PIPING LEGEND

- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- HOSE END DRAIN VALVE
- GAUGE COCK
- Y-STRAINER
- AUTOMATIC AIR VENT
- FLEXIBLE CONNECTOR
- FLANGED JOINT
- UNION
- ELBOW TURNED UP
- ELBOW TURNED DOWN
- PIPING CONNECTION (TEE)
- PIPING REDUCER
- DIRECTION OF FLOW

INSTRUMENT/CONTROL LEGEND

- (P) PRESSURE GAUGE
- (T) ANALOG THERMOMETER
- (TH) DIGITAL THERMOMETER
- (TT) TEMPERATURE TRANSMITTER
- (PT) PRESSURE TRANSMITTER
- (DP) DIFFERENTIAL PRES GAUGE
- (FM) FLOW METER
- (FS) FLOAT SWITCH
- (LCA) LOW COOLANT SWITCH
- (TLM) TANK LEVEL MONITOR
- (LSP) LEVEL SENSOR PROBE
- (GLS) GLYCOL LEVEL SENSOR

NOTE: SEE ELECTRICAL FOR ADDITIONAL DETAIL ON CONTROL & INSTRUMENTATION DEVICES

ABBREVIATIONS

ø	DIAMETER (PHASE)
A	AMPS
AFF	ABOVE FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
DFR	DIESEL FUEL RETURN
DFS	DIESEL FUEL SUPPLY
ECR	ENGINE COOLANT RETURN
ECS	ENGINE COOLANT SUPPLY
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GRC	GALVANIZED RIGID CONDUIT
HP	HORSEPOWER
HYR	HYDRONIC RETURN
HYS	HYDRONIC SUPPLY
ID	INSIDE DIAMETER
KW	KILOWATT
LT	LIQUID TIGHT
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
MPT	MALE PIPE THREAD
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OC	ON CENTER
OD	OUTSIDE DIAMETER
PRV	PRESSURE RELIEF VALVE
PSI	POUNDS/PER SQUARE INCH
PSID	PSI DIFFERENTIAL
PSIG	PSI GAUGE
SCH	SCHEDULE
TDH	TOTAL DEVELOPED HEAD
TYP	TYPICAL
UOR	USED OIL RETURN
V	VOLTS
W	WATTS
WG	WATER GAUGE

ENGINE COOLING SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
R-1 R-2	GLYCOL RADIATOR	SINGLE PASS, 4 ROW, VERTICAL CORE, 3" FLANGED CONNECTIONS, GALVANIZED COATING, EXPANDED METAL GUARD. 6,000 BTU/MIN AT 77°F AMBIENT, 50 GPM 50% ETHYLENE GLYCOL AT 192F IN, 0.22 PSI MAX GLYCOL PRESSURE DROP. 3 HP, 460 V, 3 PH, MOTOR SUITABLE FOR VFD OPERATION AT 10:1 TURNDOWN RATIO.	DIESEL RADIATOR PART NO. DR3490
TV-1	COOLANT THERMOSTATIC VALVE	3" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 175F NOMINAL TEMPERATURE	FPE PART NO. A3010-175
ET-1	GEN COOLANT EXPANSION TANK	24 GALLON CAPACITY TANK, 12.75" O.D x 48" LONG FABRICATED STEEL TANK, SEE FABRICATION DETAIL	CUSTOM FABRICATION
HP-EC	ENGINE COOLANT FILL HAND PUMP	DOUBLE ACTION PISTON HAND PUMP, ALUM HOUSING, SS PISTON SHAFT & LINER, BUNA-N SEALS, ANTI-SIPHONING VALVE.	GPI MODEL HP-100
G-EC	ENGINE COOLANT GLYCOL TANK LEVEL GAUGE	MAGNETIC OPERATED SPIRAL GAUGE FOR #1 DIESEL, 25 PSIG MAX OPERATING PRESSURE, 35" LIQUID COLUMN PLUS 4" RISER.	ROCHESTER MODEL 8660
GT-1	ENGINE COOLANT GLYCOL STORAGE TANK	60 GALLON CAPACITY, 36"x10"x44"HIGH FABRICATED RECTANGULAR STEEL TANK, SEE FABRICATION DETAIL	CUSTOM FABRICATION

HEAT RECOVERY & PLANT HEATING EQUIPMENT SCHEDULE:

HX-1	POWER PLANT HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2" SOLDER CUP PORTS, 290 MBH MIN CAPACITY. PRIMARY: 35 GPM 195F EWT (50% ETHYLENE) 2.0 PSI MAX WPD, SECONDARY: 40 GPM 185F LWT (50% PROPYLENE) 2.0 PSI MAX WPD	SWEP INTERNATIONAL AB B120THx60/1P
P-CUH1	CONTROL ROOM HEAT	1 GPM AT 18' TDH, 1/25HP, 115V, 1ø. PROVIDE WITH 3/4" SOLDER COMPANION SHUT OFF FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 15-58FC SPEED 3
P-HR1A	HEAT RECOV. PRIMARY	35 GPM AT 8' TDH, 1/6HP, 115V, 1ø. PROVIDE WITH 2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-44F SPEED 3
P-HR1B	HEAT RECOV. SECONDARY	40 GPM AT 30' TDH (CP-3) (18GPM WASHETERIA LOOP, 22 GPM SCHOOL LOOP) 1/2HP, 115V, 1ø. WITH 2" NPT FLANGES	GRUNDFOS MAGNA1 40-120 F CONSTANT PRESSURE
CUH-1	CONTROL ROOM HEAT	WALL MOUNTED HOT WATER CABINET UNIT HEATER, 18 MBH AT 1 GPM 180F EWT & 60F EAT.	TOYOTOMI HC-20 WITH WALL MOUNT BRACKET
ET-2	HEAT RECOV. EXP. TANK	BLADDER TYPE EXPANSION TANK, 44 GALLON TANK, 22 GALLON ACCEPTANCE VOL, 125 PSIG WORKING PRESSURE, 12 PSIG PRE-CHARGE.	AMTROL AX-80
HX-2	WASHETERIA HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2" SOLDER CUP PORTS, 225 MBH MIN CAPACITY. PRIMARY: 18 GPM 195F EWT (50% PROPYLENE) 1.0 PSI MAX WPD, SECONDARY: 25 GPM 185F LWT (50% PROPYLENE) 1.4 PSI MAX WPD	SWEP INTERNATIONAL AB B120THx60/1P
P-HR2	WASHETERIA HEAT RECOVERY PUMP	25 GPM AT 8' TDH, 1/6HP, 115V, 1ø. PROVIDE WITH 1-1/2" SOLDER SHUT OFF COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-44F SPEED 2
HX-3	SCHOOL HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2" SOLDER CUP PORTS, 225 MBH MIN CAPACITY. PRIMARY: 22 GPM 195F EWT (50% PROPYLENE) 1.0 PSI MAX WPD, SECONDARY: 30 GPM 185F LWT (50% PROPYLENE) 1.8 PSI MAX WPD	SWEP INTERNATIONAL AB B120THx60/1P
P-HR3	SCHOOL HEAT RECOVERY PUMP	30 GPM AT 7' TDH (CP1), 1/3HP, 115V, 1ø. PROVIDE WITH 1-1/2" SOLDER SHUT OFF COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS MAGNA 3 40-80F CONSTANT PRESSURE
GSB	SCHOOL GLYCOL SPILL BASIN	6 GALLON HEAVY DUTY POLYETHYLENE TANK WITH REMOVABLE LID AND 3/4" DRAIN SPIGOT	TAMCO INDUSTRIES #14875 WITH OPTIONAL COVER #6350

PIPE/TUBING STRUT CLAMP SCHEDULE

PIPE/TUBE	CLAMP #	PIPE/TUBE	CLAMP #
1/2" COPPER	BVT062	1/2" STEEL	B2008
3/4" COPPER	BVT087	3/4" STEEL	B2009
1" COPPER	BVT112	1" STEEL	B2010
1-1/4" COPPER	BVT125	1-1/4" STEEL	B2011
1-1/2" COPPER	BVT162	1-1/2" STEEL	B2012
2" COPPER	BVT212	2" STEEL	B2013
2-1/2" COPPER	BVT262	2-1/2" STEEL	B2014
3" COPPER	BVT312	3" STEEL	B2015

NOTES:
1) ALL CLAMP NUMBERS ARE B-LINE. EQUIVALENT EQUALS ACCEPTABLE.
2) ALL COPPER TUBE CLAMPS TO BE CUSHIONED, VIBRA-CLAMP.
3) ALL STEEL PIPE CLAMPS NOT CUSHIONED. USE FOR ALL STEEL PIPE AND RIGID CONDUIT.
4) SEE PLANS, ELEVATIONS, ISOMETRICS, AND DETAILS FOR ACTUAL PIPE SIZES.

VENTILATION EQUIPMENT SCHEDULE:

EF-1 EF-2	GENERATION ROOM EXHAUST FANS	DIRECT DRIVE 14"ø PROPELLER SIDEWALL EXHAUST FAN, 2,100 CFM AT 0.375" SP, 1,750 RPM. FURNISH WITH SPECIAL 1/2 HP, 115 V, 1 PH VARIGREEN MOTOR WITH OPTIONAL 0-10V LEADS AND OPTIONAL TRANSFORMER	GREENHECK SE1-14-436-VG (1/2 HP)
EF-1 EF-2 COMB.	FAN & INTAKE DAMPERS	OPPOSED BLADE LOW-LEAKAGE CONTROL DAMPER, AIRFOIL BLADES, GALVANIZED STEEL CONSTRUCTION, ACETAL BEARINGS, STAINLESS STEEL JAMB SEALS, TPE BLADE SEALS.	GREENHECK VCD-33
(MD)	MOTORIZED DAMPER ACTUATOR	MULTI-VOLTAGE SPRING RETURN ACTUATOR	BELIMO AF-BUP

FUEL SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
P-DF1 P-DF2 P-UO1	DAY TANK FILL PUMP DIESEL CIRC. PUMP USED OIL DRAIN PUMP	ROTARY GEAR PUMP, 5 GPM @ 25 PSID, C-FRAME MOUNT, 1" FPT INLET AND OUTLET, IRON CONSTRUCTION, STEEL SHAFT, CARBON GRAPHITE BUSHINGS, BUNA-N LIP SEAL, WITH 75 PSID INTERNAL PRV. DIRECT MOUNT TO FOOT MOUNT 56C FRAME MOTOR, 1,200 RPM, 1/2 HP, 115VAC.	GORMAN RUPP GMC1DC3-B-40C PUMP AND CENTURY #C827 MOTOR FOR FIELD ASSEMBLY
P-UO2	USED OIL INJECTION PUMP	ROTARY GEAR PUMP GEAR PUMP - 1.2 GPH @ 15 PSID, 1/8" FPT INLET AND OUTLET, PEEK GEARS, PTFE SEALS, MAGNETICALLY COUPLED TO FOOT MOUNT 56C FRAME MOTOR, 1,725 RPM, 1/2 HP, 115VAC.	MICROPUMP GA-V21.J8FS.A PUMP WITH #81518 ADAPTER & CENTURY #C826V1 MOTOR
HP-DT	DAY TANK FILL HAND PUMP	DOUBLE ACTION PISTON HAND PUMP, ALUM HOUSING, SS PISTON SHAFT & LINER, BUNA-N SEALS, ANTI-SIPHONING VALVE.	GPI MODEL HP-100
G-DT	DAY TANK LEVEL GAUGE	MAGNETIC OPERATED SPIRAL GAUGE FOR #1 DIESEL, 25 PSIG MAX OPERATING PRESSURE, 35" LIQUID COLUMN PLUS 4" RISER.	ROCHESTER MODEL 8660
M-DT	DAY TANK METER	STEEL BODY, 1" ANSI 150# FLANGED ENDS, 20-800 GPH FLOW RANGE, O-RINGS AND SEALS COMPATIBLE WITH #1 DIESEL, DIRECT READ 6-DIGIT REGISTER TO 0.1 GAL, DRY CONTACT PULSER.	ISTEC CONTOIL 9226-F
F-DT	DAY TANK FILTER	THREE FILTER BANK WITH INDIVIDUAL FILTER ISOLATION VALVES, IMPACT RESISTANT "SEE-THRU" BOWLS, 15 PSIG WORKING PRESSURE. WITH 1/2" WATER PROBE PORT & 3 EACH WATER-IN-FUEL DETECTION KITS. INSTALL 3 EACH 10 MICRON AQUABLOC FILTER ELEMENTS & FURNISH 3 SPARES.	RACOR TURBINE 791000FV10-P WATER-IN-FUEL RR30880E ELEMENTS 2020V10
F-GEN	GENSET FILTER	SINGLE FILTER, IMPACT RESISTANT "SEE-THRU" BOWL, 15 PSIG WORKING PRESSURE. INSTALL 10 MICRON AQUABLOC FILTER ELEMENTS & FURNISH 1 SPARE.	RACOR TURBINE 1000FV-10 ELEMENT 2020V10
F-UOB	USED OIL BLENDER FILTER	CUSTOM FABRICATED FILTER BANK. FURNISH WITH TWO STAGE ELEMENTS: 10 MICRON HYDROSORB II FILTER 2 MICRON PARTICULATE FILTER PROVIDE 3 OF EACH ELEMENT TYPE	CIM-TEK #30034 (HYDROSORB) CIM-TEK #30066 (2 MICRON)
ABV-1	1" ACTUATED BALL VALVE	ACTUATED BALL VALVE ASSEMBLY RATED TO -50F. TYPE 304 STAINLESS STEEL FABRICATED COUPLING BRACKET, SHAFT, AND FASTENERS CONFIGURED TO ALLOW WRENCH ACCESS FOR MANUAL OPERATION OF VALVE WITHOUT REMOVING ACTUATOR. LOW TEMP BALL VALVE, 150# RF FLANGED ENDS. ELECTRIC ACTUATOR WITH OPERATING VOLTAGE, NEMA RATING, AND TORQUE AS INDICATED. CONFIGURE WITHOUT MANUAL OVERRIDE SHAFT EXTENSION. FURNISH WITH PTC SELF REGULATING HEATER, AUXILIARY SWITCH SET (AUXILIARY SWITCHES 3 & 4), AND EXXON BEACON 325 SEVERE COLD LUBRICANT.	VALVE ASSEMBLY: DG VALVE (780) 413-1760 1" BALL VALVE - 151 IN-LB OPERATING TORQUE @ -50F NUTRON MODEL T3-R10R01LZ NEMA 7 ACTUATOR - 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023

INSTRUMENTATION SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
(TT)	TEMPERATURE TRANSMITTER	RTD, 20-240°F RANGE, 4-20mA OUTPUT, 1/2" NPT PIPING CONNECTION, 6mm DIAMETER BY 2.5" LONG STEM, HIRSCHMANN ELECTRICAL CONNECTION	NOSHOK 800-20/240-1-1-8-8-025-6
(PT)	PRESSURE TRANSMITTER	0-60 PSIG RANGE, 4-20mA OUTPUT, 1/4" NPT PIPING CONNECTION, HIRSCHMANN ELECTRICAL CONNECTION	NOSHOK 100-60-1-1-2-7
(FM)	HEAT RECOVERY FLOW METER	150# ANSI FLANGED CONNECTION, SIZE AS INDICATED, PTFE LINER, HASTELLOY C ELECTRODES, RATED FOR 210F OPERATION. FURNISH WITH TRANSMITTER FOR DIRECT AND REMOTE MOUNTING, 115/230 VAC, 50/60 HZ, AND NEMA 4X BODY.	SIEMENS SITRANS METER: FM MAGFLO MAG 3100 TRANSMITTER: F M MAGFLO MAG 5000, CODE NO. FDK: 7ME6910, OPTION 1AA10-1AA0
(LCA)	GLYCOL TANK LOW COOLANT ALARM	LOW COOLANT LEVEL ALARM FLOAT SWITCH, SEE MECHANICAL FOR INSTALLATION DETAILS	MURPHY EL-150-K1
(GLS)	GLYCOL TANK LEVEL SENSOR PROBE	12" PROBE, 2" NPT TANK CONNECTION, SS FLOAT, 1/4" RESOLUTION, NEMA 4 ENCLOSURE WITH SIGNAL CONDITIONER AND 1/2" NPT CONDUIT CONNECTION	INNOVATIVE COMPONENTS CLM-2012-SS
(FS)	DAY TANK/HOPPER FLOAT SWITCH	VERTICAL ACTION FLOAT SWITCH, REVERSIBLE 70VASPST NC/NO SWITCH, 1/8" NPT, 1"MAX ø BUNA-N FLOAT FOR S.G=.47, MINIMUM 60" LONG PVC COATED #20 AWG LEAD WIRES	INNOVATIVE COMPONENTS LS-12-111/2
(TLM)	TANK LEVEL MONITOR PANEL	TANK LEVEL MONITOR CONSOLE FOR UP TO SIX TANKS, COLOR LCD SCREEN, ETHERNET CONNECTION WITH WEB INTERFACE, PROGRAMMABLE VOLUME CALCULATIONS WITH TEMPERATURE COMPENSATION	FRANKLIN/INCON EVO 200
(LSP)	DAY TANK/HOPPER TANK LEVEL SENSOR PROBE (SHOP FAB.)	TOP-MOUNT TANK PROBE WITH INSTALLATION KIT FOR 2" NPT RISER, WATER TIGHT COMPRESSION GLAND FITTING FOR CABLE ENTRANCE. FRANKLIN FUEL SYSTEMS, NO SUBSTITUTES. PROBE AND RISER LENGTH AS INDICATED ON INSTALLATION DETAILS.	4' TANK PROBE: FMP-LL3-53-I 2' TANK PROBE: FMP-LL3-29-I FLOAT: TSP-IDF2 2" FOR DIESEL INSTALLATION KIT: TSP-C2A
(LSP)	INTERMEDIATE TANK LEVEL SENSOR PROBE (ON SITE)	TOP-MOUNT TANK PROBE WITH INSTALLATION KIT FOR 2" NPT RISER, WATER TIGHT COMPRESSION GLAND FITTING FOR CABLE ENTRANCE. FRANKLIN FUEL SYSTEMS, NO SUBSTITUTES. PROBE AND RISER LENGTH AS INDICATED ON INSTALLATION DETAILS.	10'ø TANK PROBE: FMP-LL3-125-I FLOAT: TSP-IDF2 2" FOR DIESEL INSTALLATION KIT: TSP-C2A

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS (APPLIES TO ALL SCHEDULES):
SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

ALL MATERIALS AND EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE

REVISION #2
ISSUED
DECEMBER
2023

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	UPDATED FOR CIVIL REDESIGN AND ADD SCHOOL HEAT RECOVERY	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

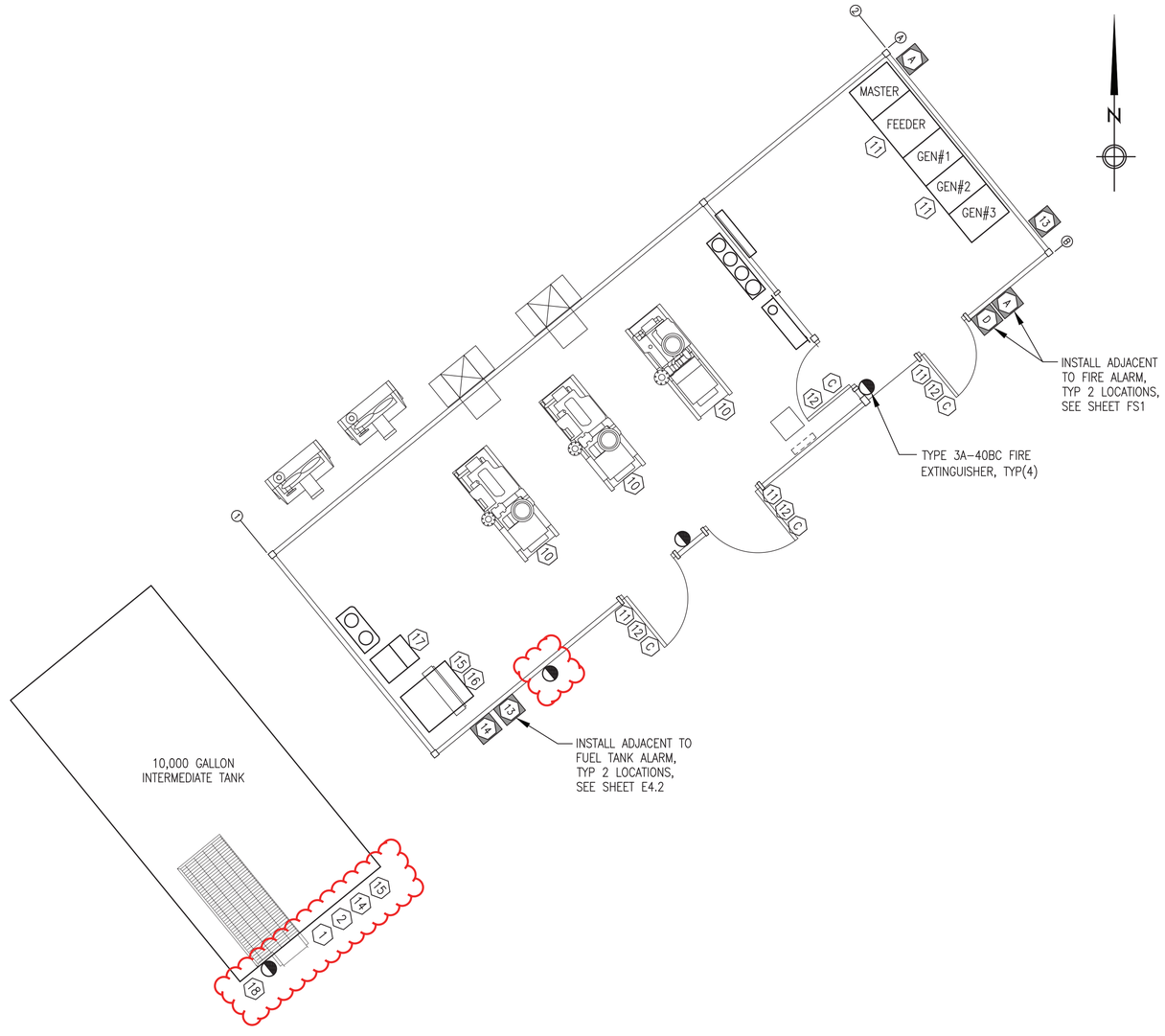
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: MECHANICAL LEGENDS & SCHEDULES

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M1	SHEET: M1.1
PROJECT NUMBER:	



1 M1.2 POWER PLANT WARNING SIGN & FIRE EXTINGUISHER PLAN
1"=4'

WARNING SIGN & INFORMATIONAL PLACARD SCHEDULE:

PROVIDE DECALS AND SIGN BOARDS AS SPECIFIED BELOW IN ACCORDANCE WITH THE SCHEDULE. INSTALL WHERE SHOWN ON THE WARNING SIGN/PLACARD PLAN THIS SHEET AND OTHER REFERENCED SHEETS.

(#) DECALS — DECALS TO BE WHITE NON-REFLECTIVE VINYL BACKGROUND, 3M 3650-10, WITH 3M SERIES 225 HIGH PERFORMANCE VINYL LETTERS, ONE SIDE ONLY, SELF ADHESIVE BACK. NOMINAL 10"x14" SIZE UNLESS INDICATED OTHERWISE OR REQUIRED TO BE LARGER FOR SPECIFIED LETTER SIZE. WARNING LITES OR EQUAL. INSTALL ON FACE OF DOORS OR ELECTRICAL ENCLOSURES WHERE INDICATED. CLEAN SURFACES AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

(#) BOARDS — SIGN BOARDS TO BE EQUAL TO DECALS EXCEPT MOUNTED ON 0.08" ALUMINUM PLATE. PROVIDE 3/16" HOLES IN ALL FOUR CORNERS. ATTACH TO CHAIN LINK FENCING WITH HOG RINGS OR STAINLESS STEEL TIES. ATTACH TO WALLS OR STRUCTURES WITH STAINLESS STEEL SCREWS OR BOLTS.

WARNING SIGNS – RED LETTERING ON WHITE BACKGROUND.

- (A) "FIRE ALARM"
- (C) "CAUTION, ROOM PROTECTED BY WATER MIST FIRE PROTECTION SYSTEM, IN CASE OF FIRE KEEP DOOR CLOSED AND DO NOT ENTER"
- (D) "FLASHING LIGHT MEANS FIRE SUPPRESSION AGENT HAS DISCHARGED"
- (1) (1) "DANGER FLAMMABLE, NO SMOKING OR OPEN FLAMES"
- (2) (2) "ATTACH STATIC WIRE, & VERIFY TANK CAPACITY PRIOR TO FILLING TANKS"
- (10) "CAUTION: THIS UNIT STARTS AUTOMATICALLY, LOCK & TAG OUT PRIOR TO SERVICE"
- (11) "DANGER HIGH VOLTAGE, AUTHORIZED PERSONNEL ONLY"
- (12) "CAUTION HEARING & EYE PROTECTION REQUIRED"
- (13) "FUEL OIL DAY TANK ALARM"
- (14) (14) "IN CASE OF SPILL CALL DEC 1-800-478-9300"

INFORMATIONAL PLACARDS – BLACK LETTERING ON WHITE BACKGROUND.

- (15) (15) "CHECK INTERMEDIATE TANK LEVEL DAILY, FILL WHEN BELOW 4'-8"
- (16) "TO MANUALLY FILL DAY TANK IN CASE OF EMERGENCY:
  1) TURN OFF POWER TO THE DAY TANK CONTROL PANEL
  2) MANUALLY OPEN ACTUATOR VALVE AT INTERMEDIATE TANK USING A WRENCH
  3) OPEN NORMALLY CLOSED VALVE BY HAND PUMP
  4) OPERATE HAND PUMP WHILE MONITORING LEVEL GAUGE"
- (17) "TO CHANGE ENGINE OIL:
  1) VERIFY ENGINE OIL HAS NOT BEEN CONTAMINATED WITH GLYCOL OR OTHER FLUIDS.
  2) LOCK & TAG GENERATOR OUT OF SERVICE
  3) OPEN NORMALLY CLOSED DRAIN VALVE AT GEN
  4) TURN ON PUMP TIMER & PUMP OUT ENGINE OIL
  5) CHANGE FILTER & PLACE OLD ONE IN HOPPER
  6) CLOSE DRAIN VALVE & REFILL ENGINE
  7) RUN ENGINE, SHUT OFF, & CHECK DIPSTICK
  8) TOP OFF & PLACE ENGINE BACK IN SERVICE"
- (18) "INTERMEDIATE TANK MAX FILL LEVEL 8'-0" (90% TANK CAPACITY)

ALL DECALS, SIGN BOARDS, FIRE EXTINGUISHERS, AND VALVE TAGS WERE FURNISHED AND INSTALLED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE ALSO TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE

VALVE TAG SCHEDULE:

GREEN (DIESEL FUEL)

- (21) "NORMALLY OPEN, CLOSE ONLY FOR EMERGENCIES & TEMPORARY MAINTENANCE OF DAY TANK & DEVICES"
- (22) "NORMALLY CLOSED, OPEN ONLY FOR HAND PRIMING DAY TANK"
- (23) "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF BLENDER"
- (24) "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF ENGINE"
- (25) not used
- (26) "NORMALLY CLOSED, OPEN ONLY FOR FUEL DELIVERY"

BROWN (USED OIL)

- (41) "NORMALLY CLOSED, OPEN ONLY FOR ENGINE OIL CHANGE"
- (42) "BLENDER FILTER #1, 10 MICRON HYDROSORB" (DECAL)
- (43) "BLENDER FILTER #2, 2 MICRON PARTICULATE" (DECAL)

PINK (COOLING/ETHYLENE GLYCOL)

- (51) "NORMALLY CLOSED, OPEN ONLY FOR ADDING COOLANT – ETHYLENE GLYCOL ONLY"
- (52) "NORMALLY CLOSED, OPEN ONLY ON HIGH COOLANT TEMPERATURE ALARM"
- (53) "NORMALLY OPEN, CLOSE ONLY ON HIGH COOLANT TEMPERATURE ALARM"
- (54) "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
- (55) "NORMALLY OPEN, HEAT RECOVERY RETURN"

YELLOW (HEAT RECOVERY/PROPYLENE GLYCOL)

- (61) "NORMALLY CLOSED, OPEN ONLY FOR ADDING FLUID – PROPYLENE GLYCOL ONLY"
- (62) "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
- (63) "NORMALLY OPEN, HEAT RECOVERY RETURN"
- (64) "NORMALLY OPEN, BOILER RETURN TO HX"
- (65) "NORMALLY OPEN, HX TO BOILER"
- (66) "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE"
- (67) "HEAT RECOVERY SYSTEM PROPYLENE GLYCOL – DO NOT MIX WITH SCHOOL"

SPECIFICATIONS:
VALVE TAGS – 3"x5"x.08" ALUMINUM, 3/16" HOLES IN ALL FOUR CORNERS, BLACK GERBER THERMAL TRANSFER FILM PRINTED LETTERS ON GERBER 220 HIGH PERFORMANCE VINYL BACKGROUND, COLOR AS INDICATED, ONE SIDE ONLY. WARNING LITES OR APPROVED EQUAL.

DECALS – WHERE NOTED AS DECALS PROVIDE WITHOUT ALUMINUM BACKING PLATE.

INSTALLATION NOTES:
1) SEE DRAWINGS THAT FOLLOW FOR LOCATIONS OF ALL SPECIFIC FUNCTION TAGS.
2) SECURE EACH METAL TAG TIGHT TO VALVE, PIPE, OR DEVICE WITH STAINLESS STEEL SAFETY WIRE THROUGH ALL FOUR CORNERS OR FASTEN TO ADJACENT WALL OR SECTION OF STRUT WITH SCREWS.
3) APPLY DECALS TO CLEAN SMOOTH SURFACES OF EQUIPMENT OR ON ADJACENT WALL.
4) FOR ALL VALVES NOT INDICATED WITH A SPECIFIC FUNCTION TAG PROVIDE 1-1/2" ROUND BRASS TAG LABELED "N.O." FOR NORMALLY OPEN VALVES AND 1-1/2" SQUARE BRASS TAG LABELED "N.C." FOR NORMALLY CLOSED VALVES. SECURE TAGS TO VALVE OR ADJACENT PIPE WITH BEADED BRASS CHAIN.

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	UPDATED FOR CIVIL REDESIGN AND ADD SCHOOL HEAT RECOVERY	12/22/23	BCG
1	UPDATED TO COORDINATE WITH ON SITE DESIGN & NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: WARNING SIGN & FIRE EXTINGUISHER PLAN, SIGN & VALVE TAG SCHEDULES

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M1 | SHEET: M1.2
PROJECT NUMBER:

Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#3	65	55	---
Level 2	#1 or #2	100	90	45
Level 3	#3 & #1 or #2	165	145	80
Level 4	All	265	---	125

Note : Gen #1 & #2 are equal capacity. Manually select lead unit.

Engine-Generator Alarm Settings (Easygen - EZGN)			
Function	Normal Range	Alarm	Shut Down
Overspeed	1795-1805	----	1900 RPM
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-850°F	900°F	-----
Under Frequency	59.5-60.5 Hz	----	58.2 Hz
Over Frequency	59.5-60.5 Hz	----	61.8 Hz
Under Voltage	470-490 V	----	432 V
Over Voltage	470-490 V	----	528 V
Reverse Power	0	----	10%

Generator Breaker Settings (Easygen - EZGN)	
Function	Setting
Gen #1 Breaker Trip Setpoint (EZGN Rated Current)	200 A
Gen #2 Breaker Trip Setpoint (EZGN Rated Current)	200 A
Gen #3 Breaker Trip Setpoint (EZGN Rated Current)	150 A
Gen Breaker Level 1 (100%) Time Over Current	3 sec.
Gen Breaker Level 2 (120%) Time Over Current	1 sec.
Gen Breaker Level 3 (250%) Time Over Current	0.4 sec.

Feeder Breaker Settings (Feeder Protection Relay - FPR)	
Function (Note: Element 1 is the only active element)	Setting
T.O.C. Trip Pickup (amps) Note: 5A = 100% of CT rating	5.0
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

Radiator VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	1
PID Reference Temperature	175°F
Proportional Gain	0.93
Integral Gain	0.3
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	10 sec.
Loss of Phase	Ignore

POWER PLANT GENERATION SWITCHGEAR OPERATION

THIS POWER PLANT IS DESIGNED TO OPERATE IN AUTOMATIC MODE UNDER CONTROL OF THE PROGRAMMABLE LOGIC CONTROLLER (PLC). MONITORING AND CONTROL IS PRIMARILY DONE THROUGH THE OPERATOR INTERFACE UNIT (OIU). IN AN EMERGENCY SUCH AS A FAILURE OF THE PLC IT CAN ALSO BE OPERATED IN MANUAL MODE. EACH ENGINE IS CONTROLLED BY AN INDIVIDUAL EASYGEN (EZGN) GENSET CONTROLLER LOCATED IN EACH GENERATOR SECTION. FOLLOWING ARE INSTRUCTIONS FOR OPERATING THE SYSTEM. SEE SECTION 3.1 OF THE O&M MANUAL FOR DETAILED SEQUENCES.

AUTOMATIC OPERATION:

1) VERIFY THAT THE "SYSTEM MODE" SWITCH ON THE MASTER SECTION IS SET TO AUTO.
2) CHECK THE MASTER SECTION FOR ANY FAULTS AS INDICATED BY THE ALARM LAMPS. CORRECT THE CAUSE OF THE FAULT (EMERGENCY STOP, LOW COOLANT LEVEL, FEEDER BREAKER TRIPPED, ETC.) PRESS THE ALARM RESET BUTTON ON THE MASTER SECTION AND VERIFY THAT THE ALARMS CLEAR.
3) CHECK EACH GENERATOR SECTION FOR ANY FAULTS. FOR ENGINE-GENERATOR RELATED FAULTS CORRECT THE CAUSE OF THE FAULT (LOW OIL LEVEL, HIGH TEMPERATURE, CIRCUIT BREAKER TRIPPED, ETC.). TO CLEAR ANY ALARMS PRESS THE "ALARM RESET" BUTTON ON THE GENERATOR SECTION.
4) PLACE EACH AVAILABLE GENERATOR IN SERVICE BY PRESSING THE "AUTO" BUTTON. IF A GENERATOR IS OUT OF SERVICE FOR REPAIR, VERIFY THE STOP BUTTON IS ILLUMINATED.
5) THE PLC WILL AUTOMATICALLY START ALL GENERATORS IN AUTO AND PARALLEL THEM TO THE BUS. AS SOON AS THE BUS IS ENERGIZED THE STATION SERVICE POWER WILL TURN ON.
6) AFTER THE AVAILABLE GENERATORS ARE ON LINE, THE PLC WILL WAIT FOR A BRIEF INTERVAL (USUALLY 15 SECONDS) AND CLOSE THE FEEDER BREAKER TO ENERGIZE THE COMMUNITY. THE RED BREAKER CLOSED LAMP WILL ILLUMINATE.

DEMAND CONTROL OPERATION (AUTO MODE):

1) GENERATORS ARE CONSIDERED AVAILABLE FOR DEMAND CONTROL ONLY WHEN THEIR EZGN IS IN THE AUTO MODE AND THERE ARE NO ALARMS. THE DEMAND CONTROL SYSTEM WILL UTILIZE ALL AVAILABLE GENERATORS AS REQUIRED TO MEET THE LOAD ON THE SYSTEM.
2) ON INITIAL STARTUP THE DEMAND CONTROL IS ACTIVATED AFTER THE FEEDER BREAKER HAS BEEN CLOSED FOR ONE MINUTE. THIS ALLOWS THE PLC TIME TO DETERMINE THE POWER DEMAND ON THE SYSTEM. THE PLC MONITORS THE LOAD ON THE SYSTEM AND COMPARES IT TO THE CONNECTED GENERATING CAPACITY.
3) THE DEMAND CONTROL PROVIDES TWO TYPES OF CONTROL FOR INCREASING LOAD – INCREASE AND OVERLOAD. THE OVERLOAD SETPOINT IS TYPICALLY THE PRIME RATING OF THE GENSET AND THE INCREASE SETPOINT IS TYPICALLY 90% OF THE OVERLOAD SETPOINT. WHEN THE LOAD EXCEEDS THE INCREASE SETPOINT FOR A PRE-SET TIME DELAY (USUALLY 30 SECONDS) THE DEMAND CONTROL WILL SWITCH TO THE NEXT HIGHER LEVEL OF GENERATING CAPACITY. WHEN THE LOAD EXCEEDS THE OVERLOAD SETPOINT THE DEMAND CONTROL WILL IMMEDIATELY SWITCH TO THE NEXT HIGHER LEVEL OF GENERATING CAPACITY (NO TIME DELAY).
4) THE DEMAND CONTROL PROVIDES ONE TYPE OF CONTROL FOR DECREASING LOAD. THE DECREASE SETPOINT IS TYPICALLY 80% OF THE OVERLOAD SETPOINT. WHEN THE LOAD DROPS BELOW THE DECREASE SETPOINT FOR A PRE-SET TIME DELAY (USUALLY 2 MINUTES) THE DEMAND CONTROL WILL SWITCH TO THE NEXT LOWER LEVEL OF GENERATING CAPACITY.
5) NOTE THAT GENERATORS #1 & #2 ARE EQUAL CAPACITY AND THE OPERATOR MUST SELECT A LEAD GENERATOR USING THE SCADA SYSTEM.
6) SEE THE DEMAND CONTROL TABLE THIS SHEET FOR DEMAND LEVEL SETPOINTS AT THE TIME OF COMMISSIONING. ON THE SCADA SYSTEM GO TO THE DEMAND TAB TO VERIFY THE PRESENT SETPOINTS.

MANUAL OPERATION:

1) PLACE THE MASTER CONTROL "SYSTEM MODE" SWITCH IN THE MANUAL POSITION.
2) CHECK THE MASTER AND GENERATOR SECTIONS FOR ANY FAULTS AND CLEAR AS DESCRIBED UNDER AUTOMATIC OPERATION STEPS 2 AND 3.
3) TO PLACE A GENERATOR IN SERVICE, PRESS THE EZGN MAN BUTTON, THEN PRESS THE "I" (START) BUTTON. AFTER THE ENGINE STARTS AND STABILIZES, PRESS THE CONTACTOR CLOSE BUTTON ON THE EZGN. THE RED BREAKER CLOSED LAMP WILL ILLUMINATE.
4) REPEAT THIS PROCESS FOR AT LEAST ONE MORE GENERATOR.
5) WITH TWO GENERATORS ON LINE ROTATE THE FEEDER BREAKER CONTROL KNOB FOR THE MAIN FEEDER BREAKER TO THE CLOSE POSITION TO ENERGIZE THE COMMUNITY. MONITOR THE LOAD ON THE SYSTEM FOR ONE MINUTE THEN SELECT THE APPROPRIATE GENERATOR(S) TO MATCH THE LOAD.
6) TAKE ANY GENERATOR(S) NOT NEEDED OFF LINE BY PRESSING THE RED EZGN STOP BUTTON. THE ENGINE WILL COOL DOWN FOR THREE MINUTES THEN SHUT OFF. NOTE THAT PRESSING THE RED STOP BUTTON TWICE WILL IMMEDIATELY SHUT DOWN THE GENERATOR.
7) TO MANUALLY SWITCH TO A DIFFERENT GENERATOR AS THE LOAD CHANGES REPEAT STEPS 3 AND 6.

SERVICE DUE / OIL CHANGE PROCEDURE:

NOTE THAT UNDER AUTOMATIC OPERATION, WHENEVER THE SERVICE TIME HAS BEEN EXCEEDED THE GENERATOR WILL AUTOMATICALLY BE TAKEN OFF LINE AS LONG AS ANOTHER GENERATOR IS AVAILABLE IN AUTO. AN "ENGINE SERVICE" MESSAGE WILL DISPLAY ON THE EZGN AND THE RED "ENGINE ALARM" LAMP WILL ILLUMINATE.

1) IF THE SWITCHGEAR IS IN MANUAL MODE, PERFORM MANUAL OPERATION STEPS 3 AND 6 ABOVE THEN CONTINUE AT STEP 3 BELOW (LOCK OUT).
2) IF THE SWITCHGEAR IS IN AUTOMATIC MODE, PRESS THE EZGN MAN BUTTON ON THE GENERATOR TO BE SERVICED. THE PLC WILL START ANOTHER GENERATOR. ONCE THE OTHER GENERATOR IS ON LINE, PRESS THE EZGN STOP BUTTON ON THE GENERATOR TO BE SERVICED. NOTE THAT IF THE STOP BUTTON IS PRESSED BEFORE ANOTHER UNIT IS ONLINE, AN OUTAGE WILL OCCUR.
3) LOCK THE UNIT OUT USING THE KEY SWITCH AND TAG OUT OF SERVICE.
4) SERVICE ENGINE (OIL CHANGE, FUEL FILTER, AIR FILTER, ETC.).
5) REMOVE TAG AND TURN THE GENERATOR LOCKOUT SWITCH TO RUN.
6) PRESS THE "SERVICE HOURS RESET" BUTTON AND HOLD FOR 10 SECONDS.
7) PRESS THE "ALARM RESET" BUTTON.
8) AFTER ALL ALARMS HAVE BEEN CLEARED PRESS THE "HOME" BUTTON.
9) START THE ENGINE BY PRESSING THE MAN BUTTON AND THEN "I" (START) BUTTON.
   a) AFTER THE ENGINE COMES UP TO SPEED VERIFY THAT THE ENGINE OIL PRESSURE IS IN THE NORMAL RANGE.
   b) CHECK THE OIL FILTER FOR LEAKS.
10) AFTER THE ENGINE RUNS FOR ONE MINUTE PRESS THE STOP BUTTON.
11) CHECK THE OIL LEVEL USING THE DIPSTICK AND ADD OIL AS REQUIRED.
12) PLACE THE GENERATOR BACK IN SERVICE BY PRESSING THE AUTO BUTTON ON THE EZGN.

ENGINE-GENERATOR PROTECTION ALARMS:

SEE THE TABLES THIS SHEET FOR ALARM LEVEL SETPOINTS AND BREAKER TRIP SETTINGS AT THE TIME OF COMMISSIONING. SEE SECTION 3.1 OF THE O&M MANUAL FOR DETAILED DESCRIPTIONS OF WARNING ALARM AND PROTECTION SEQUENCES.

FUEL/OIL SYSTEM

AUTOMATIC DAY TANK FILL – THE 200 GALLON DAY TANK IS FILLED FROM THE 10,000 GALLON INTERMEDATE TANK. IT HAS AUTOMATIC FILL CONTROLS WITH REDUNDANT HIGH AND LOW LEVEL ALARMS AND TIMERS. SEE FUEL SYSTEM CONTROL PANEL DRAWING SHEET E7.3 FOR DETAILED SEQUENCE OF OPERATION.

DAY TANK FILTER – THE DAY FILTER HAS WATER DETECTION PROBES. AN ALARM LAMP WILL ILLUMINATE WHEN WATER IS PRESENT IN THE FUEL. SEE WATER INDICATION PANEL DRAWING SHEET E7.4.

MANUAL USED ENGINE OIL DRAIN – USED OIL PUMP P-U01 IS USED TO PUMP USED ENGINE OIL FROM THE ENGINE OIL PANS TO THE USED OIL HOPPER. P-U01 RUNS THROUGH A MANUAL 0-5 MINUTE TIMER SWITCH.

AUTOMATIC USED ENGINE OIL BLENDING SYSTEM – THE USED ENGINE OIL BLENDING SYSTEM FILTERS USED OIL AND MIXES IT WITH DIESEL FUEL IN THE DAY TANK TO BE BURNED BY THE ENGINES. THE PUMPING RATES ARE SET TO BLEND APPROXIMATELY 0.5% USED OIL TO 99.5% DIESEL FUEL. NOTE THAT WHEN THERE IS NO USED OIL IN THE HOPPER THE DIESEL PUMP STILL RUNS TO USE THE BLENDER AS A FUEL "POLISHING" FILTER. SEE FUEL SYSTEM CONTROL PANEL DRAWING SHEET E7.3 FOR DETAILED SEQUENCE OF OPERATION.

MANUAL INTERMEDIATE TANK FILL – THE INTERMEDIATE TANK IS LOCATED ADJACENT TO THE POWER PLANT. IT NEEDS TO BE FILLED WHENEVER IT DROPS BELOW THE 50% FULL LEVEL. THE INTERMEDIATE TANK IS FILLED BY TRUCK.

ENGINE COOLING SYSTEM

RADIATORS – RADIATOR FAN MOTORS WILL OPERATE UNDER VARIABLE FREQUENCY DRIVE (VFD) CONTROL. WHEN THE COOLANT RETURN TEMP REACHES THE PID REFERENCE SETPOINT THE MOTOR WILL START AT MINIMUM SPEED AND RAMP UP TO THE REQUIRED SPEED. USING PID CONTROL, THE VFD WILL MODULATE THE FAN SPEED AS REQUIRED TO MAINTAIN COOLANT RETURN TEMP AT THE PID REFERENCE SETPOINT. AS THE COOLANT RETURN TEMP RISES, THE VFD WILL INCREASE THE SPEED OF THE FAN MOTOR UP TO 100%. ONCE THE FAN REACHES THE MINIMUM SPEED, THE VFD WILL MAINTAIN THAT SPEED UNTIL THE LOW SPEED TIME OUT EXPIRES. WHEN THE LOW SPEED TIME OUT EXPIRES THE MOTOR WILL STOP. THE MOTOR WILL REMAIN OFF UNTIL THE COOLANT RETURN TEMP RISES TO THE PID REFERENCE SETPOINT. SEE THE RADIATOR VFD SETTINGS TABLE THIS SHEET FOR SETPOINTS AT THE TIME OF COMMISSIONING.

THERMOSTATIC VALVE TV-1 WILL MIX HOT COOLANT FROM THE ENGINE DISCHARGE PIPE WITH COLD COOLANT FROM THE RADIATOR RETURN PIPE TO MAINTAIN 175°F +/- TEMPERATURE COOLANT RETURN TO THE ENGINES.

ENGINE COOLANT RETURN HIGH TEMPERATURE ALARM. WHEN THE ENGINE COOLANT RETURN TEMPERATURE RISES ABOVE 190°F FOR A MINIMUM OF 2 MINUTES, THE "HIGH COOLANT RETURN TEMPERATURE" LAMP SHALL ILLUMINATE. LAMP SHALL REMAIN ON UNTIL MASTER RESET BUTTON IS PRESSED.

POWER PLANT HEATING AND VENTILATION SYSTEM

GENERATION ROOM – THE OPERATING AND OFF LINE GENERATORS REJECT MORE HEAT TO THE GENERATION ROOM THAN IS REQUIRED SO EXHAUST FANS WITH INTAKE AIR DUCTS ARE INSTALLED TO PROVIDE COOLING.

GENERATION ROOM VENTILATION – THERE ARE THREE AIR INTAKES IN THE GENERATION ROOM CEILING. ONE OF THE AIR INTAKES IS USED FOR COMBUSTION AIR AND THE DAMPER IS OPEN ANY TIME THE STATION SERVICE POWER IS ON. THE OTHER TWO AIR INTAKES ARE LABELED "EF-1" AND "EF-2". THESE DAMPERS OPEN WHENEVER THE ASSOCIATED EXHAUST FAN RUNS. THE INTAKES ARE EQUIPPED WITH A MOTORIZED DAMPER THAT OPENS EACH TIME THE ASSOCIATED EXHAUST FAN RUNS.

EXHAUST FANS – THERE ARE TWO EXHAUST FANS ON THE WALL ABOVE THE FRONT OF THE GENERATORS, EF-1 AND EF-2. EACH FAN IS EQUIPPED WITH A MOTORIZED DAMPER THAT OPENS WHENEVER THE FAN RUNS ON A CALL FOR COOLING THROUGH A 24VAC DIGITAL MODULATING THERMOSTAT. THE THERMOSTAT WILL PROVIDE A 0-10V SIGNAL TO MODULATE THE FAN SPEED AS REQUIRED TO MAINTAIN GENERATING ROOM TEMP, 80F, ADJUSTABLE.

MOTOR OPERATED DAMPERS – ALL DAMPER MOTORS WILL BE NORMALLY CLOSED SPRING RETURN AND WILL CLOSE ON LOSS OF POWER (FIRE ALARM) IN LESS THAN 30 SECONDS. VENTILATION AIR INTAKE AND EXHAUST MOTORIZED DAMPERS WILL OPEN ANY TIME THE ASSOCIATED EXHAUST FAN OPERATES. THE COMBUSTION AIR INTAKE MOTORIZED DAMPER WILL BE OPEN ANY TIME PLANT OPERATES (STATION SERVICE POWER ON).

CONTROL ROOM VENTILATION – COOLING AND VENTILATION FOR THE CONTROL ROOM IS PROVIDED BY AN OPERABLE WINDOW.

CONTROL ROOM HEATING – THE CONTROL ROOM IS HEATED BY A CABINET UNIT HEATER. PUMP P-CUH1 CIRCULATES ENGINE COOLANT FROM THE PIPING MAINS THROUGH THE CABINET UNIT HEATER IN THE CONTROL ROOM. THE TEMPERATURE CONTROLLER ON THE HEATER CYCLES THE PUMP AND THE HEATER FAN ON AND OFF AS REQUIRED TO MAINTAIN TEMPERATURE IN THE CONTROL ROOM, 65 F, ADJUSTABLE.

HEAT RECOVERY SYSTEM

THE POWER PLANT HEAT EXCHANGER (HX-1), THE PRIMARY (HOT SIDE) ENGINE COOLANT CIRCULATING PUMP (P-HR1A), AND THE SECONDARY (COLD SIDE) HEAT RECOVERY FLUID MAIN CIRCULATING PUMP (P-HR1B) ARE LOCATED IN THE POWER PLANT. BOTH PUMPS OPERATE CONTINUOUSLY UNDER MANUAL CONTROL.

HEAT RECOVERY LOSS OF PRESSURE – WHEN THE SYSTEM PRESSURE IN THE HEAT RECOVERY PIPING DROPS BELOW 15 PSIG FOR 15 MINUTES, A RED LAMP "HEAT RECOVERY LOSS OF PRESSURE" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

NO LOAD ON HEAT RECOVERY SYSTEM – WHEN THE HEAT RECOVERY RETURN TEMP. IS EQUAL TO OR GREATER THAN THE HEAT RECOVERY SUPPLY TEMP. FOR 60 MINUTES, AN AMBER LAMP "NO LOAD ON HEAT RECOVERY" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE. WHEN THE HEAT RECOVERY SUPPLY TEMP. IS A MIN. OF 1°F GREATER THAN THE HEAT RECOVERY RETURN TEMP. THE LAMP WILL TURN OFF.

HEAT RECOVERY LOSS OF FLOW – WHEN THE FLOW RATE IN THE HEAT RECOVERY PIPING FALLS BELOW 10 GPM FOR 15 MINUTES, A RED LAMP "HEAT RECOVERY LOSS OF FLOW" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

THE HEAT RECOVERY SYSTEM PROVIDES INTERRUPTIBLE HEAT TO THE WASHETERIA AND SCHOOL AS SHOWN ON SHEET M8.1. HEAT EXCHANGERS ARE USED TO CONNECT TO THE BUILDINGS BOILER SYSTEMS AND THE HEAT RECOVERY SYSTEM PRE-HEATS THE BOILER RETURN. WHEN AVAILABLE RECOVERED HEAT EQUALS OR EXCEEDS BUILDING HEAT DEMAND, THE BOILERS WILL NOT FIRE. AS HEAT LOAD INCREASES THE BUILDINGS HEATING GLYCOL TEMPERATURE WILL DROP UNTIL BOILERS FIRE. BOILERS MUST BE SET AT 160F-180F OPERATING TEMPERATURE. HEAT RECOVERY PANELS PREVENT THE BUILDINGS HEATING SYSTEMS FROM BACKFEEDING INTO THE HEAT RECOVERY SYSTEM OR FROM DEPRESSING THE HEAT RECOVERY LOOP TEMPERATURE. SEE SHEET E8.2 FOR DETAILED SEQUENCE OF OPERATIONS. PUMP P-HR3 AT THE SCHOOL ALSO INCLUDES ONBOARD ENERGY USE METERING WITH RESET AND TOTALIZER DISPLAYS.

SYSTEM STARTUP

FUEL OIL PUMPS – PRIOR TO STARTING FUEL AND OIL PUMPS PRIME CAVITIES WITH LUBE OIL AND RUN MOMENTARILY TO VERIFY CORRECT ROTATION.

FUEL OIL PIPING – AFTER PRESSURE TESTING FILL ALL FILTER BODIES, PRIME ALL PIPING, AND BLEED OFF AIR.

VERIFY OPERATION OF ALL FUEL SYSTEM CONTROLS IN ACCORDANCE WITH SEQUENCES OF OPERATION ON THE CONTROL PANEL DRAWINGS.

ENGINE COOLANT PIPING – AFTER PRESSURE TESTING, FLUSHING, AND BLEEDING, FILL SYSTEM WITH ETHYLENE GLYCOL SOLUTION. SEE HYDRONIC PIPING SPECIFICATION 23 21 13.

HEAT RECOVERY PIPING – AFTER PRESSURE TESTING, FLUSHING, AND BLEEDING, FILL SYSTEM WITH PROPYLENE GLYCOL SOLUTION. SEE HYDRONIC PIPING SPECIFICATION 23 21 13.

VERIFY OPERATION AND CALIBRATION OF ENGINE COOLANT SYSTEM THERMOSTATIC VALVE.

VERIFY PROPER OPERATION OF THERMOMETERS, PRESSURE CAUGES, AND ELECTRIAL INSTRUMENTATION DEVICES. SET SWITCHES ON DIFFERENTIAL PRESSURE GAUGES TO SETPOINTS INDICATED. CALIBRATE THERMOMETERS AND ALL ELECTRICAL INSTRUMENTATION DEVICES INCLUDING TEMPERATURE TRANSMITTERS, PRESSURE TRANSMITTERS, DIFFERENTIAL PRESSURE SWITCHES, FLOW METERS, ENERGY METERS, LEVEL GAUGES, ETC. SEE INSTRUMENTATION AND CONTROL DEVICES SPECIFICATION 23 09 00.

CLEAN ALL PIPING STRAINERS AFTER FIRST 48 HOURS OR MORE OF OPERATION. MONITOR SYSTEM OPERATION FOR ONE WEEK MINIMUM BEFORE LEAVING SITE. CHANGE GLYCOL FILTER ELEMENTS AT TIME OF FIRST OIL CHANGE ON EACH ENGINE.

INITIAL TESTING WAS PERFORMED AS PART OF THE MODULE ASSEMBLY CONTRACT. FINAL SYSTEM STARTUP, TESTING, AND COMMISSIONING IS INCLUDED IN THE ON SITE SCOPE

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	ADD SCHOOL HEAT RECOVERY SYSTEM TO SEQUENCE OF OPERATIONS	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

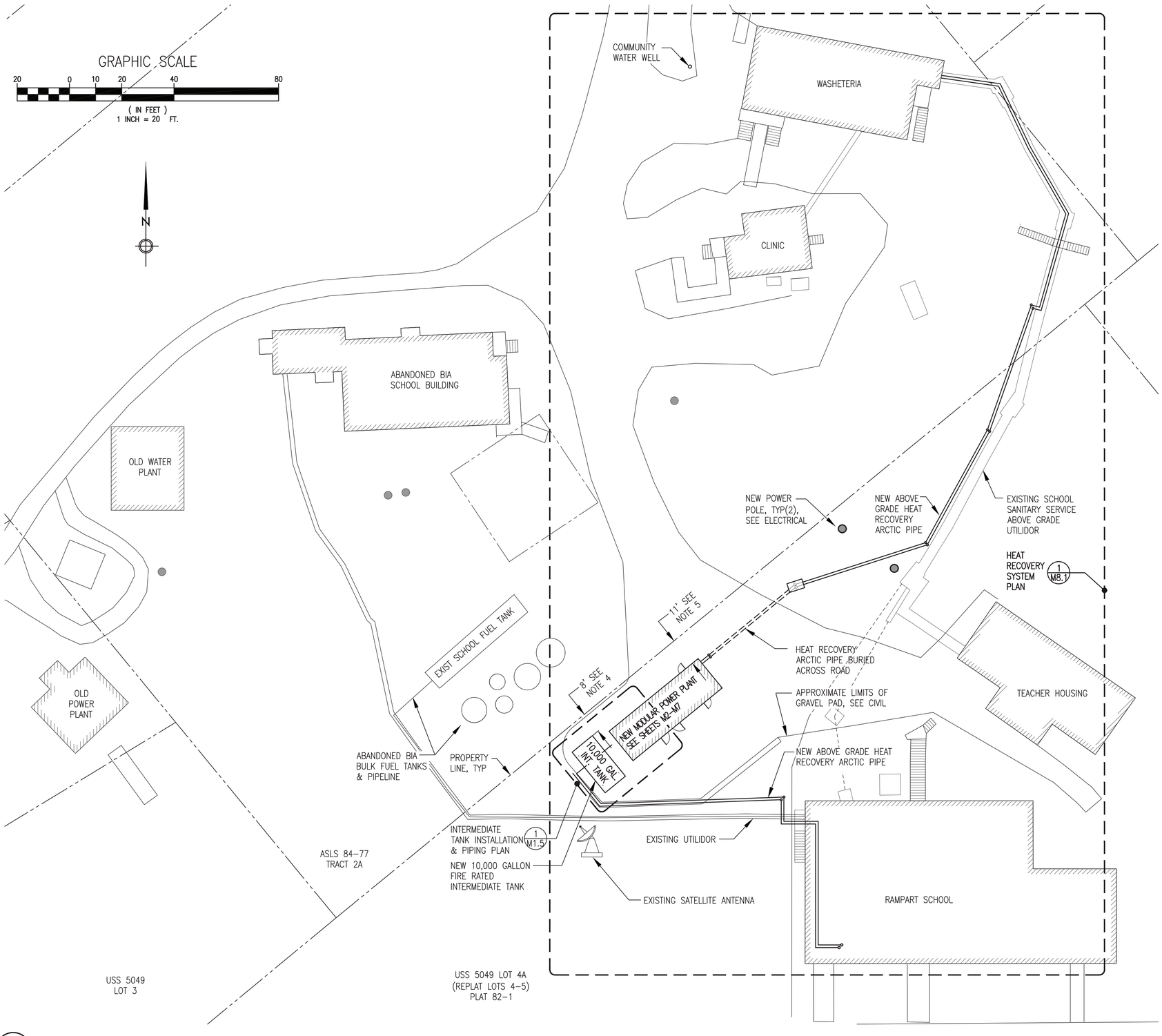
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: SYSTEM START UP & SEQUENCE OF OPERATIONS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M1 | SHEET: M1.3
PROJECT NUMBER:



1 M1.4 OVERALL PROJECT AREA PLAN
1"=20'

CODE NOTES:

1) SEE CIVIL FOR POWER PLANT SITE LAYOUT AND GRADING.

2) SEE STRUCTURAL FOR FOUNDATION DETAILS.

3) SEE ARCHITECTURAL AND STRUCTURAL FOR POWER PLANT BUILDING CONSTRUCTION.

4) INTERNATIONAL FIRE CODE AND STATE OF ALASKA REGULATIONS REQUIRE 7'-6" OF CLEARANCE FROM 751-12,000 GALLON FIRE RATED ABOVE GROUND FUEL STORAGE TANKS TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON (SEE NFPA 30 TABLE 22.4.1.1). THE LOCATION OF THE NEW 10,000 GALLON FIRE RATED FUEL TANK HAS A CLEARANCE OF 8' FROM THE NEAREST PROPERTY BOUNDARY AS INDICATED.

5) THE INTERNATIONAL BUILDING CODE REQUIRES 10' MINIMUM CLEARANCE FROM THE NEW POWER PLANT TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON. THE LOCATION OF THE NEW POWER PLANT HAS A CLEARANCE OF 11' FROM THE NEAREST PROPERTY BOUNDARY AS INDICATED.

6) THE INTERNATIONAL FIRE CODE REQUIRES FIRE APPARATUS ROADWAY TO PROVIDE ACCESS TO WITHIN 150' OF EVERY PORTION OF THE FACILITY. THE EXISTING GRAVEL ROAD AND THE NEW GRAVEL PAD PROVIDES ACCESS TO WITHIN 25' OF ALL PORTIONS OF THE NEW POWER PLANT.

GENERAL NOTE:

1) A MAJOR RENOVATION OF THE ADJACENT SCHOOL IS SCHEDULED FOR CONSTRUCTION CONCURRENTLY WITH THE POWER PLANT PROJECT. COORDINATE ALL ACTIVITIES WITH THE YUKON KOYUKUK SCHOOL DISTRICT AND THE SCHOOL CONTRACTOR

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REVISION #1 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR CIVIL REDESIGN AND ADD SCHOOL HEAT RECOVERY	12/22/23	BCG

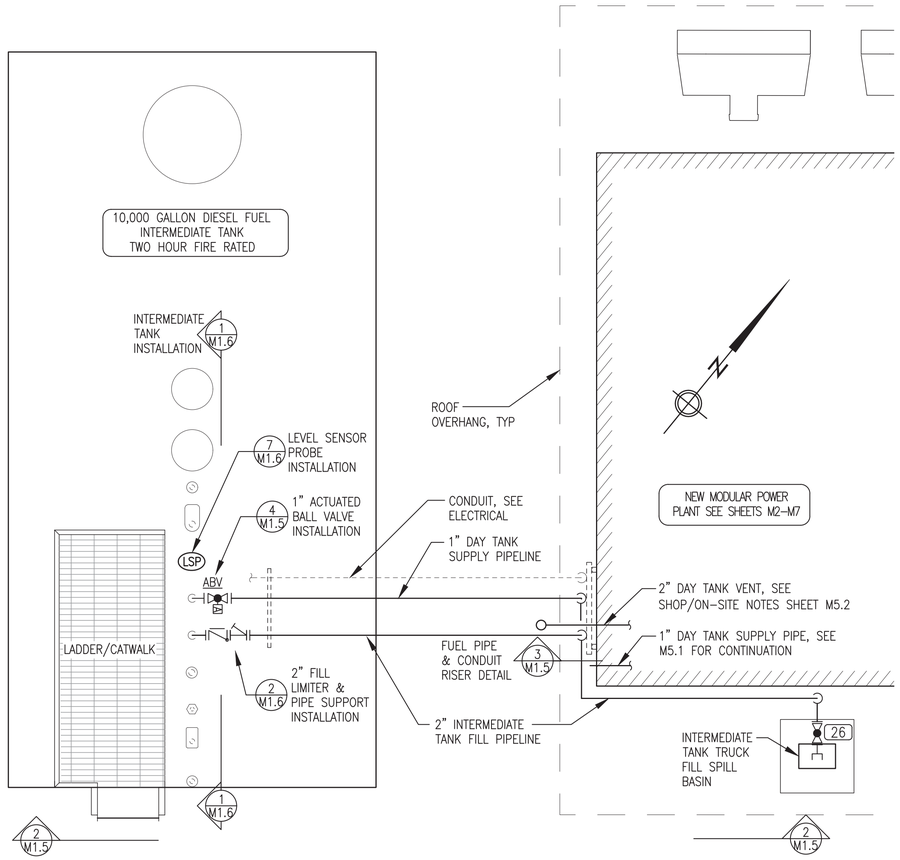
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

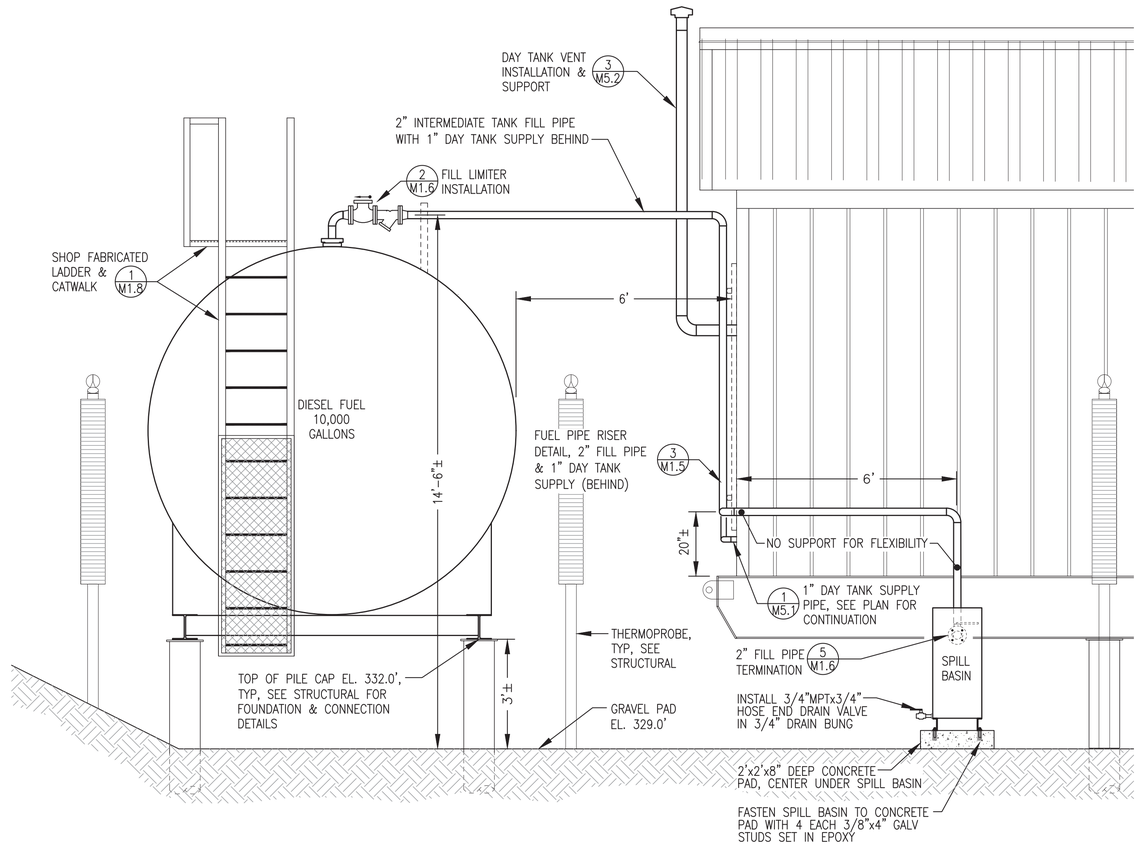
TITLE: OVERALL PROJECT AREA PLAN

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

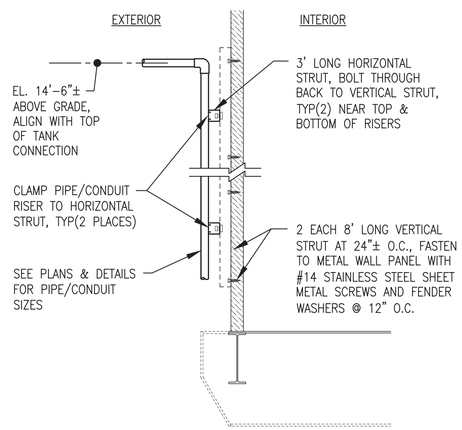
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M1 | SHEET: M1.4
PROJECT NUMBER:



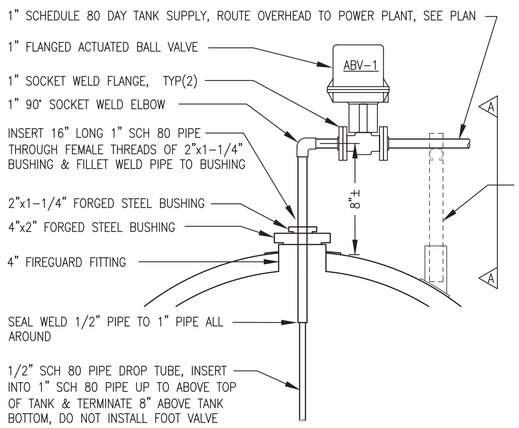
1 M1.5 ENLARGED INTEMEDIATE TANK PLAN
1/2"=1'-0"



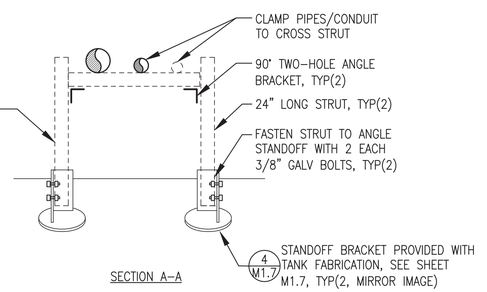
2 M1.5 INTERMEDIATE TANK INSTALLATION END ELEVATION
1/2"=1'-0"



3 M1.5 PIPE/CONDUIT RISER SUPPORT DETAIL
1/2"=1'-0"



4 M1.5 1" ACTUATED BALL VALVE & DROP TUBE INSTALLATION
NO SCALE



ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

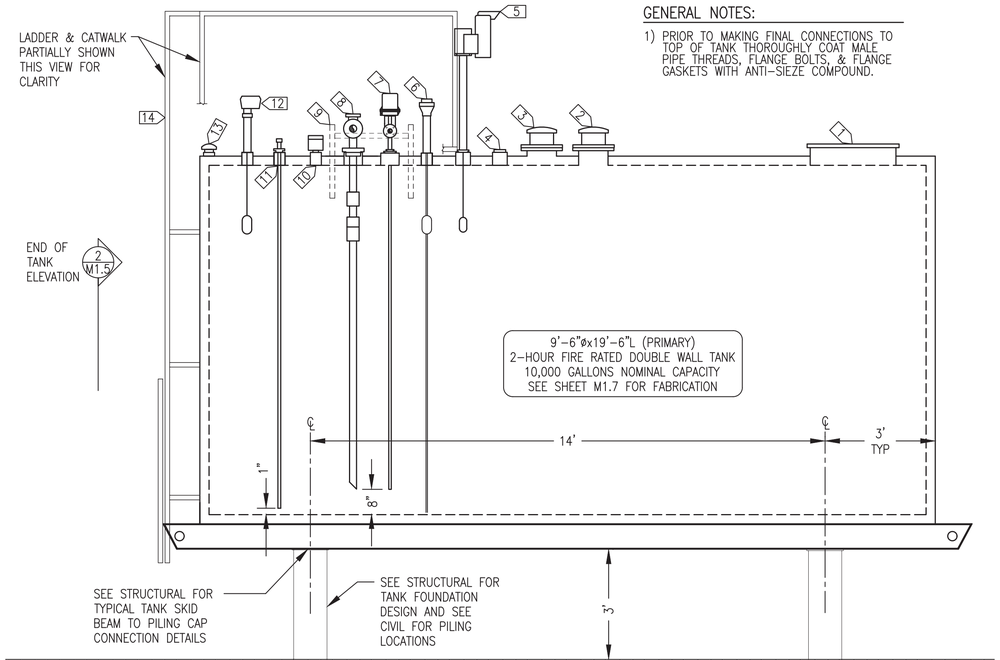
ALASKA ENERGY AUTHORITY

PROJECT: RAM POWER SYSTEM UPGRADE

TITLE: ENLARGED INTEMEDIATE TANK PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/15/22
FILE NAME: RAM PP M1	SHEET: M1.5
PROJECT NUMBER:	



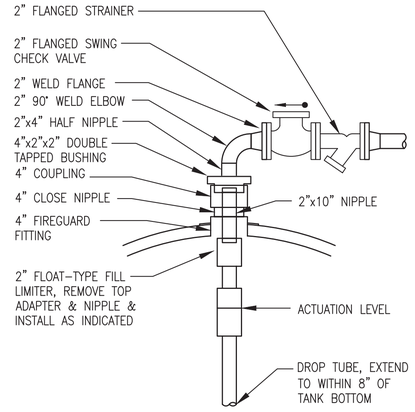
GENERAL NOTES:

1) PRIOR TO MAKING FINAL CONNECTIONS TO TOP OF TANK THOROUGHLY COAT MALE PIPE THREADS, FLANGE BOLTS, & FLANGE GASKETS WITH ANTI-SIEZE COMPOUND.

SPECIFIC NOTES:

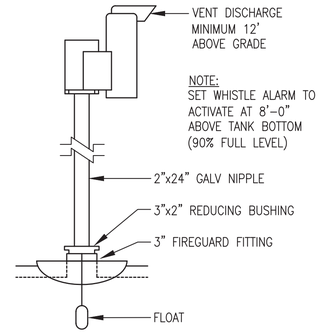
1. 24" MANHOLE.
2. 8" FLANGED PRIMARY EMERGENCY VENT.
3. 8" FLANGED SECONDARY EMERGENCY VENT.
4. SPARE 4" BUNG. INSTALL THREADED PLUG.
5. INSTALL 2" PRESSURE/VACUUM VENT WITH WHISTLE ALARM, SEE INSTALLATION DETAIL 3/M1.6.
6. 125" LONG SENSOR PROBE FOR TANK LEVEL MONITORING, SEE DETAIL 7/M1.6.
7. 1" DROP TUBE, FLANGED ACTUATOR VALVE, & 1" SCH 80 DAY TANK SUPPLY PIPE CONNECTION. SEE DETAIL 4/M1.5.
8. 2" FILL LIMITER, CHECK VALVE, STRAINER, & FILL PIPELINE CONNECTION, SEE INSTALLATION DETAIL 2/M1.6.
9. TOP OF TANK PIPE SUPPORT, SEE DETAIL 4/M1.5.
10. 2" FPT GAUGE HATCH ON 2"x4" GALV NIPPLE.
11. 1" WATER DRAW. SEE INSTALLATION DETAIL 4/M1.6.
12. 2" MECHANICAL FUEL LEVEL GAUGE, SEE INSTALLATION DETAIL 6/M1.6.
13. 2" SECONDARY TANK MONITOR PORT WITH VENT CAP.
14. SHOP FABRICATED BOLT-ON CATWALK AND LADDER WITH HINGED LOCKING SAFETY GATE AT BOTTOM. SEE SHEET M1.8.

1 M1.6 10,000 GALLON FIRE RATED DOUBLE WALL INTERMEDIATE TANK INSTALLATION
1/2"=1'-0"



NOTE: PIPING SIZED TO PROVIDE SHUT OFF WHEN ACTUATION LEVEL IS AT 8'-7" ABOVE TANK BOTTOM (95% CAPACITY). FIELD VERIFY SHUT OFF HEIGHT & ADJUST LINKAGE AS REQUIRED.

2 M1.6 FILL LIMITER INSTALLATION
NO SCALE

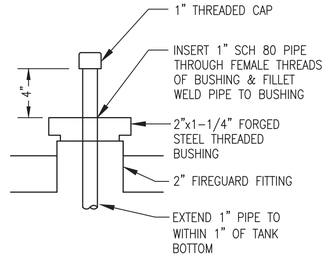


NOTE:
SET WHISTLE ALARM TO ACTIVATE AT 8'-0" ABOVE TANK BOTTOM (90% FULL LEVEL)

NOTES:

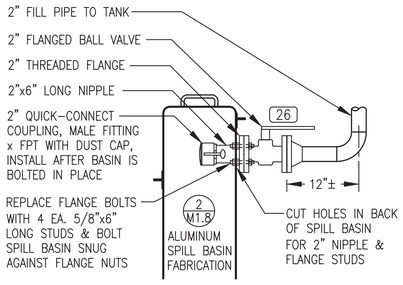
1) FEED FLOAT CABLE THROUGH NIPPLE PRIOR TO CONNECTING TO TANK.
2) GREASE FLOAT PRIOR TO INSTALLING IN TANK TO PREVENT FREEZING TO BOTTOM.

3 M1.6 P/V WHISTLE VENT INSTALLATION
NO SCALE

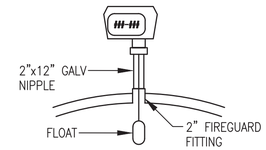


NOTE: TO USE WATER DRAW REMOVE CAP & THREAD BARREL PUMP ONTO PIPE.

4 M1.6 WATER DRAW INSTALLATION
NO SCALE



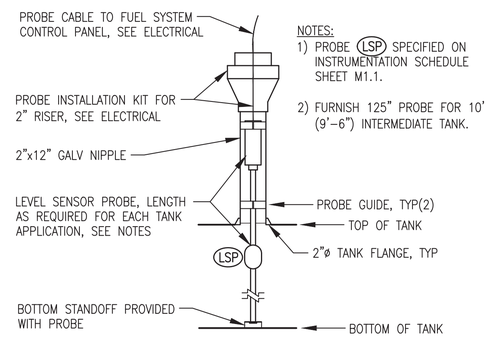
5 M1.6 FILL PIPE TERMINATION
NO SCALE



NOTES:

1) FEED FLOAT CABLE THROUGH NIPPLE PRIOR TO CONNECTING TO TANK.
2) GREASE FLOAT PRIOR TO INSTALLING IN TANK TO PREVENT FREEZING TO BOTTOM.
3) CALIBRATE GAUGE AFTER FILLING TANK AND VERIFY WITH MANUAL GAUGING ROD OR TAPE.

6 M1.6 LEVEL GAUGE INSTALLATION
NO SCALE



NOTES:

1) PROBE (LSP) SPECIFIED ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) FURNISH 125" PROBE FOR 10' (9'-6") INTERMEDIATE TANK.

7 M1.6 TYPICAL LEVEL SENSOR PROBE INSTALLATION
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

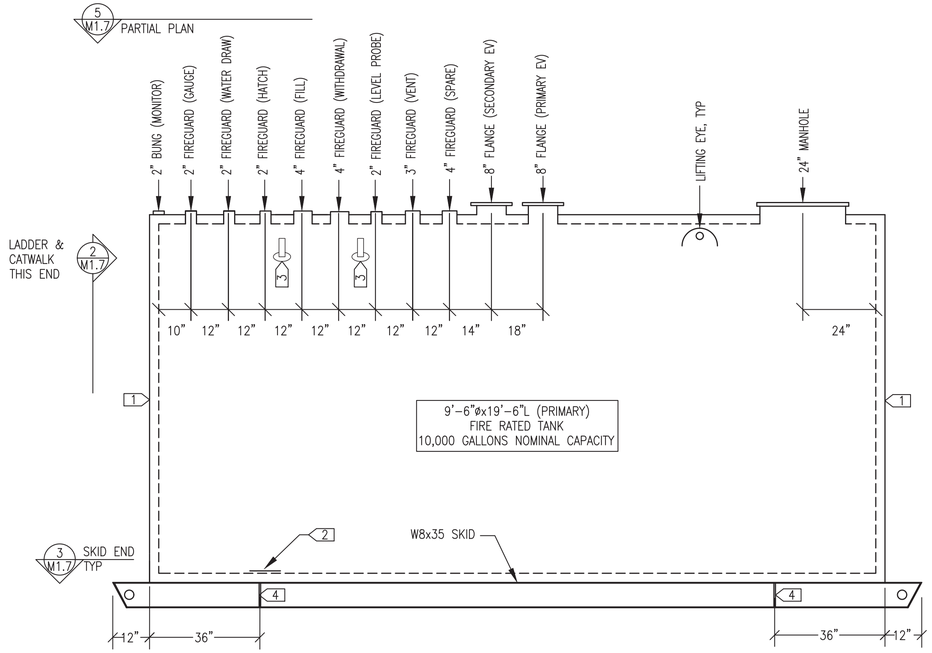
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: INTEMEDIATE TANK INSTALLATION ELEVATION & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

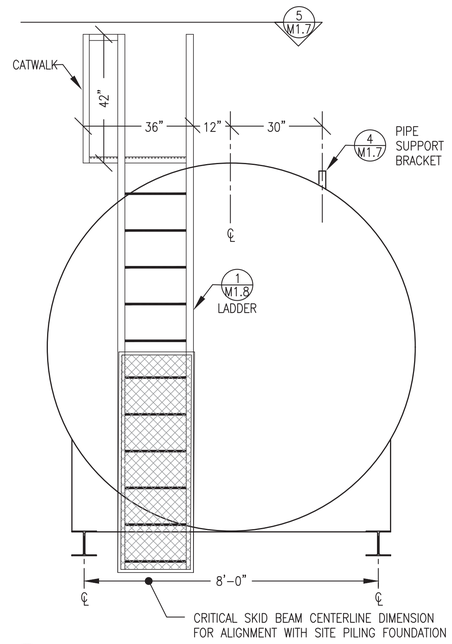
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/15/22
FILE NAME: RAM PP M1	SHEET: M1.6
PROJECT NUMBER:	



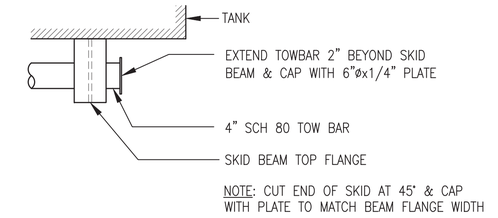
1 M1.7 SECTION THROUGH TANK
1/2"=1'-0"

TANK FABRICATION SPECIFIC NOTES

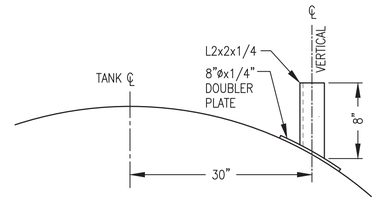
1. 4" HIGH BLACK LETTERING x1/2" STROKE: "DIESEL FUEL 10,000 GALLONS"
2. SEAL WELD 1/4"x10"ø STRIKER PLATE TO TANK BOTTOM DIRECTLY BELOW GAUGE HATCH TOP BUNG. PLATE TO BE ROLLED TO MATCH DIAMETER OF TANK.
3. TOP OF TANK PIPE SUPPORT STANDOFF, SEE PARTIAL TOP OF TANK PLAN 5/M1.7.
4. BEAM STIFFENER PLATE (WEB PLATE), TYP(2 EACH SKID, 4 TOTAL), SEE DETAIL 6/M1.7.



