MAINE AIR NATIONAL GUARD
BUILDING 518 BOILER RENOVATIONS
BANGOR, ME

LOCATION MAP

INDEX

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

	SIGNATURE	DATE
OWNER :		
ARCHITECT :		
CONTRACTOR :		

REV.	DESCRIPTION	DATE
0	ISSUED FOR BID	1 SEPT 2020

STATE OF MAINE — STEPHANIE A. LAPLANT — No. 10272 — LICENSED PROFESSIONAL ENGINEER
09.01.20

STATE OF MAINE — ANDREW R. PENNICK — No. 11... — LICENSED PROFESSIONAL ENGINEER
09.01.20

SHEET No. **GI001**

COMM. No. **4309.01**

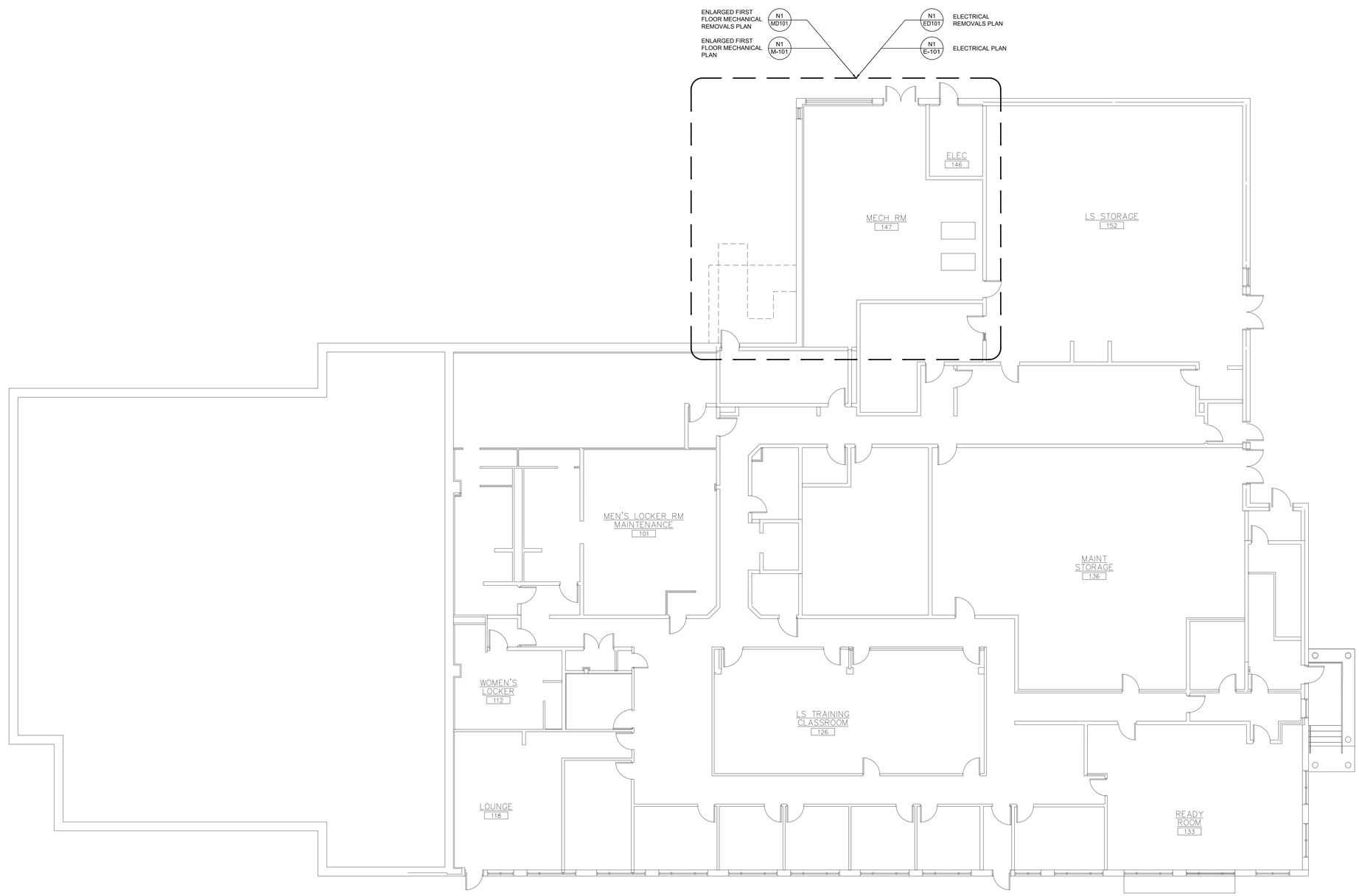
WBRC ARCHITECTS • ENGINEERS

BANGOR, MAINE
207-947-4511

PORTLAND, MAINE
207-828-4511

SARASOTA, FLORIDA
941-556-0757

www.wbrcae.com



PROJECT NORTH

Millimeters
Inches
Scale For Microfilming

AIR NATIONAL GUARD

REVISIONS

REV.	DATE	DESCRIPTION	INIT.
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
–

USING AGENCY PM
–

REAL PROPERTY ADMIN.
–

MAINTENANCE
–

BASE COMMANDER

BASE CIVIL ENGINEER
–

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
–

101st AIR REFUELING WING

MAINEiacs

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	SRJ
designed	checked
AJR	AJR

