PORT HEIDEN POWER PLANT UPGRADE PROJECT
ON SITE CONSTRUCTION

CIVIL DRAWINGS:

C1.1 CIVIL NOTES
C1.2 VICINITY MAP
C1.3 POWER PLANT SITE PLAN
C1.4 GENERAL SECTIONS
C1.5 FENCE DETAILS

ARCHITECTURAL DRAWINGS:

A1 FLOOR PLAN, REFLECTED CEILING PLAN, CODE ANALYSIS, & GENERAL NOTES
A2 INTERIOR ELEVATIONS & DOOR/WINDOW DETAILS
A3 EXTERIOR ELEVATIONS & ROOFING NOTES/TRIM
A4 BUILDING SECTIONS & DETAILS

STRUCTURAL DRAWINGS:

S1.1 FOUNDATION PLAN, CODE ANALYSIS, & STRUCTURAL NOTES
S1.2 FOUNDATION DETAILS
S1.3 STAIR PLAN & DETAILS
S2 FRAMING PLANS & DETAILS
S3 SECTIONS & DETAILS
S4 ROOF FRAMING PLANS & DETAILS

MECHANICAL DRAWINGS:

M1.1 MECHANICAL LEGEND, SCHEDULES, & SEQUENCE OF OPERATIONS
M1.2 WARNING SIGN & FIRE EXTINGUISHER PLAN, SIGN & VALVE TAG SCHEDULES
M1.3 NEW POWER PLANT AREA WORK PLAN
M1.4 DIESEL FUEL PIPING PLAN & DETAILS
M1.5 TANK FARM PIPING DETAILS & SCHEDULE
M2.1 MECHANICAL PENETRATIONS PLAN, ELEVATION, & DETAILS
M2.2 MECHANICAL SUPPORT PLANS & DETAILS
M2.3 RADIATOR SUPPORT PLAN & DETAILS
M2.4 MECHANICAL SUPPORT HORIZONTAL WALL STRUT INSTALLATION
M2.5 MECHANICAL SUPPORT VERTICAL WALL STRUT INSTALLATION
M3.1 EQUIPMENT LAYOUT PLAN, SECTIONS, & DETAILS
M3.2 WALL ELEVATIONS & PIPING DETAILS
M3.3 GENERATOR FABRICATION DETAILS
M3.4 GLYCOL STORAGE & EXPANSION TANK FABRICATION
M4.1 COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS
M4.2 COOLANT & HEAT RECOVERY ISOMETRICS & DETAILS
M5.1 DIESEL FUEL & USED OIL PIPING PLAN, DIAGRAM, & DETAILS
M5.2 DIESEL FUEL & USED OIL PIPING ELEVATIONS & DETAILS
M5.3 200 GALLON DAY TANK FABRICATION
M6 EXHAUST & CRANK VENT PLAN & DETAILS
M7.1 VENTILATION PLAN & DETAILS
M7.2 VENTILATION FABRICATION DETAILS
M8.1 HEAT RECOVERY SYSTEM NOTES, EQUIPMENT SCHEDULE, & DETAILS
M8.2 HEAT RECOVERY SYSTEM SCHOOL PLAN & DETAILS
M8.3 HEAT RECOVERY SYSTEM CITY SHOP PLAN, DETAILS & PIPING ISOMETRIC
M8.4 HEAT RECOVERY SYSTEM VILLAGE SHOP PLAN, DETAILS & PIPING ISOMETRIC
FS1 FIRE SUPPRESSION SYSTEM PLAN, SECTION, LEGEND, & NOTES

ELECTRICAL DRAWINGS:

E1.1 ELECTRICAL LEGENDS & SCHEDULES
E1.2 OVERALL PROJECT AREA PLAN, DISTRIBUTION SCHEDULES, & LEGEND
E1.3 NEW POWER PLANT AREA DISTRIBUTION PLAN
E1.4 OLD POWER PLANT AREA NEW WORK PLANS
E1.5 DISTRIBUTION DETAILS
E1.6 DISTRIBUTION STAKING SHEET
E2.1 NEW POWER PLANT AREA SITE PLAN & DETAILS
E2.2 NEW POWER PLANT ENLARGED SITE PLAN, DETAILS, & SCHEDULES
E2.3 SHUNT REACTOR INSTALLATION DETAILS
E2.4 POWER PLANT SITE COMMUNICATION PLAN & DETAILS
E3.1 WIREWAY PLAN, MODULE SECTION, & DETAILS
E3.2 ELEVATIONS & DETAILS
E3.3 ELEVATIONS & DETAILS
E4.1 RECEPTACLE & LIGHTING PLANS & STATION SERVICE PANEL
E4.2 STATION SERVICE PLAN, DETAILS, & PANEL
E5 INSTRUMENTATION & DATA PLAN & DETAILS
E6.1 SWITCHGEAR ENCLOSURE LAYOUT
E6.2 SWITCHGEAR ONE-LINE & SCHEMATICS
E6.3 24VDC ENGINE WIRING JUNCTION BOX
E7.1 DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS
E7.2 DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS
E7.3 DAY TANK CONTROL PANEL SEQUENCE OF OPERATION & DETAILS
E8.1 HEAT RECOVERY SYSTEM SCHEDULES & SCHOOL HEAT RECOVERY WIRING
E8.2 HEAT RECOVERY SYSTEM CITY & VILLAGE SHOPS HEAT RECOVERY WIRING
E8.3 HEAT RECOVERY SYSTEM SCHOOL HEAT RECOVERY PANEL "HRP"

THIS DRAWING SET INCLUDES DRAWINGS THAT SHOW WORK THAT IS INCLUDED IN THIS CONTRACT AND REFERENCE DRAWINGS THAT SHOW WORK PERFORMED UNDER THE PRIOR MODULE ASSEMBLY CONTRACT. SEE RED NOTES ON EACH SHEET FOR DELINEATION OF SCOPE.

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE PROJECT

TITLE: ON SITE CONSTRUCTION
SCHEDULE OF DRAWINGS

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

DRAWN BY: BCG | SCALE: NO SCALE
DESIGNED BY: BCG | DATE: 4-1-19
FILE NAME: PTH PPU G1 | SHEET: G1 OF 1
PROJECT NUMBER:

GENERAL CIVIL CONSTRUCTION NOTES

1. THE CONTRACTOR SHALL PROTECT ALL ITEMS NOT SCHEDULED FOR DEMOLITION DURING CONSTRUCTION. DISTURBED AREAS OUTSIDE OF PROJECT FOOTPRINT SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION.
2. ALL EXISTING UTILITIES MAY NOT BE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL CONSULT WITH THE APPROPRIATE UTILITY ORGANIZATIONS TO VERIFY AND LOCATE UTILITIES PRIOR TO CONSTRUCTION.
3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE APPROPRIATE TEMPORARY CUT SLOPES OR SHORING FOR EXCAVATIONS AND TRENCHES FOR SITE SOILS, GROUNDWATER AND RUNOFF CONDITIONS AND SURFACE LOADING CONDITIONS. THE CONTRACTOR MUST COMPLY WITH APPLICABLE FEDERAL AND STATE OSHA REGULATIONS. THE CONTRACTOR SHALL MAINTAIN ALL SIGNS, BARRICADES, AND WARNING LIGHTS AND OTHER PROTECTIVE DEVICES NECESSARY FOR SAFETY.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING HIS WORK WITH EXISTING FACILITY OPERATORS, OTHER CONTRACTORS, SUBCONTRACTORS, THE CITY, AND STATE AND FEDERAL AUTHORITIES.
5. 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.
6. ALL ITEMS TO BE INSTALLED ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. INSTALL ALL MATERIALS AND EQUIPMENT IAW MANUFACTURERS RECOMMENDATIONS, INSTRUCTIONS, AND INSTALLATION DRAWINGS, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
7. THE SPECIFICATION OF A NAME BRAND PRODUCT, "OR APPROVED EQUAL" IS PROVIDED MERELY TO ESTABLISH THE LEVEL OF QUALITY OF MATERIALS AND EQUIPMENT REQUIRED AND IS NOT A PRODUCT ENDORSEMENT. SUBMIT ANY PROPOSED SUBSTITUTIONS IN WRITING TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO PROCUREMENT.
8. FACILITY DESIGN IS IN ACCORDANCE WITH THE CURRENT INTERNATIONAL FIRE CODE, INTERNATIONAL BUILDING CODE, AND STATE OF ALASKA FIRE AND SAFETY REGULATIONS ADMINISTRATIVE CODES 13 AAC 50, 13 AAC 55, AND THE MOST RECENT MEMORANDUM OF AGREEMENT BETWEEN THE AEA AND THE STATE OF ALASKA FIRE MARSHALL.
9. PERFORM WORK WITH SKILLED CRAFTSMEN SPECIALIZED IN SAID WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.
10. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH U.S. ENVIRONMENTAL PROTECTION AGENCY, ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION, AND STATE AND FEDERAL OCCUPATIONAL HEALTH AND SAFETY REGULATIONS.

CALL BEFORE YOU DIG

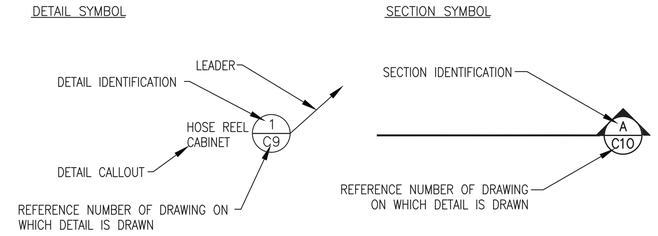
POWER – CITY OF PORT HEIDEN
LOCATE NUMBER (907) 837-2209

TELEPHONE – GCI COMMUNICATIONS
LOCATE NUMBER (800) 800-7754

ABBREVIATIONS

ADEC	ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
ADOT	ALASKA DEPARTMENT OF TRANSPORTATION
AG	ABOVE GROUND
AEA	ALASKA ENERGY AUTHORITY
ALCAP	ALUMINUM SURVEY CAP
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
API	AMERICAN PETROLEUM INSTITUTE
APPROX	APPROXIMATE
ASTM	AMERICAN SOCIETY FOR TESTING OF MATERIALS
AST	ABOVEGROUND STORAGE TANK
AWS	AMERICAN WELDING SOCIETY
BLDG	BUILDING
CI	CAST IRON
CITY	CITY OF PORT HEIDEN
CL	CENTERLINE
CMP	CORRUGATED METAL PIPE
CRIT	CRITICAL
DEMO	DEMOLISH
DFT	DRY FILM THICKNESS
DF	DIESEL FUEL
DIA	DIAMETER
DRAWINGS	CITY OF PORT HEIDEN RPSU PROJECT
DWG	DRAWING
E	EAST
EA	EACH
EG	EXISTING GRADE
EL	ELEVATION
ELEC	ELECTRIC
EPA	U.S. ENVIRONMENTAL PROTECTION AGENCY
ENGINEER	CRW ENGINEERING GROUP
E-VENT	EMERGENCY VENT
F	FAHRENHEIT
FF	FINISH FLOOR ELEV.
FG	FINISH GRADE
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FPT	FEMALE NATIONAL PIPE THREAD
FT	FOOT OR FEET
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
HDPE	HIGH DENSITY POLYETHYLENE
HP	HORSE POWER
HR	HOUR
IAW	IN ACCORDANCE WITH
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IFC	INTERNATIONAL FIRE CODE
IPC	INTERNATIONAL PLUMBING CODE
LF	LINEAR FEET
LB	POUND
M	METERS
MAX	MAXIMUM
MIL	0.001 INCH
MIN	MINIMUM
MPT	MALE NATIONAL PIPE TAPERED
N	NORTH
NC	NORMALLY CLOSED
NFS	NON FROST SUSCEPTIBLE (SOIL)
NO	NORMALLY OPEN
NPT	NATIONAL PIPE TAPERED
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
OZ	OUNCE
PCC	PORTLAND CEMENT CONCRETE
PL	PLATE
PRV	PRESSURE RELIEF VALVE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVI	POINT OF VERTICAL INTERSECTION
R	RADIUS
RF	RAISED FACE
S	SEWER
SCH	SCHEDULE
SHPO	STATE HISTORIC PRESERVATION OFFICER
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
SSPC	STEEL STRUCTURES PAINTING COUNCIL
STA	STATION
SY	SQUARE YARD
TBM	TEMPORARY BENCH MARK
TS	TUBE STEEL
TYP	TYPICAL
UG	UNDER GROUND
UL	UNDERWRITERS LABORATORY
UST	UNDERGROUND STORAGE TANK
VILLAGE	PORT HEIDEN NATIVE COMMUNITY
W/	WITH
W	WATER
WTP	WATER TREATMENT PLANT
XFRMR	ELECTRICAL TRANSFORMER

DETAIL/SECTION REFERENCES



LEGEND

- BOLLARD
- PROPERTY BOUNDARY
- CENTERLINE
- CULVERT
- DITCH LINE/DRAINAGE SWALE
- 2% DRAINAGE DIRECTION & SLOPE
- TRAVELED WAY
- EMBANKMENT FILL SLOPE
- FENCE LINE
- FIRE EXTINGUISHER
- 20 GROUND ELEVATION CONTOURS
- POWER POLE
- POWER POLE W/STREET LIGHT
- 9 INFORMATION / WARNING SIGN
- 5 SHEET NOTE
- SURVEY MONUMENT
- TEST HOLE
- TOE OF FILL SLOPE
- ANTI-SIPHON VALVE
- BALL VALVE
- CHECK VALVE
- GATE VALVE
- MOTORIZED BALL VALVE
- C ELBOW UP/DOWN
- PRESSURE RELIEF VALVE
- F FILTER
- FLEXIBLE CONNECTOR (SCHEMATIC)
- FLEXIBLE CONNECTOR (DETAIL)
- M METER
- PRESSURE TEST TAP
- D REDUCER
- TRANSFER PUMP
- WYE STRAINER
- HYDRANT

UTILITY LINE/PIPELINE DESIGNATIONS

E	ELECTRIC
F	FUEL
S	SANITARY SEWER
W	WATER

- UNDERGROUND UTILITY LINE/PIPELINE: EXISTING
- UNDERGROUND UTILITY LINE/PIPELINE: PROPOSED
- ABOVEGROUND UTILITY LINE/PIPELINE: EXISTING
- ABOVEGROUND UTILITY LINE/PIPELINE: PROPOSED

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

ISSUED FOR CONSTRUCTION MARCH 2019

CRW ENGINEERING GROUP, LLC

STATE OF ALASKA
49 TH
Karl R. Hulse
CE-10583
3/29/2019
REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN POWER SYSTEM POWER PLANT UPGRADE

TITLE: CIVIL NOTES

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

DRAWN BY: NP	SCALE: AS NOTED
DESIGNED BY: KH	DATE: 3/29/19
FILE NAME: PTH PPU C	SHEET: C1.1 OF
PROJECT NUMBER:	

1 C1.2 OVERALL PROJECT AREA PLAN
1"=1500'

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

ISSUED FOR CONSTRUCTION MARCH 2019

CRW ENGINEERING GROUP, LL

STATE OF ALASKA
49 TH
Karl Hulse
Karl R. Hulse
CE-10583
3/29/2019
REGISTERED PROFESSIONAL ENGINEER

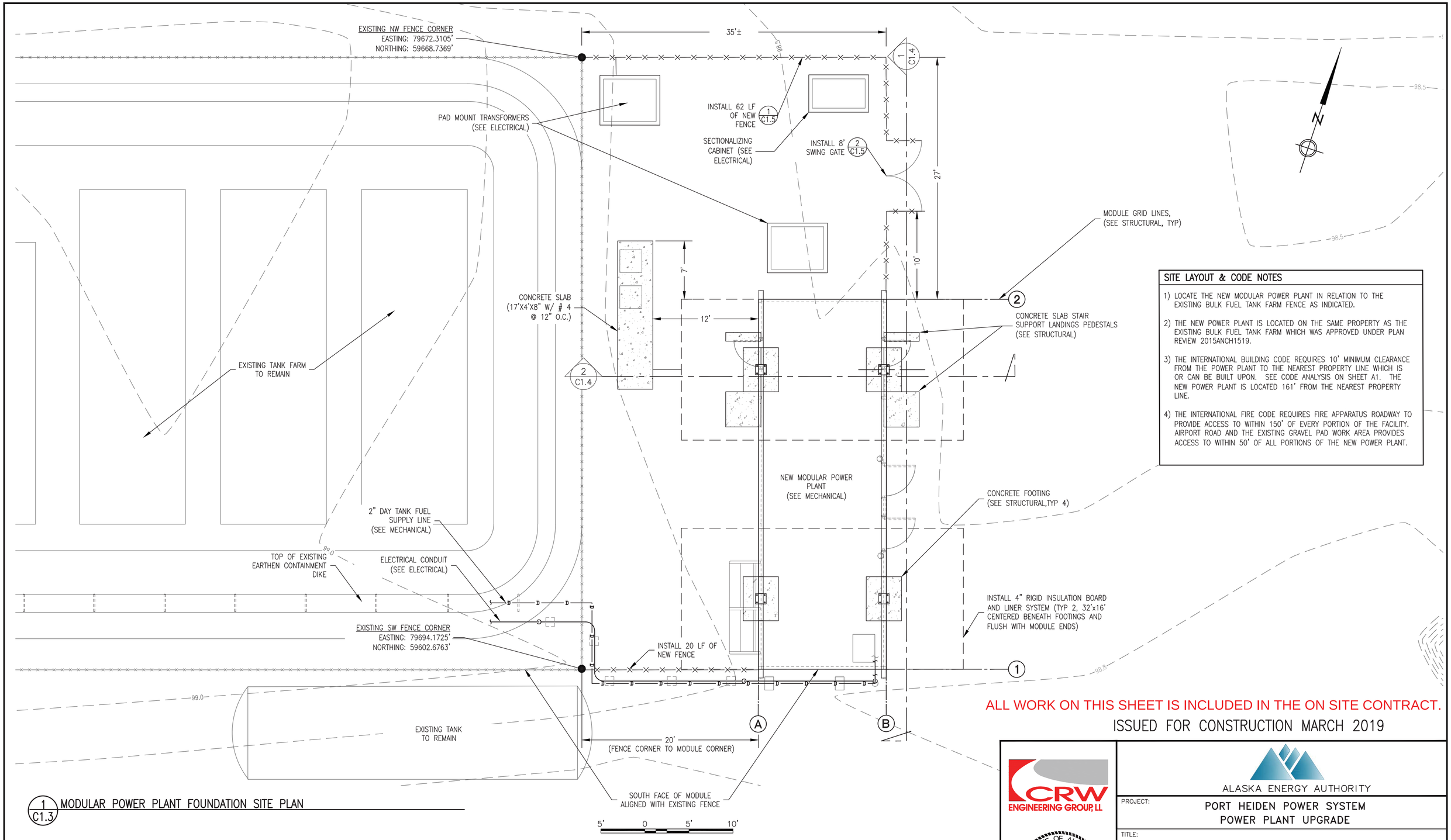
ALASKA ENERGY AUTHORITY

PROJECT:
PORT HEIDEN POWER SYSTEM
POWER PLANT UPGRADE

TITLE:
VICINITY MAP

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

DRAWN BY: NP	SCALE: AS NOTED
DESIGNED BY: KH	DATE: 3/29/19
FILE NAME: PTH PPU C	SHEET: C1.2 OF
PROJECT NUMBER:	



1 C1.3 MODULAR POWER PLANT FOUNDATION SITE PLAN

SITE LAYOUT & CODE NOTES

1) LOCATE THE NEW MODULAR POWER PLANT IN RELATION TO THE EXISTING BULK FUEL TANK FARM FENCE AS INDICATED.
2) THE NEW POWER PLANT IS LOCATED ON THE SAME PROPERTY AS THE EXISTING BULK FUEL TANK FARM WHICH WAS APPROVED UNDER PLAN REVIEW 2015ANCH1519.
3) THE INTERNATIONAL BUILDING CODE REQUIRES 10' MINIMUM CLEARANCE FROM THE POWER PLANT TO THE NEAREST PROPERTY LINE WHICH IS OR CAN BE BUILT UPON. SEE CODE ANALYSIS ON SHEET A1. THE NEW POWER PLANT IS LOCATED 161' FROM THE NEAREST PROPERTY LINE.
4) THE INTERNATIONAL FIRE CODE REQUIRES FIRE APPARATUS ROADWAY TO PROVIDE ACCESS TO WITHIN 150' OF EVERY PORTION OF THE FACILITY. AIRPORT ROAD AND THE EXISTING GRAVEL PAD WORK AREA PROVIDES ACCESS TO WITHIN 50' OF ALL PORTIONS OF THE NEW POWER PLANT.

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

ISSUED FOR CONSTRUCTION MARCH 2019

CRW ENGINEERING GROUP, LL

STATE OF ALASKA
49 TH
Karl R. Hulse
CE-10583
3/29/2019
REGISTERED PROFESSIONAL ENGINEER

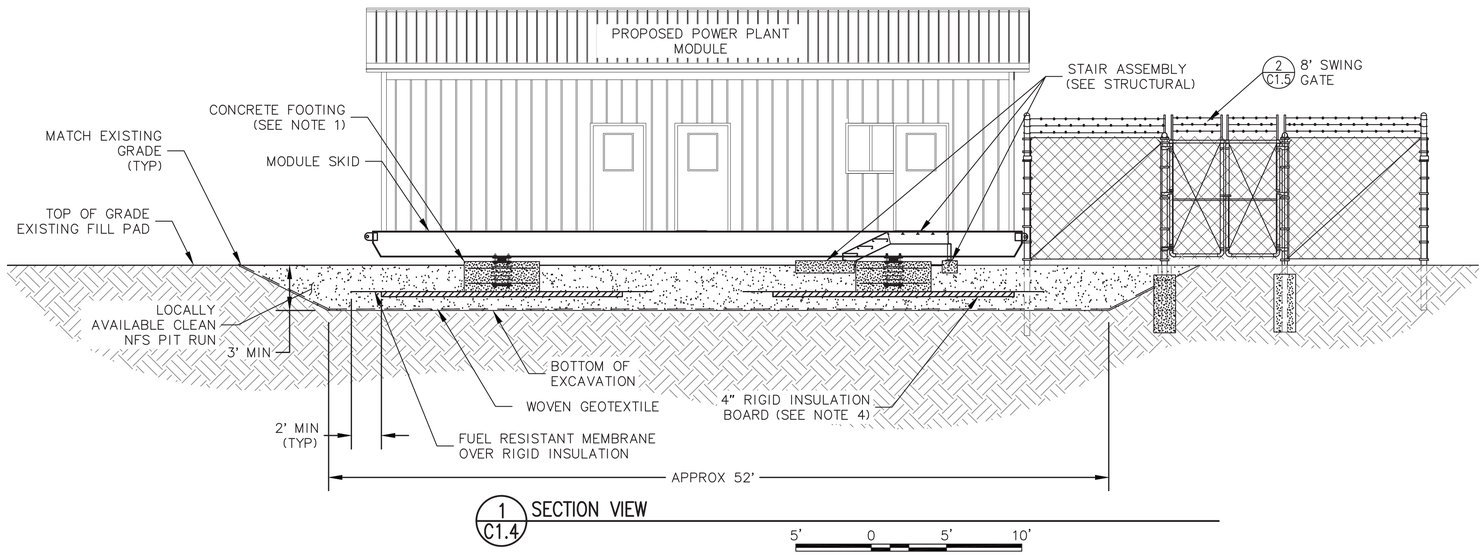
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN POWER SYSTEM POWER PLANT UPGRADE

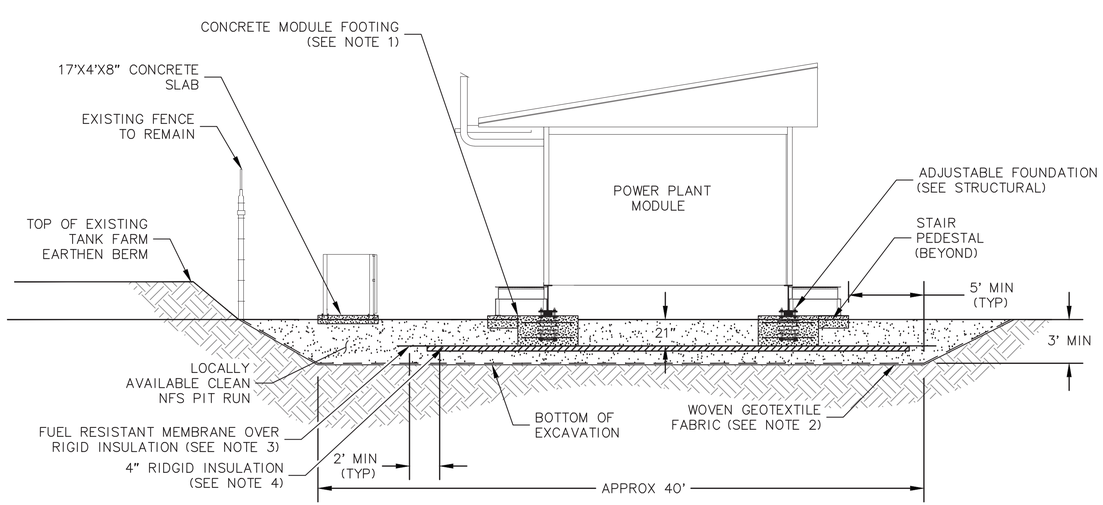
TITLE: POWER PLANT SITE PLAN

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

DRAWN BY: NP	SCALE: AS NOTED
DESIGNED BY: KH	DATE: 3/29/19
FILE NAME: PTH PPU C	SHEET: C1.3 OF
PROJECT NUMBER:	



1 C1.4 SECTION VIEW



2 C1.4 SECTION VIEW

GRAVEL PAD FOUNDATION – SEQUENCE OF CONSTRUCTION:

1. EXCAVATE TO THE MINIMUM LIMITS SHOWN.
2. SCARIFY INSITU SOILS AT THE BASE OF EXCAVATION AT LEAST 6" DEEP THEN PROOF COMPACT.
3. IF ORGANICS OR SILTS ARE ENCOUNTERED AT THE BASE OF EXCAVATION OVER-EXCAVATE A MINIMUM OF 2'.
4. PLACE WOVEN GEO-TEXTILE OVER ENTIRE EXCAVATION FOOTPRINT.
5. PLACE LOCALLY AVAILABLE PIT RUN MATERIAL IN NOMINAL 12" LIFTS AND COMPACT TO 95% MAXIMUM DRY DENSITY AS DETERMINED BY THE MODIFIED PROCTOR TEST.
6. PLACE 4" THICK RIGID FOAM INSULATION UNDER FOUNDATION FOOT PRINTS AS SHOWN. COVER RIGID INSULATION WITH SPECIFIED FUEL RESISTANT LINER. LINER MUST EXTEND A MINIMUM OF 2' BEYOND INSULATION PERIMETER.

NOTES

1. MODULE FOOTINGS ARE 24" DEEP, AND SHALL BE PLACED DIRECTLY ON MEMBRANE ABOVE RIGID INSULATION. SEE STRUCTURAL FOR FOOTING AND PEDESTAL DETAILS. TOP OF CONCRETE FOR ALL FOOTINGS SHALL BE EQUAL ELEVATION. TOP OF CONCRETE SHALL BE 3" HIGHER THAN FINISHED GRADE.
2. WOVEN GEOTEXTILE: BLACK FUEL RESISTANT GEOTEXTILE FABRIC. INSTALL WITH 3' MINIMUM OVERLAP AT ALL JOINTS. AMOCO NO. 2016, OR APPROVED EQUAL.
3. FUEL RESISTANT MEMBRANE LINER: 23 OZ/SY BLACK HIGH STRENGTH POLYESTER SCRIM COATED WITH URETHANE WHICH MEETS OR EXCEEDS THE PHYSICAL AND LOW TEMPERATURE PROPERTIES OF COOLEY L1023DEP. LINER SHALL BE RESISTANT TO LONG TERM EXPOSURE TO GASOLINE AND DIESEL. PROVIDE FACTORY SEAMING OF ALL JOINTS WITH CERTIFICATION. FIELD VERIFY SIZE REQUIRED AND INCLUDE EXCESS TO PREVENT BINDING AND EXCESSIVE STRESS. LINER SHALL BE PROTECTED AND CRATED TO PREVENT ANY DAMAGE DURING SHIPPING. PROVIDE AN UNFOLDING MAP THAT INDICATES WHERE THE LINER BUNDLE NEEDS TO BE POSITIONED TO ALLOW FOR EASE IN UNFOLDING AT THE SITE. INSTALL LINER IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
4. RIGID INSULATION: EXTRUDED POLYSTYRENE FOAM PANEL MEASURING 4' x 8' X 2", 60 PSI COMPRESSIVE STRENGTH AT 5% DEFORMATION. INSTALL IN TWO LAYERS WITH STAGGERED JOINTS, 1' MINIMUM JOINT OVERLAP. DOW HI-60, OR APPROVED EQUAL.
5. TOP OF FOUNDATION FILL SHALL MATCH EXISTING PAD FINISHED GRADE.
6. TOP OF ALL CONCRETE FOOTINGS AND SLABS SHALL BE 3" ABOVE GRADE.

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

ISSUED FOR CONSTRUCTION MARCH 2019

CRW ENGINEERING GROUP, LL

STATE OF ALASKA 49 TH Karl Hulse Karl R. Hulse CE-10583 3/29/2019 REGISTERED PROFESSIONAL ENGINEER

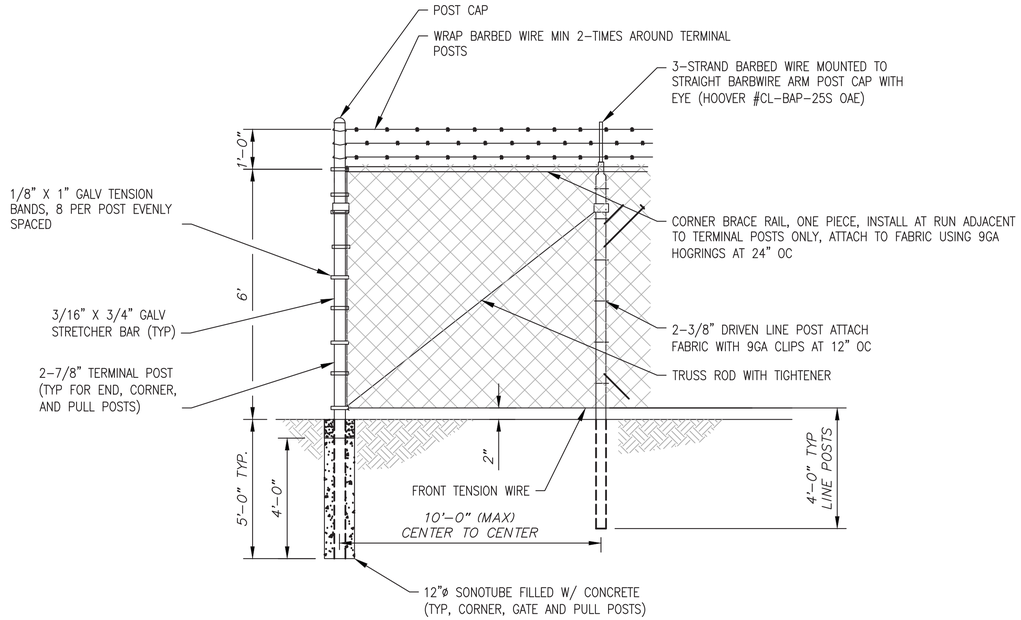
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

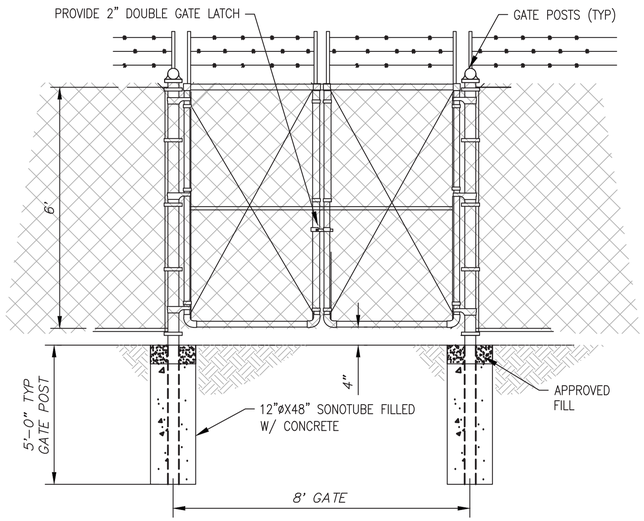
TITLE: GENERAL SECTIONS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 3/29/19
FILE NAME: PTH PPU E1-E2	SHEET: C1.4 OF
PROJECT NUMBER:	



1 C1.5 FENCE DETAILS
NTS



2 C1.5 8' SWING GATE DETAILS
NTS

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

ISSUED FOR CONSTRUCTION MARCH 2019

CRW ENGINEERING GROUP, LL

STATE OF ALASKA
49TH
Karl R. Hulse
CE-10583
3/29/2019
REGISTERED PROFESSIONAL ENGINEER

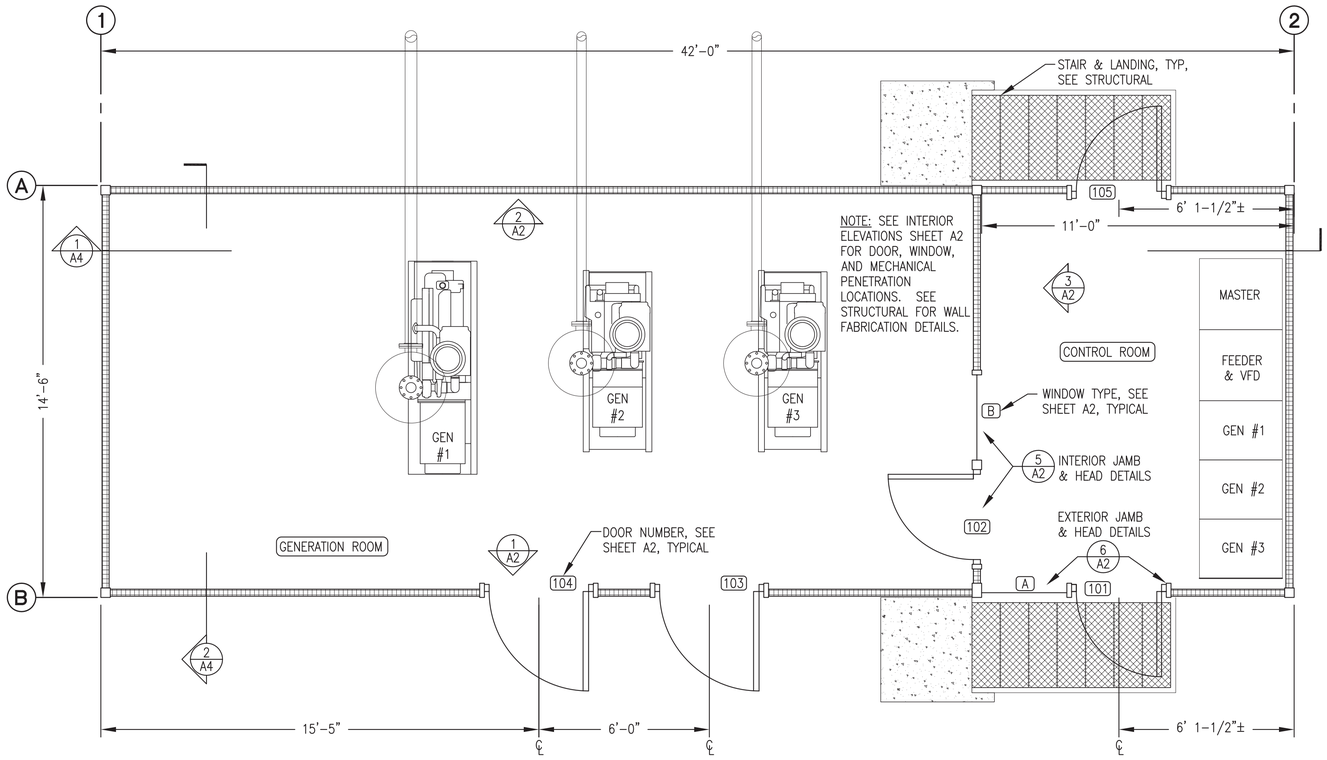
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN POWER SYSTEM POWER PLANT UPGRADE

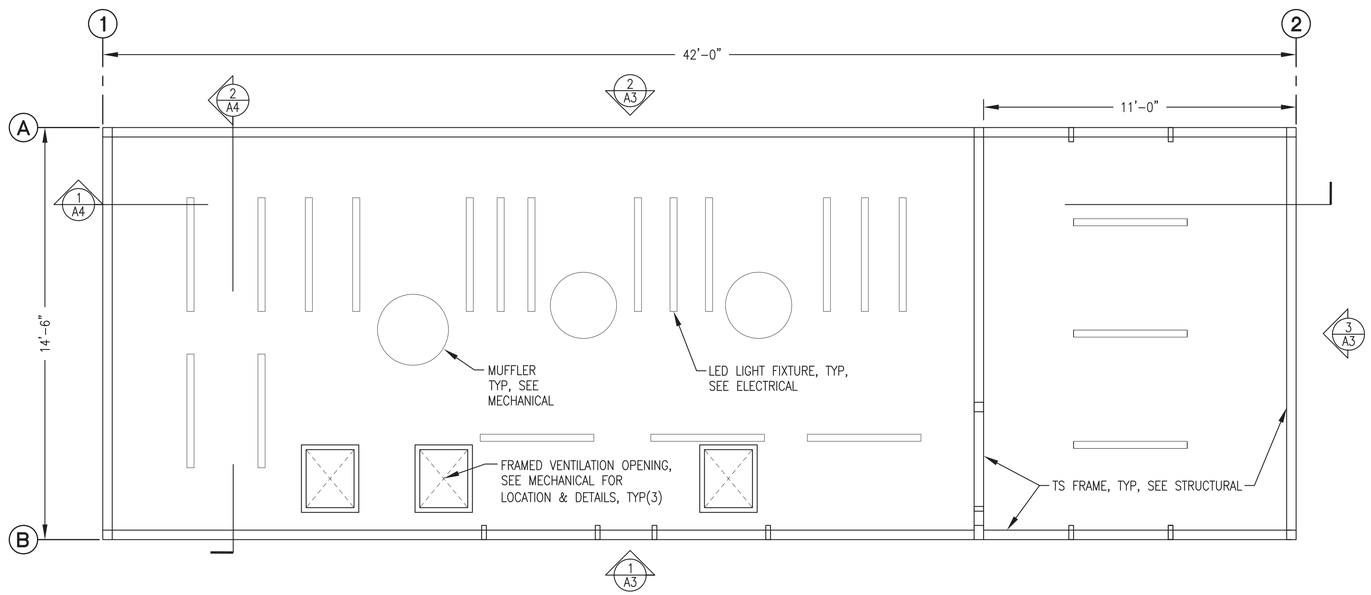
TITLE: FENCE DETAILS

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

DRAWN BY: NP	SCALE: AS NOTED
DESIGNED BY: KH	DATE: 3/29/19
FILE NAME: PTH PPU C	SHEET: C1.5 OF
PROJECT NUMBER:	



1 A1 FLOOR PLAN
3/8"=1'-0"



2 A1 REFLECTED CEILING PLAN
3/8"=1'-0"

CODE ANALYSIS – 2012 EDITION INTERNATIONAL BUILDING CODE

OCCUPANCY CLASSIFICATION
GROUP F–1: FACTORY INDUSTRIAL MODERATE HAZARD – ELECTRIC GENERATION PLANT — REF: IBC–2012, SEC. 306.2

TYPE OF CONSTRUCTION — REF: IBC–2012, TABLE 601
TYPE V–B (NON–RATED) — REF: IBC–2012, SEC. 602.5

BUILDING HEIGHTS AND AREAS — REF: IBC–2012, TABLE 503
ALLOWED 40'–0" 1 STORY 8,500 S.F. PROVIDED: 17'–0" 1 STORY 610 S.F.

FIRE RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS — REF: IBC–2012, TABLE 601
STRUCTURAL FRAME 0 HR BEARING WALLS 0 HR INTERIOR PARTITIONS 0 HR FLOOR 0 HR ROOF 0 HR

FIRE RESISTANCE RATING REQUIREMENTS FOR EXTERIOR WALLS — REF: IBC–2012, TABLE 602
EXTERIOR WALLS 10' ≤ X ≤ 30' 0 HR

FIRE PROTECTION SYSTEM — REF: IBC–2012, SEC. 903.2.4
FIRE PROTECTION NOT REQUIRED. WATER MIST FIRE SUPPRESSION SYSTEM PROVIDED (SEE MECHANICAL).

OCCUPANT LOAD — REF: IBC–2012, TABLE 1004.1.2
MECHANICAL/STORAGE = 300 S.F./PERSON 610 S.F./300 S.F. PER OCCUPANT = 2 OCCUPANTS

MEANS OF EGRESS – TRAVEL DISTANCE — REF: IBC–2012, TABLE 1016.2
REQUIRED 200' PROVIDED 20'

ARCHITECTURAL GENERAL NOTES:

1) SEE CIVIL SITE PLAN FOR LOCATION AND LAYOUT. PROVIDE SEPARATION TO PROPERTY BOUNDARIES IN ACCORDANCE WITH CODE ANALYSIS.
2) DO NOT BLOCK OR OBSTRUCT ACCESS, REQUIRED PARKING AREAS, OR REQUIRED EGRESS FROM NEIGHBORING FACILITIES. PROVIDE TEMPORARY BARRICADES OR OTHER FORMS OF PROTECTION TO PROTECT EMPLOYEES, RESIDENTS, AND VISITORS FROM INJURIES DURING CONSTRUCTION ACTIVITIES
3) PROJECT MANAGER SHALL BE RESPONSIBLE FOR ALL BUILDING PERMITS, LETTERS OF NON–OBJECTION, UTILITY SERVICES AND APPLICATIONS AS REQUIRED. PROJECT MANAGER OR CONSTRUCTION MANAGER TO BE RESPONSIBLE FOR ALL REQUIRED SAFETY PRECAUTIONS, METHODS AND TECHNIQUES.
4) PROVIDE A COMPLETE AND OPERATIONAL FACILITY. ALL WORK TO BE IN ACCORDANCE WITH CURRENT APPROVED EDITIONS OF THE IBC, IMC, IFC, AND NEC INCLUDING STATE OF ALASKA AMENDMENTS.
5) SEE SHEETS A3 AND A4 FOR DESCRIPTION OF FIELD INSTALLED ROOF SYSTEM.
6) INSULATE ALL WALLS, FLOORS, AND CEILINGS WITH HIGH TEMPERATURE MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION, MIN R VALUE 4 PER INCH, MIN 2000F MELTING TEMP. ROXUL AFB OR EQUAL. FILL ALL PANEL VOIDS OR PROVIDE THICKNESS AS INDICATED ON DRAWINGS. MECHANICALLY FASTEN FLOOR INSULATION TIGHT TO FLOOR.
7) UPON COMPLETION OF FABRICATION ROUND ALL CORNERS AND GRIND EDGES SMOOTH AND PAINT ALL INTERIOR AND EXTERIOR EXPOSED STEEL. PERFORM ALL PAINTING IN A WARM DRY ENVIRONMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS INCLUDING DRYING TIME TO RE–COAT.
8) SANDBLAST EXTERIOR SURFACE TO SSPC–SP–10. PRIME WITH ONE COAT OF REINFORCED INORGANIC ZINC PRIMER, DEVOE CATHA–COAT 302, NO SUBSTITUTES, COLOR GREEN, TO 3 MILS DRY FILM THICKNESS. COVER WITH TWO COATS OF EPOXY, DEVOE BAR–RUST 236, NO SUBSTITUTES, TO 12 MILS DRY FILM THICKNESS. FIRST COAT COLOR GRAY, SECOND COAT COLOR WHITE.
9) FINISH EXTERIOR WALLS AND SKIDS (ALL EXPOSED VERTICAL EXTERIOR SURFACES) WITH ONE COAT OF ALIPHATIC URETHANE ENAMEL, DEVOE DEVTHANE 389, NO SUBSTITUTES, COLOR WHITE, TO 3 MILS DRY FILM THICKNESS.
10) SANDBLAST INTERIOR SURFACE TO SSPC–SP–6. PRIME AND FINISH WITH TWO COATS OF EPOXY, SHERWIN WILLIAMS MACROPOXY 646, NO SUBSTITUTES, TO 8 MILS TOTAL DRY FILM THICKNESS. CEILING COLOR WHITE. WALL AND FLOOR COLOR STRUCTURAL GRAY 4031. NOTE THAT FIRST COAT ON WALLS AND FLOOR MAY BE WHITE.

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

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA 49 TH
David G. Thompson No. 7034 10/16/18
REGISTERED PROFESSIONAL ARCHITECT

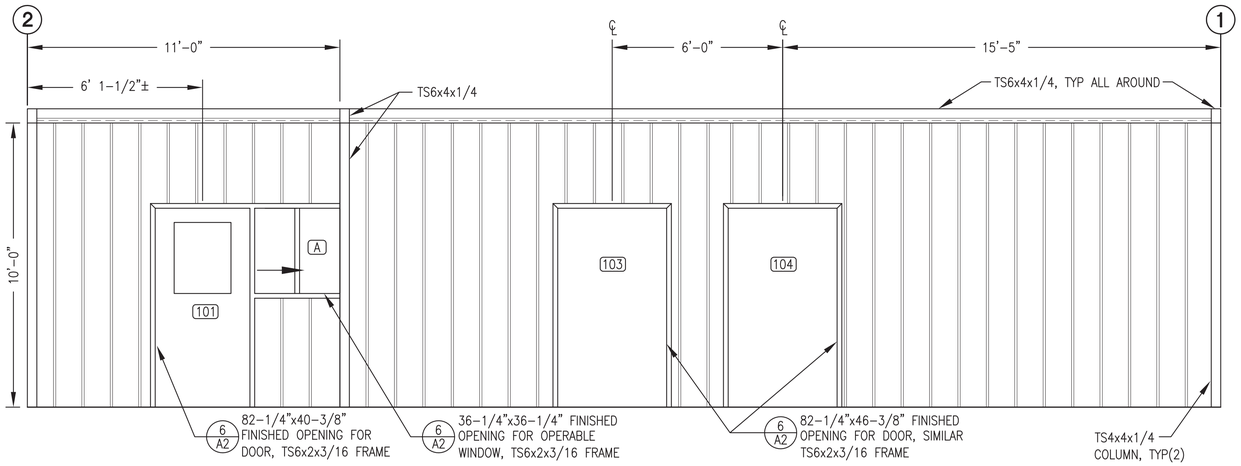
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: FLOOR PLAN, REFLECTED CEILING PLAN, CODE ANALYSIS, & GENERAL NOTES

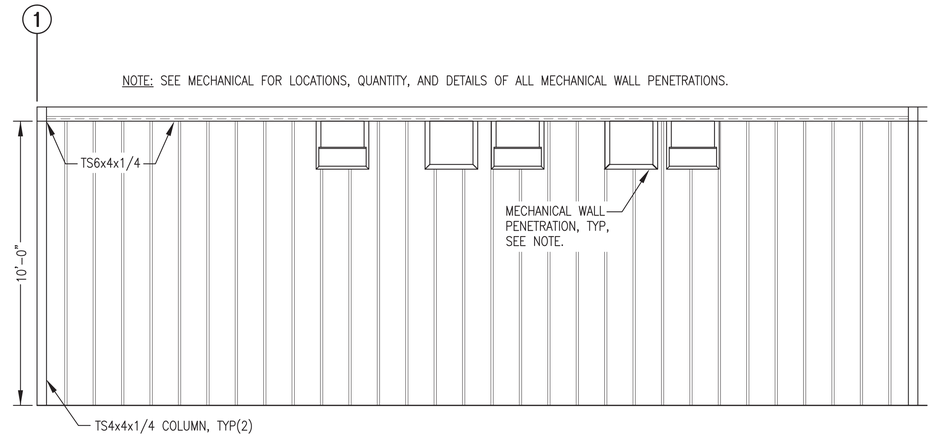
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU A1–4	SHEET: A1 OF 4
PROJECT NUMBER:	



1 A2 FRONT WALL INTERIOR ELEVATION

3/8"=1'-0"



2 A2 PARTIAL GENERATOR ROOM BACK WALL INTERIOR ELEVATION

3/8"=1'-0"

3 A2 CONTROL ROOM WALL INTERIOR ELEVATION

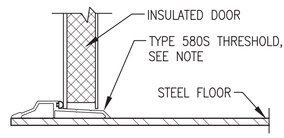
3/8"=1'-0"

FRAMED OPENING NOTES:

1) FABRICATE FRAMED OPENINGS FOR DOORS, WINDOWS, ETC, WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS. GRIND OUT INSIDE OF MITERED CORNERS TO PROVIDE FULL CLEAR OPENING.

2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED AND LOCATE TO INSIDE EDGE OR CENTERLINE AS INDICATED.

NOTE: SET THRESHOLD IN CONTINUOUS BED OF POLYURETHANE CAULK & CAULK ENDS TO JAMB TO FORM LIQUID TIGHT CONTAINMENT.



4 A2 TYPICAL DOOR THRESHOLD

NO SCALE

DOOR CONSTRUCTION							FRAME CONSTRUCTION						
DOOR NO.	WIDTH	HEIGHT	THICK NESS	MATERIAL	CORE	REMARKS	WALL THICK.	MATERIAL	TYPE	PROFILE	PREP.	FIRE RATING	HDWR. GROUP
101	3'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE	24"x24" RE-LIGHT {4}	N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-1
102	3'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE	24"x24" RE-LIGHT {4}	N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-2
103	3'-6"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE		N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-3
104	3'-6"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE		N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-3
105	3'-0"	6'-8"	1-3/4"	16 GA. H.M.	POLYURETHANE	24"x24" RE-LIGHT {4}	N/A	16 GA. H.M.	WELDED	SINGLE RABBETED	DIMPLE & PUNCH	NONE	HW-1

DOOR HARDWARE:

HW-1

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5NRP x 630
1 EA	EXIT DEVICE	PRECISION	2108 x 4908AX3 x 630
1 EA	CORE	BEST	BROWN CONSTRUCTION CORE
1 EA	DOOR CLOSER	LCN	4040 x CUSH x 689
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 34 x 630
1 EA	WEATHER STRIP	PEMKO	2891AS x 36 (HEAD)
2 EA	WEATHER STRIP	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 36

HW-2

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5 x 630
1 EA	EXIT DEVICE	PRECISION	2108 x 4908AX3 x 630
1 EA	DOOR CLOSER	LCN	4040 x CUSH x 689
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 34 x 630
1 EA	MOP PLATE	ROCKWOOD	K1050 10 x 35 x 630
1 EA	SOUND SEAL	PEMKO	2891AS x 36 (HEAD)
2 EA	SOUND SEAL	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 36

HW-3

3 EA	HINGES	HAGER	BB1191 4.5 x 4.5NRP x 630
1 EA	EXIT LOCK	SCHLAGE	ND25D x RHODES x 626
1 EA	OVERHEAD STOP	ROCKWOOD	OH1004M x US32D
1 EA	WEATHER STRIP	PEMKO	2891AS x 42 (HEAD)
2 EA	WEATHER STRIP	PEMKO	290AS x 80 (SIDE JAMBS)
1 EA	THRESHOLD	HAGER	580S x 42

NOTES:

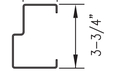
{1} DOORS AND HOLLOW METAL FRAMES GALVANIZED AND FACTORY PRIMED. ALL FRAMES WELDED CONSTRUCTION, DIMPLED AND PUNCHED.

{2} DOORS TO HAVE SOLID POLYURETHANE INSULATION CORE WITH TOPS INVERTED AND CAULKED WATER TIGHT.

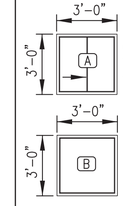
{3} FINISH ALL DOORS AND HOLLOW METAL FRAMES WITH TWO COATS OF SHERWIN WILLIAMS MACROPOXY 646, NO SUBSTITUTES, COLOR STRUCTURAL GRAY 4031.

{4} INSTALL INSULATED RE-LIGHT WITH TWO PANES OF 1/4" LAMINATED SAFETY GLASS WITH 1/2" AIR GAP IN EACH DOOR PANEL, 24"x24" OR 24"x18" AS INDICATED.

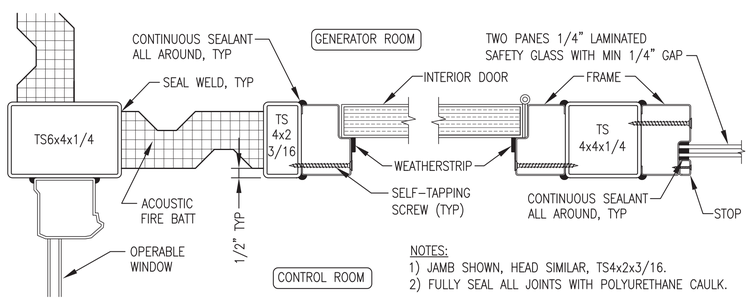
DOOR FRAME PROFILE:



WINDOW TYPES:



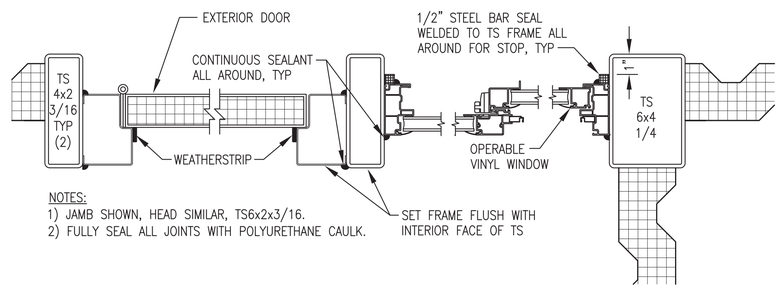
NOTE: DIMENSIONS ARE OVERALL FRAME SIZE.



NOTES:
1) JAMB SHOWN, HEAD SIMILAR, TS4x2x3/16.
2) FULLY SEAL ALL JOINTS WITH POLYURETHANE CAULK.

5 A2 INTERIOR DOOR AND WINDOW JAMB/HEAD

3"=1'-0"



NOTES:
1) JAMB SHOWN, HEAD SIMILAR, TS6x2x3/16.
2) FULLY SEAL ALL JOINTS WITH POLYURETHANE CAULK.

6 A2 TYPICAL EXTERIOR DOOR AND WINDOW JAMB/HEAD

3"=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 CONSTRUCTION OCTOBER 2018

STATE OF ALASKA 49 TH David G. Thompson No. 7034 10/16/18 REGISTERED PROFESSIONAL ARCHITECT

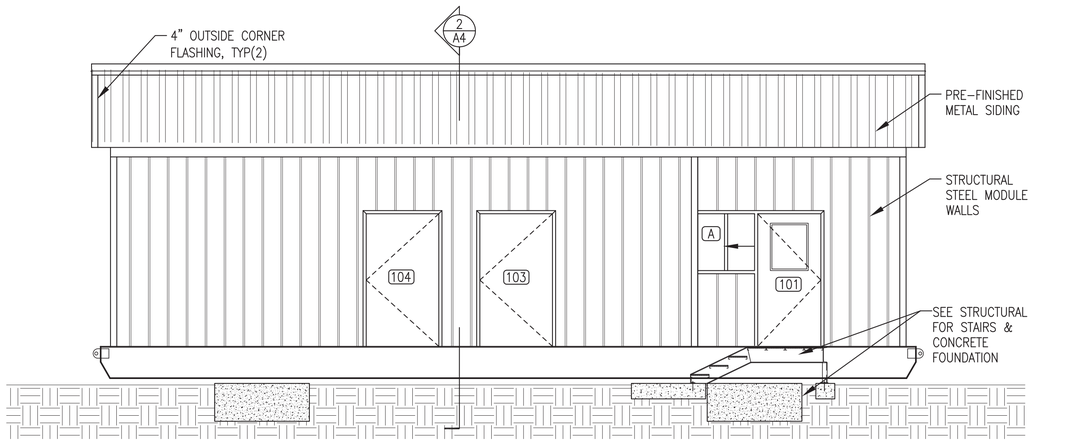
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

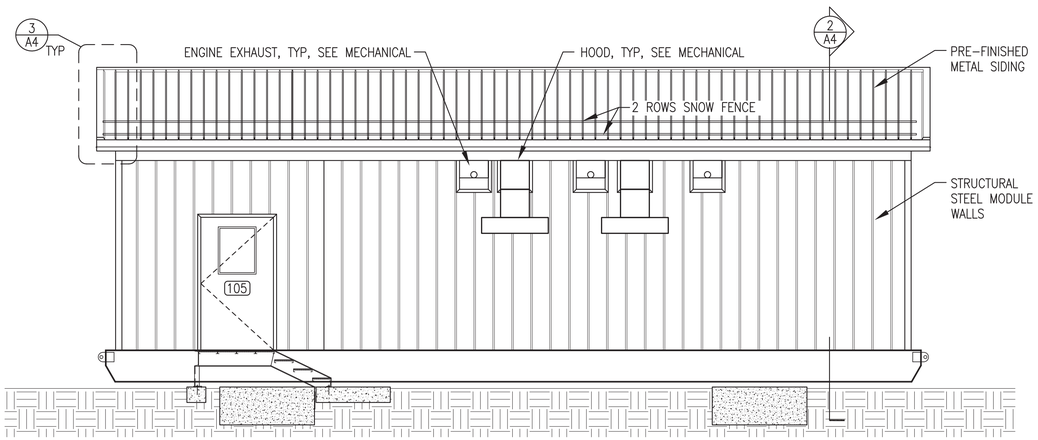
TITLE: INTERIOR ELEVATIONS & DOOR/WINDOW DETAILS

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

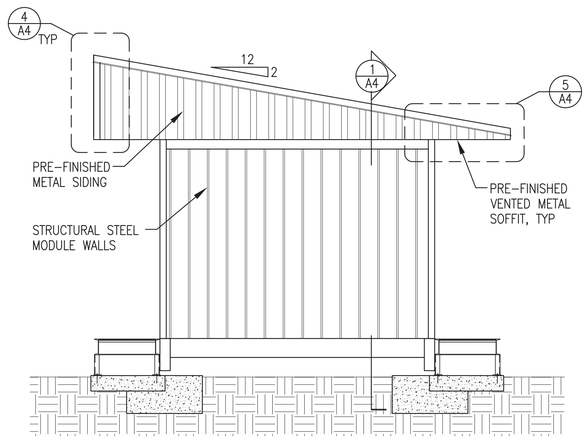
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG/DGT | DATE: 10/16/18
FILE NAME: PTH PPU A1-4 | SHEET: A2 OF 4
PROJECT NUMBER:



1 A3 FRONT EXTERIOR ELEVATION
1/4"=1'-0"



2 A3 BACK EXTERIOR ELEVATION
1/4"=1'-0"

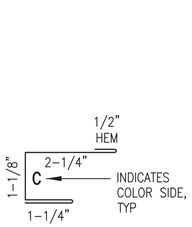


3 A3 END EXTERIOR ELEVATION
1/4"=1'-0"

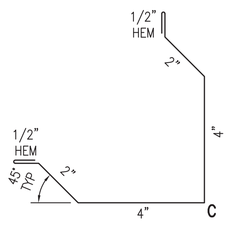
ROOFING SYSTEM NOTES:

1) FIELD INSTALL TRUSSES TO MODULE STRUCTURE, SEE STRUCTURAL. FIELD INSTALL PLYWOOD SHEATHING, ICE AND WATER SHIELD, AND METAL ROOFING/SIDING AS INDICATED. SEAL AND FLASH ALL SEAMS TO FORM A CONTINUOUS WEATHERPROOF SEAL.
2) ALL ROOFING, SIDING, SOFFIT, TRIM, AND FLASHING SHALL BE MIN 24 GAUGE GALVANIZED STEEL WITH KYNAR FINISH, COLOR JADE GREEN. ALL FASTENERS SHALL BE CORROSION RESISTANT STAINLESS STEEL SCREWS AND ALUMINUM RIVETS.
3) ROOFING SHALL BE STANDING SEAM TYPE, 24 GAUGE, 16" NET COVERAGE, 1-5/8" HIGH RIBS AT 8" O.C. AEP SPAN KLIP-RIB OR EQUAL. FURNISH CLIPS AND FASTENERS AS REQUIRED TO MEET LOAD CONDITIONS INDICATED ON SHEET S1.
4) SIDING SHALL BE LOW PROFILE, 24 GAUGE, 36" NET COVERAGE, 1-1/4" HIGH MAJOR RIBS AND 1/4 HIGH MINOR RIBS AT 12" O.C. AEP SPAN SUPER-SPAN OR EQUAL. FURNISH FASTENERS AS REQUIRED TO MEET LOAD CONDITIONS INDICATED ON SHEET S1.1.
5) VENTED SOFFIT PANELS SHALL BE 24 GAUGE GALVANIZED STEEL, 12" NET COVERAGE, KYNAR FINISH, 1" STANDOFF FROM SUBSTRATE, CONCEALED FASTENERS, WITH TWO PENCIL RIBS PROVIDING MINIMUM 7.8% NET FREE AREA. AEP SPAN FLUSH PANEL OR EQUAL.