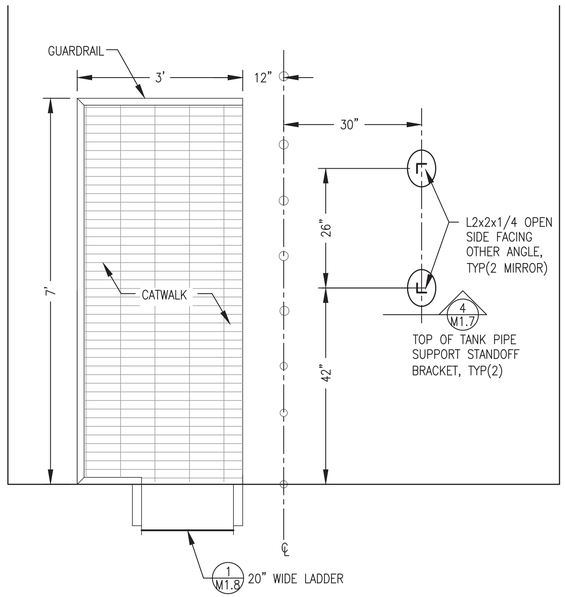
2 M1.7 TANK END ELEVATION
NO SCALE



3 M1.7 END OF SKID (TOP VIEW)
NO SCALE



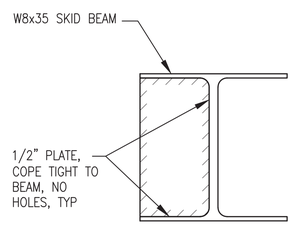
4 M1.7 TOP OF TANK STANDOFF BRACKET FABRICATION
NO SCALE



5 M1.7 10,000 GALLON INTERMEDIATE TANK TOP PARTIAL PLAN
NO SCALE

CATWALK & LADDER FABRICATION NOTES:

1) PROVIDE 3'-0"W x 7'-0"L CATWALK AS SHOWN. SURFACE OF CATWALK TO BE GALVANIZED DIAMOND TREAD GRIP STRUT. CATWALK MAY BE BOLT-ON CONNECTION OR PERMANENTLY ATTACHED TO TANK. DESIGN CATWALK TO BE ABLE TO SUPPORT A 1,000# LOAD IN ACCORDANCE WITH U.L. 142.
2) PROVIDE 42" HIGH GUARDRAIL AS SHOWN. GUARDRAIL TO BE BOLT-ON CONNECTION & PROVIDED LOOSE FOR SHIPMENT. FABRICATE FROM MINIMUM 1-1/2" TUBULAR STEEL (TS1-1/2x1-1/2"x3/16" OR 1-1/2" SCH 40 PIPE). PROVIDE MINIMUM 4" HIGH KICK PLATE AT BASE OF GUARDRAIL.
3) PROVIDE PERMANENT STEEL TABS SEAL WELDED TO TANK OR SKID FOR ALL BOLT-ON CONNECTIONS
4) PROVIDE 20" WIDE LADDER WITH LOCKING SAFETY GATE AS INDICATED. LADDER TO BE BOLT-ON CONNECTION AND PROVIDED LOOSE FOR SHIPMENT.
5) BOLT ALL CONNECTIONS AND VERIFY FIT PRIOR TO FINAL WELDING. GRIND ALL WELDS SMOOTH AND ROUND SHARP CORNERS AND EDGES.
6) REMOVE ALL BOLT ON COMPONENTS, SANDBLAST TO SSPC SP-6, AND COVER WITH THREE COATS OF COLD GALVANIZING COMPOUND, ZRC OR EQUAL.



6 M1.7 TYPICAL WEB PLATE
2"=1'-0"

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: 10,000 GALLON FIRE RATED INTERMEDIATE TANK FABRICATION DETAILS

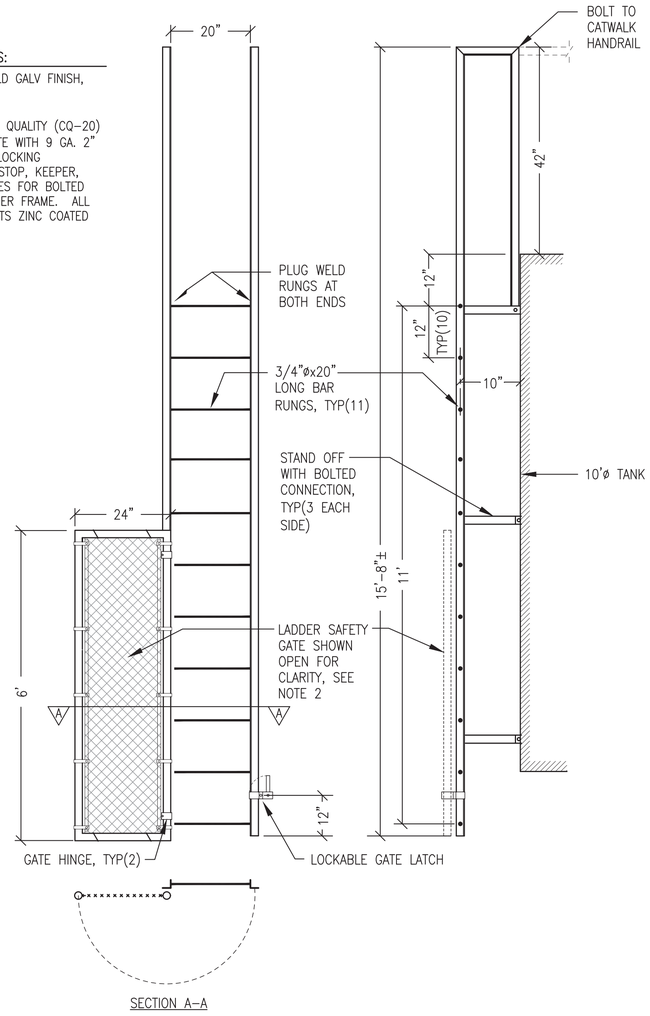
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M1 | SHEET: M1.7
PROJECT NUMBER:

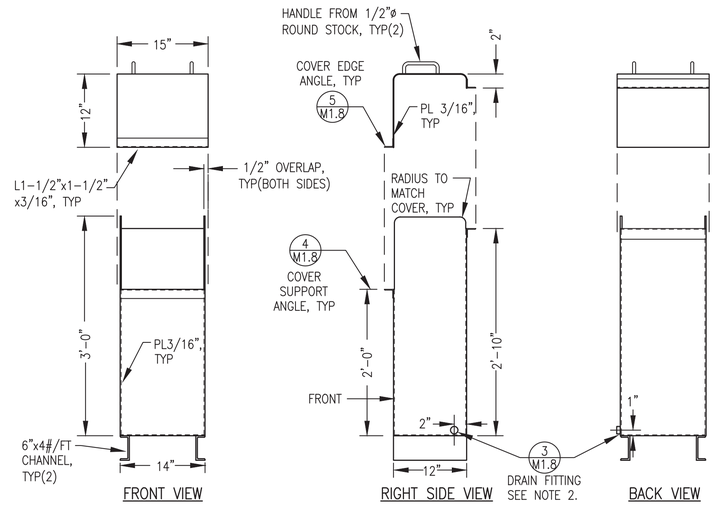
LADDER & GATE NOTES:

1) LADDER TO HAVE COLD GALV FINISH, SEE DETAIL 5/M1.7.

2) PROVIDE COMMERCIAL QUALITY (CQ-20) GATE FRAME COMPLETE WITH 9 GA. 2" CHAIN LINK FABRIC, LOCKING FROST-FREE LATCH, STOP, KEEPER, AND HEAVY GA. HINGES FOR BOLTED CONNECTION TO LADDER FRAME. ALL STEEL AND IRON PARTS ZINC COATED AFTER FABRICATION.

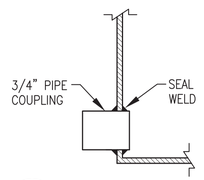


1 M1.8 TANK LADDER FABRICATION
NO SCALE

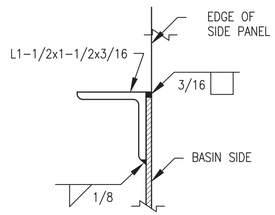


NOTES:
1. FABRICATE FROM 5086-H116 ALUMINUM PLATE & 6061-T6 ALUMINUM SHAPES.
2. INSTALL 3/4" THREADED SS BALL VALVE WITH 3/4" TYPE 304 SS CLOSE NIPPLE & PLUG.

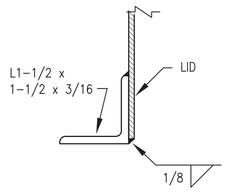
2 M1.8 ALUMINUM SPILL BASIN FABRICATION DETAILS
1"=1'-0"



3 M1.8 DRAIN FITTING
NO SCALE



4 M1.8 COVER SUPPORT ANGLE
NO SCALE



5 M1.8 COVER EDGE ANGLE
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

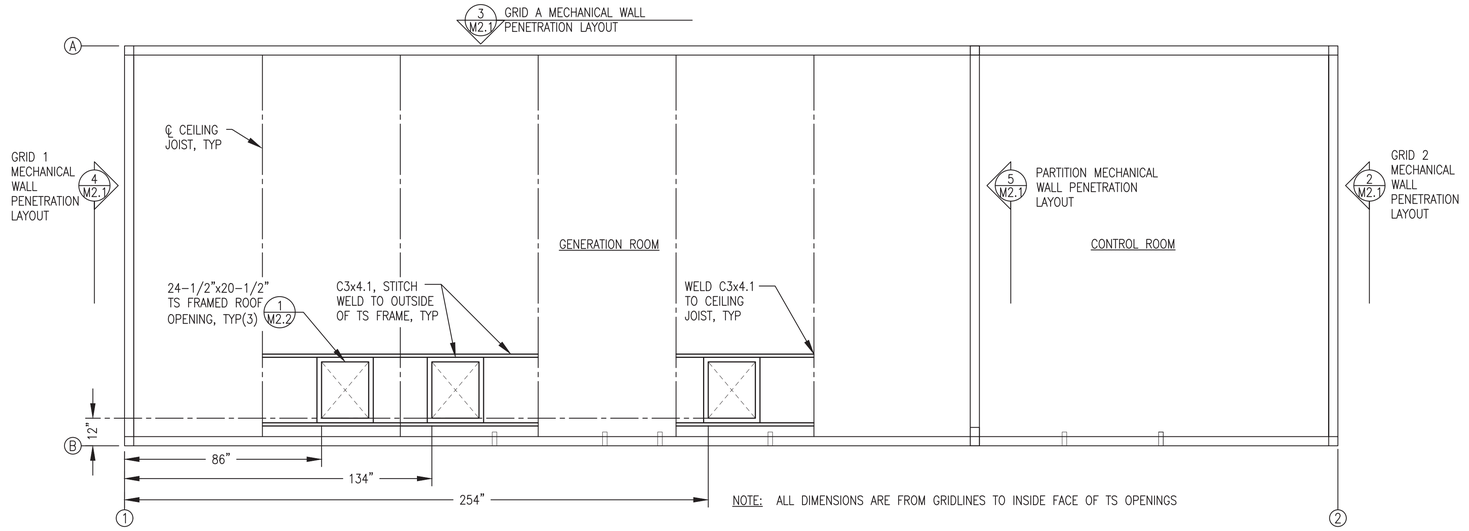
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

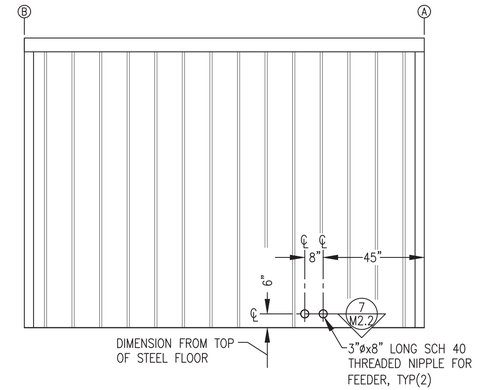
TITLE: INTERMEDIATE TANK LADDER & SPILL BASIN FABRICATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

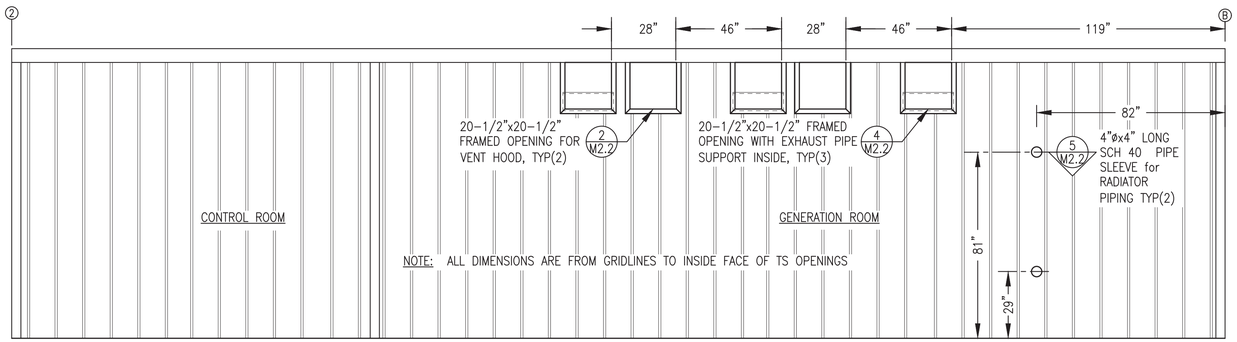
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/15/22
FILE NAME: RAM PP M1	SHEET: M1.8
PROJECT NUMBER:	



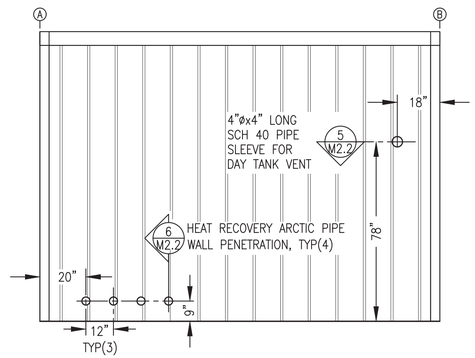
1 M2.1 MECHANICAL PENETRATION LAYOUT & ROOF PLAN
3/8"=1'-0"



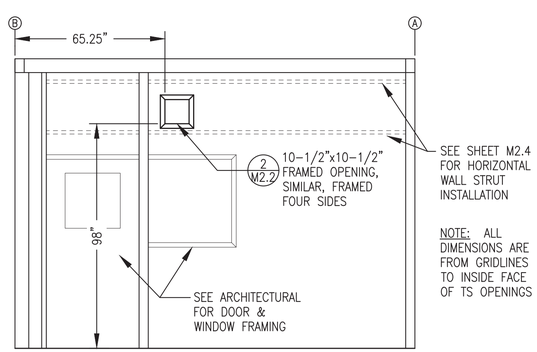
2 M2.1 GRID 2 MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION
3/8"=1'-0"



3 M2.1 GRID A MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION
3/8"=1'-0"



4 M2.1 GRID 1 MECHANICAL WALL PENETRATION LAYOUT – EXTERIOR ELEVATION
3/8"=1'-0"



5 M2.1 PARTITION MECHANICAL WALL PENETRATION LAYOUT – INTERIOR ELEVATION
3/8"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

ISSUED FOR MODULE CONSTRUCTION MARCH 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

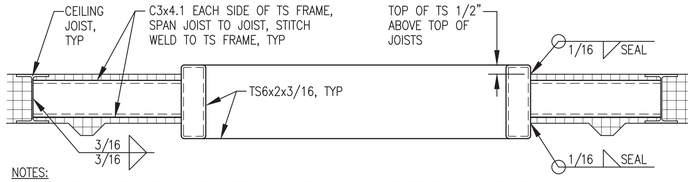
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: MECHANICAL PENETRATIONS PLAN, ELEVATIONS & DETAILS

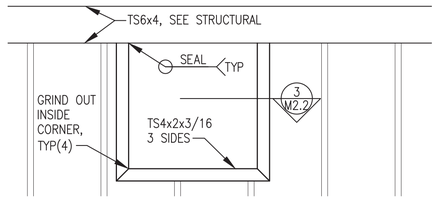
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2–M7	SHEET: M2.1
PROJECT NUMBER:	



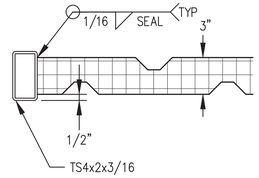
NOTES:
1) FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON PLANS.
3) GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.

1 M2.2 TYPICAL ROOF OPENING DETAIL
2"=1'-0"



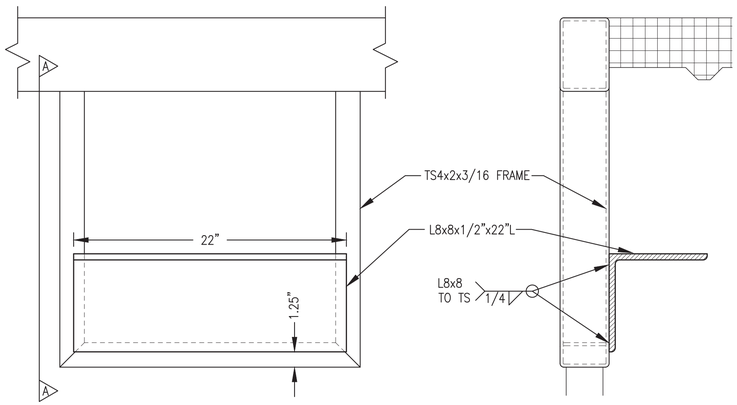
NOTE: SEE ELEVATION FOR INSIDE CLEAR OPENING SIZE.

2 M2.2 TYPICAL WALL OPENING – ELEVATION
1"=1'-0"

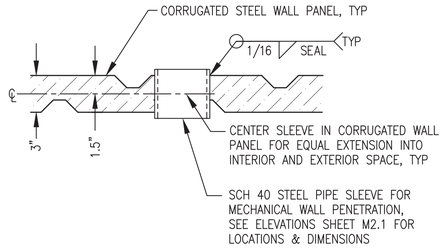


NOTES:
1) FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON ELEVATIONS.
3) GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.

3 M2.2 TYPICAL SECTION THROUGH WALL OPENING
2"=1'-0"

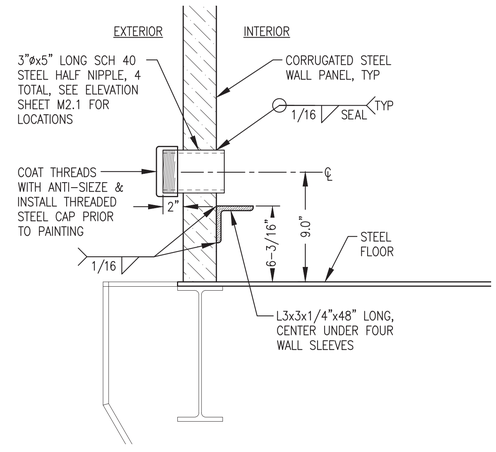


4 M2.2 EXHAUST PIPE SUPPORT AT FRAMED OPENING
2"=1'-0"

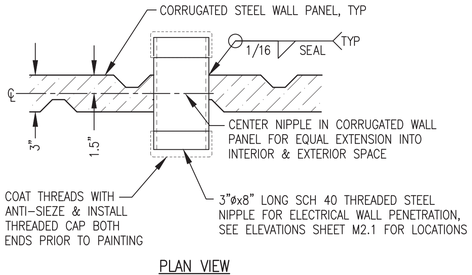


PLAN VIEW

5 M2.2 TYPICAL WALL PENETRATION PIPE SLEEVE
2"=1'-0"



6 M2.2 TYPICAL HEAT RECOVERY ARCTIC PIPE WALL PENETRATION
2"=1'-0"



PLAN VIEW

7 M2.2 TYPICAL ELECTRIC POWER FEEDER CONDUCTOR WALL PENETRATION
2"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

ISSUED FOR MODULE CONSTRUCTION MARCH 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

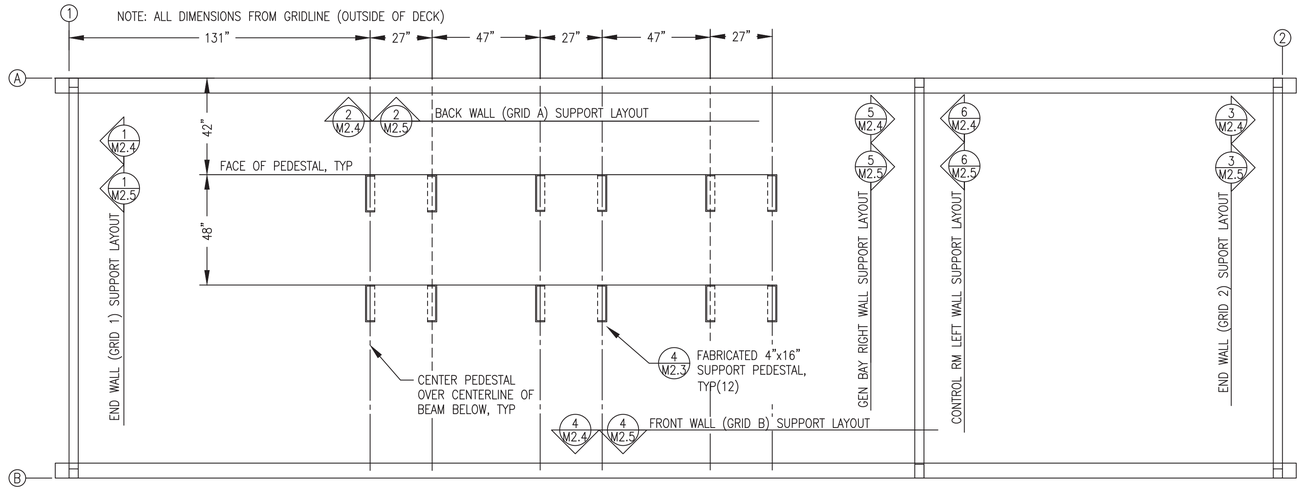
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

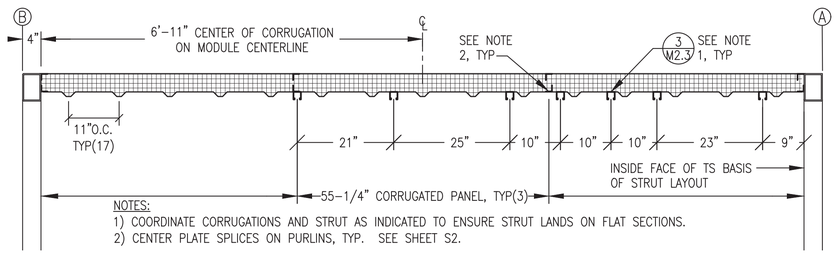
TITLE: MECHANICAL PENETRATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

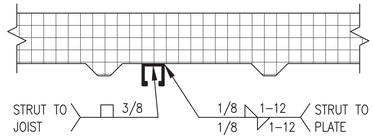
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M2.2
PROJECT NUMBER:



1 M2.3 MODULE MECHANICAL SUPPORT PLAN
3/8"=1'-0"



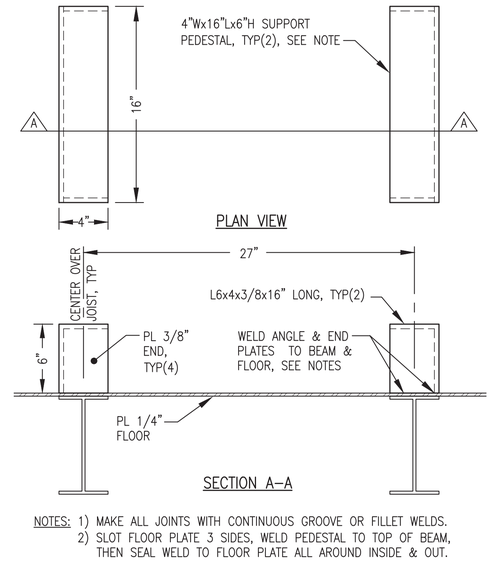
2 M2.3 SECTION THROUGH CEILING – CORRUGATION & STRUT LAYOUT
3/4"=1'-0"



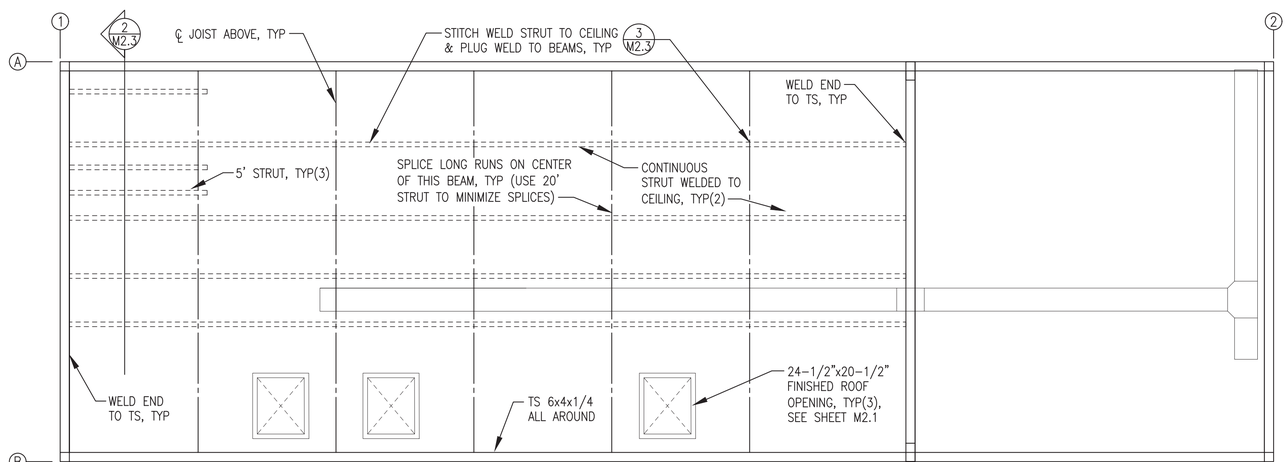
3 M2.3 STRUT ATTACHMENT TO CEILING
NO SCALE

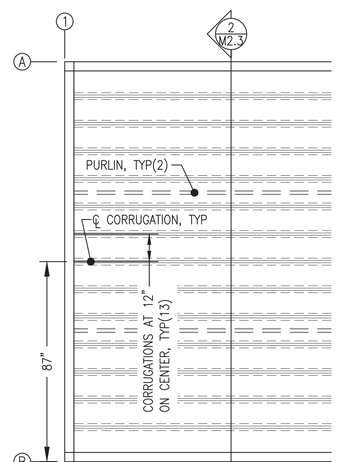
GENERAL NOTES:

1) FABRICATE PEDESTALS FROM ASTM A36 ANGLE AND PLATES AS SHOWN.
2) ALL STRUT 12 GAUGE 1-5/8"x1-5/8" SOLID BACK PLAIN (UNFINISHED). B-LINE B22-PLN OR EQUAL. PURCHASE IN 20' LENGTHS TO MINIMIZE SPLICES.
3) INSTALL ALL SUPPORTS INDICATED AND GRIND SMOOTH PRIOR TO SANDBLASTING MODULE. SANDBLAST AND PAINT ALL SUPPORTS THIS SHEET EQUIVALENT TO MODULE INTERIOR. SEE SHEET A1 FOR PAINTING SPECIFICATIONS.



4 M2.3 SUPPORT PEDESTAL FABRICATION
2"=1'-0"





5 M2.3 CEILING STRUT SUPPORT LAYOUT PLAN
3/8"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1 ISSUED JUNE 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	CHANGED INTERIOR PLATE CORRUGATIONS TO 11" O.C. & MOVED STRUT TO ALIGN	6/2/22	BCG

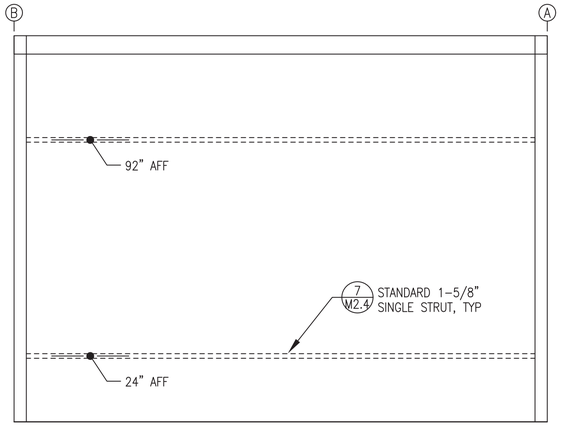
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

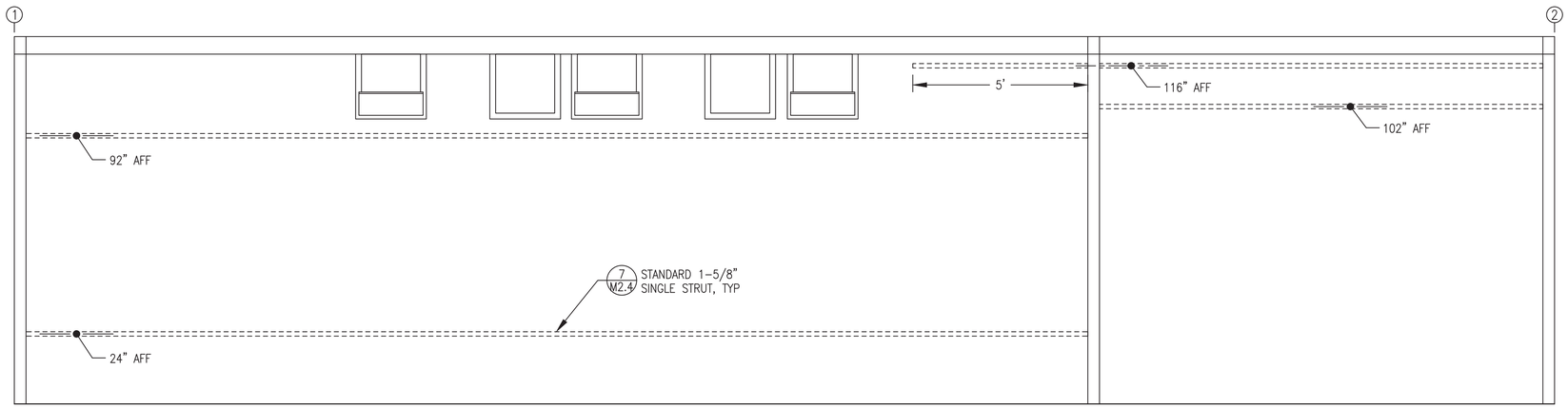
TITLE: MECHANICAL SUPPORT PLANS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

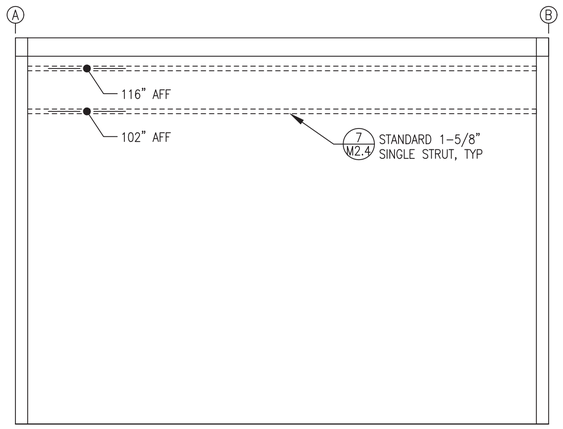
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M2.3
PROJECT NUMBER:	



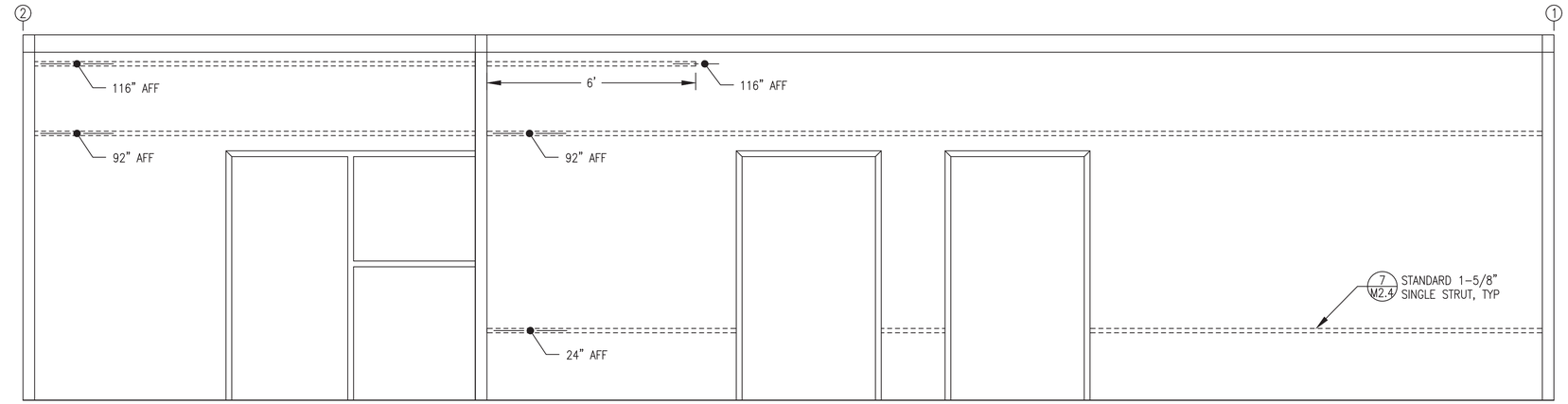
1 M2.4 END WALL (GRID 1) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



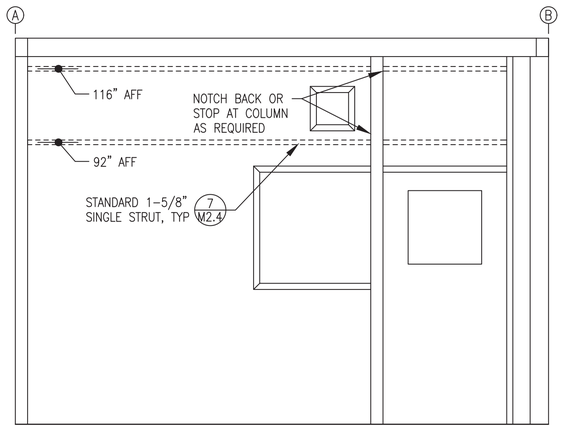
2 M2.4 BACK WALL (GRID A) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



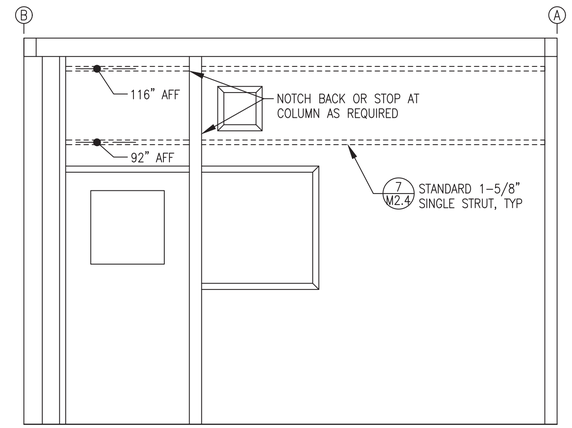
3 M2.4 END WALL (GRID 2) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



4 M2.4 FRONT WALL (GRID B) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



5 M2.4 GEN BAY RIGHT WALL HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



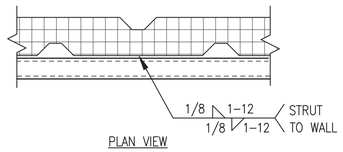
6 M2.4 CONTROL ROOM LEFT WALL HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"

HORIZONTAL WALL STRUT INSTALLATION NOTES:

1) ALL LOCATIONS ARE CENTERLINE OF STRUT ABOVE FINISHED FLOOR (AFF).

2) ALL STRUT SHALL BE 12 GAUGE, 1-5/8" x 1-5/8", PLAIN (UN-FINISHED BLACK) WITH SOLID BACK, B-LINE B22-PLN OR EQUAL.

3) PRIOR TO PAINTING MODULE, WELD ALL HORIZONTAL STRUT SECTIONS TO WALLS AS SHOWN. SANDBLAST AND PAINT STRUT WITH MODULE INTERIOR WALLS. SEE SHEET A1 FOR PAINTING SPECIFICATIONS.



PLAN VIEW

7 M2.4 HORIZONTAL WALL STRUT ATTACHMENT
NO SCALE

ISSUED FOR MODULE CONSTRUCTION MARCH 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

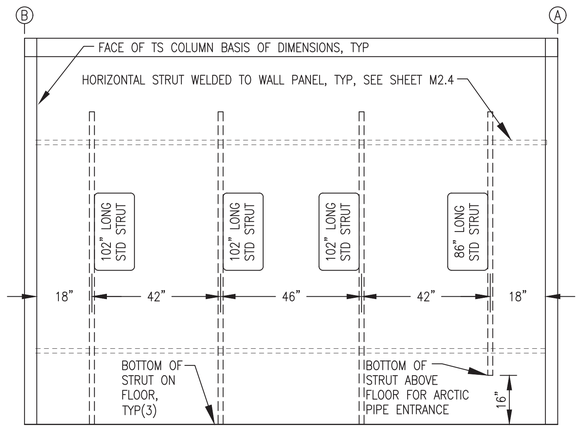
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

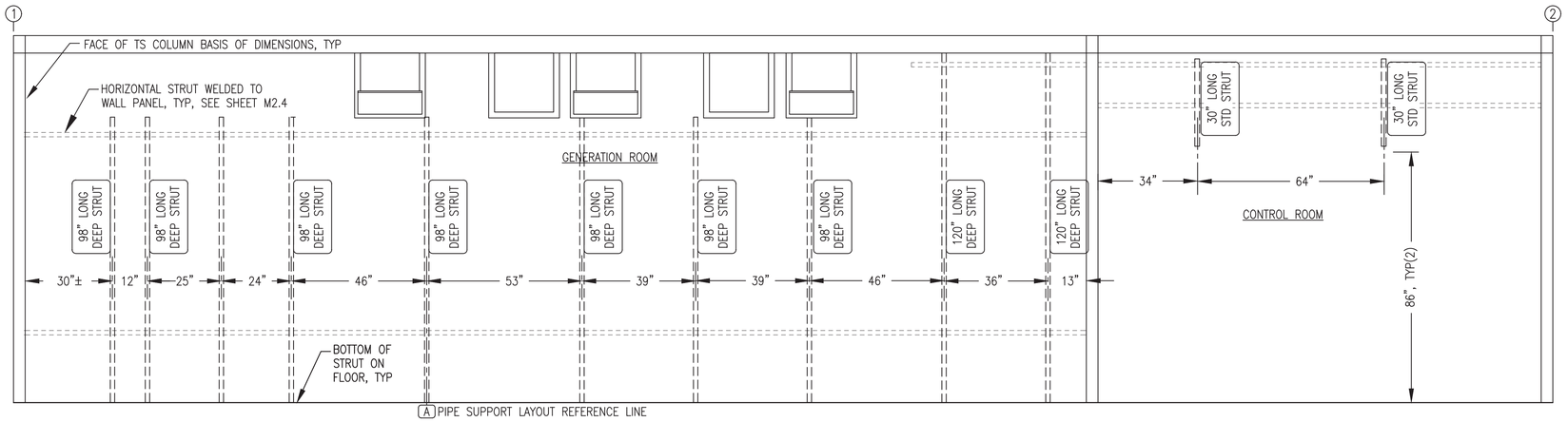
TITLE: MECHANICAL SUPPORT
HORIZONTAL WALL STRUT INSTALLATION

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

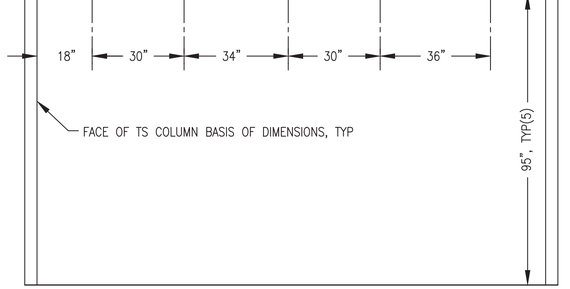
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M2.4
PROJECT NUMBER:	



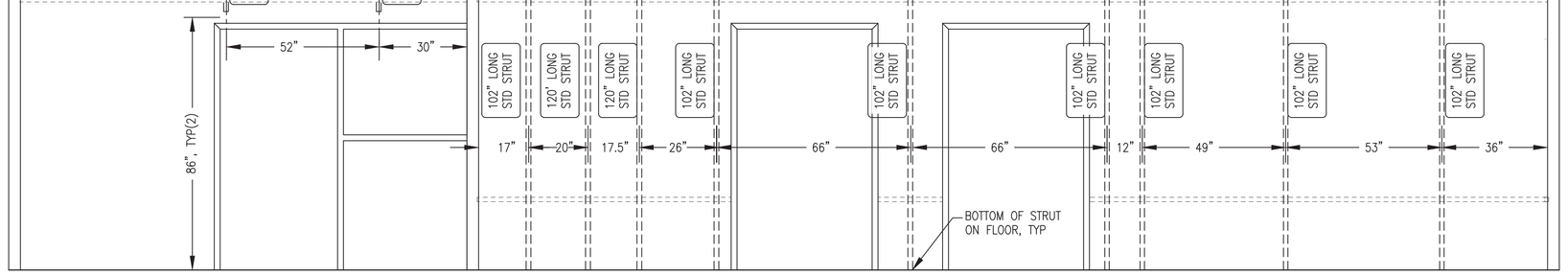
1 M2.5 END WALL (GRID 1) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



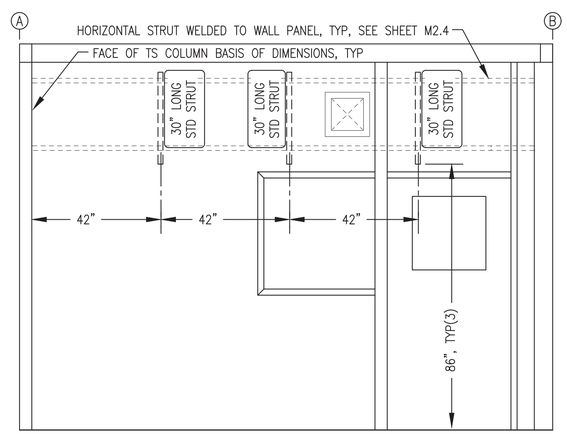
2 M2.5 BACK WALL (GRID A) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



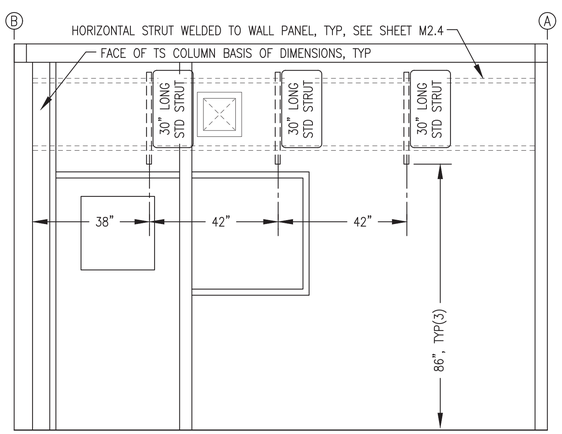
3 M2.5 END WALL (GRID 2) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



4 M2.5 FRONT WALL (GRID B) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



5 M2.5 GEN BAY RIGHT WALL VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



6 M2.5 CONTROL ROOM LEFT WALL VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"

VERTICAL WALL STRUT INSTALLATION NOTES:

1) ALL HORIZONTAL LOCATIONS ARE CENTERLINE OF STRUT FROM FACE OF TS COLUMNS. ALL VERTICAL LOCATIONS ARE END OF STRUT ABOVE FINISHED FLOOR.

2) ALL STRUT SHALL BE 12 GAUGE, PRE-GALVANIZED FINISH WITH SLOTTED BACK.
"STD" DESIGNATES STANDARD 1-5/8" x 1-5/8" SINGLE STRUT, B-LINE B22-SH-GALV OR EQUAL.
"DEEP" DESIGNATES 3-1/4" x 1-5/8" SINGLE STRUT, B-LINE B11-SH-GALV OR EQUAL.

3) FASTEN ALL VERTICAL STRUT SECTIONS TO HORIZONTAL STRUT WITH 1/2"x1" ALLEN HEAD CAP SCREWS & STRUT NUTS.

4) ONLY MAJOR WALL MOUNTED EQUIPMENT SUPPORT STRUT SHOWN THIS SHEET. SEE MECHANICAL AND ELECTRICAL DRAWINGS FOR OTHER EQUIPMENT, PIPING, AND WIREWAY STRUT SUPPORT DETAILS.

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

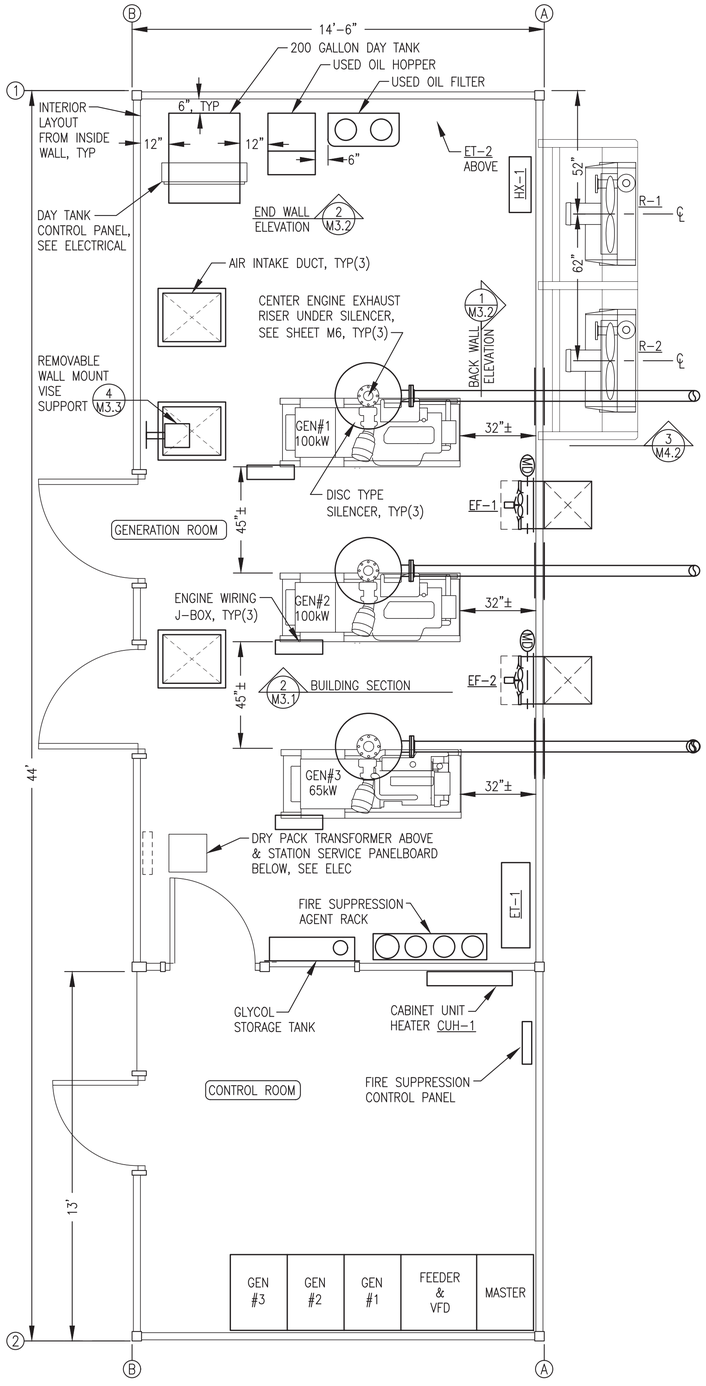
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

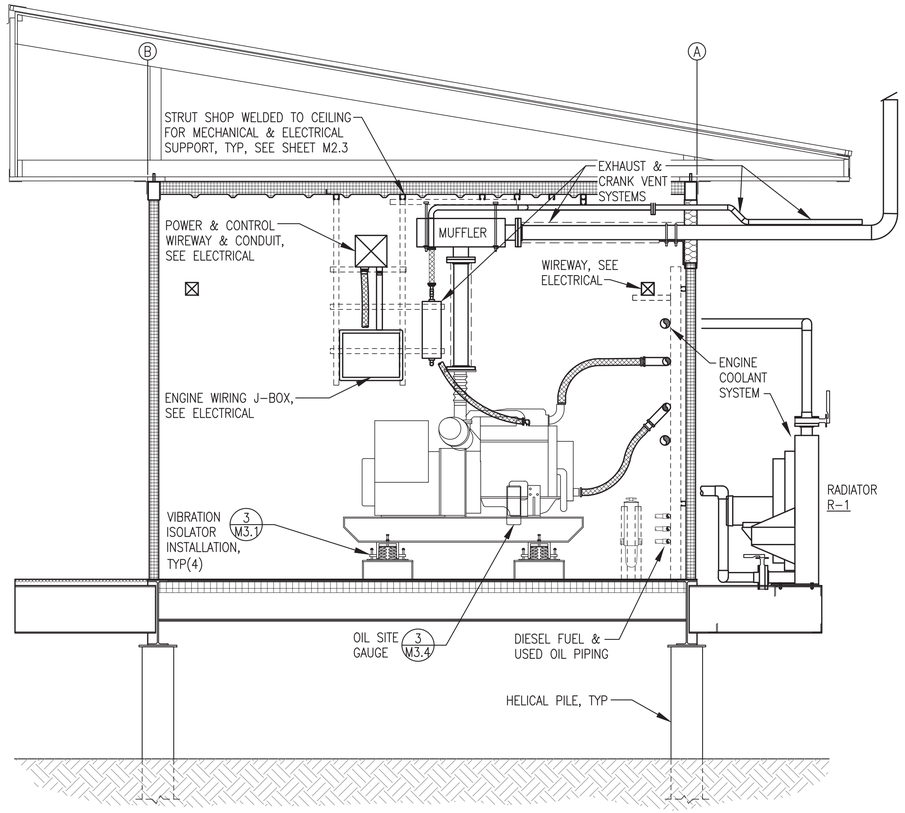
TITLE: MECHANICAL SUPPORT
VERTICAL WALL STRUT INSTALLATION

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

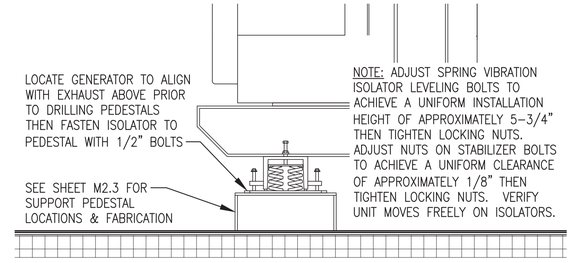
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M2.5
PROJECT NUMBER:	



1 M3.1 EQUIPMENT LAYOUT PLAN
3/8"=1'-0"



2 M3.1 TYPICAL MODULE SECTION/GENERATOR INSTALLATION
1/2"=1'-0"



3 M3.1 VIBRATION ISOATOR INSTALLATION
1"=1'-0"

EQUIPMENT LAYOUT GENERAL NOTES:
1) SEE M2 SHEETS FOR MECHANICAL AND ELECTRICAL SUPPORTS AND PENETRATIONS
2) SEE M3 SHEETS FOR GENERAL EQUIPMENT LAYOUT, BASE SUPPORT, FABRICATIONS, AND GENERATOR ASSEMBLY DETAILS.
3) SEE M4 SHEETS FOR ENGINE COOLANT SYSTEM AND HEAT RECOVERY SYSTEM PLANS, ISOMETRICS, AND DETAILS.
4) SEE M5 SHEETS FOR DIESEL FUEL AND USED OIL SYSTEM PLANS AND DETAILS.
5) SEE SHEET M6 FOR EXHAUST AND CRANK CASE VENTILATION PLANS AND DETAILS.
6) SEE M7 SHEETS FOR VENTILATION SYSTEM PLANS AND SHEET METAL FABRICATIONS.

ENGINE-GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #2	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #3	ENGINE – 99 HP, 65 EKW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 90 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274C.

ENGINE-GENERATOR CODE COMPLIANCE NOTES
1) PER IMC 915.1 THE ENGINE-GENERATORS AND ASSOCIATED MECHANICAL SYSTEMS SHALL BE IN INSTALLED COMPLIANCE WITH NFPA 37. SEE THE ABOVE REFERENCED DRAWINGS FOR ADDITIONAL DETAIL.
2) PER IMC 915.1 THE ENGINE-GENERATORS SHALL BE FABRICATED AND ASSEMBLED IN ACCORDANCE WITH U.L. 2200. SEE ENGINE-GENERATOR SPECIFICATIONS FOR ADDITIONAL DETAIL.

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. FIELD INSTALLATION OF COMPONENTS EXTERIOR TO THE MODULE UNDER THE ON SITE CONTRACT ARE DELINEATED ON SHEETS THAT FOLLOW

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER BRIAN C. GRAY ME 8210

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

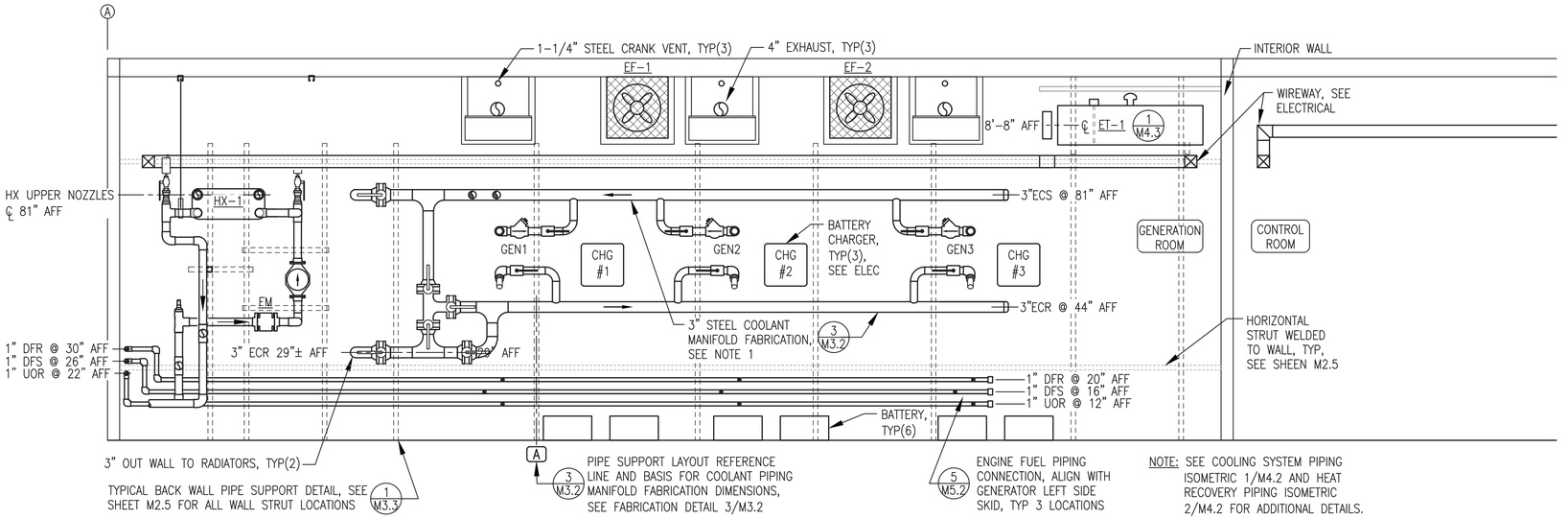
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

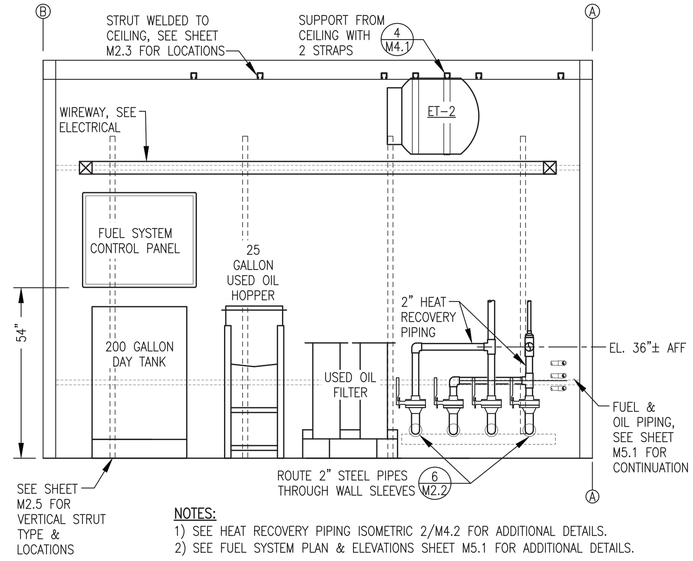
TITLE: EQUIPMENT LAYOUT PLAN, SECTION, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M3.1
PROJECT NUMBER:

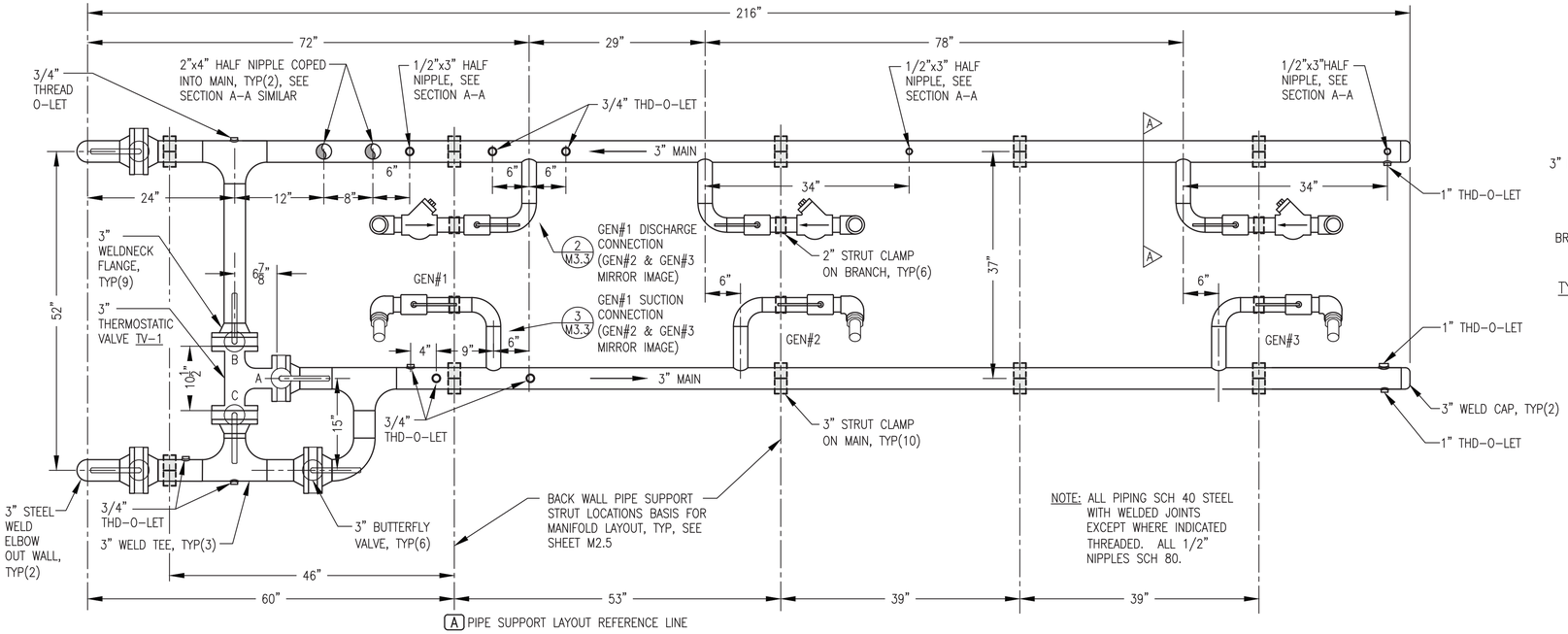


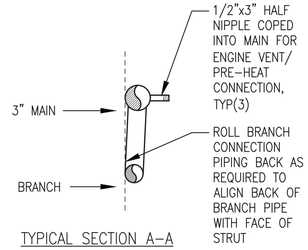
1 M3.2 BACK WALL ELEVATION
1/2"=1'-0"



NOTES:
1) SEE HEAT RECOVERY PIPING ISOMETRIC 2/M4.2 FOR ADDITIONAL DETAILS.
2) SEE FUEL SYSTEM PLAN & ELEVATIONS SHEET M5.1 FOR ADDITIONAL DETAILS.

2 M3.2 END WALL ELEVATION
1/2"=1'-0"





TYPICAL SECTION A-A

3 M3.2 COOLANT MANIFOLD ENLARGED FABRICATION DETAIL
1"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	UPDATED TO ADD SCHOOL HEAT RECOVERY	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

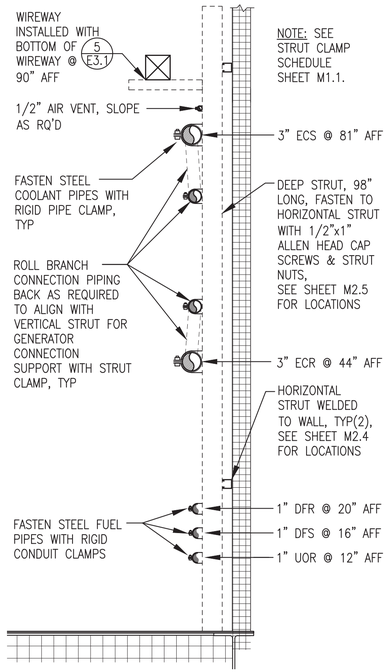
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

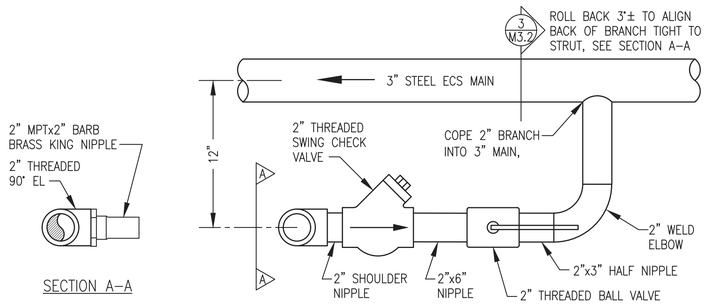
TITLE: WALL ELEVATIONS & PIPING DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M3.2
PROJECT NUMBER:

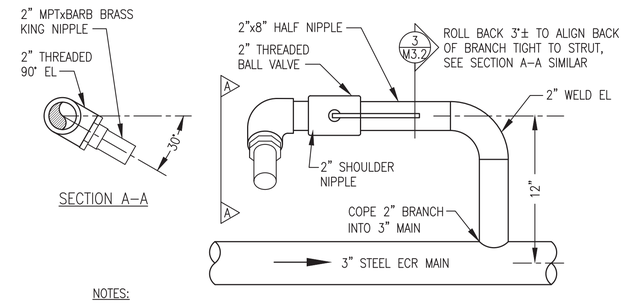


1 M3.3 TYPICAL PIPE SUPPORT AT BACK WALL
1"=1'-0"



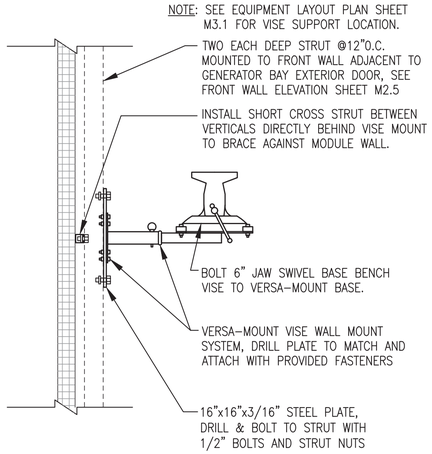
NOTES:
1) GEN#1 DISCHARGE CONNECTION SHOWN, GEN#2 & GEN#3 MIRROR IMAGE
2) MAIN PIPING 3" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
3) ALL PIPING SCHEDULE 40 STEEL.

2 M3.3 GEN#1 DISCHARGE CONNECTION (GEN#2 & GEN#3 MIRROR IMAGE)
NO SCALE



NOTES:
1) GEN#1 SUCTION CONNECTION SHOWN, GEN#2 & GEN#3 MIRROR IMAGE
2) MAIN PIPING 3" STEEL WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
3) ALL PIPING SCHEDULE 40 STEEL.

3 M3.3 GEN#1 SUCTION CONNECTION (GEN#2 & GEN#3 MIRROR IMAGE)
NO SCALE



4 M3.3 REMOVABLE BENCH VISE INSTALLATION
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

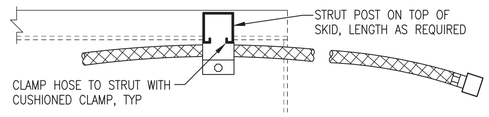
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

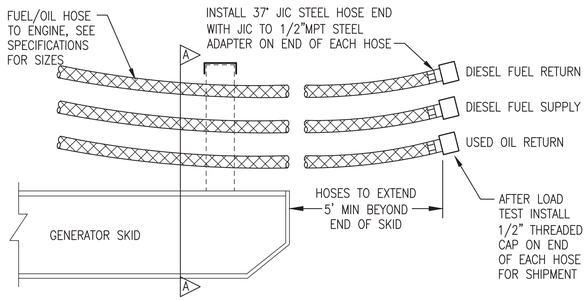
TITLE: MECHANICAL DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

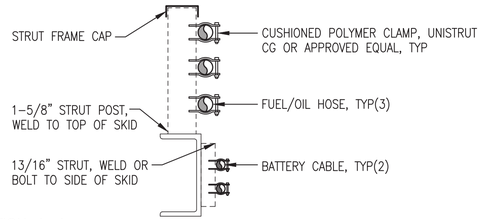
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M3.3
PROJECT NUMBER:	



LEFT SKID PLAN (TOP) VIEW



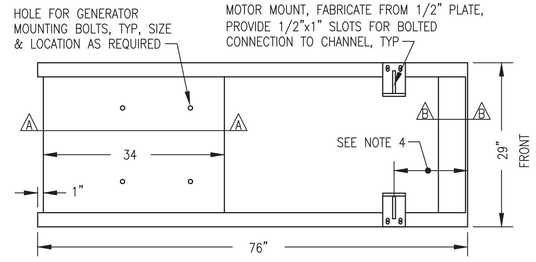
ELEVATION (SIDE) VIEW



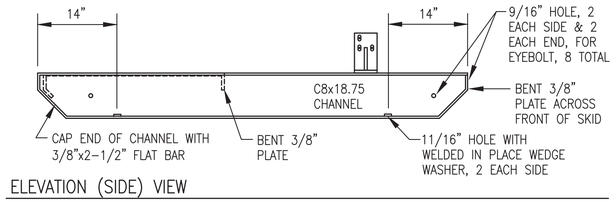
SECTION A–A

NOTE:
GROUP HOSES ON LEFT SKID AS SHOWN TO COORDINATE WITH COOLANT HOSES ABOVE.

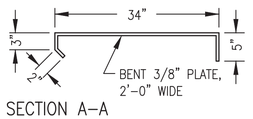
1 M3.4 FUEL/OIL HOSE & BATTERY CABLE INSTALLATION
NO SCALE



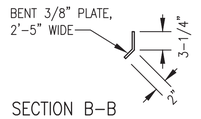
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A–A

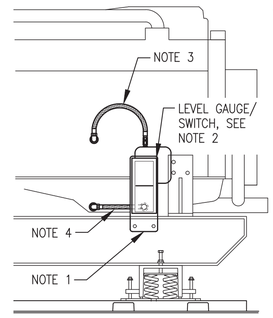


SECTION B–B

NOTES:

1) FABRICATE FROM ASTM A–36 STEEL. BEND PLATES & CUT ENDS OF CHANNELS AT 90° & 45° AS SHOWN.
2) EXCEPT WHERE INDICATED AS BOLTED MAKE ALL CONNECTIONS WITH CONTINUOUS WELDS (FILLET OR FULL–PENETRATION GROOVE AS REQUIRED) IN ACCORDANCE WITH CURRENT AWS STANDARD CODE.
3) ROUND ALL CORNERS & GRIND WELDS SMOOTH AFTER FABRICATION. PAINT TO MATCH ENGINE–GENERATOR.
4) PLACE UNIT ON SKID SO THAT THE EXHAUST RISER CENTERLINE IS 39" FROM THE FRONT OF THE SKID.

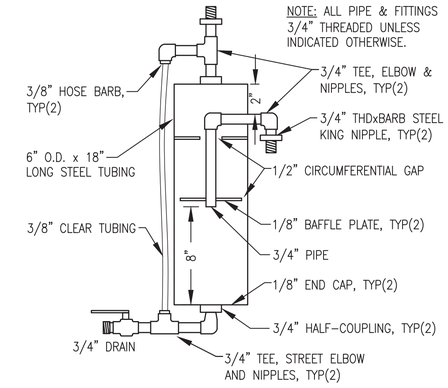
2 M3.4 TYPICAL GENERATOR SKID FABRICATION
NO SCALE



NOTES:

1) 1/4" STEEL SUPPORT PLATE PRE–DRILLED TO MATCH GAUGE/SWITCH MOUNTS AND BOTTOM HOSE ENTRANCE. BOLT TO INSIDE (BACK) OF CHANNEL SKID AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL.
2) MOUNT OIL LEVEL GAUGE/SWITCH TO STEEL SUPPORT PLATE WITH RUBBER SHOCK MOUNTS. ADJUST SWITCH CONTACTS TO 1/2" ABOVE AND BELOW NORMAL FULL LEVEL. PAINT MARK A RED LINE AT BOTH SWITCH LEVELS.
3) CONNECT TOP (VENT) PORT TO ENGINE CRANK CASE WITH #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS. ROUTE UPPER HOSE WITH HIGH POINT 4" MIN ABOVE TOP OF GAUGE.
4) CONNECT BOTTOM PORT TO ENGINE OIL PAN WITH #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS. DO NOT TEE INTO OIL DRAIN LINE. ROUTE LOWER HOSE BACK THROUGH PRE–DRILLED HOLE IN STEEL PLATE.

3 M3.4 TYPICAL OIL LEVEL GAUGE/SWITCH INSTALLATION
NO SCALE



4 M3.4 CONDENSATE TRAP FABRICATION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

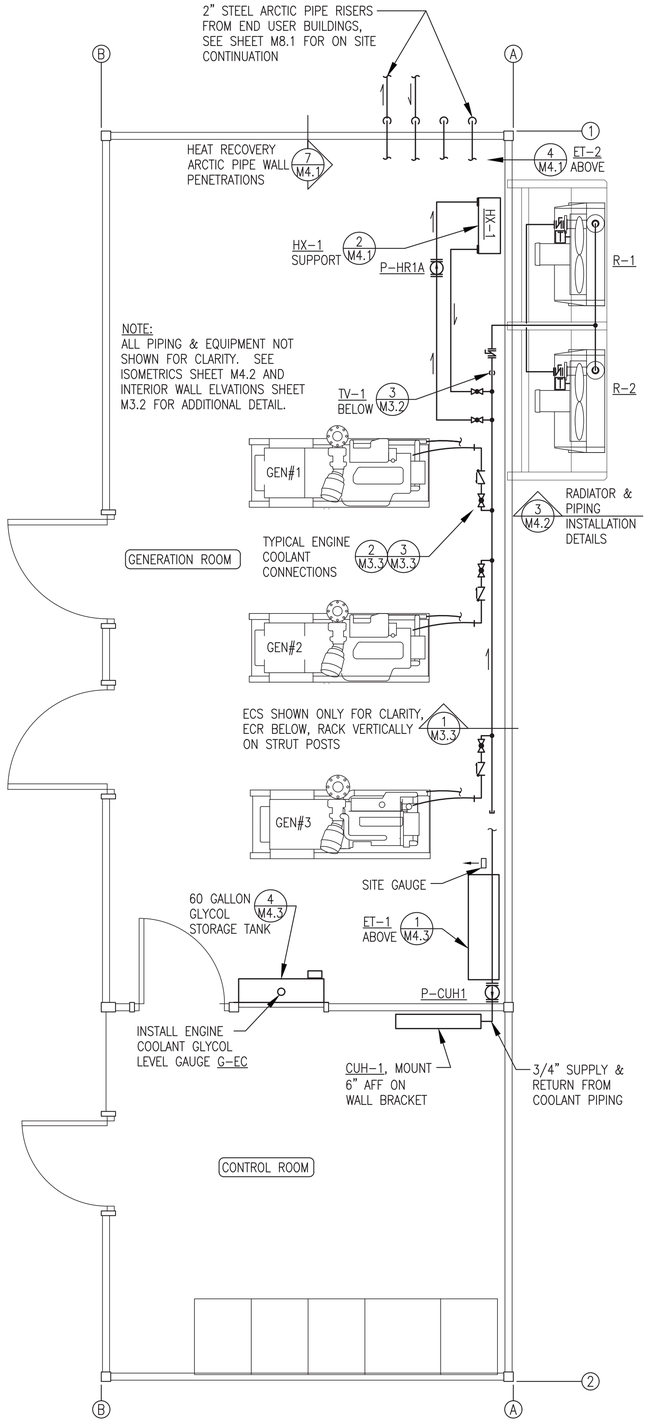
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

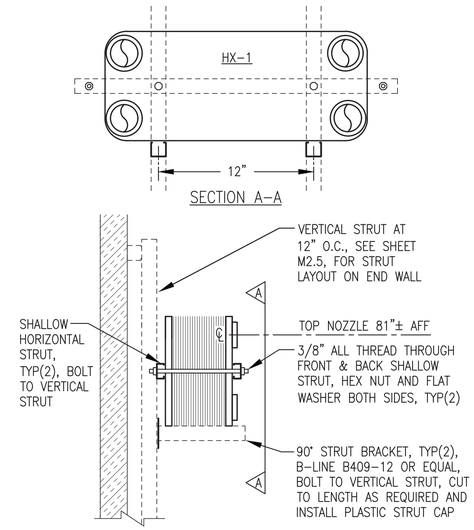
TITLE: GENERATOR FABRICATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2–M7	SHEET: M3.4
PROJECT NUMBER:	



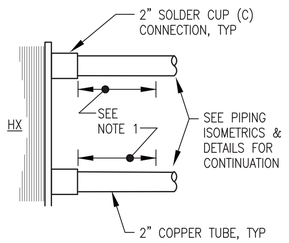
1 M4.1 COOLANT AND HEAT RECOVERY PIPING PLAN
3/8"=1'-0"



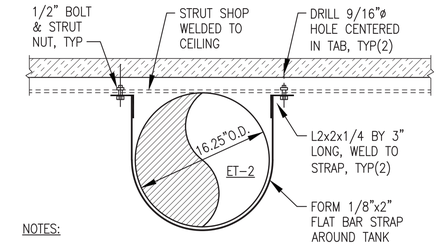
2 M4.1 HEAT EXCHANGER HX-1 SUPPORT FROM WALL
NO SCALE

HX CONNECTION NOTES:

1) PROVIDE MINIMUM 9" LONG STRAIGHT COPPER TUBE SECTION BETWEEN ALL HEAT EXCHANGER NOZZLES AND FIRST SOLDER FITTING TO ALLOW FUTURE INSTALLATION OF NON-DIMPLED REPAIR COUPLING FOR HEAT EXCHANGER TEMPORARY REMOVAL AND/OR REPLACEMENT.



3 M4.1 TYPICAL HX PIPING CONNECTION
NO SCALE

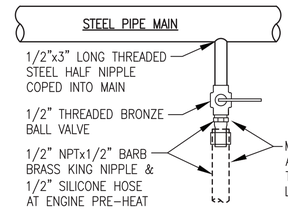


NOTES:

1) SMOOTH EDGES AFTER FABRICATION, WIRE BRUSH, SOLVENT CLEAN, AND PAINT WITH TWO COATS OF COLD GALVANIZING COMPOUND.

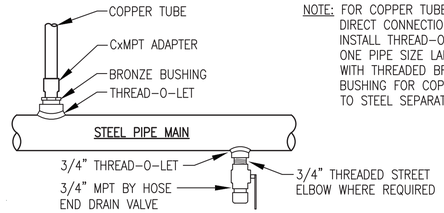
2) ONE STRAP SHOWN. INSTALL FOUR IDENTICAL STRAPS.

4 M4.1 HEAT RECOVERY EXP TANK ET-2 SUPPORT
NO SCALE



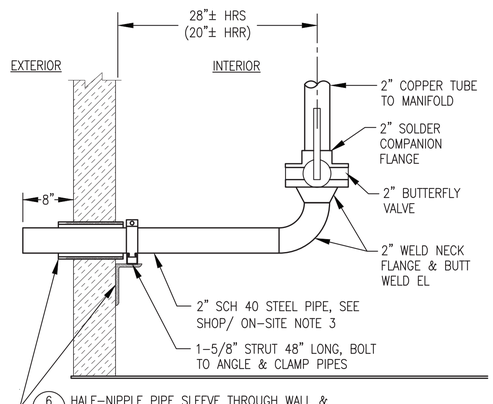
NOTE: 1/2" ENGINE PRE-HEAT/VENT HOSE CONNECTION SHOWN. PROVIDE SIMILAR SOLDER COPPER BRANCH CONNECTIONS WHERE SHOWN, SIZE AS INDICATED.

5 M4.1 TYP VALVED BRANCH CONNECTION TO STEEL MAIN
NO SCALE



NOTE: FOR COPPER TUBE DIRECT CONNECTION INSTALL THREAD-O-LET ONE PIPE SIZE LARGER WITH THREADED BRONZE BUSHING FOR COPPER TO STEEL SEPARATION.

6 M4.1 TYP DIRECT CONNECTION TO STEEL MAIN
NO SCALE



ARCTIC PIPE GENERAL NOTES:

1) SEE END WALL ELEVATION 2/M3.2 FOR PIPE WALL PENETRATION LAYOUT.

2) ONE PIPE SHOWN. PROVIDE FOUR SIMILAR.

ARCTIC PIPE SHOP/ON-SITE NOTES:

1) SHOP INSTALLATION SHOWN. STUB PIPE 8" MIN BEYOND WALL & TEMPORARILY CONNECT SUPPLY TO RETURN FOR TESTING.

2) AFTER TESTING REMOVE TEMPORARY CONNECTION, BREAK FLANGE JOINT, AND STORE PIPE IN MODULE. INSTALL THREADED PIPE CAP FOR SHIPPING.

3) AS PART OF ON-SITE INSTALLATION REMOVE THREADED PIPE CAP, REINSTALL PIPE THROUGH WALL AND CONNECT TO ARCTIC PIPE, SEE SHEET M8.

4) SHOP INSULATE COPPER TUBE UP TO BUTTERFLY VALVE. SHOP CUT & FIT INSULATION & JACKET FOR STEEL PIPE TO WALL BUT SHIP LOOSE FOR FIELD INSTALLATION.

