MAINE AIR NATIONAL GUARD
BUILDING 486 BOILER REPLACEMENT

BANGOR, ME

LOCATION MAP

PROJECT NORTH

wbrc

BANGOR, MAINE 04401
(207)947-4511
WBRCINC.COM

Apr 25, 2024 - 1:21pm – SHEET SIZE: 30x42
C:\Users\andrew.rudnicki\DC\ACCDocs\WBRC, INC\10057005 MEANG B486 Boilers\Project Files\ME\001.dwg\andrew.rudnicki

INDEX

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN232312
BGS #3746

	SIGNATURE	DATE
OWNER :		
ARCHITECT :		
CONTRACTOR :		

REV.	DESCRIPTION	DATE
0	ISSUED FOR BID	04,26,2024

STATE OF MAINE
ANDREW J. RUDNICKI
REGISTERED
PROFESSIONAL ENGINEER
04.26.24

STATE OF MAINE
04.26.24
PHILIP EDMUND
BADGER
No. 12455
LICENSED
PROFESSIONAL ENGINEER

SHEET No.
GI001

PROJECT No.
10057.005

DUCTWORK STANDARDS

- ROUND SUPPLY OR OUTSIDE AIR DUCT UP
- ROUND RETURN OR EXHAUST AIR DUCT UP
- ROUND SUPPLY OR OUTSIDE AIR DUCT DN
- ROUND RETURN OR EXHAUST AIR DUCT DN
- DIRECTION OF AIRFLOW
- DN — DUCT PLAN-INCLINED DROP (DOWNSTREAM END LOWER)
- UP — DUCT PLAN-INCLINED RISE (DOWNSTREAM END HIGHER)
- AD — ACCESS DOOR
- VOLUME DAMPER (OPPOSED BLADE TYP.)
- FD — FIRE DAMPER (WITH ACCESS DOORS UPSTREAM & DOWN STREAM OF DAMPER)
- MOD — MOTOR OPERATED DAMPER
- RECTANGULAR SUPPLY OR OUTSIDE AIR DUCT UP
- RECTANGULAR RETURN OR EXHAUST DUCT UP
- RECTANGULAR SUPPLY DUCT DN
- RECTANGULAR RETURN OR EXHAUST DUCT DN
- 12"Ø — ROUND DUCT DIAMETER IN INCHES
- 12"Ø 30x12 — DUCT SECTION-SUPPLY OR OUTSIDE AIR FIRST FIGURE IS WIDTH SECOND FIGURE IS HEIGHT
- 12"Ø 30x12 — DUCT SECTION-EXHAUST OR RETURN AIR
- RECTANGULAR DUCT TRANSITION TO ROUND DUCT
- 12x10 — RECTANGULAR DUCT SIZE-FIRST # IS SIDE SHOWN
- 12/10 — OVAL DUCT SIZE- FIRST # IS SIDE SHOWN
- FLEXIBLE DUCT

PIPING SERVICE LEGEND

PIPING LINE DESIGNATIONS

PIPE SIZE — 6" HWS — SERVICE DESIGNATION

NEW	DESCRIPTION	EXISTING TO REMAIN	EXISTING TO BE REMOVED
HWS	HOT WATER SUPPLY	EHWS	EHWS
HWR	HOT WATER RETURN	EHWR	EHWR
CWS	CHILLED WATER SUPPLY	ECWS	ECWS
CWR	CHILLED WATER RETURN	ECWR	ECWR
L	A.C. REF. LIQUID	EL	EL
S	A.C. REF. SUCTION (VAPOR)	ES	ES
NG	NATURAL GAS PIPING	ENG	ENG

GRILLE, REGISTERS, DIFFUSERS & AIRFLOW

ABBREV.	DESIGNATION	ABBREV.	DESIGNATION
EG	EXHAUST GRILLE	EA	EXHAUST AIR
RG	RETURN GRILLE	OA	OUTDOOR AIR
SD	SUPPLY DIFFUSER	RA	RETURN AIR
LSD	LINEAR SUPPLY DIFFUSER	RLA	RELIEF AIR
SG	SUPPLY GRILLE	SA	SUPPLY AIR
TG	TRANSFER GRILLE		
VD	VOLUME DAMPER		

EQUIPMENT TAG LEGEND

TAG	DESIGNATION
AHU-1	AIR HANDLING UNIT DESIGNATION
AS-1	AIR SEPARATOR DESIGNATION
B-1	BOILER DESIGNATION
CONV-1	CONNECTOR UNIT DESIGNATION
CUH-1	CABINET UNIT HEATER DESIGNATION
DWH-1	DOMESTIC WATER HEATER DESIGNATION
EF-1	EXHAUST FAN DESIGNATION
FC-1	FAN COIL DESIGNATION
FTR-1	FINNED TUBE RADIATION DESIGNATION
HE-1	HEAT EXCHANGER DESIGNATION
HRU-1	HEAT RECOVERY UNIT DESIGNATION
L-1	LOUVER DESIGNATION
P-1	PUMP DESIGNATION
RF-1	RETURN FAN DESIGNATION
SF-1	SUPPLY FAN DESIGNATION
TSH-1	TOE SPACE HEATER DESIGNATION
UH-1	UNIT HEATER DESIGNATION
VAV-1	VARIABLE AIR VOLUME BOX DESIGNATION
XT-1	EXPANSION TANK DESIGNATION

SECTION & DETAIL MARKERS

- SECTION IDENTIFICATION (LETTER)
- SHEET CONTAINING SECTION
- DETAIL IDENTIFICATION (NUMBER)
- SHEET CONTAINING DETAIL

HEATING AND VENTING SYMBOLS

NEW | DESCRIPTION | EXISTING TO REMAIN (E) | EXISTING TO BE REMOVED (R)

- BALANCING VALVE
- CONTROL VALVE
- TRIPLE DUTY VALVE
- SHUT-OFF VALVE
- BACKFLOW PREVENTER
- CHECK VALVE
- FLOW CONTROL VALVE
- STRAINER W/DRAIN & HOSE CONN.
- CONTROL VALVE (3-WAY)
- PRESSURE RELIEF VALVE
- PRESSURE REDUCING VALVE (WATER)
- DIFFERENTIAL PRESSURE REGULATING VALVE
- FLOW SWITCH
- BASEBOARD RADIATION
- CONTROL GROUP
- THERMOSTAT; H-HEATING, C-COOLING
- D.O. — DRAIN-OFF VALVE
- UNION
- INCREASER OR DECREASER CONCENTRIC
- INCREASER OR DECREASER ECCENTRIC
- DRIP LEG
- AUTOMATIC AIR VENT
- PIPE GUIDE
- PIPE ANCHOR
- DIRECTION OF FLOW
- PIPE CAP
- ELBOW UP OR RISE
- ELBOW DOWN OR DROP
- THERMOMETER
- PRESSURE GAUGE
- LWCO — LOW WATER CUT-OFF
- TECHNICAL NOTE- APPLIES ONLY TO SHEET IN WHICH IT APPEARS.
- UH-1 11.7 MBH — HVAC EQUIPMENT TAG IDENTIFICATION
- NEW CONNECTION TO EXISTING

MISCELLANEOUS ABBREVIATIONS

ABBREV.	DESIGNATION
A	ANCHOR
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
APD	AIR PRESSURE DROP
AWT	AVERAGE WATER TEMPERATURE
BD	BAROMETRIC DAMPER
BDD	BACKDRAFT DAMPER
BOS	BOTTOM OF STEEL
BTU	BRITISH THERMAL UNITS
BV	BRICK VENT
CD	COOLING CONDENSATE DRAINAGE
CFM	CUBIC FEET PER MINUTE
D	DRAIN
DB	DRY BULB
EAT	ENTERING AIR TEMP.
ECC	ECCENTRIC
EL	ELEVATION
EWT	ENTERING WATER TEMPERATURE
FA	FRESH AIR
FC	FLEXIBLE CONNECTION
FD	FIRE DAMPER
FLA	FULL LOAD AMPS
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HWBB	HOT WATER BASEBOARD
HZ	HERTZ
LAT	LEAVING AIR TEMP.
LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LWCO	LOW WATER CUT-OFF
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MD	MANUAL DAMPER
MIN	MINIMUM
MOD	MOTOR OPERATED DAMPER
MV	MANUAL VENT
N.C.	NORMALLY CLOSED
OA	OUTSIDE AIR
OSV	OIL SAFETY VALVE
PD	PRESSURE DROP
RIC	RUN IN COVER
RPM	REVOLUTIONS PER MINUTE
SP	STATIC PRESSURE
TOS	TOP OF STEEL
TV	TURNING VANES
TYP.	TYPICAL
V	VENT
VD	VOLUME DAMPER
W/	WITH
WB	WET BULB
ZD	ZONE DAMPER
E	EXISTING TO REMAIN
ER	EXISTING RELOCATED
NR	NEW TO REPLACE EXISTING IN EXISTING LOCATION
R	EXISTING TO BE REMOVED
RR	REMOVE & RELOCATE EXISTING

