMARY TAKEN FROM AVCRAD PHASE 2 PLANS
B. PLANT BOILER STAGING DONE FROM NEW BOILER CONTROL PANELS AND RETURN WATER TEMPERATURES (NOT CSC).
C. BOILER PUMPS CONTROLLED VARIABLE SPEED FROM PRESSURE SENSOR IN PIPING SYSTEM.
D. PLANT #1 AND #2 ENABLE/DISABLE SHALL PER STAGING MATRIX.
E. SHOULD ANY PLANT LOSE ANY ONE (1) BOILER AND BE TAKEN OFFLINE, THE CROSS-TIE PUMPS SHALL BE ENABLED FOR CROSS-TIE OF LOAD SUPPORT.



OVERALL FLOW DIAGRAM (1)
SCALE: NONE

PROJECT LOAD CONDITIONS (PAINT BOILER PLANT #2)

EXISTING EQUIPMENT DESIGNS FROM JACOBS PHASE 2 PROJECT:

PAINT BOILER PLANT / EQUIPMENT LOADS

PLANT / UNIT DESCRIPTIONS	LOADS / PARAMETERS								NOTES
	CONDITIONS				CONTROL (EX.)				
	EWT	LWT	LOAD (MBH)	GPM	TYPE	UNOCC °F	CHANGES		
AHU-7010A	180	160	871.9	88	2-WAY	4-20mA	NONE		A
AHU-7015A	180	160	871.9	88					
AHU-7030A	180	160	3438	431.25	2-WAY	4-20mA	NONE		
AHU-7031A	180	160	3438	431.25	2-WAY	4-20mA	NONE		B-C
AHU-7040A	180	160	1708	170	2-WAY	4-20mA	NONE		
AHU-7041A	180	160	1708	170	2-WAY	4-20mA	NONE		
BOILERS B-7050A,B,C,H	160	180	15,408	1240					B,D,E
HHWP-7050D	180	180	-	1212 (60')	VFD	0-10V	NONE		B
HHWP-7050E	180	180	-	1212 (60')	VFD	0-10V	NONE		B

A. SUMMARY TAKEN FROM AVCRAD PHASE 2 PLANS
B. PLANT BOILER STAGING DONE FROM NEW BOILER CONTROL PANELS AND RETURN WATER TEMPERATURES (NOT CSC).
C. BOILER PUMPS CONTROLLED VARIABLE SPEED FROM PRESSURE SENSOR IN PIPING SYSTEM.
D. PLANT #1 AND #2 ENABLE/DISABLE SHALL PER STAGING MATRIX.
E. SHOULD ANY PLANT LOSE ANY ONE (1) BOILER AND BE TAKEN OFFLINE, THE CROSS-TIE PUMPS SHALL BE ENABLED FOR CROSS-TIE OF LOAD SUPPORT.

BOILER STAGING ESTIMATED HRS

LOAD (MBH)	HRS	PEAK MONTH	PLANTS OPERATIONAL	PLANT HOURS SAVED WITH CROSS-TIE
26,000-28,000	22-24 [1,2]	JANUARY	1 AND 2	
24,000-26,000	44-48 [1,2]	FEBRUARY	1 AND 2	
22,000-24,000	44-48 [1,2]	DECEMBER/MARCH	1 AND 2	
20,000-22,000	22-24 [1,2]	VARIES	1 AND 2	
18,000-20,000	42-44 [1,2]	VARIES	1 AND 2	
16,000-18,000	290-310	JANUARY	1 AND 2	
14,000-16,000	685-700	DECEMBER/MARCH	1	~690
11,000-14,000	1000-1030	VARIES	1	~1015
8,000-11,000	1100-1150	VARIES	1	~1125
5,000-8,000	1400-1425	VARIES	1	~1410
2,500-5,000	1375-1400	VARIES	2	~1385
<2,500	800-825	VARIES	2	~810
TOTALS	6826-7026			6400 BOILER HRS

1. THESE RANGES INCLUDE PAINT BOOTH OPERATIONS ESTIMATED AT 2 HOURS PER DAY, 3 DAYS PER WEEK FOR LOAD SIMULATION
2. ASSUMED PAINT BOOTH LOAD WHEN BOOTHS NOT IN OPERATION IS 25% OF LOAD IN 100% FRESH AIR MODE
3. ALL BOILERS SHALL BE ROTATED FOR EACH PAIR (LEAD/LAG) BASED UPON 500 HOURS OF RUNTIME

POINTS LIST - BOILER WATER PLANT CROSS-TIE

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SET POINT	SET POINT RESET RANGE	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
HOT WATER LOOP								
SHWR-T	SECONDARY HEATING WATER RETURN TEMPERATURE	AI						A
SHWS-T	SECONDARY HEATING WATER SUPPLY TEMPERATURE	AI	42 F			X	SCHWS-T <> SETPOINT	A, B
SHW-F	SECONDARY HEATING WATER FLOW	AI						A, D
CROSS-TIE LOOP								
CTWR-T	CROSS-TIE WATER RETURN TEMPERATURE	AI						A
CTWS-T	CROSS-TIE WATER SUPPLY TEMPERATURE	AI						A
CTW-F	CROSS-TIE WATER FLOW	AI						A
CT-CV-C	CROSS-TIE ISOLATION VALVE (TYPICAL 2)	DO						A
CROSS-TIE PUMP								
CTP-COM	CROSS-TIE PUMP VFD COMMUNICATION	COM						C
CTP-C	CROSS-TIE PUMP COMMAND	DO						
CTP-CO	CROSS-TIE PUMP SPEED OUTPUT	AO						
CTP-FLT	CROSS-TIE PUMP VFD FAULT	DI				X	COMMON ALARM	
CTP-ST	CROSS-TIE PUMP STATUS	DI				X	CTP-ST <> STP-C	
CTP-NIA	CROSS-TIE PUMP NOT IN AUTO (IN HAND)	DI				X	ON ACTIVATION	
NOTES:								
A.	BAS CONTRACTOR SHALL PROVIDE DEVICE.							
B.	POINT SHALL BE ADJUSTABLE.							
C.	PROVIDE RS-232 COMMUNICATION LINK.							
D.	FLOW MONITORING DEVICE IS TO BE ADDED ON BOTH PLANT MAIN LOOPS LEAVING PLANT (EBTRON FLOW METER).							

