

Regional District Of Nanaimo

Oceanside Place Energy Recovery

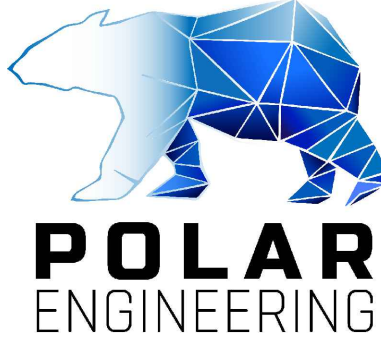
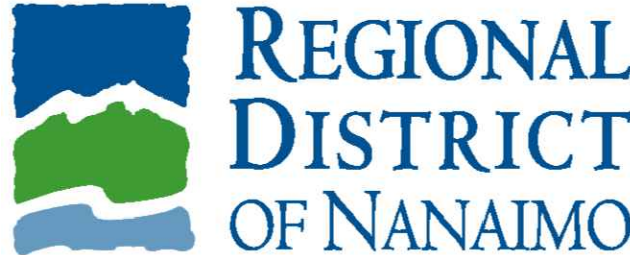



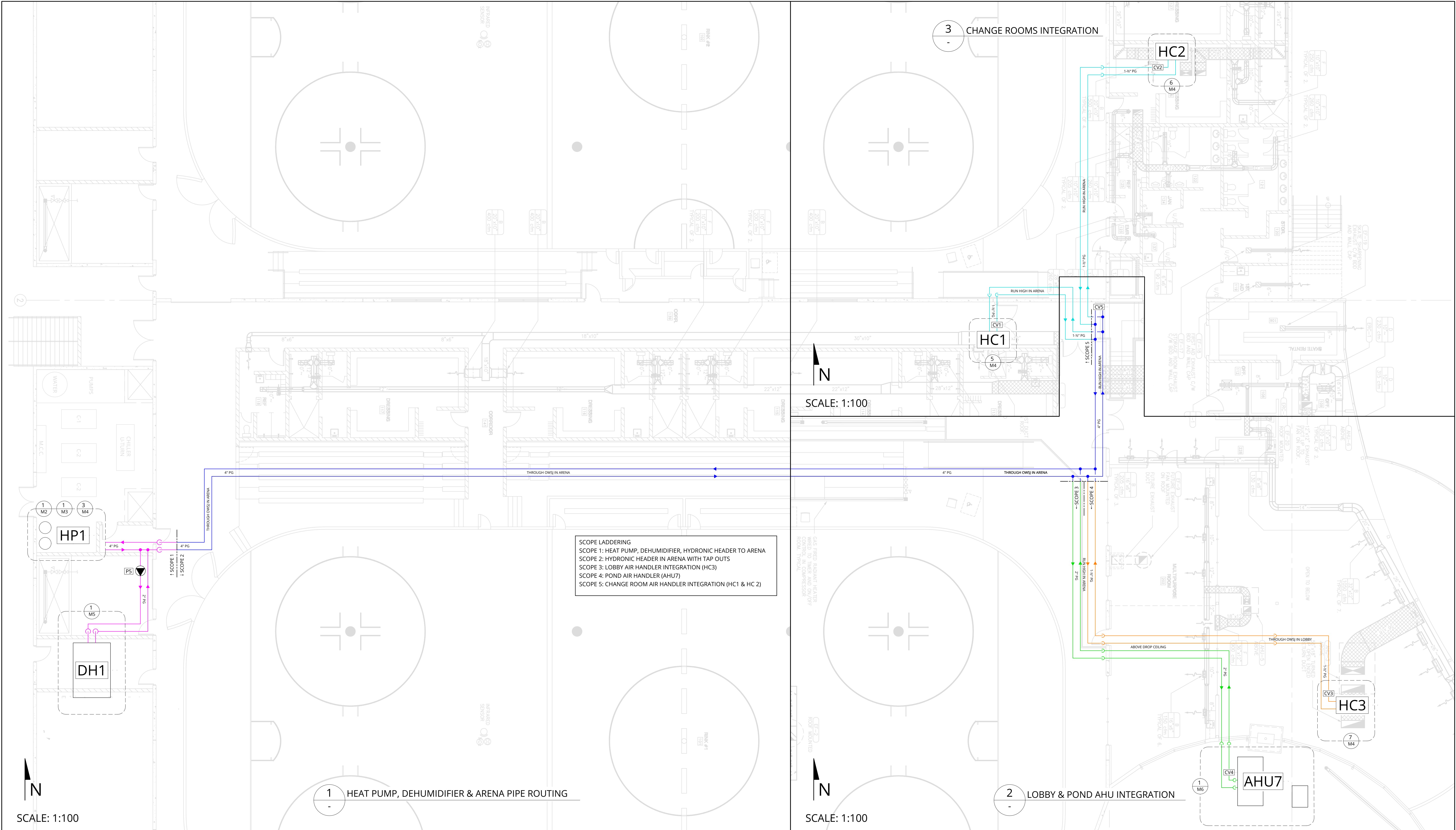
TABLE OF CONTENTS

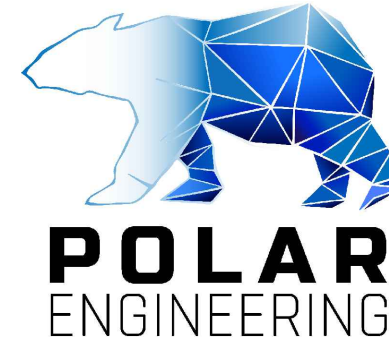


M0	TITLE PAGE
M1	PROJECT OVERVIEW
M2	HEAT PUMP P&ID
M3	AMMONIA INTEGRATION
M4	HYDRONIC P&ID
M5	DEHUMIDIFIER
M6	POND AIR HANDLER
M7	CONTROLS
M8	DETAILS

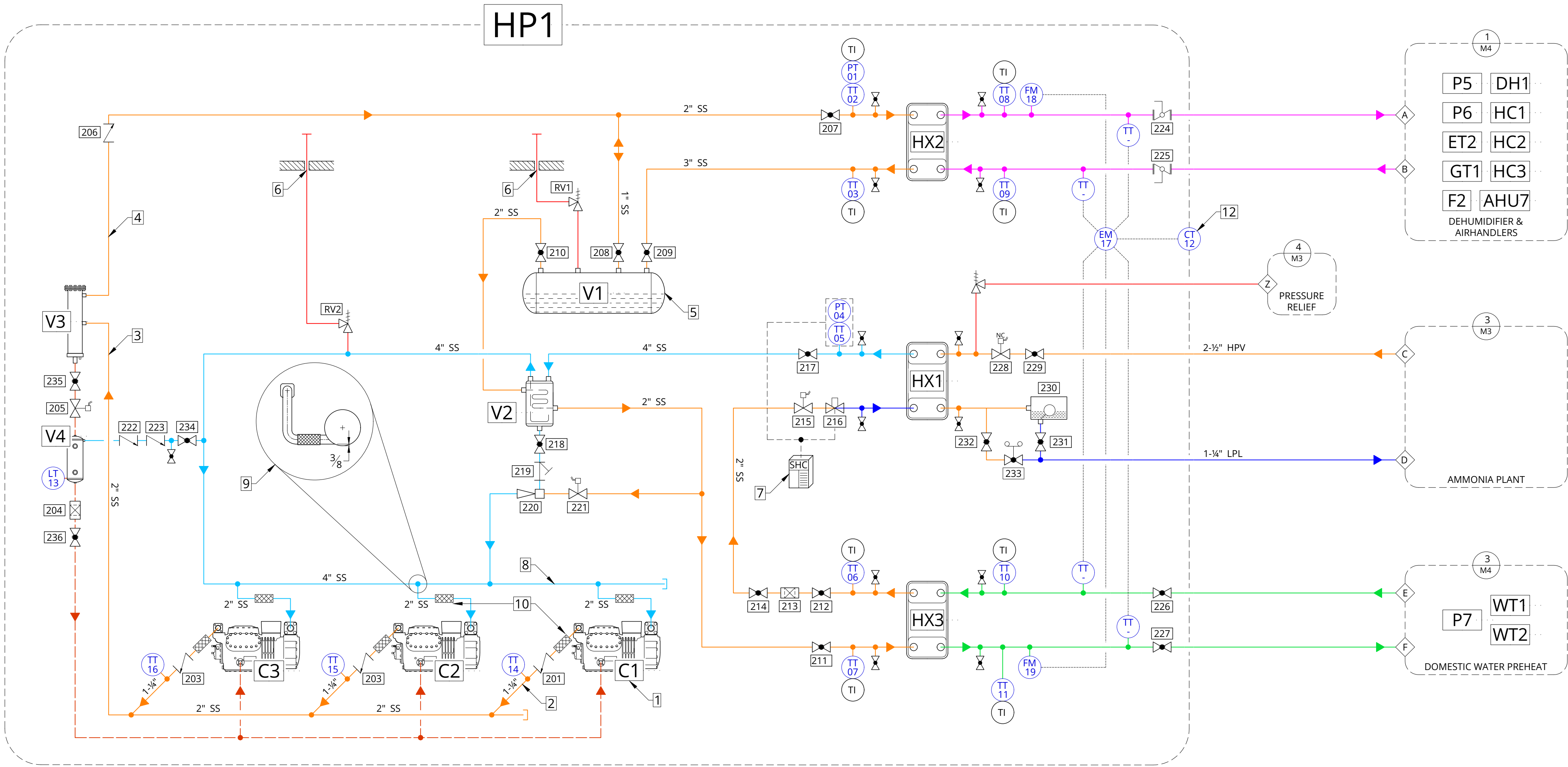


Regional District Of Nanaimo - Oceanside Place
830 West Island Highway Parksville, BC V9P 2X4

<div>PRIME CONSULTANT</div> <div><div>POLAR ENGINEERING</div></div> <div>PHONE 778-700-1086</div> <div>WEBSITE www.polareng.ca</div>	<div>CLIENT</div> <div><div>REGIONAL DISTRICT OF NANAIMO</div></div> <div>PHONE 250-390-4111</div> <div>WEBSITE www.rdn.bc.ca</div>	<div>ENGINEER OF RECORD</div> <div><div>IAN WELLE P.ENG.</div><div>EGBC PERMIT TO PRACTICE NUMBER 1003657</div></div>	<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div> <div>DRAWING TITLE</div> <div>TITLE PAGE</div>	REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
				2	2024-10-04	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE D
				3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	
				4	2025-01-31	NG	IW	ISSUED FOR TENDER	SHEET NAME M0
				5	-	-	-	-	
				6	-	-	-	-	



<div>PRIME CONSULTANT</div> <div><div>POLAR ENGINEERING</div></div> <div>PHONE 778-700-1086 WEBSITE www.polareng.ca</div>	<div>CLIENT</div> <div><div>REGIONAL DISTRICT OF NANAIMO</div></div> <div>PHONE 250-390-4111 WEBSITE www.rdn.bc.ca</div>	<div>ENGINEER OF RECORD</div> <div><div>IAN WELLE P.ENG.</div></div> <div>EGBC PERMIT TO PRACTICE NUMBER 1003657</div>	<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div>	REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
				2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE D
				3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	
				4	2025-01-31	NG	IW	ISSUED FOR TENDER	SHEET NAME M1
				5	-	-	-	-	
			6	-	-	-	-		
			<div>DRAWING TITLE</div> <div>PROJECT OVERVIEW</div>						



- PIPING LEGEND
- LOW PRESSURE LIQUID REFRIGERANT
 - HIGH PRESSURE LIQUID REFRIGERANT
 - LOW PRESSURE VAPOR REFRIGERANT
 - HIGH PRESSURE VAPOR REFRIGERANT
 - GLYCOL
 - POTABLE WATER
 - COMPRESSOR OIL

- KEYNOTES:
- INSTALL COMPRESSORS WITH SPRING ISOLATORS.
 - 45° CONNECTIONS BETWEEN COMPRESSOR DISCHARGES AND HEADER.
 - INSULATE ALL REFRIGERATION LINES.
 - VERTICAL RISER AFTER OIL SEPARATOR TO FACILITATE OIL RETURN UNDER LOW LOAD CONDITIONS.
 - INSULATE HIGH-PRESSURE RECEIVER (HP-V1) & SUCTION ACCUMULATOR (HP-V2).
 - ROUTE PRESSURE RELIEF TO EXTERIOR OF THE BUILDING IN COMPLIANCE WITH CSA B52 (SECTION 7.3.6).
 - MAINTAIN A MINIMUM OF 18R SUPERHEAT AT HP1-HX1 REFRIGERANT OUTLET.
 - SUCTION HEADER MUST BE INSTALLED DEAD LEVEL.
 - COMPRESSOR TAKEOFFS ELEVATED FROM HEADER BY 3/8-IN, TYPICAL.
 - INSTALL FLEXIBLE CONNECTIONS ON COMPRESSOR SUCTION AND DISCHARGE.
 - INSTALL TANK ABOVE HIGHEST POINT IN GLYCOL CIRCUIT.
 - INSTALL CT12 ON SINGLE POINT HEAT PUMP CONNECTION.