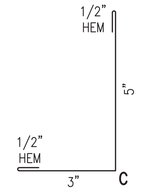
ROOFING SYSTEM TRIM & FLASHING:



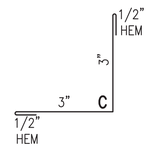
INSIDE COLOR CEE-METAL



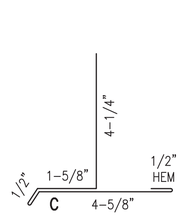
4" OUTSIDE CORNER



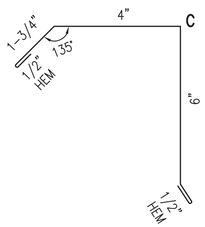
3"x5" OUTSIDE CORNER



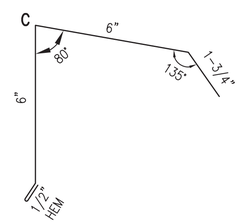
3"x3" INSIDE CORNER



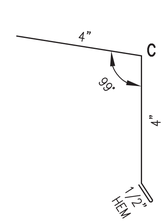
BASE DRIP



GABLE FLASHING



PEAK FLASHING



EAVE FLASHING

SNOW FENCE SPECIFICATIONS:

1) PROVIDE 2 ROWS OF SNOW RETENTION FENCE AS INDICATED.
2) SNOW FENCE SHALL BE L.M. CURBS COLOR GUARD OR APPROVED EQUAL. FURNISH COMPLETE SYSTEM INCLUDING UNPUNCHED COLOR GUARD, SPLICES, VERSA CLIPS, SNO CLIPS III, S5 KHD CLAMPS, 6" INSERTS, AND ALL REQUIRED FASTENERS.

FIELD INSTALLED ROOF SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA 49 TH
David G. Thompson
No. 7034
10/16/18
REGISTERED PROFESSIONAL ARCHITECT

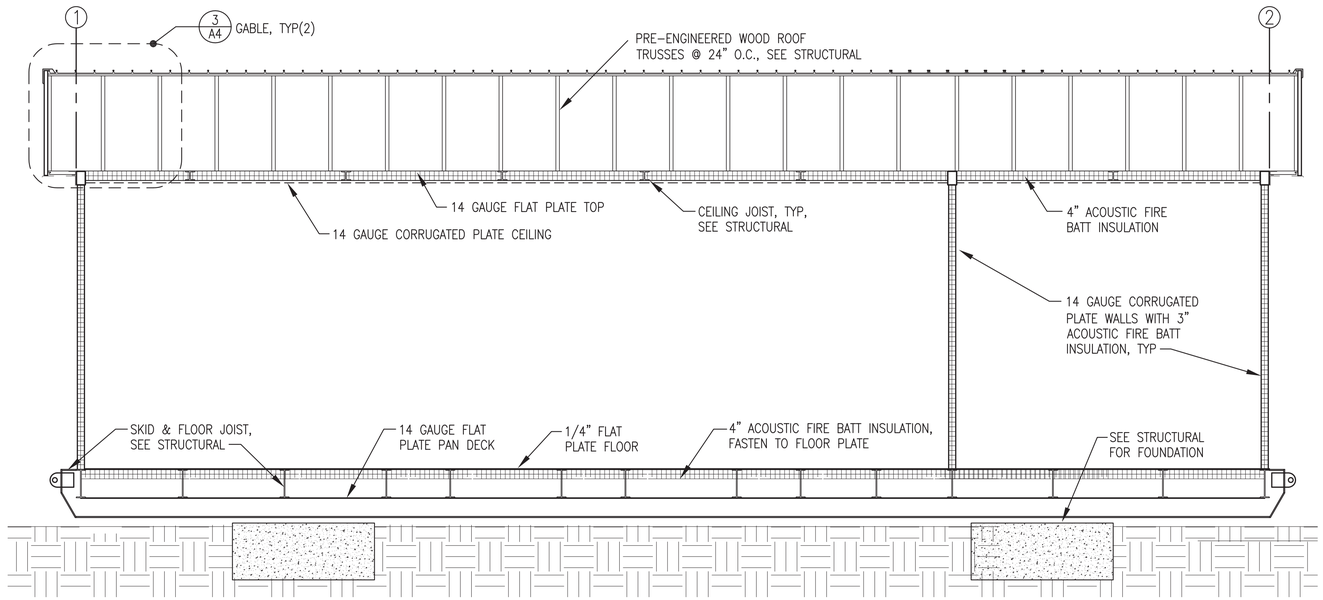
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

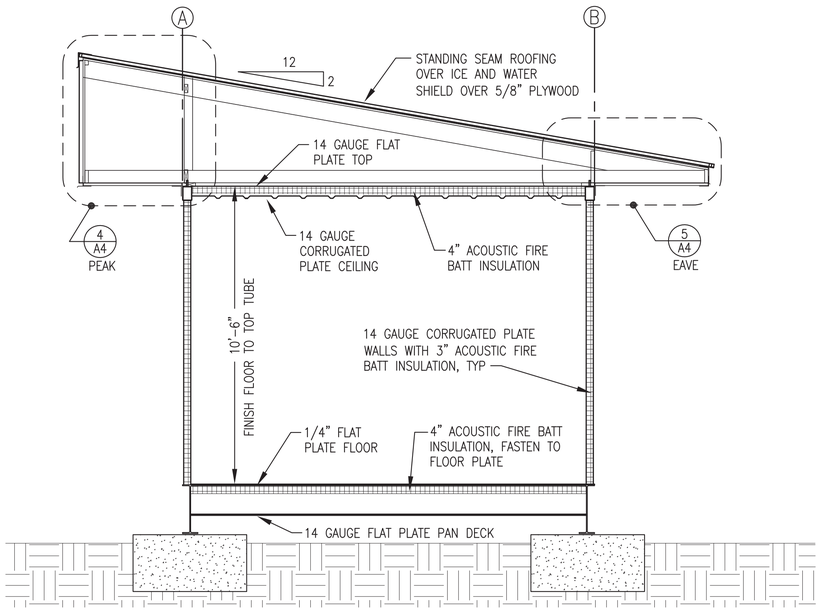
TITLE: EXTERIOR ELEVATIONS & ROOFING NOTES/TRIM

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

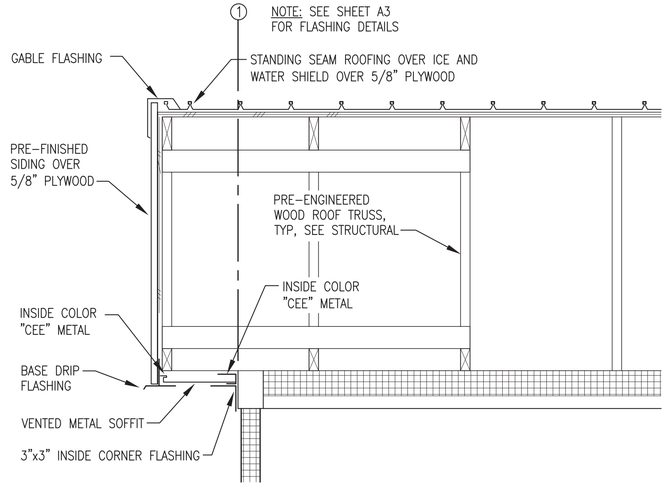
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU A1-4	SHEET: A3 OF 4
PROJECT NUMBER:	



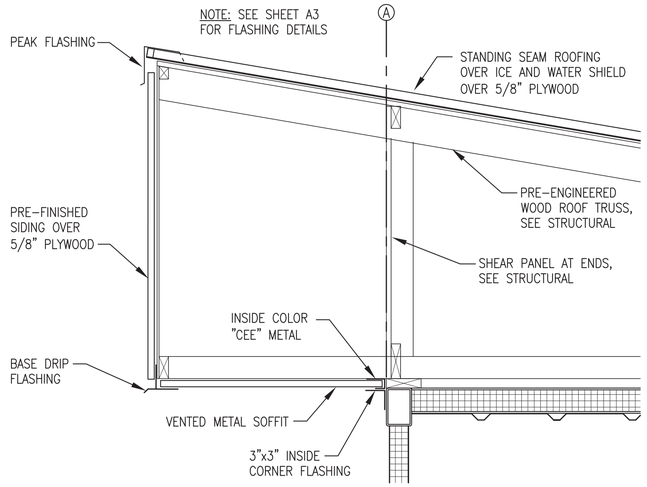
1 A4 BUILDING SECTION
3/8"=1'-0"



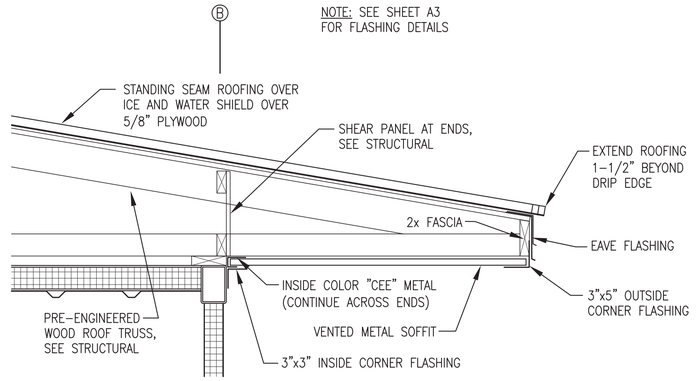
2 A4 BUILDING SECTION
3/8"=1'-0"



3 A4 GABLE DETAIL
1"=1'-0"



4 A4 PEAK DETAIL
1"=1'-0"



5 A4 EAVE DETAIL
1"=1'-0"

FIELD INSTALLED ROOF SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA
49 TH
David G. Thompson
No. 7034
10/16/18
REGISTERED PROFESSIONAL ARCHITECT

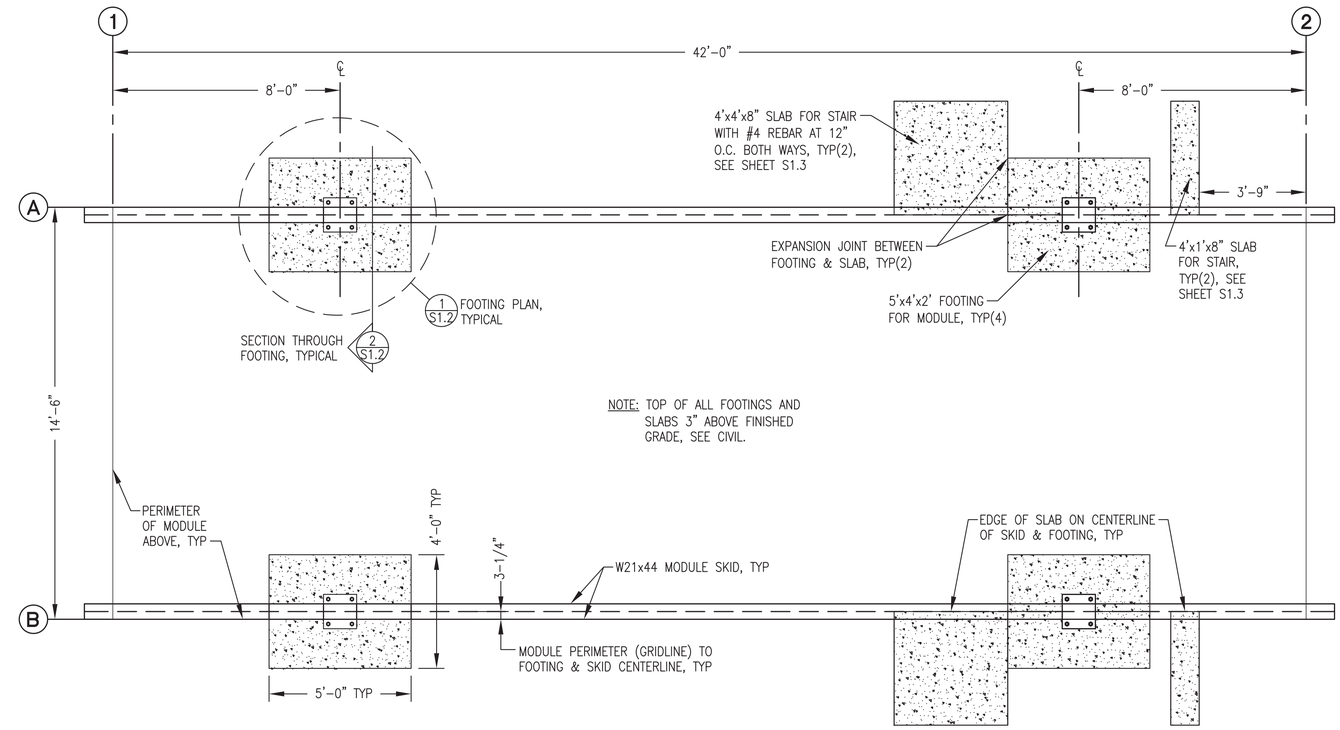
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: BUILDING SECTIONS & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU A1-4	SHEET: A4 OF 4
PROJECT NUMBER:	



1 S1 FOUNDATION PLAN
3/8"=1'-0"

STRUCTURAL GENERAL NOTES:

1.0 DESIGN LOADS:

A.	BUILDING CODE:	2012 INTERNATIONAL BUILDING CODE (IBC 2009)
B.	FLOOR LIVE LOADS: (IBC TABLE 1607.1)	
	LIGHT STORAGE/MANUFACTURING	125 PSF OR 2000 POUND POINT LOAD
	MAXIMUM GENERATOR UNIT WEIGHT	6,000 POUNDS
C.	SNOW LOADS: (ASCE 7-10)	
	GROUND SNOW LOAD, Pg =	40 PSF
	COEFFICIENT OF EXPOSURE, Ce =	1.0 PARTIALLY EXPOSED
	SNOW IMPORTANCE FACTOR, Is =	1.2 CATEGORY IV
	THERMAL COEFFICIENT, Ct =	1.2 COLD, VENTILATED ROOF
	ROOF/FLAT SNOW LOAD, Pf =	40 PSF
D.	WIND LOADS:	
	BASIC WIND SPEED =	160 MPH, 3 SECOND GUST
	RISK CATEGORY =	CATEGORY IV
	EXPOSURE CLASSIFICATION =	EXPOSURE D
E.	SEISMIC LOADING:	
	SEISMIC =	Ss = 1.0 S1 = 0.50
	SEISMIC IMPORTANCE FACTOR =	1.50 , CATEGORY IV
	SITE CLASS	"D"
	BASIC SEISMIC FORCE RESISTANCE SYSTEM =	BUILDING – BEARING WALL WITH STEEL SHEAR PANELS FOUNDATION – SPREAD CONCRETE FOOTINGS
	SEISMIC RESPONSE COEFFICIENT, R =	7.0

2.0 FOUNDATIONS:

A. SEE CIVIL FOR NFS STRUCTURAL GRAVEL PAD.
B. PROVIDE REINFORCED CONCRETE FOUNDATIONS IN ACCORDANCE WITH SPECIFICATIONS AND AS DETAILED ON SHEET S1.2.

3.0 STRUCTURAL STEEL:

A. THE DESIGN, FABRICATION, AND ERECTION OF ALL STRUCTURAL STEEL SHALL COMPLY WITH THE CODE OF STANDARD PRACTICE OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
B. ALL STEEL PLATE, SHAPES, AND ROLLED SECTIONS SHALL BE ASTM A36. ALL STEEL TUBING SHALL BE ASTM A500, GRADE B.
C. ALL METAL TO METAL CONNECTIONS SHALL BE EQUAL TO STANDARD CONNECTION, OR AS DETAILED USING A325 BOLTS (BEARING TYPE CONNECTIONS). TIGHTEN HIGH STRENGTH BOLTS WITH PROPERLY CALIBRATED WRENCHES, BY TURN-OF-THE-NUT METHOD, OR BY LOAD WASHERS. ALL CONNECTIONS UNLESS OTHERWISE DETAILED, SHALL HAVE THE MAXIMUM NUMBER OF 3/4" DIAMETER BOLTS USING STANDARD GAUGES AND CLEARANCES.
D. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE CURRENT CODE OF THE AMERICAN WELDING SOCIETY. USE AWS 5.1 E70XX ELECTRODES. MINIMUM FILLET WELD SHALL BE 3/16" EXCEPT FOR SEAL WELDS TO GAUGE METAL AS INDICATED.
E. ALL EXPOSED STEEL SURFACES SHALL BE PREPARED AND PAINTED AS INDICATED IN THE ARCHITECTURAL DRAWINGS.

4.0 WOOD:

A. 5/8" PLYWOOD SHALL HAVE A PANEL SPAN RATING OF 32/16 – MINIMUM NAILING FOR PANELS, UNLESS OTHERWISE NOTED, SHALL EQUAL 10d NAILS AT 4" CENTERS AROUND PLYWOOD PANEL EDGES AND 10d'S @ 12" CENTERS ALONG INTERMEDIATE FRAMING. BLOCK ALL DIAPHRAGM PANEL EDGES WITH 2X4 FLAT BLOCKING. OSB PANELS WILL NOT BE ACCEPTED.
B. FRAMING MATERIAL: DOUGLAS FIR OR HEM FIR, NO. 2 OR BETTER MINIMUM FOR JOISTS, STUDS, PANEL JOINTS, WOOD PLATES, BLOCKING, AND HEADERS. MAXIMUM MOISTURE CONTENT SHALL BE 19%. FOR FRAMING SPECIFICALLY INDICATED AS TREATED PROVIDE LUMBER TREATED FOR GROUND CONTACT TO 0.4 RETENTION MINIMUM.
C. ALL METAL TO WOOD OR WOOD TO WOOD CONNECTIONS SHALL BE STANDARD OR AS DETAILED ON THE DRAWINGS. ALL FASTENERS SHALL BE GALVANIZED OR STAINLESS STEEL.
D. ALL METAL FRAMING ANCHORS AND SPLICE PLATES SHALL BE FABRICATED FROM GALVANIZED STEEL AND SHALL SUPPORT THE LOADS INDICATED ON THE DRAWINGS. ANCHORS INDICATED ON THE DRAWINGS ARE "SIMPSON COMPANY" OR EQUAL.
E. MINIMUM NAILING SHALL EQUAL THAT INDICATED IN 2012 IBC TABLE 2304.9.1 UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR ANCHOR MANUFACTURER'S INSTALLATION INSTRUCTIONS. MINIMUM NAILING FOR EXTERIOR PLYWOOD PANELS SHALL EQUAL 10d NAILS AT 4" CENTERS AROUND PLYWOOD PANEL EDGES AND 10d'S @ 12" CENTERS ALONG INTERMEDIATE FRAMING. BLOCK ALL DIAPHRAGM PANEL EDGES WITH 2x4 OR 2x6 BLOCKING.
F. ERECT WOOD FRAMING MEMBERS TRUE TO LINES AND LEVELS. DO NOT DEVIATE FROM TRUE ALIGNMENT MORE THAN 1/4 INCH.
G. PREMANUFACTURED ROOF TRUSSES: ALL PRE-MANUFACTURED WOOD TRUSSES SHALL BE "GANG NAIL" OR EQUAL AND SHALL BE FABRICATED WITH GALVANIZED PLATES AND FASTENERS AS INDICATED ABOVE. TRUSSES SHALL DESIGNED FOR THE GRAVITY LOADS, WIND & SEISMIC LATERAL & UPLIFT LOADS, AND SUPPORT CONDITIONS AS INDICATED ON THE DRAWINGS. NO DURATION OF LOAD INCREASE IN STRESSES WILL BE ALLOWED FOR SNOW LOADING. UNBALANCED SNOW AND DRIFT LOADING IS REQUIRED. SUBMIT TRUSS DESIGNS STAMPED BY AN ENGINEER LICENSED TO PRACTICE IN THE STATE OF ALASKA. TRUSS DRAWINGS SHALL INDICATE ALL MATERIALS OF CONSTRUCTION.

MODULE FOUNDATION SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION OCTOBER 2018

STATE OF ALASKA 49TH
David G. Thompson SE 14226 10/16/18
REGISTERED PROFESSIONAL ENGINEER

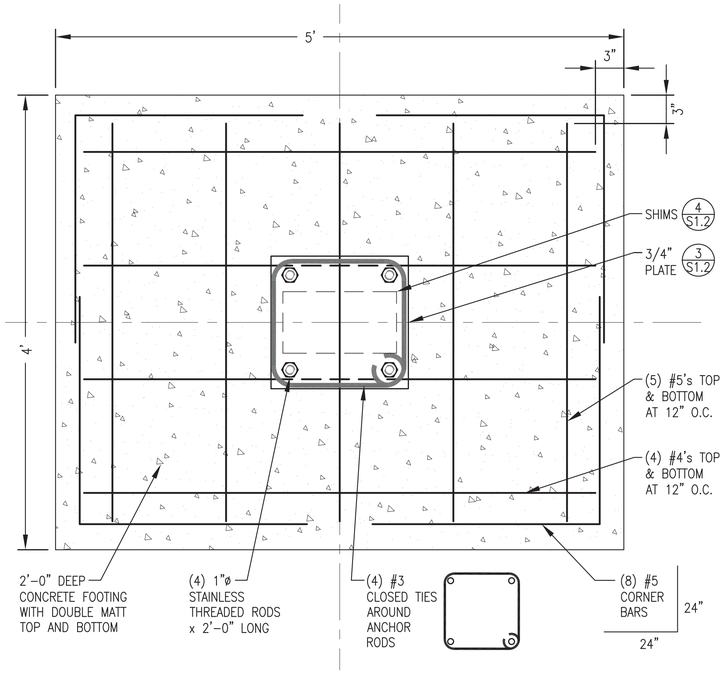
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

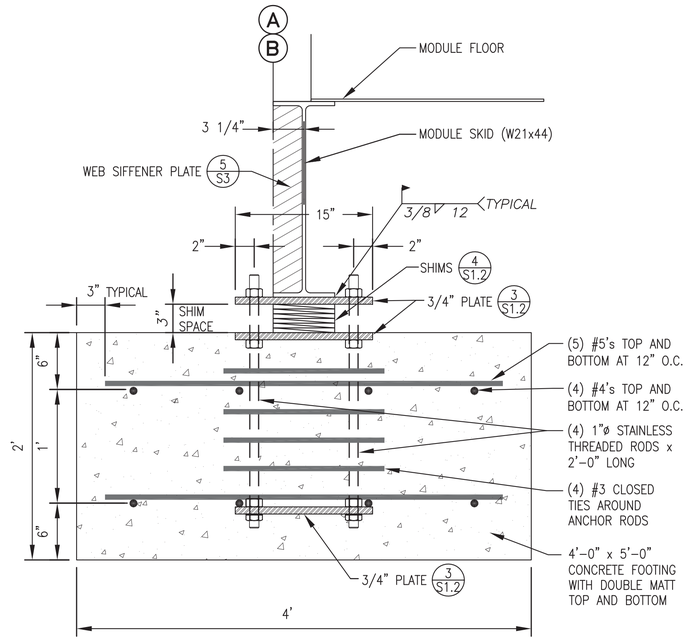
TITLE: FOUNDATION PLAN, CODE ANALYSIS, & STRUCTURAL NOTES

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

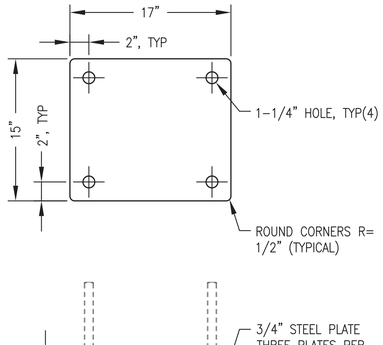
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU S1-4	SHEET: S1.1 OF 4
PROJECT NUMBER:	

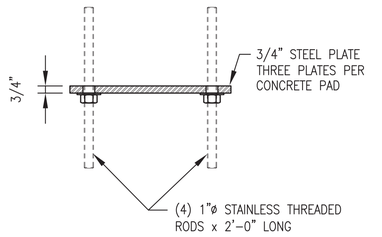


1 S1.2 FOOTING PLAN
1 1/2"=1'-0"

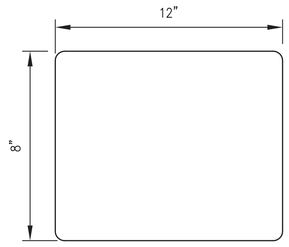


2 S1.2 SECTION THROUGH FOOTING
1 1/2"=1'-0"





3 S1.2 TYPICAL STEEL PLATE
NO SCALE



SHIM FABRICATION TABLE		
THICKNESS	QUANTITY	MATERIAL
1/4"	16	ALUMINUM
1/2"	8	ALUMINUM
1"	4	ALUMINUM

4 S1.2 TYPICAL SHIM
NO SCALE

MODULE FOUNDATION SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION OCTOBER 2018

STATE OF ALASKA 49TH
David G. Thompson SE 14226 10/16/18
REGISTERED PROFESSIONAL ENGINEER

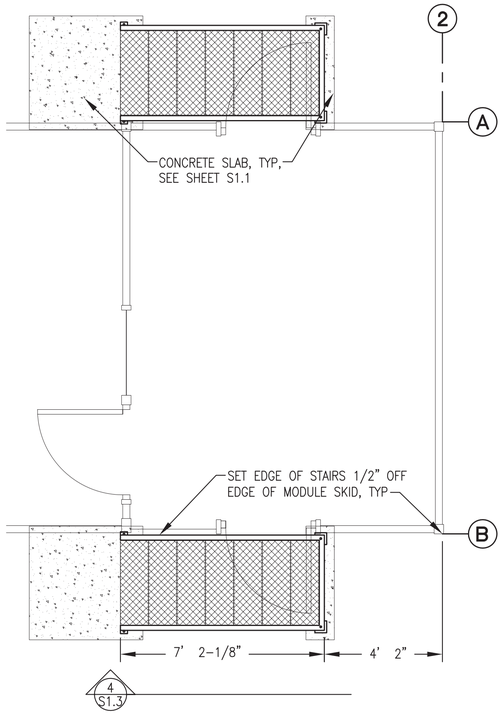
ALASKA ENERGY AUTHORITY

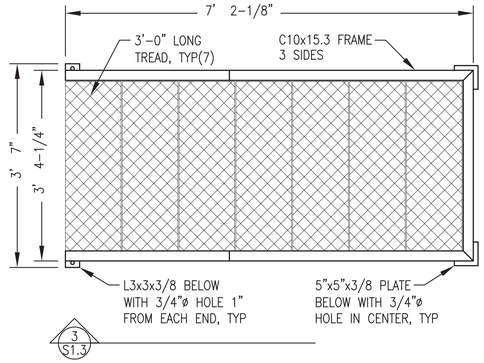
PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: FOUNDATION DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU S1-4	SHEET: S1.2 OF 4
PROJECT NUMBER:	

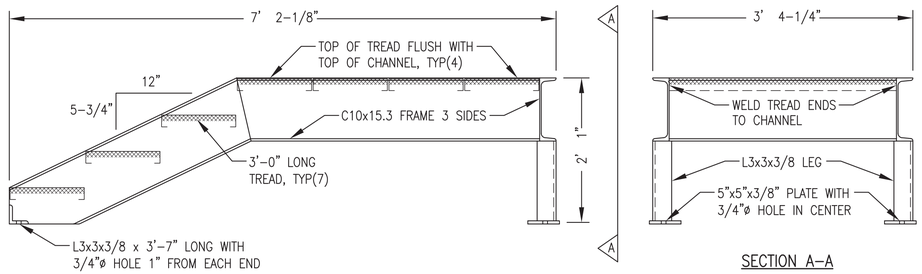




STAIR FABRICATION NOTES:

1) FABRICATE TWO IDENTICAL STAIR ASSEMBLIES.
2) FABRICATE FROM ASTM A-36 STEEL SHAPES AND PLATE AS INDICATED. STAIR AND PLATFORM TREADS TO BE 2"x11-3/4"x12 GA. GRIP STRUT.
3) MAKE ALL JOINTS AND CONNECTIONS WITH CONTINUOUS GROOVE OR FILLET WELDS.
4) UPON COMPLETION OF FABRICATION ROUND ALL OUTSIDE CORNERS AND GRIND ALL EDGES SMOOTH.
5) PREPARE COMPLETED ASSEMBLIES FOR GALVANIZING UTILIZING A CAUSTIC BATH, ACID PICKLE, AND FLUX. ALTERNATIVELY, STEEL MAY BE NEAR WHITE BLAST CLEANED TO SPCC-SP10 AND FLUXED. HOT-DIP GALVANIZE COMPLETED ASSEMBLIES IN ACCORDANCE WITH ASTM A 123.

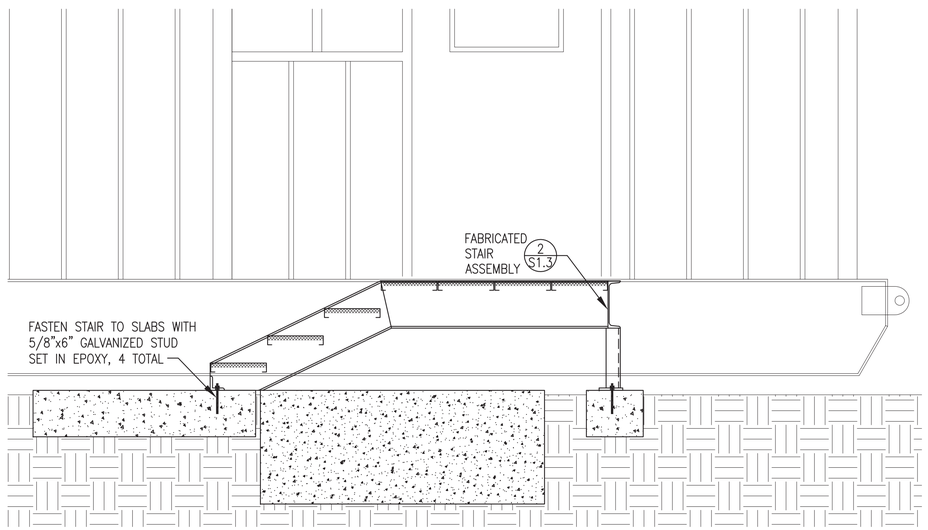
2 S1.3 STAIR FABRICATION PLAN
3/4"=1'-0"



SECTION A-A

1 S1.3 STAIR INSTALLATION PLAN
3/8"=1'-0"

3 S1.3 STAIR FABRICATION ELEVATION
1"=1'-0"



4 S1.3 STAIR INSTALLATION ELEVATION
3/4"=1'-0"

FABRICATED STAIR ASSEMBLIES WERE FURNISHED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT. FIELD INSTALLATION OF STAIRS IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA
49TH
David G. Thompson
SE 14226
10/16/18
REGISTERED PROFESSIONAL ENGINEER

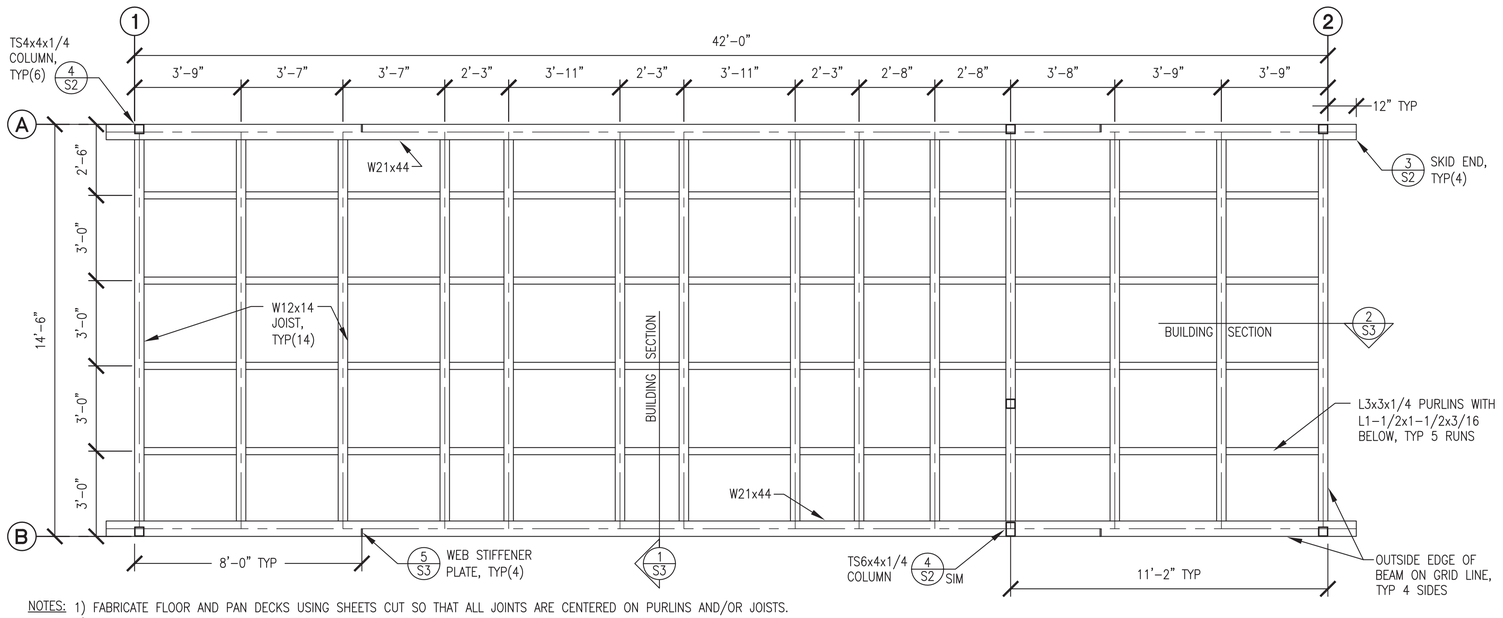
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: STAIR PLAN & DETAILS

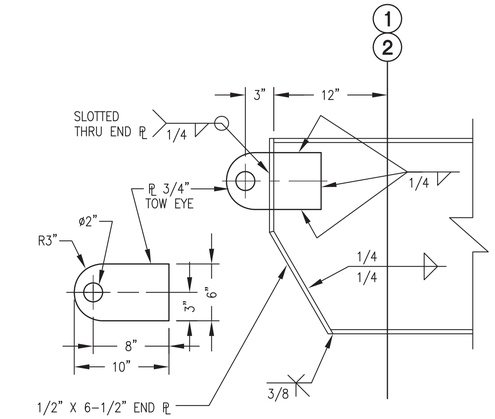
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU S1-4	SHEET: S1.3 OF 4
PROJECT NUMBER:	

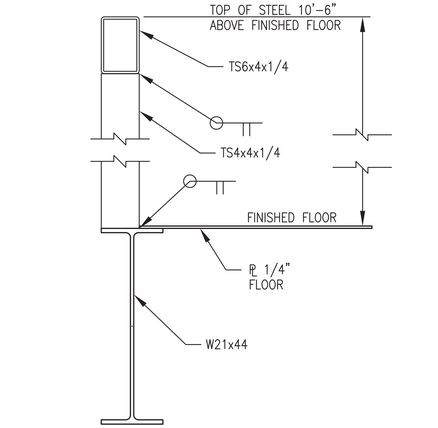


NOTES: 1) FABRICATE FLOOR AND PAN DECKS USING SHEETS CUT SO THAT ALL JOINTS ARE CENTERED ON PURLINS AND/OR JOISTS.
2) SEE MECHANICAL SUPPORT PLAN M2.2 FOR GENERATOR SUPPORT PEDESTAL LOCATIONS AND FABRICATION.

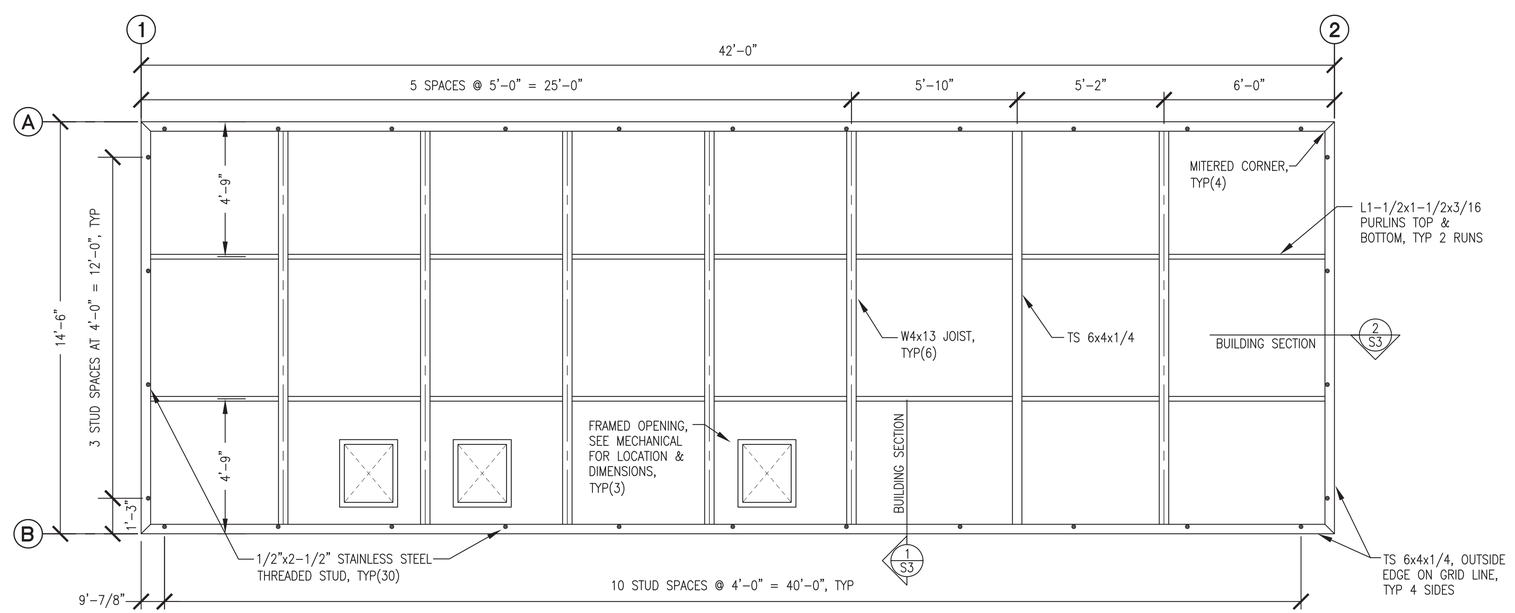
1/S2 FLOOR FRAMING PLAN
3/8"=1'-0"



3/S2 TYPICAL SKID END
1-1/2"=1'-0"



4/S2 TYP CORNER COLUMN
1-1/2"=1'-0"



NOTES: 1) FABRICATE CEILING FLAT AND CORRUGATED DECKS USING SHEETS CUT SO THAT ALL JOINTS ARE CENTERED ON PURLINS AND/OR JOISTS.
2) SEE MECHANICAL SUPPORT PLAN M2.2 FOR CEILING CORRUGATION LAYOUT AND STRUT SUPPORT LOCATION AND INSTALLATION.

2/S2 CEILING FRAMING PLAN
3/8"=1'-0"

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

ISSUED FOR CONSTRUCTION OCTOBER 2018

STATE OF ALASKA
49 TH
David G. Thompson
SE 14226
10/16/18
REGISTERED PROFESSIONAL ENGINEER

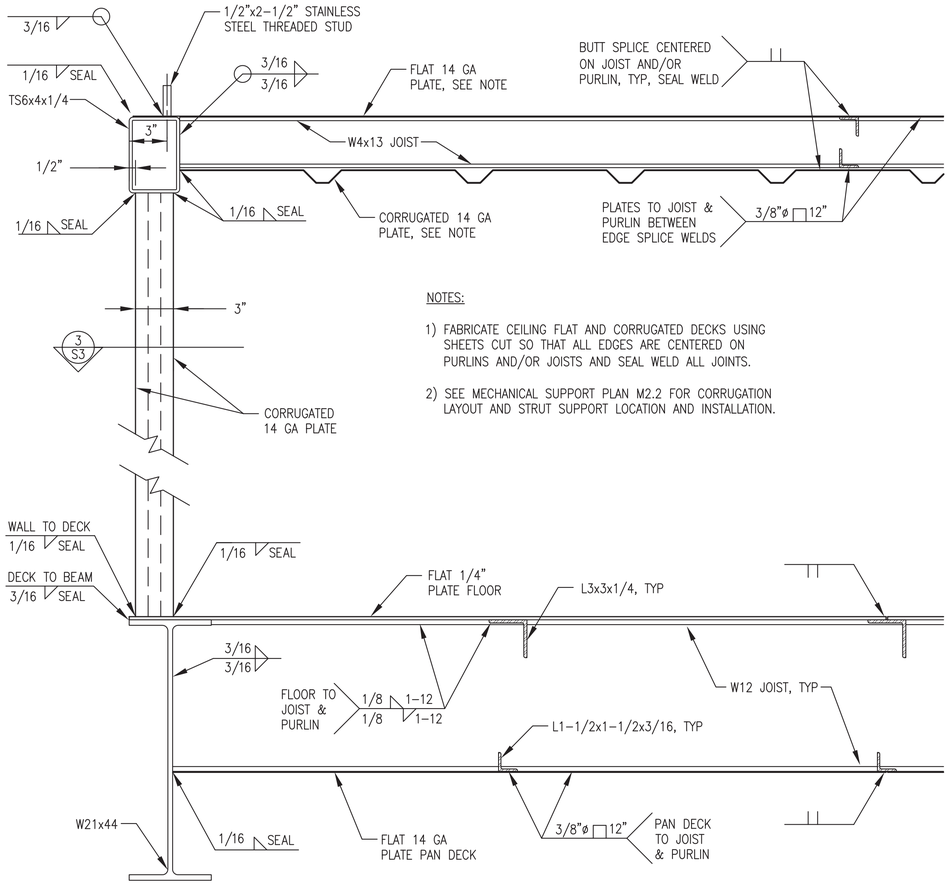
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: FRAMING PLANS & DETAILS

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

DRAWN BY: JTD
DESIGNED BY: BCG/DGT
FILE NAME: PTH PPU S1-4
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 10/16/18
SHEET: S2
OF 4

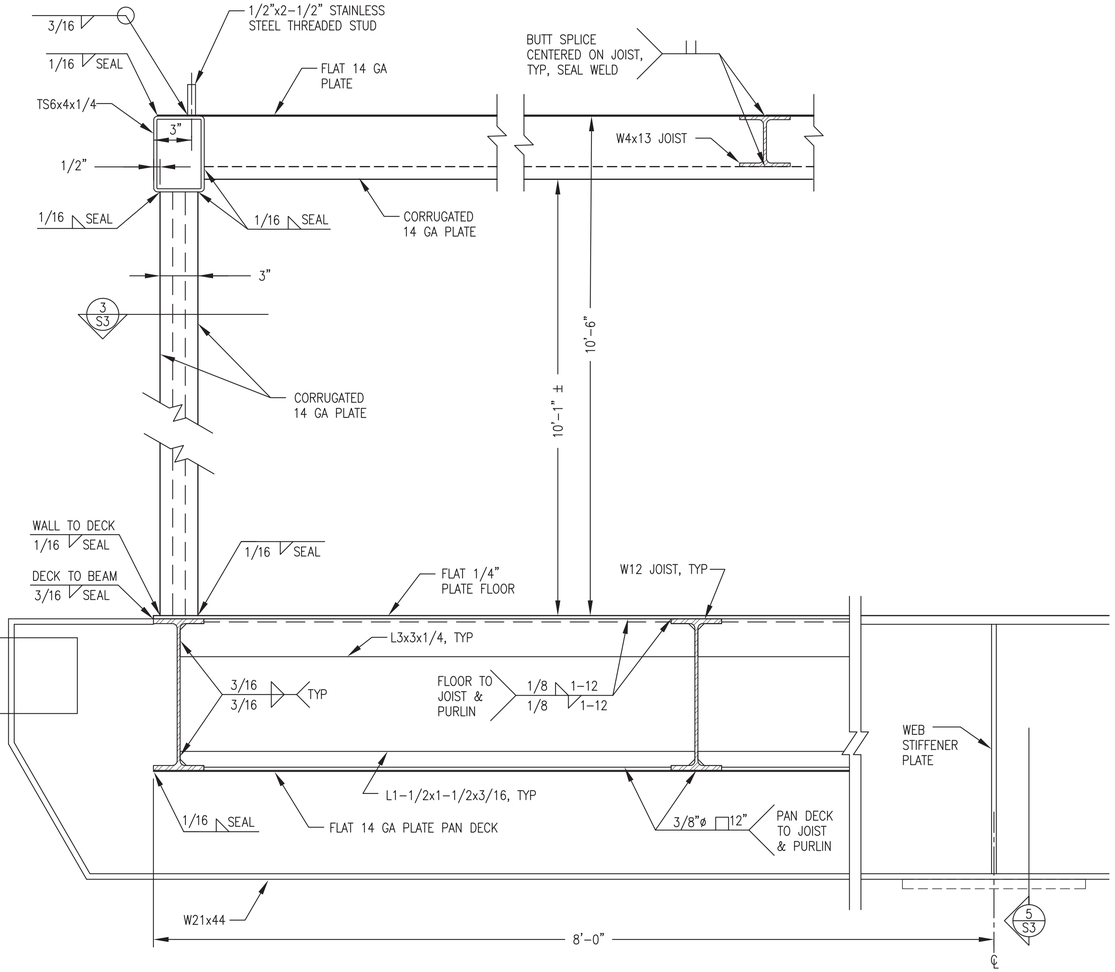


NOTES:

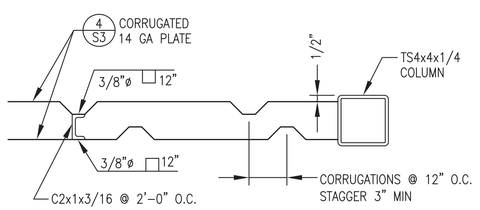
1) FABRICATE CEILING FLAT AND CORRUGATED DECKS USING SHEETS CUT SO THAT ALL EDGES ARE CENTERED ON PURLINS AND/OR JOISTS AND SEAL WELD ALL JOINTS.

2) SEE MECHANICAL SUPPORT PLAN M2.2 FOR CORRUGATION LAYOUT AND STRUT SUPPORT LOCATION AND INSTALLATION.

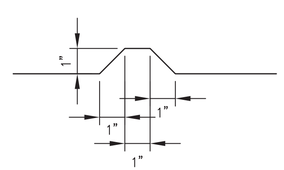
1/S3 TYPICAL BUILDING SECTION
2"=1'-0"



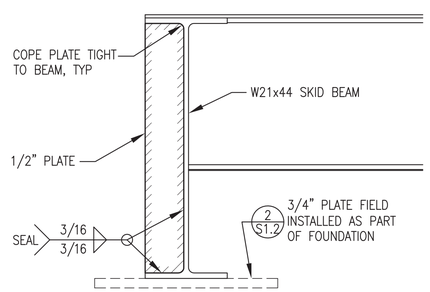
2/S3 TYPICAL BUILDING SECTION
2"=1'-0"



3/S3 TYPICAL EXTERIOR WALL – PLAN VIEW
2"=1'-0"



4/S3 TYPICAL CORRUGATION
4"=1'-0"



5/S3 WEB STIFFENER PLATE
2"=1'-0"

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

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA
49TH
David G. Thompson
SE 14226
10/16/18
REGISTERED PROFESSIONAL ENGINEER

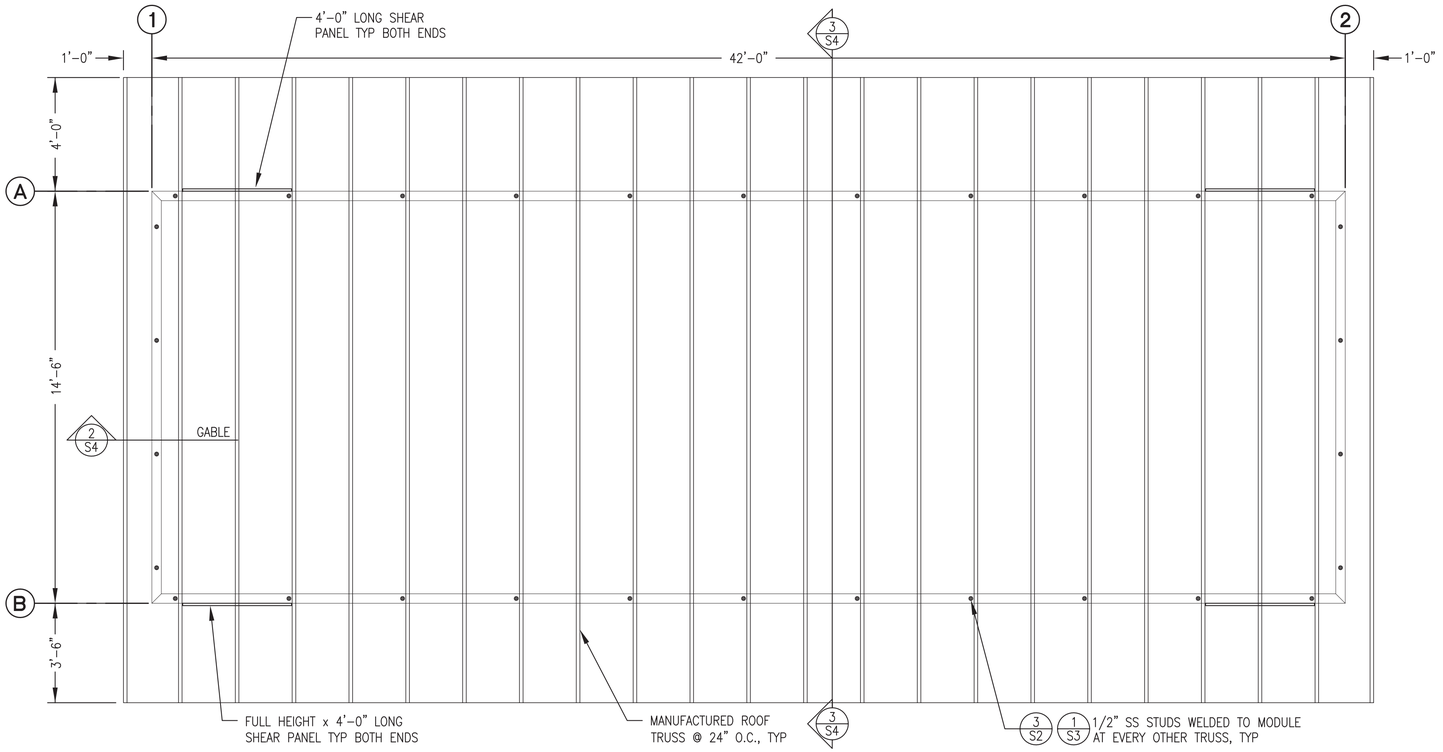
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

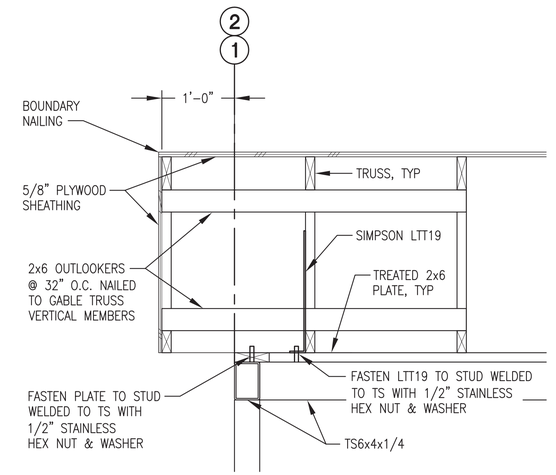
TITLE: SECTIONS & DETAILS

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

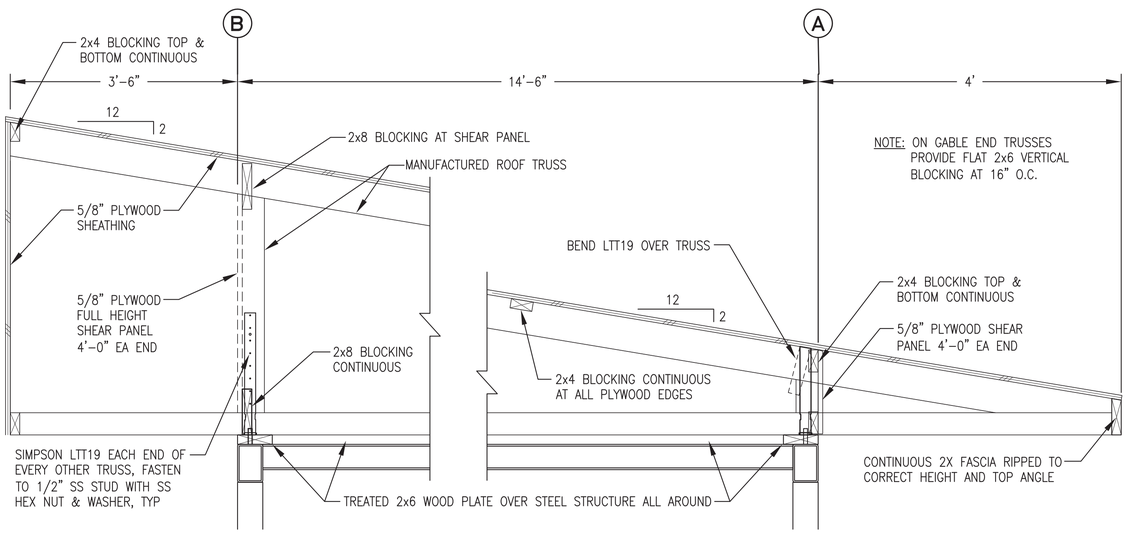
DRAWN BY: JTD
DESIGNED BY: BCG/DGT
FILE NAME: PTH PPU S1-4
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 10/16/18
SHEET: S3 OF 4



1 S4 ROOF FRAMING PLAN
3/8"=1'-0"



2 S4 TYPICAL GABLE
1"=1'-0"



3 S4 ROOF TRUSS INSTALLATION
NO SCALE

FIELD INSTALLED ROOF SYSTEM SHOWN THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION
OCTOBER 2018

STATE OF ALASKA
49TH
David G. Thompson
SE 14228
10/16/18
REGISTERED PROFESSIONAL ENGINEER

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: ROOF FRAMING PLAN & DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/DGT	DATE: 10/16/18
FILE NAME: PTH PPU S1-4	SHEET: S4 OF 4
PROJECT NUMBER:	

LEGEND

- DIRECTION OF FLOW
- CHANGE OF PIPE SIZE
- PIPING CONNECTION (TEE)
- ELBOW TURNED DOWN
- ELBOW TURNED UP
- FLANGED JOINT
- UNION
- FLEXIBLE CONNECTOR
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- HOSE END DRAIN VALVE
- GAUGE COCK
- AUTOMATIC AIR VENT
- (T) THERMOMETER
- (P) PRESSURE GAUGE
- (TT) TEMPERATURE TRANSMITTER
- (PT) PRESSURE TRANSMITTER
- (FM) FLOW METER
- (FS) FLOAT SWITCH
- (LCA) LOW COOLANT ALARM
- (TLM) TANK LEVEL MONITOR
- (LSP) LEVEL SENSOR PROBE
- (GLS) GLYCOL LEVEL SENSOR

ABBREVIATIONS

ø	DIAMETER (PHASE)
A	AMPS
AFF	ABOVE FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
DFR	DIESEL FUEL RETURN
DFS	DIESEL FUEL SUPPLY
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
ECR	ENGINE COOLANT RETURN
ECS	ENGINE COOLANT SUPPLY
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GRC	GALVANIZED RIGID CONDUIT
HP	HORSEPOWER
HRR	HEAT RECOVERY RETURN
HRS	HEAT RECOVERY 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
WPD	WATER PRESSURE DROP

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.

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 - 185F NOMINAL TEMPERATURE	FPE PART NO. A3010-185
TV-2	HEAT RECOV. THERMOSTATIC VALVE	2-1/2" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 185F NOMINAL TEMPERATURE,	FPE PART NO. A2510-185
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 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

HEAT RECOVERY & PLANT HEATING EQUIPMENT SCHEDULE:

HX-1	POWER PLANT HEAT EXCHANGER	316 SS PLATES, BRAZED CONST. 2.5" NPT, 600 MBH MIN CAPACITY. PRIMARY: 65 GPM 195F EWT (50% ETHYLENE) 1.3 PSI MAX WPD, SECONDARY: 65 GPM 185F LWT (50% PROPYLENE) 1.3 PSI MAX WPD	AMERIDEX SL-140-90 **SAME MODEL, INCREASED SECONDARY FLOW TO 65 GPM** ⚠1
P-HR1	CONTROL ROOM HEAT	1 GPM AT 18' TDH, 1/25HP, 115V, 1ø. PROVIDE WITH 3/4" SOLDER COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 15-58FC, SPEED 3
P-HR2A	HEAT RECOV. PRIMARY	65 GPM AT 8' TDH, 1/3HP, 115V, 1ø. PROVIDE WITH 2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-40/4, SPEED 3
P-HR2B	HEAT RECOV. SECONDARY	65 GPM AT 29' TDH, 3/4HP, 115V, 1ø. PROVIDE WITH 1-1/2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	**GRUNDFOS UPS 40-160/2, SPEED 3** ⚠1
CUH-1	CONTROL ROOM HEAT	FLOOR MOUNTED HOT WATER CABINET UNIT HEATER, 18 MBH AT 1 GPM 180F EWT & 60F EAT.	TOYOTOMI HC-20
ET-2	HEAT RECOV. EXP. TANK	BLADDER TYPE EXPANSION TANK, 106 GALLON TANK, 125 PSIG WORKING PRESSURE, 10 PSIG PRE-CHARGE.	AMTROL 400L

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	GREENHECK SE1-14-436-VG (1/2 HP)
EF-1 EF-2 COMB.	FAN & INTAKE DAMPERS	OPPOSED BLADE LOW-LEAKAGE CONTROL DAMPER, GALVANIZED STEEL CONSTRUCTION, 304 STAINLESS STEEL BEARINGS AND JAMB SEALS, EPDM BLADE SEALS.	GREENHECK VCD-23
(MD)	MOTORIZED DAMPER ACTUATOR	120V SPRING RETURN ACTUATOR	BELIMO AF-BUP

FUEL SYSTEM EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
P-DF1 & P-UO1	DAY TANK FILL PUMP & USED OIL DRAIN PUMP	ROTARY GEAR PUMP, 1/2" FPT INLET AND OUTLET, DUCTILE IRON CONSTRUCTION WITH STAINLESS STEEL SHAFT, BUNA-N LIP SEAL, CARBON BEARINGS, DIRECT FLEX COUPLED TO 1725 RPM ODP THERMALLY PROTECTED, AUTO RESET MOTOR, 1/3 HP, 115 V, 1 PH, 60 HZ, 4.0 GPM @ 20 PSID.	OBERDORFER C992M3E5QF50
HP-DT	DAY TANK FILL HAND PUMP (& GLYCOL FILL)	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 300# 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	10 MICRON FILTER FOR DIESEL FUEL, CLEAR BOWL WITH BOTTOM DRAIN VALVE, 150 PSIG MAXIMUM OPERATING PRESSURE, 25 GPM MAXIMUM FLOW. REPLACE FPT HEAD ASSEMBLY WITH CUSTOM FABRICATED STEEL HEAD WITH ANSI 150# FLANGED ENDS. FURNISH COMPLETE WITH WRENCH AND 5 SPARE FILTER ELEMENTS.	SUPERIOR MACHINE & WELDING HEAD WITH GOLDEN ROD NO. 495-4 BOWL, 491 WRENCH, 470-5 ELEMENTS

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
4" COPPER	BVT412	4" STEEL	B2017

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.