BOILER PLANT LOAD STAGING CONTROL MATRIX

PLANT LOAD STAGE	MAXIMUM STAGE CAPACITY (MBH)	STAGE LOAD RANGE BOILER-LOAD (MBH) (NOTE 1)		BOILER PLANT STATUS		BOILER ISOLATION VALVE STATUS					CROSS-TIE PUMP STATUS
		LOW	HIGH	PLANT #1	PLANT #2	B-001-002	B-003-004	B-005-006	B-7050A-B	B-7050C-H	
0	0	0	0	OFF	OFF	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED	ON
1	5200	520	5200	OFF	ON	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	ON
2	10400	5200	10400	ON	OFF	OPEN	OPEN	CLOSED	CLOSED	CLOSED	ON
3	15600	10410	15600	ON	ON	OPEN*	OPEN*	OPEN*	OPEN*	OPEN*	OFF
4	>15660	15660	TOTAL	ON	ON	OPEN*	OPEN*	OPEN*	OPEN*	OPEN*	OFF
N+1**	VARIES	VARIES	VARIES	ON	ON	OPEN*	OPEN*	OPEN*	OPEN*	OPEN*	ON
NOTES:											
1.	BOILER PLANT STAGE UP LOGIC: WHEN THE BOILER PLANT REACHES STAGE MAXIMUM LOAD.										
2.	BOILER PLANT STAGE DOWN LOGIC: WHEN THE BOILER PLANT REACHES STAGE MINIMUM LOAD.										
3.	HHW-LOAD = 500 x (SHW-F) x (SHWS-T - SHWR-T) / 12000. ADD LOADS OF BOILERS 7050A/B/C/H AND B-001 THRU 006 FOR TOTAL PLANT LOAD (26,100 MBH).										
4.	BOILER ROTATION SCHEME SHALL BE EVERY 500 HOURS FOR SETS OF TWO ON BOTH PLANTS.										
*	EACH PLANT SHALL STAGE INDEPENDENTLY IN THIS MODE AND ISOLATE BOILERS AND ENABLE/DISABLE INDEPENDENTLY.										
**	UPON A LOSS OF ANY BOILER IN EITHER PLANT, BOILER SHALL BE ISOLATED CLOSED AND DISABLED. CROSS-TIE PUMP SHALL ENGAGE AND CONTROL SPEED BASED UPON PLANT SUPPLY WATER TEMPERATURE TO SUPPLEMENT THIS SIDE OF THE PLANT.										

SEQUENCE OF OPERATIONS
BOILER PLANT STAGING AND CROSS-TIE

GENERAL DESCRIPTION

Existing boiler plant #2 (Boilers serves the existing paint booth air handling equipmen. Existing core boiler plant #1 serves the existing office/common areas. Both systems are in a primary-secondary configuration with constant speed primary pumps and variable speed secondary pumps.
New piping is being added to connect the separate boiler plant distribution loops of boiler plant #1 and boiler plant #2. New cross-tie pump, isolation valves, flow meters, temperature sensors, and boiler plant load staging sequence is being added in order to share capacity between the two existing boiler plants. Any sequence given should we be in cross-tie mode shall leave individual boiler plant staging at the plant level. Boilers within each plant shall remain on existing rotation schedules and lead/lag modes. With the exception of a failure mode of a single boiler, both plants shall remain online but cross tie pump shall be enabled and vary speed based upon the water temperature of the loop that put a boiler out of rotation.
All existing individual heating hot water plant sequences, setpoints, interlocks, etc. are to remain unless noted otherwise by these documents.
All controls work shall be performed by the facility's controls vendor (CSC). Product specification and standards shall match existing.

COMPONENT CONTROL LOOPS

CROSS-TIE PUMP CONTROL (HHW-CTP)
The cross-tie pump shall be enabled or disabled as indicated on the Boiler Plant Load Staging Control Matrix.
A pump that is enabled shall start on low speed and ramp up to maintain the heating water supply temperature setpoint as measured by the existing secondary heating water supply temperature sensors on the BP-002 loop (SHWS-T). Prior to pump enable, the cross-tie isolation valves (CT-V) shall open
A pump that is disabled shall be powered off. The cross-tie isolation valves (CT-V) shall close.

EXISTING BOILER CONTROL
Existing boiler plant sequences, setpoints, interlocks, etc. are existing to remain. This sequence dictates when each boiler plant (with their associated pumps, control valves, etc.) is staged on/off.

Boiler plant stages shall be as indicated on the Boiler Plant Load Staging Control Matrix.
Boiler enabling/disabling shall be in pairs in a lead/lag sequence. Lead boiler pairs shall be determined weekly based on equal runtime.

BOILER PLANT DISABLED MODE
The existing boiler plant disabled mode shall be reset from 120°F temperature up to 140°F ambient temperature.

LEAVING HEATING WATER TEMPERATURE SETPOINT
The existing leaving BOILER water temperature setpoint reset shall be confirmed/modified as indicated in the table below.

OAT		LHWT SETPOINT
<20°F	-->	180°
20-30°F	-->	170°
30-40°F	-->	160°
40-50°F	-->	150°
>50°F	-->	140°

N+1 FAILURE MODE SEQUENCE
Upon a loss of any boiler within each plant, cross-tie mode shall be activated to serve as redundant load / boiler for each side of the plant. The boiler shall be disabled and isolation valve closed. The cross-tie pump shall be enabled, cross-tie isolation valve opened, and speed controlled to coinciding plants heating hot water supply temperature. Even if load is held on the plant, pump speed shall be at minimum until boiler is put back into plant lineup with alarm cleared.

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CORY WILSON
04.13.2026
NUMBER PE-2010009876
PROFESSIONAL ENGINEER

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CORY WILSON
MISSOURI PE # 2010009876

REPLACE BOILERS PHASE 2,
BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD,
MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

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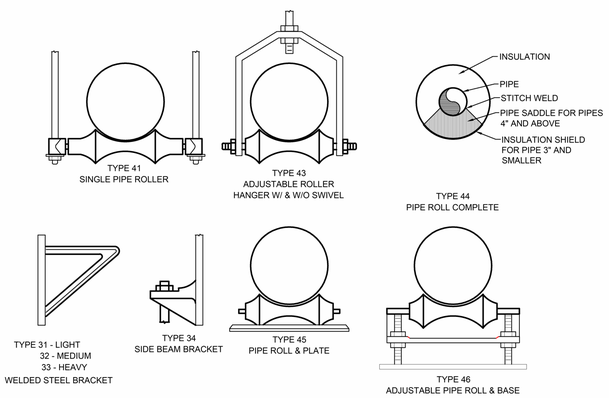
MECHANICAL DETAILS

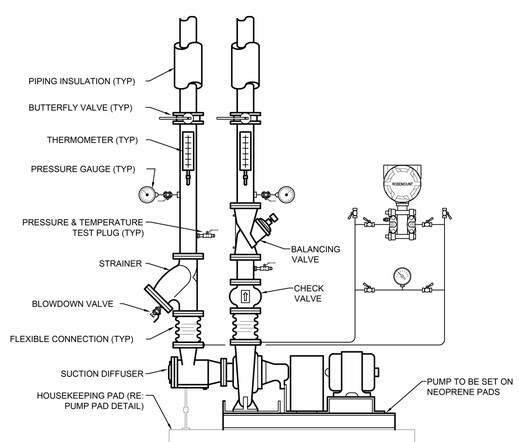
SHEET NUMBER:

M-400



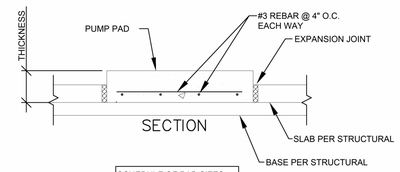
3 PIPE BRACKETS AND ROLLERS

SCALE: NONE



8 BASE MOUNTED PUMP DETAIL

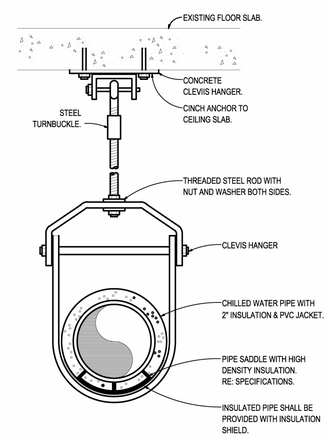
SCALE: NONE



SCHEDULE OF PAD SIZES	
HP	THICKNESS
3-5	6"
7.5-10	6"
15-20	8"
25-30	8"
40-50	8"
60-75	10"
100-125	12"