7 M4.1 HEAT RECOVERY ARCTIC PIPE WALL PENETRATIONS
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	UPDATED YO ADD SCHOOL HEAT RECOVERY	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

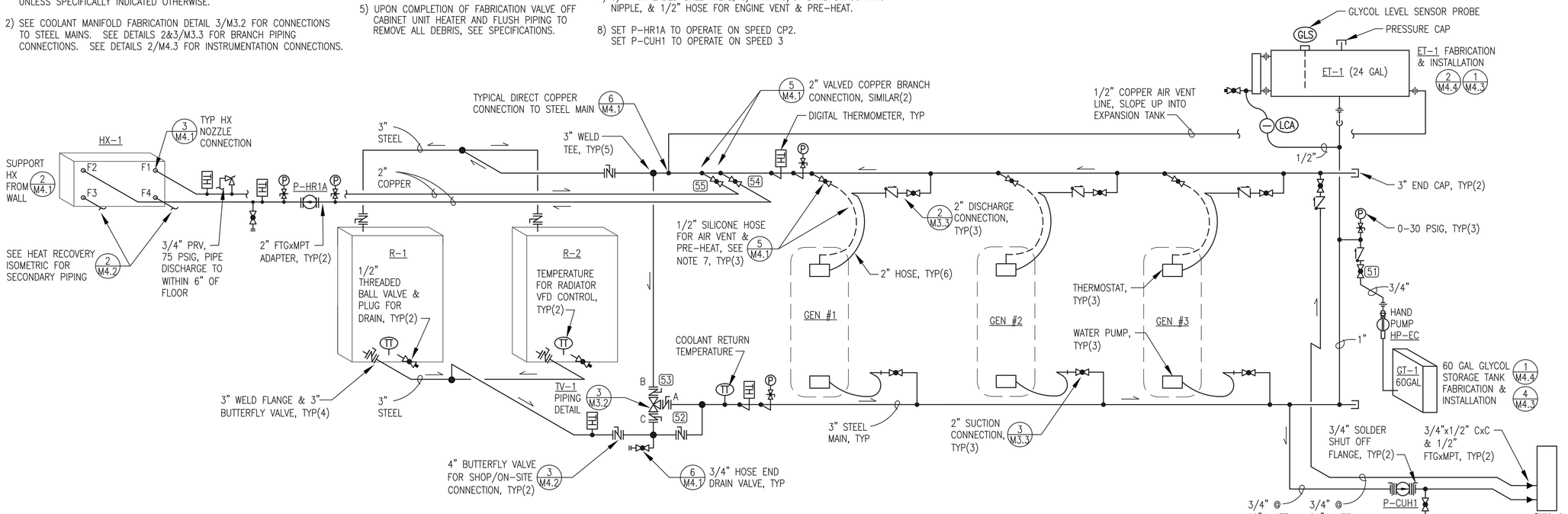
DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: RAM PP M2-M7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 3/15/22
SHEET: M4.1

COOLING SYSTEM ISOMETRIC NOTES:

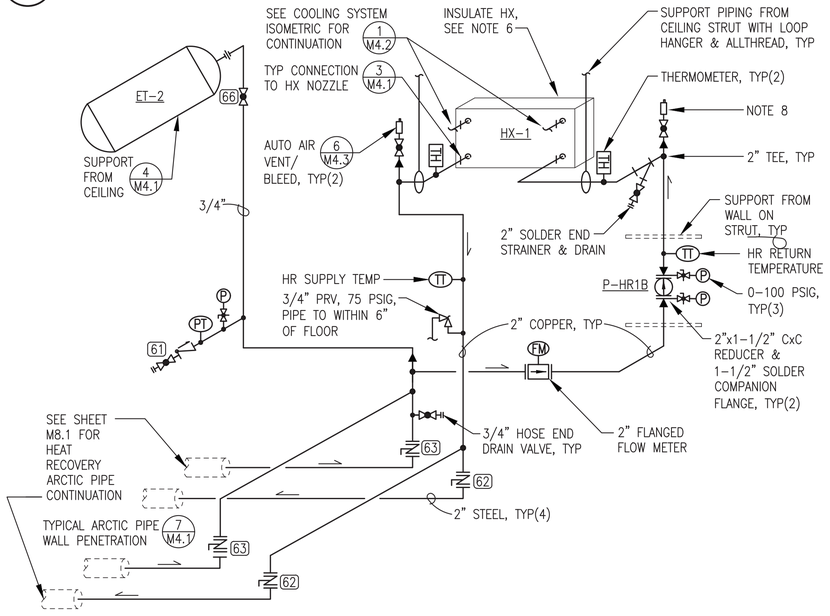
1) ALL PIPING SHOWN THIS ISOMETRIC 4" SCH 40 STEEL WITH WELDED JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE, SEE DETAIL 3/M3.2 FOR COOLING MANIFOLD DETAILS. ALL ENGINE BRANCH CONNECTIONS SCH 40 STEEL WITH WELDED AND THREADED JOINTS. ALL OTHER PIPE SHOWN THIS ISOMETRIC TYPE "L" HARD DRAWN COPPER WITH SOLDER JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE.
2) SEE COOLANT MANIFOLD FABRICATION DETAIL 3/M3.2 FOR CONNECTIONS TO STEEL MAINS. SEE DETAILS 2&3/M3.3 FOR BRANCH PIPING CONNECTIONS. SEE DETAILS 2/M4.3 FOR INSTRUMENTATION CONNECTIONS.
3) ALL COOLANT PRESSURE GAUGES 0–30 PSIG.
4) SEE ELECTRICAL INSTRUMENTATION SCHEDULE FOR TEMPERATURE TRANSMITTERS AND OTHER INSTRUMENTATION.
5) UPON COMPLETION OF FABRICATION VALVE OFF CABINET UNIT HEATER AND FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
6) SHOP INSULATE COOLANT PIPING MAINS FROM GENERATOR VALVES TO BUTTERFLY VALVES AT WALL PENETRATIONS. SHOP CUT & FIT INSULATION & JACKET FROM VALVES TO WALL BUT SHIP LOOSE FOR FIELD INSTALLATION. ALL OTHER PIPING NOT INSULATED.
7) 3/4" THREADED BALL VALVE, 3/4"MPTx5/8" BARB BRASS KING NIPPLE, & 1/2" HOSE FOR ENGINE VENT & PRE–HEAT.
8) SET P–HR1A TO OPERATE ON SPEED CP2. SET P–CUH1 TO OPERATE ON SPEED 3

HYDRONIC PIPING SHOP/ON–SITE NOTES:

1) SEE SPECIFICATION 23 21 13 FOR COOLING AND HEAT RECOVERY PIPING TESTING, FLUSHING, DRAINING, AND FILLING REQUIREMENTS.
2) SEE DETAILS 7/M4.1, 3/M4.2, AND 5/M4.3 FOR SHOP/FIELD REQUIREMENTS FOR PIPING THROUGH THE EXTERIOR WALLS.



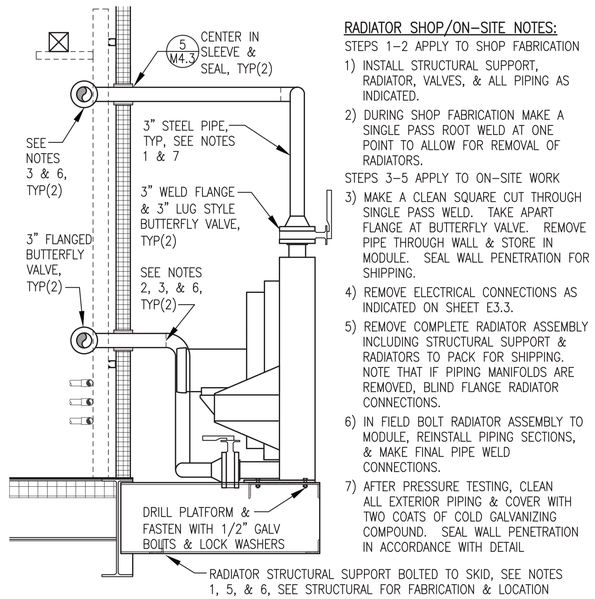
1/M4.2 COOLING SYSTEM PIPING ISOMETRIC
NO SCALE



2/M4.2 HEAT RECOVERY SYSTEM PIPING ISOMETRIC
NO SCALE

HEAT RECOVERY ISOMETRIC NOTES:

1) ALL PIPING SHOWN THIS ISOMETRIC TYPE "L" COPPER WITH SOLDER JOINTS, 2"ø EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. ALL FLANGES ANSI 150# PATTERN TWO–PIECE WITH POWDER COATED STEEL FLANGE AND SOLDER COPPER TUBE ADAPTER. FOR ALL JOINTS EXCEPT BUTTERFLY VALVES INSTALL SPIRAL WOUND METALLIC GASKETS AND COAT GASKETS WITH ANTI–SEIZE COMPOUND PRIOR TO ASSEMBLING.
2) MAKE ALL CONNECTIONS FOR INSTRUMENTATION WITH T–DRILL TAP OR REDUCING TEE. SEE DETAIL 3/M4.3.
3) ALL HEAT RECOVERY PRESSURE GAUGES 0–100 PSIG.
4) SEE INSTRUMENTATION SCHEDULE SHEET M1.1 FOR TEMPERATURE AND PRESSURE TRANSMITTERS AND FLOW METER.
5) UPON COMPLETION OF FABRICATION FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
6) INSULATE ALL 2" HEAT RECOVERY PIPING MAINS. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL–BACK FIBERGLASS INSULATION ALL AROUND AND TAPE ALL SEAMS.
7) SET P–HR1B TO OPERATE ON CP3.
8) RISE UP BEHIND WIREWAY FOR THIS AIR VENT CONNECTION.



3/M4.2 RADIATOR & PIPING INSTALLATION
3/4"=1'–0"

RADIATOR SHOP/ON–SITE NOTES:

STEPS 1–2 APPLY TO SHOP FABRICATION

1) INSTALL STRUCTURAL SUPPORT, RADIATOR, VALVES, & ALL PIPING AS INDICATED.
2) DURING SHOP FABRICATION MAKE A SINGLE PASS ROOT WELD AT ONE POINT TO ALLOW FOR REMOVAL OF RADIATORS.

STEPS 3–5 APPLY TO ON–SITE WORK

3) MAKE A CLEAN SQUARE CUT THROUGH SINGLE PASS WELD. TAKE APART FLANGE AT BUTTERFLY VALVE. REMOVE PIPE THROUGH WALL & STORE IN MODULE. SEAL WALL PENETRATION FOR SHIPPING.
4) REMOVE ELECTRICAL CONNECTIONS AS INDICATED ON SHEET E3.3.
5) REMOVE COMPLETE RADIATOR ASSEMBLY INCLUDING STRUCTURAL SUPPORT & RADIATORS TO PACK FOR SHIPPING. NOTE THAT IF PIPING MANIFOLDS ARE REMOVED, BLIND FLANGE RADIATOR CONNECTIONS.
6) IN FIELD BOLT RADIATOR ASSEMBLY TO MODULE, REINSTALL PIPING SECTIONS, & MAKE FINAL PIPE WELD CONNECTIONS.
7) AFTER PRESSURE TESTING, CLEAN ALL EXTERIOR PIPING & COVER WITH TWO COATS OF COLD GALVANIZING COMPOUND. SEAL WALL PENETRATION IN ACCORDANCE WITH DETAIL

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	UPDATED YO ADD SCHOOL HEAT RECOVERY	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

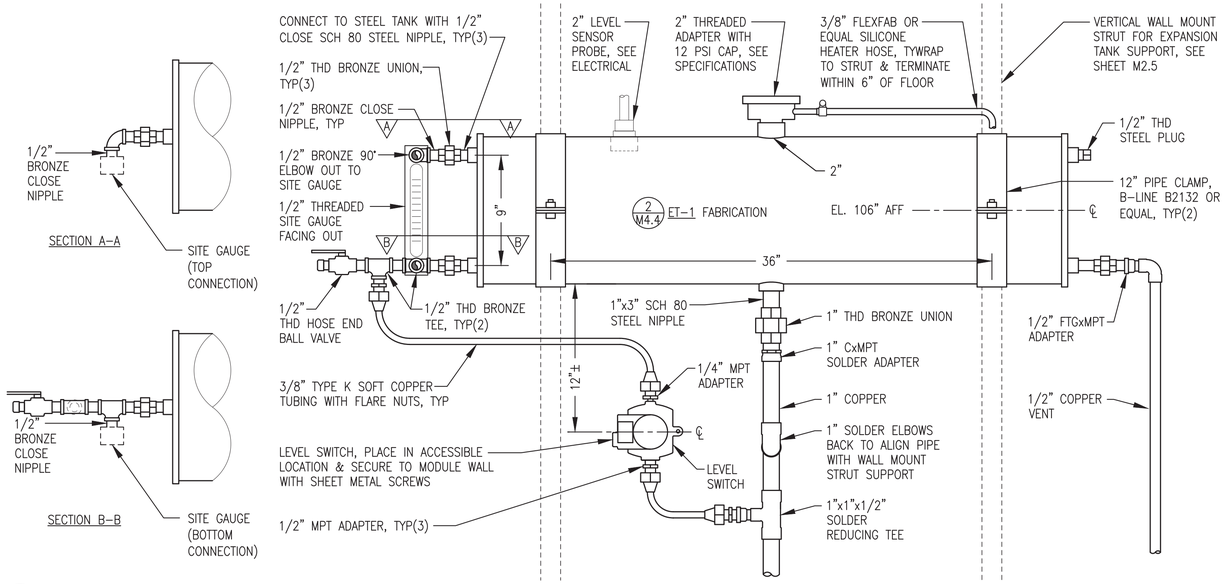
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

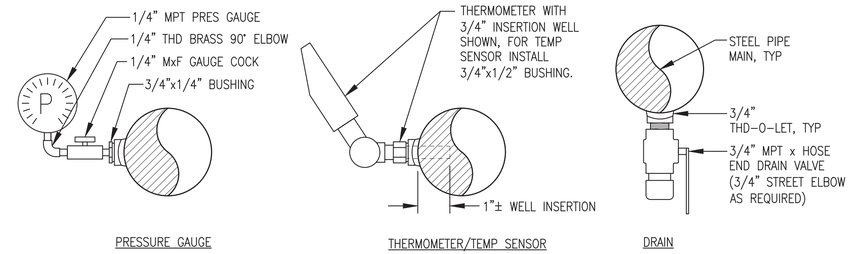
TITLE: COOLANT & HEAT RECOVERY ISOMETRICS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

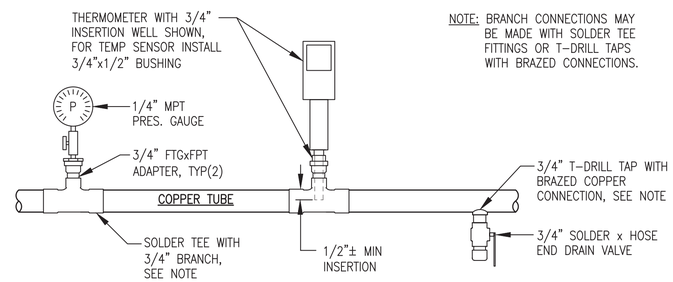
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2–M7	SHEET: M4.2
PROJECT NUMBER:	



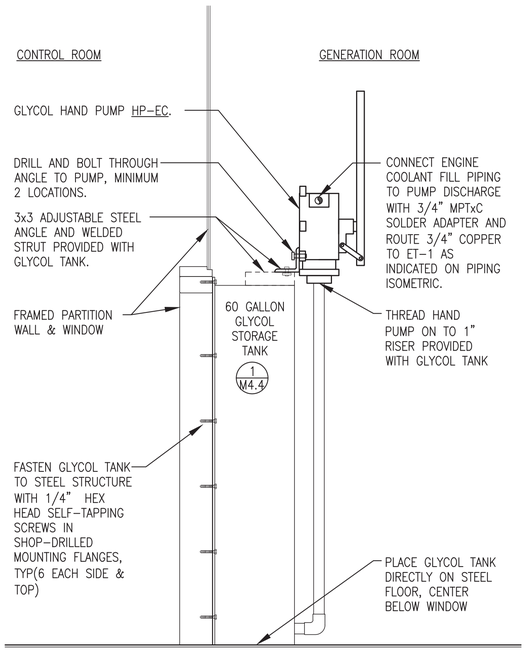
1 M4.3 24 GAL EXPANSION TANK ET-1 INSTALLATION
NO SCALE



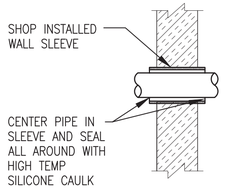
2 M4.3 TYP INSTRUMENT/DRAIN INSTALLATION IN STEEL PIPE
NO SCALE



3 M4.3 TYP INSTRUMENT/DRAIN INSTALLATION IN COPPER TUBE
NO SCALE



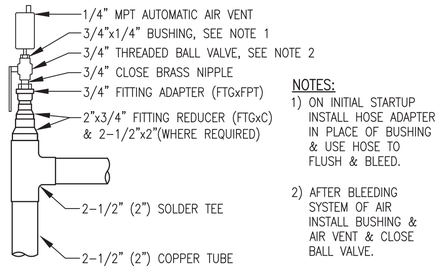
4 M4.3 GLYCOL STORAGE TANK & HAND PUMP HP-EC INSTALLATION DETAIL
NO SCALE



SHOP/ON-SITE NOTES:
1) SEAL OPENINGS AS PART OF ON-SITE WORK.

GENERAL NOTES:
1) THIS DETAIL FOR COOLANT PIPING WITH SHOP INSTALLED WALL SLEEVES.
2) FOR ALL PIPE/CONDUIT LESS THAN 2" O.D. AND WITHOUT A SHOP INSTALLED WALL SLEEVE, HOLE SAW OPENING APPROXIMATELY 1/4" LARGER THAN PIPE O.D. THROUGH WALL & SEAL ALL AROUND WITH POLYURETHANE CAULKING.

5 M4.3 COOLANT PIPING WALL PENETRATION
NO SCALE



NOTES:
1) ON INITIAL STARTUP INSTALL HOSE ADAPTER IN PLACE OF BUSHING & USE HOSE TO FLUSH & BLEED.
2) AFTER BLEEDING SYSTEM OF AIR INSTALL BUSHING & AIR VENT & CLOSE BALL VALVE.

6 M4.3 TYPICAL AIR VENT INSTALLATION IN COPPER
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: ENGINE COOLANT & HEAT RECOVERY PIPING DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

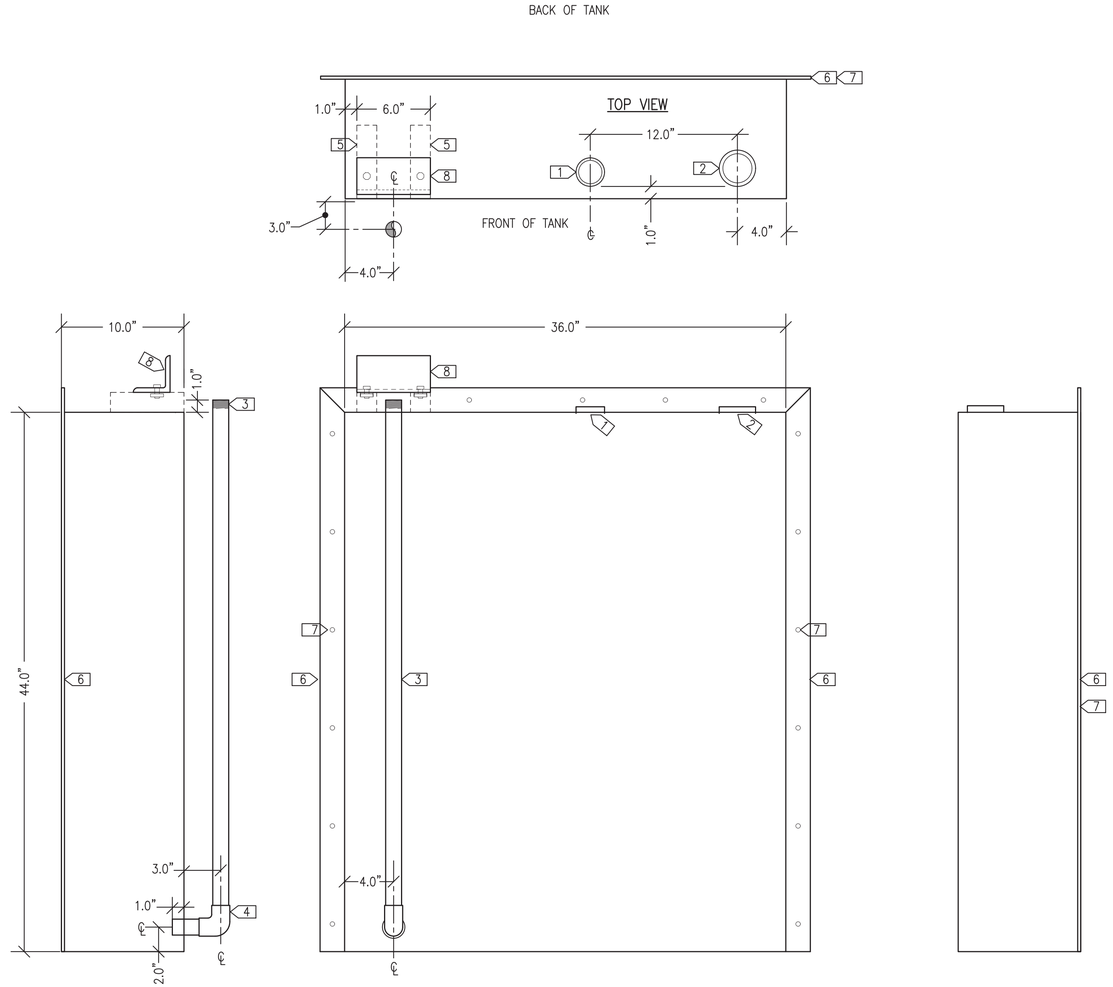
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M4.3
PROJECT NUMBER:	

GLYCOL TANK GENERAL NOTES:

1. FABRICATE SINGLE WALL 60 GALLON NOMINAL CAPACITY GLYCOL TANK.
2. FABRICATE FROM ASTM A-36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS.
3. PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. SEAL WELD ALL TANK ATTACHMENTS.
4. ALL FPT OPENINGS TO BE FORGED STEEL HALF COUPLINGS.
5. PRESSURE TEST COMPLETED ASSEMBLY TO 5 PSIG MAXIMUM USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.
6. UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PRIME AND COVER WITH TWO COATS OF EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
7. UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. INSTALL 2" SCREENED VENT ON 2" FPT FILL CONNECTION WITH 2" CLOSE NIPPLE FOR SHIPPING. SEAL ALL OTHER OPENINGS WITH PLASTIC OR STEEL PLUGS..

GLYCOL TANK SPECIFIC NOTES:

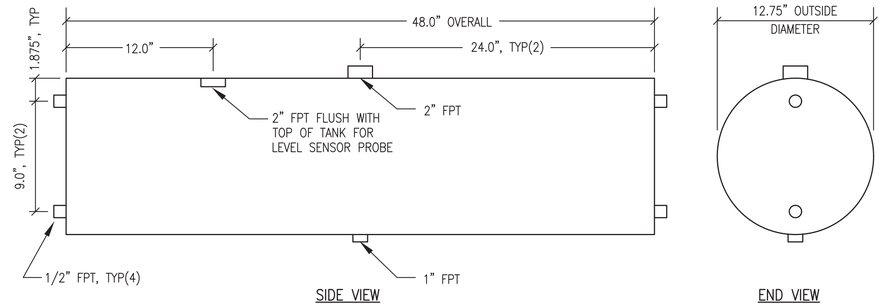
1. 1-1/2" FPT (TANK GAUGE)
2. 2" FPT (VENT) – INSTALL 2" THREADED VENT CAP
3. 1" SCHEDULE 80 PIPE WITH THREADED TOP CONNECTION (WITHDRAWAL)
4. 1" SOCKETWELD 90° ELBOW
5. 6" LONG STRUT, END FLUSH WITH FRONT OF TANK
6. 2x1/4" FLAT BAR CONTINUOUS THREE SIDES
7. 3/8" HOLE AT 8" O.C. ALL AROUND
8. L3x3x1/4"x6" LONG FOR FUTURE CONNECTION TO HAND PUMP BY OTHERS. PAINT TO MATCH TANK AND FASTEN TO STRUTS WITH 1/2" BOLTS & STRUT NUTS.



1 M4.4 60 GALLON GLYCOL STORAGE TANK
1"=6"

EXPANSION TANK GENERAL NOTES:

1) FABRICATE SINGLE WALL 24 GALLON NOMINAL CAPACITY GLYCOL EXPANSION TANK.
2) FABRICATE SHELL FROM MINIMUM 10 GAUGE ASTM A-36 PLATE STEEL ROLLED AND WELDED OR SCHEDULE 5 LIGHTWALL ASTM A53 STEEL PIPE. FABRICATE HEADS FROM 3/16" THICK ASTM A-36 PLATE STEEL. MAKE ALL JOINTS WITH CONTINUOUS FULL-PENETRATION WELDS.
3) PROVIDE WITH ALL OPENINGS INDICATED USING MINIMUM 3000# FORGED STEEL PIPE HALF COUPLINGS IN ACCORDANCE WITH U.L 142 FIGURE 7.1 #2.
4) PRESSURE TEST COMPLETED ASSEMBLY TO 15 PSIG MINIMUM.
5) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
6) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.



2 M4.4 24 GALLON GLYCOL EXPANSION TANK
1"=6"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

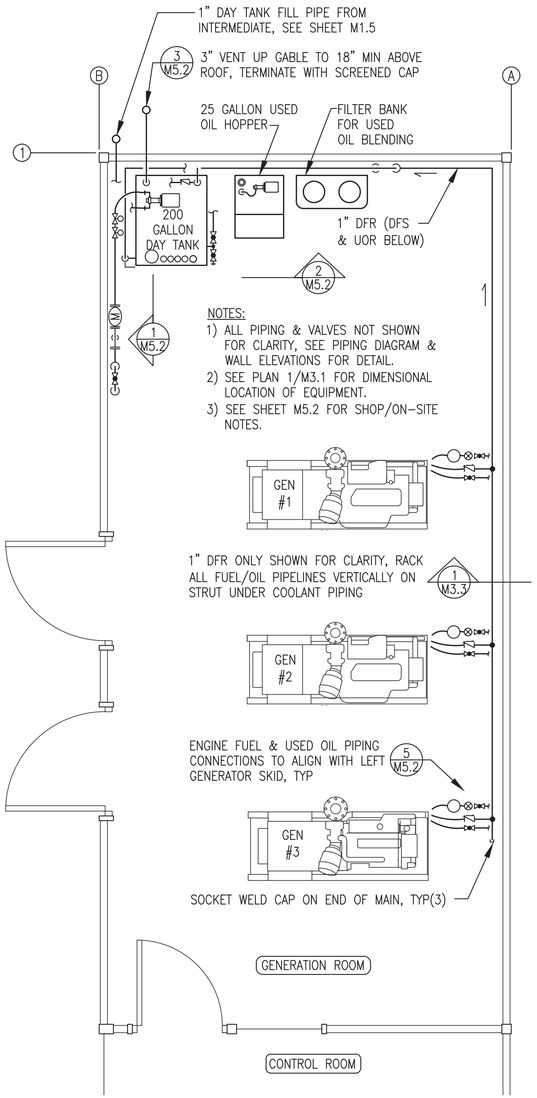
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: GLYCOL STORAGE & EXPANSION TANKS FABRICATION

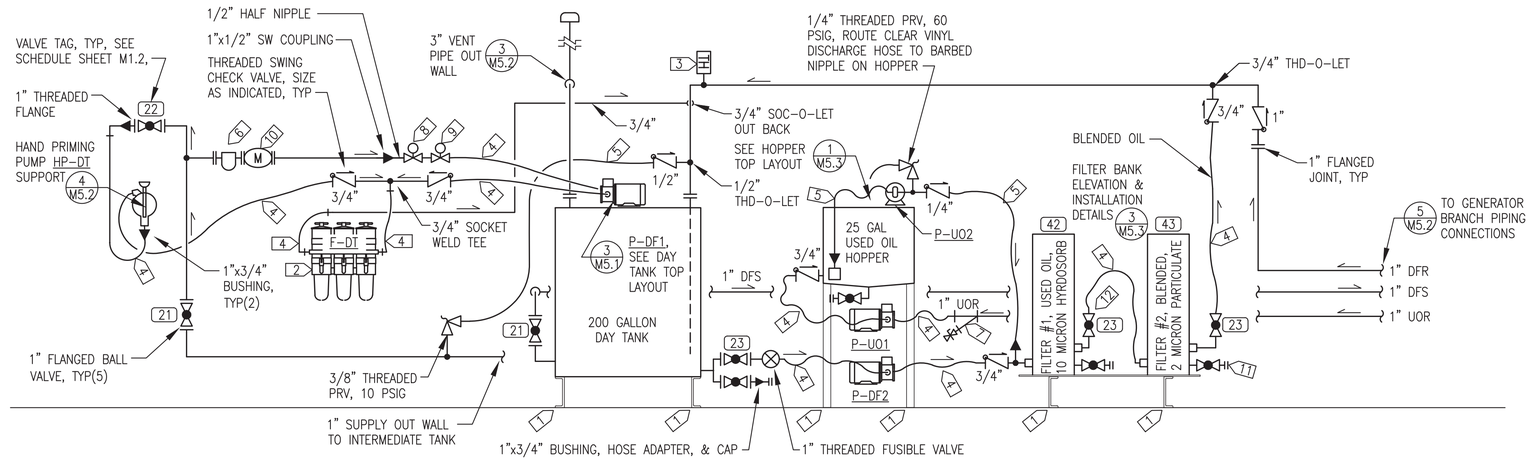
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M4.4
PROJECT NUMBER:	



1 M5.1 DIESEL FUEL SYSTEM & USED OIL PIPING PLAN

3/8"=1'



PIPING DIAGRAM SPECIFIC NOTES:

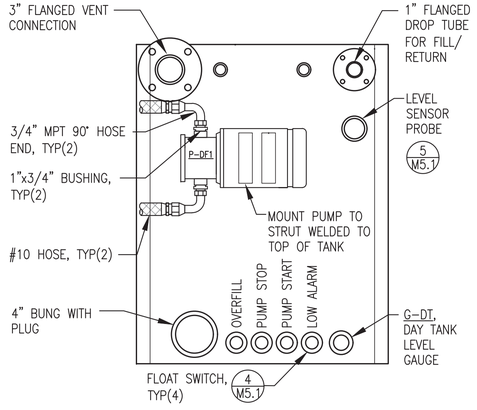
1. FASTEN DEVICE TO FLOOR WITH MIN 1"x3/16" FILLET WELD ALL 4 CORNERS, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING.
2. 3/4" THREADED DUAL FILTER BANK F-DT.
3. DIGITAL THERMOMETER, INSTALL WELL IN 3/4" THREAD-O-LET.
4. #10 HOSE WITH 1/2" OR 3/4" NPT ENDS TO MATCH EQUIPMENT.
5. #6 HOSE WITH 1/8", 1/4", OR 3/8" NPT ENDS.
6. 1" FLANGED BASKET STRAINER IN 1" DAY TANK SUPPLY WITH GAUGE COCK BLOW DOWN.
7. 1" THREADED "Y" STRAINER IN 1" UOR WITH GAUGE COCK BLOW DOWN.
8. 1/2" NO SOLENOID VALVE.
9. 1/2" NC SOLENOID VALVE.
10. METER M-DT EQUIPPED WITH 1" ANSI 150# FLANGED ENDS.
11. 3/4" THREADED BALL VALVE WITH HOSE ADAPTER & CAP, TYP(3).
12. 3/4" THREADED BALL VALVE, TYP(2).

PIPING DIAGRAM GENERAL NOTES:

1) FABRICATE DAY TANK, FILTER BANK, & HOPPER IN ACCORDANCE WITH FABRICATION DETAILS.
2) ALL DFS, DFR & UOR PIPING 1" SCH 80 EXCEPT WHERE INDICATED AS 3/4". ALL VENT PIPING 3" SCH 40.
3) ALL DFS, DFR & UOR PIPING JOINTS SOCKET OR BUTT WELD EXCEPT FOR THREADED CONNECTIONS TO EQUIPMENT & VALVES. ALL VENT PIPING JOINTS THREADED.
4) ON ALL HOSES FIELD INSTALL JICxNPT SWIVEL ENDS, SIZE REQUIRED TO MATCH PIPING, PUMPS, OR EQUIPMENT.

2 M5.1 DIESEL FUEL & USED OIL PIPING DIAGRAM

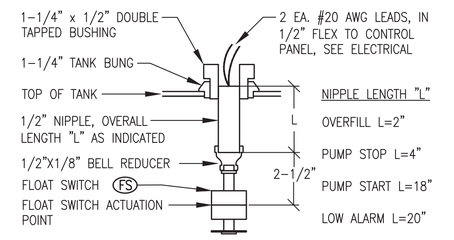
NO SCALE



3 M5.1 TOP OF DAY TANK - PLAN VIEW

NO SCALE

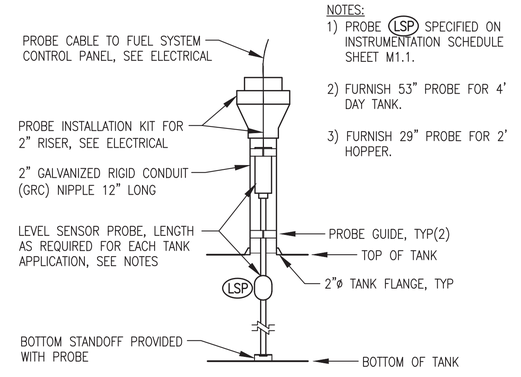
NOTES:
1) FLOAT SWITCH (FS) SPECIFIED ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) PRIOR TO INSTALLATION CHASE THREADS ON FLOAT SWITCH WITH 1/8" PIPE DIE TO CLEAN OFF ANY EXCESS EPOXY, USE CARE TO AVOID DAMAGING WIRES.



4 M5.1 DAY TANK FLOAT SWITCH INSTALLATION

NO SCALE

NOTES:
1) PROBE (LSP) SPECIFIED ON INSTRUMENTATION SCHEDULE SHEET M1.1.
2) FURNISH 53" PROBE FOR 4' DAY TANK.
3) FURNISH 29" PROBE FOR 2' HOPPER.



5 M5.1 TYPICAL LEVEL SENSOR PROBE INSTALLATION

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1 ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

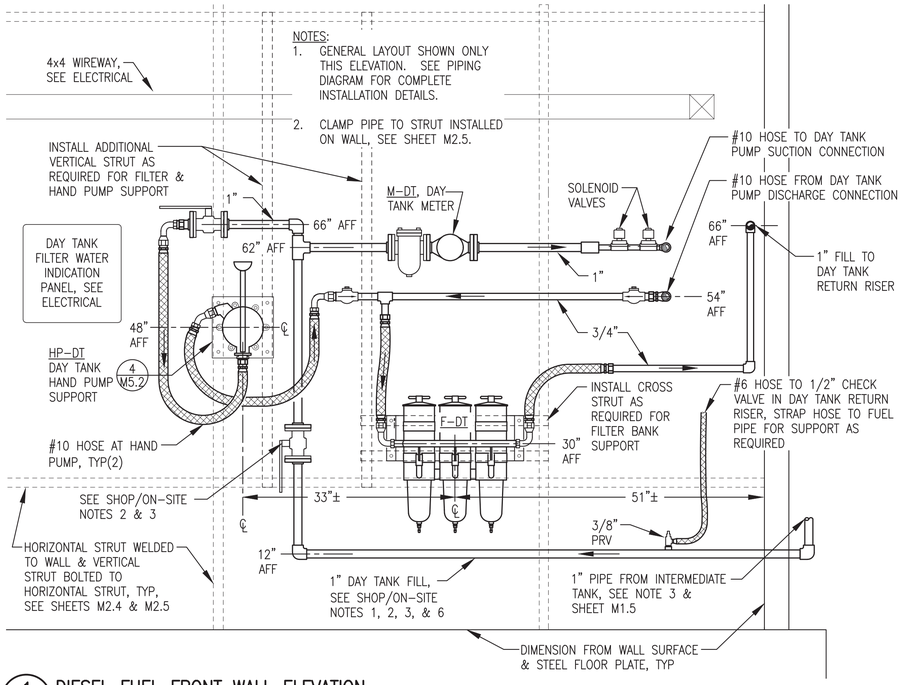
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

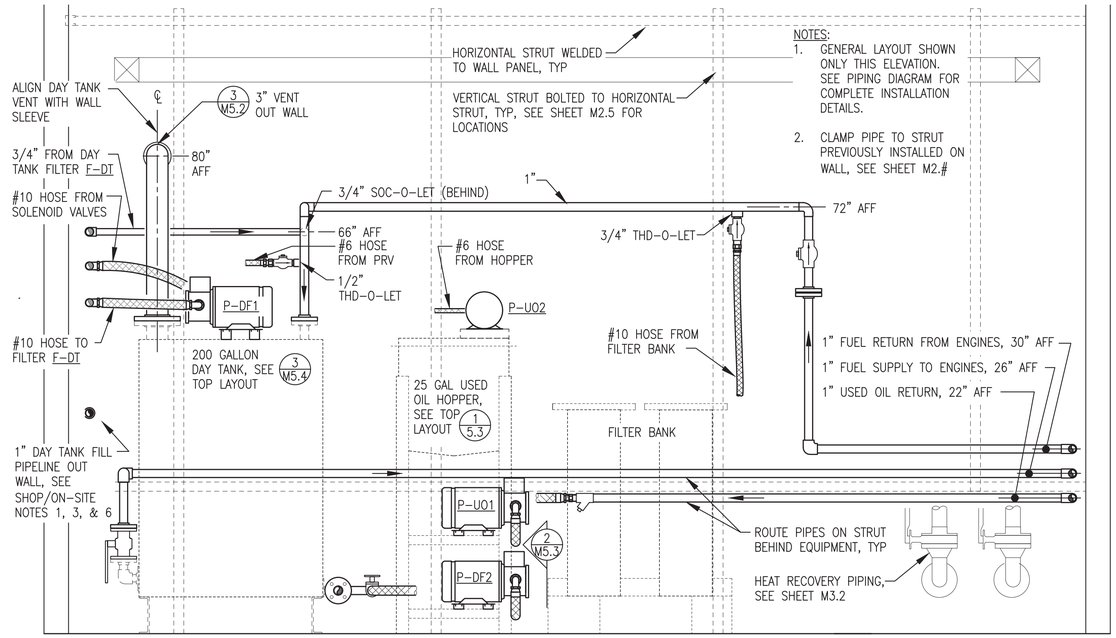
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M5.1
PROJECT NUMBER:



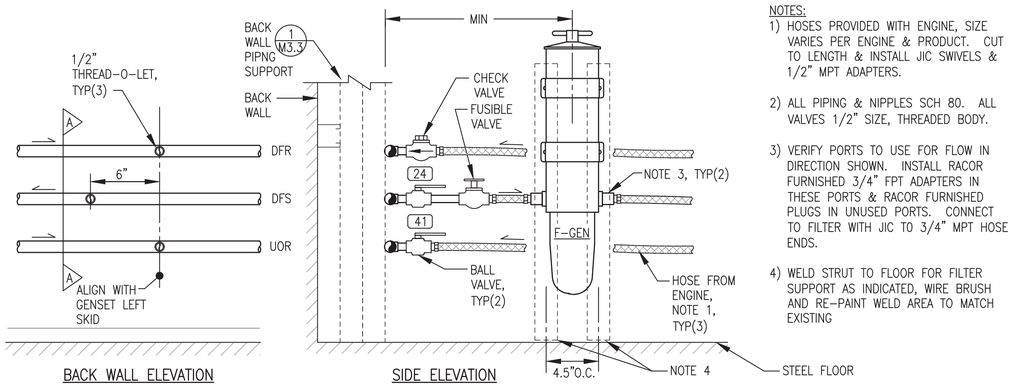
1 M5.2 DIESEL FUEL FRONT WALL ELEVATION
1"=1'

FUEL SHOP/ON-SITE NOTES:

1. DURING SHOP FABRICATION HOLE SAW 1-1/2"ø OPENING FOR DAY TANK FILL PIPE, STUB PIPE 12" MIN BEYOND WALL, & TERMINATE WITH 1" MALE THREAD FOR TESTING.
2. UPON COMPLETION OF TESTING CLOSE VALVE, DRAIN PIPE, DISCONNECT FLANGE FROM VALVE THEN SLIDE PIPE OVER & SECURE FOR SHIPPING. SEAL WALL OPENING.
3. AS PART OF ON-SITE INSTALLATION REINSTALL FILL PIPE THEN CUT THREADS OFF EXTERIOR END & INSTALL SOCKET WELD ELBOW.
4. DURING SHOP FABRICATION INSTALL TEMPORARY VENT PIPE OUT WALL. UPON COMPLETION OF TESTING REMOVE TEMPORARY PIPE & SEAL WALL OPENING FOR SHIPPING.
5. AS PART OF ON-SITE INSTALLATION INSTALL 3" GALVANIZED THREADED VENT PIPE OUT WALL & UP TO VENT CAP. SEE DETAIL 3/M5.2.
6. UPON FINAL ON-SITE ASSEMBLY SEAL 1" FILL PIPE TO EXTERIOR WALL & 3" VENT PIPE TO WALL SLEEVE WITH POLYURETHANE CAULKING ALL AROUND.

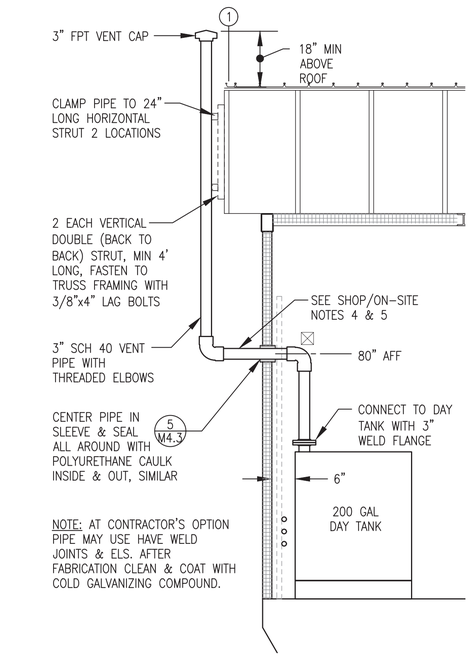


2 M5.2 DIESEL FUEL & USED OIL END WALL ELEVATION
1"=1'

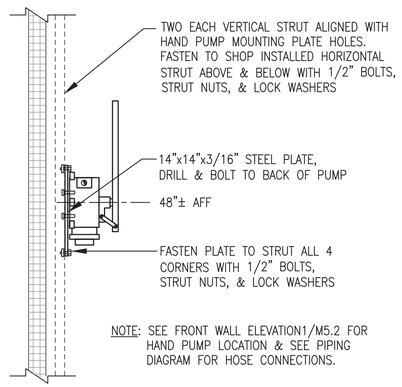


NOTES:
1) HOSES PROVIDED WITH ENGINE, SIZE VARIES PER ENGINE & PRODUCT. CUT TO LENGTH & INSTALL JIC SWIVELS & 1/2" MPT ADAPTERS.
2) ALL PIPING & NIPPLES SCH 80. ALL VALVES 1/2" SIZE, THREADED BODY.
3) VERIFY PORTS TO USE FOR FLOW IN DIRECTION SHOWN. INSTALL RACOR FURNISHED 3/4" FPT ADAPTERS IN THESE PORTS & RACOR FURNISHED PLUGS IN UNUSED PORTS. CONNECT TO FILTER WITH JIC TO 3/4" MPT HOSE ENDS.
4) WELD STRUT TO FLOOR FOR FILTER SUPPORT AS INDICATED, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING

5 M5.2 ENGINE FUEL PIPING CONNECTION
NO SCALE



3 M5.2 DAY TANK VENT INSTALLATION
1/2"=1'-0"



4 M5.2 DAY TANK HAND PUMP HP-DT WALL SUPPORT
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

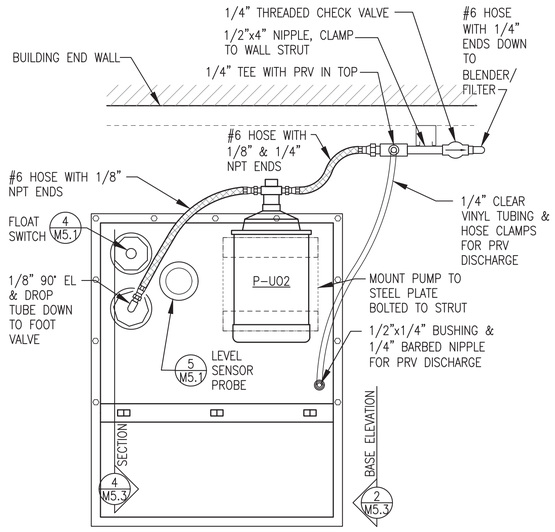
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

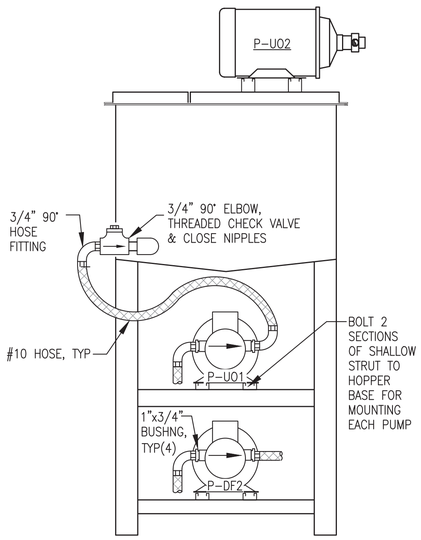
TITLE: DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

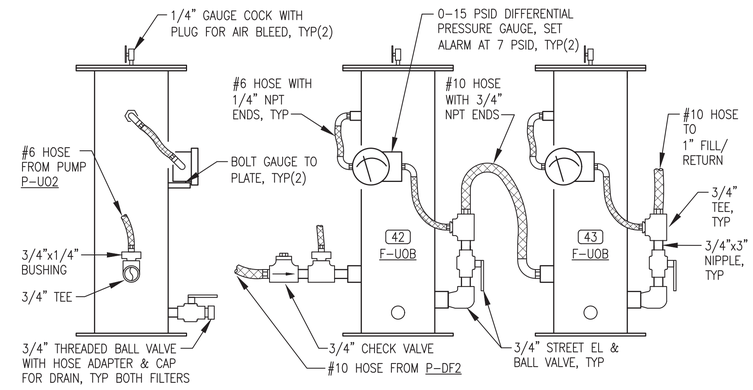
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M5.2
PROJECT NUMBER:



1 M5.3 TOP OF HOPPER – PLAN VIEW
NO SCALE



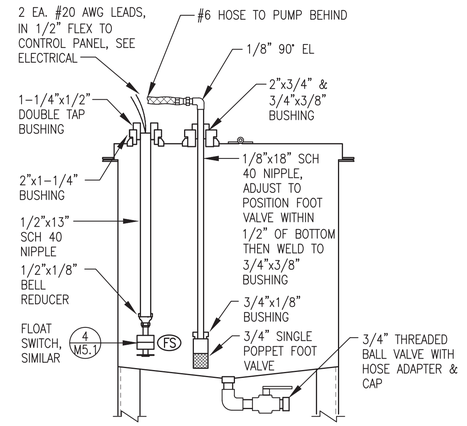
2 M5.3 HOPPER BASE ELEVATION
NO SCALE



FILTER #1 INLET SIDE ELEVATION

FRONT ELEVATION

3 M5.3 FILTER BANK ELEVATIONS
NO SCALE



4 M5.3 SECTION THROUGH HOPPER
NO SCALE

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REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

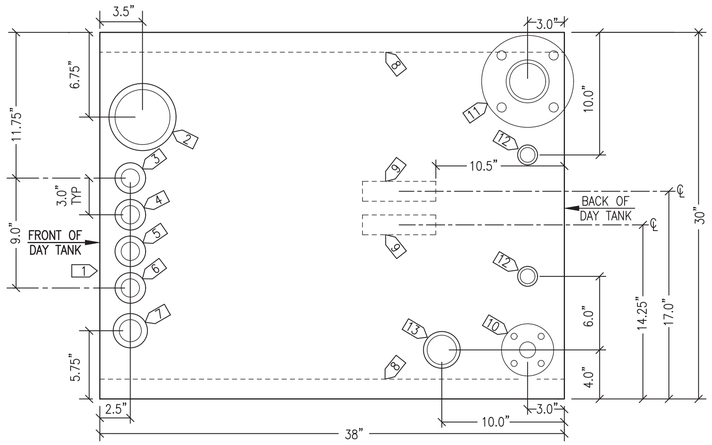
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: USED OIL HOPPER & BLENDER INSTALLATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M5.3
PROJECT NUMBER:	



TOP VIEW

DAY TANK SPECIFICATIONS:

1) FABRICATE SINGLE WALL 200 GALLON NOMINAL CAPACITY DAY TANK. FABRICATE IN ACCORDANCE WITH UL 142.

2) FABRICATE FROM ASTM A-36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS IN ACCORDANCE WITH UL 142 FIGURE 6.5 – #1, #6, #7, OR #8.

3) PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. SEAL WELD ALL TANK ATTACHMENTS.

4) INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 – #4 UNLESS INDICATED OTHERWISE. ALL DROP TUBES SCH 40 ASTM A53 STEEL PIPE WITH MPT OR FLANGED END AS INDICATED.

5) PRESSURE TEST COMPLETED ASSEMBLY TO 5 PSIG MAXIMUM USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.

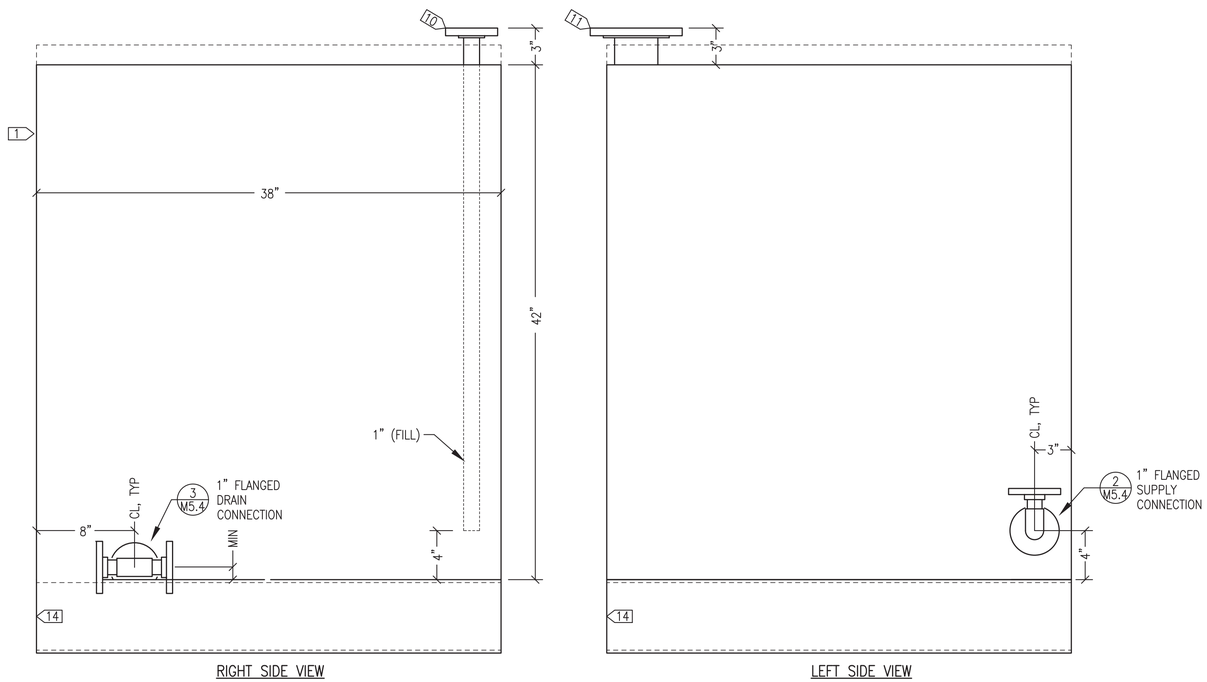
6) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.

7) LABEL ALL OPENINGS WITH 1/4" BLACK LETTERS INDICATING FUNCTION AS LISTED IN PARENTHESES IN SPECIFIC NOTES.

8) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. SEAL ALL MPT OPENINGS WITH THREADED STEEL CAPS. SEAL FPT TANK OPENINGS WITH THREADED STEEL PIPE PLUGS WHERE INDICATED. INSTALL 1-1/4" VENT CAP WHERE INDICATED. SEAL ALL OTHER FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.

DAY TANK SPECIFIC NOTES:

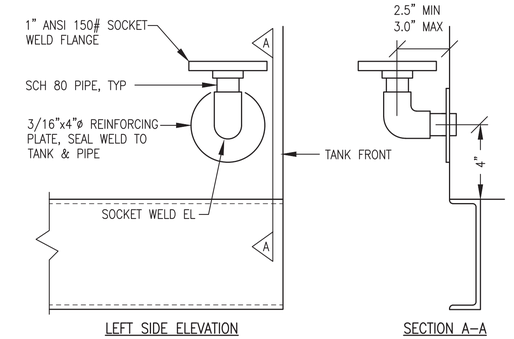
1. PROVIDE 2" HIGH LETTERING: "DIESEL FUEL 200 GALLONS"
2. 4" FPT (MANUAL FILL) – INSTALL THREADED STEEL PLUG
3. 1-1/4" FPT (OVERFILL) – INSTALL VENT CAP FOR SHIPPING
4. 1-1/4" FPT (PUMP STOP)
5. 1-1/4" FPT (PUMP START)
6. 1-1/4" FPT (LOW ALARM)
7. 1-1/2" FPT (TANK GAUGE)
8. 38"L STRUT, ENDS FLUSH WITH TANK
9. 6"L STRUT
10. 1" SCH 40 DROP TUBE (FILL) WITH 1" 150# FLANGE
11. 3" 150# FLANGED VENT CONNECTION
12. 1" FPT (SPARE) – INSTALL THREADED STEEL PLUG
13. 2" FPT (TANK LEVEL PROBE)
14. C6x8.2, 38" LONG



RIGHT SIDE VIEW

LEFT SIDE VIEW

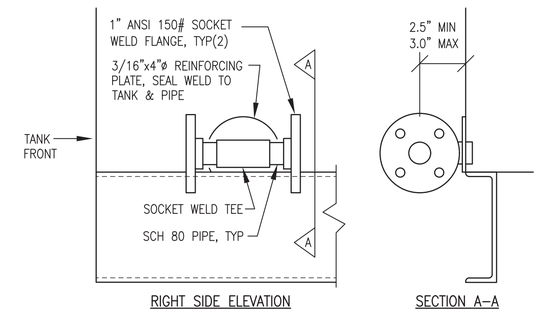
1 M5.5 200 GALLON SINGLE WALL DAY TANK
1"=6"



LEFT SIDE ELEVATION

SECTION A-A

2 M5.4 1" FLANGED SUPPLY CONNECTION
NO SCALE



RIGHT SIDE ELEVATION

SECTION A-A

3 M5.4 1" FLANGED DRAIN CONNECTION
NO SCALE

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

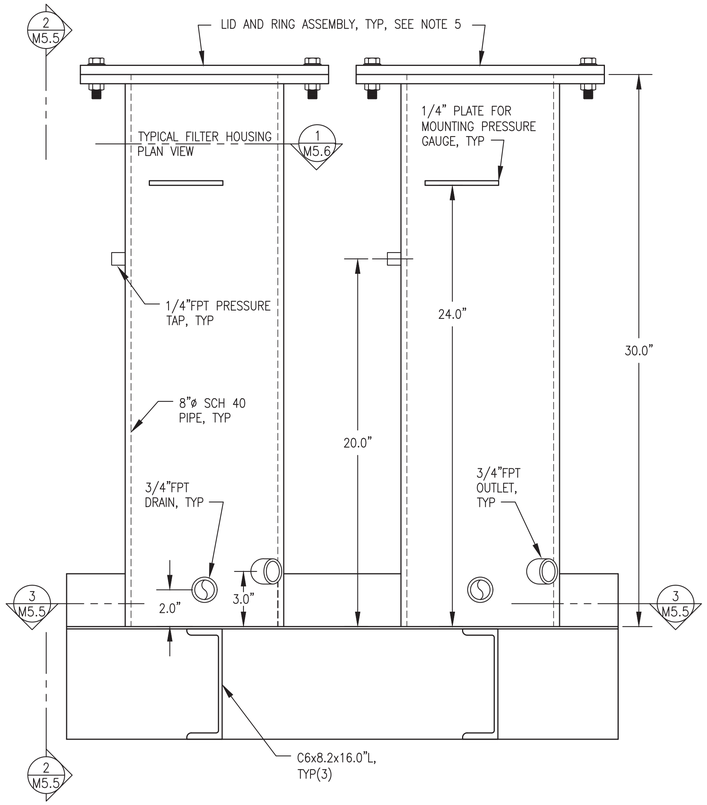
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

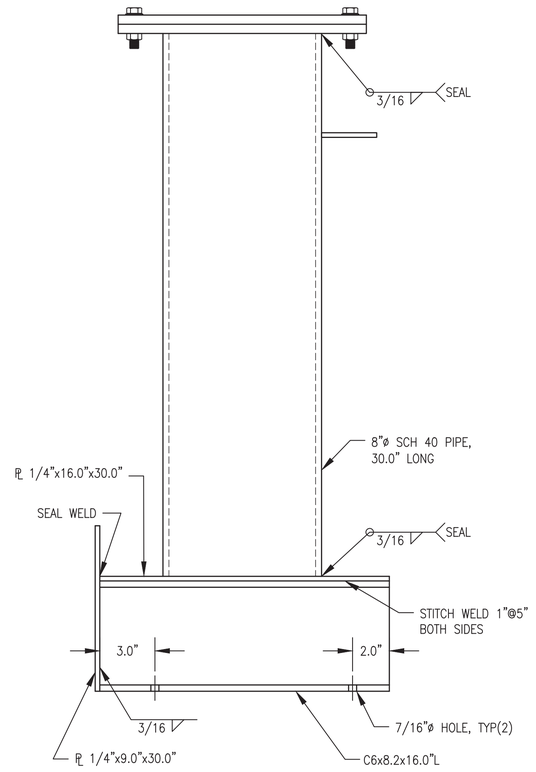
TITLE: 200 GALLON DAY TANK FABRICATION

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

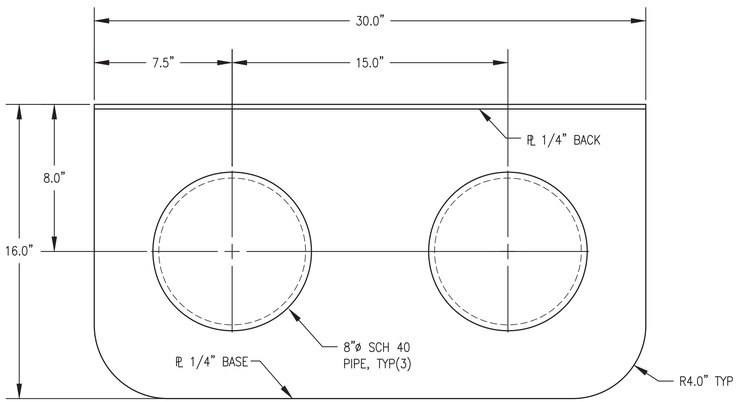
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M5.4
PROJECT NUMBER:	



1 M5.5 OIL FILTER BANK FRONT ELEVATION
1/4" = 1"



2 M5.5 SECTION THROUGH FILTER & BASE
1/4" = 1"



3 M5.5 OIL FILTER BANK BASE PLAN
1/4" = 1"

FILTER BANK GENERAL NOTES:

1. FABRICATE TWO CHAMBER FILTER BANK AS INDICATED. SEE SHEET M5.5 FOR INTERNAL DETAILS.
2. FABRICATE FROM ASTM A-36 STEEL PLATE AND SHAPES AND ASTM A-53 PIPE. ALL JOINTS TO BE FULL CONTINUOUS SEAL WELDS EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.
3. PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. INSTALL MINIMUM 3,000# FORGED STEEL HALF COUPLINGS FOR ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 – #2.
4. PRESSURE TEST COMPLETED ASSEMBLY TO MINIMUM 50 PSIG USING SOAPY WATER SOLUTION ON ALL WELD JOINTS.
5. UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.
6. AFTER PAINTING REMOVE LID, WIRE BRUSH MATING SURFACES OF LID AND RING TO REMOVE ALL PAINT AND POLISH SURFACES SMOOTH. APPLY A LIGHT COAT OF GREASE OR ANTI-SIEZE PASTE TO BOTH FACES PRIOR TO INSTALLING GASKET. INSTALL 13.5" O.D. FULL-FACED 1/4" BUNA-N RUBBER GASKET (ALASKA RUBBER OR EQUAL) ON FILTER LIDS.
7. FURNISH FASTENERS AS INDICATED AND COAT WITH ANTI-SIEZE.
8. PRESSURE TEST EACH FILTER HOUSING ASSEMBLY TO 50 PSIG MINIMUM.
9. UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR
CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

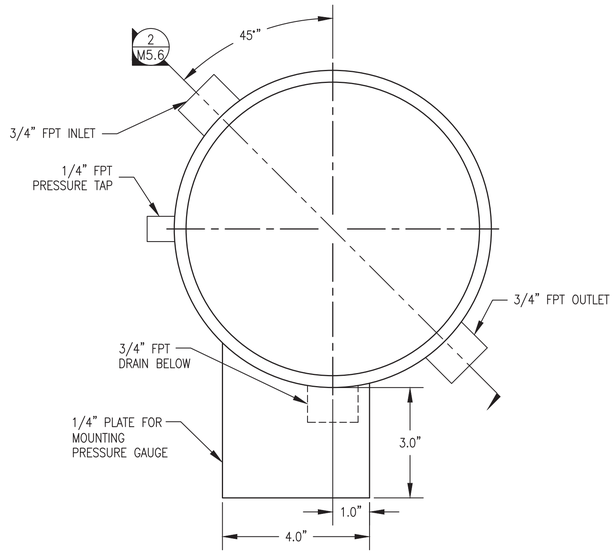
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

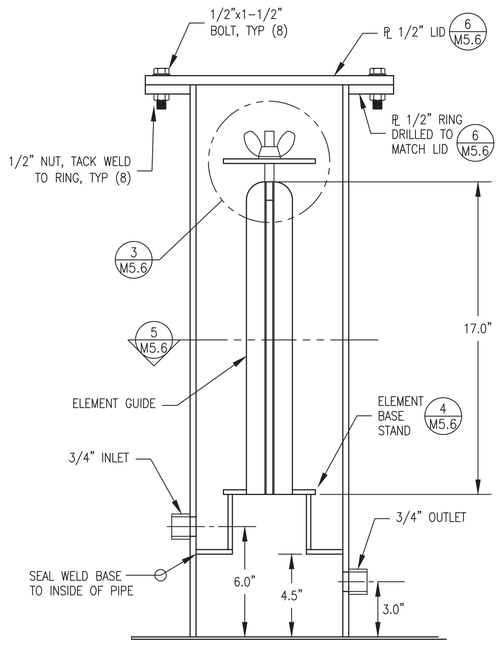
TITLE: USED OIL BLENDER
FILTER BANK LAYOUT & CONFIGURATION

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

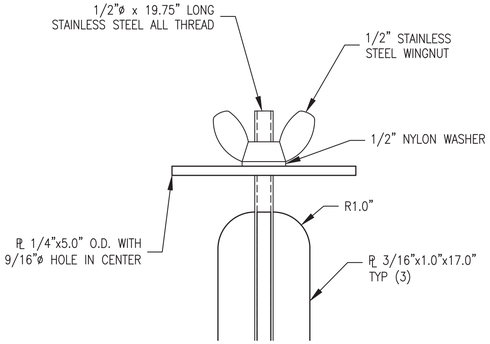
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M5.5
PROJECT NUMBER:	



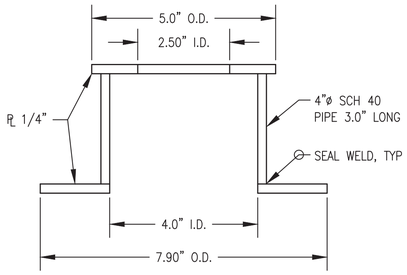
1 M5.6 TYPICAL FILTER HOUSING – PLAN VIEW
1/2" = 1"



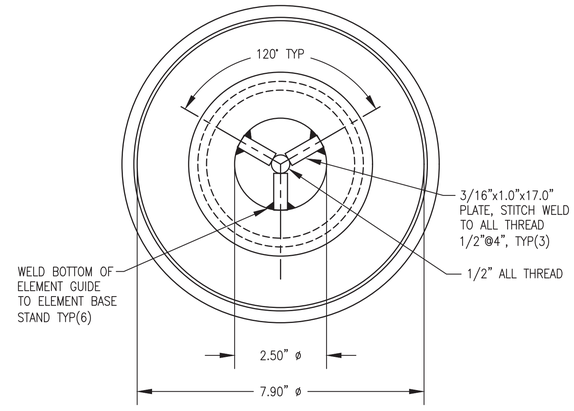
2 M5.6 TYPICAL SECTION THROUGH FILTER HOUSING
1/4" = 1"



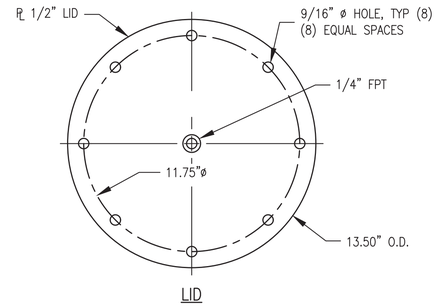
3 M5.6 ELEMENT RETAINER CAP
1/2" = 1"



4 M5.6 ELEMENT BASE STAND
1/2" = 1"



5 M5.6 SECTION THROUGH ELEMENT GUIDE
1/2" = 1"



6 M5.6 LID & MATING RING – PLAN VIEW
1/4" = 1"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR
CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

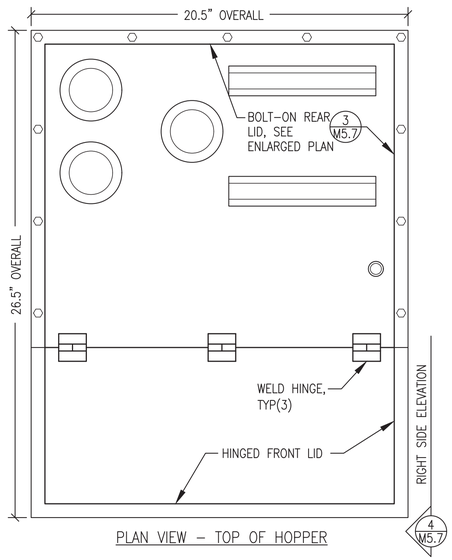
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

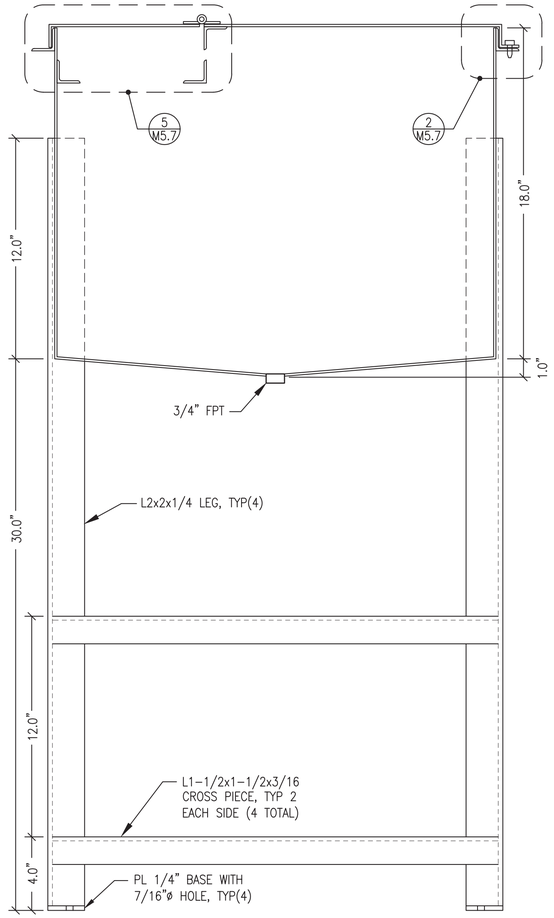
TITLE: USED OIL BLENDER
TYPICAL FILTER HOUSING DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

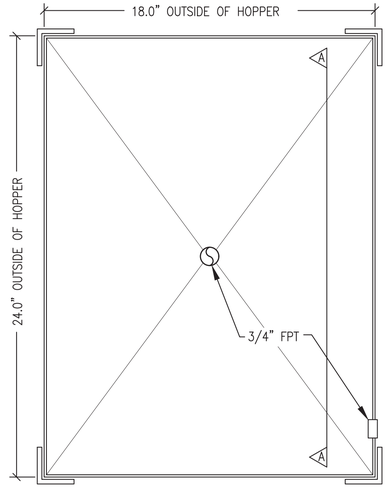
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2–M7 | SHEET: M5.6
PROJECT NUMBER:



PLAN VIEW – TOP OF HOPPER



SECTION A-A



PLAN VIEW – BOTTOM OF HOPPER

1 M5.7 HOPPER PLAN & SECTION
3"=1'-0"

FABRICATION NOTES:

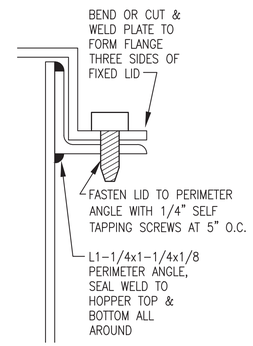
1) FABRICATE SINGLE WALL 25 GALLON USABLE CAPACITY HOPPER.

2) FABRICATE FROM MINIMUM 10 GAUGE ASTM A-36 STEEL PLATE. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS. SEAL WELD ALL TANK ATTACHMENTS.

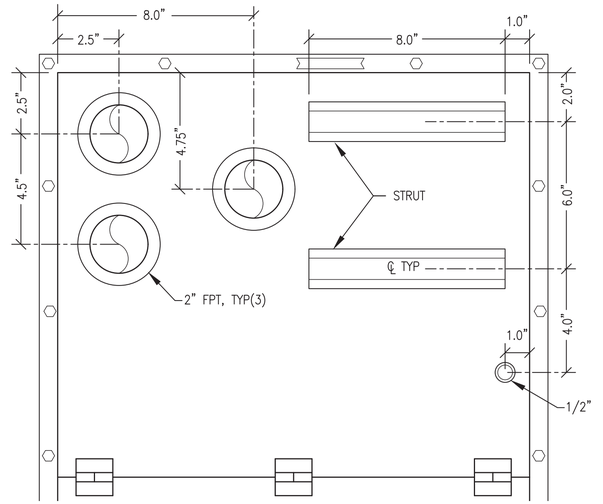
3) PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. INSTALL ALL FPT OPENINGS IN ACCORDANCE WITH UL 142 FIGURE 7.1 – #1, #2, #4, OR #6. ALL STRUT TO BE 1-5/8"x1-5/8"x12 GA SOLID BACK PLAIN (BLACK), B-LINE B22 PLN OR EQUAL. FURNISH ALL FASTENERS AS INDICATED.

4) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS EPOXY, PPG AMERLOC 2 VOC OR APPROVED EQUAL, COLOR ANSI 61 GRAY.

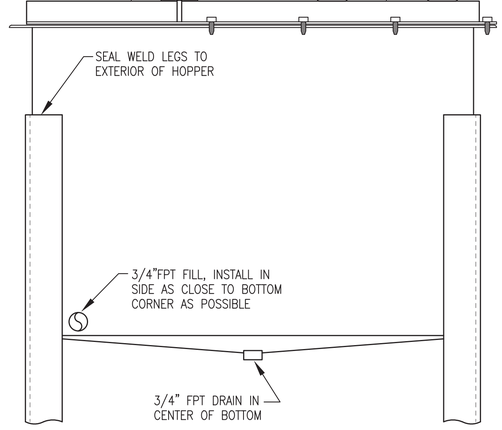
5) PRIOR TO SHIPPING, SEAL ALL FPT OPENINGS WITH PLASTIC OR STEEL PLUGS.



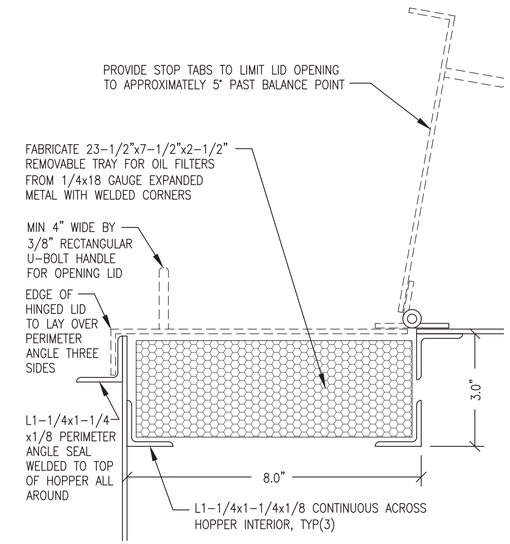
2 M5.7 FIXED LID PERIMETER ATTACHMENT
12"=1'-0"



3 M5.7 FIXED LID ENLARGED PLAN VIEW
4"=1'-0"



4 M5.7 HOPPER RIGHT SIDE ELEVATION
3"=1'-0"



5 M5.7 HINGED LID & FILTER TRAY DETAIL
6"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

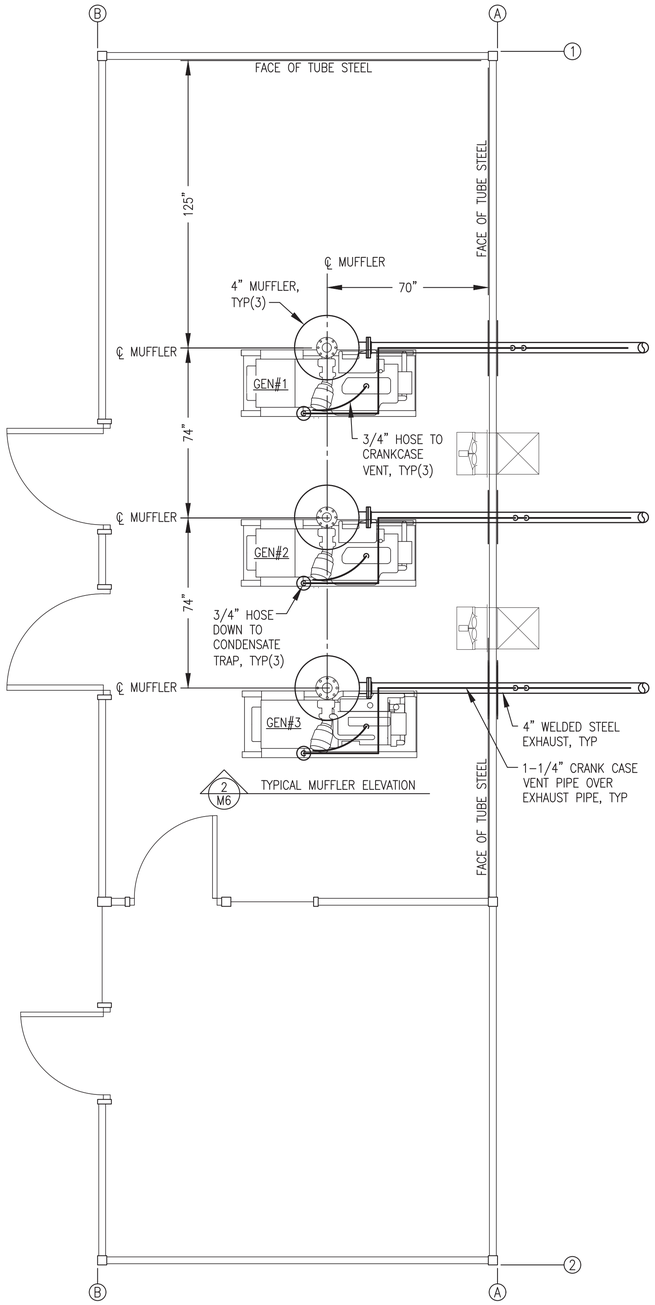
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: USED OIL BLENDER
25 GALLON HOPPER FABRICATION

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M5.7
PROJECT NUMBER:	



2/M6 TYPICAL MUFFLER ELEVATION

1/M6 MUFFLER, EXHAUST & CRANK VENT PIPE PLAN
3/8"=1'-0"

EXHAUST & CRANK VENT GENERAL NOTES:

1) THE MAXIMUM EXHAUST TEMPERATURE FOR THE ENGINES IS LESS THAN 1400°F. THE WALLS AND CEILING ARE NON-COMBUSTIBLE CONSTRUCTION CONSISTING OF STEEL WITH HIGH TEMPERATURE ROCKWOOL INSULATION.

2) ALL EXTERIOR EXHAUST PIPE AND FITTINGS (FROM MUFFLER TO RAIN CAP) TYPE 304L STAINLESS STEEL WITH BUTT WELD FITTINGS. INTERIOR EXHAUST PIPE RISER (FROM FLEX TO MUFFLER) CARBON STEEL OR MAY BE STAINLESS AT CONTRACTORS OPTION. ALL FLANGES ANSI 150# FLAT FACED SLIP ON.

3) ALL EXTERIOR CRANK VENT PIPE AND FITTINGS TYPE 304L STAINLESS STEEL WITH BUTT WELD FITTINGS. ALL INTERIOR CRANK VENT PIPE AND FITTINGS CARBON STEEL WITH SOCKET WELD FITTINGS OR MAY BE STAINLESS AT CONTRACTORS OPTION. ALL FLANGES ANSI 150# RAISED FACE SOCKET WELD.

4) ALL EXHAUST FLANGE BOLTS BLACK OR STAINLESS STEEL. COAT WITH HIGH TEMPERATURE ANTI-SIEZE COMPOUND. ALL EXHAUST FLANGE GASKETS HIGH TEMPERATURE FULL FACE.

EXHAUST & CRANK VENT SHOP/ON-SITE NOTES:

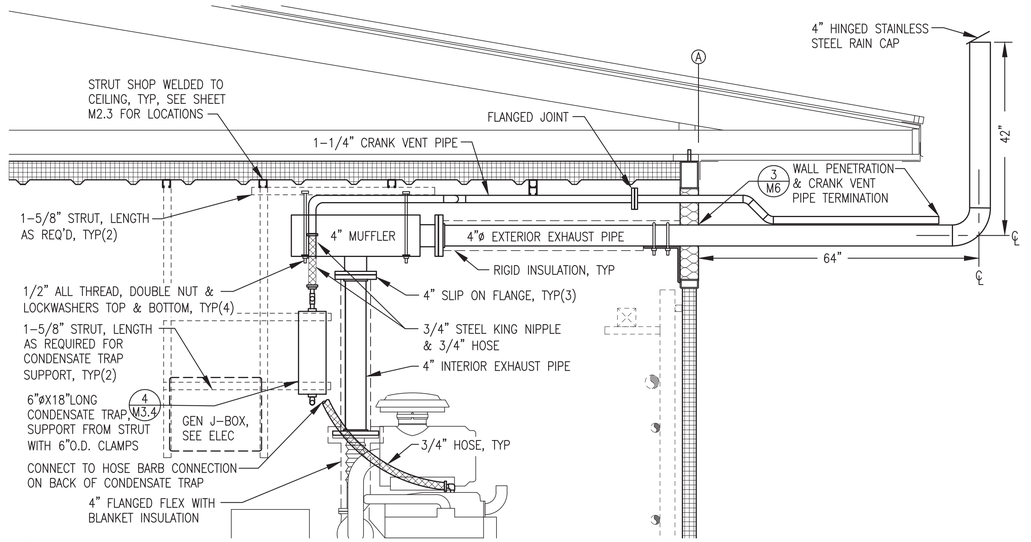
1) SHOP FABRICATE COMPLETE EXHAUST AND CRANK VENT PIPING SYSTEM AS INDICATED.

2) SHOP INSTALL BLANKET INSULATION ON FLEX AND RIGID INSULATION FROM FLEX TO MUFFLER. SHOP FIT INSULATION FROM MUFFLER TO WALL, LABEL FOR THE ASSOCIATED GENERATOR AND STORE INSIDE MODULE.

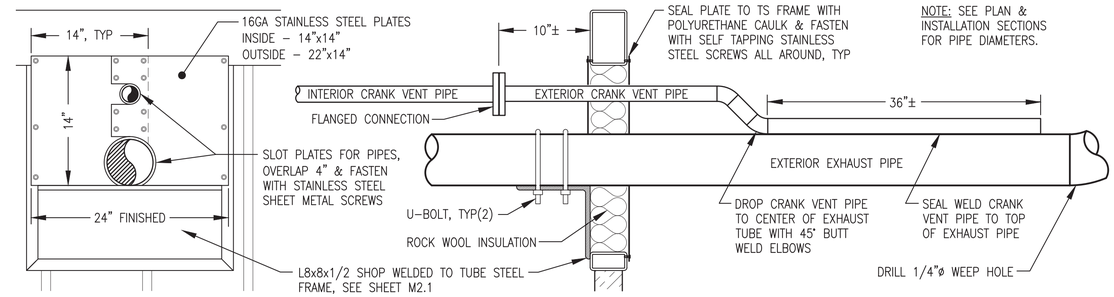
3) SHOP FABRICATE STAINLESS STEEL COVER PLATES BUT DO NOT INSTALL. LABEL COVER PLATES FOR THE ASSOCIATED GENERATOR AND STORE INSIDE MODULE. SHOP FURNISH ROCK WOOL INSULATION AND PACKAGE LOOSE SHIP WITH COVER PLATES.

4) UPON COMPLETION OF TESTING BREAK EXHAUST FLANGE JOINT ON MUFFLER OUTLET AND CRANK VENT FLANGE JOINT AND REMOVE U-BOLTS. REMOVE PIPING FOR SHIPPING AND TEMPORARILY SEAL WALL PENETRATION.

5) IN FIELD REINSTALL PIPING WITH NEW FLANGE GASKETS. RE-INSTALL PIPING INSULATION. INSULATE WALL PENETRATION, INSTALL COVER PLATES, AND SEAL TO WALL.



2/M6 TYPICAL MUFFLER, EXHAUST, CONDENSATE TRAP & CRANK VENT PIPE INSTALLATION
3/4"=1'-0"



3/M6 WALL PENETRATION & CRANK VENT PIPE TERMINATION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

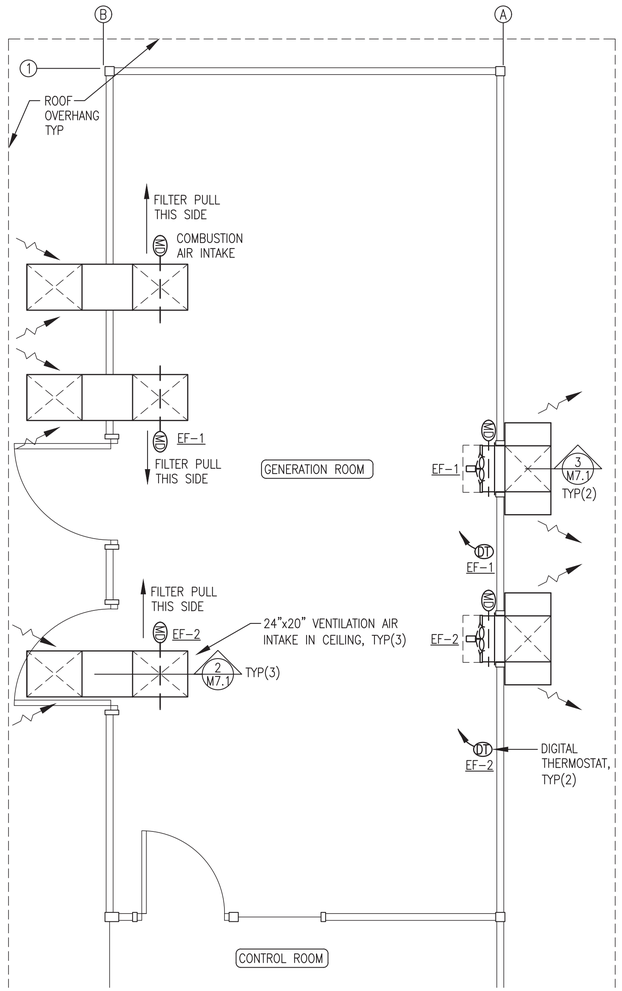
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

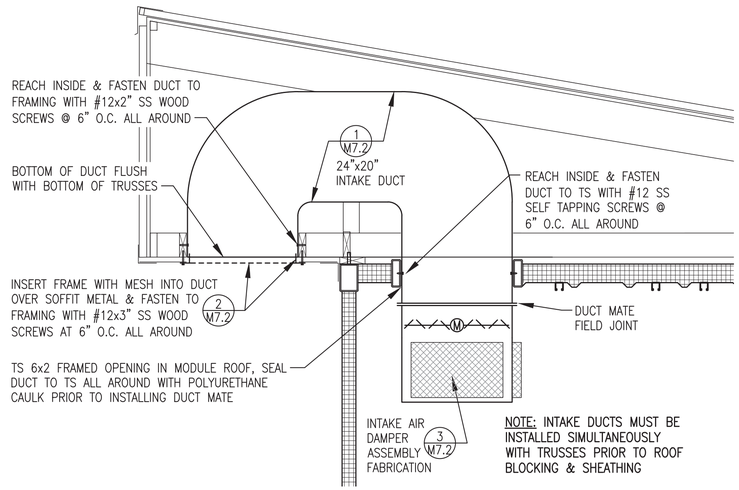
TITLE: EXHAUST & CRANK VENT PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

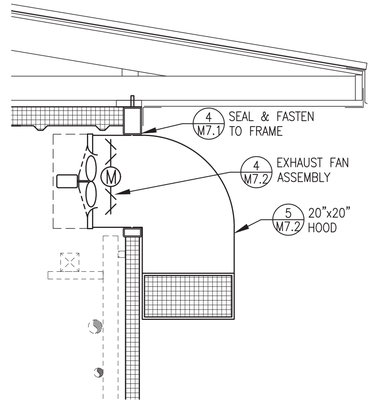
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M6
PROJECT NUMBER:	



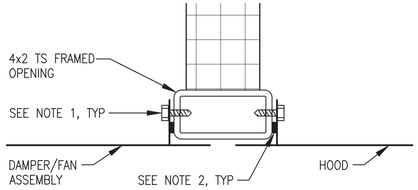
1 M7.1 VENTILATION PLAN
3/8"=1'-0"



2 M7.1 INTAKE DUCT INSTALLATION
3/4"=1'-0"



3 M7.1 EXHAUST FAN INSTALLATION
3/4"=1'-0"



NOTES:

1) FASTEN MOUNTING FLANGE TO TS WITH #12 STAINLESS STEEL SELF TAPPING SCREWS. ON HOODS FASTEN ON TOP AND SIDES ONLY. ON EXHAUST FANS FASTEN ON SIDES ONLY.
2) SEAL MOUNTING FLANGE TO TS WITH CONTINUOUS BEAD OF POLYURETHANE CAULKING ALL AROUND.

4 M7.1 TYPICAL WALL PENETRATION
4"=1'-0"

VENTILATION SYSTEM SHOP/ON-SITE NOTES:

1) FURNISH ENTIRE VENTILATION SYSTEM AS PART OF MODULE SHOP FABRICATION.
2) DURING SHOP FABRICATION INSTALL EXHAUST FAN ASSEMBLIES. TEST FIT EXTERIOR HOODS AND INTAKE DUCTS BUT DO NOT INSTALL.
3) DURING SHOP FABRICATION TEMPORARILY CONNECT INTAKE DAMPERS TO ELECTRICAL ROUGH IN AND TEST TO VERIFY FUNCTION. SEE SHEET E4.2.
4) AS PART OF ON-SITE WORK INSTALL EXHAUST HOODS AND INTAKE DUCTING AS INDICATED.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

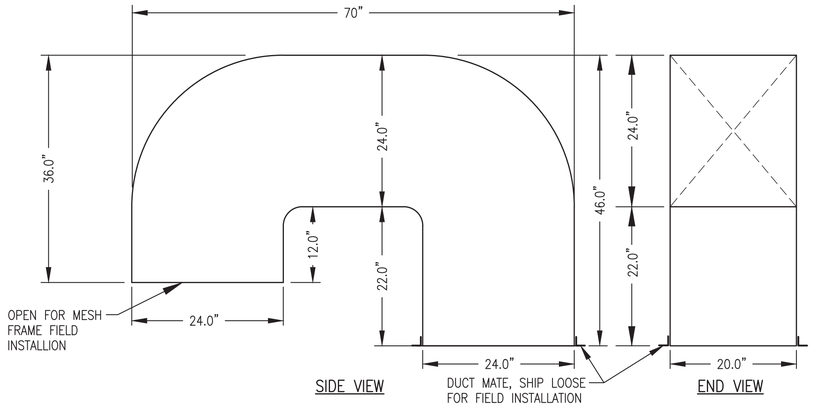
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: VENTILATION PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

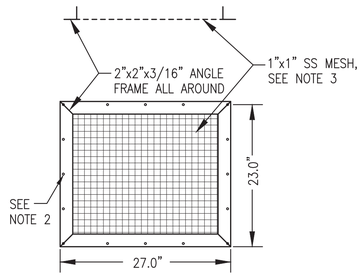
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/15/22
FILE NAME: RAM PP M2-M7	SHEET: M7.1
PROJECT NUMBER:	



NOTES:

1) FABRICATE 3 IDENTICAL DUCTS FROM MIN 18 GAUGE GALV SHEET METAL WITH SEALED MECHANICAL JOINTS OR AT CONTRACTORS OPTION 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.
2) DUCTS ARE DESIGNED TO FIELD INSTALL BETWEEN TRUSSES. DO NOTE ADD JOINTS.

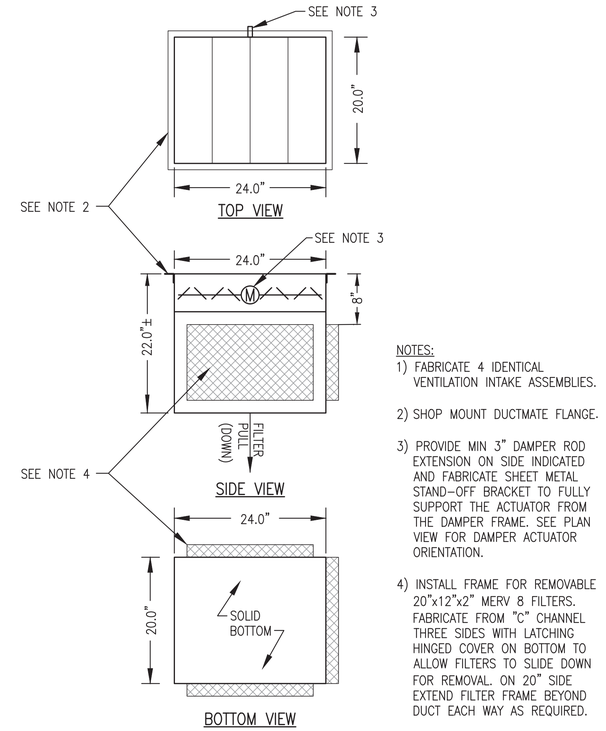
1 M7.2 INTAKE DUCT FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE 3 IDENTICAL AIR INTAKE MESH FRAMES.
2) FABRICATE FRAME FROM 2"x2"x3/16" ALUMINUM ANGLE WITH MITERED AND WELDED CORNERS AND 1/4" HOLES AT 6" O.C. ALL AROUND, 1/2" FROM OUTSIDE EDGE OF FRAME.
3) INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO ANGLE FRAME WITH STAINLESS STEEL SCREWS ALL AROUND.

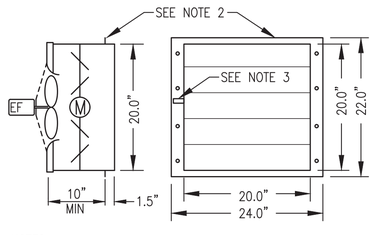
2 M7.2 INTAKE MESH FRAME
1"=1'-0"



NOTES:

1) FABRICATE 4 IDENTICAL VENTILATION INTAKE ASSEMBLIES.
2) SHOP MOUNT DUCTMATE FLANGE.
3) PROVIDE MIN 3" DAMPER ROD EXTENSION ON SIDE INDICATED AND FABRICATE SHEET METAL STAND-OFF BRACKET TO FULLY SUPPORT THE ACTUATOR FROM THE DAMPER FRAME. SEE PLAN VIEW FOR DAMPER ACTUATOR ORIENTATION.
4) INSTALL FRAME FOR REMOVABLE 20"x12"x2" MERV 8 FILTERS. FABRICATE FROM "C" CHANNEL THREE SIDES WITH LATCHING HINGED COVER ON BOTTOM TO ALLOW FILTERS TO SLIDE DOWN FOR REMOVAL. ON 20" SIDE EXTEND FILTER FRAME BEYOND DUCT EACH WAY AS REQUIRED.

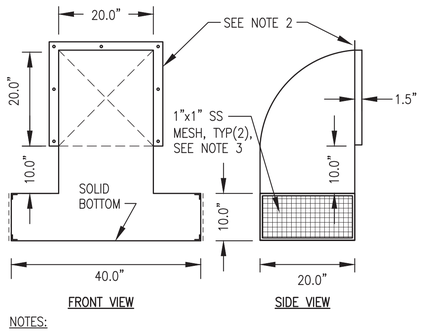
3 M7.2 INTAKE AIR DAMPER FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE 2 IDENTICAL ASSEMBLIES COMPLETE WITH FAN AND DAMPER MOUNTED AND SEALED TO DUCT.
2) PROVIDE 2" WIDE MOUNTING FLANGE ON SIDES WITH 1/4" HOLES AT 5" O.C. PROVIDE 1" MOUNTING FLANGE ON TOP AND BOTTOM WITHOUT HOLES.
3) PROVIDE MIN 3" DAMPER ROD EXTENSION ON THE LEFT SIDE AND FABRICATE SHEET METAL STAND-OFF BRACKET TO FULLY SUPPORT THE ACTUATOR FROM THE DAMPER FRAME.

4 M7.2 EXHAUST FAN ASSEMBLY FABRICATION
1"=1'-0"



NOTES:

1) FABRICATE HOODS FROM 0.090" THICK TYPE 5052 ALUMINUM WITH ALL WELDED SEAMS.
2) PROVIDE 2" WIDE MOUNTING FLANGE ON TOP & SIDES WITH 1/4" HOLES AT 9" O.C.
3) INSTALL 1"x1" STAINLESS STEEL WIRE MESH IN HEMMED STAINLESS STEEL FRAME AND FASTEN TO ANGLE FRAME WITH STAINLESS STEEL SCREWS ALL AROUND, TYP(2).

5 M7.2 EXHAUST HOOD FABRICATION
3/4"=1'-0"

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

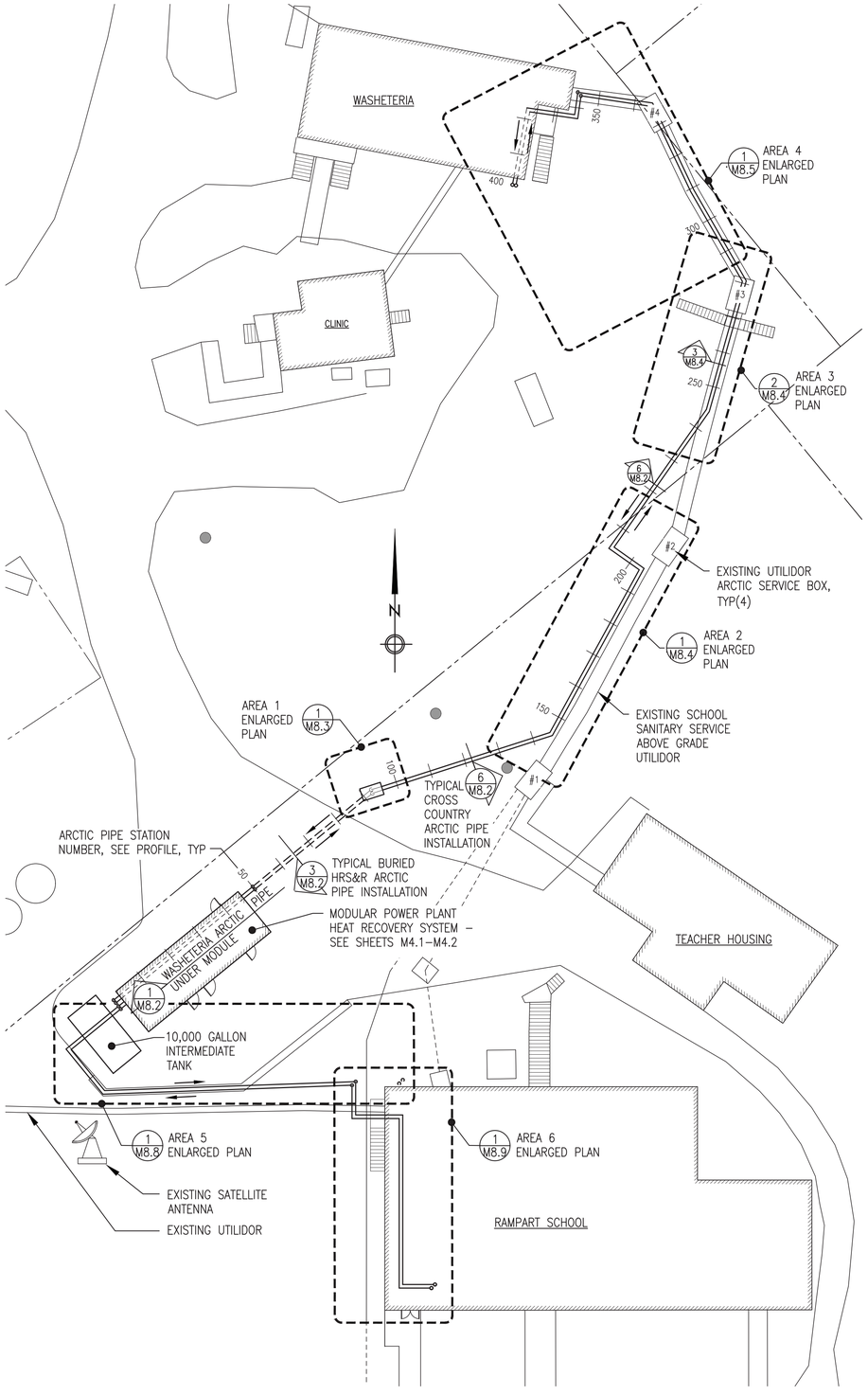
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

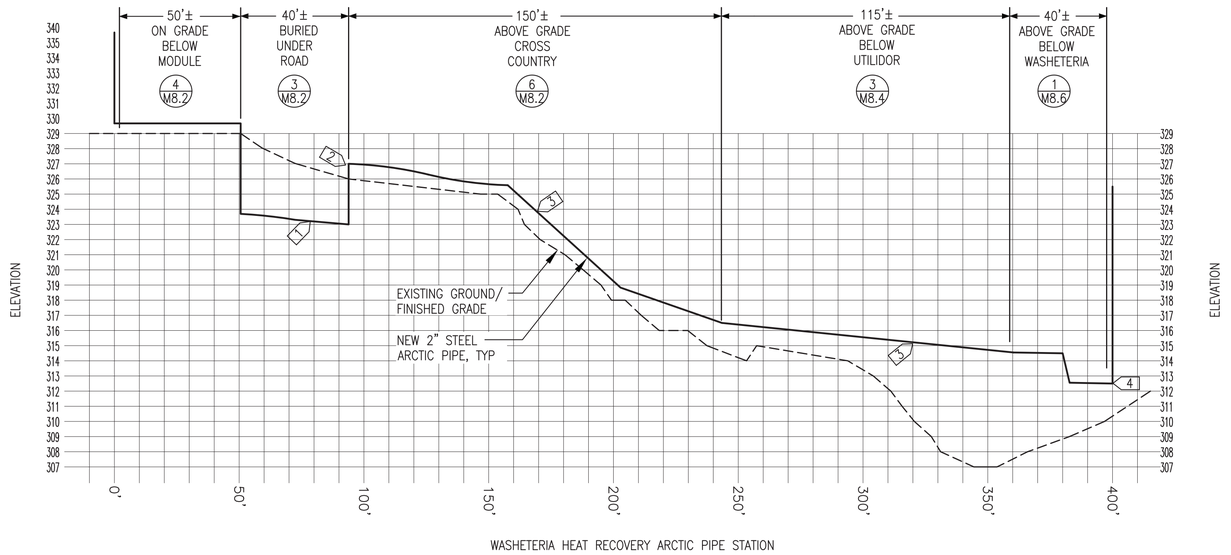
TITLE: SHEET METAL FABRICATION DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP M2-M7 | SHEET: M7.2
PROJECT NUMBER:



1 M8.1 OVERALL HEAT RECOVERY SYSTEM ARCTIC PIPE PLAN
1"=20'



2 M8.1 WASHETERIA HEAT RECOVERY ARCTIC PIPE PROFILE
1"=15'

GENERAL NOTES

1. A MAJOR RENOVATION OF THE ADJACENT SCHOOL IS SCHEDULED FOR CONSTRUCTION CONCURRENTLY WITH THE HEAT RECOVERY PROJECT. COORDINATE ALL ACTIVITIES WITH THE YUKON KOYUKUK SCHOOL DISTRICT AND THE SCHOOL CONTRACTOR.
2. SEE SPECIFICATIONS FOR COMPLETE HEAT RECOVERY EARTHWORK, MATERIALS, AND INSTALLATION REQUIREMENTS.
3. FIELD VERIFY ALL EXISTING ABOVE AND BELOW GRADE UTILITIES PRIOR TO EXCAVATING.
4. TAKE CARE TO AVOID DAMAGING EXISTING ORGANIC GROUND COVER ALONG ARCTIC PIPE CROSS COUNTRY ROUTE DURING CONSTRUCTION TO PROTECT TUNDRA AND FROZEN SOIL.
5. COVER OPEN ENDS OF PIPE AND FITTINGS EXPANSION PLUGS OR CAPS WHILE HANDLING TO PREVENT ENTRY OF DEBRIS AND DIRT. DO NOT USE RAGS OR SIMILAR TEMPORARY PLUGS.
6. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION AND FOR DIFFERENTIAL GROUND MOVEMENT WITHOUT STRESSING PIPE, JOINTS, OR CONNECTED EQUIPMENT.
7. LONG SECTIONS OF PIPE MAY BEND GRADUALLY AS REQUIRED TO FOLLOW GRADE OR SUPPORTS. MAINTAIN GRADIENT AS INDICATED IN SPECIFIC NOTES TO AVOID AIR TRAPS.
8. INSTALL INSULATION JOINT KITS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS TO CREATE A WATERPROOF CASING.
9. FILL SYSTEM WITH FRESH WATER, PURGE AIR, AND CIRCULATE TO FLUSH. DRAIN SYSTEM, FILL WITH GLYCOL SOLUTION, AND PURGE AIR TO PLACE IN SERVICE. USE LOW POINT DRAIN VALVES AND HIGH POINT VENT VALVES. SEE SPECIFICATION 23 21 13 FOR ADDITIONAL DETAIL.

PROFILE SPECIFIC NOTES

1. ON BURIED SECTIONS INSTALL CONTINUOUS RIGID INSULATION UNDER ARCTIC PIPE TO PROTECT FROZEN GROUND AND INSTALL TRACEABLE LOCATOR/WARNING TAPE OVER ARCTIC PIPE AS INDICATED ON DETAIL 3/M8.2.
2. INSTALL HOSE END VALVES AT HIGH POINT FOR PURGING AIR. SEE DETAIL 3/M8.3.
3. INSTALL ABOVE GRADE ARCTIC PIPE FROM LOW POINT AT WASHETERIA (APPROXIMATE STATION 400) TO NEW ARCTIC SERVICE BOX (APPROXIMATE STATION 92) WITH CONTINUOUS UPWARD SLOPE AS INDICATED ON PROFILE TO AVOID POTENTIAL AIR TRAPS.
4. INSTALL HOSE END VALVES AT LOW POINT FOR FILLING, FLUSHING, AND DRAINING. SEE DETAIL 4/M8.6.

ALL WORK ON SHEETS M8.1 THROUGH M8.11 IS INCLUDED IN THE ON SITE CONTRACT

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO SCHOOL UNDER ADDITIVE ALTERNATE #1. PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

REVISION #1 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED FOR CIVIL REDESIGN AND ADD SCHOOL HEAT RECOVERY	12/22/23	BCG

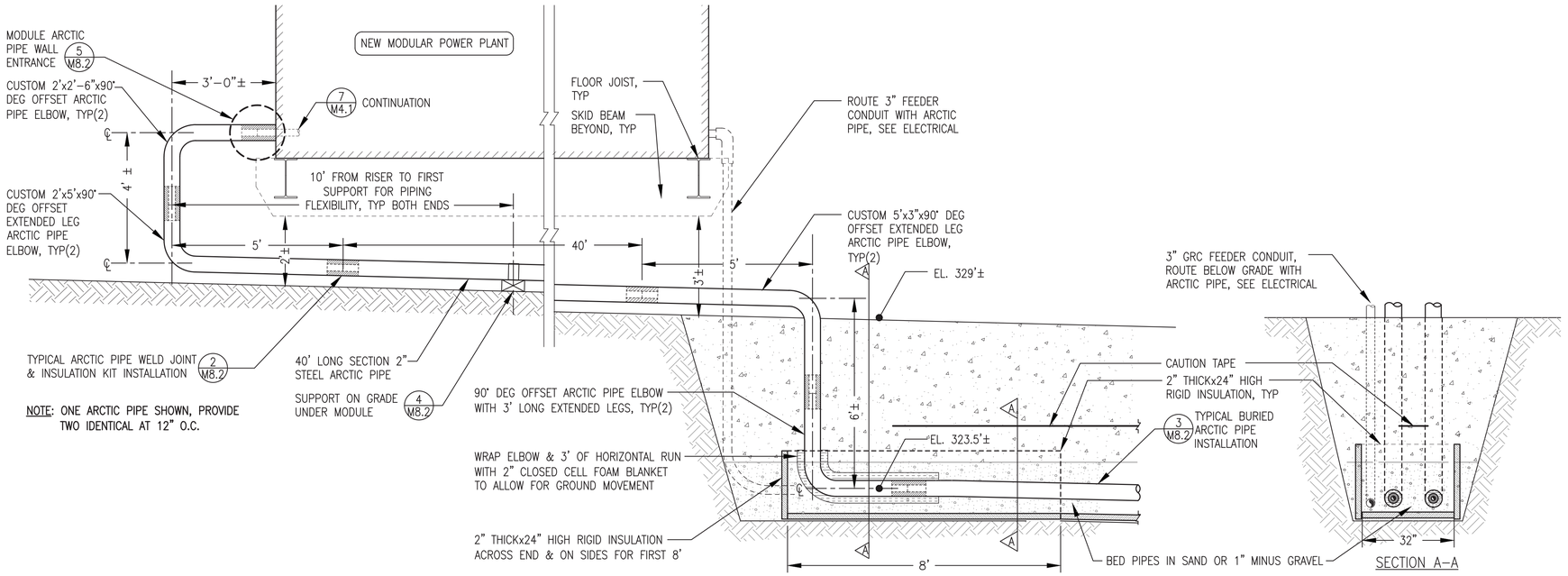
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: OVERALL HEAT RECOVERY SYSTEM ARCTIC PIPE PLAN & PROFILE

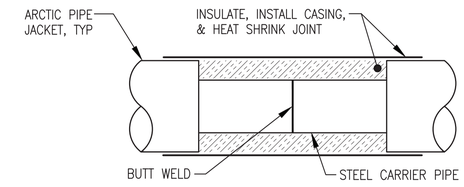
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M8 | SHEET: M8.1
PROJECT NUMBER:

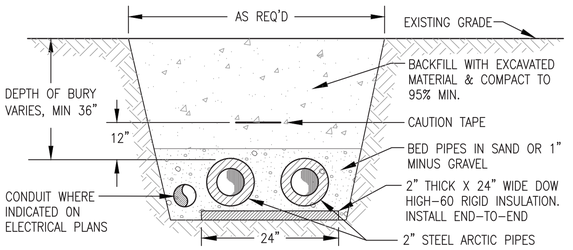


NOTE: ONE ARCTIC PIPE SHOWN, PROVIDE TWO IDENTICAL AT 12" O.C.

1/M8.2 WASHETERIA ARCTIC PIPE SECTION UNDER MODULE
1/2"=1'-0"

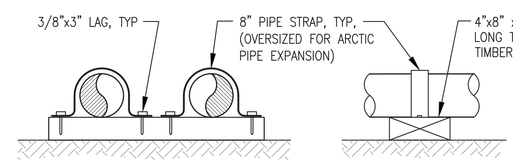


2/M8.2 TYPICAL ARCTIC PIPE WELDED JOINT & INSULATION DETAIL
NO SCALE

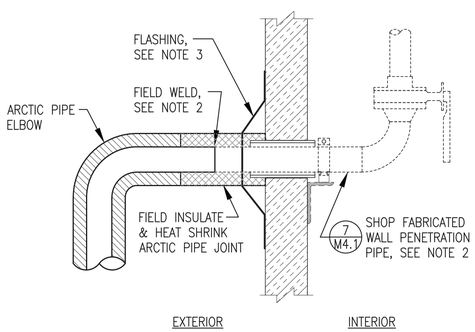


3/M8.2 TYPICAL BURIED ARCTIC PIPE INSTALLATION
NO SCALE

NOTE: PROVIDE PIPE SUPPORTS AT 10' ON CENTER MAX UNLESS SPECIFICALLY INDICATED OTHERWISE.



4/M8.2 TYPICAL ARCTIC PIPE INSTALLATION UNDER MODULE
NO SCALE

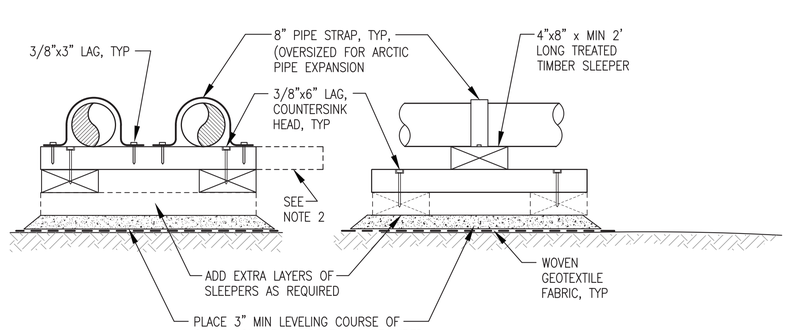


NOTES:

1) ONE ARCTIC PIPE SHOWN. PROVIDE TWO IDENTICAL.
2) FIELD REINSTALL SHOP FABRICATED PIPE SECTION THROUGH WALL AND WELD TO ARCTIC PIPE.
3) INSTALL MULTI-FLASH #5 RETROFIT MF501BA WALL FLASHING OVER ARCTIC PIPE. SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING & FASTEN TO WALL WITH STAINLESS STEEL SHEET METAL SCREWS ALL AROUND.

5/M8.2 ARCTIC PIPE WALL ENTRANCE AT MODULE
NO SCALE

NOTES:
1. PROVIDE PIPE SUPPORTS AT 10' ON CENTER MAX UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. EXTEND TOP SUPPORT TIMBER 12" MINIMUM AS INDICATED AT ALL ARCTIC PIPE SUPPORTS FROM STATION 100 THROUGH STATION 130 FOR SUPPORT OF 3" GRC ELECTRIC POWER FEEDER. SEE DETAIL 2/E1.3.



6/M8.2 TYPICAL CROSS COUNTRY ARCTIC PIPE INSTALLATION
NO SCALE

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

REVISION #1 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED GRADING AT MODULE PER CIVIL REDESIGN	12/22/23	BCG

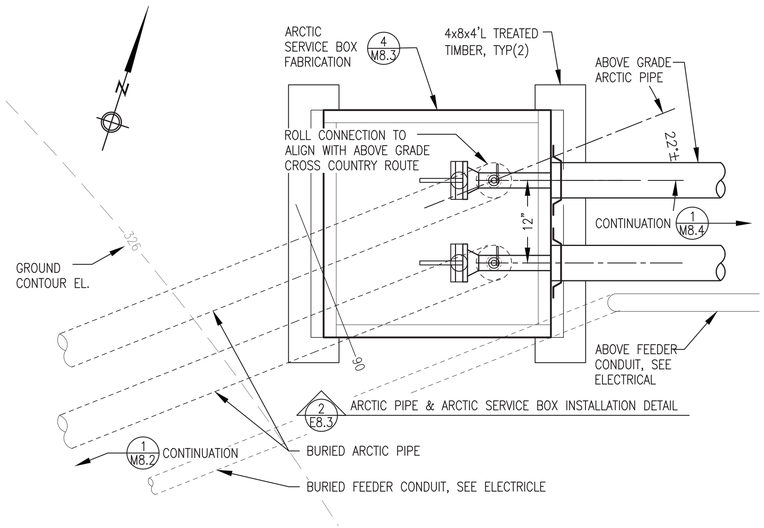
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

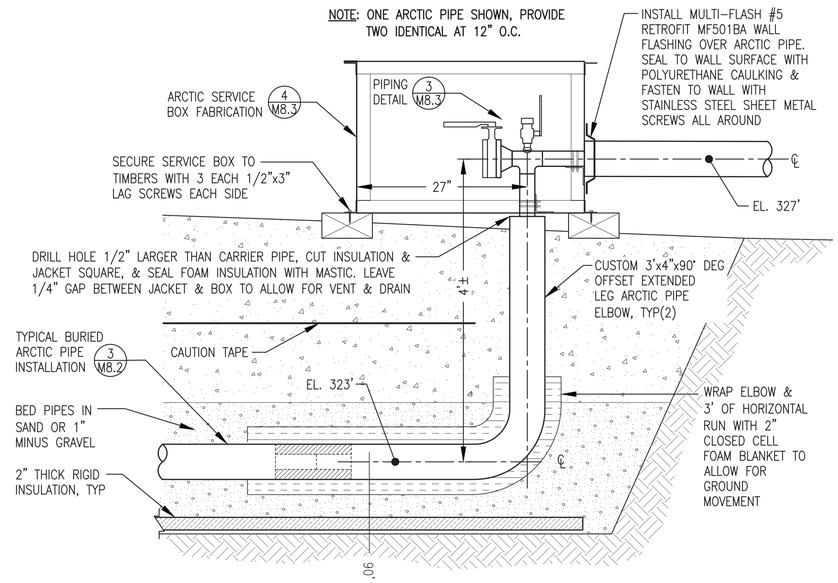
TITLE: HEAT RECOVERY SYSTEM ARCTIC PIPE SECTIONS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

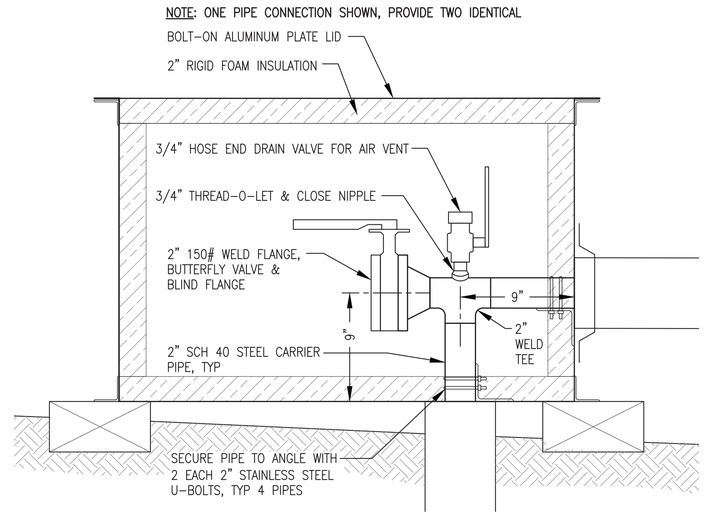
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M8 | SHEET: M8.2
PROJECT NUMBER:



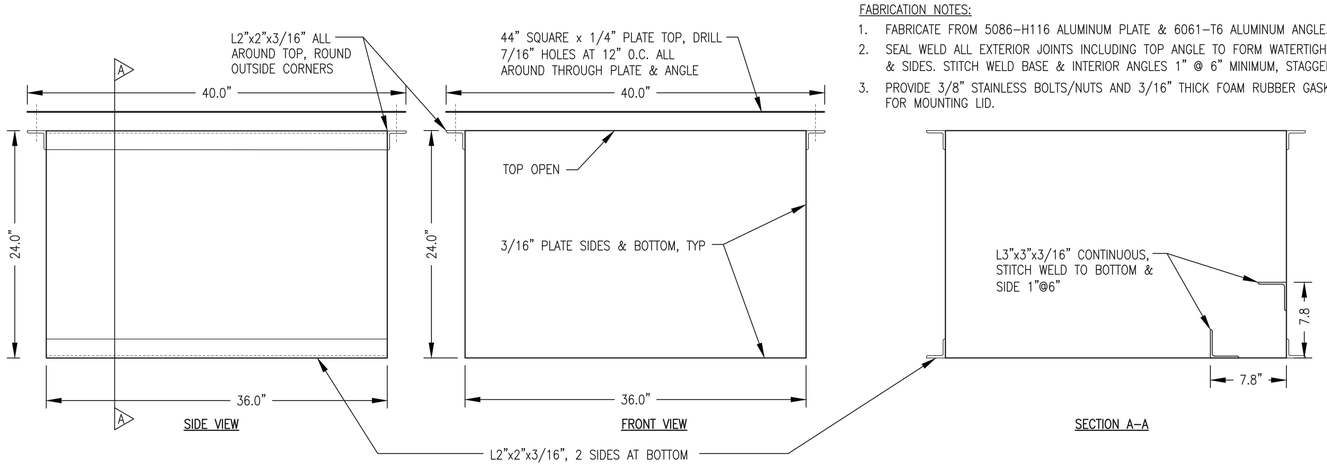
1 M8.3 AREA 1 ENLARGED PLAN
1"=1'-0"



2 M8.3 ARCTIC PIPE & ARCTIC SERVICE BOX INSTALLATION DETAIL
1"=1'-0"



3 M8.3 ARCTIC SERVICE BOX PIPING DETAIL
2"=1'-0"



FABRICATION NOTES:

1. FABRICATE FROM 5086-H116 ALUMINUM PLATE & 6061-T6 ALUMINUM ANGLE.
2. SEAL WELD ALL EXTERIOR JOINTS INCLUDING TOP ANGLE TO FORM WATERTIGHT TOP & SIDES. STITCH WELD BASE & INTERIOR ANGLES 1" @ 6" MINIMUM, STAGGERED.
3. PROVIDE 3/8" STAINLESS BOLTS/NUTS AND 3/16" THICK FOAM RUBBER GASKET FOR MOUNTING LID.

4 M8.3 ALUMINUM ARCTIC SERVICE BOX FABRICATION
1-1/2"=1'-0"

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM ARCTIC PIPE ENLARGED PLANS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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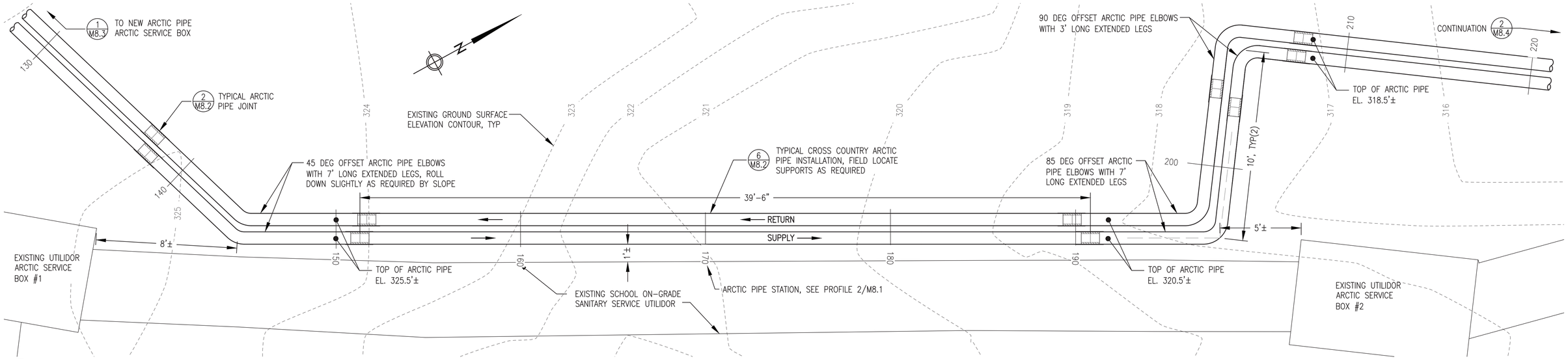
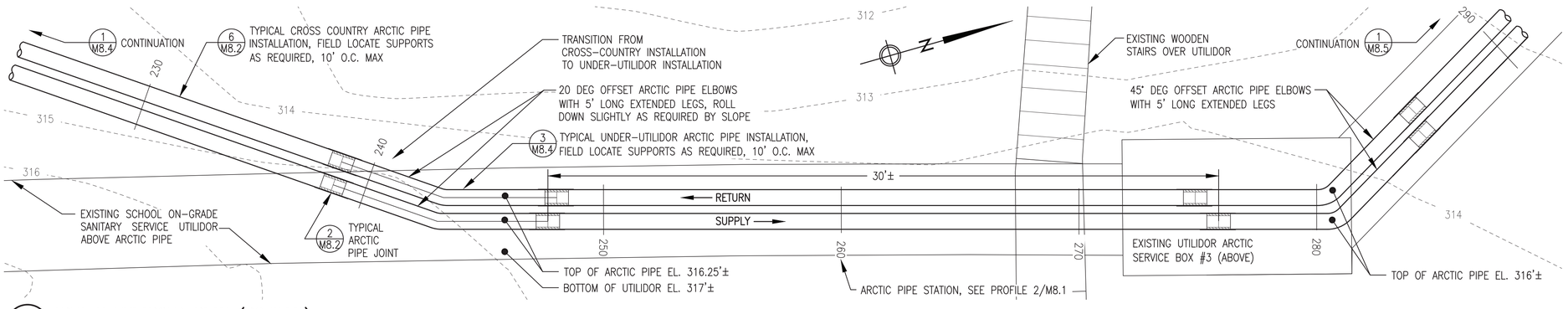
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M8 | SHEET: M8.3
PROJECT NUMBER:



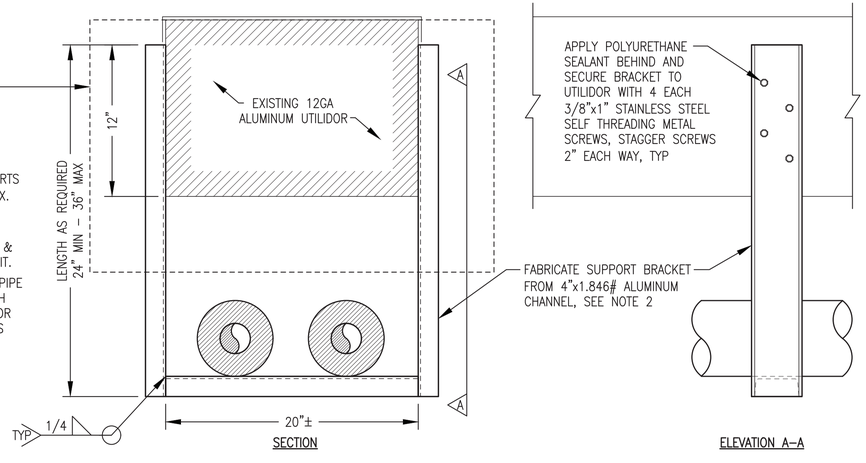
1 M8.4 AREA 2 ENLARGED PLAN (ROTATED)

3/8=1'-0"



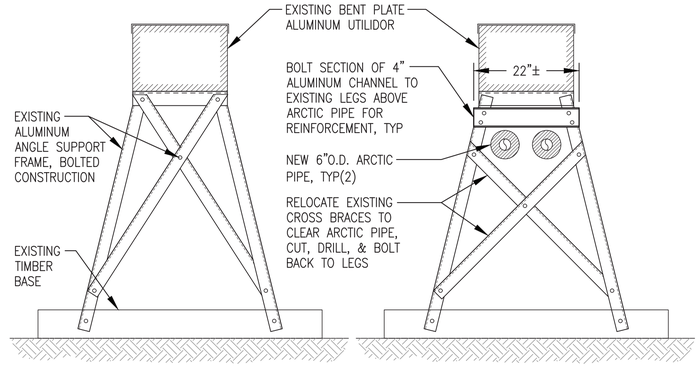
2 M8.4 AREA 3 ENLARGED PLAN (ROTATED)

3/8=1'-0"



3 M8.4 TYPICAL UNDER-UTILIDOR ARCTIC PIPE INSTALLATION

NOTES:
1. TRESTLE SUPPORTS BEGIN AT ARCTIC PIPE STATION 250 AND CONTINUE TO STATION 350 AT APPROXIMATELY 10'0.C.
2. SEE DETAIL 5/E8.4 FOR PHOTO OF TYPICAL EXISTING TRESTLE SUPPORT



4 M8.4 UTILIDOR TRESTLE SUPPORT MODIFICATION, TYP 10 LOCATIONS

5 M8.4 TYPICAL EXISTING UTILIDOR TRESTLE SUPPORT

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM ARCTIC PIPE ENLARGED PLANS & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

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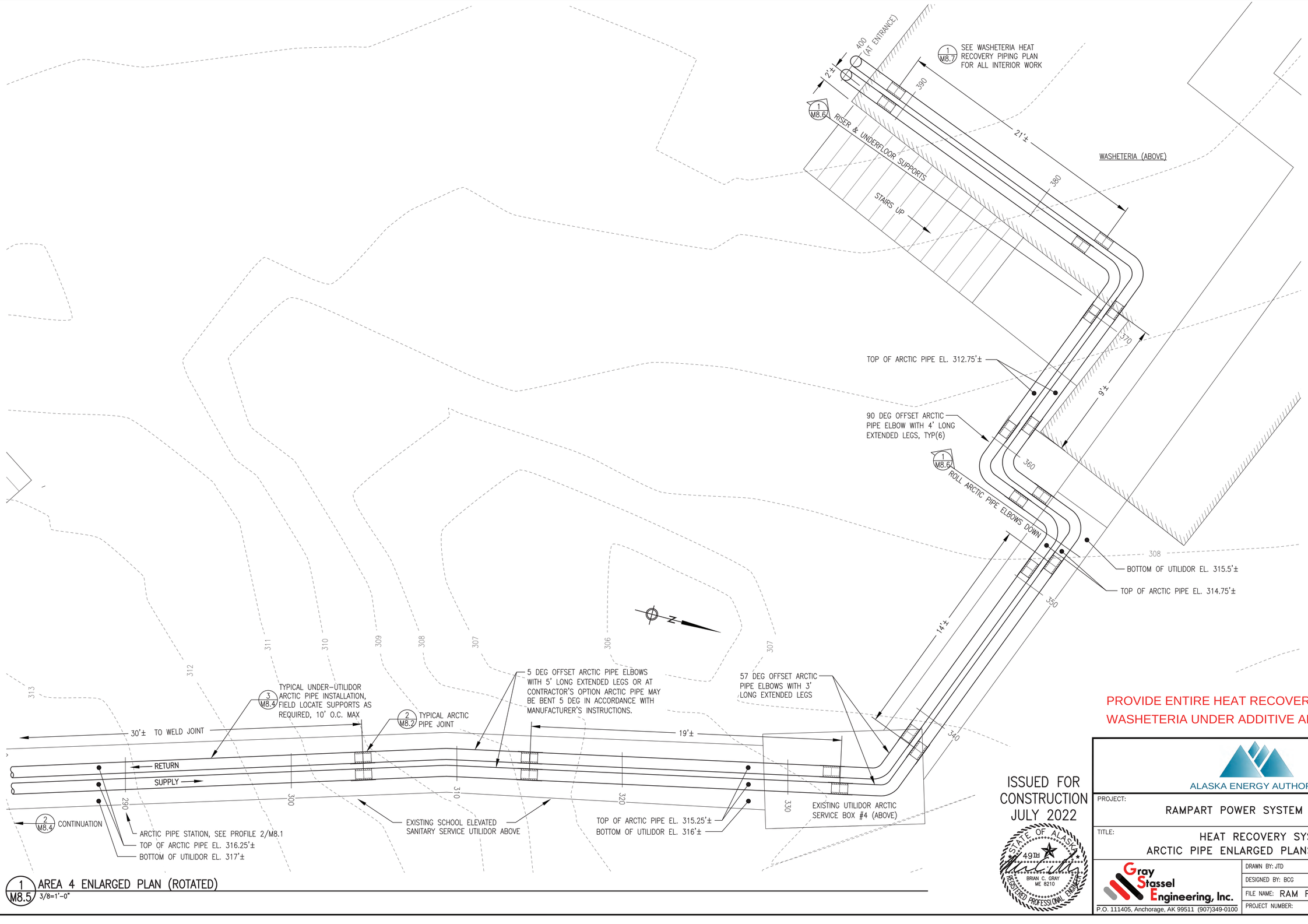
DESIGNED BY: BCG | DATE: 7/15/22
FILE NAME: RAM PP M8 | SHEET: M8.4
PROJECT NUMBER:



1 M8.5 AREA 4 ENLARGED PLAN (ROTATED)
3/8=1'-0"

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA
49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

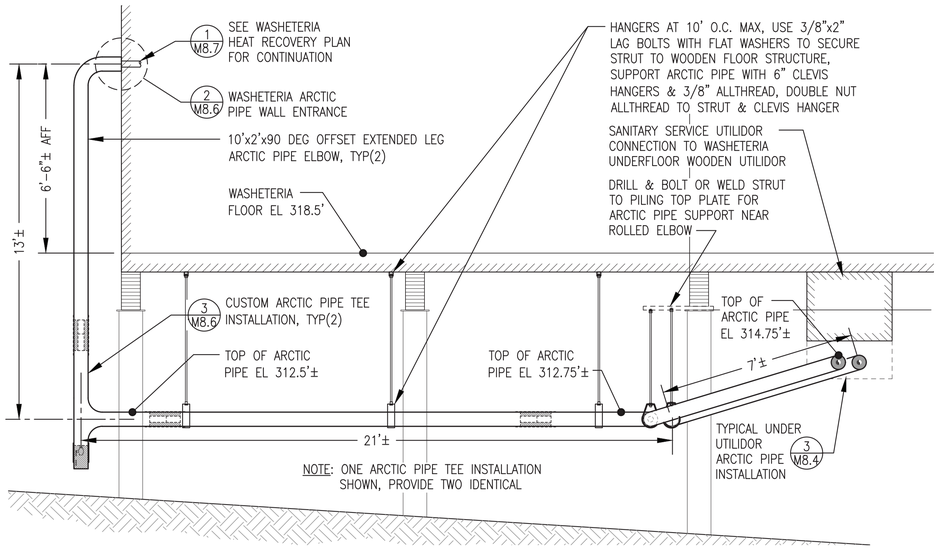
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
ARCTIC PIPE ENLARGED PLANS & DETAILS

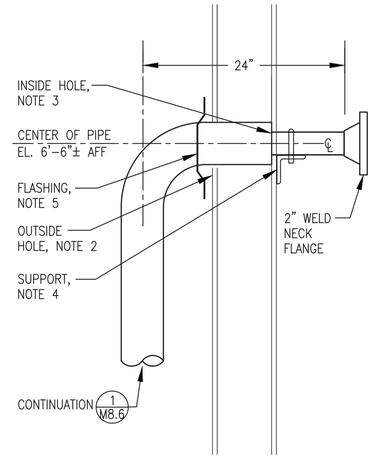
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: RAM PP M8
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 7/15/22
SHEET: M8.5



1 M8.6 WASHETERIA UNDER FLOOR ARCTIC PIPE & RISER ELEVATION

3/8=1'-0"

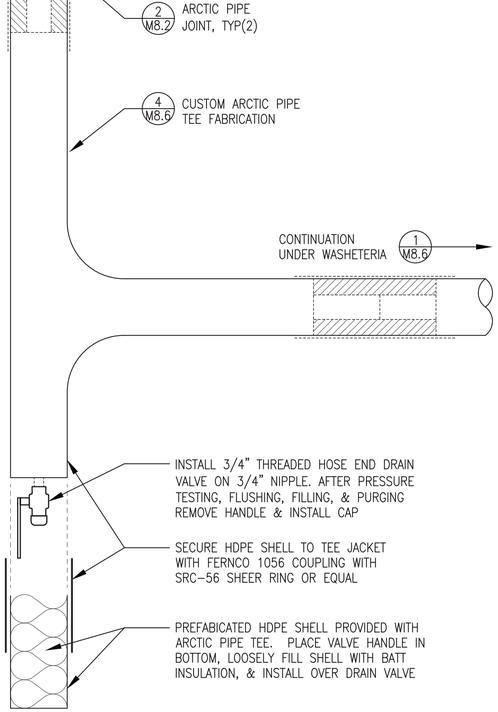


NOTES:

1. ONE ARCTIC PIPE ENTRY SHOWN, PROVIDE TWO IDENTICAL AT 12" O.C.
2. CUT OUTSIDE HOLE 1/2"ø LARGER THAN ARCTIC PIPE JACKET.
3. CUT INSIDE HOLE 1/2" LARGER THAN CARRIER PIPE, CENTER PIPE, INSERT ARCTIC PIPE UNTIL JACKET TOUCHES INTERIOR WALL SHEATHING, & CAULK ALL AROUND.
4. INSTALL 4' LONG SECTION L3"x3"x3/16" STEEL ANGLE AT ELEVATION OF BOTTOM OF STEEL CARRIER PIPE. SECURE ANGLE TO WALL WITH 3/8"x3" LAG SCREW AT MINIMUM 3 EACH WALL STUDS. SECURE 2" STEEL PIPES TO ANGLE WITH U-BOLTS.
5. INSTALL MULTI-FLASH #5 RETROFIT MF501BA WALL FLASHING OVER ARCTIC PIPE. SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING & FASTEN TO WALL WITH STAINLESS WOOD SCREWS ALL AROUND.

2 M8.6 WASHETERIA ARCTIC PIPE WALL ENTRANCE & SUPPORT

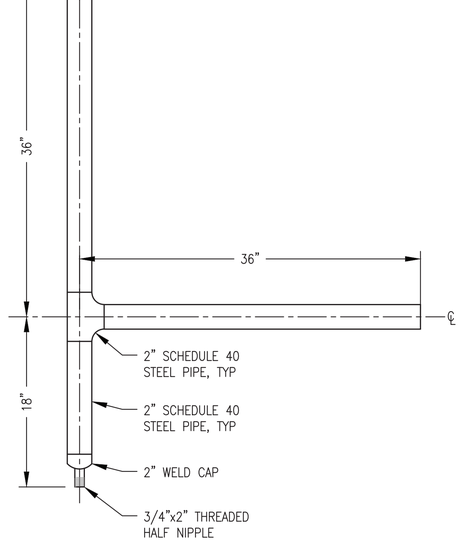
NO SCALE



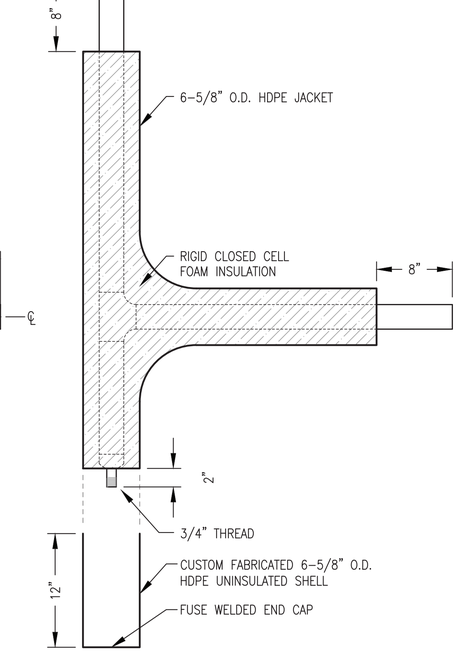
3 M8.6 ARCTIC PIPE TEE INSTALLATION

1-1/2"=1'-0"

NOTE: ONE ARCTIC PIPE TEE FABRICATION SHOWN, PROVIDE TWO IDENTICAL



2" SCHEDULE 40 CARRIER PIPE FABRICATION



2" CARRIER PIPE x 6-5/8" O.D. ARCTIC PIPE TEE ASSEMBLY

4 M8.6 CUSTOM ARCTIC PIPE TEE FABRICATION

1-1/2"=1'-0"

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

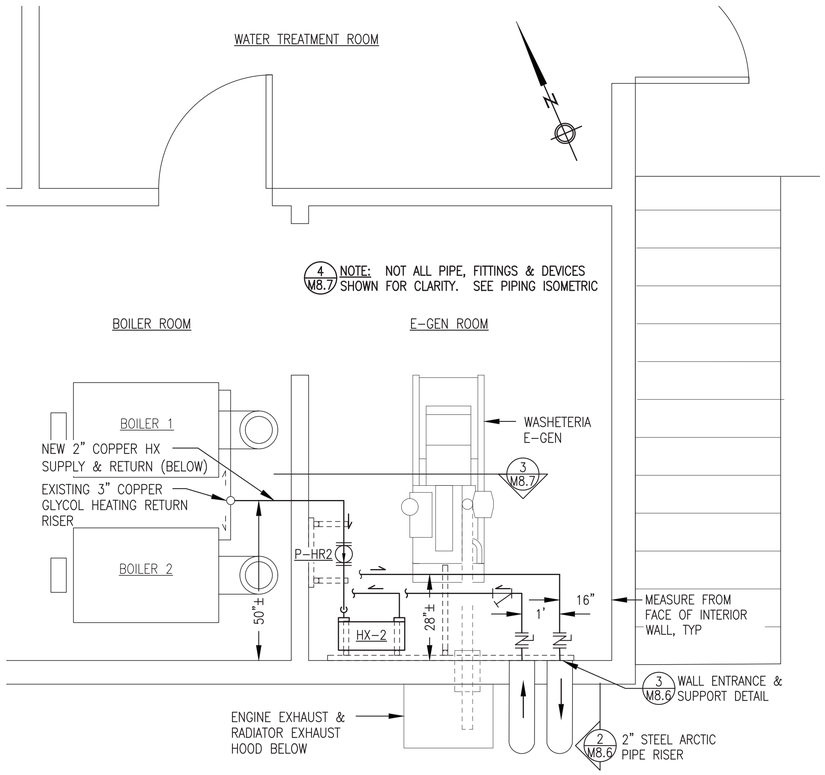
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM ARCTIC PIPE SECTIONS & DETAILS

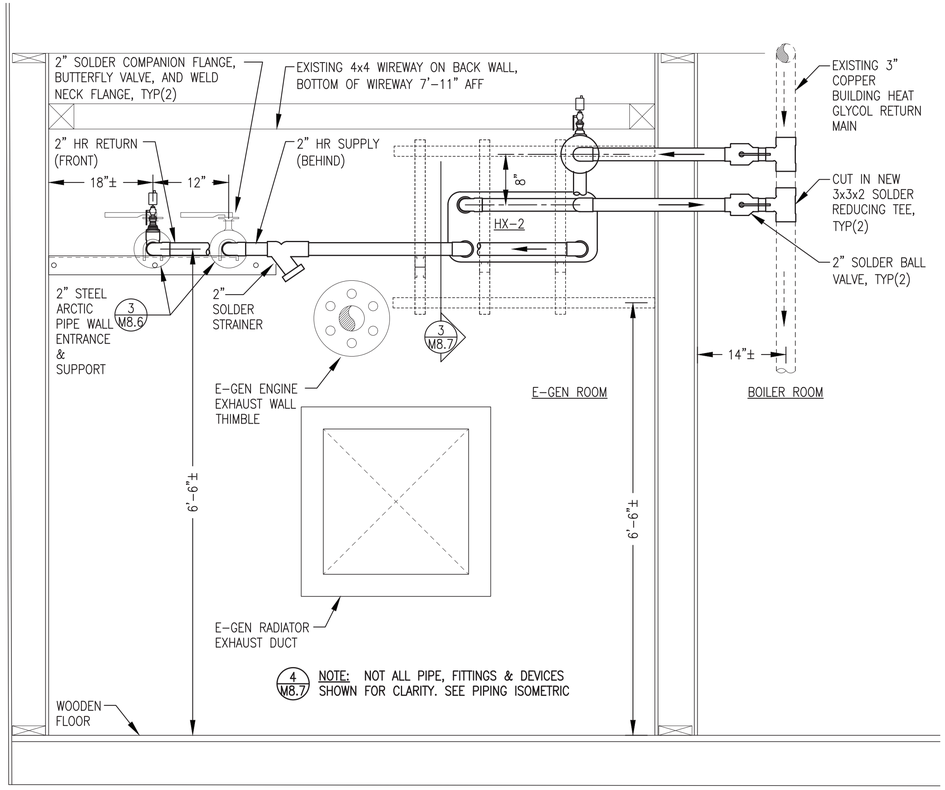
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/15/22
FILE NAME: RAM PP M8	SHEET: M8.6
PROJECT NUMBER:	



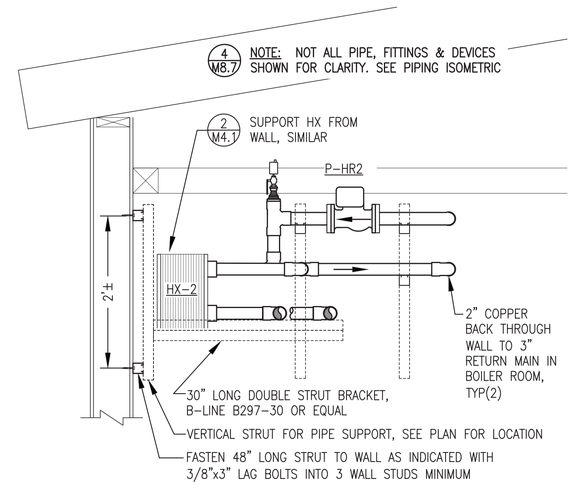
1 M8.7 WASHETERIA HEAT RECOVERY PIPING PLAN

1/2"=1'-0"



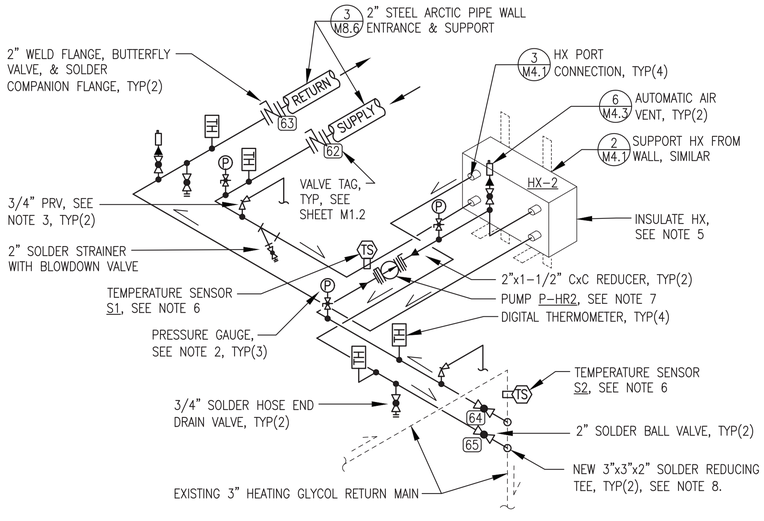
2 M8.7 WASHETERIA E-GEN ROOM BACK WALL ELEVATION

1"=1'-0"



3 M8.7 HEAT EXCHANGER PIPING DETAIL

1"=1'-0"



4 M8.7 WASHETERIA HEAT RECOVERY PIPING ISOMETRIC

NO SCALE

NOTES:

1. ALL NEW PIPING 2" TYPE "L" COPPER TUBE UNLESS SPECIFICALLY INDICATED OTHERWISE. SUPPORT PIPING & EQUIPMENT FROM BUILDING STRUCTURE WITH STRUT AND FITTINGS AS REQUIRED.
2. ALL PRESSURE GAUGES 0-100 PSIG.
3. 3/4" PRV, 100 PSIG SETPOINT, PIPE DISCHARGE TO WITHIN 6" OF FLOOR.
4. SEE DETAIL 3/M4.3 FOR INSTRUMENTATION AND DRAIN VALVE INSTALLATION.
5. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLAS INSULATION ALL AROUND & TAPE ALL SEAMS. INSULATE ALL NEW PIPING EXISTING WASHETERIA HYDRONIC PIPING TO REMAIN PARTIALLY INSULATED.
6. TEMPERATURE SENSOR PROVIDED WITH HEAT RECOVERY PANEL, SEE SHEET E8.2. INSTALL WHERE INDICATED. WIRE BRIUSH PIPE SURFACE, PLACE SENSOR DIRECTLY ON PIPE, SECURE TO PIPE WITH MINIMUM 2 WRAPS OF HIGH TEMPERATURE FOIL BACKED TAPE, AND COVER WITH PIPE INSULATION. ROUTE LEAD WIRE TO PANEL, SEE SHEET E8.1.
7. SET P-HR2 TO OPERATE ON SPEED 2.
8. CONNECT TO EXISTING 3" COPPER MAIN WITH 3"x3"x2" SOLDER REDUCING TEE OR WITH 2" T-DRILL TAP.

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO WASHETERIA UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

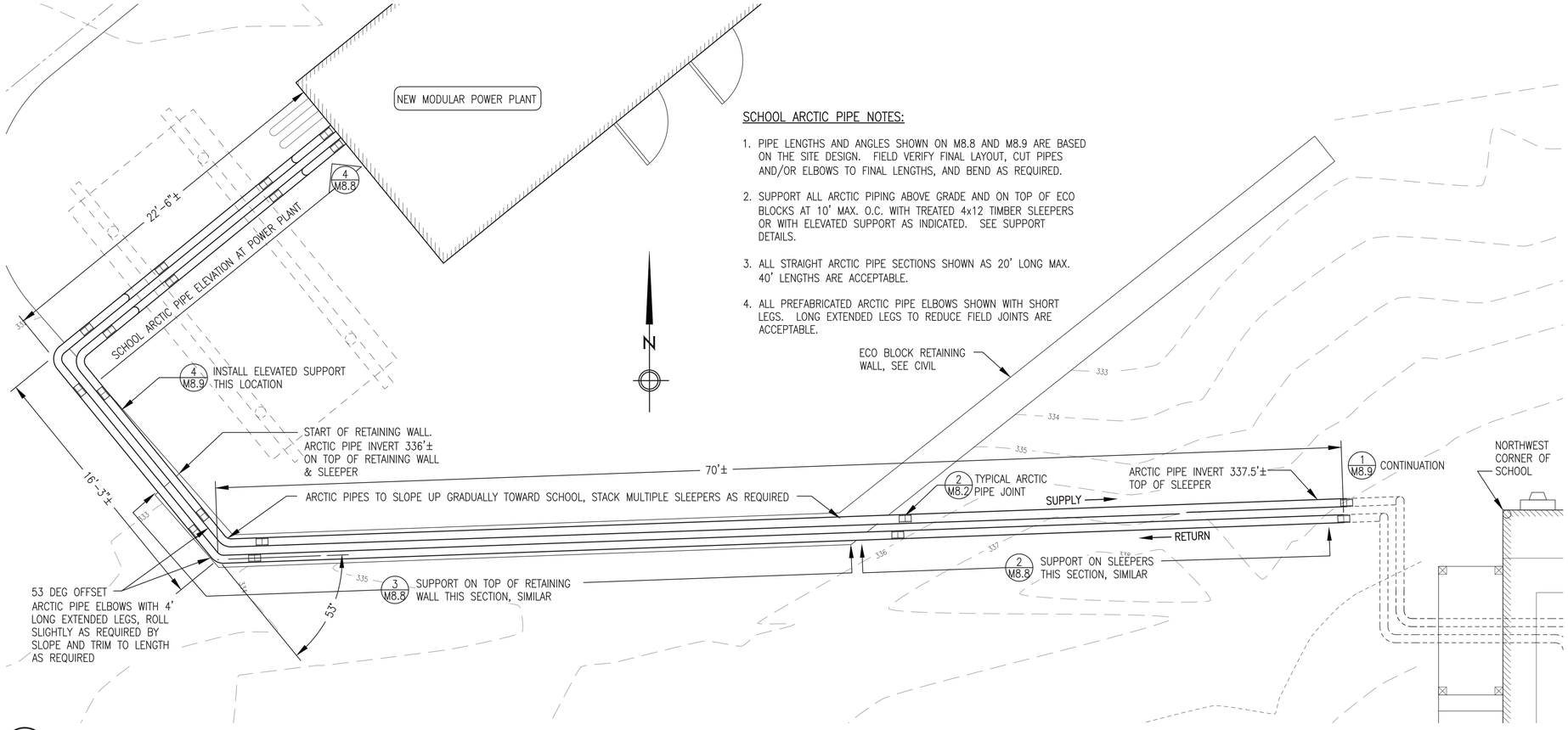
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
WASHETERIA PIPING PLAN, DETAILS, & ISOMETRIC

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 7/15/22
FILE NAME: RAM PP M8	SHEET: M8.7
PROJECT NUMBER:	



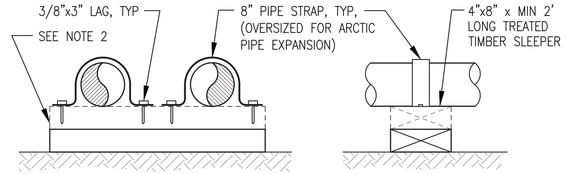
1 M8.8 AREA 5 ENLARGED PLAN
1/4=1'-0"

SCHOOL ARCTIC PIPE NOTES:

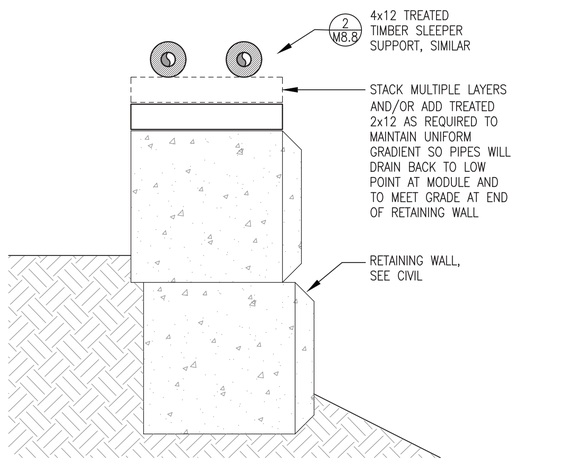
1. PIPE LENGTHS AND ANGLES SHOWN ON M8.8 AND M8.9 ARE BASED ON THE SITE DESIGN. FIELD VERIFY FINAL LAYOUT, CUT PIPES AND/OR ELBOWS TO FINAL LENGTHS, AND BEND AS REQUIRED.
2. SUPPORT ALL ARCTIC PIPING ABOVE GRADE AND ON TOP OF ECO BLOCKS AT 10' MAX. O.C. WITH TREATED 4x12 TIMBER SLEEPERS OR WITH ELEVATED SUPPORT AS INDICATED. SEE SUPPORT DETAILS.
3. ALL STRAIGHT ARCTIC PIPE SECTIONS SHOWN AS 20' LONG MAX. 40' LENGTHS ARE ACCEPTABLE.
4. ALL PREFABRICATED ARCTIC PIPE ELBOWS SHOWN WITH SHORT LEGS. LONG EXTENDED LEGS TO REDUCE FIELD JOINTS ARE ACCEPTABLE.

SLEEPER SUPPORT NOTES:

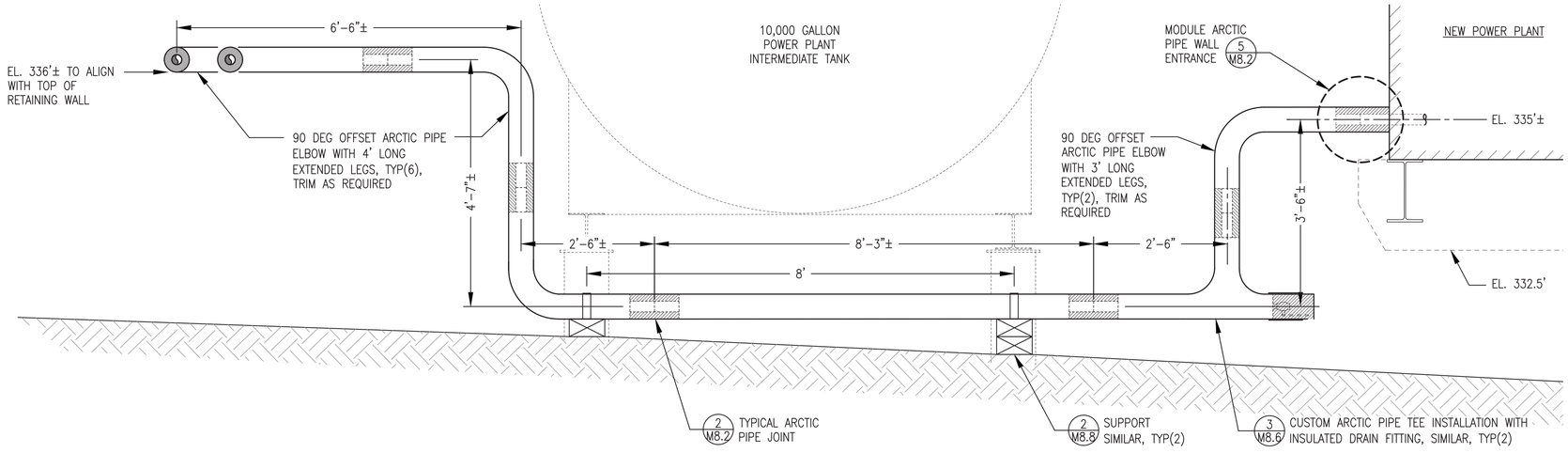
1. PROVIDE PIPE SUPPORTS AT 10' ON CENTER MAX UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. STACK MULTIPLE LAYERS AND/OR ADD TREATED 2x12 AS REQUIRED TO MAINTAIN UNIFORM GRADIENT SO PIPES WILL DRAIN BACK TO LOW POINT AT MODULE.



2 M8.8 ARCTIC PIPE SLEEPER SUPPORT ON GRADE
NO SCALE



3 M8.8 ARCTIC PIPE SLEEPER SUPPORT ON GRADE
NO SCALE



NOTE: ONE ARCTIC PIPE SHOWN, PROVIDE TWO SIMILAR AT 12" O.C.

4 M8.8 SCHOOL ARCTIC PIPE ELEVATION AT POWER PLANT
3/4=1'-0"

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO SCHOOL UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION DECEMBER 2023

STATE OF ALASKA — 49TH — BRIAN C. GRAY ME 8210 — REGISTERED PROFESSIONAL ENGINEER

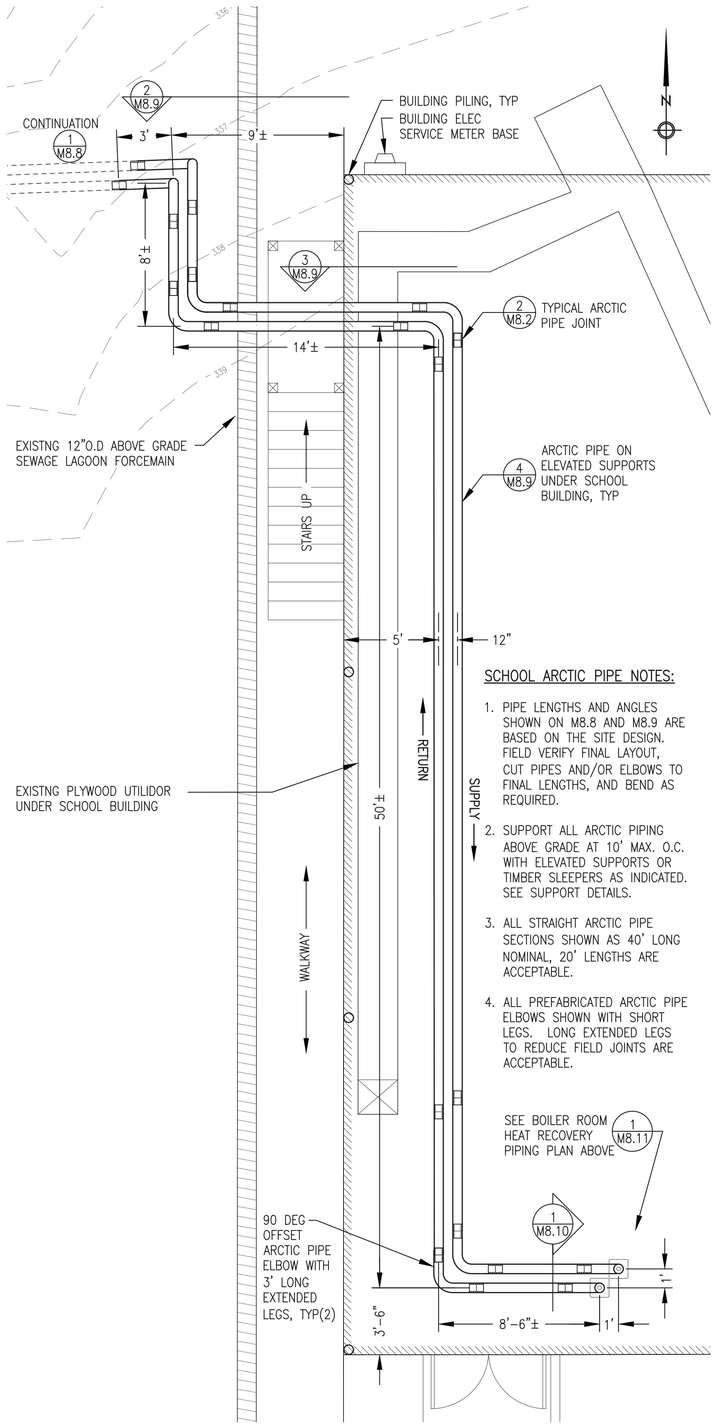
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM AREA 5 ENLARGED PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

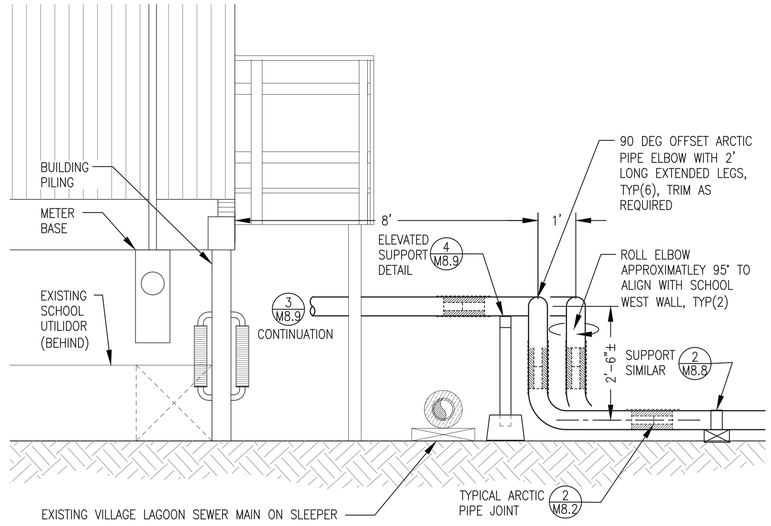
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 12/22/23
FILE NAME: RAM PP M8	SHEET: M8.8
PROJECT NUMBER:	



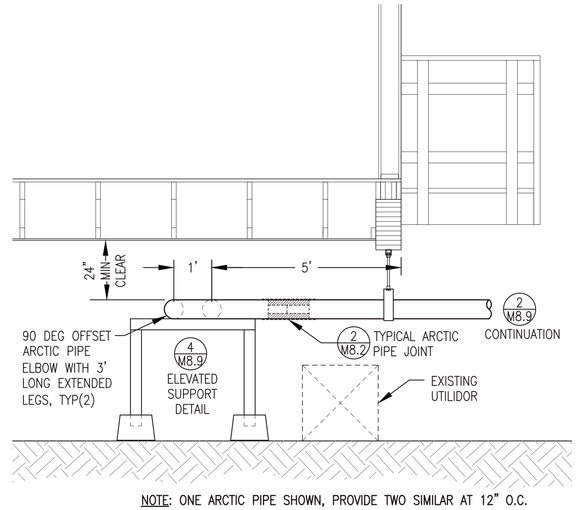
1 M8.9 AREA 6 ENLARGED PLAN (SCHOOL UNDERFLOOR PLAN)
1/4=1'-0"

SCHOOL ARCTIC PIPE NOTES:

1. PIPE LENGTHS AND ANGLES SHOWN ON M8.8 AND M8.9 ARE BASED ON THE SITE DESIGN. FIELD VERIFY FINAL LAYOUT, CUT PIPES AND/OR ELBOWS TO FINAL LENGTHS, AND BEND AS REQUIRED.
2. SUPPORT ALL ARCTIC PIPING ABOVE GRADE AT 10' MAX. O.C. WITH ELEVATED SUPPORTS OR TIMBER SLEEPERS AS INDICATED. SEE SUPPORT DETAILS.
3. ALL STRAIGHT ARCTIC PIPE SECTIONS SHOWN AS 40' LONG NOMINAL, 20' LENGTHS ARE ACCEPTABLE.
4. ALL PREFABRICATED ARCTIC PIPE ELBOWS SHOWN WITH SHORT LEGS. LONG EXTENDED LEGS TO REDUCE FIELD JOINTS ARE ACCEPTABLE.



2 M8.9 ARCTIC PIPE ELEVATION AT SCHOOL WEST WALL
1/2=1'-0"

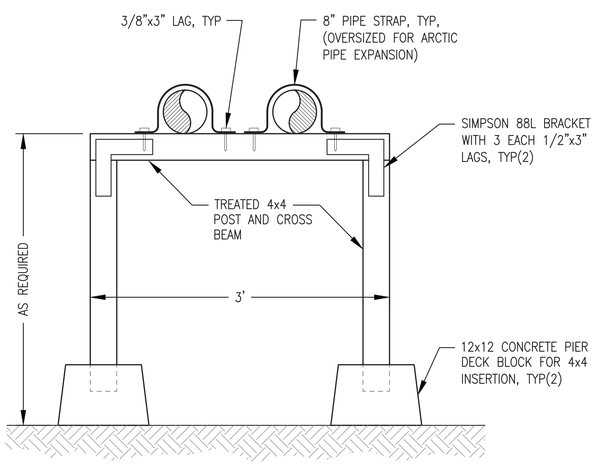


NOTE: ONE ARCTIC PIPE SHOWN, PROVIDE TWO SIMILAR AT 12" O.C.

3 M8.9 ARCTIC PIPE ELEVATION UNDER SCHOOL
1/2=1'-0"

ELEVATED SUPPORT NOTES:

1. PROVIDE PIPE SUPPORTS AT 10' ON CENTER MAX UNLESS SPECIFICALLY INDICATED OTHERWISE.
2. ADJUST POST HEIGHTS AS REQUIRED FOR UNEVEN TERRAIN AND TO MAINTAIN UNIFORM GRADIENT SO PIPES WILL DRAIN BACK TO LOW POINT AT MODULE.



4 M8.9 ARCTIC PIPE SLEEPER SUPPORT ON GRADE
NO SCALE

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO SCHOOL UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM
AREA 6 ENLARGED PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
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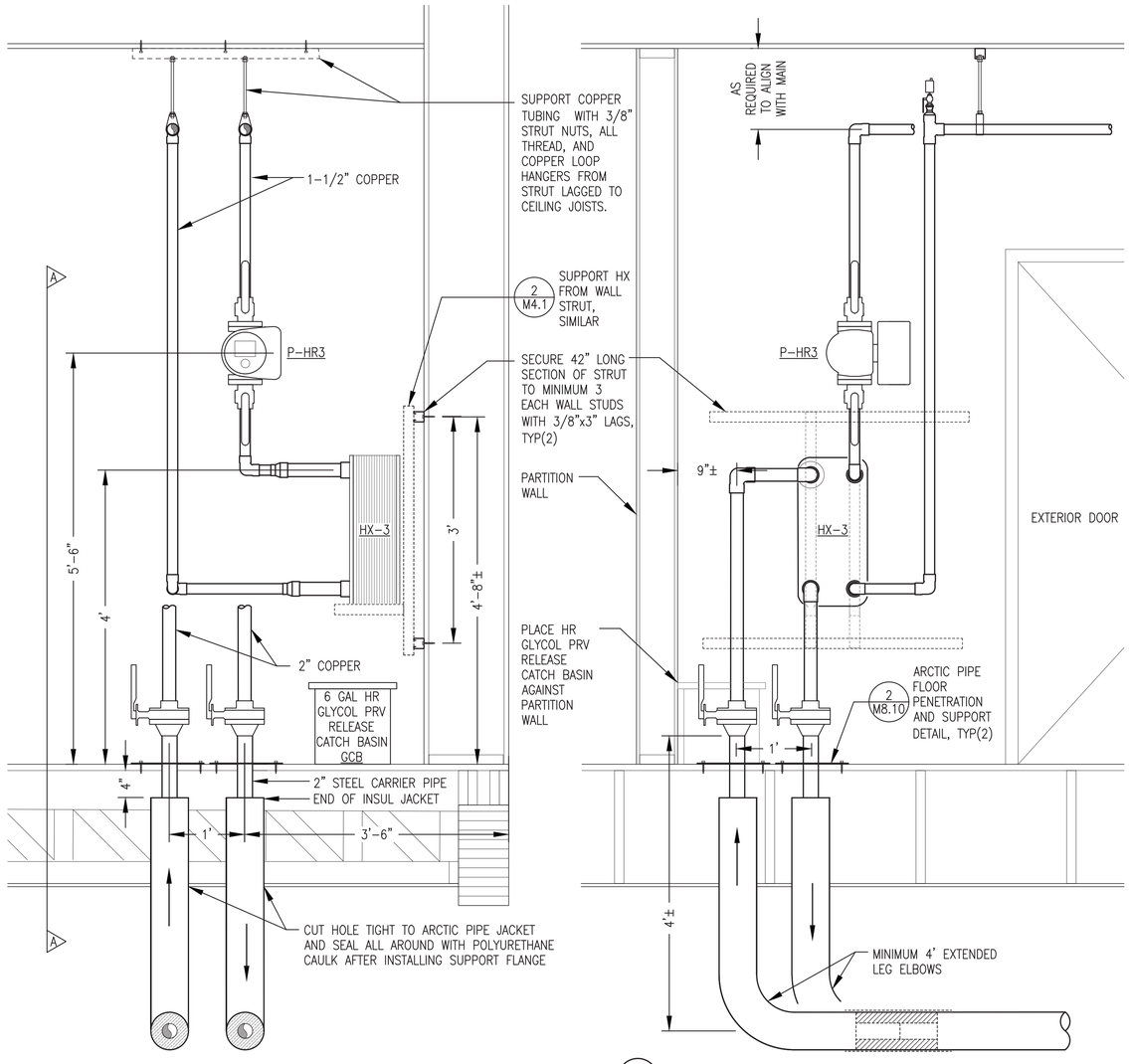
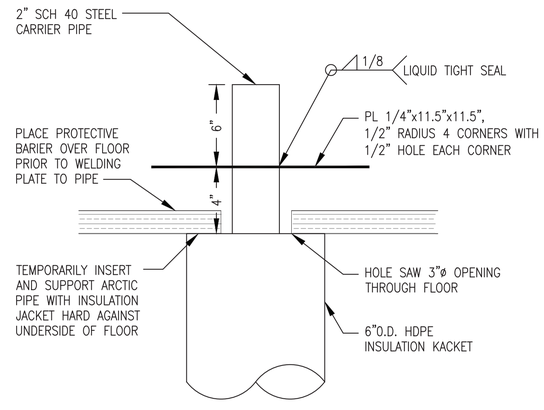
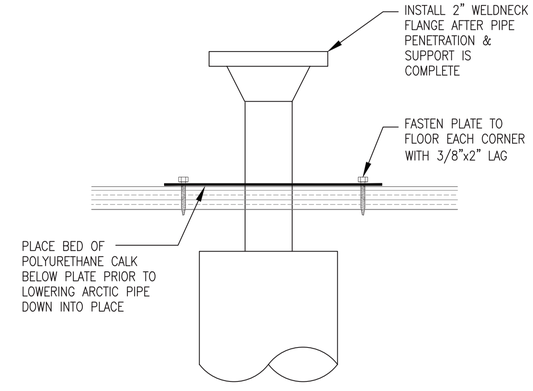
FILE NAME: RAM PP M8 | SHEET: M8.9
PROJECT NUMBER:



1 M8.10 SCHOOL ARCTIC PIPE ENTRANCE & BOILER ROOM HEAT RECOVERY PIPING ELEVATIONS
1"=1'-0"





2 M8.10 ARCTIC PIPE FLOOR PENTRATION & SUPPORT DETAIL
1"=1'-0"

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO SCHOOL UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION DECEMBER 2023

STATE OF ALASKA 49TH
BRIAN C. GRAY ME 8210
REGISTERED PROFESSIONAL ENGINEER

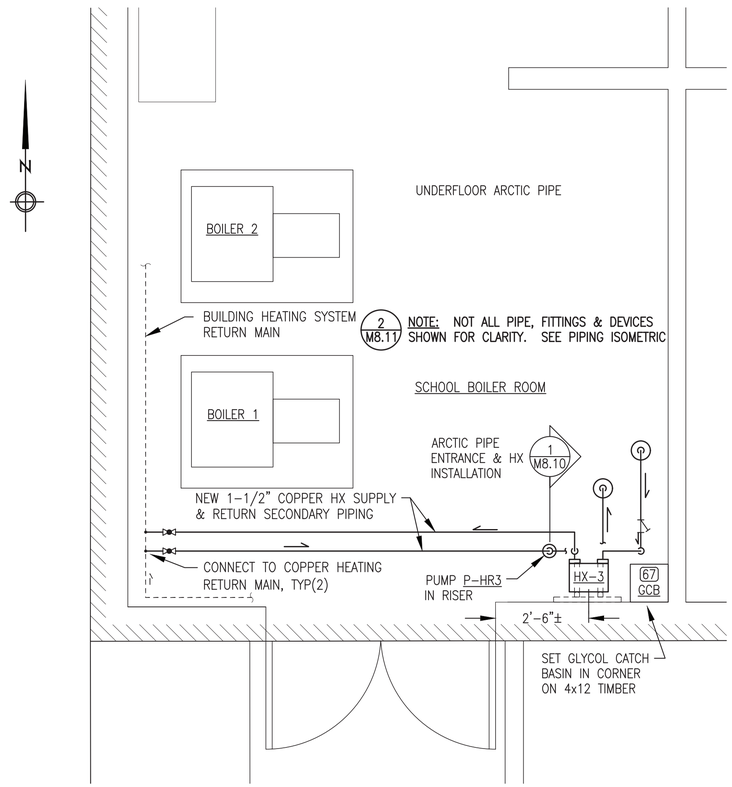
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

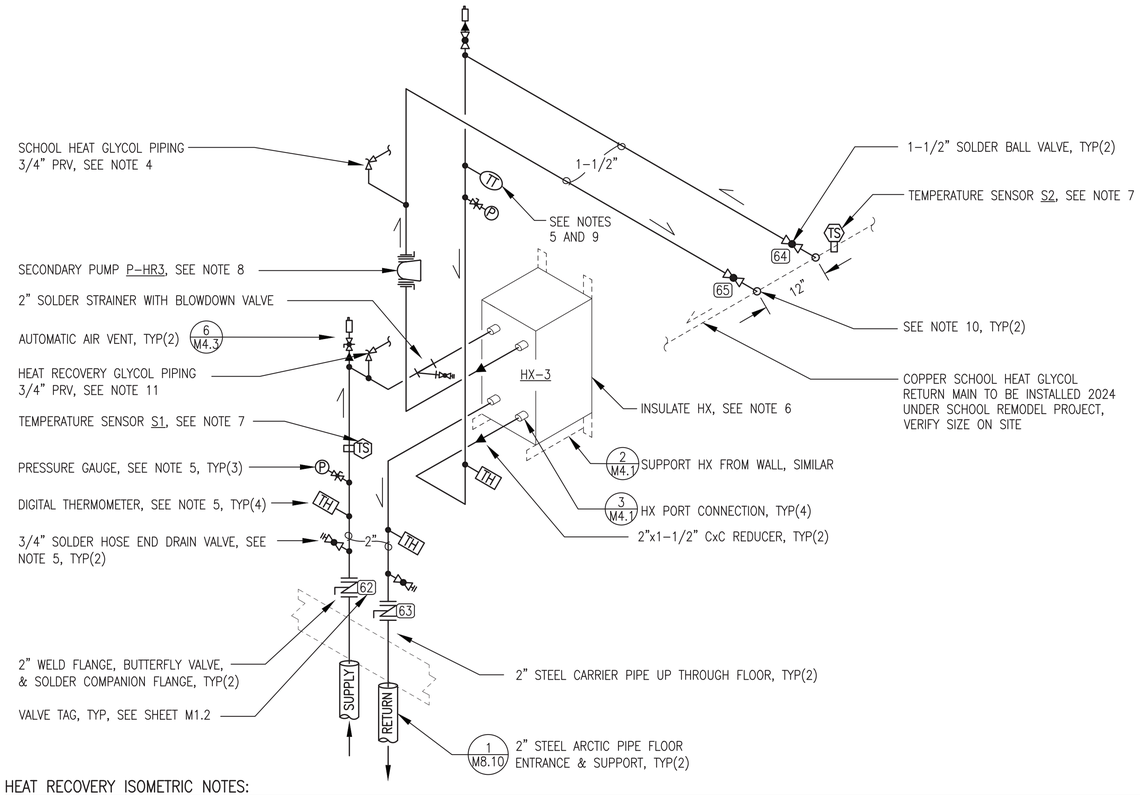
TITLE: HEAT RECOVERY SYSTEM SCHOOL BOILER ROOM PIPING DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: RAM PP M8
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 12/22/23
SHEET: M8.10



1 M8.11 SCHOOL BOILER ROOM HEAT RECOVERY PIPING PLAN
1/2=1'-0"



HEAT RECOVERY ISOMETRIC NOTES:

1. NEW HR PIPING SHOWN WITH DARK-SOLID LINES. SCHOOL PIPING SHOWN WITH LIGHT-DASHED LINES.
2. ALL NEW PIPING TYPE "L" COPPER TUBE WITH SOLDER JOINTS UNLESS SPECIFICALLY INDICATED OTHERWISE, SIZE AS INDICATED. SUPPORT PIPING & EQUIPMENT FROM BUILDING STRUCTURE WITH STRUT AND FITTINGS AS REQUIRED. ALL FLANGES ANSI 150# PATTERN TWO-PIECE WITH POWDER COATED STEEL FLANGE AND SOLDER COPPER TUBE ADAPTER UNLESS INDICATED OTHERWISE. FOR ALL FLANGE JOINTS INSTALL SPIRAL WOUND METALLIC GASKETS AND COAT GASKETS WITH ANTI-SEIZE COMPOUND PRIOR TO ASSEMBLING.
3. ALL PRESSURE GAUGES 0-100 PSIG.
4. 3/4" PRV, 100 PSIG SETPOINT, PIPE DISCHARGE TO SCHOOL HEATING SYSTEM GLYCOL MIX TANK.
5. SEE DETAIL 3/M4.3 FOR INSTRUMENTATION AND DRAIN VALVE INSTALLATION.
6. INSULATE ALL 1-1/2" AND 2" HEAT RECOVERY PIPING. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLAS INSULATION ALL AROUND AND TAPE ALL SEAMS.
7. TEMPERATURE SENSOR PROVIDED WITH HEAT RECOVERY PANEL, SEE SHEET E8.2. INSTALL WHERE INDICATED. WIRE BRIUSH PIPE SURFACE, PLACE SENSOR DIRECTLY ON PIPE, SECURE TO PIPE WITH MINIMUM 2 WRAPS OF HIGH TEMPERATURE FOIL BACKED TAPE, AND COVER WITH PIPE INSULATION. ROUTE LEAD WIRE TO PANEL, SEE SHEET E8.3.
8. PUMP P-HR3 WITH 1-1/2" SOLDER ISOLATION FLANGES. PROGRAM FOR 6 PSI CONSTANT PRESSURE OPERATION (CP1).
9. 4-20mA TEMPERATURE TRANSMITTER (SENSOR) FOR ANALOG ENERGY METERING INPUT ON PUMP P-HR3. PROGRAM PUMP P-HR3 TO MATCH SENSOR PARAMETERS AND LOCATION IN "RETURN" PIPE. SEE SHEET E8.3 FOR PROGRAMMING INSTRUCTIONS AND INSTRUMENTATION CABLE CONNECTION TERMINALS.
10. CONNECT 1-1/2" COPPER HX BRANCH PIPING TO SCHOOL COPPER RETURN MAIN WITH T-DRILL TAP OR LINE SIZE BY 1-1/2" COPPER REDUCING TEES.
11. 3/4" PRV, 100 PSIG SETPOINT. ROUTE 3/4" COPPER PRV DISCHARGE TO GLYCOL CATCH BASIN GRB (SEE EQUIPMENT SCHEDULE SHEET M1.1). SLOT TOP OF BASIN AT PIPE ENTRANCE SO TOP IS REMOVABLE. SET BASIN ON 4x12 TIMBER TO RAISE UP SO DRAIN SPIGOT CLEARS FLOOR. ATTACH TAG 67 TO TOP OF BASIN, SEE TAG SCHEDULE SHEET M1.2.

2 M8.11 SCHOOL HEAT RECOVERY PIPING ISOMETRIC
NO SCALE

PROVIDE ENTIRE HEAT RECOVERY SYSTEM TO SCHOOL UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION DECEMBER 2023

STATE OF ALASKA 49TH BRIAN C. GRAY ME 8210 REGISTERED PROFESSIONAL ENGINEER

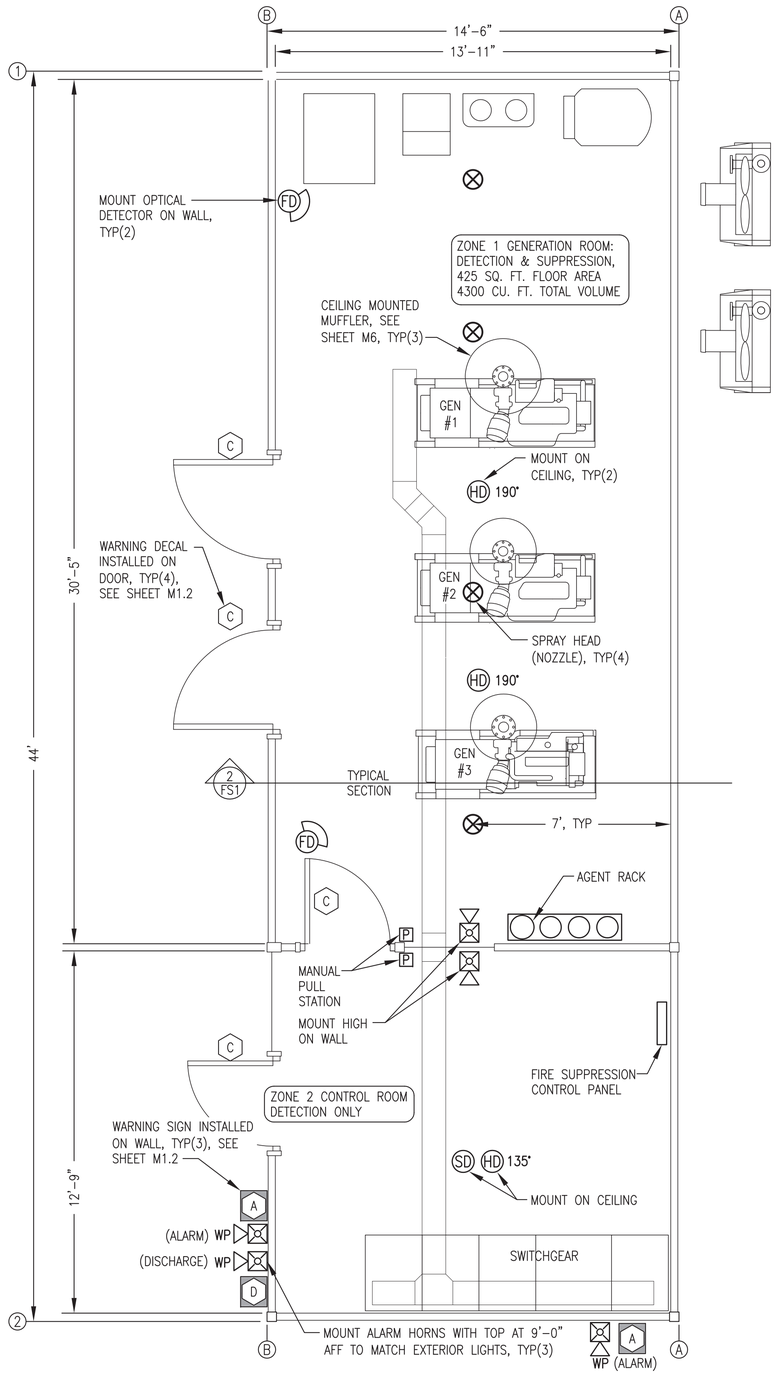
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

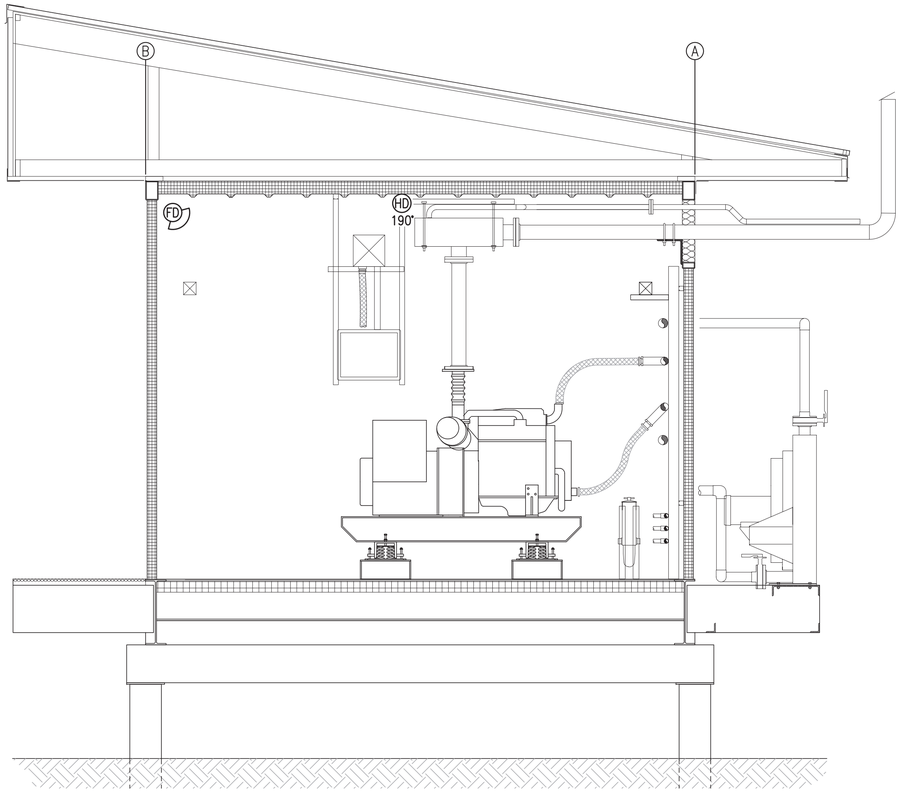
TITLE: HEAT RECOVERY SYSTEM
SCHOOL BOILER ROOM PIPING PLAN, ISOMETRIC & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 12/22/23
FILE NAME: RAM PP M8	SHEET: M8.11
PROJECT NUMBER:	



1 FS1 FIRE SUPPRESSION SYSTEM PLAN
3/8"=1'-0"



2 FS1 TYPICAL SECTION THROUGH BUILDING
3/8"=1'-0"

FIRE SUPPRESSION SYMBOL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
HD 135°	NORMAL TEMP. (135°F) DETECTOR	P	MANUAL PULL STATION
HD 190°	HIGH TEMP. (190°F) DETECTOR		INTERIOR ALARM HORN/STROBE
FD	FLAME (OPTICAL) DETECTOR	WP	EXTERIOR ALARM HORN/STROBE
SD	SMOKE (IONIZATION) DETECTOR		

FIRE SUPPRESSION PLACARD SCHEDULE (SEE SHEET M1.2)	
SYMBOL	DESCRIPTION
A	"FIRE ALARM"
C	"CAUTION, ROOM PROTECTED BY WATER MIST FIRE PROTECTION SYSTEM, IN CASE OF FIRE KEEP DOOR CLOSED AND DO NOT ENTER"
D	"FLASHING LIGHT MEANS FIRE SUPPRESSION AGENT HAS DISCHARGED"

FIRE SUPPRESSION WIRE SCHEDULE			
SYMBOL	CIRCUIT DESCRIPTION	WIRE TYPE	WIRE COLOR
A	24V DC POWER	#14 AWG SOLID	RED & BLACK
B	DETECTION CIRCUITS	#14 AWG SOLID	BLUE & YELLOW
C	ANNUNCIATION ALARM	#14 AWG SOLID	BROWN & ORANGE
D	ANNUNCIATION DISCHARGE	#14 AWG SOLID	WHITE, & GRAY
E	24V DC AUX POWER	#14 AWG SOLID	RED & BLACK WITH GRAY STRIPE

GENERAL NOTES:

1) INTERIOR FINISH OF ALL WALLS AND CEILING METAL SIDING. INTERIOR FINISH OF FLOOR WELDED STEEL PLATE. CEILING HEIGHT IN ALL ROOMS 10'-2 ABOVE FINISHED FLOOR.

2) ALL DOORS SELF-CLOSING WITH GASKETS. ALL BUILDING PIPING AND CONDUIT PENETRATIONS SEALED LIQUID TIGHT. ALL BUILDING DUCT PENETRATIONS EQUIPPED WITH MOTORIZED DAMPERS THAT CLOSE ON GENERATOR SHUT DOWN.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE. SEE SPECIFICATION 21 13 30 FOR DELINEATION OF FINAL RE-ASSEMBLY, TESTING, AND COMMISSIONING THAT IS INCLUDED IN THE ON SITE SCOPE

REVISION #1
ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
BRIAN C. GRAY
ME 8210
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: FIRE SUPPRESSION SYSTEM PLAN, SECTION, LEGEND, & NOTES

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: BCG | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 3/15/22
FILE NAME: RAM PP FS1 | SHEET: FS1 OF 1
PROJECT NUMBER:

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS (APPLIES TO ALL SCHEDULES):
SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

ELECTRICAL EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
1	DAY TANK ALARM HORN/STROBE	MULTI-TONE ALARM WITH STROBE, 115V, NEMA 3R, WEATHER RESISTANT SURFACE MOUNT BELL BOX	WHEELOCK MT4-115-WH-VNS
2	DIGITAL THERMOSTAT	MULTIPLE OUTPUT MODULATING DIGITAL THERMOSTAT	HONEYWELL TB7980B
3	NOT USED	NOT USED	NOT USED
4	EXTERIOR LIGHT	AREA LIGHT, WIDE DISPERSION WALL PACK WITH PHOTO CONTROL. LED, 17.7W, 120-277V DRIVER	HUBBELL NRG-356L-5K-U-PC
5	EMERGENCY LIGHT	WHITE PLASTIC ENCLOSURE, 120-347V INPUT, DUAL 5.3W LED LAMPS, LITHIUM IRON PHOSPHATE BATTERY	LITHONIA EML6L UVOLT LTP SRDT
6	EMERGENCY/EXIT LIGHT COMBO	WHITE PLASTIC ENCLOSURE, RED EXIT SIGN, 277/120V INPUT, DUAL 1.5W 9.6V LED LAMPS. OPTIONAL HIGH OUTPUT NI-CAD BATTERY	LITHONIA LHQM LED R HO
7	EMERGENCY EXIT REMOTE LIGHT	REMOTE LAMP FIXTURE, DUAL HEAD, RATED FOR EXTERIOR INSTALLATION IN DAMP/WET LOCATIONS, 1.5W 9.6V LED LAMPS.	LITHONIA ELA T QWP L0309
8	INTERIOR LIGHT	SURFACE MOUNTED LED STRIPLIGHT FIXTURE, 48" LONG, 34W, 5000'K WITH SNAP ON FROSTED DIFFUSER	LITHONIA L1N-L48-5000LM-FST
9	TIMER SWITCH	0-5 MINUTE , 120V, 20A, 1HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER.	INTERMATIC FF5M
10	LIGHT SWITCH	SINGLE POLE SNAP SWITCH, 120V, 20A, METAL, 1-1/2HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER, IVORY.	HUBBELL 1221-I
11	1ø SMALL MOTOR DISCONNECT	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
12	NOT USED	NOT USED	
13	STATION SERVICE TRANSFORMER	DRY TYPE, ENERGY STAR, ENCLOSURE TYPE 1 WITH INTEGRAL WALL MOUNT BRACKETS, 15 kVA, HV 480 DELTA, LV 208Y/120	HAMMOND HPS SENTINEL CAT. NO. SG3A0015KB
14	STATION SERVICE PANELBOARD	COPPER BUS, 3 PHASE, 4 WIRE, 120/208V, 125A MAIN BREAKER, 30 CIRCUITS, BOLT-IN BREAKERS, 20" WIDE NEMA 1 ENCLOSURE, SURFACE MOUNT, NO KNOCKOUTS	SIEMENS TYPE P1 OR SQUARE D TYPE NQ
15	STANDARD RECEPTACLE	SURFACE MOUNT 125V NEMA 5-20R RECEPTACLE. INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	PASS & SEYMOUR 5362W
16	EXTERIOR GFCI RECEPTACLE	125V NEMA 5-20R GFCI RECEPTACLE. MOUNT IN CAST FDA BOX WITH WEATHERPROOF COVER	PASS & SEYMOUR 2095-W
17	BATTERY CHARGER	12/24-VOLT SOLID STATE 20-AMP AUTO-EQUALIZING BATTERY CHARGER FOR 120 VAC INPUT, WITH OPTIONAL HIGH/LOW VOLTAGE, AC POWER FAILURE, & REMOTE SUMMARY ALARM RELAYS	SENS NRG22-20-RCLS OR LEMARCHE ECSR-40/20-12/24V-AV1
18	WELDER/COMPR. RECEPTACLE	NEMA 6-30R , BLACK, 250V, 30A, 2 POLE, WITH GROUND. INSTALL IN DEEP 4"x4" STEEL BOX WITH 2.15"ø HOLE METAL COVER	PASS & SEYMOUR 3801
19	NOT USED	NOT USED	NOT USED
20	RADIATOR MOTOR DISCONNECT	NON-FUSED LOCKABLE SAFETY SWITCH, NEMA 3R ENCLOSURE, 3PST, 600V, 30A, MIN 5HP RATED	SIEMENS HNF361R OR SQUARE D HU361R
21	24VAC CONTROL TRANSFORMER	120V PRIMARY, 24V SECONDARY, 20VA OUTPUT, 1/2" THREADED HUB MOUNT	FUNCTIONAL DEVICES TR20VA001
22	ENCLOSED POWER RELAY (RIB)	20A, 1HP RATED CONTACT, SPDT, 24VAC COIL, NEMA 1 ENCLOSURE, RED LED PILOT LIGHT	FUNCTIONAL DEVICES RIB2401B
23	SNAP SWITCH WITH THERMAL UNIT	600VAC, 1HP, 16A MANUAL MOTOR STARTER WITH TYPE S, TYPE A, MELTING ALLOY, CLASS 20 THERMAL UNIT	SQUARE D 2510F01 MOTOR STARTER WITH A14.8 THERMAL UNIT
24	ROUTER - HIGH SPEED INTERNET	4-PORT GIGABIT ROUTER, DUAL 2.4 AND 5 GHz WIFI WITH ADJUSTABLE ANTENNAS, 4 GIGABIT LAN, 1 GIGBIT WAN, USB 2.0 AND USB 4.0, MINIMUM 256 MB RAM	ASUS RT-ACI-900P

ELECTRICAL CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERATOR LEADS (ENGINE STARTER CABLES SIMILAR)	HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, TIN COATED COPPER CONDUCTOR. THERMOSET EPDM INSULATION, UL 3340/3374, MINIMUM 600V, LISTED 150°C FOR NON-FLEXING	COBRA CABLE, BELDEN, OR OMINI	TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 150°C.
GENERAL USE CONDUCTORS	CLASS B CONCENTRIC STRANDED, SOFT DRAWN COPPER. TYPE XHHW2 INSULATION, 600V AND 90C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL & CANBUS CONDUCTORS	#18 AWG STRANDED TINNED COPPER CONDUCTORS, 600V POLYETHYLENE INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE & PVC OUTER JACKET	BELDEN PART #'S SINGLE PAIR: #1120A FOUR PAIR: #1049A SINGLE TRIAD: #1121A	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY.
EHTERNET (CAT5e) COMMUNICATION CONDUCTORS	SOLID BARE COPPER CONDUCTORS, 300V FEP INSULATION & JACKET, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE	FOUR PAIR #24 BELDEN 1585LC	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY. ROUTE ALL DEVICENET & CAT5e CABLES IN SEPARATE DEDICATED RACEWAY.
AERIAL, SELF-SUPPORTED TELEPHONE CABLE	RUS APPROVED PE-38, AERIAL FIGURE 8 TELEPHONE CABLE.	TWELVE PAIR #22 AWG	ALL INSTALLATION SHALL CONFORM TO THE APPLICABLE RUS BULLETIN.

COLOR CODING - UNLESS SPECIFICALLY INDICATED OTHERWISE COLOR CODE CONDUCTORS AS FOLLOWS:

- 480-VOLT POWER CONDUCTORS
  - PHASE A - BROWN
  - PHASE B - ORANGE
  - PHASE C - YELLOW
  - NEUTRAL - WHITE WITH YELLOW STRIPE
- 120/208-VOLT POWER CONDUCTORS
  - PHASE A - BLACK
  - PHASE B - RED
  - PHASE C - BLUE
  - NEUTRAL - WHITE
- 24 VOLT DC CONDUCTORS
  - +24VDC - RED or RED WITH GRAY STRIPE
  - -24VDC - BLACK or BLACK WITH GRAY STRIPE
- CONTROL & INSTRUMENT CONDUCTORS
  - COLOR CODED PER MANUFACTURER'S STANDARD

NOTES:

1) FOR NO. 6 AWG AND SMALLER CONDUCTORS COLOR CODING SHALL BE PROVIDED BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION. FOR ALL CONDUCTORS LARGER THAN NO. 6 SCOTCH 35 MARKING TAPE OR EQUIVALENT MAY BE USED TO COLOR CODE THE CABLE. WHERE MARKING TAPE IS USED THE CABLE SHALL BE IDENTIFIED AT EVERY ACCESSIBLE LOCATION. PROVIDE A MINIMUM OF 2 INCHES OF TAPE AT EACH LOCATION.

2) GROUNDING - PROVIDE A SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY. DO NOT USE THE CONDUIT AS AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE OF THE SAME TYPE AS THE PHASE CONDUCTORS AND SHALL BE SIZED AS INDICATED ON THE DRAWINGS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

OWNER FURNISHED OVERHEAD TRANSFORMER SCHEDULE

LOAD DESCRIPTION	SHEET NUMBER	XFMR kVA RATING	TOTAL BANK kVA RATING	PRIMARY VOLTAGE	SECONDARY VOLTAGE	XFMR TYPE	XFMR PHASE	TRANSFORMER CONNECTION	NO. XFMRS IN BANK	3ø CONNECTION
POWER PLANT STEP-UP	E1.3	50	150	12.47/7.2 kV	480/277	POLE	1ø	3ø WYE-WYE	3	480/277
SCHOOL SERVICE	E1.3	25	75	12.47/7.2 kV	208/120	POLE	1ø	3ø WYE-WYE	3	208/120 (1)
TQ & CLINIC SERVICE	E3.2	25	25	7.2 kV	120/240	POLE	1ø	SINGLE-PHASE	1	

TRANSFORMER NOTES:

1) TRANSFORMERS ORIGINALLY PROCURED FOR 120/240V 1ø SERVICE. FIELD RECONNECT AS REQUIRED TO PROVIDE FULL TRANSFORMER CAPACITY AT 120V.

WIRING & DEVICE SYMBOL LEGEND

SYMBOL	DESCRIPTION
SS-##	HOME RUN TO PANEL & BREAKER(S) INDICATED. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL CONDUCTOR, CURVED DASH INDICATES GROUND CONDUCTOR. IF NOT SPECIFICALLY INDICATED, PROVIDE 2#12 AWG & 1#12 AWG GROUND.
#	ELECTRICAL ITEM - SEE EQUIPMENT SCHEDULE
1/4	MOTOR (HORESPOWER INDICATED)
MD	MOTORIZED DAMPER - SEE MECHANICAL
	125V, 20A, DUPLEX RECEPTACLE
T	LINE VOLTAGE THERMOSTAT
DT	DIGITAL THERMOSTAT, MODULATING
$	SNAP SWITCH / SMALL MOTOR DISCONNECT
T$	TIMER SWITCH
	GROUND

INSTRUMENTATION & ENERGY MEASUREMENT LEGEND

NOTE: SEE SCHEDULES SHEET M1.1 FOR EQUIPMENT SPECIFICATIONS.

SYMBOL	SERVICE/FUNCTION	SYMBOL	SERVICE/FUNCTION
TT	TEMPERATURE TRANSMITTER	FS	DAY TANK/HOPPER FLOAT SWITCH
PT	PRESSURE TRANSMITTER	GLS	GLYCOL TANK LEVEL SENSOR PROBE
FM	HEAT RECOVERY FLOW METER	TLM	TANK LEVEL MONITOR PANEL
LCA	GLYCOL TANK LOW COOLANT ALARM	LSP	TANK LEVEL SENSOR PROBE

ALL MATERIALS AND EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE ASSEMBLY PROJECT EXCEPT FOR THOSE ITEMS SPECIFICALLY INDICATED IN RED CLOUDS WHICH ARE TO BE FURNISHED AND INSTALLED AS PART OF THE ON SITE SCOPE. NOTE THAT THE OVERHEAD TRANSFORMERS ARE OWNER FURNISHED AND CONTRACTOR INSTALLED.

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	ADD OWNER FURNISHED TRANSFORMER SCHEDULE	12/23/23	BCG
1	UPDATED TO COORDINATE WITH ON SITE DESIGN & NAPASKIAK MODULE	7/15/22	BCG

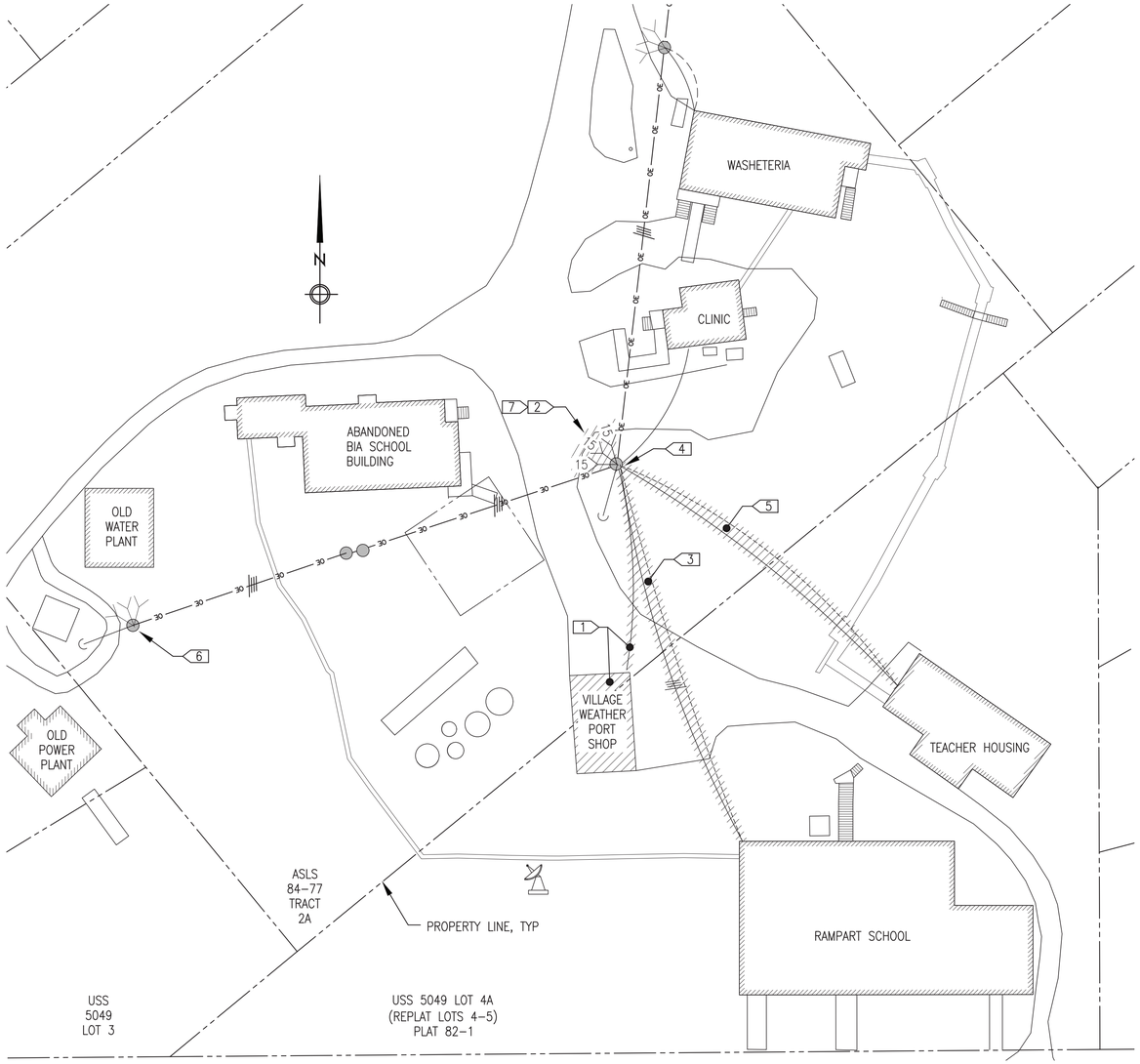
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

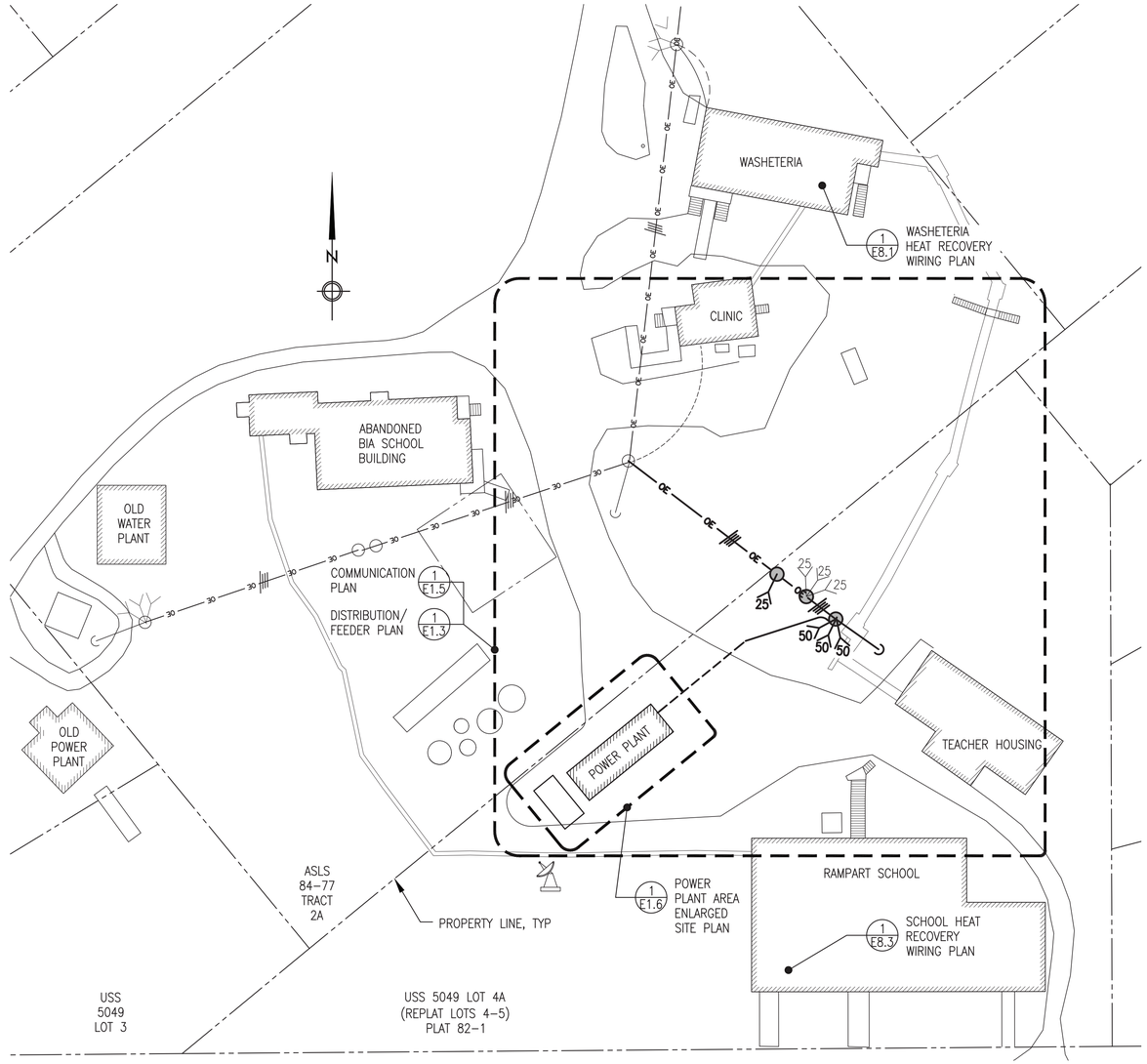
TITLE: ELECTRICAL LEGENDS & SCHEDULES

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E1	SHEET: E1.1
PROJECT NUMBER:	



1 E1.2 OVERALL PROJECT AREA ELECTRICAL DEMOLITION PLAN
1"=30'



2 E1.2 OVERALL PROJECT AREA ELECTRICAL NEW WORK PLAN
1"=30'

ELECTRICAL DEMOLITION GENERAL NOTES

1. ALL CONDUCTORS & CONDUITS SHOWN HATCHED TO BE MODIFIED, RELOCATED, DEMOLISHED OR ABANDONED. SEE SPECIFIC NOTES.
2. DE-ENERGIZE ALL AFFECTED CIRCUITS PRIOR TO BEGINNING DEMOLITION.
3. TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO CONDUCTORS & EQUIPMENT BEING REMOVED DURING DEMOLITION. TURN ALL REMOVED EQUIPMENT OVER TO VILLAGE FOR FINAL DISPOSITION.

ELECTRICAL NEW WORK GENERAL NOTES

1. THE EXISTING SCHOOL OVERHEAD SECONDARY SERVICE AND PHONE CONDUCTORS ARE LESS THAN 12' ABOVE GRADE WHERE THEY CROSS ABOVE THE NEW POWER PLANT CONSTRUCTION SITE NEAR THE VILLAGE WEATHERPORT SHOP. THE NEW SCHOOL OVERHAED SERVICES MUST BE INSTALLED AND THE OVERHEAD EXISTING SERVICES DEMOLISHED PRIOR TO BEGINNING THE NEW POWER PLANT SITE EXCAVATION WORK.
2. A MAJOR RENOVATION OF THE ADJACENT SCHOOL IS SCHEDULED FOR CONSTRUCTION CONCURRENTLY WITH THE POWER PLANT UPGRADE PROJECT. COORDINATE ALL ACTIVITIES WITH THE YUKON KOYUKUK SCHOOL DISTRICT AND THE SCHOOL CONTRACTOR.

ELECTRICAL DEMOLITION SPECIFIC NOTES

1. EXISTING VILLAGE WEATHERPORT SHOP ALONG WITH SECONDARY SERVICE TO BE DEMOLISHED BY OTHERS PRIOR TO START OF THIS PROJECT.
2. DEMOLISH THREE EACH EXISTING 15kVA TRANSFORMERS AFTER COMPLETION OF NEW WORK AND TURN OVER TO UTILITY. REMOVE CROSS ARM, EQUIPMENT RACK, CUTOUTS, AND ALL OTHER MATERIAL ASSOCIATED WITH TRANSFORMERS. TRANSFORMER EQUIPMENT RACK CUTOUTS, AND SURGE ARRESTERS MAY BE REUSED IN NEW INSTALLATION. TURN CROSS ARM AND OTHER MATERIAL OVER TO UTILITY
3. DEMOLISH SECONDARY SERVICE AND PHONE CONDUCTORS TO SCHOOL BUILDING. SEE SHEETS E1.3 AND E1.5 FOR RECONNECTION.
4. TEMPORARILY DISCONNECT CLINIC SECONDARY SERVICE FROM OLD TRANSFORMER BANK. SEE SHEET E1.3 FOR RECONNECTION.
5. DEMOLISH SECONDARY SERVICE AND PHONE CONDUCTORS TO TEACHER HOUSING. SEE SHEETS E1.3 AND E1.5 FOR RECONNECTION.
6. DISCONNECT OLD POWER PLANT STEP UP TRANSFORMER BANK AFTER COMMISSIONING NEW POWER PLANT
7. SAVE EXISTING AREA LIGHT FOR RECONNECTION

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REVISION #1 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER CLOIS W. VERSYP EE 7802

REV.	DESCRIPTION	DATE	BY
1	REVISIONS TO SCHOOL SERVICE AND HEAT RECOVERY	12/22/23	BCG

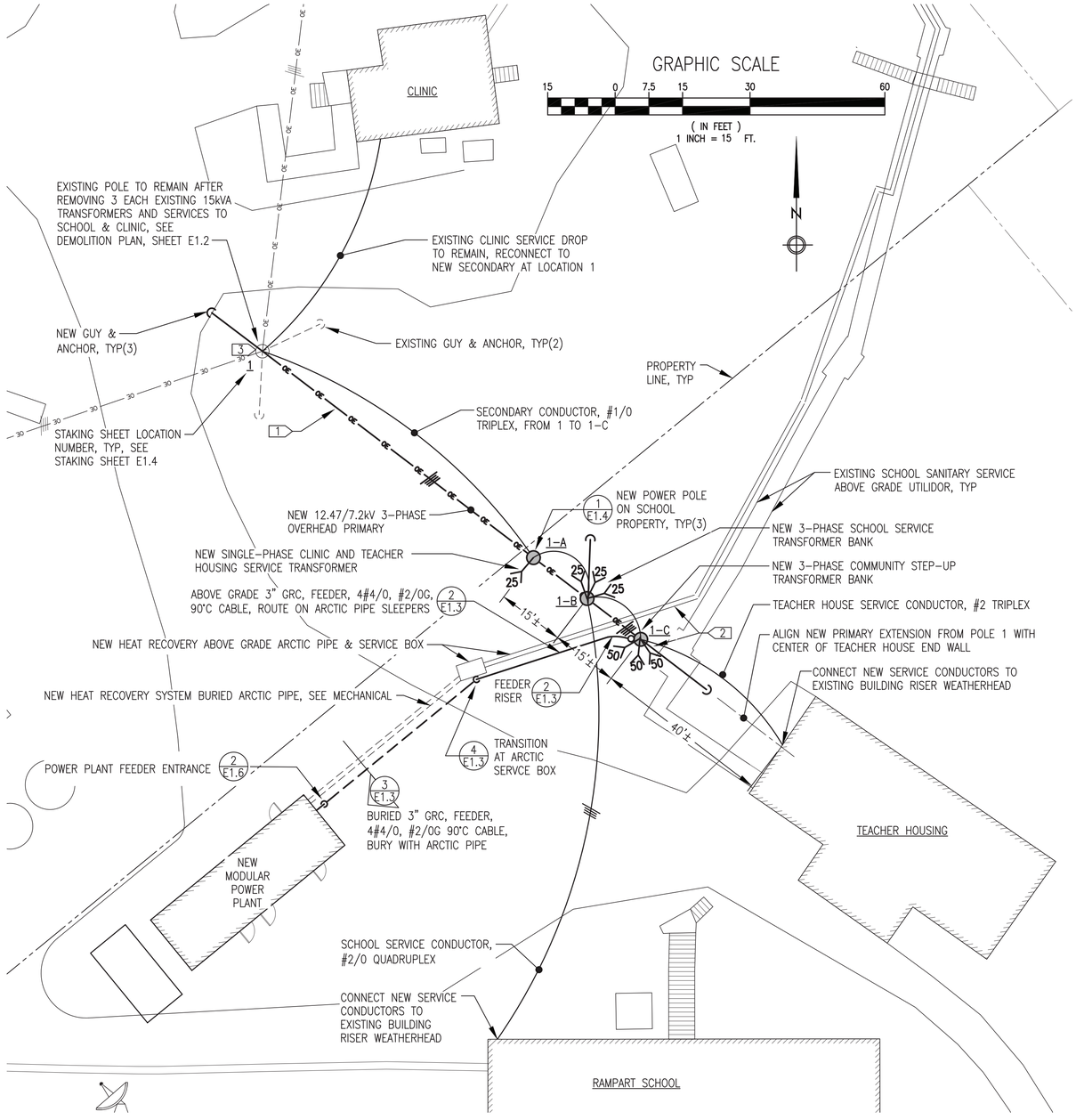
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: OVERALL PROJECT AREA DEMOLITION & NEW WORK PLANS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 6/13/22
FILE NAME: RAM PP E1 | SHEET: E1.2
PROJECT NUMBER:



GENERAL NOTES

1) THE LATEST ADOPTED EDITION OF ANSI C2 – NATIONAL ELECTRICAL SAFETY CODE (NESC) AND RUS BULLETIN 1728F–804, SPECIFICATIONS AND DRAWINGS FOR 12.47/7.2 kV OVERHEAD DISTRIBUTION SYSTEMS SHALL BE FOLLOWED, INCLUDING ANY STATE OF ALASKA AMENDMENTS.

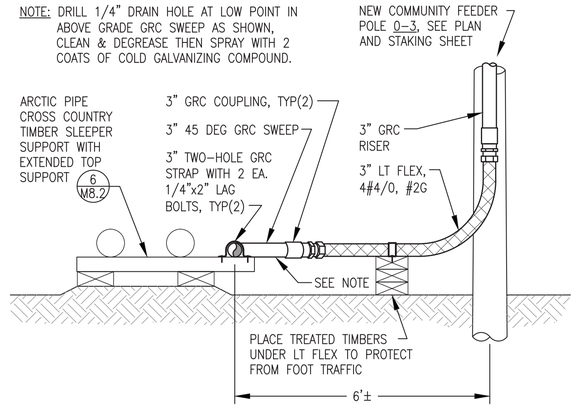
2) THE LATEST ADOPTED EDITION OF RUS BULLETIN 1753F–152, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION OF AERIAL PLANT.

3) THE CONTRACTOR SHALL REFERENCE OTHER PROJECT DRAWINGS AND SHALL ASK FOR LOCATES TO IDENTIFY ALL UNDERGROUND UTILITIES. NOTIFY THE AUTHORITY OF ANY APPARENT CONFLICTS. DAMAGE TO UNDERGROUND UTILITIES SHALL BE REPAIRED TO THE SATISFACTION OF THE AUTHORITY AND THE UTILITY AT NO COST TO THE AUTHORITY.

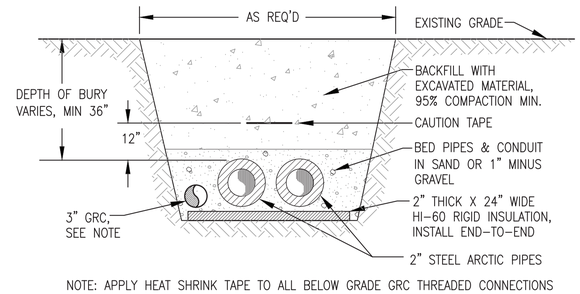
SPECIFIC NOTES

1. THE NEW OVERHEAD PRIMARY ROUTE WILL CLOSELY FOLLOW THE EXISTING TEACHER HOUSING SECONDARY SERVICE BRUSH LINE. PROVIDE ADDITIONAL BRUSH CLEARING THIS AREA AS REQUIRED TO ENSURE A MINIMUM 10' WIDE CLEARING FROM POLE 1 TO TEACHER HOUSING BUILDING.
2. EXISTING ABOVE GRADE SCHOOL SANITARY SERVICE UTILIDOR AND NEW HEAT RECOVERY SYSTEM ABOVE GRADE ARCTIC PIPE LOCATED THIS AREA. LOCATE POLE MIN 5' CLEAR OF UTILIDOR AND ARCTIC PIPE. FIELD ADJUST POLE AND ANCHOR LOCATION AS REQUIRED.
3. RECONNECT EXISTING AREA LIGHT

1 E1.3 OVERHEAD DISTRIBUTION & FEEDER PLAN
1"=15'

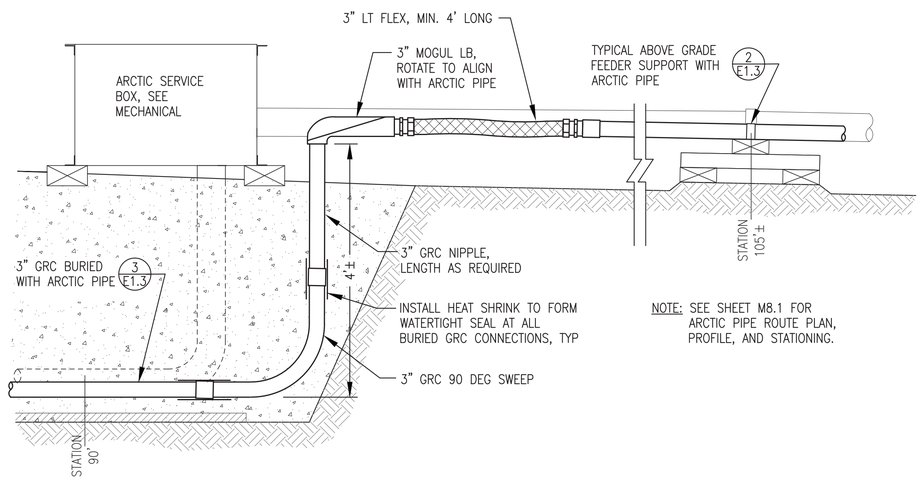


2 E1.3 FEEDER CONDUIT SUPPORT & POLE RISER
NO SCALE



NOTE: APPLY HEAT SHRINK TAPE TO ALL BELOW GRADE GRC THREADED CONNECTIONS

3 E1.3 TYPICAL BURIED FEEDER CONDUIT INSTALLATION
NO SCALE



4 E1.3 FEEDER CONDUIT TRANSITION AT ARCTIC SERVICE BOX
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH
CLOS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISIONS TO SCHOOL SERVICE	12/22/23	BCG
1	INCREASED SCHOOL SERVICE DROP TO #2/0	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: OVERHEAD DISTRIBUTION & FEEDER PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 6/13/22
FILE NAME: RAM PP E1 | SHEET: E1.3
PROJECT NUMBER:

STAKING SHEET

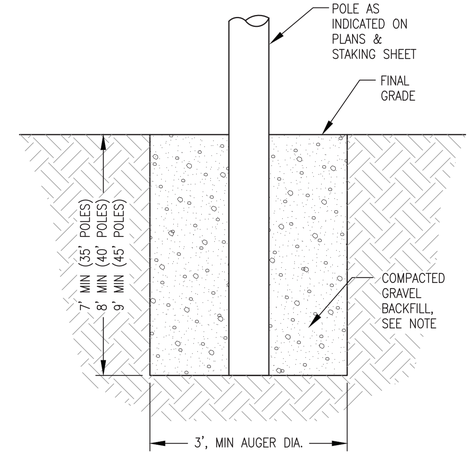
LOCATION NUMBER	PRIMARY ASSEMBLY		POLE		PRIMARY CONDUCTOR			GUY			ANCHOR		XFMR		SECONDARY CONDUCTOR			SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		REMARKS/COMMENTS/NOTES
	QTY	UNIT	HEIGHT	CLASS	QTY	SIZE/TYPE	BACKSPAN (FT)	NO.	UNIT	LEAD	NO.	UNIT	NO.	UNIT	QTY	SIZE/TYPE	BACKSPAN (FT)	NO.	UNIT	NO.	UNIT	
1	1	C5.21	40' (EXIST)	4				2	E1.1La	20'	1	F1.10			1	#1/0 TPLX	75'			1	J2.2	PROVIDE GUY FOR TELEPHONE CABLE. SUPPORT TELEPHONE CABLE AS REQUIRED. SEE NOTES 4, 5, 6, and 7.
1-A	1	C1.11L	40'	4	4	#2 ACSR	75'						1	G1.4-25	1	PE-38 TEL CABLE	75'			2 1 1	J2.2 H1.1 N6.1a	SUPPORT TELEPHONE CABLE AS REQUIRED.
1-B	1	C1.11L	40'	4	4	#2 ACSR	15'	2	E1.1La	20'	1	F1.10	1	G3.3-75	1 1	#1/0 TPLX PE-38 TEL CABLE	15' 15'	1	#2/0 QPLX	2 1 1 1	J2.2 K1.2 H1.1 N6.1a	PROVIDE GUY FOR TELEPHONE CABLE. SUPPORT TELEPHONE CABLE AS REQUIRED.
1-C	1	C5.21	40'	4	4	#2 ACSR	15'	2	E1.1La	20'	1	F1.10	1	G3.3-150	1 1	#1/0 TPLX PE-38 TEL CABLE	15' 15'	1	#2 TPLX	2 1	K1.2 H1.1	PROVIDE GUY FOR TELEPHONE CABLE. SUPPORT TELEPHONE CABLE AS REQUIRED.

STAKING SHEET NOTES

1. SEE PLAN SHEET AND DETAILS FOR ADDITIONAL INFORMATION.
2. INSTALL ARMOR ROD ON THREE PHASES AND NEUTRAL, EXCEPT AT DEAD END ASSEMBLIES. INSTALL ON ANY INSULATORS USED FOR JUMPERS.
3. VERIFY PHASE CONNECTIONS AND MAINTAIN EXISTING PHASE POSITION.
4. POSITION NEW GUYS AND ANCHORS SO THEY ARE NOT IN THE TRAVELED WAY.
5. CONNECT NEW TELEPHONE CABLE INTO THE EXISTING TELEPHONE CABLE AS REQUIRED TO PROVIDE TELEPHONE AND/OR DSL SERVICE TO THE SERVICES INDICATED.
6. RECONNECT EXISTING AREA LIGHT.
7. CONNECT EXISTING CLINIC SERVICE TO NEW SECONDARY CONDUCTORS.

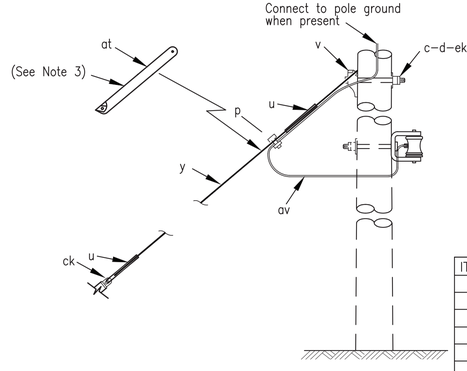
DISTRIBUTION SYSTEM INSTALLATION GENERAL NOTES

1. SEE SPECIFICATIONS FOR EQUIPMENT REQUIREMENTS AND COMPLETE REQUIREMENTS FOR ELECTRICAL DISTRIBUTION AND TELEPHONE SYSTEM INSTALLATION.
2. ALL OVERHEAD ELECTRICAL WORK SHALL CONFORM TO THE REQUIREMENTS OF RUS BULLETIN 1728F-804, SPECIFICATIONS AND DRAWINGS FOR 12.47/7.2 kV OVERHEAD DISTRIBUTION SYSTEMS, UNLESS MODIFIED BY THESE DRAWINGS OR SPECIFICATIONS. ALL MATERIAL SHALL BE RUS APPROVED. OBTAIN COPY OF THE RUS BULLETIN AND MAINTAIN COPY ON THE JOBSITE.
3. ALL OVERHEAD OVERHEAD TELEPHONE WORK SHALL CONFORM TO THE REQUIREMENTS OF RUS BULLETIN 1753F-152, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION OF AERIAL PLANT, UNLESS MODIFIED BY THESE DRAWINGS OR SPECIFICATIONS. ALL MATERIAL SHALL BE RUS APPROVED. OBTAIN COPY OF THE RUS BULLETIN AND MAINTAIN COPY ON THE JOBSITE. PROVIDE POLE ATTACHMENTS AS REQUIRED FOR SUPPORTING TELEPHONE CABLE AT POLES. THESE PLANS WERE SUBMITTED TO LOCAL TELEPHONE SERVICE PROVIDER UNITED UTILITIES, INC. (UUI) JUNE 2022 FOR PLANNING AND SCHEDULING PURPOSES. COORDINATE NEW TELEPHONE SERVICE INSTALLATION WORK WITH UUI PRIOR TO CONSTRUCITON.
4. WHERE RUS UNITS ARE REFERENCED, MATERIAL ITEMS MAY NOT BE LISTED IN THE MATERIAL LIST. CONTRACTOR SHALL REFER TO RUS UNIT REFERENCED TO DETERMINE WHAT MATERIAL MUST BE PROVIDED.
5. ANY MODIFIED RUS CONSTRUCTION UNIT OR ANY NEW CONSTRUCTION UNITS ARE INCLUDED IN THE DETAIL SHEETS OF THE PROJECT DRAWINGS. ANY STANDARD RUS CONSTRUCTION UNITS REFERENCED ON THE DRAWINGS OR STAKING SHEETS SHALL BE OBTAINED BY THE CONTRACTOR. FAILURE TO HAVE THE CORRECT RUS CONSTRUCTION UNIT WILL NOT BE ACCEPTABLE AS AN EXCUSE FOR AN INCORRECT INSTALLATION.
6. ALL HARDWARE SHALL BE ALUMINUM, HOT DIP GALVANIZED, OR STAINLESS STEEL. ALL SMALL FASTENERS SHALL BE STAINLESS STEEL.
7. PRIMARY OVERHEAD CONDUCTOR SHALL BE AS INDICATED ON THE DRAWINGS.
8. ALL INSULATOR TIES SHALL BE PREFORMED TYPE. ALL NEUTRAL AND PHASE CONDUCTOR DEADENDS SHALL BE PREFORMED TYPE.
9. ALL PHASE CONDUCTOR DEADENDS SHALL BE MADE USING A SHOE TYPE CLAMP.
10. NOT ALL GROUNDS ARE SHOWN. GROUND NEUTRAL WIRE AND TRANSFORMER GROUNDED BUSHING ALONG WITH TRANSFORMER CASE. ROUTE #4 AWG SOLID COPPER GROUND CONDUCTOR DOWN POLE GROUND. ATTACH COPPER GROUND CONDUCTOR TO POLE WITH COPPER PLATED STAPLES. ALL CONNECTIONS TO CABLE SHALL BE MADE WITH COPPER COMPRESSION LUGS. NO ALUMINUM CONNECTORS OR CABLES SHALL BE USED, EXCEPT AT CONNECTIONS TO ACSR. AT ACSR CONNECTIONS, USE CONNECTORS RATED FOR COPPER/ALUMINUM.
11. ALL QUANTITIES MAY NOT BE SHOWN. DETERMINE QUANTITIES OF ALL NECESSARY MATERIAL AND EQUIPMENT.
12. ARMOR RODS SHALL BE PROVIDED FOR ALL ACSR CONDUCTORS. ARMOR RODS SHALL BE INSTALLED AT EACH INSULATOR BUT WILL NOT BE REQUIRED AT PRIMARY DEAD-END ASSEMBLIES.
13. INSULATORS SHALL BE SELECTED TO PROPERLY ACCOMMODATE THE ARMOR ROD INSTALLED ON THE CONDUCTOR.



NOTES:
1) AUGER MINIMUM 3' DIAMETER HOLE, DEPTH AS INDICATED.
2) BACKFILL WITH GRAVEL AND COMPACT IN MAXIMUM 8" LIFTS.

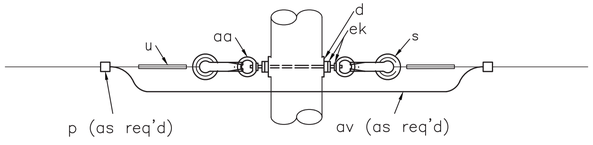
1 / E1.4 TYPICAL POLE INSTALLATION
NO SCALE



NOTES:
1. PROVIDE PRE-FORMED GUY DEADEND (u.) OTHER DEADEND MATERIAL SHALL NOT BE SUBSTITUTED.
2. INSTALL RED STRIPED REFLECTIVE TAPE ON BOTH SIDES OF GUY GUARD. INSTALL TAPE IN WARM ENVIRONMENT, ABOVE MANUFACTURE RECOMMENDED TEMPERATURE.

ITEM	QTY	MATERIAL
c	1	Bolt, machine, 3/4" x required length
d	1	Washer, square, 4", curved
p		Connectors, guy bond and as required
j	1	Screw, lag, 1/2" x 4"
u	2	Preformed Deadend for guy strand, heavy duty
v	1	Guy attachment, guy hook type
y		Guy wire, 3/8" EHS.
at	1	Guy marker, Yellow
av		Jumpers, as required
ck	1	Clamp, anchor bonding
ek	1	Locknuts

2 / E1.4 E1.1La SINGLE DOWN GUY
NO SCALE



ITEM	QTY	MATERIAL
d	2	Washer, square 3" curve
n	1	Bolt,double arming,5/8" x req'd length
p		Connectors, as req'd
aa	2	Nut, eye, 5/8"
av		Jumpers, as req'd
ek	4	Locknuts
s	2	Clevis, secondary, swinging, insulated
u	2	Deadend for neutral, heavy duty preformed.

DESIGN PARAMETERS: PERMITTED LONGITUDINAL LOADING: 5,000 lbs.

3 / E1.4 N6.1a NEUTRAL ASSEMBLY - DOUBLE DEADEND
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISIONS TO SCHOOL SERVICE	12/22/23	BCG
1	INCREASED SCHOOL SERVICE DROP TO #2/0	7/15/22	BCG

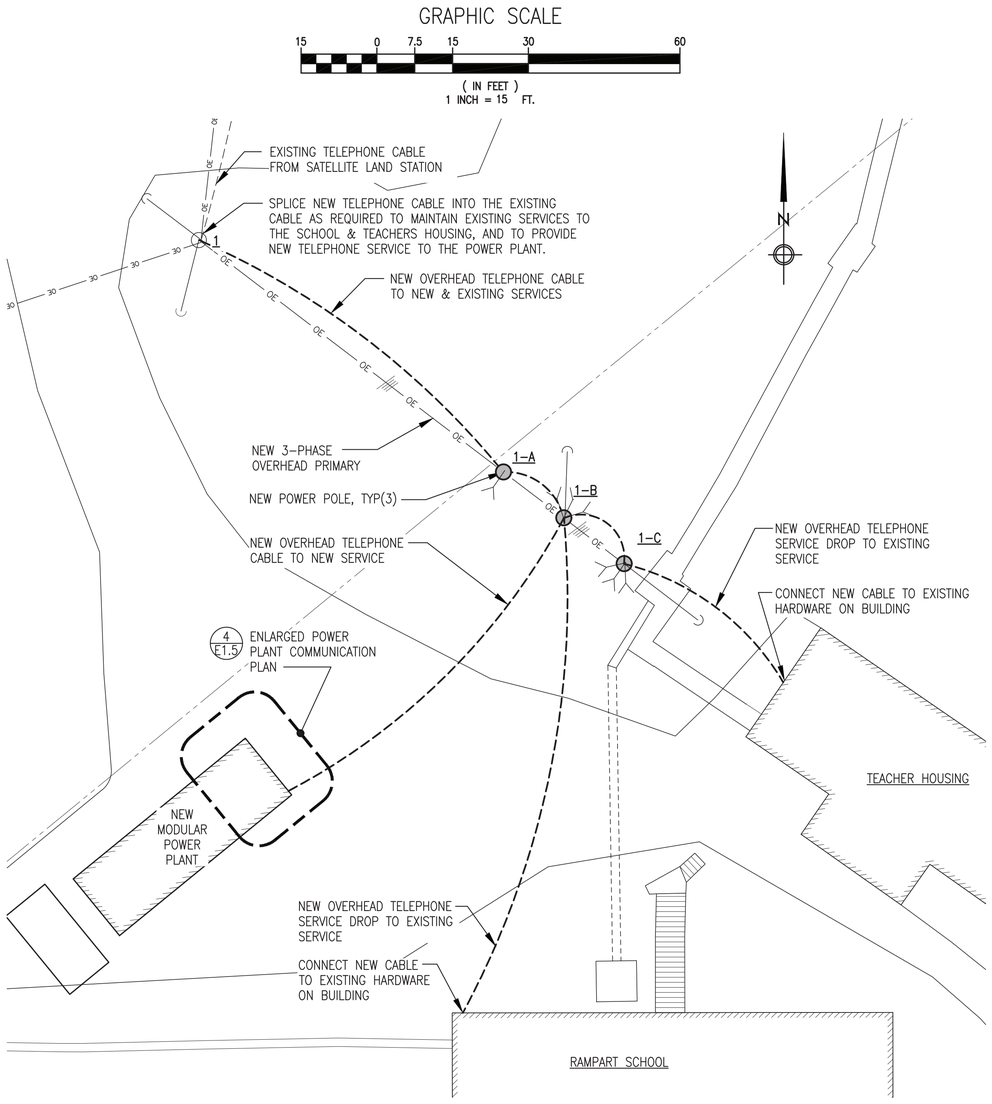
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

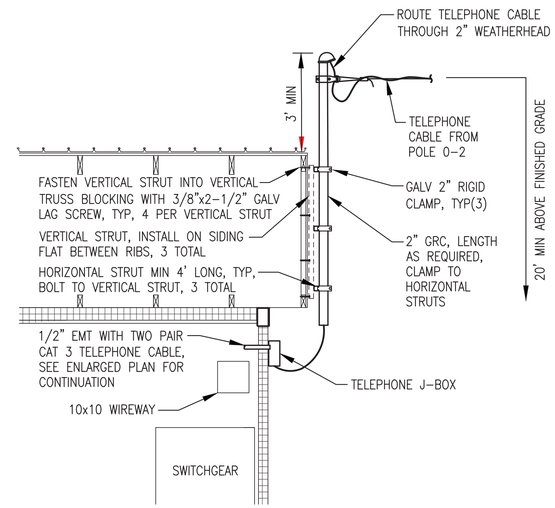
TITLE: OVERHEAD DISTRIBUTION STAKING SHEET, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

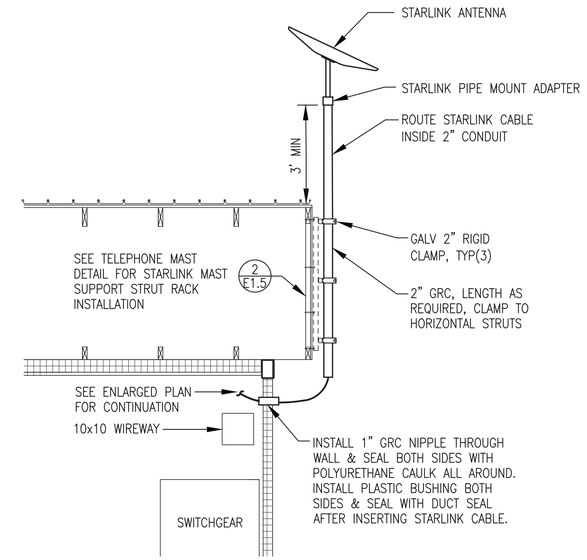
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 6/13/22
FILE NAME: RAM PP E1 | SHEET: E1.4
PROJECT NUMBER:



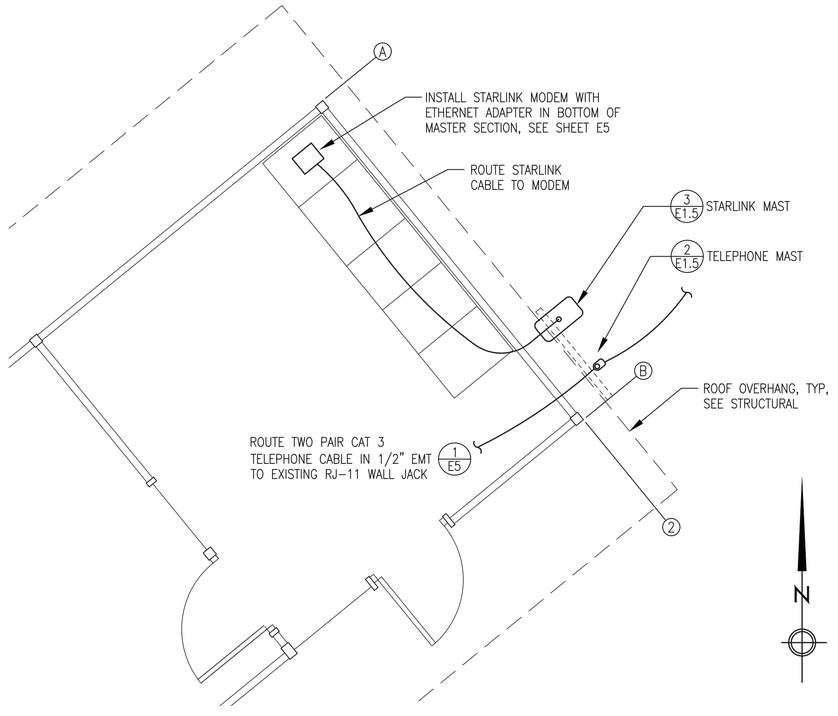
1 E1.5 TELEPHONE SERVICE PLAN
1"=15'



2 E1.5 TELEPHONE MAST
NO SCALE



3 E1.5 STARLINK MAST
NO SCALE



4 E1.5 ENLARGED POWER PLANT COMMUNICATION PLAN
1/4"-1'-0"

TELEPHONE SERVICE GENERAL NOTES:

1) FURNISH AND INSTALL COMPLETE SYSTEM WITH TELEPHONE, CABLES, AND ACCESSORIES REQUIRED TO PROVIDE A DEDICATED TELEPHONE SERVICE DROP TO THE POWER PLANT AS SHOWN HERE AND ON SHEET E5.
2) ALL INSTALLATION SHALL CONFORM TO RUS BULLETIN 1753F-152, SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION OF AERIAL PLANT.
3) THESE PLANS WERE SUBMITTED TO LOCAL TELEPHONE SERVICE PROVIDER UNITED UTILITIES, INC. (UUI) JUNE 2022 FOR PLANNING AND SCHEDULING PURPOSES. COORDINATE NEW TELEPHONE SERVICE INSTALLATION WORK WITH UUI PRIOR TO CONSTRUCTION.

INTERNET SERVICE GENERAL NOTES:

1) THE INTERNET SERVICE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE CHARACTERISTICS:
   20 MBPS DOWNLOAD
   5 MBPS UPLOAD
   NO MONTHLY DATA LIMIT
   STARLINK STANDARD OR APPROVED EQUAL.
2) FURNISH AND INSTALL COMPLETE SYSTEM WITH ANTENNA, MAST, PIPE MOUNT ADAPTER, MODEM, CABLE, CONNECTORS, ETHERNET ADAPTER, AND ACCESSORIES.
3) UPON COMPLETION OF INSTALLATION THE INTERNET SYSTEM SHALL BE COMMISSIONED IN ACCORDANCE WITH THE SERVICE PROVIDER'S REQUIREMENTS.
4) IN ADDITION TO FURNISHING AND INSTALLING SYSTEM, THE CONTRACTOR SHALL PRE-PAY FOR A 1 YEAR INTERNET SERVICE CONTRACT.

