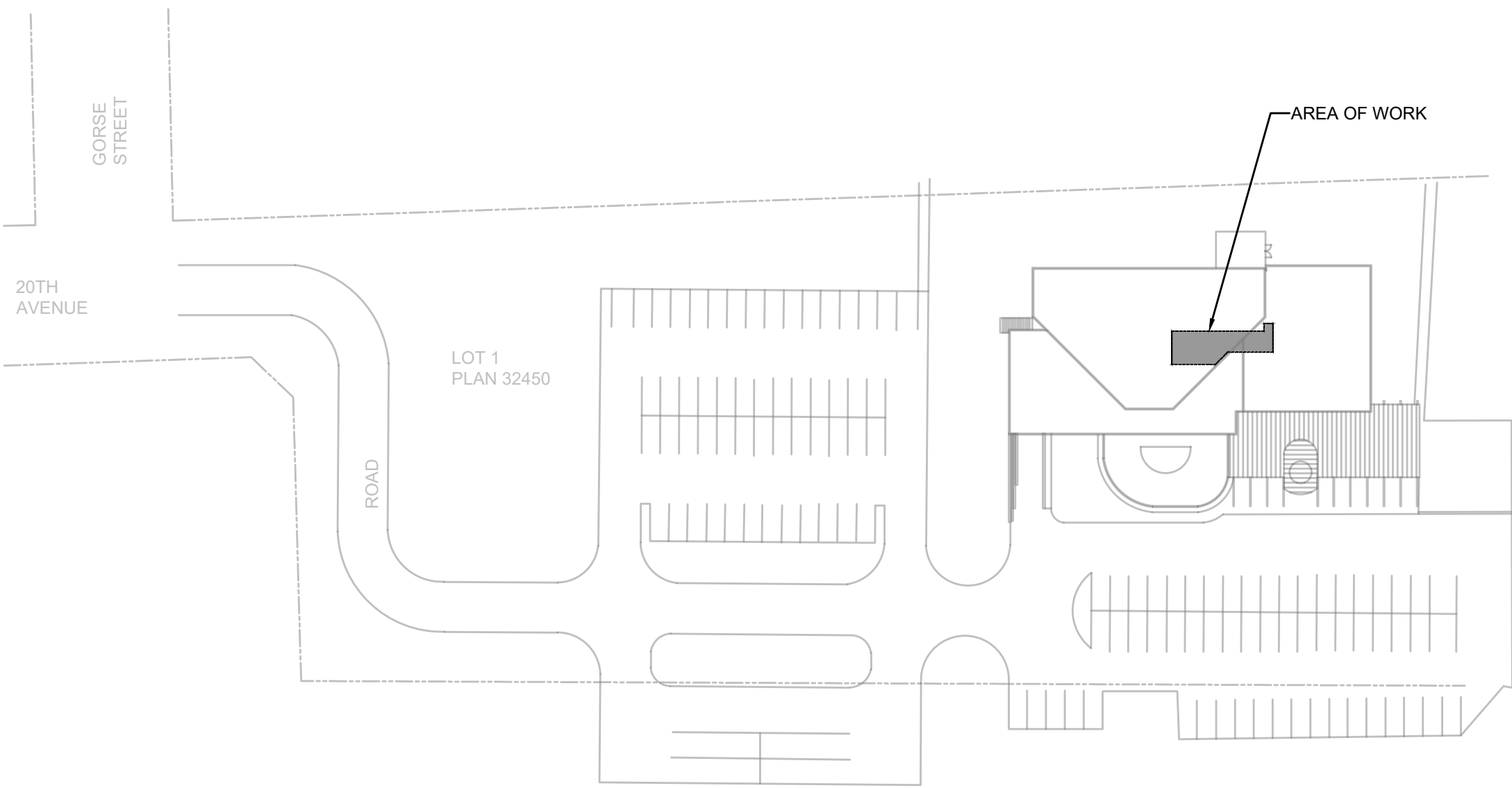
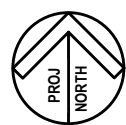


EXPLORATION PLACE MUSEUM GAHP INSTALLATION

333 BECOTT PL, PRINCE GEORGE, BC V2L 4V7

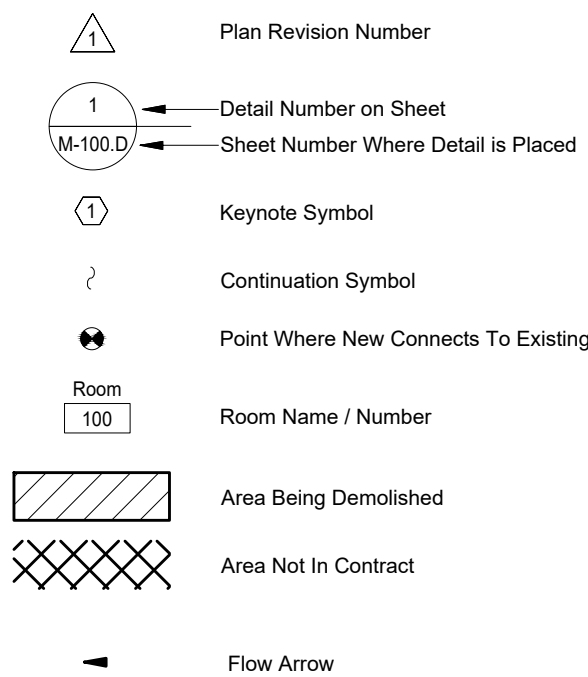
GENERAL NOTES

- THE MECHANICAL SYSTEM SHALL CONSIST OF ALL THE WORK SHOWN ON DRAWINGS, SCHEMATICS, AND AS DESCRIBED IN SPECIFICATIONS.
- INSTALL ALL MECHANICAL WORK AS HIGH AS POSSIBLE, TIGHT TO STRUCTURE ABOVE, EXCEPT WHERE CONFLICT OCCURS WITH REQUIREMENTS LISTED UNDER SPECIFICATION (VIBRATION ISOLATION).
- THE MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE AND DO NOT ATTEMPT TO SHOW ALL REQUIRED OFFSETS. REFER TO ARCHITECTURAL AND STRUCTURAL DRAWINGS FOR CONSTRUCTION DETAILS.
- ITEMS NOTED "TYPICAL" OR "TYP" ON ANY SHEET APPLY TO THAT PARTICULAR SHEET.
- COORDINATE WITH SPECIFICATION. IN CASE OF CONFLICT BETWEEN SPECIFICATIONS AND DRAWINGS THE MORE STRINGENT SHALL APPLY.
- PROVIDE ELECTRICAL CODE MINIMUM HORIZONTAL AND VERTICAL WORKING CLEARANCE FOR ALL ELECTRICAL PANELS AND EQUIPMENT. OFFSET MECHANICAL AS REQUIRED.
- COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE OF THEIR WORK WITH THE WORK OF THIS CONTRACTOR. PROVIDE COORDINATED SHOP DRAWINGS PRIOR TO FABRICATION AND INSTALLATION.
- MECHANICAL EQUIPMENT SHALL NOT BE USED FOR TEMPORARY HEAT DURING CONSTRUCTION.
- ALL DUCTWORK SIZES SHOWN ARE INSIDE CLEAR DIMENSIONS. ADD APPROPRIATE DIMENSION FOR INSULATION OR DUCT LINER TO OBTAIN "TOTAL" DUCT SIZE.
- INSTALL DYNAMIC FIRE DAMPERS AT ALL LOCATIONS WHERE DUCTS PENETRATE FIRE RATED WALLS OR OCCUPANCY SEPARATION WALLS. DAMPER FIRE RATING SHALL BE 1-1/2 HOUR UNLESS NOTED OTHERWISE. COORDINATE DAMPER ACCESS WITH ARCHITECT.
- CONTRACTOR TO PROVIDE A SIMILAR TYPE DUCT CONSTRUCTION FOR ALL EXPOSED APPLICATIONS (I.E. NO LONGITUDINAL SEAM AND SPIRAL SEAM IN EXPOSED APPLICATIONS). FLANGE TYPE DUCT CONNECTIONS FOR EXPOSED AREAS IS PROHIBITED UNLESS OTHERWISE NOTED. CONTRACTOR TO REFER TO SPECIFICATIONS FOR TYPE OF DUCT CONSTRUCTION ALLOWED.
- PROVIDE TRANSITIONS AND FLEXIBLE CONNECTORS AS REQUIRED TO CONNECT DUCTWORK TO FANS AND OTHER MECHANICAL EQUIPMENT.
- CONTRACTOR TO PROVIDE MEP DRAWINGS AS SHOP DRAWINGS FOR THE LAYOUT OF ALL MECHANICAL ROOM AREAS FOR REVIEW AND APPROVAL.
- INSULATE DUCT PLENUMS FOR OUTSIDE AIR, RETURN AIR AND EXHAUST AIR. FOR ALL OTHER DUCTWORK INSULATION REFER TO SPECIFICATIONS.
- REFER TO MECHANICAL DETAILS FOR ADDITIONAL ACOUSTICAL AND THERMAL INSULATION REQUIREMENTS FOR DUCT AND EQUIPMENT.
- SEISMIC RESTRAINTS FOR ALL EQUIPMENT AND PIPING SHALL BE COVERED BY MECHANICAL CONTRACTOR.
- SEISMIC ENGINEER SHALL BE RETAINED UNDER THE MECHANICAL CONTRACTOR'S SCOPE OF WORK TO ENSURE SEISMIC INSTALLATIONS ARE INSTALLED IN ACCORDANCE WITH CODE. SEISMIC INSTALLATION SHALL BE APPROVED BY A CERTIFIED SEISMIC ENGINEER AND PROVIDE SIGNED SEALED SHOP DRAWINGS TO THAT EFFECT.
- WHEREVER POSSIBLE, ALL PIPING TO BE RUN AS HIGH AS POSSIBLE TO PROVIDE SUFFICIENT CLEARANCE FOR DUCTWORK.
- PROVIDE CONDENSATE DRAIN LINE FOR ALL COOLING EQUIPMENT TO NEAREST DRAIN.



1 SITE PLAN
SCALE: 1/8" = 1' - 0"

General Plan Symbols



Abbreviations

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	M/JA	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
		PSI	POUNDS PER SQUARE INCH
		PSIG	POUNDS PER SQUARE INCH GAUGE

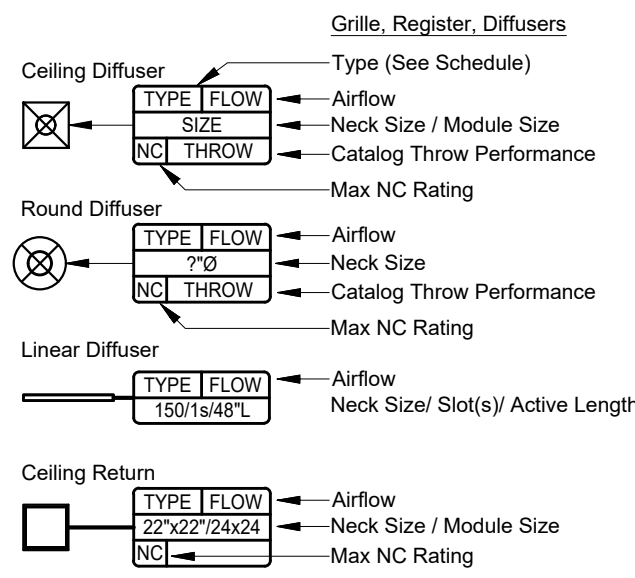
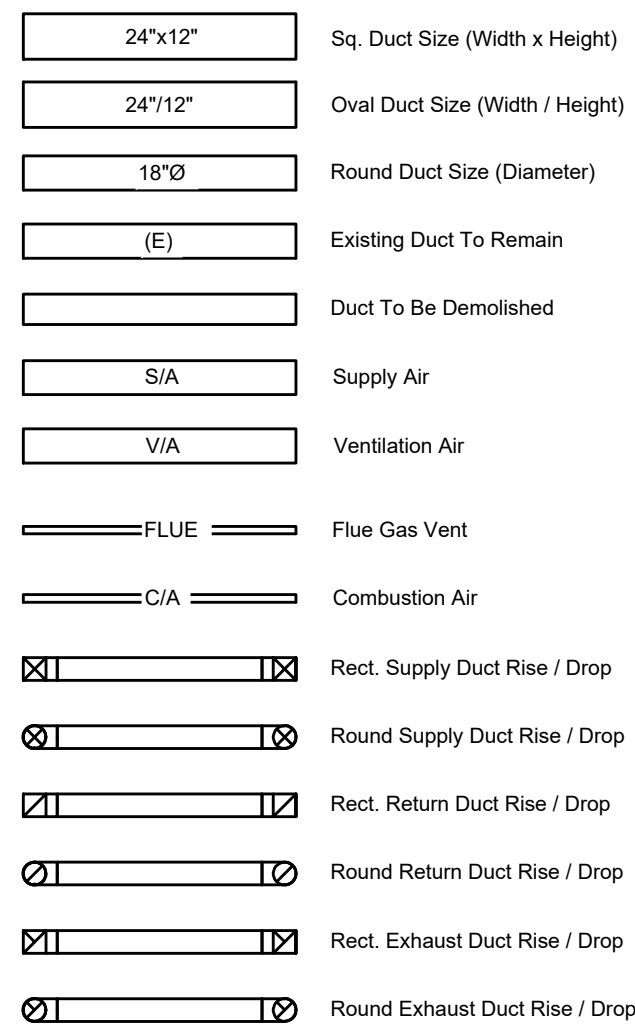
Equipment Abbreviations