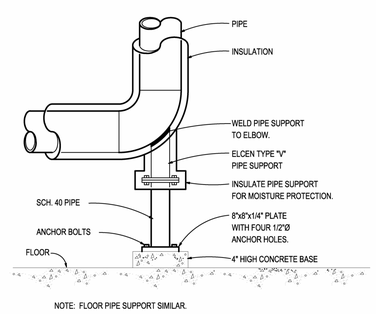
3 EQUIPMENT PAD DETAIL

SCALE: NONE



4 CLEVIS HANGER DETAIL

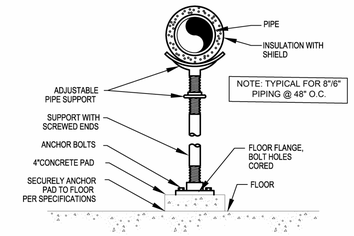
SCALE: NONE



NOTE: FLOOR PIPE SUPPORT SIMILAR.

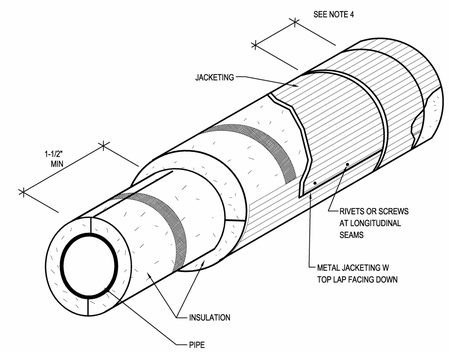
3 PIPE SUPPORT DETAIL

SCALE: NONE



5 HORIZONTAL PIPE SUPPORT DETAIL

SCALE: NONE

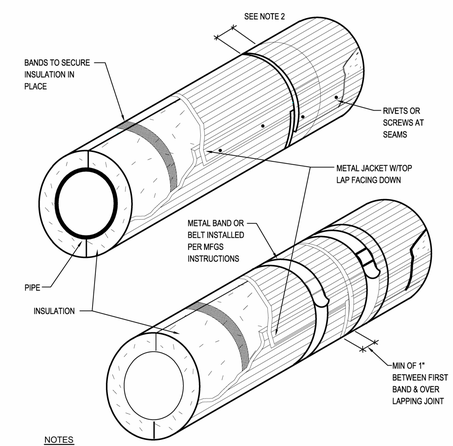


NOTES

1. STAGGER LONGITUDINAL AND CIRCUMFERENTIAL INSULATION JOINTS FOR EFFECTIVE SEAL
2. STAGGER JACKETING AND OUTER INSULATION JOINTS FOR EFFECTIVE SEAL
3. LONGITUDINAL JACKETING SEAMS POSITIONED AT 3 OR 9 O'CLOCK ONLY W/TOP LAP FACING DOWN FOR WEATHER PROOFING.
4. OVERLAP CIRCUMFERENTIAL JACKETING JOINT 1-1/2" MIN

2 PERFORMED MULTI-LAYER METAL JACKETED PIPE INSULATION

SCALE: NONE



NOTES

1. LONGITUDINAL JACKETING SEAMS POSITIONED AT 3 OR 9 O'CLOCK ONLY W/TOP LAP FACING DOWN FOR WEATHER PROOFING.
2. OVERLAP JACKETING A MIN OF 1-1/2"

1 FIELD APPLIED METAL JACKETING OVER PIP INSULATION

SCALE: NONE

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VARIABLE FREQUENCY DRIVE SCHEDULE

TAG NO.	NAME	MANUFACTURER	VOLTAGE	NEW WIRE	PHASE	NEW FUSE/CB SIZE	HP	ENCLOSURE	FEEDER PANEL	NOTES	DRAWING LOCATION	NOTES
VFD-1	CROSS TIE HHW CTP	ABB ACCH SERIES DANFOSS VLT SERIES (WITH BYPASS)	480	3-#10 & #10 GND 3/4" CONDUIT	3	25	7.5	NEMA 1	MCC BREAKER	PROVIDED BY M/C INSTALLED BY E/C	-	1-6

NOTE:
1. ALL VARIABLE FREQUENCY DRIVES SHALL BE PROVIDED BY TEMPERATURE CONTROLS CONTRACTOR OR MECHANICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WIRING AND CONDUIT, INCLUDING MOUNTING AND INSTALLING THE VFD.
2. TEMPERATURE CONTROL CONTRACTOR SHALL PROVIDE ALL CONTROL WIRING AND CONDUIT FOR NEW CONTROL. MOUNT AHU VFD ON WALL ADJACENT TO EXISTING ELECTRICAL PANELS OR AIR HANDLING UNITS.
3. INTERCEPT EXISTING WIRING.
4. PROVIDE DRIVE WITH BYPASS / ACROSS THE LINE STARTER
5. PROVIDE DRIVE WITH BACNET SERIAL COMMUNICATION CARD
6. PROVIDE WITH GENERAL PURPOSE I/O RELAY
7. PROVIDE NEW BREAKER/STARTER COMBINATION IN EXISTING BUCKET WITH NEW NEMA STARTER SIZE 2 AND ELECTRONIC OVERLOADS WITHIN MCC

COOLING TOWER NOTE:
1. COOLING TOWER DRIVE TO BE PROVIDED BY UNIT MANUFACTURER, INSTALLED BY ELECTRICAL CONTRACTOR PER ELECTRICAL PLANS

GAS CONNECTED LOAD TABLE

EQUIPMENT:	BTUH
BOILERS B-1 THRU B-6	3,000,000
BOILERS B-7050A,B,C,H	4,000,000
OTHER LOADS	VARIES
TOTAL ADDED LOAD	0 (NET EVEN)

HVAC PIPING MATERIAL SCHEDULE

PIPING							FITTINGS		MAX. WORKING		FIELD TEST	
SYSTEM	SIZE	TYPE	SCH	GRD	ASTM	MATERIAL	MAT.	TYPE	PRESS (PSI)	TEMP (°F)	PRESS (PSI)	TIME
HOT WATER SUPPLY & RETURN	3" & UP*	SL/CW	40	A	A120	CS\BLK	CS	WELD	125	45-80	150	1 HR
CONDENSATE DRAIN ABOVE GRADE	ALL	M	--	--	B88	CP	CP	DR\S	10FT	40-70	10FT	1 HR
TEMPERATURE & PRESSURE RELIEF DRAIN	ALL	M	--	--	B88	CP	CP	DR\S	10FT	40-70	10FT	1 HR

ATP - ARMCO TRUSS PIPE
BLK - BLACK
BS - BELL & SPIGOT
CI - CAST IRON
CP - COPPER
CS - CARBON STEEL
CW - CONTINUOUS WELD
DI - DUCTILE IRON
DR - DRAINAGE FITTING
GLV - GALVANIZED
LC - LEAD CAULKING
MI - MALLEABLE IRON
MJ - MECHANICAL JOINT
NG - NEOPRENE GASKET
NH - NO-HUB
PE - POLYETHYLENE
PVC - POLYVINYL CHLORIDE
S - BRAZED JOINT - SILVER BRAZING ALLOY
SJ - SOLDER JOINT 95-5 TIN-ANTIMONY
SL - SEAMLESS STEEL
SS - STANDARD STRENGTH - SERVICE WEIGHT
SW - SOLVENT WELD
THRD - THREADED
WELD - WELDED

NOTE: NO "PULLED TEES" ALLOWED ON COPPER PIPING.