WBRC
ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

OVERALL PLAN

project	contract
4309.01	
drawing	rev.
GI002	–
sheet 2 of 9 sheets	
file	

STATE OF MAINE ANDREW J. RHODES REGISTERED PROFESSIONAL ENGINEER

09.01.20

DUCTWORK STANDARDS

ROUND SUPPLY OR OUTSIDE AIR DUCT UP

RECTANGULAR SUPPLY OR OUTSIDE AIR DUCT UP

ROUND RETURN OR EXHAUST AIR DUCT UP

RECTANGULAR RETURN OR EXHAUST DUCT UP

ROUND SUPPLY OR OUTSIDE AIR DUCT DN

RECTANGULAR SUPPLY DUCT DN

ROUND RETURN OR EXHAUST AIR DUCT DN

RECTANGULAR RETURN OR EXHAUST DUCT DN

DIRECTION OF AIRFLOW

12"Ø — ROUND DUCT DIAMETER IN INCHES

DN — DUCT PLAN-INCLINED DROP (DOWNSTREAM END LOWER)

45° ROUND DUCT ELBOW

UP — DUCT PLAN-INCLINED RISE (DOWNSTREAM END HIGHER)

90° ROUND DUCT ELBOW

AD — ACCESS DOOR

12"Ø 30x12 — DUCT SECTION-SUPPLY OR OUTSIDE AIR FIRST FIGURE IS WIDTH SECOND FIGURE IS HEIGHT

FC — FLEXIBLE CONNECTION

12"Ø 30x12 — DUCT SECTION-EXHAUST OR RETURN AIR

BDD — BACKDRAFT DAMPER

RECTANGULAR DUCT TRANSITION TO ROUND DUCT

VOLUME DAMPER (OPPOSED BLADE TYP.)

12x10 — RECTANGULAR DUCT SIZE- FIRST # IS SIDE SHOWN

FD — FIRE DAMPER (WITH ACCESS DOORS UPSTREAM & DOWN STREAM OF DAMPER)

MOD — MOTOR OPERATED DAMPER

FLEXIBLE DUCT

PIPING SERVICE LEGEND

PIPING LINE DESIGNATIONS

PIPE SIZE — SERVICE DESIGNATION — 6" HWS

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
FOS	FUEL OIL BURNER SUPPLY	EFOS	EFOS
FO	FUEL OIL VENT	EFO	EFO
FO	FUEL OIL FILL	EFO	EFO
G	LP GAS PIPING	EG	EG

SECTION & DETAIL MARKERS

SECTION IDENTIFICATION

SHEET CONTAINING SECTION

DETAIL IDENTIFICATION

SHEET CONTAINING DETAIL

GRILLE, 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		

TYPICAL DIFFUSER DROP

SYMBOLS — DESIGNATION

SD-1 XXX CFM — DIFFUSER TAG WITH AIRFLOW (CUBIC FEET PER MINUTE)

BOTTOM BRANCH TAKE-OFF (ALL AIR TERMINALS SHALL HAVE VOLUME DAMPER UNLESS OTHERWISE NOTED)

TYPICAL CEILING DIFFUSER

SD-1 XXX CFM — DIFFUSER TAG WITH AIRFLOW (CUBIC FEET PER MINUTE)

FLEX DUCT CONNECTION TO DIFFUSER

ARROWS INDICATE DIRECTION OF BLOW

TYPICAL REGISTER/GRILLE

SG-1 XXX CFM — SUPPLY GRILLE

EG-1 XXX CFM — EXHAUST GRILLE

EQUIPMENT TAG LEGEND

TAG	DESIGNATION
ACCU-1	AIR-COOLED CONDENSING UNIT DESIGNATION
AHU-1	AIR HANDLING UNIT DESIGNATION
AS-1	AIR SEPARATOR DESIGNATION
B-1	BOILER DESIGNATION
CH-1	AIR-COOLED CHILLER DESIGNATION
CONV-1	CONVECTOR UNIT DESIGNATION
CUH-1	CABINET UNIT HEATER DESIGNATION
EF-1	EXHAUST FAN DESIGNATION
FTR-1	FINNED TUBE RADIATION DESIGNATION
HC-1	HEATING COIL DESIGNATION
HUM-1	HUMIDIFIER DESIGNATION
IE-1	INDOOR EVAPORATOR 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
UV-1	UNIT VENTILATOR DESIGNATION
VAV-1	VARIABLE AIR VOLUME BOX DESIGNATION
XT-1	EXPANSION TANK DESIGNATION
ZD-1	ZONE DAMPER DESIGNATION

HEATING AND VENTING SYMBOLS

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

MISC. 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
EXTG	EXISTING
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.

REVISIONS

REV.	DATE	DESCRIPTION	INIT.
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
–

USING AGENCY PM
–

REAL PROPERTY ADMIN.
–

MAINTENANCE
–

BASE COMMANDER

BASE CIVIL ENGINEER
–

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
–

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	SRJ
designed	checked
AJR	AJR