INSTRUMENTATION: SEE ELECTRICAL INSTRUMENTATION SCHEDULE ON SHEET E1.1 FOR INSTRUMENTATION DEVICES SHOWN ON THE MECHANICAL DRAWINGS.

SEQUENCE OF OPERATIONS

DAY TANK WILL HAVE AUTOMATIC FILL CONTROLS WITH REDUNDANT HIGH AND LOW LEVEL ALARMS AND TIMERS. SEE FUEL SYSTEM CONTROL PANEL DRAWINGS FOR DETAILED SEQUENCE.

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 ASSOCIATED EXHAUST FAN OPERATES. THE COMBUSTION AIR INTAKE MOTORIZED DAMPER WILL BE OPEN ANY TIME PLANT OPERATES (STATION SERVICE POWER ON).

EXHAUST FANS EF-1 AND EF-2 WILL OPERATE 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 TEMPERATURE, 75F, ADJUSTABLE.

CABINET UNIT HEATER CUH-1 AND CIRCULATING PUMP P-HR1 WILL OPERATE ON A CALL FOR HEATING THROUGH THE INTERNAL CUH CONTROLS TO MAINTAIN CONTROL ROOM TEMPERATURE, 65F, ADJUSTABLE.

RADIATOR FAN MOTORS WILL OPERATE UNDER VARIABLE FREQUENCEY DRIVE (VFD) CONTROL. WHEN THE COOLANT RETURN TEMP REACHES THE WAKE UP 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 WAKE UP SETPOINT. THE INITIAL OPERATING SETTINGS SHALL BE SET TO THE FOLLOWING VALUES AND SHALL BE ADJUSTABLE:
170F = PID REFERENCE TEMPERATURE 160F = WAKE UP TEMPERATURE
0.93 = PROPORTIONAL GAIN 0.3 = INTEGRAL GAIN 0 = DERIVATIVE
6 HZ = MINIMUM SPEED 60 SEC = LOW SPEED TIME OUT

HEAT RECOVERY PUMPS P-HR2A AND P-HR2B WILL OPERATE CONTINUOUSLY UNDER MANUAL CONTROL.

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.

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.

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.

ALL EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND ARE SHOWN HERE FOR REFERENCE ONLY. FINAL TESTING AND COMMISSIONING OF THE MODULE IN ACCORDANCE WITH THE SEQUENCE OF OPERATIONS IS INCLUDED IN THE ON SITE CONTRACT.

⚠ REVISED DRAWING ISSUED MARCH 2019

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

REV.	DESCRIPTION	DATE	BY
1	CHANGED P-HR2B SELECTION, REVISED HX-1 FLOW AND PRESSURE DROP	3/20/19	BCG

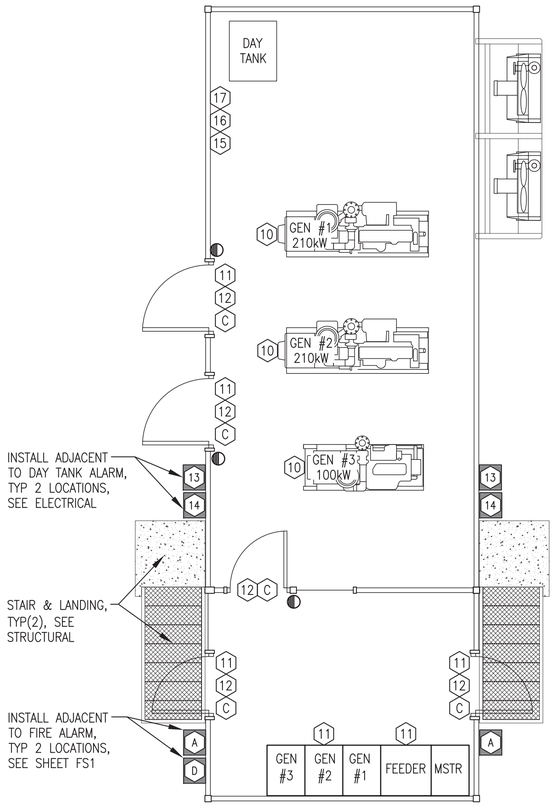
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: MECHANICAL LEGEND, SCHEDULES, & 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: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M1.1 OF 7
PROJECT NUMBER:



1 M1.2 POWER PLANT WARNING SIGN/PLACARD & FIRE EXTINGUISHER PLAN
1/4"=1'-0"

WARNING SIGN & INFORMATIONAL PLACARD SCHEDULE:

WARNING SIGNS & INFORMATIONAL PLACARDS – PROVIDE DECALS AND SIGN BOARDS AS INDICATED IN THE SCHEDULE BELOW, QUANTITY & LOCATION WHERE SHOWN ON THE WARNING SIGN/PLACARD PLAN THIS SHEET.

(#) 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"
- (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) "IN CASE OF SPILL CALL DEC 1-800-478-9300"

INFORMATIONAL PLACARDS – BLACK LETTERING ON WHITE BACKGROUND.

- (15) "CHECK BULK TANK LEVEL DAILY, SWITCH TO A DIFFERENT BULK TANK WHEN LEVEL DROPS BELOW 12" "
- (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 TANK FARM 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) LOCK & TAG GENERATOR OUT OF SERVICE
  2) DRAIN ENGINE OIL INTO DRUM OR BUCKET
  3) CHANGE FILTER
  4) CLOSE DRAIN VALVE & REFILL ENGINE
  5) RUN ENGINE, SHUT OFF, & CHECK DIPSTICK
  6) TOP OFF & PLACE ENGINE BACK IN SERVICE"
- (18) ⚠1 "#2 DIESEL TANKS C5, C6 AND C7 PROVIDE FUEL FOR THE POWER PLANT AUTO FILL DAY TANK. LEAVE ONE TANK BOTTOM VALVE OPEN AT A TIME AND OTHER TWO CLOSED AND LOCKED. SWITCH TO A DIFFERENT WHEN LEVEL DROPS BELOW 12". "
- (19) ⚠1 THE PIPELINE FILTER CONTAINS A WATER BLOCKING ELEMENT. THE ELEMENT SHOULD BE CHANGED AT A MINIMUM EVERY FALL AFTER FREEZE UP AND IF PUMPING RATE SLOWS DOWN. TURN OFF DAY TANK CONTROL PANEL IN POWER PLANT AND CONFIRM THAT ACTUATED BALL VALVE ABV IS FULLY CLOSED PRIOR TO CHANGING FILTER."

VALVE TAG SCHEDULE:

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.
NOTE: PROVIDE TAGS NOTED AS DECALS WITHOUT ALUMINUM BACKING PLATE.

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) NOT USED
- (24) "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF ENGINE"

BROWN (USED OIL)

- (41) "NORMALLY CLOSED, OPEN ONLY FOR ENGINE OIL CHANGE"

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"

ORANGE (HEAT RECOVERY/PROPYLENE GLYCOL)

- (61) "NORMALLY CLOSED, OPEN ONLY FOR ADDING FLUID – PROPYLENE GLYCOL ONLY"
- ⚠1 (62) "NORMALLY OPEN, HEAT RECOVERY SUPPLY"
- ⚠1 (63) "NORMALLY OPEN, HEAT RECOVERY RETURN"
- (64) "NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF SYSTEM"
- ⚠1 (65) "NORMALLY OPEN, BOILER RETURN TO HX"
- ⚠1 (66) "NORMALLY OPEN, HX TO BOILER"

INSTALLATION – SECURE EACH TAG TIGHT TO VALVE, PIPE, OR DEVICE WITH STAINLESS STEEL CABLE TIES OR SAFETY WIRE THROUGH ALL FOUR CORNERS OR FASTEN TO ADJACENT WALL OR SECTION OF STRUT WITH SCREWS.

NOTES:
1) SEE DRAWINGS THAT FOLLOW FOR LOCATIONS OF ALL SPECIFIC FUNCTION TAGS.
2) FOR ALL VALVES NOT INDICATED WITH A SPECIFIC FUNCTION TAG PROVIDE 1-1/2"ø BRASS TAG LABELED "N.O." FOR NORMALLY OPEN VALVES AND 1"ø BRASS TAG LABELED "N.C." FOR NORMALLY CLOSED VALVES. SECURE TAGS TO VALVE OR ADJACENT PIPE WITH BEADED BRASS CHAIN.

MODULE SHOP/ON-SITE NOTES:

1) FURNISH AND INSTALL ALL DECALS, SIGN BOARDS. AND FIRE EXTINGUISHERS AS PART OF THE MODULE SHOP FABRICATION WORK.
2) FURNISH AND INSTALL ALL VALVE TAGS AS PART OF THE MODULE SHOP FABRICATION WORK.
⚠1 3) FURNISH AND INSTALL ALL SIGN BOARDS AND VALVE TAGS FLAGGED AS REVISION #1 AS PART OF THE ON SITE CONSTRUCTION WORK. SEE SHEETS M1.4, M8.2, M8.3, AND M8.4 FOR LOCATIONS.

ALL SIGNS AND TAGS ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND ARE SHOWN HERE FOR REFERENCE ONLY EXCEPT AS NOTED. SIGNS AND TAGS NOTED AS REVISION #1 ARE INCLUDED IN THE ON SITE CONTRACT.

⚠ REVISED DRAWING ISSUED MARCH 2019

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

REV.	DESCRIPTION	DATE	BY
1	ADD SIGNS AND TAGS FOR ON-SITE CONSTRUCTION	3/20/19	BCG

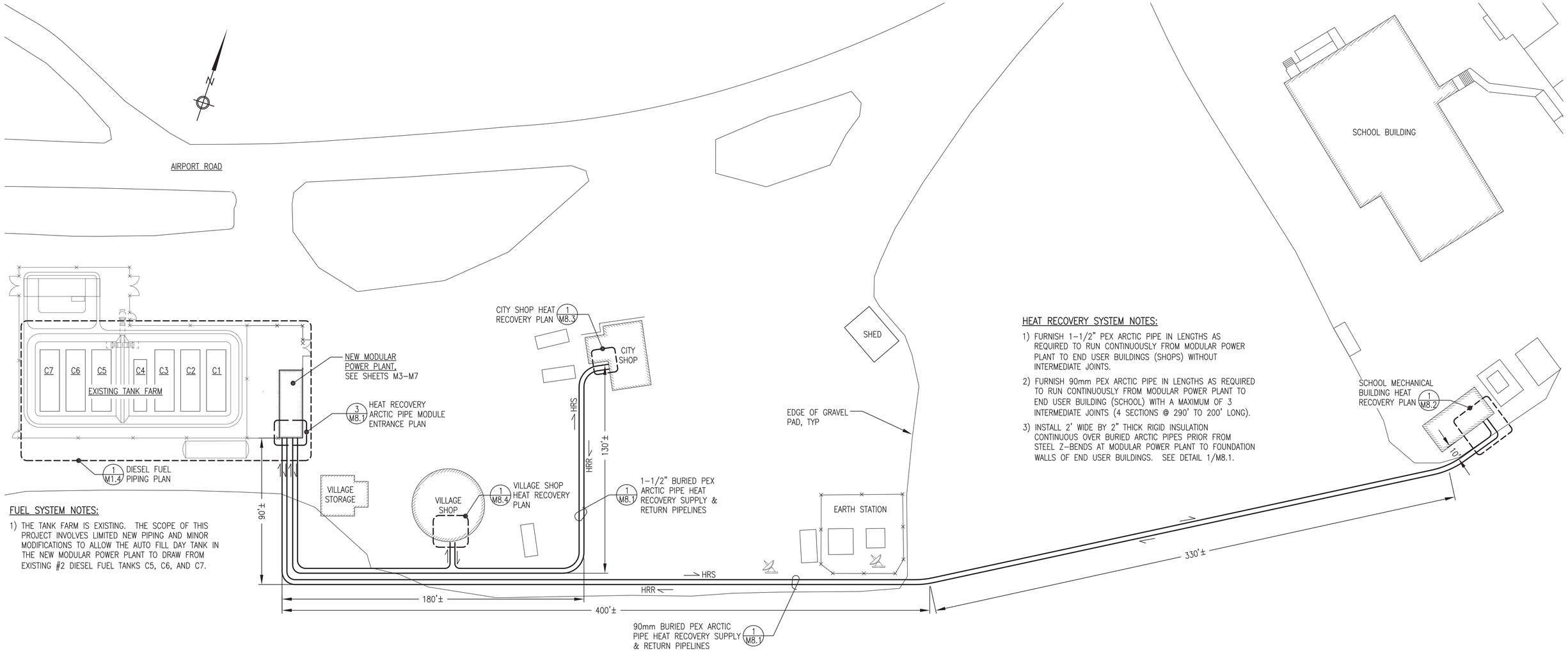
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT 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: 1-14-19
FILE NAME: PTH PPU M2-7	SHEET: M1.2 OF 8
PROJECT NUMBER:	



FUEL SYSTEM NOTES:

1) THE TANK FARM IS EXISTING. THE SCOPE OF THIS PROJECT INVOLVES LIMITED NEW PIPING AND MINOR MODIFICATIONS TO ALLOW THE AUTO FILL DAY TANK IN THE NEW MODULAR POWER PLANT TO DRAW FROM EXISTING #2 DIESEL FUEL TANKS C5, C6, AND C7.

HEAT RECOVERY SYSTEM NOTES:

1) FURNISH 1–1/2" PEX ARCTIC PIPE IN LENGTHS AS REQUIRED TO RUN CONTINUOUSLY FROM MODULAR POWER PLANT TO END USER BUILDINGS (SHOPS) WITHOUT INTERMEDIATE JOINTS.
2) FURNISH 90mm PEX ARCTIC PIPE IN LENGTHS AS REQUIRED TO RUN CONTINUOUSLY FROM MODULAR POWER PLANT TO END USER BUILDING (SCHOOL) WITH A MAXIMUM OF 3 INTERMEDIATE JOINTS (4 SECTIONS @ 290' TO 200' LONG).
3) INSTALL 2' WIDE BY 2" THICK RIGID INSULATION CONTINUOUS OVER BURIED ARCTIC PIPES PRIOR FROM STEEL Z–BENDS AT MODULAR POWER PLANT TO FOUNDATION WALLS OF END USER BUILDINGS. SEE DETAIL 1/M8.1.

1 / M1.3 NEW POWER PLANT AREA WORK PLAN

1"=30'

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

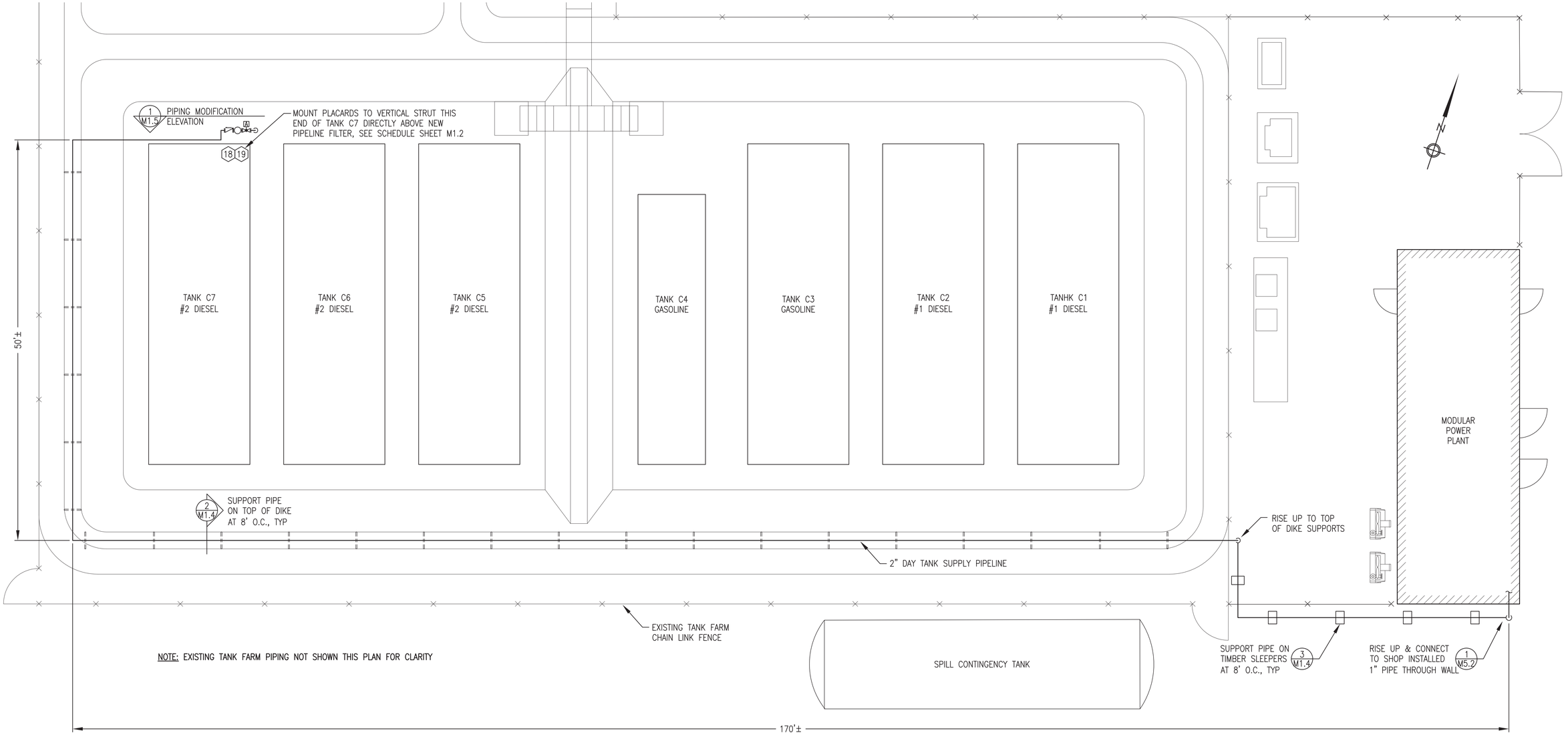
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

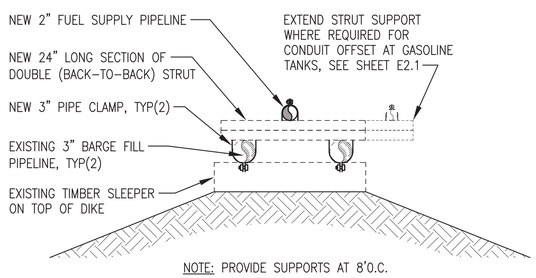
TITLE: NEW POWER PLANT AREA WORK PLAN

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

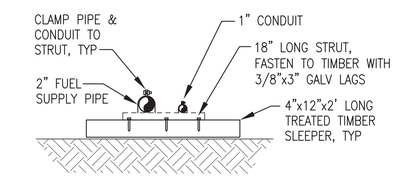
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M1 | SHEET: M1.3 OF 8
PROJECT NUMBER:



1 M1.4 DIESEL FUEL PIPING PLAN
1"=6'



2 M1.4 TYPICAL PIPE SUPPORT ON DIKE FROM FILL PIPELINES
NO SCALE



3 M1.4 FUEL PIPE SLEEPER SUPPORT
NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

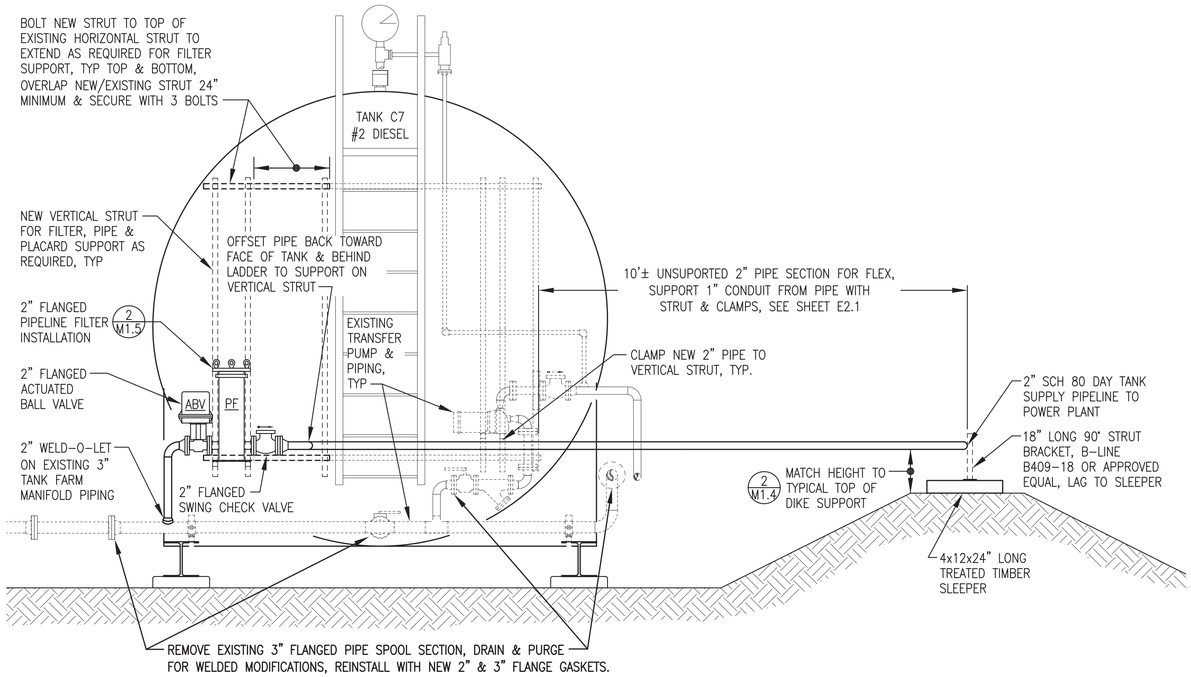
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

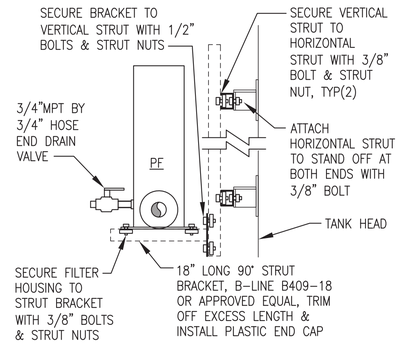
TITLE: DIESEL FUEL PIPING PLAN & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M1 | SHEET: M1.4 OF 8
PROJECT NUMBER:



1 M1.5 PIPING MODIFICATION ELEVATION
1"=2'



2 M1.5 PIPELINE FILTER INSTALLATION
NO SCALE

FUEL SYSTEM EQUIPMENT SCHEDULE

SYMBOL	FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
ABV	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 2" BALL VALVE - 360 IN-LB OPERATING TORQUE @ -50F NUTRON MODEL T3-R20R01LZ-05 NEMA 7 ACTUATOR - 600 IN-LBS TORQUE, 10 SECOND STROKE TIME, 0.50 LOCKED ROTOR AMPS. RCS MODEL SXR-1023
PF	PIPELINE FILTER	SINGLE ELEMENT FILTER, EPOXY COATED CARBON STEEL HOUSING, BOLT-ON COVER WITH BUNA-N GASKET, 2" ANSI 150# FLANGED INLET/OUTLET, 100 PSIG MAXIMUM WORKING PRESSURE, 60 GPM FLOW CAPACITY.	CIM-TEK VIKING 1F FILTER (#40187). PROVIDE SIX 30 MICRON HYDROSORB II FILTER CARTRIDGES (#30037) AND TWO SPARE BUNA-N COVER GASKETS (#90560).

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS:
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 WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION APRIL 2019

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

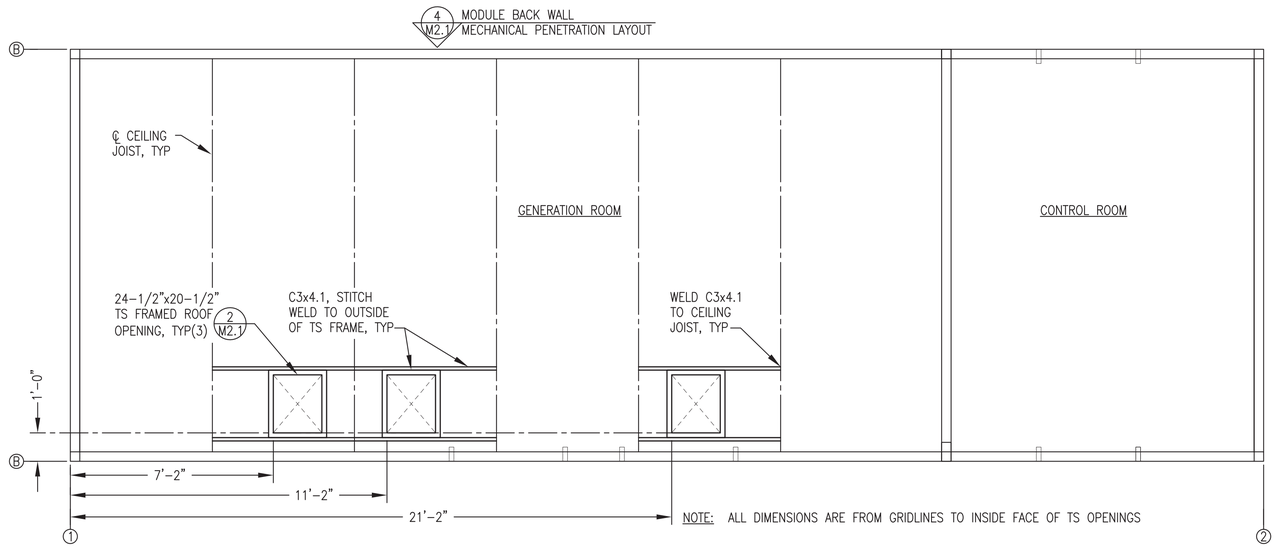
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

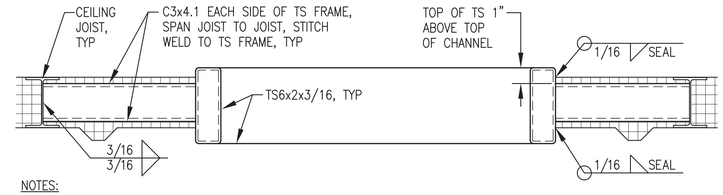
TITLE: TANK FARM PIPING DETAILS & SCHEDULE

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M1 | SHEET: M1.5 OF 8
PROJECT NUMBER:



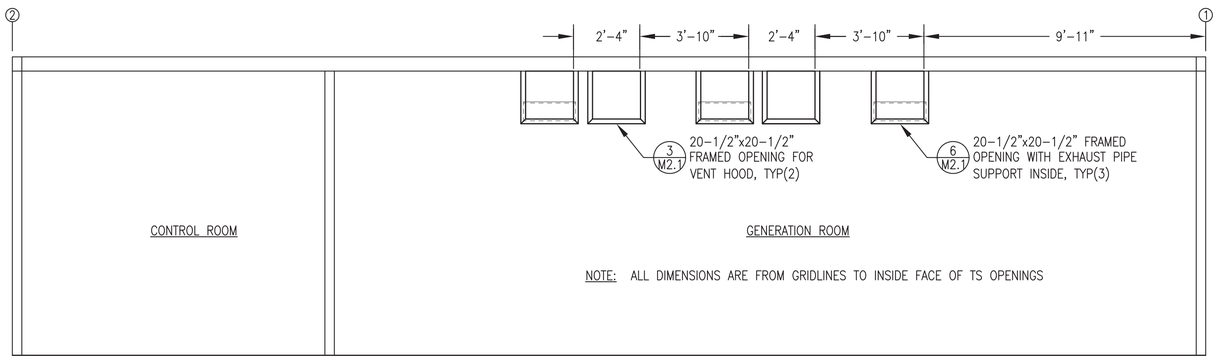
1 M2.1 MODULE MECHANICAL ROOF PENETRATION PLAN
3/8"=1'–0"



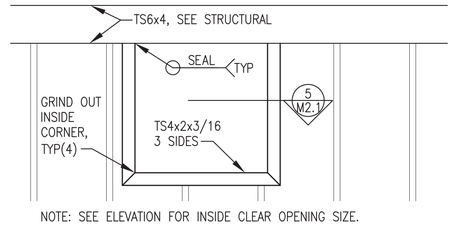
NOTES:

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.

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



4 M2.1 MODULE MECHANICAL WALL PENETRATIONS AT GRID A – EXTERIOR ELEVATION
1/2"=1'–0"

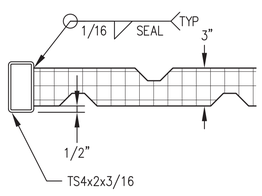


NOTE: SEE ELEVATION FOR INSIDE CLEAR OPENING SIZE.

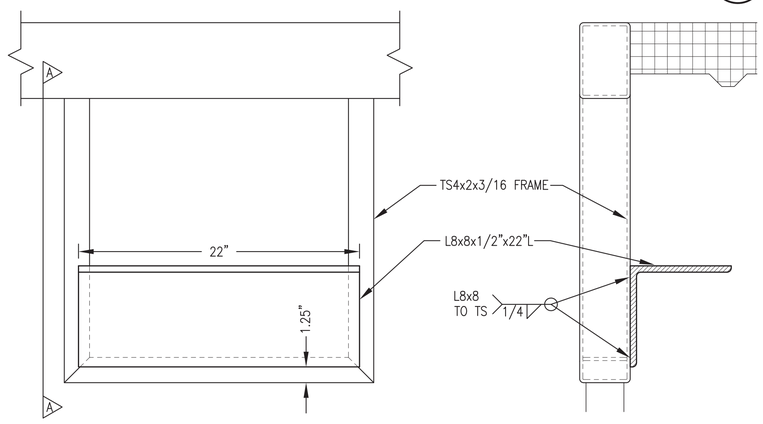
3 M2.1 TYPICAL WALL OPENING – ELEVATION
1"=1'–0"

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.



5 M2.1 TYPICAL SECTION THROUGH WALL OPENING
2"=1'–0"



6 M2.1 EXHAUST PIPE SUPPORT AT FRAMED OPENING
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 CONSTRUCTION JANUARY 2019

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

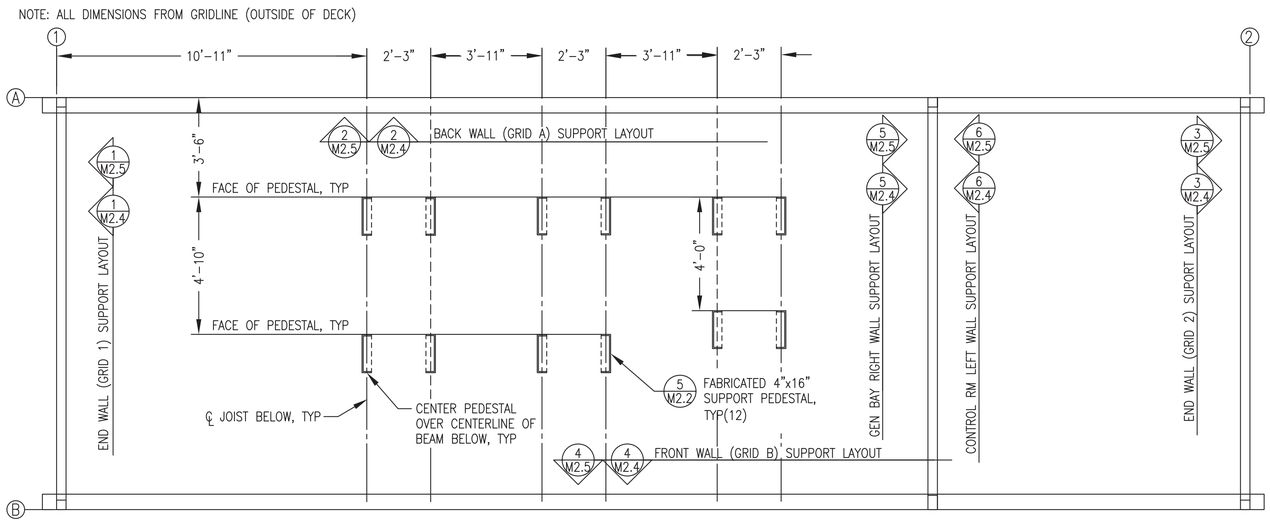
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

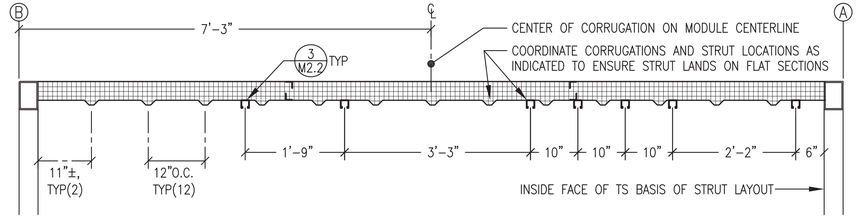
TITLE: MECHANICAL PENETRATIONS PLAN, ELEVATION, & DETAILS

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

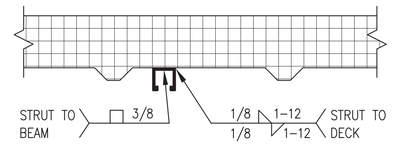
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1–14–19
FILE NAME: PTH PPU M2–7 | SHEET: M2.1 OF 7
PROJECT NUMBER:



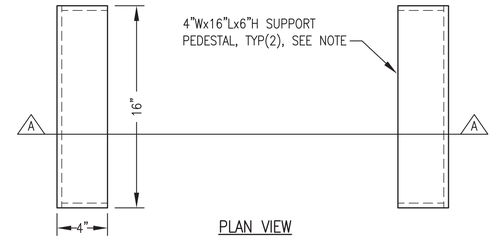
1 M2.2 MODULE MECHANICAL SUPPORT PLAN
3/8"=1'-0"



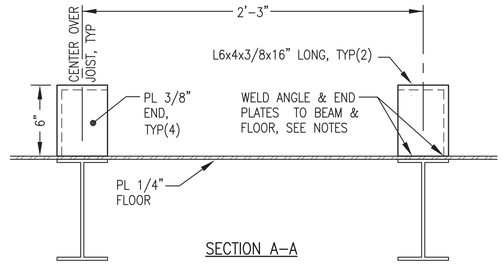
2 M2.2 SECTION THROUGH CEILING – CORRUGATION & STRUT LAYOUT
3/4"=1'-0"



3 M2.2 STRUT ATTACHMENT TO CEILING
NO SCALE



PLAN VIEW



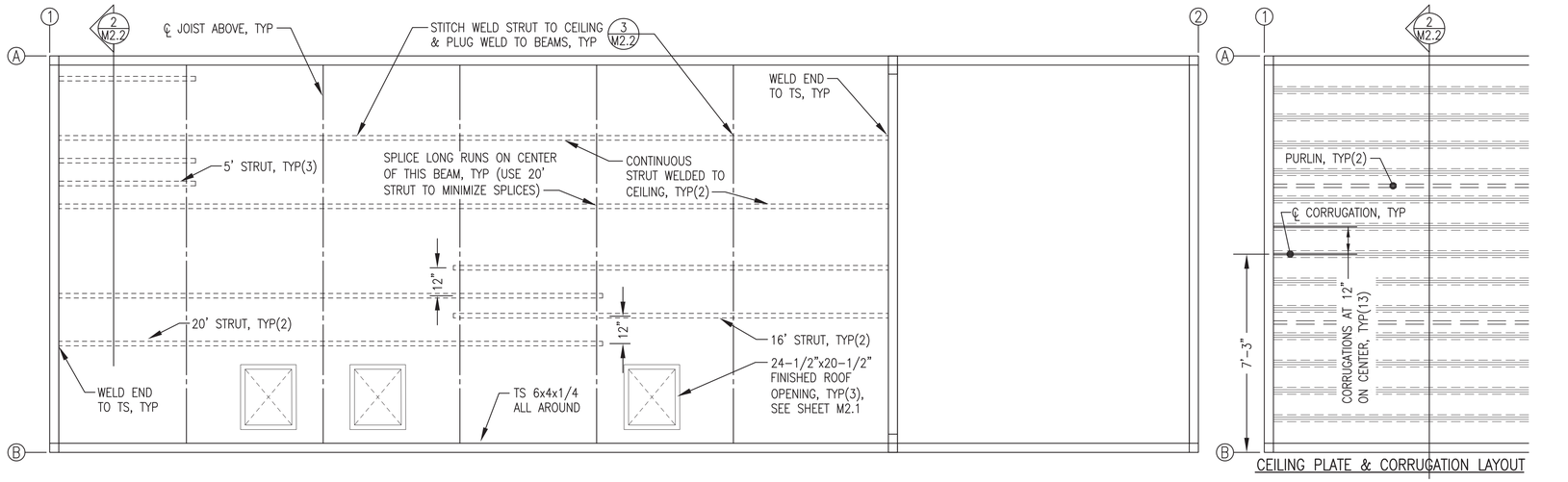
SECTION A–A

NOTES: 1) MAKE ALL JOINTS WITH CONTINUOUS GROOVE OR FILLET WELDS.
2) SLOT FLOOR PLATE 3 SIDES THEN WELD PEDESTAL TO TOP OF BEAM AND SEAL WELD TO FLOOR PLATE ALL AROUND.

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

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.



CEILING MOUNTED STRUT LAYOUT

CEILING PLATE & CORRUGATION LAYOUT

4 M2.2 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.

ISSUED FOR CONSTRUCTION
JANUARY 2019

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

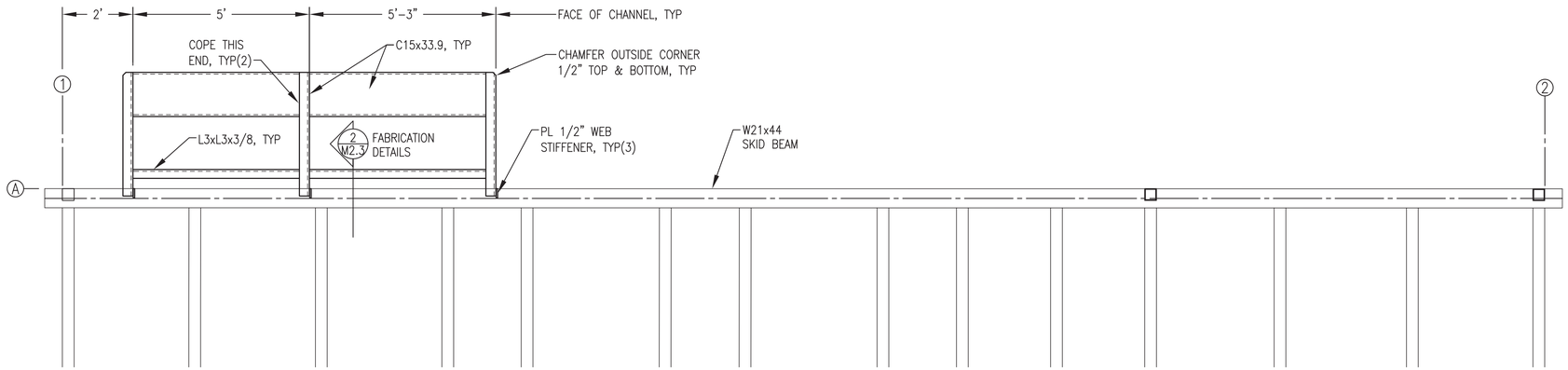
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

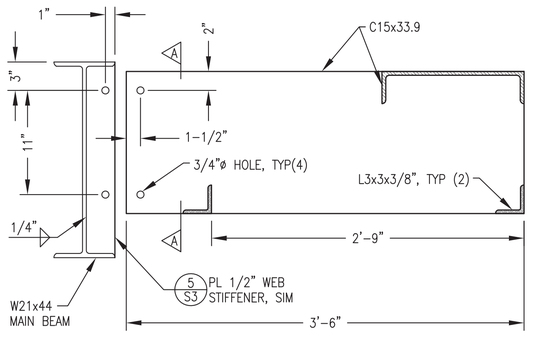
TITLE: MECHANICAL SUPPORT PLANS & DETAILS

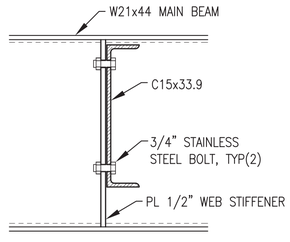
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: PTH PPU M2-7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 1-14-19
SHEET: M2.2 OF 7



1 M2.3 RADIATOR SUPPORT PLAN
1/2"=1'-0"





SECTION A-A

2 M2.3 RADIATOR SUPPORT FABRICATION
1-1/2"=1'-0"

SUPPORT FABRICATION NOTES:

1) FABRICATE SUPPORT FROM ASTM A36 ANGLE & CHANNEL AS SHOWN.
2) RACK ALL SUPPORT BRACKETS LEVEL & PERPENDICULAR TO SKID WITH CONNECTIONS BOLTED TIGHT PRIOR TO WELDING.
3) UPON COMPLETION OF WELDING ROUND CORNERS AND GRIND EDGES SMOOTH.
4) PRIOR TO SANDBLASTING MODULE REMOVE SUPPORTS THEN SANDBLAST AND PAINT EQUIVALENT TO MODULE EXTERIOR WALLS. SEE SHEET A1 FOR PAINTING SPECIFICATIONS.

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

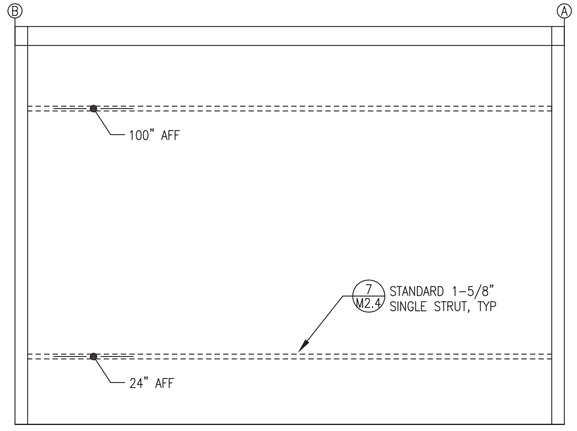
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

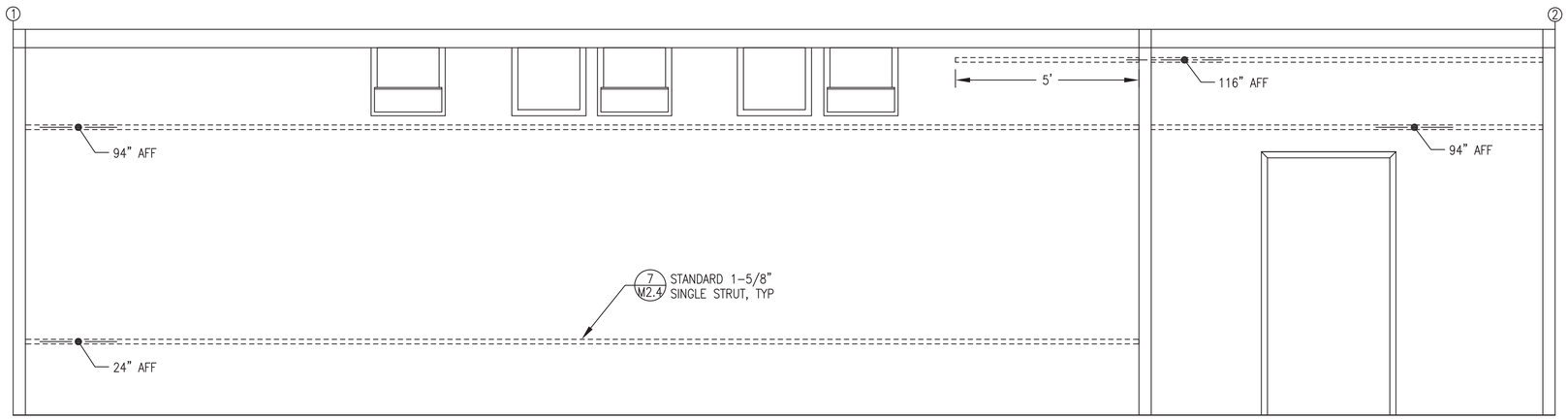
TITLE: RADIATOR SUPPORT PLAN & DETAILS

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

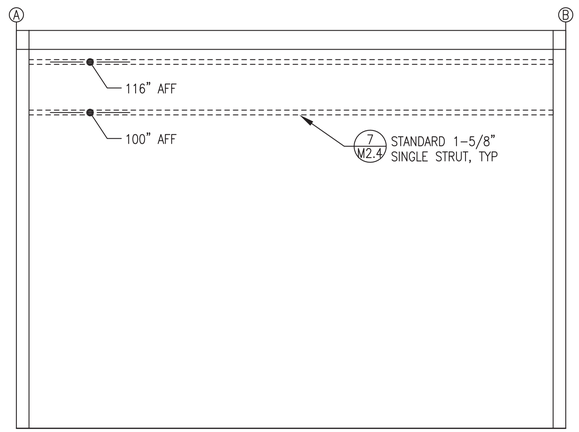
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M2.3 OF 7
PROJECT NUMBER:



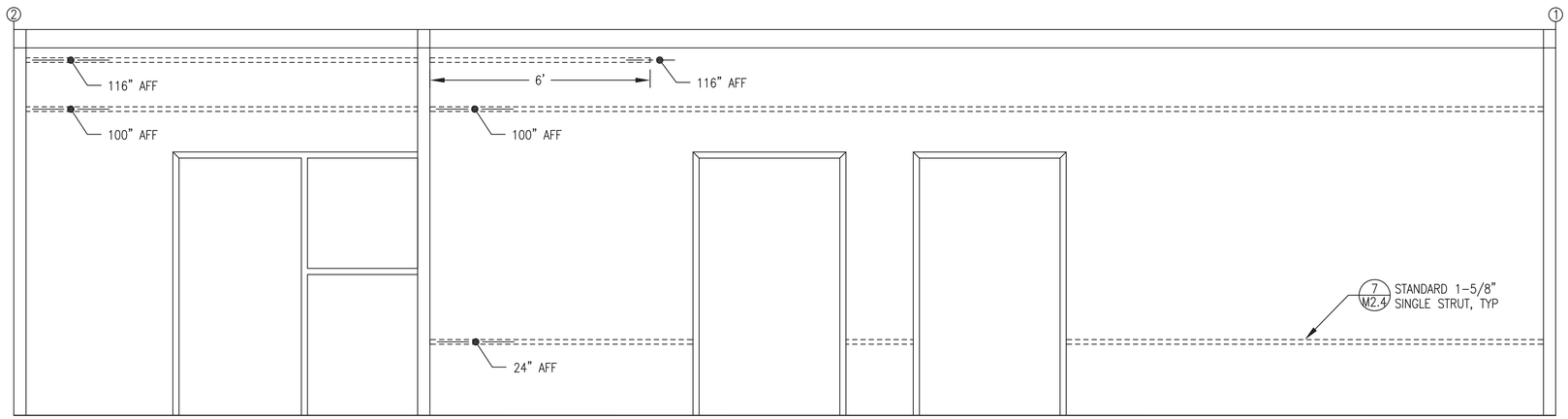
1 M2.4 END WALL (GRID 1) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



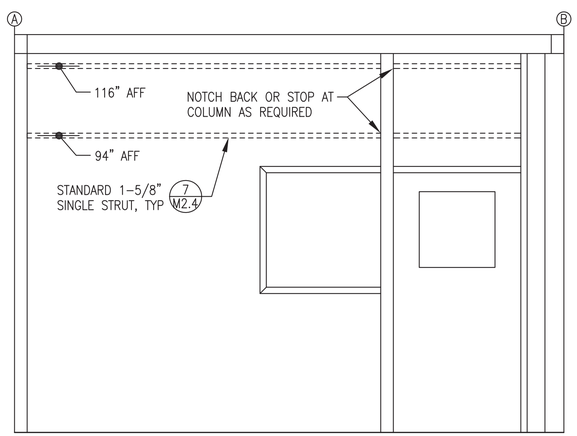
2 M2.4 BACK WALL (GRID A) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



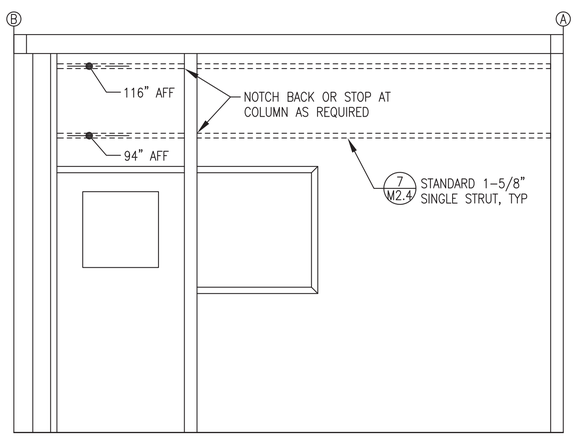
3 M2.4 END WALL (GRID 2) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



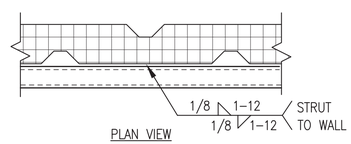
4 M2.4 FRONT WALL (GRID B) HORIZONTAL WALL STRUT LAYOUT
1/2"=1'-0"



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"



7 M2.4 HORIZONTAL WALL STRUT ATTACHMENT
NO SCALE

HORIZONTAL WALL STRUT 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.

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

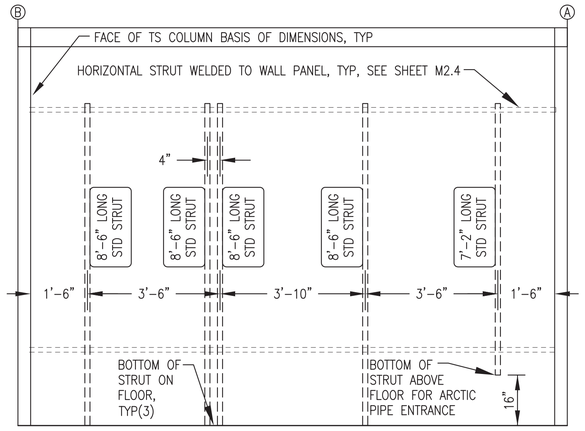
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

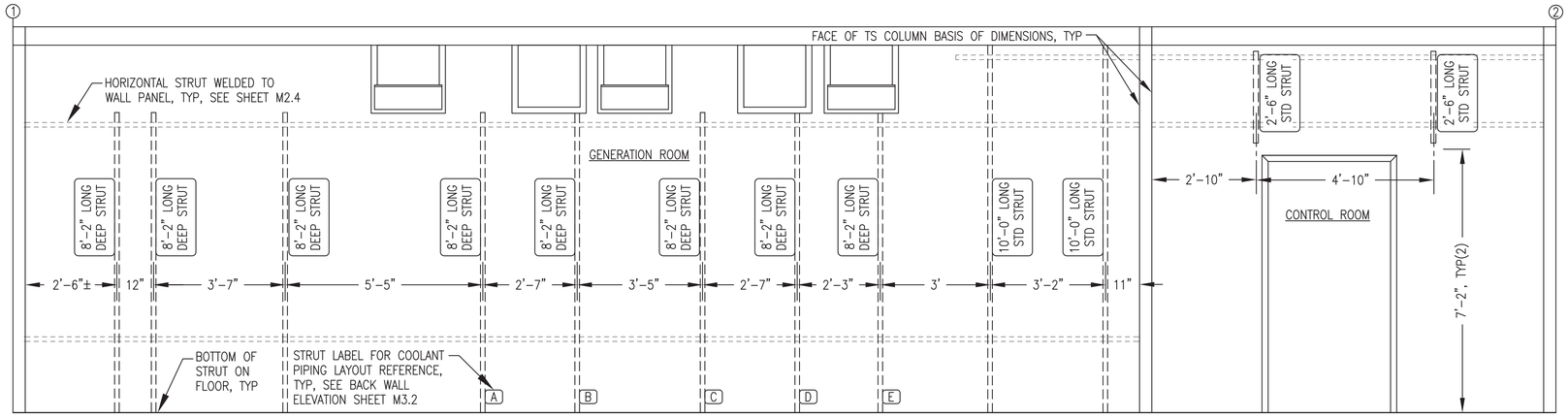
TITLE: MECHANICAL SUPPORT HORIZONTAL
WALL STRUT INSTALLATION

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

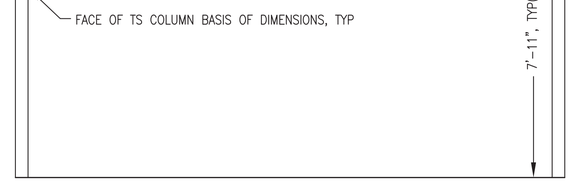
DRAWN BY: JTD
DESIGNED BY: BCG
FILE NAME: PTH PPU M2-7
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 1-14-19
SHEET: M2.4 OF 7



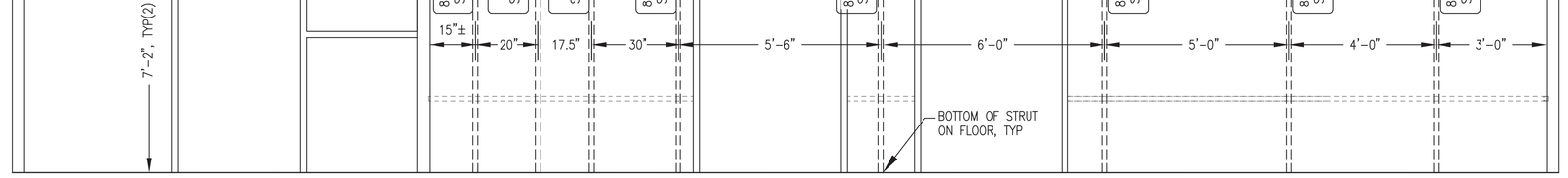
1 M2.5 END WALL (GRID 1) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



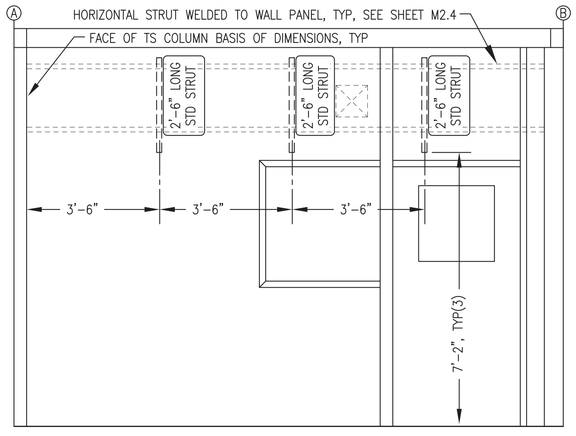
2 M2.5 BACK WALL (GRID A) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



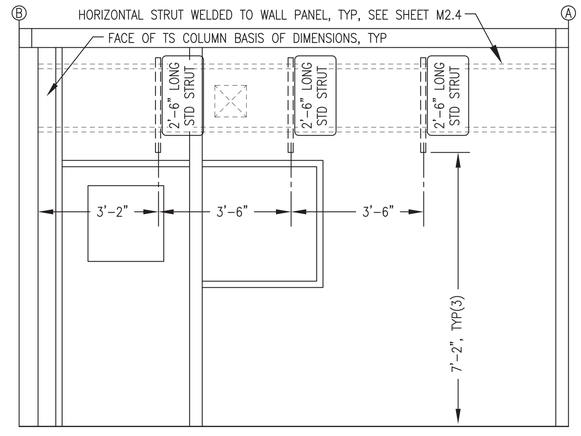
3 M2.5 END WALL (GRID 2) VERTICAL WALL STRUT LAYOUT
1/2"=1'-0"



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.