AC	AIR CONDITIONING UNIT	ET	EXPANSION TANK
ACCU	AIR COOLING CONDENSING UNIT	EWV	ELECTRIC WATER HEATER
AHU	AIR HANDLING UNIT	FCU	FAN COIL UNIT
AS	AIR SEPARATOR	FP	FIRE PUMP
B	BOILER	GI	GREASE INTERCEPTOR
CH	CHILLER	GRV	GRAVITY ROOF VENTILATOR
CT	COOLING TOWER	HWP	HEATING WATER PUMP
CUH	CABINET UNIT HEATER	HRU	HEAT RECOVERY UNIT
CHWP	CHILLED WATER PUMP	PRV	POWER ROOF VENTILATOR
DBP	DOMESTIC WATER BOOSTER PUMP	RE	RETURN/EXHAUST FAN
DC	DUCT MOUNTED COIL	RTU	ROOFTOP UNIT
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER

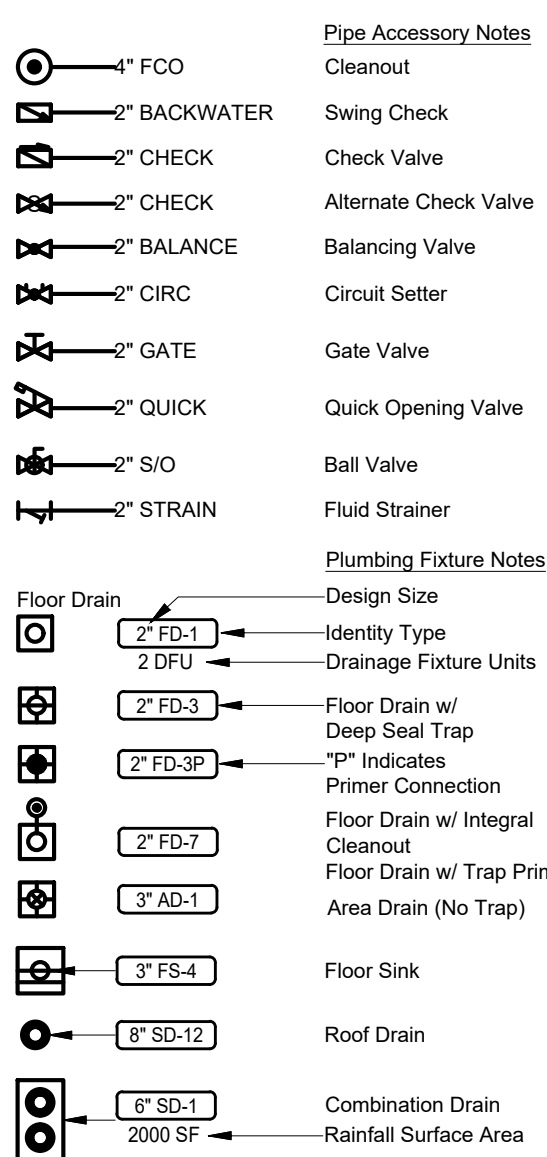
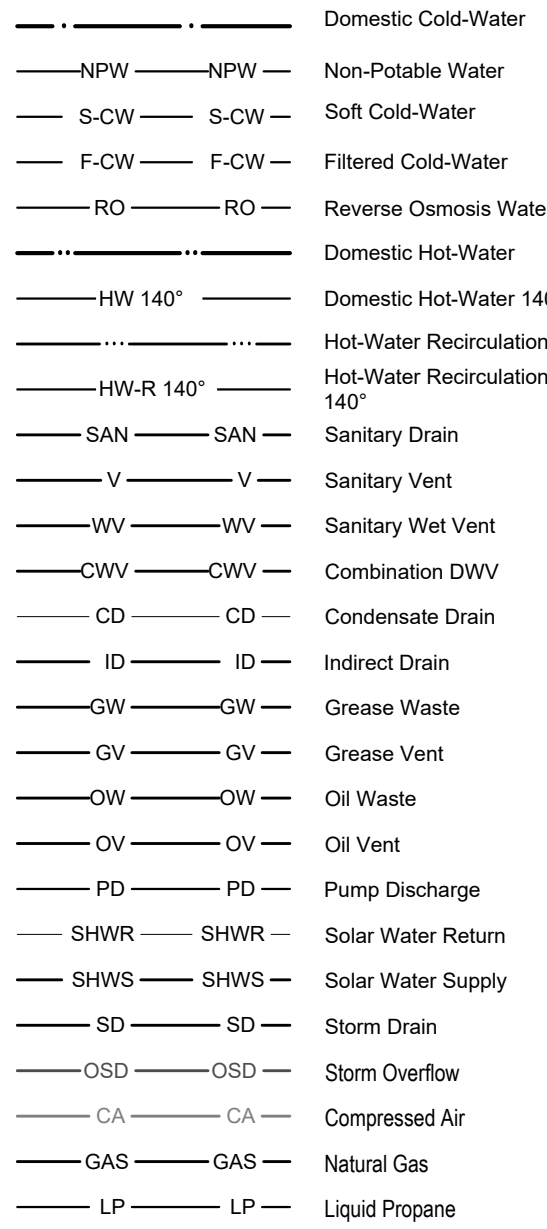
* NOTE *

ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.

HVAC Symbols



Plumbing Symbols



MECHANICAL HVAC DESIGN (ENERGY)

BC BUILDING CODE 2024: BCBC 2024

HVAC DESIGN:

ENERGY STANDARD CODE: ASHRAE 90.1 2010

COMPLIANCE PATH: PRESCRIPTIVE (REGULAR)
DESIGN METHOD: MANDATORY PROV AND PRESCRIPTIVE REQTS
IN ACCORDANCE WITH: SECTION 6 (N.C. OR FIRST TI)

CLIMATE ZONE: 7 PER 90.1-2010

VENTILATION: NON-RES: 62-2001 (EXCEPT ADD'M N)

IF MIXED USE: NON-RES: 62-2001 (EXCEPT ADD'M N)

BUILDING CODE

BC BUILDING CODE 2024

MECHANICAL SERVICE WATER HEATING DESIGN (ENERGY)

BC BUILDING CODE 2024

HVAC DESIGN:

ENERGY STANDARD CODE: ASHRAE 90.1 2016

COMPLIANCE PATH: PRESCRIPTIVE (REGULAR)

IN ACCORDANCE WITH: SECTION 7 (N.C. OR FIRST TI)

DRAWING LIST

DWG NO.	DRAWING NAME	SCALE
M-000	COVER PAGE	AS SHOWN
M-100.D	MAIN FLOOR MECHANICAL DEMOLITION PLAN	1/8" = 1' - 0"
M-100	MAIN FLOOR MECHANICAL RENOVATION PLAN	1/8" = 1' - 0"
M-101.D	SECOND FLOOR MECHANICAL DEMOLITION PLAN	1/8" = 1' - 0"
M-101	SECOND FLOOR MECHANICAL RENOVATION PLAN	1/8" = 1' - 0"
M-102.D	ROOF MECHANICAL DEMOLITION PLAN	1/8" = 1' - 0"
M-102	ROOF MECHANICAL RENOVATION PLAN	1/8" = 1' - 0"
M-103.D	MECHANICAL ROOM DEMOLITION PLAN	1/4" = 1' - 0"
M-103	MECHANICAL ROOM RENOVATION PLAN	1/4" = 1' - 0"
M-500	DETAILS	N.T.S.
M-600	SCHEDULES	N.T.S.
M-700	MECHANICAL ROOM PIPING SCHEMATIC	N.T.S.
M-800	SPECIFICATIONS	N.T.S.

Impact
ENGINEERING

167 WATER STREET
VANCOUVER, BC V6B 1A7
WWW.IMPACTENG.CA

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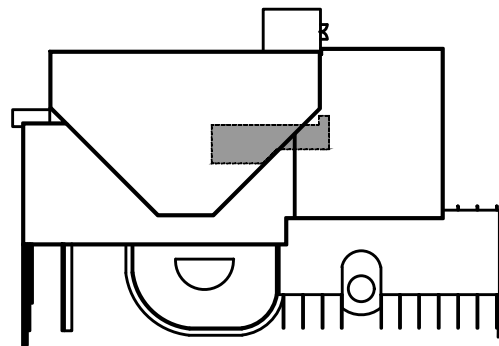
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1	2026-08-07	ISSUED FOR TENDER REVIEW
	YYYY-MM-DD	SUBMISSION INFORMATION

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PROFESSIONAL SEALS



KEYPLAN



CLIENT

REGIONAL DISTRICT OF FRASER -
FORT GEORGE

PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

COVER PAGE

DESIGN BM	DATE 2026-08-11	SCALE AS SHOWN
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-000	VERSION 2
APPROVED BM		



① REMOVE EXISTING 20"Ø FLUE VENT UP TO ROOF DURING PHASE 2. REFER TO DRAWING M-103.D FOR MECHANICAL ROOM DEMOLITION DETAILS.

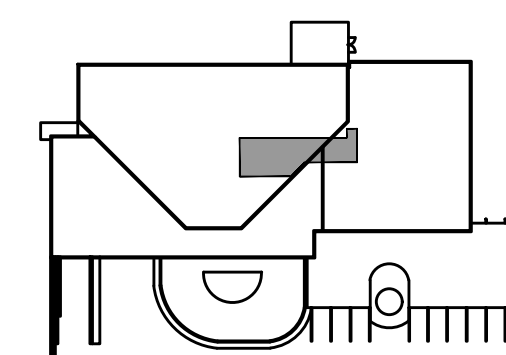
A	PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
B	PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
C	PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
D	PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
E	PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

PROFESSIONAL SEALS

PN#1002601



KEYPLAN



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REGIONAL DISTRICT OF FRASER -
FORT GEORGE

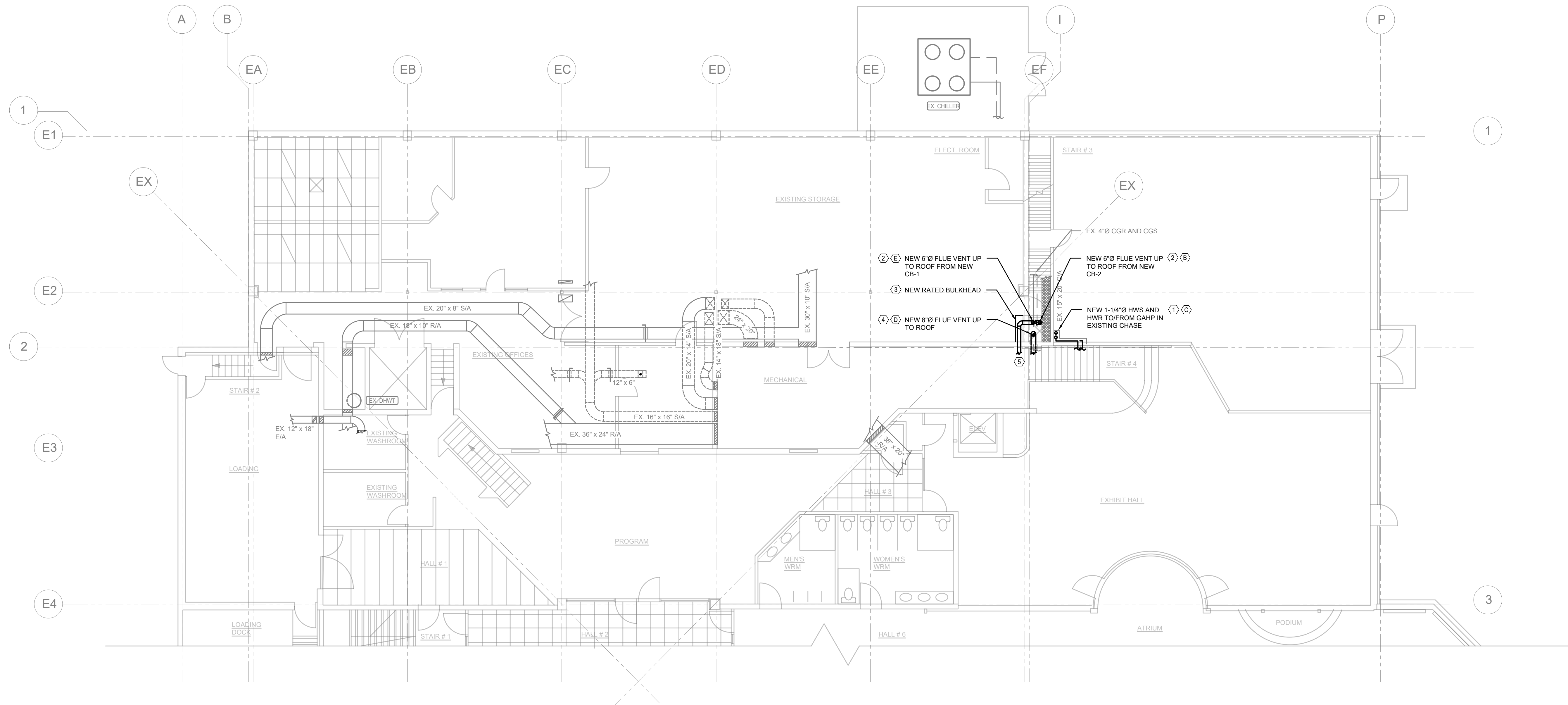
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

MAIN FLOOR MECHANICAL DEMOLITION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO M-100.D	VERSION 2
APPROVED BM		



1 MAIN FLOOR MECHANICAL RENOVATION PLAN
M-100 SCALE: 1/8" = 1' - 0"

DRAWING NOTES

- ① PROVIDE NEW 1-1/4"Ø HWS AND HWR PIPING TO/FROM GAHP. NEW PIPING TO BE ENCLOSED IN EXISTING CHASE.
- ② PROVIDE NEW 6"Ø FLUE VENT FROM CONDENSING BOILERS UP TO ROOF.
- ③ PROVIDE NEW RATED BULKHEAD TO ENCLOSE NEW CONDENSING BOILER FLUE VENTS.
- ④ PROVIDE NEW 8"Ø FLUE VENT FROM EXISTING BOILER B-3 UP TO ROOF.
- ⑤ REFER TO DRAWING M-103 FOR MORE MECHANICAL ROOM RENOVATION DETAILS.