WBRC ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

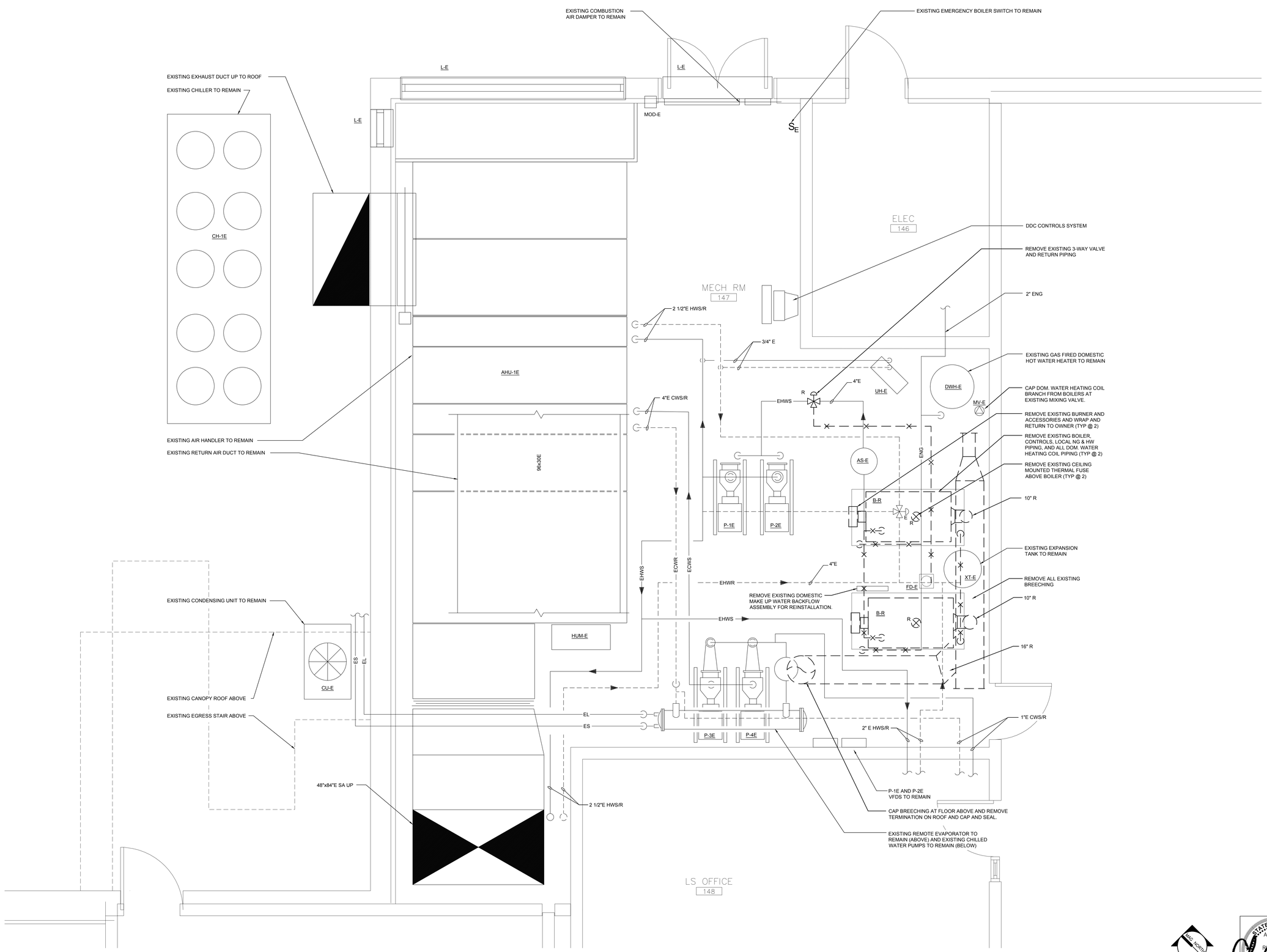
MEANG BUILDING 518 BOILER RENOVATIONS

MECHANICAL LEGEND

STATE OF MAINE ANDREW J. RENICK 12134 LICENSED PROFESSIONAL ENGINEER
09.01.20

project	contract
4309.01	
drawing	rev.
M-001	–
sheet 3 of 9 sheets	
file	

Scale For Microfilming
Millimeters
Inches



PROJECT NORTH

REVISIONS

REV.	DATE	DESCRIPTION	INIT
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
–

USING AGENCY PM
–

REAL PROPERTY ADMIN.
–

MAINTENANCE
–

BASE COMMANDER

BASE CIVIL ENGINEER
–

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
–

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	SRJ
designed	checked
AJR	AJR