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

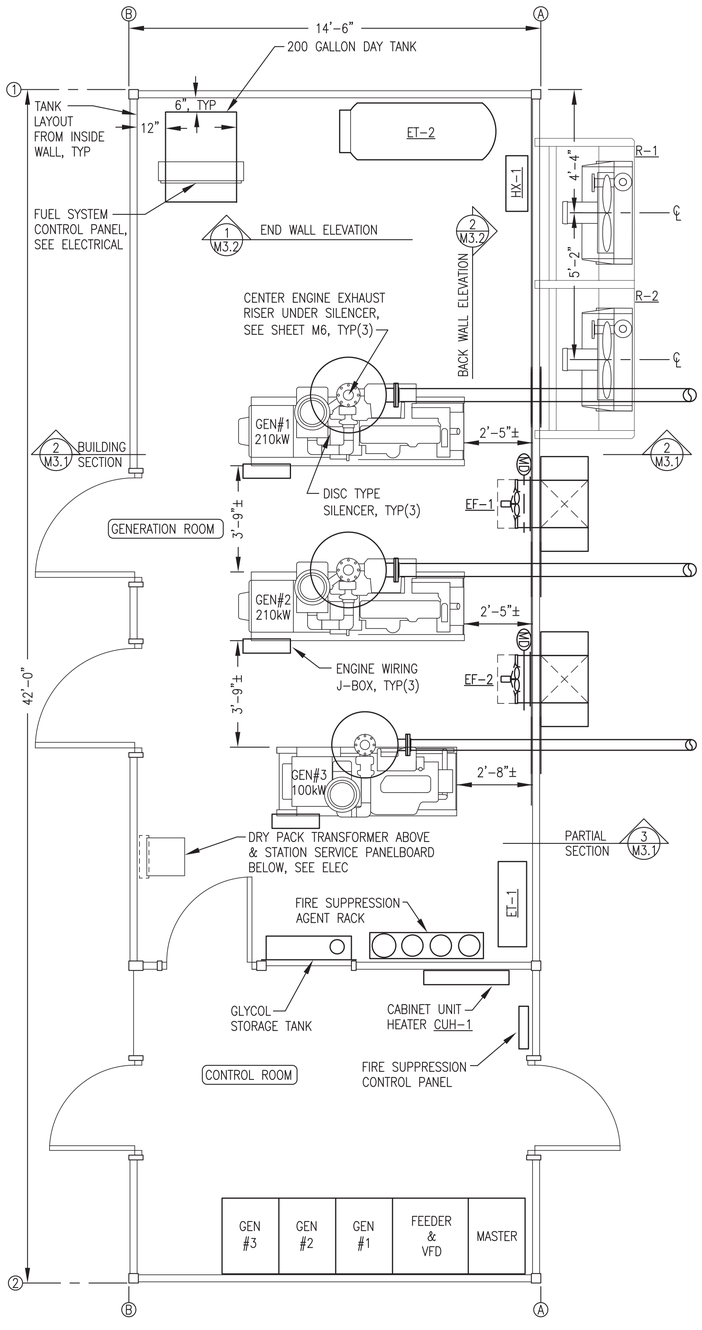
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

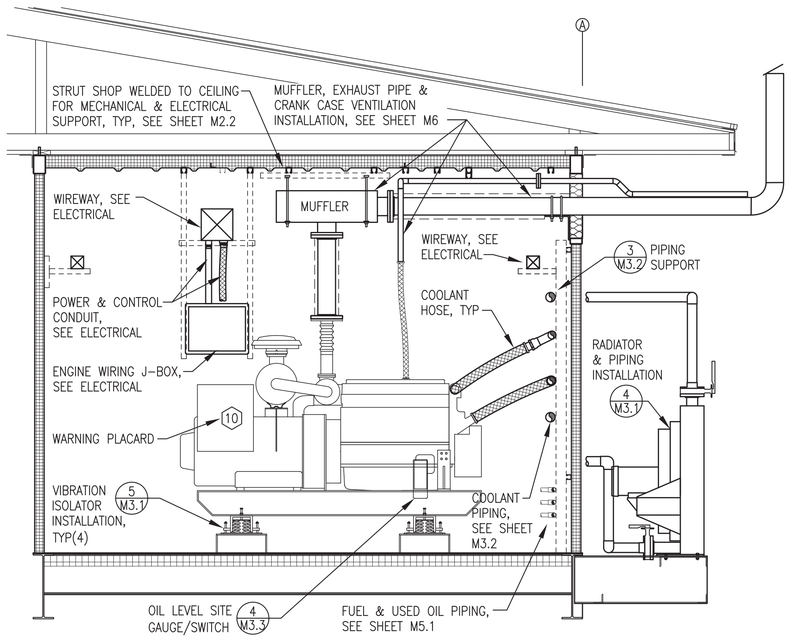
TITLE: MECHANICAL SUPPORT VERTICAL WALL STRUT INSTALLATION

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

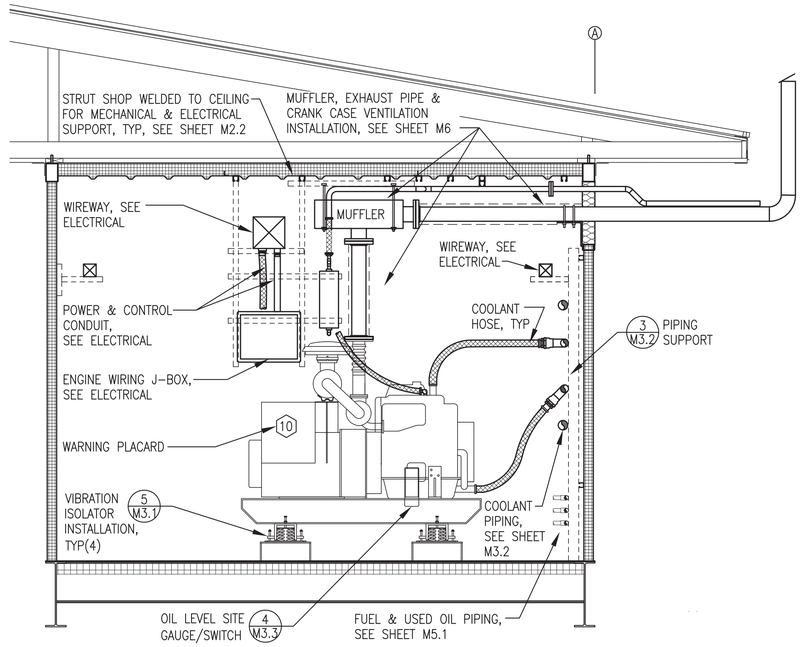
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M2.5 OF 7
PROJECT NUMBER:



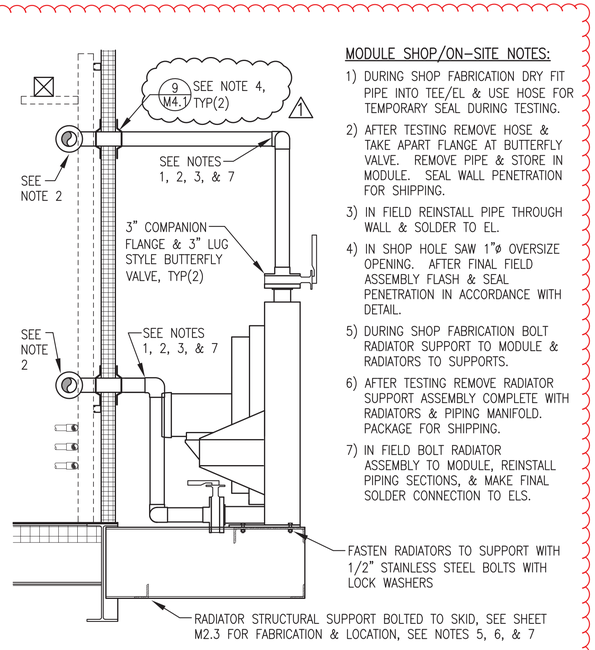
1 M3.1 EQUIPMENT LAYOUT PLAN
3/8"=1'-0"



2 M3.1 BUILDING SECTION/GENERATOR #1/#2 INSTALLATION
1/2"=1'-0"



3 M3.1 BUILDING SECTION/GENERATOR #3 INSTALLATION
1/2"=1'-0"

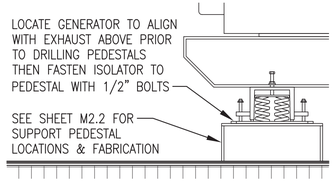


MODULE SHOP/ON-SITE NOTES:

1) DURING SHOP FABRICATION DRY FIT PIPE INTO TEE/EL & USE HOSE FOR TEMPORARY SEAL DURING TESTING.
2) AFTER TESTING REMOVE HOSE & TAKE APART FLANGE AT BUTTERFLY VALVE. REMOVE PIPE & STORE IN MODULE. SEAL WALL PENETRATION FOR SHIPPING.
3) IN FIELD REINSTALL PIPE THROUGH WALL & SOLDER TO EL.
4) IN SHOP HOLE SAW 1"ø OVERSIZE OPENING. AFTER FINAL FIELD ASSEMBLY FLASH & SEAL PENETRATION IN ACCORDANCE WITH DETAIL.
5) DURING SHOP FABRICATION BOLT RADIATOR SUPPORT TO MODULE & RADIATORS TO SUPPORTS.
6) AFTER TESTING REMOVE RADIATOR SUPPORT ASSEMBLY COMPLETE WITH RADIATORS & PIPING MANIFOLD. PACKAGE FOR SHIPPING.
7) IN FIELD BOLT RADIATOR ASSEMBLY TO MODULE, REINSTALL PIPING SECTIONS, & MAKE FINAL SOLDER CONNECTION TO ELS.

4 M3.1 RADIATOR & PIPING INSTALLATION
3/4"=1'-0"

NOTE: ADJUST SPRING VIBRATION ISOLATOR LEVELING BOLTS TO ACHIEVE A UNIFORM INSTALLATION HEIGHT OF APPROXIMATELY 5-3/4" THEN TIGHTEN LOCKING NUTS. ADJUST NUTS ON STABILIZER BOLTS TO ACHIEVE A UNIFORM CLEARANCE OF APPROXIMATELY 1/8" THEN TIGHTEN LOCKING NUTS. VERIFY UNIT MOVES FREELY ON ISOLATORS.



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

COOLING SYSTEM ON SITE FILLING AND TESTING

UPON COMPLETION OF ON-SITE PIPING INSTALLATION, FILL COOLING SYSTEM WITH ETHYLENE GLYCOL SOLUTION AND TOP OFF TO BRING THE LEVEL IN THE EXPANSION TANK TO APPROXIMATELY 50%.

ISOLATE ENGINES AND RADIATORS PRIOR TO PRESSURE TESTING AND HYDROSTATICALLY TEST COOLANT PIPING MAINS AT 100 PSIG MINIMUM FOR ONE HOUR WITH NO NOTICEABLE WATER LEAKS OR PRESSURE DROPS EXCEPT AS CAUSED BY TEMPERATURE CHANGE.

AFTER PRESSURE TESTING, PERFORM ALL FUNCTIONAL TESTING OF THE MODULE REQUIRED BY THE CONTRACT DOCUMENTS. ENSURE THAT ENGINES ARE OPERATED LONG ENOUGH WITH ADEQUATE LOAD TO GET THERMOSTATS FULLY OPEN AND TO CIRCULATE GLYCOL THROUGH ALL PIPING AND ACCESSORIES.

OPERATE CONTROL ROOM HEATING SYSTEM TO ENSURE IT IS FULLY CHARGED WITH GLYCOL.

VERIFY PROPER FUNCTION OF ALL INSTRUMENTATION AND CALIBRATE ALL DEVICES.

TRANSFER EXCESS ETHYLENE GLYCOL SOLUTION INTO GLYCOL STORAGE TANK UNTIL 95% FULL. STORE ANY EXCESS ETHYLENE GLYCOL SOLUTION WITH THE MODULES IN THE ORIGINAL DRUMS SEALED FOR LONG-TERM STORAGE.

1

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

⚠ REVISED DRAWING ISSUED MARCH 2019

REV.	DESCRIPTION	DATE	BY
1	ADDED REQUIREMENTS FOR FILLING & TESTING ON-SITE, CORRECTED DETAIL REFERENCE	3/20/19	BCG

ALASKA ENERGY AUTHORITY

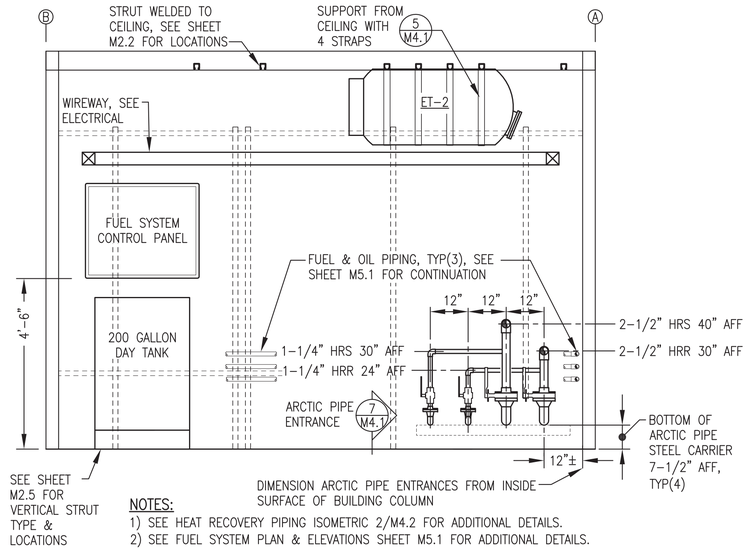
PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: EQUIPMENT LAYOUT, PLAN, SECTIONS, & DETAILS

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

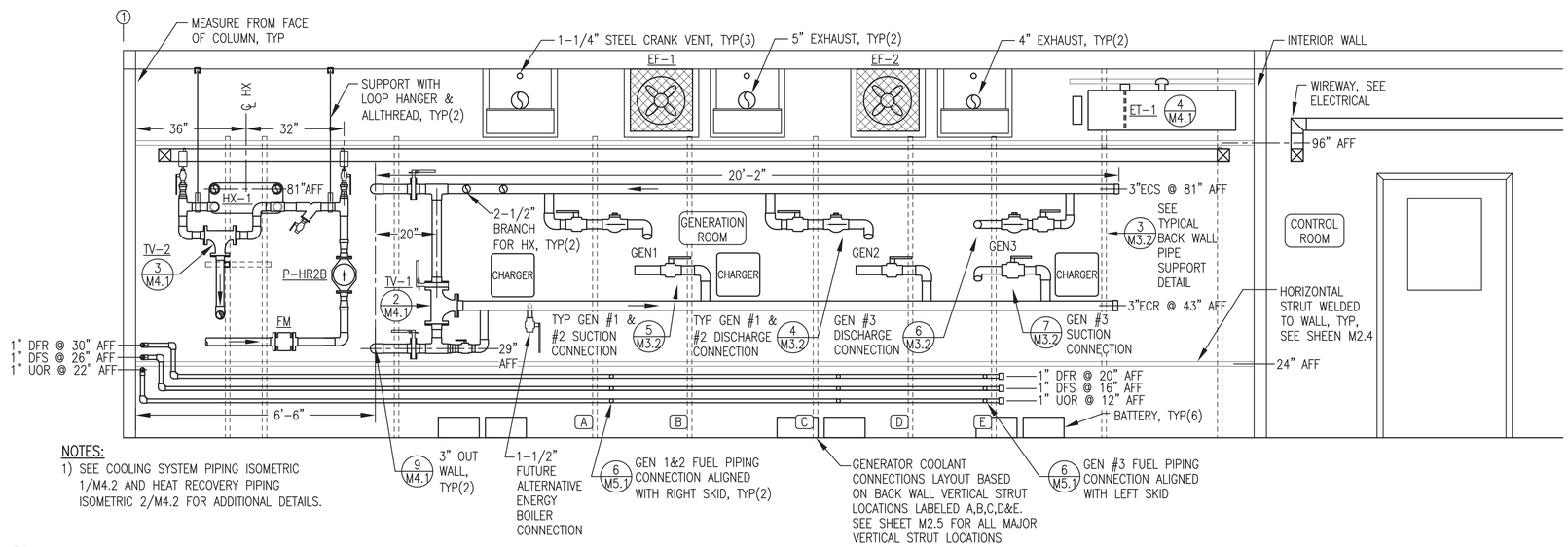
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M3.1 OF 7
PROJECT NUMBER:

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



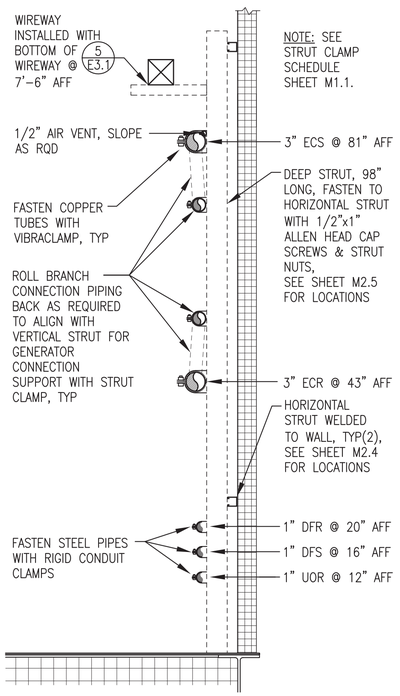
NOTES:
1) SEE HEAT RECOVERY PIPING ISOMETRIC 2/M4.2 FOR ADDITIONAL DETAILS.
2) SEE FUEL SYSTEM PLAN & ELEVATIONS SHEET M5.1 FOR ADDITIONAL DETAILS.

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

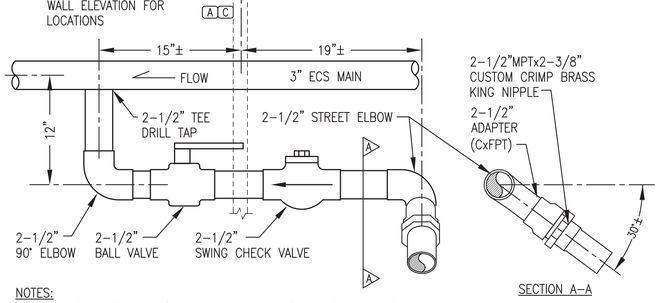


NOTES:
1) SEE COOLING SYSTEM PIPING ISOMETRIC 1/M4.2 AND HEAT RECOVERY PIPING ISOMETRIC 2/M4.2 FOR ADDITIONAL DETAILS.

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

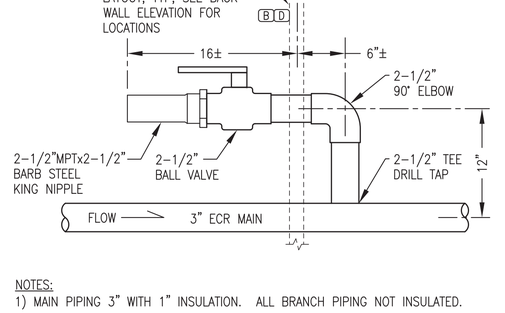


3 M3.2 TYPICAL PIPE SUPPORT AT BACK WALL
1"=1'-0"



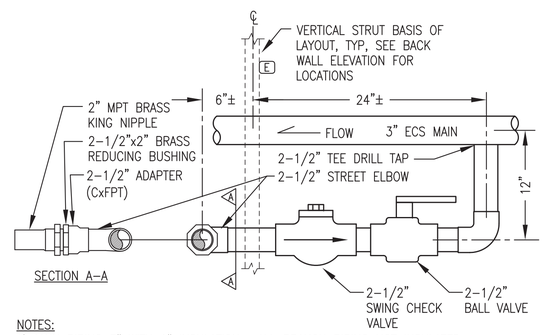
NOTES:
1) MAIN PIPING 3" WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING TYPE L COPPER TUBE. ALL LINE SIZE VALVES SOLDER END.

4 M3.2 GENERATOR #1 & #2 DISCHARGE CONNECTION
NO SCALE



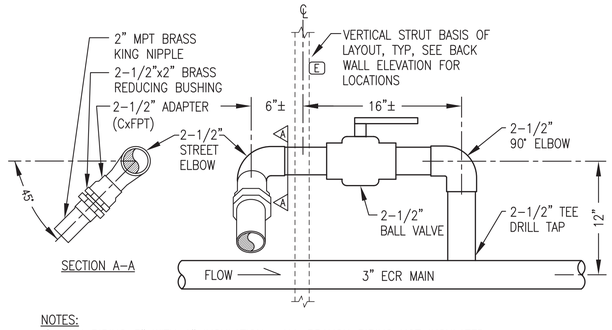
NOTES:
1) MAIN PIPING 3" WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING TYPE L COPPER TUBE. ALL LINE SIZE VALVES SOLDER END.

5 M3.2 GENERATOR #1 & #2 SUCTION CONNECTION
NO SCALE



NOTES:
1) MAIN PIPING 3" WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING TYPE L COPPER TUBE. ALL LINE SIZE VALVES SOLDER END.

6 M3.2 GENERATOR #3 DISCHARGE CONNECTION
NO SCALE



NOTES:
1) MAIN PIPING 3" WITH 1" INSULATION. ALL BRANCH PIPING NOT INSULATED.
2) ALL PIPING TYPE L COPPER TUBE. ALL LINE SIZE VALVES SOLDER END.

7 M3.2 GENERATOR #3 SUCTION CONNECTION
NO SCALE

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

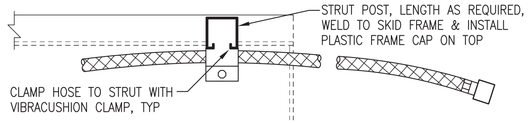
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

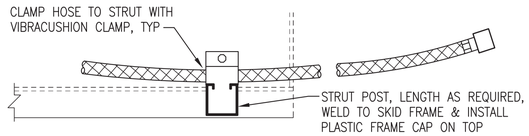
TITLE: WALL ELEVATIONS & PIPING DETAILS

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

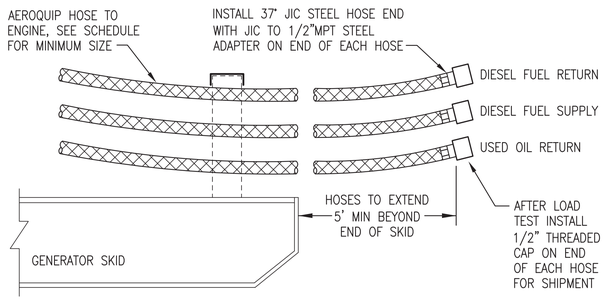
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 1-14-19
FILE NAME: PTH PPU M2-7	SHEET: M3.2 OF 7
PROJECT NUMBER:	



GEN #3 (4045) LEFT SKID PLAN (TOP) VIEW



GEN #1 & #2 (6090) RIGHT SKID PLAN (TOP) VIEW

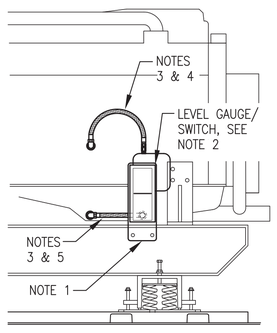


ELEVATION (SIDE) VIEW

MINIMUM HOSE SIZE SCHEDULE		
FUEL SUPPLY	FUEL RETURN	USED OIL
#8	#8	#10

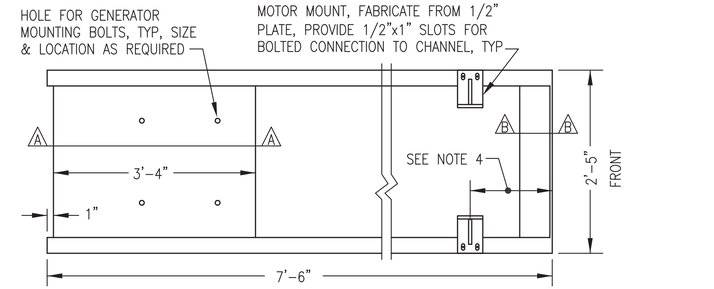
NOTE:
ON 4045 GROUP HOSES ON LEFT SKID AND ON 6090 GROUP HOSES ON RIGHT SKID AS SHOWN TO COORDINATE WITH COOLANT HOSES.

1 M3.3 FUEL & OIL HOSE TERMINATIONS
NO SCALE

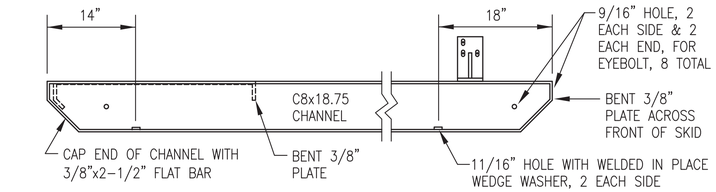


NOTES:
1) 1/4" STEEL SUPPORT PLATE PRE-DRILLED TO MATCH GAUGE/SWITCH MOUNTS, CHANNEL SKID HOLES AND BOTTOM HOSE ENTRANCE. BOLT TO INSIDE (BACK) OF CHANNEL SKID AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL. ADJUST SWITCH CONTACTS 1/2" ABOVE & BELOW.
2) MOUNT OIL LEVEL GAUGE/SWITCH TO STEEL SUPPORT PLATE WITH RUBBER SHOCK MOUNTS .
3) #8 HOSE WITH 1/2" OR 3/8" NPT JIC SWIVEL ENDS AS REQUIRED.
4) CONNECT TOP (VENT) PORT TO ENGINE CRANK CASE WITH HOSE. ROUTE UPPER HOSE TO AVOID LOW POINT TRAPS.
5) CONNECT BOTTOM PORT TO ENGINE OIL PAN WITH HOSE. DO NOT TEE INTO OIL DRAIN LINE. ROUTE LOWER HOSE BACK THROUGH PRE-DRILLED HOLE IN STEEL PLATE.

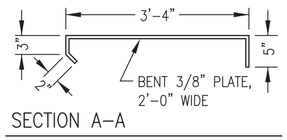
4 M3.3 TYPICAL OIL LEVEL GAUGE/SWITCH INSTALLATION
NO SCALE



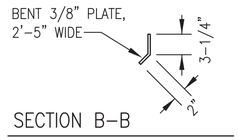
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



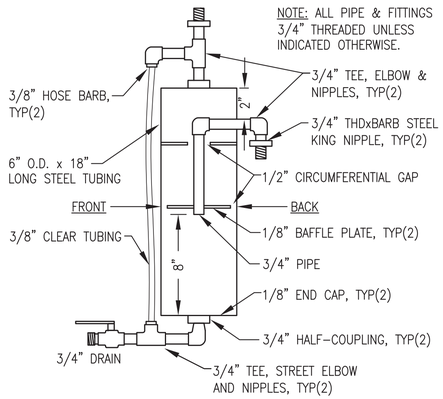
SECTION A-A



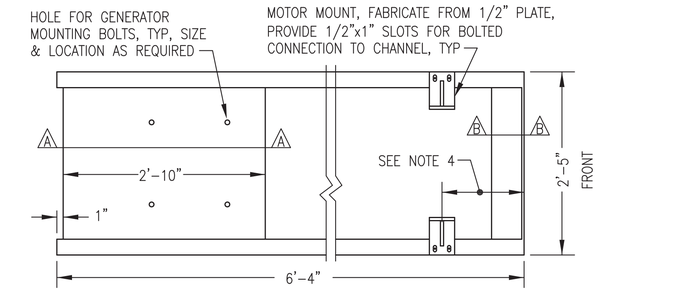
SECTION B-B

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 4'-1" FROM THE FRONT OF THE SKID.

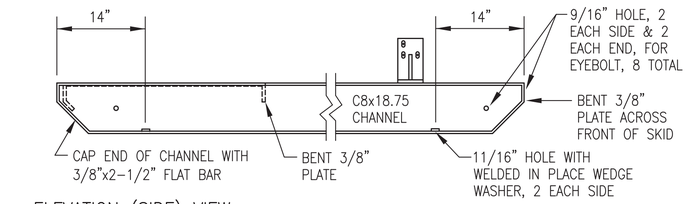
2 M3.3 GENERATOR #1 & #2 (JOHN DEERE 6090AFM75) SKID DESIGN
NO SCALE



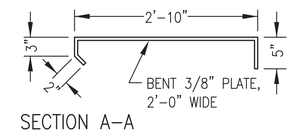
5 M3.3 CONDENSATE TRAP FABRICATION
NO SCALE



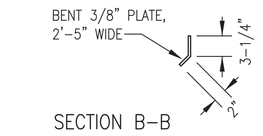
PLAN (TOP) VIEW



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 3'-2" FROM THE FRONT OF THE SKID.

3 M3.3 GENERATOR #3 (JOHN DEERE 4045AFM85) SKID DESIGN
a

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT 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: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M3.3 OF 7
PROJECT NUMBER:

GLYCOL TANK SPECIFIC NOTES:

1> 1–1/2" FPT – INSTALL DAY TANK GAUGE G–DT.

2> 2" FPT – INSTALL 2" SCREENED VENT CAP ON 2"x6" NIPPLE.

3> 1" SCHEDULE 80 PIPE WITH THREADED TOP CONNECTION (WITHDRAWAL)

4> 1" SOCKETWELD 90° ELBOW

5> 1" THREADED HAND PUMP ADAPTER FLANGE, TOP OF FLANGE FLUSH WITH TOP OF TANK. INSTALL DAY TANK HAND PUMP HP–DT.

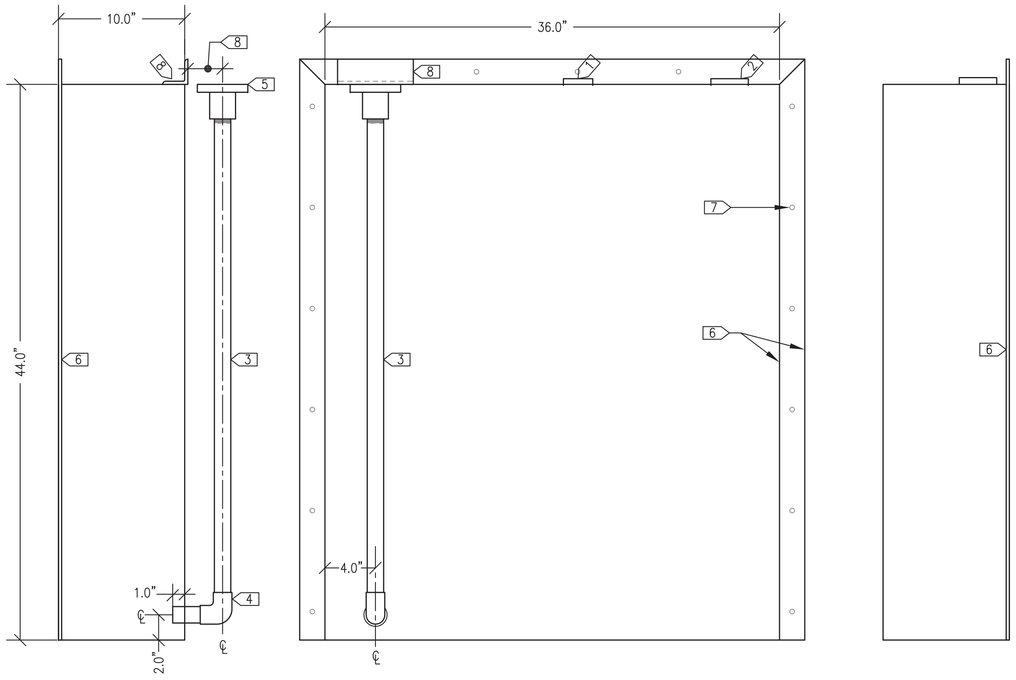
6> 2x1/4" FLAT BAR CONTINUOUS THREE SIDES

7> 3/8" HOLE AT 8" O.C. ALL AROUND

8> L2x2x1/4"x6' LONG. SET FACE TO BOLT TO HAND PUMP.

GLYCOL TANK GENERAL NOTES:

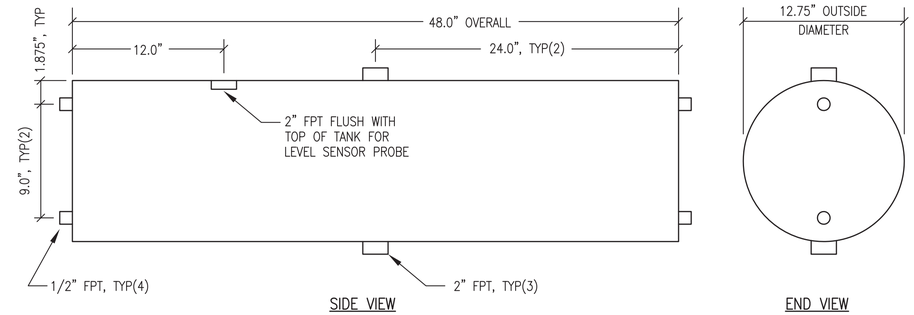
1. FABRICATE SINGLE WALL 60 GALLON NOMINAL CAPACITY GLYCOL TANK.
2. FABRICATE FROM ASTM A–36 STEEL PLATE, 10 GAUGE MINIMUM EXCEPT FOR TOP 3/16" MINIMUM. ALL TANK SEAM JOINTS TO BE FULL CONTINUOUS WELDS.
3. PROVIDE WITH ALL OPENINGS AND ATTACHMENTS INDICATED. SEAL WELD ALL TANK ATTACHMENTS.
4. ALL FPT OPENINGS TO BE FORGED STEEL HALF COUPLINGS.
5. 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 OF SHERWIN WILLIAMS MACROPOXY 646 OR APPROVED EQUAL, COLOR STRUCTURAL GRAY 4031.
6. UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. INSTALL VENT CAP, GAUGE, AND HAND PUMP.



1 / M3.4 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 OF SHERWIN WILLIAMS MACROPOXY 646 OR APPROVED EQUAL, COLOR STRUCTURAL GRAY 4031.
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 / M3.4 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.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

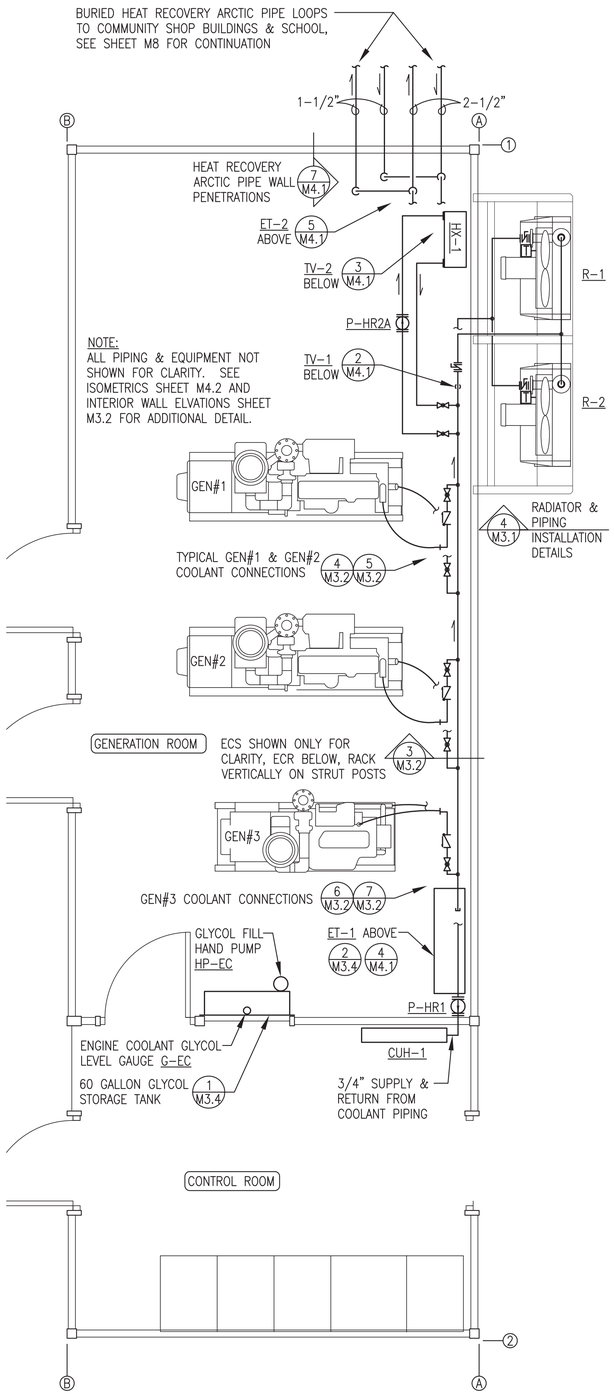
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

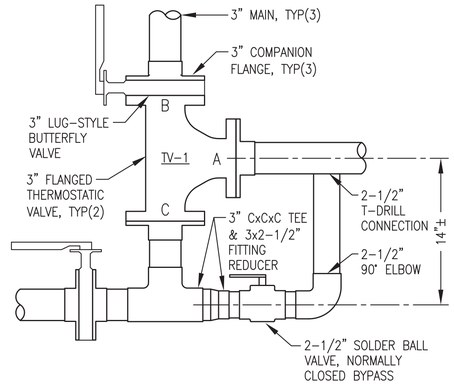
TITLE: GLYCOL STORAGE & EXPANSION TANK FABRICATION

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

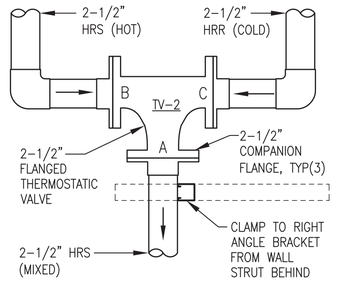
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1–14–19
FILE NAME: PTH PPU M2–7 | SHEET: M3.4 OF 7
PROJECT NUMBER:



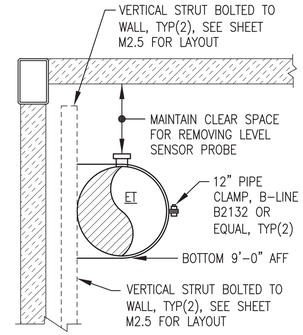
1 M4.1 COOLANT AND HEAT RECOVERY PIPING PLAN
3/8"=1'-0"



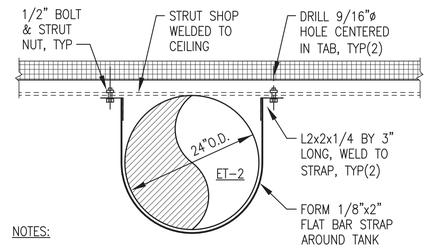
2 M4.1 TV-1 INSTALLATION
NO SCALE



3 M4.1 TV-2 INSTALLATION
NO SCALE

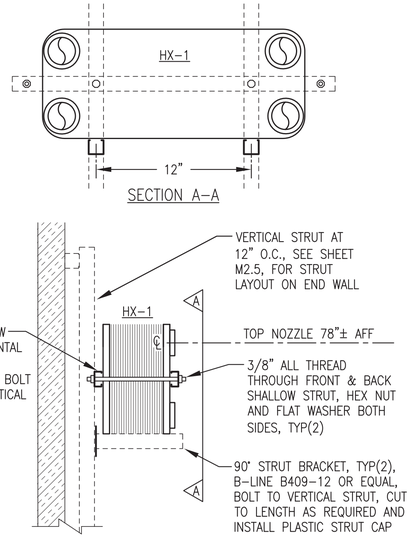


4 M4.1 EXP TANK ET-1 SUPPORT
NO SCALE



NOTES:
1) SMOOTH EDGES AFTER FABRICATION, WIRE BRUSH, SOLVENT CLEAN, AND PAINT WITH TWO COATS OF DIRECT TO METAL ALKYD ENAMEL, SHERWIN WILLIAMS DTM OR APPROVED EQUAL, COLOR STRUCTURAL GRAY 4031.
2) ONE STRAP SHOWN. INSTALL FOUR IDENTICAL STRAPS.

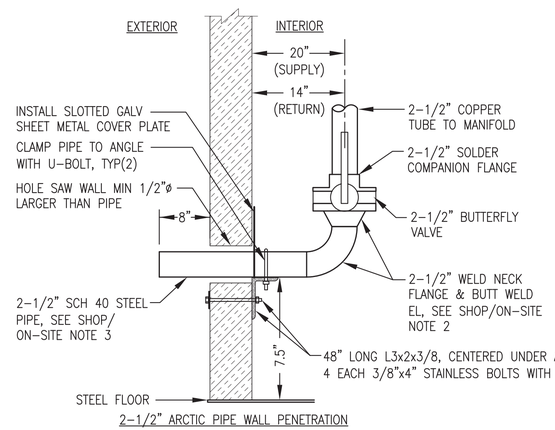
5 M4.1 HEAT RECOVERY EXP TANK ET-2 SUPPORT
NO SCALE

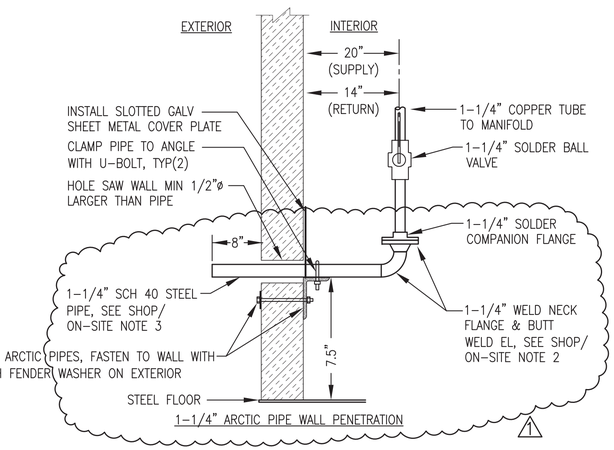


6 M4.1 HEAT EXCHANGER SUPPORT FROM WALL
NO SCALE

ARCTIC PIPE GENERAL NOTES:
1) SEE ELEVATION 3/M3.2 FOR PENETRATION LOCATIONS.
2) ONE PIPE FOR EACH SIZE SHOWN. PROVIDE TWO IDENTICAL FOR EACH SIZE.

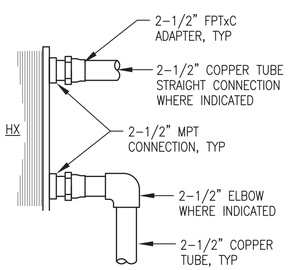
ARCTIC PIPE SHOP/ON-SITE NOTES:
1) SHOP INSTALLATION SHOWN. STUB PIPE 8" MIN BEYOND WALL & TEMPORARILY CONNECT SUPPLY TO RETURN FOR TESTING.
2) AFTER TESTING REMOVE TEMPORARY CONNECTION, BREAK FLANGE JOINT, AND STORE PIPE IN MODULE. PLUG WALL PENETRATION FOR SHIPPING.
3) AS PART OF ON-SITE INSTALLATION REINSTALL PIPE THROUGH WALL AND CONNECT TO ARCTIC PIPE, SEE SHEET M8.





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

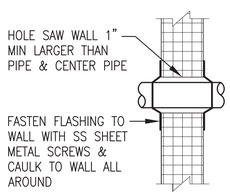
THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.



8 M4.1 HX PIPING CONNECTION
NO SCALE

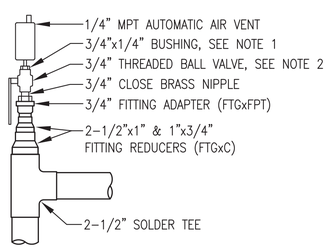
SHOP/ON-SITE NOTES:
1) FLASH OPENINGS AS PART OF ON-SITE WORK.

GENERAL NOTES:
1) THIS DETAIL APPLIES TO ALL PIPE & CONDUIT 2" & LARGER EXCEPT ARCTIC PIPE.
2) FLASH ALL OPENINGS TO EXTERIOR WALL. WHERE ACCESSIBLE ON INTERIOR, INSTALL FLASHING OR CAULK ALL AROUND.



9 M4.1 TYP 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.



10 M4.1 TYPICAL AIR VENT INSTALLATION
NO SCALE

⚠ REVISED DRAWING ISSUED MARCH 2019

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

REV.	DESCRIPTION	DATE	BY
1	CHANGED 1-1/2" ARCTIC PIPE TO 1-1/4"	3/20/19	BCG

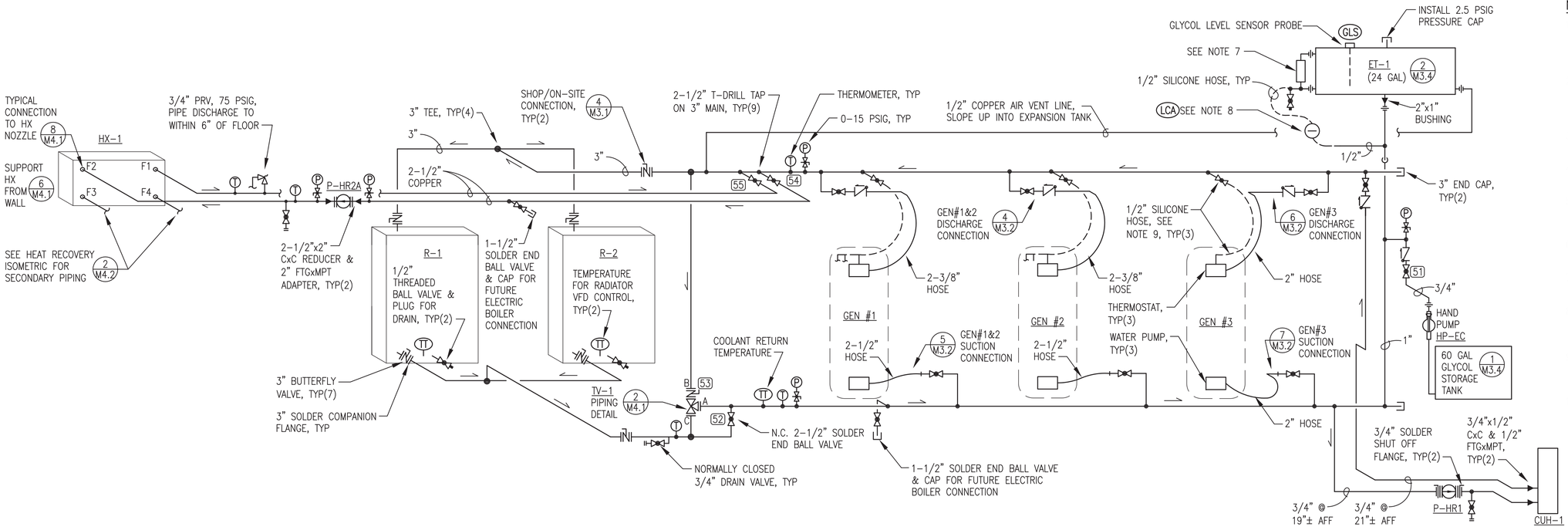
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: COOLANT & HEAT RECOVERY PIPING PLAN & DETAILS

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

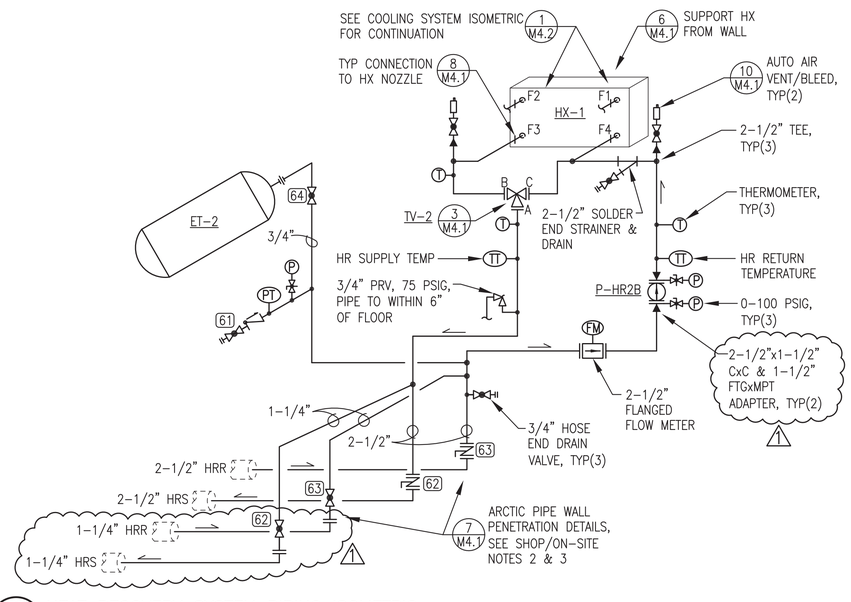
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 1-14-19
FILE NAME: PTH PPU M2-7	SHEET: M4.1 OF 7
PROJECT NUMBER:	



1 M4.2 COOLING SYSTEM PIPING ISOMETRIC
NO SCALE

NOTES:

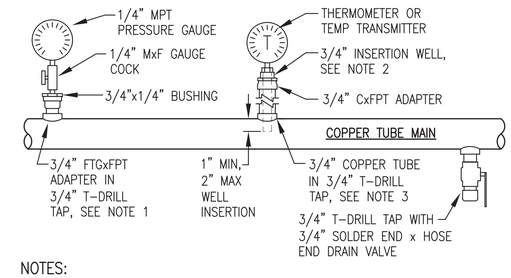
1) ALL PIPING SHOWN THIS ISOMETRIC TYPE "L" COPPER WITH SOLDER JOINTS, 3"ø EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. ALL FLANGES ANSI 150# PATTERN BRONZE COMPANION WITH SOLDER ENDS.
2) MAKE ALL CONNECTIONS FOR INSTRUMENTATION WITH T-DRILL TAP, SEE DETAIL 3/M4.2. MAKE ALL OTHER REDUCING BRANCH CONNECTIONS WITH T-DRILL TAP OR TEE AS REQUIRED.
3) ALL COOLANT PRESSURE GAUGES 0-15 PSIG. ALL THERMOMETERS FAHRENHEIT RANGE.
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) INSULATE COOLANT PIPING MAINS FROM GENERATOR VALVES TO RADIATORS. ALL OTHER PIPING NOT INSULATED.
7) INSTALL 9" LONG COOLANT SITE GAUGE ON 1/2" TEES, INSTALL 1/2" THREADED BALL VALVE WITH PLUG FOR DRAIN.
8) LOW COOLANT ALARM SWITCH, MOUNT WITH SWITCH POINT LEVEL WITHIN 12" OF TANK BOTTOM. CONNECT TO HOSE WITH NPTx5/8" BARB, 1/2" ON BOTTOM, 1/4" ON TOP.
9) 3/4" THREADED BALL VALVE, 3/4"MPTx5/8" BARB BRASS KING NIPPLE, & 1/2" HOSE FOR ENGINE VENT & PRE-HEAT.
10) SET P-HR1 & P-HR2A TO OPERATE ON SPEED 3.



2 M4.2 HEAT RECOVERY SYSTEM PIPING ISOMETRIC
NO SCALE

NOTES:

1) ALL PIPING SHOWN THIS ISOMETRIC 2-1/2" TYPE L HARD DRAWN COPPER UNLESS SPECIFICALLY INDICATED OTHERWISE. ALL FLANGES ANSI 150# PATTERN BRONZE COMPANION WITH SOLDER ENDS.
2) UNLESS SPECIFIED OTHERWISE MAKE ALL CONNECTIONS FOR INSTRUMENTATION WITH T-DRILL TAP, SEE DETAIL 3/M4.2. MAKE ALL OTHER REDUCING BRANCH CONNECTIONS WITH T-DRILL TAP AS REQUIRED UNLESS INDICATED OTHERWISE.
3) ALL HEAT RECOVERY PRESSURE GAUGES 0-100 PSIG. ALL THERMOMETERS FAHRENHEIT RANGE.
4) SEE ELECTRICAL INSTRUMENTATION SCHEDULE FOR TEMPERATURE AND PRESSURE TRANSMITTERS AND FLOW METER.
5) UPON COMPLETION OF FABRICATION FLUSH PIPING TO REMOVE ALL DEBRIS, SEE SPECIFICATIONS.
6) INSULATE HEAT RECOVERY PIPING MAINS.
7) SET P-HR2B TO OPERATE ON SPEED 3.



NOTES:

1) USE T-DRILL TAPS AS SHOWN FOR INSTALLATIONS IN 1-1/4" AND LARGER COPPER MAINS. USE LINE SIZE TEE FITTINGS FOR INSTALLING INSTRUMENTATION IN 1" AND SMALLER MAINS. ADJUST ADAPTER AND BUSHING SIZES TO MATCH TEES.
2) TEMPERATURE TRANSMITTER INSTALLATION SIMILAR TO THERMOMETER EXCEPT USE 3/4"x1/2" BUSHING.
3) FOR MAINS SMALLER THAN 2" USE COPPER TUBE RISER AS SHOWN, LENGTH AS REQUIRED FOR 1" TO 2" WELL INSERTION INTO MAIN. FOR LARGER PIPES OMIT RISER AND INSERT 3/4" FTGxFPT ADAPTER INTO T-DRILL TAP.

3 M4.2 TYPICAL INSTRUMENT INSTALLATION
NO SCALE

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 4/M3.1 AND 7/M4.1 FOR SPECIFIC REQUIREMENTS FOR PIPING THROUGH THE EXTERIOR WALLS.
3) ARCTIC PIPE TO BE INSTALLED AS PART OF THE ON-SITE WORK.

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

⚠ REVISED DRAWING ISSUED MARCH 2019

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

REV.	DESCRIPTION	DATE	BY
1	CHANGED P-HR2B CONNECTIONS TO 1-1/2" AND CHANGED ARCTIC PIPE TO 1-1/4"	3/20/19	BCG

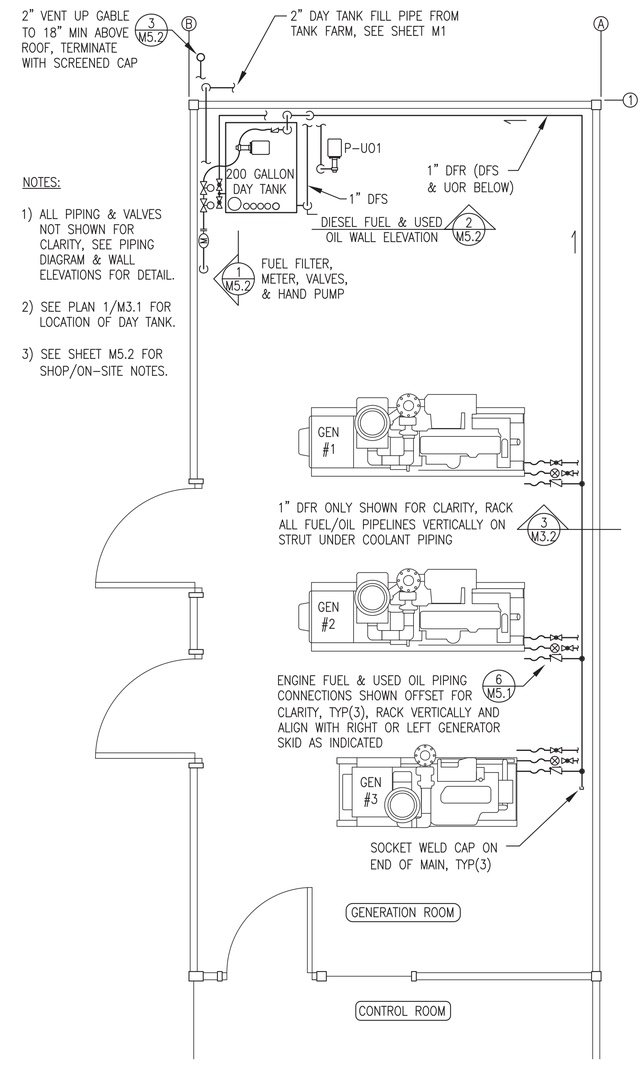
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

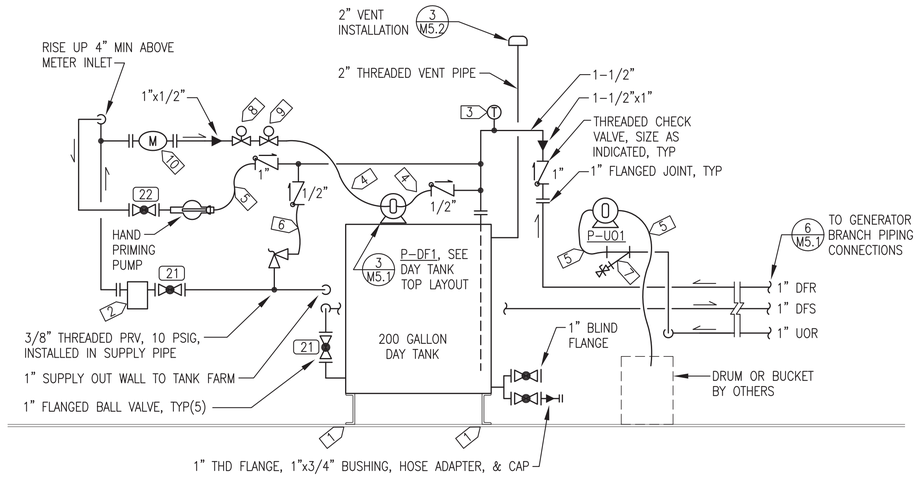
TITLE: COOLANT & HEAT RECOVERY ISOMETRICS & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M4.2 OF 7
PROJECT NUMBER:



1 M5.1 DIESEL FUEL SYSTEM & USED OIL PIPING PLAN
3/8"=1'



2 M5.1 DIESEL FUEL & USED OIL PIPING DIAGRAM
NO SCALE

PIPING DIAGRAM GENERAL NOTES:

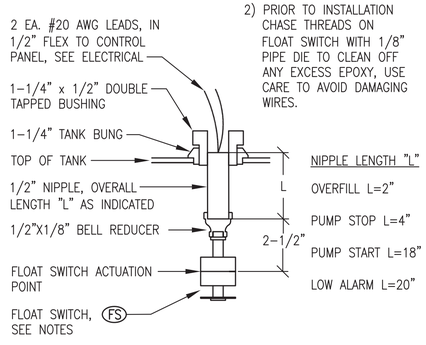
1) FABRICATE DAY TANK, FILTER BANK, & HOPPER IN ACCORDANCE WITH FABRICATION PLANS AND DETAILS.
2) ALL DAY TANK SUPPLY & RETURN PIPING 1" SCH 80 EXCEPT WHERE INDICATED AS 1-1/2". ALL VENT PIPING 2" SCH 40.
3) ALL PIPING JOINTS SOCKET OR BUTT WELD EXCEPT FOR THREADED VENT & CONNECTIONS TO EQUIPMENT & VALVES.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

PIPING DIAGRAM SPECIFIC NOTES:

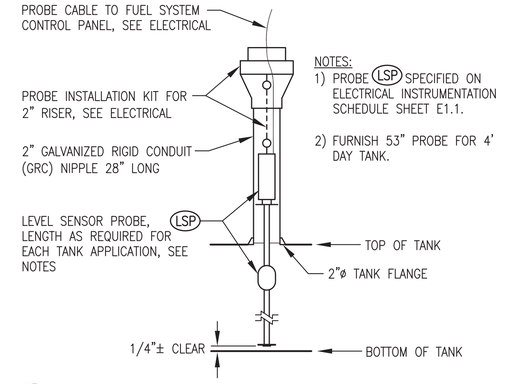
1. FASTEN DEVICE TO FLOOR WITH MIN 1"x3/16" FILLET WELD ALL 4 CORNERS, WIRE BRUSH AND RE-PAINT WELD AREA TO MATCH EXISTING.
2. 1" ANSI 150# FLANGED FILTER F-DT, REMOVE DRAIN VALVE & INSTALL 1/8"MxF DRAIN COCK.
3. THERMOMETER, INSTALL WELL IN 3/4" THREAD-O-LET.
4. #10 HOSE WITH 1/2" OR 3/4" NPT ENDS.
5. #12 HOSE WITH 1/2", 3/4", OR 1" NPT ENDS.
6. #6 HOSE WITH 1/8", 1/4", OR 3/8" NPT ENDS.
7. 1" THREADED 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 300# FLANGED ENDS, PROVIDE 1" ANSI 300# FLANGES & GASKETS, SOCKET WELD ON INLET & THREADED ON OUTLET.

3 M5.1 TOP OF DAY TANK – PLAN VIEW
NO SCALE

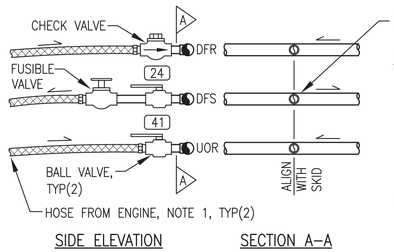
NOTES:
1) FLOAT SWITCH (FS) SPECIFIED ON ELECTRICAL INSTRUMENTATION SCHEDULE SHEET E1.1.
2) PRIOR TO INSTALLATION CHASE THREADS ON FLOAT SWITCH WITH 1/8" PIPE DIE TO CLEAN OFF ANY EXCESS EPOXY, USE CARE TO AVOID DAMAGING WIRES.



4 M5.1 DAY TANK FLOAT SWITCH INSTALLATION
NO SCALE



5 M5.1 TYPICAL LEVEL SENSOR PROBE INSTALLATION
NO SCALE



NOTES:
1) HOSES PROVIDED WITH ENGINE, SIZE VARIES PER ENGINE & PRODUCT. ALL EQUIPPED WITH JIC SWIVELS & 1/2" MPT ADAPTERS. CUT TO LENGTH & RE-INSTALL ENDS.
2) ALL PIPING & NIPPLES SCH 80. ALL VALVES 1/2" SIZE, THREADED BODY.