1 HEAT PUMP SCHEMATIC

HEAT PUMP COMPRESSORS										
TAG	MAKE	MODEL	FLUID	OPERATION (F)		COOLING CAPACITY [MBH]	HEATING CAPACITY [MBH]	MOTOR [KW]	ELECTRICAL [V/PH/Hz]	NOTES
				SST	SDT					
HP1-C1	BITZER	6FE-50Y	R513A	62	165	447	495	61.6	575/3/60	1,2,3,4
HP1-C2	BITZER	6FE-50Y	R513A	62	165	447	495	61.6	575/3/60	1,2,3,4
HP1-C3	BITZER	6FE-50Y	R513A	62	165	447	495	61.6	575/3/60	1,2,3,4

- NOTES:
- TO BE SUPPLIED WITH BITZER CM-RC IQ MODULE, VARISTEP CAPACITY CONTROL, HEAD COOLING FAN, AND KRIWAN INT 280B OIL LEVEL REGULATOR.
 - M1 MOTOR
 - 175F MAXIMUM CONDENSING TEMPERATURE
 - 35F MINIMUM EVAPORATING TEMPERATURE

HEAT PUMP VESSELS										
TAG	MAKE	MODEL	DESCRIPTION	FLUID	DIAMETER [IN]	LENGTH [IN]	OPERATING TEMPERATURE [F]	OPERATING PRESSURE [PSIG]	DWP [PSIG]	NOTES
HP1-V1	HENRY	TBD	LIQUID RECIEVER	R513A	-	-	165	344	450	1
HP1-V2	HENRY	AF-16042	SUCTION ACCUMULATOR	R513A	16	42	165	72	450	2
HP1-V3	TEMPRITE	928	OIL SEPARATOR	R513A	13	42	165	344	650	
HP1-V4	TEMPRITE	47115	OIL RESERVOIR	R513A OIL	6	28	165	344	650	

- NOTES:
- CONTRACTOR TO FINALIZE RECIEVER BASED ON FINAL CHARGE
 - C/W BOIL OFF COIL

HEAT PUMP HEAT EXCHANGERS										
TAG	MAKE	MODEL	DESCRIPTION	CAPACITY [KBTU/HR]	DWP [PSI]	SIDE 1				NOTES
						FLUID	FLOW [LB/HR]	TEMP IN [F]	TEMP OUT [F]	
HX1	ALFA LAVAL	M10-BWFD	CASCADE	1,287	300	NH3	2,610	85	84.9	
HX2	ALFA LAVAL	ACH502DQ-214AH-F	CONDENSER	1,435	653	R513A	25,590	201	165	
HX3	DOUCETTE	BPDW-422-50	SUBCOOLER	340	435	R513A	25,590	165	135	1

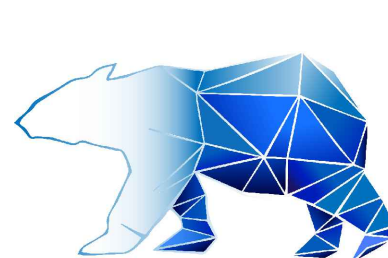


- NOTES:
- DOUBLE WALL VENTED

HEAT PUMP PRESSURE RELIEF VALVES				
TAG	MAKE	MODEL	DESCRIPTION	NOTES
RV1	TO SPEC	TO SPEC	HP1 HIGH SIDE PRESSURE RELIEF VALVE	1
RV2	TO SPEC	TO SPEC	HP1 LOW SIDE PRESSURE RELIEF VALVE	1

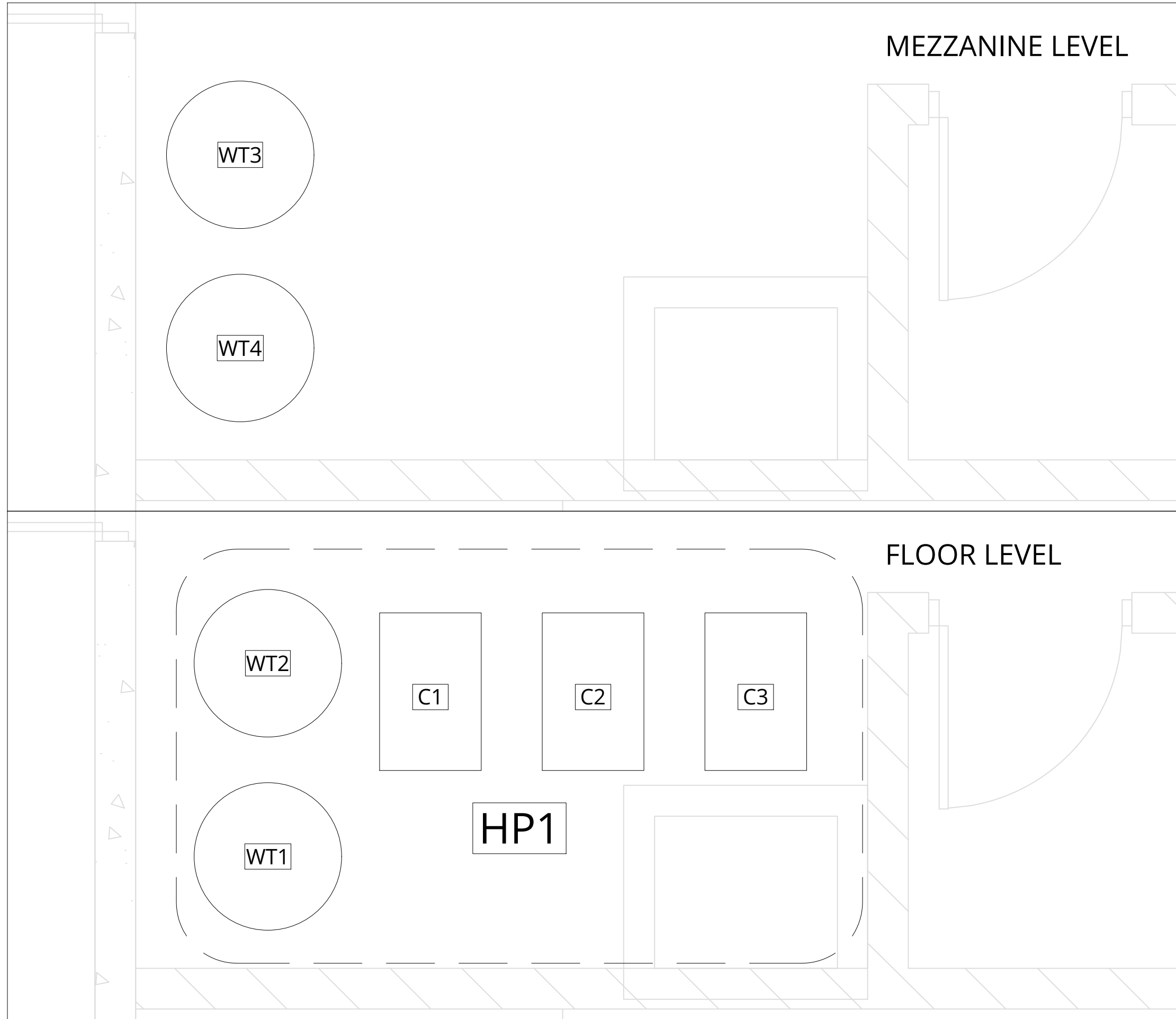
- NOTES:
- PRESSURE RELIEF VALVE TO BE SIZED BASED ON THE CHARGE OF THE FABRICATED HEAT PUMP.

HEAT PUMP VALVES				
TAG	LOCATION	DESCRIPTION	MAKE/MODEL	NOTES
201	HP-C1	COMPR DISCHARGE CHECK	DANFOSS, CHV32	
202	HP-C2	COMPR DISCHARGE CHECK	DANFOSS, CHV32	
203	HP-C3	COMPR DISCHARGE CHECK	DANFOSS, CHV32	
204	HP-V4	OIL RETURN FILTER	-	1
205	HP-V3	OIL RETURN SOLENOID	DANFOSS, ERV V2 (NO)	
206	HP-V3	OIL SEP CHECK	DANFOSS, CHV65B	
207	HP-HX2	CONDENSER ISOLATION	DANFOSS, SVA50	
208	HP-V1	HPR EQL ISOLATION	DANFOSS, SVA25	
209	HP-V1	HPR INLET ISOLATION	DANFOSS, SVA80	
210	HP-V1	HPR OUTLET ISOLATION	DANFOSS, SVA50	
211	HP-HX3	SUBCOOLER INLET ISOLATION	DANFOSS, SVA50	
212	HP-HX3	SUBCOOLER OUTLET ISOLATION	DANFOSS, SVA50	
213	HP-HX3	FILTER DRIER	DANFOSS, DCR-09617-DM NS 54	
214	HP-HX3	EVAP INLET ISOLATION	DANFOSS, SVA50	
215	HP-HX1	SOLENOID VALVE	DANFOSS, ICS 50 + EVM	
216	HP-HX1	EXPANSION VALVE	ETS COLIBRI 100C	
217	HP-HX1	EVAP OUTLET ISOLATION	DANFOSS, SVA100	
218	HP-V2	V2 ISOLATION	TO SPEC	
219	HP-V2	V2 OIL STRAINER	TO SPEC	
220	HP-V2	INJECTOR	TO SPEC	
221	HP-V2	V2 OIL RETURN SOLENOID	TO SPEC	
222	HP-V4	V4 PRESSURE EQUALIZATION	OCV1	
223	HP-V4	V4 PRESSURE EQUALIZATION	OCV1	
224	HP-HX2	CONDENSER ISOLATION	TO SPEC	
225	HP-HX2	CONDENSER ISOLATION	TO SPEC	
226	HP-HX3	SUBCOOLER ISOLATION	TO SPEC	
227	HP-HX3	SUBCOOLER ISOLATION	TO SPEC	
228	HP-HX1	NH3 CONDENSER SOLENOID	DANFOSS, ICS 50 + EVM	
229	HP-HX1	SOLENOID ISOLATION	DANFOSS, SVA65	
230	HP-HX1	NH3 FLOAT	DANFOSS, HFI-50	
231	HP-HX1	FLOAT ISOLATION	DANFOSS, SVA32	
232	HP-HX1	MANUAL EXPANSION	DANFOSS, REG 15A	
233	HP-HX1	MEV ISOLATION	DANFOSS, SVA32	
234	HP-V4	V4 ISOLATION	TO SPEC	
235	HP-V4	V4 ISOLATION	TO SPEC	
236	HP-V4	V4 ISOLATION	TO SPEC	

- NOTES:
- ENSURE ACCESS FOR FILTER CHANGES

PRIME CONSULTANT		CLIENT		ENGINEER OF RECORD		PROJECT TITLE OCEANSIDE PLACE - ENERGY RECOVERY		REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
 POLAR ENGINEERING		 REGIONAL DISTRICT OF NANAIMO		 2025-02-03 IAN WELLE P.ENG. EGBC PERMIT TO PRACTICE NUMBER 1003657				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
						2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE D		
						3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	SHEET NAME M2		
						4	2025-01-31	NG	IW	ISSUED FOR TENDER			
						5	-	-	-	-			
						6	-	-	-	-			
PHONE 778-700-1086		WEBSITE www.polareng.ca				DRAWING TITLE HEAT PUMP P&ID							

FILE NAME: 2409 OCEANSIDE ER RECOVERY (PLOT DATE: 2025-01-31) | DRAWN BY: NGW

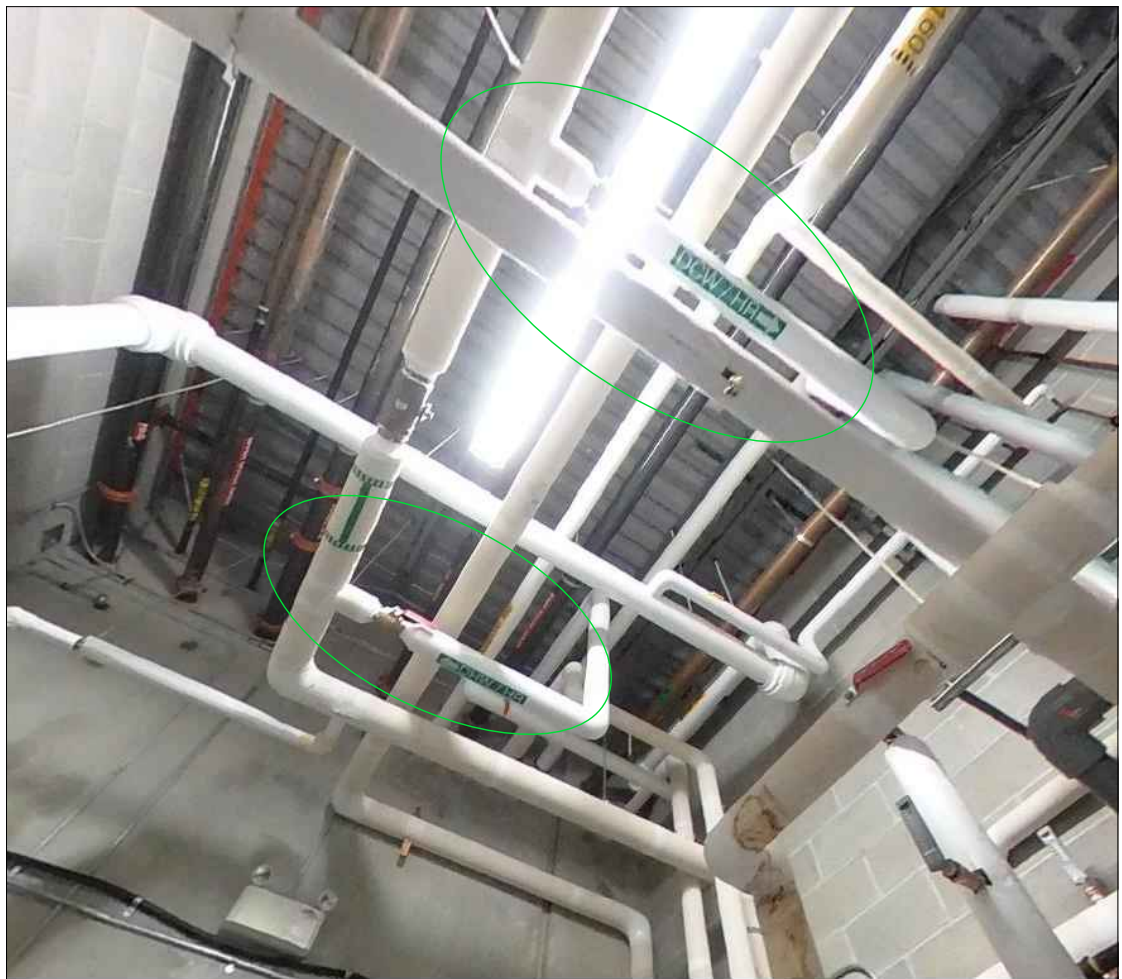


1 HEAT PUMP LAYOUT - FLOOR & MEZZANINE LEVELS



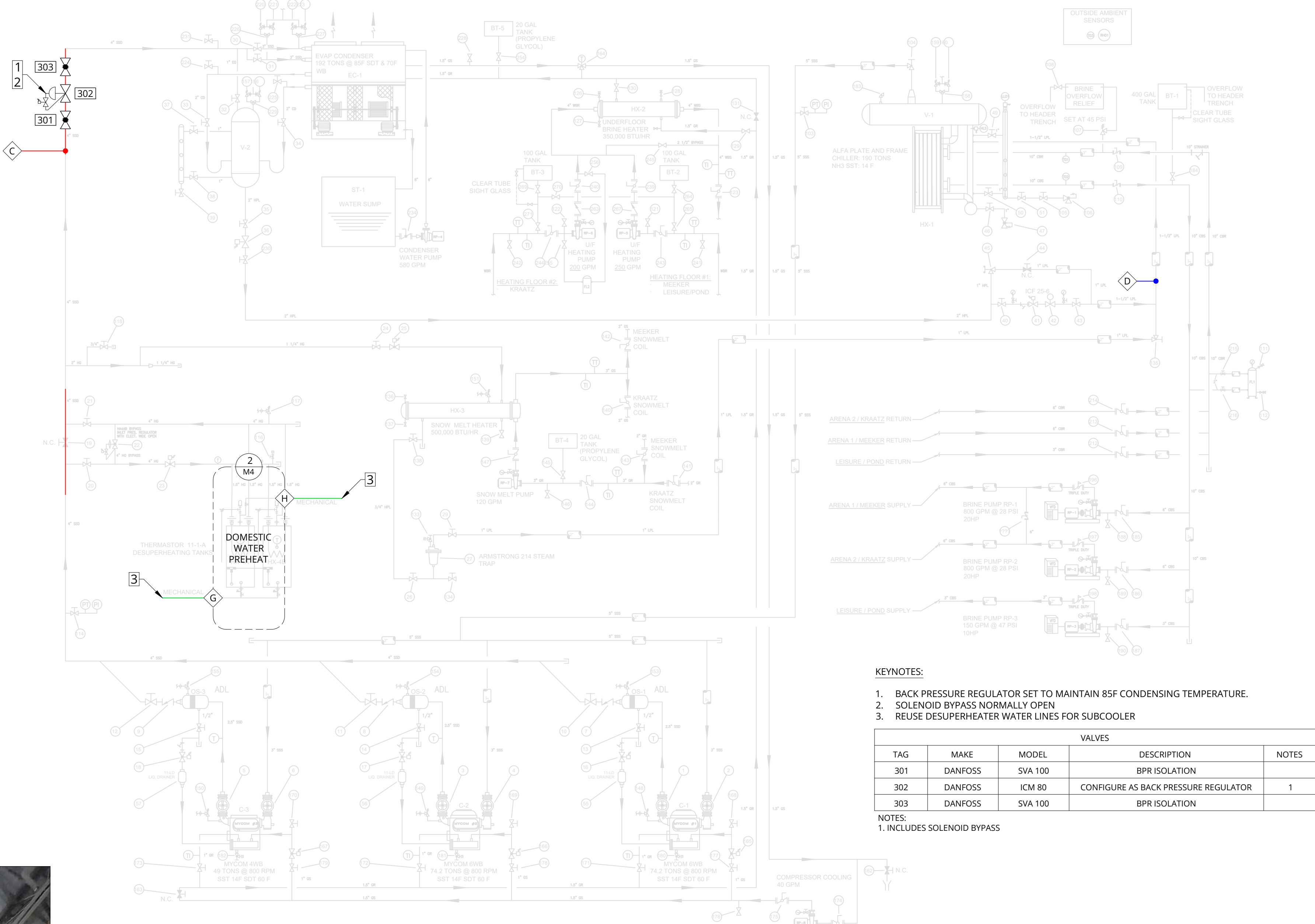
2 HEAT PUMP LOCATION IN MECH ROOM

- NOTES:
- SEE STRUCTURAL DRAWINGS FOR DETAILS ON MEZZANINE EXPANSION
 - SEE M7-1 FOR CHANGES TO DUCTING AND LADDER

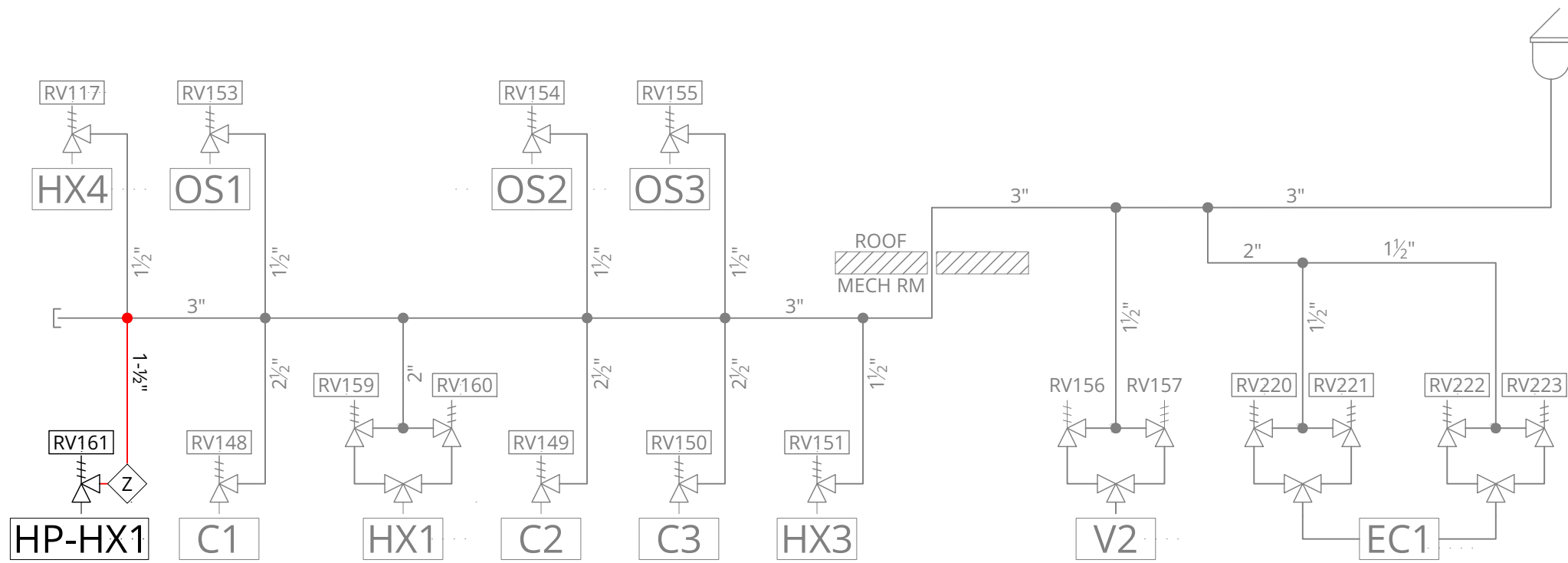


5 DESUPERHEATERS WATERLINES IN BOILER ROOM

- NOTES:
- SEE KEYNOTE #3



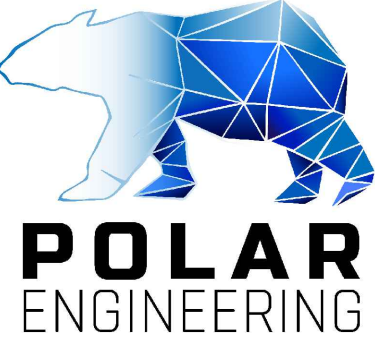


3 AMMONIA PLANT INTEGRATION SCHEMATIC

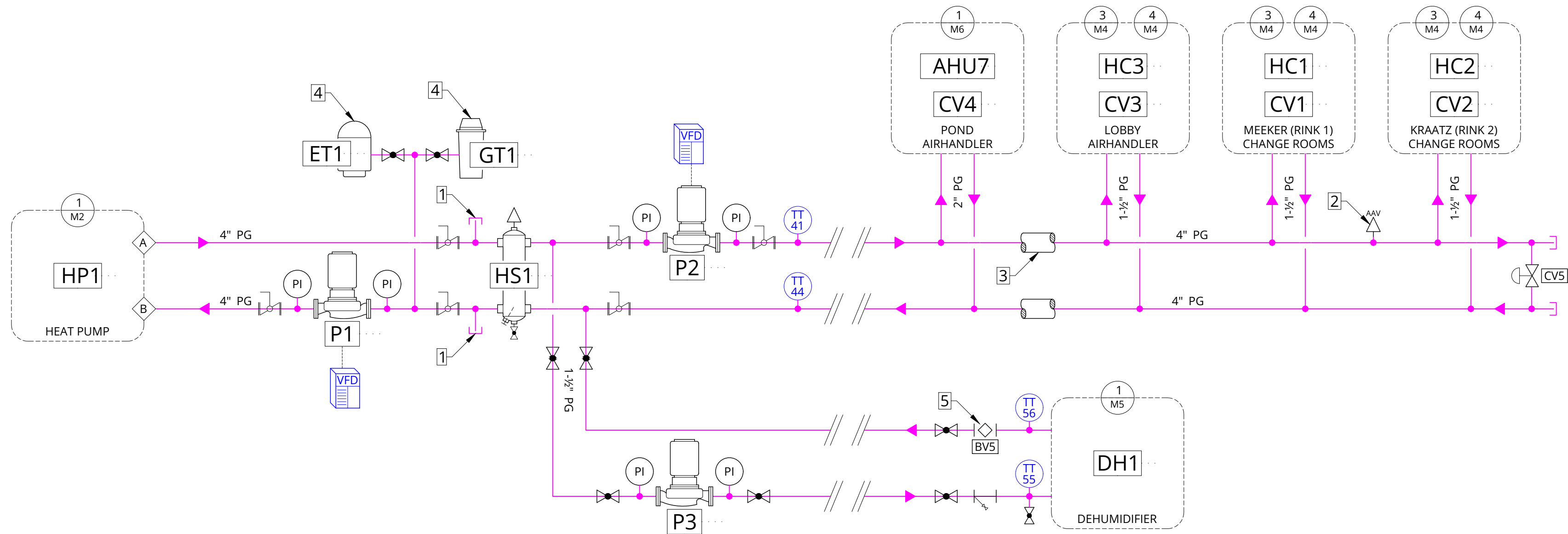


4 AMMONIA PRESSURE RELIEF SCHEMATIC

AMMONIA PRESSURE RELIEF VALVES									
TAG	MAKE	MODEL	SERVICE	SET PRESSURE (PSIG)	RELIEF NOTATION	RELIEF CAPACITY (LB-AIR/MIN)	INLET (IN)	OUTLET (IN)	NOTES
RV161/162	PARKER	SR1R	HX5	250	SINGLE	7.2	0.5	0.75	

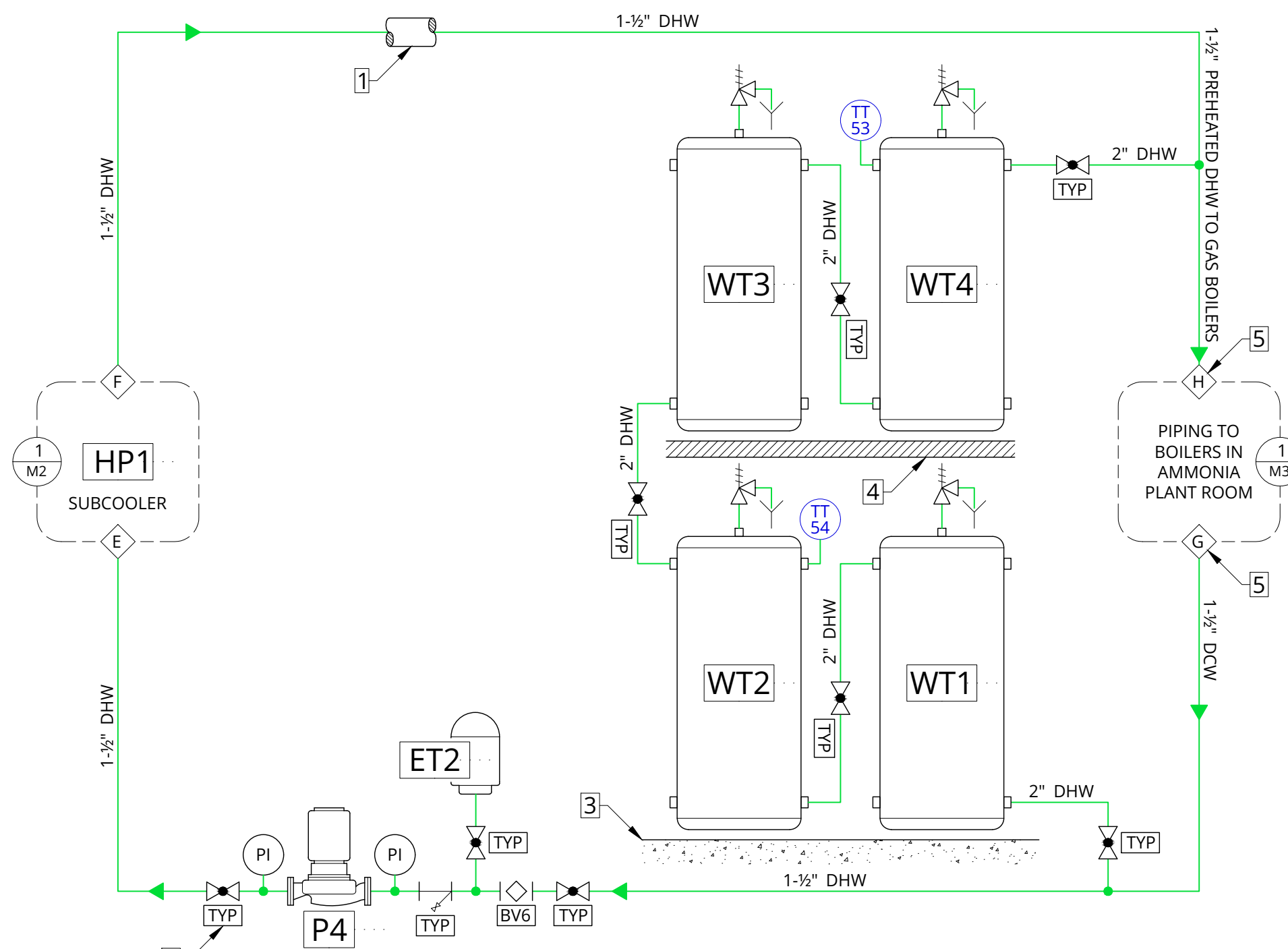
NOTES:

<div>PRIME CONSULTANT</div> <div>POLAR ENGINEERING</div> <div>PHONE 778-700-1086 WEBSITE www.polareng.ca</div>	<div>CLIENT</div> <div>REGIONAL DISTRICT OF NANAIMO</div> <div>PHONE 250-390-4111 WEBSITE www.rdn.bc.ca</div>	<div>ENGINEER OF RECORD</div> <div>IAN WELLE P.ENG.</div> <div>EGBC PERMIT TO PRACTICE NUMBER 1003657</div>	<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div> <div>DRAWING TITLE</div> <div>AMMONIA PLANT INTEGRATION</div>	REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
				2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE
				3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	D
				4	2025-01-31	NG	IW	ISSUED FOR TENDER	SHEET NAME
				5	-	-	-	-	M3
				6	-	-	-	-	



1 HEAT PUMP CONDENSER LOOP SCHEMATIC

- KEYNOTES:
1. CAPPED 4-INCH TEE FOR FUTURE EXPANSION
 2. LOCATE AIR VENT AT HIGHEST POINT IN GLYCOL SYSTEM AT TOP OF VERTICAL RISER
 3. INSULATE ALL GLYCOL PIPING
 4. COMMISSION TO MAINTAIN 25PSI STATIC PRESSURE FILL
 5. BALANCE TO MEET DESIGN FLOWRATE



2 HEAT PUMP SUBCOOLER DHW PREHEAT SCHEMATIC

- KEYNOTES:
1. INSULATE ALL DHW PIPING
 2. TYPICAL VALVES ARE TO SPECIFICATION
 3. LOCATE WT1 & WT2 ON THE FLOOR
 4. LOCATE WT3 & WT4 ON THE MEZZANINE
 5. REUSE DESUPERHEATER WATER LINES FOR SUBCOOLER

STORAGE TANKS						
TAG	MAKE	MODEL	DESCRIPTION	CAPACITY [GAL]	FLUID	NOTES
ST1	TUNSTALL	ST120-HP	INSULATED STORAGE TANK	120	WATER	
ST2	TUNSTALL	ST120-HP	INSULATED STORAGE TANK	120	WATER	
ST3	TUNSTALL	ST120-HP	INSULATED STORAGE TANK	120	WATER	
ST4	TUNSTALL	ST120-HP	INSULATED STORAGE TANK	120	WATER	

- NOTES:
1. PICKLED & PASSIVATED 316L STAINLESS INTERIOR MATERIAL. NO ANODE REQ'D
 2. R16-5 INSULATION
 3. SENSOR WELLS & 2-INCH INLET/OUTLET PORTS W INLET DIFFUSER

HYDRAULIC SEPARATOR						
TAG	MAKE	MODEL	DESCRIPTION	CAPACITY [GAL]	FLUID	NOTES
F1	CALEFFI	549510A	4-INCH HYDRAULIC SEPARATOR	8.0	30% PG	1,2

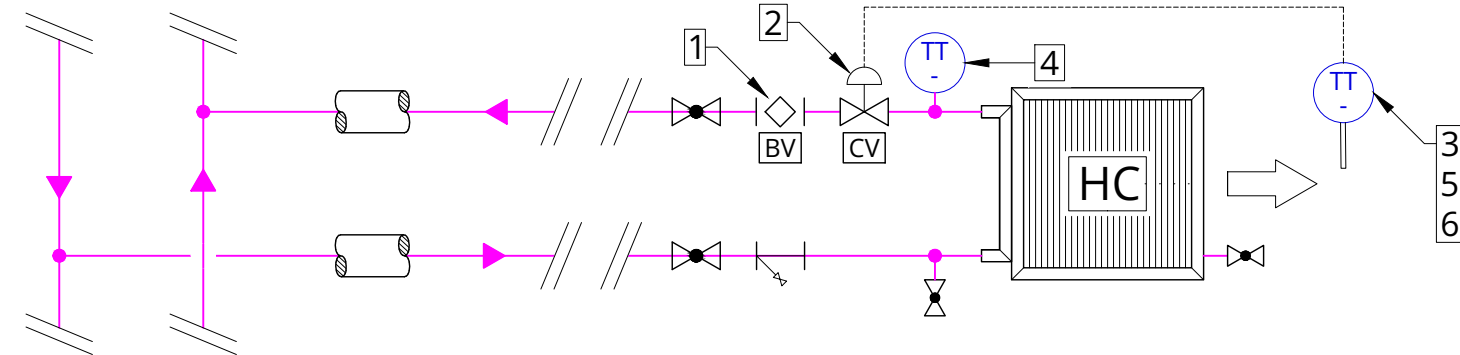
- NOTES:
1. CW AIR VENT, FILTER, MAGNETIC PLUG & BLOWDOWN
 2. ENSURE BLOWDOWN VALVE & MAGNETIC WELL HAVE ADEQUATE SERVICE CLEARANCE

EXPANSION TANKS						
TAG	MAKE	MODEL	DESCRIPTION	CAPACITY [GAL]	FLUID	NOTES
ET1	AMTROL	L-200	HYDRONIC	43	30% PG	1
ET2	-	-	DHW	10	WATER	1

- NOTES:
1. CHARGE AIR SIDE TO 25 PSI

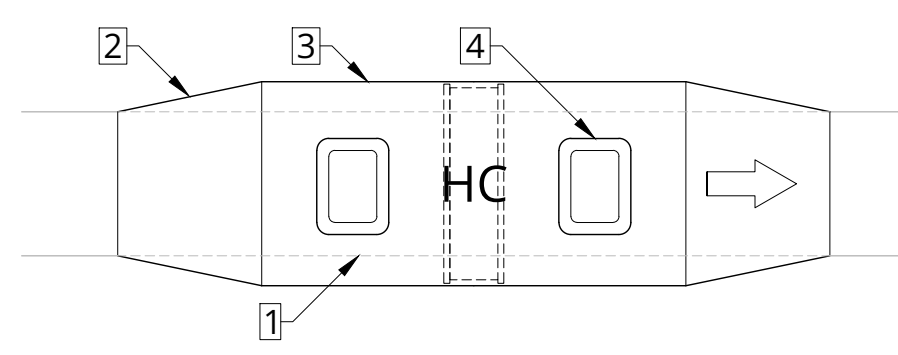
GLYCOL FEED TANKS							
TAG	MAKE	MODEL	DESCRIPTION	CAPACITY [GAL]	FLUID	POWER	NOTES
GT1	CALEFACTIO	GMPLC55		55	30% PG	120V/60HZ/1P	1,2,3,4

- NOTES:
1. CW ALARM PANEL KIT (#GMPAL)
 2. CW LIQUID LEVEL GAUGE, PUMP SUCTION HOSE W STRAINER, PRESSURE PUMP W CHECK VALVE, CUTOUT PIGGYBACK LEVEL FLOAT, ADJUSTABLE PRV
 3. PRESSURE REDUCING VALVE SET TO 25PSI
 4. HYDRONIC CONNECTION MAY BE OF FLEXIBLE TYPE W MINIMUM 50PSI RATING



3 TYPICAL HEATING COIL DETAIL WITH CONTROL VALVE

- KEYNOTES:
1. BALANCE VALVES: BV1, BV2, BV3, BV4. BALANCE TO MEET DESIGN FLOWRATE
 2. CONTROL VALVES: CV1, CV2, CV3, CV4
 3. PROVIDE AIR TEMPERATURE SENSOR SUPPLY DUCT DOWNSTREAM OF HEATING COIL
 4. LWT SENSORS: TT42, TT45, TT48, TT51
 5. LAT SENSORS: TT43, TT46, TT49, TT52
 6. CONNECT AHU1&2 TO TEMPERATURE SENSOR DOWNSTREAM OF COIL - USE TO CONTROL GAS HEATER



4 TYPICAL HEATING COIL DUCT INTEGRATION

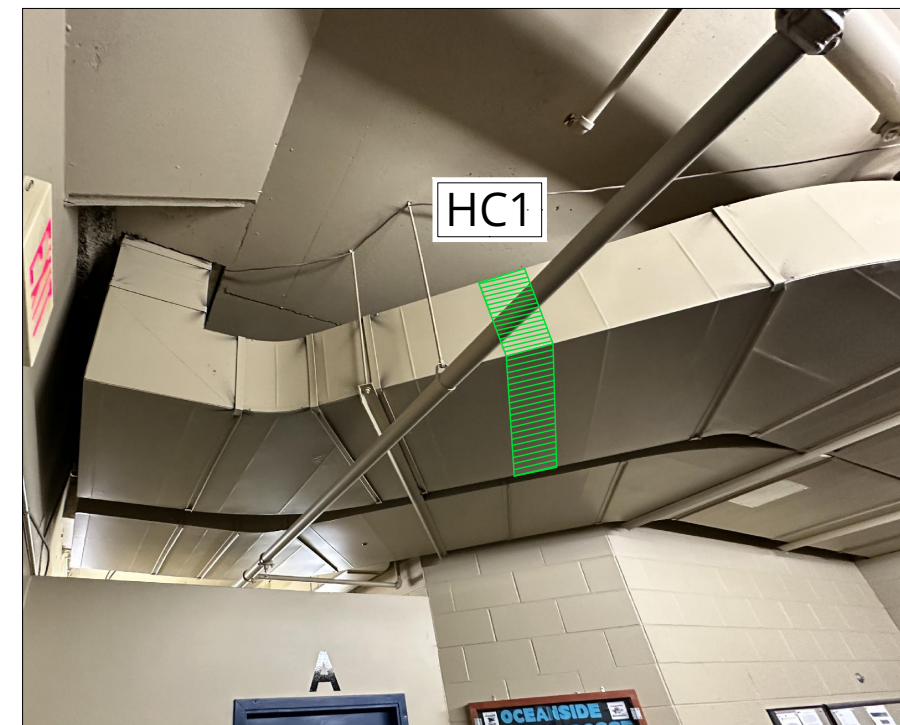
- KEYNOTES:
1. DEMOLISH EXISTING DUCT SECTION
 2. EXPAND DUCTING TO MATCH AIR COIL SIZE WITH TRANSITIONS
 3. PROVIDE STRAIGHT DUCT SECTION FOR HEATING COIL
 4. INSTALL HAND ACCESS DOORS ON BOTH SIDES OF HEATING COIL

PUMPS					
TAG		P1	P2	P3	P4
LOCATION		MECH RM (133)	MECH RM (133)	MECH RM (133)	MECH RM (133)
SERVICE		HP1 CONDENSER	HYDRONICS	DH1	HP1 SUBCOOLER
CAPACITY	SYSTEM FLOW [GPM]	134	109	49	34.5
	PUMP FLOW [GPM]	134	109	49	34.5
	HEAD [PSI]	1.75	35.4	8.25	5
	NPSH [PSI]	1.5	5.29	0.91	1.24
	PUMP EFFICIENCY [%]	69	73	59	57
TYPE	DESCRIPTION	VERTICAL INLINE	VERTICAL INLINE	VERTICAL INLINE	VERTICAL INLINE
	FLUID TYPE	30% PG	30% PG	30% PG	DOMESTIC WATER
	RPM @ DUTY POINT	865	3312	1083	1170
	BHP @ DUTY POINT [HP]	0.67	3.07	0.38	0.18
	SUCT CONN [IN]	4	1.5	2	2
	IMP DIA [IN]	4.93	4.96	7.15	5.24
	BASE TYPE	PIPE MOUNT	PIPE MOUNT	PIPE MOUNT	PIPE MOUNT
	SUCTION DIFFUSER	-	-	-	-
ELECTRICAL	MOTOR SIZE [HP]	0.5	5	0.75	0.33
	MOTOR RPM	-	-	1200	1200
	VOLT/PHASE/HZ	575/3P/60	575/3P/60	575/3P/60	575/3P/60
	DRIVE CONTROL	EXTERNAL VFD	EXTERNAL VFD	SINGLE SPEED	SINGLE SPEED
WEIGHT	WEIGHT [LB]	200	108	192	135
BASIS OF DESIGN	MAKE	ARMSTRONG	ARMSTRONG	ARMSTRONG	ARMSTRONG
	MODEL	4380-4x4x6-6P	4380-1.5x1.5x5	4380-2x2x8-6P	4380-2x2x6-6P
	NOTES	1,3	1,3	1,3	1,4

- NOTES:
1. INCLUDE SUCTION DIFFUSER AS INSTALLATION REQUIRES. MATCH SYSTEM SIZE & PUMP INLET SIZE
 3. BACNET MS/TP COMMUNICATION INTERFACE MODULE
 4. ALL BRONZE OR SS CONSTRUCTION SUITABLE FOR DOMESTIC WATER

HEATING COILS						
TAG		HC1	HC2	HC3	AHU7	DH1
LOCATION		AHU1 SA DUCT	AHU2 SA DUCT	AHU3 RA DUCT	UNIT	UNIT
SERVICE		HEATING	HEATING	HEATING	HEATING	HEATING
CAPACITY	CAPACITY [MBH]	200	167	323	433	586
TYPE	DWP [PSI]	150	150	150	-	-
	FIN HEIGHT [IN]	15	12	24	-	-
	FIN LENGTH [IN]	42	34	65	-	-
	ROWS	3	3	2	-	-
	FPI	8	10	10	-	-
AIR SIDE	FLOWRATE [CFM]	2500	2000	8000	5000	6600
	VELOCITY [FPM]	599	744	772	501	-
	EAT [FDB]	18	18	53	15	66
	LAT [FDB]	92	95	90	95	147
	APD [IN-WG]	0.32	0.54	0.40	0.211	-
FLUID SIDE	FLUID TYPE	30% PG	30% PG	30% PG	30% PG	30% PG
	FLOWRATE [GPM]	18.0	13.5	32.0	45.7	49
	EWT [F]	160	160	160	160	160
	LWT [F]	137	134	139	140	135
	WPD [FT-WC]	4.6	3.7	1.9	16	10.7
	CONN SIZE [IN]	-	-	-	-	-
BASIS OF DESIGN	MAKE	ENGINEERED AIR	ENGINEERED AIR	ENGINEERED AIR	TRANE	EI SOLUTIONS
	MODEL	-	-	-	-	-
	NOTES	1,2	1,2	1,2	3	3

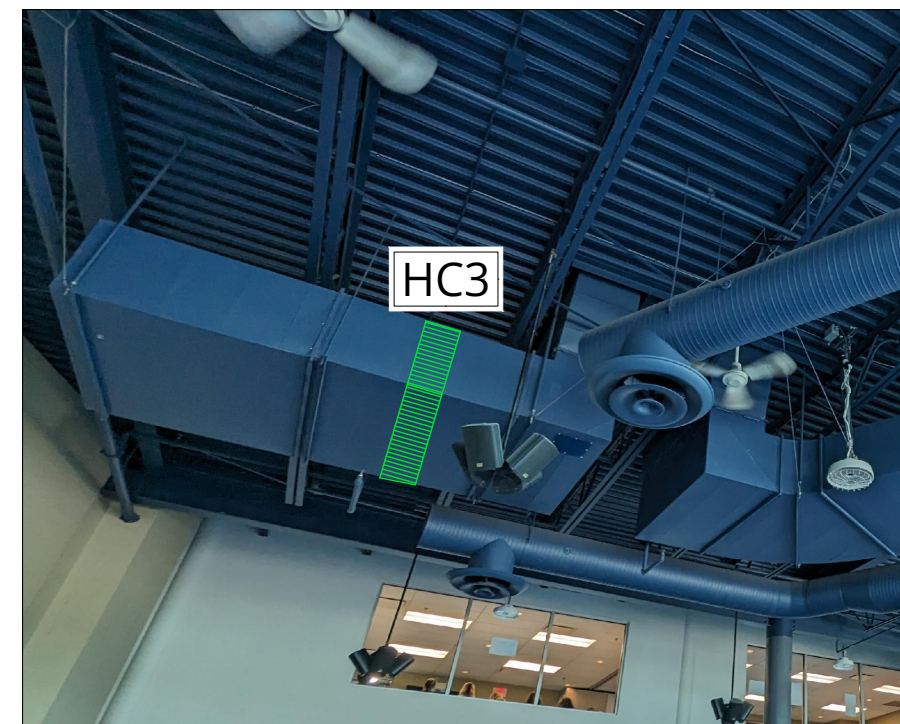
- NOTES:
1. SELECT ROWS, FINS, AND CIRCUITING TO SUIT DESIGN CRITERIA
 2. FIELD CONFIRM COIL SIZING PRIOR TO ORDERING
 3. CW UNIT



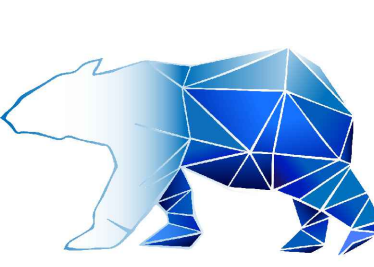


5 HEATING COIL (HC1) LOCATION IN SUPPLY DUCT

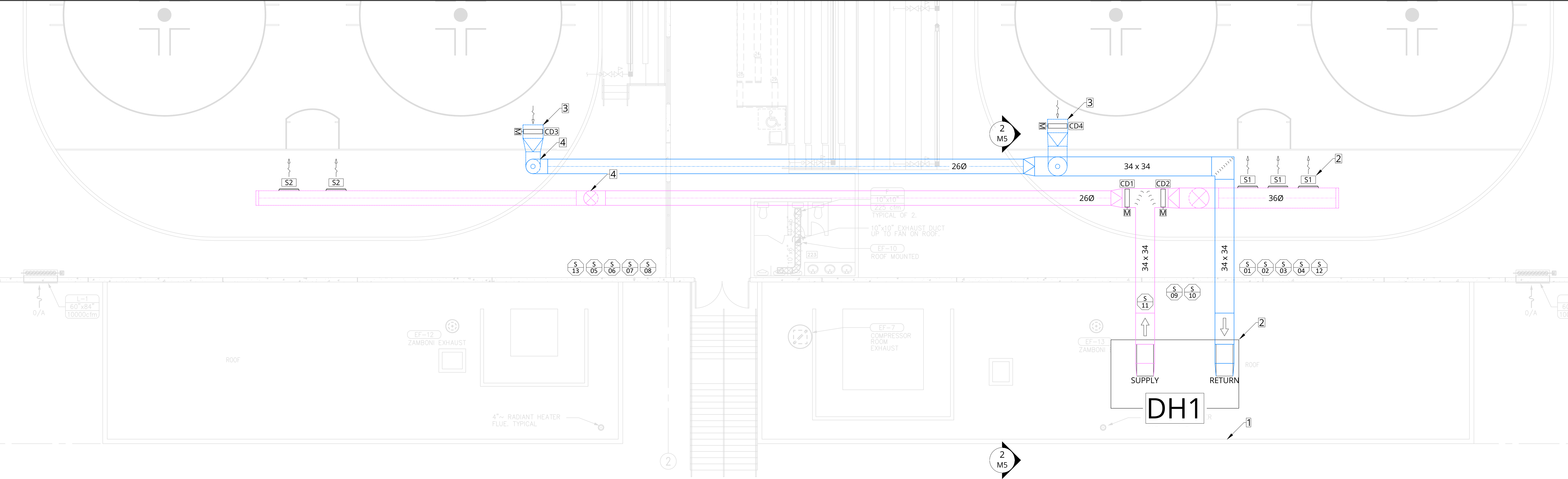


6 HEATING COIL (HC2) LOCATION IN SUPPLY DUCT



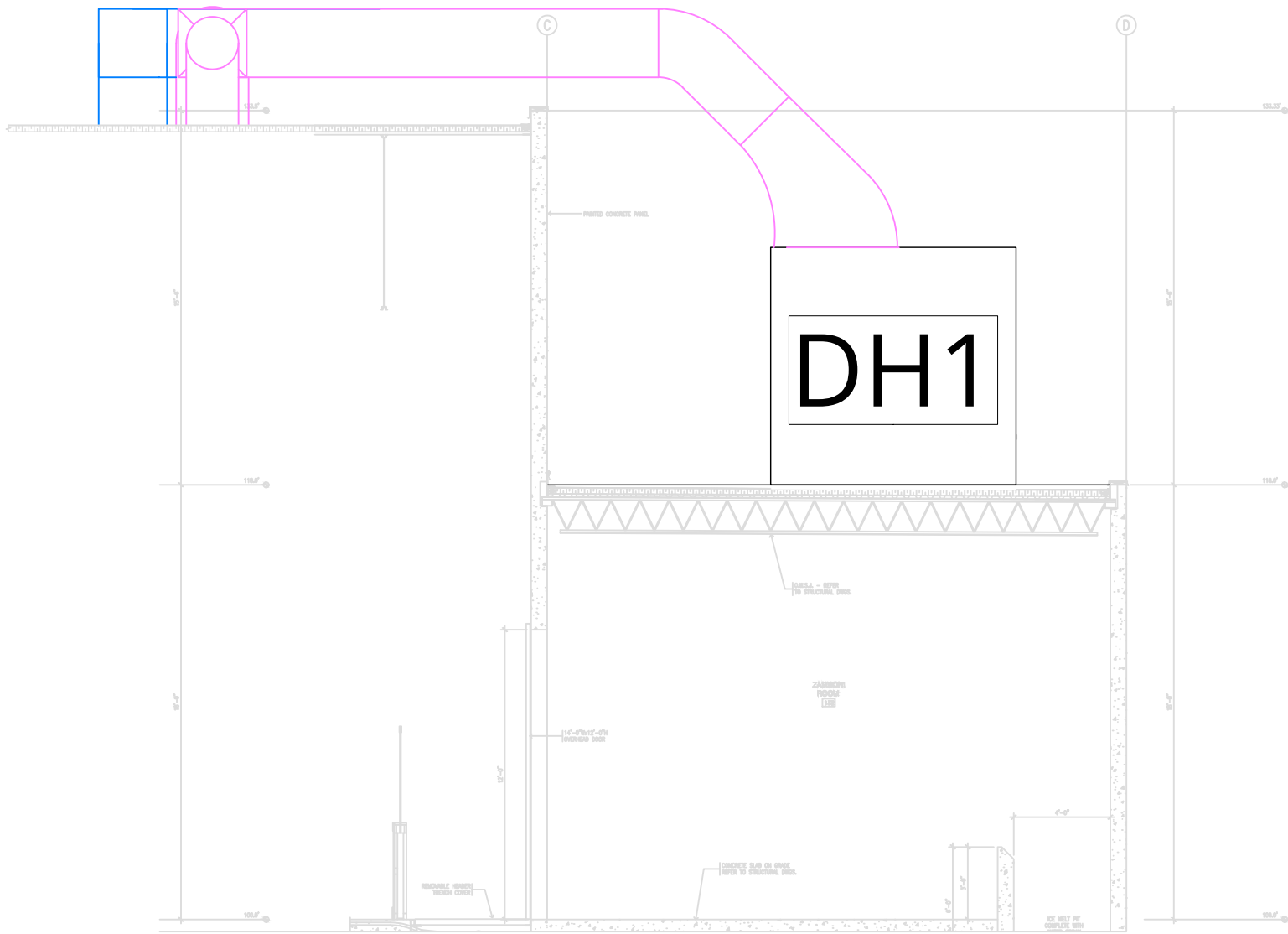
7 HEATING COIL (HC3) LOCATION IN RETURN DUCT

<div>PRIME CONSULTANT</div> <div><div>POLAR ENGINEERING</div></div> <div>PHONE778-700-1086WEBSITEwww.polareng.ca</div>		<div>CLIENT</div> <div><div>REGIONAL DISTRICT OF NANAIMO</div></div> <div>PHONE250-390-4111WEBSITEwww.rdn.bc.ca</div>		<div>ENGINEER OF RECORD</div> <div><div>PROFESSIONAL ENGINEER OF S.L. TRANGELED # 50517 2025-02-03 STEFFEN TRANGELED P.ENG. EGBC PERMIT TO PRACTICE NUMBER 1003657</div></div>		<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div>		REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
								1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
								2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE
						<div>DRAWING TITLE</div> <div>HYDRONIC P&ID</div>		3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	D
								4	2025-01-31	NG	ST	ISSUED FOR TENDER	SHEET NAME
								5	-	-	-	-	M4
		6	-	-	-	-							



1 DEHUMIDIFIER & DUCTWORK

- KEYNOTES:
- 1. SUPPLY AND INSTALL RAILING ALONG ROOF EDGE.
 - 2. DIRECT AWAY FROM ICE SURFACE ALONG CEILING.
 - 3. INSTALL BIRD SCREEN.
 - 4. REUSE AND ENLARGE EXISTING OPENINGS.
 - 5. SEE STRUCTURAL DRAWINGS FOR DETAILS FOR UNIT MOUNTING.



2 SIDE VIEW

DEHUMIDIFIERS										
TAG	DESCRIPTION	MAKE	MODEL	SUPPLY AIR (CFM)	SUPPLY AIR ESP (IN-WC)	H ₂ O REMOVAL RATE (LB/HR)	REACT AIR (CFM)	POWER (V/PH/Hz)	HEATER (KBTU/H)	NOTES
DH1	DEHUMIDIFIER	EI SOLUTIONS	FLEX-120-PB	12,000	1.5	304.7	6,600	575/3/60	-	1,2,3

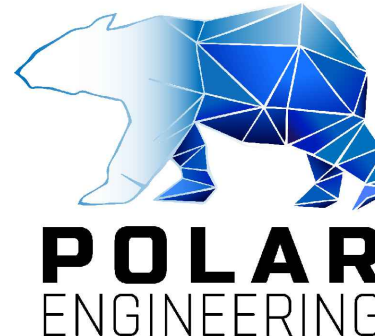


- NOTES:
- 1. MOISTURE REMOVAL RATE BASED ON 100% OA & SUMMER CONDITIONS
 - 2. HEAT RECLAIM COIL CAPACITY EQUALS 585.7 KBTU/H
 - 3. HEATING COIL CAPACITY EQUALS 721.6 KBTU/H

CONTROL DAMPERS							
TAG	DESCRIPTION	MAKE	MODEL	AIRFLOW (CFM)	WIDTH (IN)	HEIGHT (IN)	NOTES
CD1	CONTROL DAMPER	TAMCO	SERIES 1000	6,000	34	34	1
CD2	CONTROL DAMPER	TAMCO	SERIES 1000	6,000	34	34	1
CD3	CONTROL DAMPER	TAMCO	SERIES 1000	6,000	34	34	2
CD4	CONTROL DAMPER	TAMCO	SERIES 1000	6,000	34	34	2

- NOTES:
- 1. INSTALL WITH MODULATING ACTUATOR
 - 2. INSTALL WITH 2 POSITION ACTUATOR

GRILLE, REGISTERS & DIFFUSERS						
TAG	DESCRIPTION	MAKE	MODEL	AIRFLOW (CFM)	SIZE	NOTES
S1	HCD LOUVER	PRICE INDUSTRIES	HCD	2,000	36" x 15"	
S2	HCD LOUVER	PRICE INDUSTRIES	HCD	3,000	36" x 15"	

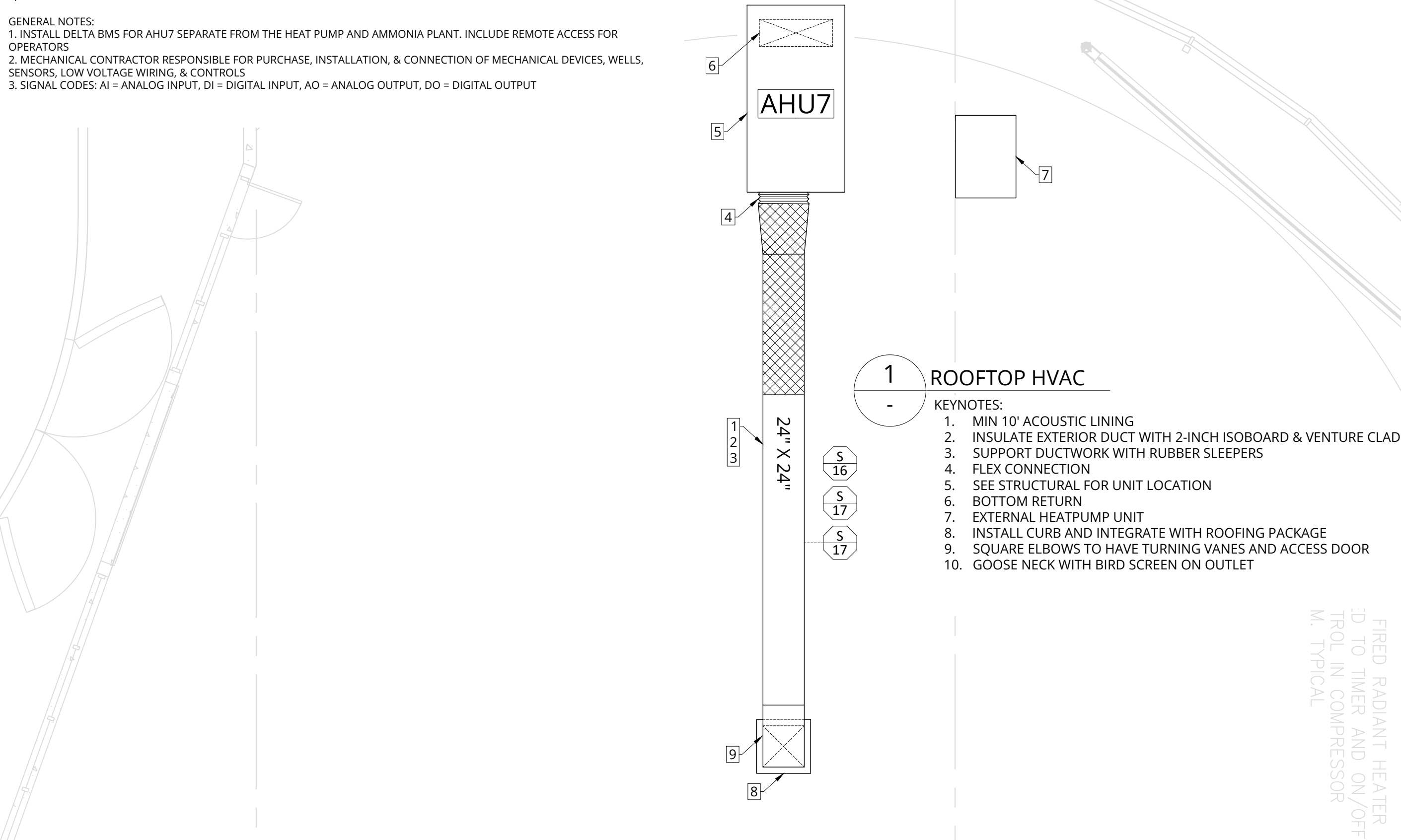
SCALE: 1:80

<div>PRIME CONSULTANT</div> <div><div>POLAR ENGINEERING</div></div> <div>PHONE 778-700-1086 WEBSITE www.polareng.ca</div>	<div>CLIENT</div> <div><div>REGIONAL DISTRICT OF NANAIMO</div></div> <div>PHONE 250-390-4111 WEBSITE www.rdn.bc.ca</div>	<div>ENGINEER OF RECORD</div> <div><div>IAN WELLE P.ENG. EGBC PERMIT TO PRACTICE NUMBER 1003657</div></div>	<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div>	REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
				2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE D
			3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	SHEET NAME M5	
			4	2025-01-31	NG	IW	ISSUED FOR TENDER		
			5	-	-	-	-		
			6	-	-	-	-		
<div>DRAWING TITLE</div> <div>DEHUMIDIFIER</div>									