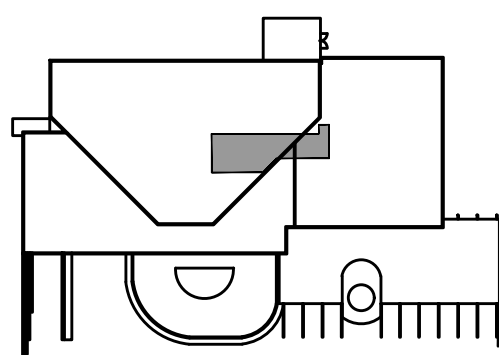
PHASING PLAN

- (A) PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
- (B) PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- (C) PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- (D) PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- (E) PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

PROFESSIONAL SEALS



KEYPLAN



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REGIONAL DISTRICT OF FRASER - FORT GEORGE

PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

MAIN FLOOR MECHANICAL
RENOVATION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO.	VERSION
APPROVED BM	M-100	2

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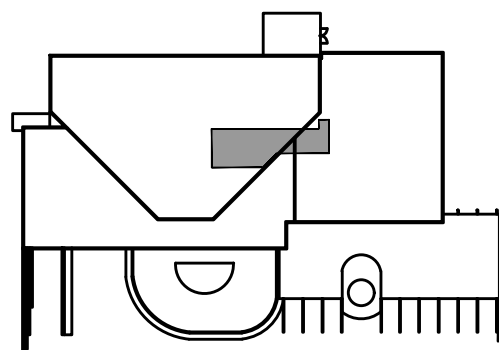
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	YYYY-MM-DD	SUBMISSION INFORMATION

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FORT GEORGE

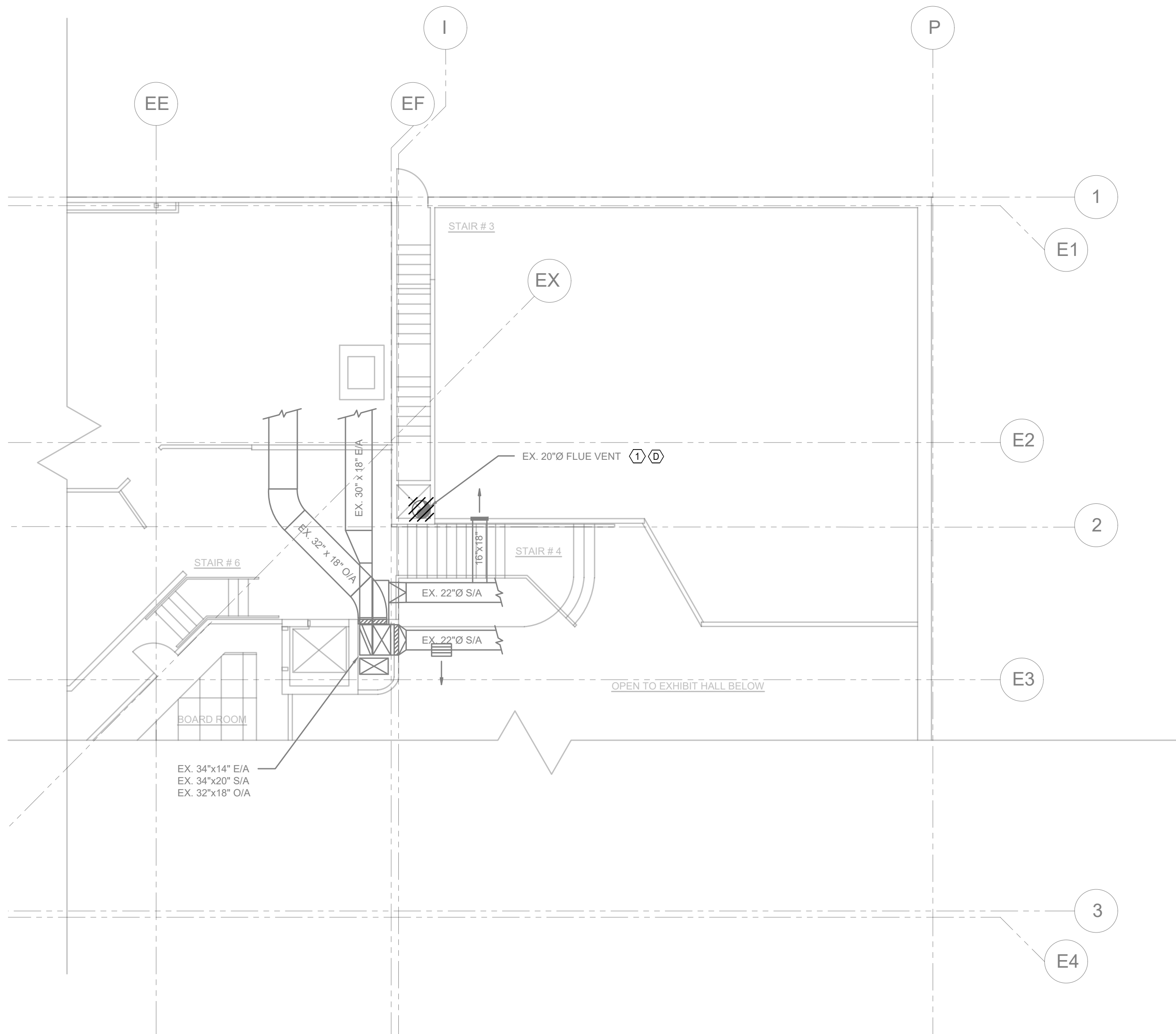
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

SECOND FLOOR MECHANICAL
DEMOLITION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-101.D	VERSION 2
APPROVED BM		



1 SECOND FLOOR MECHANICAL DEMOLITION PLAN
M-101.D SCALE: 1/8" = 1' - 0"

DRAWING NOTES

- (1) REMOVE EXISTING 20'0" FLUE VENT UP TO ROOF DURING PHASE 2.

PHASING PLAN

- (A) PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
- (B) PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- (C) PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- (D) PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- (E) PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

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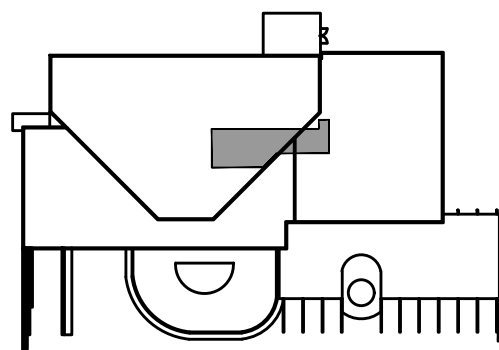
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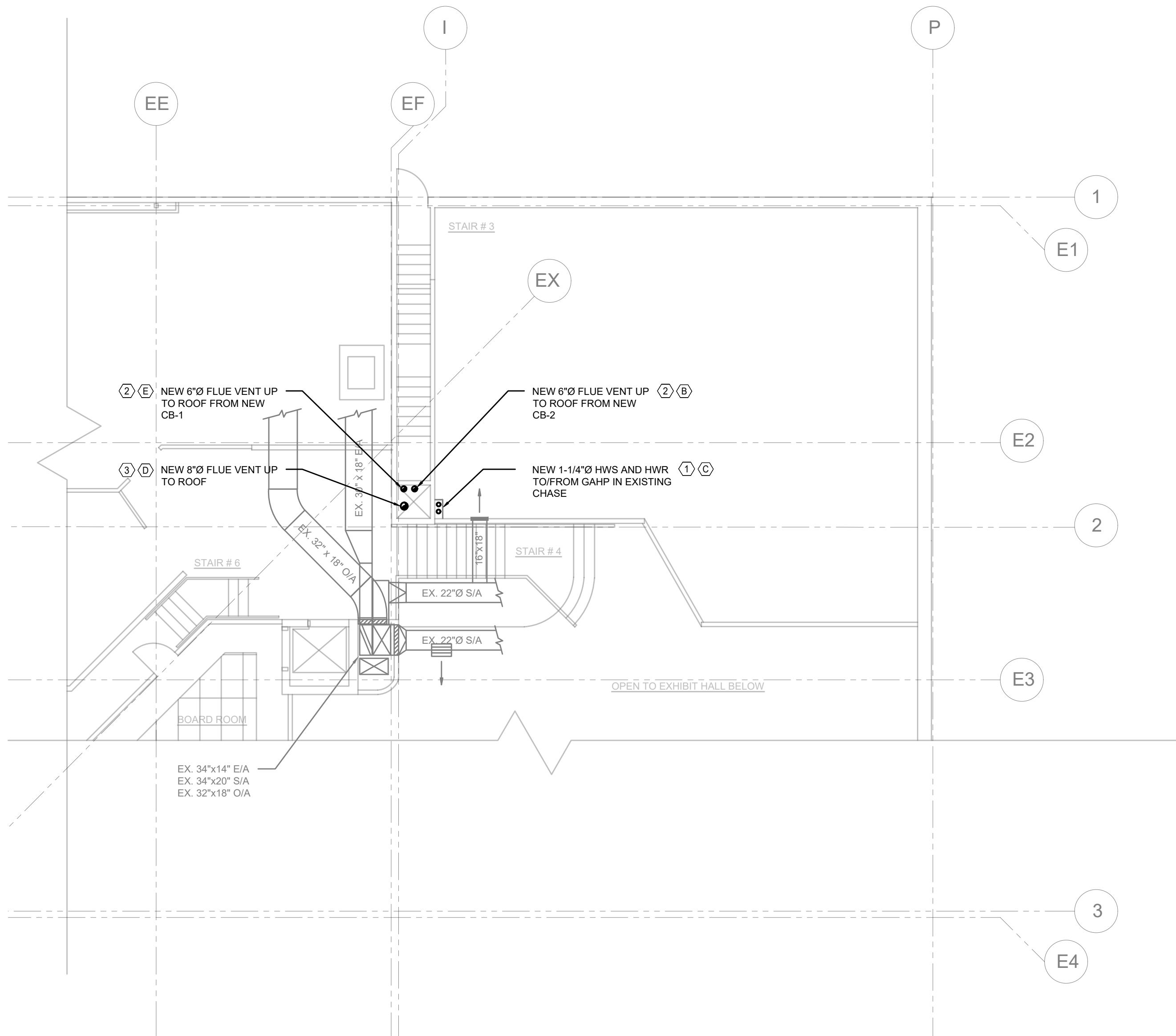
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

SECOND FLOOR MECHANICAL
RENOVATION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-101	VERSION 2
APPROVED BM		



1 SECOND FLOOR MECHANICAL RENOVATION PLAN
M-101 SCALE: 1/8" = 1' - 0"

DRAWING NOTES

- 1 PROVIDE NEW 1-1/4" HWS AND HWR PIPING TO/FROM GAHP. NEW PIPING TO BE ENCLOSED IN EXISTING CHASE.
- 2 PROVIDE NEW 6" FLUE VENT FROM CONDENSING BOILERS UP TO ROOF.
- 3 PROVIDE NEW 8" FLUE VENT FROM EXISTING BOILER B-3 UP TO ROOF.

PHASING PLAN

- A PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
- B PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- C PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- D PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- E PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

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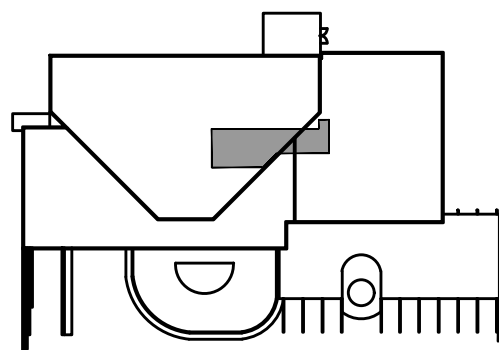
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PROFESSIONAL SEALS



KEYPLAN



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REGIONAL DISTRICT OF FRASER -
FORT GEORGE

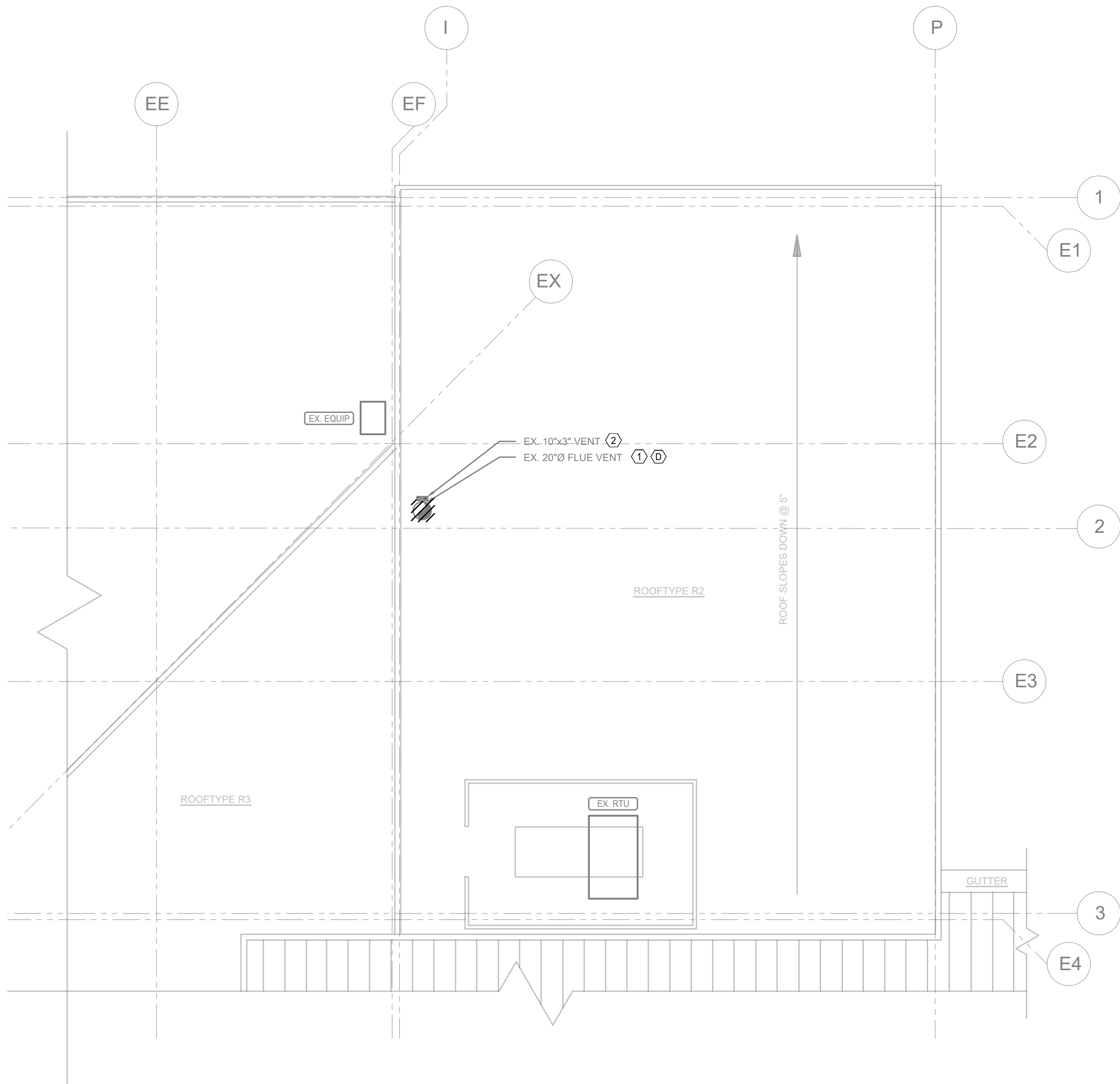
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

ROOF MECHANICAL
DEMOLITION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-102.D	VERSION 2
APPROVED BM		



1 ROOF MECHANICAL DEMOLITION PLAN
M-102.D SCALE: 1/8" = 1' - 0"

DRAWING NOTES

- 1 REMOVE EXISTING 20"Ø BOILER FLUE VENT DURING PHASE 2.
- 2 EXISTING 10"x3" VENT TO STAY.

PHASING PLAN

- PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
- PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

CONSULTANT - SUB-CONSULTANT

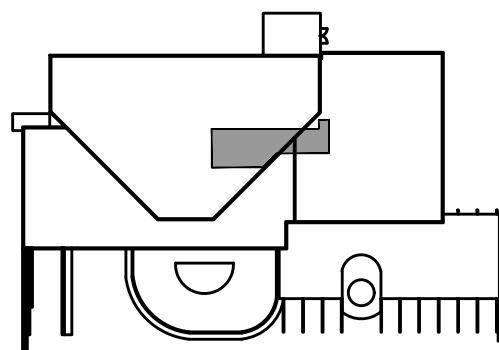
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PROFESSIONAL SEALS



KEYPLAN



CLIENT

REGIONAL DISTRICT OF FRASER -
FORT GEORGE

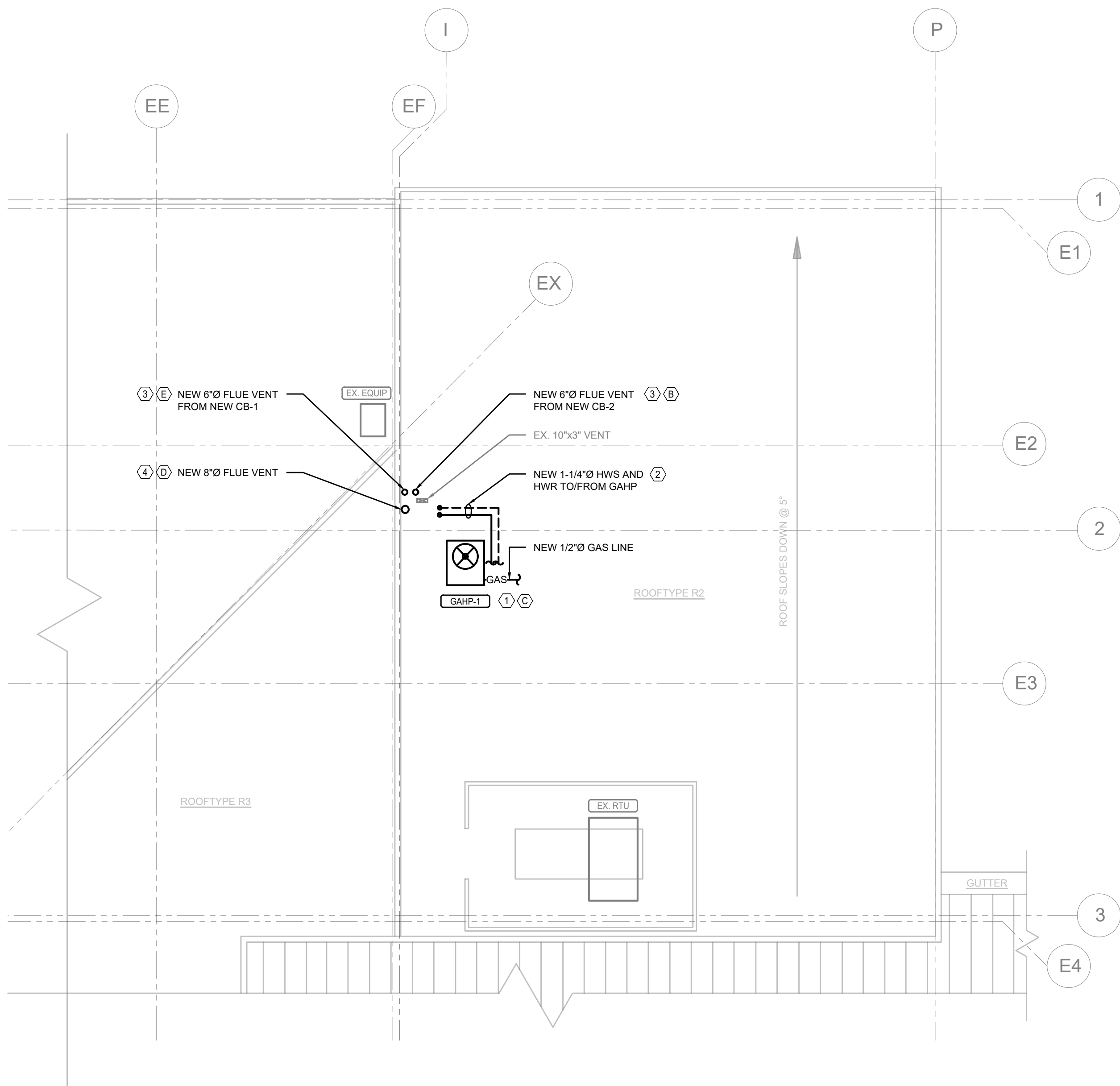
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

ROOF MECHANICAL
RENOVATION PLAN

DESIGN BM	DATE 2026-08-11	SCALE 1/8" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-102	VERSION 2
APPROVED BM		



1 ROOF MECHANICAL RENOVATION PLAN
M-102 SCALE: 1/8" = 1' - 0"

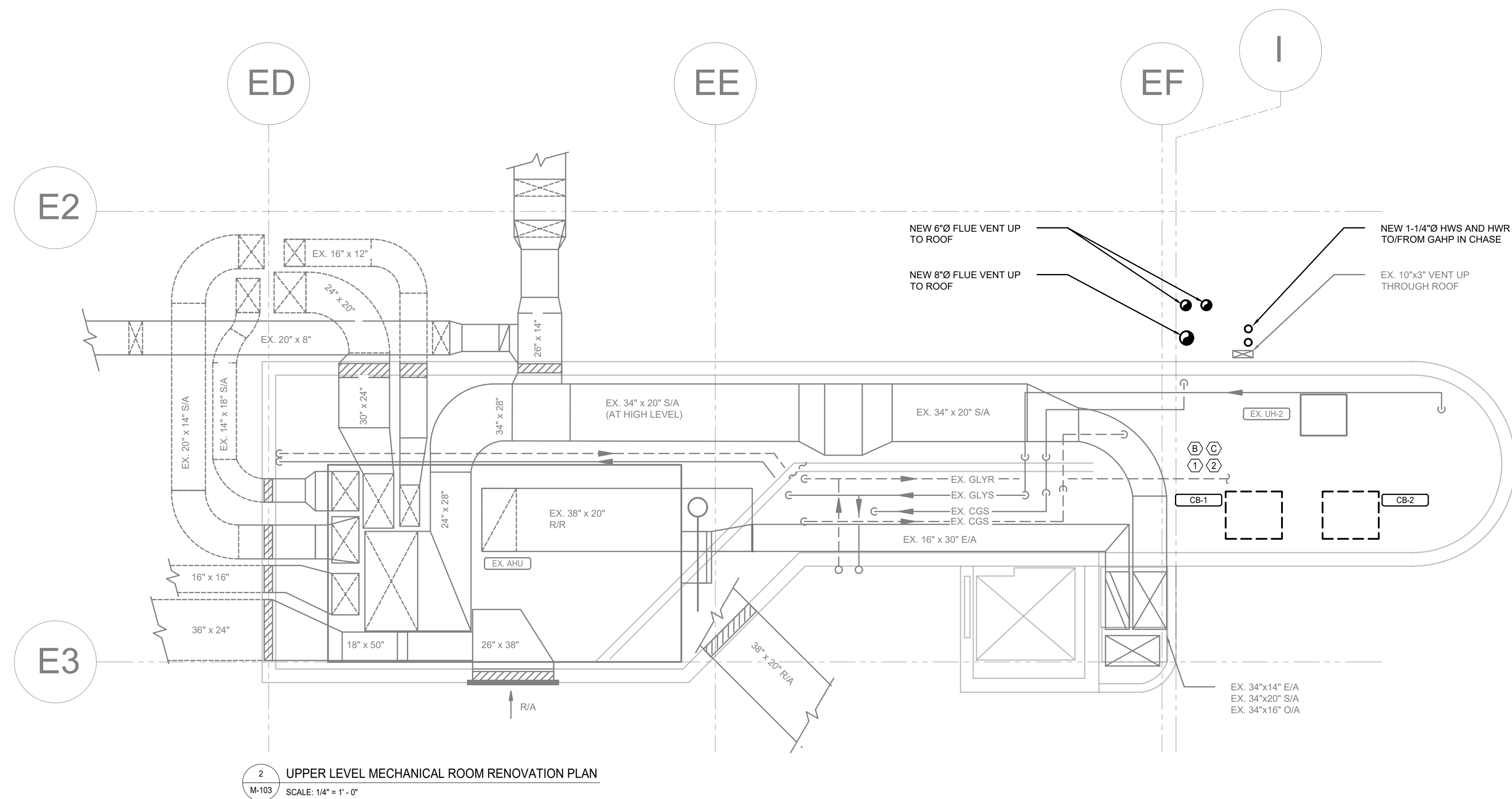
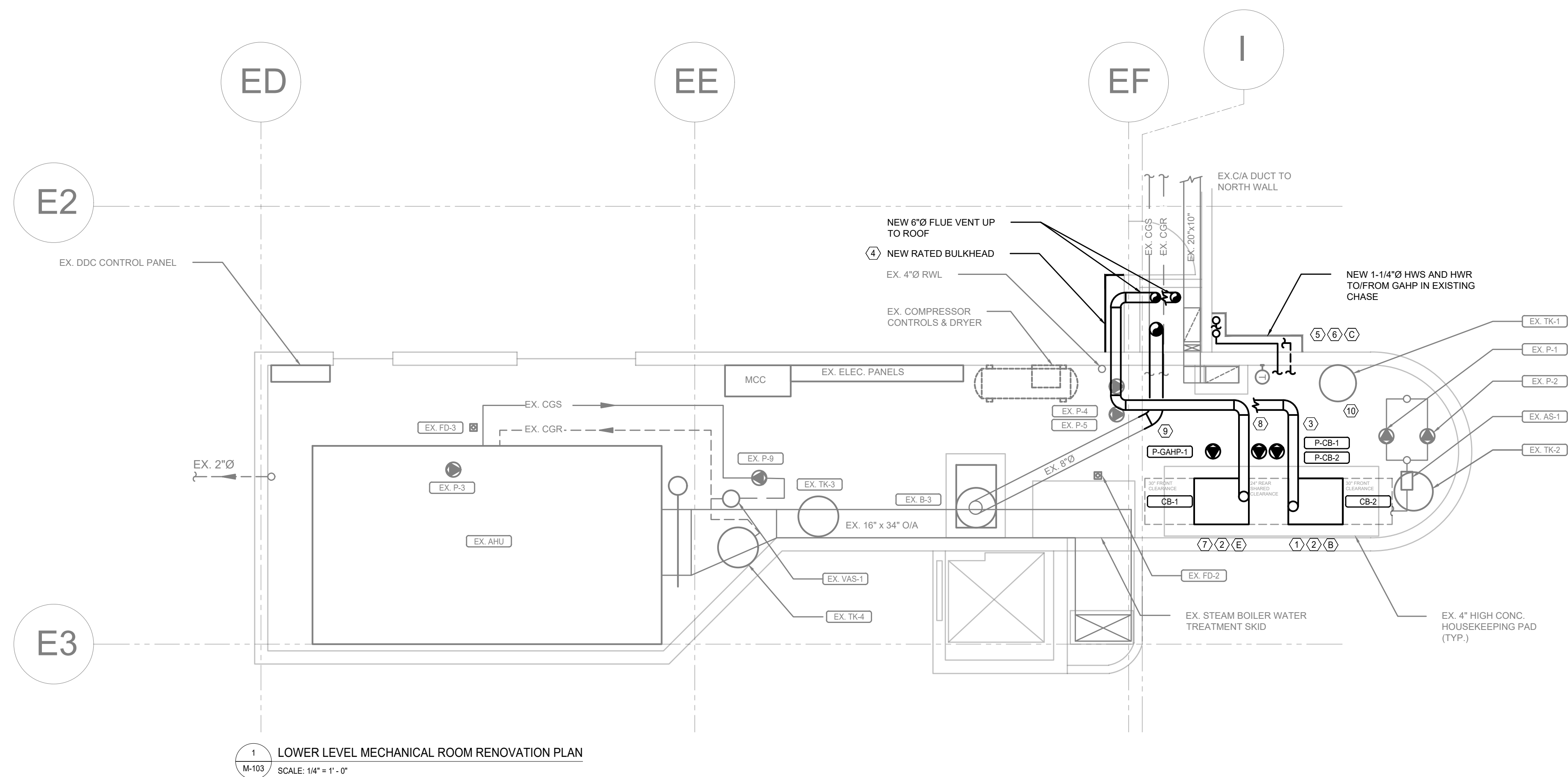
DRAWING NOTES

- PROVIDE AND INSTALL NEW GAS ABSORPTION HEAT PUMP GAHP-1 IN LOCATION SHOWN. MOUNT NEW UNIT ON SLEEPERS C/W VIBRATION ISOLATORS. TIE NEW 1/2"Ø GAS PIPING INTO EXISTING GAS LINE ON ROOF AND PROVIDE A NEW GAS PRV. LOCATE UNIT BETWEEN ADJACENT EXISTING OPEN-WEB STEEL JOISTS AND PROVIDE STEEL SUPPORT FRAMING TO DISTRIBUTE LOADS TO THE JOISTS. FRAME ALL NEW ROOF OPENINGS AND VERIFY EXISTING CONDITIONS PRIOR TO INSTALLATION.
- PROVIDE NEW 1-1/4"Ø HWS AND HWR PIPING TO MECHANICAL ROOM BELOW.
- NEW 6"Ø FLUE VENT TO TERMINATE ABOVE ROOF PER MANUFACTURER'S REQUIREMENTS. ENSURE ORIGINAL ROOF OPENING IS WEATHER PROTECTED WITH A WELL SEALED METAL CAP OR RETAIN THE CURRENT ELEVATED CAP.
- NEW 8"Ø FLUE VENT TO TERMINATE ABOVE ROOF PER MANUFACTURER'S REQUIREMENTS.

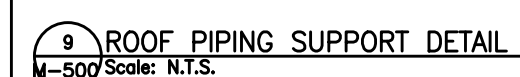
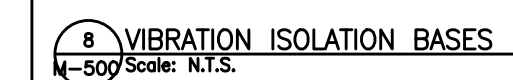
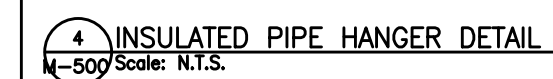
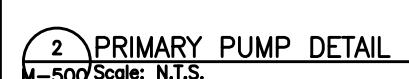
PHASING PLAN

- PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR RELOCATION OF EXISTING TANKS TK-1 AND TK-2.
- PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

1



DESIGN BM	DATE 2026-08-11	SCALE 1/4" = 1' - 0"
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO M-103	VERSION 2
APPROVED BM		



Exploration Place 333 Becott Pl, Prince George, BC V2L 4V7		MECHANICAL EQUIPMENT SCHEDULES -- BOILERS				Page 1 of 1
EQUIPMENT DATA						
UNIT NO.		CB-1		CB-2		
SERVICE		HEATING SYSTEM		HEATING SYSTEM		
LOCATION		MECH ROOM		MECH ROOM		
MANUFACTURER		IBC		IBC		
MODEL		EX 850		EX 850		
BOILER DATA						
INPUT	(kW)	240		240		
	(MBH)	850		850		
OUTPUT	(kW)	241		241		
	(MBH)	824.5		824.5		
EFFICIENCY	(%)	97		97		
MAX FLOW RATE	(L/S)	6.31		6.31		
	(GPM)	100		100		
MOTOR HP		-		-		
POWER USE @ FULL FIRE						
LESS PUMPS	W	228		228		
ELECTRICAL SERVICE		120/160		120/160		
NOTES		1, 2, 3, 4, 5, 6		1, 2, 3, 4, 5		
NOTES						
NOTE (1)	C/W CIRCULATION PUMP					
NOTE (2)	C/W LOW WATER CUTOFF SWITCH					
NOTE (3)	C/W FRESH AIR INTAKE W/ FILTER FOR BOILER ROOM AIR					
NOTE (4)	C/W PRV AT 30 PSI					
NOTE (5)	C/W BACNET COMPATIBILITY					
NOTE (6)	C/W BOILER NETWORK WIRING KIT					

Exploration Place 333 Becott Pl, Prince George, BC V2L 4V7		MECHANICAL EQUIPMENT SCHEDULES -- HEAT PUMP		Page 1 of 1
EQUIPMENT DATA				
UNIT NO.		GAHP-1		
SERVICE LOCATION		SPACE HEATING PREHEAT ROOF		
MANUFACTURER MODEL		ROBUR GAHP A PLUS		
HEATING				
TOTAL HEATING CAPACITY	(KW)	39.2		
TOTAL HEATING CAPACITY	(KBH)	133.8		
NOMINAL FLOW	USGPM	14.7		
HEAD @ NOMINAL	(FT)	11.7		
HOT WATER OUTLET TEMP	(F)	149		
	C	65		
HOT WATER INLET TEMP	(F)	86 - 131		
	C	30 - 55		
AMBIENT OPERATING TEMP	(F)	-40 - 113		
	C	-40 - 45		
ELECTRICAL				
VOLTAGE	(V/Ph/Hz)	208-230/1/60		
TOTAL ELECTRICAL OPERATING CONSUMPTION (UNIT ONLY)	(KW)	0.90		
MCA (UNIT ONLY)	(A)	8.0		
MOCP	(A)	10.9		
NOTES		1, 2, 3, 4, 5		
NOTE (1)	C/W CIRCULATION PUMP			
NOTE (2)	C/W LOW WATER CUTOFF SWITCH			
NOTE (3)	C/W PRV AT 30 PSI			
NOTE (4)	C/W BACNET CAPABILITY			
NOTE (5)	C/W MASON INDUSTRIES TYPE SSLFH SEISMIC SPRING ISOLATORS OR APPROVED EQUIVALENT WITH 1" MINIMUM STATIC DEFLECTION			

Exploration Place 333 Becott Pl, Prince George, BC V2L 4V7		MECHANICAL EQUIPMENT SCHEDULES -- PUMPS				Page 1 of 1
EQUIPMENT DATA						
UNIT NO.	P-CB-1	P-CB-2	P-GAHP-1			
SERVICE	CB-1	CB-2	GAHP-1			
	RETURN SIDE	RETURN SIDE	RETURN SIDE			
LOCATION	MECH ROOM	MECH ROOM	MECH ROOM			
MANUFACTURER	GRUNDFOS	GRUNDFOS	GRUNDFOS			
MODEL	MAGNA3 65-150 GF	MAGNA3 65-150 GF	MAGNA3 40-180 GF			
PUMP DATA - FLUID VARIES						
FLUID	50% GLYCOL	50% GLYCOL	50% GLYCOL			
FLOW RATE	(L/s)	6	6	1		
	(GPM)	100	100	15		
HEAD	(m)	7	7	11		
	(FT)	23.1	23.1	35.3		
PUMP TYPE	INLINE	INLINE	INLINE			
CONNECTION	GF65	GF65	GF19/26/40/43			
OP TEMP	(C)	110.0	110.0	110.0		
MAX	(F)	230	230	230		
MIN	(C)	-10.0	-10.0	-10.0		
	(F)	14	14	14		
MOTOR HP		1385 W	1385 W	606 W		
ELECTRICAL SERVICE		208-230/1/60	208-230/1/60	115/1/60		
EFFICIENCY	(%)	71	71	76		
NOTES	1, 2, 3	1, 2, 3	1, 2, 3			
NOTES						
NOTE (1)	INTEGRATED ECM					
NOTE (2)	INTELLIGENT PUMP WITH BACNET					
NOTE (3)	SENSOR FOR FLOW CONTROL					



167 WATER STREET
VANCOUVER, BC V6B 1A7
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CONSULTANT - SUB-CONSULTANT

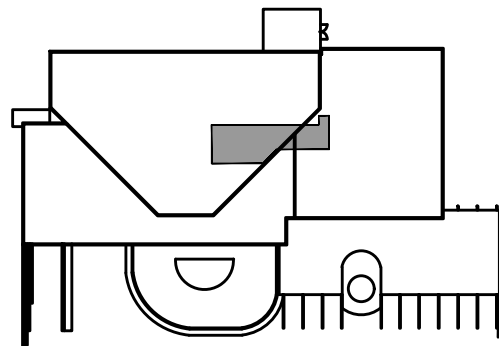
2	2026-08-11	ISSUED FOR TENDER
1	2026-08-07	ISSUED FOR TENDER REVIEW
	YYYY-MM-DD	SUBMISSION INFORMATION

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PROFESSIONAL SEALS



KEYPLAN



CLIENT

REGIONAL DISTRICT OF FRASER -
FORT GEORGE

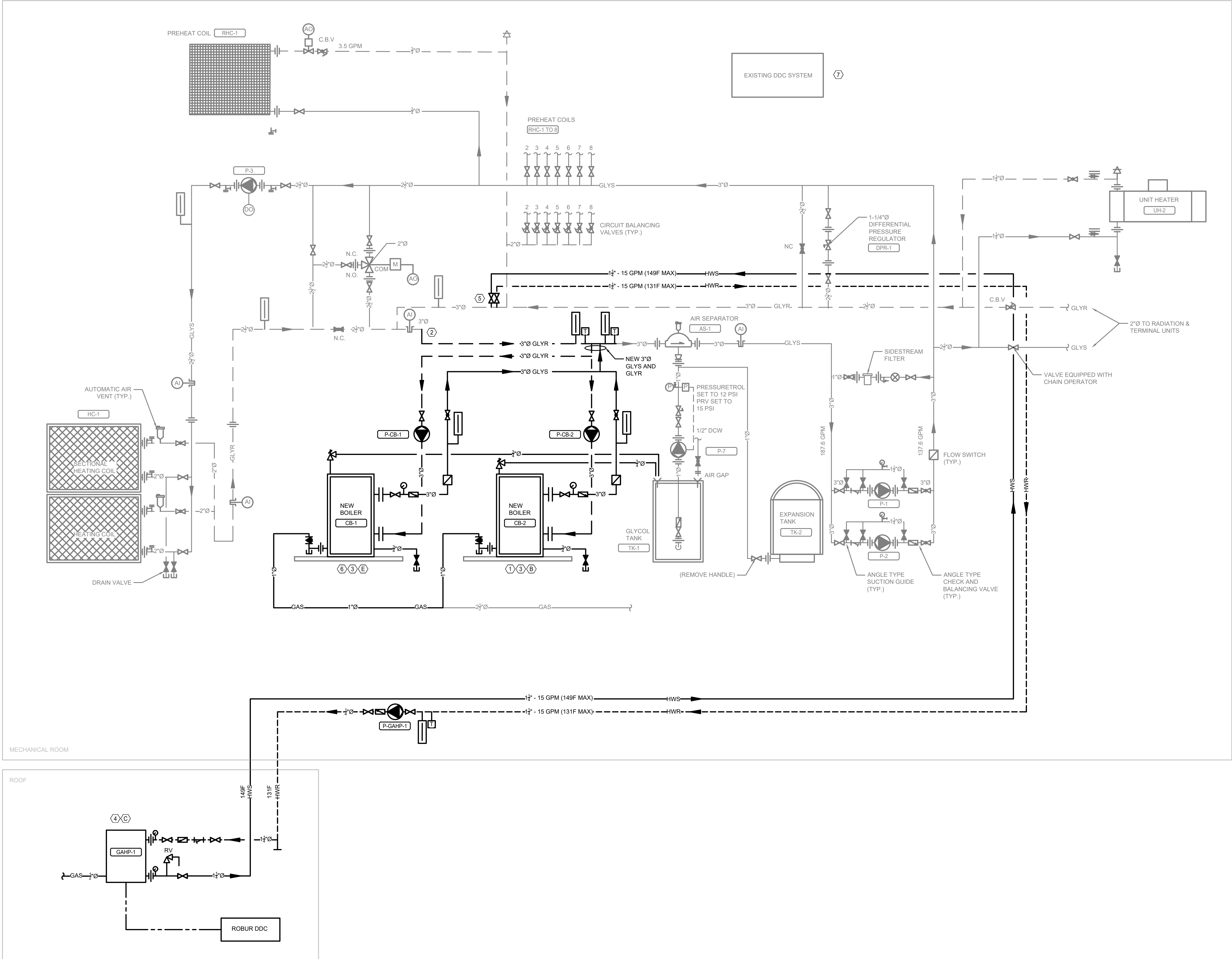
PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

SCHEDULES

DESIGN BM	DATE 2026-08-11	SCALE N.T.S.
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO M-600	VERSION 2
APPROVED BM		



1 MECHANICAL ROOM PIPING SCHEMATIC
M-700 SCALE: N.T.S.

GENERAL NOTE

- ① EXISTING DRAWINGS HAVE BEEN USED FOR THIS SCHEMATIC AND MAY NOT REFLECT ACTUAL AS-BUILT CONDITIONS. THEREFORE THE CONTRACTOR SHOULD VERIFY EXISTING PIPING AND EQUIPMENT CONNECTIONS ON SITE PRIOR TO PROCEEDING WITH WORK.

DRAWING NOTES

- ① PROVIDE AND INSTALL ONE (1) NEW CONDENSING BOILER CB-2 C/W NEW 2-1/2" GLYS AND GLYR PIPING, CIRCULATOR PUMP P-CB-2 AND CONNECT TO EXISTING HEATING WATER LOOP USING CLOSELY SPACED TEES. EXISTING 2-1/2" BOILER B-1 GLYS AND GLYR TO BE RE-PIPED TO CONNECT TO NEW PRIMARY LOOP DURING PHASE 1.
- ② RE-PIPE EXISTING 3" GLYR TO ACCOMMODATE NEW PRIMARY LOOP CLOSELY SPACED TEES CONFIGURATION.
- ③ NEW CONDENSING BOILERS TO BE INSTALLED IN A BACK-TO-BACK CONFIGURATION WITH SHARED REAR CLEARANCES. CB-2 TO BE INSTALLED DURING PHASE 1 AND CB-1 TO BE INSTALLED DURING PHASE 2.
- ④ PROVIDE AND INSTALL NEW GAS ABSORPTION HEAT PUMP GAHP-1 C/W NEW 1-1/4" HWS AND HWR PIPING FROM ROOF TO MECHANICAL ROOM AND CIRCULATOR PUMP P-GAHP-1.
- ⑤ CONNECT NEW GAHP HWS AND HWR PIPING TO EXISTING 3" GLYR PIPING USING CLOSELY SPACED TEES.
- ⑥ PROVIDE AND INSTALL ONE (1) NEW CONDENSING BOILER CB-1 C/W NEW 2-1/2" GLYS AND GLYR PIPING, CIRCULATOR PUMP P-CB-1 AND CONNECT TO NEW PRIMARY LOOP TO REPLACE EXISTING BOILER B-1.
- ⑦ CONNECT THE FOLLOWING NEW AND EXISTING HEATING EQUIPMENT TO EXISTING BUILDING DDS/BAS. PROVIDE REQUIRED WIRING AND PROGRAMMING FOR A COMPLETE OPERATING SYSTEM. UPDATE DDC GRAPHICS TO REFLECT REVISED HEATING SYSTEM CONFIGURATION.
- NEW CONDENSING BOILERS CB-1 AND CB-2 (ONLY ONE BOILER SHALL OPERATE AT A TIME. DDC SHALL ALTERNATE THE DUTY BOILER WEEKLY TO EQUALIZE EQUIPMENT RUNTIME).
 - NEW BOILER CIRCULATION PUMPS P-CB-1 AND P-CB-2.
 - NEW GAHP UNIT GAHP-1.
 - NEW GAHP CIRCULATION PUMP P-GAHP-1.
 - NEW TEMPERATURE SENSORS FOR BOILER CLOSELY SPACED TEES PIPING ARRANGEMENT.
 - EXISTING SUPPLY HEATING PUMPS P-1 AND P-2 INFORMATION.
 - EXISTING HYDRONIC TERMINAL EQUIPMENT SUCH AS UNIT HEATERS, FORCED FLOW HEATERS, AND BASEBOARDS.
 - EXISTING GLYCOL TANK AND EXPANSION TANK TK-1 AND TK-2.

PHASING PLAN

- Ⓐ PHASE 1: EXISTING BOILER B-2 TO BE REMOVED TO MAKE SPACE FOR NEW CONDENSING BOILER CB-2.
- Ⓑ PHASE 1: ONE (1) NEW CONDENSING BOILER (CB-2) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-2 BEFORE DECOMMISSIONING AND REMOVING EXISTING B-1 TO ENSURE CONTINUOUS HEATING OPERATION DURING CONSTRUCTION.
- Ⓒ PHASE 1: INSTALL NEW GAS ABSORPTION HEAT PUMP (GAHP-1) ON ROOF AND TIE INTO EXISTING HEATING WATER LOOP TO SERVE AS PREHEAT.
- Ⓓ PHASE 2: EXISTING BOILER B-1 TO BE REMOVED.
- Ⓔ PHASE 2: ONE (1) NEW CONDENSING BOILER (CB-1) TO BE INSTALLED. INSTALL, START-UP, AND COMMISSION NEW CB-1.

CONSULTANT - SUB-CONSULTANT

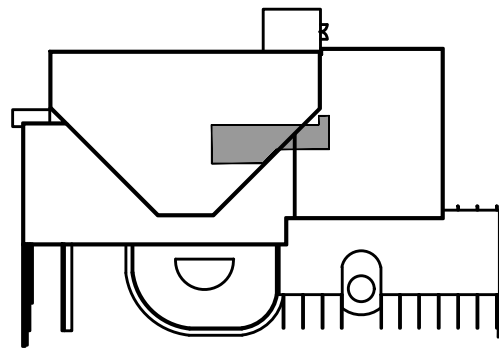
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PROFESSIONAL SEALS



KEYPLAN



CLIENT

REGIONAL DISTRICT OF FRASER -
FORT GEORGE

PROJECT

EXPLORATION PLACE MUSEUM
GAHP INSTALLATION

DRAWING

MECHANICAL ROOM PIPING
SCHEMATIC

DESIGN BM	DATE 2026-08-11	SCALE N.T.S.
DRAWN AP	PROJECT NO. 25_160	
CHECKED BM	DRAWING NO. M-700	VERSION 2
APPROVED BM		

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| <div> <div>MECHANICAL WORK SPECIFICATION</div> <div>GENERAL</div> <div>1. REFERENCES</div> <div>1.1 The General Conditions of the Contract, the Supplementary Conditions, and all Sections of Division 01 apply to and are a part of this Section of the Specification.</div> <div>2. SUBMITTALS</div> <div>1 Prior to supplying products to the site, submit for review, 8 copies of shop drawings and/or product data sheets indicating in detail the design, construction & performance of mechanical equipment, & all mechanical products except pipe & fittings, sleeves, escutcheon plates, ductwork, & similar items. Endorse shop drawings & product data sheets with "Certified to Be in Accordance With All Requirements".</div> <div>2 Read the following in conjunction with the wording on the Consultant's review stamp applied to shop drawings for product data sheets submitted:</div> <div>"This review is for the sole purpose of ascertaining conformance with the general design concept. This review does not approve the detail design inherent in the shop drawings, responsibility for which remains with the Contractor and such review does not relieve the Contractor of the responsibility for errors or omissions in the shop drawings or of his responsibility for meeting all requirements of the Contract Documents. Be responsible for dimensions to be confirmed & correlated at the job site, for information that pertains solely to fabrication process or to techniques of construction & installation, and for coordination of the work of all sub-trades."</div> <div>3 Submit the following to the Consultant:</div> <div>1 project close-out documentation: O & M Manuals, record as-built drawings, and all associated data</div> <div>2 progress payment breakdown: a detailed breakdown of the mechanical work cost suitable for evaluation of progress payments</div> <div>3 extended warranties: copies of all extended warranties</div> <div>1.3 DEFINITIONS</div> <div>1 The following are definitions of words found in this mechanical work Specification and on associated drawings</div> <div>1 "provide" (and tenses of provide) - means supply and install complete</div> <div>2 "install" (and tenses of install) - means install and connect complete</div> <div>3 "supply" - means supply only</div> <div>4 "Consultant" - means the Architect or Consulting Engineer who has prepared the Contract Documents on behalf of the Owner</div> <div>5 "Equal to" - means that a product proposed for installation, other than the specified product, must be equal to the specified product in size, materials of construction, performance, durability, & warranty requirements, & the final decision in this matter rests with the Consultant</div> <div>1.4 CODES, REGULATIONS, AND STANDARDS</div> <div>1 Abide by the latest edition of all Codes, Regulations, and Standards referred to and/or applied by governing authorities.</div> <div>2 All mechanical piping system work, including equipment, must comply in all respects with requirements of local technical standards authorities & CSA B51, Boiler, Pressure Vessels and Pressure Piping Code. Pressure vessels and fittings defined in Clause 4.3 of a CSA B51 must bear a Canadian Registration Number (CRN)</div> <div>3 Install to the requirements of the BC Building Code 2024 and the recommended procedures of SMACNA and all equipment manufacturers' suppliers</div> <div>4 All hot and chilled water, steam and steam condensate, compressed air and vacuum piping shall be installed, examined, tested and approved in accordance with the requirements of ASME 31.9, Building Services Pipe, current edition, and the requirements of this specification and the engineering drawings.</div> <div>1 Before any welding is performed, the contractor shall submit to the owner or his authorized representative copies of any welding procedure specifications and their supporting procedure qualification records for review and acceptance. Copies of acceptance records shall be made available for review to the owner or his representative at the construction site.</div> <div>2 Where the engineer determines that additional examinations beyond the requirements of B31.9 are necessary, those examinations will be shown on the drawings or noted in subsequent specification sections. The degree of examination, examination methods and acceptance criteria will be specified and accepted by the contractor prior to the start of work.</div> <div>1.5 EXAMINATION OF SITE</div> <div>1 Prior to submitting a bid, visit the site & review & include for existing site conditions.</div> <div>1.6 DRAWINGS AND SPECIFICATION</div> <div>1 Mechanical drawings are performance drawings, diagrammatic, show approximate locations of equipment & services, are intended to convey scope of work, & do not show architectural and structural details. Provide offsets, fittings, transformations, & similar details to be consistent with architectural and/or architectural & structural details not shown on drawings.</div> <div>1.7 PLANNING AND LAYOUT OF THE WORK</div> <div>1 Properly plan, coordinate, & establish locations & routing of services with subcontractors such that services will clear each other as well as any obstructions.</div> <div>2 Conceal work in partially finished or unfinished areas to the extent made possible by area construction. Install piping, to each other.</div> <div>1.8 GENERAL RE: INSTALLATION OF EQUIPMENT</div> <div>1 Unless otherwise specified install equipment in accordance with equipment manufacturers' recommendations & instructions. Governing Codes, Standards, & Regulations take precedence over manufacturer's instructions.</div> <div>1.9 PERMITS, FEES, AND CERTIFICATES</div> <div>1 Unless otherwise specified, apply for, obtain & pay for all permits required to complete the mechanical work.</div> <div>1.10 WORKPLACE SAFETY</div> <div>1 Comply with requirements of the Workplace Hazardous Materials Information System (WHMIS). Submit WHMIS documents (Material Safety Data Sheets) for products where required & maintain 1 copy at the site.</div> <div>2 Comply with requirements of Occupational Health & Safety Regulations & all other regulations pertaining to health and safety, including worker's compensation/ insurance board & local protection regulations.</div> <div>3 If during the course of work, asbestos containing materials, black mould, lead paint, or any other such materials are encountered or suspected, immediately report the discovery to the Consultant & cease all work in the area in question. Do not resume work in affected areas until the situation has been properly corrected & without written approval from the Owner.</div> <div>1.11 Liability</div> <div>1 The mechanical contractor shall assume full responsibility for layout of the work of Division 01 and for any damage caused by improper location or performance of work</div> <div>2 Protect work and building surfaces from damage due to the contractor's performance of work. Pay particular attention to the protection of building vapour barriers and water proof membranes. Cover floors and other finished surface to avoid damage. During periods of freezing weather, ensure all piping is protected from potential freeze-up and any mechanical openings in the building envelope are weather and temperature protected.</div> <div>3 Maintain the site in a clean and orderly condition at all times.</div> <div>4 At the completion of the work, remove tools, waste and surplus equipment and materials from the site.</div> <div>5 Maintain insurance that will fully protect the owner, the general contractor, the mechanical contractor and the mechanical contractor's sub-trades from all claims which may arise from the mechanical contractor's performance of work.</div> <div>1.12 SCAFFOLDING, RIGGING, AND HOISTING</div> <div>1 Erect and operate scaffolding, rigging, hoisting equipment & associated hardware required for your work.</div> <div>1.13 CLOSEOUT SUBMITTALS</div> <div>1 Prior to application for Substantial Performance, submit all required items & documentation specified, including Operating & Maintenance Manuals, as-built record drawings, extended warranties, test certificates, final commissioning report, & TAB report.</div> <div>2 Operating and Maintenance Manuals: Submit 3 hard copies of operating & maintenance manuals in hardcover 3" D' ring binders, & identified with Project name, & "MECHANICAL OPERATING AND MAINTENANCE MANUAL" wording. Manuals are to include:</div> <div>1 Name of engineer/ and mechanical Contractor and phone number</div> <div>2 Description of System and Scope of Work</div> <div>3 Shop drawing of all equipment</div> <div>4 List of tagged valves</div> <div>5 Extended warranties</div> </div> <div> <div>MECHANICAL WORK IDENTIFICATION</div> <div>1 Identify all rewire/cabled work in accordance with existing identification standards at the site, or, if all new work or no existing standard, identify new exposed piping & ductwork such that it can be easily seen.</div> <div>2 Piping: Paint gas piping with primer & 2 coats of yellow paint in accordance with Code requirements. For electrically traced mechanical work include "ELECTRICALLY TRACED" Pipe identification is to be equal to SMS Ltd. or Brady vinyl plastic with indoor/outdoor type vinyl ink lettering & directional arrows. For pipe to and including 150 mm (6") dia., use colored type snap-on markers. For pipe larger than 150 mm (6") dia., use saddle type snap-on markers. 2 opposite identification locations & c/w nylon cable ties. Identification wording & colours, unless otherwise indicated, is to be in accordance with CAN/CSG-B-24.3.</div> <div>3 Ductwork: Custom made Mylar stencils with 50 mm (2") high lettering to accurately describe the ductwork. "AIR-LI SUPPLY" c/w a directional arrow, & coloured ink with ink pads & roller applicators. Ink colour
is generally to be black but must contrast with the lettering background.</div> <div>4 Exposed Piping and Ductwork: Identify at every end, adjacent to valves, strainers, damper & similar accessory, at each equipment location, on both sides of pipes & ducts penetrating floors, walls, or partitions, at 6 m (20') intervals on runs exceeding 6 m (20') in length, at least once in each room, & at least once on runs less than 6 m (20').</div> <div>5 Concealed Piping & Ductwork: Identify at points where pipes or ducts enter & leave rooms, shafts, pipe chases, furred spaces, & similar areas, at maximum 6 m (20') intervals above suspended accessible ceilings, at least once in each room, at each access door location, & at each pipe/equipment, automatic valve, etc.</div> <div>6 Equipment: Provide an identification nameplate for pieces of equipment, including control valves, motorized dampers, instruments, & similar products. Nameplates are to be 2-ply laminated black/white plastic, minimum 12 mm x 50 mm (1/2" x 2") for smaller items, minimum 25 mm x 65 mm (1" x 2 1/2") for equipment & minimum 50 mm x 100 mm (2" x 4") for control panels & similar items. Secure nameplates with stainless steel screws unless prohibitive, in which case use epoxy cement. Equipment identification terminology is to be as per drawing identification.</div> <div>7 Valve Tags & Chart: Attach a tag to each new valve, except valves located at the equipment they control. Tags are to be coloured, 40 mm (1 1/2") square, 2-ply laminated plastic with bevelled edges, red-white, green-white, yellow-black, etc., to match the piping identification colour. c/w a 3.2 mm (1/8") dia. by 100 mm (4") long brass plated steel bead chain, and 4 lines of engraved identification wording to indicate the valve number, size, service, R or NC. Prepare a computer printed chart for existing chart if available, value tag numbering is to be an extension of existing numbering & the new valve tag a wall to incorporate the existing chart. Frame & glaze 1 copy of the chart & affix to a chart in each main Mechanical and/or Equipment Room.</div> <div>1.25 FASTENING AND SECURING HARDWARE</div> <div>1 Provide fastening & securing hardware to maintain installations attached to the structure or to finished floors, walls & ceilings in a secure & rigid manner capable of withstanding the dead loads, live loads, superimposed dead loads, & any vibration of the installed products. Where construction is not suitable to support the loads, provide additional framing or special fasteners to ensure proper securement to the structure. Do not attach fasteners to steel deck without written consent from the Consultant.</div> <div>1.26 GENERAL RE: INSTALLATION OF VALVES</div> <div>1 Generally, valve locations are indicated or specified, however, regardless of locations shown, provide shut-off valves to isolate all systems, at the base of vertical risers, in branch take-offs at mains & to isolate equipment, to system pump work chases, valves, strainers & similar accessories, domestic water & heating system expansion tanks, & flexible branch ductwork from steel metal ducts to grilles or diffusers.</div> <div>1.27 PIPE LEAKAGE TESTING</div> <div>1 Before new piping has been insulated or concealed, & before equipment, fixtures and fittings have been connected, pressure test piping for leakage in accordance with requirements of applicable Codes and Standards. Have completed test report sheets dated & signed by those present to confirm proper test results. Ensure that piping has been properly flushed, cleaned & is clear of foreign matter prior to pressure testing.</div> <div>1.28 CONCRETE WORK FOR MECHANICAL EQUIPMENT BASES/PADS</div> <div>1 Unless otherwise specified, provide all poured concrete work, including reinforcing & formwork, required for mechanical work. Concrete is to be minimum 20,700 kPa ready-mix concrete in accordance with CAN/CSA-A23.1 & the Building Code.</div> <div>1.29 CUTTING, DRILLING, AND PATCHING FOR MECHANICAL WORK</div> <div>1 Do all cutting, drilling and patching of the existing building for the installation of your work. Control dust and debris prior to cutting and/or drilling work. Patch surfaces, where required, to exactly match existing finishes using tradesmen skilled in the particular trade or application worked on.</div> <div>2 Where new pipes pass through existing construction, core drill an opening sized to leave 12 mm (1/2") clearance around pipes or pipe insulation. In poured concrete construction, determine the location, if any, of existing concealed services.</div> <div>3 Pack and seal the void between pipe openings and the pipe or pipe insulation for the length of the opening in interior construction with rock wool & random packing with non-hardening adhesive like caulking. Seal sleeves in exterior walls below grade (& any other wall where water leakage may be a problem) with link type mechanical seals.</div> <div>1.30 ROOFING WORK</div> <div>1 Do flashing work, including counter-flashing, for mechanical work penetrating and/or set in the roof.</div> <div>2 Where roof revisions and/or replacements are part of the project, include in the contract, including, lifting, & temporarily remove mechanical equipment on the roof as required to permit completion of the roofing work, & for re-installing the equipment when the roofing work is complete.</div> <div>1.31 WASTE MANAGEMENT AND DISPOSAL</div> <div>1 Separate and recycle waste materials in accordance with requirements of Canadian Construction Association Standard Document CSA 81, A Best Practices Guide to Solid Waste Reduction. Do not let waste materials accumulate at the site.</div> <div>1.32 DEMOLITION WORK</div> <div>1 Where indicated on the drawings, disconnect & remove mechanical work, including hangers, supports, insulation, & similar items. Cut back obsolete piping behind finishes, identify, & cap water-tight. Estimate the extent & cost of the work at the site during bidding period (scheduled site visits). Perform demolition work in accordance with requirements of CAN/CSA-C553, Code of Practice for Safety in Demolition of Structures.</div> <div>2 If existing isolation valves are not available to isolate sections of piping to be removed, provide such valves.</div> <div>3 Unless otherwise specified, remove & dispose of demolished materials which are not to be relocated, repaired or reused.</div> <div>4 Refrigeration Equipment: Remove & reclaim refrigerant from equipment to be decommissioned, removed and/or altered in accordance with Refrigerant Management Canada guidelines, & governing codes and regulations. Do not under any circumstances vent refrigerant from existing equipment to atmosphere. Dispose of reclaimed refrigerant by engaging the services of a licensed firm specializing in recycling of reclaimed refrigerant. Submit documentation to confirm that the refrigerant has been properly removed from the site & recycled or disposed of.</div> <div>1.33 TESTING, ADJUSTING & BALANCING (TAB)</div> <div>2 Perform TAB of mechanical systems which include, as applicable, domestic hot & tempered water systems, & HVAC & control systems in accordance with either the National Standards for A Total System Design published by the Associated Air Conditioning Engineers of Canada, or the Standards for Testing, Adjusting, & Balancing of Environmental Systems published by the National Environmental Balancing Bureau. Employ an agency certified by either the Associated Air Balance Council or the National Environmental Balancing Bureau.</div> <div>3 Submit electronic copies of draft reports. Upon approval of draft reports, submit 2 copies of final reports with schematic system diagrams & other data in identified 3-ring binders.</div> <div>4 Spot check final report results with the Consultant, & if results do not, on a consistent basis, agree with the final report, rebalance the systems involved, resubmit the final report, & again perform spot checks with the Consultant.</div> <div>5 Balance air distribution systems installed, but not limited to:</div> <div>1 Main corridor pressurization MUA</div> <div>2 Storage room exhaust fans</div> <div>3 Parkade transfer and main fans</div> <div>4 Elevator machine room fans</div> <div>5 Garbage room fans</div> <div>6 Suite bathroom exhaust fan</div> <div>7 Suite ERVs</div> <div>8 Any existing diffusers/grilles on the system.</div> <div>9 High Building Stairwell pressurization, including pressure differential testing</div> <div>10 Measure R Vestibules, including pressure differential testing</div> <div>11 Smoke evacuation fans</div> <div>12 Healthcare/Labs Positive and Negative pressure rooms, including pressure differential testing</div> </div> <div> <div>Healthcare/Labs) Fumehood ash airflow testing</div> <div>Balance water distribution systems including, but not limited to:</div> <div>1 Domestic hot water recirculation system</div> <div>2 Heating or Chilled water supply and return and all associated pipes and manifolds</div> <div>3 Flow through heat exchangers</div> <div>7 Provide pump impeller trimming as required. Do not trim pumps with variable speed drives.</div> <div>VIBRATION AND SEISMIC CONTROL</div> <div>1 Provide neoprene grommets on all equipment with motors 1/2hp and greater. Provide spring isolators on all equipment with motors 1/2hp and greater.</div> <div>2 Provide seismic restraints on all ceiling hung equipment (fans, ducts, diffusers etc), isolated equipment, piping and ductwork in accordance with the National Building Code of Canada, BC Building Code, NFPA and SMACNA guidelines for Seismic Restraints of Mechanical systems and Plumbing Piping Systems.</div> <div>3 Contractor shall retain a professional engineer, registered in the province of BC, and specializing in the design of seismic restraint
systems and structural engineering to ascertain that all mechanical equipment installed under this contract are adequately seismically restrained. Provide the required letters of assurance (Schedule B and D) for all mechanical and plumbing seismic work for insurance to the city.</div> <div>4 Prior to construction commencement, Contractor shall organize a meeting with the General Contractor, Mechanical Contractor, Structural Consultants and other appropriate parties. At that meeting, the Contractor shall present in general the approach/details used to provide seismic bracing for equipment & ductwork with piping highlighting attachments to structure and trade coordination.</div> <div>5 The installation of seismic restrains shall not compromise vibration isolation capabilities</div> <div>6 Contractor to provide certification by Seismic Professional Engineer prior to occupancy inspection</div> <div>MECHANICAL INSULATION</div> <div>1 Provide and install all required mechanical insulation. Insulation system materials inside the building must have a fire hazard rating of not more than 25 for flame spread & 50 for smoke developed when tested in accordance with CANULC-S102. Thermal performance, i.e. conductivity, of insulation is to meet or exceed the values given in the National Energy Code of Canada for Buildings, ASHRAE/IES Standard 90.1, & as defined by the BCICCA Quality Standards for mechanical insulation.</div> <div>2 Insulating contractor to be a BCICCA QAC certified contractor. Provide BCICCA inspection reports for the installation.</div> <div>3 Submit product data sheets for insulation products.</div> <div>4 As applicable, do not insulate heating piping within radiation unit enclosures, or branch domestic water piping, or piping located under counter top serve counter mounted plumbing fixtures & fittings (except barrier-free lavatories), exposed chrome plated domestic water angle supplies from concealed piping to plumbing fixtures & fittings (except barrier-free lavatories), heated liquid system pump casings, valves, strainers & similar accessories, domestic water & heating system expansion tanks, & flexible branch ductwork from steel metal ducts to grilles or diffusers.</div> <div>5 Install insulation directly over pipes & ducts and not over hangers & supports. Install piping insulation & jacket continuous through pipe openings & sleeves. Install duct insulation continuous through walls, partitions, & similar surfaces except at fire dampers.</div> <div>6 Where piping and/or equipment is traced with electric heating cable, ensure that cable has been successfully tested prior to the application of insulation, & ensure that the cable is not damaged or displaced during the application of insulation, & is to be secured using laces, snaps, or Velcro double stitched in place:</div> <div>1 Plate type heat exchanger(s)</div> <div>2 150 mm (6") diameter & larger piping strainers, backflow preventers, etc.</div> <div>3 Provide "wrap type" removable and reusable insulation covers equal to Insulab Systems Inc. covers for "cold" circular balancing valves, backflow preventers, & similar items in piping less than 150 mm (6") dia.</div> <div>21. Mineral Fibre Insulation-Ductwork Insulation: Insulate the following ductwork systems inside the building with mineral fibre insulation of the thickness indicated below. Insulation to be type B-2 as defined by BCICCA standard specification 1502:</div> <div>1 Fresh air intake ductwork, casings & plenums to & including mixing plenums or sections, or, if mixing plenums or sections are not provided, to the 1" heating coil, or if both mixing plenums or sections & heating coil sections are not provided, & the fresh air is not tempered, then the fresh air ductwork system complete</div> <div>1.40 mm (1 1/2") thick</div> <div>2 Mixed supply air or preheated supply air casings, plenums & sections to & including the fan section where not factory insulated:</div> <div>1.25 mm (1") thick</div> <div>3 Supply and return air ductwork, except for ductwork exposed in the area it serves:</div> <div>1.25 mm (1") thick rigid board or 40 mm (1 1/2") thick flexible blanket</div> <div>4 Exhaust discharge ductwork for a distance of 3 m (10') downstream (back) from exhaust openings to atmosphere, including exhaust plenums within the 3 m (10') distance:</div> <div>1.25 mm (1") thick rigid board or 40 mm (1 1/2") thick flexible blanket</div> <div>5 Any other ductwork, casings, plenums or sections specified or detailed on the drawings to be insulated - thickness as specified.</div> <div>6 Acceptable Materials:</div> <div>1 Equal to Johns Manville Inc. Type 814 "Spin-Glass" preformed board type insulation to ASTM C612, with a factory applied reinforced aluminium foil & kraft paper facing for exposed rectangular ductwork,</div> <div>ii. roll form semi-rigid insulation equal to Multi-Glass Insulation Ltd. "Multi-Flex Mkt" to ASTM C1393 with a factory applied vapour barrier facing for exposed round & oval ducts,</div> <div>iii. blanket type roll form insulation equal to Johns Manville Inc. Duct Wrap Type 150 "Multi-Flex" to ASTM Standard C553, 24 kg/m³ (1 1/2 lb./ft.) density, 40 mm (1 1/2") thick with a factory applied vapour barrier facing for concealed rectangular, round & oval ductwork.</div> <div>2 Condensate drainage piping from air conditioning system/unit drain pans to main vertical drain risers or to indirect drainage point:</div> <div>1.25 mm (1") thick</div> <div>3 Chilled water piping, supply & return (Fluid Operating Temperature: 4.0 to 60°F):</div> <div>1.25 mm (1") thick</div> <div>4 Hot water heating piping, supply & return (Fluid Operating Temperature: 105°F to 140°F):</div> <div>1.25 mm (1") thick</div> <div>5 Hot water heating piping, supply & return (Fluid Operating Temperature: 105°F to 140°F):</div> <div>ii. 40 mm (1 1/2") dia. - 25 mm (1") thick</div> <div>iii. 40 mm (1 1/2") dia. - 40 mm (1 1/2") thick</div> <div>6 Piping as above located inside the building in unheated areas or outside the building & indicated to be traced with electric heating cable:</div> <div>1.50 mm (2") thick</div> <div>7 Unheated drums (p) in dry zone standpipe and/or sprinkler system piping in unheated areas - 50 mm (2") thick (Note that drum drips will be traced with electric heating cable & are not to be shown. Confirm the number & size of drum drips in unheated areas with the trade providing the piping & include for the insulation to suit. Note that wherever possible drum drips will be located in heated areas.</div> <div>11 "wet" type fire protection piping in unheated areas & indicated to be traced with electric heating cable:</div> <div>1.50 mm (2") thick</div> <div>12 Refrigerant piping inside building:</div> <div>1.50 mm (2") thick</div> </div> <div> <div>Thermal Insulation Association of Canada National Installation Standard.</div> <div>NATURAL GAS</div> <div>1 Gas Service: Make arrangements with the supply utility on behalf of the Owner for installation of natural gas service piping with gas pressure regulator & meter assembly where shown. Provide 2 m (7') high minimum 200 mm (8") dia. Schedule 80 galvanized steel concrete filled bollards at the meter-regulator location in a protective pallet. Install the pipe 12 m (4') below grade in a continuous 600 mm (2') dia. reinforced concrete footing. Smoothly transition the pipe from the concrete above the top of the pipe & larger with 2 coats of yellow exterior equipment enamel.</div> <div>2 Piping Installation: Provide natural gas distribution piping & connect gas fired or operated equipment, & provide all required vent piping to atmosphere, including vent piping from pressure regulators. Do piping work in accordance with requirements of the National Building Code of Canada, NFPA and BC & local Gas Codes. Conform to the following requirements:</div> <div>1 slope gas piping in the direction of flow to low points, & provide full pipe dia. 150 mm (6") long drip pockets at the bottom of vertical risers, at piping low points, & wherever else shown and/or require.</div> <div>2 ensure that supports for roof mounted piping are sized (height) to accommodate the roof slope & the required piping slope, & to permit the installation of low point drip pockets</div> <div>3 identify piping above ground with 2 coats of safety yellow enamel applied over primer, and SMS Ltd., or equal coil type vinyl identification markers with arrow for "UG" gas piping.</div> <div>1 provide continuous 75 mm (3") wide yellow PVC warning tape with "CAUTION - GAS LINE BURIED BELOW" wording at 750 mm (30") intervals located above the pipe approximately 250 mm (10") below grade</div> <div>2 Employ an independent testing agency to test the continuity of the polyethylene jacket, once the piping is installed, using a 12000 volt Holiday Detector</div> <div>3 Heat shrink factory extruded polyethylene sleeves over bare pipe at weld</div> <div>4 Submit report from testing agency certifying continuity of polyethylene jacket</div> <div>2 Coordinate with other Divisions and lay the jacketed pipe on a 150 mm (6") bed of fresh-water washed sand and arrange for a depth of covering of 300 mm (12") of fresh-water washed sand</div> <div>3 Pressure Regulators: Provide CSA certified pressure regulators in locations where indicated and/or required. For indoor applications, use lever acting design, dead end lockup type, each c/w a vent limiter, self-aligning valve, die-cast aluminium housing, & synthetic rubber compound diaphragm, mounted in a horizontal upright position. Note that these pressure regulators do not require vent piping. For outdoor appliances use spring-loaded self-operated design, tight closing type selected for the facility gas pressure & piping pressure loss, & connected equipment load at full firing rate plus 20% safety
c/w a c/w at 1035 kPa (150 psi) rated cast iron body finished with corrosion resistant epoxy enamel, an aluminium diaphragm & spring case with Nitrite diaphragm, diast, & body O-ring, & throttling type, high flow rate, tight shut-off relief valve selected to protect equipment downstream of the regulator in coordination with regulator capacity. Provide 6 mm (1/2") diameter test ports upstream and downstream of each regulator assembly. Combine vents where permitted & increase vent size accordingly. Extend vent piping up through the roof 3 m (10') away from equipment air intakes & building openings and terminated in a turn-down elbow fitting with bronze bush screen. When installation is complete, check each regulator for proper operation, correct venting, correct vent pipe size, correct vent pipe pressure. Indicate operating set-points, relief settings & vent arrangements for each regulating station on as-built record drawings.</div> <div>4 Underground Natural Gas Piping:</div> <div>1 "Safety Yellow" coloured polyethylene pipe, fittings, & joints to CSA-B137.4</div> <div>2 Steel Pipe: Schedule 40 to ASTM A53-84a Grade B with Factory extruded polyethylene jacket with field closures for joining</div> <div>5 Above Ground Natural Gas Piping:</div> <div>1 Schedule 40 mild black carbon steel, ASTM A53, Grade B, complete with malleable cast iron screwed fittings to ANSI B21.1 & screwed joints,</div> <div>2 150 mm (6") diameter & larger piping strainers, backflow preventers, etc.</div> <div>3 Provide "wrap type" removable and reusable insulation covers equal to Insulab Systems Inc. covers for "cold" circular balancing valves, backflow preventers, & similar items in piping less than 150 mm (6") dia.</div> <div>21. Mineral Fibre Insulation-Ductwork Insulation: Insulate the following ductwork systems inside the building with mineral fibre insulation of the thickness indicated below. Insulation to be type B-2 as defined by BCICCA standard specification 1502:</div> <div>1 Fresh air intake ductwork, casings & plenums to & including mixing plenums or sections, or, if mixing plenums or sections are not provided, to the 1" heating coil, or if both mixing plenums or sections & heating coil sections are not provided, & the fresh air is not tempered, then the fresh air ductwork system complete</div> <div>1.40 mm (1 1/2") thick</div> <div>2 Mixed supply air or preheated supply air casings, plenums & sections to & including the fan section where not factory insulated:</div> <div>1.25 mm (1") thick</div> <div>3 Supply and return air ductwork, except for ductwork exposed in the area it serves:</div> <div>1.25 mm (1") thick rigid board or 40 mm (1 1/2") thick flexible blanket</div> <div>4 Exhaust discharge ductwork for a distance of 3 m (10') downstream (back) from exhaust openings to atmosphere, including exhaust plenums within the 3 m (10') distance:</div> <div>1.25 mm (1") thick rigid board or 40 mm (1 1/2") thick flexible blanket</div> <div>5 Any other ductwork, casings, plenums or sections specified or detailed on the drawings to be insulated - thickness as specified.</div> <div>6 Acceptable Materials:</div> <div>1 Equal to Johns Manville Inc. Type 814 "Spin-Glass" preformed board type insulation to ASTM C612, with a factory applied reinforced aluminium foil & kraft paper facing for exposed rectangular ductwork,</div> <div>ii. roll form semi-rigid insulation equal to Multi-Glass Insulation Ltd. "Multi-Flex Mkt" to ASTM C1393 with a factory applied vapour barrier facing for exposed round & oval ducts,</div> <div>iii. blanket type roll form insulation equal to Johns Manville Inc. Duct Wrap Type 150 "Multi-Flex" to ASTM Standard C553, 24 kg/m³ (1 1/2 lb./ft.) density, 40 mm (1 1/2") thick with a factory applied vapour barrier facing for concealed rectangular, round & oval ductwork.</div> <div>2 Condensate drainage piping from air conditioning system/unit drain pans to main vertical drain risers or to indirect drainage point:</div> <div>1.25 mm (1") thick</div> <div>3 Chilled water piping, supply & return (Fluid Operating Temperature: 4.0 to 60°F):</div> <div>1.25 mm (1") thick</div> <div>4 Hot water heating piping, supply & return (Fluid Operating Temperature: 105°F to 140°F):</div> <div>1.25 mm (1") thick</div> <div>5 Hot water heating piping, supply & return (Fluid Operating Temperature: 105°F to 140°F):</div> <div>ii. 40 mm (1 1/2") dia. - 25 mm (1") thick</div> <div>iii. 40 mm (1 1/2") dia. - 40 mm (1 1/2") thick</div> <div>6 Piping as above located inside the building in unheated areas or outside the building & indicated to be traced with electric heating cable:</div> <div>1.50 mm (2") thick</div> <div>7 Unheated drums (p) in dry zone standpipe and/or sprinkler system piping in unheated areas - 50 mm (2") thick (Note that drum drips will be traced with electric heating cable & are not to be shown. Confirm the number & size of drum drips in unheated areas with the trade providing the piping & include for the insulation to suit. Note that wherever possible drum drips will be located in heated areas.</div> <div>11 "wet" type fire protection piping in unheated areas & indicated to be traced with electric heating cable:</div> <div>1.50 mm (2") thick</div> <div>12 Refrigerant piping inside building:</div> <div>1.50 mm (2") thick</div> </div> <div> <div>Automatic Control Valves: Supply all required automatic control valves. Hand the valves to the appropriate piping trades at the site in the locations they are required for installation as part of the piping work. Ensure that each valve is properly located & installed. Unless otherwise specified, control valves for proportional operation are to have equal percentage characteristics, and control valves for open/shut two position operation are to have straight line flow characteristics. All valves are to be to have position indicators. Heating valves are to be normally open unless otherwise specified. Cooling valves are to be normally closed unless otherwise specified. Each control valve must be suitable in all respects for the application, including system pressure, & must have design output & flow rates with minimum pressure drops as follows:</div> <div>1 Chilled water solution valves for coils: 28 kPa (4 psi)</div> <div>2 Heating water/glycol solution valves for coils: 17.5 kPa (2.5 psi)</div> <div>3 Heating water valves for radiation units: 7 kPa (1 psi)</div> <div>4 Automatic Control Dampers: Dampers for modulating & mixing applications are to be parallel blade type. Dampers for open-shut service are to be opposed blade type. Maximum blade length is to be 1 m (4'). Dampers greater than 2 section & 150 mm (6") diameter are to be normally open & sized to control the damper against maximum pressure or dynamic closing pressure, whichever is greater, to suit the sizes of dampers involved, & to provide sufficient force to maintain the damper rated leakage characteristics. Operators for dampers to be connected to the building fire alarm system or to freeze protection devices are to be equipped with additional delays to permit the dampers to respond and go to the required position in less than 15 seconds upon receipt of a signal. Operator enclosures are to be suitable for the environment in which they are located.</div> <div>6 Motorized Damper: Equal to T. A. Morrison & Co. Inc. "TAMCO" Series 1000 (Series 9000 for fresh & exhaust air applications) aluminium dampers, parallel blade type for modulating & mixing applications, opposed blade type for open-shut service. Damper motors are to be equal to Belimo EF Series, spring return, fail-safe, 24 or 120 VAC as required, modulating or 2-position as required, overvoltage protected & c/w enclosure to suit mounting location. Provide where shown. Connect with control wires as shown.</div> <div>7 Thermostat: Wall mounting, 24V unless otherwise specified, 7-day programmable heat-cool digital thermostat for F° or C° indication, c/w backlit display, thermometer, real time clock, & momentary override for after-hours occupation</div> <div>8 Duct Smoke Detector: Ionization type duct mounting detectors supplied as part of the electrical work for mounting as part of the control system work</div> <div>9 Carbon Monoxide Detector: Equal to QEL model QAS-101 CO with interlocks with the parkade exhaust fan. CO unit shall be mounted 1500 mm above finished floor level and set to energize fan at 40 ppm CO and alarm at 100 ppm CO</div> <div>10 Control System Components: Provide all required control system components & related hardware. Refer to drawing control diagrams, points lists, & sequences. Where components are pipe, duct or equipment mounted supply the components at the proper time, coordinate installation with the appropriate trade, & ensure that the components are properly located & mounted.</div> <div>11 Control Wiring: Do all required control wiring from 15A-1P circuits terminated as part of the electrical work in junction boxes in equipment rooms/areas. Coordinate exact junction box locations at the site with the electrical trade. Except as specified below, install wiring in conduit. Unless otherwise specified, the final 600 mm (2') diameter conduit shall be installed in a rigid conduit extends across flexible duct connections is to be liquid-tight flexible conduit. Conduit wiring in ceiling spaces & wall cavities may be plenum rated cable installed without conduit but neatly harnessed, secured, & demarcated.</div> <div>12 Testing, Adjusting & Balancing (TAB): When TAB work is complete, check the installation of components & all wiring connections, make any required adjustments, coordinate adjustments with personnel doing HVAC testing, adjusting & balancing work, & commission the control systems.</div> <div>13 Demonstration & Training: Include for a full day
of on-site operation demonstration & training sessions for 2 groups of 6 people.</div> </div> <div> <div>SEQUEL OF OPERATION</div> <div>1 Gas Absorption Heat Pump (GAHP-1)</div> <div>1.1 New Robur GAHP-A Plus to preheat the existing heating water return prior to the new condensing boiler</div> <div>1.2 GAHP-1 to be enabled upon call for heating based on OAT and heating loop water temperature using the following logic:</div> <div>1.2.1 GAHP-1 enabled if OAT < 16C (60.8F) (adj.), and GAHP-1 entering water temperature is within the manufacturer's allowable operating range</div> <div>1.2.2 GAHP-1 disabled if OAT > 18C (64F) (adj.), heating demand is satisfied, or GAHP entering water temperature reaches 55C (131F)</div> <div>1.2.3 Provide minimum QAC OAT dead band to avoid short cycling OAT enable/disable points to be adjustable through DDC.</div> <div>1.3 GAHP-1 to be enabled upon call for heating based on OAT and heating loop water temperature using the following logic:</div> <div>1.3.1 GAHP-1 to operate as preheat unit. New condensing boilers to provide additional heating as required to maintain the heating system supply water temperature setpoint.</div> <div>1.3.2 GAHP-1 to operate as preheat unit. New condensing boilers to provide additional heating as required to maintain the heating system supply water temperature setpoint.</div> <div>1.3.3 GAHP-1 to operate as preheat unit. New condensing boilers to provide additional heating as required to maintain the heating system supply water temperature setpoint.</div> <div>1.3.4 GAHP-1 to operate as preheat unit. New condensing boilers to provide additional heating as required to maintain the heating system supply water temperature setpoint.</div> <div>1.3.5 GAHP-1 to operate as preheat unit. New condensing boilers to provide additional heating as required to maintain the heating system supply water temperature setpoint.</div> <div>1.3.6 GAHP-1 to operate as preheat unit. 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