6 M5.1 ENGINE FUEL PIPING CONNECTION
NO SCALE

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

ISSUED FOR CONSTRUCTION
JANUARY 2019

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

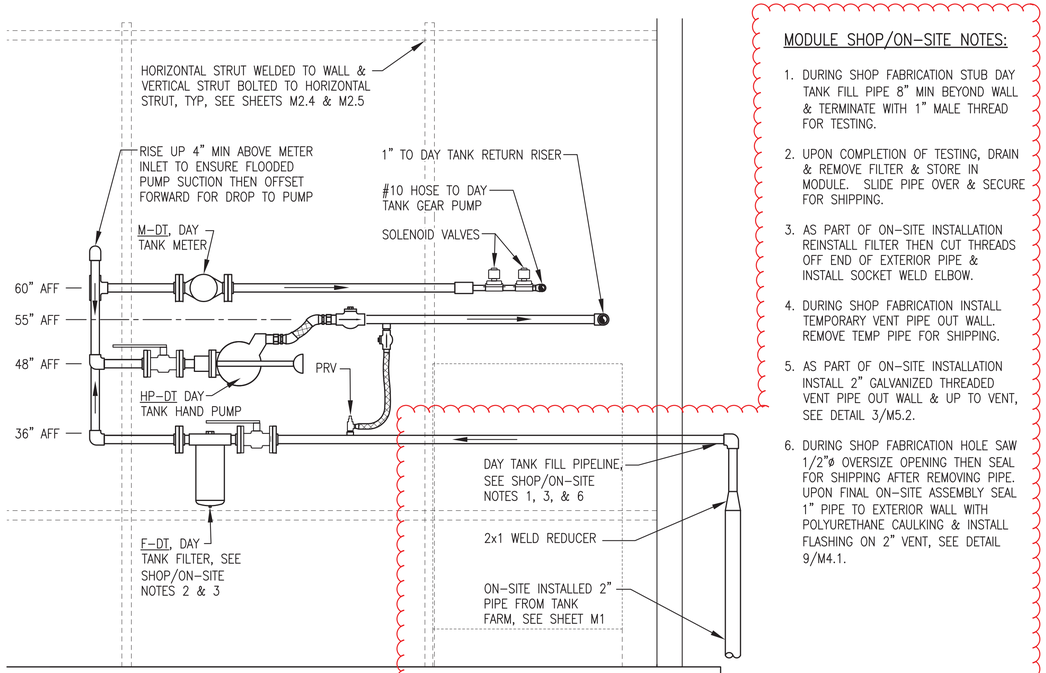
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

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

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

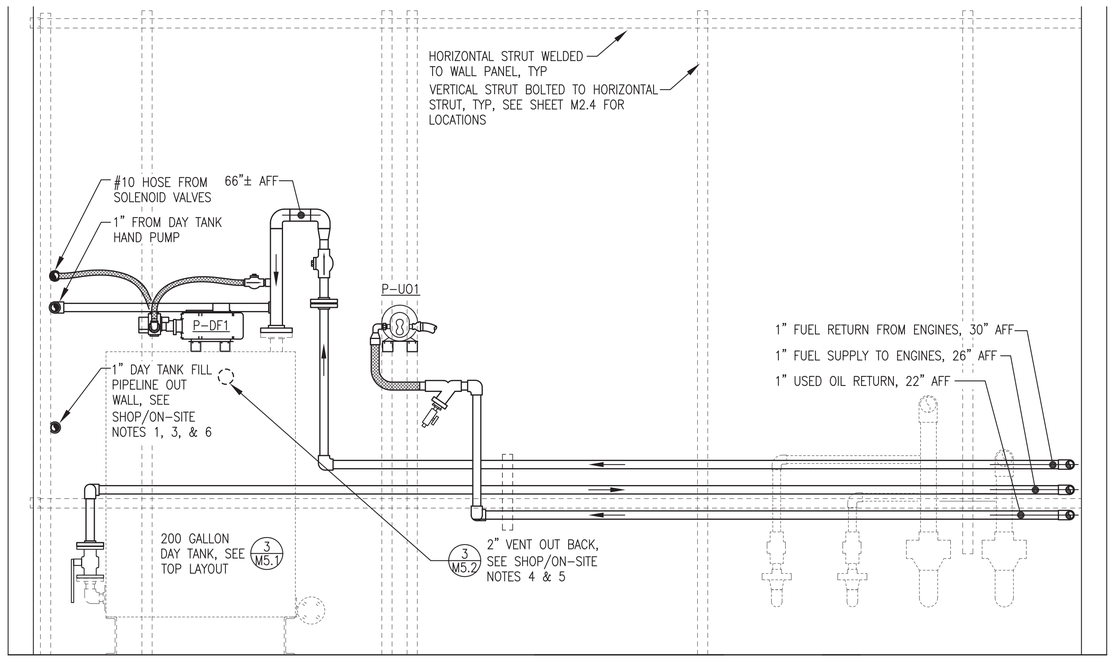
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M5.1 OF 7
PROJECT NUMBER:



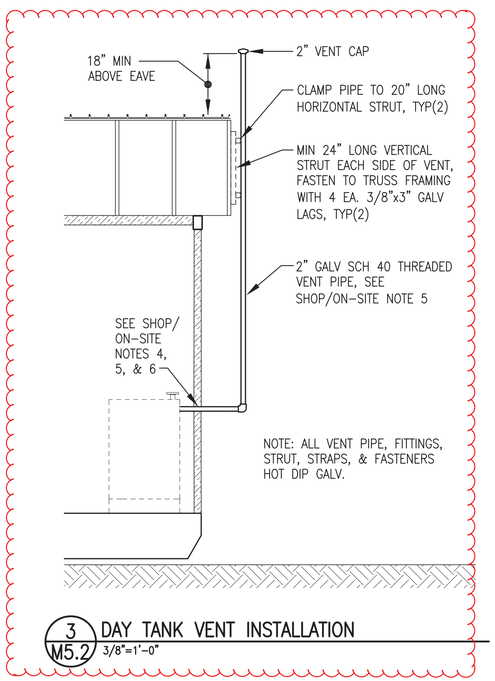
1 M5.1 DIESEL FUEL FRONT WALL ELEVATION
1"=1'

MODULE SHOP/ON-SITE NOTES:

1. DURING SHOP FABRICATION STUB DAY TANK FILL PIPE 8" MIN BEYOND WALL & TERMINATE WITH 1" MALE THREAD FOR TESTING.
2. UPON COMPLETION OF TESTING, DRAIN & REMOVE FILTER & STORE IN MODULE. SLIDE PIPE OVER & SECURE FOR SHIPPING.
3. AS PART OF ON-SITE INSTALLATION REINSTALL FILTER THEN CUT THREADS OFF END OF EXTERIOR PIPE & INSTALL SOCKET WELD ELBOW.
4. DURING SHOP FABRICATION INSTALL TEMPORARY VENT PIPE OUT WALL. REMOVE TEMP PIPE FOR SHIPPING.
5. AS PART OF ON-SITE INSTALLATION INSTALL 2" GALVANIZED THREADED VENT PIPE OUT WALL & UP TO VENT, SEE DETAIL 3/M5.2.
6. DURING SHOP FABRICATION HOLE SAW 1/2"ø OVERSIZE OPENING THEN SEAL FOR SHIPPING AFTER REMOVING PIPE. UPON FINAL ON-SITE ASSEMBLY SEAL 1" PIPE TO EXTERIOR WALL WITH POLYURETHANE CAULKING & INSTALL FLASHING ON 2" VENT, SEE DETAIL 9/M4.1.



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



3 M5.2 DAY TANK VENT INSTALLATION
3/8"=1'-0"

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ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT 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: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M5.2 OF 7
PROJECT NUMBER:

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.

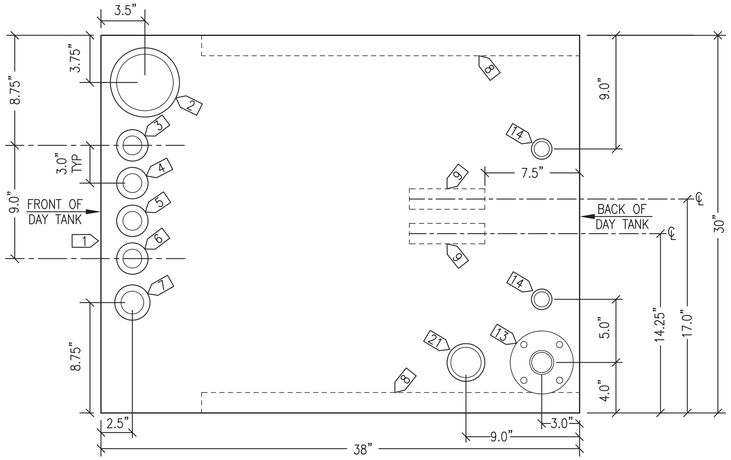
5) UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. PAINT WITH TWO COATS OF SHERWIN WILLIAMS MACROPOXY 646 OR APPROVED EQUAL, COLOR STRUCTURAL GRAY 4031.

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

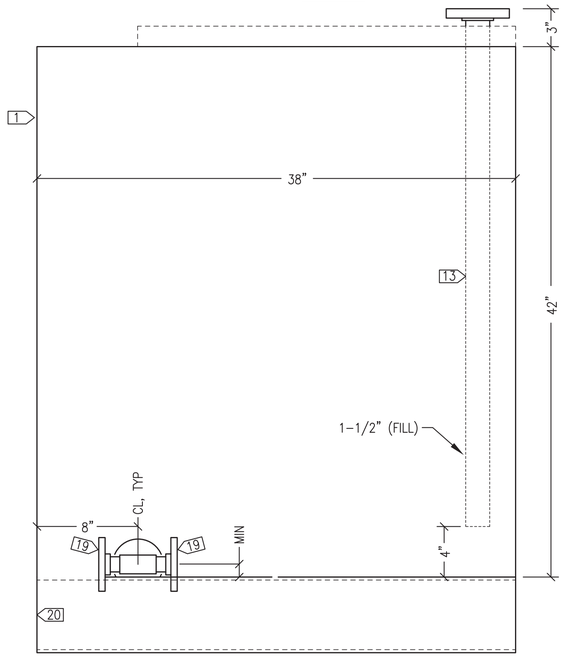
7) UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS AND AIR DRY INTERIOR. SEAL ALL MPT OPENINGS WITH THREADED STEEL CAPS. SEAL FPT TANK OPENINGS WITH THREADED STEEL PIPE PLUGS WHERE INDICATED. INSTALL 1-1/4" VENT CAP WHERE INDICATED. SEAL ALL OTHER FPT OPENINGS WITH PLASTIC OR STEEL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

DAY TANK SPECIFIC NOTES:

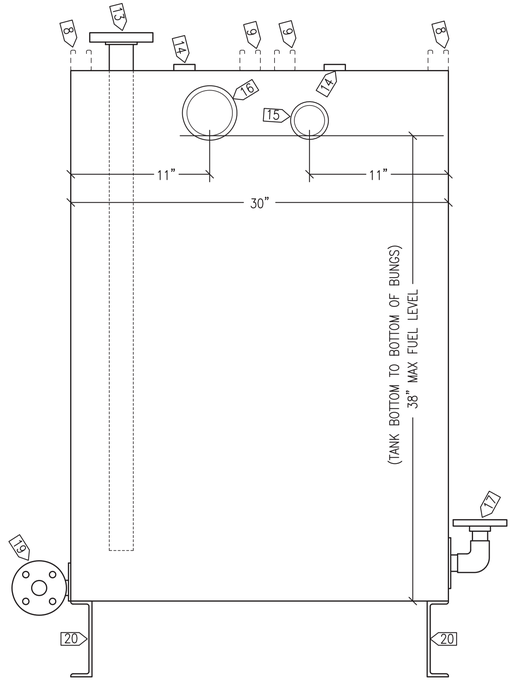
1. PROVIDE 2" HIGH LETTERING: "DIESEL FUEL 200 GALLONS"
2. 4" FPT (MANUAL FILL) – INSTALL THREADED STEEL PLUG
3. 1-1/4" FPT (OVERFILL) – INSTALL VENT CAP FOR SHIPPING
4. 1-1/4" FPT (PUMP STOP)
5. 1-1/4" FPT (PUMP START)
6. 1-1/4" FPT (LOW ALARM)
7. 1-1/2" FPT (TANK GAUGE)
8. 30"L STRUT, END FLUSH WITH BACK OF TANK
9. 6"L STRUT
10. NOT USED
11. NOT USED
12. NOT USED
13. 1-1/2" SCH 40 DROP TUBE (FILL) WITH 150# FLANGE
14. 1" FPT (SPARE) – INSTALL THREADED STEEL PLUG
15. 2" FPT (VENT)
16. 3" FPT (EMERGENCY VENT) – INSTALL THREADED STEEL PLUG
17. 1" FLANGE (SUPPLY) – SEE DETAIL 2/M5.3
18. NOT USED
19. 1" FLANGE (DRAIN) – SEE DETAIL 3/M5.3
20. C6x8.2, 38" LONG
21. 2" FPT (TANK LEVEL PROBE)



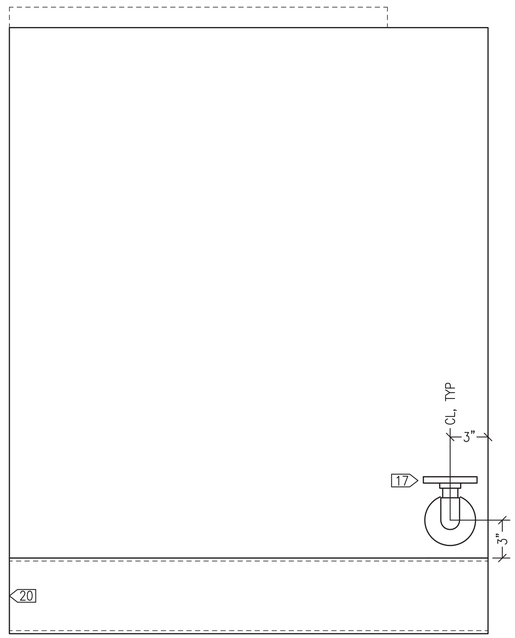
TOP VIEW



RIGHT SIDE VIEW

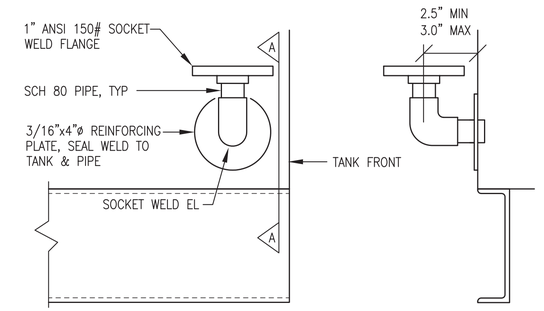


BACK VIEW



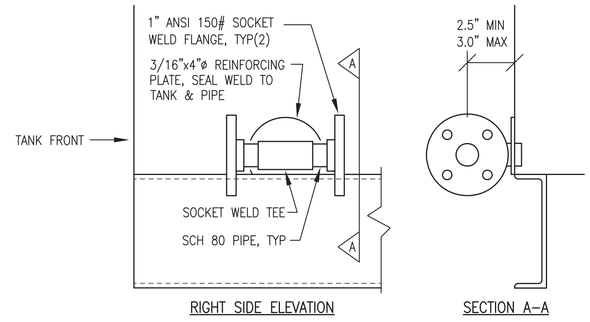
LEFT SIDE VIEW

1 M5.3 200 GALLON SINGLE WALL DAY TANK
1"=6"



LEFT SIDE ELEVATION SECTION A-A

2 M5.3 1" FLANGED SUPPLY CONNECTION
NO SCALE



RIGHT SIDE ELEVATION SECTION A-A

3 M5.3 1" FLANGED DRAIN CONNECTION
NO SCALE

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: 200 GALLON DAY TANK FABRICATION

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

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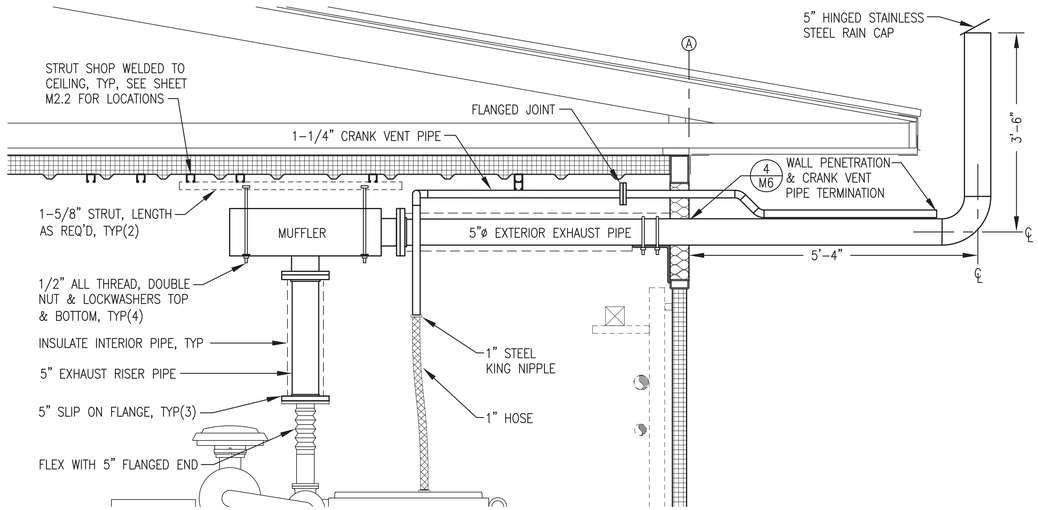
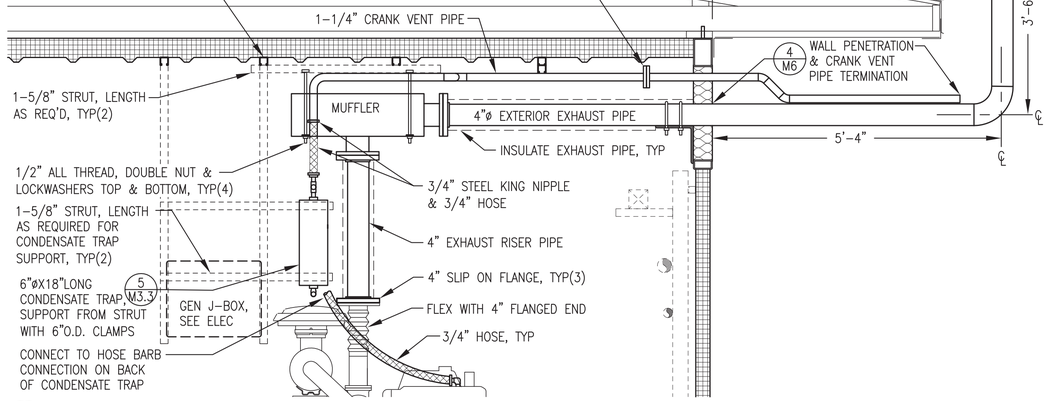
DESIGNED BY: BCG	DATE: 1-14-19
FILE NAME: PTH PPU M2-7	SHEET: M5.3 OF 7
PROJECT NUMBER:	



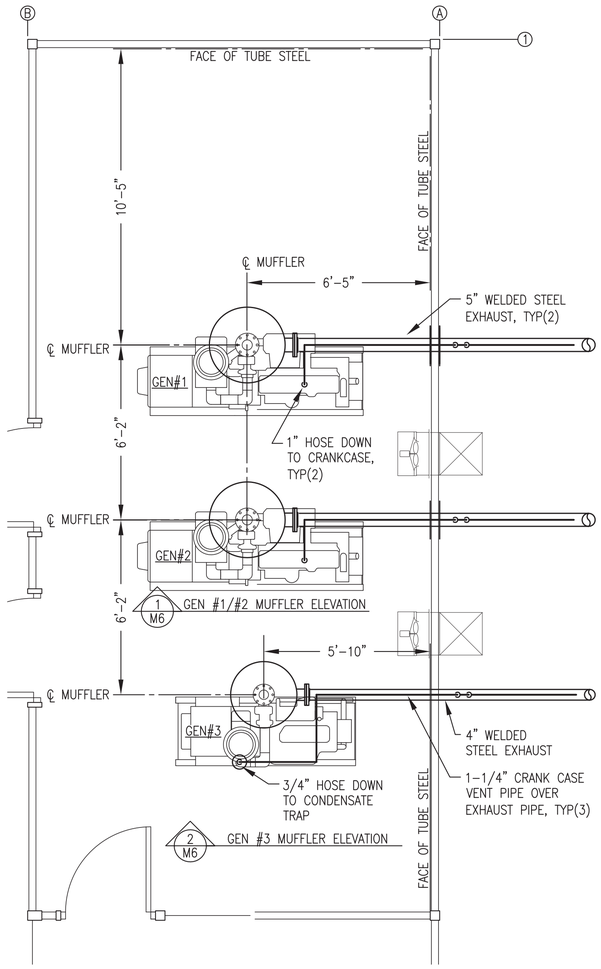
1 / M6 GEN #1/#2 MUFFLER, EXHAUST & CRANK VENT PIPE INSTALLATION

3/4"=1'-0"



2 / M6 GEN #3 MUFFLER, EXHAUST, CONDENSATE TRAP & CRANK VENT PIPE INSTALLATION

3/4"=1'-0"



3 / M6 MUFFLER, EXHAUST & CRANK VENT PIPE PLAN

3/8"=1'-0"

EXHAUST & CRANK VENT GENERAL NOTES:

1) 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.

2) 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# FLAT FACED SOCKET WELD.

3) ALL EXHAUST FLANGE BOLTS BLACK OR STAINLESS STEEL. COAT WITH HIGH TEMPERATURE ANTI-SIEZE.

EXHAUST & CRANK VENT SHOP/ON-SITE NOTES:

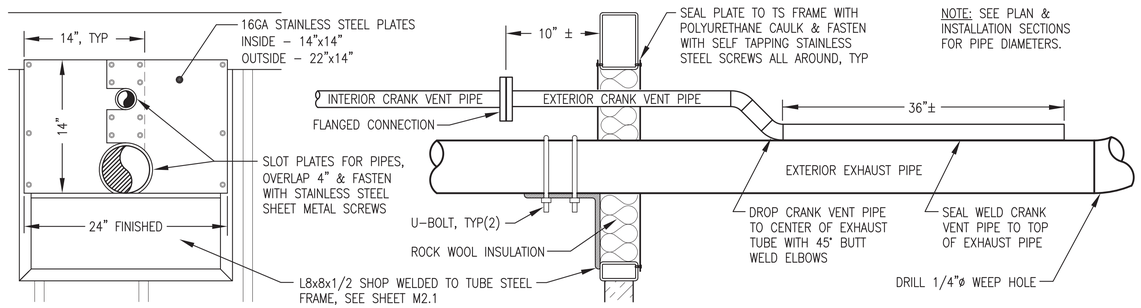
1) SHOP FABRICATE COMPLETE EXHAUST AND CRANK VENT PIPING SYSTEM AS INDICATED.

2) SHOP INSTALL 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.

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.



NOTE: SEE PLAN & INSTALLATION SECTIONS FOR PIPE DIAMETERS.

4 / M6 WALL PENETRATION & CRANK VENT PIPE TERMINATION

NO SCALE

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

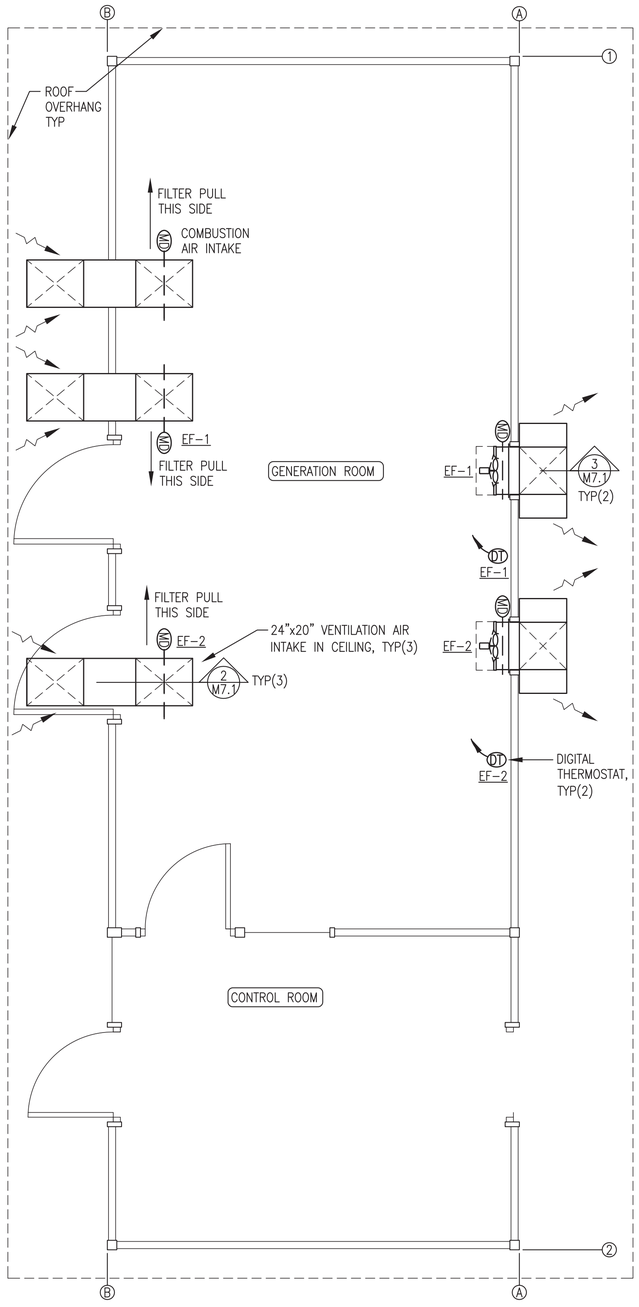
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

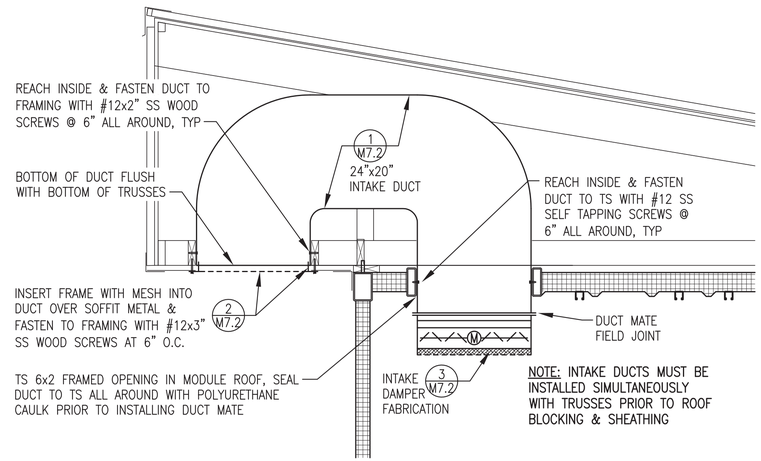
TITLE: EXHAUST & CRANK VENT PLAN & DETAILS

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

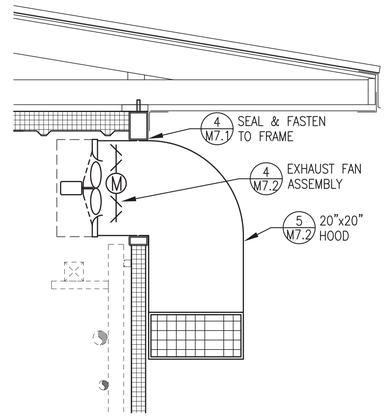
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 1-14-19
FILE NAME: PTH PPU M2-7	SHEET: M6 OF 7
PROJECT NUMBER:	



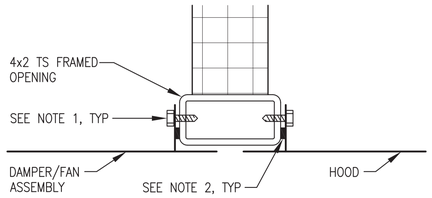
1 M7.1 VENTILATION PLAN
3/8"=1'-0"



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 ASSEMBLY. 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 FABRICTION WORK AND SOME INSTALLATION WORK WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. SEE SHOP/ON-SITE NOTES FOR DELINEATION OF WORK INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

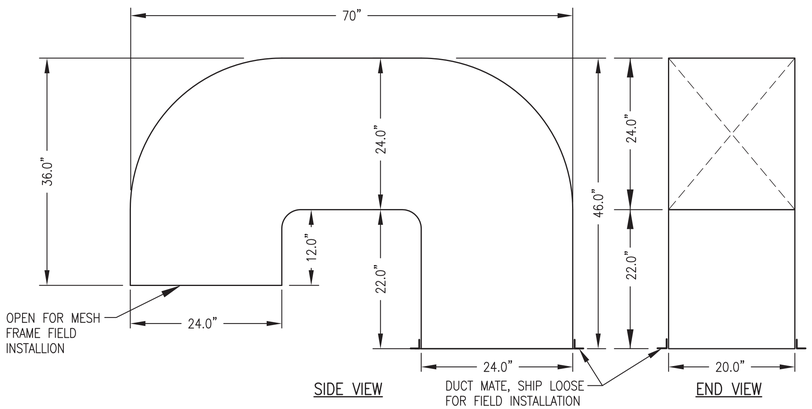
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: VENTILATION PLAN & DETAILS

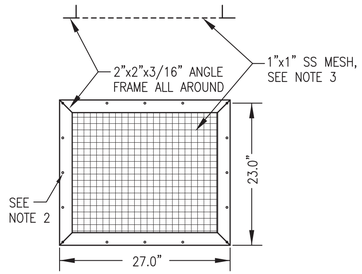
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M7.1 OF 7
PROJECT NUMBER:



NOTE: 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.

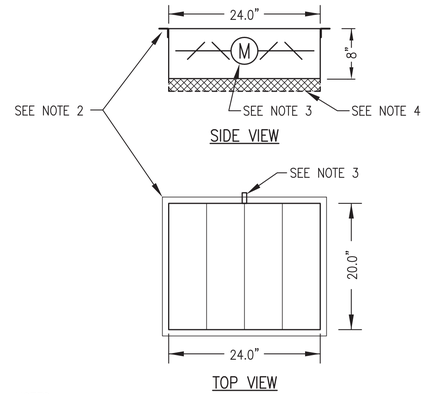
1 M7.2 INTAKE DUCT FABRICATION
1"=1'-0"



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.

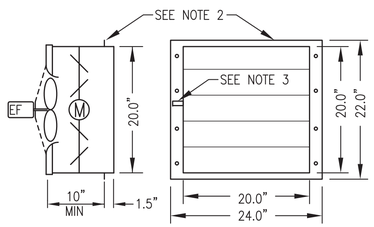
2 M7.2 INTAKE MESH FRAME
1"=1'-0"



NOTES:

1. FABRICATE 3 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.
4. INSTALL FRAME FOR REMOVABLE 24"x24"x2" FURNACE FILTERS. FABRICATE FROM "C" CHANNEL THREE SIDES WITH LATCHING HINGED COVER ON FOURTH SIDE TO ALLOW FILTERS TO SLIDE OUT. SEE PLAN VIEW FOR DAMPER ACTUATOR AND FILTER PULL ORIENTATION. EXTEND FILTER FRAME 2"± BEYOND DAMPER FRAME EACH WAY ON NARROW DIMENSION.

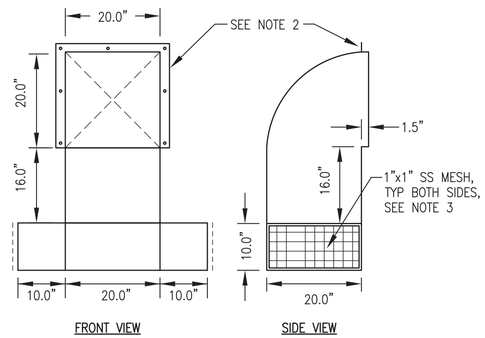
3 M7.2 INTAKE AIR DAMPER FABRICATION
1"=1'-0"



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 2 IDENTICAL 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.

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.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: VENTILATION 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: 1-14-19
FILE NAME: PTH PPU M2-7 | SHEET: M7.2 OF 7
PROJECT NUMBER:

LEGEND

- DIRECTION OF FLOW
- CHANGE OF PIPE SIZE
- PIPING CONNECTION (TEE)
- ELBOW TURNED DOWN
- ELBOW TURNED UP
- FLANGED JOINT
- UNION
- FLEXIBLE CONNECTOR
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- HOSE END DRAIN VALVE
- GAUGE COCK
- AUTOMATIC AIR VENT
- (T) THERMOMETER
- (P) PRESSURE GAUGE
- (TS) TEMPERATURE SENSOR
- (RT) RESISTANCE TEMPERATURE DEVICE
- (EFM) ENERGY METER FLOW METER

HEAT RECOVERY PROJECT SCOPE

THE PURPOSE OF THIS PROJECT IS TO REDUCE THE ANNUAL HEATING FUEL CONSUMPTION IN THE COMMUNITY OF PORT HEIDEN BY CONNECTING THE SCHOOL BUILDING AND COMMUNITY CENTER HEATING SYSTEMS TO A NEW POWER PLANT HEAT RECOVERY SYSTEM. THE HEAT RECOVERY SYSTEM WILL PROVIDE SUPPLEMENTAL HEAT ONLY. ALL EXISTING OIL FIRED HEATING APPLIANCES WILL REMAIN. THE SCOPE OF THE HEAT RECOVERY SYSTEM PROJECT IS AS FOLLOWS:

* INSTALLATION OF PEX ARCTIC PIPE FROM THE NEW POWER PLANT TO THE SCHOOL MECHANICAL BUILDING, CITY SHOP & VILLAGE SHOP.
* INSTALLATION OF NEW HEAT EXCHANGER AND PUMP IN THE SCHOOL BOILER ROOM WITH BRANCH CONNECTIONS TO THE BOILER RETURN MAIN.
* INSTALLATION OF HEAT RECOVERY CONTROL PANEL IN SCHOOL BOILER ROOM FOR PREVENTION OF NEGATIVE HEAT FLOW (DISCHARGE) FROM BUILDING HEATING SYSTEM TO HEAT RECOVERY SYSTEM, SEE ELEC.
* INSTALLATION OF REVENUE GRADE ENERGY METER IN SCHOOL BOILER ROOM FOR RECORDING SCHOOL ENERGY USE, SEE ELEC.
* INSTALLATION OF HEAT RECOVERY SYSTEM UNIT HEATERS IN CITY SHOP AND VILLAGE SHOP.

HEAT RECOVERY SYSTEM ON SITE FILLING AND TESTING

UPON COMPLETION OF ARCTIC PIPE INSTALLATION AND PRIOR TO INSULATING AND COVERING JOINTS, PRESSURE TEST ALL PEX CRIMP JOINTS AND STEEL WELD JOINTS. PRESSURIZE ARCTIC PIPE WITH MINIMUM 20 PSIG AIR, SOAK EACH JOINT WITH A FOAMING SOAPY WATER SOLUTION, AND VISUALLY INSPECT EACH JOINT FOR LEAKS.

AFTER TESTING ARCTIC PIPE, ISOLATE ARCTIC PIPE FROM PIPING IN THE END USER BUILDINGS. FILL ABOVE GRADE PIPING AND EQUIPMENT IN THE END USER BUILDINGS WITH POTABLE WATER AND HYDROSTATICALLY TEST ALL PIPING AT 100 PSIG MINIMUM FOR ONE HOUR WITH NO NOTICEABLE WATER LEAKS OR PRESSURE DROPS EXCEPT AS CAUSED BY TEMPERATURE CHANGE.

FLUSH ABOVE GRADE PIPING AND EQUIPMENT IN THE END USER BUILDINGS SYSTEM WITH POTABLE WATER AND DRAIN OR BLOW OUT WITH AIR TO REMOVE ALL WATER.

AFTER PRESSURE TESTING AND FLUSHING, BLEED AIR RESERVOIR ON THE EXPANSION TANK IN THE MODULE AS REQUIRED TO MAINTAIN 10 PSIG RESIDUAL WITH THE SYSTEM EMPTY. FILL THE ENTIRE HEAT RECOVERY SYSTEM INCLUDING MODULE PIPING, ARCTIC PIPE, AND END USER BUILDING PIPING WITH PROPYLENE GLYCOL SOLUTION TO 20 PSIG MINIMUM WITH SYSTEM COLD. VENT AIR FROM ALL HIGH POINT VENTS PRIOR TO STARTING CIRCULATING PUMPS.

CYCLE PUMPS ON AND OFF AND VENT HIGH POINTS UNTIL ALL AIR HAS BEEN PURGED FROM THE PIPING. ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO MAINTAIN 20 PSIG MINIMUM WITH SYSTEM COLD. WHEN SYSTEM COMES UP TO NORMAL TEMPERATURE (170F MINIMUM) ADD PROPYLENE GLYCOL SOLUTION AS REQUIRED TO BRING SYSTEM PRESSURE TO 30 PSIG MINIMUM AT EXPANSION TANK.

VERIFY PROPER FUNCTION OF ALL INSTRUMENTATION AND CALIBRATE ALL DEVICES.

PERFORM COMPLETE FUNCTIONAL TESTING OF THE HEAT RECOVERY SYSTEM INCLUDING CONTROL DEVICES AND PANELS.

CLEAN ALL PIPING STRAINERS AFTER THE FIRST 24 HOURS OF OPERATION. CLEAN STRAINERS AND BLEED AIR AT LEAST ONE MORE TIME PRIOR TO LEAVING THE PROJECT SITE.

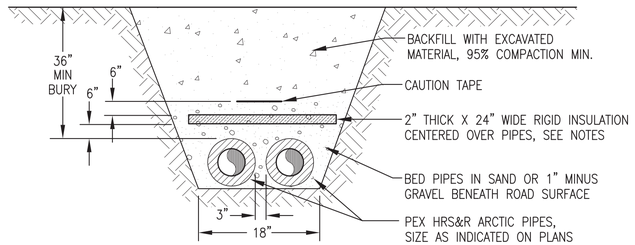
ALL EXCESS PROPYLENE GLYCOL SOLUTION SHALL BE LEFT WITH THE MODULE IN THE ORIGINAL DRUMS SEALED FOR STORAGE.

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.

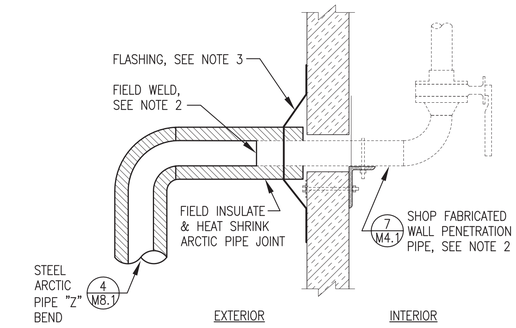
HEAT RECOVERY EQUIPMENT SCHEDULE

HX-2	SCHOOL HEAT EXCHANGER	316 SS PLATES, BRAZED CONSTRUCTION, 2.5" NPT PORTS, 500 MBH MIN CAPACITY. PRIMARY: 55 GPM 185F EWT (50% PROPYLENE) 1.0 PSI MAX WPD, SECONDARY: 55 GPM 175F LWT (50% PROPYLENE) 1.0 PSI MAX WPD	AMERIDEX SL-140-90
P-HR3	SCHOOL HEAT RECOVERY PUMP	55 GPM AT 9' TDH, 1/3HP, 115V, 1ø. PROVIDE WITH 2-1/2" NPT COMPANION FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 50-40/4 SPEED 3
P-UH1 P-UH2 P-UH3	SHOP HEAT RECOVERY PUMPS	5 GPM AT 5' TDH, 1/25HP, 115V, 1ø. PROVIDE WITH 3/4" SOLDER SHUT OFF FLANGES, GASKETS, & BOLTS.	GRUNDFOS UPS 15-58FC SPEED 1
UH-1	CITY SHOP MAIN BAY UNIT HEATER	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 45.6 MBH AT 4.7 GPM 200F EWT AND 60F EAT, 1/12HP, 120V, 1ø.	MODINE HC-63-S-01
UH-2	CITY SHOP OFFICE UNIT HEATER	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 30.9 MBH AT 3.2 GPM 200F EWT AND 60F EAT, 1/12HP, 120V, 1ø.	MODINE HC-47-S-01
UH-3	VILLAGE SHOP UNIT HEATER	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 30.9 MBH AT 3.2 GPM 200F EWT AND 60F EAT, 1/12HP, 120V, 1ø.	MODINE HC-47-S-01

NOTES:
1) PROVIDE MINIMUM 25 PSI COMPRESSIVE STRENGTH EXTRUDED POLYSTYRENE (XPS) RIGID INSULATION, DOW STYROFOAM SQUARE EDGE OR APPROVED EQUAL. EXPANDED POLYSTYRENE WILL NOT BE ACCEPTED.
2) INSTALL RIGID INSULATION CONTINUOUS END-TO-END AS INDICATED ON SITE PLAN.

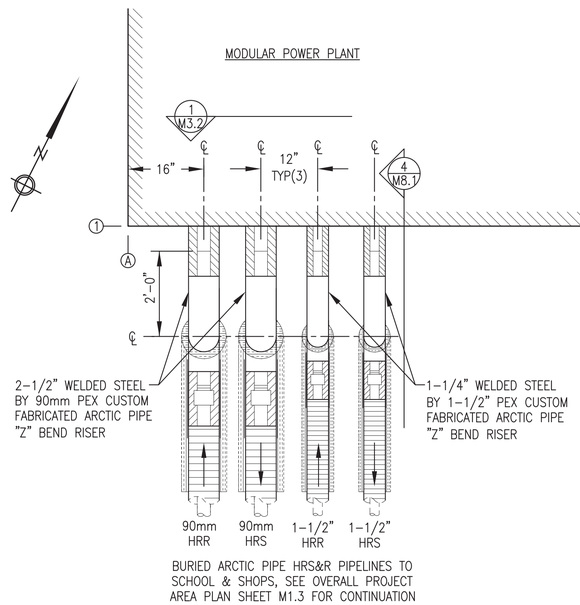


1 M8.1 TYPICAL BURIED ARCTIC PIPE INSTALLATION
NO SCALE



NOTES:
1) ONE PIPE SHOWN. PROVIDE FOUR SIMILAR.
2) FIELD REINSTALL SHOP FABRICATED PIPE SECTION THROUGH WALL AND WELD TO ARCTIC PIPE.
3) AFTER WELDING, PRESSURE TESTING, AND INSULATING JOINT, INSTALL FLASHING OVER ARCTIC PIPE, SEAL TO WALL SURFACE WITH POLYURETHANE CAULKING, & FASTEN TO WALL WITH STAINLESS STEEL SHEET METAL SCREWS ALL AROUND.

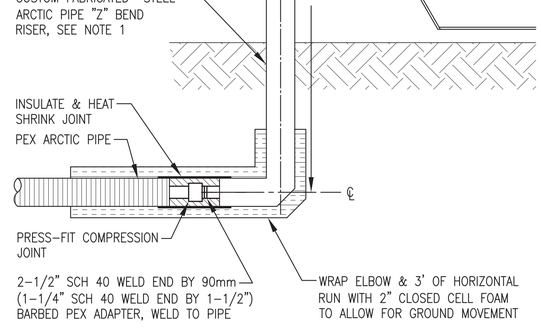
2 M8.1 TYPICAL ARCTIC PIPE FIELD CONNECTION AT MODULE
NO SCALE



BURIED ARCTIC PIPE HRS&R PIPELINES TO SCHOOL & SHOPS, SEE OVERALL PROJECT AREA PLAN SHEET M1.3 FOR CONTINUATION

3 M8.1 ENLARGED PLAN AT MODULE ARCTIC PIPE ENTRANCE
3/4"=1'-0"

NOTES:
1) PROVIDE 2 EACH 2-1/2" STEEL "Z"BENDS AND PROVIDE 2 EACH 1-1/4" STEEL "Z"BENDS. FABRICATE FROM SCH 40 STEEL WITH ALL WELDED JOINTS.
2) FIELD WELD 2-1/2" (1-1/4") "Z" BEND TO SHOP FABRICATED 2-1/2" (1-1/4") PIPE.



4 M8.1 POWER PLANT ARCTIC PIPE ENTRANCE
3/4"=1'-0"

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

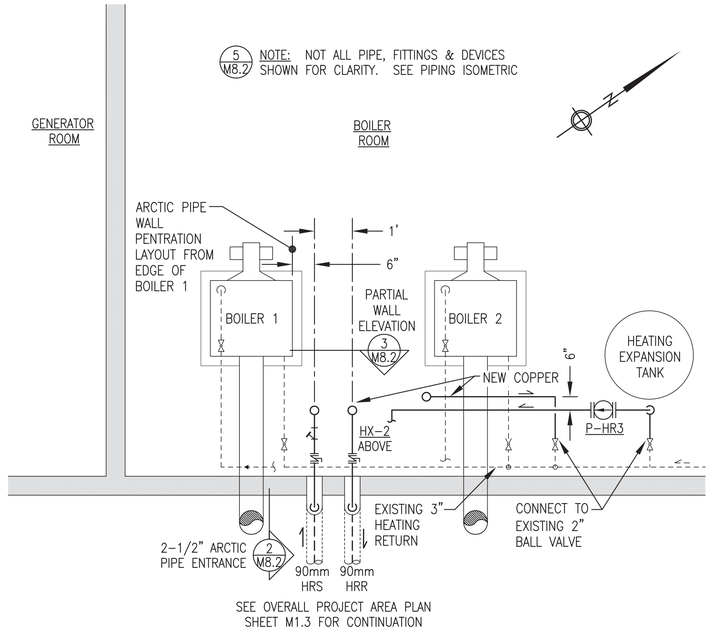
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

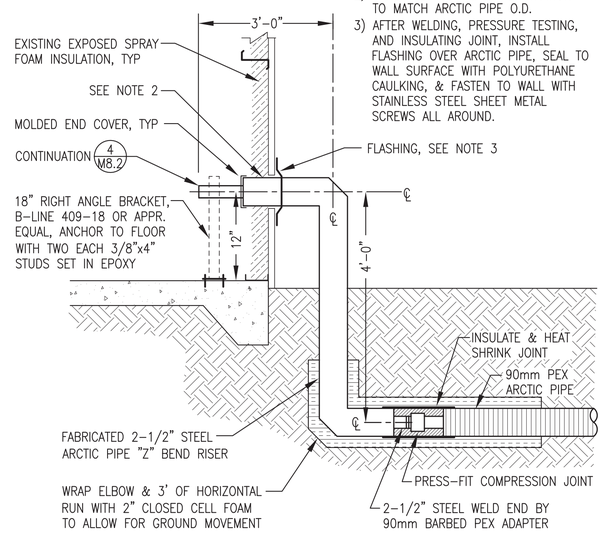
TITLE: HEAT RECOVERY SYSTEM
NOTES, EQUIPMENT SCHEDULE, & DETAILS

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

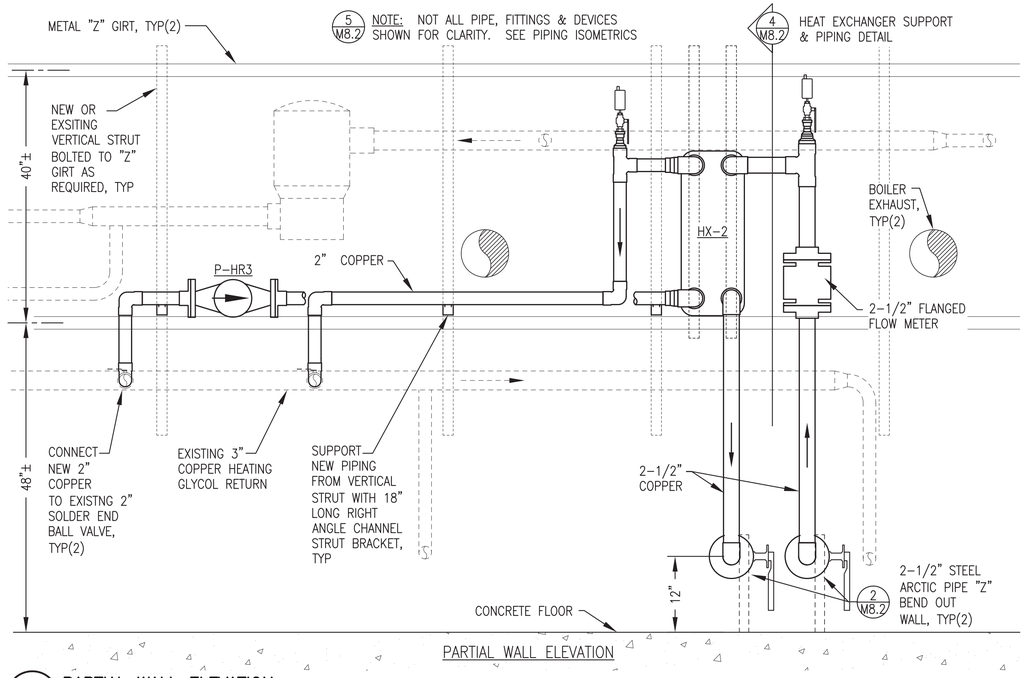
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M8 | SHEET: M8.1 OF 8
PROJECT NUMBER:



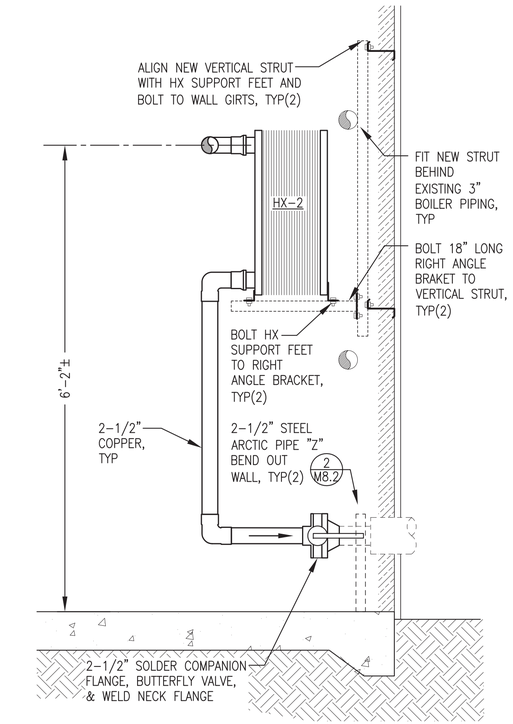
1 M8.2 SCHOOL MECHANICAL BUILDING HEAT RECOVERY PLAN
1/2"=1'-0"



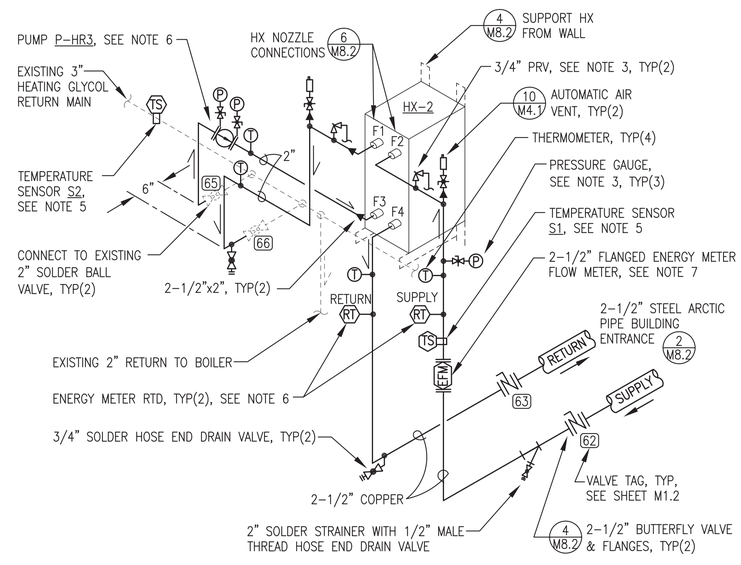
2 M8.2 SCHOOL MECHANICAL BUILDING ARCTIC PIPE ENTRANCE
NO SCALE



3 M8.2 PARTIAL WALL ELEVATION
1"=1'-0"



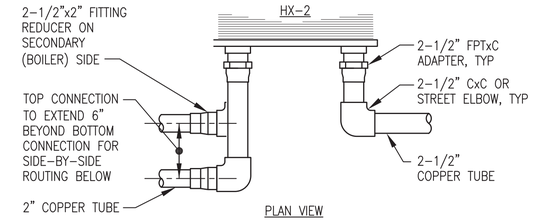
4 M8.2 SCHOOL HEAT EXCHANGER SUPPORT & PIPING
1"=1'-0"



5 M8.2 SCHOOL HEAT RECOVERY PIPING ISOMETRIC
NO SCALE

NOTES:

1. ALL NEW PIPING & EQUIPMENT SHOWN IN DARK SOLID LINES. ALL EXISTING PIPING & EQUIPMENT SHOWN IN LIGHT DASHED LINES.
2. ALL NEW PIPING 2" AND 2-1/2" TYPE "L" COPPER TUBE UNLESS SPECIFICALLY INDICATED OTHERWISE. SUPPORT PIPING & EQUIPMENT FROM BUILDING STRUCTURE WITH STRUT AND FITTINGS AS REQUIRED.
3. PIPE 3/4" PRV DISCHARGE TO WITHIN 6" OF FLOOR. SEE DETAIL 3/M4.2 FOR INSTRUMENTATION INSTALLATION.
4. WRAP HEAT EXCHANGER WITH 1" RIGID FOIL-BACK FIBERGLAS INSULATION ALL AROUND & TAPE ALL SEAMS. INSULATE ALL NEW PIPING WITH 1/8"x2" SELF-ADHESIVE FOIL BACKED FOAM INSULATION SPIRAL WRAPPED. EXISTING SCHOOL HYDRONIC PIPING TO REMAIN UN-INSULATED EXCEPT AS NOTED.
5. TEMPERATURE SENSOR PROVIDED WITH HEAT RECOVERY PANEL, SEE ELECTRICAL. INSTALL ON SURFACE OF PIPING WHERE INDICATED. WIRE BRUSH PIPE TO REMOVE SURFACE RESIDUE AND PLACE SENSOR DIRECTLY ON CLEANED AREA. ON EXISTING SCHOOL HYDRONIC PIPING SPIRAL WRAP MINIMUM 6" LENGTH OF PIPE WITH 1/8"x2" SELF-ADHESIVE FOIL BACKED FOAM INSULATION.
6. RTD PROVIDED WITH ENERGY METER FOR HEAT RECOVERY FEED (SUPPLY) & RETURN, SEE ELECTRICAL. 3/4" INSTALLATION WELL PROVIDED WITH RTD.
7. FLOW METER PROVIDED WITH ENERGY METER, SEE ELECTRICAL. INSTALL IN FLOODED SECTION OF PIPE WITH MINIMUM STRAIGHT, FITTING-FREE LENGTH OF 5 PIPE DIAMETERS UPSTREAM AND DOWNSTREAM OF METER.
8. CONNECT TO PUMP NPT FLANGES WITH 2" CxMPT ADAPTER. SET PUMP TO SPEED 3.



6 M8.2 HX-2 PIPING CONNECTION
NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

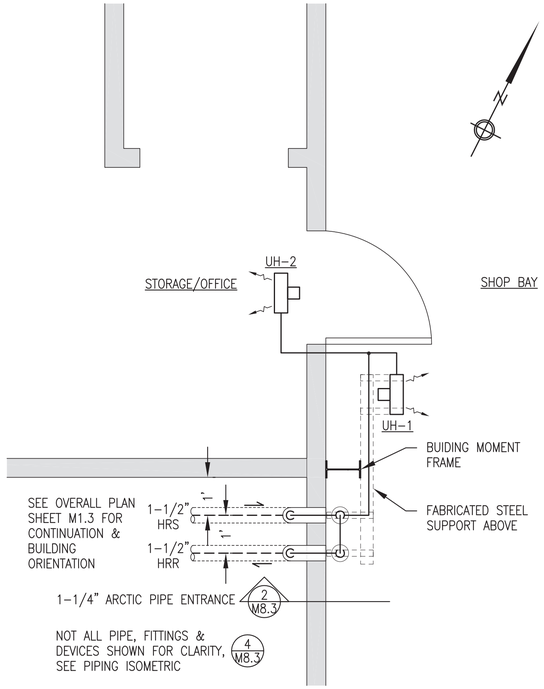
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: HEAT RECOVERY SYSTEM SCHOOL PLAN & DETAILS

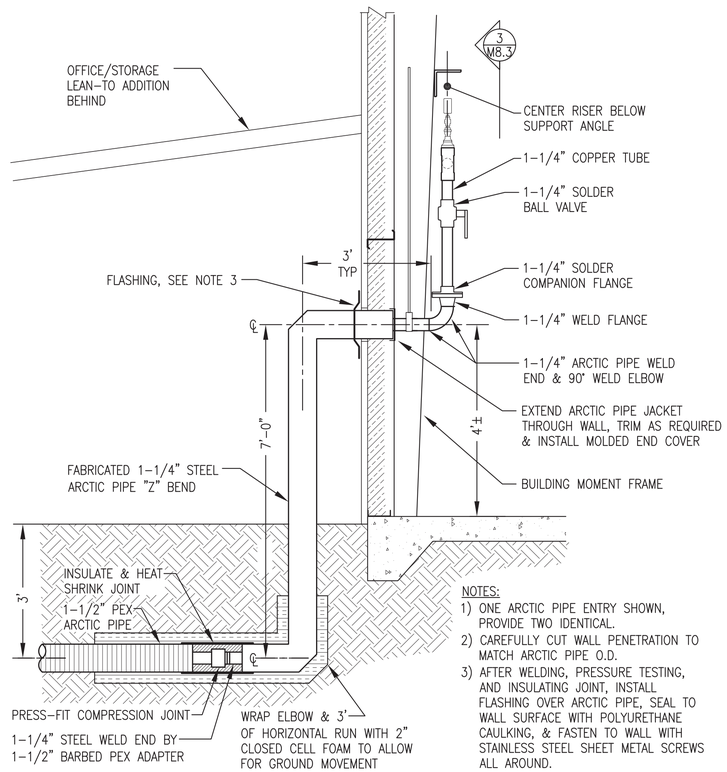
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M8 | SHEET: M8.2 OF 8
PROJECT NUMBER:



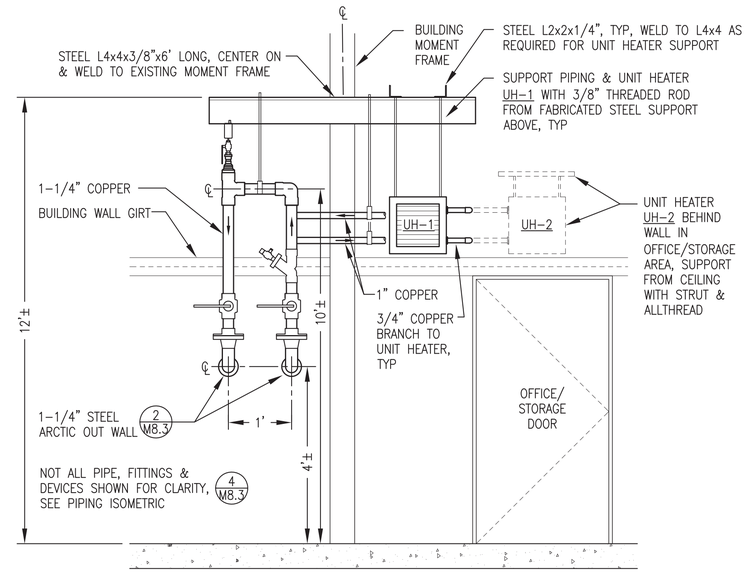
1 M8.3 CITY SHOP HEAT RECOVERY PLAN

1/2"=1'-0"



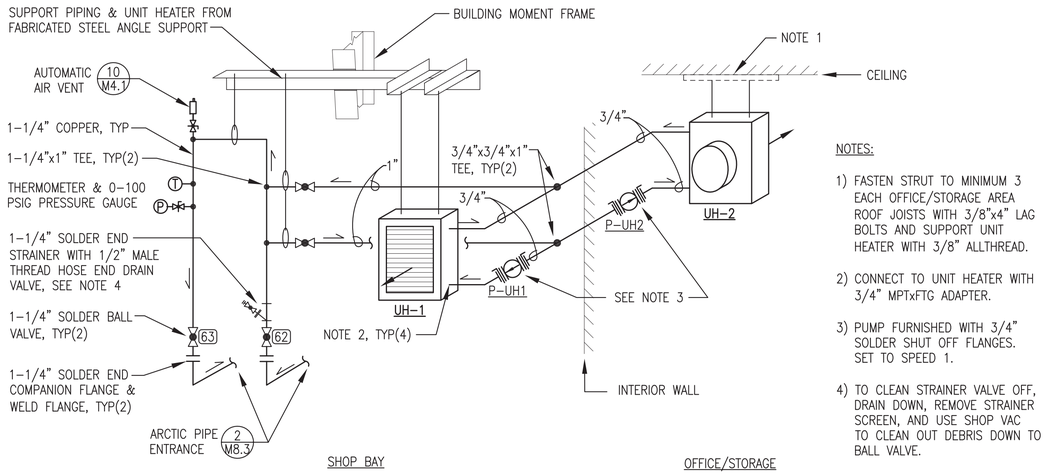
2 M8.3 CITY SHOP ARCTIC PIPE ENTRANCE SECTION

NO SCALE



3 M8.3 CITY SHOP ARCTIC PIPE ENTRANCE ELEVATION

NO SCALE



4 M8.3 CITY SHOP HEAT RECOVERY PIPING ISOMETRIC

NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

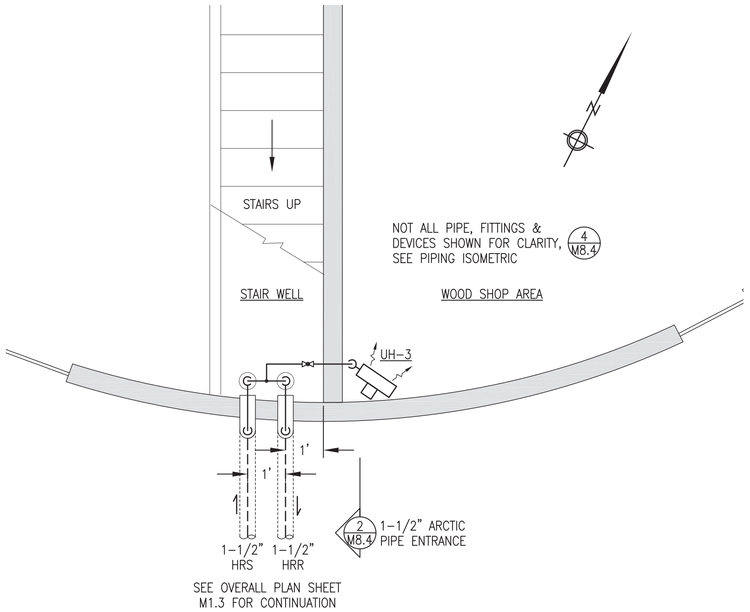
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

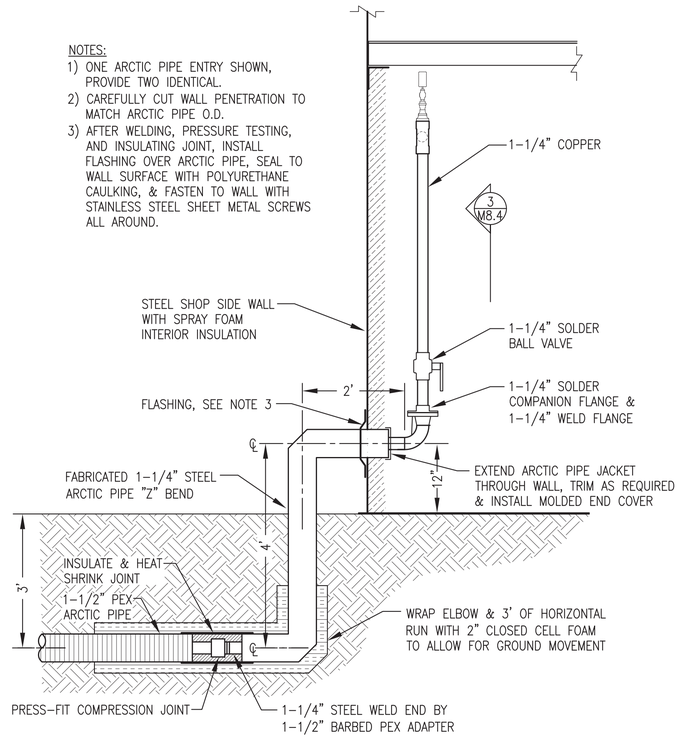
TITLE: HEAT RECOVERY SYSTEM CITY SHOP PLAN, DETAILS & PIPING ISOMETRIC

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

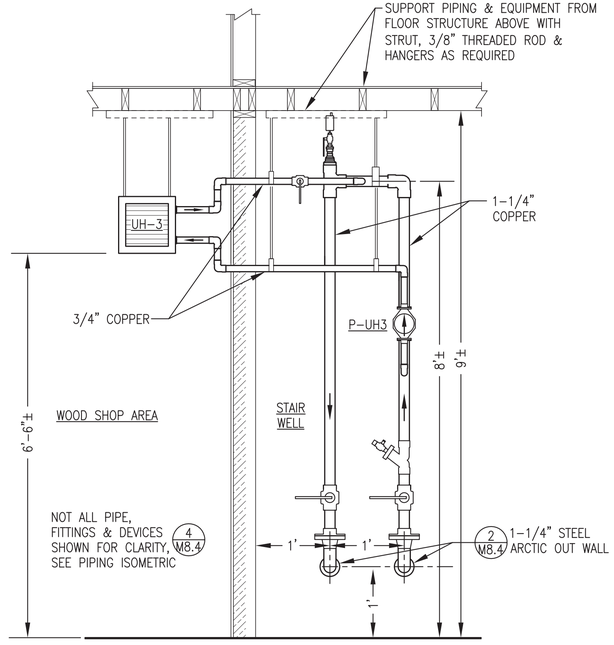
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M8 | SHEET: M8.3 OF 8
PROJECT NUMBER:



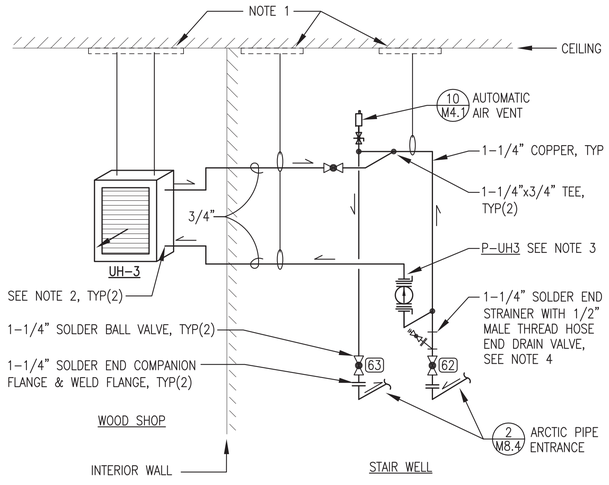
1 M8.4 CITY SHOP HEAT RECOVERY PLAN
1/2"=1'-0"



2 M8.4 VILLAGE SHOP ARCTIC PIPE ENTRANCE SECTION
NO SCALE



3 M8.4 VILLAGE SHOP ARCTIC PIPE ENTRANCE ELEVATION
NO SCALE



NOTES:

1) FASTEN STRUT TO MINIMUM 3 EACH OFFICE/STORAGE AREA ROOF JOISTS WITH 3/8"x4" LAG BOLTS AND SUPPORT UNIT HEATER WITH 3/8" ALLTHREAD.
2) CONNECT TO UNIT HEATER WITH 3/4" MPTxFTG ADAPTER.
3) PUMP FURNISHED WITH 3/4" SOLDER SHUT OFF FLANGES. SET TO SPEED 1.
4) TO CLEAN STRAINER VALVE OFF, DRAIN DOWN, REMOVE STRAINER SCREEN, AND USE SHOP VAC TO CLEAN OUT DEBRIS DOWN TO BALL VALVE.