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REVISION #1
ISSUED
DECEMBER
2023

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

REV.	DESCRIPTION	DATE	BY
1	REVISIONS TO POWER PLANT COMMUNICATIONS	12/22/23	BCG

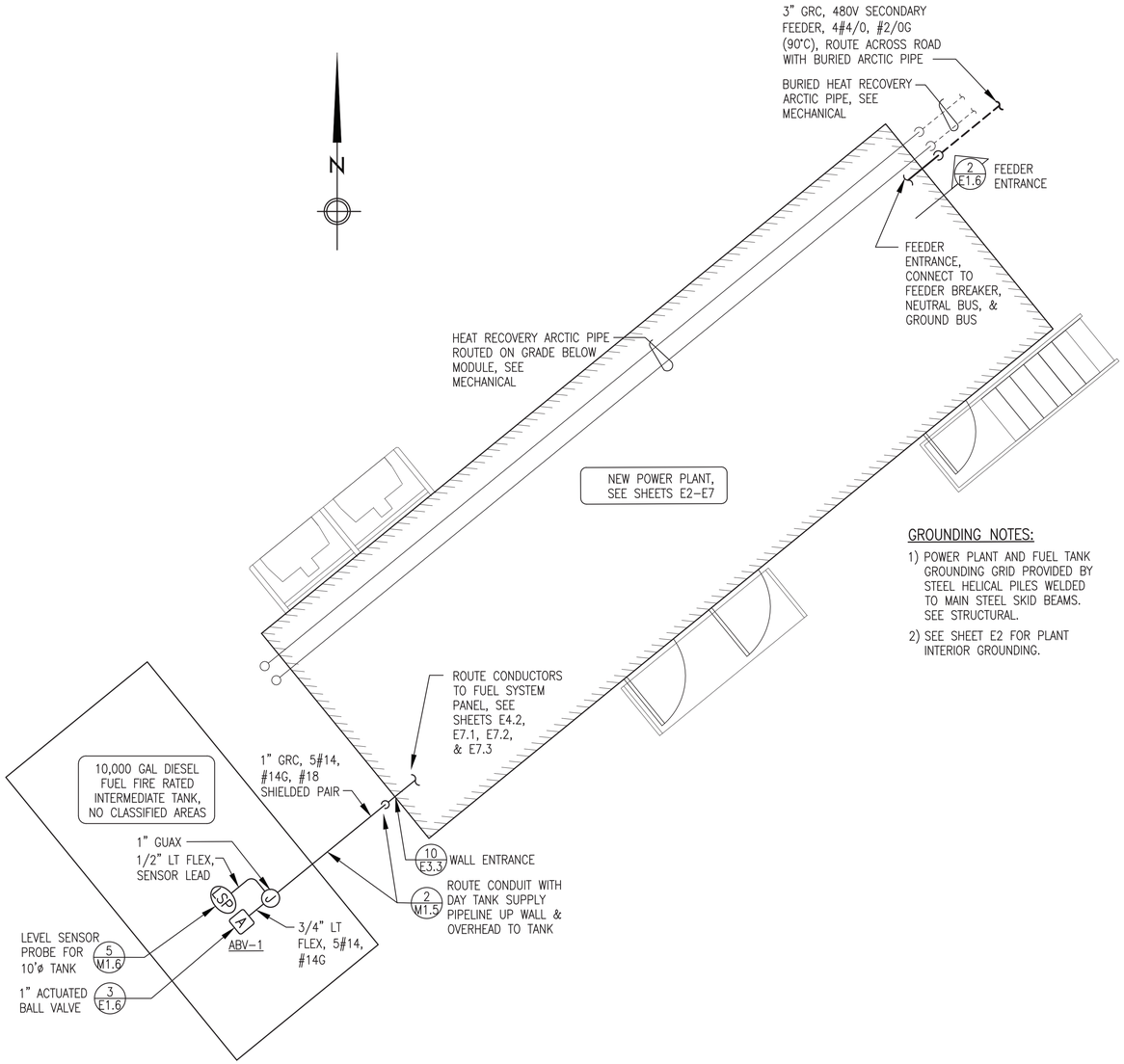
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: COMMUNICATION PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

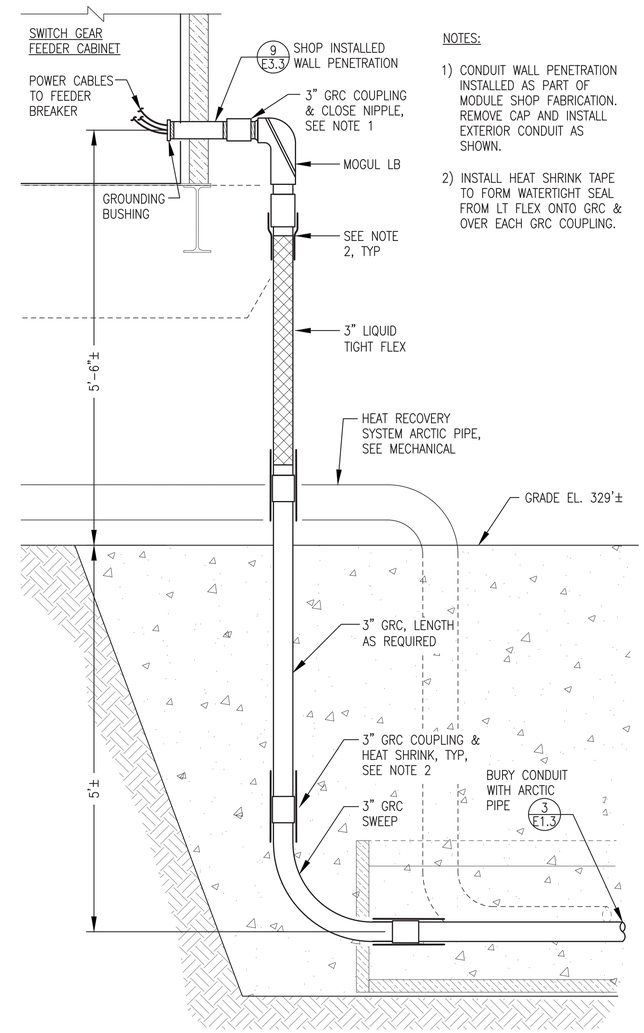
DRAWN BY: JTD	SCALE: NO SCALE
DESIGNED BY: CWV/BCG	DATE: 6/13/22
FILE NAME: RAM PP E1	SHEET: E1.5
PROJECT NUMBER:	



GROUNDING NOTES:

1) POWER PLANT AND FUEL TANK GROUNDING GRID PROVIDED BY STEEL HELICAL PILES WELDED TO MAIN STEEL SKID BEAMS. SEE STRUCTURAL.
2) SEE SHEET E2 FOR PLANT INTERIOR GROUNDING.

1 E1.6 POWER PLANT AREA ENLARGED SITE PLAN
1/4"=1'



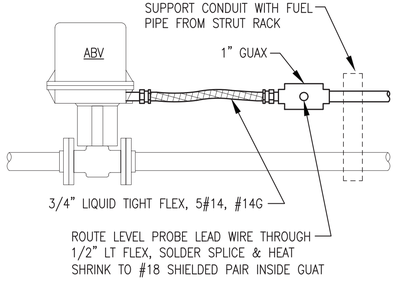
NOTES:

1) CONDUIT WALL PENETRATION INSTALLED AS PART OF MODULE SHOP FABRICATION. REMOVE CAP AND INSTALL EXTERIOR CONDUIT AS SHOWN.
2) INSTALL HEAT SHRINK TAPE TO FORM WATERTIGHT SEAL FROM LT FLEX ONTO GRC & OVER EACH GRC COUPLING.

2 E1.6 POWER PLANT FEEDER ENTRANCE
NO SCALE

NOTES:

1) ACTUATED BALL VALVE CONTROLLED FROM FUEL SYSTEM CONTROL PANEL IN POWER PLANT, SEE LOGIC DIAGRAM SHEET E7.1 FOR CONDUCTOR TERMINATIONS.
2) SEE MECHANICAL FOR ACTUATED BALL VALVE SPECIFICATIONS & INSTALLATION.



3 E1.6 ACTUATOR VALVE CONNECTION
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: POWER PLANT AREA ENLARGED SITE PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

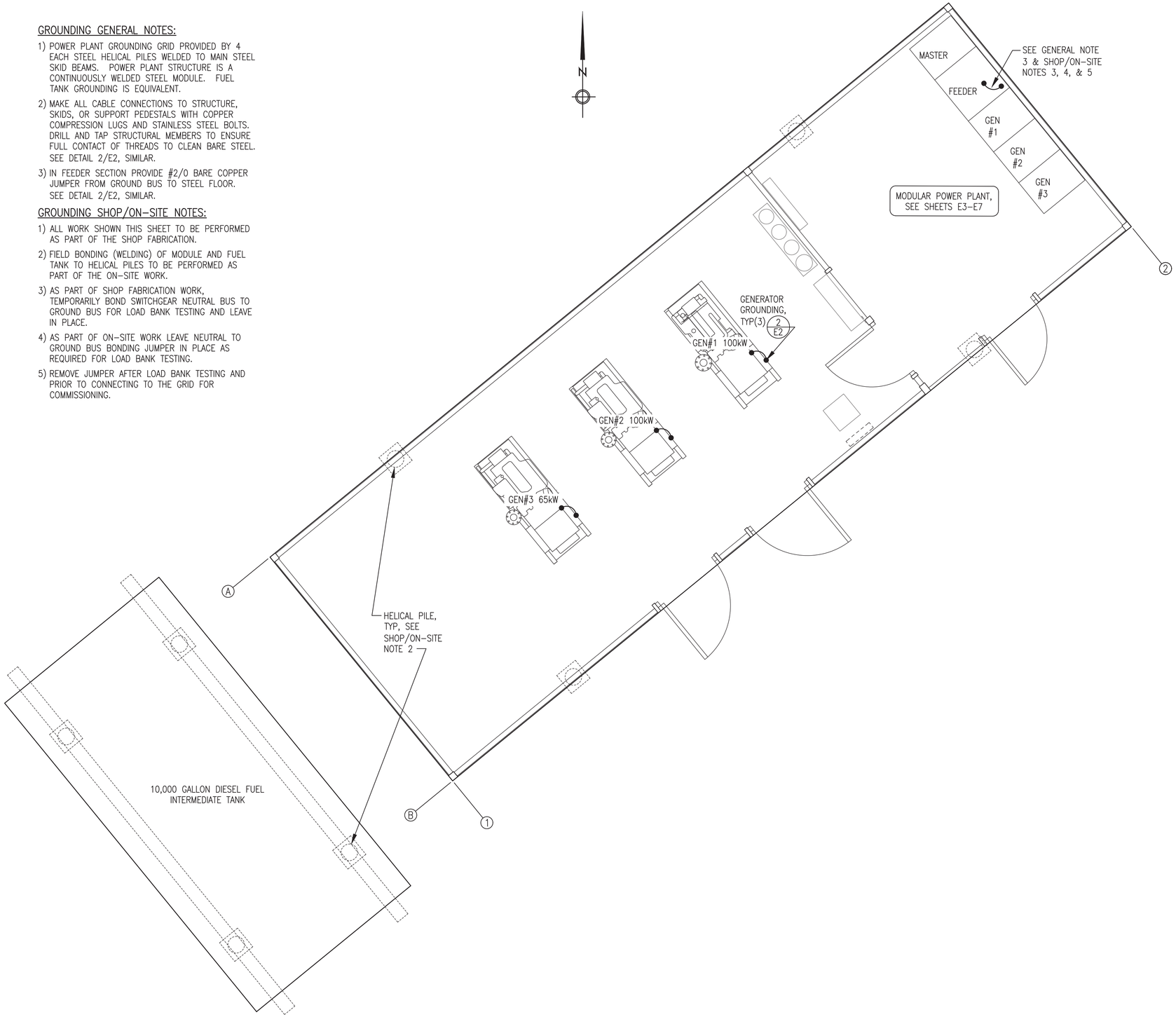
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 7/15/22
FILE NAME: RAM PP E1 | SHEET: E1.6
PROJECT NUMBER:

GROUNDING GENERAL NOTES:

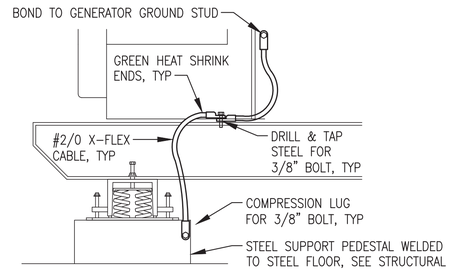
1) POWER PLANT GROUNDING GRID PROVIDED BY 4 EACH STEEL HELICAL PILES WELDED TO MAIN STEEL SKID BEAMS. POWER PLANT STRUCTURE IS A CONTINUOUSLY WELDED STEEL MODULE. FUEL TANK GROUNDING IS EQUIVALENT.
2) MAKE ALL CABLE CONNECTIONS TO STRUCTURE, SKIDS, OR SUPPORT PEDESTALS WITH COPPER COMPRESSION LUGS AND STAINLESS STEEL BOLTS. DRILL AND TAP STRUCTURAL MEMBERS TO ENSURE FULL CONTACT OF THREADS TO CLEAN BARE STEEL. SEE DETAIL 2/E2, SIMILAR.
3) IN FEEDER SECTION PROVIDE #2/0 BARE COPPER JUMPER FROM GROUND BUS TO STEEL FLOOR. SEE DETAIL 2/E2, SIMILAR.

GROUNDING SHOP/ON-SITE NOTES:

1) ALL WORK SHOWN THIS SHEET TO BE PERFORMED AS PART OF THE SHOP FABRICATION.
2) FIELD BONDING (WELDING) OF MODULE AND FUEL TANK TO HELICAL PILES TO BE PERFORMED AS PART OF THE ON-SITE WORK.
3) AS PART OF SHOP FABRICATION WORK, TEMPORARILY BOND SWITCHGEAR NEUTRAL BUS TO GROUND BUS FOR LOAD BANK TESTING AND LEAVE IN PLACE.
4) AS PART OF ON-SITE WORK LEAVE NEUTRAL TO GROUND BUS BONDING JUMPER IN PLACE AS REQUIRED FOR LOAD BANK TESTING.
5) REMOVE JUMPER AFTER LOAD BANK TESTING AND PRIOR TO CONNECTING TO THE GRID FOR COMMISSIONING.



1 E2 POWER PLANT GROUNDING PLAN
3/8"=1'-0"



2 E2 GENERATOR GROUNDING
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REVISION #1 ISSUED FOR MODULE CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH ON SITE DESIGN	7/15/22	BCG

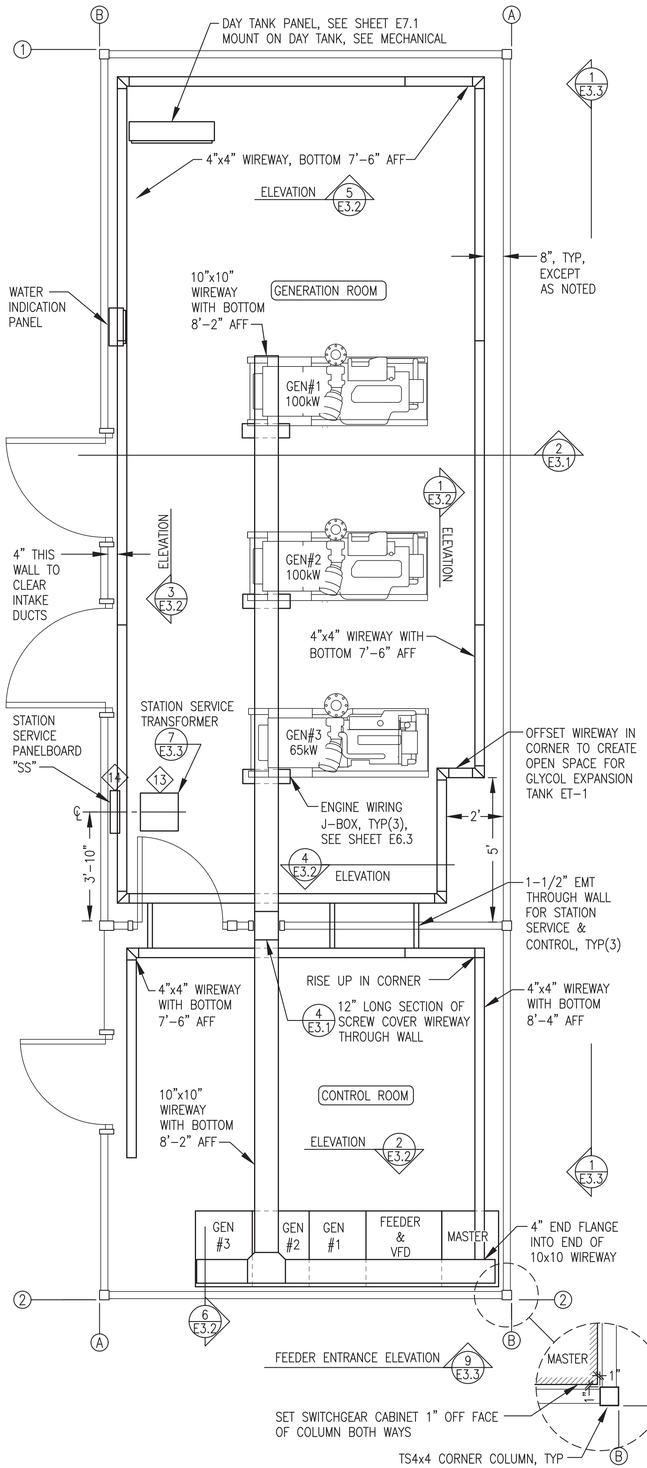
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

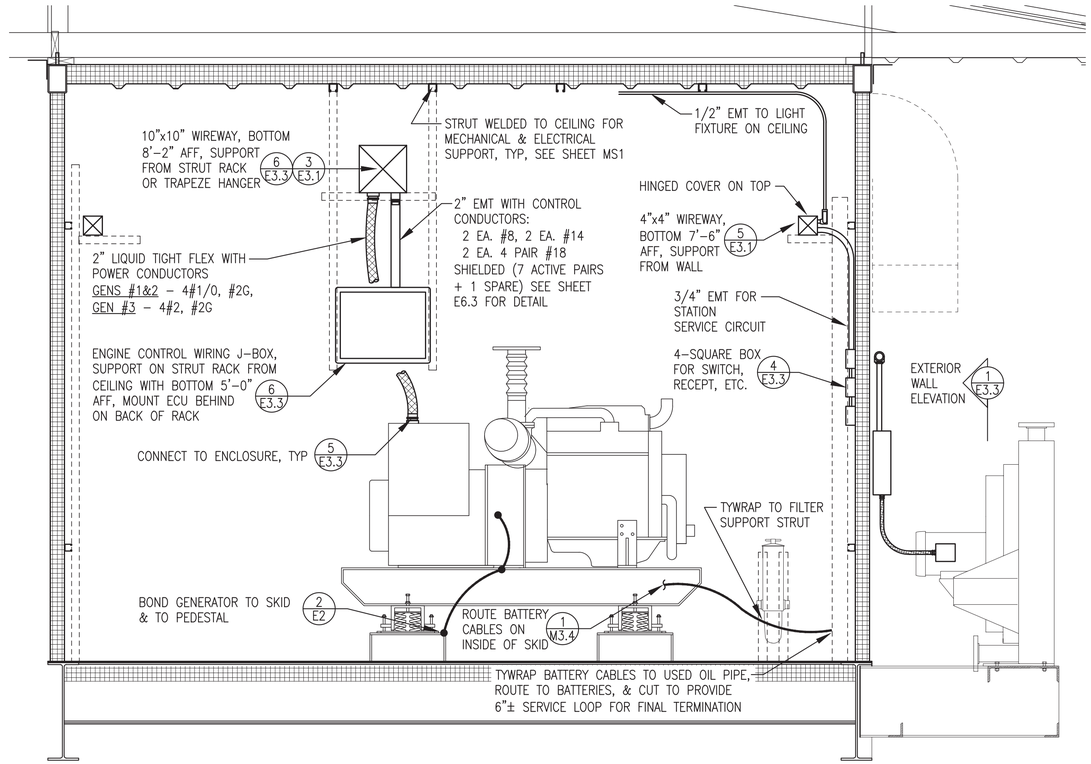
TITLE: GROUNDING PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

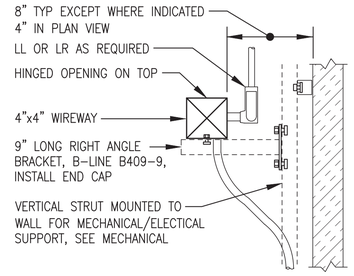
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E2-E5	SHEET: E2
PROJECT NUMBER:	



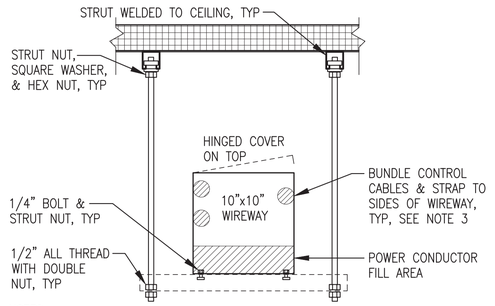
1 E3.1 EQUIPMENT LAYOUT & WIREWAY PLAN
3/8"=1'-0"



2 E3.1 TYPICAL MODULE SECTION
3/4"=1'-0"

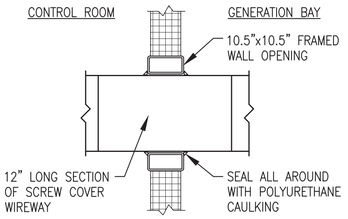


5 E3.1 4" WIREWAY SUPPORT FROM WALL
NO SCALE



NOTES:
1) INSTALL HANGER AT EACH JOINT & AT END.
2) HANGER NOT REQUIRED AT ENGINE J-BOX SUPPORT, SEE DETAIL 4/E4.3.
3) STRAP CABLES AT 5' O.C. MIN USING 3M 06292 OR EQUAL STICKY BACK BASES. FASTEN BASES TO WIREWAY SIDE WITH MACHINE BOLTS.

3 E3.1 10" WIREWAY TRAPEZE HANGER
NO SCALE



4 E3.1 WIREWAY WALL PENETRATION
NO SCALE

ENGINE-GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #2	ENGINE – 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.
GEN #3	ENGINE – 99 HP, 65 EKW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR – MINIMUM 90 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274C.

REVISION #1
ISSUED FOR
MODULE
CONSTRUCTION
JULY 2022

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

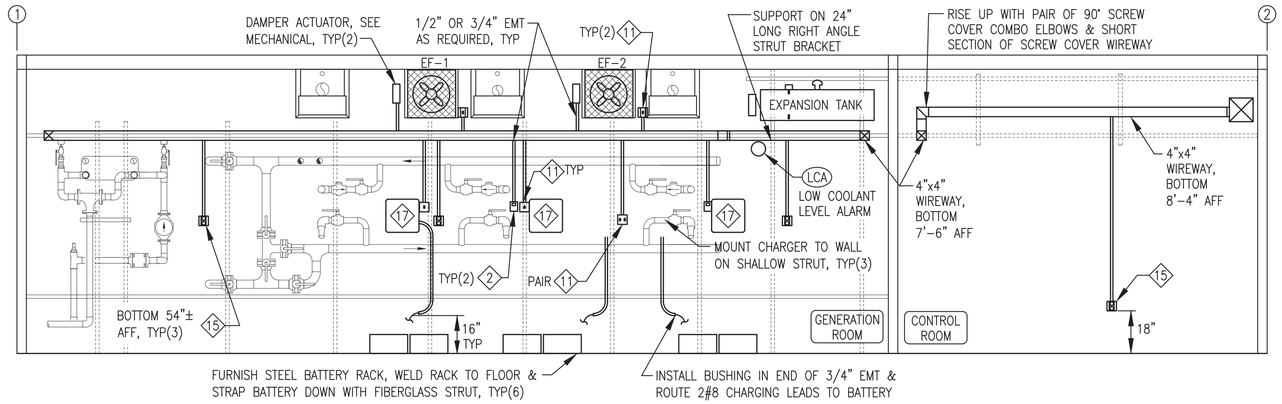
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

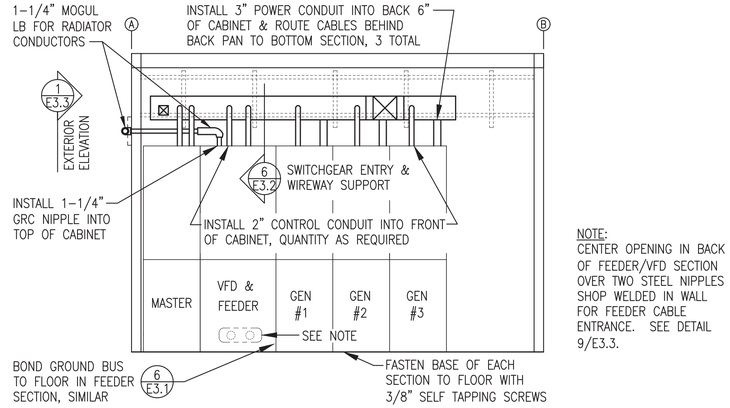
TITLE: WIREWAY PLAN, BUILDING SECTION, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: RAM PP E2-E5
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 3/15/22
SHEET: E3.1

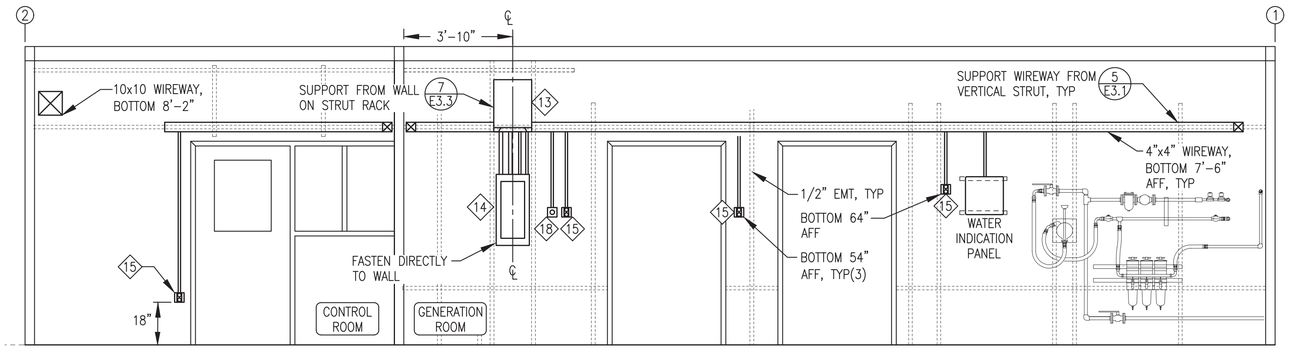


1 E3.2 WALL ELEVATION AT GRID A
3/8"=1'-0"

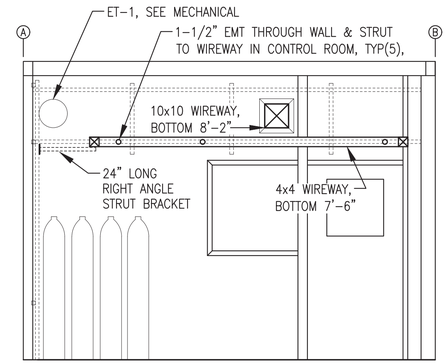


NOTE:
CENTER OPENING IN BACK OF FEEDER/VFD SECTION OVER TWO STEEL NIPPLES SHOP WELDED IN WALL FOR FEEDER CABLE ENTRANCE. SEE DETAIL 9/E3.3.

2 E3.2 WALL ELEVATION AT GRID 2
3/8"=1'-0"

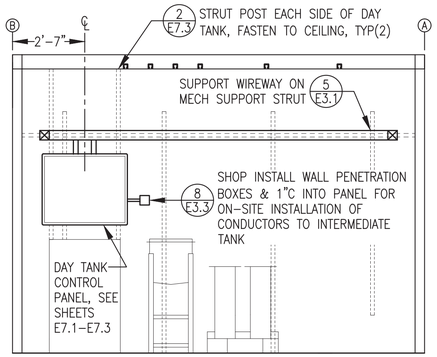


3 E3.2 WALL ELEVATION AT GRID B
3/8"=1'-0"

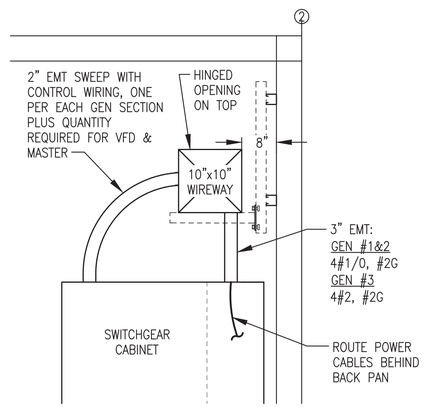


4 E3.2 INTERIOR WALL ELEVATION
3/8"=1'-0"

GENERAL NOTE:
WALL ELEVATIONS SHOWN PRIMARILY FOR GENERAL LAYOUT OF MAJOR RACEWAY, EQUIPMENT, AND DEVICES REQUIRING REGULAR ACCESS FOR NORMAL PLANT OPERATIONS. ALL EQUIPMENT, DEVICES & INSTRUMENTATION CIRCUITS NOT SHOWN FOR CLARITY. SEE PLANS & DETAILS FOR COMPLETE ELECTRICAL INSTALLATIONS.



5 E3.2 WALL ELEVATION AT GRID 1
3/8"=1'-0"



6 E3.2 SWITCHGEAR ENTRY & WIREWAY SUPPORT
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1 ISSUED FOR MODULE CONSTRUCTION JULY 2022

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

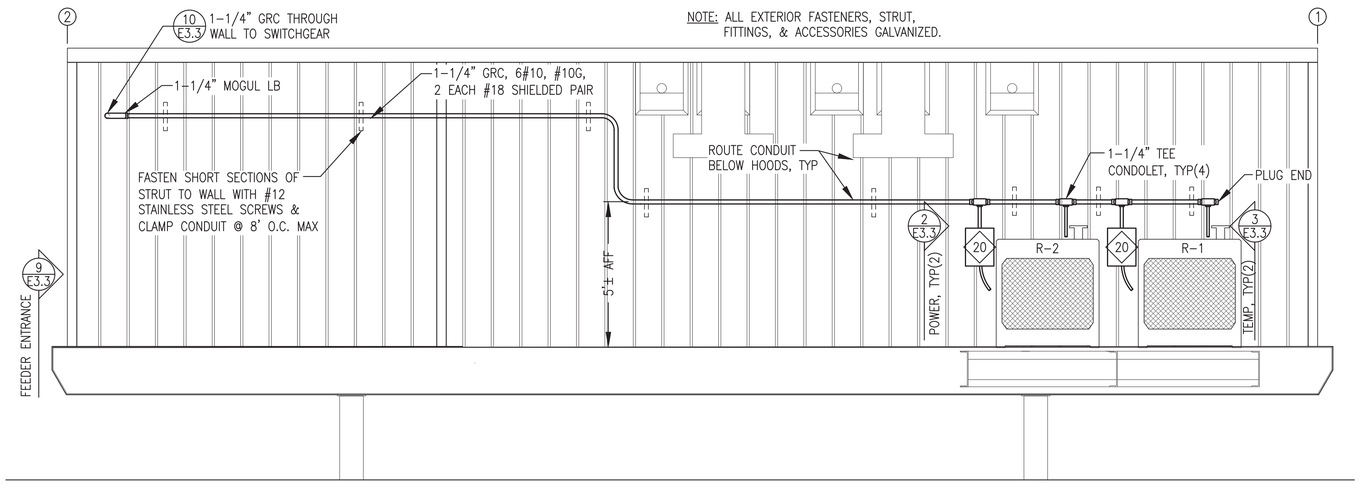
PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: ELEVATIONS & DETAILS

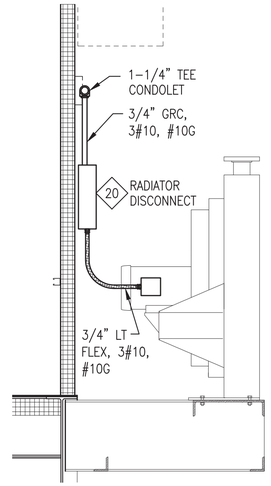
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 3/15/22
FILE NAME: RAM PP E2-E5 | SHEET: E3.2
PROJECT NUMBER:

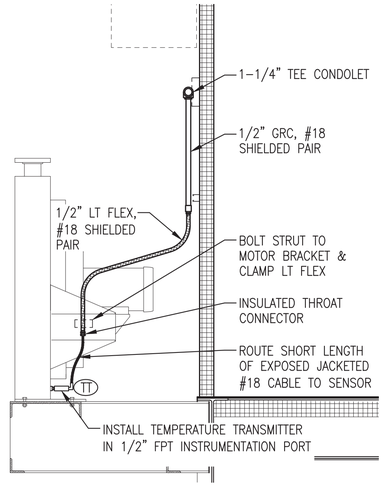
STATE OF ALASKA 49TH — CLOIS W. VERSYP EE 7802 — REGISTERED PROFESSIONAL ENGINEER



1 E3.3 BACK WALL EXTERIOR ELEVATION
3/8"=1'-0"

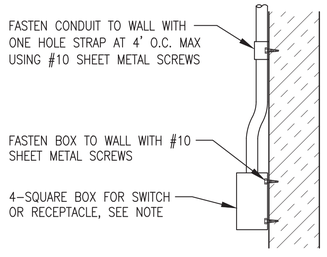


2 E3.3 RADIATOR POWER CONNECTION
3/4"=1'-0"



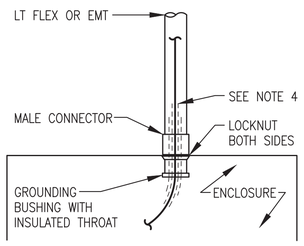
3 E3.3 RADIATOR TEMPERATURE TRANSMITTER
3/4"=1'-0"

RADIATOR SHOP/ON-SITE NOTES:
1) DURING SHOP FABRICATION INSTALL ALL DEVICES AND RACEWAYS AS INDICATED.
2) AS PART OF ON-SITE WORK, IF RADIATORS ARE REMOVED FOR SHIPPING DISCONNECT LIQUID TIGHT FLEXES AND SEAL ENDS. COIL AND SECURE CONDUCTORS AND FLEXES FOR SHIPPING.
3) AS PART OF ON-SITE WORK REINSTALL AS INDICATED.



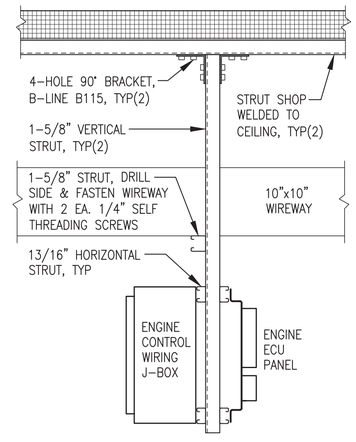
NOTE: INSTALL THERMOSTATS & TIMER SWITCHES IN DEEP SINGLE GANG BELL BOX INSTEAD OF 4-SQUARE BOX.

4 E3.3 TYPICAL INTERIOR DEVICE MOUNTING
NO SCALE

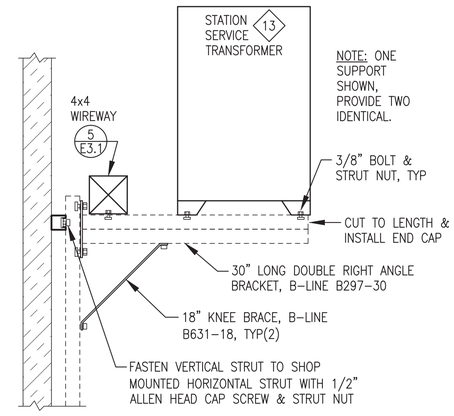


NOTES:
1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT GROUNDING CONDUCTOR.
3) INSTALL PLASTIC BUSHING WHERE GROUNDING BUSHING IS NOT REQUIRED.
4) ON GENERATOR ENCLOSURES PROTECT CABLES FROM WEAR BY INSTALLING 2 LAYERS OF HEAVY WALL HEAT SHRINK. BASE LAYER 12" LONG & SECOND LAYER 8" LONG, CENTERED IN CONNECTOR.

5 E3.3 TYP ENCLOSURE CONNECTION
NO SCALE



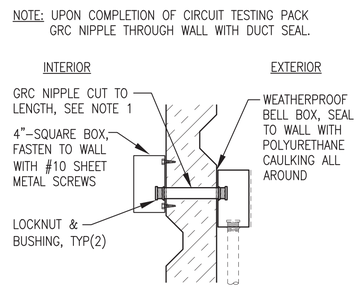
6 E3.3 ENGINE WIRING J-BOX SUPPORT
NO SCALE



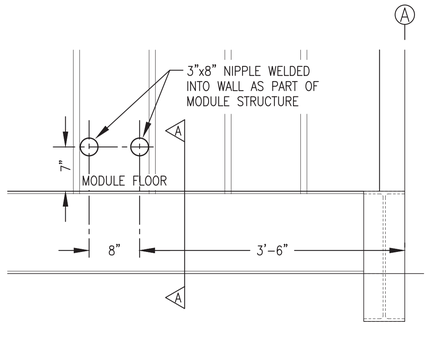
NOTE: ONE SUPPORT SHOWN, PROVIDE TWO IDENTICAL.

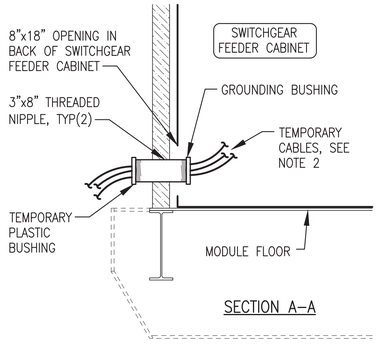
7 E3.3 STATION SERVICE TRANSFORMER SUPPORT
NO SCALE

NOTE: UPON COMPLETION OF CIRCUIT TESTING PACK GRC NIPPLE THROUGH WALL WITH DUCT SEAL.



8 E3.3 TYP EXTERIOR WALL-MOUNT DEVICE
NO SCALE

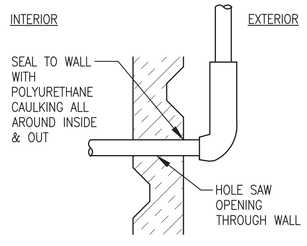




FEEDER SHOP/ON-SITE NOTES:
1) DURING SHOP FABRICATION INSTALL TEMPORARY FEEDER CABLES THROUGH ONE NIPPLE AS SHOWN. SPARE NIPPLE TO REMAIN CAPPED.
2) ROUTE TEMPORARY CABLES TO LOAD BANK FOR TESTING. AFTER TESTING INSTALL THREADED CAP ON EXTERIOR END OF NIPPLE.
3) INSTALL FEEDER TO TRANSFORMER AS PART OF ON-SITE WORK, SEE SHEET E1.6 FOR CONTINUATION.
4) UPON COMPLETION OF TESTING PACK GRC NIPPLES THROUGH WALL WITH DUCT SEAL.

9 E3.3 FEEDER ENTRANCE DETAIL
1"=1'-0"

NOTE: UPON COMPLETION OF CIRCUIT TESTING PACK GRC NIPPLE THROUGH WALL WITH DUCT SEAL.



10 E3.3 TYP CONDUIT WALL PENETRATION
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REVISION #1 ISSUED FOR MODULE CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

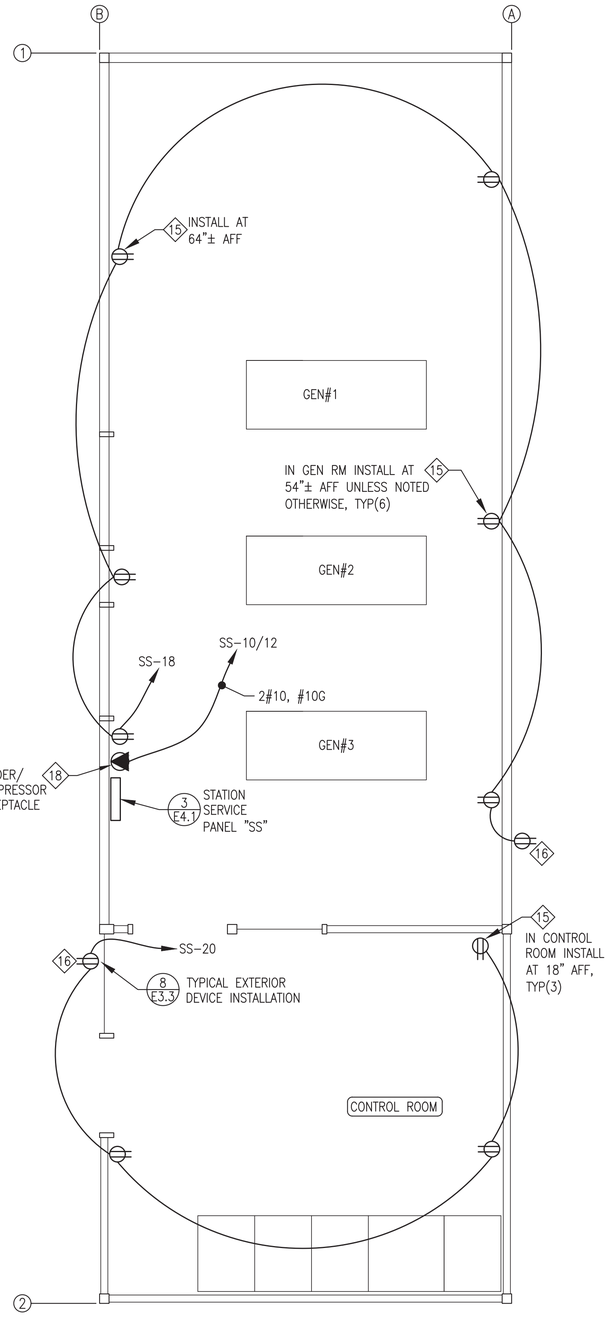
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: ELEVATIONS & DETAILS

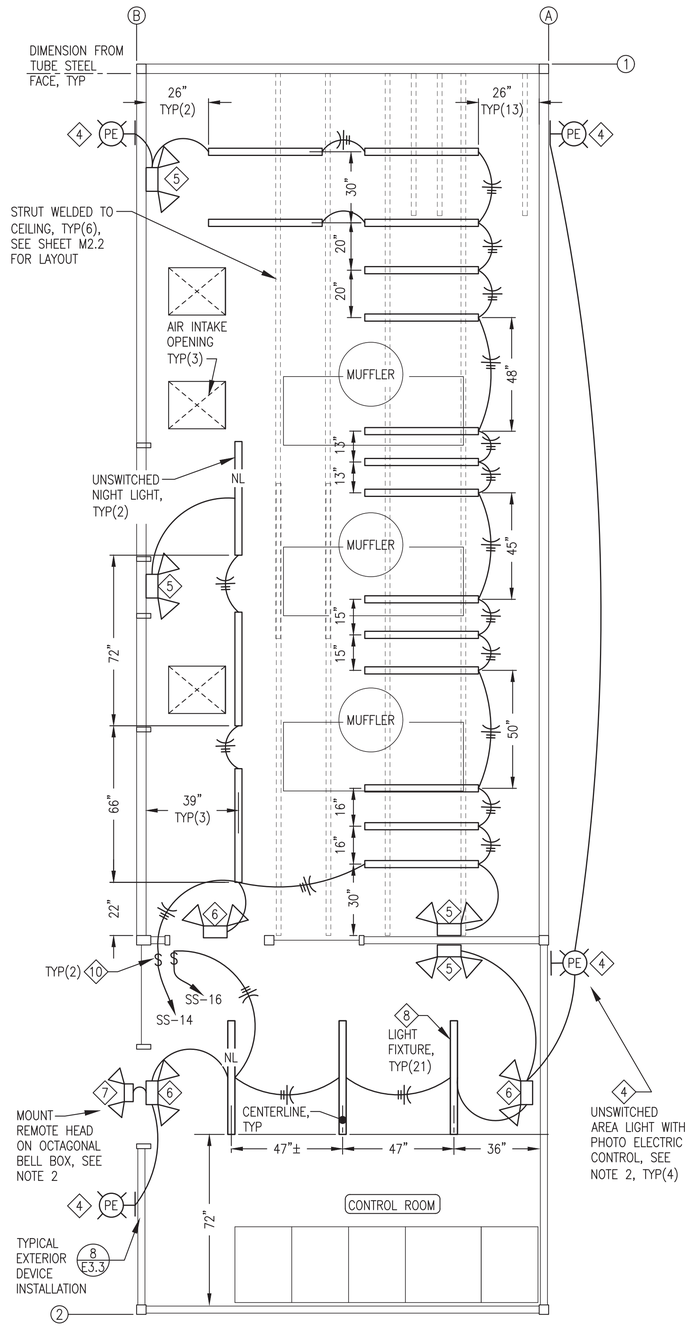
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E2-E5	SHEET: E3.3
PROJECT NUMBER:	



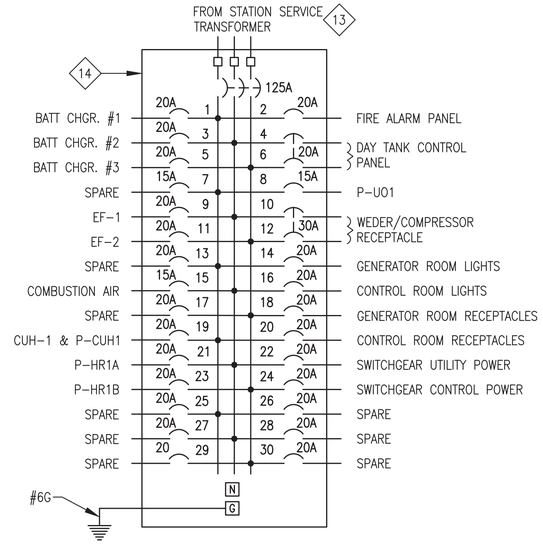
NOTES:
1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

1 E4.1 RECEPTACLE PLAN
3/8"=1'-0"



NOTES:
1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
2) MOUNT EXTERIOR AREA AND EMERGENCY LIGHTS WITH TOP 9'-0" AFF.
3) FASTEN INTERIOR LIGHTS TO CEILING WITH #12 SHEET METAL SCREWS EXCEPT WHERE LIGHTS CROSS STRUT USE 1/4" BOLTS & STRUT NUTS, TYP

2 E4.1 LIGHTING PLAN
3/8"=1'-0"



3 E4.1 STATION SERVICE PANEL "SS"
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1 ISSUED FOR MODULE CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

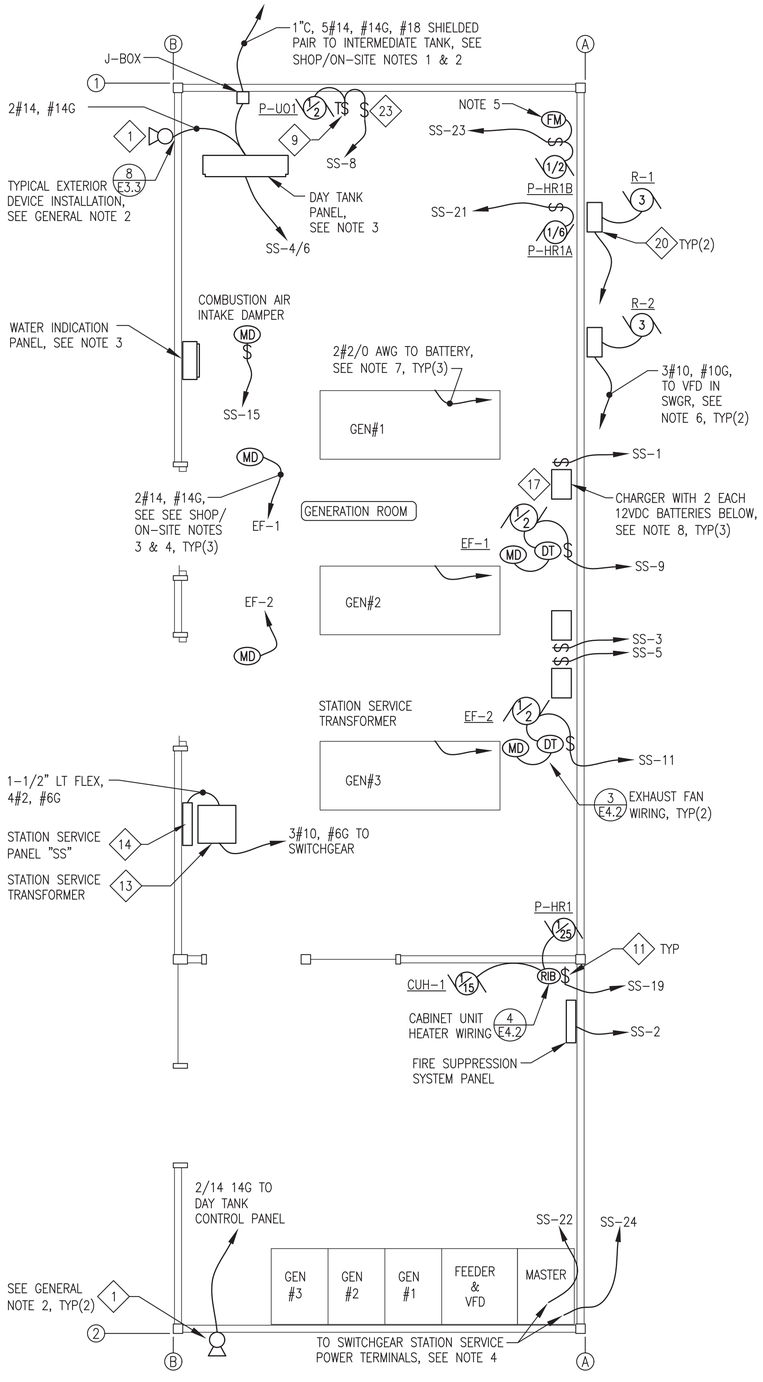
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: RECEPTACLE & LIGHTING PLANS & PANELBOARD

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 3/15/22
FILE NAME: RAM PP E2-E5 | SHEET: E4.1
PROJECT NUMBER:



1 E4.2 STATION SERVICE PLAN

3/8"=1'-0"

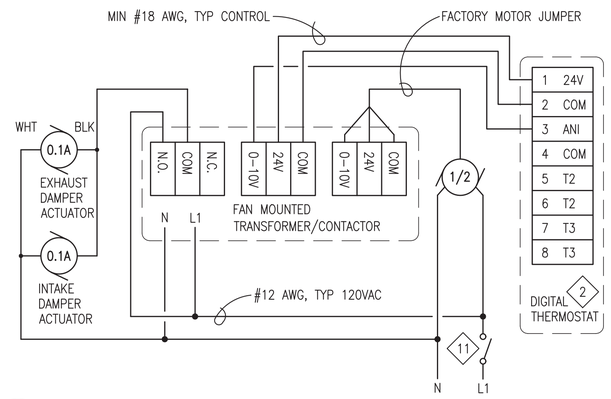
STATION SERVICE GENERAL NOTES:

1) ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.
2) MOUNT ALARMS HORNS WITH TOP AT 9'-0" AFF TO MATCH EXTERIOR LIGHTS, SEE SHEET E4.1
3) SEE SHEETS E7.1-E7.4 FOR DAY TANK AND WATER INDICATION PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
4) SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL POWER AND CONTROL WIRING.
5) INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. PROVIDE POWER FROM P-HR1B DISCONNECT.
6) ROUTE RADIATOR VFD POWER CONDUCTORS IN SEPARATE EXTERIOR CONDUIT, SEE ELEVATION 1/E3.3. DO NOT ROUTE IN WIREWAY. NOTE THAT CONDUCTORS ARE OVERSIZED FOR 80% DE-RATE AND PROVIDED WITH 15A BREAKER IN SWITCHGEAR.
7) ROUTE BATTERY CABLES TO FRONT OF SKID SUPPORTED WITH CUSHIONED CLAMPS, SEE SHEET M3.4. ROUTE FROM SKID DIRECTLY UNDER FUEL HOSES TO WALL AND TYWRAP CABLES TO USED OIL PIPE ALONG WALL, SEE DETAIL 2/E3.1. CUT TO PROVIDE 6"± SERVICE LOOP FOR FINAL TERMINATION ON BATTERIES.
8) MOUNT BATTERY CHARGER TO WALL ON SHALLOW STRUT AND INSTALL BATTERIES IN RACK ON FLOOR BELOW, SEE ELEVATION 1/E3.2.

STATION SERVICE SHOP/ON-SITE NOTES:

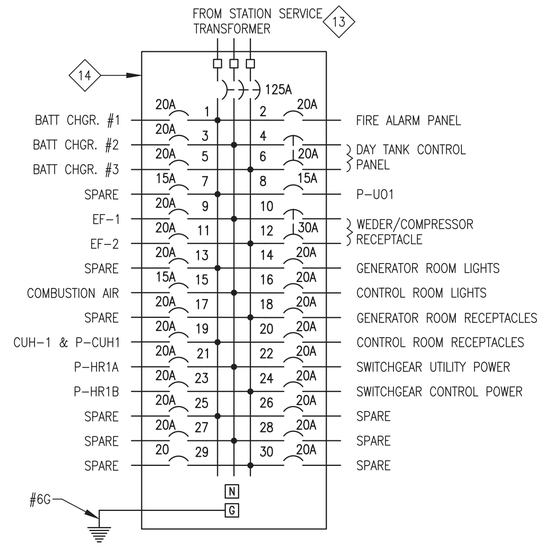
1) DURING SHOP FABRICATION INSTALL WALL PENETRATION AND CONDUIT INTO DAY TANK PANEL. SEE ELEVATION 5/E3.2.
2) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO INTERMEDIATE TANK, SEE SHEET E1.6.
3) DURING SHOP FABRICATION INSTALL CEILING MOUNTED BOX ADJACENT TO DAMPER ACTUATOR AND TEMPORARILY CONNECT DAMPER TO VERIFY OPERATION.
4) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO DAMPER ACTUATOR. SEE SHEET M7.

MAKE THE FOLLOWING SETTINGS ON DIGITAL THERMOSTAT:
APPLICATION = 0 (INTERNAL SENSOR)
OUTPUT 1 = 0 (COOL/0-10V)
OUTPUT 2 = 0 (NOT USED)
OUTPUT 3 = 0 (NOT USED)
OUTPUT 3 ACTIVATION = 0 (100%)
NSB VALUE = 3 (6°F)
OUTPUT 1 MIN = 0 (0%)
MAX SETPOINT = 90°F
MIN SETPOINT = 50°F



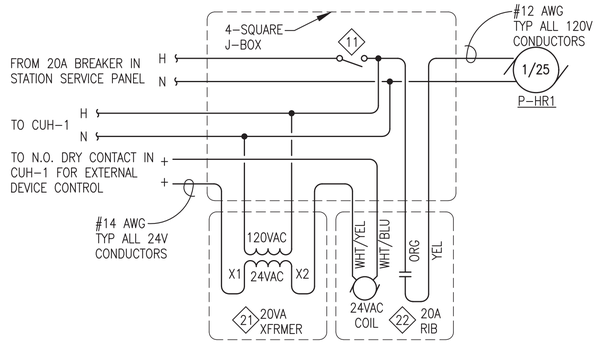
3 E4.2 EXHAUST FAN WIRING DIAGRAM

NO SCALE



2 E4.2 STATION SERVICE PANEL "SS"

NO SCALE



4 E4.2 CUH-1 WIRING DIAGRAM

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES

REVISION #1 ISSUED FOR MODULE CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER CLOIS W. VERSYP EE 7802

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

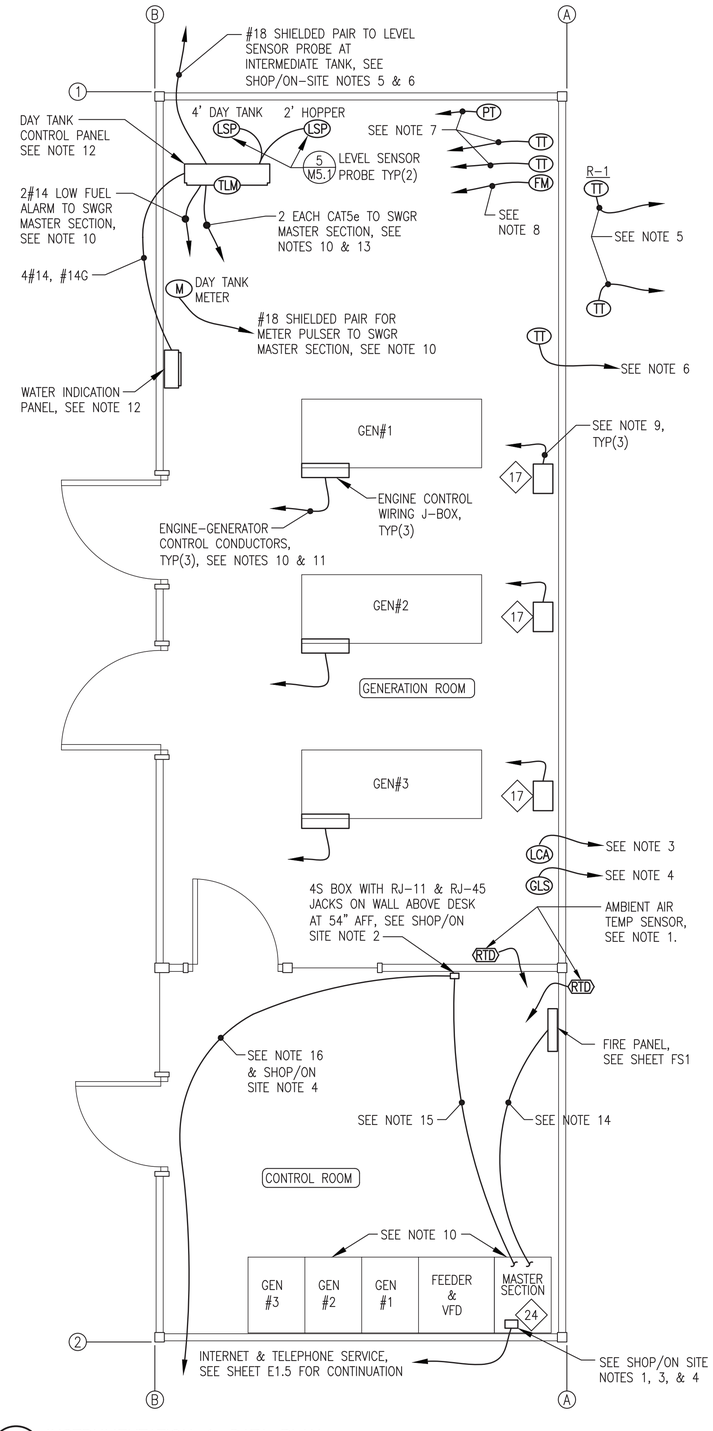
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: STATION SERVICE PLAN, DETAILS, & PANELBOARD

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E2-E5	SHEET: E4.2
PROJECT NUMBER:	



1 E5 INSTRUMENTATION & DATA PLAN

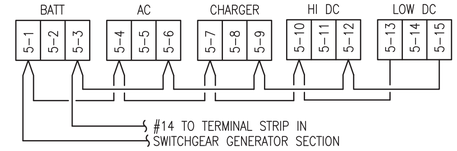
3/8"=1'-0"

INSTRUMENTATION & DATA PLAN NOTES:

1. RTD TEMPERATURE SENSOR PROVIDED WITH SWITCHGEAR. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE DETAIL 3/E5 AND NOTE 10.
2. INSTALL DSL MODEM AND INTERNET ROUTER ON TOP OF MASTER SECTION IN RACK OR CABINET. CONNECT MODEM TO ROUTER AND TO TELEPHONE LINE. CONNECT ROUTER TO ETHERNET SWITCH INSIDE MASTER SECTION. CONNECT BOTH TO 120VAC UPS. SEE NOTE 10 AND SHOP/ON SITE NOTES 1 AND 2.
3. LOW COOLANT LEVEL ALARM SWITCH INSTALLED AT EXPANSION TANK, SEE MECHANICAL. CONNECT TO N.C. SWITCH (WHITE & RED) AND ROUTE 2#14 TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
4. GLYCOL LEVEL SENSOR PROBE INSTALLED IN EXPANSION TANK, SEE MECHANICAL. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR. SEE NOTE 10.
5. INSTALL TEMP TRANSMITTER IN EACH RADIATOR, SEE DETAIL 3/E3.3. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR VFD SECTION. SEE ELEVATION 1/E3.3 AND NOTE 10.
6. INSTALL COOLANT RETURN TEMP TRANSMITTER IN PIPING MAIN WHERE SHOWN ON COOLING PIPING ISOMETRIC 1/M4.2. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION, SEE NOTE 10.
7. INSTALL TWO TEMP TRANSMITTERS AND ONE PRESSURE TRANSMITTER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. ROUTE #18 SHIELDED PAIR FROM EACH TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
8. INSTALL FLOW METER FOR HEAT RECOVERY MONITORING WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC 2/M4.2. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
9. ROUTE 2#14 FROM BATTERY CHARGER ALARM CONTACTS TO ASSOCIATED SWITCHGEAR GENERATOR SECTION, SEE NOTE 10 AND WIRING DIAGRAM 2/E5.
10. SEE SWITCHGEAR SHOP DRAWINGS FOR TERMINATION OF ALL INSTRUMENTATION AND DATA WIRING INCLUDING CONTROL POWER.
11. ROUTE ENGINE-GENERATOR CONTROL CONDUCTORS TO SWITCHGEAR IN 10x10 WIREWAY WITH POWER CONDUCTORS. SEE DETAIL 2/E3.1, SHEET E6.3, AND NOTE 10.
12. SEE SHEETS E7.1-E7.4 FOR DAY TANK AND WATER INDICATION CONTROL PANEL DESIGN AND WIRING TERMINATIONS. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
13. ROUTE CAT5e CONDUCTORS FROM DAY TANK PANEL REMOTE I/O AND TANK LEVEL MONITOR TO ETHERNET SWITCH IN SWITCHGEAR MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
14. ROUTE CAT5e FOR DATA AND 2#14 FOR GENERATOR SHUT DOWN FROM FIRE PANEL TO SWITCHGEAR MASTER SECTION, SEE SHEET FS1 AND NOTE 10. INSTALL IN SEPARATE DEDICATED RACEWAY, COLOR RED. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
15. ROUTE CAT5e FROM RJ-45 JACK TO ETHERNET SWITCH IN MASTER SECTION. INSTALL IN SEPARATE DEDICATED RACEWAY. DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
16. FIELD ROUTE TWO PAIR CAT 3 TELEPHONE CABLE IN 1/2" SURFACE MOUNT EMT FROM CABLE ENTRANCE TO EXISTING RJ-11 JACK.

INSTRUMENTATION SHOP/ON-SITE NOTES:

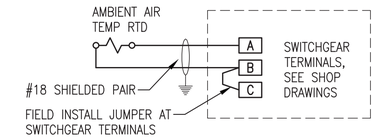
1. AS PART OF SHOP FABRICATION INSTALL ETHERNET SWITCH IN MASTER SECTION.
2. AS PART OF SHOP FABRICATION INSTALL RJ-11 AND RJ-45 JACKS AND ALL DATA/COM CABLES EXCEPT AS SPECIFICALLY NOTED.
3. AS PART OF ON-SITE WORK INSTALL STARLINK MODEM WITH ETHERNET ADAPTER IN BOTTOM OF MASTER SECTION. CONNECT MODEM TO ETHERNET SWITCH AND TO 120VAC UPS INSIDE MASTER SECTION. SEE NOTE 10.
4. AS PART OF ON-SITE WORK INSTALL STARLINK CABLE FROM MODEM TO ANTENNAE AND INSTALL TELEPHONE CABLE FROM RJ-11 JACK TO MAST AS SHOWN ON SHEET E1.5.
5. AS PART OF SHOP FABRICATION INSTALL WALL PENETRATION AND CONDUIT INTO DAY TANK PANEL. SEE ELEVATION 5/E3.2.
6. AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO INTERMEDIATE TANK, SEE SHEET E1.6.



NOTE: PRIOR TO ENERGIZING MAKE THE FOLLOWING SETTINGS ON CHARGER:
1) AC LINE VOLTAGE SWITCH TO "115V".
2) AUTO BOOST JUMPER TO "NORM".
3) FLOAT VOLTAGE JUMPER TO "13.50/27.00" (FOR GEL CELL).
4) BATTERY RANGE JUMPER TO "24V".

2 E5 BATTERY CHARGER ALARM WIRING DIAGRAM

NO SCALE



3 E5 AMBIENT AIR TEMP RTD TERMINATION

NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT AS SPECIFICALLY INDICATED IN THE SHOP/ON SITE NOTES.

REVISION #2 ISSUED DECEMBER 2023

STATE OF ALASKA 49TH — CLOIS W. VERSYP EE 7802 — REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	ADD STARLINK INTERNET & SEPARATE PHONE SERVICE	12/22/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: INSTRUMENTATION & DATA PLAN & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 3/15/22
FILE NAME: RAM PP E2-E5 | SHEET: E5
PROJECT NUMBER:

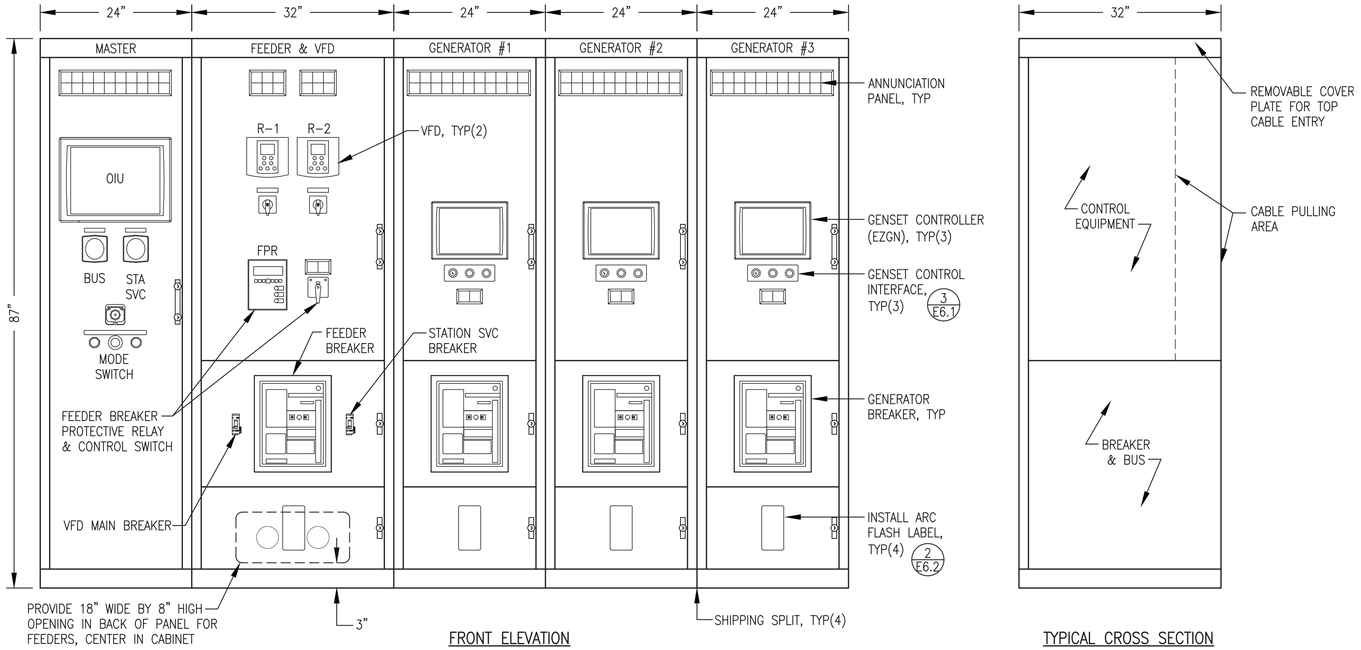
Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#3	65	55	---
Level 2	#1 or #2	100	90	45
Level 3	#3 & #1 or #2	165	145	80
Level 4	All	265	---	125
Note : Gen #1 & #2 are equal capacity. Manually select lead unit.				

Engine-Generator Alarm Settings (Easygen - EZGN)			
Function	Normal Range	Alarm	Shut Down
Overspeed	1795-1805	----	1900 RPM
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-850°F	900°F	-----
Under Frequency	59.5-60.5 Hz	----	58.2 Hz
Over Frequency	59.5-60.5 Hz	----	61.8 Hz
Under Voltage	470-490 V	----	432 V
Over Voltage	470-490 V	----	528 V
Reverse Power	0	----	10%

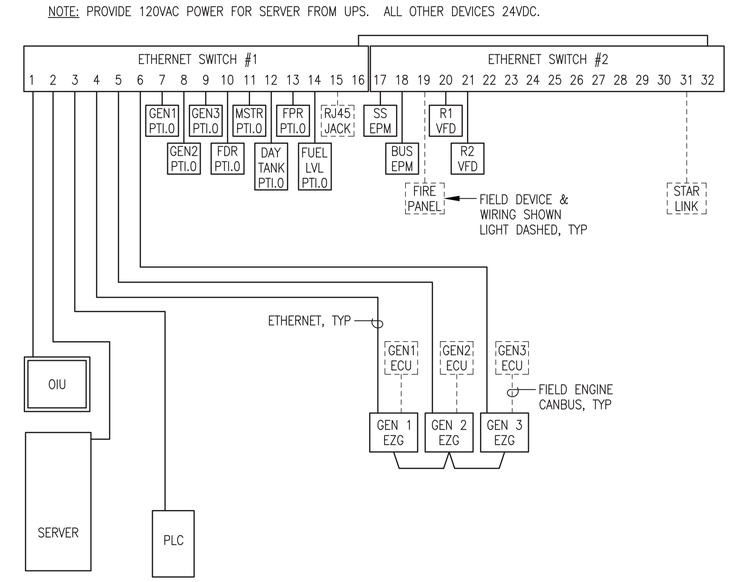
Generator Breaker Settings (Easygen - EZGN)	
Function	Setting
Gen #1 Breaker Trip Setpoint (EZGN Rated Current)	200 A
Gen #2 Breaker Trip Setpoint (EZGN Rated Current)	200 A
Gen #3 Breaker Trip Setpoint (EZGN Rated Current)	150 A
Gen Breaker Level 1 (100%) Time Over Current	3 sec.
Gen Breaker Level 2 (120%) Time Over Current	1 sec.
Gen Breaker Level 3 (250%) Time Over Current	0.4 sec.

Feeder Breaker Settings (Feeder Protection Relay - FPR)	
Function (Note: Element 1 is the only active element)	Setting
T.O.C. Trip Pickup (amps) Note: 5A = 100% of CT rating	5.0
T.O.C. Curve Selection	U4
T.O.C. Time Dial	5.00
E.M Reset delay (Y/N)	N
Constant Time Adder (seconds)	0.00
Minimum Response Time (seconds)	0.00
Maximum Phase T.O.C. Torque Control	1

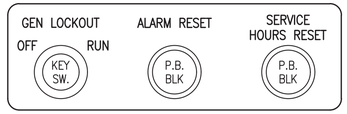
Radiator VFD Settings	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	1
PID Reference Temperature	175°F
Proportional Gain	0.93
Integral Gain	0.3
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	10 sec.
Loss of Phase	Ignore



1 E6.1 SWITCHGEAR ENCLOSURE LAYOUT
NO SCALE



2 E6.1 COMMUNICATION SCHEMATIC
NO SCALE



EASYGEN INTERFACE CONTROLS

3 E6.1 GENSET CONTROL (EZGN) INTERFACE CONTROLS
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV#2
ISSUED FOR CONSTRUCTION
NOV 2023

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER CLOIS W. VERSYP EE 7802

REV.	DESCRIPTION	DATE	BY
2	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

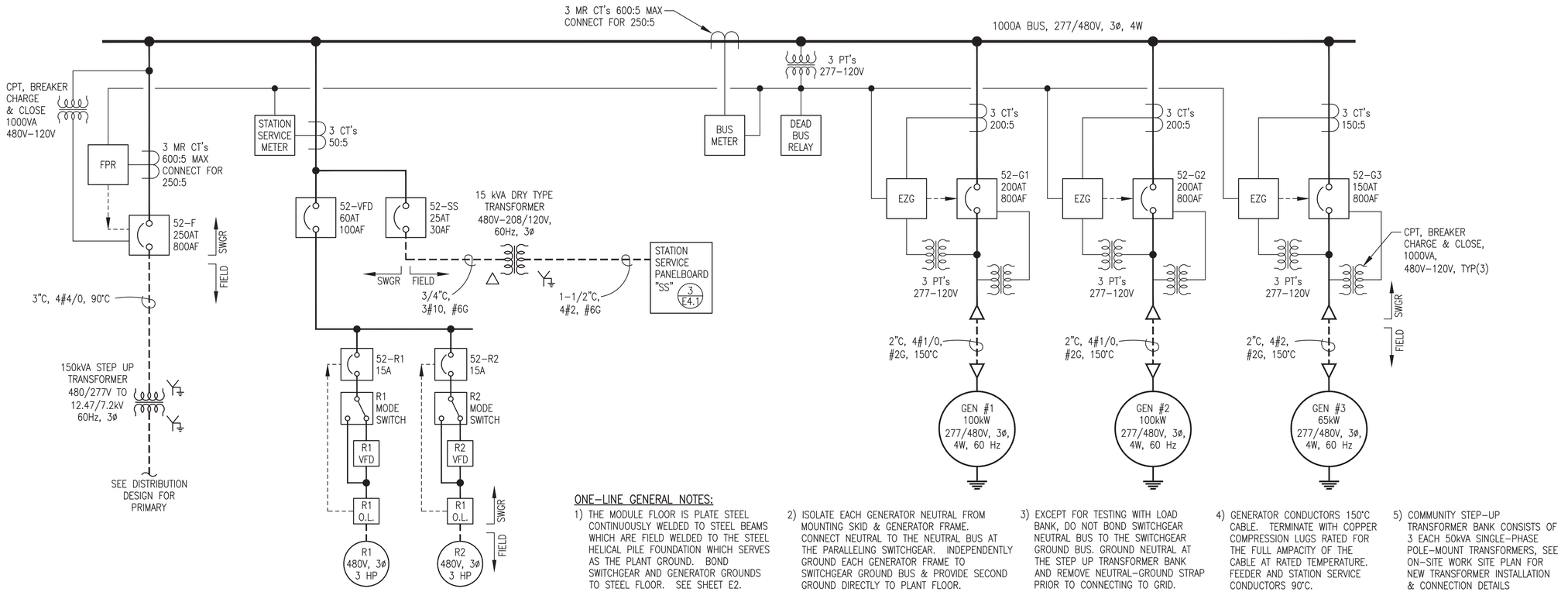
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: SWITCHGEAR ENCLOSURE LAYOUT, SETTING TABLE, & DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 3/15/22
FILE NAME: RAM PP E6 | SHEET: E6.1
PROJECT NUMBER:



SWITCHGEAR SYMBOL LEGEND

- TRANSFORMER — PT=POTENTIAL XFRMR, CPT=CONTROL POWER XFRMR
- CURRENT TRANSFORMER — M.R. – INDICATES MULTIRATIO, CT'S RATING FACTOR RF=2.0
- CIRCUIT BREAKER — AT=AMP TRIP RATING, AF=AMP FRAME RATING
- EZG — WOODWARD EASYGEN GENSET CONTROLLER
- FPR — FEEDER PROTECTION RELAY
- SHOP INSTALLED POWER WIRING/BUS
- FIELD INSTALLED POWER WIRING
- SHOP INSTALLED CONTROL WIRING

ONE–LINE GENERAL NOTES:

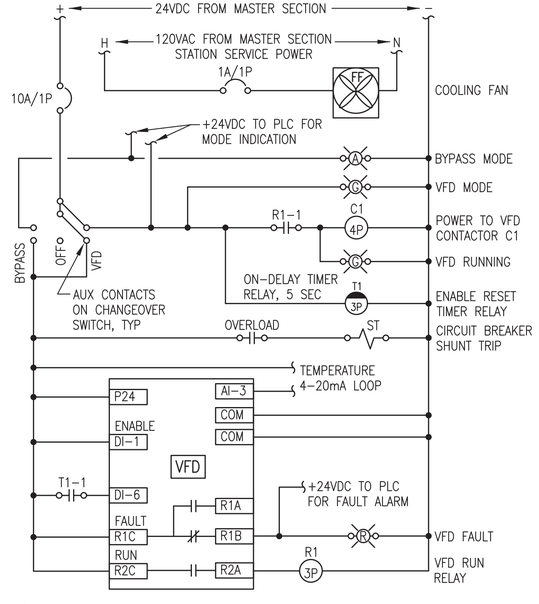
1) THE MODULE FLOOR IS PLATE STEEL CONTINUOUSLY WELDED TO STEEL BEAMS WHICH ARE FIELD WELDED TO THE STEEL HELICAL PILE FOUNDATION WHICH SERVES AS THE PLANT GROUND. BOND SWITCHGEAR AND GENERATOR GROUNDS TO STEEL FLOOR. SEE SHEET E2.
2) ISOLATE EACH GENERATOR NEUTRAL FROM MOUNTING SKID & GENERATOR FRAME. CONNECT NEUTRAL TO THE NEUTRAL BUS AT THE PARALLELING SWITCHGEAR. INDEPENDENTLY GROUND EACH GENERATOR FRAME TO SWITCHGEAR GROUND BUS & PROVIDE SECOND GROUND DIRECTLY TO PLANT FLOOR.
3) EXCEPT FOR TESTING WITH LOAD BANK, DO NOT BOND SWITCHGEAR NEUTRAL BUS TO THE SWITCHGEAR GROUND BUS. GROUND NEUTRAL AT THE STEP UP TRANSFORMER BANK AND REMOVE NEUTRAL–GROUND STRAP PRIOR TO CONNECTING TO GRID.
4) GENERATOR CONDUCTORS 150°C CABLE. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT RATED TEMPERATURE. FEEDER AND STATION SERVICE CONDUCTORS 90°C.
5) COMMUNITY STEP–UP TRANSFORMER BANK CONSISTS OF 3 EACH 50kVA SINGLE–PHASE POLE–MOUNT TRANSFORMERS, SEE ON–SITE WORK SITE PLAN FOR NEW TRANSFORMER INSTALLATION & CONNECTION DETAILS

1 E6.2 SWITCHGEAR ONE–LINE DIAGRAM
NO SCALE

ARC FLASH NOTES:

1) PERMANENTLY AFFIX ARC FLASH LABELS TO EACH SECTION WITH 480V POWER AS INDICATED.
2) SCALED PDF IMAGES OF THESE LABELS WILL BE FURNISHED TO THE FABRICATOR UPON REQUEST.

2 E6.2 ARC FLASH LABELS
NO SCALE



3 E6.2 TYPICAL RADIATOR VFD LOGIC DIAGRAM
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FOR THE FEEDER AND STEP UP TRANSFORMER WHICH ARE INCLUDED IN THE ON SITE WORK

REVISION #1
ISSUED FOR
MODULE
CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE. 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

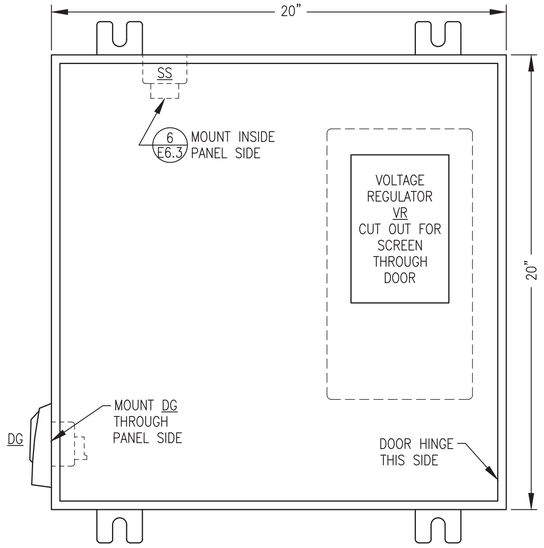
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

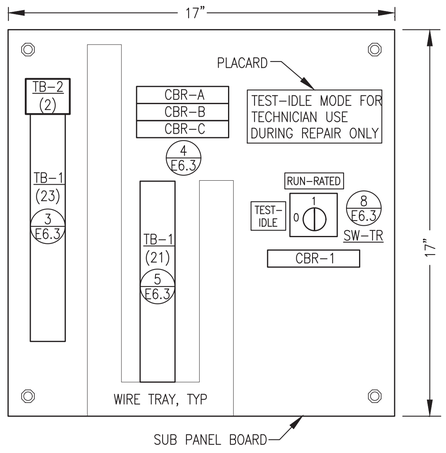
TITLE: SWITCHGEAR ONE–LINE & SCHEMATICS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

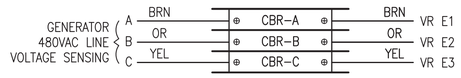
DRAWN BY: JTD | SCALE: NO SCALE
DESIGNED BY: CWV/BCG | DATE: 3/15/22
FILE NAME: RAM PP E6 | SHEET: E6.2
PROJECT NUMBER:



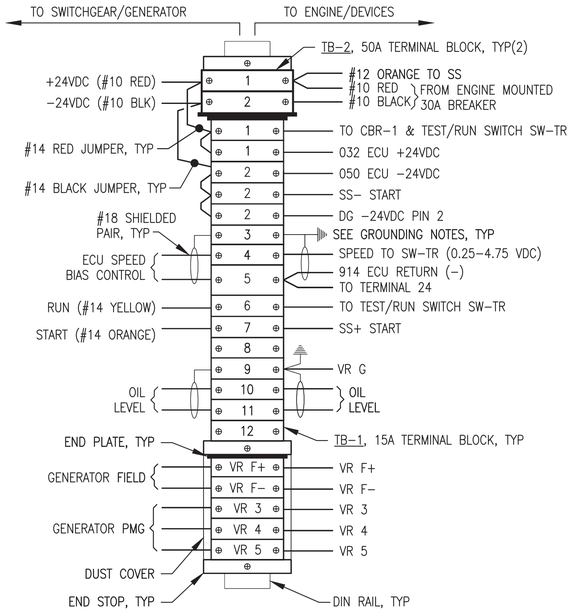
1 E6.3 JUNCTION BOX FRONT PANEL LAYOUT
NO SCALE



2 E6.3 JUNCTION BOX SUB PANEL LAYOUT
NO SCALE

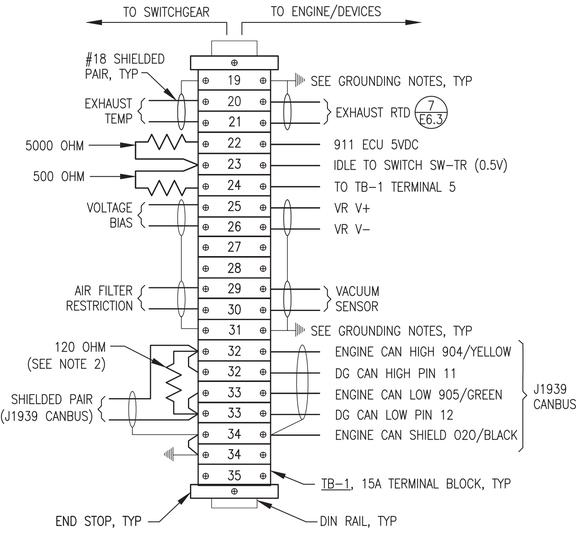


4 E6.3 CIRCUIT BREAKER CONNECTIONS
NO SCALE



NOTE: TYPICAL JOHN DEERE ECU CONNECTION NUMBERS SHOWN. SEE WIRING HARNESS FOR EACH ENGINE FOR ACTUAL ECU CONNECTIONS.

3 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE



NOTES: 1) ALL RESISTORS 0.25W.
2) REMOVE RESISTOR IF ENGINE WIRING HARNESS HAS 120 OHM END OF LINE RESISTOR.

5 E6.3 TERMINAL STRIP CONNECTIONS
NO SCALE

BILL OF MATERIALS

TAG	MANUFACTURER	MODEL	DESCRIPTION
CBR-A/B/C	ALLEN-BRADLEY	1489-M1-C010	RAIL MOUNT CIRCUIT BREAKER, 1P, 1A
CBR-1	ALLEN-BRADLEY	1489-M1-C050	RAIL MOUNT CIRCUIT BREAKER, 1P, 5A
DG	JOHN DEERE	DG-14	DIAGNOSTIC GAUGE WITH HARNESS PROGRAMMED FOR MARINE TIER 3 WITH UNIQUE JOHN DEERE FAULT CODE
ENCL.	HOFFMAN	A20H20ALP	20x20x8" NEMA 12
	HOFFMAN	A20P20	BACK PANEL
SS	JOHN DEERE	AT145341	STARTER AUXILIARY SOLENOID, 24V
SW-TR	ALLEN-BRADLEY	194L-A12-225-2	CHANGEOVER SWITCH, 12A, 2P
	ALLEN-BRADLEY	194L-HE-4A-175	90 DEGREE I-O HANDLE
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK
VR	BASLER	DECS-150 5NS1V1N1S	DIGITAL VOLTAGE REGULATOR

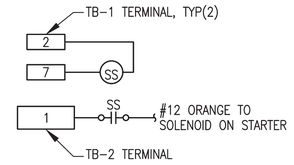
BRAND SPECIFIC NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

SHOP FABRICATION NOTES:

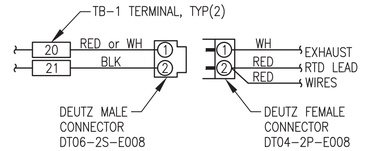
1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
2) INSTALL IN A NEMA 12 ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
3) PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS HARDWARE AS REQUIRED TO MATCH TERMINALS. LABEL ALL TERMINALS EXACTLY AS INDICATED ON THE DETAILS.
4) ALL WIRE #14AWG EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. LABEL BOTH ENDS OF ALL JUMPERS WITH THE ENGINE PANEL TERMINAL NUMBER.
5) PROVIDE MECHANICAL GROUND LUGS FASTENED TO BACK PANEL AND GROUNDED TO ENGINE-GENERATOR. GROUND ALL SHIELD DRAIN WIRES TO LUGS AT BACK PANEL ONLY.
6) PROVIDE WIRING HARNESSES FOR CONNECTION TO GENERATOR AND TO ENGINE. INSTALL WIRES IN LIQUID TIGHT FLEX OR FLEXIBLE PLASTIC WIRE LOOM AND PROVIDE SERVICE LOOPS IN ACCORDANCE WITH SPECIFICATIONS.
7) SHOP TEST EACH NEW ENGINE-GENERATOR WITH ASSOCIATED JUNCTION BOX PERMANENTLY CONNECTED. UPON COMPLETION OF TESTING, COIL WIRING HARNESSES AND SECURE JUNCTION BOX TO GENERATOR FOR SHIPPING.

FIELD INSTALLATION NOTES:

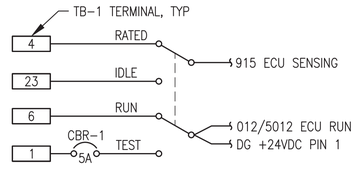
1) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE ENGINE PANEL TERMINAL NUMBER.
2) ON SHIELDED CONDUCTORS GROUND ALL SHIELD DRAIN WIRES AT ENGINE J-BOX ONLY. CLIP DRAIN WIRES AT OPPOSITE ENDS.



6 E6.3 STARTER AUX SOLENOID SS WIRING
NO SCALE



7 E6.3 EXHAUST RTD CONNECTOR
NO SCALE



8 E6.3 TEST-IDLE/RUN-RATED SWITCH SW-TR WIRING
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR
MODULE
CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE. 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

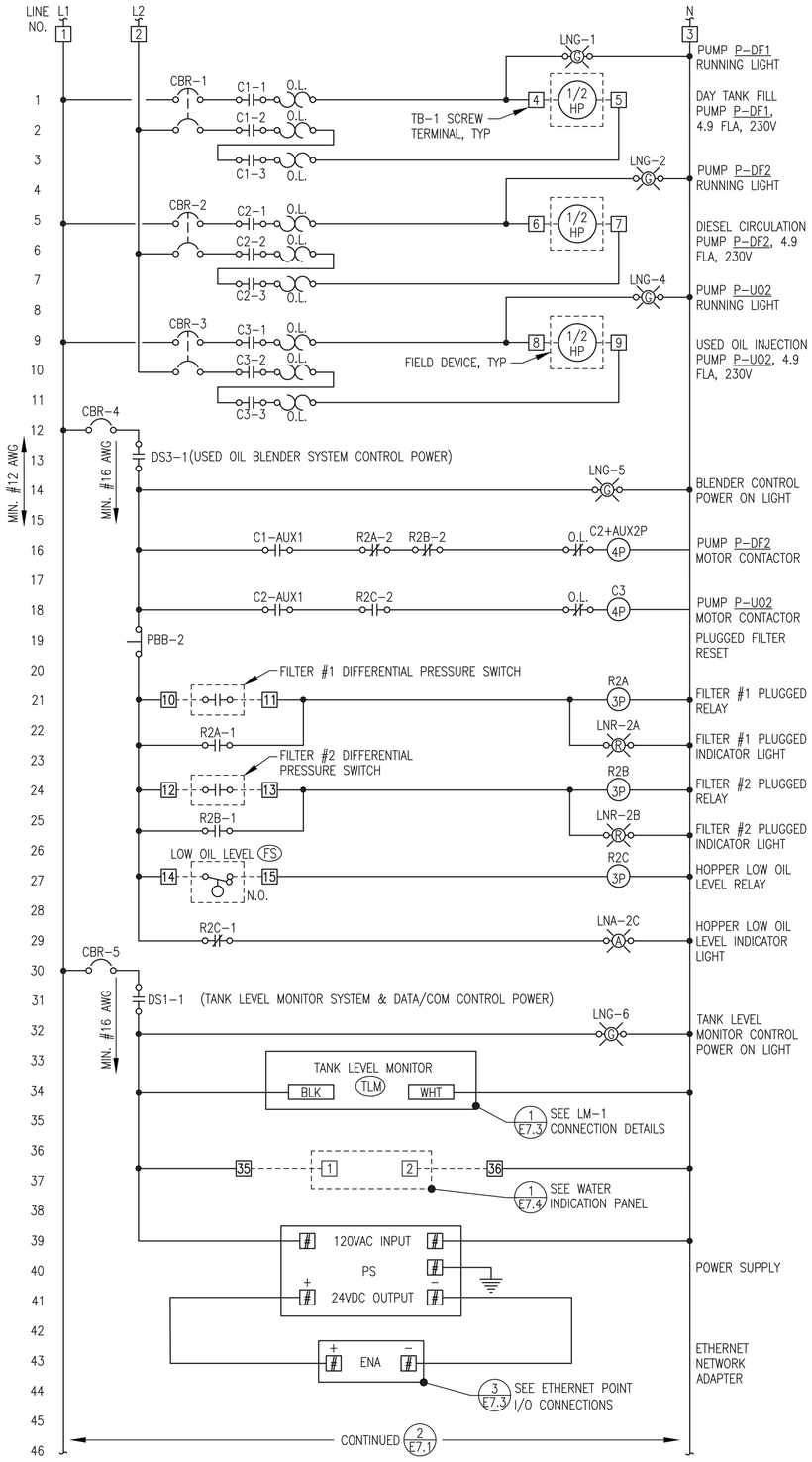
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

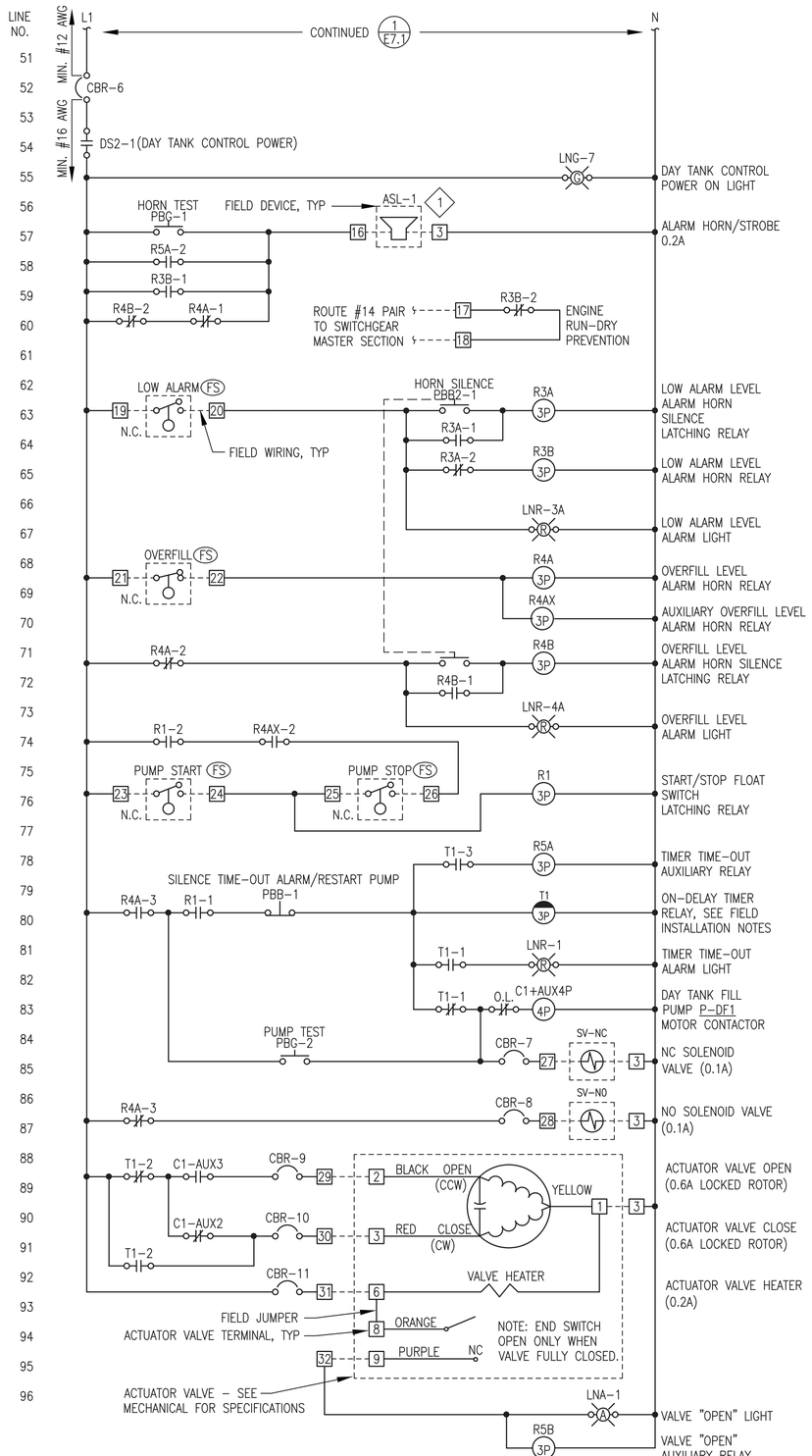
TITLE: 24VDC ENGINE WIRING JUNCTION BOX

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: RAM PP E6
PROJECT NUMBER:
SCALE: NO SCALE
DATE: 3/15/22
SHEET: E6.3



1 E7.1 USED OIL BLENDER SYSTEM LOGIC DIAGRAM
NO SCALE



2 E7.1 DAY TANK LOGIC DIAGRAM
NO SCALE

BILL OF MATERIALS

NOTE: ON THIS SHEET AND THE PANEL DRAWINGS THAT FOLLOW SPECIFIC PARTS MANUFACTURER AND MODEL ARE SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE HOW SUBSTITUTE ITEM MEETS OR EXCEEDS SPECIFIED ITEM QUALITY AND PERFORMANCE CHARACTERISTICS AND ALSO COMPLIES WITH MECHANICAL AND/OR ELECTRICAL CONNECTIONS AND PHYSICAL LAYOUT REQUIREMENTS.

TAG	MANUFACTURER	MODEL	DESCRIPTION
AUX2P	ALLEN-BRADLEY	100FA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC
AUX4P	ALLEN-BRADLEY	100FA31	AUXILIARY CONTACT FOR CONTACTOR, 4 POLE, 3NO, 1NC
C	ALLEN-BRADLEY	100C09D10	CONTACTOR, 120V COIL, 9A, 4 POLE
CBR-1,2,3	ALLEN-BRADLEY	1489-M2-C150	RAIL-MOUNT CIRCUIT BREAKER, 2 POLE, 15A
CBR-4,5,6	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-7,8,9,10,11	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
DS	ALLEN-BRADLEY	194LE201753	DISCONNECT, 2 POSITION, 3 N.O., 20A, FACE MOUNT
	ALLEN-BRADLEY	194LHC4E1751	KNOB ACTUATOR FOR LOAD SWITCH, ON/OFF, LOCKABLE
ENA	ALLAN-BRADLEY	1734-AENTR	I/O DUAL PORT ETHERNET NETWORK ADAPTER
DI8	ALLAN-BRADLEY	1734-IB8	DIGITAL INPUT MODULE, 24VDC, 8 POINT, SINKING
LNG	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-130V, NEMA 4X
LNR	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
LNA	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-130V, NEMA 4X
OL	ALLEN-BRADLEY	193-1EEDB	OVERLOAD, 230V, 1ø, ADJUSTABLE 3.2A-16.0A RANGE
PBB	ALLEN-BRADLEY	800HAR2D2	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, BLACK
PBB2	ALLEN-BRADLEY	800HAR2A2	MOMENTARY PUSH BUTTON, 2 NO, NEMA 4X, BLACK
PBG	ALLEN-BRADLEY	800HAR1D1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
PP	PHOENIX CONTACTS	FLPPRJ45/RJ45	ETHERNET PATCH PANEL, RJ45xRJ45, DIN RAIL MOUNT
PS	PULS	CP5.241-S1	5A, 120VAC/24VDC POWER SUPPLY
R	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
T	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
TB-1,2	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS
TLM	TANK LEVEL MONITOR, SEE INSTRUMENTATION SCHEDULE ON SHEET M1.1		

LEGEND

- PANEL WIRING
- FIELD WIRING
- O.L. OVERLOADS
- R# CONTROL RELAY
- R#-# NORMALLY OPEN CONTACT
- PB-# NORMALLY OPEN MOMENTARY PUSH BUTTON
- T# TIME DELAY RELAY
- SS-# 2-POSITION SELECTOR SWITCH
- R#-# NORMALLY CLOSED CONTACT
- PB-# NORMALLY CLOSED MOMENTARY PUSH BUTTON
- C# CONTACTOR
- SW-# NORMALLY OPEN FLOAT SWITCH
- SV# SOLENOID VALVE
- # TERMINAL BLOCK
- SW-# NORMALLY CLOSED FLOAT SWITCH
- ASL-# ALARM & STROBE LIGHT
- CB-# CIRCUIT BREAKER

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT EXCEPT FOR TERMINATION AT THE PANEL OF EXTERIOR FIELD CONDUCTORS SHOWN ON SHEET E1.6 IS INCLUDED IN THE ON SITE WORK

REV#2
ISSUED FOR CONSTRUCTION
NOV 2023

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

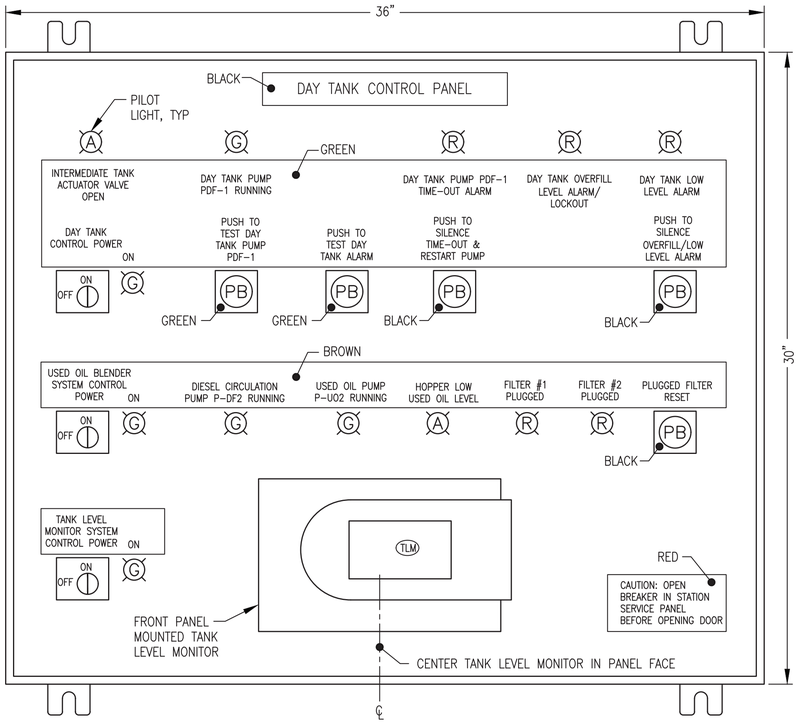
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

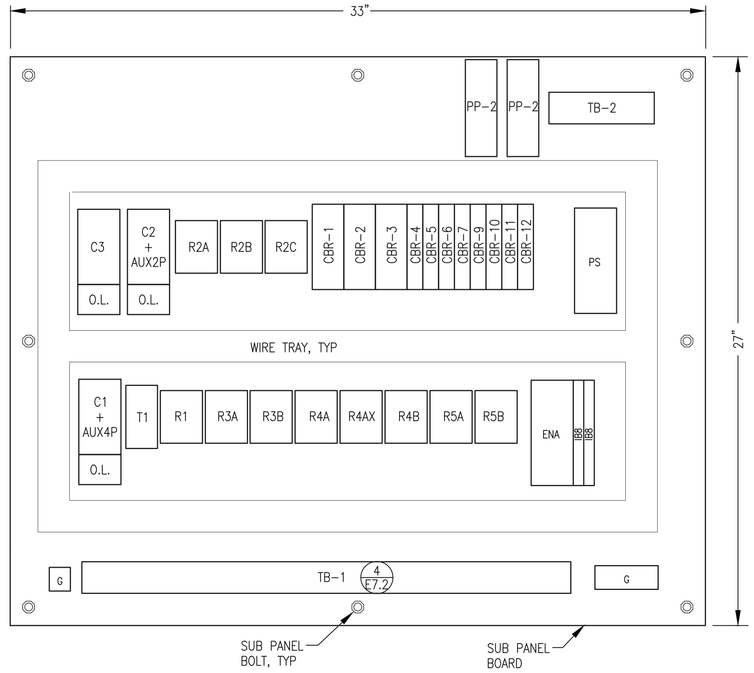
TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

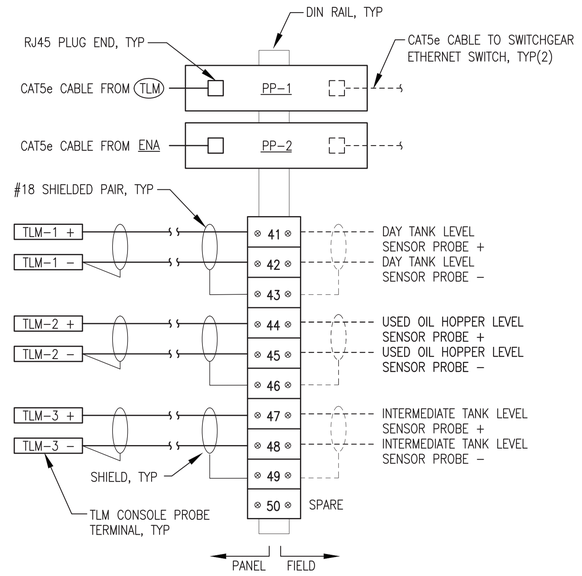
DRAWN BY: BCG/JTD
DESIGNED BY: CWV/BCG
FILE NAME: RAM PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 3/15/22
SHEET: E7.1



1 E7.2 FRONT PANEL LAYOUT
NO SCALE



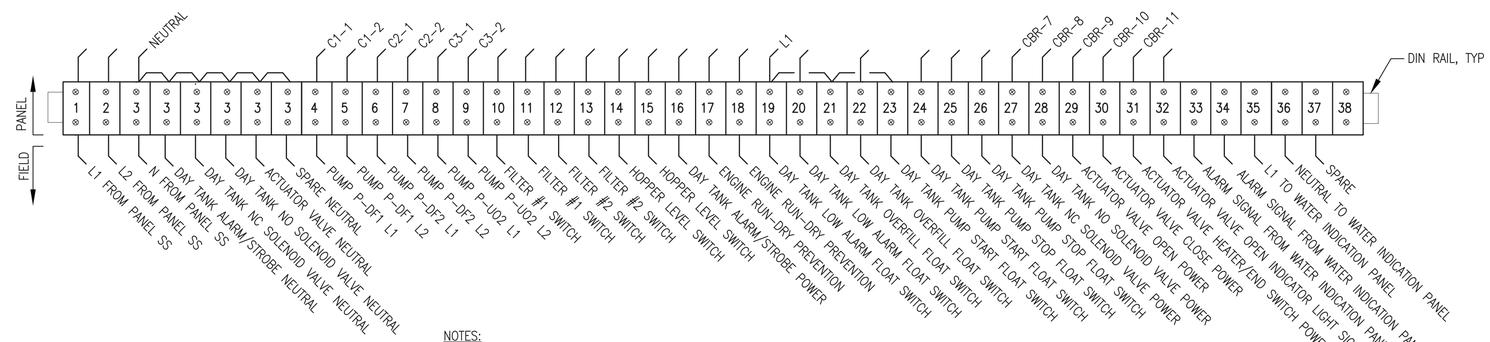
2 E7.2 SUB PANEL LAYOUT
NO SCALE



NOTES:

1. INSTALL TERMINAL STRIP TB–2 AND ETHERNET PATCH PANEL PP–1 ON VERTICAL DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP IN THE UPPER RIGHT CORNER OF PANEL TO ACCOMMODATE CONDUCTOR ENTRY THROUGH RIGHT SIDE OF PANEL, SEE SUB–PANEL LAYOUT.

3 E7.2 TB–2 TERM STRIP LAYOUT
NO SCALE



NOTES:

1) INSTALL TERMINAL STRIP TB–1 ON HORIZONTAL DIN RAIL AS SHOWN. LOCATE TERMINAL STRIP BELOW PANEL DEVICES TO ACCOMMODATE CONDUCTOR ROUTING FROM CONDUITS CONNECTING TO BOTTOM OF PANEL, SEE SUB–PANEL LAYOUT.
2) IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 6 EACH 35A SCREW TERMINAL GROUNDING BUS.

4 E7.2 TB–1 TERMINAL STRIP LAYOUT
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REV#2
ISSUED FOR CONSTRUCTION
NOV 2023

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E7	SHEET: E7.2
PROJECT NUMBER:	

PANEL NOTES:

1) PROVIDE COMPLETE LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. INSTALL IN A NEMA 12 ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK. SEE SHEET E7.2 FOR PANEL LAYOUT DETAILS.

2) USE MIN #12 WIRE FOR ALL CIRCUITS UP TO FIRST IN-LINE PANEL BREAKERS (FOR 20A FEED). USE MIN #16 AWG ON ALL 5 AMP CIRCUITS AND MIN #14 AWG WIRE ON ALL 15A CIRCUITS. TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).

3) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING. PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES AS SHOWN ON THE PANEL FACE LAYOUT AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREWS, COLOR AS INDICATED.

4) BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.

5) DEVICES AND WIRING NOTED AS "FIELD" AND SHOWN WITH DASHED LINES WILL BE FIELD INSTALLED AND ARE NOT PART OF THE PANEL SHOP FABRICATION. FOR BENCH TEST, PROVIDE TEMPORARY DEVICES AND WIRING AS REQUIRED TO SIMULATE FIELD DEVICES.

6) POWER TO PANEL PROVIDED FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN LISTED LOAD CENTER. SEE FIELD INSTALLATION NOTE #3.

FIELD INSTALLATION NOTES:

1) SEE MECHANICAL FOR DAY TANK INSTALLATION & PIPING. INSTALL CONTROL PANEL & FIELD DEVICES AS INDICATED TO PROVIDE REDUNDANT HIGH & LOW LIMIT CONTROLS & OVERFILL PROTECTION.

2) FIELD WIRING TO FLOAT SWITCHES, SOLENOID VALVES, ACTUATOR VALVE, & ALARM HORN #14 AWG. ALL OTHER FIELD WIRING #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH CONTROL PANEL TERMINAL BLOCK TERMINATION NUMBERS. WHEN NOT IN CONDUIT, MAKE JACKETED COM CABLE ENCLOSURE ENTRIES WITH CABLE GLAND CONNECTORS.

3) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS ON SHEET E2. PROVIDE POWER TO DAY TANK PANEL FROM DEDICATED 20A 2-POLE CIRCUIT BREAKER IN STATION SERVICE PANELBOARD.

4) VERIFY THAT ALL DAY TANK FLOAT SWITCHES ARE ORIENTED FOR N.C. (OPEN ON RISE) OPERATION PRIOR TO INSTALLATION. ALL FLOATS SHOWN ON LOGIC DIAGRAM WITH TANK AT FULL (PUMP STOP) LEVEL. VERIFY THAT THE HOPPER FLOAT SWITCH IS ORIENTED FOR N.O. (CLOSE ON RISE) OPERATION.

5) FILL PUMP CAVITIES WITH LUBE OIL PRIOR TO INITIAL OPERATION. VERIFY PROPER ROTATION OF PUMPS. PRIME SYSTEM WITH HAND PRIMING PUMP PRIOR TO BEGINNING DAY TANK FILL.

6) FIELD TEST COMPLETED UNIT TO VERIFY ALL CONTROL AND ALARM FUNCTIONS. MANIPULATE FLOAT SWITCHES BY REACHING IN THROUGH ADJACENT 4" BUNG. TEMPORARILY SET TIMING RELAY TO 30 SECONDS TO VERIFY TIME-OUT AND RESET FUNCTIONS.

7) SET TIMING RELAY TIME DELAY TO 30 MINUTES (APPROX. 55 GALS. REQUIRED FROM PUMP START TO PUMP STOP LEVEL @ APPROX. 4 GPM). ON THE INITIAL TANK FILL, THE PUMP TEST/RESET BUTTON MAY HAVE TO BE MANUALLY RESET IN ORDER TO GET THE FUEL LEVEL TO WITHIN THE NORMAL OPERATING RANGE. SEE SEQUENCE OF OPERATIONS.

DAY TANK FILL SEQUENCE OF OPERATIONS:

1) WHEN THE DAY TANK CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED, THE POWER LIGHT IS ON AND POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE HEATER/OPEN LIGHT CIRCUIT.

2) WHEN THE DAY TANK IS NOT CALLING FOR FUEL, POWER IS PROVIDED TO THE REMOTE ACTUATOR VALVE CLOSE CIRCUIT. WHEN THE ACTUATOR IS IN THE FULLY CLOSED POSITION, THE CLOSING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #2 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT IS OFF.

3) NORMAL FILL OPERATION – WHEN THE FUEL LEVEL DROPS TO THE "PUMP START" SWITCH, THE TIMER IS STARTED, THE N.C. DAY TANK SOLENOID VALVE OPENS, THE REMOTE ACTUATOR VALVE OPENS & THE VALVE "OPEN" LIGHT TURNS ON, THE DAY TANK PUMP IS ENERGIZED, THE PUMP "ON" LIGHT TURNS ON, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT CLOSES. WHEN THE ACTUATOR IS IN THE FULLY OPEN POSITION, THE OPENING CIRCUIT IS BROKEN BY INTERNAL ACTUATOR LIMIT SWITCH #7 AND THE REMOTE ACTUATOR VALVE "OPEN" LIGHT REMAINS ON. WHEN FUEL REACHES THE "PUMP STOP" FLOAT SWITCH BEFORE THE TIMER TIMES-OUT, THE TIMER IS RESET, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, AND THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS.

4) TIMER OPERATION – IF THE TIMER TIMES-OUT THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE REMOTE ACTUATOR VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "TIME-OUT" ALARM LIGHT TURNS ON, AND THE TIME-OUT ALARM HORN SOUNDS. PRESSING THE "TIME-OUT ALARM SILENCE / PUMP RESTART" BUTTON RESETS THE TIMER, SILENCES THE ALARM HORN, AND STARTS THE NORMAL FILL OPERATION. SEE FIELD INSTALLATION NOTES FOR TIMER SETTING.

5) OVERFILL FUEL LEVEL – IF THE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE "OVERFILL" FLOAT SWITCH, THE N.O. DAY TANK SOLENOID VALVE CLOSES, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE USED OIL BLENDER RUN SIGNAL DRY CONTACT OPENS, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, AND THE ALARM HORN SOUNDS. PRESSING THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "OVERFILL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL FALLS BELOW THE "OVERFILL" FLOAT SWITCH, THE "OVERFILL LEVEL" ALARM LIGHT TURNS OFF, THE N.O. DAY TANK SOLENOID VALVE OPENS AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED). WHEN THE FUEL LEVEL REACHES THE "PUMP START" FLOAT SWITCH, THE NORMAL FILL OPERATION IS REPEATED.

6) LOW FUEL LEVEL – IF THE FUEL LEVEL FALLS BELOW THE "LOW ALARM" FLOAT SWITCH, THE "LOW FUEL LEVEL" ALARM LIGHT TURNS ON, THE ENGINE RUN-DRY PREVENTION DRY CONTACT OPENS, AND THE ALARM HORN SOUNDS. THE LEVEL ALARM HORN "SILENCE" BUTTON SILENCES THE ALARM HORN WHILE LEAVING THE "LOW FUEL LEVEL" ALARM LIGHT ON. WHEN THE FUEL LEVEL RISES ABOVE THE "LOW ALARM" FLOAT SWITCH THE "LOW FUEL LEVEL" ALARM LIGHT TURNS OFF, THE ENGINE RUN-DRY PREVENTION DRY CONTACT CLOSES, AND THE ALARM HORN TURNS OFF (IF NOT PREVIOUSLY SILENCED).

7) PUMP & HORN TEST – MOMENTARY CONTACT BUTTONS ARE PROVIDED TO TEST FUNCTION OF THE DAY TANK PUMP AND ALARM HORN. PRESSING THE "PUSH TO TEST DAY TANK PUMP" BUTTON STARTS THE TIMER, MOMENTARILY OPENS THE N.C. DAY TANK SOLENOID VALVE & ACTUATED BALL VALVE, ENERGIZES THE DAY TANK PUMP, TURNS ON THE DAY TANK PUMP "RUNNING" LIGHT AND CLOSES THE USED OIL BLENDER RUN SIGNAL DRY CONTACT. THE "PUSH TO TEST DAY TANK PUMP" BUTTON IS LOCKED OUT IF THE DAY TANK IS AT THE OVERFILL LEVEL. PRESSING THE "PUSH TO TEST DAY TANK ALARM" BUTTON MOMENTARILY ENERGIZES THE ALARM HORN/STROBE.

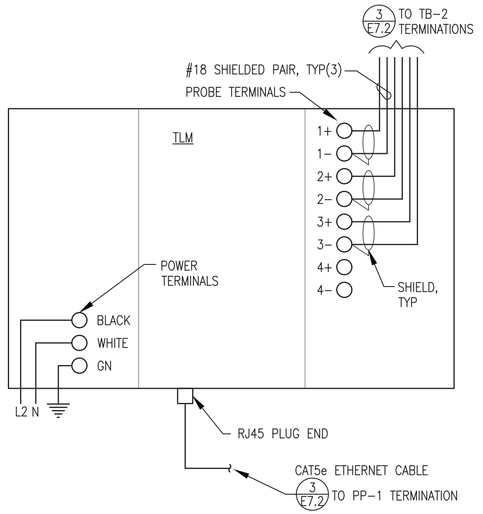
USED OIL BLENDER SYSTEM SEQUENCE OF OPERATIONS:

1) WHEN THE BLENDER CIRCUIT BREAKER AND CONTROL POWER SWITCH ARE CLOSED; THE GREEN POWER LIGHT IS ON AND POWER IS PROVIDED TO ALL CONTROL DEVICES.

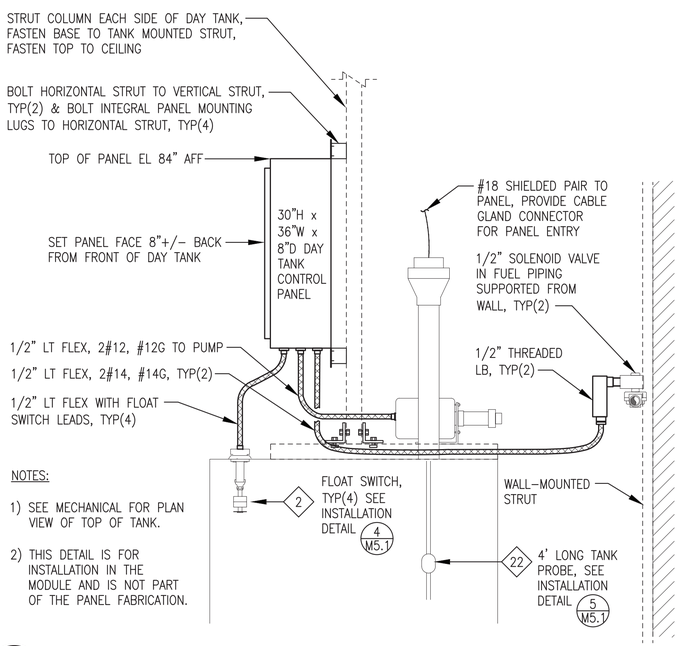
2) NORMAL OPERATION – WHENEVER THE DAY TANK FILL SEQUENCE IS INITIATED, BOTH THE DIESEL CIRCULATING PUMP P-DF2 AND THE USED OIL INJECTION PUMP P-UO2 RUN AND THE ASSOCIATED GREEN PUMP RUNNING LIGHTS ARE ON.

3) PLUGGED FILTER – IF THE DIFFERENTIAL PRESSURE ACROSS A FILTER REACHES THE ALARM SETPOINT, BOTH PUMPS STOP RUNNING AND THE RED FILTER PLUGGED LIGHT FOR THE ASSOCIATED FILTER TURNS ON. THE ALARM LATCHES AND THE SYSTEM WILL NOT OPERATE UNTIL THE PROBLEM IS CORRECTED. AFTER THE FILTER ELEMENT HAS BEEN CHANGED THE BLACK RESET BUTTON MUST BE PRESSED TO RESUME NORMAL OPERATION.

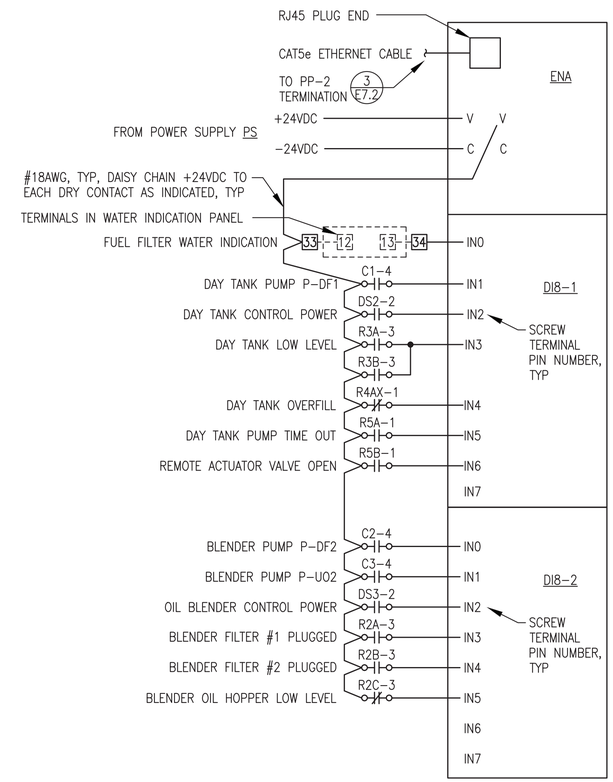
4) HOPPER LOW OIL LEVEL – WHEN THE OIL LEVEL FALLS BELOW THE LOW LEVEL FLOAT SWITCH, USED OIL INJECTION PUMP P-UO2 STOPS RUNNING AND THE AMBER HOPPER LOW OIL LEVEL LIGHT TURNS ON. PUMP P-UO2 WILL NOT OPERATE UNTIL THE USED OIL LEVEL IN THE HOPPER RISES ABOVE THE LOW LEVEL. RESET IS NOT REQUIRED.



1 E7.3 TANK LEVEL MONITOR (TLM) CONSOLE CONNECTIONS
NO SCALE



2 E7.3 DAY TANK CONTROL PANEL & DEVICE INSTALLATION
NO SCALE



3 E7.3 ETHERNET POINT I/O CONNECTIONS
NO SCALE

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR

REV#2
ISSUED FOR CONSTRUCTION
NOV 2023

STATE OF ALASKA 49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
2	REVISE PANEL TO MATCH SHOP AS BUILT	11/13/23	BCG
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

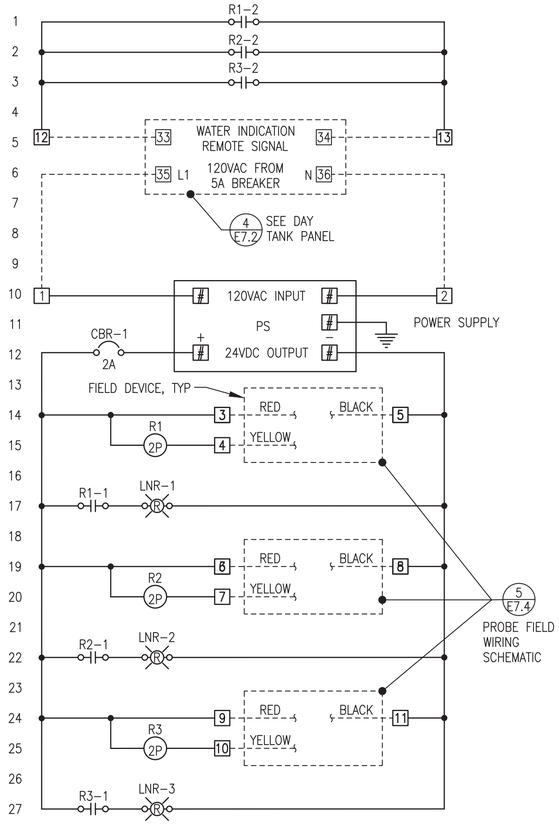
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

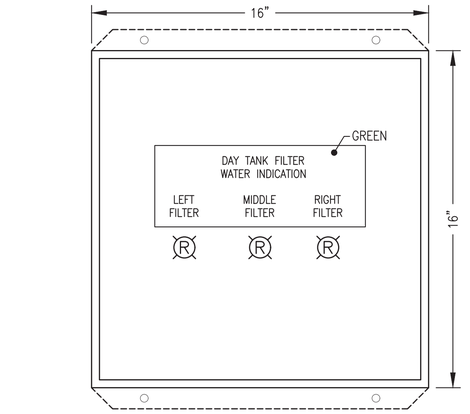
TITLE: DAY TANK CONTROL PANEL NOTES, SEQUENCE OF OPERATIONS & INTERCONNECT DETAILS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

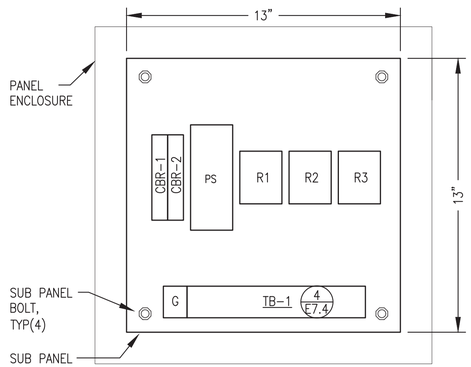
DRAWN BY: BCG/JTD
DESIGNED BY: CWV/BCG
FILE NAME: RAM PP E7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 3/15/22
SHEET: E7.3



1 E7.4 PANEL WIRING DIAGRAM
NO SCALE



2 E7.4 FRONT PANEL LAYOUT
NO SCALE



3 E7.4 SUB PANEL LAYOUT
NO SCALE

PANEL BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR-1	1	ALLEN-BRADLEY	1489-M1-C020	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 2A
LNR	3	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
PS	1	PULS	CP.241-S1	5A, 120VAC/24VDC POWER SUPPLY
R	3	ALLEN-BRADLEY	700HA32A1	2PDT RELAY
	3	ALLEN-BRADLEY	700HN100	8 PIN SOCKET BASE
TB	15	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

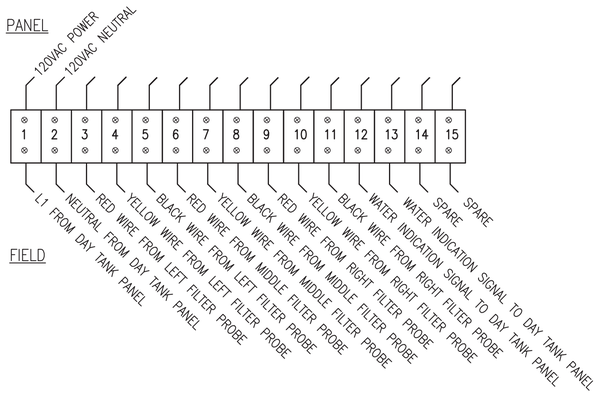
PANEL SHOP FABRICATION NOTES:

1) FURNISH COMPLETE PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN WIRING DIAGRAM AND BILL OF MATERIALS ALONG WITH ALL PANEL DEVICE ACCESSORIES, DIN RAIL, & HARDWARE REQUIRED FOR COMPLETE INSTALLATION.

2) INSTALL IN A 16"x16"x8" NEMA 12 STEEL ENCLOSURE WITH INTEGRAL MOUNTING FLANGES AT BACK, A MIN 16 GAUGE INTERIOR BACK PANEL, AND HINGED DOOR. ENCLOSURE COLOR ANSI 61 GRAY AND BACK PANEL COLOR WHITE.

3) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.

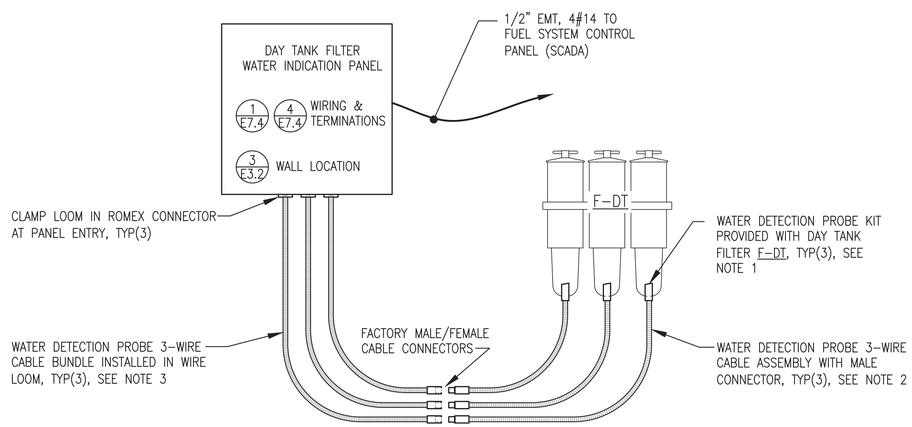
4) CONNECT DEVICES WITH MANUFACTURER PROVIDED CABLES IN ACCORDANCE WITH INSTALLATION INSTRUCTIONS.



NOTES:

1. INSTALL TERMINAL STRIP TB-1 HORIZONTALLY AS SHOWN. LOCATE TERMINAL STRIP BELOW WIRE TRAY TO ACCOMMODATE FIELD CONDUCTORS ENTERING BOTTOM OF PANEL, SEE SUB-PANEL LAYOUT.
2. IN ADDITION TO THE TERMINAL STRIPS SHOWN, PROVIDE 2 EACH 60A SCREW TERMINAL GROUNDING BUS.

4 E7.4 TERMINAL STRIP TB-1 LAYOUT
NO SCALE



5 E7.4 FIELD WIRING SCHEMATIC
NO SCALE

NOTES:

1. THREE EACH RACOR WATER DETECTION PROBE KITS, MODEL RK30880E, SHIPPED LOOSE WITH 3-FILTER BANK. NOT ALL KIT COMPONENTS USED THIS INSTALLATION. KEEP THREE EACH WATER DETECTION PROBE CABLES WITH MOLDED MALE CONNECTORS AND KEEP THREE EACH 3-WIRE CABLE BUNDLES WITH MOLDED FEMALE CONNECTORS. DISCARD THREE EACH PILOT LIGHTS AND DISCARD THREE EACH MOUNTING PANELS.
2. PRIOR TO FLOODING SYSTEM WITH FUEL INSTALL WATER DETECTION PROBES IN EACH FILTER ACCORDING TO MANUFACTURER'S INSTRUCTIONS. ROUTE FACTORY LOOMED CABLES WITH MOLDED FEMALE CONNECTORS BACK TO WALL IN NEAT AND ORGANIZED FASHION FOR CONNECTION TO WIRE EXTENSION CONNECTORS. TYWRAP LOOM TO CONDUIT OR PIPING.
3. FACTORY 3-WIRE CABLE BUNDLES FURNISHED WITH MOLDED MALE CONNECTORS. FIELD INSTALL IN 3/8" PLASTIC WIRE LOOM FROM CONNECTOR TO PANEL ENTRY AND ROUTE TO PANEL IN NEAT AND ORGANIZED FASHION. TYWRAP LOOM TO ADJACENT CONDUIT, PIPING, OR STRUT.

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY

REVISION #1
ISSUED FOR
MODULE
CONSTRUCTION
JULY 2022

STATE OF ALASKA
49TH
CLOIS W. VERSYP
EE 7802
REGISTERED PROFESSIONAL ENGINEER

REV.	DESCRIPTION	DATE	BY
1	UPDATED TO COORDINATE WITH NAPASKIAK MODULE	7/15/22	BCG

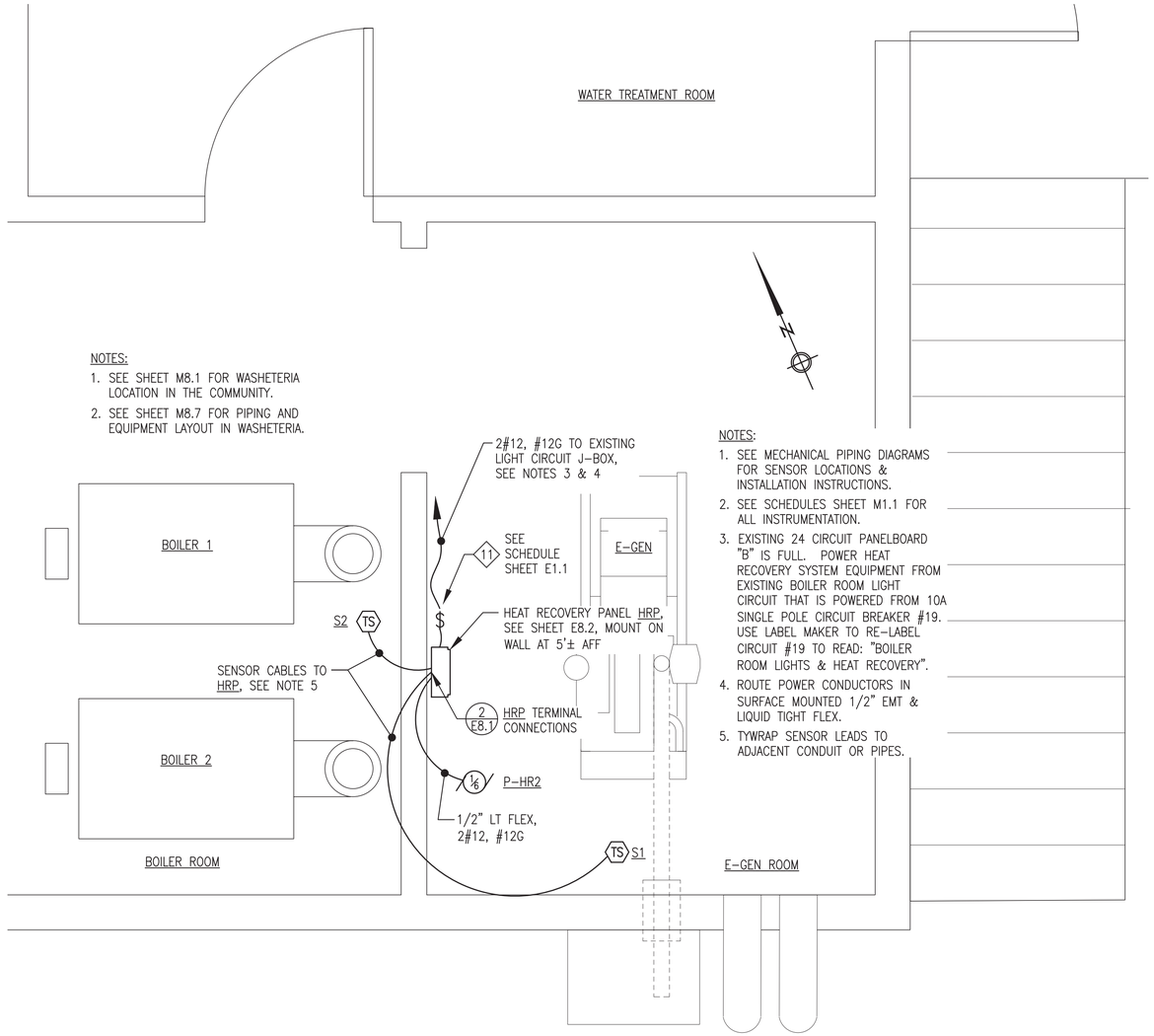
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

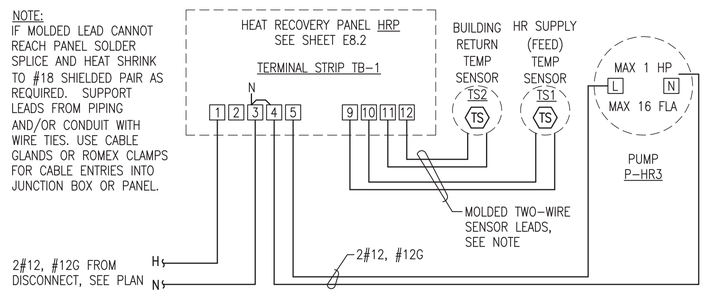
TITLE: DAY TANK FILTER WATER INDICATION PANEL

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: BCG/JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 3/15/22
FILE NAME: RAM PP E7	SHEET: E7.4
PROJECT NUMBER:	



1 E8.1 SCHOOL MECH BUILDING HEAT RECOVERY WIRING PLAN
3/4"=1'-0"



2 E8.1 WASHETERIA HEAT RECOVERY PANEL HRP TERMINAL CONNECTIONS
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT UNDER ADDITIVE ALTERNATE #2

ISSUED FOR CONSTRUCTION JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

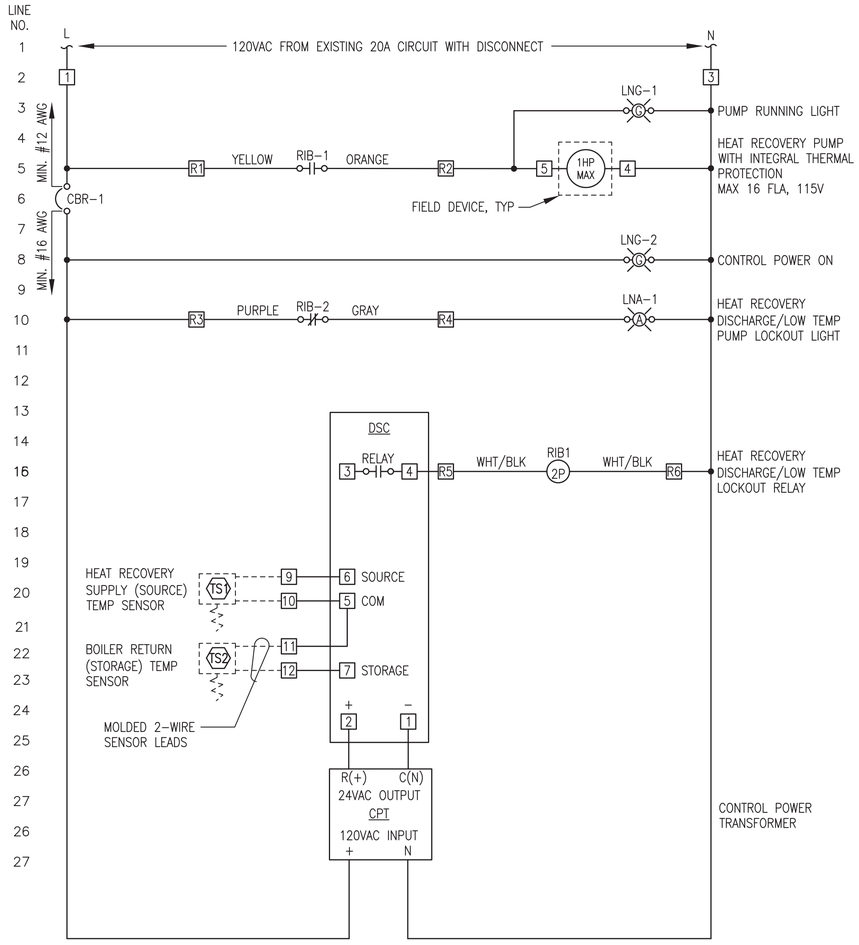
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

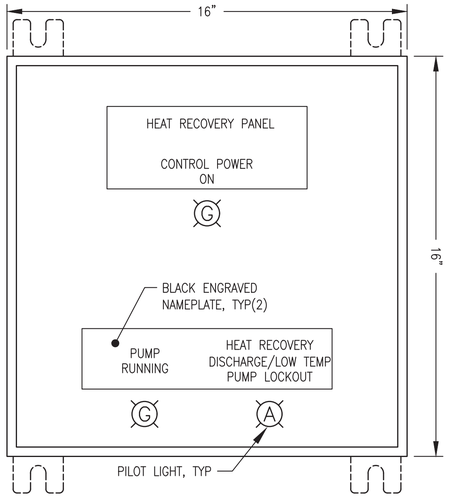
TITLE: HEAT RECOVERY SYSTEM WASHETERIA WIRING PLAN & DIAGRAMS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

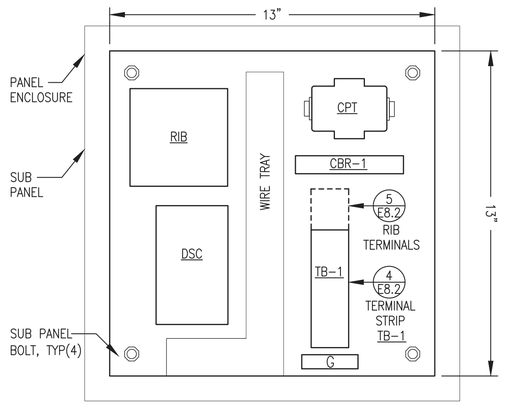
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 7/15/22
FILE NAME: RAM PP E8 | SHEET: E8.1 OF 8
PROJECT NUMBER:



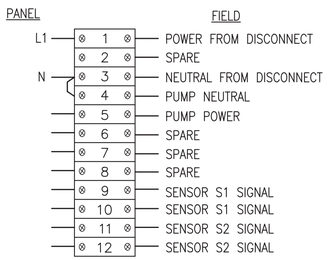
1 E8.2 HEAT RECOVERY PANEL LOGIC DIAGRAM
NO SCALE



2 E8.2 FRONT PANEL LAYOUT
NO SCALE



3 E8.2 SUB PANEL LAYOUT
NO SCALE



4 E8.2 TERMINAL STRIP TB-1
NO SCALE

5 E8.2 RIB TERMINAL STRIP
NO SCALE

LEGEND

R#	CONTROL RELAY	R#-#	NORMALLY OPEN CONTACT	CB-#	CIRCUIT BREAKER
#	TERMINAL BLOCK	R#-#	NORMALLY CLOSED CONTACT	-------	FIELD WIRING
				———	PANEL WIRING

BILL OF MATERIALS

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
CBR	1	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CPT	1	FUNCTIONAL DEVICES	TR40VA002	40VA, 24VAC CONTROL POWER TRANSFORMER
DSC	1	TEKMAR	MODEL 156	DIFFERENCE SETPOINT CONTROLLER WITH MINIMUM AND MAXIMUM TEMPERATURE FUNCTIONS, 24VAC, 1 EACH N.O. RELAY RATED 240V, 10A, 1/3HP
LNG	2	ALLEN-BRADLEY	800HQRH10G	GREEN LED PILOT LIGHT, 120V, NEMA 4X
LNA	1	ALLEN-BRADLEY	800HQRH10A	AMBER LED PILOT LIGHT, 120V, NEMA 4X
RIB	1	FUNCTIONAL DEVICES	RIB01P	DPDT RELAY, 120VAC COIL, 20A, 1HP N.C. RATED
TS1,2	2	TEKMAR	MODEL 085	SOLAR SENSOR, 10K THERMISTOR, 6mm DIA x 45mm LONG, 5' LEAD WIRE
TB		ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS

HEAT RECOVERY PANEL SEQUENCE OF OPERATION:

CONTROL POWER: WHEN THE CIRCUIT BREAKER IN THE LOAD CENTER IS CLOSED, THE WALL-MOUNT DISCONNECT IS CLOSED, AND THE INTERNAL CIRCUIT BREAKER CBR-1 IS CLOSED, POWER IS PROVIDED TO CONTROL DEVICES AND THE "CONTROL POWER ON" LIGHT IS ON.

NORMAL OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 (HEAT RECOVERY SUPPLY TEMPERATURE OR "SOURCE") AND SENSOR S2 (BOILER RETURN TEMPERATURE OR "STORAGE") IS GREATER THAN THE DELTA-T SETPOINT (7 DEG F) AND THE HEAT RECOVERY SUPPLY SENSOR S1 TEMPERATURE IS GREATER THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE PUMP WILL RUN AND THE "PUMP RUNNING" LIGHT WILL BE ON.

DISCHARGE LOCKOUT OPERATION: WHEN THE DIFFERENCE BETWEEN SENSOR S1 AND SENSOR S2 BECOMES LESS THAN THE DELTA-T SETPOINT (7 DEG F) MINUS THE DELTA-T DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL OPEN, THE RIB1 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON, AND THE PUMP WILL STOP. WHEN THE DIFFERENCE BETWEEN S1 AND S2 BECOMES GREATER THAN THE DELTA-T SETPOINT: THE DSC RELAY WILL CLOSE, THE RIB1 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

DISTRICT HEAT LOW TEMPERATURE LOCKOUT OPERATION: IF THE HEAT RECOVERY SUPPLY TEMPERATURE (SENSOR S1 "SOURCE") FALLS TO LESS THAN THE MINIMUM SOURCE SETPOINT (160 DEG F): THE DSC RELAY WILL OPEN, THE RIB2 COIL WILL BE DE-ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN ON AND THE PUMP WILL STOP. WHEN THE HEAT RECOVERY SUPPLY TEMPERATURE (S1) RECOVERS AND BECOMES EQUAL TO THE MINIMUM SOURCE SETPOINT (160 DEG F) PLUS THE MINIMUM SOURCE DIFFERENTIAL (5 DEG F): THE DSC RELAY WILL CLOSE, THE RIB2 COIL WILL BE ENERGIZED, THE AMBER "LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

SHOP FABRICATION NOTES:

1) FURNISH COMPLETE PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM AND BILL OF MATERIALS ALONG WITH ALL PANEL DEVICE ACCESSORIES REQUIRED FOR COMPLETE INSTALLATION. FURNISH TEMPERATURE SENSORS LOOSE SHIP WITH PANEL FOR FIELD INSTALLATION.

2) INSTALL IN A NEMA 12 ENCLOSURE, MIN 14 GAUGE STEEL CONSTRUCTION WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL, AND HINGED LOCKABLE DOOR. PAINT ENCLOSURE ANSI 61 GRAY AND PAINT BACK PANEL WHITE.

3) TAG EACH END OF ALL JUMPERS WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS).

4) LABEL ALL PANEL DEVICES ON BASE OR BACK PANEL ADJACENT TO ITEM. LABEL REMOTE EQUIPMENT CONNECTIONS AT EACH TERMINAL BLOCK BY THE ITEM TITLE AS SHOWN ON THE FIELD SIDE OF THE TERMINAL STRIP DRAWING.

5) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR AS INDICATED. SECURE TO PANEL FACE WITH A MINIMUM OF TWO MOUNTING SCREWS.

6) PROGRAM THE DIFFERENTIAL SETPOINT CONTROLLER (DSC) WITH THE FOLLOWING SETTINGS:
SET THE DRAINDOWN/DRAINBACK DIP SWITCH TO DRAINDOWN.
△T SETPOINT=7; △T DIFFERENTIAL=5; MINIMUM SOURCE SETPOINT=160; MINIMUM SOURCE DIFFERENTIAL=5;
MAXIMUM STORAGE SETPOINT=200; MAXIMUM STORAGE DIFFERENTIAL=10. SET DISPLAY TO °F.

6) BENCH TEST COMPLETED UNIT. PROVIDE MIN 48 HOURS NOTICE TO ENGINEER TO SCHEDULE OBSERVATION OF BENCH TEST. PROVIDE SWITCHES AND LAMPS TO SIMULATE OPERATION OF ALL FIELD DEVICES.

FIELD INSTALLATION NOTES:

1) SEE FIELD WIRING DIAGRAM 3/E8.1. PERFORM ALL FIELD WIRING IN ACCORDANCE WITH ELECTRICAL SPECIFICATIONS. FIELD WIRING TO MOTORS MIN #12 AWG. LABEL BOTH ENDS OF ALL CONDUCTORS WITH PANEL TERMINAL BLOCK TERMINATION NUMBERS.

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT. PROVIDE THE PANEL FOR THE WASHETERIA UNDER ADDITIVE ALTERNATE #2. PROVIDE THE PANEL FOR THE SCHOOL UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION
JULY 2022

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

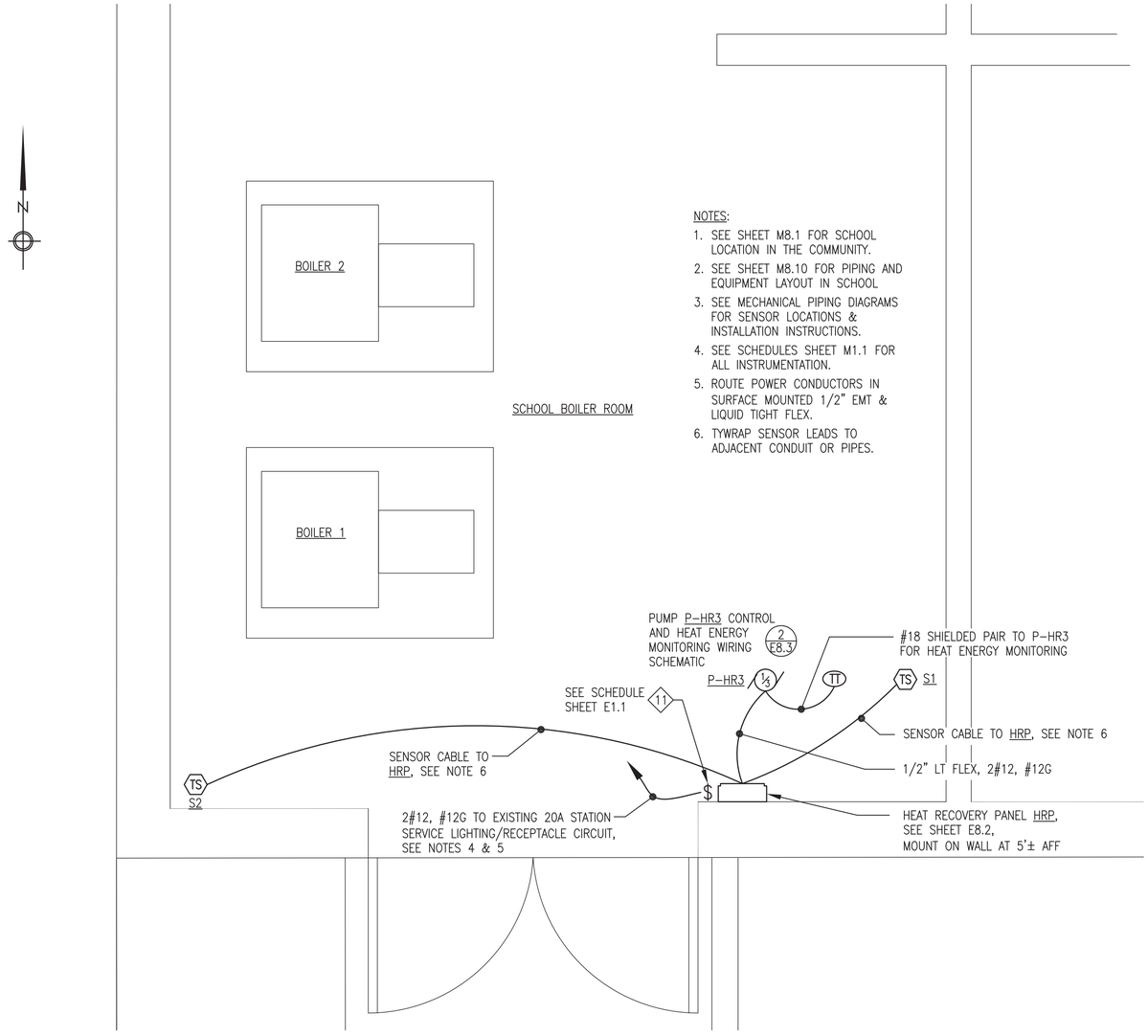
ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

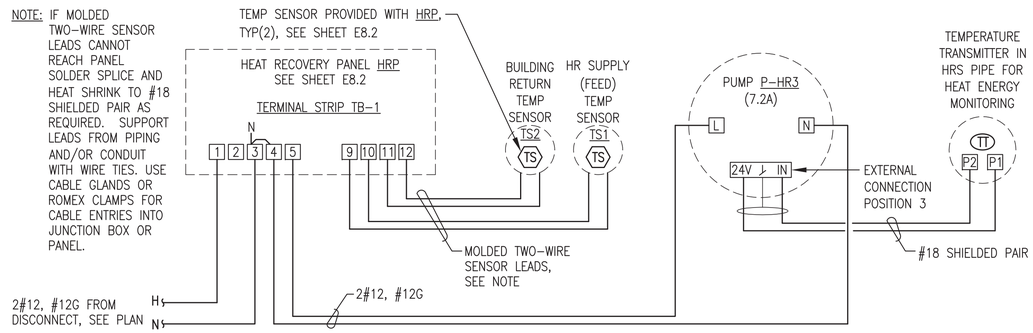
TITLE: HEAT RECOVERY SYSTEM
WASHETERIA HEAT RECOVERY PANEL HRP

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 7/15/22
FILE NAME: RAM PP E8 | SHEET: E8.2 OF 8
PROJECT NUMBER:



1 E8.3 SCHOOL MECH BUILDING HEAT RECOVERY WIRING PLAN
3/4"=1'-0"



PUMP P-HR3 PROGRAMMING NOTES

START UP GUIDE: ON INITIAL STARTUP, THE STARTUP GUIDE WILL RUN AUTOMATICALLY. ENTER THE FOLLOWING VALUES:
- UNITS = US UNITS
- CONTROL MODE = "CONSTANT PRESSURE"
- SET POINT = 7PSI
- ESTIMATED FLOW RATE = 30GPM
- HEAD = 7PSI

THESE VALUES SHOULD APPEAR ON THE PUMP CONTROL PANEL "HOME SCREEN" AFTER THE STARTUP GUIDE RUNS.

"SETTINGS" MENU: DETAILED PUMP PARAMETER SETTINGS ARE PROGRAMMED THROUGH THIS MENU WITH ADDITIONAL INFORMATION AND SUPPORT PROVIDED THROUGH THE "ASSIST" MENU. CONFIGURE THE PUMP TO DISPLAY HEAT ENERGY DELIVERED IN US UNITS (GPH, BTU). ENTER THE FOLLOWING VALUES:
- OPERATING MODE = NORMAL
- ANALOG INPUT = HEAT ENERGY MONITOR
- ANALOG INPUT UNIT = °F
- SENSOR RANGE, MIN = 120
- SENSOR RANGE, MAX = 240
- ELECTRICAL SIGNAL = 4-20mA

SET ALL OTHER VALUES AS DEFAULT OR AS REQUIRED FOR STANDARD ENGLISH LANGUAGE AND US UNITS OPERATION.

2 E8.3 PUMP P-HR3 CONTROL & HEAT ENERGY MONITORING WIRING SCHEMATIC
NO SCALE

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT UNDER ADDITIVE ALTERNATE #1

ISSUED FOR CONSTRUCTION DECEMBER 2023

STATE OF ALASKA 49TH CLOIS W. VERSYP EE 7802 REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: RAMPART POWER SYSTEM UPGRADE

TITLE: HEAT RECOVERY SYSTEM SCHOOL WIRING PLAN & DIAGRAMS

Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 12/15/23
FILE NAME: RAM PP E8 | SHEET: E8.3 OF 8
PROJECT NUMBER:

DISTRIBUTION SYSTEM GENERAL NOTES

1. ALL CONSTRUCTION WORK SHALL BE DONE IN ACCORDANCE WITH THE STAKING SHEETS, NOTES TO STAKING SHEETS, SPECIFICATIONS, AND THE DRAWINGS.

2. THE 2007 EDITION OF ANSI C2 – NATIONAL ELECTRICAL SAFETY CODE (NESC), RUS BULLETIN 1728F-804 AND SPECIFICATIONS AND DRAWINGS FOR 12.47/7.2 kV LINE CONSTRUCTION, UNLESS MODIFIED BY THESE DRAWINGS OR SPECIFICATIONS, SHALL BE FOLLOWED, INCLUDING ANY STATE OF ALASKA AMENDMENTS. OBTAIN COPIES OF THE RUS BULLETINS AND MAINTAIN COPIES ON THE JOB SITE. ADDITIONALLY, CONSTRUCTION SPECIFICATIONS ARE INCLUDED IN DIVISIONS 26 AND 33 OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL BE THOROUGHLY FAMILIAR WITH THE CONTRACT DOCUMENTS, RUS CONSTRUCTION UNITS, AND ANSI C2.

3. THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM CURRENTLY SERVES CUSTOMERS. SERVICE SHALL BE MAINTAINED AT ALL TIMES TO THE CUSTOMERS EXCEPT WHEN OUTAGES ARE REQUIRED FOR SERVICE CONVERSION OR OTHER CONSTRUCTION RELATED ACTIVITIES. ALL OUTAGES SHALL BE COORDINATED IN ADVANCE WITH RAMPART VILLAGE COUNCIL (OWNER). PRIOR TO COMMENCING WORK ON THE UPGRADE, MEET WITH RAMPART VILLAGE COUNCIL TO DEVELOP AN OUTAGE SCHEDULE THAT WILL KEEP DISRUPTIONS OF POWER TO THE CUSTOMERS TO A MINIMUM. RAMPART VILLAGE COUNCIL SHALL HAVE FINAL AUTHORITY ON WHEN OUTAGES CAN OCCUR.

4. UNLESS OTHERWISE INDICATED, THE EXISTING PRIMARY AND SECONDARY DISTRIBUTION SYSTEM, INCLUDING HARDWARE, CONDUCTORS (BOTH PRIMARY AND SECONDARY), TRANSFORMERS, CROSSARMS, INSULATORS, LIGHTS, ANCHOR RODS, GUYS, AND ALL OTHER MATERIAL DIRECTLY RELATED TO THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM BEING TAKEN OUT OF SERVICE SHALL BE REMOVED AFTER COMPLETION OF THE INSTALLATION, ENERGIZATION, AND SERVICE CONVERSIONS TO THE NEW ELECTRICAL DISTRIBUTION SYSTEM. POLES THAT HAVE TELECOM SYSTEM CONDUCTORS OR EQUIPMENT ATTACHED SHALL NOT BE REMOVED.

5. ALL EXISTING UTILITIES MAY NOT BE SHOWN. CONTRACTOR SHALL LOCATE ALL UNDERGROUND UTILITIES PRIOR TO DIGGING HOLES FOR POLES AND ANCHORS. COORDINATE WITH THE RAMPART VILLAGE COUNCIL TO LOCATE UNDERGROUND UTILITIES.

6. THE DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW ALL FEATURES OF THE REQUIRED WORK. PROVIDE ALL EQUIPMENT AND MATERIALS REQUIRED FOR A COMPLETE SYSTEM. VERIFY EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IMMEDIATELY CONTACT THE ENGINEER FOR CLARIFICATION OF QUESTIONABLE ITEMS OR APPARENT CONFLICTS.

7. ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK ASSOCIATED WITH WORKING ON OR NEAR AN ENERGIZED MEDIUM VOLTAGE DISTRIBUTION SYSTEM.

8. THE SITE PLANS USED WERE DEVELOPED USING A COMBINATION OF AERIAL PHOTOGRAPHY AND SURVEY DATA PROVIDED BY OTHERS. ANY VARIATIONS BETWEEN WHAT IS SHOWN AND THE ACTUAL FIELD CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER.

9. SEE CONSTRUCTION SPECIFICATIONS FOR ADDITIONAL INFORMATION.

10. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR COORDINATING HIS WORK WITH EXISTING FACILITY OPERATORS, OTHER CONTRACTORS AND/OR SUBCONTRACTORS WORKING IN THE COMMUNITY, LOCAL UTILITY AND GOVERNMENT ORGANIZATIONS, AND STATE AND FEDERAL AUTHORITIES.

11. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROVIDING CONSTRUCTION ACCESS FOR EQUIPMENT AND PERSONNEL AS REQUIRED TO COMPLETE POLE INSTALLATION, POLE HARDWARE AND CONDUCTOR INSTALLATION, AND ALL OTHER PROJECT TASKS. CONTRACTOR SHALL COORDINATION WITH LOCAL ENTITIES AND RESIDENTS, ERECT TEMPORARY STRUCTURES, AND PERFORM TEMPORARY REMOVAL/RELOCATION AND REPLACEMENT OF ALL STRUCTURES, STEAM HOUSES, ETC. AS NECESSARY TO COMPLETE THE WORK. ALL EXISTING STRUCTURES AFFECTED BY THE WORK SHALL BE RETURNED TO THEIR ORIGINAL OR BETTER CONDITION BY THE CONTRACTOR IMMEDIATELY AFTER THE CONTRACTOR'S WORK IN THAT AREA IS COMPLETED. CONTRACTOR SHALL COORDINATE ALL NECESSARY PUBLIC SAFETY ACTIVITIES INCLUDING SIGNAGE, BARRIERS, TRAFFIC CONTROL PLANS, LIGHTING, PUBLIC NOTIFICATIONS, AND OTHER ITEMS DEEMED NECESSARY TO PROTECT THE PUBLIC DURING CONSTRUCTION ACTIVITIES.

12. THE CONTRACTOR SHALL BALANCE THE PHASES OF THE NEW DISTRIBUTION SYSTEM. DURING CONSTRUCTION LOAD IMBALANCE SHOULD BE KEPT TO A MINIMUM AND SHALL NOT EXCEED 10%. .

TELECOM SYSTEM GENERAL NOTES

1. THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM POLES ARE SHARED WITH THE TELECOM SYSTEM, UNITED UTILITY, INC. CONTRACTOR SHALL NOT DISRUPT THE EXISTING TELECOM SYSTEM WITHOUT THE CONSENT OF THE TELECOM COMPANY. ANY PART OF THE EXISTING TELECOM SYSTEM DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED OR REPLACED AS DIRECTED BY THE TELECOM COMPANY.

2. UNLESS OTHERWISE NOTED ON THE DRAWINGS, THE EXISTING TELECOM SYSTEM SHALL REMAIN AS IS. WHERE POLES WITH TELECOM CONDUCTORS OR EQUIPMENT ARE REPLACED, TELECOM CONDUCTORS OR EQUIPMENT SHALL BE REATTACHED TO THE NEW POLE.

3. POLES TAKEN OUT OF SERVICE THAT HAVE TELECOM CONDUCTORS OR EQUIPMENT ATTACHED SHALL NOT BE REMOVED.

DISTRIBUTION UPGRADE SCOPE OF WORK

1. THE SCOPE OF WORK FOR UPGRADING THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM IN RAMPART, ALASKA, IS AS FOLLOWS:
   - UPGRADE 2-PHASE PRIMARY DISTRIBUTION TO 3-PHASE FROM THE WASHETERIA TO C STREET.
   - UPGRADE 1-PHASE PRIMARY DISTRIBUTION TO 2-PHASE FROM C STREET TO EAST OF A STREET.
   - INSTALL NEW 1-PHASE PRIMARY DISTRIBUTION ALONG D STREET FROM 2ND AVENUE TO THE END OF D STREET.
   - INSTALL NEW 1-PHASE PRIMARY DISTRIBUTION ALONG 4TH AVENUE FROM D STREET TO E STREET.
   - INSTALL NEW PRIMARY DISTRIBUTION FROM THE OLD POWER PLANT TO THE WEST SIDE OF THE COMMUNITY.
   - RESET LEANING POLES, RE-TENSION GUYS, INSTALL NEW GUYS AND ANCHORS WHERE NEEDED AND REPLACE POLES TO RAISE LOW SECONDARY CONDUCTORS.

2. THE LIMIT OF CONSTRUCTION FOR NEW SERVICE DROPS IS THE CONNECTION TO THE EXISTING SERVICE MAST OF THE HOUSE BEING SERVED. THE CONTRACTOR SHALL REMOVE THE EXISTING SECONDARY SERVICE DROP CONDUCTORS AS INDICATED ON THE DRAWINGS AND INSTALL NEW SERVICE CONDUCTORS AS INDICATED ON THE DRAWINGS. THE EXISTING METER BASE OR SERVICE MAST WILL NOT BE THE RESPONSIBILITY OF THE CONTRACTOR EXCEPT FOR PROVIDING DEADEND ASSEMBLIES AND MAKING THE CONNECTION TO THE EXISTING SERVICE ENTRANCE CONDUCTORS AT THE SERVICE MAST. IF THE EXISTING SERVICE MAST IS NOT IN SATISFACTORY CONDITION TO SUPPORT THE NEW SERVICE, THE CONTRACTOR SHALL NOTIFY RAMPART VILLAGE COUNCIL FOR RESOLUTION. THE CONTRACTOR SHALL NOTIFY RAMPART VILLAGE COUNCIL FAR ENOUGH IN ADVANCE TO ALLOW RAMPART VILLAGE COUNCIL TIME TO REPAIR OR REPLACE THE SERVICE MAST.

DISTRIBUTION SYSTEM INSTALLATION NOTES

1. SEE SPECIFICATIONS FOR EQUIPMENT REQUIREMENTS AND COMPLETE REQUIREMENTS FOR ELECTRICAL DISTRIBUTION INSTALLATION.

2. WHERE RUS UNITS ARE REFERENCED, MATERIAL ITEMS MAY NOT BE LISTED IN THE MATERIAL LIST. CONTRACTOR SHALL REFER TO RUS UNIT REFERENCED TO DETERMINE WHAT MATERIAL MUST BE PROVIDED.

3. ANY MODIFIED RUS CONSTRUCTION UNIT OR ANY NEW CONSTRUCTION UNITS ARE INCLUDED IN THE DETAIL SHEETS OF THE DRAWINGS. ANY STANDARD RUS CONSTRUCTION UNITS REFERENCED ON THE DRAWINGS OR STAKING SHEETS SHALL BE OBTAINED BY THE CONTRACTOR. FAILURE TO HAVE THE CORRECT RUS CONSTRUCTION UNIT WILL NOT BE ACCEPTABLE AS AN EXCUSE FOR AN INCORRECT INSTALLATION.

4. ALL HARDWARE SHALL BE ALUMINUM, HOT DIP GALVANIZED, OR STAINLESS STEEL. ALL SMALL FASTENERS SHALL BE STAINLESS STEEL.

5. PRIMARY OVERHEAD CONDUCTOR SHALL #2 ACSR.

6. ALL INSULATOR TIES SHALL BE PREFORMED TYPE. ALL NEUTRAL AND PHASE CONDUCTOR DEADENDS SHALL BE PREFORMED TYPE.

7. ALL PHASE CONDUCTOR DEADENDS SHALL BE MADE USING A SHOE TYPE CLAMP.

8. NOT ALL GROUNDS ARE SHOWN. GROUND NEUTRAL WIRE AND TRANSFORMER GROUNDED BUSHING ALONG WITH TRANSFORMER CASE. ROUTE #4 AWG SOLID COPPER GROUND CONDUCTOR DOWN POLE GROUND. ATTACH COPPER GROUND CONDUCTOR TO POLE WITH COPPER PLATED STAPLES. ALL CONNECTIONS TO CABLE SHALL BE MADE WITH COPPER COMPRESSION LUGS. NO ALUMINUM CONNECTORS OR CABLES SHALL BE USED, EXCEPT AT CONNECTIONS TO ACSR. AT ACSR CONNECTIONS, USE CONNECTORS RATED FOR COPPER/ALUMINUM.

9. ALL QUANTITIES MAY NOT BE SHOWN. DETERMINE QUANTITIES OF ALL NECESSARY MATERIAL AND EQUIPMENT.

10. ARMOR RODS SHALL BE PROVIDED FOR ALL NEW ACSR CONDUCTORS. ARMOR RODS SHALL BE INSTALLED AT EACH INSULATOR BUT WILL NOT BE REQUIRED AT PRIMARY DEAD-END ASSEMBLIES.

11. INSULATORS SHALL BE SELECTED TO PROPERLY ACCOMMODATE THE ARMOR ROD INSTALLED ON THE CONDUCTOR.

DISTRIBUTION SYSTEM TEMPORARY INSTALLATION NOTES

1. THE UPGRADES TO THE EXISTING ELECTRICAL DISTRIBUTION SYSTEM WILL REQUIRE TEMPORARY INSTALLATIONS TO MINIMIZE OUTAGES AND MAINTAIN POWER TO THE CUSTOMERS DURING THE CONSTRUCTION OF THE UPGRADES. AS INDICATED, ALL OUTAGES SHALL BE COORDINATED WITH AND APPROVED BY THE RAMPART VILLAGE COUNCIL. ACCEPTABLE METHODS WILL BE AS FOLLOWS:

   a) CONTRACTOR MAY INSTALL TEMPORARY INSULATED MEDIUM VOLTAGE CONDUCTORS AND ROUTE THE CONDUCTORS ON THE GROUND. IF THIS METHOD IS CHOSEN, THE AT-GRADE CONDUCTORS SHALL BE PROTECTED FROM VANDALISM AND DAMAGE AND PROVISIONS SHALL BE MADE FOR THE SUPPORT OF THE EXISTING POLES DURING THE INSTALLATION OF THE UPGRADES.

   b) OTHER METHODS MAY BE PROPOSED BY THE CONTRACTOR AS APPLICABLE TO ALLOW INSTALLATION OF THE UPGRADES WHILE THE EXISTING SYSTEM REMAINS IN SERVICE.

2. IN ALL CASES, THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE BEST METHOD OF MAINTAINING POWER TO CUSTOMERS WHILE THE UPGRADES ARE BEING INSTALLED. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL REQUIRED FOR TEMPORARY INSTALLATIONS.

3. AT ALL TIMES AND IN ALL LOCATIONS, TEMPORARY INSTALLATIONS SHALL MEET THE NESC SAFETY REQUIREMENTS. ANY TEMPORARY INSTALLATION THAT IS ROUTED ON THE GROUND SHALL BE CLEARLY IDENTIFIED AND, IF REQUIRED, PROVISIONS SHALL BE INSTALLED FOR PERSONNEL AND VEHICLE CROSSING.

ABBREVIATIONS

(E)	EXISTING
A	AMPERE
AC	ALTERNATING CURRENT
AIC	AMPERES INTERRUPTING CAPACITY
AWG	AMERICA WIRE GAGE
BCu	BARE COPPER
C	CONDUCTOR
C	CONDUIT
CB	CIRCUIT BREAKER
CIC	CABLE IN CONDUIT
CT	CURRENT TRANSFORMER
DIA	DIAMETER
DISC	DISCONNECT
DWG	DRAWING
EA	EACH
EL	ELEVATION
F	FAHRENHEIT
FT	FEET
FU	FUSE
G,GND	GROUND
H	HOT CONDUCTOR
HDPE	HIGH DENSITY POLYETHYLENE
HPS	HIGH PRESSURE SODIUM
HZ	HERTZ
JCN	JACKETED CONCENTRIC NEUTRAL
KVA	KILOVOLT-AMPERES
KW	KILOWATT
LFMC	LIQUID-TIGHT FLEXIBLE METAL CONDUIT
LFNC	LIQUID-TIGHT FLEXIBLE NON-METALLIC CONDUIT
LTG	LIGHTING
M	METER
MAX	MAXIMUM
MCM	THOUSAND CIRCULAR MILLS
MFR	MANUFACTURER
MIN	MINIMUM
N	NEUTRAL CONDUCTOR
NTS	NOT TO SCALE
P	POLE
PED	SECONDARY SERVICE PEDESTAL
PDS	PRIMARY DISTRIBUTION SWITCHGEAR
PH	PHASE
PVC	POLYVINYL CHLORIDE
R	SHUNT REACTOR
RMC	RIGID METAL CONDUIT, GALVANIZED
TR	TRANSFORMER
TYP	TYPICAL
UD	UNDERGROUND DISTRIBUTION
U/G	UNDERGROUND
UON	UNLESS OTHERWISE NOTED
USGS	UNITED STATES GEOLOGICAL SURVEY
V	VOLTS
VA	VOLT-AMPERES
VAC	VOLTS-ALTERNATING CURRENT
W	WATTS
WP	WEATHERPROOF
XFMR	TRANSFORMER
XLP	CROSS LINKED POLYETHYLENE

LEGEND

EXISTING SINGLE PHASE OVERHEAD PRIMARY	NEW SINGLE PHASE OVERHEAD PRIMARY
EXISTING 2-PHASE OVERHEAD PRIMARY	NEW 2-PHASE OVERHEAD PRIMARY
EXISTING 3-PHASE OVERHEAD PRIMARY	NEW 3-PHASE OVERHEAD PRIMARY
EXISTING UNDERGROUND	NEW UNDERGROUND
EXISTING SECONDARY*	NEW SECONDARY*
EXISTING ELECTRICAL POLE	NEW ELECTRICAL POLE
EXISTING STUB POLE	NEW STUB POLE
XX EXISTING TRANSFORMER XX=SIZE	XX NEW TRANSFORMER XX=SIZE
EXISTING GUY	NEW GUY
EXISTING LIGHT	NEW LIGHT

ALL ELECTRICAL DISTRIBUTION WORK SHALL BE PROVIDED UNDER ADDITIVE ALTERNATES AS INDICATED ON THE PAGES THAT FOLLOW.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH T.R. Keene EE-14401 09/09/22 REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503
PHONE: (907) 562-3252
#AECL882-AK

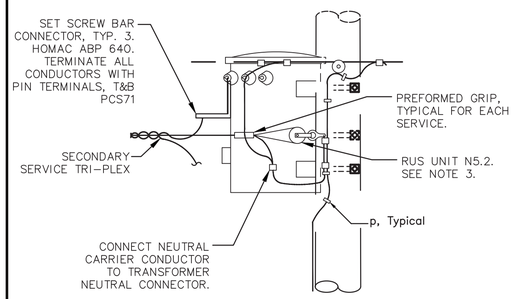
RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION LEGEND, ABBREVATIONS, SPECIFICATIONS & NOTES
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22

Plot Date: Dec 23
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E10.0

File: J:\JobsData\72310.02 Rampart Rpsu – Distribution Wo 14\00 Codd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg Plot Date: 12/28/2023 3:09 PM

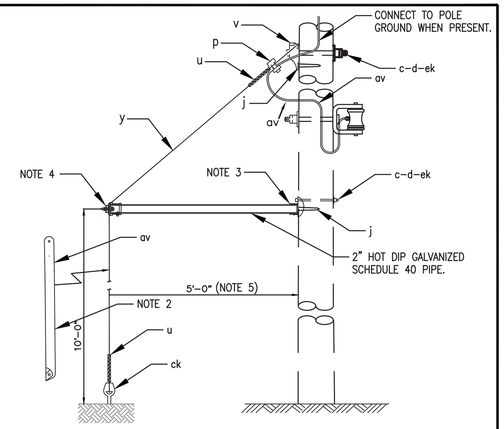


NOTES:
1) THIS CONSTRUCTION UNIT APPLIES ONLY TO SINGLE-PHASE SECONDARY CONNECTIONS AT SINGLE-PHASE TRANSFORMERS. FOR CONNECTIONS THREE-PHASE TRANSFORMERS SEE APPROPRIATE RUS CONSTRUCTION UNIT.
2) FOR POLE GROUNDING, TRANSFORMER GROUNDING, NEUTRAL CONNECTIONS, ETC. SEE THE APPROPRIATE RUS CONSTRUCTION UNIT.
3) FOR SERVICES ON OPPOSITE SIDES OF POLE PROVIDE TWO UNITS. AN EYE NUT MAY BE USED FOR THE SECOND UNIT IF DESIRED BY THE CONTRACTOR.

ITEM	QTY	MATERIAL
p		Connectors, as req'd
–	–	–
av		Jumpers, as req'd

SINGLE-PHASE SECONDARY SERVICE ASSEMBLY

DEC 2017		N7.6

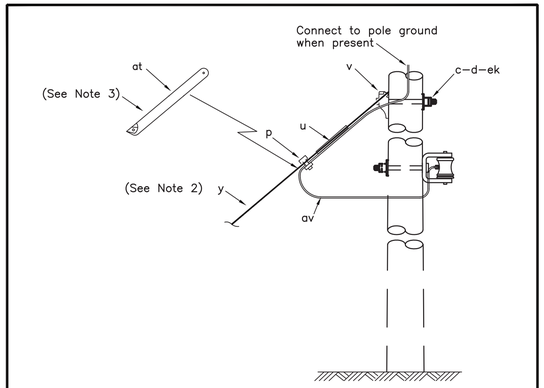


ITEM	QTY	MATERIAL
c	2	Bolt, machine, 5/8" x req'd length
d	1	Washer, 3" square, curved
j	3	Screw, lag, 1/2 x 4
p		Connectors, guy bond and as req'd
u	2	Deadend for guy strand, Preformed Line Products. See Specifications.
v	1	Guy attachment,
y		Guy wire, as req'd
at	1	Guy marker
av		Jumpers, as req'd
ck	1	Clamp, anchor bonding
ek	1	Locknuts

NOTES:
1. GUY WIRE SHALL BE 3/8" EHS.
2. INSTALL RED STRIPED REFLECTIVE TAPE ON BOTH SIDES OF GUY GUARD. INSTALL TAPE IN WARM ENVIRONMENT, ABOVE MANURACTURERS RECOMMENDED TEMPERATURE.
3. 2" POLE PLATE FOR SIDEWALK GUY ARM. HUBBELL CATALOG NO. 0501
4. 2" CLAMP END FITTING FOR SIDEWALK GUY ARM. HUBBELL CATALOG NO. 0502.
5. ADJUST LENGTH AS REQUIRED FOR LOCATION.

SIDE WALK GUY

DEC 2017		E7.1



NOTES:
1. PROVIDE PRE-FORMED GUY DEADEND (u.) OTHER DEADEND MATERIAL SHALL NOT BE SUBSTITUTED.
2. GUY WIRE SHALL BE 3/8" EHS UNLESS OTHERWISE NOTED. SEE SPECIFICATION.
3. INSTALL RED STRIPED REFLECTIVE TAPE ON BOTH SIDES OF GUY GUARD. INSTALL TAPE IN WARM ENVIRONMENT, ABOVE MANUFACTURE RECOMMENDED TEMPERATURE.

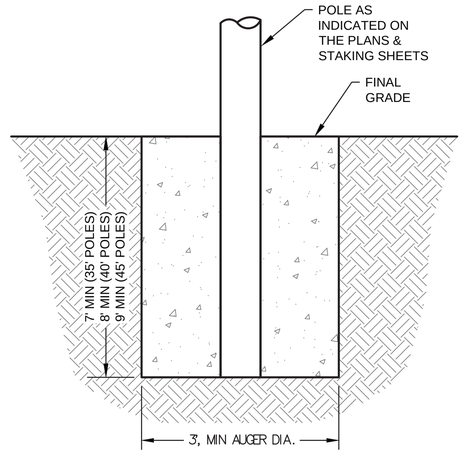
ITEM	QTY	MATERIAL
c	1	Bolt, machine, 3/4" x req'd length
d	1	Washer, square, 4", curved
p		Connectors, guy bond and as req'd
j	1	Screw, lag, 1/2" x 4"
u	2	Deadend for guy strand, heavy duty
v	1	Guy attachment, guy hook type
y		Guy wire, as req'd
at	1	Guy marker, Yellow
av		Jumpers, as req'd
ck	1	Clamp, anchor bonding
ek	1	Locknuts

DESIGN PARAMETERS:
PERMITTED LOAD IS LEAST OF: 8,500 LBS (IN ANY DIRECTION) or 90% of RATED BREAKING STRENGTH OF GUY WIRE

SINGLE DOWN GUY (THROUGH BOLT TYPE)

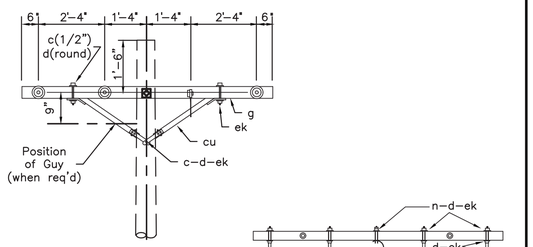
DEC 2017		E1.1La

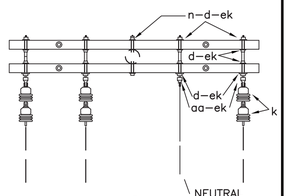
TRANSFORMER FUSE LINK SCHEDULE	
TRANSFORMER SIZE	FUSE LINK SIZE AND TYPE
10KVA	1.4 Amp, SloFast
15KVA	2.1 Amp, SloFast
25 KVA	3.5 Amp, SloFast
37.5 KVA	5.2 Amp, SloFast
75 KVA	10.4 Amp, SloFast
100 KVA	14 Amp, SloFast



NOTES:
1. AUGER MINIMUM 3' DIAMETER HOLE, DEPTH AS INDICATED.
2. BACKFILL WITH GRAVEL AND COMPACT IN MAXIMUM 8" LIFTS.

1 / E10.1 **TYPICAL POLE INSTALLATION**
Scale: NTS





PLAN

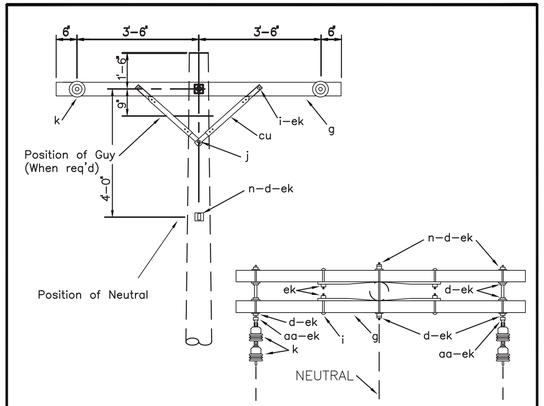
ITEM	QTY	MATERIAL
c	4	Bolt, machine, 1/2" x req'd length
c	2	Bolt, machine, 5/8" x req'd length
d	4	washer, round, 1 3/8"
d	19	Washer, square, 2 1/4"
g	2	Crossarm, 3 5/8" x 4 5/8" x 8'-0"
k	6	Insulator, suspension, 4 1/4"
n	4	Bolt, double arm, 5/8" x req'd length
aa	10	Nut, eye, 5/8"
cu	2	Brace, wood,
ek	22	Locknuts

NOTES:
1. Double arming bolt, item "n" and eye nut, item "aa" may be replaced with double arming eye bolt, item "dy."

DESIGN PARAMETERS:
PERMITTED UNBALANCED CONDUCTOR TENSION:
See Table B (Exhibit 2)

SINGLE DEADEND ON CROSSARMS

AUG 2022	3 – PHASE PRIMARY 12.47/7.2 kV	C7.2



PLAN

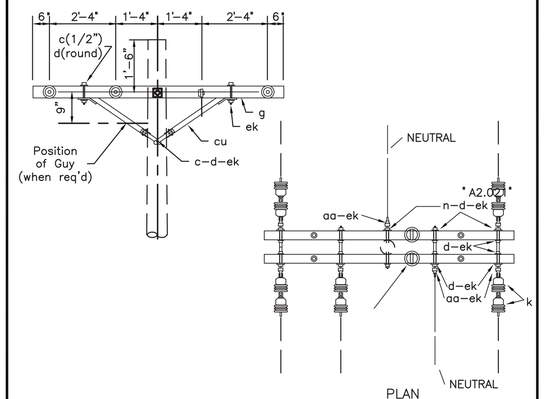
ITEM	QTY	MATERIAL
d	10	Washer, square, 2 1/4"
d	2	Washer, square, 3", curved
g	2	Crossarm, 3 5/8" x 4 5/8" x 8'0"
i	4	Bolt, carriage, 3/8" x 4 1/2"
j	2	Screw, lag, 1/2" x 4"
k	4	Insulator, suspension, 4 1/4"
n	4	Bolt,double arming,5/8" x req'd length
aa	3	Nut, eye, 5/8"
cu	4	Brace, 28"
ek	17	Locknuts

NOTES:
1. Double arming bolt, item "n", and eye nut, item "aa" may be replaced with double arming eye bolt, item "dy".

DESIGN PARAMETERS:
PERMITTED UNBALANCED CONDUCTOR TENSION:
See Table A (Exhibit 2)

SINGLE DEADEND ON CROSSARMS

AUG 2022	2 – PHASE PRIMARY 12.47/7.2 kV	B5.21a



PLAN

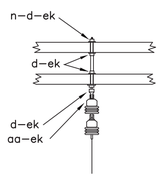
ITEM	QTY	MATERIAL
c	4	Bolt, machine, 1/2" x req'd length
c	2	Bolt, machine, 5/8" x req'd length
d	4	washer, round, 1 3/8"
d	19	Washer, square, 2 1/4"
g	2	Crossarm, 3 5/8" x 4 5/8" x 8'-0"
k	10	Insulator, suspension, 4 1/4"
n	5	Bolt, double arm, 5/8" x req'd length
aa	11	Nut, eye, 5/8"
cu	2	Brace, wood,
ek	24	Locknuts

NOTES:
1. Double arming bolt, item "n" and eye nut, item "aa" may be replaced with double arming eye bolt, item "dy."

DESIGN PARAMETERS:
PERMITTED UNBALANCED CONDUCTOR TENSION:
See Table B (Exhibit 2)

DOUBLE DEADEND ON CROSSARMS (3-PHASE TO 2-PHASE)

AUG 2022	3 – PHASE PRIMARY 12.47/7.2 kV	C8.2



A5.01a

NOTE: When connecting to existing bolt end, only eyenut "aa", locknut "ek" and insulators "k" are required.

ITEM	QTY	MATERIAL
d	4	Washer, square, 2 1/4"
k	2	Insulator, suspension, 4 1/4"
n	1	Bolt,double arming,5/8" x req'd length
aa	1	Nut, eye, 5/8"
ek	5	Locknuts

DESIGN PARAMETERS:
PERMITTED LONGITUDINAL LOAD = 5000 lbs./Conductor

DEADEND ON EXISTING CROSSARM

AUG 2022	12.47/7.2 kV	A5.01a

ALASKA ENERGY AUTHORITY

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#AECL882-AK

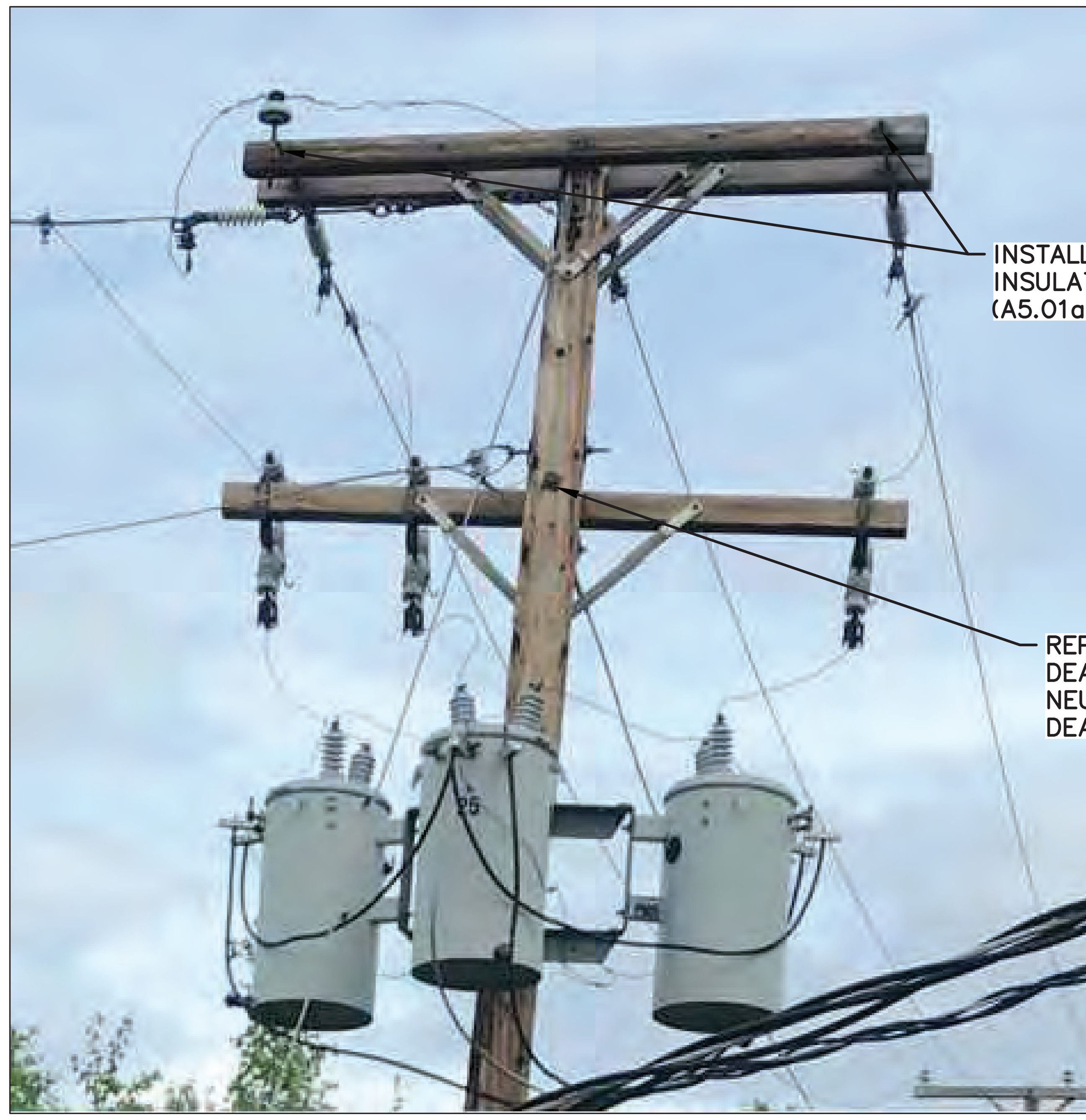
RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION DETAILS
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22

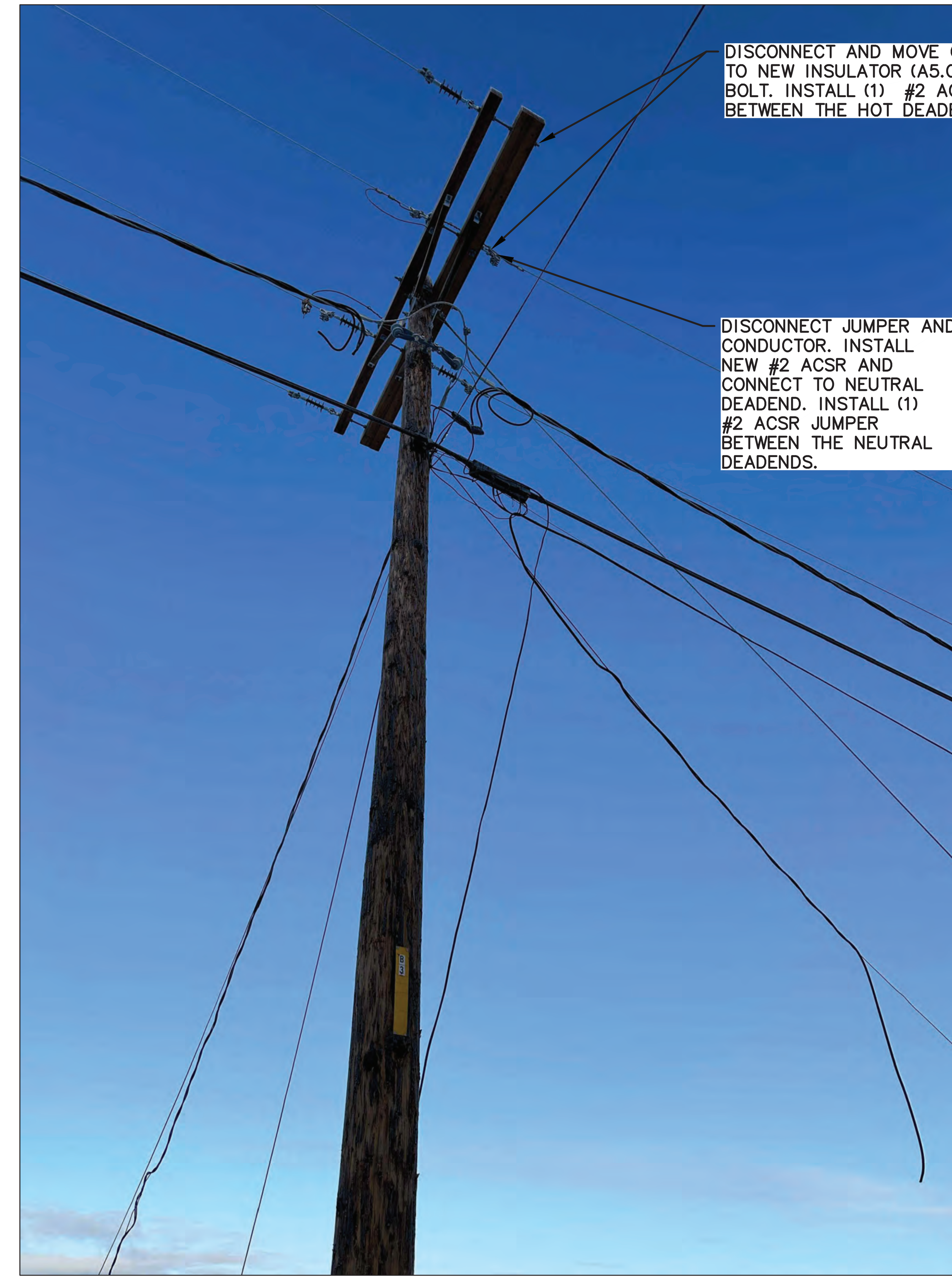
Plot Date: Dec 23
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E10.1

File: J:\JobsData\72310.02 Rampart Rpsu - Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg Plot Date: 12/28/2023 3:09 PM



1 E10.2 **POLE 1-2**
Scale: NTS



2 E10.2 **POLE 8**
Scale: NTS

File: J:\JobsData\72310.02 Rampart Rpsu - Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg   Plot Date: 12/28/2023 3:09 PM

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH T. R. Keene EE-14401 09/09/22 REGISTERED PROFESSIONAL ENGINEER

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ANCHORAGE, ALASKA 99503
PHONE: (907) 562-3252
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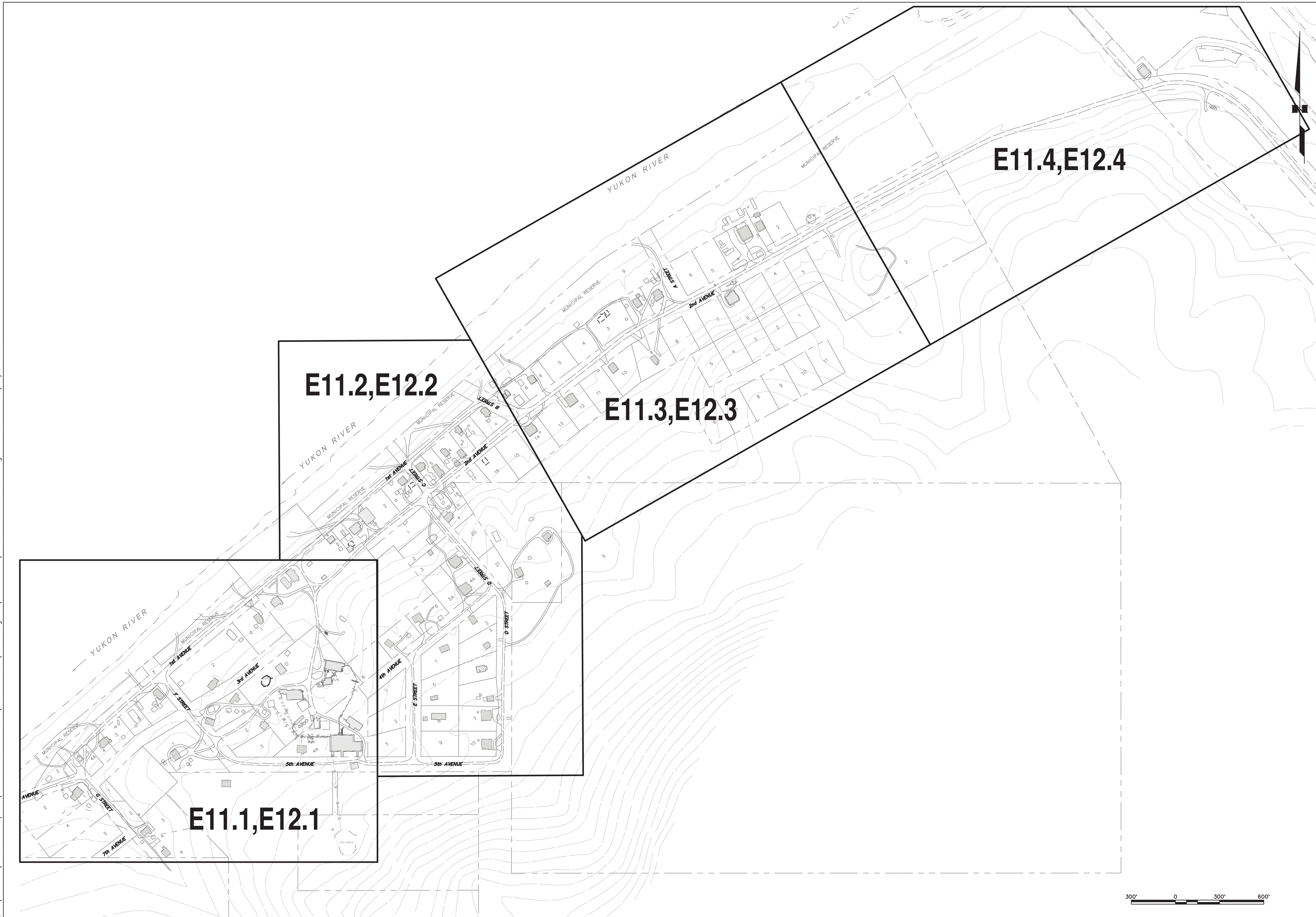
RAMPART POWER SYSTEM UPGRADE
POLE PHOTOS
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
1	REVISED PER DISTRIBUTION CHANGES	TRK	12/28/23

Plot Date Dec 23
Designed TRK
Drawn TRK
Approved KH

Sheet No. E10.2



ALASKA ENERGY AUTHORITY

STATE OF ALASKA
49 TH
Tyler R. Keene
EE-14401
09/09/22
REGISTERED PROFESSIONAL ENGINEER

CRW ENGINEERING GROUP, LLC
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ANCHORAGE, ALASKA 99503
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#AECL882-AK

RAMPART POWER SYSTEM UPGRADE

OVERALL DISTRIBUTION SITE PLAN

RAMPART, ALASKA

NO.	REVISION	BY	DATE
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Plot Date Dec 23
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.0

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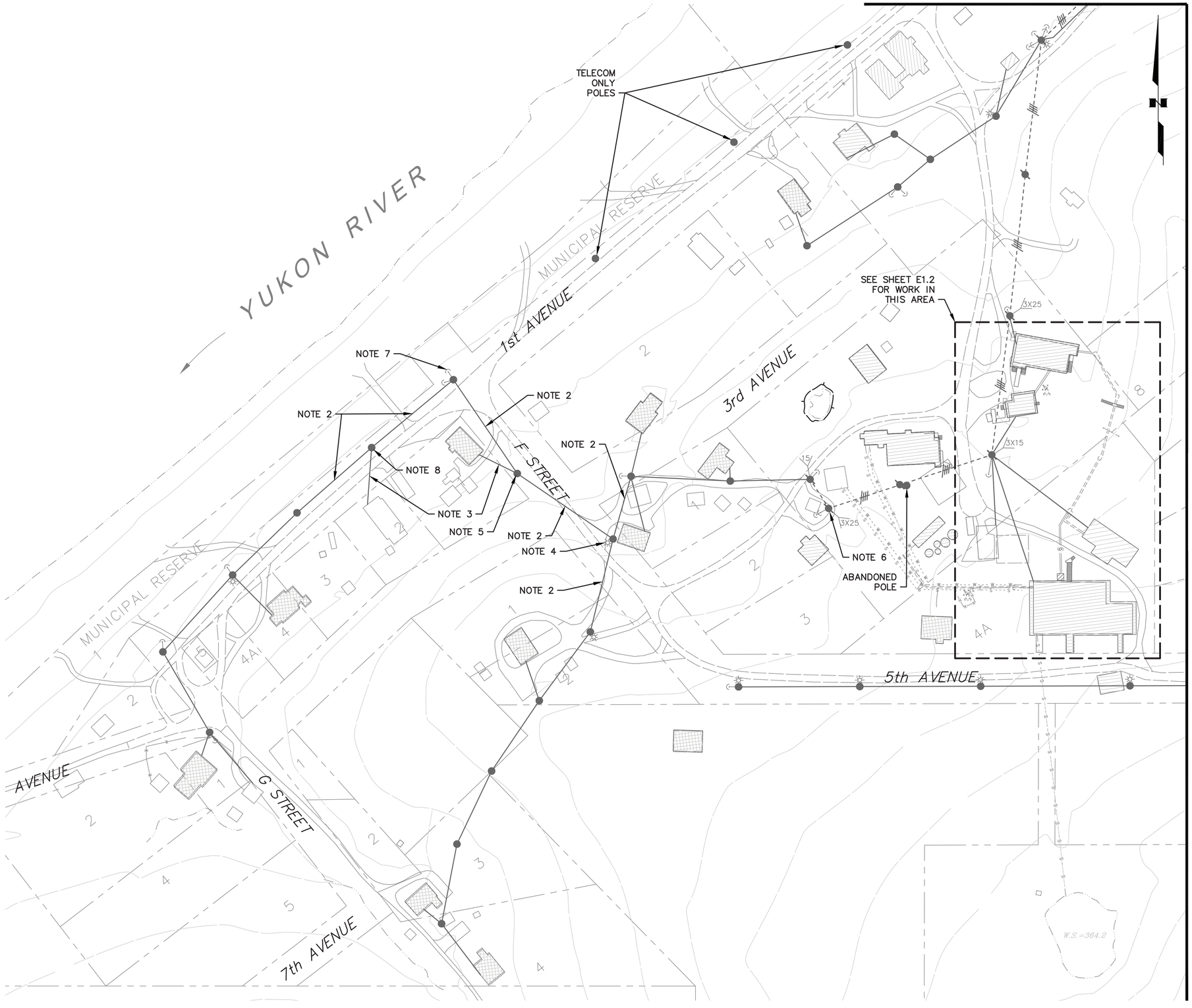

NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. DEMOLISH EXISTING SECONDARY CONDUCTORS BETWEEN POLES.
3. DEMOLISH SECONDARY SERVICE CONDUCTORS, PRESERVE SERVICE RISER.
4. POLE TO REMAIN FOR TELECOM. DEMOLISH ALL HARDWARE, ETC. RELATED TO SECONDARY DISTRIBUTION. REMOVE EXISTING LIGHT AND INSTALL ON NEW POLE 1–3, SEE SHEET E12.1.
5. POLE TO REMAIN FOR TELECOM. DEMOLISH ALL HARDWARE, ETC. RELATED TO SECONDARY DISTRIBUTION.
6. REPLACE SINGLE DEADEND WITH DOUBLE DEADEND, SEE STAKING SHEETS. DISCONNECT OLD POWER PLANT STEP UP TRANSFORMER BANK AFTER COMMISSIONING NEW POWER PLANT.
7. DEMOLISH GUY AND ANCHOR.
8. DEMOLISH POLE AND REPLACE, SEE SHEET E12.1. REATTACH EXISTING TELECOM TO NEW POLE.

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #3.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — 49TH — REGISTERED PROFESSIONAL ENGINEER — K. KAMM — EE-11401 — 09/09/22

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RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION DEMOLITION PLAN
(1 of 4)
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22

Plot Date: Dec 23
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E11.1

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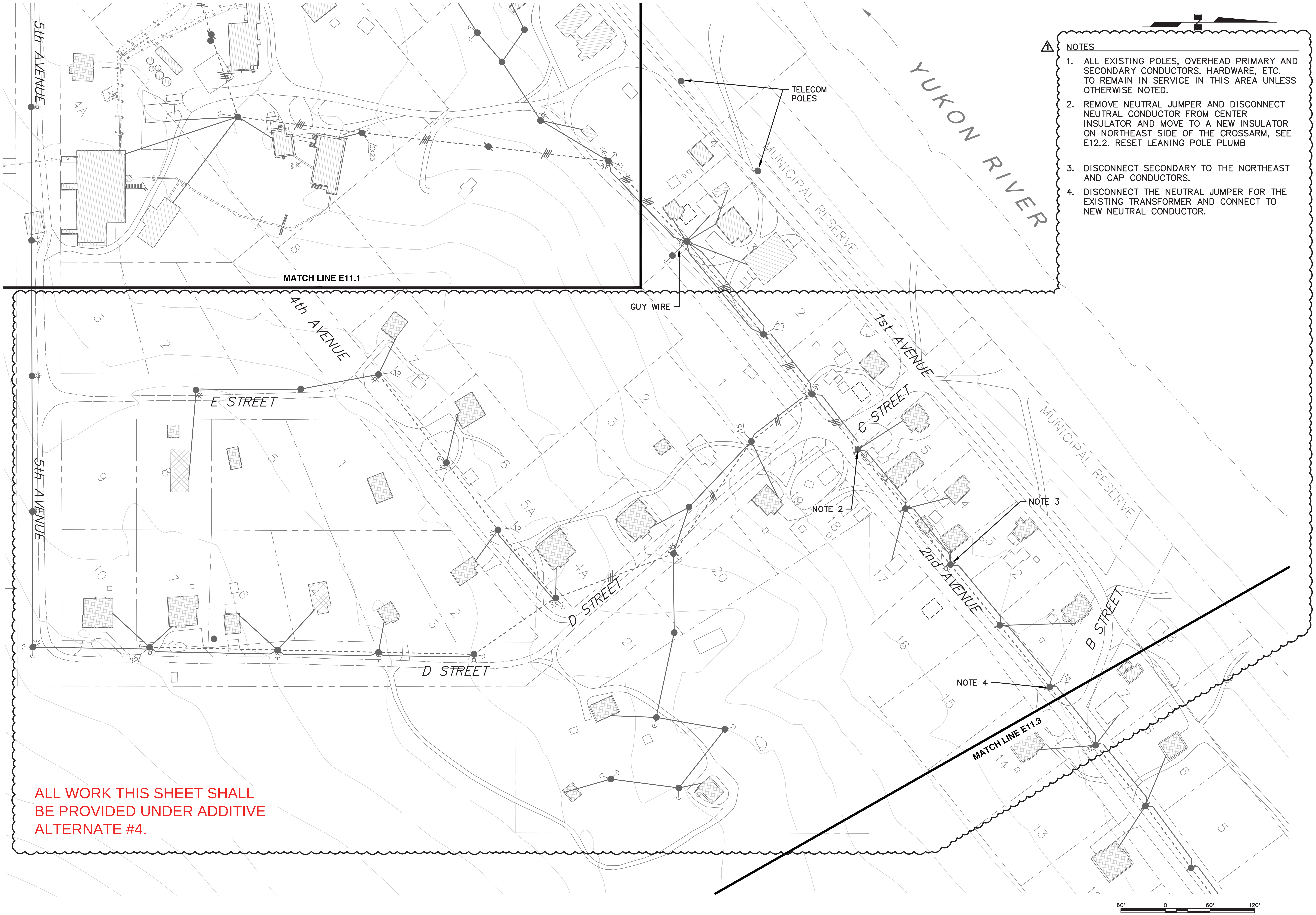

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.

NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. REMOVE NEUTRAL JUMPER AND DISCONNECT NEUTRAL CONDUCTOR FROM CENTER INSULATOR AND MOVE TO A NEW INSULATOR ON NORTHEAST SIDE OF THE CROSSARM, SEE E12.2. RESET LEANING POLE PLUMB
3. DISCONNECT SECONDARY TO THE NORTHEAST AND CAP CONDUCTORS.
4. DISCONNECT THE NEUTRAL JUMPER FOR THE EXISTING TRANSFORMER AND CONNECT TO NEW NEUTRAL CONDUCTOR.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH Tyler R. Keene EE-14401 09/09/22 REGISTERED PROFESSIONAL ENGINEER

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RAMPART POWER SYSTEM UPGRADE

DISTRIBUTION DEMOLITION PLAN
(2 of 4)

RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
1	REVISED PER DISTRIBUTION CHANGES	TRK	12/28/23

Plot Date Dec 23
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.2

File: J:\JobsData\72310.02 Rampart Rpsu - Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg Plot Date: 12/28/2023 3:09 PM

NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY AND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED.
2. DEMOLISH ALL EXISTING 1–PHASE HARDWARE, ETC. TAKEN OUT OF SERVICE DUE TO THE 2–PHASE PRIMARY UPGRADE AT THIS POLE. PRESERVE 1–PHASE DISTRIBUTION TO THE EAST AND SOUTH.
3. DEMOLISH ALL EXISTING 1–PHASE HARDWARE, ETC. TAKEN OUT OF SERVICE DUE TO THE 2–PHASE PRIMARY UPGRADE AT THIS POLE.
4. DEMOLISH EXISTING SECONDARY CONDUCTORS BETWEEN POLES. LEAVE ENOUGH SLACK AT EACH POLE TO ATTACH TO POLE/TRANSFORMER ON POLE TO THE WEST AND NEW CONDUCTORS ON POLE TO THE EAST.
5. REMOVE EXISTING GUY AND ANCHOR AND REPLACE. SEE SHEET E12.3.
6. DEMOLISH PRIMARY CONDUCTORS BACK TO POLE TO THE WEST AND TERMINATE ON NEW DOUBLE DEADEND. SEE SHEET E12.3.
7. DEMOLISH POLE.
8. DISCONNECT THE NEUTRAL JUMPER FOR THE EXISTING TRANSFORMER AND CONNECT TO NEW NEUTRAL CONDUCTOR.

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.

YUKON RIVER

RESERVE

MUNICIPAL

A STREET

2nd AVENUE

NOTE 2
NOTE 3
NOTE 4
NOTE 5
NOTE 6
NOTE 7
NOTE 8

MATCH LINE E11.2

MATCH LINE E11.4

60' 0 60' 120'

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH REGISTERED PROFESSIONAL ENGINEER K. KAMM EE-11401 09/09/22

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RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION DEMOLITION PLAN
(3 of 4)
RAMPART, ALASKA

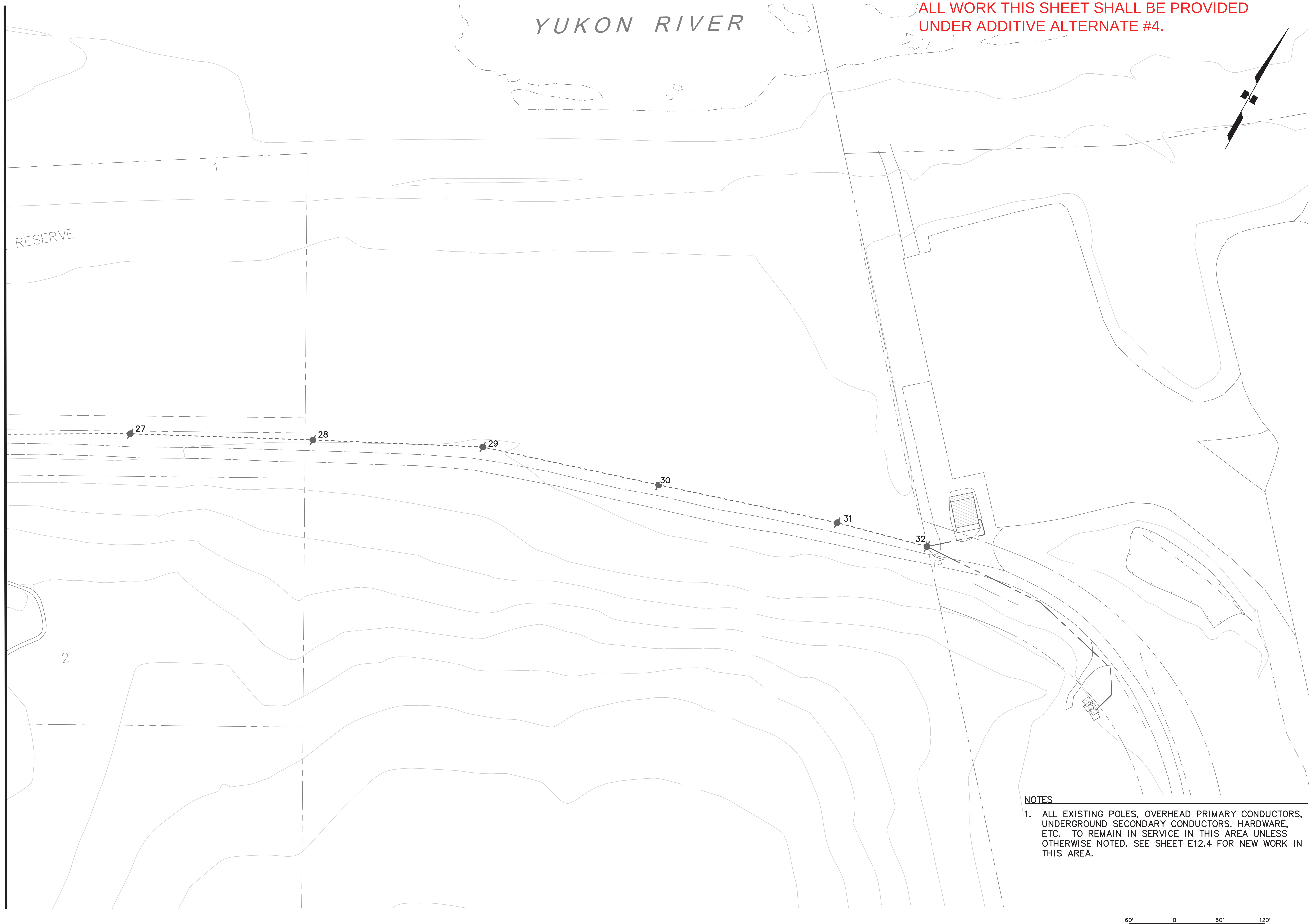
NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
1	REVISED PER DISTRIBUTION CHANGES	TRK	12/28/23

Plot Date: Dec 23
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E11.3

File: J:\JobsData\72310.02 Rampart Rpsu – Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg Plot Date: 12/28/2023 3:09 PM

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.



NOTES

1. ALL EXISTING POLES, OVERHEAD PRIMARY CONDUCTORS, UNDERGROUND SECONDARY CONDUCTORS. HARDWARE, ETC. TO REMAIN IN SERVICE IN THIS AREA UNLESS OTHERWISE NOTED. SEE SHEET E12.4 FOR NEW WORK IN THIS AREA.

Plot Date: 12/28/2023 3:09 PM

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ALASKA ENERGY AUTHORITY

STATE OF ALASKA — 49 TH — T.R. Keene — EE-14401 — 09/09/22 — REGISTERED PROFESSIONAL ENGINEER

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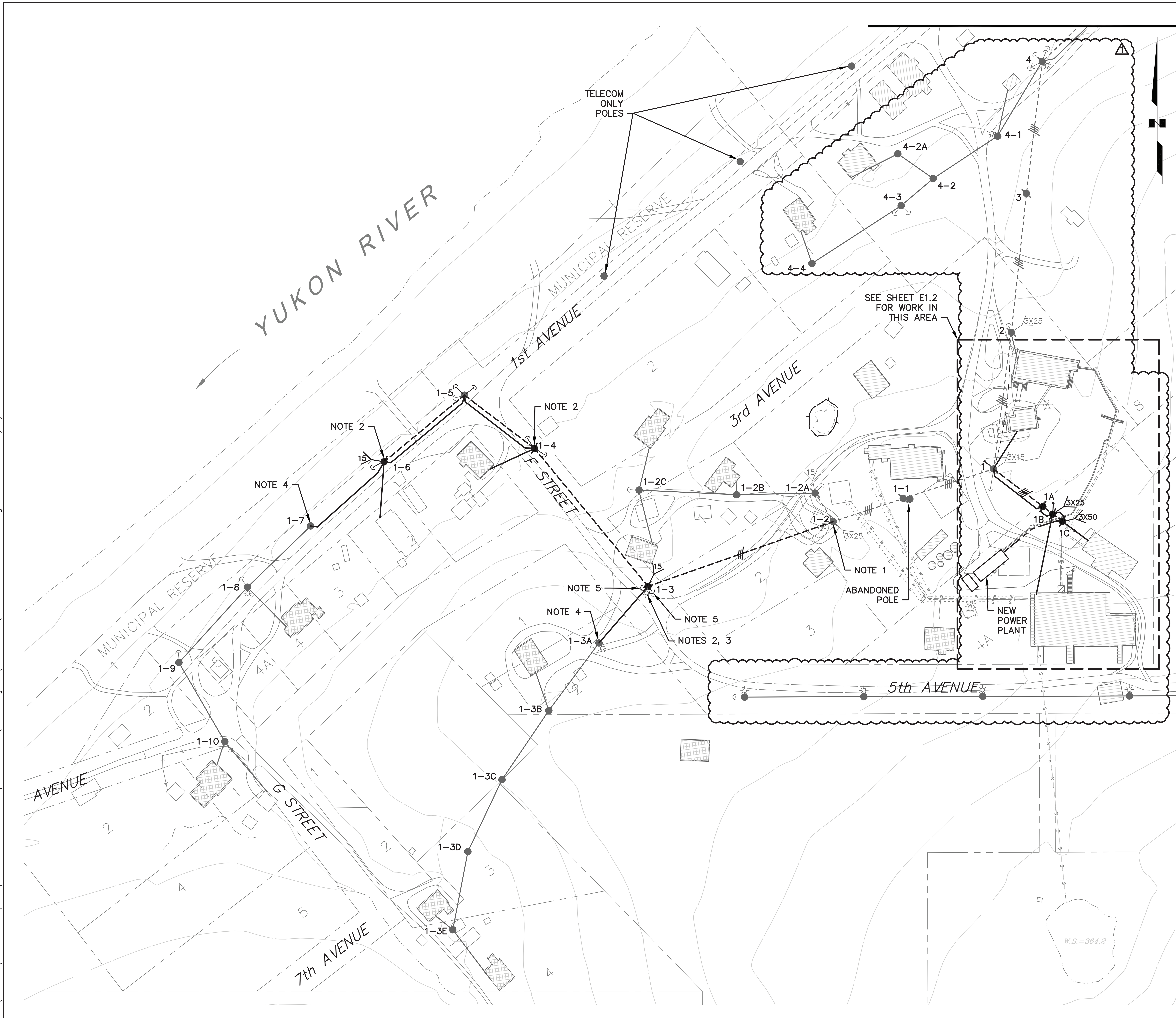
#AECL882-AK

RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION DEMOLITION PLAN
(4 of 4)
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22

Plot Date Dec 23
Designed TRK
Drawn TRK
Approved KH

Sheet No. E11.4



ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #3.

NOTES

1. UPGRADE EXISTING SINGLE DEADEND TO A DOUBLE DEADEND TO INSTALL NEW 2–PHASE PRIMARY DISTRIBUTION TO THE SOUTHWEST, SEE STAKING SHEETS. PRESERVE 1–PHASE TO THE NORTHEAST. SEE PHOTO 1/E10.2.
2. INSTALL NEW POLE, SEE STAKING SHEETS. REATTACH EXISTING TELECOM TO NEW POLE.
3. INSTALL REMOVED LIGHT ON NEW POLE.
4. CONNECT NEW TO EXISTING SECONDARY CONDUCTORS.
5. SIDEWALK GUY.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH Lee R. Keene EE-14401 09/09/22 REGISTERED PROFESSIONAL ENGINEER

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RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION PLAN
(1 of 4)
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
1	REVISED PER DISTRIBUTION CHANGES		

Plot Date Dec 23
Designed TRK
Drawn TRK
Approved KH

Sheet No. E12.1

Plot Date: 12/28/2023 3:09 PM

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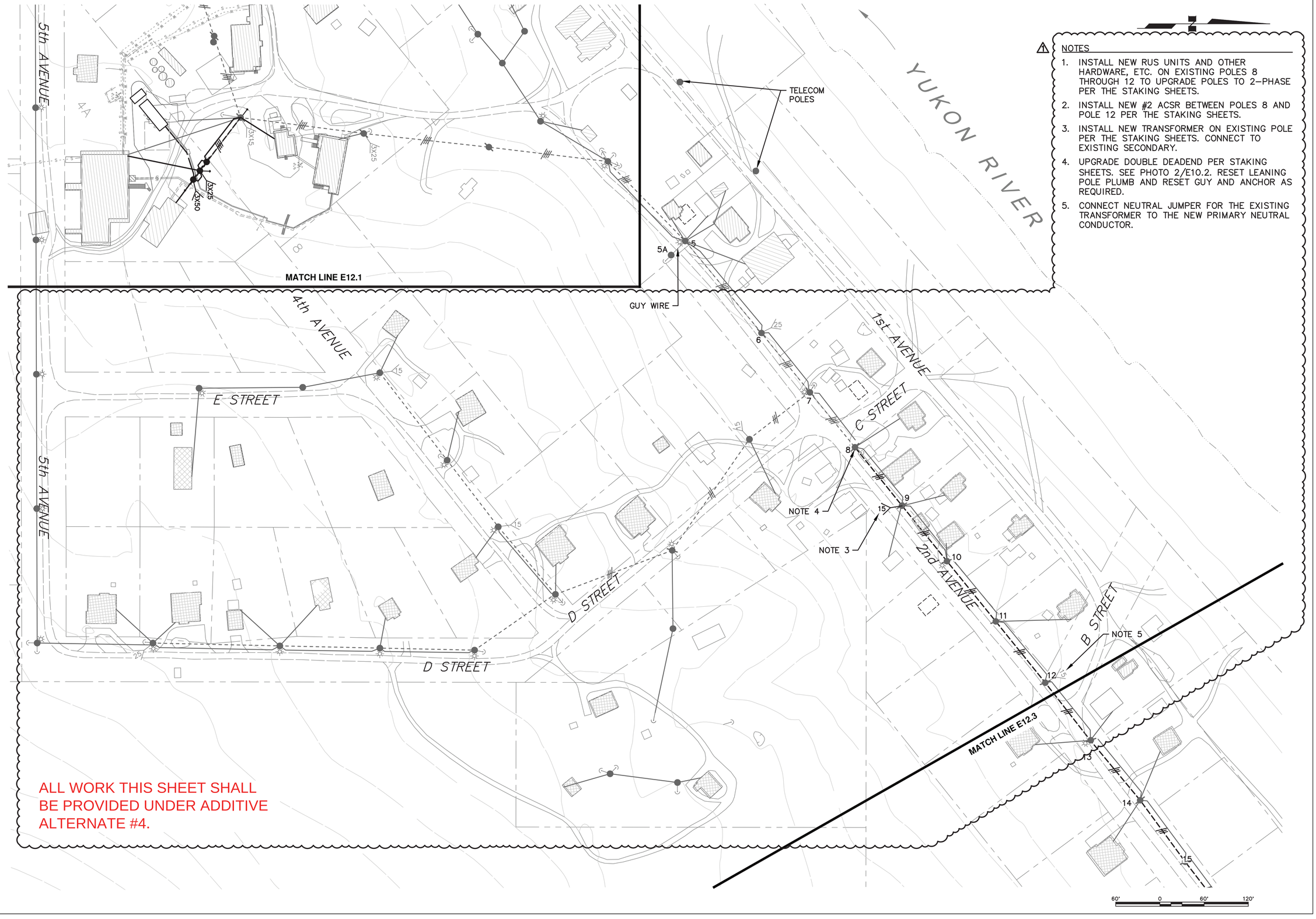

NOTES

1. INSTALL NEW RUS UNITS AND OTHER HARDWARE, ETC. ON EXISTING POLES 8 THROUGH 12 TO UPGRADE POLES TO 2–PHASE PER THE STAKING SHEETS.
2. INSTALL NEW #2 ACSR BETWEEN POLES 8 AND POLE 12 PER THE STAKING SHEETS.
3. INSTALL NEW TRANSFORMER ON EXISTING POLE PER THE STAKING SHEETS. CONNECT TO EXISTING SECONDARY.
4. UPGRADE DOUBLE DEADEND PER STAKING SHEETS. SEE PHOTO 2/E10.2. RESET LEANING POLE PLUMB AND RESET GUY AND ANCHOR AS REQUIRED.
5. CONNECT NEUTRAL JUMPER FOR THE EXISTING TRANSFORMER TO THE NEW PRIMARY NEUTRAL CONDUCTOR.

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.

ALASKA ENERGY AUTHORITY

STATE OF ALASKA — 49TH — REGISTERED PROFESSIONAL ENGINEER — T. KARNS — EE-11401 — 09/09/22

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#AECL882-AK

RAMPART POWER SYSTEM UPGRADE

DISTRIBUTION PLAN
(2 of 4)

RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
1	REVISED PER DISTRIBUTION CHANGES	TRK	12/28/23

Plot Date: Dec 23
Designed: TRK
Drawn: TRK
Approved: KH

Sheet No. E12.2

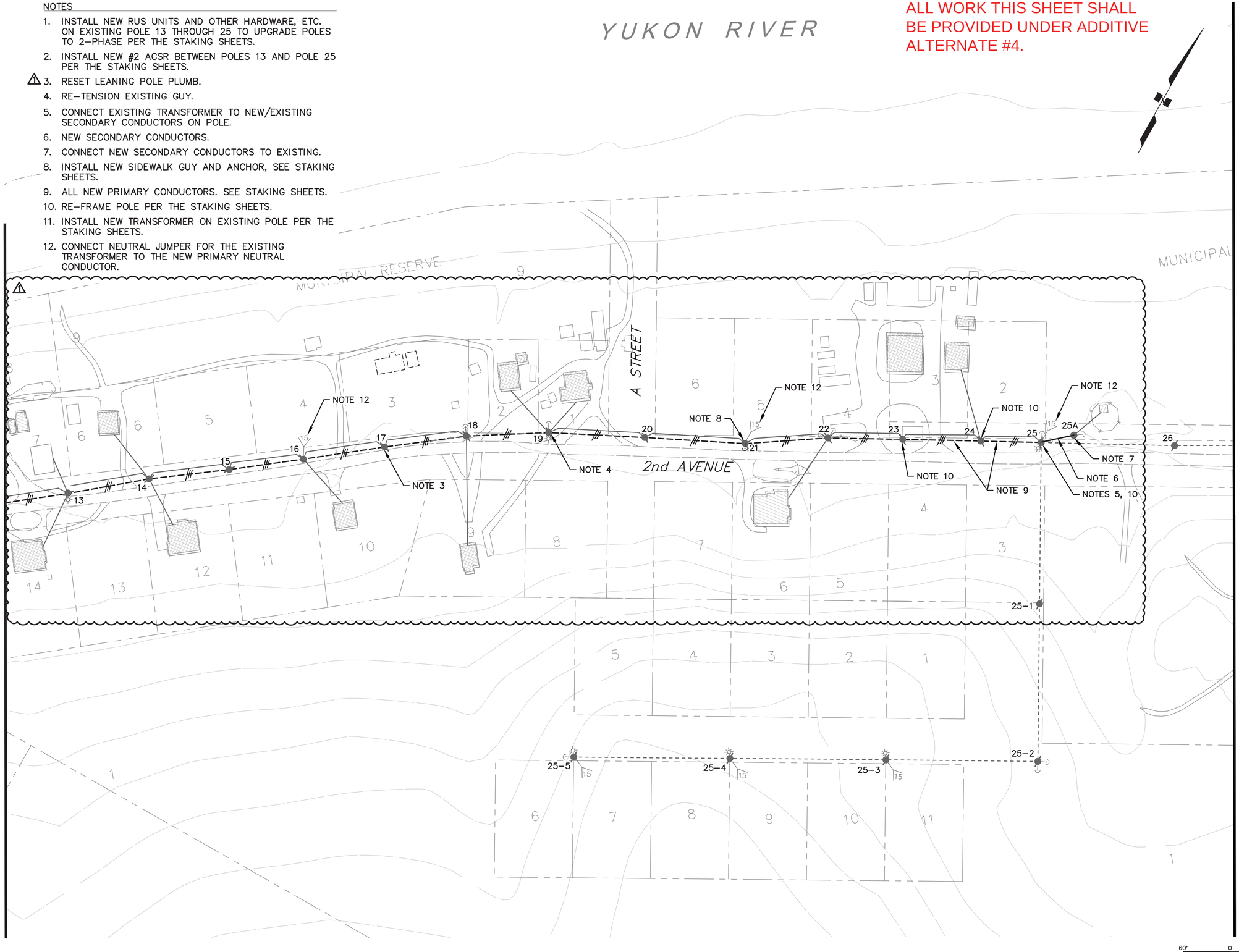
Plot Date: 12/28/2023 3:09 PM

File: J:\JobsData\72310.02 Rampart Rpsu – Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg

NOTES

1. INSTALL NEW RUS UNITS AND OTHER HARDWARE, ETC. ON EXISTING POLE 13 THROUGH 25 TO UPGRADE POLES TO 2–PHASE PER THE STAKING SHEETS.
2. INSTALL NEW #2 ACSR BETWEEN POLES 13 AND POLE 25 PER THE STAKING SHEETS.
3. ⚠ RESET LEANING POLE PLUMB.
4. RE–TENSION EXISTING GUY.
5. CONNECT EXISTING TRANSFORMER TO NEW/EXISTING SECONDARY CONDUCTORS ON POLE.
6. NEW SECONDARY CONDUCTORS.
7. CONNECT NEW SECONDARY CONDUCTORS TO EXISTING.
8. INSTALL NEW SIDEWALK GUY AND ANCHOR, SEE STAKING SHEETS.
9. ALL NEW PRIMARY CONDUCTORS. SEE STAKING SHEETS.
10. RE–FRAME POLE PER THE STAKING SHEETS.
11. INSTALL NEW TRANSFORMER ON EXISTING POLE PER THE STAKING SHEETS.
12. CONNECT NEUTRAL JUMPER FOR THE EXISTING TRANSFORMER TO THE NEW PRIMARY NEUTRAL CONDUCTOR.

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.



ALASKA ENERGY AUTHORITY

STATE OF ALASKA 49TH — REGISTERED PROFESSIONAL ENGINEER — K. KAMM — EE-11401 — 09/09/22 — REGISTERED PROFESSIONAL ENGINEER

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RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION PLAN
(3 of 4)
RAMPART, ALASKA

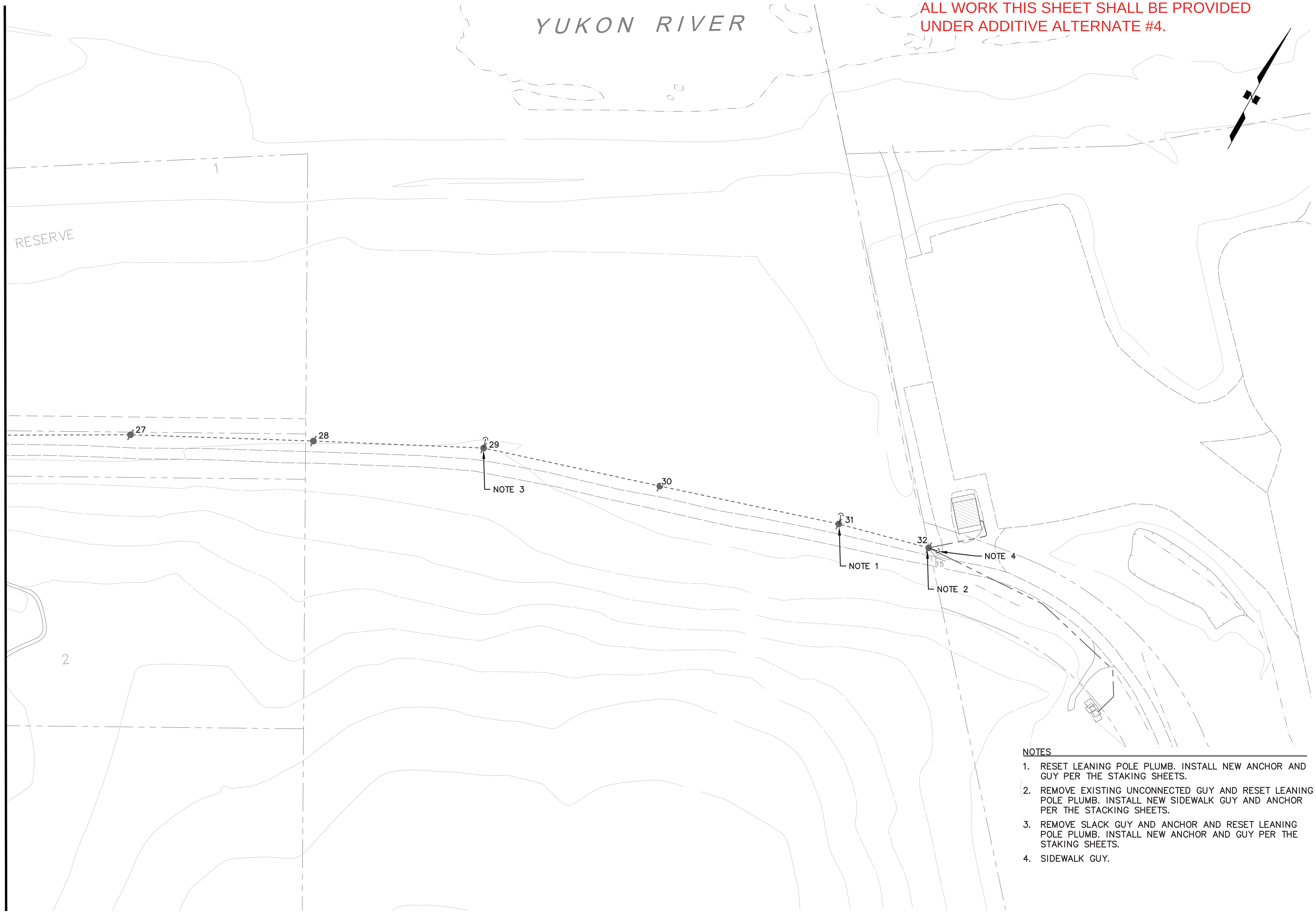
NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22
⚠	REVISED PER DISTRIBUTION CHANGES	TRK	12/28/23

Plot Date Dec 23 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.3

File: J:\JobsData\72310.02 Rampart Rpsu – Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg Plot Date: 12/28/2023 3:09 PM

ALL WORK THIS SHEET SHALL BE PROVIDED UNDER ADDITIVE ALTERNATE #4.



NOTES

1. RESET LEANING POLE PLUMB. INSTALL NEW ANCHOR AND GUY PER THE STAKING SHEETS.
2. REMOVE EXISTING UNCONNECTED GUY AND RESET LEANING POLE PLUMB. INSTALL NEW SIDEWALK GUY AND ANCHOR PER THE STACKING SHEETS.
3. REMOVE SLACK GUY AND ANCHOR AND RESET LEANING POLE PLUMB. INSTALL NEW ANCHOR AND GUY PER THE STAKING SHEETS.
4. SIDEWALK GUY.

ALASKA ENERGY AUTHORITY

CRW ENGINEERING GROUP LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503
PHONE: (907) 562-3252
#AECL882-AK

RAMPART POWER SYSTEM UPGRADE
DISTRIBUTION PLAN
(4 of 4)
RAMPART, ALASKA

NO.	REVISION	BY	DATE
0	ISSUED FOR CONSTRUCTION	TRK	09/09/22

Plot Date Dec 23 | Designed TRK | Drawn TRK | Approved KH

Sheet No. E12.4

Plot Date: 12/28/2023 3:09 PM

File: J:\JobsData\72310.02 Rampart Rpsu – Distribution Wo 14\00 Cadd 2019\01 Working Set\03 Electrical\72310.02 RAMPART RPSU.dwg

RAMPART RPSU
DISTRIBUTION UPGRADES

STAKING SHEETS

ISSUED FOR CONSTRUCTION
DECEMBER 2023

CRW ENGINEERING GROUP, LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503

REV. NO.	DATE	DESCRIPTION	BY
0	9/9/22	ISSUED FOR CONSTRUCTION	TRK
1	12/28/23	REVISED PER CHANGE IN EXISTING DISTRIBUTION SYSTEM	TRK

CRW ENGINEERING GROUP, LLC
3940 ARCTIC BLVD, SUITE 300
ANCHORAGE, ALASKA 99503
(907) 562-3252

DESIGNER	DATE
TRK	September 9, 2022
CHECKER	**DATE**
TRK	September 9, 2022
DIST. ENG.	**DATE**
TRK	September 9, 2022

RAMPART RPSU
DISTRIBUTION UPGRADES

STAKING SHEETS SHOW ONLY LOCATION WHERE NEW WORK IS REQUIRED. SEE ADDITIONAL STAKING SHEETS ON SHEET E1.4 FOR WORK RELATED TO THE NEW POWER PLANT.

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR No.	CONDUCTOR SIZE/TYPE	CONDUCTOR Back Span	POLE HEIGHT	POLE CLASS	PRIMARY ASSEMBLY No.	PRIMARY ASSEMBLY Units	GUYS No.	GUYS Units	ANCHORS No.	ANCHORS Units	XFMRS No.	XFMRS Units	SECONDARY CONDUCTOR SERVICE No.	SECONDARY CONDUCTOR SERVICE SIZE/TYPE	SECONDARY CONDUCTOR BACKFEED Back Span	SECONDARY CONDUCTOR BACKFEED No.	SECONDARY CONDUCTOR BACKFEED SIZE/TYPE	SECONDARY SERVICE No.	SECONDARY SERVICE Units	MISCELLANEOUS CONSTRUCTION UNITS No.	MISCELLANEOUS CONSTRUCTION UNITS Units	RIGHT OF WAY	REMARKS/COMMENTS/NOTES
WORK INCLUDED IN ADDITIVE ALTERNATE #3																										
1-2			4	EXISTING				2	A5.01a														1	N6.1		EXISTING POLE. PROVIDE #2 ACSR JUMPERS. NOTES 4, 8.
1-3			3	#2 ACSR	240	45	4	1	B5.21a	2	E7.1	2	F1.10	1	G1.4-15						1	J3.1	1	H1.1		PROVIDE #2 ACSR JUMPERS. INSTALL EXISTING LIGHT. NOTE 7.
								1	A5.1						120/240V								1	N7.6		
															1-PHASE											
1-3A																		95	1	#1/0 TRIPLEX	1	J3.1				EXISTING POLE. CONNECT TO EXISTING SECONDARY.
1-4		12	2	#2 ACSR	220	45	4	1	A2.01	2	E1.1La	2	F1.10			1	#4 TRIPLEX	95			2	J3.1	1	N2.1		
1-5		77	2	#2 ACSR	115			1	A4.2	2	E1.1La	2	F1.10					115	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE. ADD 1-PHASE PRIMARY DISTRIBUTION
1-6			2	#2 ACSR	130	45	4	1	A5.1	1	E1.1La	1	F1.10	1	G1.4-15	1	#4 TRIPLEX	95	1	#1/0 TRIPLEX	2	J3.1	1	H1.1		REPLACE EXISTING POLE NOTE 7. REATTACH TELECOM TO NEW POLE
															120/240V								1	N7.6		
															1-PHASE											
1-7																		120	1	#1/0 TRIPLEX	2	J3.1				EXISTING POLE
WORK INCLUDED IN ADDITIVE ALTERNATE #4																										
8			4	EXISTING				1	A5.01a							1	EXISTING									EXISTING POLE, RESET. NOTES 5, 8. PROVIDE #2 ACSR JUMPERS.
9			1	#2 ACSR	100			1	A1.011					1	G1.4-15	2	EXISTING						1	H1.1		EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTES 6, 7, 8. NEW XFMR CONNECT TO (E) SECONDARY.
			2	EXISTING											120/240V								1	N7.6		
															1-PHASE											
10			1	#2 ACSR	95			1	A1.011							1	EXISTING									EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
11			1	#2 ACSR	106			1	A1.011							1	EXISTING									EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE			BACKFEED							
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
12			1	#2 ACSR	105			1	A1.011																	EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8. EXISTING XFMRS (15KVA)
			2	EXISTING																						
13			1	#2 ACSR	100			1	A1.011							2	EXISTING									EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
14			1	#2 ACSR	105			1	A1.011							2	EXISTING						1	H1.1		EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTES 8.
			2	EXISTING																			1	N7.6		
15			1	#2 ACSR	105			1	A1.011																	EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
16			1	#2 ACSR	100			1	A1.011							1	EXISTING									EXISTING POLE. EXISTING XFMRS (15KVA) INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
17			1	#2 ACSR	105			1	A1.011																	EXISTING POLE, RESET. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
18		5	1	#2 ACSR	105			1	A2.021							1	EXISTING									EXISTING POLE. INSTALL PIN INSULATORS FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
19		5	1	#2 ACSR	110			1	A1.011							2	EXISTING									EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
20			1	#2 ACSR	123			1	A1.011																	EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
21		8	1	#2 ACSR	130			1	A1.011	1	E7.1	1	F1.10													EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8. EXISTING XFMRS (15KVA)
			2	EXISTING																						
22		4	1	#2 ACSR	105			1	A1.011							1	EXISTING									EXISTING POLE. INSTALL PIN INSULATOR FOR NEUTRAL. NOTE 8.
			2	EXISTING																						
23			1	#2 ACSR	100			1	B6.21																	EXISTING POLE. REPLACE CROSSARM WITH NEW RUS UNIT. INSTALL NEUTRAL PER B5.21.
			2	EXISTING																						
24			3	#2 ACSR	100			1	B1.14																	EXISTING POLE. INSTALL NEW RUS UNIT.
25			3	#2 ACSR	80			1	B5.21												2	J3.1				EXISTING POLE. INSTALL NEW RUS UNIT. PRESERVE 1-PHASE TO THE EAST&SOUTH CONNECT EXISTING XFMR TO SECONDARY.

LOCATION NUMBER	STATION	LINE ANGLE (DEG)	CONDUCTOR			POLE		PRIMARY ASSEMBLY		GUYS		ANCHORS		XFMRS		SECONDARY CONDUCTOR					SECONDARY SERVICE		MISCELLANEOUS CONSTRUCTION UNITS		RIGHT OF WAY	REMARKS/COMMENTS/NOTES
																SERVICE			BACKFEED							
			No.	SIZE/TYPE	Back Span	HEIGHT	CLASS	No.	Units	No.	Units	No.	Units	No.	Units	No.	SIZE/TYPE	Back Span	No.	SIZE/TYPE	No.	Units	No.	Units		
25A																1	EXISTING	45	1	#2 TRIPLEX	1	J3.1				EXISTING POLE. CONNECT TO EXISTING CONDUCTORS.
29										1	E7.1	1	F1.10													EXISTING POLE, RESET. INSTALL NEW GUY/ ANCHOR.
31										1	E1.1La	1	F1.10													EXISTING POLE, RESET. INSTALL NEW GUY/ ANCHOR.
32										1	E7.1	1	F1.10													EXISTING POLE, RESET. EXISTING XFMRS (15KVA) INSTALL SIDEWALK GUY/ANCHOR.

STAKING SHEET NOTES:

1. SEE PROJECT DETAIL DRAWINGS FOR MODIFIED RUS CONSTRUCTION UNITS. UNLESS OTHERWISE INDICATED, GUY LEADS SHALL BE 30 FEET.
2. ON THE RUS CONSTRUCTION UNIT G1.4 AND G1.5 AN ARMOR ROD IS INDICATED AT THE CONNECTION TO THE LINE WITH A HOT LINE CLAMP. DO NOT INSTALL SURGE ARRESTERS ON TRANSFORMERS.
3. RUS ASSEMBLY H1.1 SHALL USE #4 AWG COPPER FOR POLE GROUND CONDUCTOR. ALUMINUM CONDUCTORS SHALL NOT BE USED.
4. INSTALL (2) INSULATORS ON EXISTING BOLTS ENDS TO MAKE (2) DOUBLE DEADENDS. PROVIDE #2 JUMPERS, PIN INSULATORS, HARDWARE, ETC. AS REQUIRED. REPLACE NEUTRAL DEADEND WITH DOUBLE DEADEND.
5. DISCONNECT EXISTING NEUTRAL CONDUCTOR TO POLE 9 AND MOVE TO NEW INSULATOR WITH NEW BOLT (SEE PHOTO ON SHEET E10.2). CONNECT NEW #2 ACSR TO POLE 9 TO EXISTING NEUTRAL DEADEND. PROVIDE #2 JUMPERS.
6. CONNECT EXISTING CONDUCTORS TO NEW TRANSFORMER.
7. OWNER TO PROVIDE TRANSFORMERS ONLY. CONTRACTOR SHALL PROVIDE RUS UNITS AND ALL OTHER HARDWARE, MATERIALS, ETC. REQUIRED FOR INSTALLATION.
8. EXISTING POLES WHERE PIN CONNECTORS OR INSULATORS ARE BEING ADDED HAVE EXISTING CROSSARM ASSEMBLIES.