*NOTE: AT CONTRACTOR'S OPTION, GROOVED OR VICTAULIC FITTINGS MAY BE SUBSTITUTED FOR WELDED FITTINGS ON CHILLED AND HEATING HOT WATER PIPING SYSTEMS.

**NOTE: ALL NEW HEATING HOT WATER PIPING SHALL BE FURNISHED WITH 1.5", 3 LB DENSITY FIBERGLASS WRAP AND ALUMINUM JACKETING.

HYDRONIC SPECIALTIES SCHEDULE

SYSTEM	CROSS-TIE HTG HOT WATER	
SYSTEM OPERATING TEMP.	180°	
WORKING PRESSURE (psi)	150	
AIR SEPARATOR(S)		
MANUFACTURER		
MODEL NO./QUANTITY		
GPM/WPD (FT.)		
SIZE		
EXPANSION TANK(S)		
MANUFACTURER		
MODEL NO./QUANTITY		
MIN. TANK VOLUME		
MAX ACCEPTANCE VOL.		
SHOT FEEDER		
MANUFACTURER		
MODEL NO.		
CAPACITY (GAL)		
SUCTION DIFFUSER		
MANUFACTURER	ARMSTRONG	
MODEL NO.	SG-66	
GPM/WPD (FT.)	1000/2.92'	
SIZE	6"x6"	
BUFFER TANK(S)	N/A	
MANUFACTURER	--	
MODEL NO./QUANTITY	--	
MIN. TANK VOLUME	--	
INSULATED	--	
MAX DESIGN PRESSURE	--	

PUMPS

MARK	LOCATION	SERVES	GPM	HEAD (FT)	HP	EFF. %	IMPLR DIA. (in)	NPSHr	VOLT/PH/HZ	RPM	TYPE	MANUFACTURER	SERIES & MODEL	REMARKS
HHW CTP	MEZZANINE PLANT	HHW CROSS-TIE	1000	30	7.5	71.7%	10.5	9.5'	480/3/60	1125	BMES	B&G 1510E SERIES	1510E-6BD	1,2,4,5,6

REMARKS:
1. INERTIA BASE
2. PROVIDE WITH ALL CONNECTIONS PER APPLICABLE DETAIL.
3. NEMA 3R ENCLOSURE.
4. PROVIDE WITH APPLICABLE SUCTION GUIDE WITH REMOVABLE STARTUP STRAINER.
5. PROVIDE WITH INDIVIDUAL BALANCE, CHECK, AND ISOLATION (TRIPLY DUTY NOT ALLOWED)
6. REFER TO ELECTRICAL PLANS FOR FREQUENCY DRIVE LOCATIONS.

BOILERS

MARK	SERVICE	FUEL TYPE	FLOW (GPM)	PD (FT.HD)	BOILER TURN-DOWN	MIN. OPER. PRESS	BOILER HP	MBH INPUT	MBH OUTPUT	EWT (°F)	LWT (°F)	WORKING PRESS. (PSIG)	SUP/RET SIZES	COMB AIR SIZE	EXHAUST SIZE	VOLT/PH/HZ	FLA/MCA	MOCP	MANUFACTURER & MODEL	ACCESSORIES
B-001	HTG HOT WATER	NAT GAS	261	10	13:1	7-14"[1]	86.3	3000	2889	160	180	160	4"/4"[2]	10"[3]	8"[4]	480/3/60	10.0 / 15	20/3P[5]	FULTON EDR+3000	ALL
B-002	HTG HOT WATER	NAT GAS	261	10	13:1	7-14"[1]	86.3	3000	2889	160	180	160	4"/4"[2]	10"[3]	8"[4]	480/3/60	10.0 / 15	20/3P[5]	FULTON EDR+3000	ALL
B-003	HTG HOT WATER	NAT GAS	261	10	13:1	7-14"[1]	86.3	3000	2889	160	180	160	4"/4"[2]	10"[3]	8"[4]	480/3/60	10.0 / 15	20/3P[5]	FULTON EDR+3000	ALL
B-004	HTG HOT WATER	NAT GAS	261	10	13:1	7-14"[1]	86.3	3000	2889	160	180	160	4"/4"[2]	10"[3]	8"[4]	480/3/60	10.0 / 15	20/3P[5]	FULTON EDR+3000	ALL
B-7050A	HTG HOT WATER	NAT GAS	310	10	13:1	7-14"	103	4000	3852	160	180	160	4"/4"[2]	12"[3]	10"[4]	480/3/60	12.0 / 15	20/3P[5]	FULTON EDR+4000	ALL
B-7050B	HTG HOT WATER	NAT GAS	310	10	13:1	7-14"	103	4000	3852	160	180	160	4"/4"[2]	12"[3]	10"[4]	480/3/60	12.0 / 15	20/3P[5]	FULTON EDR+4000	ALL
B-7050C	HTG HOT WATER	NAT GAS	310	10	13:1	7-14"	103	4000	3852	160	180	160	4"/4"[2]	12"[3]	10"[4]	480/3/60	12.0 / 15	20/3P[5]	FULTON EDR+4000	ALL
B-7050H	HTG HOT WATER	NAT GAS	310	10	13:1	7-14"	103	4000	3852	160	180	160	4"/4"[2]	12"[3]	10"[4]	480/3/60	12.0 / 15	20/3P[5]	FULTON EDR+4000	ALL

ACCESSORIES:
1. VIBRATION SPRING ISOLATORS MOUNTS
2. CONDENSATE DRAIN TRAP WITH CONDENSATE NEUTRALIZATION KIT (SINGLE OR MULTIPLE BOILERS AS APPLICABLE)
3. SAFETY RELIEF VALVE SIZED IN ACCORDANCE WITH ASME REQUIREMENTS (60 PSI)
4. MOTORIZED GAS VALVE
5. GAS PRESSURE REGULATOR (LOCK-UP STYLE)
6. CSD-1 CONTROLS AND FUEL TRAIN
7. DIRECT SPARK IGNITION
8. INTEGRAL CONTROL PANEL. RE: CONTROLS DIAGRAM
9. HI-TEMP AND LO-WATER CUTOFFS WITH MANUAL RESET
10. ASME PRESSURE VESSEL
11. COMBUSTION AIR INTAKE FILTER
12. DUPLEX STAINLESS STEEL HEAT EXCHANGER
13. ELECTRIC MOTORIZED BUTTERFLY VALVE WITH NEMA 4X HOUSING
14. O2 TRIM CONTROLS FOR COMBUSTION VIA INTEGRAL CONTROL PANEL

NOTES:
1. PROVIDE REGULATOR TO STEP DOWN FROM EXISTING PRESSURE OF 18" AND SET TO 11-14" W.C.
2. ANSI 150 PSI CLASS FLANGES
3. PROVIDE TRANSITION TO MATCH EXISTING COMBUSTION AIR DROP SIZE. USE SELKIRK OR EQUAL CLASS IV AL29-4C STAINLESS STEEL.
4. PROVIDE TRANSITION TO MATCH EXISTING EXHAUST VENT DROP SIZE. USE SELKIRK OR EQUAL CLASS IV AL29-4C STAINLESS STEEL FLUE PIPING.
5. UTILIZE EXISTING FEEDER AND BREAKER SERVING DEMOLISHED BOILER. CONFIRM SIZE/POLE MATCHES.

APPROVED EQUALS:
1. AERCO BENCHMARK PLATINUM 3000 MBH/4000 MBH MODELS
2. LOCHINVAR HELLCAT 3000 MBH/4000 MBH MODELS
3. ANY EQUALS MUST BE EQUIVALENT IN SIZE TO BOD TO MEET STATE CLEARANCES

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MECHANICAL SCHEDULES

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M-500

MECHANICAL CONTROLS NOTES

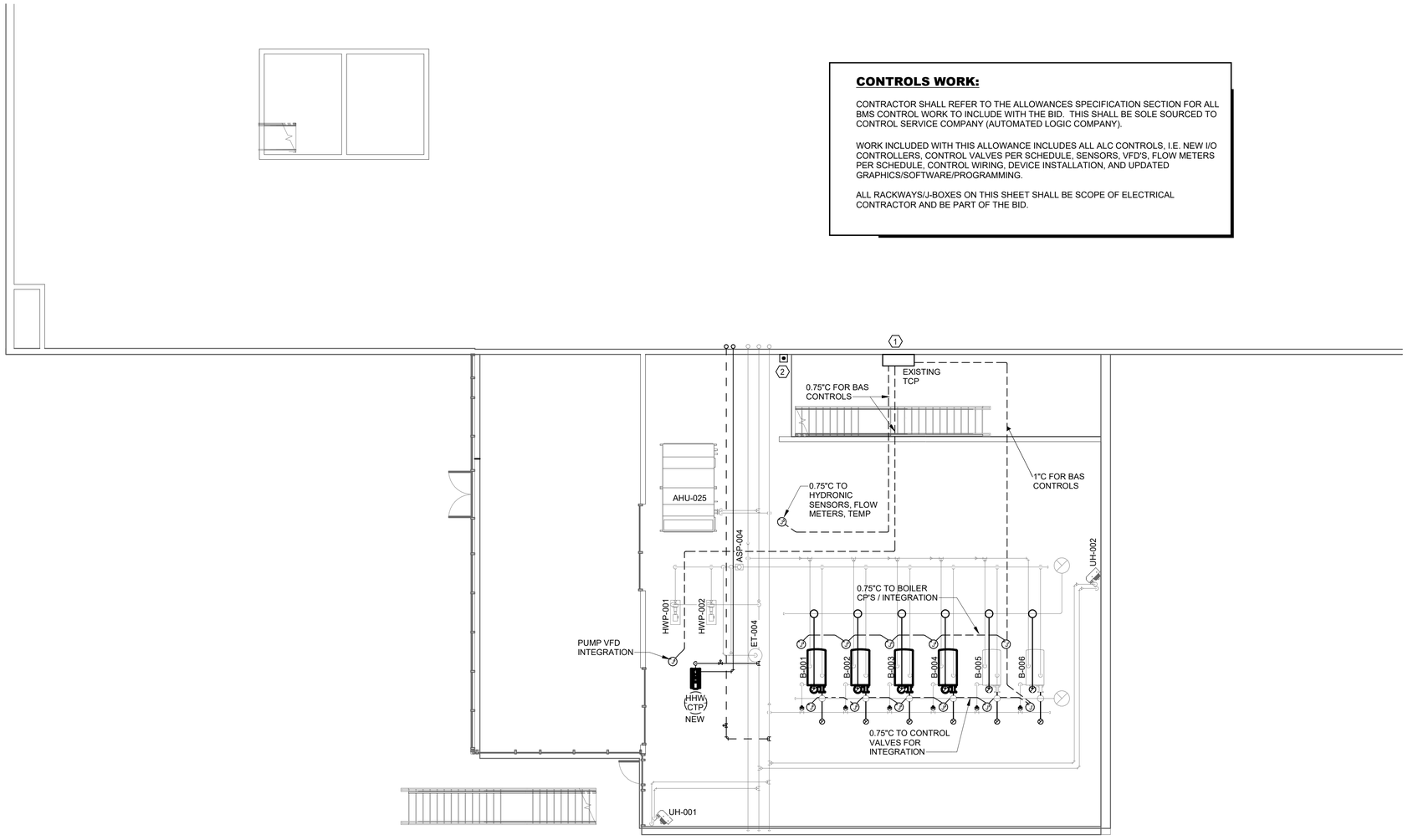
1. ROUTE ALL CONTROL CONDUITS TO EXISTING CONTROL PANEL FOR I/O INTEGRATION CABLING BY BAS CONTRACTOR.
2. NEW BOILER EPO SWITCH EQUAL TO KELE MODEL ST120SL-N1-BS WITH 4 OR 6 CONTRACTOR BLOCK KELE PILNCCB/PILNOCB

CONTROLS WORK:

CONTRACTOR SHALL REFER TO THE ALLOWANCES SPECIFICATION SECTION FOR ALL BMS CONTROL WORK TO INCLUDE WITH THE BID. THIS SHALL BE SOLE SOURCED TO CONTROL SERVICE COMPANY (AUTOMATED LOGIC COMPANY).

WORK INCLUDED WITH THIS ALLOWANCE INCLUDES ALL ALC CONTROLS, I.E. NEW I/O CONTROLLERS, CONTROL VALVES PER SCHEDULE, SENSORS, VFD'S, FLOW METERS PER SCHEDULE, CONTROL WIRING, DEVICE INSTALLATION, AND UPDATED GRAPHICS/SOFTWARE/PROGRAMMING.

ALL RACKWAYS/J-BOXES ON THIS SHEET SHALL BE SCOPE OF ELECTRICAL CONTRACTOR AND BE PART OF THE BID.



MAIN BOILER ROOM (MEZZANINE) 1
1/8" = 1'-0"

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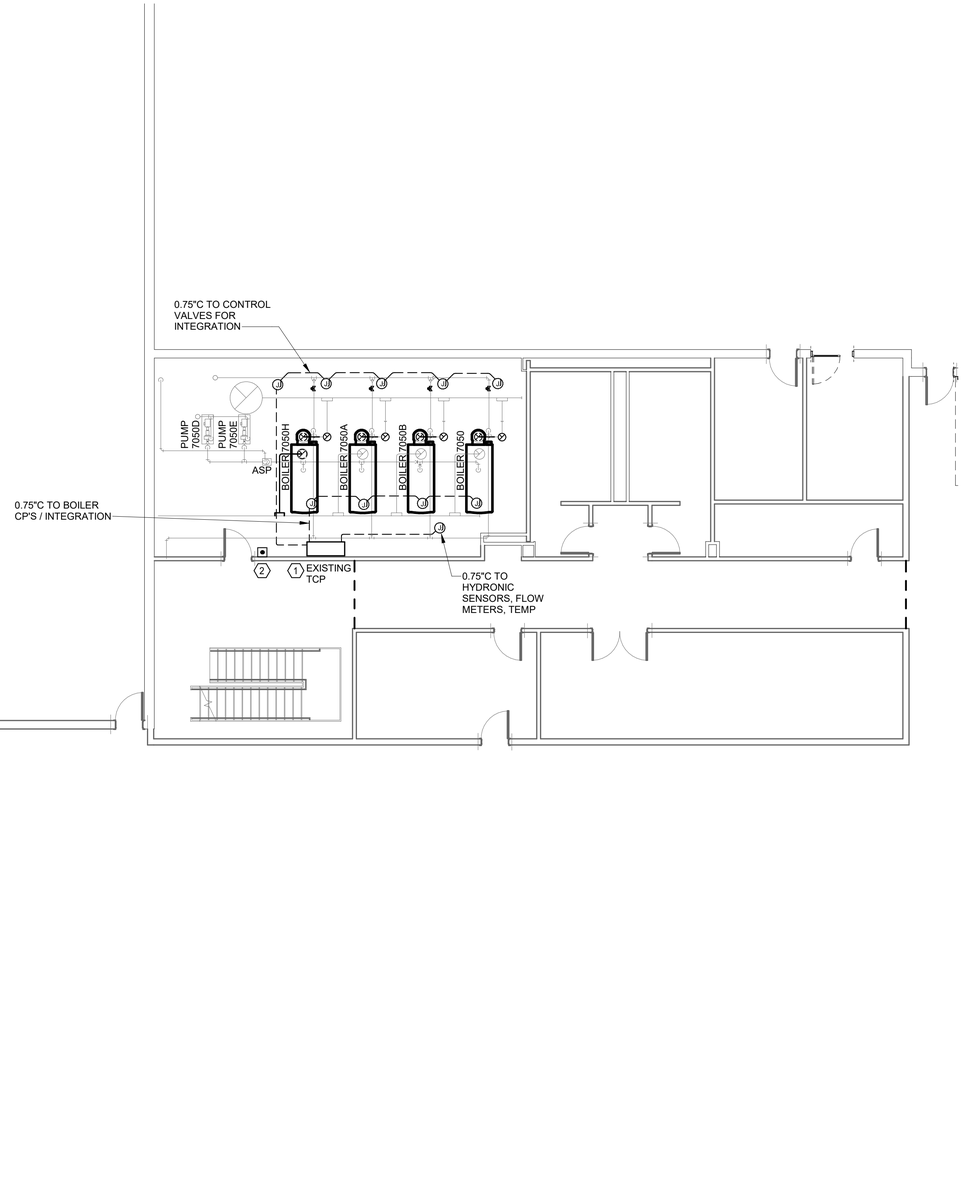
1. ROUTE ALL CONTROL CONDUITS TO EXISTING CONTROL PANEL FOR I/O INTEGRATION CABLING BY BAS CONTRACTOR.
2. NEW BOILER EPO SWITCH EQUAL TO KELE MODEL ST120SL-N1-BS WITH 4 OR 6 CONTRACTOR BLOCK KELE PILNCCB/PILNOCB



PAINT BOOTH BOILER ROOM (LOWER LEVEL) 1

1/8" = 1'-0"

CONTROLS WORK:

CONTRACTOR SHALL REFER TO THE ALLOWANCES SPECIFICATION SECTION FOR ALL BMS CONTROL WORK TO INCLUDE WITH THE BID. THIS SHALL BE SOLE SOURCED TO CONTROL SERVICE COMPANY (AUTOMATED LOGIC COMPANY).

WORK INCLUDED WITH THIS ALLOWANCE INCLUDES ALL ALC CONTROLS, I.E. NEW I/O CONTROLLERS, CONTROL VALVES PER SCHEDULE, SENSORS, VFD'S, FLOW METERS PER SCHEDULE, CONTROL WIRING, DEVICE INSTALLATION, AND UPDATED GRAPHICS/SOFTWARE/PROGRAMMING.

ALL RACKWAYS/J-BOXES ON THIS SHEET SHALL BE SCOPE OF ELECTRICAL CONTRACTOR AND BE PART OF THE BID.

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CORY WILSON
04.13.2026
NUMBER PE-2010009876
PROFESSIONAL ENGINEER

PROFESSIONAL ENGINEER
CORY WILSON
MISSOURI PE # 2010009876

REPLACE BOILERS PHASE 2, BUILDING 29 - SPRINGFIELD AVCRAD

1107TH THEATER AVIATION SUSTAINMENT MAINTENANCE GROUP

SPRINGFIELD,
MISSOURI 65802

PROJECT # T2523-01
SITE # 6270
ASSET # 8136270004

REVISION:
DATE:
REVISION:
DATE:
REVISION:
DATE:
ISSUE DATE: 04.13.2026

CAD DWG FILE:
DRAWN BY:
CHECKED BY:
DESIGNED BY:

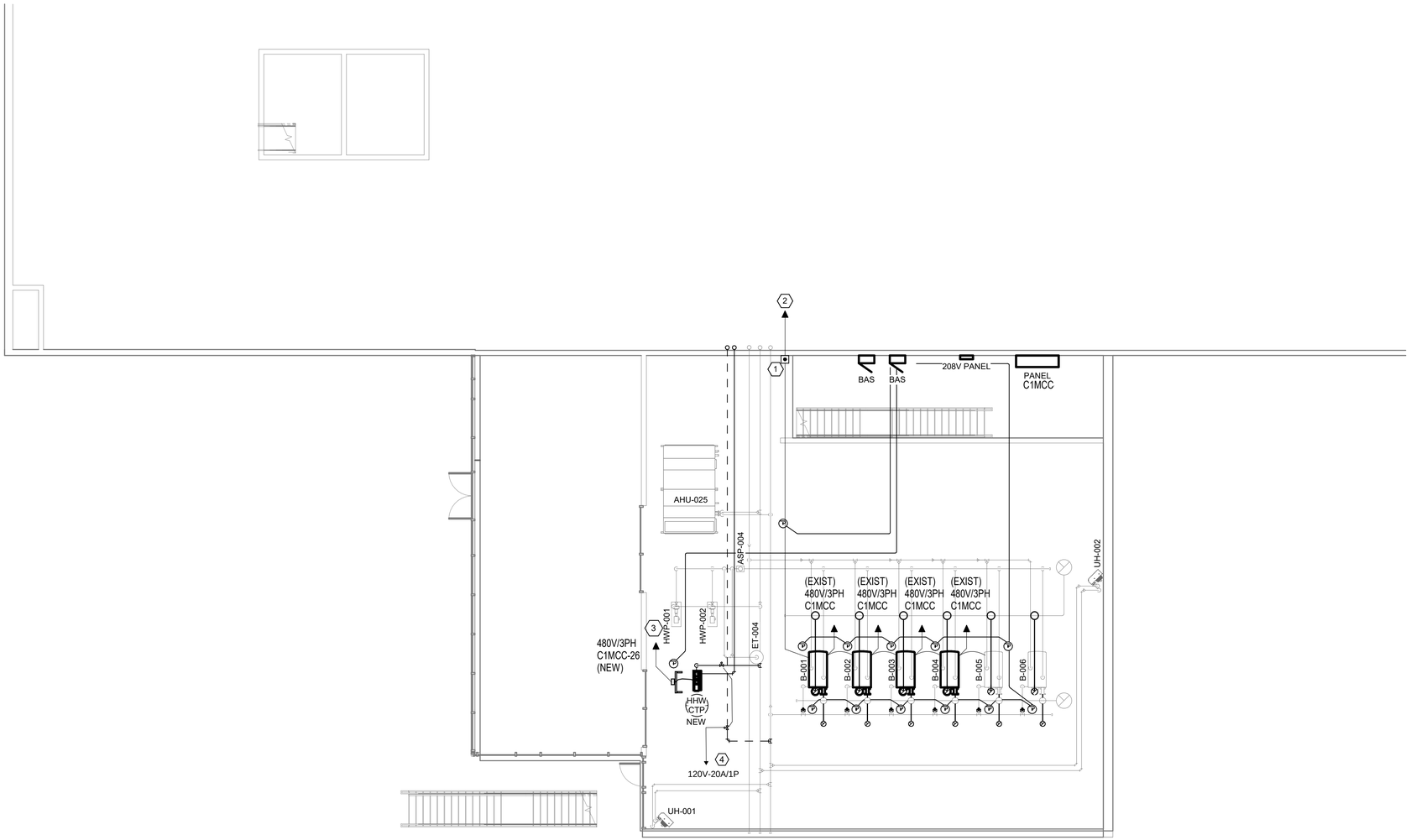
SHEET TITLE:
PARTIAL LOWER LEVEL MECHANICAL CONTROLS PLAN

SHEET NUMBER:

I-110

ENLARGED POWER PLAN NOTES

1. NEW BOILER EPO SWITCH EQUAL TO KELE MODEL ST120SL-N1-BS WITH 4 OR 6 CONTACTOR BLOCK KELE PILNCCB/PILNOCB
2. ROUTE #12 WIRING FROM BOILER EMERGENCY SHUTDOWN AUX CONTACTS THRU BOILER EPO, CONTACTOR, TO NEW 20A/1P CIRCUIT BREAKER IN LOW VOLTAGE PANEL.
3. ROUTE NEW CIRCUIT TO EXISTING BREAKER WITHIN EXISTING MCC, SEE RISER DIAGRAM.
4. ROUTE HOMERUN TO EXISTING 20A/1P CIRCUIT BREAKER TO SPARE WITHIN EXISTING PANEL TO CIRCUIT 120V CONTROL VALVES.



BOILER ROOM (MEZZANINE) 1
1/8" = 1'-0"

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CAD DWG FILE:
DRAWN BY:
CHECKED BY:
DESIGNED BY:

SHEET TITLE:
ENLARGED MEZZANINE MAIN BOILER ROOM POWER PLAN

SHEET NUMBER:

E-100

ENLARGED POWER PLAN NOTES

1. NEW BOILER EPO SWITCH EQUAL TO KELE MODEL ST120SL-N1-BS WITH 4 OR 6 CONTACTOR BLOCK KELE PILNCCB/PILNOCB
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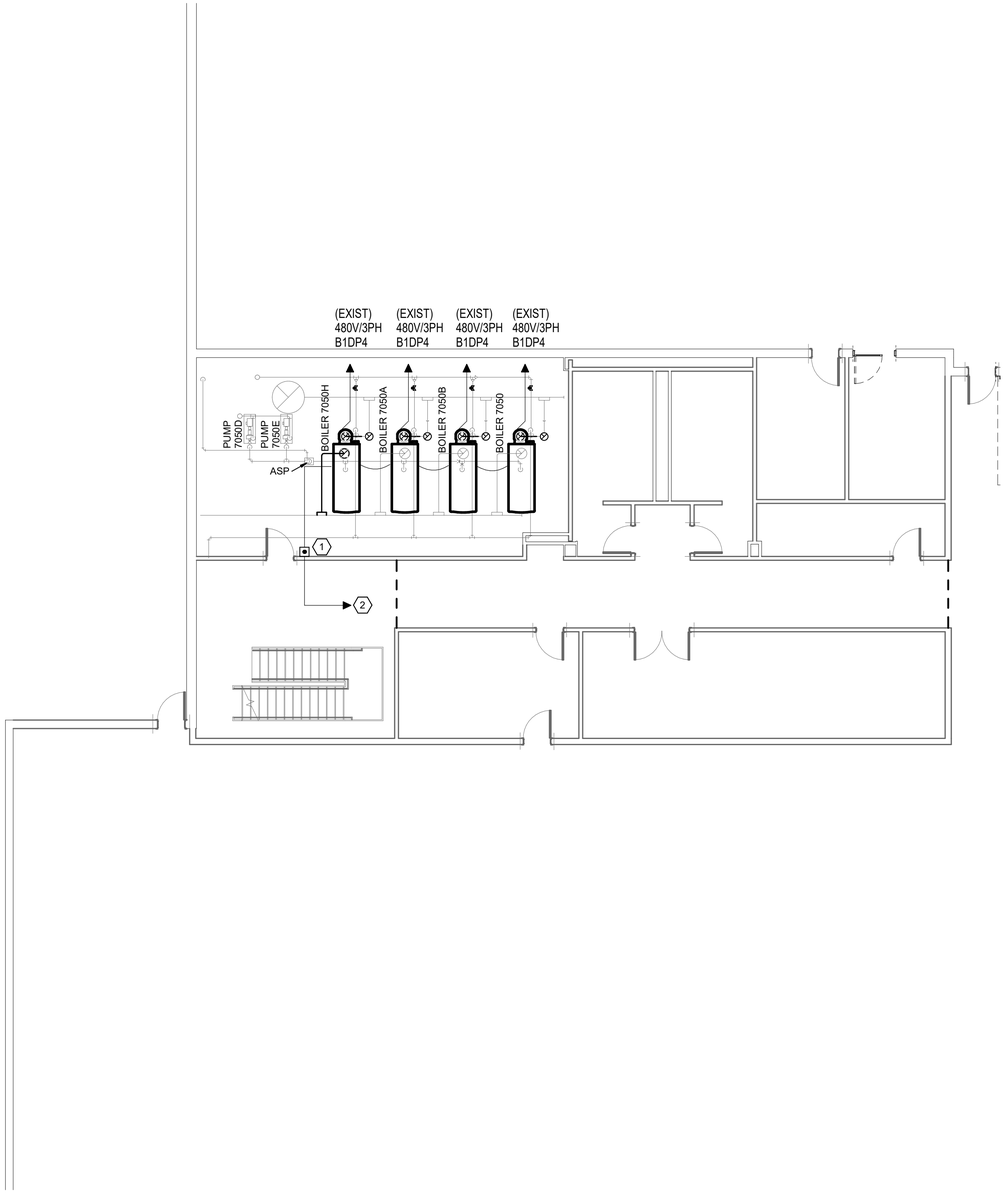

BOILER ROOM (LOWER LEVEL) 1
1/8" = 1'-0"

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SHEET TITLE:
ENLARGED LOWER LEVEL PAINT BOOTH BOILER ROOM POWER PLAN

SHEET NUMBER:

E-110

CONDUIT APPLICATION SCHEDULE

APPLICATION	MATERIAL	FITTING TYPE (IF APPLICABLE)	NOTES
SERVICE ENTRANCE CONDUIT ABOVE GRADE ONLY	RIGID STEEL	-	-
FEEDERS ABOVE GRADE	EMT	COMPRESSION	-
ALL BRANCH CIRCUITS FOR LIGHTING AND POWER	EMT	COMPRESSION	-
ALL HVAC EQUIPMENT, SUPPLY/EXHAUST FANS AND MOTORS	EMT	COMPRESSION	-
LIGHT FIXTURE WHIPS LIMITED TO 5'-0" IN LENGTH	MC CABLE	-	CU ONLY
UNDERGROUND TELEPHONE SERVICE	PVC	-	-
UNDERGROUND CABLE TV / INTERNET	PVC	-	-
SERVICE ENTRANCE CONDUIT BELOW GRADE WHERE NOT BELOW PAVED AREA	SCH 40 PVC	-	2
BRANCH CIRCUITS BELOW GRADE	PVC	-	1
LINE VOLTAGE THERMOSTAT / CONTROL WIRING	EMT	COMPRESSION	-
T-STAT WIRING OR CONTROL WIRING IN WALLS AND IN AREAS WITHOUT CEILINGS	EMT	COMPRESSION	-
FIRE ALARM CABLING (POWER-LIMITED, FIRE-PROTECTIVE, SIGNALING CIRCUIT CABLE)	EMT	COMPRESSION	-
DATA/TELEPHONE CABLING WHERE CEILINGS INSTALLED	OPEN/CABLE TRAY	-	3
INTERCOM/SECURITY SYSTEM	OPEN	-	3

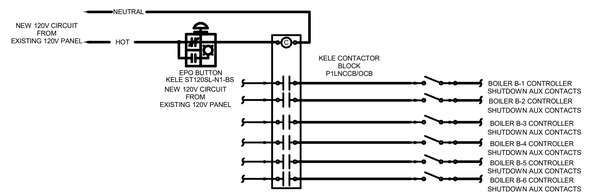
1. TRANSITION TO EMT SHALL BE MADE PRIOR TO COMING UP FROM BELOW GRADE
2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN UTILITY COMPANY REQUIREMENTS FOR PRIMARY SERVICE AND ENCASING IN CONCRETE IF REQUIRED.
3. WHERE CEILINGS EXIST, WIRING CAN BE OPEN, PLENUM-RATED WIRING. IN AREAS WITHOUT A CEILING, EMT CONDUIT IS REQUIRED.

FEEDER SCHEDULE

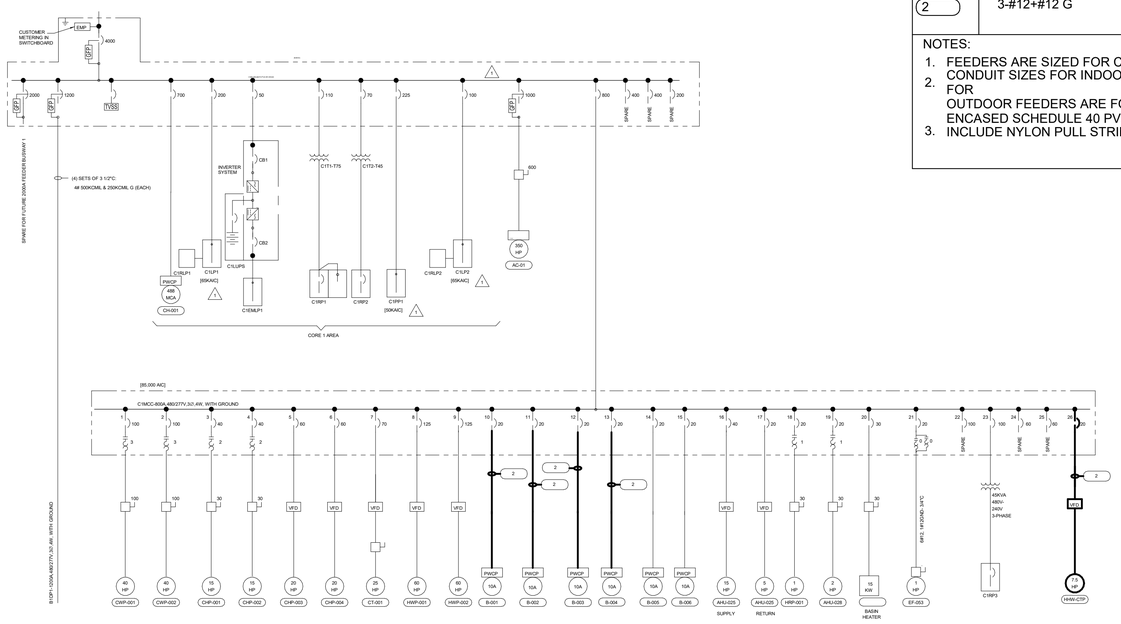
FEEDER NUMBER	FEEDER SIZE	CONDUIT SIZE	FEEDER NUMBER	FEEDER SIZE	CONDUIT SIZE
2	3-#12+#12 G	3/4"	2Y	3-#12+#12 N+#12 G	3/4"

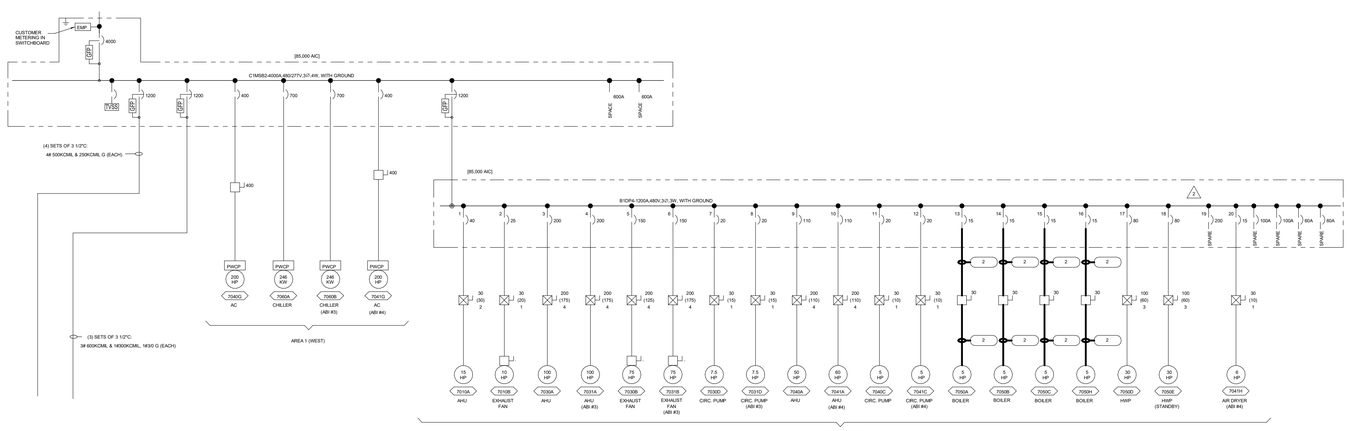
NOTES:

1. FEEDERS ARE SIZED FOR COPPER CONDUCTORS BASED ON 75^C MAXIMUM OPERATING TEMPERATURE.
2. CONDUIT SIZES FOR INDOOR FEEDERS ARE MINIMUM SIZES FOR THHN/THWN-2 IN EMT. CONDUIT SIZES FOR
   OUTDOOR FEEDERS ARE FOR THHN/THWN-2 IN CONCRETE
   ENCASED SCHEDULE 40 PVC. CONDUIT COUNT INCLUDES ONE SPARE.
3. INCLUDE NYLON PULL STRING IN SPARE CONDUITS.



BOILER EPO 2
N.T.S





ONE-LINE DIAGRAM 1
N.T.S

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SHEET TITLE:

ELECTRICAL DIAGRAMS & SCHEDULES

SHEET NUMBER:

E-300

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