GENERAL NOTES

1. ALL NEW SPACE THERMOSTATS SHALL BE MOUNTED 4'-0" ABOVE FINISHED FLOOR (AFF).
2. EQUIPMENT, DUCTWORK AND PIPING LOCATIONS SHOWN ARE APPROXIMATE EXCEPT WHERE DIMENSIONED. EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR TO AVOID INTERFERENCES.
3. FLEXIBLE CONNECTIONS SHALL BE PROVIDED BETWEEN MOTORIZED UNITS AND DUCTWORK CONNECTIONS.
4. PROVIDE ACCESS DOORS IN EQUIPMENT AND DUCTWORK FOR ACCESS TO DAMPERS, MOTORS, FILTERS, FANS AND ON BOTH SIDES OF HEATING COILS.
5. PIPING SHALL BE RUN AS DIRECT AS POSSIBLE, PARALLEL TO & FORMING RIGHT ANGLES TO THE LINES OF THE BUILDING, SUPPORTED FROM THE STRUCTURE, FREE FROM POCKETS & SAGS & PITCHED TO LOW POINT DRAINS.
6. LOCATE ALL VALVES FOR EASY ACCESS & OPERATION. DO NOT LOCATE VALVES W/STEMS BELOW HORIZONTAL.
7. ALL EXTERIOR WALL PENETRATIONS SHALL BE SEALED WEATHERTIGHT.
8. ALL EQUIPMENT SHALL BE INSTALLED ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
9. DUCTWORK SHALL BE COORDINATED TO PREVENT ANY INTERFERENCES W/ PLUMBING, PIPING, ELECTRICAL, STRUCTURAL, FIRE PROTECTION, ARCHITECTURAL AND OTHER WORK.
10. ALL DUCT SIZES SHOWN ARE CLEAR INTERNAL DIMENSIONS.
11. CONTRACTOR TO FIELD VERIFY ALL EXISTING DUCT SIZES, PIPE SIZES, LOUVERS, ETC. INCLUDING LOCATIONS & ARRANGEMENTS OF SAME. COORDINATE NEW WORK WITH EXISTING CONDITIONS.

GENERAL ELECTRICAL DEMO NOTES

1. ELECTRICAL CONTRACTOR SHALL REVIEW ALL TRADE'S DRAWINGS. THIS SHALL INCLUDE ALL ELECTRICAL DEVICES, FIXTURES AND/OR SWITCHGEAR. ALL EXISTING EQUIPMENT SHALL REMAIN ON EXISTING SURFACES UNLESS SPECIFICALLY NOTED OTHERWISE.
2. WIRING FOR EXISTING BRANCH CIRCUIT DEVICES TO BE DEMOLISHED SHALL BE REMOVED BACK TO THE PANELBOARD. THE ASSOCIATED CIRCUIT BREAKER SHALL BE TURNED OFF AND MARKED AS SPARE IN THE PANELBOARD DIRECTORY. DO NOT ABANDON BRANCH CIRCUIT WIRING ABOVE CEILINGS OR IN WIREWAYS.
3. ALL RACEWAYS & CABLES, NO LONGER IN USE, SHALL BE REMOVED.
4. MAINTAIN, OR RESTORE IF INTERRUPTED BY REMOVALS OR IN PATH OF NEW CONSTRUCTION, ALL CONDUITS, BRANCH CIRCUITS, AND FEEDERS PASSING THROUGH AND SERVING UNDISTURBED AREAS (SHOWN OR NOT SHOWN).
5. ALL EXISTING CONDUITS STUBBED THROUGH FLOOR SERVING ITEMS TO BE REMOVED (SHOWN OR NOT SHOWN) AND NOT REQUIRED TO BE REUSED SHALL BE CUT OFF FLUSH WITH THE SLAB DECK AND SEALED.
6. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADES WORK, THE ELECTRICAL CONTRACTOR SHALL CAREFULLY REMOVE AND STORE ANY ELECTRICAL ITEMS IN THE PATH OF WORK, REINSTALLING AND RECONNECTING SAME AS REQUIRED IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED AFTER COMPLETION OF OTHER TRADES WORK IN THAT AREA.
7. ENSURE REMOVAL OF ELECTRICAL DEVICES IN CONSTRUCTION AREA DOES NOT AFFECT ADJACENT AREAS.
8. ALL ELECTRICAL FIXTURES, DEVICES AND EQUIPMENT SHALL BE TURNED OVER TO THE OWNER. IF OWNER DOES NOT WISH TO KEEP ITEMS, THEY BECOME THE PROPERTY OF THE ELECTRICAL CONTRACTOR AND MUST BE REMOVED FROM THE SITE.

GENERAL ELECTRICAL NOTES

1. ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE, AND IN ACCORDANCE WITH ALL APPLICABLE CODES, INCLUDING, BUT NOT LIMITED TO NFPA 70, 90A, 101 AND DIRECTION OF AUTHORITY HAVING JURISDICTION.
2. EXACT LOCATION OF MECHANICAL EQUIPMENT THAT REQUIRES ELECTRICAL CONNECTION IS SHOWN ON THE MECHANICAL PLANS.
3. CONTRACTOR SHALL REVIEW ALL TRADES CONTRACT DOCUMENTS, AND FIELD VERIFY TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT AND CONDUITS.
4. COORDINATE ARRANGEMENT, MOUNTING, AND SUPPORT OF ELECTRICAL CONDUIT AND EQUIPMENT TO PROVIDE FOR EASE OF DISCONNECTING THE EQUIPMENT WITH MINIMUM INTERFERENCE TO OTHER INSTALLATIONS; TO ALLOW RIGHT OF WAY FOR PIPING INSTALLED AT A REQUIRED SLOPE; AND SO CONNECTING RACEWAYS SHALL BE CLEAR OF OBSTRUCTIONS AND OF THE WORKING AND ACCESS SPACE OF OTHER EQUIPMENT.
5. RUN SEPARATE NEUTRAL WIRE FOR EACH DEDICATED BRANCH CIRCUIT SHOWN ON THE PLANS.

ELECTRICAL SYMBOL LEGEND

- SPECIAL PURPOSE OUTLET OR EQUIPMENT CONNECTION - COORDINATE LOCATION AND TYPE OF CONNECTION WITH EQUIPMENT BEING SERVED.
- JUNCTION BOX WITH COVER
- MOTOR - SIZE AS INDICATED - COORDINATE W/ ACTUAL EQUIPMENT BEING SERVED
- SM — MANUAL STARTER - COORDINATE WITH EQUIPMENT BEING SERVED SINGLE THROW
- FUSED DISCONNECT SWITCH - NEMA ENCLOSURE AS REQUIRED REMOTE CONTROL
- MAGNETIC STARTER - COORDINATE W/ EQUIPMENT BEING SERVED

04.26.24

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COORDINATION

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
BGS #3746

date	detailed
26 APRIL 2024	SRJ
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AJR	AJR

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MAINE AIR NATIONAL GUARD
B486 BOILER REPLACEMENT

MECHANICAL & ELECTRICAL LEGEND

project	contract
10057.005	
drawing	rev.
ME001	—

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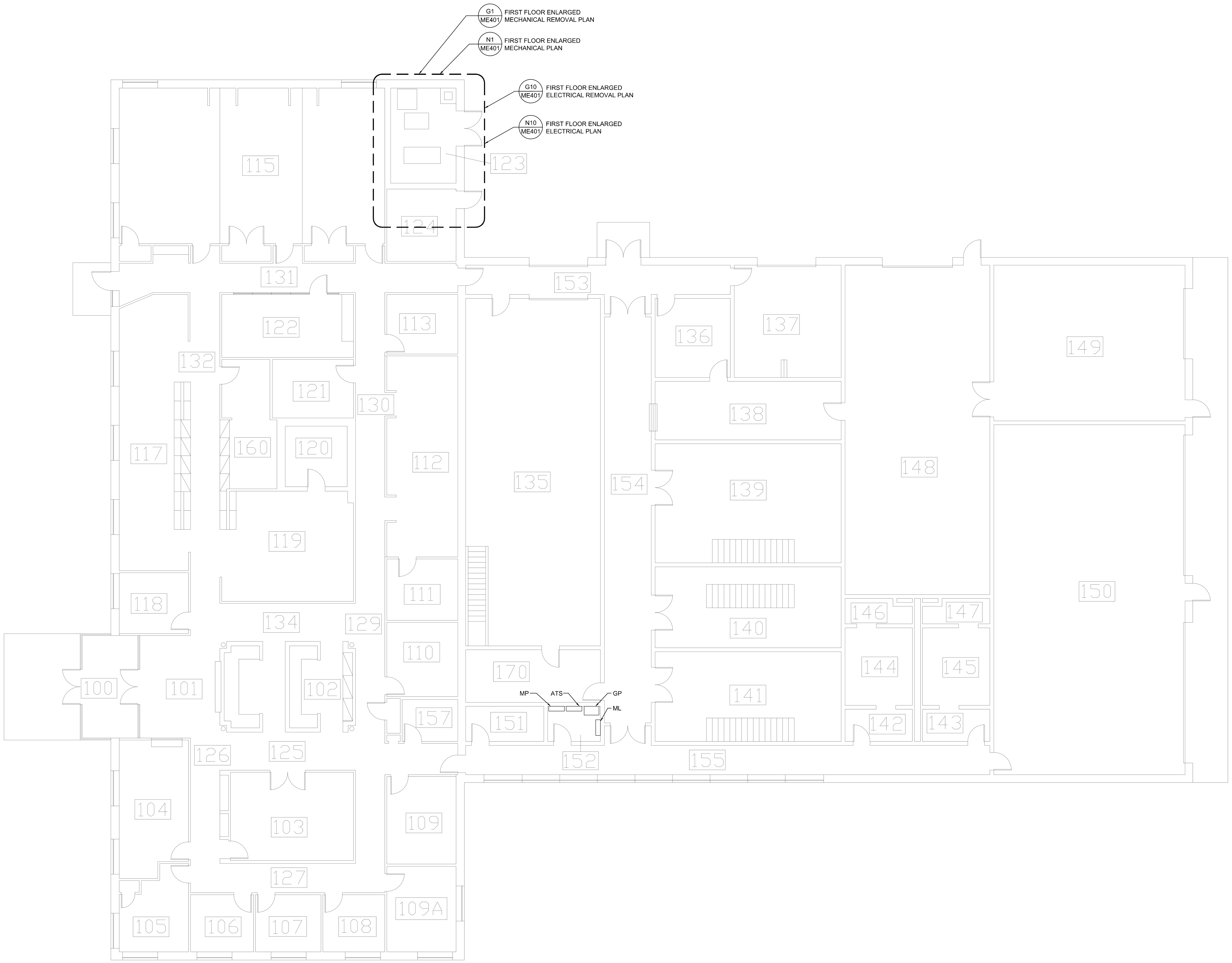