AHU7 INPUT POINT LIST					
TAG	DESCRIPTION	PURPOSE	LOCATION	SIGNAL	NOTES
S12	CO2 SENSOR	SPACE CO2 CONCENTRATION	RA DUCT	AI	1
S13	TEMPERATURE	SPACE TEMPERATURE	POND	AI	
S14	RELATIVE HUMIDITY	SPACE HUMIDITY	POND	AI	
S15	OCCUPANCY SENSOR	CHECK SPACE OCCUPANCY	POND	AI	2
S16	CO2 SENSOR	OUTDOOR CO2 CONCENTRATION	ROOFTOP	DI	
S17	TEMPERATURE	OUTDOOR TEMPERATURE	ROOFTOP	AI	
AHU7	OUTDOOR AIR DAMPER	OUTDOOR AIR RATIO	AHU7	AO	3

NOTES:
1. LOCATE CO2 SENSOR IN RETURN DUCTWORK
2. ENSURE OCCUPANCY SENSOR IS POSITIONED TO PROVIDE COVERAGE OF SPACE
3. PROVIDE MODULATING ACTUATOR FOR OUTDOOR AIR DAMPER

GENERAL NOTES:
1. INSTALL DELTA BMS FOR AHU7 SEPARATE FROM THE HEAT PUMP AND AMMONIA PLANT. INCLUDE REMOTE ACCESS FOR OPERATORS
2. MECHANICAL CONTRACTOR RESPONSIBLE FOR PURCHASE, INSTALLATION, & CONNECTION OF MECHANICAL DEVICES, WELLS, SENSORS, LOW VOLTAGE WIRING, & CONTROLS
3. SIGNAL CODES: AI = ANALOG INPUT, DI = DIGITAL INPUT, AO = ANALOG OUTPUT, DO = DIGITAL OUTPUT



AIR HANDLER										
TAG	MAKE	MODEL	DESCRIPTION	TYPE	HEATING CAPACITY [KBTU/HR]	COOLING CAPACITY [KBTU/HR]	FLOW RATE [CFM]	POWER [W/PHVHZ]	FAN [HP]	NOTES
AHU7	TRANE	CSAAA010	SERVICES POND	HEAT PUMP	216	192	5,000	575/3/60	7.5	1,2

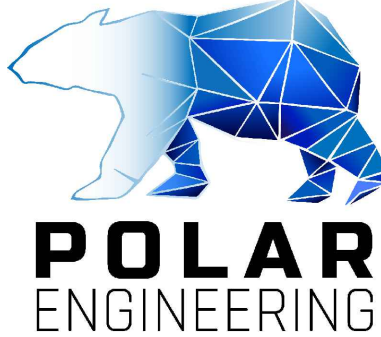


NOTES:
1. AHU CW EXTERNAL SAMSUNG HEAT PUMP UNIT, MODEL AM192DXVQQH/AA
2. AHU CW HYDRONIC PREHEAT COIL

SCALE: 1:60

AHU7: GRILLE, REGISTERS & DIFFUSERS						
TAG	DESCRIPTION	MAKE	MODEL	AIRFLOW (CFM)	SIZE	NOTES
SG1	DBH-20T-6WAY	PRICE INDUSTRIES	DBH-6WAY	5,000	20T	
RG1	EGG CRATE GRILLE	PRICE INDUSTRIES	80	2,500	26" x 18"	
RD1	RELIEF DAMPER	GREENHECK	BR-10	1,000	24" X 24"	1

1. ADJUST DAMPER TO MAINTAIN 0.05 IN-WG POSITIVE PRESSURE AT 1,000 CFM

SCALE: 1:60

<div>PRIME CONSULTANT</div> <div>POLAR ENGINEERING</div> <div>PHONE 778-700-1086 WEBSITE www.polareng.ca</div>	<div>CLIENT</div> <div>REGIONAL DISTRICT OF NANAIMO</div> <div>PHONE 250-390-4111 WEBSITE www.rdn.bc.ca</div>	<div>ENGINEER OF RECORD</div> <div>STEFFEN TRANGELED P.ENG.</div> <div>EGBC PERMIT TO PRACTICE NUMBER 1003657</div>	<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div> <div>DRAWING TITLE</div> <div>POND AIR HANDLER</div>	REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #
				1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409
				2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	D
				3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL	
				4	2025-01-31	NG	ST	ISSUED FOR TENDER	M6
				5	-	-	-	-	
				6	-	-	-	-	

INPUT POINT LIST					
TAG	DESCRIPTION	PURPOSE	LOCATION	SIGNAL	NOTES
HP-C1	IQ MODULE	COMPRESSOR STATUS/ALARMS	C1	-	
HP-C2	IQ MODULE	COMPRESSOR STATUS/ALARMS	C2	-	
HP-C3	IQ MODULE	COMPRESSOR STATUS/ALARMS	C3	-	
HP-PT01	PRESSURE SENSOR	DISCHARGE PRESSURE	HX2	AI	1
HP-TT02	TEMPERATURE SENSOR	DISCHARGE TEMPERATURE	HX2	DI	1
HP-TT03	TEMPERATURE SENSOR	CONDENSING TEMPERATURE	HX2	AI	1
HP-PT04	PRESSURE SENSOR	SUCTION PRESSURE	HX1	AI	1
HP-TT05	TEMPERATURE SENSOR	SUCTION SUPERHEAT TEMPERATURE	HX1	AI	1
HP-TT06	TEMPERATURE SENSOR	SUBCOOLER OUTLET TEMPERATURE	HX3	AI	1
HP-TT07	TEMPERATURE SENSOR	SUBCOOLER INLET TEMPERATURE	HX3	AI	1
HP-TT08	TEMPERATURE SENSOR	CONDENSER LWT	HX2	AI	1,2
HP-TT09	TEMPERATURE SENSOR	CONDENSER EWT	HX2	AI	1,2
HP-TT10	TEMPERATURE SENSOR	SUBCOOLER EWT	HX3	AI	1,2
HP-TT11	TEMPERATURE SENSOR	SUBCOOLER LWT	HX3	AI	1,2
HP-CT12	CURRENT SENSOR	HEAP PUMP POWER	HP1	AI	1,2
HP-LT13	LEVEL SWITCH	LOW LEVEL OIL SWITCH	V2	DI	
HP-TT14	TEMPERATURE SENSOR	C1 DISCHARGE TEMPERATURE	C1	AI	1
HP-TT15	TEMPERATURE SENSOR	C2 DISCHARGE TEMPERATURE	C2	AI	1
HP-TT16	TEMPERATURE SENSOR	C3 DISCHARGE TEMPERATURE	C3	AI	1
HP-EM17	OMICON SYSTEM1000	CONDENSER & SUBCOOLER OUTPUT	HP1	BACNET	3
HP-FM18	F3104-11111-1111 FLOWMETER	CONDENSER FLOWRATE	HX2	AI	2
HP-FM19	F4600-150-010-16 FLOWMETER	SUBCOOLER FLOWRATE	HX3	AI	2
TT41	TEMPERATURE SENSOR	HYDRONIC SUPPLY TEMP	P2	AI	1
TT42	TEMPERATURE SENSOR	HEATING COIL LWT	HC1	AI	1
TT43	TEMPERATURE SENSOR	HEATING COIL LAT	HC1	AI	1
TT44	TEMPERATURE SENSOR	HYDRONIC RETURN TEMP	P2	AI	1
TT45	TEMPERATURE SENSOR	HEATING COIL LWT	HC2	AI	1
TT46	TEMPERATURE SENSOR	HEATING COIL LAT	HC2	AI	1
TT48	TEMPERATURE SENSOR	HEATING COIL LWT	HC3	AI	1
TT49	TEMPERATURE SENSOR	HEATING COIL LAT	HC3	AI	1
TT51	TEMPERATURE SENSOR	HEATING COIL LWT	AHU7	AI	1
TT52	TEMPERATURE SENSOR	HEATING COIL LAT	AHU7	AI	1
TT53	TEMPERATURE SENSOR	SUBCOOLER TANK LWT	ST4	AI	1
TT54	TEMPERATURE SENSOR	SUBCOOLER TANK EWT	ST1	AI	1
TT55	TEMPERATURE SENSOR	HEATING COIL EWT	DH1	AI	1
TT56	TEMPERATURE SENSOR	HEATING COIL LWT	DH1	AI	1
P1	PUMP STATUS	CONDENSER PUMP STATUS	P1	DI	
P2	PUMP STATUS	HYDRONIC PUMP STATUS	P2	DI	
P3	PUMP STATUS	DEHUMIDIFIER PUMP STATUS	P3	DI	
P4	PUMP STATUS	SUBCOOLER PUMP STATUS	P4	DI	
P1	PUMP SPEED	CONDENSER PUMP SPEED	P1	AI	
P2	PUMP SPEED	HYDRONIC PUMP SPEED	P2	AI	
GT1	ALARM	GLYCOL FEEDTANK LOW LEVEL	GT1	DI	
DH1	DEHUMIDIFIER	DEHUMIDIFIER RUN STATUS	DH1	DI	
S01	TEM & RH SENSOR	INTERIOR TEMPERATURE & RH	RINK 1	AI	1
S02	CO2 SENSOR	INTERIOR CO2	RINK 1	AI	1
S03	CO SENSOR	INTERIOR CO	RINK 1	AI	1,5
S04	DEWPOINT SENSOR	INTERIOR DEWPOINT	RINK 1	AI	1
S05	TEM & RH	INTERIOR TEMPERATURE & RH	RINK 2	AI	1
S06	CO2 SENSOR	INTERIOR CO2	RINK 2	AI	1
S07	CO SENSOR	INTERIOR CO	RINK 2	AI	1,5
S08	DEWPOINT SENSOR	INTERIOR DEWPOINT	RINK 2	AI	1
S09	TEM & RH SENSOR	EXTERIOR TEMPERATURE & RH	ROOFTOP	AI	1
S10	CO2 SENSOR	EXTERIOR CO2	ROOFTOP	AI	1
S11	AIR PRESSURE SWITCH	DUCT PRESSURE	SUPPLY DUCT	DI	
S12	NO2 SENSOR	INTERIOR NO2	RINK1	AI	6
S13	NO2 SENSOR	INTERIOR NO2	RINK2	AI	6
DH-S1	TEMPERATURE SENSOR	PROCESS EAT	DH1	AI	
DH-S2	RELATIVE HUMIDITY SENSOR	PROCESS EARH	DH1	AI	
DH-S3	TEMPERATURE SENSOR	PROCESS LAT	DH1	AI	
DH-S4	RELATIVE HUMIDITY SENSOR	PROCESS LARH	DH1	AI	
DH-S5	TEMPERATURE SENSOR	REGEN EAT	DH1	AI	
DH-S6	RELATIVE HUMIDITY SENSOR	REGEN EARH	DH1	AI	
DH-S7	TEMPERATURE SENSOR	REGEN LAT	DH1	AI	
DH-S8	TEMPERATURE SENSOR	PREHEAT COIL LAT	DH1	AI	
DH-S9	DIFFERENTIAL PRESSURE SENSOR	PROCESS FILTERS	DH1	DI	
DH-S10	DIFFERENTIAL PRESSURE SENSOR	REGEN FILTERS	DH1	DI	
DH-S11	FAN SPEED	PROCESS FANS	DH1	AI	
DH-S12	FAN SPEED	REGEN FANS	DH1	AI	
AHU1	RUN STATUS	HEATING DEMAND	AHU1	DI	4
AHU2	RUN STATUS	HEATING DEMAND	AHU2	DI	4
AHU3	RUN STATUS	HEATING DEMAND	AHU3	DI	4
AHU7	RUN STATUS	HEATING DEMAND	AHU7	DI	
DH1	RUN STATUS	HEATING DEMAND	DH1	DI	

NOTES:
1. ENSURE SENSOR RANGE ENCOMPASSES OPERATING RANGE
2. CONNECT TO ENERGY METER
3. INTEGRATE WITH HEAT PUMP DDC TO SUPPLY ENERGY, TEMPERATURE, FLOWRATE, POWER & COP TO HP1 GRAPHICS VIA BACNET
4. SIGNAL FROM EXISTING UNITS
5. MINIMUM SENSOR REQUIREMENTS: 1PPM RESOLUTION, 0-200PPM RANGE, ±5% PRECISION
6. MINIMUM SENSOR REQUIREMENTS: 20PPB RESOLUTION, 0-10PPM RANGE, ±5% PRECISION

GENERAL NOTES:
1. MECHANICAL CONTRACTOR RESPONSIBLE FOR PURCHASE, INSTALLATION, & CONNECTION OF MECHANICAL DEVICES, WELLS, SENSORS, LOW VOLTAGE WIRING, & CONTROLS
2. SIGNAL CODES: AI = ANALOG INPUT, DI = DIGITAL INPUT, AO = ANALOG OUTPUT, DO = DIGITAL OUTPUT

GENERAL NOTES:
1. MECHANICAL CONTRACTOR RESPONSIBLE FOR PURCHASE, INSTALLATION, & CONNECTION OF MECHANICAL DEVICES, WELLS, SENSORS, LOW VOLTAGE WIRING, & CONTROLS
2. SIGNAL CODES: AI = ANALOG INPUT, DI = DIGITAL INPUT, AO = ANALOG OUTPUT, DO = DIGITAL OUTPUT

NOTES:
1. HEAT PUMP REQUIRES SINGLE POINT CONNECTION AND CONTAINS THREE COMPRESSORS AT 60.6KW EACH
2. HEAT PUMP COMPRESSORS CONTROLLER BY HEAT PUMP CONTROL PANEL
3. FHP MOTORS ARE LESS THAN 1/4 HP

STARTER CODES:
CP = CONTROL PANEL
MRR = MOTOR RATED RELAY
VSD = VARIABLE SPEED DRIVE
PCS = PACKAGED CONTROL SYSTEM

CONTROL CODES:
BAS = BUILDING AUTOMATION SYSTEM
PS = PRESSURE SWITCH

NOTES:
1. COMPLETE W BELIMO MFT ACTUATOR, SPRING OR CAPACITOR. FAILSAFE

NOTES:
1. CW TEST PORTS & MEMORY

FILE NAME: 2409 OCEANSIDE ER REV0001 | PLT01 DATE: 2025-02-03 | DRAWN BY: M702



1 MECHANICAL ROOM PLATFORM

KEYNOTES:

- DEMOLISH EXISTING PLATFORM AND REPLACE (SEE STRUCTURAL FOR DETAILS).
- TRIM BACK DUCTWORK AND MOVE CONTROL DAMPER CLOSER TO WALL.
- DEMOLISH LOWER HALF OF LADDER TO HEIGHT OF NEW PLATFORM.



2 EXISTING DEHUMIDIFIER

KEYNOTES:

- DEMOLISH EXISTING DEHUMIDIFIER AND DUCTWORK.



3 DEHUMIDIFIER DUCTWORK

KEYNOTES:

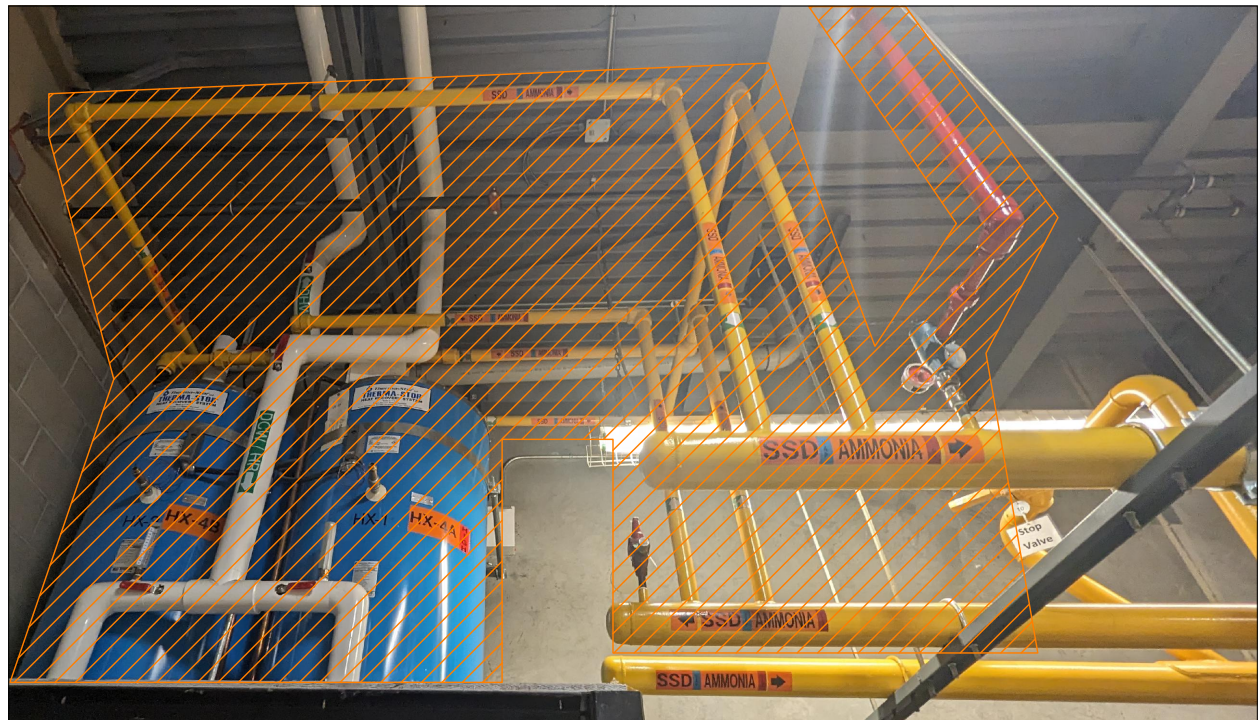
- DEMOLISH DEHUMIDIFIER DUCTWORK ON ROOF AND INSIDE RINKS.



5 POND DEHUMIDIFIER

KEYNOTES:

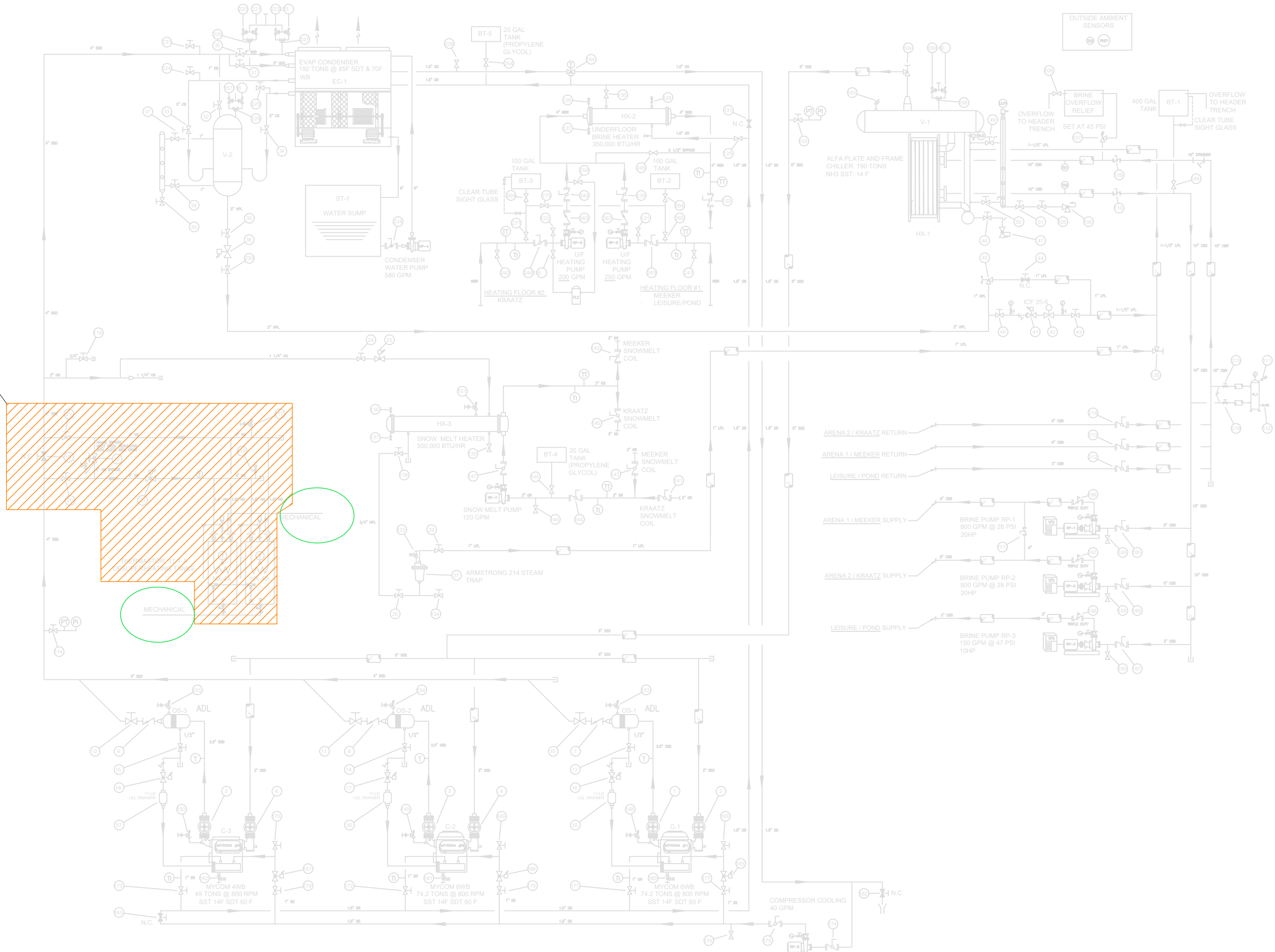
- DEMOLISH POND DEHUMIDIFIER AND SHED.
- LEAVE PAD



6 DESUPERHEATERS 1 & 2

KEYNOTES:

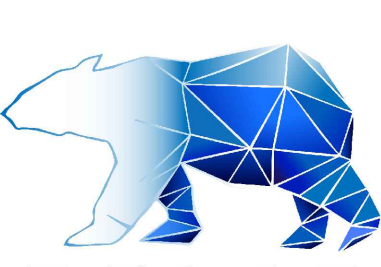

- DEMOLISH DESUPERHEATERS & AMMONIA PIPING.
- REUSE WATER LINES DCWHR & DHWWR FOR SUBCOOLER.



8 DEHUMIDIFIER DUCTWORK IN THE POND

KEYNOTES:

- DEMOLISH DEHUMIDIFIER DUCTWORK IN THE POND AND PATCH PENETRATIONS

<div>PRIME CONSULTANT</div> <div></div> <div>PHONE778-700-1086WEBSITEwww.polareng.ca</div>		<div>CLIENT</div> <div></div> <div>PHONE250-390-4111WEBSITEwww.rdn.bc.ca</div>		<div>ENGINEER OF RECORD</div> <div></div> <div>IAN WELLE P.ENG. EGBC PERMIT TO PRACTICE NUMBER 1003657</div>		<div>PROJECT TITLE</div> <div>OCEANSIDE PLACE - ENERGY RECOVERY</div>		REV #	DATE	DRAWN BY	CHECKED BY	DESCRIPTION	PROJ #			
								1	2024-09-06	NG	IW	ISSUED FOR REVIEW	2409			
								2	2024-10-03	NG	IW	ISSUED FOR REVIEW 90%	SHEET SIZE	D		
								3	2024-12-20	NG	IW	ISSUED FOR REVIEW FINAL				
								DRAWING TITLE	MECHANICAL DEMOLITION	4	2025-01-31	NG	IW	ISSUED FOR TENDER	SHEET NAME	M8
										5	-	-	-	-		
6	-	-	-	-												