4 M8.4 VILLAGE SHOP HEAT RECOVERY PIPING ISOMETRIC
NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

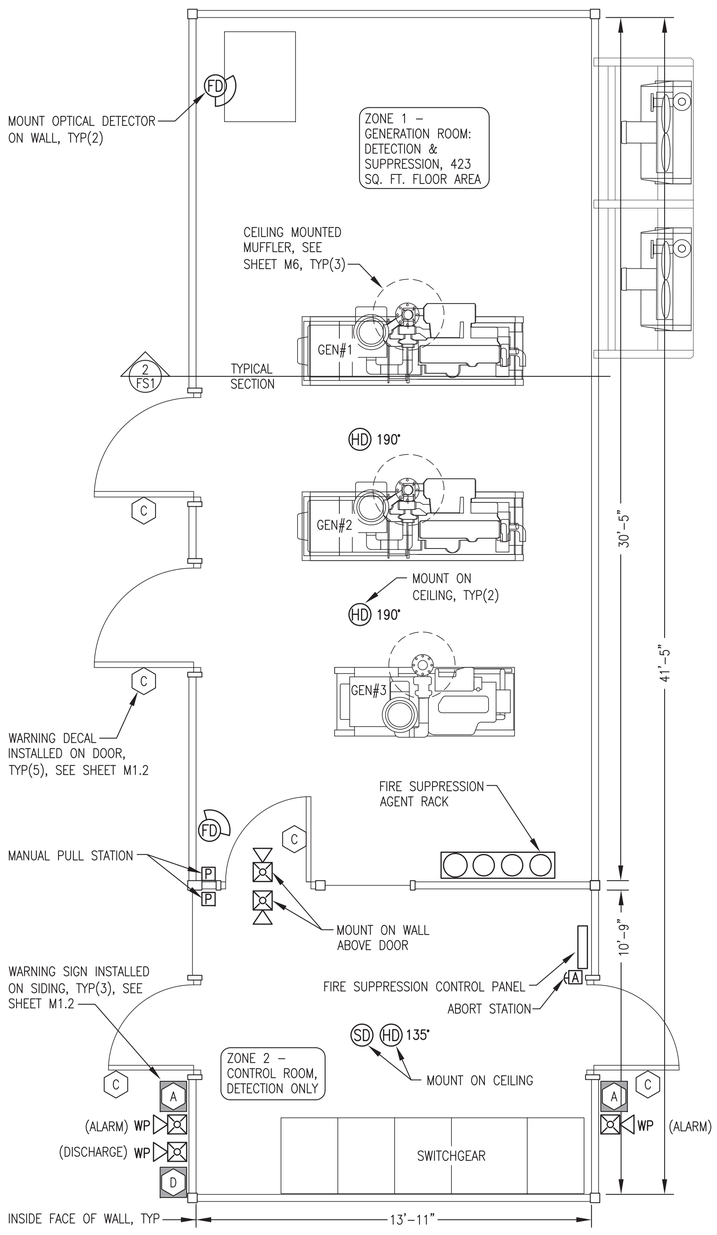
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

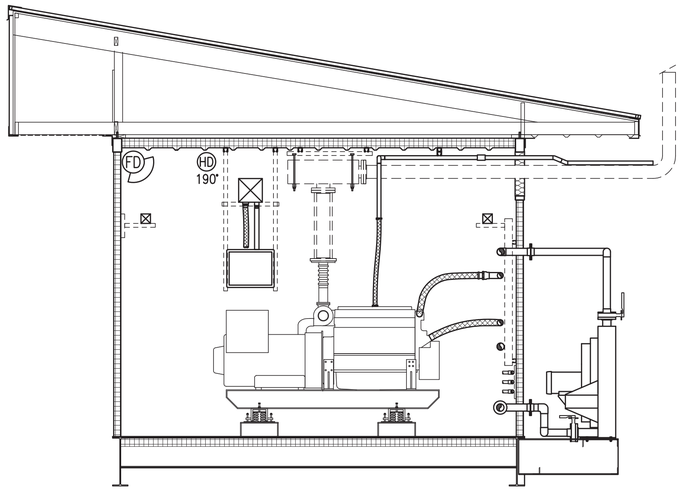
TITLE: HEAT RECOVERY SYSTEM VILLAGE SHOP PLAN, DETAILS & PIPING ISOMETRIC

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG | DATE: 4/1/19
FILE NAME: PTH PPU M8 | SHEET: M8.4 OF 8
PROJECT NUMBER:



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



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

FIRE SUPPRESSION GENERAL NOTES:

1) INTERIOR FINISH OF ALL WALLS, FLOOR, AND CEILING 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.

FIRE SUPPRESSION SHOP/ON–SITE NOTES:

1) UPON COMPLETION OF MODULE SHOP TESTING: DISCONNECT BATTERIES. DRAIN ALL WATER OUT OF THE SYSTEM AND BLOW OUT WITH AIR TO PREVENT FREEZE DAMAGE. LEAVE ONE FULLY CHARGED NITROGEN CYLINDER INSTALLED IN THE RACK PLUS ONE LOOSE SHIP FULLY CHARGED SPARE NITROGEN CYLINDER.

2) DURING ON–SITE CONSTRUCTION: FILL BOTTLES WITH CLEAN POTABLE WATER IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS. FULLY TEST AND CERTIFY SYSTEM. TRAIN AEA STAFF AND LOCAL OPERATORS.

FIRE SUPPRESSION SYMBOL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
P	MANUAL PULL STATION	HD 135°	NORMAL TEMP. (135°F) DETECTOR
A	ABORT 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

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

ALL WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY EXCEPT AS NOTED. FINAL TESTING AND COMMISSIONING IS INCLUDED IN THE ON SITE CONTRACT AS NOTED IN THE SHOP/ON-SITE NOTES AND THE SPECIFICATIONS.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT 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: 1–14–19
FILE NAME: PTH PPU 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	LINE VOLTAGE THERMOSTAT	HEATING/COOLING THERMOSTAT, 16 FLA @ 120V, SPDT, 50F TO 80F RANGE.	DAYTON 1UHH2
◇4	AREA 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	WALL MOUNT, WHITE 20 GA STEEL ENCLOSURE, 277/120VAC, 8.4A INPUT, SEALED LEAD-ACID BATTERY, DUAL 5.3W 6VDC LED LAMPS	HUBBEL DUAL-LITE CCU2
◇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 OR EQUAL
◇7	NOT USED	NOT USED	NOT USED
◇8	MODULE INTERIOR LIGHTING	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, 1-1/2HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
◇12	NOT USED	NOT USED	NOT USED
◇13	STATION SERVICE TRANSFORMER	DRY TYPE, ENERGY STAR, ENCLOSURE TYPE 3R WITH INTEGRAL WALL MOUNT BRACKETS, 9 kVA, HV 480 DELTA, LV 208Y/120	HAMMOND HPS C3F009KBS WITH NQT6 CASE
◇14	STATION SERVICE PANELBOARD	COPPER BUS, 3 PHASE, 4 WIRE, 120/208V, 100A, 30 CIRCUITS, BOLT-IN BREAKERS, SURFACE MOUNT, NEMA 1	SIEMENS OR SQUARE D
◇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 CHARLES 93-INCHGR20-A
◇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, 75VA OUTPUT, PLATE MOUNT, INSTALL ON 4"x4" PRESSED STEEL BOX	HONEYWELL AT175A1008
◇22	ENCLOSED POWER RELAY	20A, 1HP RATED CONTACT, SPDT, 24VAC COIL, NEMA 1 ENCLOSURE, RED LED PILOT LIGHT	FUNCTIONAL DEVICES RIB2401B

ELECTRICAL CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERATOR LEADS & FEEDERS (480V) & ENGINE STARTER CABLES (24VDC)	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 XHHW INSULATION, 600V AND 75C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL 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.
CANBUS (DEVICENET) COMMUNICATION CONDUCTORS	STRANDED TINNED COPPER CONDUCTORS, 600V PVC/NYLON & FRPP INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH TINNED COPPER BRAID SHIELD & PVC OUTER JACKET	TWO PAIR #16 & #18 BELDEN 7896A	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 CAT5e CABLES IN SEPARATE DEDICATED RACEWAY.

COLOR CODING - UNLESS SPECIFICALLY INDICATED OTHERWISE CONDUCTORS SHALL BE COLOR CODED 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 EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY. DO NOT USE THE CONDUIT AS AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE CLASS B CONCENTRIC STRANDED, SOFT-DRAWN COPPER OF THE SIZES INDICATED ON THE DRAWINGS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

ELECTRICAL 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
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 COLIBRI CL6D
LSP	FUEL/OIL TANK LEVEL SENSOR PROBE	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: TSP-LL2-53-I FLOAT: INTSP-IDF2 2" FOR DIESEL INSTALLATION KIT: TSP-K2A
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

BUILDING PLANS 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

ALL EQUIPMENT ON SCHEDULES THIS SHEET WERE FURNISHED AS PART OF THE PRIOR MODULE FABRICATION CONTRACT AND ARE SHOWN HERE FOR REFERENCE ONLY.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: ELECTRICAL 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: 1/14/19
FILE NAME: PTH PPU E1-E2 | SHEET: E1.1 OF 7
PROJECT NUMBER:

1 E1.2 OVERALL PROJECT AREA PLAN
1"=1,500'

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 CONTRACTOR SHALL REFERENCE OTHER PROJECT DRAWINGS AND SHALL ASK FOR LOCATES TO IDENTIFY ALL UNDERGROUND UTILITIES, WHETHER EXISTING OR FUTURE, AND SHALL NOTIFY THE OWNER OF ANY CONFLICTS. DAMAGE TO UNDERGROUND UTILITIES SHALL BE REPAIRED TO THE SATISFACTION OF THE OWNER WITH NO INCREASE IN BID PRICE.

DISTRIBUTION METER SCHEDULE

SYMBOL	SERVICE/FUNCTION	METER SPECIFICATION	METER BASE
(M1)	120/240V, 3–WIRE, SINGLE PHASE, 100A, DIRECT READ	FORM 2S, 120/240 VOLT, CLASS 100, SINGLE–PHASE, 3–WIRE, SELF–CONTAINED METER. PROGRAMMABLE METER RATED 600 VOLTS. PROGRAM METER FOR VOLTAGE AND CONNECTION.	SURFACE MOUNT UNDERGROUND RINGLESS METER BASE, TYPE 3R, 120/240V SINGLE PHASE, 3–WIRE, 100 AMP, 4–JAW WITH 100 AMP 2–POLE MAIN CIRCUIT BREAKER.
(M2)	120/208V, 3–WIRE, SINGLE PHASE, 100A, DIRECT READ	FORM 12S, 120/208 VOLT, CLASS 100, SINGLE–PHASE, 3–WIRE, SELF–CONTAINED METER. PROGRAMMABLE METER RATED 600 VOLTS. PROGRAM METER FOR VOLTAGE AND CONNECTION.	SURFACE MOUNT UNDERGROUND RINGLESS METER BASE, TYPE 3R, 120/208V SINGLE PHASE, 3–WIRE, 100 AMP, 5–JAW WITH 60 AMP 2–POLE MAIN CIRCUIT BREAKER.
(M3)	120/208V, 4–WIRE, 3–PHASE, 100A, DIRECT READ	FORM 16S, CLASS 100, 120/208 VOLT, THREE–PHASE, 4–WIRE, SELF–CONTAINED METER. PROGRAMMABLE METER RATED 600 VOLTS. PROGRAM METER FOR VOLTAGE AND CONNECTION.	SURFACE MOUNT OVERHEAD RINGLESS METER BASE, TYPE 3R, 200 AMP, 208/120V, 3 PHASE, 4 WIRE, 7 JAW WITH 100A 3–POLE BREAKER

DISTRIBUTION TRANSFORMER SCHEDULE

TRANSFORMER NUMBER	CAPACITY	PH	HIGH VOLTAGE	LOW VOLTAGE	NOTES
PM1–COMMUNITY FEEDER	225kVA	3ø	12.47 GRND Y/7.2kV	480/277V	WITH FIBERGLASS GROUND SLEEVE
PM2–VILLAGE SHOP	45kVA	3ø	12.47 GRND Y/7.2kV	208/120V	WITH FIBERGLASS GROUND SLEEVE
PM3–OLD POWER PLANT	15kVA	1ø	7.2kV	240/120V	WITH FIBERGLASS GROUND SLEEVE

LEGEND

- (#) LOCATION NUMBER (SEE STAKING SHEET FOR REQUIRED EQUIPMENT)
- ## PM# PADMOUNT TRANSFORMER, ID AND KVA INDICATED
- (SC) THREE–PHASE PRIMARY SECTIONALIZING CABINET
- THREE–PHASE PRIMARY BURIED CONDUCTOR
- SECONDARY SERVICE POWER PEDESTAL

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

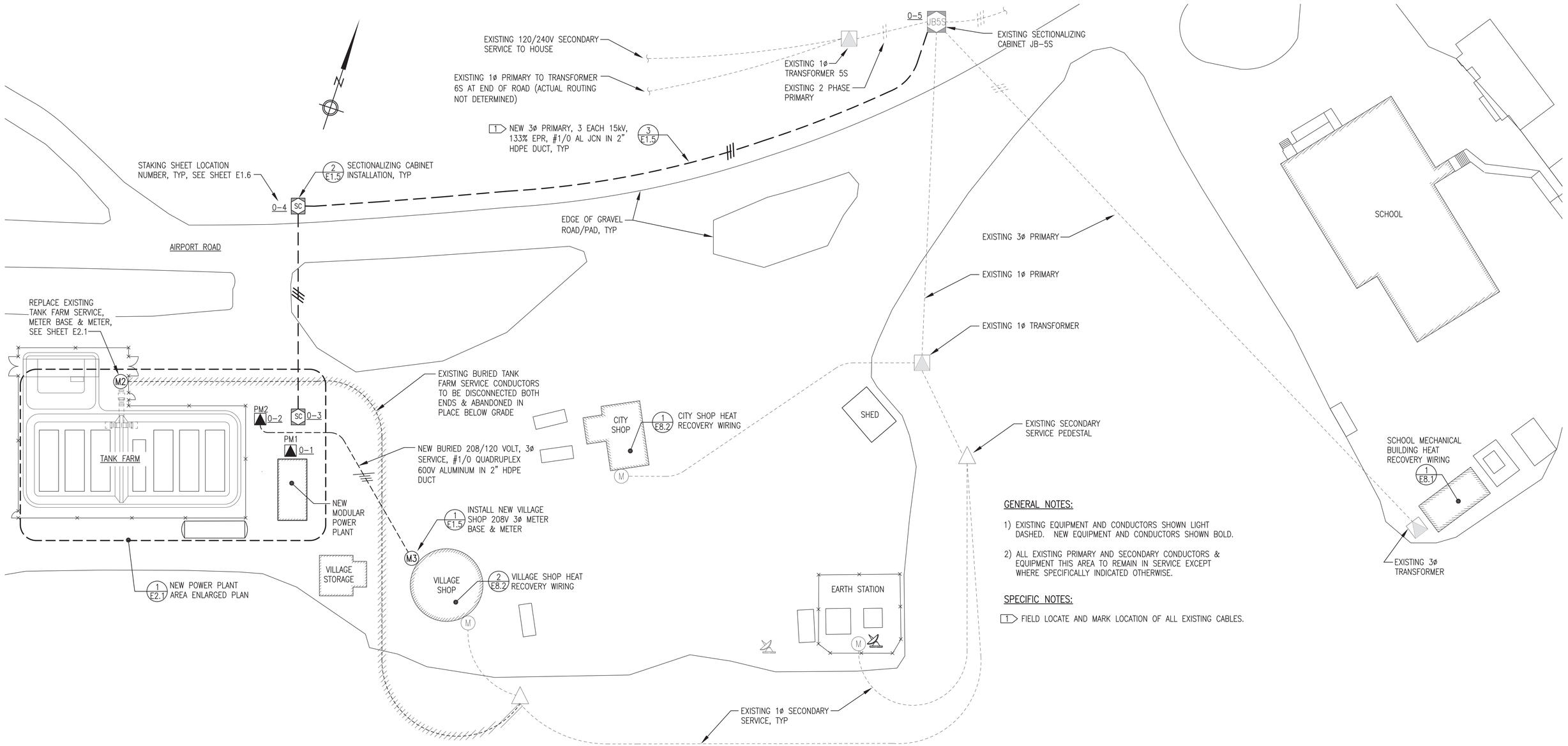
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: OVERALL PROJECT AREA PLAN, DISTRIBUTION SCHEDULES, & LEGEND

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 4/1/19
FILE NAME: PTH PPU E1–E2 | SHEET: E1.2 OF 8
PROJECT NUMBER:



1 E1.3 NEW POWER PLANT AREA DISTRIBUTION & ELECTRICAL WORK PLAN

1"=30'

GENERAL NOTES:

1) EXISTING EQUIPMENT AND CONDUCTORS SHOWN LIGHT DASHED. NEW EQUIPMENT AND CONDUCTORS SHOWN BOLD.

2) ALL EXISTING PRIMARY AND SECONDARY CONDUCTORS & EQUIPMENT THIS AREA TO REMAIN IN SERVICE EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.

SPECIFIC NOTES:

1 FIELD LOCATE AND MARK LOCATION OF ALL EXISTING CABLES.

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

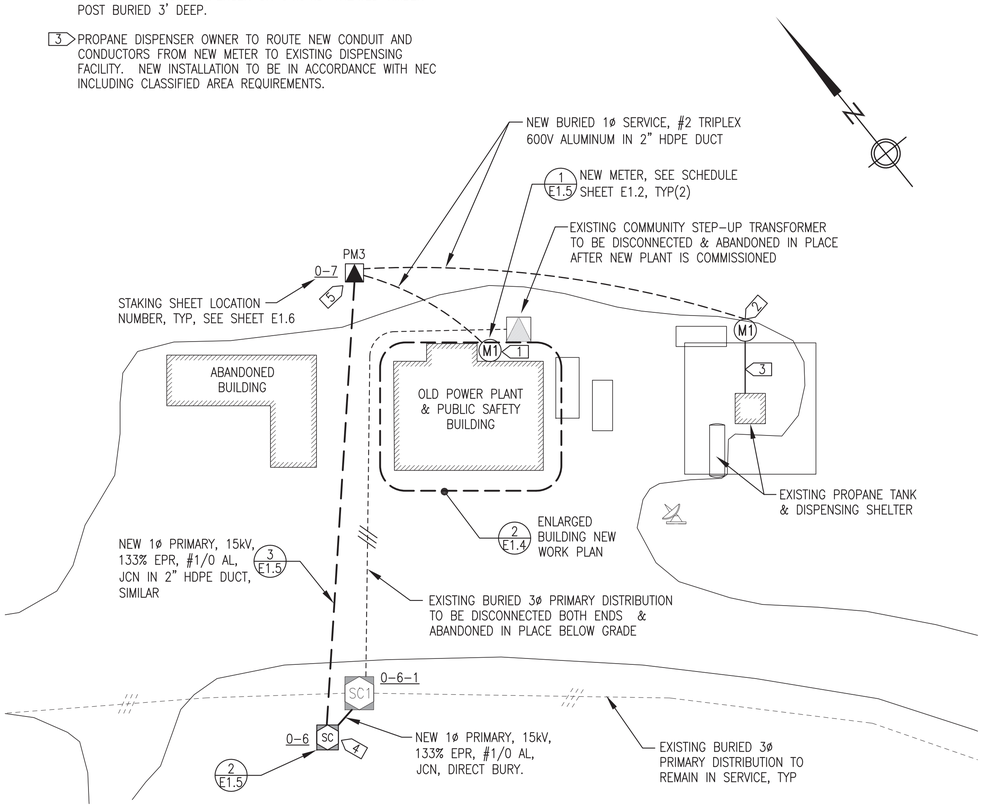
TITLE: NEW POWER PLANT AREA DISTRIBUTION PLAN

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

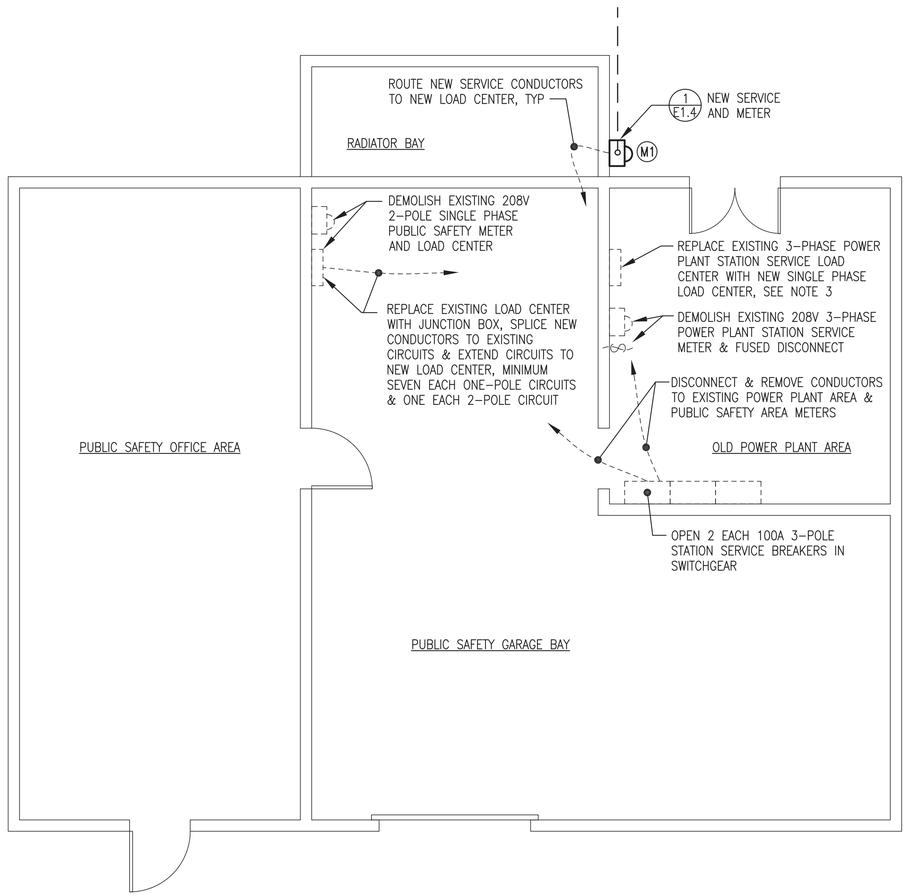
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 4/1/19
FILE NAME: PTH PPU E1–E2	SHEET: E1.3 OF 8
PROJECT NUMBER:	

SPECIFIC NOTES:

1. NEW METER, METER BASE, AND SERVICE ENTRANCE DISCONNECT TO PROVIDE 1ø SERVICE TO EXISTING BUILDING AFTER OLD POWER PLANT IS DECOMMISSIONED.
2. NEW METER, METER BASE, AND SERVICE ENTRANCE DISCONNECT TO PROVIDE 1ø SERVICE TO EXISTING PROPANE DISPENSER AFTER OLD POWER PLANT IS DECOMMISSIONED. INSTALL MINIMUM 20' FROM DISPENSER ON 6"x6"x8' TREATED TIMBER POST BURIED 3' DEEP.
3. PROPANE DISPENSER OWNER TO ROUTE NEW CONDUIT AND CONDUCTORS FROM NEW METER TO EXISTING DISPENSING FACILITY. NEW INSTALLATION TO BE IN ACCORDANCE WITH NEC INCLUDING CLASSIFIED AREA REQUIREMENTS.
4. INSTALL NEW SECTIONALIZING CABINET NEAR THE EXISTING SC1. COORDINATE WITH EXISTING CABLES AND MAINTAIN CLEARANCE BETWEEN EQUIPMENT FOR ACCESS AND MAINTENANCE.
5. REMOVE TUNDRA AND ORGANICS IN AREA WHERE PM3 WILL BE INSTALLED. INSTALL 10 YARDS OF GRAVEL TO CREATE A PAD UP TO THE ROAD GRADE.



1 E1.4 OLD POWER PLANT AREA DISTRIBUTION PLAN
1"=30'



2 E1.4 OLD POWER PLANT & PUBLIC SAFETY BUILDING INTERIOR WORK CONCEPTUAL PLAN
1"=5'

NOTES:

1) THIS BUILDING IS CURRENTLY POWERED DIRECTLY FROM THE 208V 3-PHASE DIESEL GENERATOR SWITCHGEAR BUS. NEW DISTRIBUTION AND METER ARE BEING PROVIDED AS PART OF THIS PROJECT TO PROVIDE A NEW 120/240V SINGLE-PHASE POWER SOURCE TO SERVE THE ENTIRE BUILDING AFTER THE OLD POWER PLANT IS DE-ENERGIZED.
2) ALL INTERIOR WORK ON THIS PLAN (SHOWN WITH LIGHT DASHED LINES) IS CONCEPTUAL ONLY. THE FACILITY OWNER IS TO PROVIDE FINAL DESIGN AND PERFORM ALL ELECTRICAL WORK INSIDE THE FACILITY.
3) DISCONNECT AND DEMOLISH ALL EXISTING 3-PHASE CIRCUITS ASSOCIATED WITH POWER GENERATION EQUIPMENT. RECONNECT EXISTING SINGLE-POLE AND TWO-POLE CIRCUITS REQUIRED FOR BUILDING EQUIPMENT, LIGHTING, AND RECEPTACLES.
4) THIS BUILDING IS CURRENTLY HEATED FROM DIESEL GENERATOR JACKET WATER. A HEAT SOURCE, SUCH AS OIL FIRED SPACE HEATERS OR BOILER WILL BE REQUIRED TO MAINTAIN SPACE HEAT. THE FACILITY OWNER IS TO PROVIDE DESIGN AND PERFORM ALL WORK TO INSTALL PERMANENT HEAT.

PROJECT SCOPE NOTES:

1) THE SCOPE OF THIS PROJECT INCLUDES ALL DISTRIBUTION WORK SHOWN THIS SHEET, INSTALLATION OF TWO NEW METERS AS SHOWN ON THIS SHEET, DE-ENERGIZING OLD POWER PLANT AND STEP UP TRANSFORMER AFTER THE NEW PLANT IS COMMISSIONED.
2) ALL WORK INSIDE THE OLD POWER PLANT AND PUBLIC SAFETY BUILDING IS TO BE PERFORMED BY THE FACILITY OWNER AND IS NOT INCLUDED IN THE SCOPE OF THIS PROJECT.
3) ALL WORK BEYOND THE METER AT THE PROPANE FACILITY IS TO BE PERFORMED BY THE FACILITY OWNER AS INDICATED AND IS NOT INCLUDED IN THE SCOPE OF THIS PROJECT.

ALL WORK ON THIS SHEET IS INCLUDED IN THE ON SITE CONTRACT EXCEPT FOR WORK SPECIFICALLY NOTED TO BE PERFORMED BY THE FACILITY OWNER.

ISSUED FOR CONSTRUCTION APRIL 2019

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

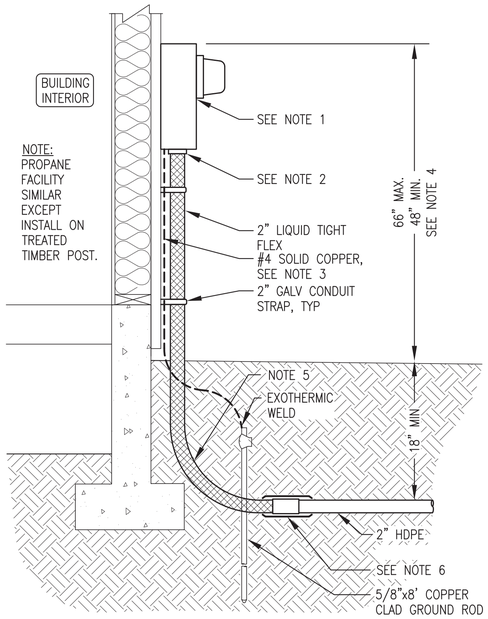
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

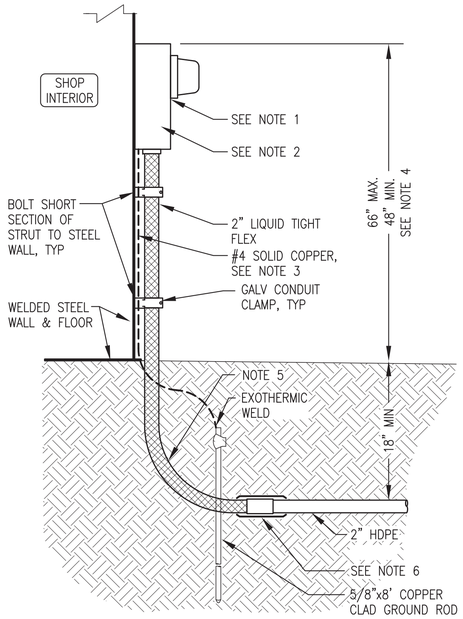
TITLE: OLD POWER PLANT AREA NEW WORK PLANS

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

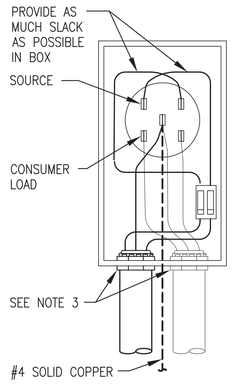
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 4/1/19
FILE NAME: PTH PPU E1-E2	SHEET: E1.4 OF 8
PROJECT NUMBER:	



PUBLIC SAFETY BUILDING METER INSTALLATION



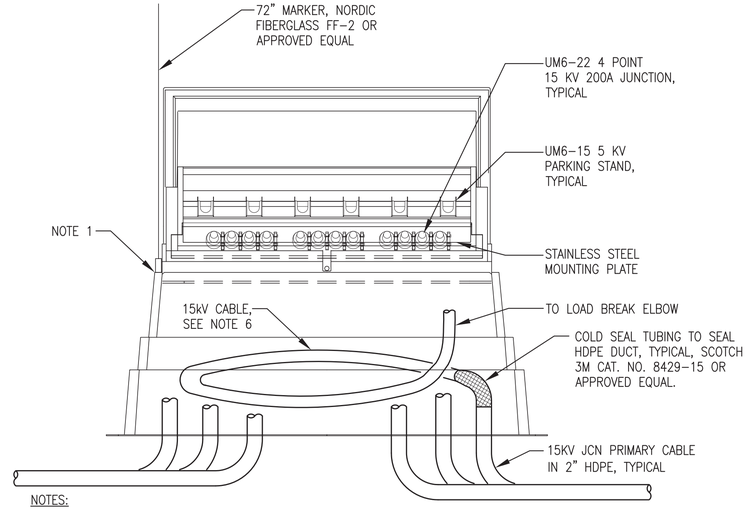
VILLAGE SHOP METER INSTALLATION



METER BASE DETAIL

NOTES:

1. INSTALL METER BASE/DISCONNECT AT LOCATIONS INDICATED ON PLANS. FASTEN TO WOOD FRAMING/POST WITH STAINLESS STEEL WOOD SCREWS. FASTEN TO STEEL SHOP WITH STAINLESS STEEL BOLTS OR SELF THREADING SCREWS.
2. MAKE ENTRY THROUGH BOTTOM WITH WATER TIGHT HUB. TERMINATE LIQUID TIGHT FLEXIBLE CONDUIT WITH A GASKETED STRAIGHT FLEX CONNECTOR.
3. TIE-WRAP GROUND CONDUCTOR TO LT FLEX.
4. MAXIMUM HEIGHT SHOWN. ACTUAL HEIGHT SHALL BE AS REQUIRED FOR THE SPECIFIC INSTALLATION.
5. CURVE LIQUID TIGHT FLEXIBLE CONDUIT UP. KEEP RADIUS BELOW GRADE. DO NOT BEND CONDUIT SMALLER THAN A 12" RADIUS.
6. CONNECT FLEX CONNECTOR TO DUCT WITH SHUR-LOCK II COUPLER OR APPROVED EQUAL. WRAP FITTINGS WITH HDPE HEAT SHRINK TAPE OR TUBE TO FORM CONTINUOUS WATER TIGHT SEAL FROM DUCT TO FLEX.



NOTES:

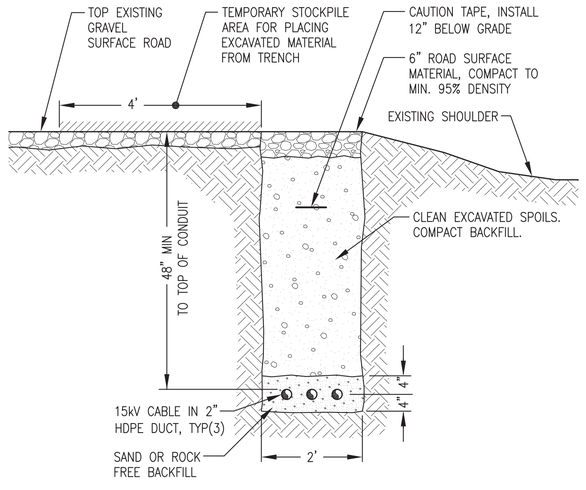
1. PROVIDE 18" EXTENSION, AS SPECIFIED.
2. INSTALL GROUNDING LUG, HUBBELL/FARGO CC-207P OR APPROVED EQUAL ON EACH MOUNTING BOARD AND CONNECT TO GROUND.
3. SEE UM33 FOR ADDITIONAL GROUNDING NOTES.
4. INSTALL DRAIN WIRE ON EACH UM6-10.
5. ENSURE THAT ALL METAL COMPONENTS ARE GROUNDED.
6. PROVIDE SLACK IN THE CABLE TO THE MAXIMUM EXTENT PRACTICABLE. IF POSSIBLE, PROVIDE ONE FULL LOOP AROUND THE BASE OF THE GROUND SLEEVE OR SECTIONALIZING CABINET. SEE SPECIFICATIONS.

1 E1.5 RUS UNIT UM8 METER INSTALLATION

NO SCALE

2 E1.5 SECTIONALIZING CABINET SPECIFIC REQUIREMENTS

NO SCALE



3 E1.5 PRIMARY CABLE INSTALLATION

NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: DISTRIBUTION 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: 4/1/19
FILE NAME: PTH PPU E1-E2	SHEET: E1.5 OF 8
PROJECT NUMBER:	

STAKING SHEET

LOCATION NUMBER	PRIMARY CONDUCTOR No.	PRIMARY CONDUCTOR SIZE/TYPE	PRIMARY CONDUCTOR BACK SPAN	PRIMARY ASSEMBLY No.	PRIMARY ASSEMBLY UNITS	XFMR No.	XFMR 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	REMARKS, COMMENTS, NOTES
0–1 PM1				1	UM1–7NC	1	UG–17–2–225								1	UM48–2	STEP–UP TRANSFORMER. SEE PLAN DRAWINGS FOR CONDUCTORS FROM SWITCHGEAR TO SECONDARY TERMINALS.
				3	UM6–1										3	UM6–10	
				3	UM6–15												
0–2 PM2	3	#1/0 AL JCN, CIC	25	1	UM1–7NC	1	UG–17–2–45	1	#1/0 QPLX				2	SEE PLAN DWG	1	UM48–2	ONE THREE–PHASE SERVICE TO VILLAGE SHOP. ONE SINGLE–PHASE SERVICE TO TANK FARM. SEE NOTE 6.
				3	UM6–1			1	3#6,#6G,1"C						3	UM6–10	
				3	UM6–15										2	UR–2	
0–3 SC	3	#1/0 AL JCN, CIC	15	1	UM33										6	UM6–10	
				9	UM6–1												
				3	UM6–15												
				3	UM6–22												
0–4 SC	3	#1/0 AL JCN, CIC	130	1	UM33										9	UM6–10	
				6	UM6–1												
				3	UM6–15												
				3	UM6–22												
0–5 JB–5S	3	#1/0 AL JCN, CIC	425	3	UM6–1												JB5S IS EXISTING. SEE NOTE 3.
0–6 SC				1	UM33										13	UM6–10	NOTE 4.
				2	UM6–1												
				3	UM6–15												
				3	UM6–22												
0–6–1 SC1	1	#1/0 AL JCN, DIRECT BURY	10	1	UM6–1										3	UM6–10	SC1 IS EXISTING. SEE NOTE 5.
0–7 PM3	1	#1/0 AL JCN, CIC	170	1	UM1–7NC	1	UG–7–15	2	#2 TPLX				2	SEE PLAN DWG	1	UM48–1	ONE SINGLE–PHASE SERVICE TO OLD POWER PLANT. ONE SINGLE–PHASE SERVICE TO PROPANE DISPENSER. SEE NOTE 6.
				3	UM6–1										2	UM6–10	
				1	UM6–15										2	UR–2	

STAKING SHEET NOTES

1. DIMENSIONS SHOWN IN STAKING SHEET ARE APPROXIMATE. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS.
2. SEE PLAN DRAWINGS FOR ADDITIONAL REQUIREMENTS.
3. INSTALL NEW CONDUCTORS TO SECTIONALIZING CABINET AND INSTALL EQUIPMENT SHOWN OR SPECIFIED. CABLE SHALL BE INSTALLED AS INDICATED FOR NEW SECTIONALIZING CABINETS.
4. INSTALL NEW SECTIONALIZING CABINET NEAR THE EXISTING CABINET. MAINTAIN CLEARANCE FOR MAINTENANCE AND ACCESS. PROVIDE TEMPORARY SERVICE FOR TRANSFORMER PM3 FROM THE EXISTING SYSTEM.
5. CAREFULLY INSTALL NEW PRIMARY CONDUCTOR TO EXISTING SECTIONALIZING CABINET. AFTER OLD POWER PLANT IS DE–ENERGIZED, REMOVE THE EXISTING STEP–UP TRANSFORMER FEED FROM THE JUNCTION AND INSTALL INSULATED CAPS OVER JUNCTION POINTS. CUT THE EXISTING DE–ENERGIZED CABLES AT THE BASE OF THE CABINET.
6. BURY SECONDARY CABLE 24" DEEP.
7. ALL HARDWARE AND FASTENERS SHALL BE 316 STAINLESS STEEL.
8. RUS UNIT UM33, SECTIONALIZING CABINET, IS NOT COMPLETE AS SHOWN ON THE RUS CONSTRUCTION UNIT. REFER TO DETAILS ON THE DRAWINGS AND SPECIFICATIONS TO DETERMINE COMPLETE REQUIREMENTS FOR SECTIONALIZING CABINETS.

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

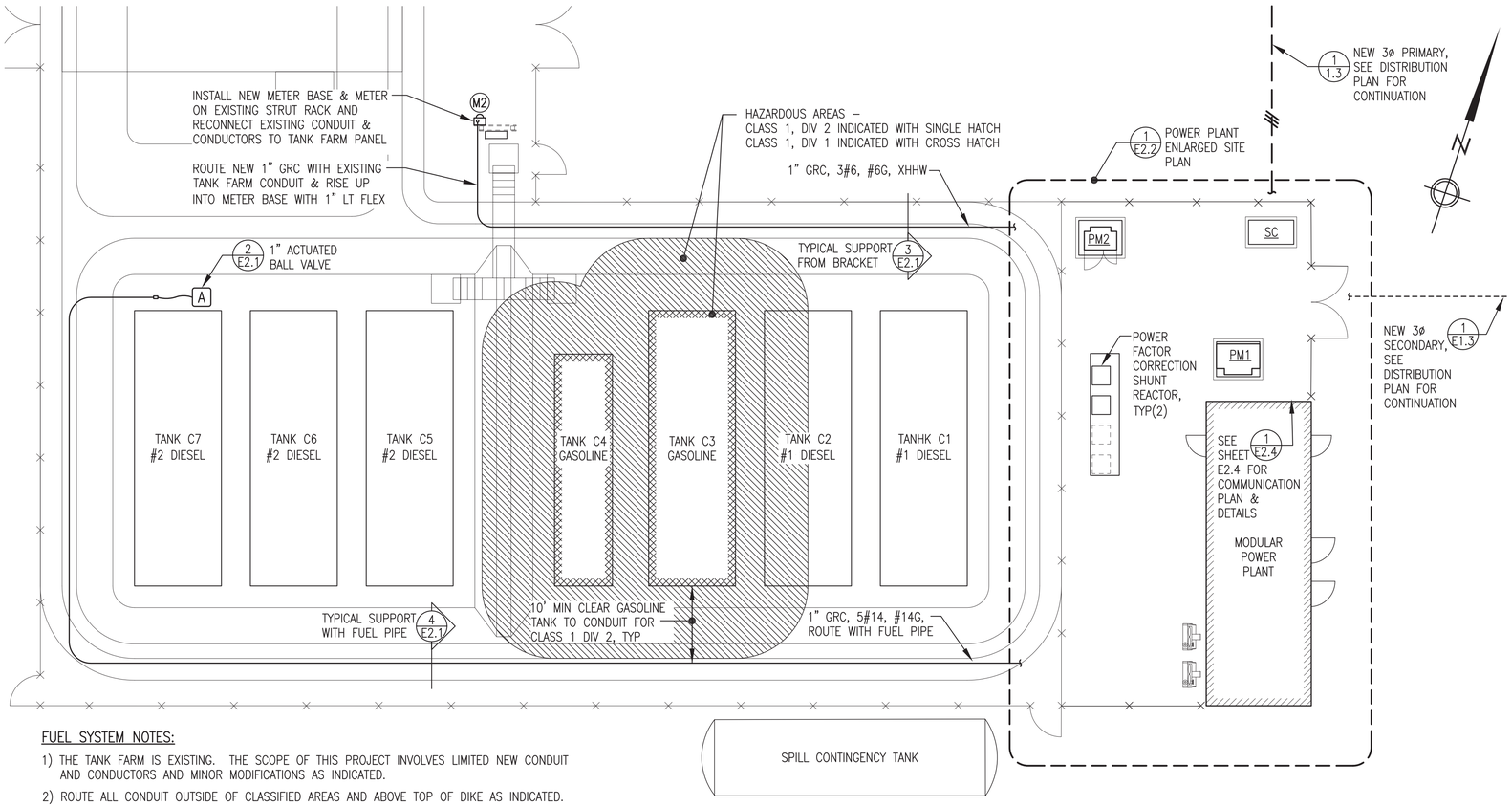
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: DISTRIBUTION STAKING SHEET

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

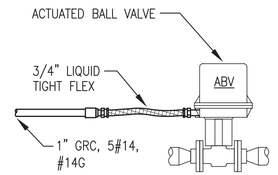
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 4/1/19
FILE NAME: PTH PPU E1–E2 | SHEET: E1.6 OF 8
PROJECT NUMBER:



FUEL SYSTEM NOTES:

1) THE TANK FARM IS EXISTING. THE SCOPE OF THIS PROJECT INVOLVES LIMITED NEW CONDUIT AND CONDUCTORS AND MINOR MODIFICATIONS AS INDICATED.
2) ROUTE ALL CONDUIT OUTSIDE OF CLASSIFIED AREAS AND ABOVE TOP OF DIKE AS INDICATED.

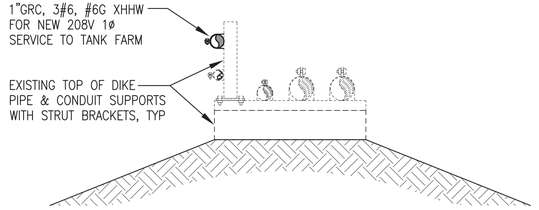
1 E2.1 NEW POWER PLANT AREA SITE PLAN
1"=10'



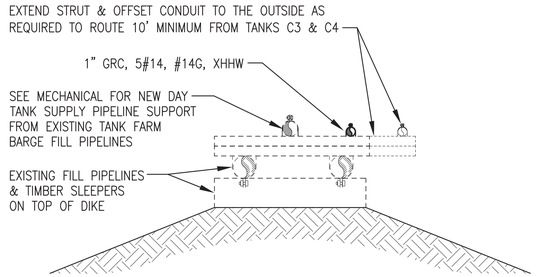
NOTES:

1) ACTUATED BALL VALVE CONTROLLED FROM FUEL SYSTEM CONTROL PANEL IN POWER PLANT, SEE LOGIC DIAGRAM SHEET E7.1 FOR CONDUCTOR TERMINATIONS.
2) ACTUATED BALL VALVE INSTALLED ABOVE TOP OF DIKE. SEE SHEET M1.5 FOR INSTALLATION AND SPECIFICATIONS.
3) SUPPORT GRC FROM 2" SCH 80 STEEL FUEL PIPE WITH STRUT AND CLAMPS.

2 E2.1 ACTUATOR VALVE CONNECTION
NO SCALE



3 E2.1 TYPICAL SUPPORT ON DIKE FROM BRACKET
NO SCALE



4 E2.1 TYPICAL SUPPORT ON DIKE FROM FILL PIPELINES
NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

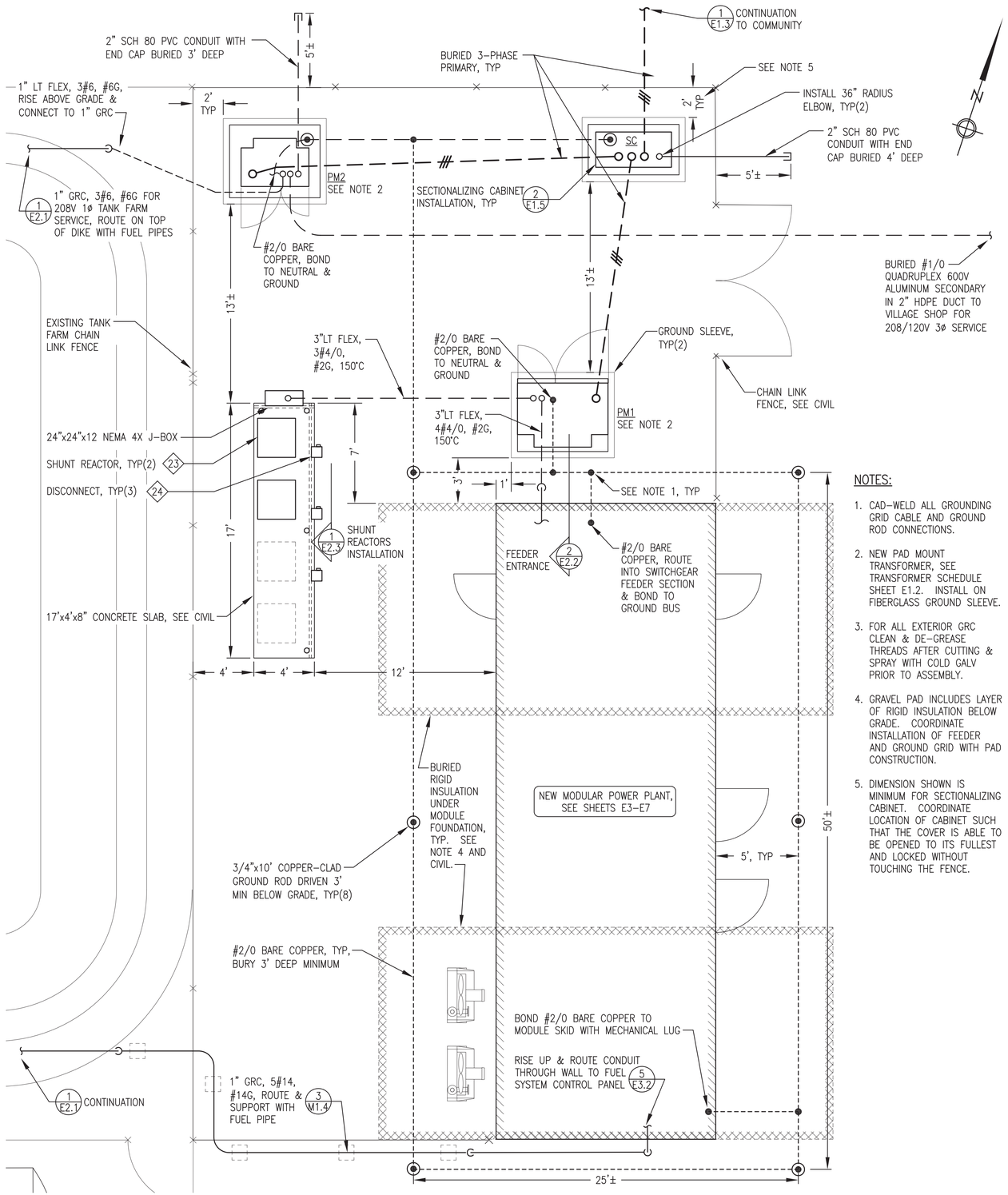
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: NEW POWER PLANT AREA SITE 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: 4/1/19
FILE NAME: PTH PPU E1-E2 | SHEET: E2.1 OF 8
PROJECT NUMBER:



1 E2.2 NEW POWER PLANT ENLARGED SITE PLAN
1"=4'

NOTES:

1. CAD-WELD ALL GROUNDING GRID CABLE AND GROUND ROD CONNECTIONS.
2. NEW PAD MOUNT TRANSFORMER, SEE TRANSFORMER SCHEDULE SHEET E1.2. INSTALL ON FIBERGLASS GROUND SLEEVE.
3. FOR ALL EXTERIOR GRC CLEAN & DE-GREASE THREADS AFTER CUTTING & SPRAY WITH COLD GALV PRIOR TO ASSEMBLY.
4. GRAVEL PAD INCLUDES LAYER OF RIGID INSULATION BELOW GRADE. COORDINATE INSTALLATION OF FEEDER AND GROUND GRID WITH PAD CONSTRUCTION.
5. DIMENSION SHOWN IS MINIMUM FOR SECTIONALIZING CABINET. COORDINATE LOCATION OF CABINET SUCH THAT THE COVER IS ABLE TO BE OPENED TO ITS FULLEST AND LOCKED WITHOUT TOUCHING THE FENCE.

ELECTRICAL CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
480V COMMUNITY FEEDER	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 XHHW INSULATION, 600V AND 75C RATED.		

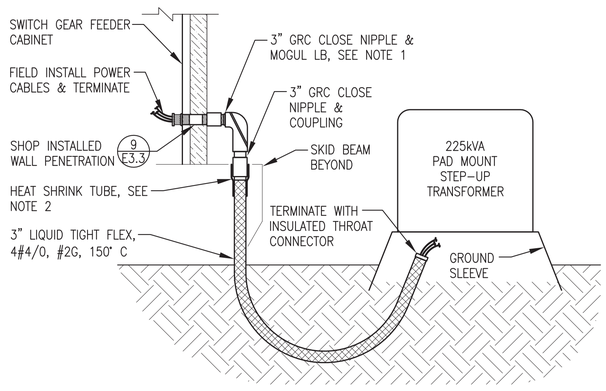
ON-SITE ELECTRICAL EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
23	POWER FACTOR CORRECTION INDUCTIVE SHUNT REACTOR	IRON CORE, 50 kVAR, 480 VAC, 3 PHASE, WYE CONNECTED, 10 kV BIL, 13.9 MILLI H INSULATION CLASS, 220C TEMPERATURE RISE, NEMA 3R TYPE 316 STAINLESS STEEL ENCLOSURE. PAINT MUNSELL GREEN.	REX POWER MAGNETICS CAT# 75C13900E6-3/E3RX
24	REACTOR FUSED DISCONNECT	FUSED LOCKABLE SAFETY SWITCH, NEMA 4X STAINLESS STEEL ENCLOSURE, 3PST, 600V, 100A, PROVIDE WITH 80A TYPE R FUSES	SQUARE D H363DS. OR EQUAL

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS: 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.

NOTES:

1) CONDUIT WALL PENETRATION INSTALLED AS PART OF MODULE SHOP FABRICATION. REMOVE PLUG AND INSTALL EXTERIOR CONDUIT AS SHOWN.
2) INSTALL HEAT SHRINK TUBE FROM GRC COUPLING ON TO FLEX, RAYCHEM WCSM 130/36-1500/S OR APPROVED EQUAL.