AIR NATIONAL GUARD

REVISIONS			
REV	DATE	DESCRIPTION	INIT
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COORDINATION

CONTRACTING OFFICER
-
USING AGENCY PM
-
REAL PROPERTY ADMIN.
-
MAINTENANCE
-
BASE COMMANDER
BASE CIVIL ENGINEER
-
CHIEF ENGINEER
ENVIRONMENTAL MANAGER
-

101st AIR REFUELING WING

MAINEiacs

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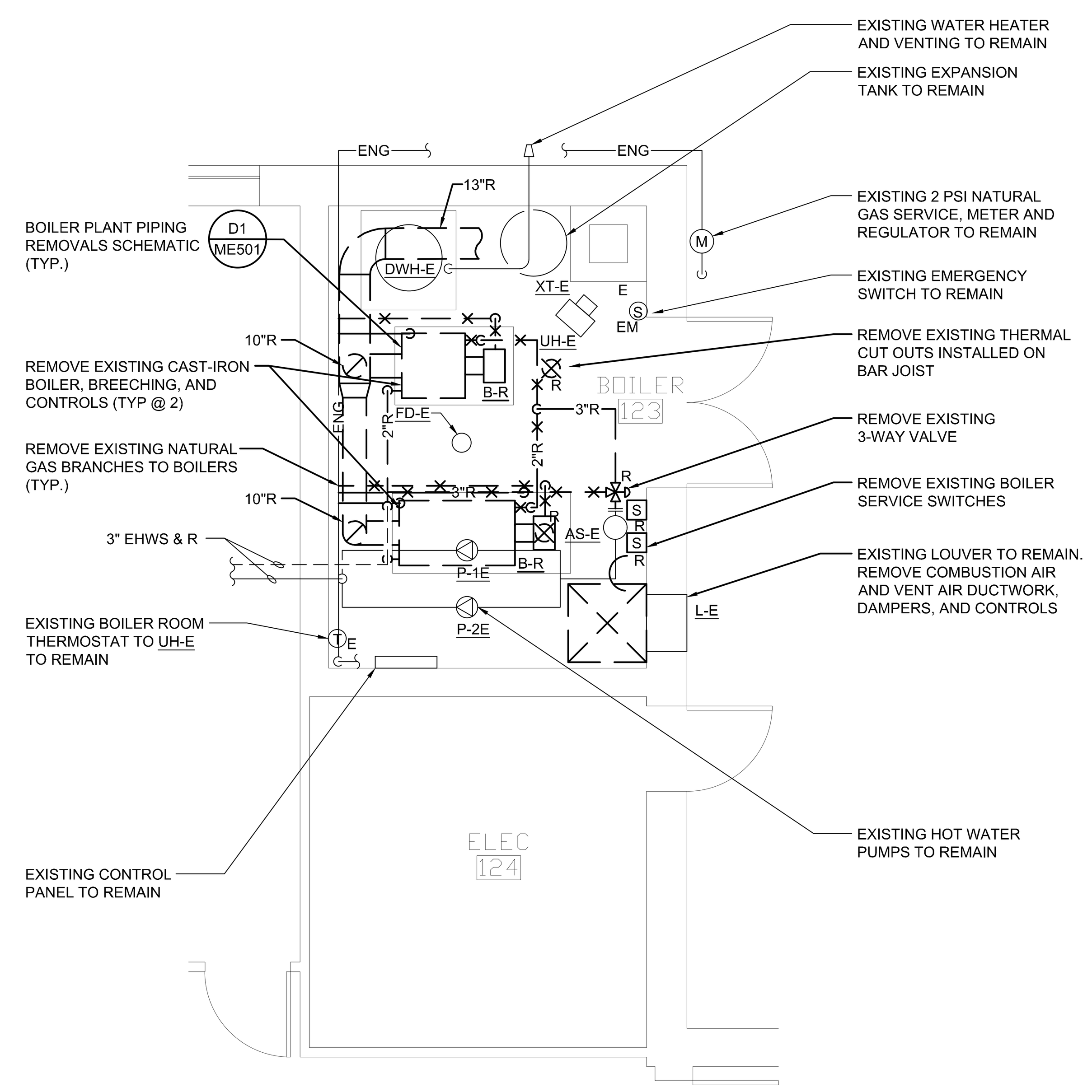
FIRST FLOOR MECHANICAL & ELECTRICAL PLAN

project	contract
10057.005	
drawing	rev.
ME101	–

sheet 3 of 5 sheets
file

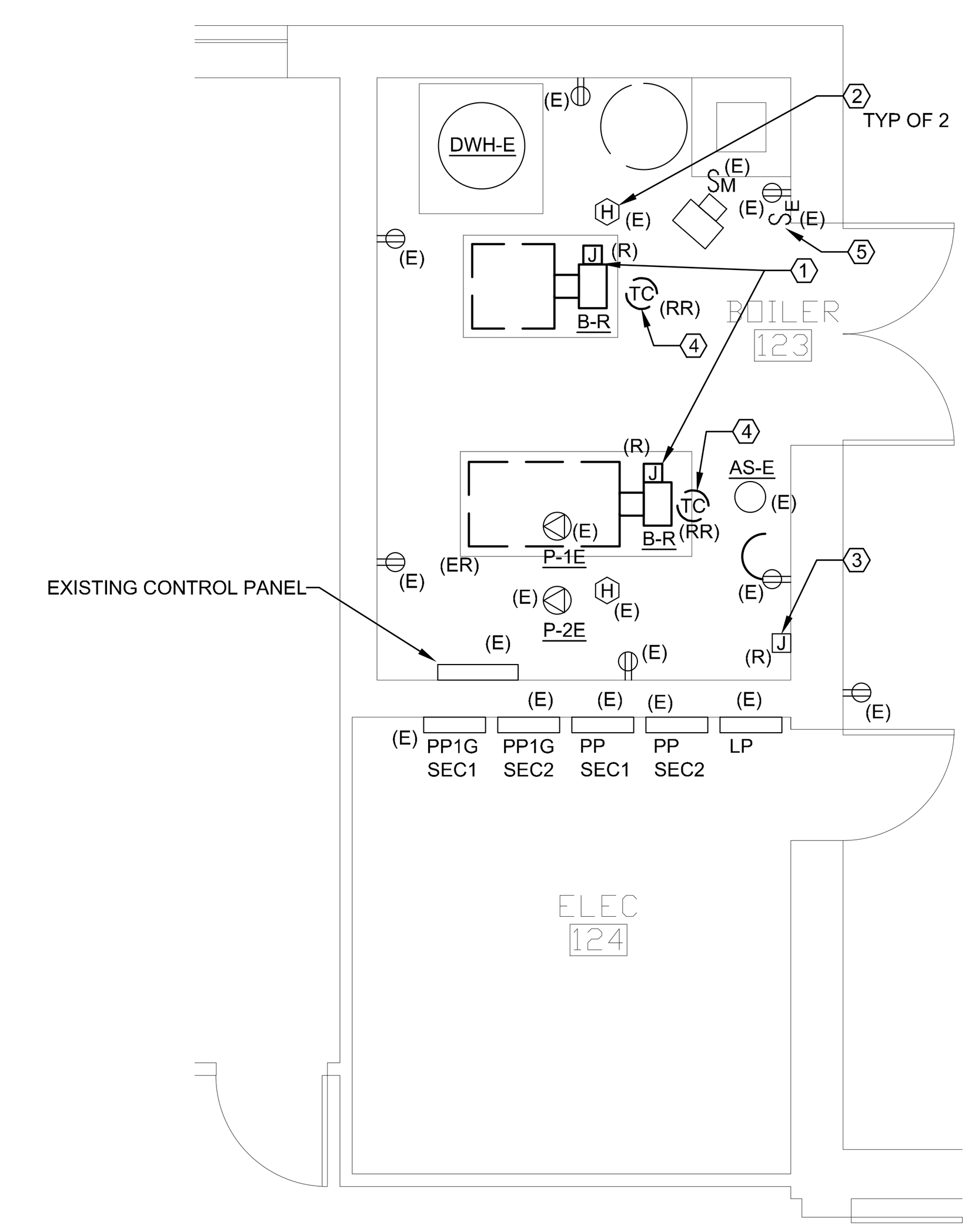
MAG NORTH
PROJECT NORTH

STATE OF MAINE
ANDREW
PROFESSIONAL ENGINEER
04.26.24



G1 FIRST FLOOR ENLARGED MECHANICAL REMOVAL PLAN

1/4"=1'-0"



G10 FIRST FLOOR ENLARGED ELECTRICAL REMOVAL PLAN

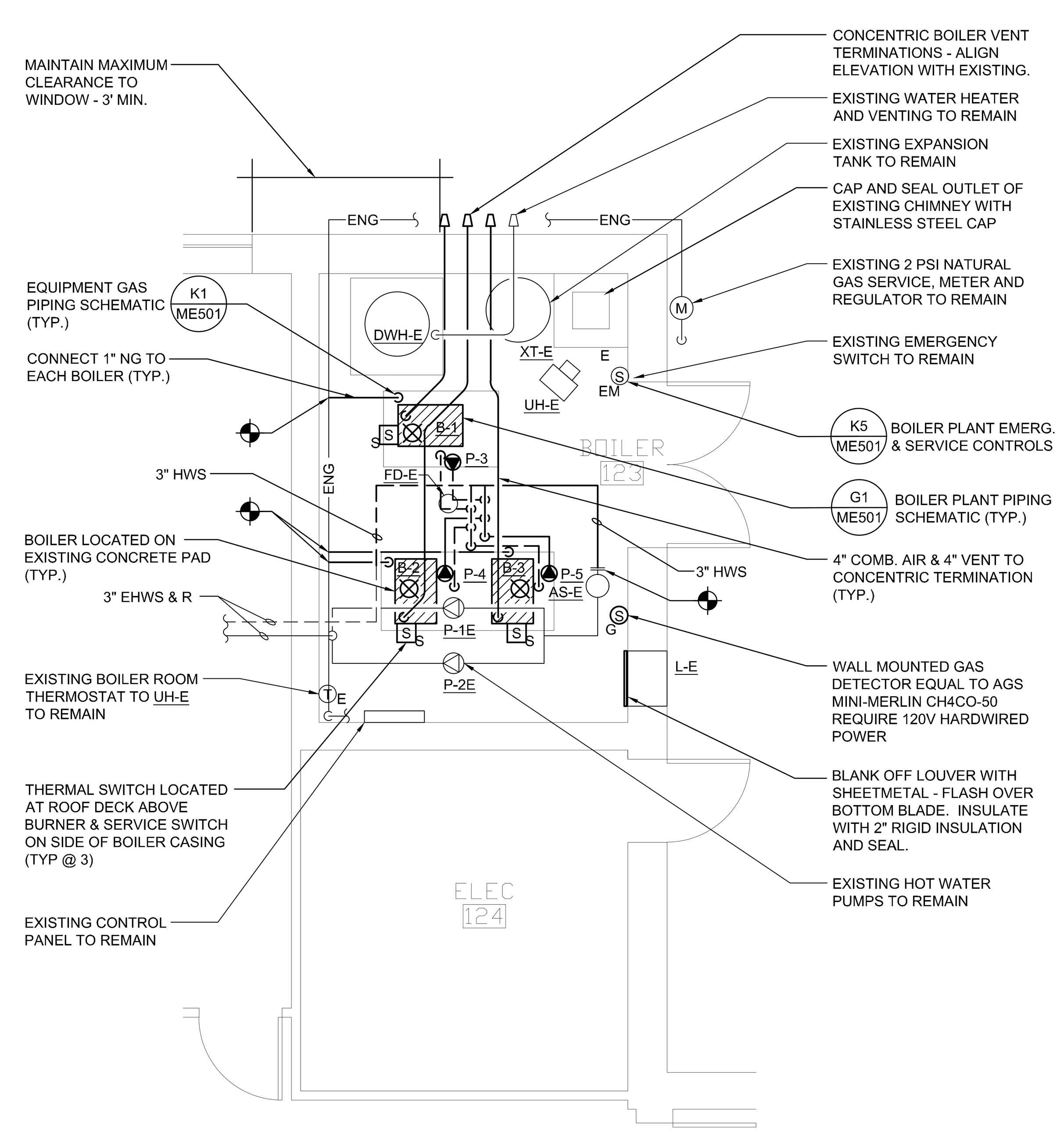
1/4"=1'-0"

ELECTRICAL GENERAL DEMO NOTES:

1. WIRING FOR EXISTING BRANCH CIRCUIT DEVICES TO BE DEMOLISHED SHALL BE REMOVED BACK TO THE PANEL BOARD. THE ASSOCIATED CIRCUIT BREAKER SHALL BE TURNED OFF AND MARKED AS SPARE IN THE PANEL BOARD DIRECTORY. DO NOT ABANDON BRANCH CIRCUIT WIRING ABOVE CEILINGS OR IN WIREWAYS.
2. MAINTAIN, OR RESTORE IF INTERRUPTED BY REMOVALS OR IN PATH OF NEW CONSTRUCTION, ALL CONDUITS, BRANCH CIRCUITS, AND FEEDERS PASSING THROUGH AND SERVING UNDISTURBED AREAS (SHOWN OR NOT SHOWN).
3. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADES WORK, THIS CONTRACTOR SHALL CAREFULLY REMOVE AND STORE ANY ELECTRICAL ITEMS IN THE PATH OF WORK, REINSTALLING AND RECONNECTING SAME AS REQUIRED IN ACCORDANCE WITH THE PLANS AND/OR AS DIRECTED AFTER COMPLETION OF OTHER TRADES WORK IN THAT AREA.
4. ALL EXISTING FIXTURES AND ELECTRICAL DEVICES TO BE REMOVED AND NOT RELOCATED SHALL BE TURNED OVER TO OWNER. IF OWNER DECIDES THEY DO NOT WISH TO KEEP REMOVED FIXTURE, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE FROM SITE.
5. THE CONTRACTOR SHALL DISCONNECT AND REMOVE ALL ELECTRICAL WIRING AND EQUIPMENT AS REQUIRED WITH IN ALL AREAS TO BE RENOVATED. THIS SHALL INCLUDE, BUT NOT LIMITED TO, FIXTURES, DEVICES, OUTLETS, SWITCHES, RECEPTACLES, STARTERS, DISCONNECTS, PANELS, FEEDERS, ETC.
6. ALL ELECTRICAL INFORMATION SHOWN IS FROM EXISTING DRAWINGS AND FIELD NOTES AND IS TO BE USED AS A GUIDE FOR EQUIPMENT LOCATIONS. CONTRACTOR SHALL VISIT THE SITE TO VERIFY EXISTING CONDITIONS PRIOR TO SUBMISSION OF BID. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO OBSERVE THIS REQUIREMENT.

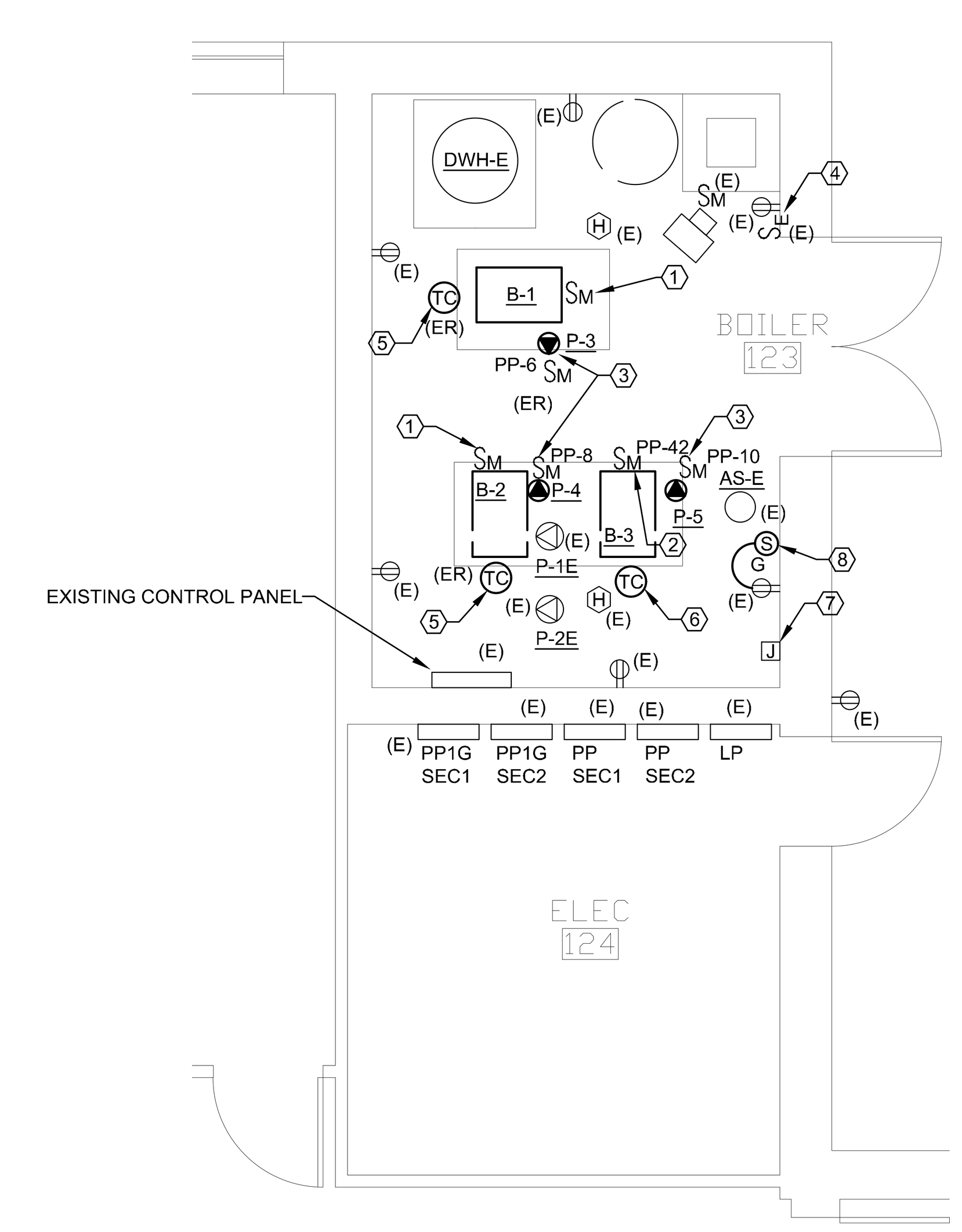
ELECTRICAL DEMO NOTES:

1. EXISTING POWER FOR BOILERS TO BE REMOVED. DISCONNECT THE POWER AND PREPARE THE CIRCUIT FOR THE NEW BOILER IN THE EXISTING, AND NEW LOCATION.
2. EXISTING FIRE ALARM HEAT DETECTOR TO REMAIN, TYPICAL OF 2.
3. EXISTING POWER FOR DAMPER TO BE REMOVED BACK TO A JUNCTION BOX AND MARK WITH PANEL, CIRCUIT # AND SPARE ON THE BLANK COVER.
4. CONTRACTOR SHALL REMOVE THE EXISTING THERMAL CUTOUT AND RELOCATE IT FOR THE NEW BOILER LAYOUT.
5. EXISTING EMERGENCY SWITCH TO REMAIN AND CONNECTED TO THE NEW BOILER CIRCUITS TO SHUT OFF ALL FOSSIL FUEL BURNING EQUIPMENT.



N1 FIRST FLOOR ENLARGED MECHANICAL PLAN

1/4"=1'-0"



N10 FIRST FLOOR ENLARGED ELECTRICAL PLAN

1/4"=1'-0"

ELECTRICAL GENERAL NOTES:

1. ALL ELECTRICAL AND CONTROL WIRING SHALL BE IN 1/2" MINIMUM EMT CONDUIT FOR ALL LOCATIONS, HIDDEN OR EXPOSED.
2. AT THE COMPLETION OF THE PROJECT THE CONTRACTOR SHALL PROVIDE A NEW TYPED UPDATED PANEL DIRECTORY IN ANY PANEL THAT WAS ALTERED DURING THIS PROJECT.
3. CONTRACTOR SHALL VERIFY ALL CIRCUIT USED FOR THIS PROJECT, IF THE EXISTING SPARE BREAKER IS IN USE, CONTRACTOR SHALL PROVIDE A NEW BREAKER IN THE PANEL OR AN ADJACENT PANEL AS REQUIRED.
4. CONTRACTOR SHALL COORDINATE ALL ELECTRICAL WORK WITH ALL OTHER TRADES. REMOVE, RELOCATE, REPLACE, RECONNECT AND CONNECT ANY ELECTRICAL THAT IS REQUIRED FOR THE PROJECT.

ELECTRICAL NUMBERED NOTES:

1. CONTRACTOR SHALL REUSE THE EXISTING BOILER CIRCUIT FOR THE NEW BOILER, COORDINATE CONNECTIONS WITH THE MECHANICAL CONTRACTOR.
2. CONTRACTOR SHALL PROVIDE A NEW 1P20 AMP BREAKER IN THE EXISTING PANEL FOR THE NEW BOILER POWER.
3. CONTRACTOR SHALL REUSE THE EXISTING SPARE BREAKER IN THE EXISTING PANEL FOR THE NEW LOAD.
4. CONTRACTOR SHALL RE-USE THE EMERGENCY SHUT-OFF SWITCH AT THE EXIT DOOR TO TURN POWER OFF TO ALL OF THE FOSSIL FUEL BURNING DEVICES IN THE ROOM. CONTRACTOR SHALL PROVIDE A RELAY AT EACH THERMAL CUTOUT/BOILER FOR THE SINGLE SWITCH TO CONTROL ALL OF THE POWER.
5. CONTRACTOR SHALL PROVIDE RELOCATE THE EXISTING THERMAL CUT OUT OVER THE FOSSIL FUEL BURNING DEVICE TO REMOVE POWER WHEN THE THERMAL CUT-OUT IS ACTIVATED.
6. CONTRACTOR SHALL PROVIDE A NEW THERMAL CUT OUT OVER THE FOSSIL FUEL BURNING DEVICE TO REMOVE POWER WHEN THE THERMAL CUT-OUT IS ACTIVATED.
7. PROVIDE A JUNCTION BOX FOR THE EXISTING DAMPER POWER WITH A BLACK COVER AND MARKED WITH PANEL NAME, CIRCUIT NUMBER AND SPARE.
8. CONTRACTOR SHALL CONNECT THE POWER FOR THE NEW GAS DETECTOR, PROVIDED BY THE MECHANICAL CONTRACTOR, TO THE EXISTING RECEPTACLE CIRCUIT.

MAG NORTH
PROJECT NORTH

04.26.24

REVISIONS

REV.	DATE	DESCRIPTION	INIT.
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COORDINATION
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USING AGENCY PM
REAL PROPERTY ADMIN.
MAINTENANCE
BASE COMMANDER
BASE CIVIL ENGINEER
CHIEF ENGINEER
ENVIRONMENTAL MANAGER

AIR NATIONAL GUARD
101st AIR REFUELING WING
MAINEiacs

MAINE AIR NATIONAL GUARD
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MAINE AIR NATIONAL GUARD
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ENLARGED FIRST FLOOR
MECHANICAL & ELECTRICAL
PLANS

project	contract
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drawing	rev.
ME401	–

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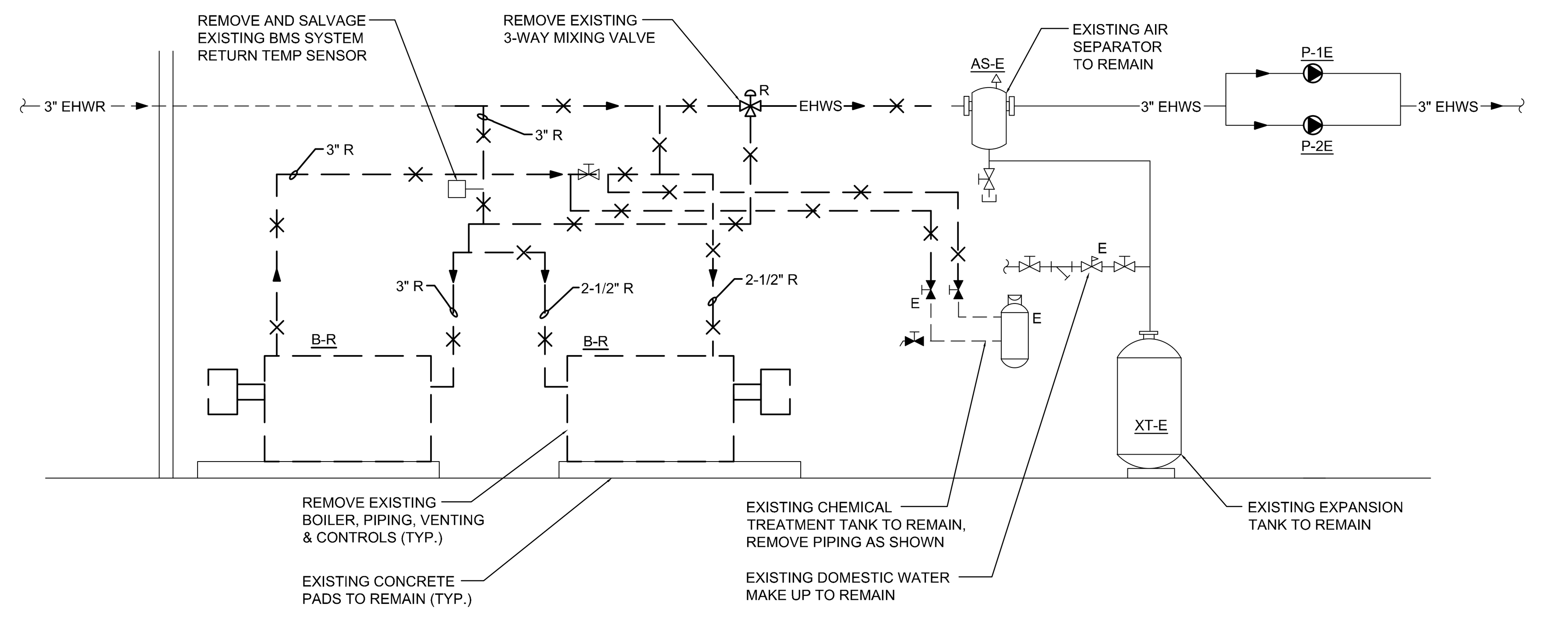
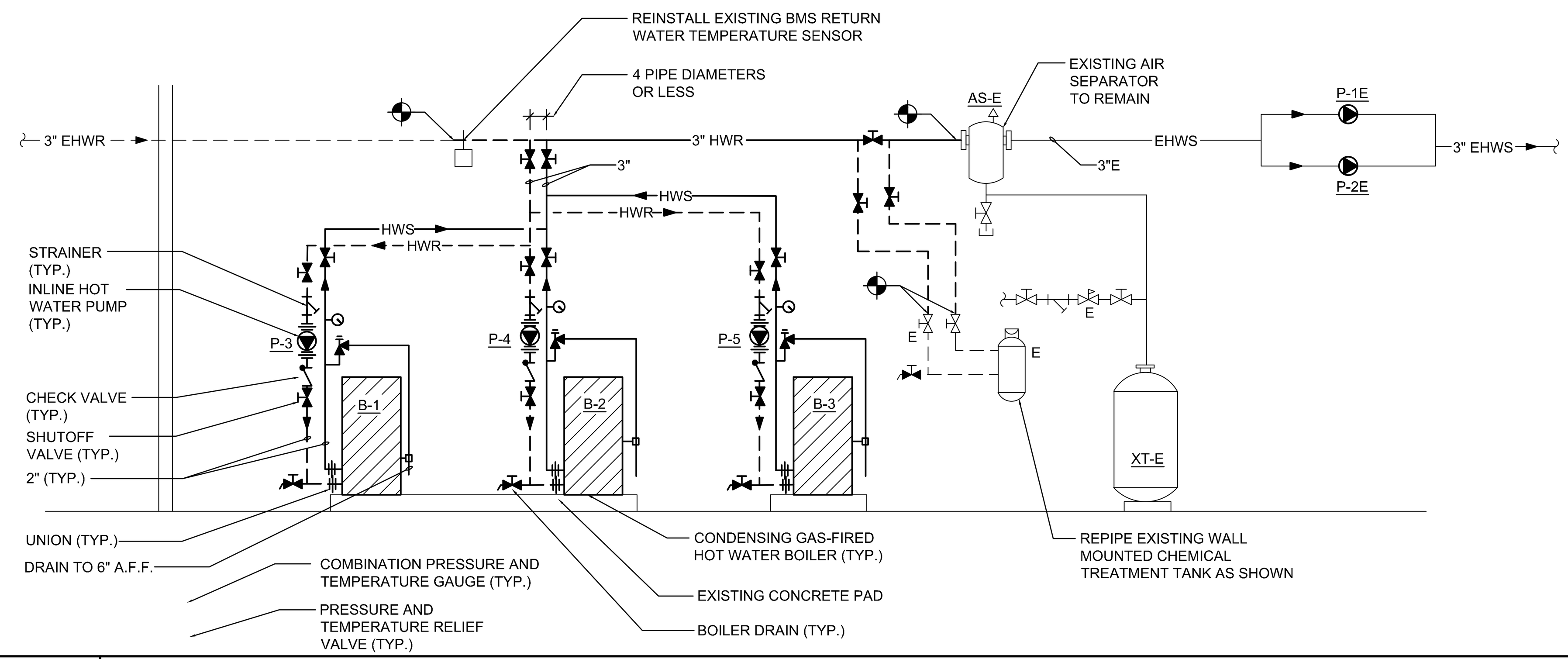
file



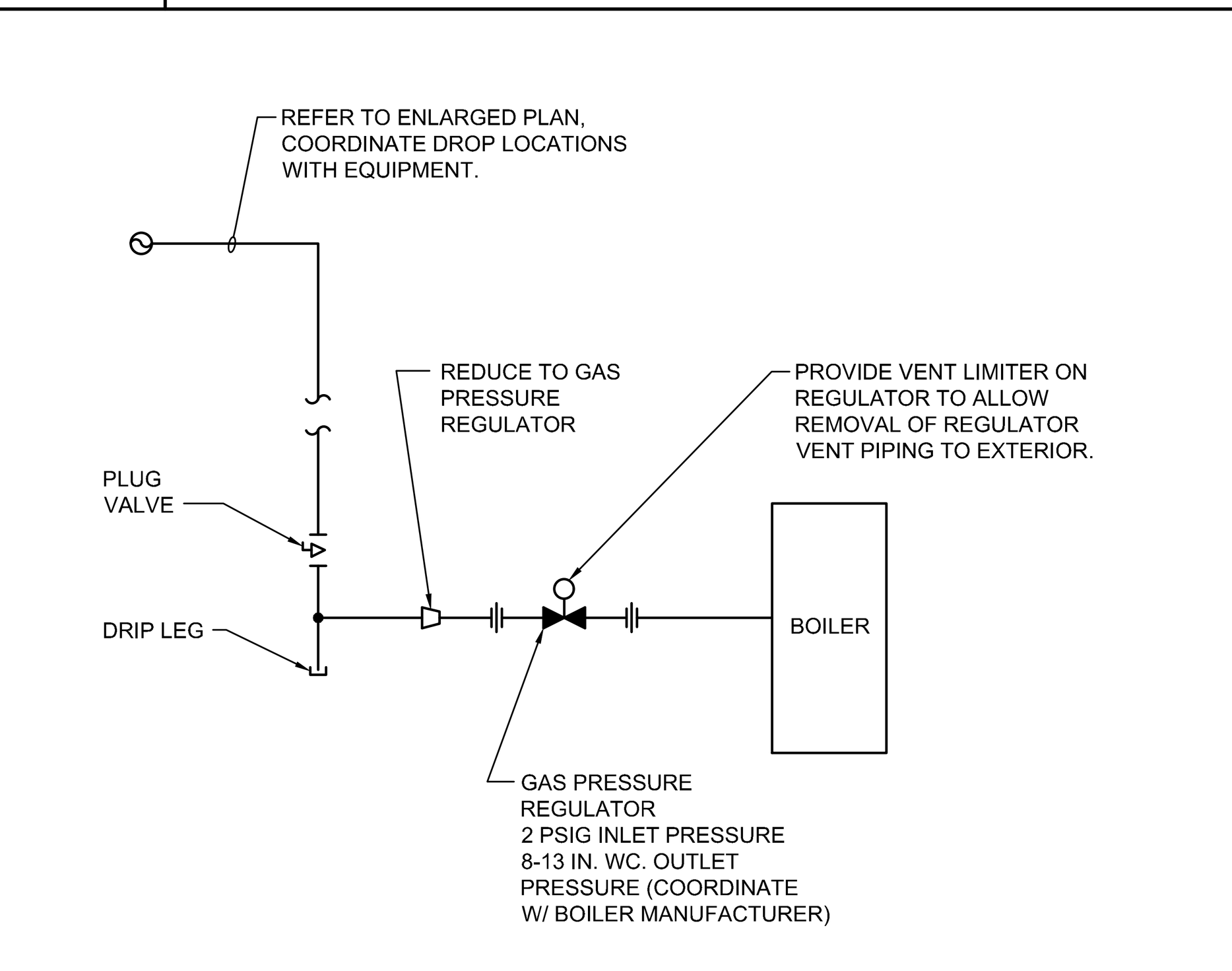
D1 BOILER PLANT REMOVALS SCHEMATIC

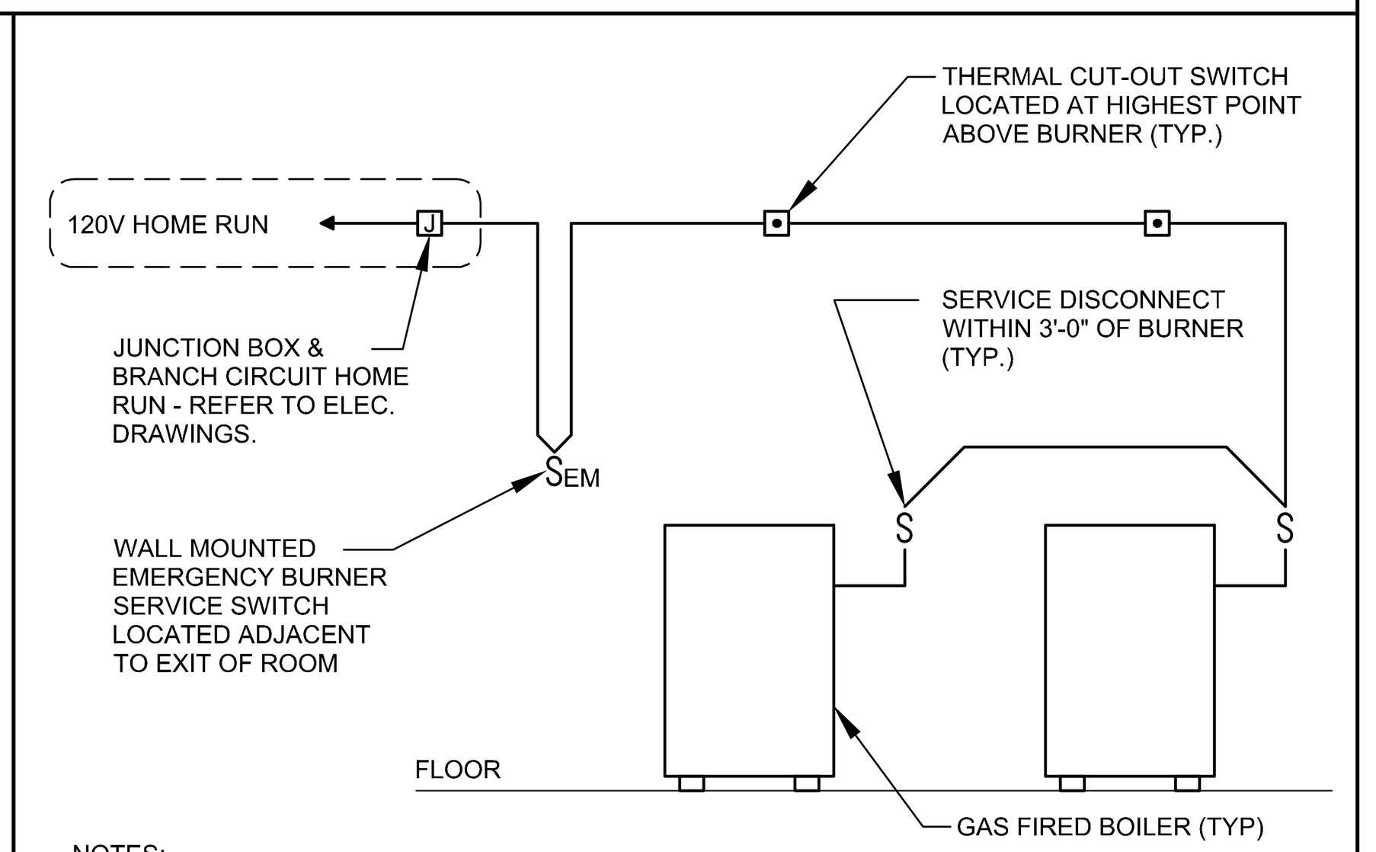
NTS –



G1 BOILER PLANT PIPING SCHEMATIC

NTS –





NOTES:
1. ALL WIRING, CONDUIT & DEVICES TO BE CONCEALED.
2. EMERGENCY BURNER SWITCH 120V, SINGLE GANG, SINGLE POLE, 15-AMP, GROUNDED, UL LISTED, TOGGLE SWITCH, TOGGLE SWITCH, IN BACK BOX, IN WHITE FINISH. COVER PLATE SHALL BE SINGLE GANG, LABELED " EMERGENCY SWITCH ON/OFF, GAS BURNER " WITH WHITE TEXT ON RED FLUSH MOUNTED METAL FACE PLATE.
3. THERMAL CUT-OUT SWITCH LISTED, WITH REPLACEABLE 165°F THERMAL FUSE IN 4 " SQUARE JUNCTION BOX. COVER PLATE SHALL BE FLUSH MOUNTED WITH STAMPED TEXT ON RED FLUSH MOUNTED METAL FACE PLATE.

K1 EQUIPMENT GAS PIPING SCHEMATIC

NTS –

K5 BOILER PLANT EMERG. & SERVICE CONTROLS

NTS –

PANEL	PP SEC 1									EXISTING
VOLTAGE: 120/208V	PHASES: 3		WIRE: 4		TYPE:					LOCATION: ELECTRICAL ROOM
225A MCB	FED FROM: PANEL LP VIA XFRM T04									MOUNTING: SURFACE
SERVICE	KW	BRKR	NOTE	NO	PHASE	NO	NOTE	BRKR	KW	SERVICE
BOILER #1		1P20	1	1	A	2	1	1P20		BOILER #2
DOMESTIC WATER PUMP #1		1P20	E	3	B	4	E	1P20		EF-2, EF-3, EF-4
SAWDUST FILTER SHAKER		1P20	E	5	C	6	3	1P20		PUMP P-1
ATC#2		1P20	E	7	A	8	3	1P20		PUMP P-2
CUH-1, CUH-2, EF-1		1P20	E	9	B	10	3	1P20		PUMP P-3
ATC #1		1P20	E	11	C	12	E	1P20		LIGHTING
LIGHTING		1P20	E	13	A	14	E	1P20		LIGHTING
RECEPTACLES		1P20	E	15	B	16	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	17	C	18	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	19	A	20	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	21	B	22	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	23	C	24	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	25	A	26	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	27	B	28	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	29	C	30	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	31	A	32	E	1P20		RECEPTACLES
RECEPTACLES		1P20	E	33	B	34	E	1P20		DRAWING COPIER
CADD PLOTTER		1P20	E	35	C	36	E	1P20		RECEPTACLES
VENDING MACHINE		1P20	E	37	A	38	E	1P20		VENDING MACHINE
VENDING MACHINE		1P20	E	39	B	40	E	1P20		REFRIGERATOR
RECEPTACLES		1P20	E	41	C	42	2	1P20		BOILER #3

NOTES:
E = EXISTING BREAKER AND EXISTING LOAD TO REMAIN.
1 = EXISTING BREAKER FOR NEW LOAD.
2 = EXISTING SPARE BREAKER FOR NEW LOAD.
3 = NEW BREAKER IN THE EXISTING PANEL FOR NEW LOAD.

PLUMBING SYSTEM PERFORMANCE SPECIFICATIONS:

1. CODES AND GENERAL REQUIREMENTS: DESIGN AND CONSTRUCT ALL PLUMBING SYSTEMS IN ACCORDANCE WITH THE 2015 UNIFORM PLUMBING CODE AS ADOPTED BY THE STATE OF MAINE, ADA, AND ASHRAE 90.1. PLUMBING SHOWN ON DRAWINGS IS GENERALLY SCHEMATIC AND ACTUAL LOCATIONS OF PIPING SHALL BE FULLY COORDINATED WITH ALL TRADES. ALL PIPING SHALL BE CONCEALED UNLESS NOTED OTHERWISE. ALL PIPING SHALL BE INSTALLED TO ALLOW FOR EXPANSION USING OFFSETS, SWING JOINTS, EXPANSION FITTINGS OR JOINTS, TO PREVENT UNDUE STRAIN ON PIPING AND EQUIPMENT. NO WATER PIPING SHALL BE INSTALLED IN EXTERIOR WALLS OR OTHER SPACES WHERE SUSCEPTIBLE TO FREEZING.
2. DOMESTIC WATER PIPING: ALL INTERIOR DOMESTIC WATER PIPING SHALL BE TYPE "L" COPPER WITH LEAD FREE SOLDERED FITTINGS TO MATCH EXISTING. INSULATE ALL INTERIOR DOMESTIC WATER PIPING FOR CONDENSATION PROTECTION IN ACCORDANCE WITH ASHRAE 90.1.
3. NATURAL GAS PIPING: ALL NATURAL GAS PIPING SHALL BE SCHEDULE 40 BLACK IRON PIPE WITH THREADED OR WELDED CAST FITTINGS. ALL PIPING SHALL BE FINISHED WITH YELLOW EPOXY PAINT MATCHING EXISTING. COMPLETED PIPING SYSTEM SHALL BE LEAK TESTED AND REPORT SUBMITTED TO THE OWNER.
4. INSPECT AND PRESSURE TEST ALL NATURAL GAS PIPING PER NFPA 54. ISOLATE PIPING FROM METER TO EQUIPMENT. TEST AT 50 PSI FOR 12 HOURS. PIPING WILL BE CONSIDERED ACCEPTABLE WITH LESS THAN 5 PSI DROP OVER TEST DURATION.
5. CONDENSATE PIPING: ALL BOILER CONDENSATE PIPING SHALL BE SCHEDULE 40 SOLID WALL PVC OR TYPE "L" COPPER WITH LEAD FREE SOLDERED FITTINGS. CONDENSATE SHALL BE PIPED TO A SECONDARY NEUTRALIZATION STATION BEFORE DISCHARGING TO EXISTING FLOOR DRAIN WITH DOWNTURN ELBOW.
6. LABELING: PROVIDE PIPE LABELS AND FLOW ARROWS ON ALL NEW DOMESTIC WATER PIPING AND NATURAL GAS PIPING AT 20' INTERVALS.

MECHANICAL SYSTEM PERFORMANCE SPECIFICATIONS:

1. CODES & GENERAL REQUIREMENTS: DESIGN AND CONSTRUCT ALL HVAC SYSTEMS IN ACCORDANCE WITH UFC-3-410-01, UFC-3-430-11, NFPA 54, ASHRAE 62 & 90.1, ADA, STATE OF MAINE REGULATORY REQUIREMENTS. REFRIGERANT PIPING SHOWN ON DRAWINGS IS GENERALLY SCHEMATIC AND ACTUAL LOCATIONS OF PIPING SHALL BE FULLY COORDINATED WITH ALL TRADES. ALL PIPING SHALL BE INSTALLED TO ALLOW FOR EXPANSION USING OFFSETS, SWING JOINTS, EXPANSION FITTINGS OR JOINTS, TO PREVENT UNDUE STRAIN ON PIPING AND EQUIPMENT. NO WATER PIPING SHALL BE INSTALLED IN EXTERIOR WALLS, ATTICS, OR OTHER SPACES WHERE SUSCEPTIBLE TO FREEZING.
2. PHASING OF WORK: CONTRACTOR SHALL PERFORM WORK IN COORDINATION WITH THE OWNER. BOILER PLANT SHALL BE SHUT DOWN ONCE HEATING IS NOT LONGER NEEDED. REVISED BUILDING LOOP PIPING SHALL BE COMPLETED FIRST WITH TEES AND VALVES INSTALLED FOR CONNECTION OF BOILER INJECTION PIPING. THE BOILER INJECTION LOOP SHALL BE CONSTRUCTED NEXT WITH ALL BOILER BRANCHES WITH ISOLATION VALVES TO PERMIT BOILERS TO BE CONNECTED AS WORK IS COMPLETED TO PROVIDE HEAT TO THE BUILDING. BOILER PLANT MUST BE TESTED AND FUNCTIONAL BY THE START OF THE HEATING SEASON.
3. LABELING: PROVIDE PIPE LABELS AND FLOW ARROWS ON ALL NEW AND EXISTING HOT WATER PIPING. PROVIDE ENGRAVED PLASTIC EQUIPMENT LABELS ON ALL NEW EQUIPMENT. FASTEN LABELS TO EQUIPMENT WITH FOAM TAPE OR RIVETS. MINIMUM TEXT SIZE 1/2" LETTER HEIGHT. APPLY EQUIPMENT LABELS ABOVE CEILING WHERE EXPOSED IN FINISHED SPACE.
4. HOT WATER PIPING SYSTEMS: ALL INTERIOR HOT WATER PIPING SHALL BE EITHER TYPE L COPPER TUBING WITH SOLDERED FITTINGS OR SCH. 40 BLACK IRON PIPE WITH THREADED OR WELDED FITTINGS. MECHANICAL CRIMP OR GROOVED JOINT FITTINGS ARE NOT ACCEPTABLE.
INSULATE ALL HOT WATER PIPING INCLUDING VALVES AND FITTINGS WITH 1" THICK PREFORMED MINERAL FIBER PIPE INSULATION FOR PIPING 1-1/4" AND SMALLER. PIPING 1-1/2" AND LARGER SHALL BE INSULATED WITH 2" THICK MINERAL FIBER. LEAVE ALL VALVE HANDLES AND REMOVABLE CAPS VISIBLE AND ACCESSIBLE.
SUPPORT HOT WATER PIPING WITH INSULATION SADDLES AND CLEVIS HANGERS OR UNISTRUT AND PIPE CLAMPS SIZED FOR OD OF INSULATION. SUPPORT PIPING AT 60" ON CENTER AND WITHIN 12" OF CHANGE IN DIRECTIONS.
5. HOT WATER PUMPS: INLINE HOT WATER PUMPS SHALL BE CLOSE COUPLED WITH CONSTANT SPEED MOTORS. PUMP BODY SHALL BE CAST IRON WITH A STAINLESS STEEL OR REINFORCED NYLON IMPELLER AND STAINLESS STEEL SHAFT. MOTOR ORIENTATION SHALL BE FIELD ADJUSTABLE FROM PUMP BODY. SUPPORT PUMP INDEPENDENTLY OF PIPING FOR PUMPS WITH MOTORS LARGER THAN 1/2 HP.
6. HOT WATER BOILERS: FLOOR MOUNTED HIGH-EFFICIENCY GAS-FIRED CONDENSING BOILERS SHALL BE PEERLESS ONLY AS SCHEDULED PER OWNER'S PROJECT REQUIREMENTS. BOILERS SHALL HAVE STAINLESS STEEL BURNER AND HEAT EXCHANGER, 5:1 TURN DOWN MODULATING BURNER, PRESSURE & TEMPERATURE RELIEF VALVE, AND INTEGRAL CONDENSATE NEUTRALIZATION. PROVIDE SECONDARY EXTERNAL CONDENSATE NEUTRALIZATION OF BOILERS PRIOR TO DISCHARGE TO FLOOR DRAIN. FACTORY CONTROLS SHALL INCLUDE OUTDOOR RESET, CASCADE CONTROL OF MULTIPLE BOILERS, OUTPUTS FOR INJECTION AND HW SYSTEM PUMP, DIGITAL DISPLAY FOR USER ADJUSTMENT AND MONITORING OF BOILER.
7. BOILER VENTING: COMBUSTION AIR PIPING SHALL BE 4" SCHEDULE 40 SOLID CORE PVC WITH CEMENTED JOINTS. BOILER VENT PIPING SHALL BE EITHER 4" SCHEDULE 40 CPVC OR POLYPROPYLENE PIPING WITH CEMENTED OR FUSED JOINTS. COMBUSTION AIR AND VENT PIPING SHALL CONNECT TO A CONCENTRIC WALL TERMINATION.
8. TESTING, ADJUSTING & BALANCING: ALL SYSTEMS AND EQUIPMENT SHALL BE TESTED, ADJUSTED, AND BALANCED AT PROJECT COMPLETION TO OBTAIN AND VERIFY PERFORMANCE INDICATED ON DRAWINGS. ALL TAB WORK SHALL BE PERFORMED BY AN INDEPENDENT CONTRACTOR WITHIN THE CONTRACT.

MECHANICAL SYSTEM SEQUENCE OF CONTROL:

GENERAL: EXISTING BUILDING IS SERVED BY A HONEYWELL BUILDING MANAGEMENT SYSTEM. THIS SYSTEM SHALL REMAIN AND BE MODIFIED AND/OR EXPANDED FOR THE NEW WORK.

COMBUSTION & VENT AIR DAMPERS: COMBUSTION AIR & VENT DAMPERS ARE NOT BE REQUIRED WITH DIRECT VENT BOILERS. REMOVE EXISTING DAMPER ACTUATOR CONTROL PROGRAMMING FROM BMS SYSTEM.

P-1E & P-2E: EXISTING CONSTANT SPEED HOT WATER PUMPS SHALL CONTINUE TO OPERATE WITH EXISTING CONTROL SEQUENCES.

BOILER PLANT:

1. BOILERS SHALL HAVE FACTORY INSTALLED, WIRED CONTROLS CAPABLE OF INJECTION PUMP CONTROL, STAGING OF BOILERS, OUTDOOR RESET AND MODULATING FIRING.
2. MOVE EXISTING BMS CONTROLS ENABLE SIGNAL TO MASTER BOILER (B-1).
3. FACTORY PROVIDED OUTDOOR AIR TEMPERATURE SENSOR SHALL BE LOCATED ON THE NORTH SIDE OF BUILDING. LOCATE AWAY FROM DIRECT SUN OR POTENTIAL HEAT SOURCES.
4. PRIOR TO BOILER FIRING, ASSOCIATED INJECTION PUMP (P-3, P-4 OR P-5) SHOULD START AND PROVE FLOW.
5. BOILERS SHALL MODULATE AND STAGE AS NECESSARY TO MAINTAIN HOT WATER SUPPLY SETPOINT BASED ON THE RESET SCHEDULE AS FOLLOWS (ADJUSTABLE):

OUTDOOR TEMPERATURE:	HOT WATER TEMPERATURE:
0°F OR LESS	180°F
50°F OR HIGHER	140°F

6. ALARMS SHALL BE GENERATED ON BOILER CONTROLLER FOR HIGH TEMP CUT OFF, LOW WATER TEMP, FLAME FAILURE, AND PUMP START FAILURE.

BOILER SCHEDULE

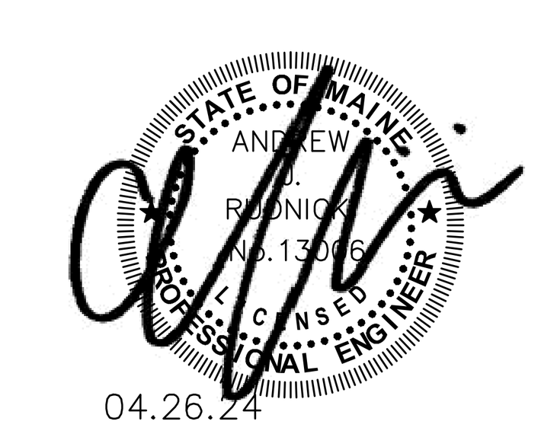
TAG	MODEL	NG GAS INPUT (MBH)	NET I-B-R OUTPUT (MBH)	AFUE %	TURNDOWN	NAT. GAS PRESSURE (IN-WC)	VENT AIR CONNECTION (IN)	COMB. AIR CONNECTION (IN)	ELECTRICAL			NOTES
									MOCP	VOLT	PHASE	
B-1	PFC-460	460	381	95.2	5 : 1	4 - 13	4	4	20A	120	1	1, 2, 3, 4
B-2	PFC-460	460	381	95.2	5 : 1	4 - 13	4	4	20A	120	1	1, 2, 3, 4
B-3	PFC-460	460	381	95.2	5 : 1	4 - 13	4	4	20A	120	1	1, 2, 3, 4

BOILER SCHEDULE NOTES:
1. BASED ON PEERLESS
2. BUILT-IN CONDENSATE NEUTRALIZATION SYSTEM
3. PROVIDE CPVC CONCENTRIC WALL TERMINATION
4. INTEGRAL CONTROLS WITH LED SCREEN INCL. SYSTEM SENSORS, PUMP CONTROL, BOILER CASCADE CONTROL AND BMS INTEGRATION

PUMP SCHEDULE

TAG	LOCATION	SERVES	MODEL	TYPE	GPM	HEAD FT	EFF %	MOTOR RPM	ELECTRICAL			NOTES
									BHP	HP	POWER	
P-1E	MECH ROOM	BUILDING HEATING LOOP	EXTG 1641	INLINE	110					3	208/3	3, 4
P-2E	MECH ROOM	BUILDING HEATING LOOP	EXTG 1641	INLINE	110					3	208/3	3, 4
P-3	MECH ROOM	BOILER B-1 INJECTION	1935	INLINE	29	20	52	1760	0.28	1/3	120/1	1, 2
P-4	MECH ROOM	BOILER B-2 INJECTION	1935	INLINE	29	20	52	1760	0.28	1/3	120/1	1, 2
P-5	MECH ROOM	BOILER B-3 INJECTION	1935	INLINE	29	20	52	1760	0.28	1/3	120/1	1, 2

PUMP SCHEDULE NOTES:
1. BASED ON TACO
2. BASED ON 30°F THROUGH BOILER.
3. EXISTING TACO
4. FLOWRATE BASED ON EXISTING EQUIPMENT SELECTION PARAMETERS



04.26.24	ISSUED FOR BID

COORDINATION

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
BGS #3746

date	detailed
26 APRIL 2024	SRJ
designed	checked
AJR	AJR

WBRCINC.COM
BANGOR, MAINE 207-947-4511

MAINE AIR NATIONAL GUARD
B486 BOILER REPLACEMENT

MECHANICAL & ELECTRICAL DETAILS

project	contract
10057.005	
drawing	rev.
ME501	–

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