WBRC
ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

ENLARGED FIRST FLOOR MECHANICAL REMOVALS PLAN

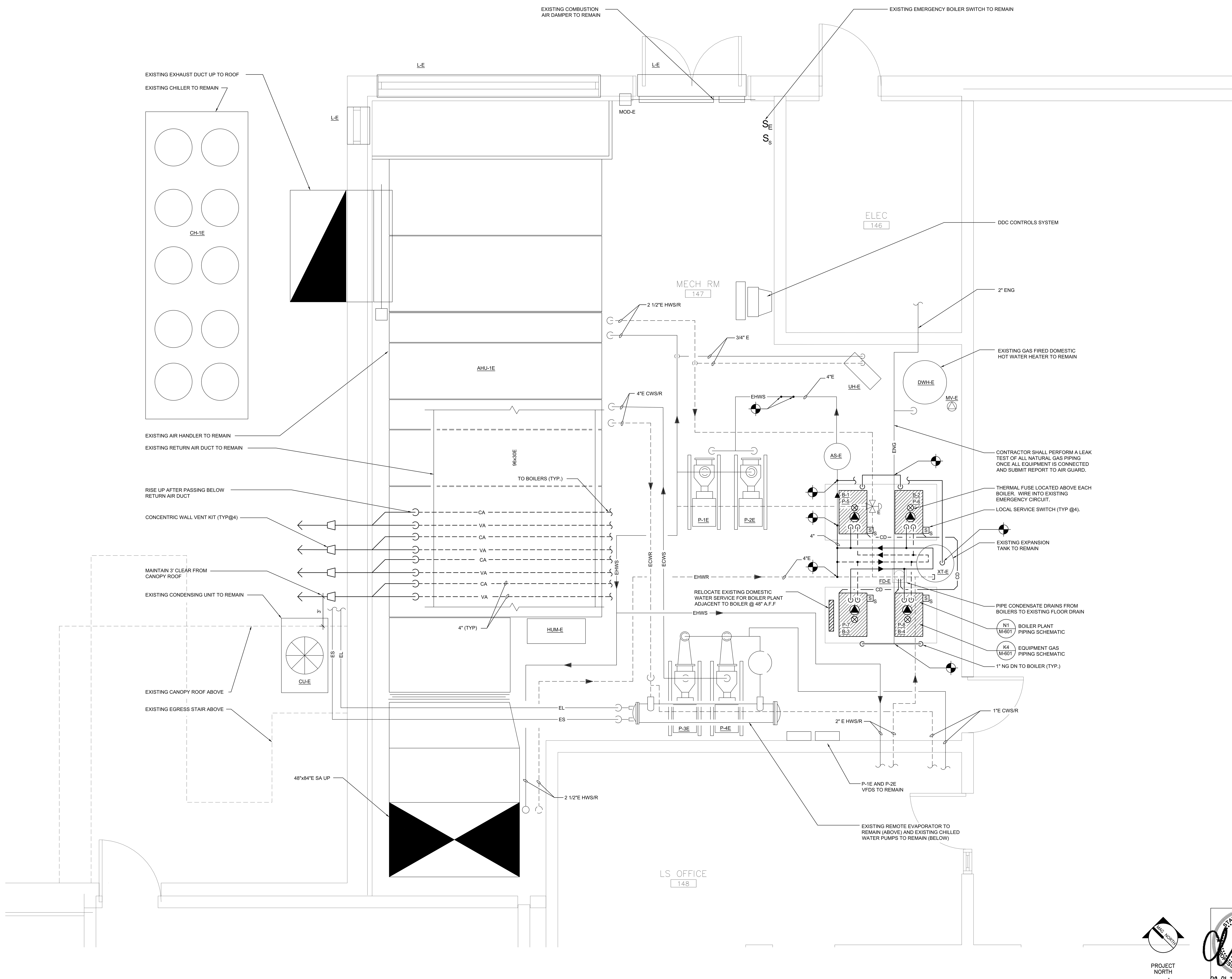
project	contract
4309.01	

drawing	rev.
MD101	–

sheet 4 of 9 sheets
file

STATE OF MAINE
ANDREW
REGISTERED
NO. 13
PROFESSIONAL ENGINEER

21.01.20



REVISIONS			
REV	DATE	DESCRIPTION	INIT
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER –

USING AGENCY PM –

REAL PROPERTY ADMIN. –

MAINTENANCE –

BASE COMMANDER

BASE CIVIL ENGINEER –

CHIEF ENGINEER

ENVIRONMENTAL MANAGER –

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	SRJ
designed	checked
AJR	AJR

WBRC
ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

ENLARGED FIRST FLOOR MECHANICAL PLAN

project	contract
4309.01	
drawing	rev.
M-101	–

sheet 5 of 9 sheets
file

BOILER SCHEDULE

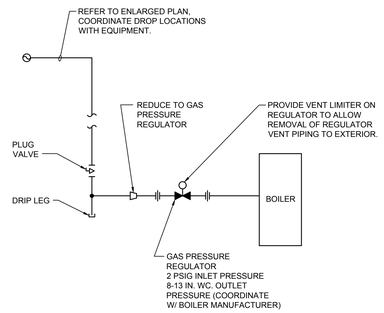
TAG	MODEL	NATURAL GAS INPUT MBH	GROSS OUTPUT MBH	AFUE EFFICIENCY %	NATURAL GAS PRESSURE IN-WC	VENT AIR CONNECTION INCHES	COMB AIR CONNECTION INCHES	ELECTRICAL			NOTES
								MOCP	VOLT	PHASE	
B-1	PF-399	80 - 399	380	95	10-14	4	4	15	120	1	1, 2, 3, 4, 5
B-2	PF-399	80 - 399	380	95	10-14	4	4	15	120	1	1, 2, 3, 4, 5
B-3	PF-399	80 - 399	380	95	10-14	4	4	15	120	1	1, 2, 3, 4, 5
B-4	PF-399	80 - 399	380	95	10-14	4	4	15	120	1	1, 2, 3, 4, 5

BOILER SCHEDULE NOTES:
1. BASED ON PEERLESS
2. PRESSURE RELIEF VALVE FOR FIELD INSTALLATION
3. CONDENSATE NEUTRALIZATION KIT
4. PROVIDE COAXIAL POLYPROPYLENE COMBUSTION / VENT AIR PIPING AND CONCENTRIC WALL VENT
5. BOILER INJECTION PUMP POWERED BY FACTORY BOILER CONTROLLER.

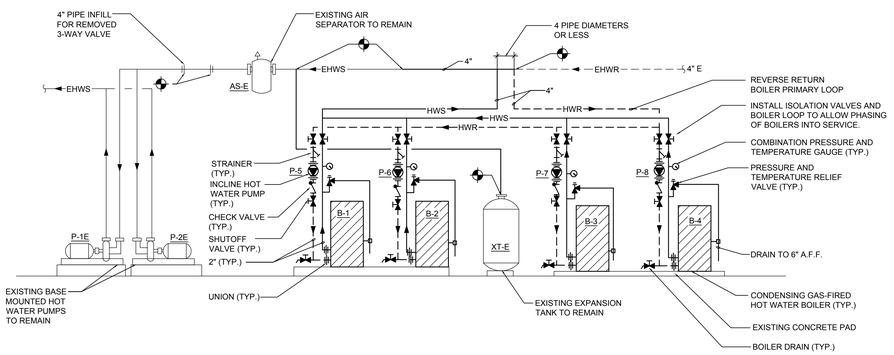
PUMP SCHEDULE

TAG	SERVES	MODEL	TYPE	GPM	HEAD FT	ELECTRICAL			NOTES
						HP	VOLT	PHASE	
P-5	BOILER B-1 INJECTION	VR3452-HY1	INLINE	25.0	15.0	1/4	120	1	1, 2, 3
P-6	BOILER B-2 INJECTION	VR3452-HY1	INLINE	25.0	15.0	1/4	120	1	1, 2, 3
P-7	BOILER B-3 INJECTION	VR3452-HY1	INLINE	25.0	15.0	1/4	120	1	1, 2, 3
P-8	BOILER B-4 INJECTION	VR3452-HY1	INLINE	25.0	15.0	1/4	120	1	1, 2, 3

PUMP SCHEDULE NOTES:
1. BASED ON TACO
2. ECM MOTOR WITH INTEGRAL VARIABLE SPEED CONTROLS
3. PERFORMANCE BASED ON 30°F TEMPERATURE RISE THROUGH BOILER



K1	NOT USED	K4	EQUIPMENT GAS PIPING SCHEMATIC
NTS	--	NTS	--



N1	BOILER PLANT PIPING SCHEMATIC
NTS	--

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.

CHILLED WATER PLANT: EXISTING CHILLER AND CHILLED WATER PUMPS (P-3E & P-4E) SHALL CONTINUE TO OPERATE WITH EXISTING CONTROL SEQUENCES.

COMBUSTION & VENT AIR DAMPERS: COMBUSTION AIR DAMPER SHALL NOT BE REQUIRED WITH DIRECT VENT BOILERS. DDC SEQUENCE SHALL BE REVISED TO OPEN BOTH COMBUSTION AIR AND VENT AIR DAMPER IF BOILER ROOM TEMPERATURE EXCEEDS 80°F (ADJUSTABLE).

P-1E & P-2E: EXISTING 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 DDC CONTROLS ENABLE SIGNAL TO MASTER BOILER (B-1).
3. FACTORY PROVIDED OUTDOOR AIR TEMPERATURE SENSOR SHALL BE LOCATED ON THE NORTH SIDE OF BUILDING.
4. 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	150°F

5. PRIOR TO BOILER FIRING, ASSOCIATED INJECTION PUMP SHOULD START AND PROVE FLOW.
6. ALARMS SHALL BE GENERATED ON BOILER CONTROLLER FOR HIGH TEMP CUT OFF, LOW WATER TEMP, FLAME FAILURE, AND PUMP START FAILURE.

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. LABELING: PROVIDE PIPE LABELS AND FLOW ARROWS ON ALL NEW DOMESTIC WATER 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, 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 A MANNER THAT MINIMIZES LOSS OF HEATING HOT WATER SYSTEM AND MAINTAINS HEAT TO THE FACILITY. BUILDING LOOP PIPING SHALL BE COMPLETED FIRST. THE BOILER INJECTION LOOP 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.
3. LABELING: PROVIDE PIPE LABELS AND FLOW ARROWS ON ALL NEW REFRIGERANT PIPING AT 20' INTERVALS. 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. 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.
4. HOT WATER PUMPS: INLINE HOT WATER PUMPS SHALL HAVE ECM MOTOR WITH INTEGRAL SPEED CONTROLLER. PUMP BODY SHALL BE CAST IRON WITH A REINFORCED NYLON IMPELLER AND STAINLESS STEEL SHAFT. USER INTERFACE SHALL BE LOCATED ON END OF PUMP MOTOR ALLOWING ADJUSTMENTS TO SPEED, FLOW OR PRESSURE SETPOINTS. INTERFACE SHALL HAVE LED DISPLAY. PUMP SHALL BE INSTALLED WITH THE PUMP SHAFT HORIZONTAL. MOTOR SHALL BE HERMETICALLY SEALED FROM IMPELLER. MOTOR ORIENTATION SHALL BE FIELD ADJUSTABLE FROM PUMP BODY.
5. 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. 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.
6. 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. TERMINATION SHALL BE BOILER MANUFACTURER'S CONCENTRIC WALL KIT. WALL VENT LOCATIONS MUST BE COORDINATED WITH EXISTING CANOPY ROOF, DOORS, WINDOWS AND EQUIPMENT.
7. 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.

REVISIONS

REV.	DATE	DESCRIPTION	INIT.
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
--

USING AGENCY PM
--

REAL PROPERTY ADMIN.
--

MAINTENANCE
--

BASE COMMANDER

BASE CIVIL ENGINEER
--

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
--

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	SRJ
designed	checked
AJR	AJR

WBRC ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-826-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

MECHANICAL DETAILS & SCHEDULES

project	contract
4309.01	
drawing	rev.
M-601	-
sheet 6 of 9 sheets	
file	

STATE OF MAINE ANDREW J. RENICK 5082 LICENSED PROFESSIONAL ENGINEER
29.01.20

LEGEND

ALL DEVICES, FIXTURES, ETC. SHALL BE NEW UNLESS DESIGNATED WITH THE FOLLOWING TAGS:

- E EXISTING TO REMAIN
- ER EXISTING RELOCATED
- NR NEW TO REPLACE EXISTING IN EXISTING LOCATION
- R EXISTING TO BE REMOVED
- RR REMOVE & RELOCATE EXISTING

- 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
- GROUND
- ADA ELECTRICALLY-ASSISTED DOOR OPENER PUSHBUTTON
- BRANCH CIRCUIT RUN IN CEILING OR IN WALLS
- LOW VOLTAGE OR CONTROL WIRING - #12 MINIMUM OR AS NOTED
- MULTI-CONDUCTOR BRANCH CIRCUIT - NUMBER OF HASHMARKS IS NUMBER OF WIRES (NOT INCLUDING GROUND WIRE) WITHOUT HASHMARKS IS TWO WIRE
- HOMERUN TO CIRCUIT AND PANEL INDICATED - NUMBER OF ARROWS IS NUMBER OF PHASE WIRES - NUMBER OF WIRES AS INDICATED ABOVE
- CONTINUATION OF CIRCUIT
- DIRECTIVE ARROW
- PANELBOARD - SEE PANELBOARD SCHEDULE(S)
- FACP FIRE ALARM SYSTEM CONTROL PANEL
- FIRE ALARM SYSTEM DUCT MOUNTED SMOKE DETECTOR

NEW PANEL		PGH-A								
VOLTAGE: 120/208V		PHASES: 3		WIRE: 4		TYPE:			LOCATION:	
100A MLO		FED FROM:							MOUNTING: FLUSH	
SERVICE	KW	BRKR	NOTE	NO	PHASE	NO	NOTE	BRKR	KW	SERVICE
BOILER B-1	1.2	1P20		1	A	2		1P20	1.2	BOILER B-2
BOILER B-3	1.2	1P20		3	B	4		1P20	1.2	BOILER B-4
SPARE		1P20		5	C	6		1P20		SPARE
SPARE		1P20		7	A	8		1P20		SPARE
SPARE		1P20		9	B	10		1P20		SPARE
SPACE		--		11	C	12		--		SPACE
SPACE		--		13	A	14		--		SPACE
SPACE		--		15	B	16		--		SPACE
SPACE		--		17	C	18		--		SPACE

GENERAL NOTES:

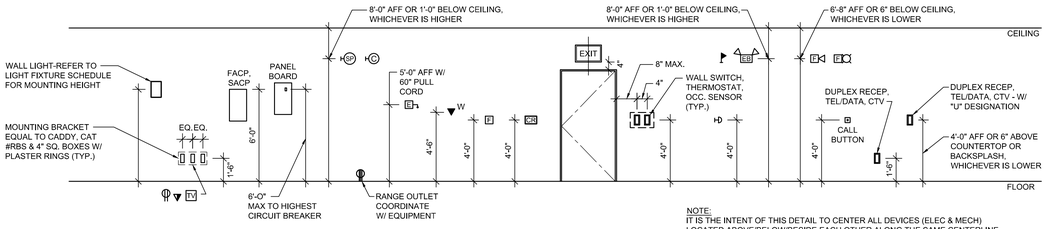
1. ELECTRICAL CONTRACTOR SHALL REVIEW ALL TRADE'S DRAWINGS. ALL EXISTING EQUIPMENT SHALL REMAIN ON EXISTING SURFACES UNLESS SPECIFICALLY NOTED OTHERWISE.
2. MAINTAIN, OR RESTORE IF INTERRUPTED BY REMOVALS OR IN PATH OF NEW CONSTRUCTION, ALL CONDUITS, BRANCH CIRCUITS, AND FEEDERS PASSING THROUGH AND SERVING UNDISTURBED AREAS (SHOWN OR NOT SHOWN).
3. 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.
4. IN ANY AREA REQUIRING THE PERFORMANCE OF ANY TRADES WORK, THIS 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.

SPECIFICATION FOR ELECTRICAL SYSTEMS:

1. CODES AND GENERAL REQUIREMENTS: ELECTRICAL SYSTEMS AND INSTALLATION SHALL COMPLY WITH UFC-3-52-01, UFC-3-501-01, NFPA 70 (NATIONAL ELECTRIC CODE), NFPA 101 (LIFE SAFETY CODE), AND ASHRAE 90.1. COORDINATE WITH MECHANICAL TRADE FOR ALL REQUIREMENTS.
2. CONDUCTORS: FEEDERS AND BRANCH CIRCUITS SHALL BE COPPER, WITH TYPE THHN-2/THWN-2 INSULATION INSTALLED WITHIN CONDUITS. RUN SEPARATE NEUTRAL WIRE FOR EACH DEDICATED BRANCH CIRCUIT SHOWN ON THE PLANS.
3. RACEWAYS & BOXES: CONDUIT FOR INTERIOR SPACES SHALL BE EMT IN DRY LOCATIONS, GRC IN WET OR WASHDOWN LOCATIONS. MINIMUM RACEWAY SIZE SHALL BE 3/4-INCH TRADE SIZE. USE MANUFACTURER'S ELBOWS FOR RIGHT ANGLES. CONDUITS SHALL BE CONCEALED ABOVE ACCESSIBLE CEILINGS. ALL PENETRATIONS OF RATED CEILINGS, WALLS AND PARTITIONS SHALL BE SEALED WITH A UL LISTED AND APPROVED FIRE SEALANT MATERIAL TO MAINTAIN THE RATING OF SEPARATION. ALL OUTLET AND DEVICE BOXES SHALL BE SHEET METAL. DEVICES SHALL NOT BE INSTALLED BACK-TO-BACK IN ADJACENT ROOMS. ADJUST LOCATIONS AS NECESSARY TO AVOID THIS CONDITION.
4. IDENTIFICATION: PROVIDE SELF-ADHESIVE VINYL LABELS ON INDOOR ELECTRICAL EQUIPMENT DEVICES SUCH AS JUNCTION BOXES INDICATING UNIQUE DESIGNATION THAT IS CONSISTENT WITH WIRING DIAGRAMS, SCHEDULE AND OPERATIONS AND MAINTENANCE MANUAL.
5. FUSED DISCONNECT SWITCHES: ALL EQUIPMENT CONNECTIONS SHALL BE COORDINATED TO PROVIDE METHOD OF POWER DISCONNECT AS REQUIRED BY CODE AND PER MANUFACTURER'S RECOMMENDATIONS. MARKED TO SHOW WHETHER UNIT IS OFF OR ON. PROVIDE NEMA 250 TYPE 1 COVER.
6. PAINT ALL METAL CONDUIT, CONDUIT HANGERS AND SUPPORTS, PULL AND JUNCTION BOXES WHERE EXPOSED, PRIOR TO INSTALLATION, TO MATCH SURFACE ON WHICH THE ITEM WILL BE INSTALLED. AT COMPLETION OF CONSTRUCTION ACTIVITIES, TOUCH UP AND RESTORE DAMAGED COATED SURFACES INCLUDING EXISTING WALLS AND CEILINGS.

ABBREVIATIONS

A	AMPERES
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
ATS	AUTOMATIC TRANSFER SWITCH
BATT	BATTERY
BHEC	BANGOR HYDRO ELECTRIC CO.
BKR	BREAKER
BLDG	BUILDING
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
CMP	CENTRAL MAINE POWER CO.
CT	CURRENT TRANSFORMER
DN	DOWN
DWG	DRAWING
EMERG	EMERGENCY
EMT	ELECTRICAL METALLIC TUBING
EQUIP	EQUIPMENT
FA	FIRE ALARM
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FA-PE	FIRE ALARM SYSTEM POWER EXTENDER
FIN	FINISH, FINISHED
FLR	FLOOR
GND	GROUND
HP	HORSEPOWER, HEAT PUMP
JB	JUNCTION BOX
KVA	KILO VOLT AMPS
KW	KILOWATT(S)
LTG	LIGHTING
MAX	MAXIMUM
MIN	MINIMUM
N	NEW
OC	ON CENTER
OS/OI	OWNER SUPPLIED, OWNER INSTALLED ITEM
PAR	PARTIAL CIRCUIT
PVC	POLYVINYL CHLORIDE
RECEP	RECEPTACLE
TEL	TELEPHONE
TYP	TYPICAL
UG	UNDERGROUND
V	VOLTS
W	WATTS
WG	WIRE GUARD
WM	WIREMOLD
WP	WEATHERPROOF



NOTE:
IT IS THE INTENT OF THIS DETAIL TO CENTER ALL DEVICES (ELEC & MECH) LOCATED ABOVE/BELOW/BESIDE EACH OTHER ALONG THE SAME CENTERLINE. PROVIDE MTG. BLOCKING/SUPPORTS AS REQ'D.

MOUNTING HEIGHT DETAIL
NOT TO SCALE

REVISIONS

REV.	DATE	DESCRIPTION	INIT
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
--

USING AGENCY PM
--

REAL PROPERTY ADMIN.
--

MAINTENANCE
--

BASE COMMANDER

BASE CIVIL ENGINEER
--

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
--

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	DVS
designed	checked
KN	SJL

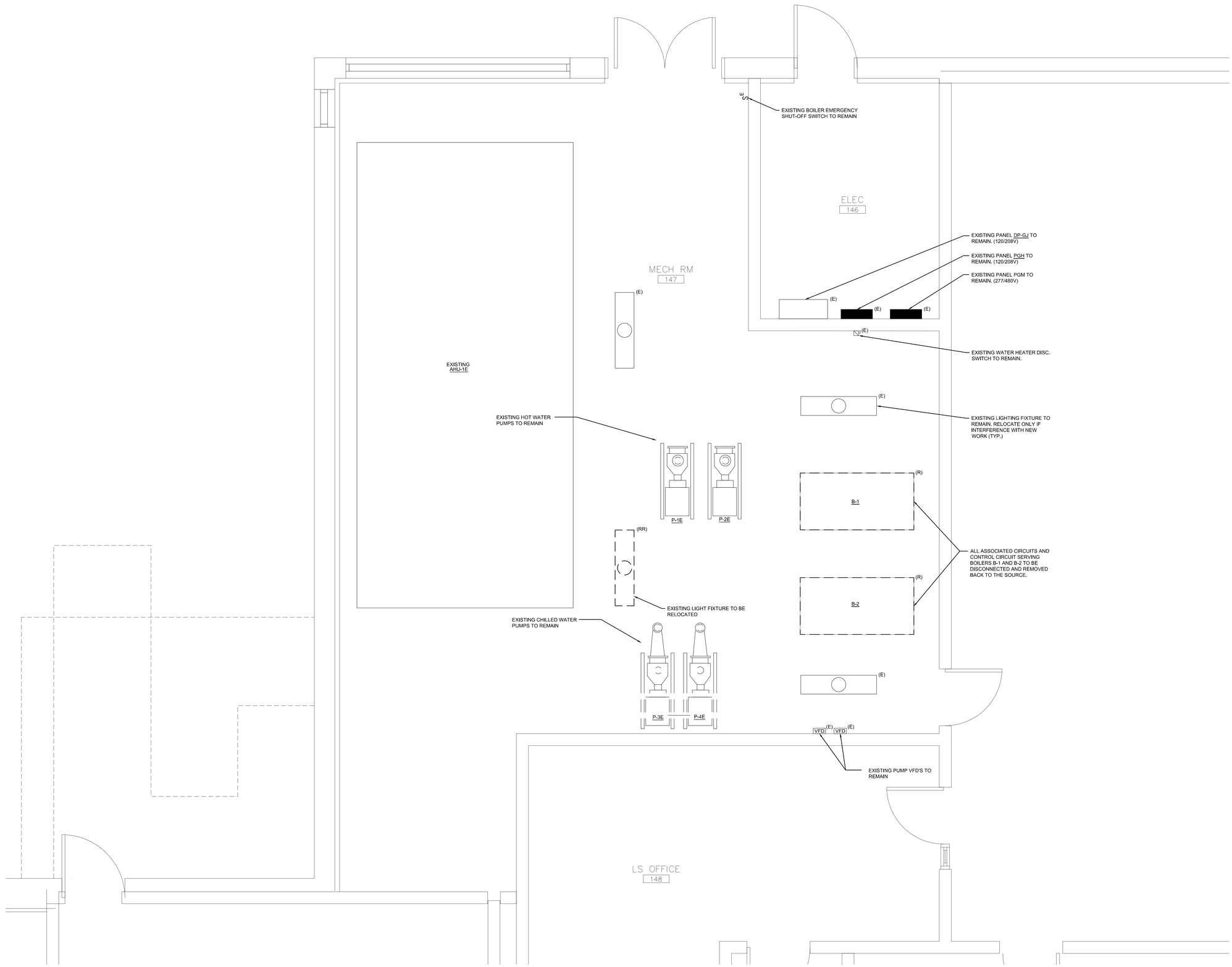
WBRC ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

ELECTRICAL LEGEND & PANELBOARD SCHEDULES

project	contract
4309.01	
drawing	rev.
E-001	-
sheet 7 of 9 sheets	
file	

STATE OF MAINE
STEPHANIE
LAPLANT
No.10272
LICENSED PROFESSIONAL ENGINEER
09.01.20



REVISIONS			
REV.	DATE	DESCRIPTION	INIT.
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
–

USING AGENCY PM
–

REAL PROPERTY ADMIN.
–

MAINTENANCE
–

BASE COMMANDER

BASE CIVIL ENGINEER
–

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
–

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	DVS
designed	checked
KN	SJL

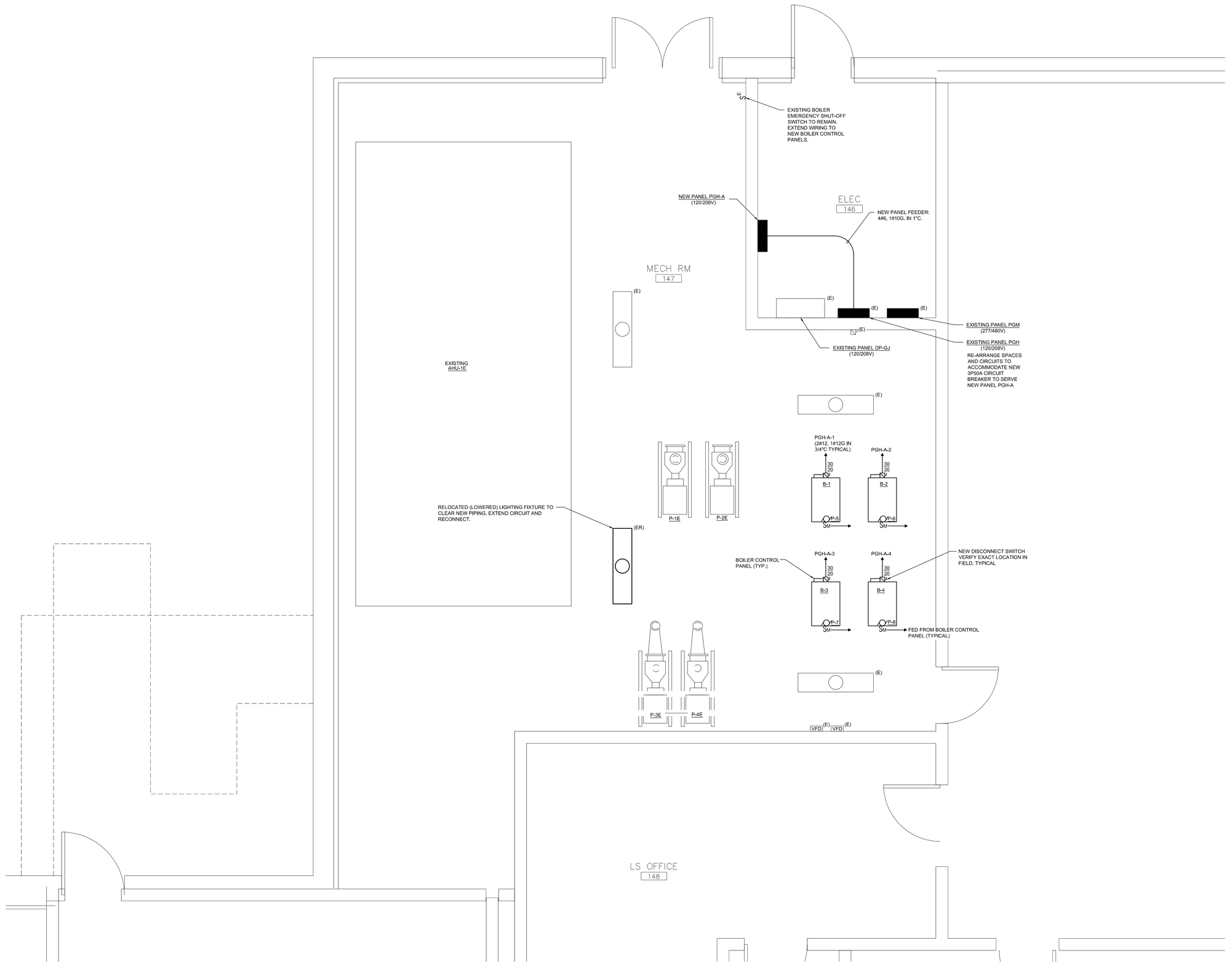
WBRC ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

ELECTRICAL REMOVALS PLAN

project	contract
4309.01	
drawing	rev.
ED101	–
sheet 8 of 9 sheets	
file	

STATE OF MAINE
STEPHANIE M. LAPLANT
No. 10272
LICENSED PROFESSIONAL ENGINEER
09.01.20



REVISIONS

REV.	DATE	DESCRIPTION	INIT.
0	09.01.20	ISSUED FOR BID	

COORDINATION

CONTRACTING OFFICER
–

USING AGENCY PM
–

REAL PROPERTY ADMIN.
–

MAINTENANCE
–

BASE COMMANDER

BASE CIVIL ENGINEER
–

CHIEF ENGINEER

ENVIRONMENTAL MANAGER
–

MAINE AIR NATIONAL GUARD
BANGOR INTERNATIONAL AIRPORT
BANGOR, MAINE
Project No. - FKNN202194

date	detailed
1 SEPT 2020	DVS
designed	checked
KN	SJL

WBRC ARCHITECTS• ENGINEERS
WWW.WBRCAE.COM
BANGOR, MAINE 207-947-4511
PORTLAND, MAINE 207-828-4511
SARASOTA, FLORIDA 941-556-0757

MEANG BUILDING 518 BOILER RENOVATIONS

ELECTRICAL PLAN

project	contract
4309.01	

drawing E-101 rev. –

sheet 9 of 9 sheets

file

STATE OF MAINE STEPHANIE LAPLANT No.10272 LICENSED PROFESSIONAL ENGINEER
09.01.20