2 E2.2 MAIN FEEDER MODULE ENTRANCE
NO SCALE

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

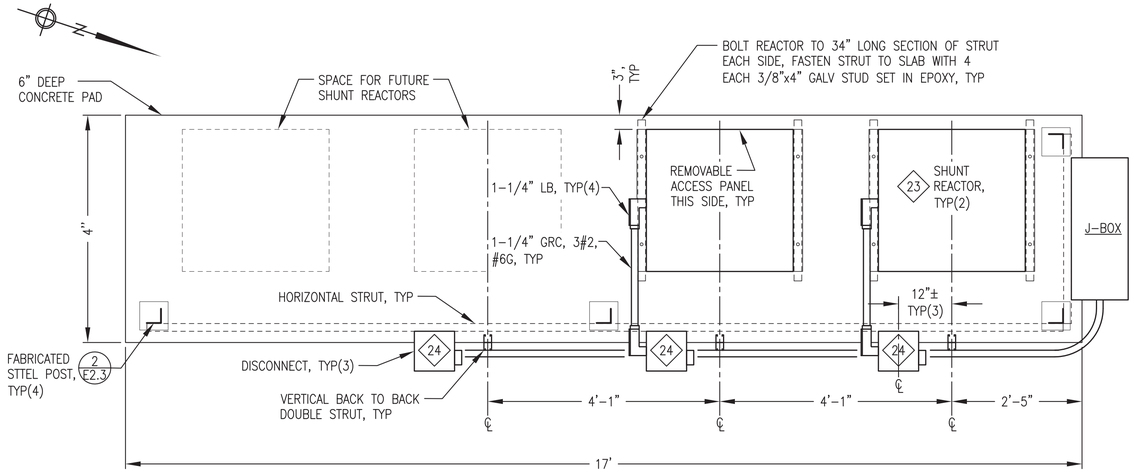
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

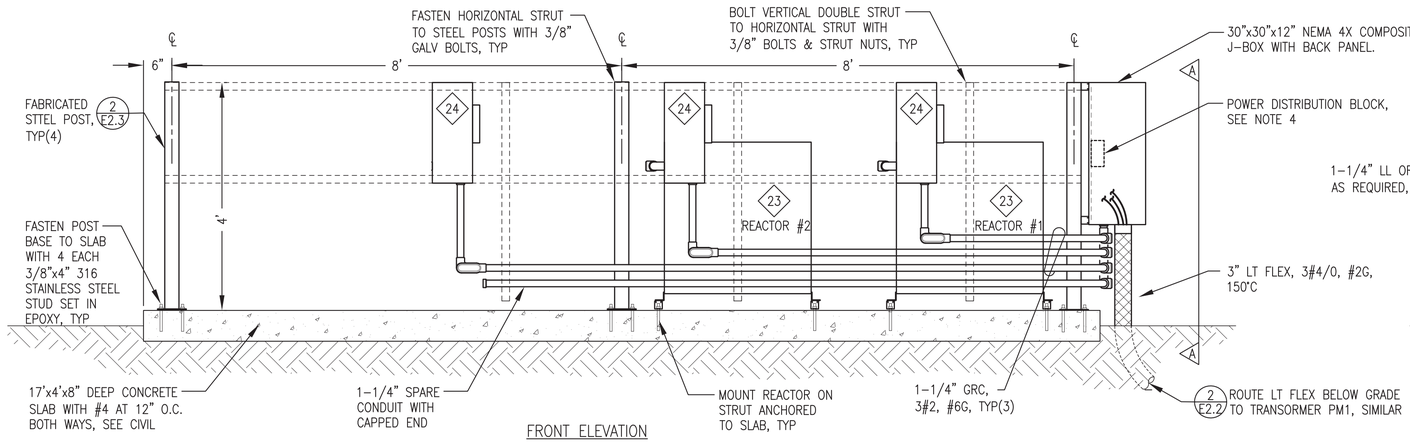
TITLE: NEW POWER PLANT ENLARGED SITE PLAN, DETAILS, & SCHEDULES

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

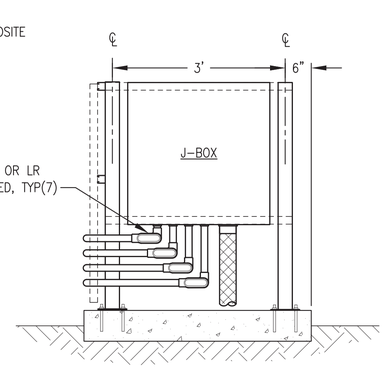
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 4/1/19
FILE NAME: PTH PPU E1-E2 | SHEET: E2.2 OF 8
PROJECT NUMBER:



PLAN VIEW



FRONT ELEVATION



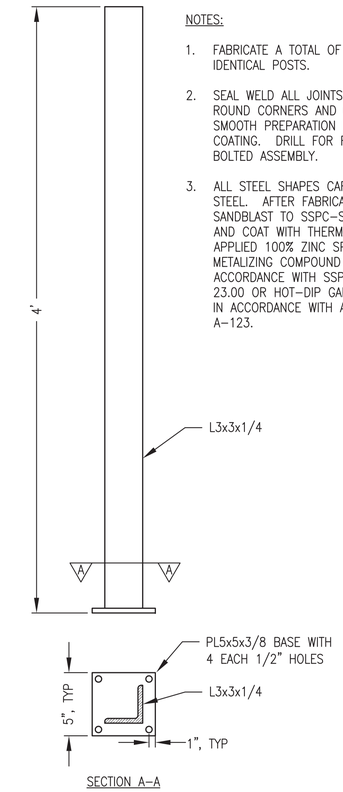
END ELEVATION A-A

NOTES:

1) ALL STRUT, CLAMPS, HARDWARE, AND FASTENERS HOT DIP GALVANIZED.
2) ALL CONDUCTORS TYPE XHHW UNLESS SPECIFICALLY NOTED OTHERWISE.
3) MAKE ALL CONDUIT ENTRIES THROUGH BOTTOM OR SIDE AS SHOWN USING WATER TIGHT HUBS.
4) INSTALL 4 EACH POWER DISTRIBUTION BLOCKS FOR #4/0 RUN AND 6 EACH #2 TAPS, GREAVES POWER DISTRIBUTION SIDE-STACKER SPD-P1-K6 OR APPROVED EQUAL. MOUNT ON BACK PAN. TERMINATE 150°C CABLE WITH SHOO-PIN OR APPROVED EQUAL.

NOTES:

1. FABRICATE A TOTAL OF FOUR IDENTICAL POSTS.
2. SEAL WELD ALL JOINTS. ROUND CORNERS AND GRIND SMOOTH PREPARATION FOR COATING. DRILL FOR FIELD BOLTED ASSEMBLY.
3. ALL STEEL SHAPES CARBON STEEL. AFTER FABRICATION SANDBLAST TO SSPC-SP-10 AND COAT WITH THERMALLY APPLIED 100% ZINC SPRAY METALIZING COMPOUND IN ACCORDANCE WITH SSPC-CS 23.00 OR HOT-DIP GALVANIZE IN ACCORDANCE WITH ASTM A-123.



SECTION A-A

1/E2.3 SHUNT REACTOR INSTALLATION DETAIL
1"=1-0"

2/E2.3 STEEL POST FABRICATION
1"=1-0"

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

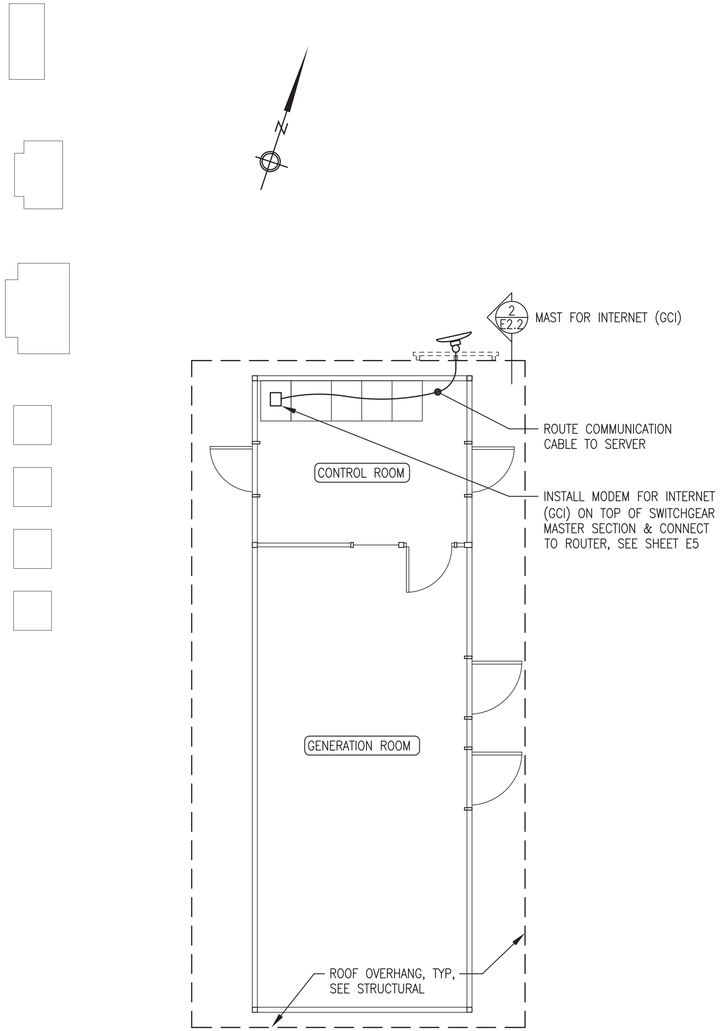
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

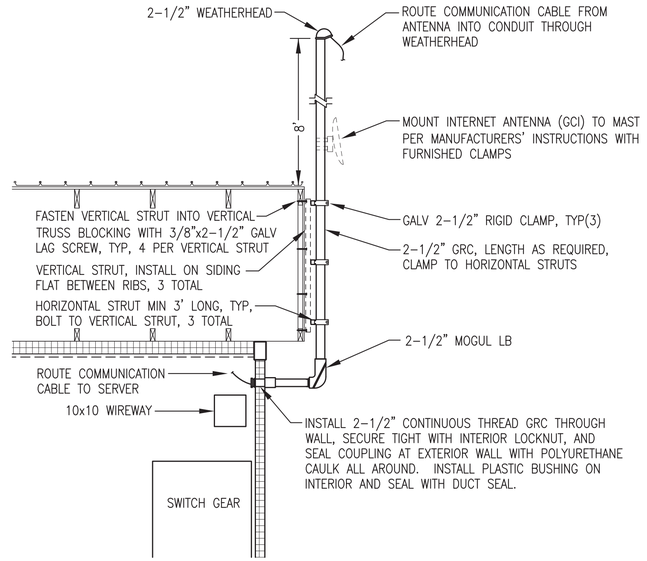
TITLE: SHUNT REACTOR INSTALLATION DETAILS

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 4/1/19
FILE NAME: PTH PPU E1-E2	SHEET: E2.3 OF 8
PROJECT NUMBER:	



1 E2.4 POWER PLANT SITE – COMMUNICATION PLAN
1"=5'



2 E2.4 COMMUNICATIONS ANTENNA MAST DETAILS
1"=2'

INTERNET SERVICE GENERAL NOTES:

1) FURNISH AND INSTALL A COMPLETE SYSTEM WITH ALL EQUIPMENT AND ACCESSORIES REQUIRED TO PROVIDE DEDICATED INTERNET SERVICE TO THE NEW POWER PLANT.

2) THE INTERNET SERVICE SHALL HAVE THE FOLLOWING MINIMUM PERFORMANCE CHARACTERISTICS:
   1.0 MBPS DOWNLOAD
   256 KBPS UPLOAD
   7 GB MONTHLY DATA LIMIT
   GCI ALASKA RURAL INTERNET 1M OR APPROVED EQUAL.

3) THE SYSTEM SHALL INCLUDE ANTENNA WITH MOUNTING HARDWARE, MODEM, AND ALL ACCESSORIES, CABLES, AND CONNECTORS REQUIRED.

4) UPON COMPLETION OF INSTALLATION THE SYSTEM SHALL BE COMMISSIONED IN ACCORDANCE WITH THE SERVICE PROVIDER'S REQUIREMENTS.

5) IN ADDITION TO FURNISHING AND INSTALLING THE SYSTEM, THE CONTRACTOR SHALL PRE–PAY FOR A 1 YEAR SERVICE CONTRACT.

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

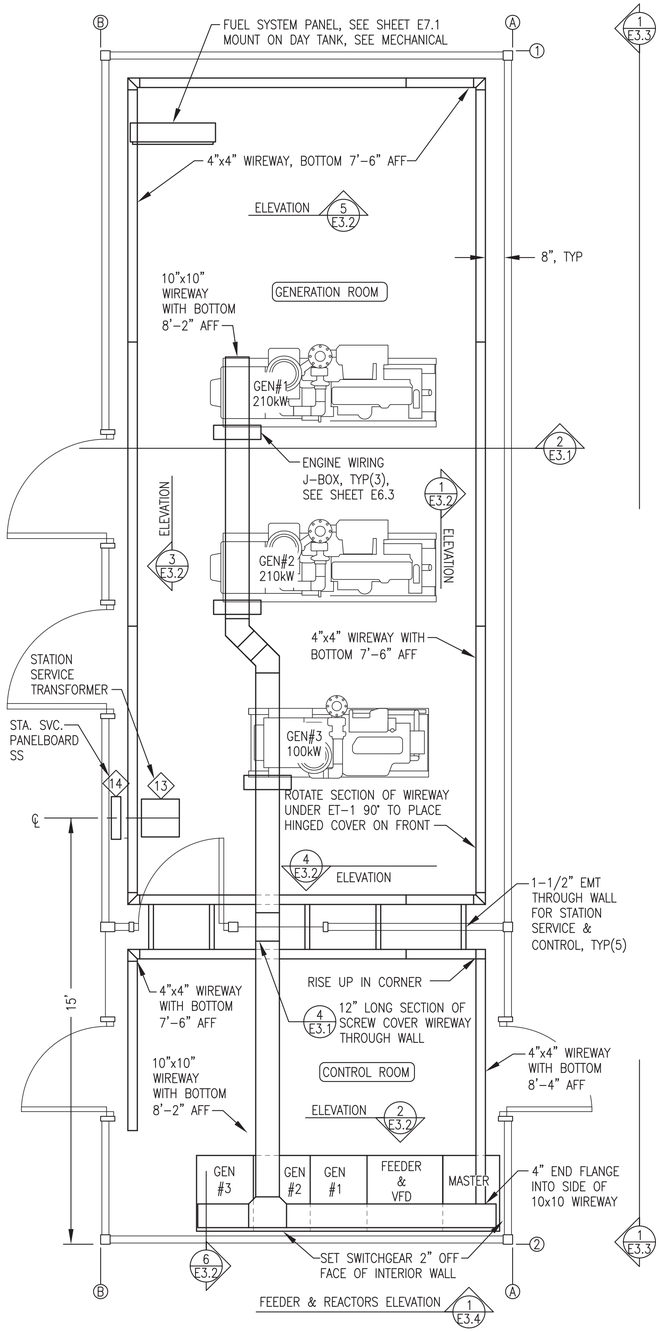
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: POWER PLANT SITE
COMMUNICATION PLAN & DETAILS

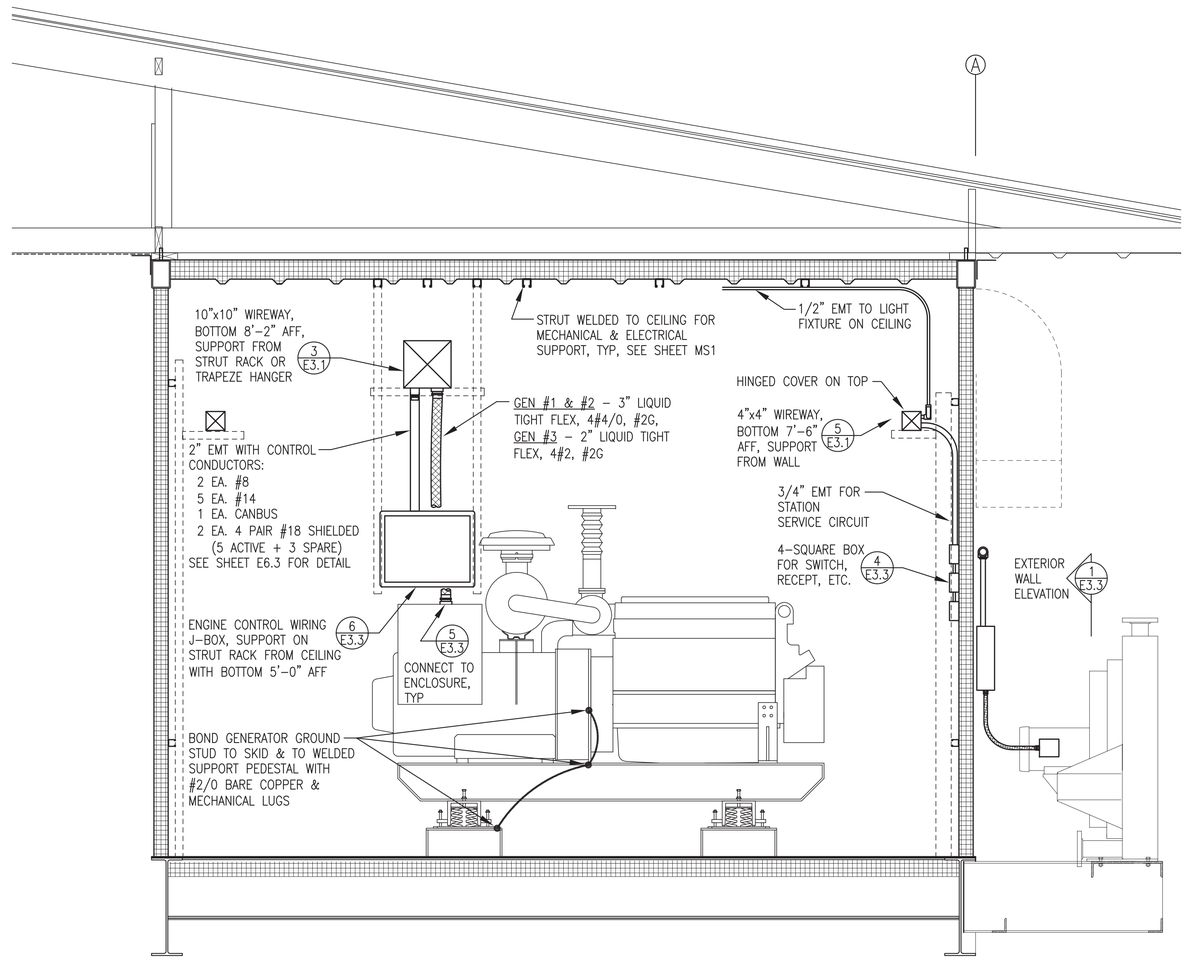
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 4/1/19
FILE NAME: PTH PPU E1–E2 | SHEET: E2.4 OF 8
PROJECT NUMBER:



1 E3.1 EQUIPMENT LAYOUT & WIREWAY PLAN

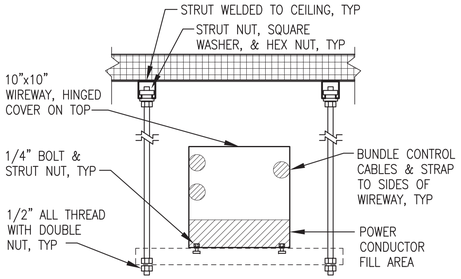
3/8"=1'-0"



2 E3.1 TYPICAL MODULE SECTION

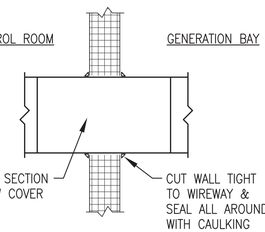
3/4"=1'-0"

NOTES:
1) INSTALL HANGER AT EACH JOINT & AT END.
2) HANGER NOT REQUIRED AT ENGINE J-BOX SUPPORT, SEE DETAIL 4/E4.3.



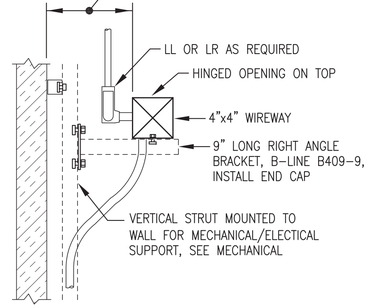
3 E3.1 10" WIREWAY TRAPEZE HANGER

NO SCALE



4 E3.1 WIREWAY WALL PENETRATION

NO SCALE



5 E3.1 4" WIREWAY SUPPORT FROM WALL

NO SCALE

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

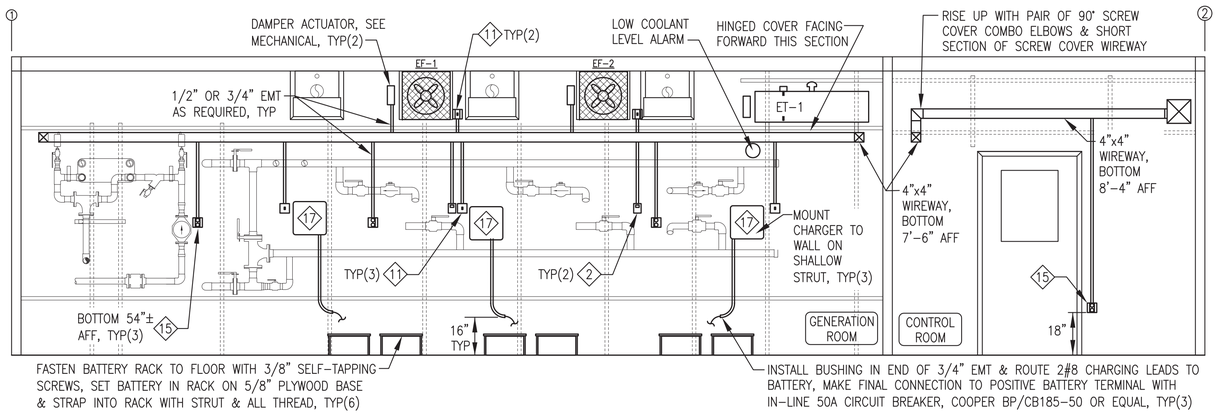
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

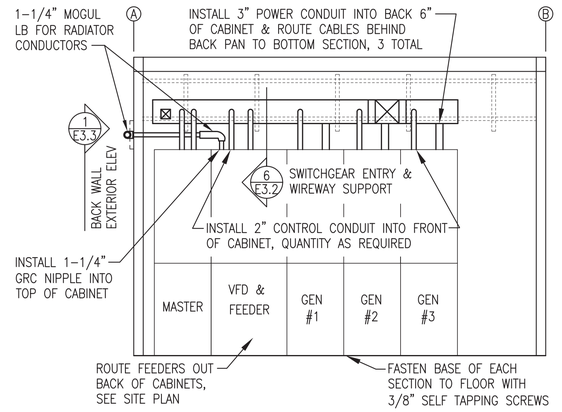
TITLE: WIREWAY PLAN, MODULE SECTION, & DETAILS

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

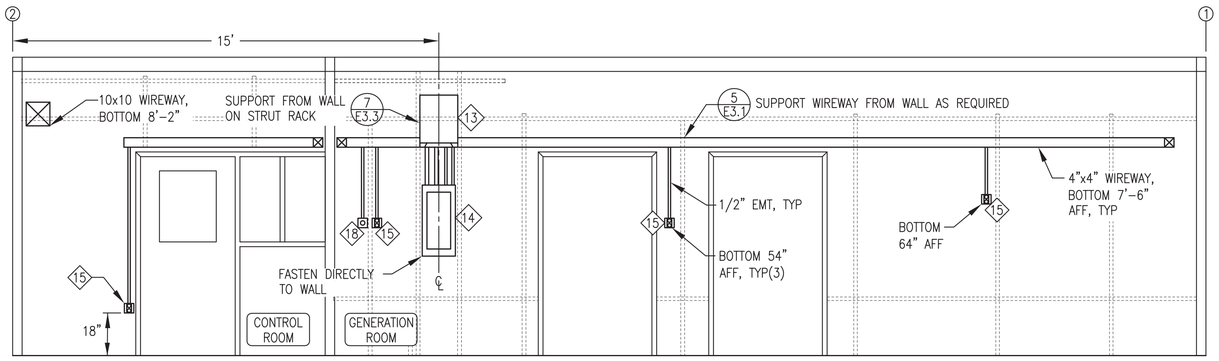
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 1/14/19
FILE NAME: PTH PPU E3-E5	SHEET: E3.1 OF 7
PROJECT NUMBER:	



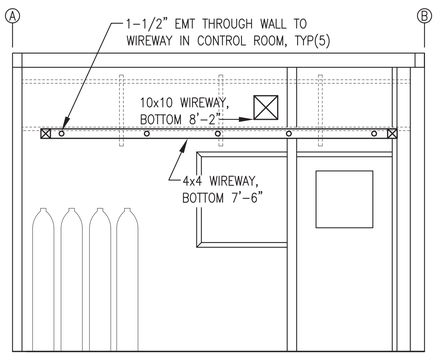
1 E3.2 WALL ELEVATION AT GRID A
3/8"=1'-0"



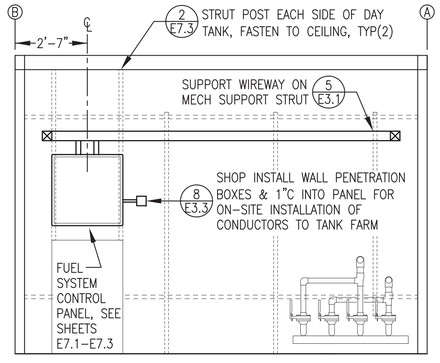
2 E3.2 WALL ELEVATION AT GRID 2
3/8"=1'-0"



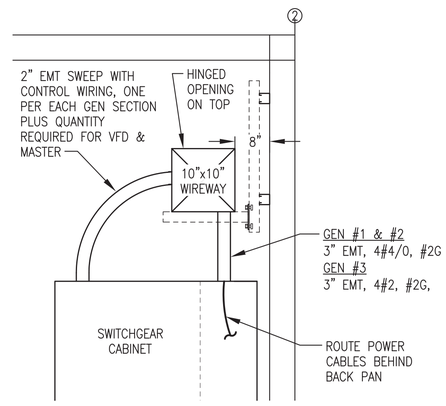
3 E3.2 WALL ELEVATION AT GRID B
3/8"=1'-0"



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



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.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

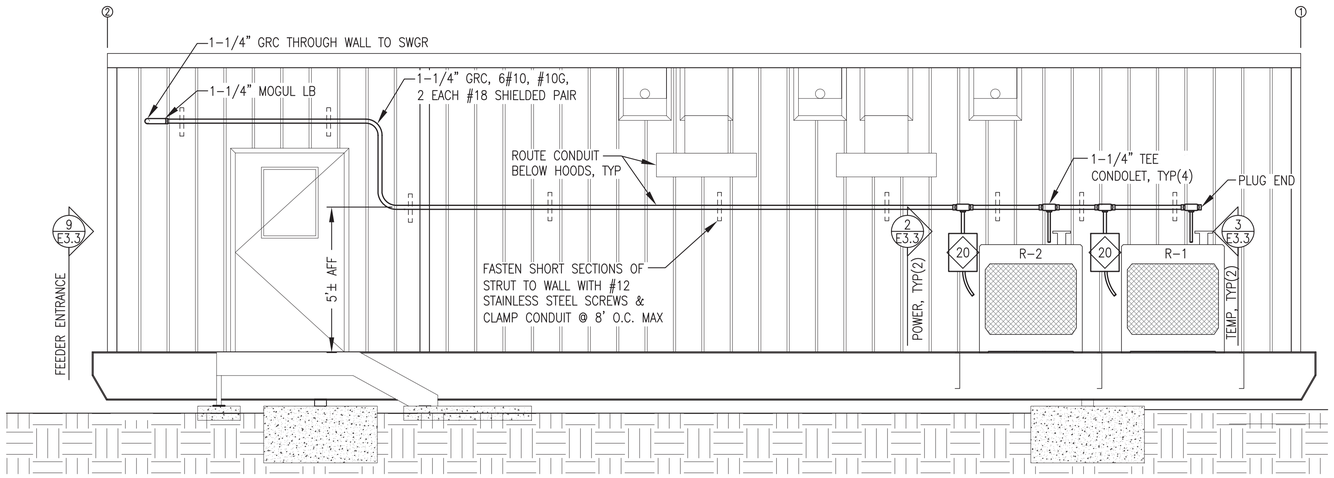
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

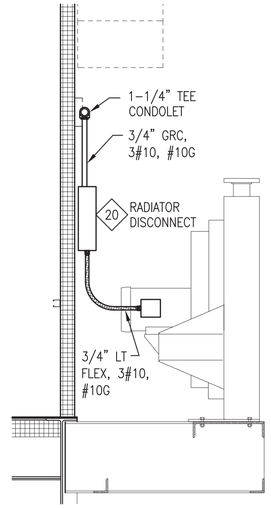
TITLE: ELEVATIONS & DETAILS

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

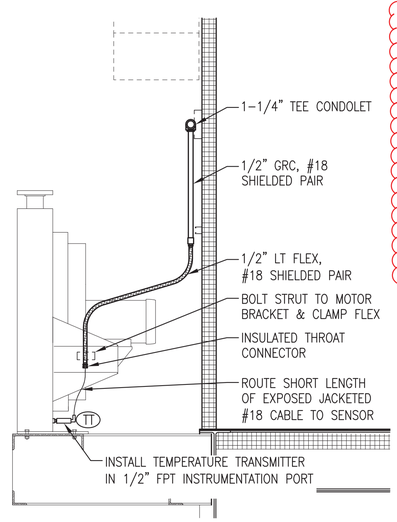
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 1/14/19
FILE NAME: PTH PPU E3-E5	SHEET: E3.2 OF 7
PROJECT NUMBER:	



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



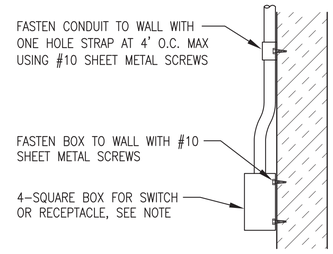
2 E3.3 RADIATOR POWER CONNECTION
3/4"=1'-0"



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.

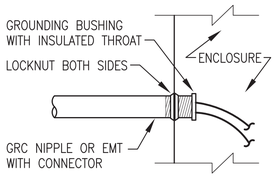


NOTE: INSTALL THERMOSTATS & TIMER SWITCHES IN DEEP SINGLE GANG BELL BOX INSTEAD OF 4-SQUARE BOX.

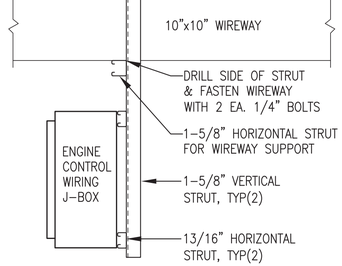
4 E3.3 TYPICAL INTERIOR DEVICE MOUNTING
NO SCALE

NOTES:

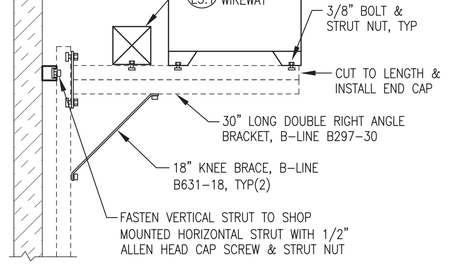
1) THIS DETAIL APPLIES TO CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
2) AT A MINIMUM INSTALL GROUNDING BUSHING ON ALL GENERATOR POWER CONDUIT, COMMUNITY FEEDER CONDUIT, STATION SERVICE FEEDERS, AND WHERE OTHERWISE INDICATED OR REQUIRED. BOND GROUNDING BUSHING TO EQUIPMENT GROUNDING CONDUCTOR.
3) INSTALL PLASTIC BUSHING WHERE GROUNDING BUSHING IS NOT REQUIRED.
4) ON GENERATOR ENCLOSURES MAKE ALL CONNECTIONS AS TIGHT AS POSSIBLE.



5 E3.3 TYP ENCLOSURE CONNECTION
NO SCALE

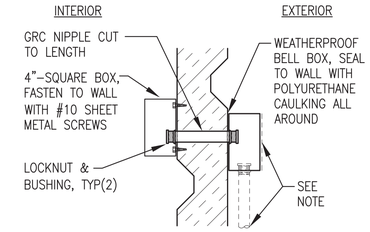


6 E3.3 ENGINE WIRING J-BOX SUPPORT
NO SCALE



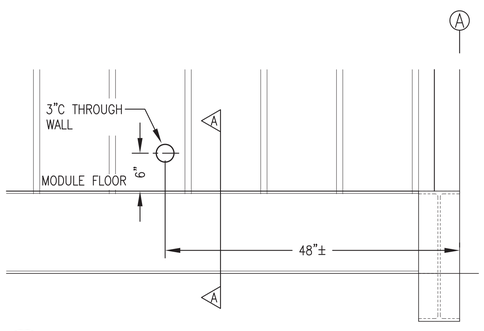
NOTE: ONE SUPPORT SHOWN, PROVIDE TWO IDENTICAL.

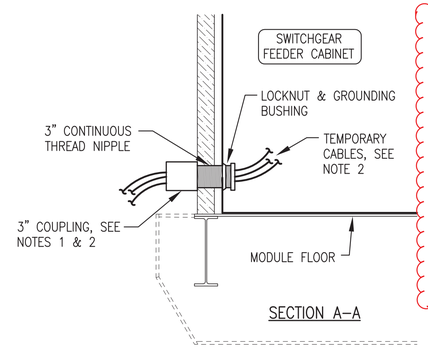
7 E3.3 STATION SERVICE TRANSFORMER SUPPORT
NO SCALE



NOTE: FOR CONDUIT PENETRATIONS WITHOUT BELL BOX SEAL ALL AROUND CONDUIT WITH POLYURETHANE CAULK.

8 E3.3 TYP EXTERIOR DEVICE INSTALLATION
NO SCALE





FEEDER SHOP/ON-SITE NOTES:

1) DURING SHOP FABRICATION INSTALL WALL PENETRATION AS SHOWN AND SEAL COUPLING TO EXTERIOR WALL WITH POLYURETHANE CAULK ALL AROUND.
2) USE WALL PENETRATION TO ROUTE TEMPORARY CABLES TO LOAD BANK FOR TESTING. AFTER TESTING INSTALL THREADED PLUG IN COUPLING.
3) INSTALL FEEDER TO TRANSFORMER AS PART OF ON-SITE WORK, SEE SHEET E2 FOR CONTINUATION.

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

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

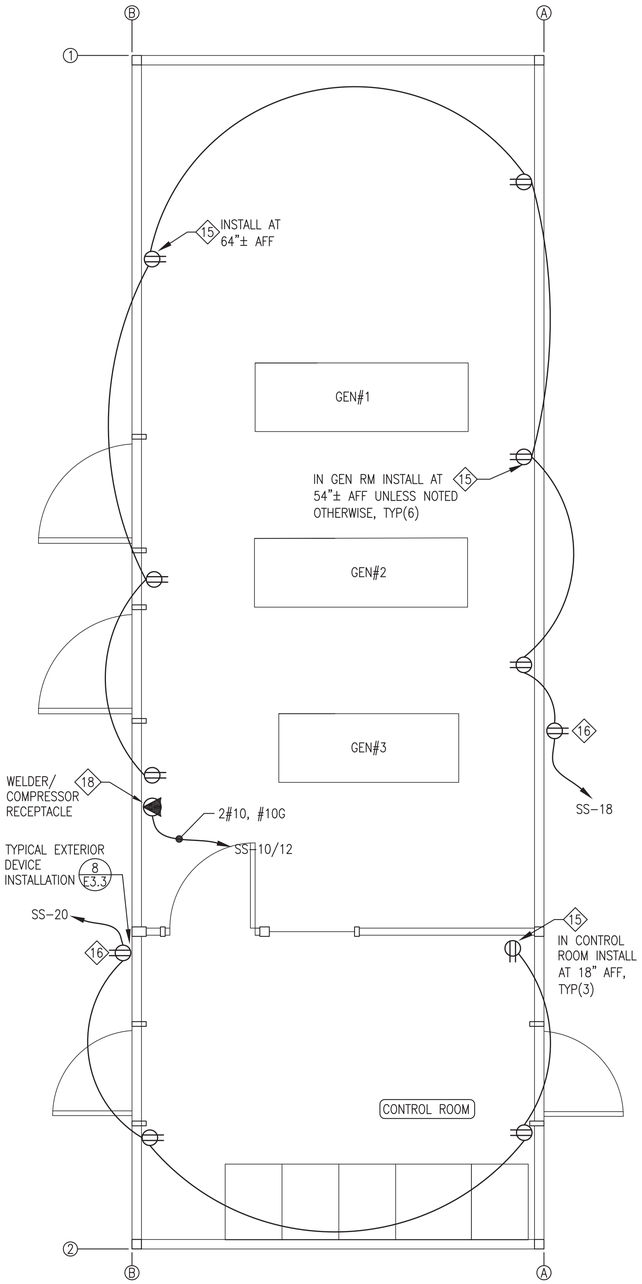
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: ELEVATIONS & DETAILS

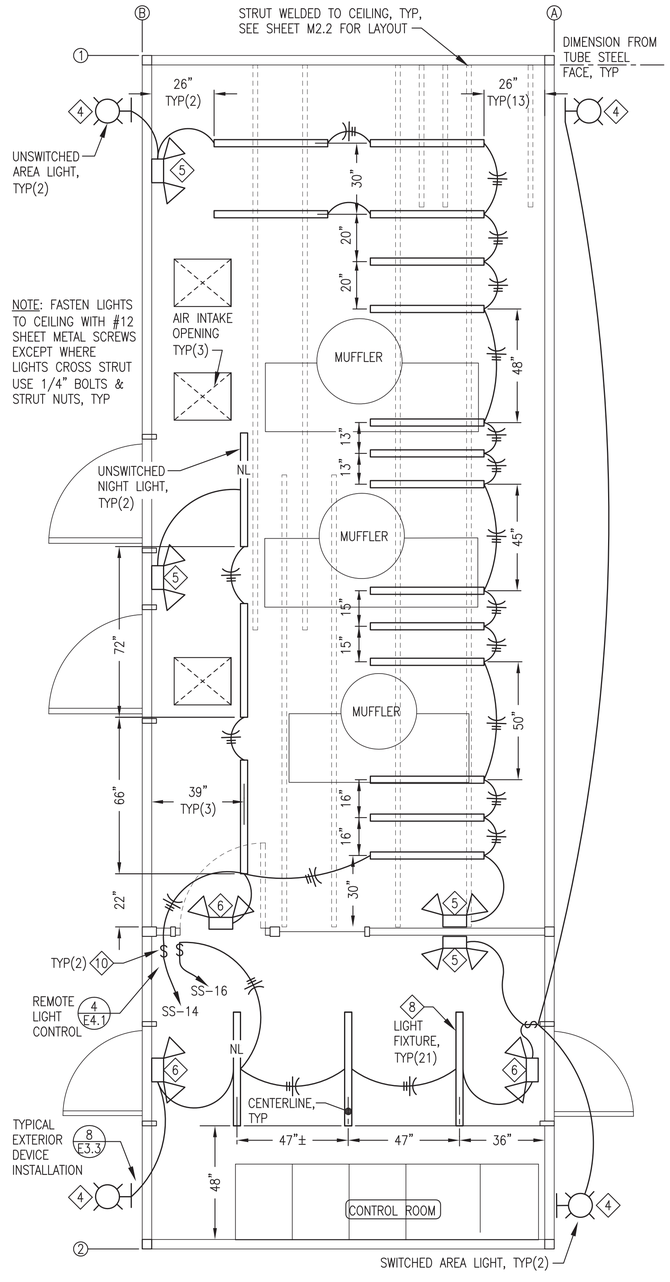
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 1/14/19
FILE NAME: PTH PPU E3-E5 | SHEET: E3.3 OF 7
PROJECT NUMBER:



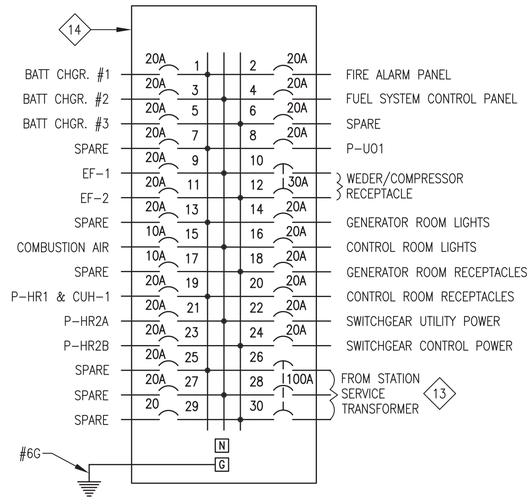
NOTE: ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

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

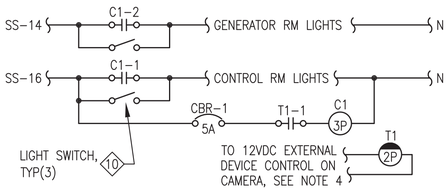


NOTE: ALL WIRING RUNS 2#12, #12G UNLESS SPECIFICALLY NOTED OTHERWISE.

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



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



4 E4.1 LIGHTING REMOTE CONTROL SCHEMATIC
NO SCALE

NOTES:

1) INSTALL CONTACTOR, TIMER RELAY, AND CIRCUIT BREAKER IN 12"x12"x6" NEMA 1 JUNCTION BOX ON WALL ABOVE LIGHT SWITCHES.
2) ALL LIGHTING CIRCUIT WIRING MIN #12 AWG. ALL 5A CONTROL CIRCUIT WIRING MIN #16AWG.
3) SET TIMER FOR 5 MINUTES, SINGLE SHOT MODE.
4) CONNECT TO CONFIGURABLE OUTPUT PINS ON CAMERA AND PROGRAM TO POWER RELAY ON CAMERA OPERATION.

BILL OF MATERIALS:

CBR1: 5A, 1P, RAIL MOUNT CIRCUIT BREAKER. ALLEN BRADLEY 1489-A1-050.

C1: 23A, 3P CONTACTOR, 120V COIL. ALLEN BRADLEY 100-C23D10.

T1: 10A, DPDT RELAY, 12VDC COIL, WITH SOCKET BASE AND TIMING MODULE. ALLEN BRADLEY 700-HA32Z12 RELAY WITH 700HN204 BASE AND 700HT3 SERIES B TIMING MODULE.

BUILDING PLANS SYMBOL LEGEND			
SYMBOL	DESCRIPTION	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.		125V, 20A, DUPLEX RECEPTACLE
		T	LINE VOLTAGE THERMOSTAT
		DT	DIGITAL THERMOSTAT, MODULATING
#	ELECTRICAL ITEM – SEE EQUIPMENT SCHEDULE ON SHEET E6		SNAP SWITCH / SMALL MOTOR DISCONNECT
1/4	MOTOR (HORESPOWER INDICATED)	T$	TIMER SWITCH
MD	MOTORIZED DAMPER – SEE MECHANICAL		GROUND

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

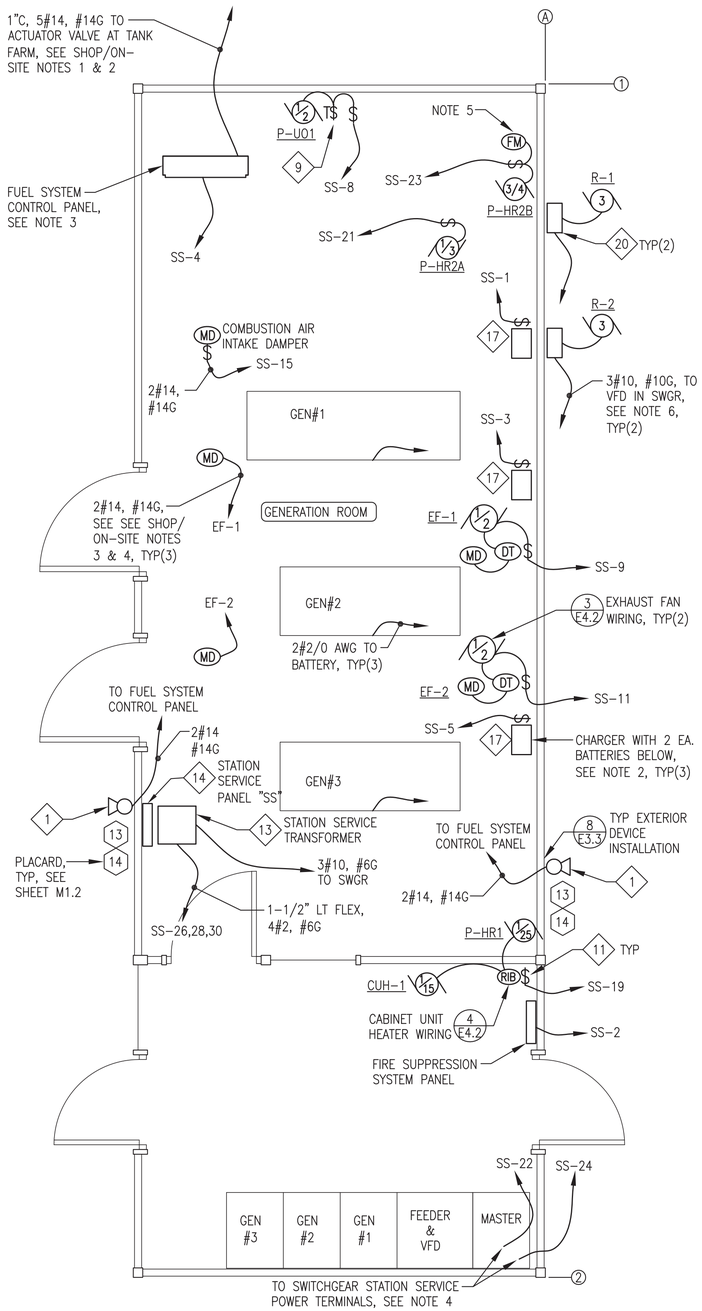
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: RECEPTACLE & LIGHTING PLANS, & STATION SERVICE PANEL

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 1/14/19
FILE NAME: PTH PPU E3-E5 | SHEET: E4.1 OF 7
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 BATTERY CHARGER TO WALL ON SHALLOW STRUT AND INSTALL BATTERIES ON FLOOR BELOW, SEE ELEVATION 1/E3.2.

3) SEE SHEETS E7.1-E7.3 FOR DAY TANK CONTROL PANEL DESIGN. 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. PROVIDE POWER FROM P-HR2B DISCONNECT.

6) RADIATOR VFD POWER CONDUCTORS OVERSIZED FOR 80% DE-RATE. DO NOT ROUTE IN WIREWAY. ROUTE IN SEPARATE EXTERIOR CONDUIT, SEE ELEVATION 1/E3.3.

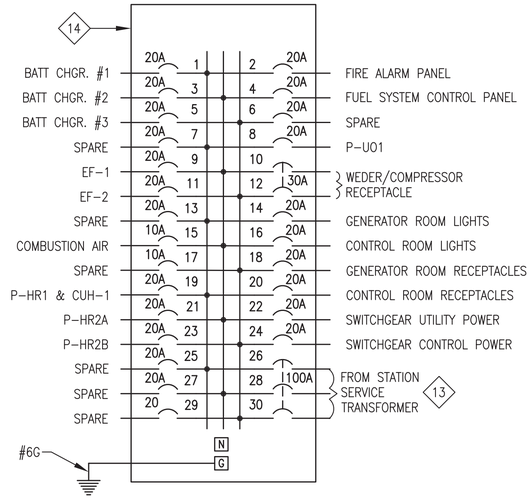
STATION SERVICE SHOP/ON-SITE NOTES:

1) DURING SHOP FABRICATION INSTALL WALL PENETRATION AND CONDUIT INTO DAY TANK PANEL. SEE ELEVATION 5/E3.2.

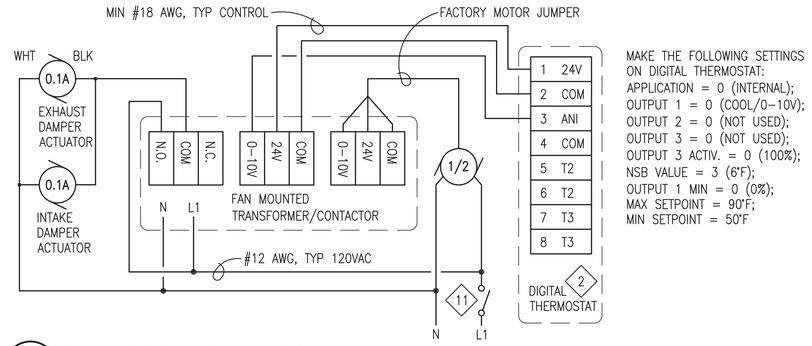
2) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO TANK FARM, SEE SHEET E2.

3) DURING SHOP FABRICATION INSTALL CEILING MOUNTED BOX ADJACENT TO DAMPER ACTUATOR AND TEMPORARILY CONNECT DAMPER TO VERIFY OPERATION.

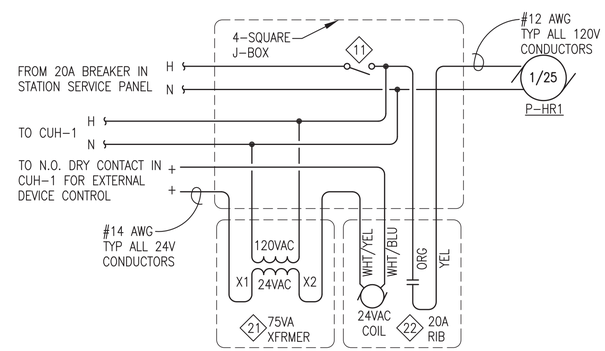
4) AS PART OF ON-SITE WORK INSTALL CONDUIT AND CONDUCTORS TO DAMPER ACTUATOR. SEE SHEET M7.



2 E4.2 STATION SERVICE PANEL "SS"
NO SCALE



3 E4.2 EXHAUST FAN WIRING DIAGRAM
NO SCALE



4 E4.2 CUH-1 WIRING DIAGRAM
NO SCALE

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

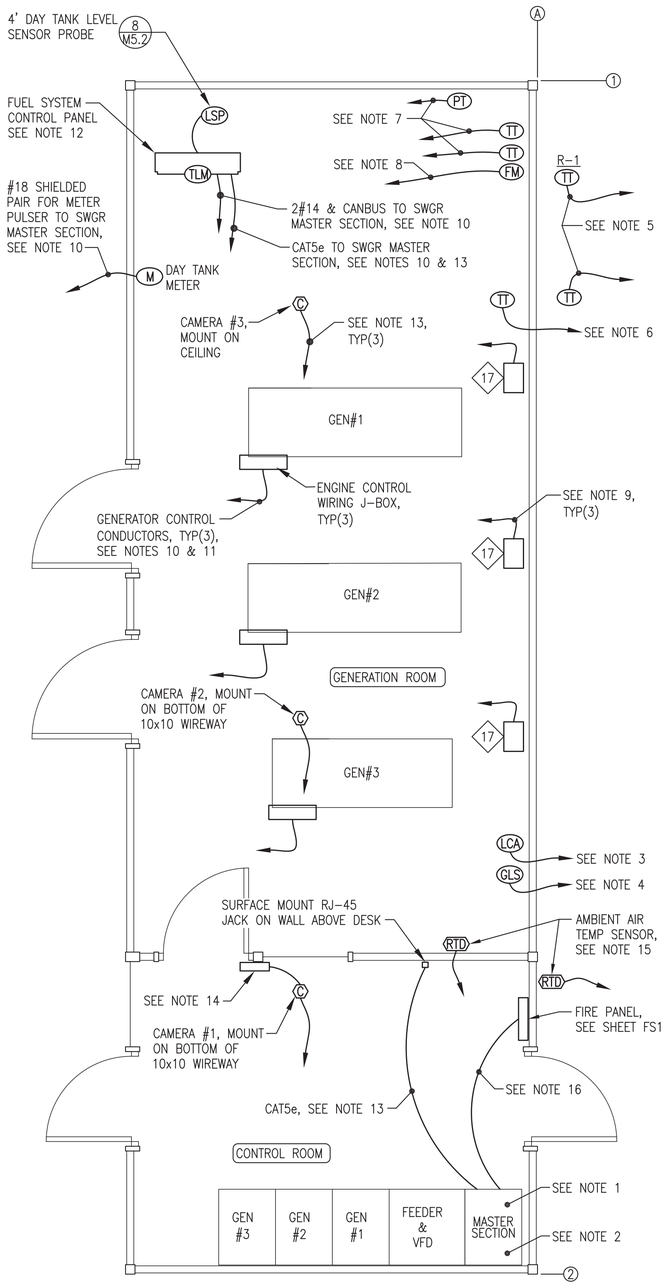
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: STATION SERVICE PLAN, DETAILS, & PANEL

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 1/14/19
FILE NAME: PTH PPU E3-35	SHEET: E4.2 OF 7
PROJECT NUMBER:	



1 E5 INSTRUMENTATION & DATA PLAN
3/8"=1'-0"

INSTRUMENTATION & DATA PLAN NOTES:

1. INSTALL CAMERA POE+ SWITCH INSIDE MASTER SECTION. CONNECT TO 120VAC CONTROL POWER AND TO ETHERNET SWITCH, SEE NOTE 10.
2. INSTALL ROUTER ON TOP OF MASTER SECTION IN RACK OR CABINET. CONNECT TO 120VAC UPS AND TO ETHERNET SWITCH, SEE NOTE 10.
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 NOTE 10.
6. INSTALL COOLANT RETURN TEMP TRANSMITTER IN PIPING MAIN WHERE SHOWN ON COOLING PIPING ISOMETRIC. 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. PROVIDE POWER FROM P-HR2B DISCONNECT. 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 GENERATOR CONTROL CONDUCTORS TO SWITCHGEAR IN 10x10 WIREWAY WITH POWER CONDUCTORS. SEE SHEETS E3.1, E6.3, AND NOTE 10.
12. SEE SHEETS E7.1-E7.3 FOR FUEL SYSTEM CONTROL PANEL DESIGN. ALL ACCESSORIES NOT SHOWN ON PLANS. SEE LOGIC DIAGRAMS FOR ADDITIONAL DETAIL.
13. ROUTE CAT5e CONDUCTORS FROM EACH CAMERA TO POE+ SWITCH IN MASTER SECTION. ROUTE CAT5e CONDUCTORS FROM FUEL SYSTEM PANEL, FIRE SUPPRESSION PANEL, AND RJ-45 JACK TO ETHERNET SWITCH IN SWITCHGEAR MASTER SECTION. SEE NOTE 10. INSTALL ALL CAT5e CONDUCTORS IN SEPARATE DEDICATED RACEWAYS - DO NOT ROUTE WITH STATION SERVICE OR POWER CONDUCTORS.
14. INSTALL CONTACTOR WITH TIMER RELAY FOR REMOTE LIGHTING CONTROL. OPERATE FROM DRY CONTACT ON CAMERA #1. TIMER TO TURN LIGHTS ON FOR 5 MINUTES EACH TIME CAMERA IS OPERATED. SEE SCHEMATIC 4/E4.1.
15. RTD TEMPERATURE SENSOR PROVIDED WITH SWITCHGEAR. ROUTE #18 SHIELDED PAIR TO SWITCHGEAR MASTER SECTION. SEE NOTE 10.
16. ROUTE CAT5e FOR DATA AND 2#14 FOR GENERATOR SHUT DOWN FROM FIRE PANEL TO SWITCHGEAR MASTER SECTION, SEE NOTES 10 AND 13.

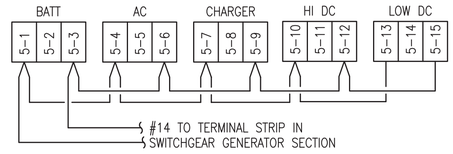
INSTRUMENTATION SHOP/ON-SITE NOTES:

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 TANK FARM, SEE SHEET E2.2. 1

DATA DEVICE SCHEDULE

DEVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
ROUTER - HIGH SPEED INTERNET	4-PORT GIGABIT ROUTER, DUAL 2.4 AND 5 GHz WIFI WITH ADJUSTABLE ANTENNAS, 4 GIGABIT LAN, 1 GIGBIT WAN, MINIMUM 256 MB RAM	ASUS RT-N66U OR APPROVED EQUAL
POE+ - POWER OVER ETHERNET CAMERA SWITCH	MINIMUM 4 PORT MANAGED GIGABIT SWITCH, MINIMUM 14 GBPS THROUGHPUT, MINIMUM 30W POWER OVER ETHERNET PER PORT, MINIMUM 130W TOTAL, 120VAC POWER	AXIS T8508 POE+ OR APPROVED EQUAL
CAMERAS	NETWORK CAMERA, HDTV 1080P RESOLUTION, 360 DEGREE PAN, MINIMUM 90 DEGREE TILT, 10X ZOOM, AUTO FOCUS, POWER OVER ETHERNET, WITH PROGRAMMABLE OUTPUT CONNECTIONS FOR EXTERNAL CONTROL OF LIGHTING	AXIS M5525-E PTZ OR APPROVED EQUAL

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.

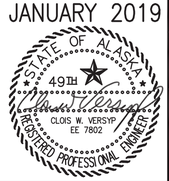


NOTE: PRIOR TO ENERGIZING MAKE THE FOLLOWING SETTINGS ON CHARGER:
1) AC LINE VOLTAGE SWITCH TO "115V".
2) AUTO BOOST JUMPER TO "NORM".
3) FLOAT VOLTAGE JUMPER TO "13.50/27.00" (FOR GEL CELL).
4) BATTERY RANGE JUMPER TO "24V".

2 E5 BATTERY CHARGER ALARM WIRING DIAGRAM
NO SCALE

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

ISSUED FOR CONSTRUCTION JANUARY 2019



REV.	DESCRIPTION	DATE	BY
1	ADDED SHOP/ON-SITE NOTES	4/16/19	BCG

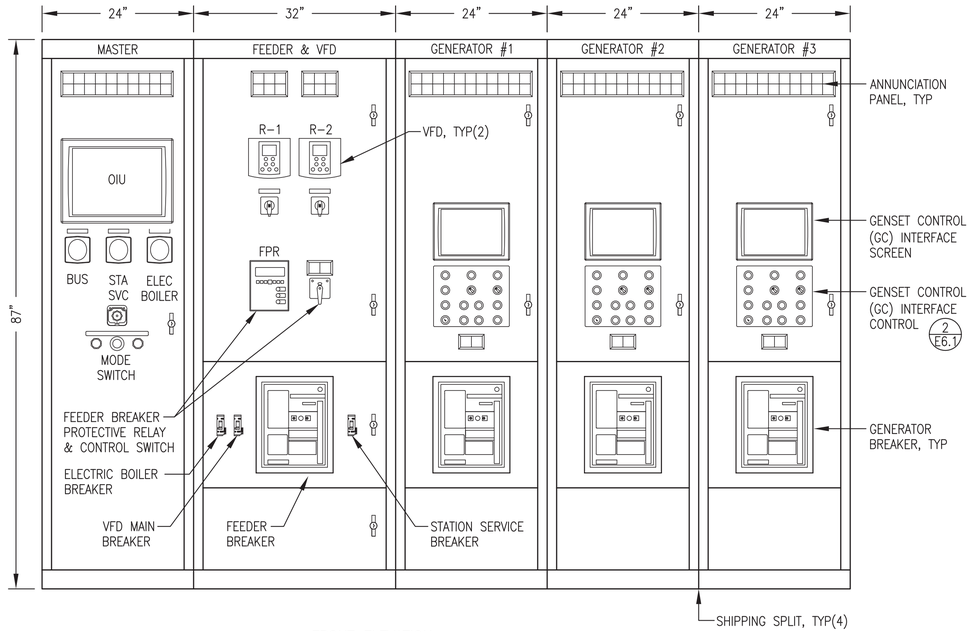
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

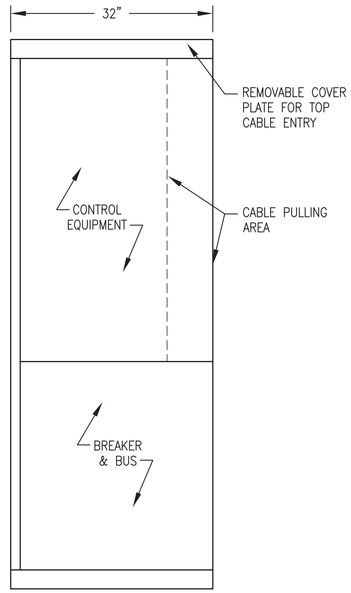
TITLE: INSTRUMENTATION & DATA PLAN & DETAILS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 1/14/19
FILE NAME: PTH PPU E3-E5 | SHEET: E5 OF 7
PROJECT NUMBER:



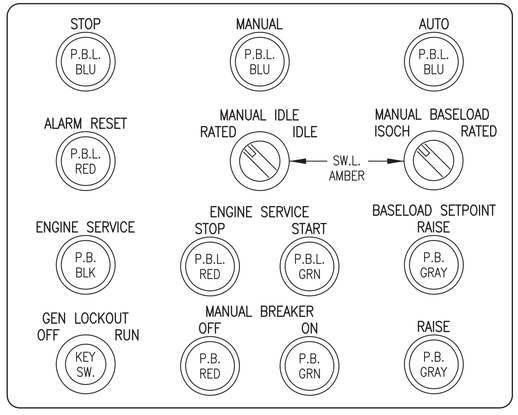
FRONT ELEVATION



TYPICAL CROSS SECTION

1 E6.1 SWITCHGEAR ENCLOSURE LAYOUT

NO SCALE



LEGEND:

P.B.	PUSH BUTTON
P.B.L.	PUSH BUTTON WITH LIGHT
SW.L.	SWITCH WITH LIGHT
KEY SW.	LOCKABLE KEY SWITCH

2 E6.1 EASYGEN 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.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

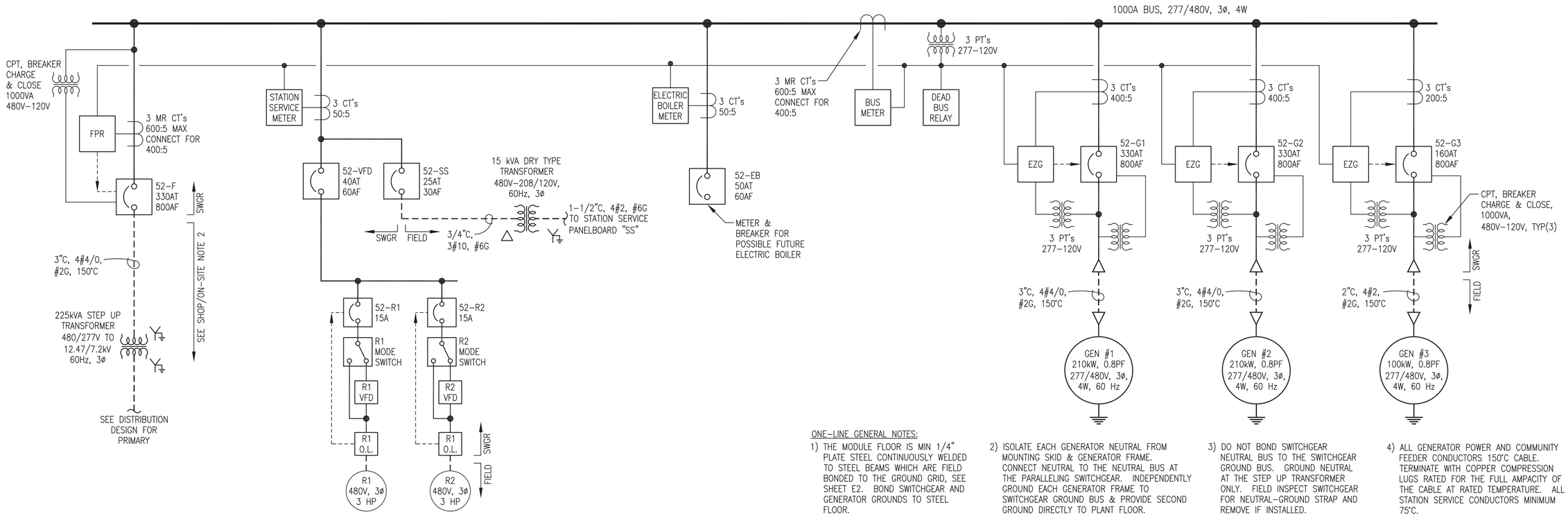
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: SWITCHGEAR ENCLOSURE LAYOUT

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

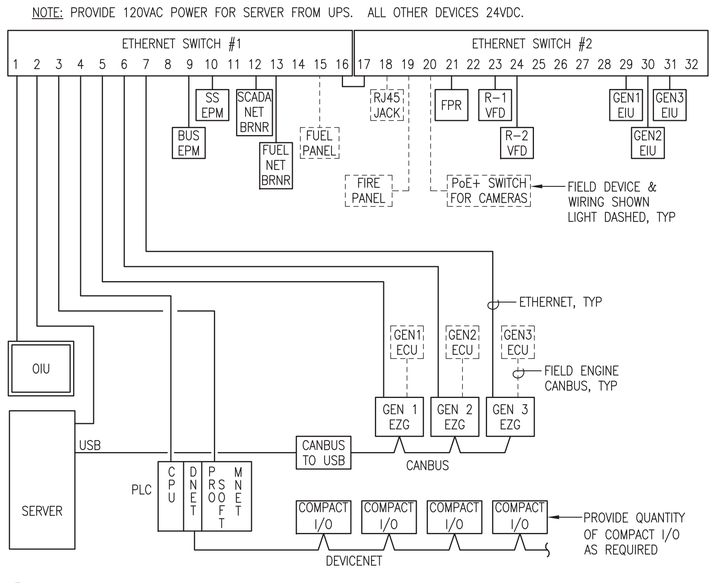
DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 1/14/19
FILE NAME: PTH PPU E6 | SHEET: E6.1 OF 7
PROJECT NUMBER:



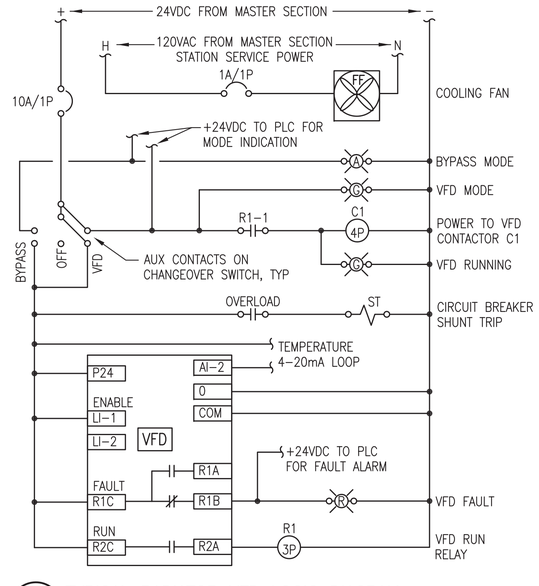
ONE–LINE GENERAL NOTES:

1) THE MODULE FLOOR IS MIN 1/4" PLATE STEEL CONTINUOUSLY WELDED TO STEEL BEAMS WHICH ARE FIELD BONDED TO THE GROUND GRID, SEE SHEET E2. BOND SWITCHGEAR AND GENERATOR GROUNDS TO STEEL FLOOR.
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) DO NOT BOND SWITCHGEAR NEUTRAL BUS TO THE SWITCHGEAR GROUND BUS. GROUND NEUTRAL AT THE STEP UP TRANSFORMER ONLY. FIELD INSPECT SWITCHGEAR FOR NEUTRAL–GROUND STRAP AND REMOVE IF INSTALLED.
4) ALL GENERATOR POWER AND COMMUNITY FEEDER CONDUCTORS 150°C CABLE. TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT RATED TEMPERATURE. ALL STATION SERVICE CONDUCTORS MINIMUM 75°C.

1 E6.2 SWITCHGEAR ONE–LINE DIAGRAM
NO SCALE



2 E6.2 COMMUNICATION SCHEMATIC
NO SCALE



3 E6.2 TYPICAL RADIATOR VFD LOGIC DIAGRAM
NO SCALE

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

SWITCHGEAR SHOP/ON–SITE NOTES:

1) DEVICES AND WIRING NOTED AS FIELD ARE EXTERNAL TO THE SWITCHGEAR BUT ARE INCLUDED IN THE MODULE SHOP FABRICATION WORK.
2) THE FEEDER, STEP UP TRANSFORMER, AND DISTRIBUTION ARE TO BE INSTALLED AS PART OF THE ON–SITE WORK AND ARE NOT PART OF THE MODULE SHOP FABRICATION WORK.

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. WORK INCLUDED IN THE ON SITE CONTRACT IS NOTED WITHIN THE CLOUDED AREAS.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

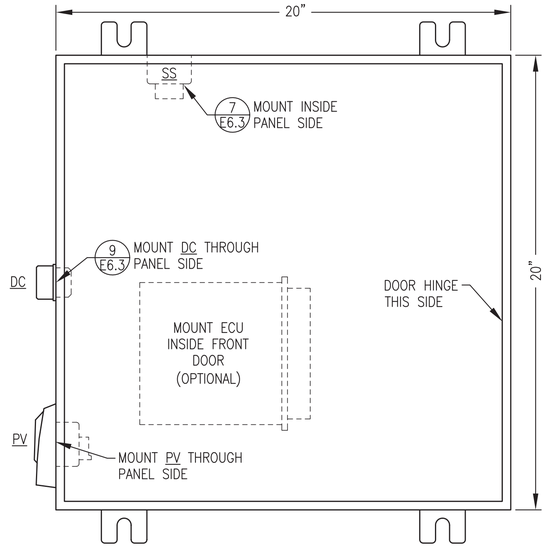
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: SWITCHGEAR ONE–LINE & SCHEMATICS

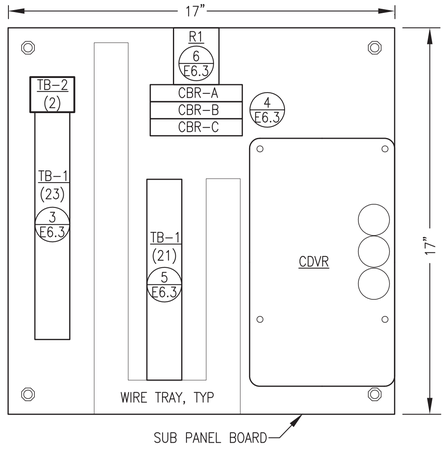
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: PTH PPU E6
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 1/14/19
SHEET: E6.2 OF 7



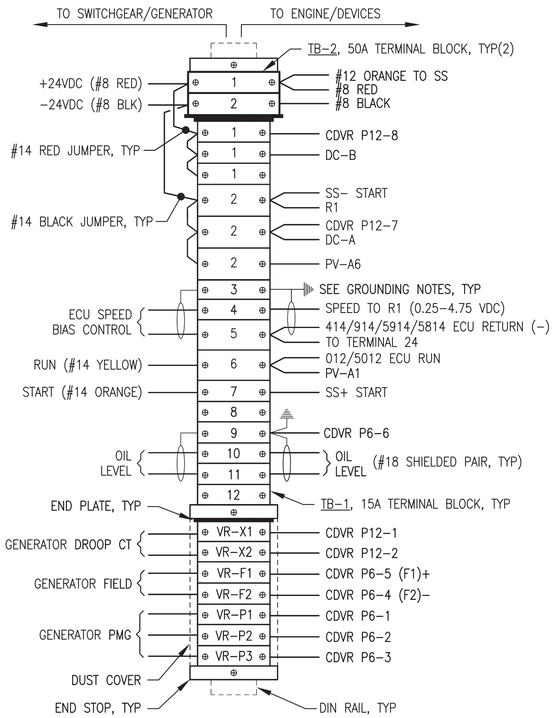
1 E6.3 JUNCTION BOX FRONT PANEL LAYOUT

NO SCALE



2 E6.3 JUNCTION BOX SUB PANEL LAYOUT

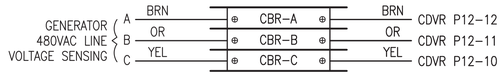
NO SCALE



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

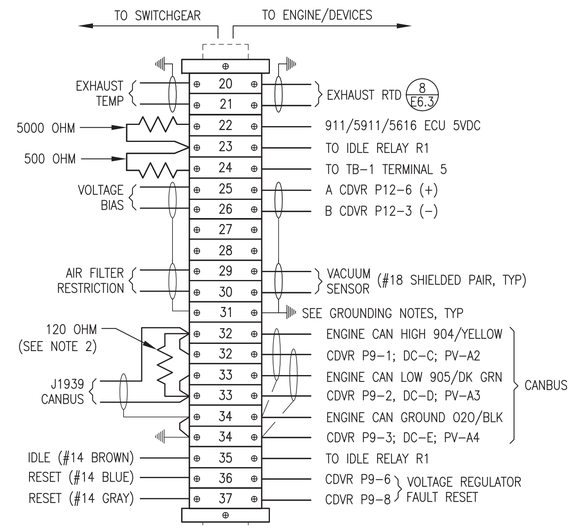
3 E6.3 TERMINAL STRIP CONNECTIONS

NO SCALE



4 E6.3 CIRCUIT BREAKER 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
ENCLOSURE	HOFFMAN	A20H20ALP	20x20x8" NEMA 12
	HOFFMAN	A20P20	BACK PANEL
CDVR	CATERPILLAR	314-7755	DIGITAL VOLTAGE REGULATOR
	CATERPILLAR	254-1265	HARNESS FOR VOLTAGE REGULATOR
CBR	ALLEN-BRADLEY	1489-M1-C010	RAIL MOUNT CIRCUIT BREAKER, 1-POLE, 1A
DC	JOHN DEERE	57M7919	DIAGNOSTIC CONNECTOR, 9-PIN, CAN-BUS
	DEUTSCH	HD18-009	CONNECTOR STRAIN RELIEF
	DEUTSCH	HDC16-9	CONNECTOR PROTECTIVE DUST CAP
	DEUTSCH	HD10-9-GKT	CONNECTOR GASKET
	DEUTSCH	JDL062397	CONNECTOR LANYARD
PV	MURPHY	PV101-C-MSTD	POWER VIEW W/HARNESS
R1	ALLEN-BRADLEY	700HAB2Z24	DPDT RELAY, 24VDC COIL
	ALLEN-BRADLEY	700HN101	8 PIN SOCKET BASE
SS	CATERPILLAR	9X-8124	STARTER AUXILIARY SOLENOID, 24V
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK

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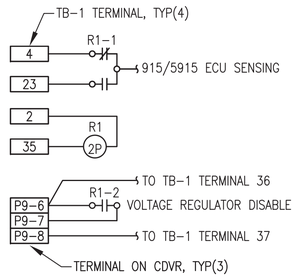
SHOP FABRICATION NOTES:

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 PANEL END 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 ENGINE-GENERATOR WITH ASSOCIATED JUNCTION BOX PERMANENTLY CONNECTED. UPON COMPLETION OF TESTING, COIL WIRING HARNESSES AND SECURE JUNCTION BOX TO GENERATOR FOR SHIPPING.

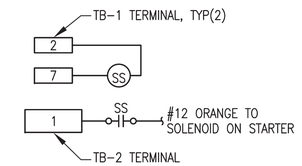
FIELD INSTALLATION NOTES:

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 TO LUGS AT PANEL END ONLY.



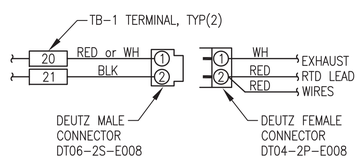
6 E6.3 IDLE RELAY R1 WIRING DIAGRAM

NO SCALE



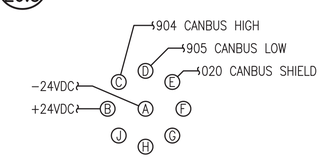
7 E6.3 STARTER AUX SOLENOID SS WIRING

NO SCALE



8 E6.3 EXHAUST RTD CONNECTOR

NO SCALE



9 E6.3 DIAGNOSTIC CONNECTOR WIRING

NO SCALE

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ISSUED FOR CONSTRUCTION JANUARY 2019

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

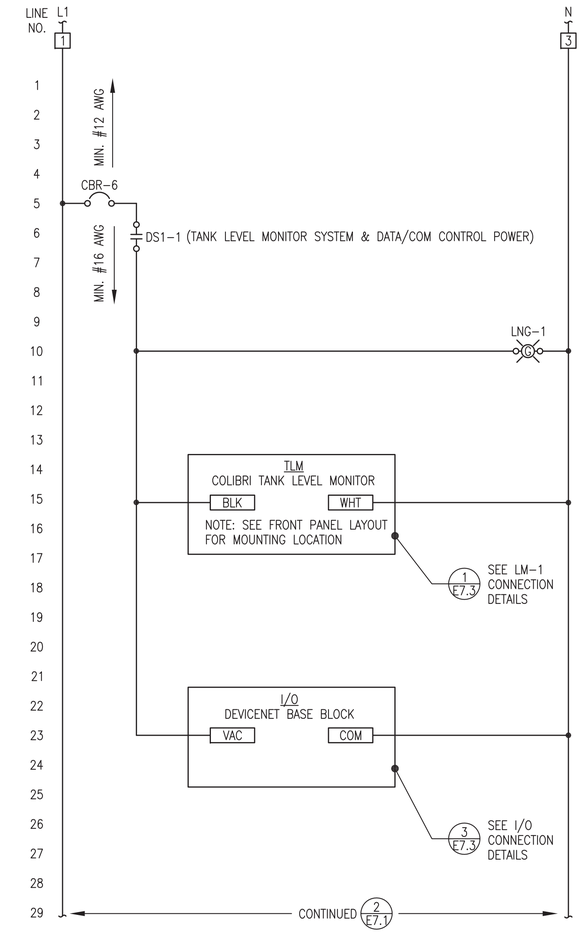
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

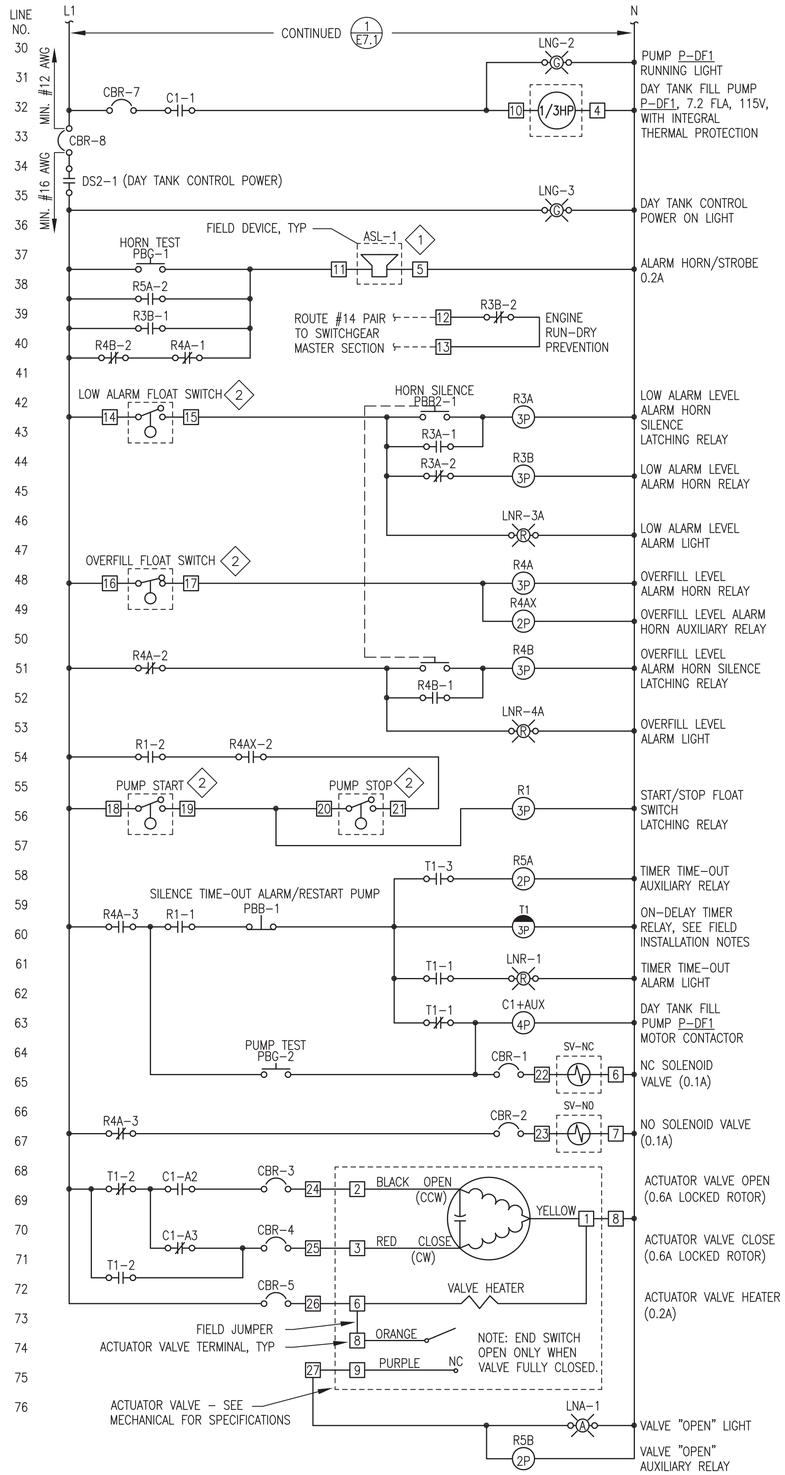
TITLE: 24VDC ENGINE WIRING JUNCTION BOX

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 1/14/19
FILE NAME: PTH PPU E6	SHEET: E6.3 OF 7
PROJECT NUMBER:	



1 E7.1 DAY TANK LOGIC LOGIC DIAGRAM
NO SCALE



2 E7.1 DAY TANK LOGIC DIAGRAM (CONTINUED)
NO SCALE

BILL OF MATERIALS (NOTE: PROVIDE MATERIALS AS SPECIFIED – NO SUBSTITUTIONS ALLOWED)

TAG	QTY	MANUFACTURER	MODEL	DESCRIPTION
AUX	1	ALLEN-BRADLEY	100SA11	AUXILIARY CONTACT FOR CONTACTOR, 2 POLE, NO, NC
C	1	ALLEN-BRADLEY	100C23D10	CONTACTOR, 120V COIL, 23A, 3 POLE WITH 1 NO AUX
CBR-1,2,3,4,5	5	ALLEN-BRADLEY	1489-M1-C010	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 1A
CBR-6,8	2	ALLEN-BRADLEY	1489-M1-C050	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CBR-7	1	ALLEN-BRADLEY	1489-M1-C150	RAIL-MOUNT CIRCUIT BREAKER, 1 POLE, 15A
DS	2	ALLEN-BRADLEY	194LE201753	DISCONNECT, 2 POSITION, 3 N.O., 20A, FACE MOUNT
	2	ALLEN-BRADLEY	194LHC4E1751	KNOB ACTUATOR FOR LOAD SWITCH, ON/OFF, LOCKABLE
LNG	3	ALLEN-BRADLEY	800HQRH2G	GREEN LED PILOT LIGHT, 12-130V, NEMA 4X
LNR	3	ALLEN-BRADLEY	800HQRH2R	RED LED PILOT LIGHT, 12-130V, NEMA 4X
LNA	1	ALLEN-BRADLEY	800HQRH2A	AMBER LED PILOT LIGHT, 12-130V, NEMA 4X
I/O	1	ALLEN-BRADLEY	1790D-T8A0	120VAC DEVICENET 8 INPUT BASE TERM. BLOCK
PBB	1	ALLEN-BRADLEY	800HAR2D2	MOMENTARY PUSH BUTTON, 1 NC, NEMA 4X, BLACK
PBB2	1	ALLEN-BRADLEY	800HAR2A2	MOMENTARY PUSH BUTTON, 2 NO, NEMA 4X, BLACK
PBG	2	ALLEN-BRADLEY	800HAR1D1	MOMENTARY PUSH BUTTON, 1 NO, NEMA 4X, GREEN
PP	1	PHOENIX CONTACTS	FLPPRJ45/RJ45	ETHERNET PATCH PANEL, RJ45xRJ45, DIN RAIL MOUNT
R (3P)	5	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	5	ALLEN-BRADLEY	700HN101	11 PIN SOCKET BASE
R (2P)	3	ALLEN-BRADLEY	700HA32A1	DPDT RELAY
T	3	ALLEN-BRADLEY	700HN100	8 PIN SOCKET BASE
	1	ALLEN-BRADLEY	700HA33A1	3PDT RELAY
	1	ALLEN-BRADLEY	700HN205	11 PIN RELAY SOCKET BASE FOR TIMER
	1	ALLEN-BRADLEY	700HT3	SERIES B TIMING MODULE
TB-1/2	42	ALLEN-BRADLEY	1492CAM1L	35A, 600V, LARGE-HEAD SCREW TERMINALS
*TLM	*1	* OWNER FURNISHED COMPONENT TO BE INSTALLED BY PANEL FABRICATOR IN PANEL FACE AND CONNECTED AS INDICATED		* FRANKLIN/INCON COLIBRI CL6D TANK LEVEL MONITOR CONSOLE, COLOR LCD SCREEN, ETHERNET CONNECTION WITH WEB INTERFACE, PROGRAMMABLE VOLUME CALCULATIONS FOR UP TO SIX TANKS WITH TEMPERATURE COMPENSATION

LEGEND

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

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

ISSUED FOR CONSTRUCTION JANUARY 2019

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

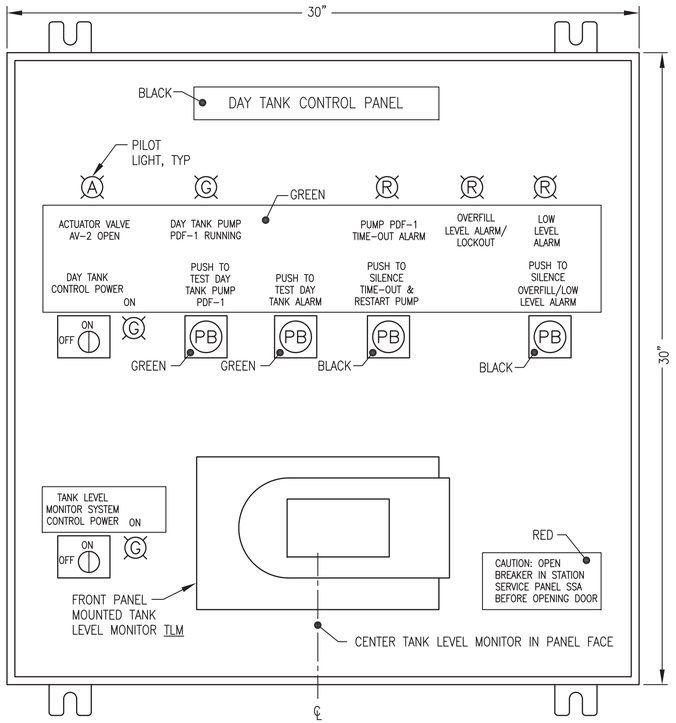
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

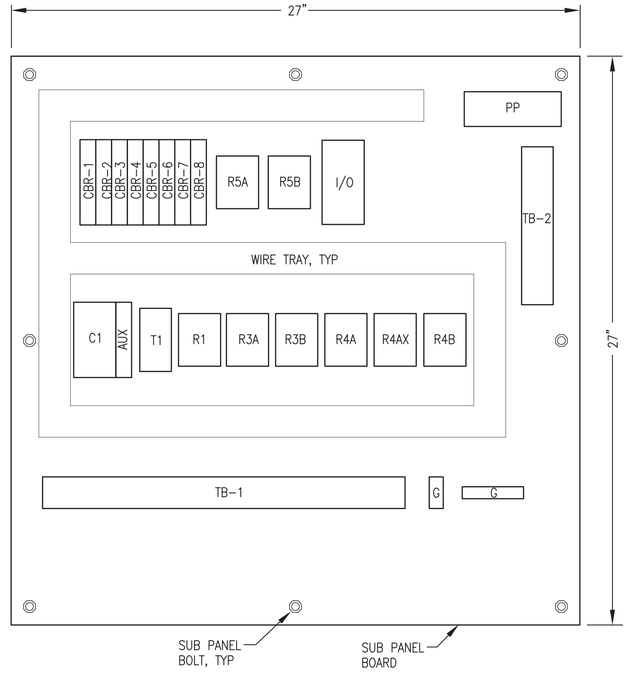
TITLE: DAY TANK CONTROL PANEL LOGIC DIAGRAM & BILL OF MATERIALS

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

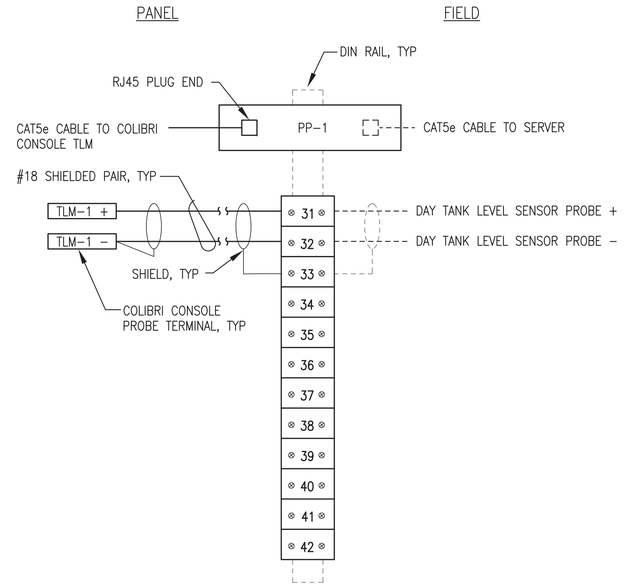
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/CWV	DATE: 1/14/19
FILE NAME: PTH PP E7	SHEET: E7.1 OF 7
PROJECT NUMBER:	



1 E7.2 FRONT PANEL LAYOUT
NO SCALE



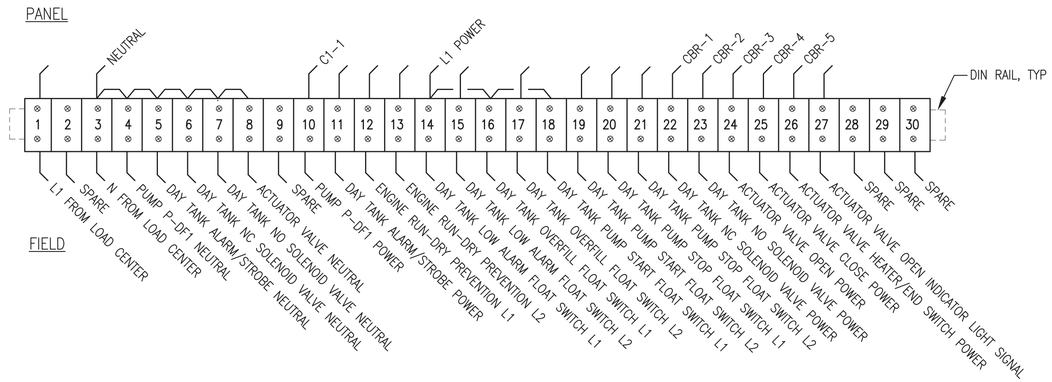
2 E7.2 SUB PANEL LAYOUT
NO SCALE



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 TERMINAL STRIP AND PP–1 ETHERNET PATCH PANEL 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

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. TERMINATION AT THE PANEL OF EXTERIOR FIELD CONDUCTORS AS NOTED ON SHEET E2.2 IS INCLUDED IN THE ON SITE

ISSUED FOR CONSTRUCTION JANUARY 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: DAY TANK CONTROL PANEL LAYOUT & TERMINAL STRIPS

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

DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: BCG/CWV | DATE: 1/14/19
FILE NAME: PHL PP E7 | SHEET: E7.2 OF 7
PROJECT NUMBER:

PANEL NOTES:

1) PROVIDE COMPLETE UL LISTED PANEL ASSEMBLY WITH ALL DEVICES INDICATED IN LOGIC DIAGRAM EXCEPT FOR FIELD DEVICES. FIELD DEVICES ARE INDICATED WITH DASHED OUTLINE. INSTALL IN A 30"TALLx30"WIDEx8"DEEP NEMA 12 ENCLOSURE WITH 4 EACH INTEGRAL MOUNTING LUGS AT BACK. SEE SHEET E7 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. FOR ALL JUMPERS THAT RUN CONTINUOUSLY (ONE-PIECE WIRE) BETWEEN THE DESIGNATED BEGINNING AND ENDING POINTS, TAG EACH END WITH DEVICE OR TERMINATION DESIGNATOR OF LANDING OF OPPOSITE END OF JUMPER (REVERSE ADDRESS). FOR ALL JUMPERS THAT RUN DISCONTINUOUSLY (MULTIPLE WIRES) BETWEEN THE DESIGNATED BEGINNING AND ENDING POINTS, TAG WITH A COMMON JUMPER NUMBER. TAG ALL NEUTRALS WITH A COMMON JUMPER NUMBER. PROVIDE AN AS-BUILT LOGIC WIRING DIAGRAM THAT INCLUDES ALL ASSIGNED JUMPER TAGS.

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) FIELD WIRING AND FIELD INSTALLED DEVICES PROVIDED BY OTHERS ARE SHOWN FOR INFORMATIONAL PURPOSES ONLY AND ARE NOT PART OF THE PANEL BID.

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 LISTED LOAD CENTER.

4) VERIFY THAT ALL 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.

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

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 SILENCE TIME OUT/RESTART BUTTON MAY HAVE TO BE PRESSED 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.

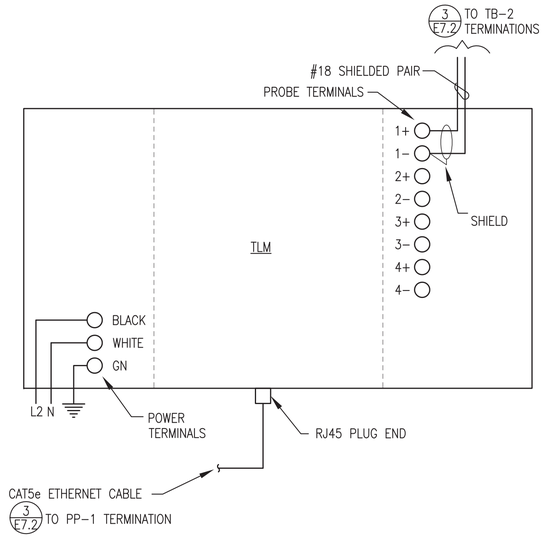
3) NORMAL FILL OPERATION – WHEN THE FUEL LEVEL DROPS TO THE "PUMP START" SWITCH, THE TIMER IS STARTED, THE N.C. DAY TANK SOLENOID VALVE OPENS, THE REMOTE ACTUATOR VALVE OPENS & THE VALVE "OPEN" LIGHT TURNS ON, THE DAY TANK PUMP IS ENERGIZED, AND THE PUMP "ON" LIGHT TURNS ON. WHEN THE ACTUATOR IS IN THE 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, AND THE PUMP "ON" LIGHT TURNS OFF.

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 "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.

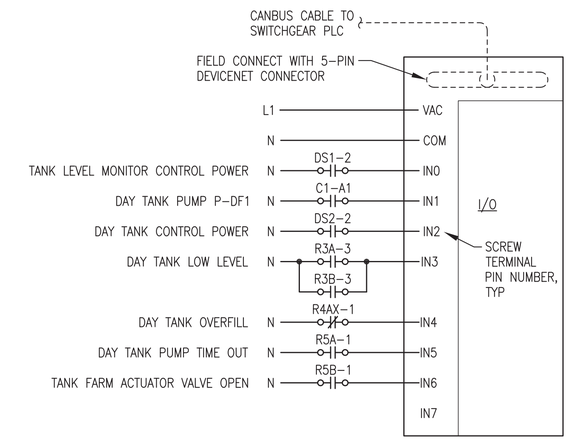
5) OVERFILL FUEL LEVEL – IF THE TANK OVERFILLS AND THE FUEL LEVEL REACHES THE "OVERFILL" FLOAT SWITCH, THE N.O. DAY TANK SOLENOID VALVE CLOSES, THE "OVERFILL LEVEL" ALARM LIGHT TURNS ON, THE N.C. DAY TANK SOLENOID VALVE AND REMOTE ACTUATOR VALVE CLOSE, THE VALVE "OPEN" LIGHT TURNS OFF, THE PUMP DE-ENERGIZES, THE PUMP "ON" LIGHT TURNS OFF, THE "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).

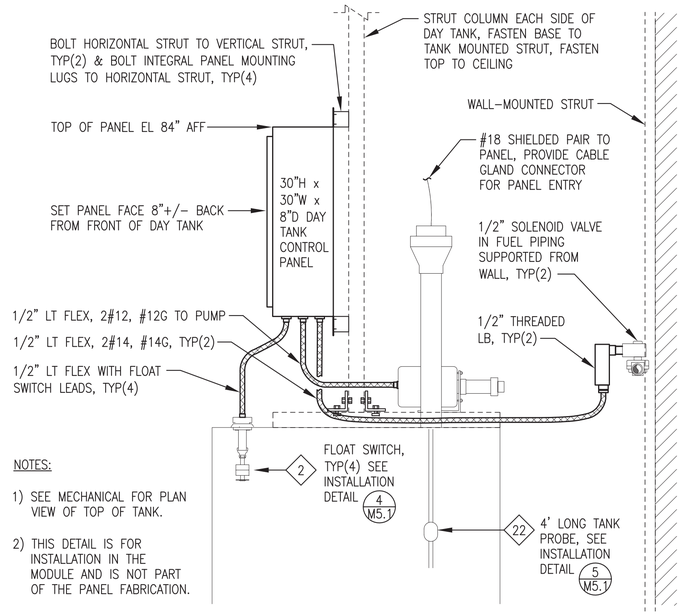
7) PUMP & HORN TEST – MOMENTARY CONTACT BUTTONS ARE PROVIDED TO TEST FUNCTION OF THE DAY TANK PUMP AND ALARM HORN. PRESSING THE "PUSH TO TEST DAY TANK PUMP" BUTTON STARTS THE TIMER, MOMENTARILY OPENS THE N.C. DAY TANK SOLENOID VALVE & ACTUATED BALL VALVE, ENERGIZES THE DAY TANK PUMP, AND TURNS ON THE DAY TANK PUMP "RUNNING" LIGHT. 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.



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



3 E7.3 DEVICENET TERMINAL BLOCKS (I/O) LOGIC & CONNECTION DETAILS
NO SCALE



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

THE MAJORITY OF WORK ON THIS SHEET WAS PERFORMED AS PART OF THE PRIOR MODULE ASSEMBLY CONTRACT AND IS SHOWN HERE FOR REFERENCE ONLY. TERMINATION AT THE PANEL OF EXTERIOR FIELD CONDUCTORS AS NOTED ON SHEET E2.2 IS INCLUDED IN THE ON SITE CONTRACT.

ISSUED FOR CONSTRUCTION JANUARY 2019

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

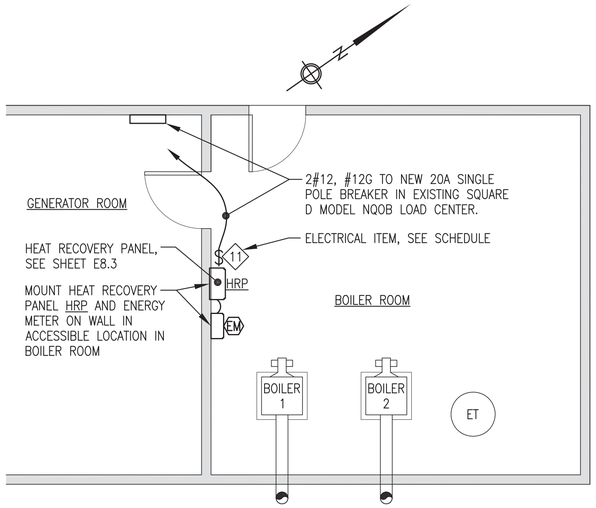
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: DAY TANK CONTROL PANEL SEQUENCE OF OPERATION & DETAILS

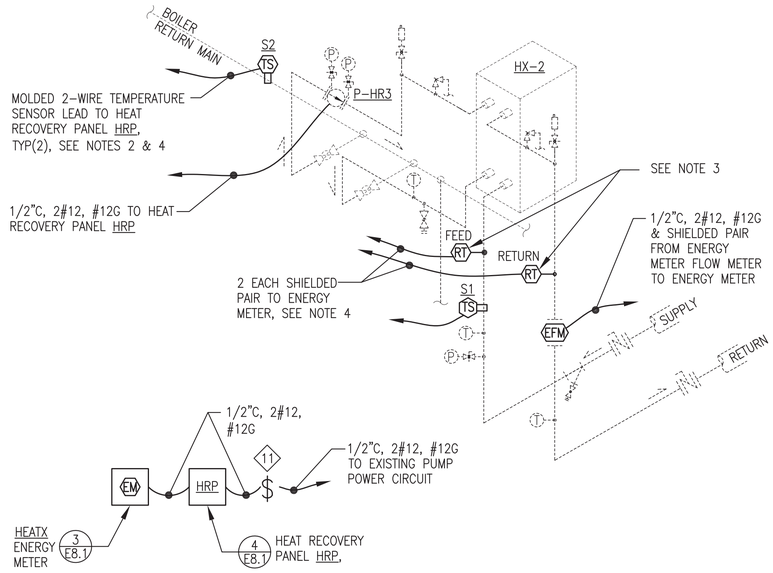
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG/CWV	DATE: 1/14/19
FILE NAME: PTH PP E7	SHEET: E7.3 OF 7
PROJECT NUMBER:	



NOTE: NOT ALL CONDUCTORS AND DEVICES SHOWN THIS PLAN FOR CLARITY. SEE POWER & INSTRUMENTAION DIAGRAM FOR COMPLETE WIRING DETAILS. (2 / E8.1)

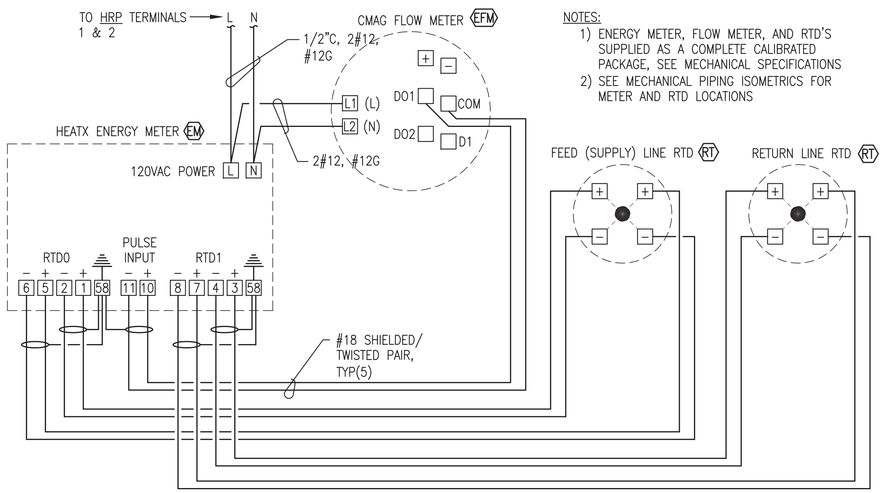
1 / E8.1 SCHOOL MECHANICAL BUILDING PLAN
1/4"=1'-0"



SCHOOL HEAT RECOVERY POWER & INSTRUMENTATION NOTES:

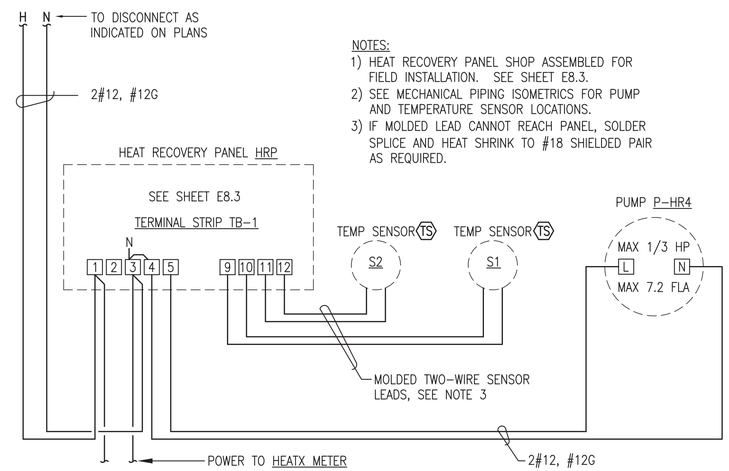
1) INSTALL HEAT RECOVERY PANEL & HEATX METER IN ACCESSIBLE LOCATION IN BOILER ROOM. SUPPORT FROM WALL OR STRUT RACK. SEE SHEET M8.2 FOR LAYOUT & PIPING ARRANGEMENT.
2) HEAT SENSORS S1 & S2 WITH MOLDED WIRE LEADS PROVIDED WITH HEAT RECOVERY PANEL. SEE PIPING ISOMETRIC FOR INSTALLATION.
3) FEED & RETURN RTD'S AND ENERGY METER FLOW METER PROVIDED WITH HEATX ENERGY METER
4) SOLDER-SPLICE AND HEAT SHRINK MOLDED 2-WIRE LEADS & SHIELDS TO #18 SHIELDED/TWISTED PAIR IN JUNCTION BOX WHERE SENSOR LEAD EXTENSION REQUIRED. USE CABLE GLANDS OR ROMEX CLAMPS FOR CABLE ENTRIES INTO JUNCTION BOX OR PANEL. SUPPORT LEADS FROM PIPING AND/OR CONDUIT WITH WIRE TIES.

2 / E8.1 SCHOOL HEAT RECOVERY POWER & INSTRUMENTATION DIAGRAM
NO SCALE



NOTES:
1) ENERGY METER, FLOW METER, AND RTD'S SUPPLIED AS A COMPLETE CALIBRATED PACKAGE, SEE MECHANICAL SPECIFICATIONS
2) SEE MECHANICAL PIPING ISOMETRICS FOR METER AND RTD LOCATIONS

3 / E8.1 SCHOOL ENERGY METER WIRING DIAGRAM
NO SCALE



NOTES:
1) HEAT RECOVERY PANEL SHOP ASSEMBLED FOR FIELD INSTALLATION. SEE SHEET E8.3.
2) SEE MECHANICAL PIPING ISOMETRICS FOR PUMP AND TEMPERATURE SENSOR LOCATIONS.
3) IF MOLDED LEAD CANNOT REACH PANEL, SOLDER SPLICE AND HEAT SHRINK TO #18 SHIELDED PAIR AS REQUIRED.

4 / E8.1 SCHOOL HEAT RECOVERY PANEL (HRP) WIRING DIAGRAM
NO SCALE

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 CONDUCTOR SCHEDULE

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERAL USE CONDUCTORS	CLASS B CONCENTRIC STRANDED, SOFT DRAWN COPPER. TYPE XHHW INSULATION, 600V AND 75C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL 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.

ELECTRICAL EQUIPMENT SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
3	LINE VOLTAGE THERMOSTAT	HEATING/COOLING THERMOSTAT, 16 FLA @ 120V, SPDT, 50F TO 80F RANGE.	DAYTON 1UHH2
11	1ø SMALL MOTOR DISCONNECT	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1-1/2HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL

INSTRUMENTATION SCHEDULE

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
TS	HRP TEMPERATURE SENSOR	TEMPERATURE SENSOR PROVIDED WITH HEAT RECOVERY PANEL, SEE SHEET E8.3	TEKMAR

HEAT RECOVERY ENERGY MEASUREMENT SYSTEM SCHEDULE

PROVIDE A COMPLETE THERMAL ENERGY MEASUREMENT SYSTEM INCLUDING ENERGY (BTU) METER, MAGNETIC FLOW METER AND TWO IMPEDANCE MATCHED RTD's WITH PIPING WELLS. ALL SYSTEM COMPONENTS TO BE SUPPLIED AND CALIBRATED BY A SINGLE MANUFACTURER AND PROVIDED WITH A CERTIFICATE OF NIST TRACEABLE CALIBRATION FOR UTILITY GRADE METERING.

SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
EM	ENERGY METER	BTU METER FOR USE WITH FLOW METER AND RTD's SPECIFIED BELOW. WALL MOUNT, 120VAC, PROGRAMMABLE FOR WATER AND GLYCOL. DISPLAY TO INCLUDE TOTAL ENERGY, PERIODIC ENERGY (RESET), POSITIVE ENERGY (CHARGE), NEGATIVE ENERGY (DISCHARGE), VOLUME FLOW RATE, ENERGY RATE, SUPPLY TEMPERATURE AND RETURN TREMPERATURE.	CENTRAL STATION STEAM HEATX-W-0-AC-3.5-S
EFM	FLOW METER	FLOW METER FOR USE WITH ENERGY METER ABOVE. 2" ANSI 150# FLANGED CONNECTION, 120VAC, PFA LINER, HASTELLOY C ELECTRODES, 316 SS GROUND RINGS, INTEGRAL MOUNTED TRANSMITTER, RATED FOR 210F OPERATION.	CENTRAL STATION STEAM CADILLAC METER CMAG D-II-F-150-H-C-S-FM
RT	RTD	RESISTANCE TEMPERATURE DEVICE (RTD's) FOR USE WITH ENERGY METER ABOVE. PROVIDE TWO PRECISION IMPEDANCE MATCHED 4-WIRE RTD's WITH 3/4" NPT THERMAL WELLS.	CENTRAL STATION STEAM CADILLAC

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

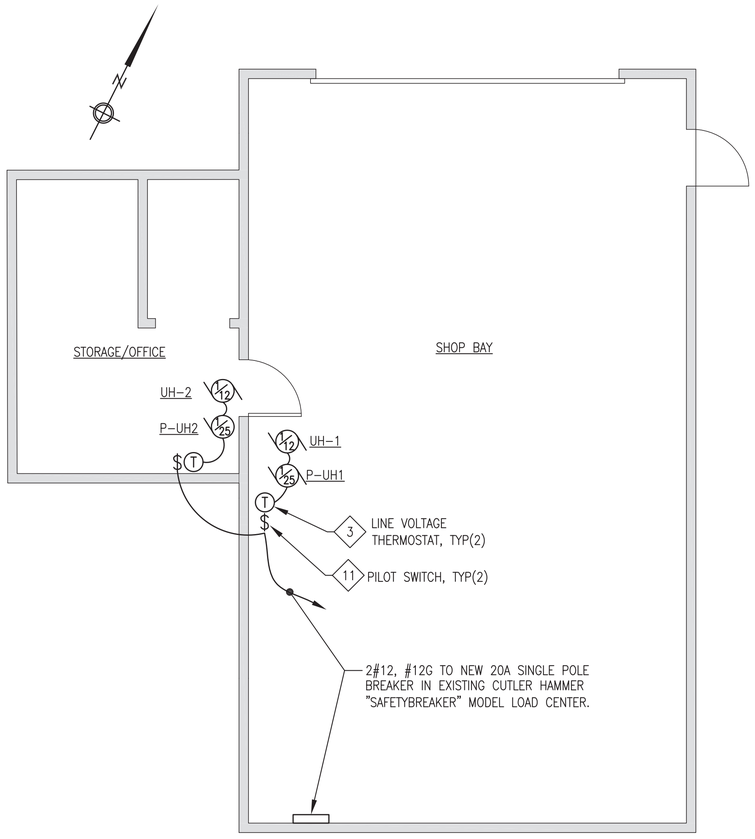
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

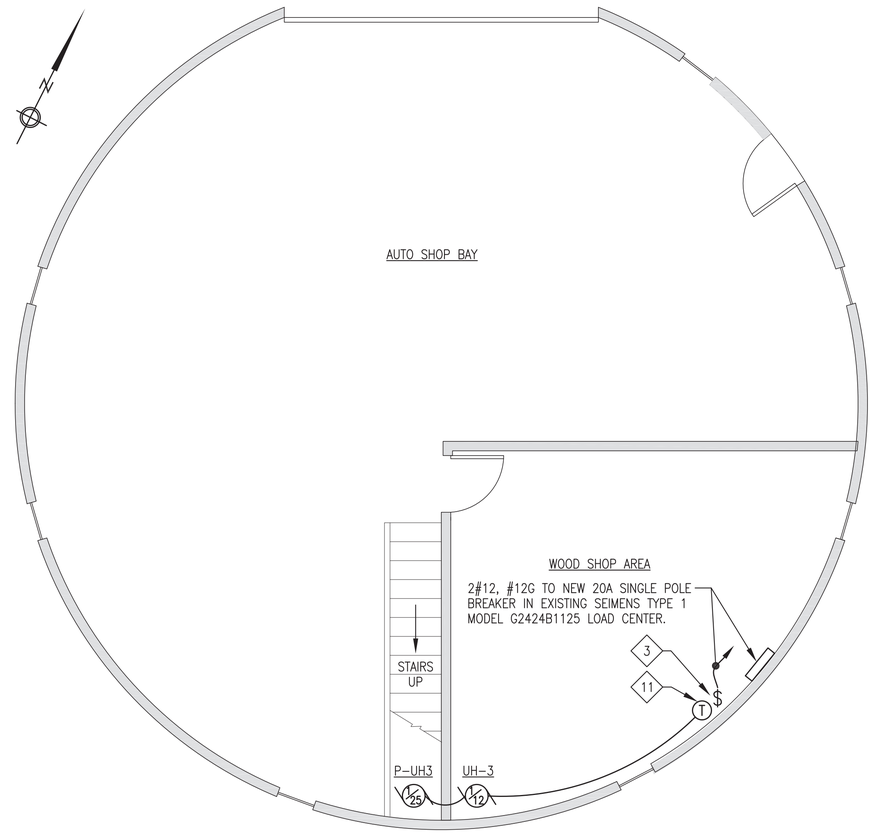
TITLE: HEAT RECOVERY SYSTEM SCHEDULES & SCHOOL HEAT RECOVERY WIRING

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

DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 4/1/19
FILE NAME: PTH PPU E8	SHEET: E8.1 OF 8
PROJECT NUMBER:	



1 E8.2 CITY SHOP PLAN
1/4"=1'-0"



2 E8.2 VILLAGE SHOP PLAN
1/4"=1'-0"

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

ISSUED FOR
CONSTRUCTION
APRIL 2019

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

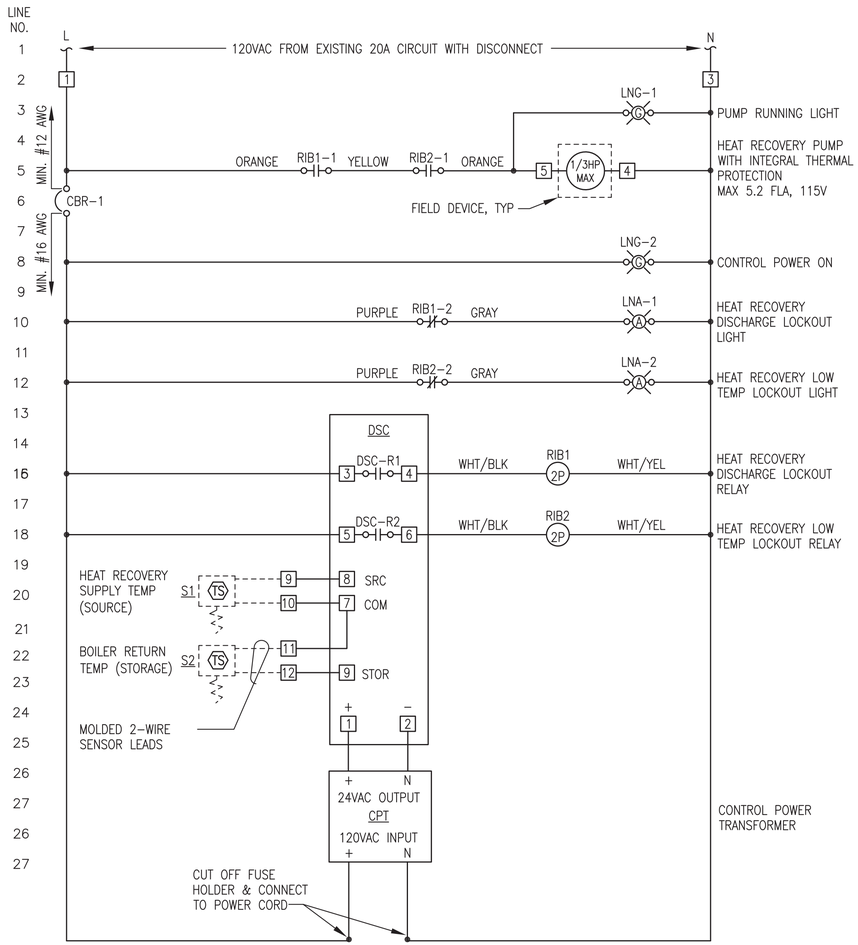
ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM
POWER PLANT UPGRADE

TITLE: HEAT RECOVERY SYSTEM
CITY & VILLAGE SHOPS HEAT RECOVERY WIRING

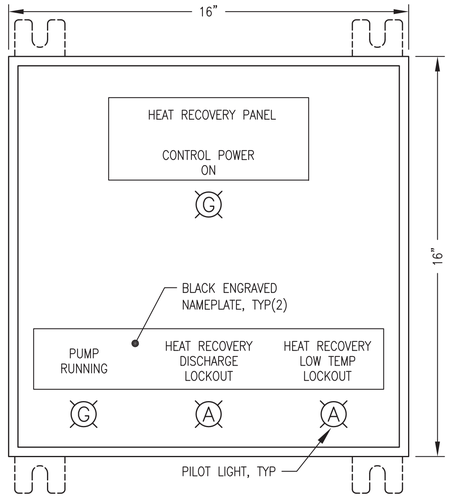
Gray Stassel Engineering, Inc.
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DRAWN BY: JTD
DESIGNED BY: CWV/BCG
FILE NAME: PTH PPU E8
PROJECT NUMBER:
SCALE: AS NOTED
DATE: 4/1/19
SHEET: E8.2 OF 8



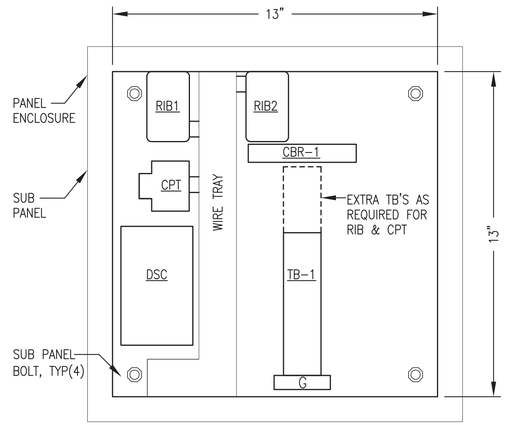
1 E8.3 HEAT RECOVERY PANEL LOGIC DIAGRAM

NO SCALE



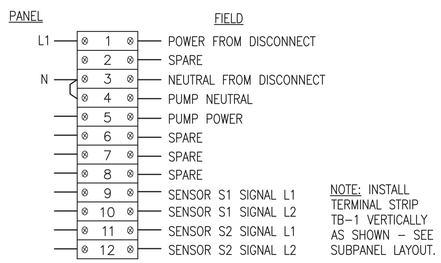
2 E8.3 FRONT PANEL LAYOUT

NO SCALE



3 E8.3 SUB PANEL LAYOUT

NO SCALE



4 E8.3 TERMINAL STRIP TB-1

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–A1–C050	RAIL–MOUNT CIRCUIT BREAKER, 1 POLE, 5A
CPT	1	TEKMAR	MODEL 009	40VA, 24VAC CONTROL POWER TRANSFORMER
DSC	1	TEKMAR	MODEL 155	DIFFERENTIAL SETPOINT CONTROLLER, 24VAC, 2 EACH N.O. RELAYS RATED 240V, 10A, 1/3HP
LNG	2	ALLEN–BRADLEY	800HQRH10G	GREEN LED PILOT LIGHT, 120V, NEMA 4X
LNA	2	ALLEN–BRADLEY	800HQRH10A	AMBER LED PILOT LIGHT, 120V, NEMA 4X
RIB1,2	2	FUNCTIONAL DEVICES	RIB2401D	2PDT RELAY, 120VAC COIL, 10A, 1/3HP N.C. RATED
S1,2	2	TEKMAR	MODEL 078	UNIVERSAL SENSOR, 10K THERMISTOR, 15' LEADS
TB		ALLEN–BRADLEY	1492CAM1L	35A, 600V, LARGE–HEAD SCREW TERMINALS

EQUIPMENT REQUIREMENTS FOR APPROVED EQUALS (APPLIES TO BILL OF MATERIALS): 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) 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 16"x16"x6" 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=150; 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) 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.

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 "SOURCE") AND SENSOR S2 (BOILER RETURN TEMPERATURE "STORAGE") IS GREATER THAN THE DELTA–T SETPOINT (7 DEG F, ADJUSTABLE) AND; THE HEAT RECOVERY SUPPLY SENSOR S1 TEMPERATURE IS GREATER THAN THE MINIMUM SOURCE SETPOINT (150 DEG F, ADJUSTABLE) 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, ADJUSTABLE) MINUS THE DELTA–T DIFFERENTIAL (5 DEG F, ADJUSTABLE), THE DSC–R1 RELAY WILL OPEN, THE RIB1 COIL WILL BE DE–ENERGIZED, THE AMBER "DISCHARGE 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–R1 RELAY WILL CLOSE, THE RIB1 COIL WILL BE ENERGIZED, THE AMBER "DISCHARGE 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 (150 DEG F, ADJUSTABLE): THE DSC–R2 RELAY WILL OPEN, THE RIB2 COIL WILL BE DE–ENERGIZED, THE AMBER "LOW HEAT RECOVERY TEMP 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 (150 DEG F, ADJUSTABLE) PLUS THE MINIMUM SOURCE DIFFERENTIAL (5 DEG F, ADJUSTABLE); THE DSC–R2 RELAY WILL CLOSE, THE RIB2 COIL WILL BE ENERGIZED, THE AMBER "LOW HEAT RECOVERY TEMP LOCKOUT" LIGHT WILL TURN OFF, AND THE PUMP WILL RUN.

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

ISSUED FOR CONSTRUCTION APRIL 2019

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

ALASKA ENERGY AUTHORITY

PROJECT: PORT HEIDEN RURAL POWER SYSTEM POWER PLANT UPGRADE

TITLE: HEAT RECOVERY SYSTEM SCHOOL HEAT RECOVERY PANEL "HRP"

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DRAWN BY: JTD | SCALE: AS NOTED
DESIGNED BY: CWV/BCG | DATE: 4/1/19
FILE NAME: PTH PPU E8 | SHEET: E8.3 OF 8
PROJECT NUMBER: