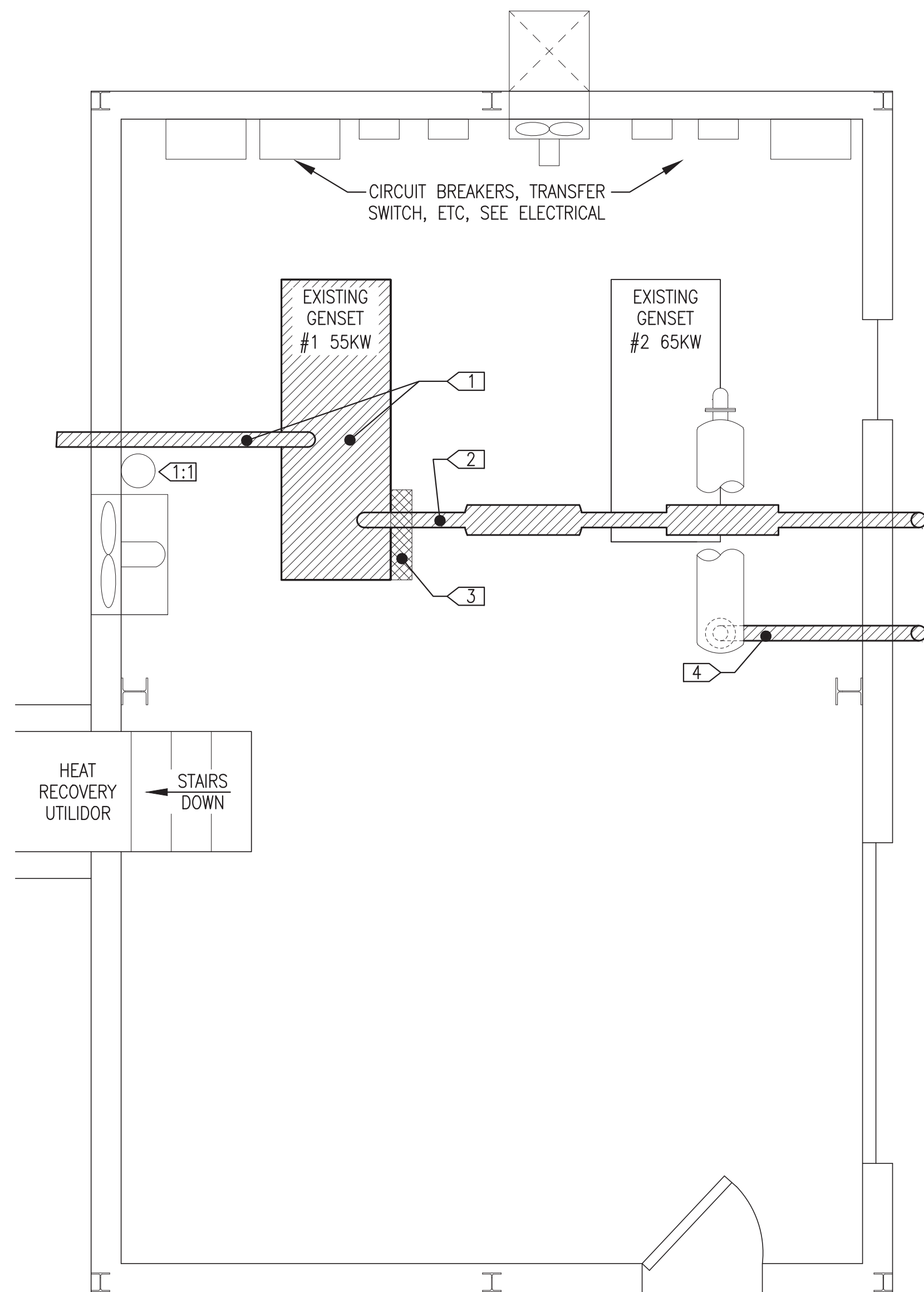


PROJECT DESCRIPTION

1. THE PLATINUM POWER PLANT CONSISTS OF A 20'x30 PRE-ENGINEERED INSULATED METAL BUILDING WITH TWO DIESEL ENGINE-GENERATOR SETS (GENSETS) CONNECTED TO A COMMON ENGINE COOLANT/HEAT RECOVERY MANIFOLD. NEITHER THE POWER PLANT COMMUNITY FEEDER ELECTRICAL CONNECTION NOR THE COMMON ENGINE COOLANT/HEAT RECOVERY SYSTEM ARE DESIGNED FOR GENSET PARALLELING OPERATION. THEREFORE THIS IS NOT A PARALLELING POWER PLANT. A FULL COMMUNITY OUTAGE IS REQUIRED EACH TIME A GENSET IS TAKEN OFFLINE OR PLACED ONLINE. THIS PROJECT WILL NOT PROVIDE PARALLELING CAPABILITY FOR THE POWER PLANT.
2. THE PURPOSE OF THIS PROJECT IS TO REMOVE EXISTING GENSET #1 AND TO REPLACE WITH A NEW TIER 3 MARINE ENGINE GENSET.
3. IN ADDITION, MINOR MODIFICATIONS WILL BE MADE TO THE PLANT MECHANICAL AND ELECTRICAL SYSTEMS AS INDICATED.



DEMOLITION GENERAL NOTES:

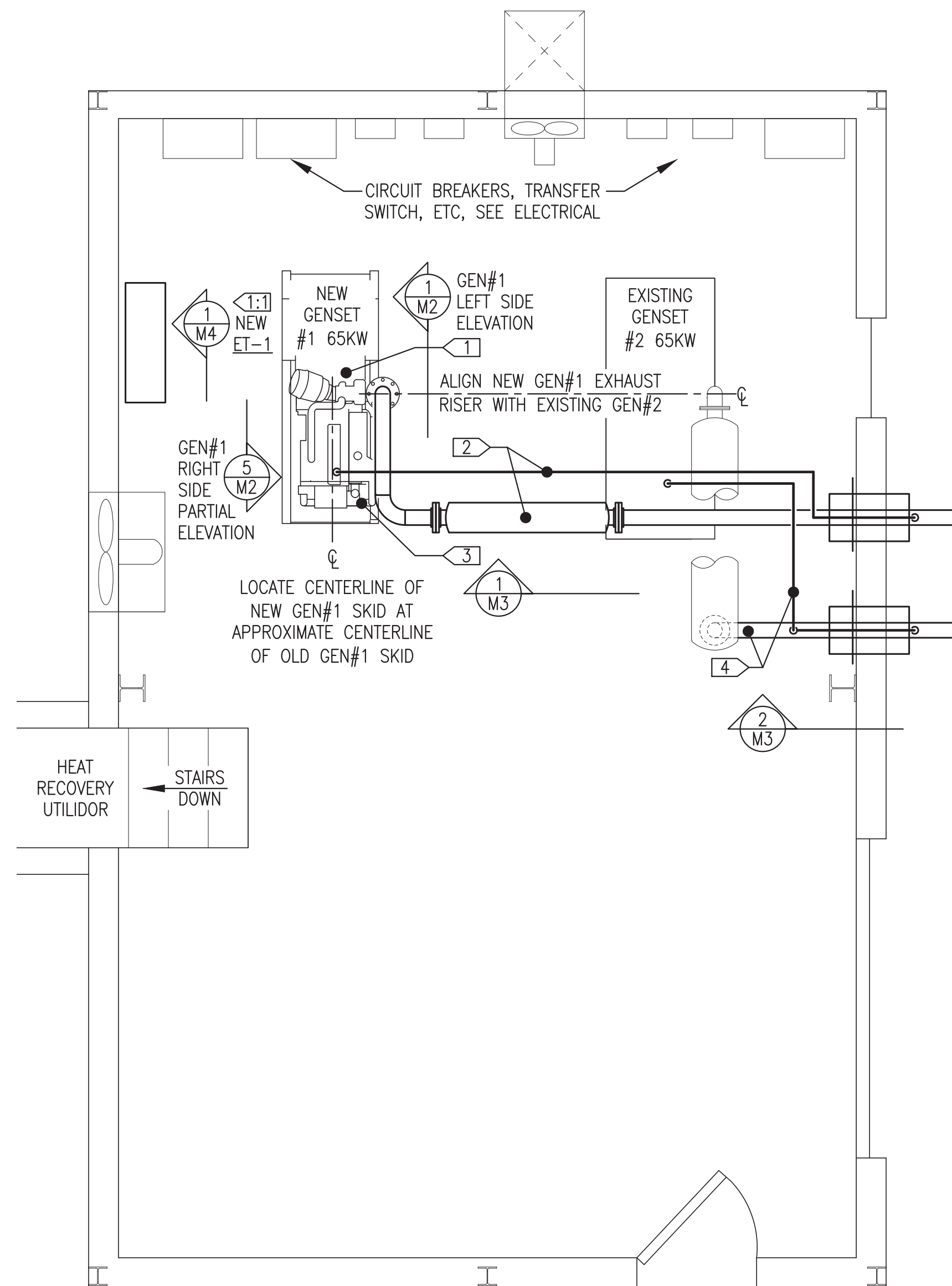
1. EXISTING EQUIPMENT AND PIPING TO BE REMOVED INDICATED BY HATCHING
2. TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO GENERATION EQUIPMENT BEING REMOVED DURING DEMOLITION. TARP GENERATOR ENDS AND SEAL ALL EXPOSED CONNECTIONS PRIOR TO REMOVING FROM PLANT. TURN ALL REMOVED EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION.
3. DRAIN GENSET #1 ENGINE OF GLYCOL AND SAVE FOR RE-USE.
4. ENGINE BLOCK FOR GENSET #1 IS TO BE TAKEN OUT PERMANENT SERVICE BUT NOT RENDERED UNUSABLE. A DERA CERTIFICATE OF ENGINE DESTRUCTION IS NOT REQUIRED.
5. UPON COMPLETION OF WORK, THE BUILDING OWNER IS TO INSULATE, COVER, AND SEAL ANY OPENINGS IN EXTERIOR WALLS RESULTING FROM DEMOLITION.
6. SEE ELECTRICAL PLANS FOR ADDITIONAL DEMOLITION.

DEMOLITION SPECIFIC NOTES:

- BASE BID
- 1 REMOVE EXISTING GEN#1 IN ITS ENTIRETY INCLUDING 4" PVC AIR INTAKE PIPE.
 - 2 REMOVE EXISTING GEN#1 EXHAUST SYSTEM IN ITS ENTIRETY.
 - 3 REMOVE A PORTION OF EXISTING 2" COPPER COOLANT PIPING THIS AREA. SEE NEW WORK DETAILS FOR LIMITS OF DEMOLITION.
 - 4 REMOVE ALL EXISTING GEN#2 EXHAUST PIPE BEYOND MUFFLER OUTLET FLANGE.
- ADDITIVE ALTERNATE #1
- 1:1 DEMOLISH EXISTING COOLANT RESERVOIR, PIPE, AND VALVES AS SHOWN ON SHEET M4.

1 M1 DEMOLITION PLAN
3/8"=1'-0"

GENSET	DESCRIPTION
GEN #1 (2021 DERA)	ENGINE - 99 HP, 65 kW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE OR APPROVED EQUAL. 12 VDC STARTING/CONTROL VOLTAGE. GENERATOR - 208V 3-PHASE, MINIMUM 90KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274C OR APPROVED EQUAL.
GEN #2 (EXISTING)	ENGINE - 99 HP, 65 kW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE. 12 VDC STARTING/CONTROL VOLTAGE. GENERATOR - 208V 3-PHASE, 65kW, NORTHERN LIGHTS M65C1B.



2 M1 NEW WORK PLAN
3/8"=1'-0"

SCHEDULE OF DRAWINGS:

- M1 PROJECT DESCRIPTION, SCHEDULE OF DRAWINGS, & MECHANICAL WORK PLANS
- M2 NEW GENERATOR #1 INSTALLATION DETAILS
- M3 EXHAUST & CRANK VENT SYSTEM ELEVATIONS & DETAILS
- M4 EXPANSION TANK ELEVATIONS & DETAILS
- M5 GENSET FABRICATION DETAILS
- E1 ELECTRICAL DEMOLITION & NEW WORK PLANS
- E2 NEW GEN#1 INSTALLATION DETAILS
- E3 GROUNDING PLAN & RADIATOR WIRING DIAGRAM
- E4 GEN#1 12V CONTROL PANEL

NEW WORK GENERAL NOTES:

1. EXISTING EQUIPMENT AND PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
2. NEW EQUIPMENT AND PIPING TO BE INSTALLED SHOWN WITH DARK SOLID LINES.
3. RECEIVE OWNER FURNISHED GLYCOL SOLUTION FROM UTILITY. FILL NEW ENGINE AND PIPING WITH SALVAGED AND NEW GLYCOL UNDER BASE BID. ADD ADDITIONAL OWNER FURNISHED GLYCOL SOLUTION UNDER ADDITIVE ALTERNATE #1 TO CHARGE NEW EXPANSION TANK AND PIPING.
4. SEE ELECTRICAL FOR ADDITIONAL INSTALLATION DETAILS.

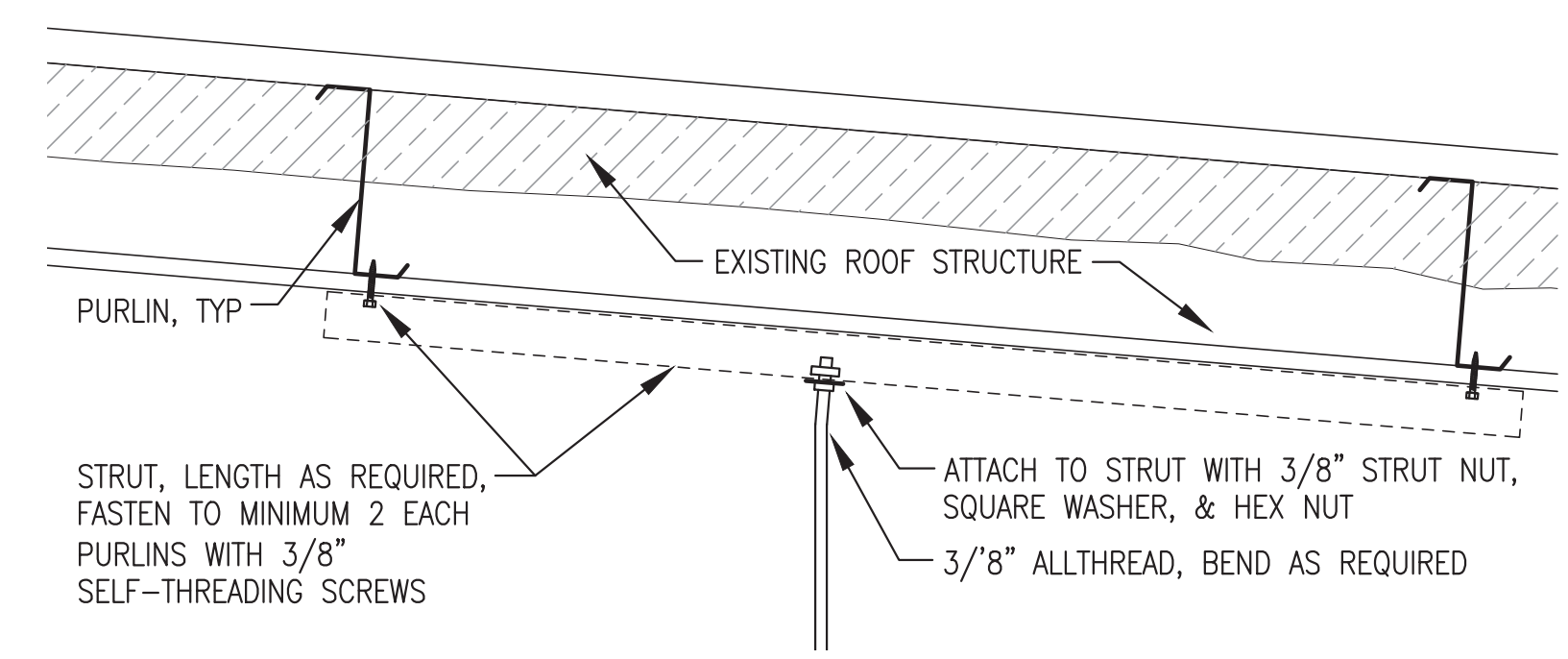
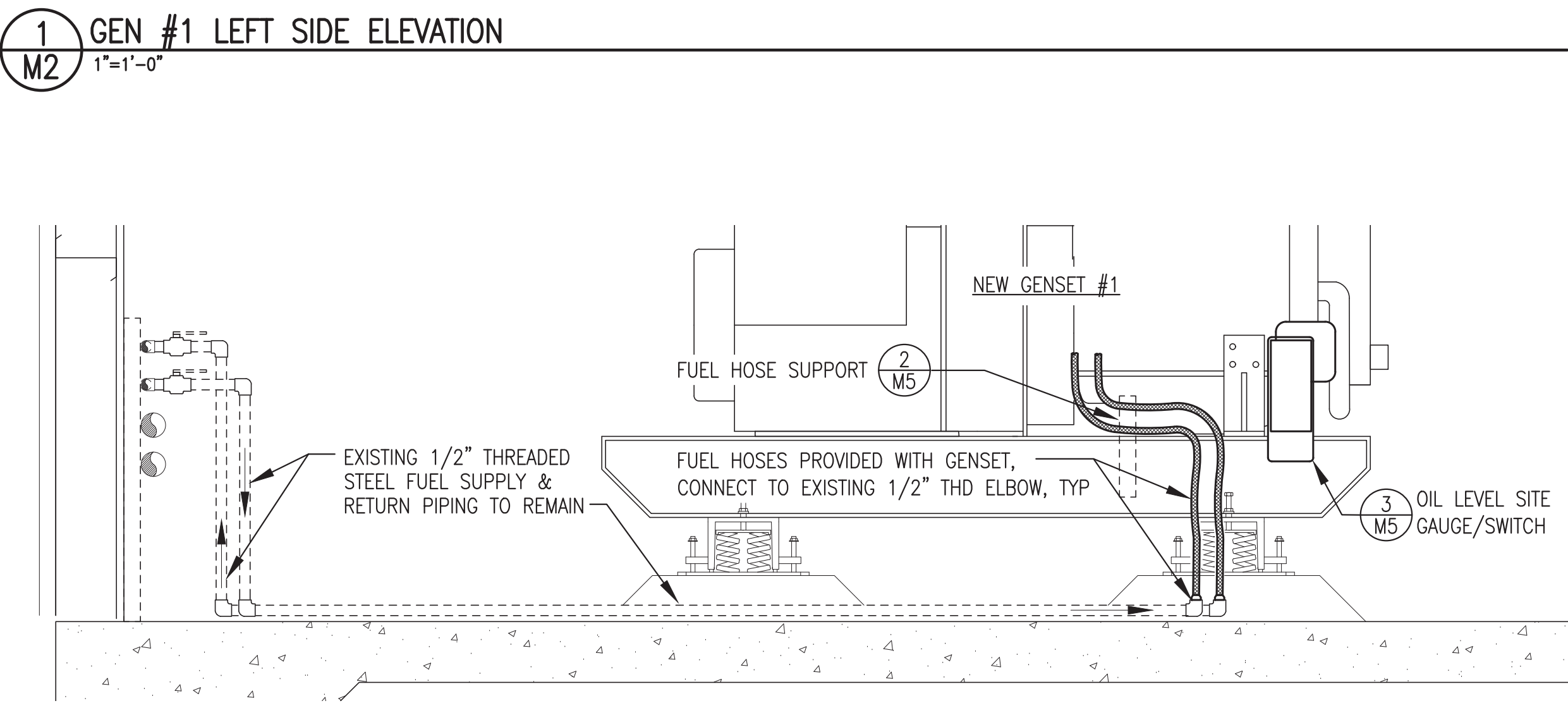
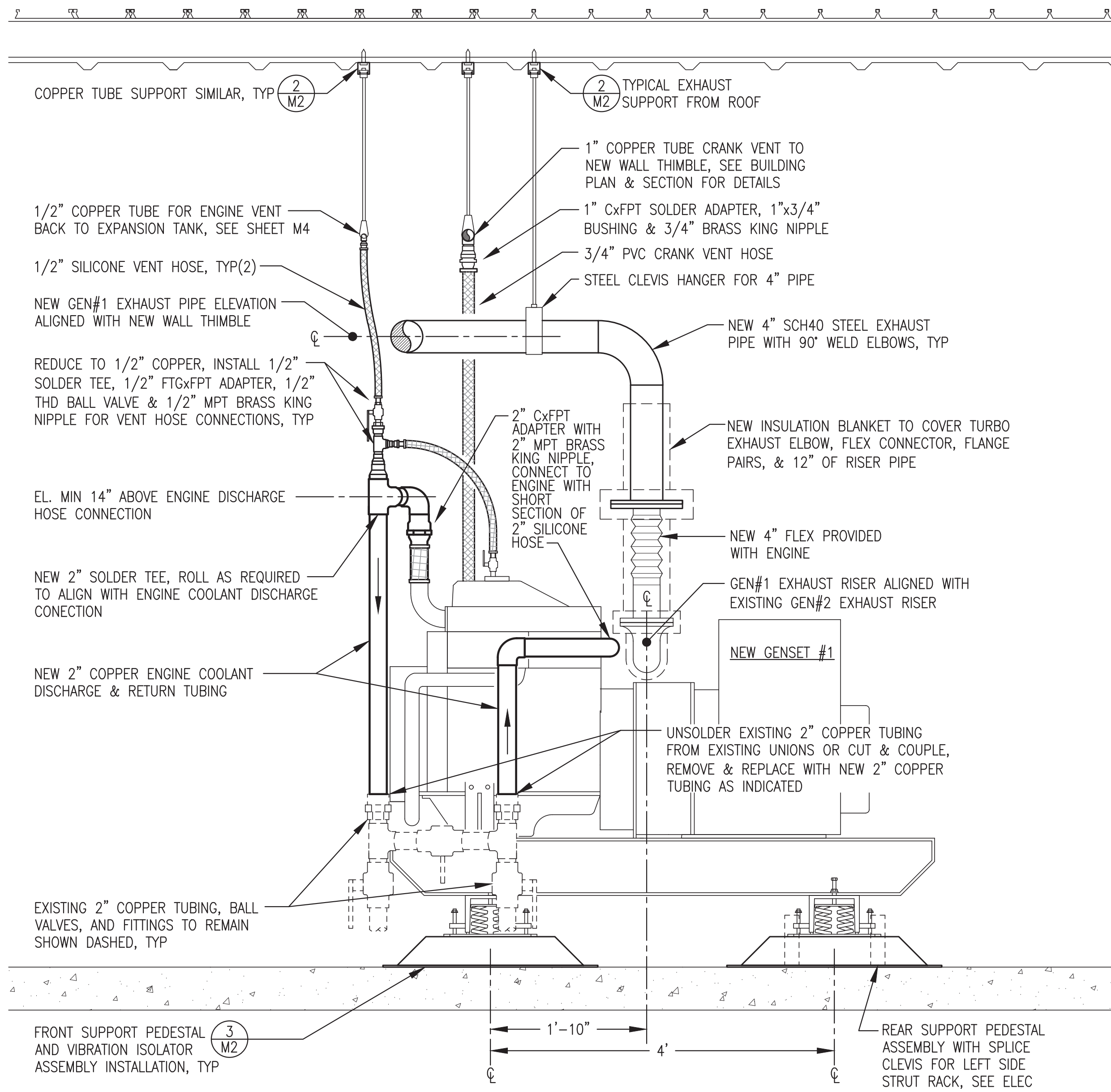
NEW WORK SPECIFIC NOTES:

- BASE BID
- 1 INSTALL COMPLETE NEW GENSET #1 INCLUDING: COOLANT, FUEL, EXHAUST, AND CRANK VENT CONNECTIONS. SEE ELEVATION 1/M2.
 - 2 INSTALL NEW GEN#1 EXHAUST SYSTEM INCLUDING MUFFLER, EXHAUST PIPE, AND WALL THIMBLE. INSTALL NEW CRANK VENT SYSTEM. SEE SHEETS M2 AND M3.
 - 3 MODIFY A PORTION OF EXISTING 2" COPPER COOLANT PIPING THIS AREA FOR NEW ENGINE COOLANT HOSE CONNECTIONS. SEE ELEVATION 1/M2.
 - 4 INSTALL NEW GEN#2 EXHAUST PIPING BEYOND EXISTING MUFFLER DISCHARGE FLANGE INCLUDING WALL THIMBLE. INSTALL NEW CRANK VENT SYSTEM. SEE SHEET M3.
- ADDITIVE ALTERNATE #1
- 1:1 INSTALL NEW COOLANT SYSTEM EXPANSION TANK, PIPING, VALVES, HOSES, PUMP, AND APPURTENANCES AS SHOWN ON SHEET M4.

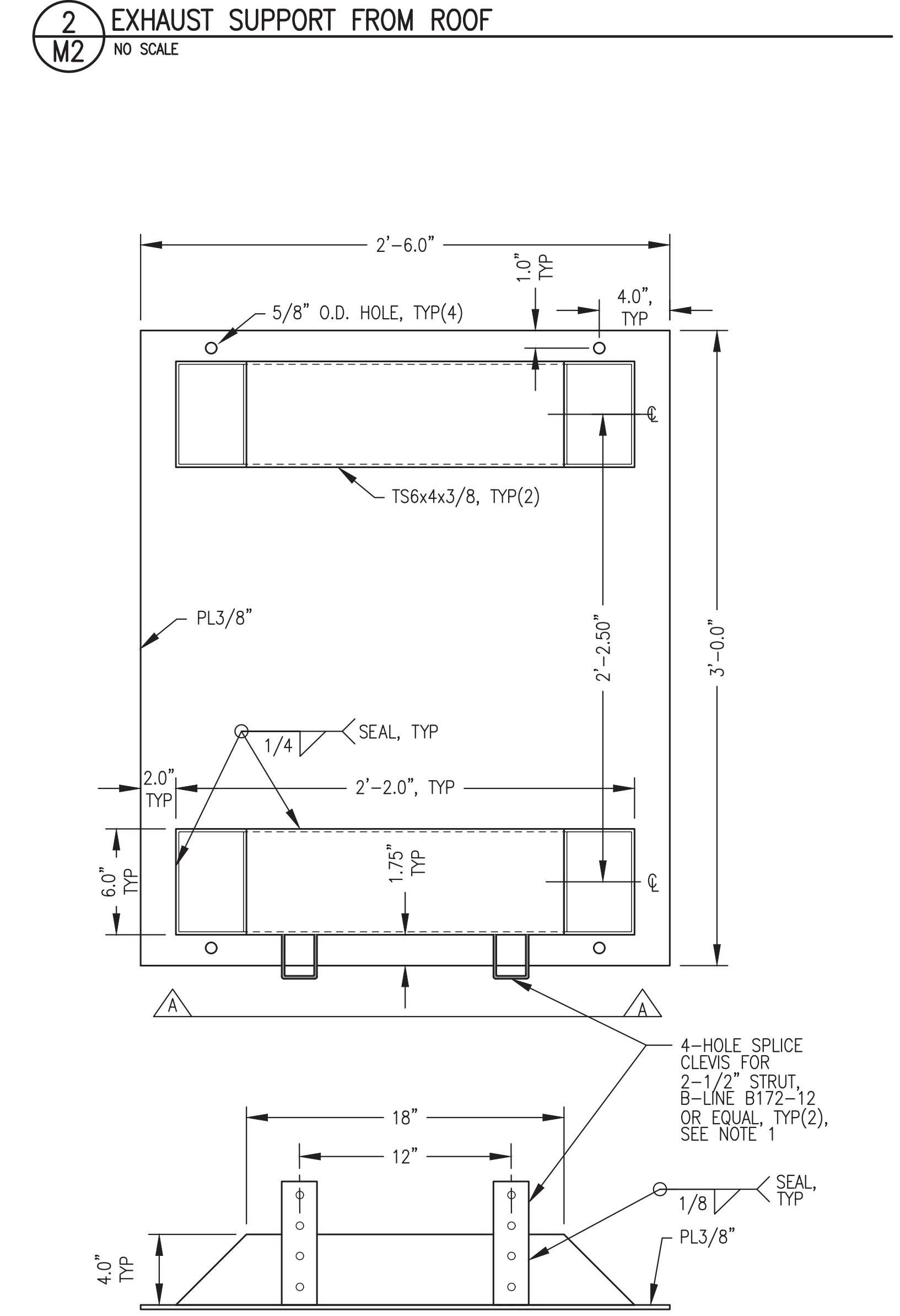
ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECTS PLATINUM POWER PLANT UPGRADE		
TITLE: PROJECT DESCRIPTION, SCHEDULE OF DRAWINGS, & MECHANICAL WORK PLANS		
 P.O. 111405, Anchorage, AK 99511 (907)349-0100	DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: PLAT DERA M1-5 PROJECT NUMBER:	SCALE: AS NOTED DATE: 4/20/22 SHEET: M1



NOTE: SUPPORT 4" STEEL EXHAUST PIPING FROM MINIMUM 2 EACH PURLINS AS SHOWN. SMALL DIAMETER COPPER TUBE MAY BE SUPPORTED FROM CORRUGATED CEILING METAL WITH MIN 24" LONG SECTION OF STRUT & 4 EA. #12 SHEET METAL SCREWS.

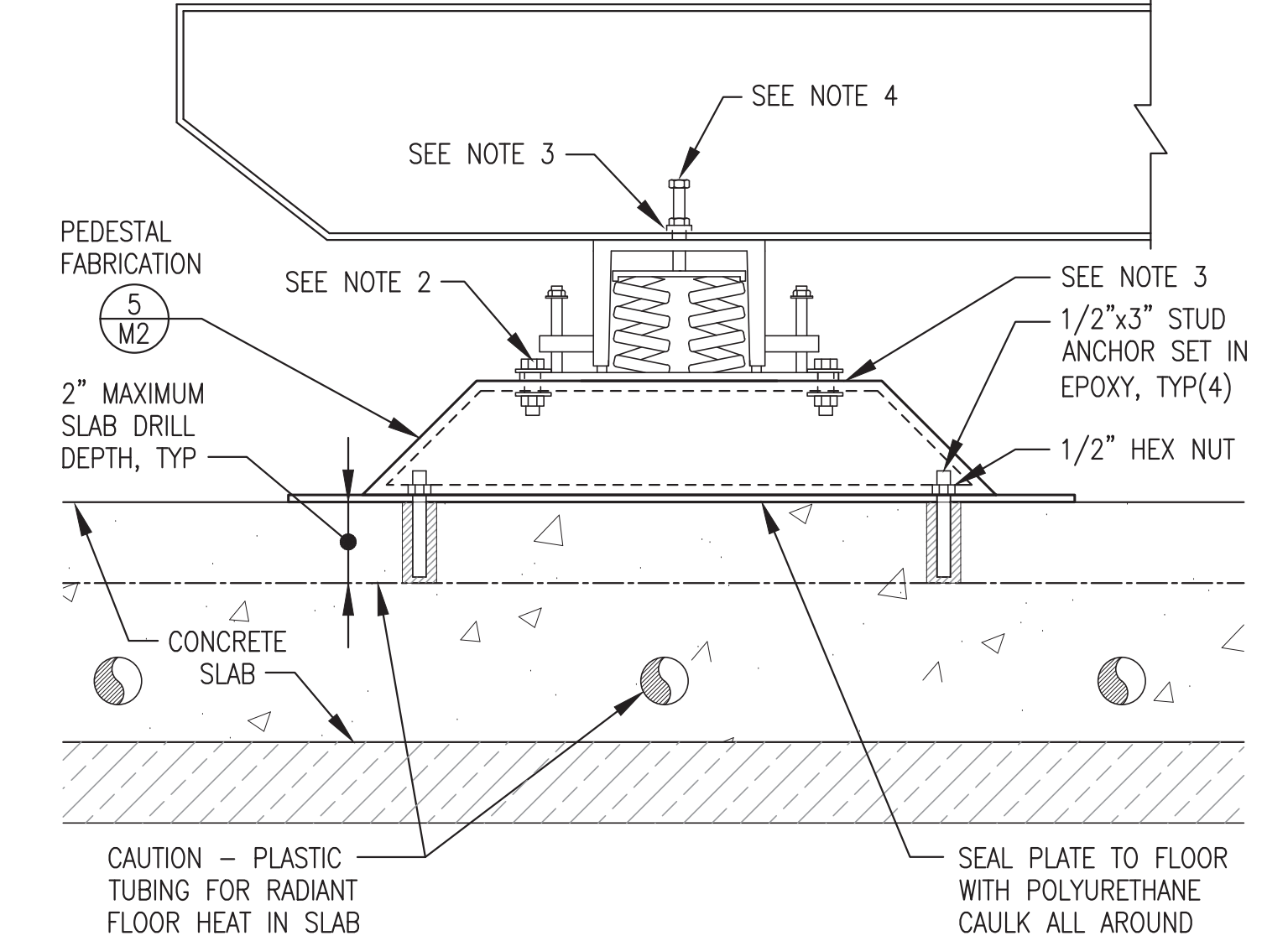


FABRICATION NOTES:

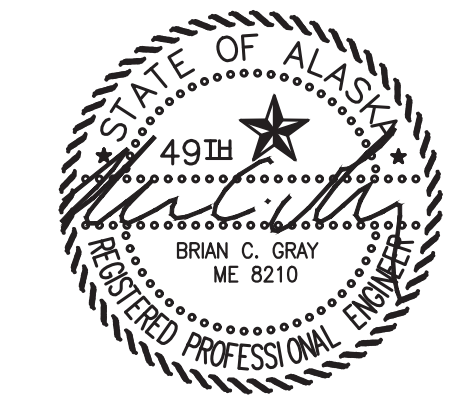
- 1) FABRICATE ONE SUPPORT ASSEMBLY AS INDICATED WITH SPLICE CLEVIS (REAR SUPPORTS) AND ONE SUPPORT ASSEMBLY IDENTICAL EXCEPT WITHOUT SPLICE CLEVIS (FRONT SUPPORTS).
- 2) FABRICATE SUPPORTS FROM STEEL TS8"x4"x3/8" AND PL3/8".
- 3) GRIND EDGES AND ROUND SHARP CORNERS, SANDBLAST ENTIRE ASSEMBLY, AND FINISH WITH TWO COATS OF HIGH SOLIDS EPOXY COATING, PPG AMERLOCK 2 VOC, NO SUBSTITUTES, COLOR ANSI 61 GRAY.

INSTALLATION NOTES:

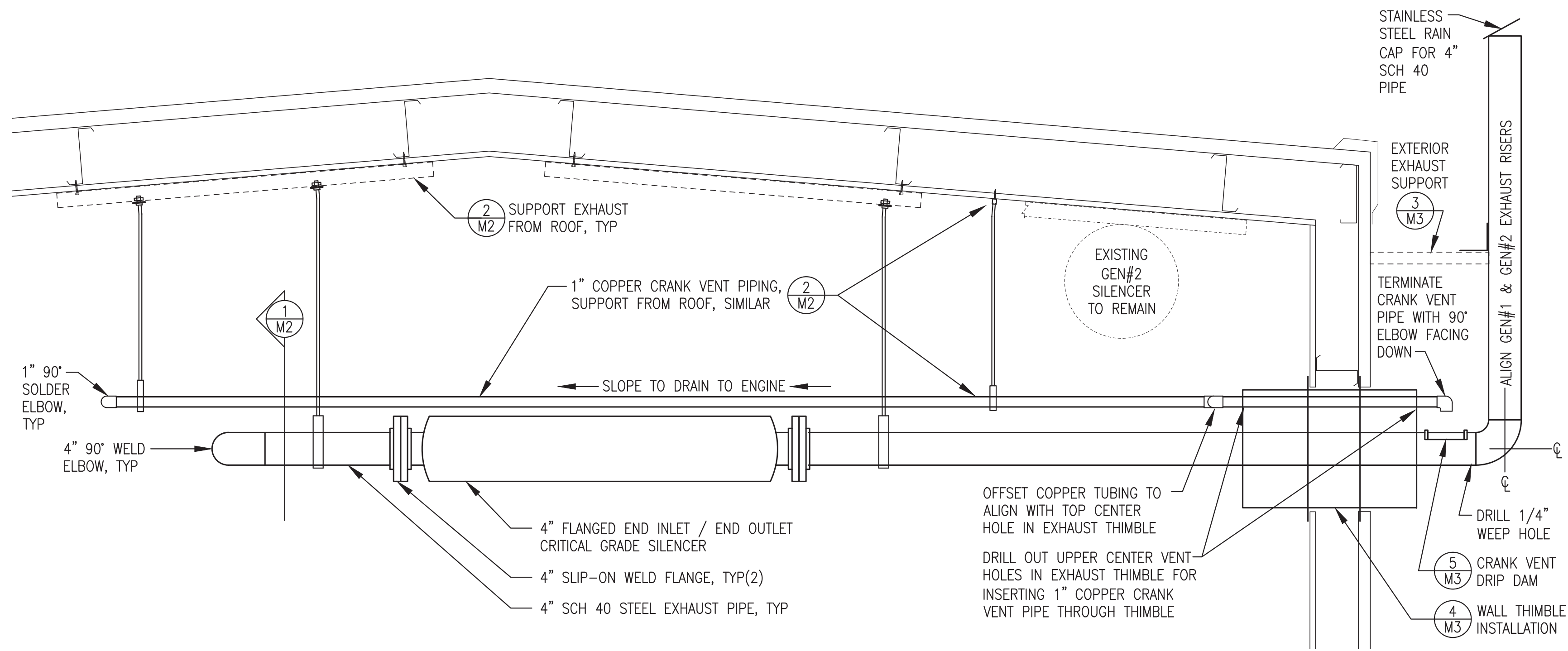
- 1) ATTACH ISOLATORS TO SKID AT WEDGE WASHERS.
- 2) FIELD DRILL TOP OF PEDESTAL TO MATCH VIBRATION ISOLATOR BASE & FASTEN WITH 4 EA. 1/2" BOLTS WITH LOCK WASHERS.
- 3) LOCATE GENERATOR AS INDICATED ON PLAN PRIOR TO ANCHORING PEDESTAL PLATES TO FLOOR
- 4) ADJUST SPRING VIBRATION ISOLATOR LEVELING BOLTS 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..



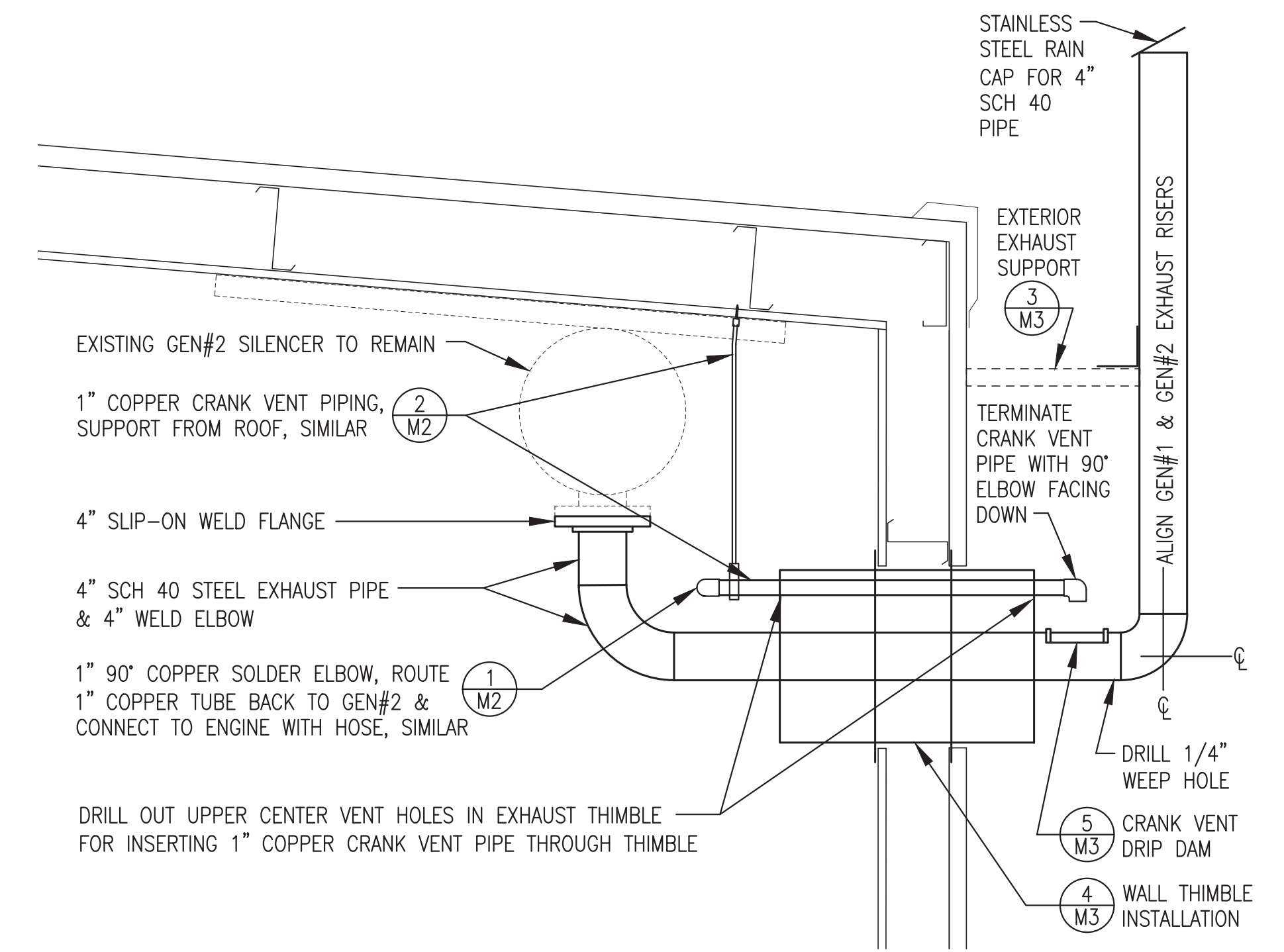
ISSUED FOR CONSTRUCTION
 APRIL 2022



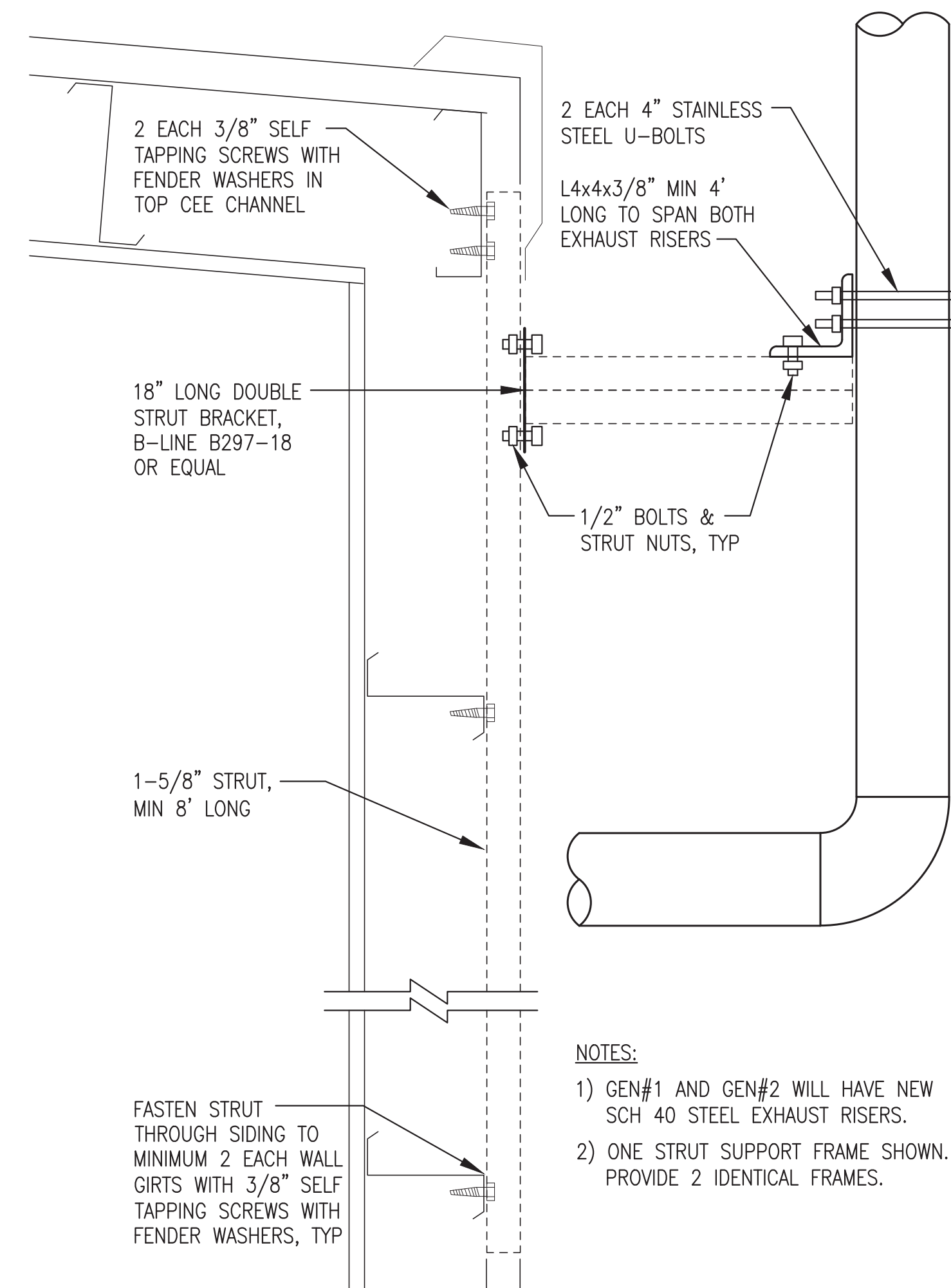
ALASKA ENERGY AUTHORITY	
PROJECT: FFY20 DERA PROJECT PLATINUM POWER PLANT UPGRADE	
TITLE: NEW GENERATOR #1 INSTALLATION DETAILS	
 Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100	DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: PLAT DERA M1-5 PROJECT NUMBER:
SCALE: AS NOTED DATE: 4/20/22	SHEET: M2



1
M3 NEW GEN #1 EXHAUST & CRANK VENT SYSTEM ELEVATION
1"=1'-0"



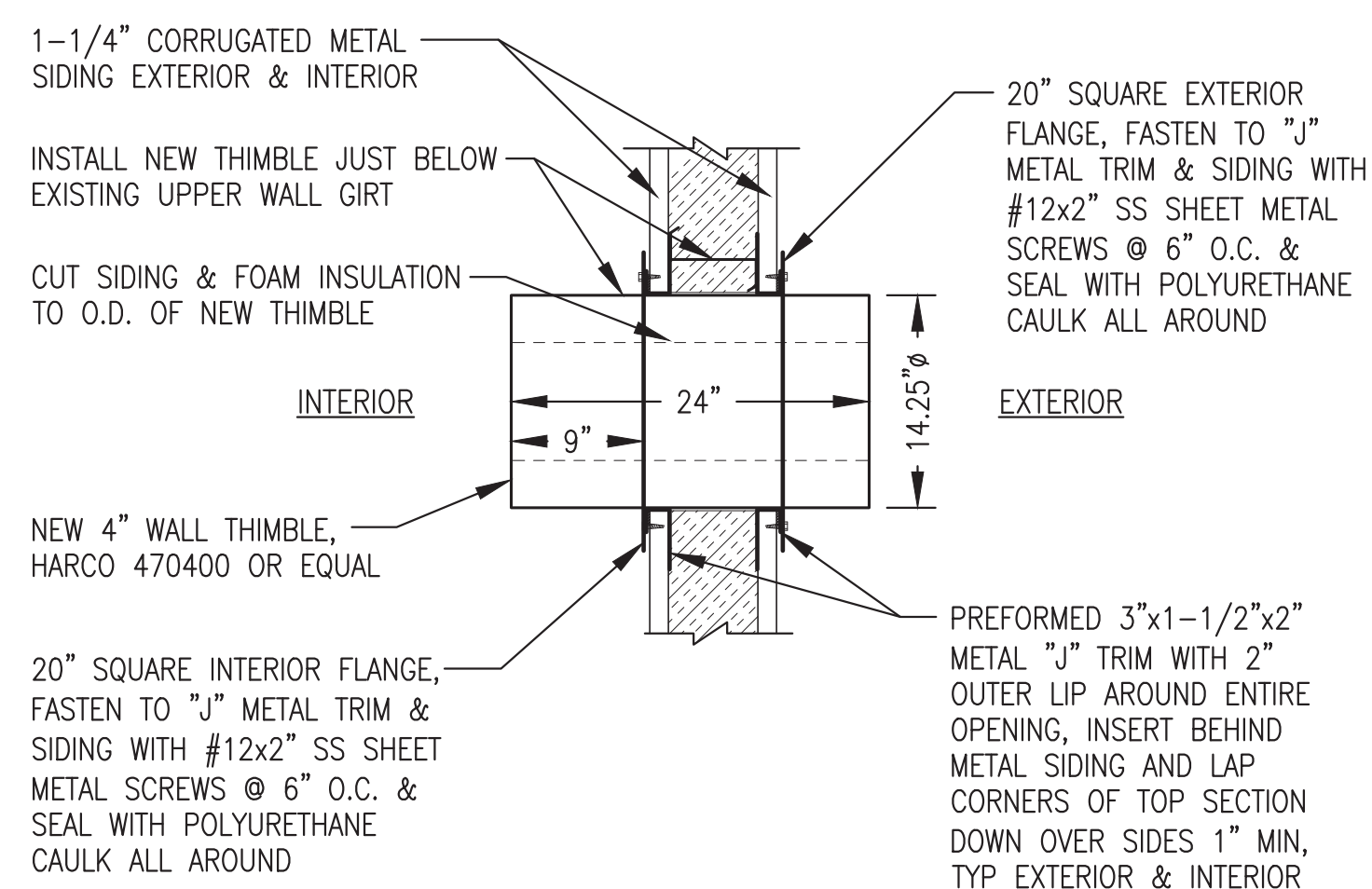
2
M3 GEN #2 REVISED EXHAUST & CRANK VENT SYSTEM ELEVATION
1"=1'-0"



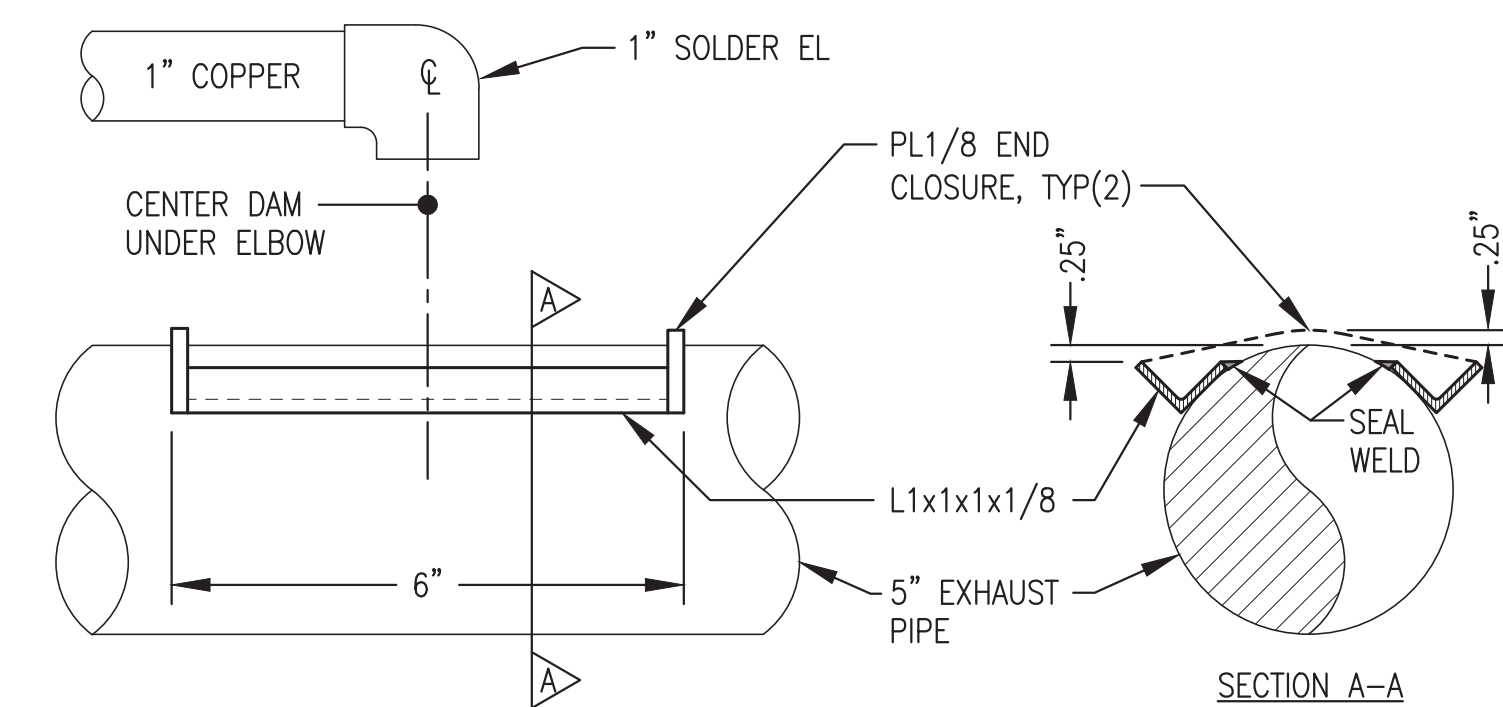
3
M3 EXTERIOR EXHAUST PIPE SUPPORT
NO SCALE

NOTES:

- 1) GEN#1 AND GEN#2 WILL HAVE NEW SCH 40 STEEL EXHAUST RISERS.
- 2) ONE STRUT SUPPORT FRAME SHOWN. PROVIDE 2 IDENTICAL FRAMES.

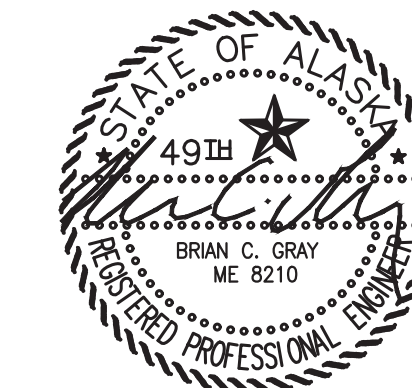


4
M3 NEW WALL THIMBLE INSTALLATION
NO SCALE

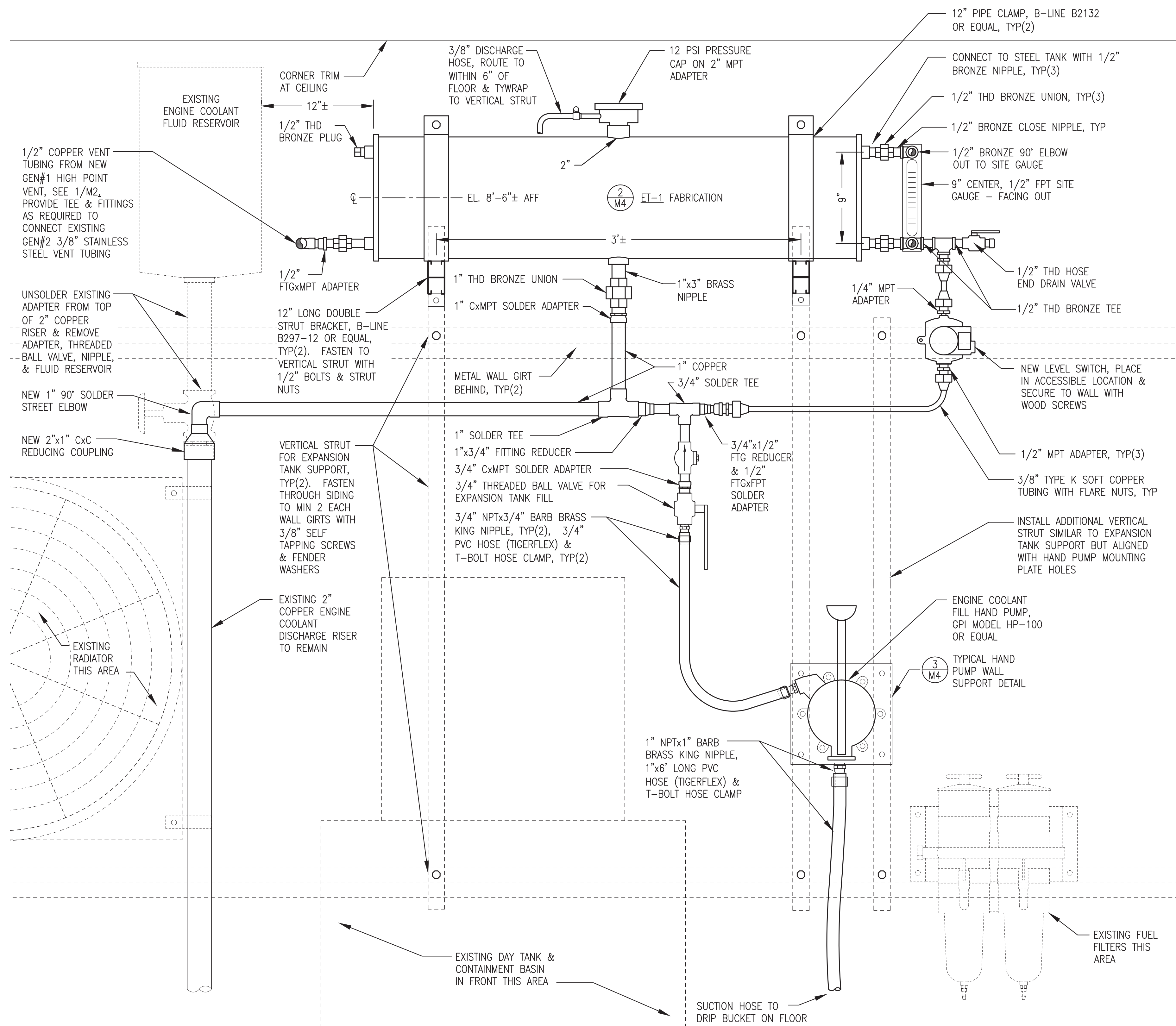


5
M3 CRANKCASE DRIP DAM FABRICATION DETAIL
NO SCALE

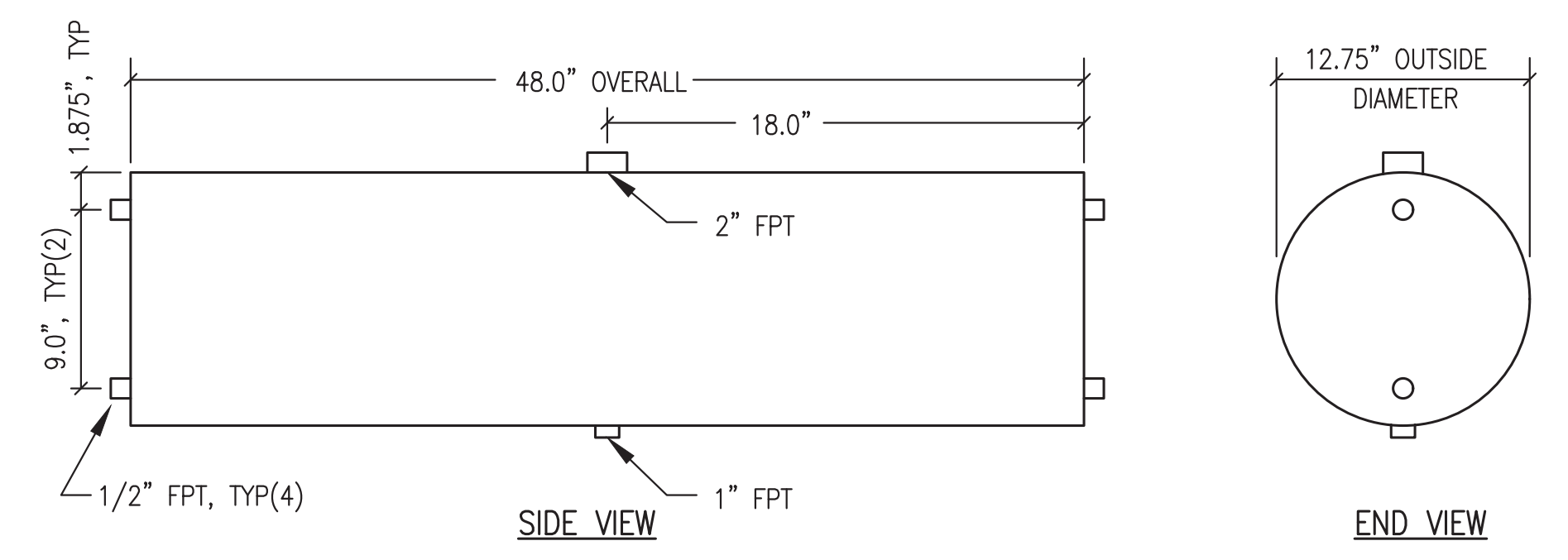
ISSUED FOR
CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECT PLATINUM POWER PLANT UPGRADE	
TITLE: EXHAUST & CRANK VENT SYSTEM ELEVATIONS & DETAILS	
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/20/22
FILE NAME: PLAT DERA M1-5	SHEET: M3
PROJECT NUMBER:	
P.O. 111405, Anchorage, AK 99511 (907)349-0100	

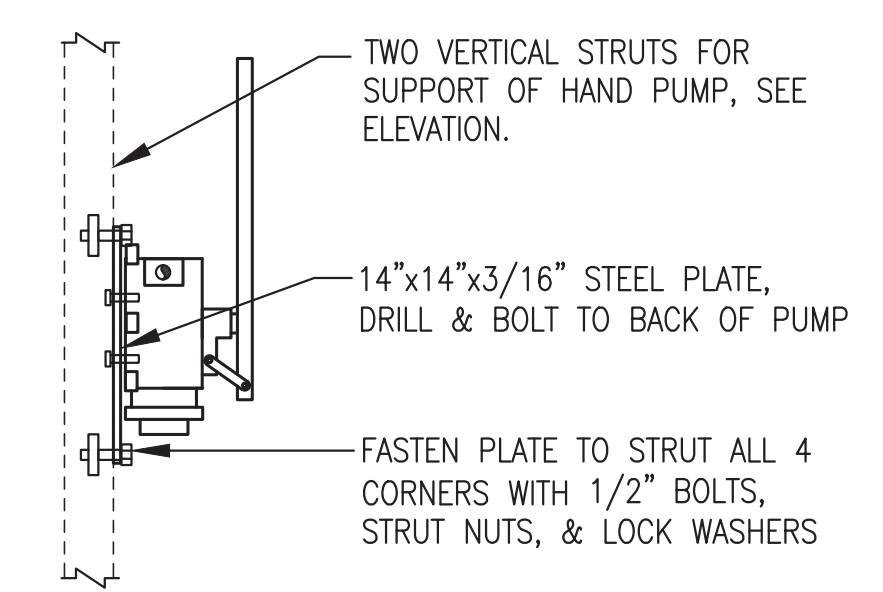


1 24 GAL EXPANSION TANK ET-1 INSTALLATION
M4 NO SCALE



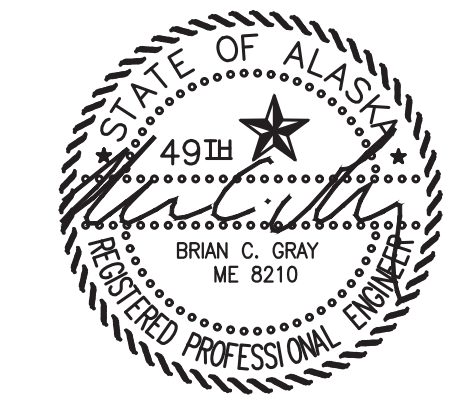
- EXPANSION TANK GENERAL NOTES:**
- FABRICATE SINGLE WALL 24 GALLON NOMINAL CAPACITY GLYCOL EXPANSION TANK.
 - FABRICATE SHELL FROM MINIMUM 10 GAUGE ASTM A-36 PLATE STEEL ROLLED AND WELDED OR SCHEDULE 5 LIGHTWALL ASTM A53 STEEL PIPE. FABRICATE HEADS FROM 3/16" THICK ASTM A-36 PLATE STEEL. MAKE ALL JOINTS WITH CONTINUOUS FULL-PENETRATION WELDS.
 - PROVIDE WITH ALL OPENINGS INDICATED USING MINIMUM 3000# FORGED STEEL PIPE HALF COUPLINGS IN ACCORDANCE WITH U.L. 142 FIGURE 7.1 #2.
 - PRESSURE TEST COMPLETED ASSEMBLY TO 15 PSIG MINIMUM.
 - UPON COMPLETION OF FABRICATION, ROUND ALL CORNERS AND SHARP EDGES. SANDBLAST TANK EXTERIOR AND ALL ATTACHMENTS IN ACCORDANCE WITH SSPC-SP-6. FINISH WITH TWO COATS OF HIGH SOLIDS EPOXY COATING, PPG AMERLOCK 2 VOC, NO SUBSTITUTES, COLOR ANSI 61 GRAY.
 - UPON COMPLETION FLUSH INTERIOR OF TANK TO REMOVE ALL DIRT AND DEBRIS, AIR DRY INTERIOR, AND SEAL ALL TANK OPENINGS WITH PLASTIC PLUGS.

2 24 GALLON GLYCOL EXPANSION TANK ET-1 FABRICATION
M4 1-1/2"=1'-0"

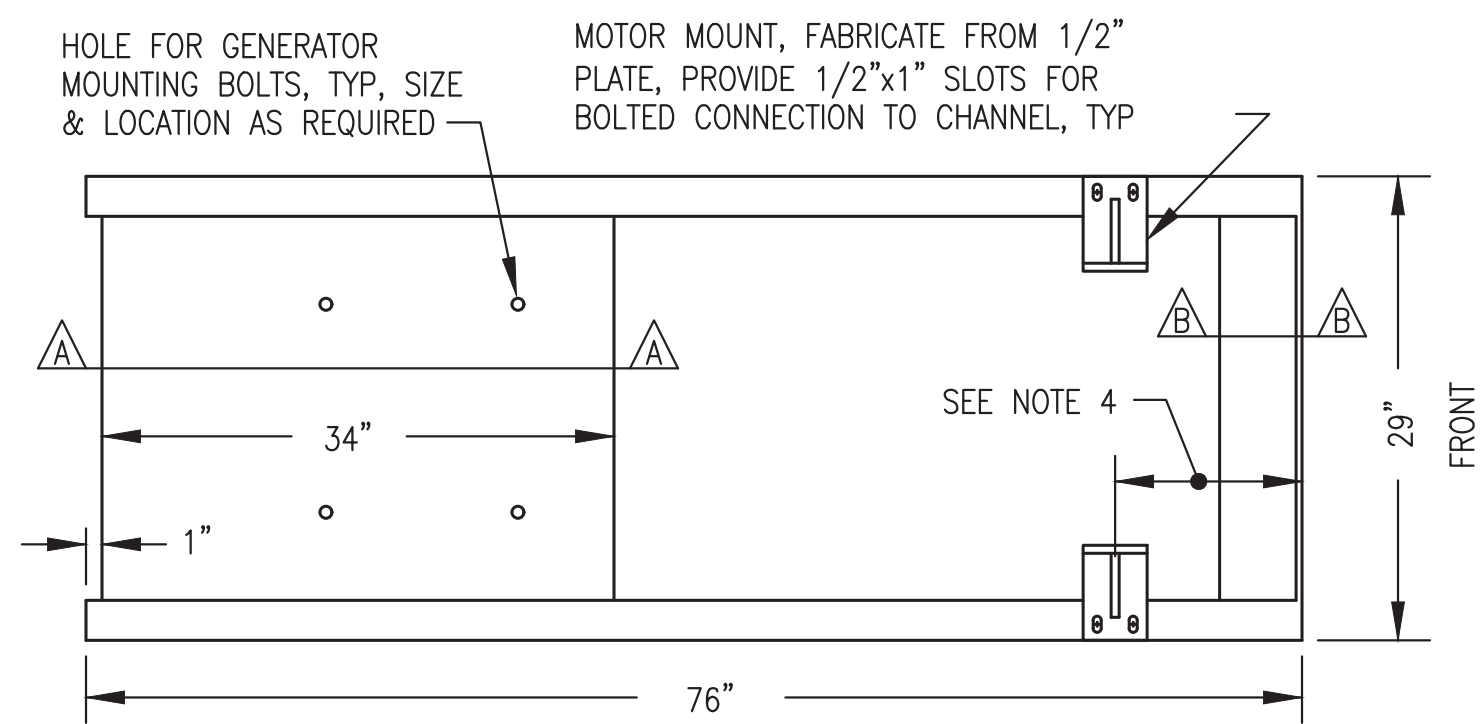


3 HAND PUMP WALL SUPPORT DETAIL
M4 NO SCALE

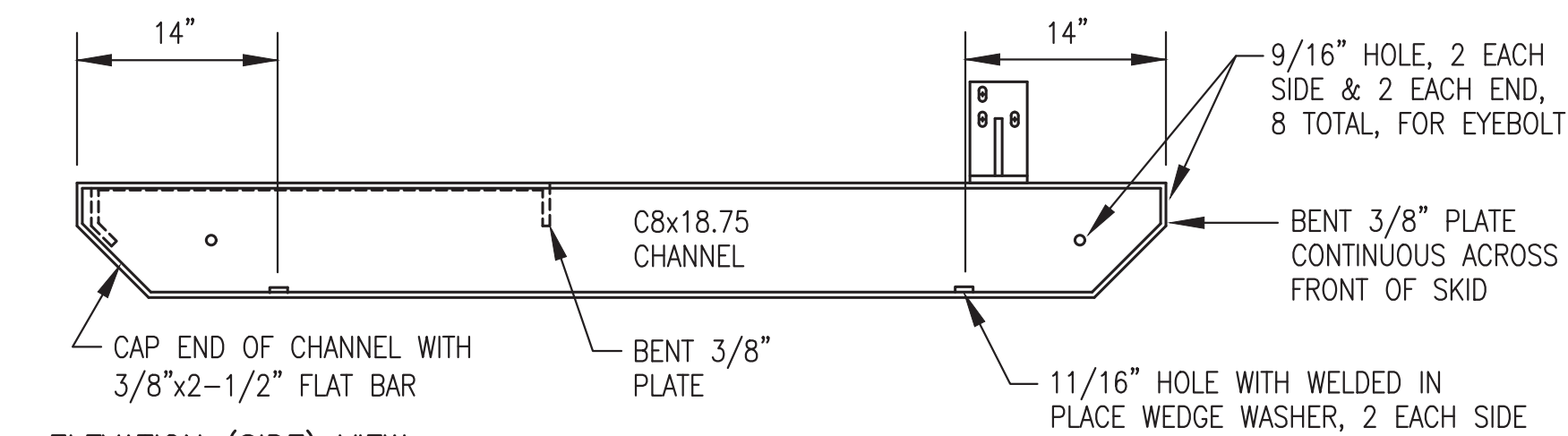
ISSUED FOR CONSTRUCTION
APRIL 2022



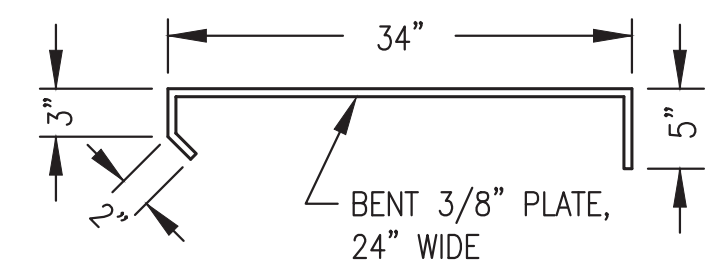
ALASKA ENERGY AUTHORITY		
PROJECT:	FFY20 DERA PROJECT PLATINUM POWER PLANT UPGRADE	
TITLE:	EXPANSION TANK ELEVATIONS & DETAILS	
DRAWN BY: JTD	SCALE: AS NOTED	DATE: 4/20/22
DESIGNED BY: BCG	FILE NAME: PLAT DERA M1-5	SHEET: M4
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



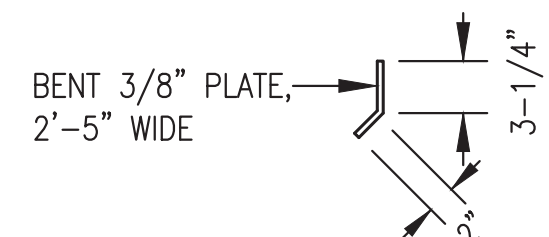
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A-A

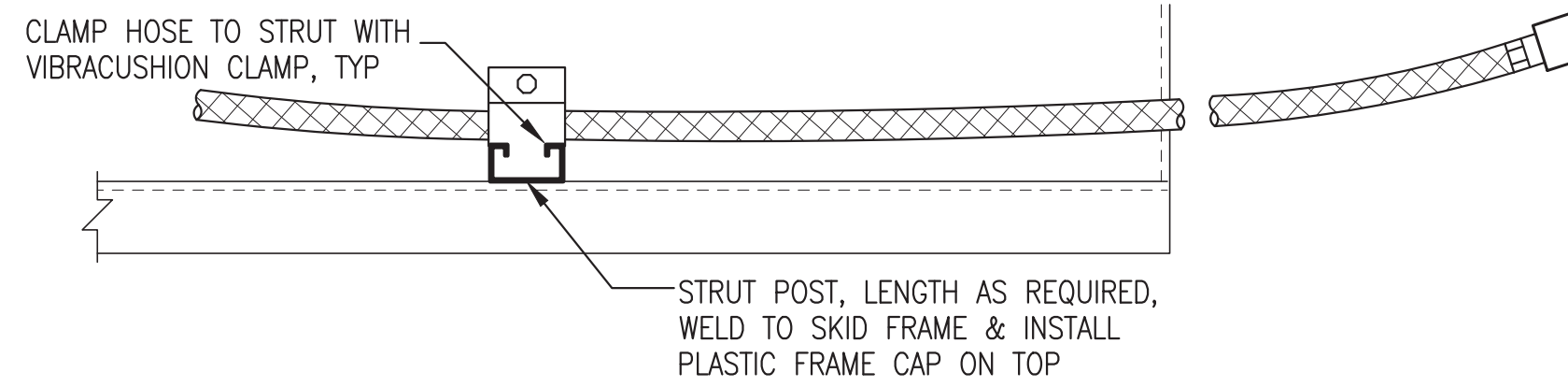


SECTION B-B

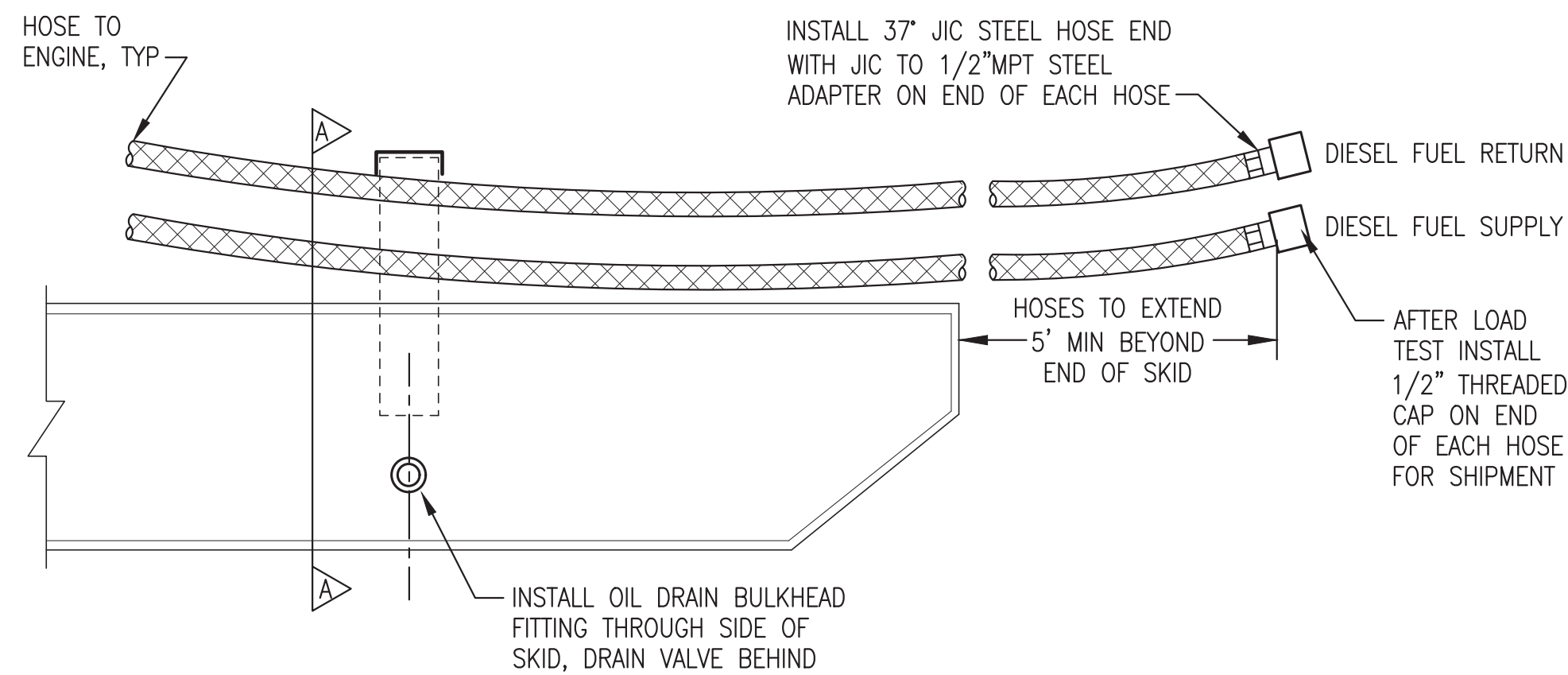
NOTES:

- 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 ENGINE ON SKID SO THAT THE CENTERLINE OF THE EXHAUST RISER IS 39" FROM THE FRONT OF THE SKID.

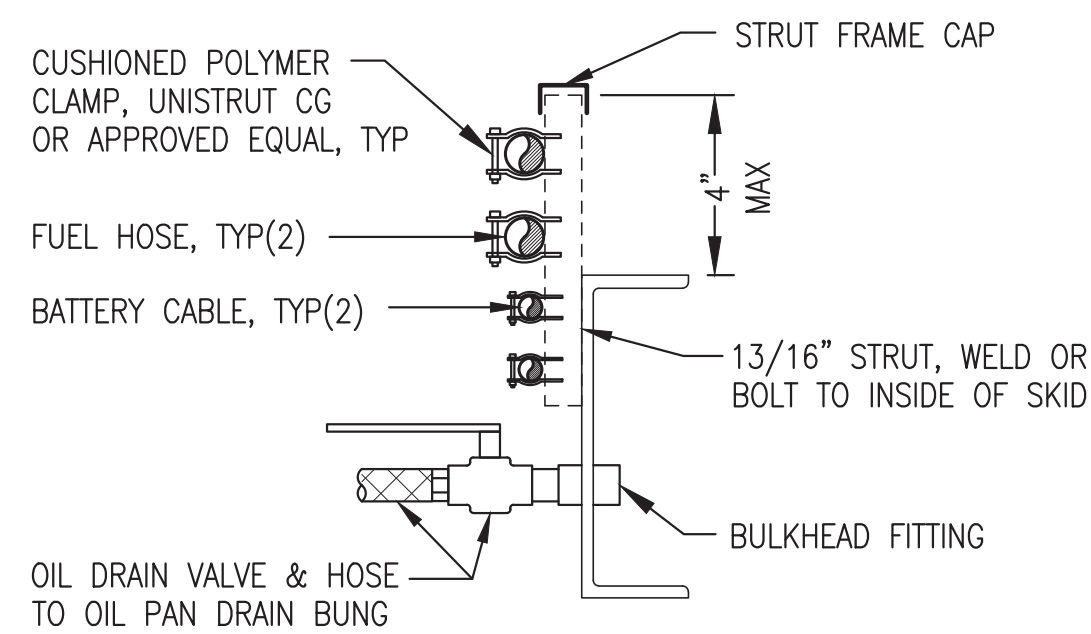
1 GEN#1 (JOHN DEERE 4045) SKID DESIGN
M5 NO SCALE



GEN#1 RIGHT SKID PLAN

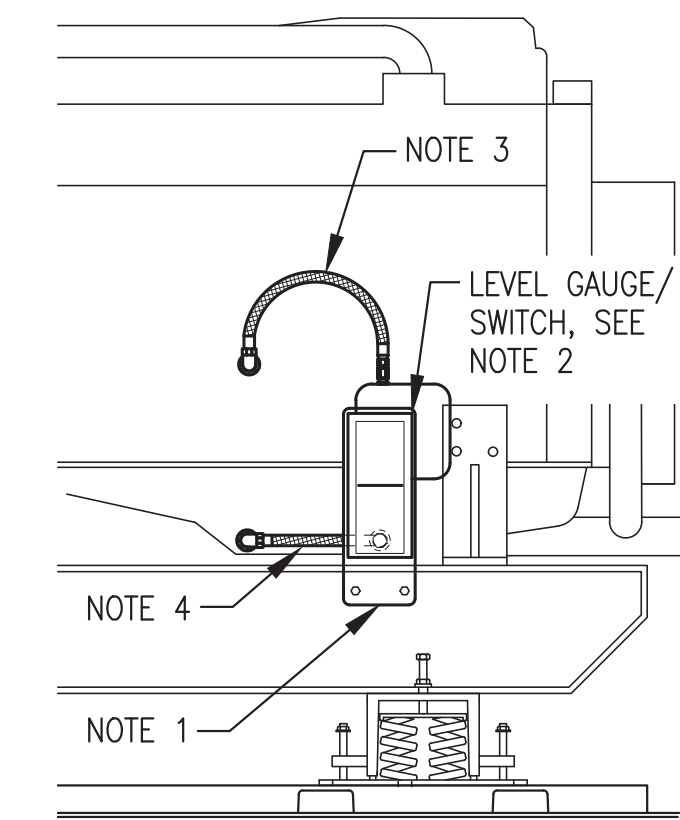


GEN#1 RIGHT SKID ELEVATION



GEN#1 RIGHT SKID SECTION A-A

2 FUEL & OIL HOSE TERMINATIONS
M5 NO SCALE

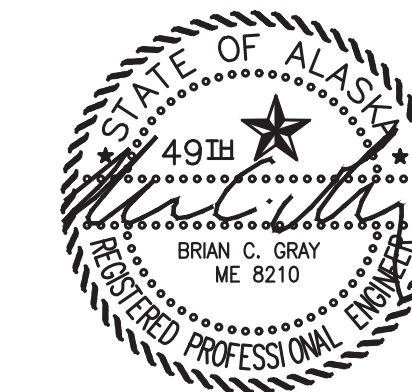


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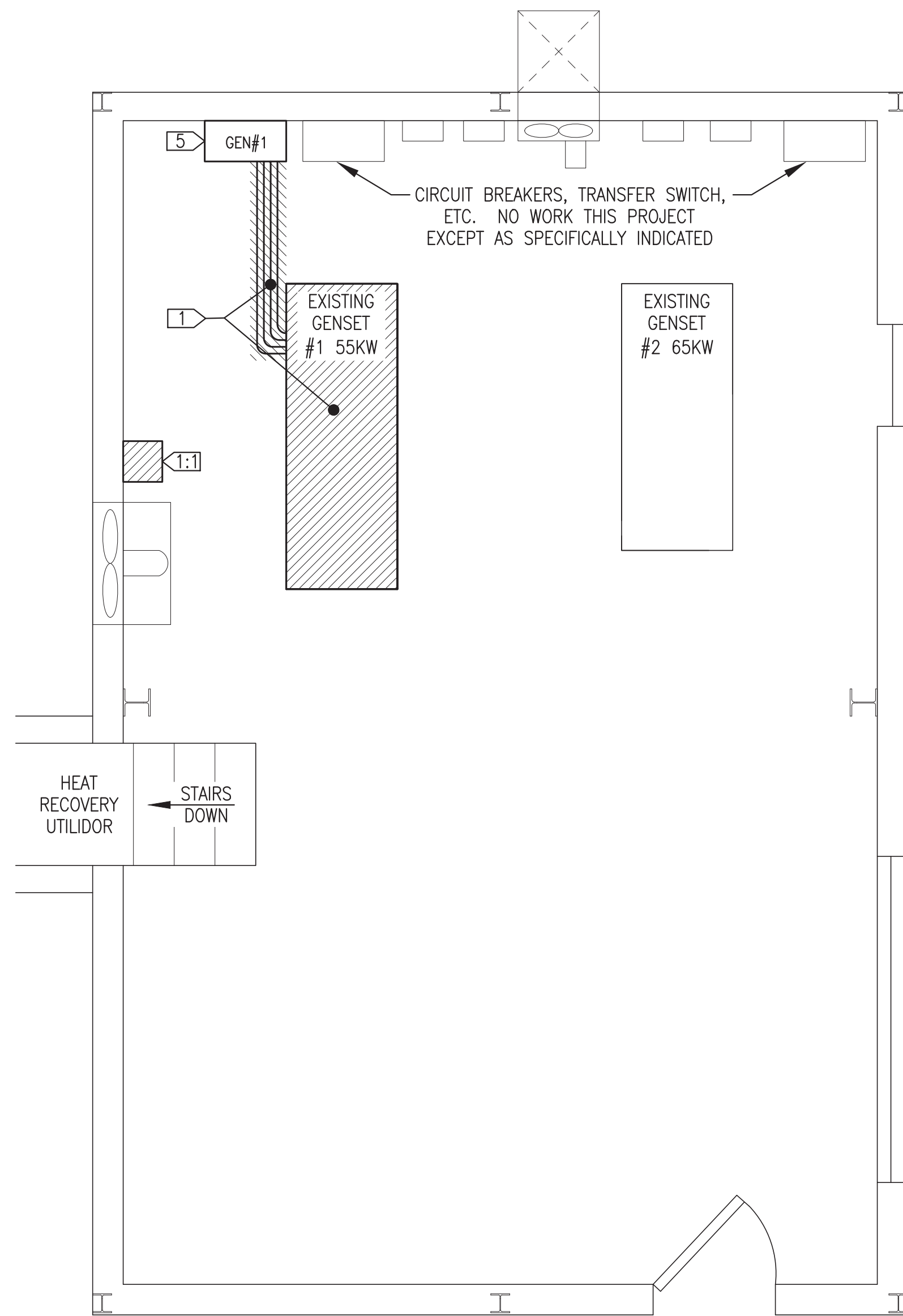
- 1) 1/4" STEEL SUPPORT PLATE PRE-DRILLED TO MATCH GAUGE/SWITCH MOUNTS AND BOTTOM HOSE ENTRANCE. BOLT TO INSIDE (BACK) OF CHANNEL SKID AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL.
- 2) MOUNT OIL LEVEL GAUGE/SWITCH TO STEEL SUPPORT PLATE WITH RUBBER SHOCK MOUNTS. ADJUST SWITCH CONTACTS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

3 OIL LEVEL GAUGE/SWITCH INSTALLATION
M5 NO SCALE

ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECT PLATUNUM POWER PLANT UPGRADE	
TITLE: GENSET FABRICATION DETAILS	
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/20/22
FILE NAME: PLAT DERA M1-5	SHEET: M5
PROJECT NUMBER:	
P.O. 111405, Anchorage, AK 99511 (907)349-0100	

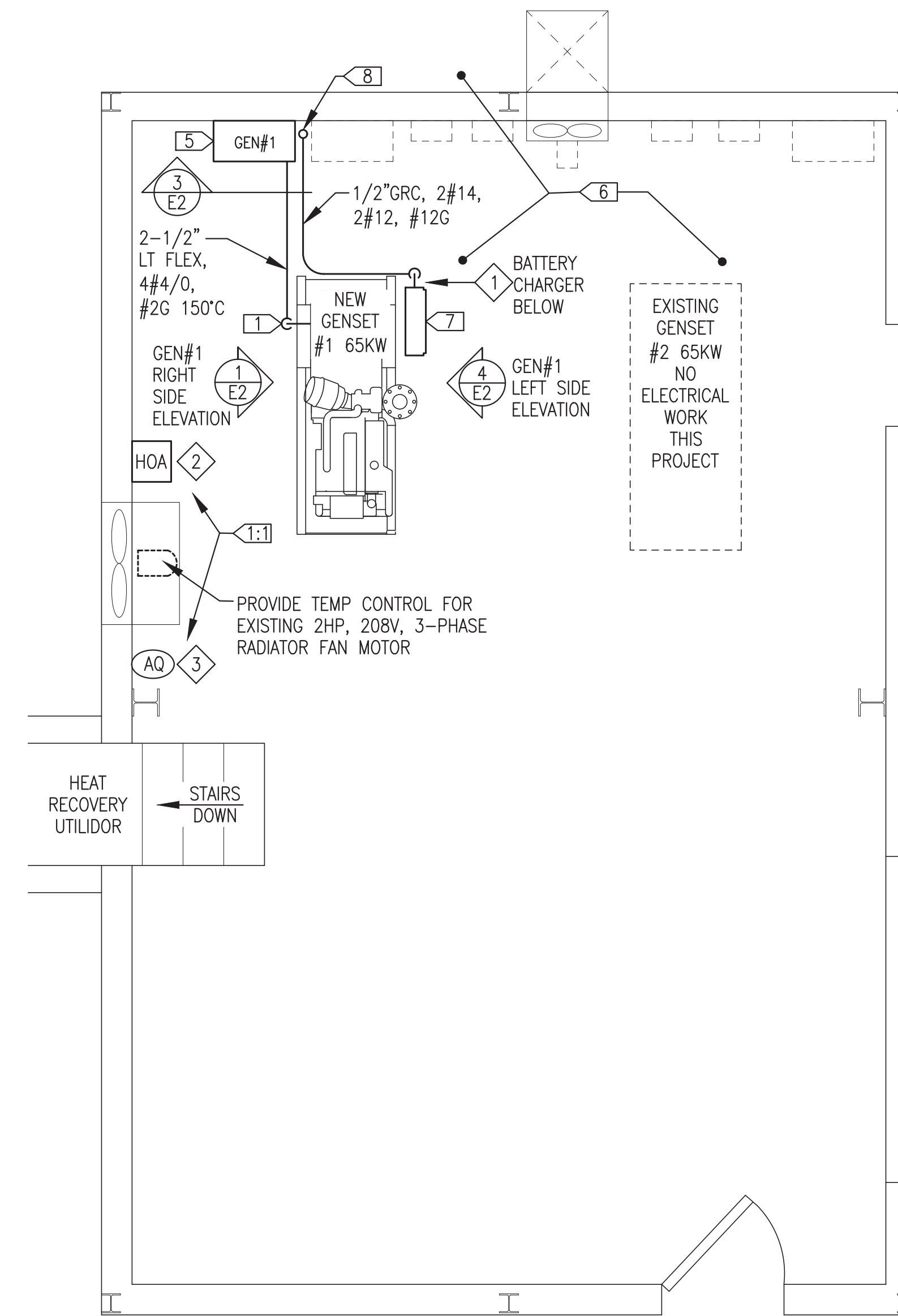


DEMOLITION GENERAL NOTES:

1. THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF PLATINUM. KEEP OUTAGES TO A MINIMUM AND COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY.
2. ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL. AREAS CONTAINING EXISTING EQUIPMENT AND PIPING TO BE REMOVED INDICATED BY HATCHING.
3. ENSURE ALL EQUIPMENT AND CIRCUITS TO BE REMOVED ARE DE-ENERGIZED PRIOR TO BEGINNING DEMOLITION. LOCK AND TAG OUT ALL AFFECTED CIRCUIT BREAKERS AND DISCONNECTS.
4. TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO ELECTRICAL EQUIPMENT AND CONDUCTORS BEING SALVAGED FOR REUSE. TURN ALL REMOVED MATERIALS AND EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION IF NOT REUSED.

DEMOLITION SPECIFIC NOTES:

- BASE BID**
- 1) REMOVE EXISTING GEN#1 IN ITS ENTIRETY AND ALL EXISTING POWER, CONTROL, AND INSTRUMENTATION CONDUCTORS.
 - 2) SEE MECHANICAL
 - 3) SEE MECHANICAL
 - 4) SEE MECHANICAL
 - 5) EXISTING GEN #1 BREAKER ENCLOSURE TO REMAIN. CAREFULLY DISCONNECT AND REMOVE EXISTING POWER CONDUCTORS AND CIRCUIT BREAKER. SEE NEW WORK FOR MODIFICATIONS.
- ADDITIVE ALTERNATE #1**
- 1:1) REMOVE EXISTING ENCLOSED CONTACTOR FOR RADIATOR FAN MOTOR, SEE NEW WORK FOR REPLACEMENT CONTACTOR AND TEMP SENSOR INSTALLATION.



NEW WORK GENERAL NOTES:

1. EXISTING EQUIPMENT TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
2. NEW EQUIPMENT TO BE INSTALLED SHOWN WITH DARK SOLID LINES.

NEW WORK SPECIFIC NOTES:

- BASE BID**
- 1) INSTALL NEW GEN #1 CONDUIT AND POWER CONDUCTORS. SEE ELEVATION 1/E2 AND SEE MECHANICAL FOR ADDITIONAL GENSET INSTALLATION DETAILS.
 - 2) SEE MECHANICAL
 - 3) SEE MECHANICAL
 - 4) SEE MECHANICAL
 - 5) MODIFY GEN#1 BREAKER ENCLOSURE FOR INSTALLATION OF NEW 300A BREAKER WITH SHUNT TRIP. SEE DETAIL 3/E2.
 - 6) INSTALL GROUNDING GRID AND CONNECT GENERATOR SKIDS. SEE GROUNDING PLAN 1/E3.
 - 7) INSTALL NEW GEN#1 CONTROL PANEL, ECU, BATTERY CHARGER, STARTER CABLES AND ASSOCIATED CONDUIT AND CONDUCTORS ON FLOOR MOUNTED STRUT RACK. SEE ELEVATION 4/E2.
 - 8) 1/2" GRC UP WALL TO UPPER WIREWAY. ROUTE 2#14 TO GEN#1 CT/BREAKER PANEL FOR BREAKER SHUNT TRIP AND ROUTE 2#12 TO 20A BREAKER IN PANELBOARD.
- ADDITIVE ALTERNATE #1**
- 1:1) INSTALL NEW AQUASTAT AND NEW ENCLOSED CONTACTOR WITH HAND-OFF-AUTO CONTROL AND OVERLOAD FOR RADIATOR FAN MOTOR CONTROL, SEE WIRING DIAGRAM 2/E3. STRAP AQUASTAT TO 2" COPPER ENGINE COOLANT RETURN MAIN UPSTREAM OF RADIATOR INLET.

1
E1 DEMOLITION PLAN
3/8"=1'-0"

2
E1 NEW WORK PLAN
3/8"=1'-0"


NEW ELECTRICAL EQUIPMENT/DEVICE SCHEDULE			
SYMBOL	SERVICE	DESCRIPTION	MANUFACTURER/MODEL
1	BATTERY CHARGER	12-VOLT SOLID STATE 45A BATTERY CHARGER FOR 120VAC INPUT	IOTA DLS-45, PROVIDE WITH OPTIONAL IQ4 SOLID STATE CONTROLLER OR APPROVED EQUAL
2	ENCLOSED CONTACTOR	NEMA 1 ENCLOSURE WITH IEC STYLE CONTACTOR, HAND-OFF-AUTO SWITCH, 9A, 208V 3-PHASE, 120V COIL, SOLID STATE OVERLOAD RELAY	ALLEN-BRADLEY 109-C09AD-OLR & 198-SS HOA OR APPROVED EQUAL
3	AQUASTAT CONTROLLER	120V, 8A, 100F-240F RANGE, 5F-30F ADJUSTABLE DEAD BAND, SPST CONTACT TO MAKE ON RISE, SURFACE MOUNT	HONEYWELL L4006 OR APPROVED EQUAL
4	DISCONNECT	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
5	GEN #1 CIRCUIT BREAKER	MOLDED CASE CIRCUIT BREAKER, 400A FRAME, 300A TRIP PLUG, 12 VDC SHUNT TRIP COIL	ABB XT5NU330ABNNAOXXX

ELECTRICAL CONDUCTOR SCHEDULE					
SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:	COLOR CODING - UNLESS SPECIFICALLY INDICATED OTHERWISE COLOR CODE CONDUCTORS AS FOLLOWS:	
GENERATOR 208V POWER LEADS (ENGINE STARTER CABLES SIMILAR)	EXTRA FLEXIBLE CABLE, COPPER CONDUCTOR. TYPE VW-1, MINIMUM 600V, MINIMUM 105°C	BELDEN, COBRA, OMINI, OR POLAR	TERMINATE WITH COPPER COMPRESSION LUGS RATED FOR THE FULL AMPACITY OF THE CABLE AT 105°C.	120/208-VOLT POWER PHASE A - BLACK PHASE B - RED PHASE C - BLUE NEUTRAL - WHITE 24 VOLT DC +24VDC - RED -24VDC - BLACK	
GENERAL USE CONDUCTORS	CLASS B CONCENTRIC STRANDED, SOFT DRAWN COPPER. TYPE XHHW INSULATION, 600V AND 75C OR 90C RATED.				
<p>NOTES:</p> <p>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 IDENTIFY AT EVERY ACCESSIBLE LOCATION WITH A MINIMUM OF 2 INCHES OF TAPE AT EACH LOCATION.</p> <p>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 OF THE SAME TYPE AS THE PHASE CONDUCTORS AND SHALL BE SIZED AS INDICATED ON THE DRAWINGS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.</p>					

ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1 (2021 DERA)	ENGINE - 99 HP, 65 kW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE OR APPROVED EQUAL. 12 VDC STARTING/CONTROL VOLTAGE. GENERATOR - 208V 3-PHASE, MINIMUM 90KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274C OR APPROVED EQUAL.
GEN #2 (EXISTING)	ENGINE - 99 HP, 65 kW PRIME, JOHN DEERE 4045TFM85, TIER 3 MARINE. 12 VDC STARTING/CONTROL VOLTAGE. GENERATOR - 208V 3-PHASE, 65kW, NORTHERN LIGHTS M65C1B.

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APRIL 2022





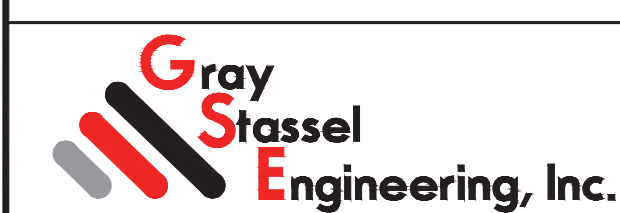
ALASKA ENERGY AUTHORITY

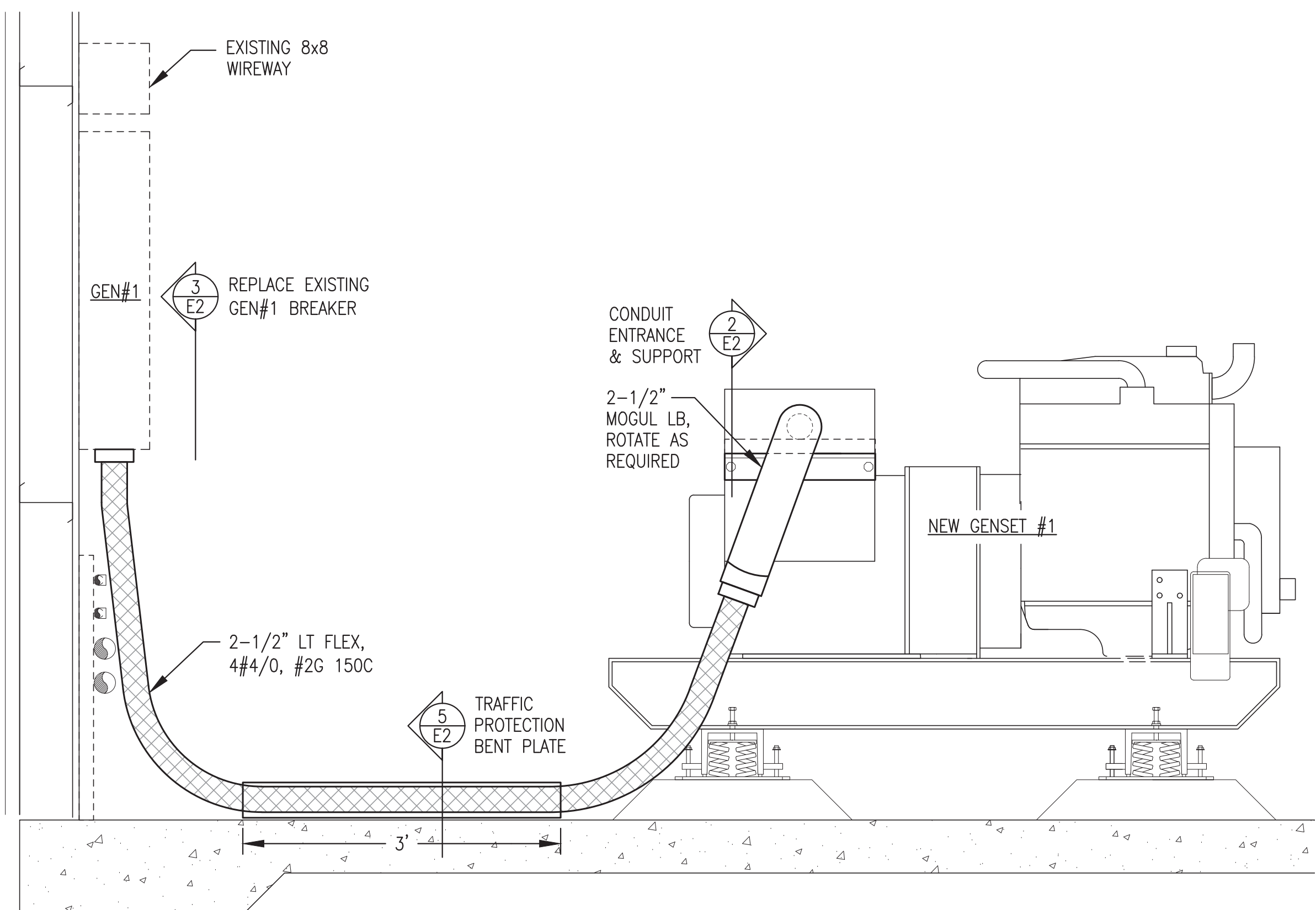
PROJECT: **FFY20 DERA PROJECTS
PLATINUM POWER PLANT UPGRADE**

TITLE: **ELECTRICAL DEMOLITION & NEW WORK PLANS**

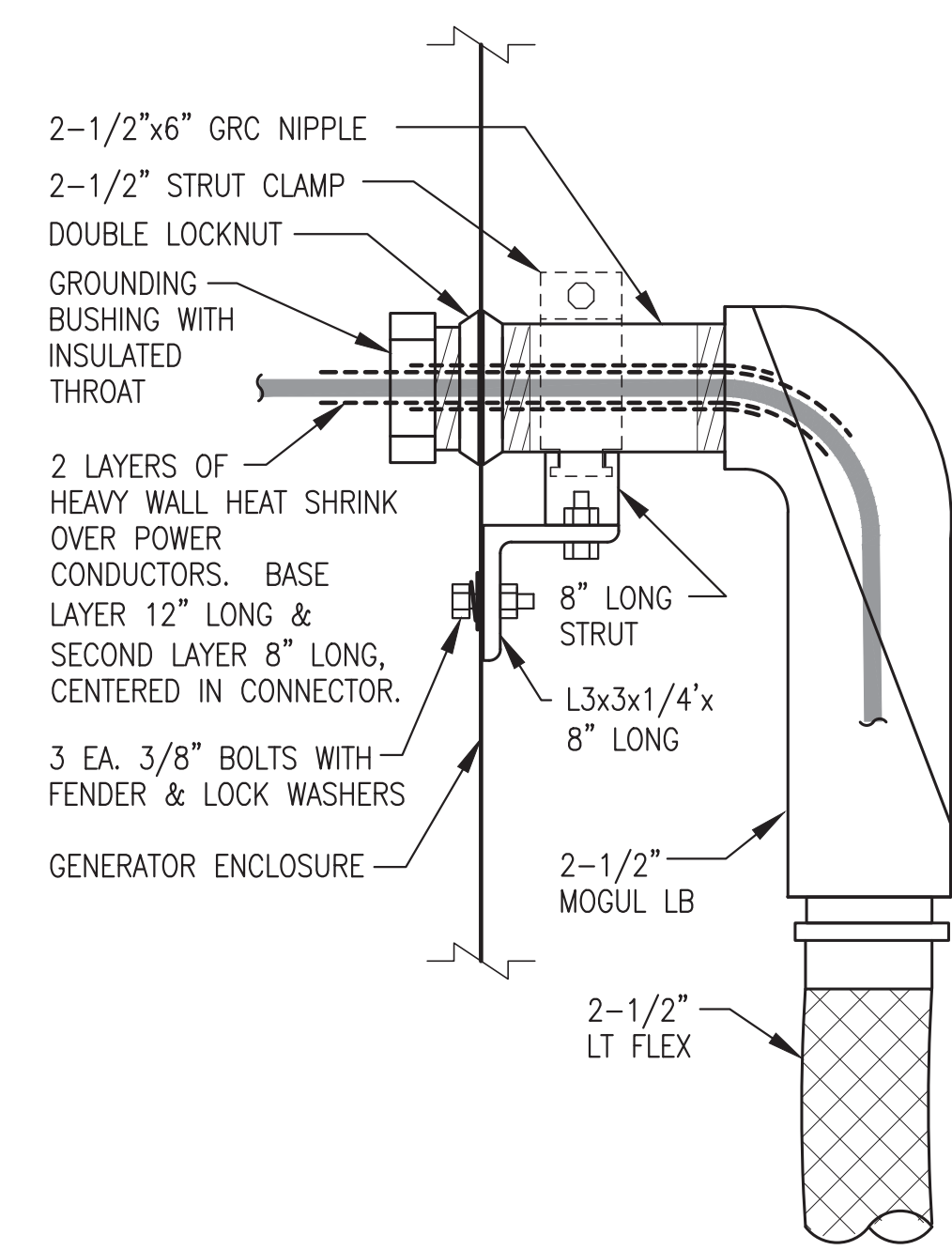
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 4/20/22
FILE NAME: PLAT DERA E1-4	SHEET: E1
PROJECT NUMBER:	

P.O. 111405, Anchorage, AK 99511 (907)349-0100

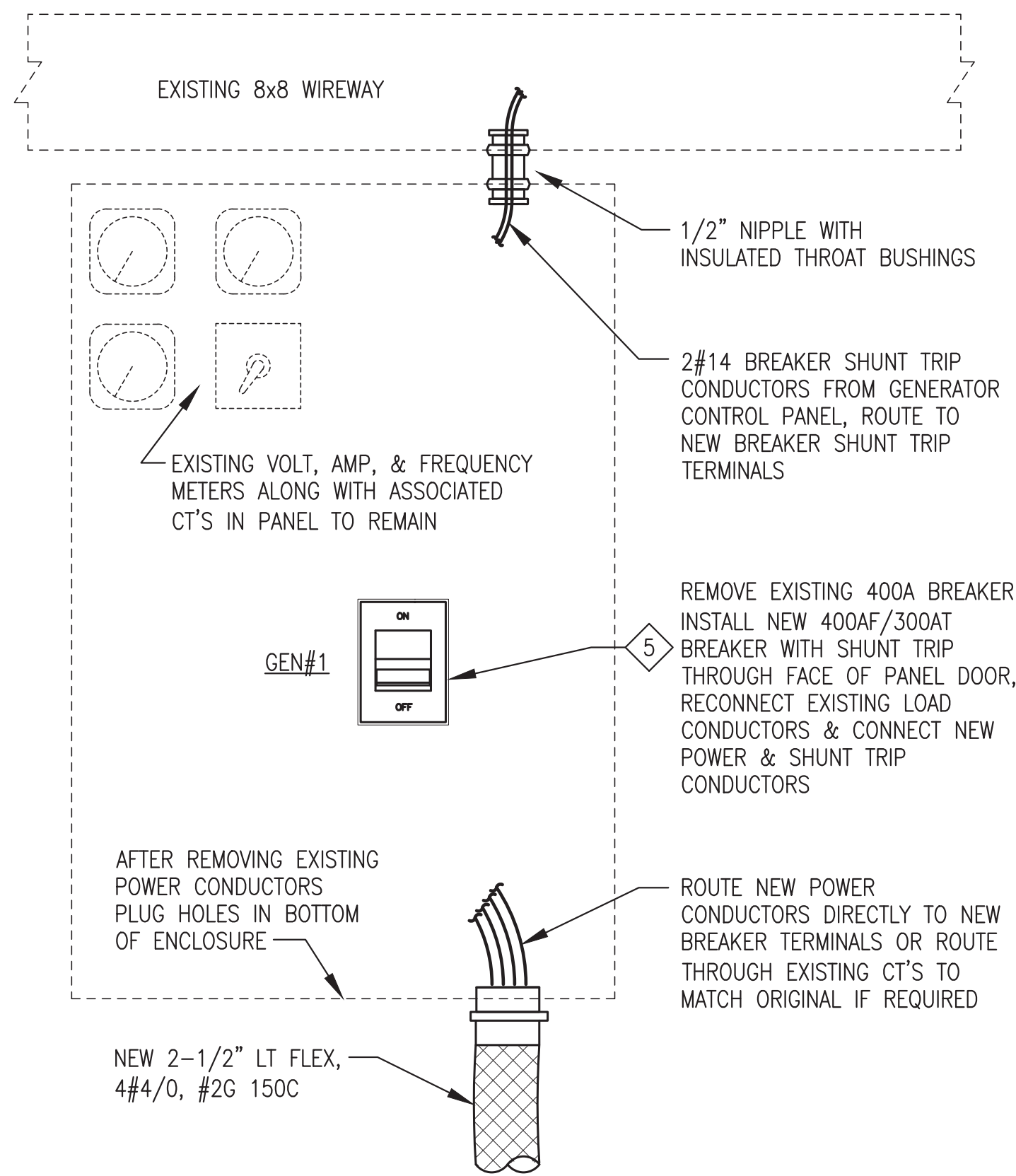




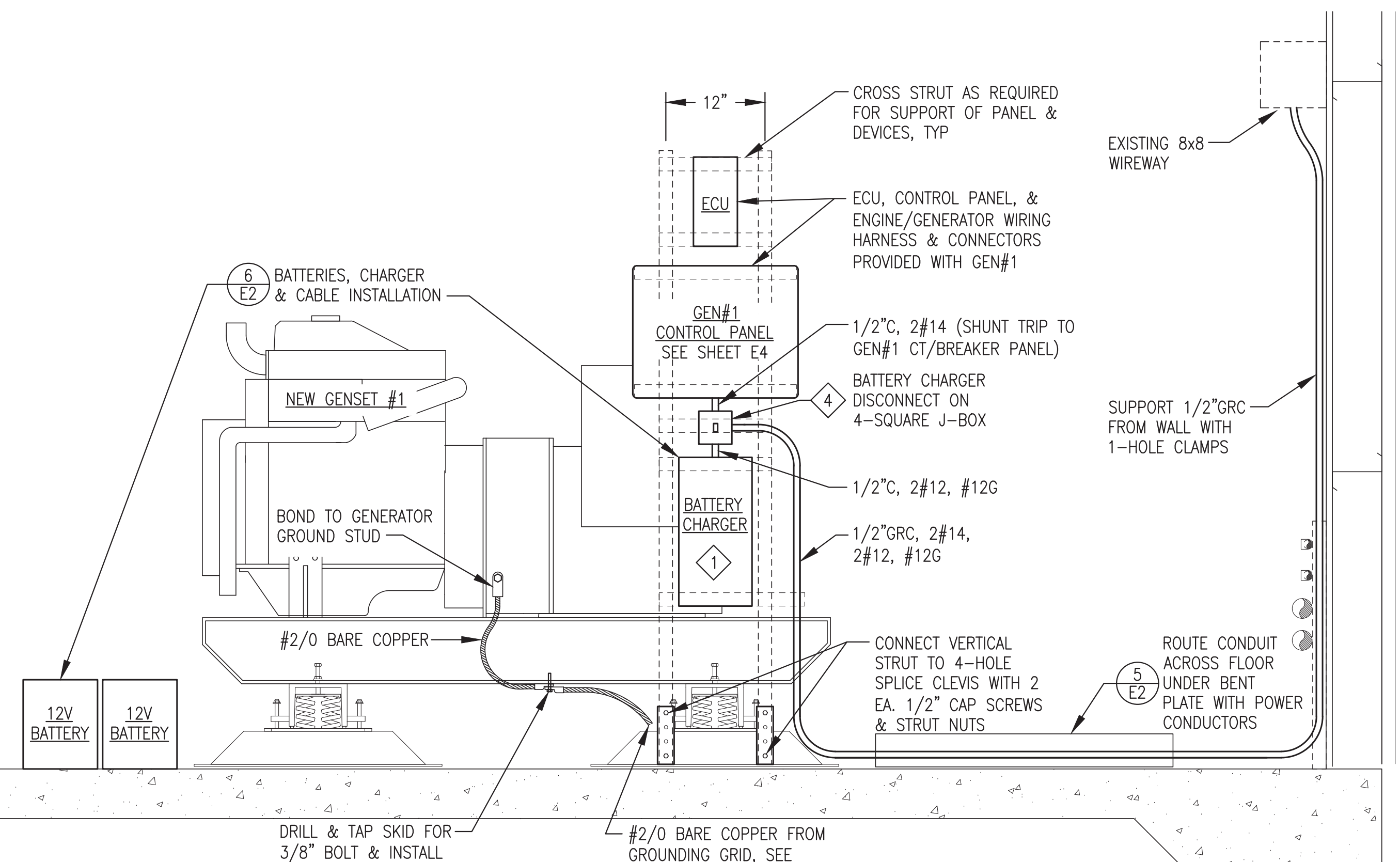
1 GEN #1 RIGHT SIDE ELEVATION
E2 1"=1'-0"



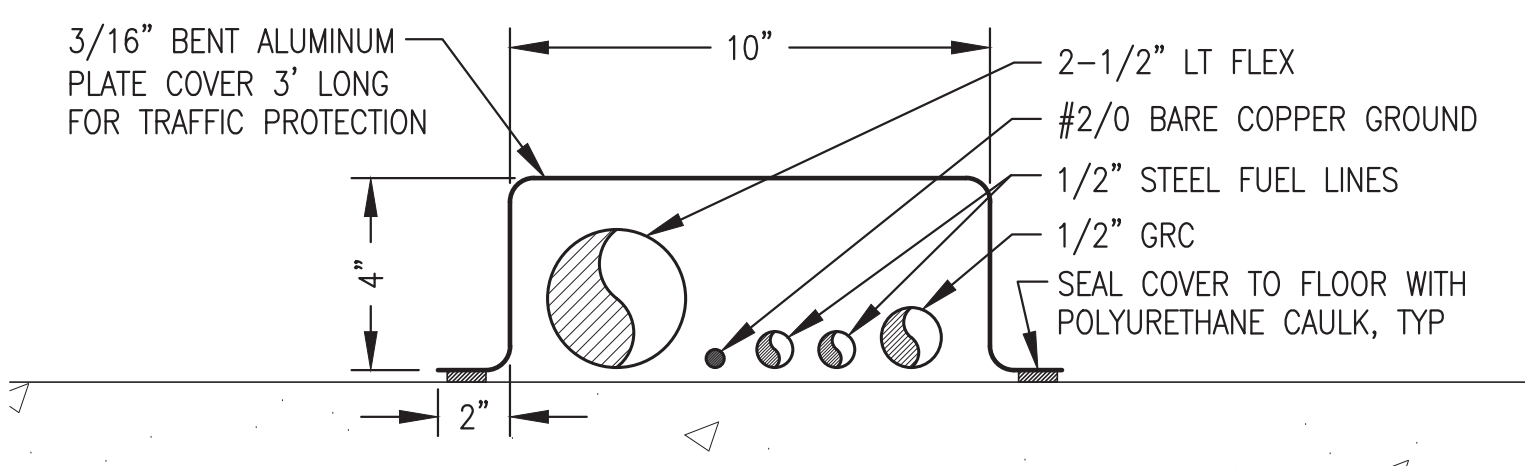
2 GEN#1 POWER CONDUIT ENTRANCE & SUPPORT
E2 NO SCALE



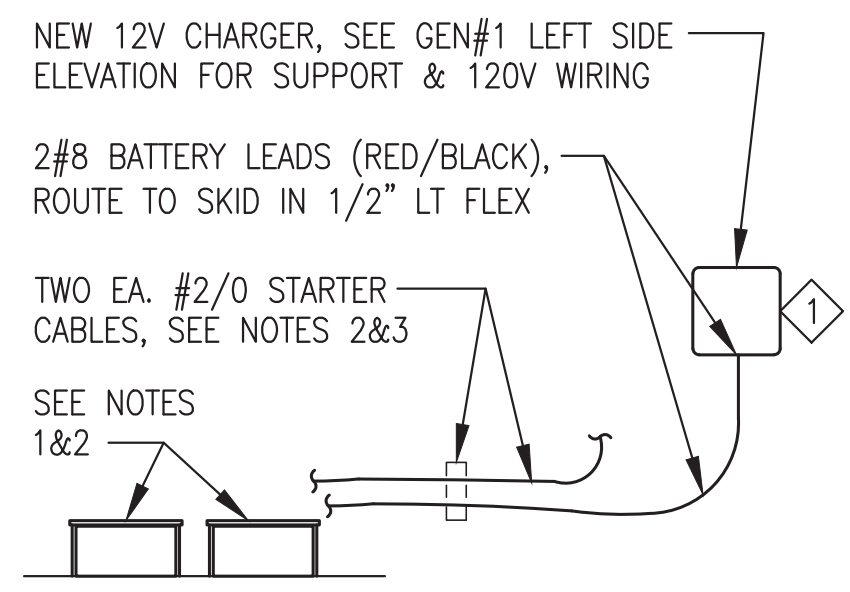
3 EXISTING GEN#1 BREAKER ENCLOSURE MODIFICATIONS
E2 NO SCALE



4 GEN #1 LEFT SIDE ELEVATION
E2 1"=1'-0"



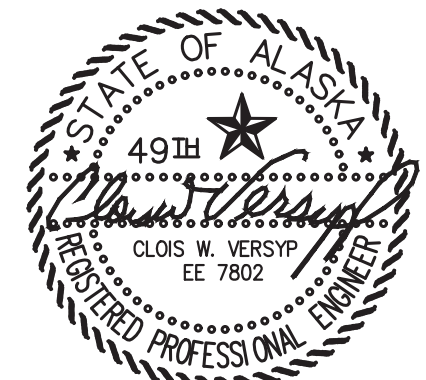
5 TRAFFIC PROTECTION BENT PLATE COVER
E2 NO SCALE



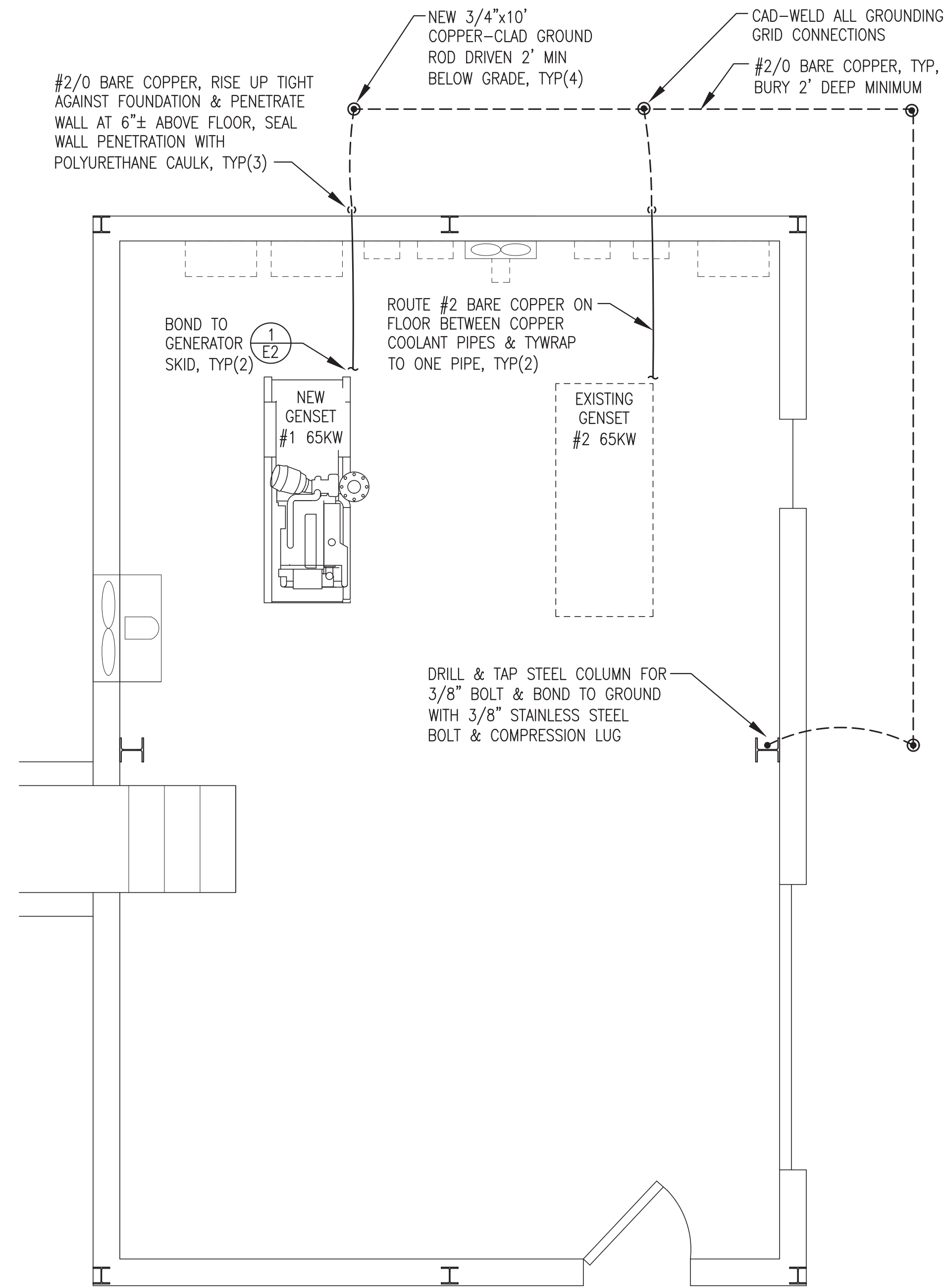
- NOTES:
- TWO EACH BATTERIES PROVIDED WITH GENSET WIRED IN PARALLEL FOR 12V OPERATION. PLACE AT FRONT OF GEN#1 SKID.
 - #2/0 EX-FLEX BATTERY CABLES PROVIDED WITH GENSET. MAKE BATTERY CONNECTIONS WITH CRIMP BATTERY TERMINAL FITTINGS AND INSTALL TERMINAL COVERS.
 - SEE SHEET M5 FOR STARTER CABLE SUPPORT FROM GENSET SKID.

6 GEN#1 BATTERIES & CHARGER INSTALLATION
E2 NO SCALE

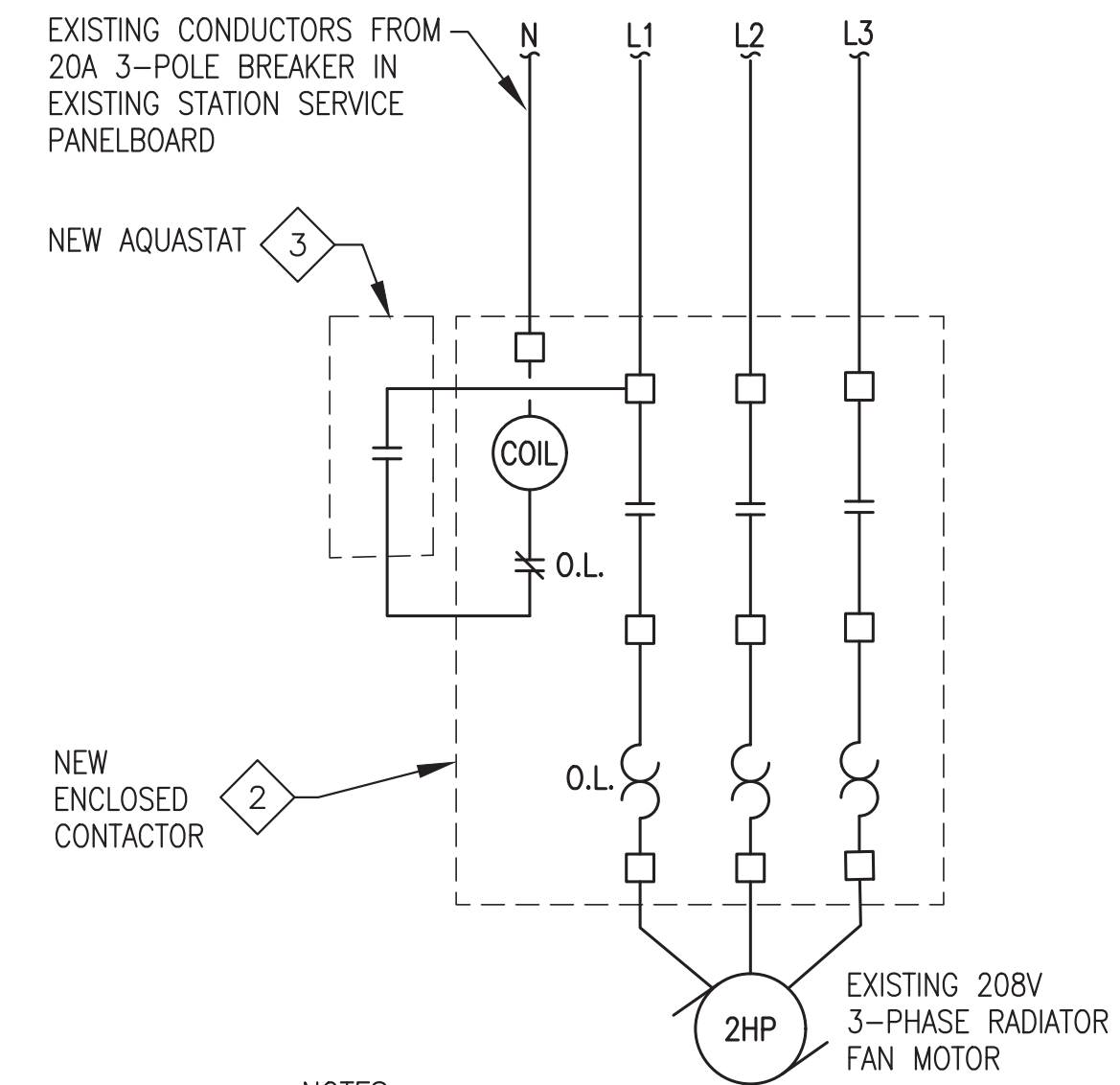
ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECT PLATINUM POWER PLANT UPGRADE		
TITLE: NEW GEN#1 INSTALLATION DETAILS		
 P.O. 111405, Anchorage, AK 99511 (907)349-0100	DRAWN BY: JTD DESIGNED BY: BCG FILE NAME: PLAT DERA E1-4 PROJECT NUMBER:	SCALE: AS NOTED DATE: 4/20/22 SHEET: E2



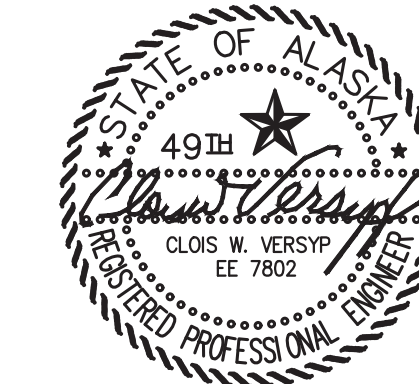
1
E3 GROUNDING PLAN
1/2"=1'-0"



NOTES:
1) FIELD ADJUST OVERLOAD TO 115% OF ACTUAL MOTOR NAMEPLATE FLA.

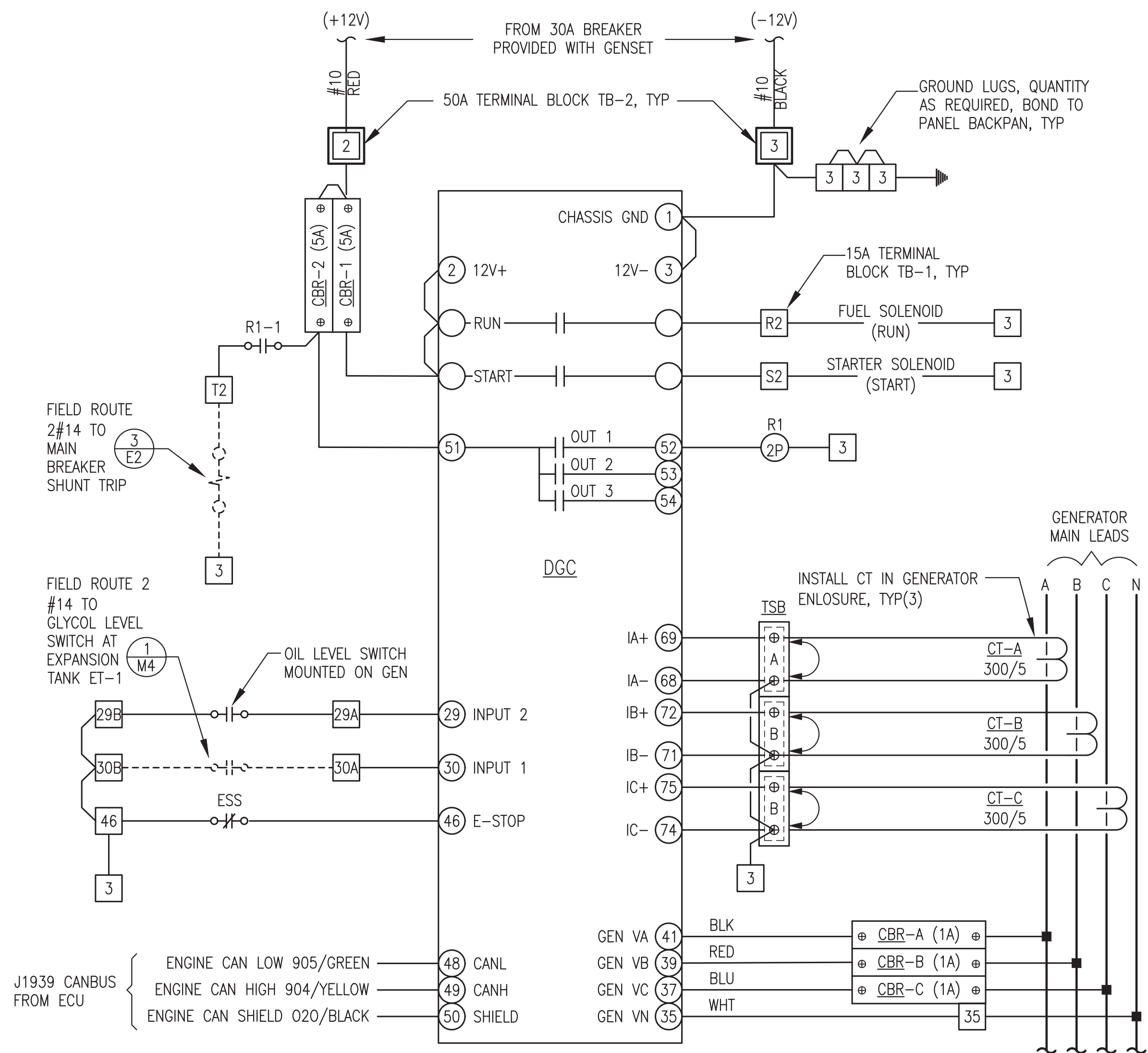
2
E3 RADIATOR WIRING DIAGRAM
NO SCALE

ISSUED FOR
CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECTS PLATINUM POWER PLANT UPGRADE		
TITLE: GROUNDING PLAN & RADIATOR WIRING DIAGRAM		
DRAWN BY: JTD	SCALE: AS NOTED	
DESIGNED BY: CWV/BCG	DATE: 4/20/22	
FILE NAME: PLAT DERA E1-4	SHEET: E3	
P.O. 111405, Anchorage, AK 99511 (907)349-0100		





GEN #1 CONTROLLER "DGC" SEQUENCE OF OPERATIONS

CONTROL POWER: WHEN THE 12VDC 30A CIRCUIT BREAKER PROVIDED WITH THE GENSET AND THE 5A CONTROL POWER BREAKER ARE CLOSED, POWER IS PROVIDED TO THE DGC AND THE LCD DISPLAY IS ILLUMINATED.

NORMAL OPERATION: THE DGC WILL RECEIVE DATA FROM THE ENGINE ECU J1939 CANBUS; FROM GENERATOR CT'S AND VOLTAGE LEADS; AND FROM REMOTE DRY CONTACT GLYCOL AND OIL LEVEL SWITCHES. WHEN ALL MONITORED PARAMETERS ARE WITHIN NORMAL OPERATING RANGE (SEE TABLE BELOW) AND ALL REMOTE INPUT CONTACTS ARE IN THE OPEN POSITION, THE DGC WILL ALLOW THE GENSET TO OPERATE. THE GENERATOR IS STARTED AND STOPPED BY PRESSING THE ASSOCIATED ICONS ON THE LCD TOUCH SCREEN INTERFACE.

PRE-ALARM OPERATION: WHEN ANY MONITORED PARAMETERS ARE WITHIN THE PRE-ALARM RANGE (SEE TABLE BELOW), THE DGC WILL DISPLAY A CORRESPONDING PRE-ALARM BANNER.

ALARM (SHUT-DOWN) OPERATION: WHEN ANY MONITORED PARAMETERS ARE WITHIN THE ALARM RANGE (SEE TABLE BELOW), OR ANY REMOTE INPUT CONTACT IS IN THE CLOSED POSITION, THE DGC WILL SHUT THE ENGINE DOWN, DISPLAY A CORRESPONDING ALARM BANNER, AND WILL TRIP THE MAIN BREAKER. THE ALARM CONDITION MUST BE CLEARED AND THE MAIN BREAKER MUST BE MANUALLY RESET PRIOR TO PLACING THE GENSET BACK IN SERVICE.

EMERGENCY SHUTOFF SWITCH (ESS) OPERATION: WHEN THE ESS HAS BEEN PRESSED AN "EMERGENCY SHUTOFF ACTIVATED" BANNER APPEARS, THE GENERATOR WILL SHUT DOWN IMMEDIATELY, AND THE DGC WILL SEND A BREAKER TRIP SIGNAL TO THE MAIN BREAKER. THE MAINTAINED CONTACT EMERGENCY SHUTOFF SWITCH MUST BE PULLED OUT AND THE MAIN BREAKER MUST BE MANUALLY RESET PRIOR TO PLACING THE GENSET BACK IN SERVICE.

Function	Normal Range	Pre-Alarm	Shut Down
Oil Pressure	30-50 PSI	14.5 PSI	10 PSI
Overspeed	1750-1850 RPM	----	1860
Under Frequency	59.5-60.5 Hz	----	58.0 Hz
Over Frequency	59.5-60.5 Hz	----	62.0 Hz
Under Voltage	200-216 V	----	185 V
Over Voltage	200-216 V	----	231 V

BILL OF MATERIALS

TAG	MANUFACTURER	MODEL	DESCRIPTION
CBR-A/B/C	ALLEN-BRADLEY	1489-M1-C010	RAIL MOUNT CIRCUIT BREAKER, 1P, 1A
CBR-1/2	ALLEN-BRADLEY	1489-M1-C050	RAIL MOUNT CIRCUIT BREAKER, 1P, 5A
CT-A/B/C	ITI	112:301	CURRENT TRANSFORMER, 300:5 RATIO, RELAY CLASS 100
DGC	BASLER	DGC-2020ES 5C	DIGITAL GENSET CONTROLLER, 12V, 5A CT INPUT, J1939 CANBUS
ESS	ALLEN-BRADLEY	800T-FX6D4	PUSH-PULL EMERGENCY STOP SWITCH, PUSH BUTTON GUARD, E-STOP YELLOW RING, 1 N.C. CONTACT, FINGER SAFE
ENCLOSURE	HOFFMAN	A20H20ALP	20x20x8" NEMA 12 BACK PANEL
R1	ALLEN-BRADLEY	700HA32Z12	DPDT RELAY, 12VDC COIL
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK
TSB	FLEX-CORE	1704SC	TERMINAL SHORTING BLOCK, 4 CIRCUIT
VT	SIEMENS	52MA3B08	POTENTIOMETER, 2W, 1,000 OHMS, 30mm

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

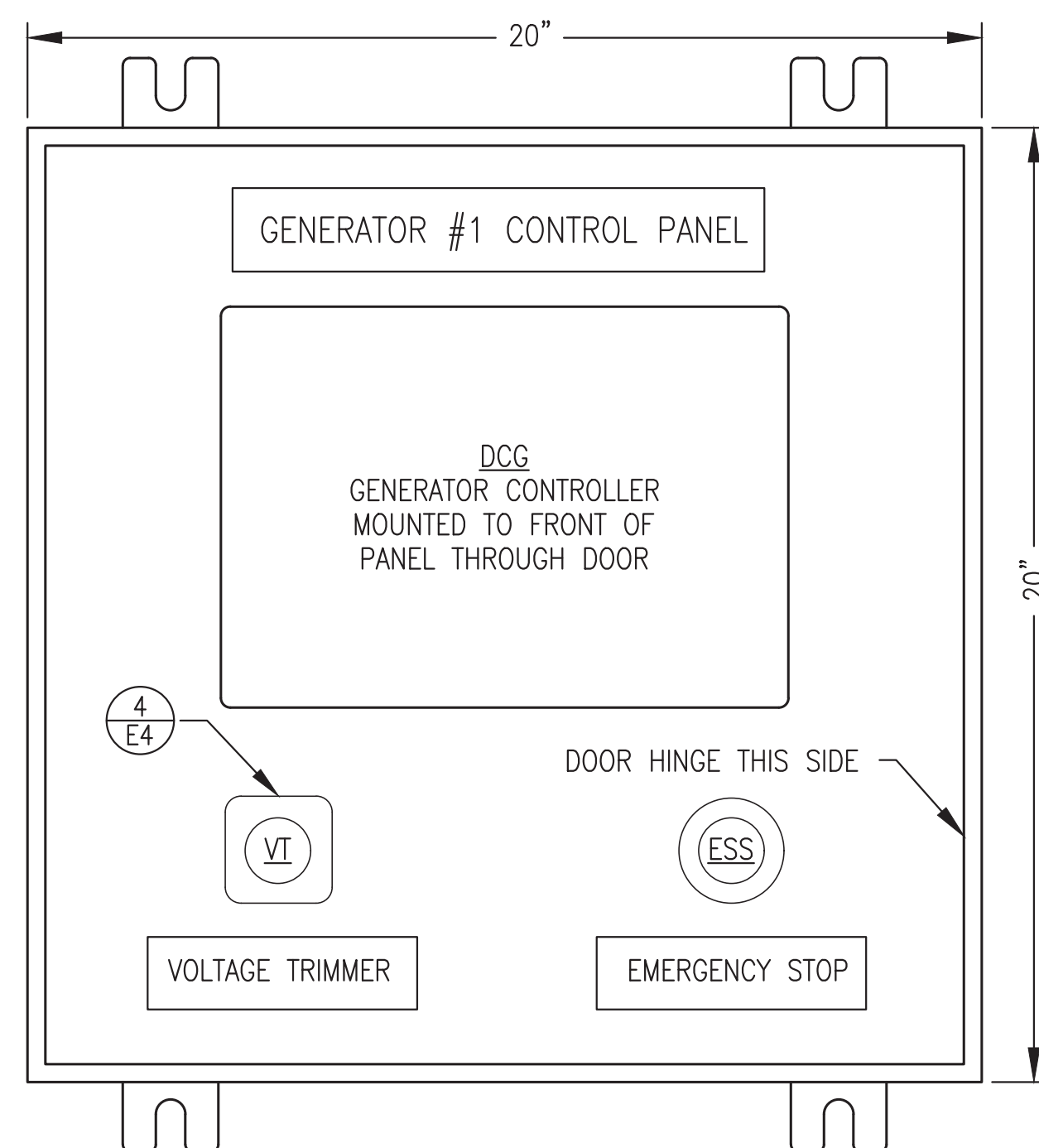
SHOP FABRICATION NOTES:

- 1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
- 2) ALL SHOP-INSTALLED DEVICES AND CONDUCTOR SHOWN WITH SOLID LINES. ALL FIELD-INSTALLED DEVICES AND CONDUCTOR SHOWN WITH DASHED LINES.
- 3) INSTALL IN A 20"x20"x8" NEMA 12 ENCLOSURE, COLOR ANSI 61 GRAY, WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR. SIZE AS INDICATED.
- 4) 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.
- 5) 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 AND TO -12VDC SOURCE.
- 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) PROVIDE BEVELED EDGE WHITE CORE NAMEPLATES, FACE COLOR BLACK, AND SECURE TO PANEL FACE WITH A MINIMUM OF TWO STAINLESS STEEL MOUNTING SCREW
- 7) SHOP TEST NEW ENGINE-GENERATOR WITH CONTROL PANEL CONNECTED. UPON COMPLETION OF TESTING, COIL WIRING HARNESSES AND SECURE PANEL TO GENERATOR FOR SHIPPING.

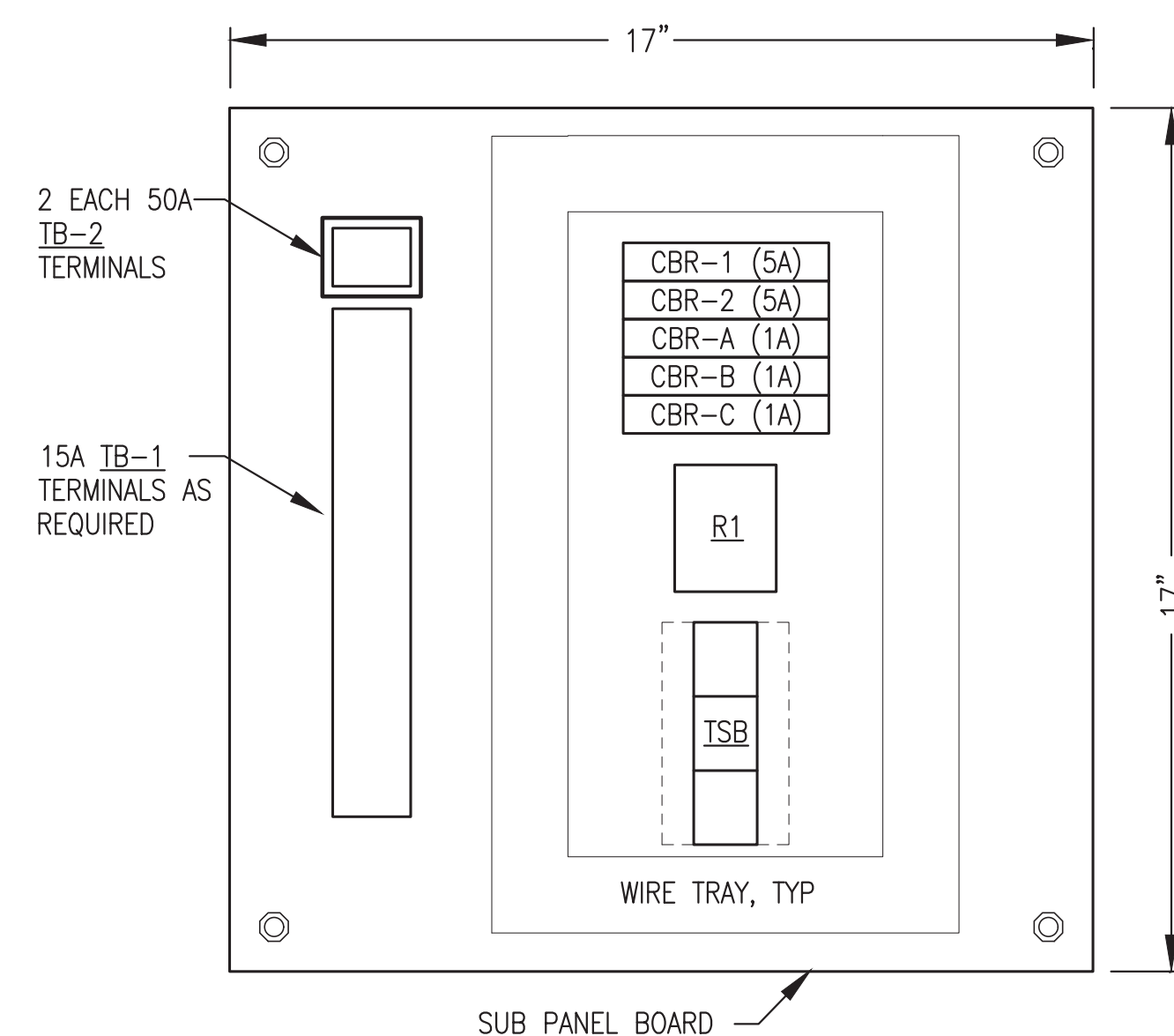
FIELD INSTALLATION NOTES:

- 1) PERFORM ALL FIELD WIRING IN ACCORDANCE WITH SPECIFICATIONS. LABEL BOTH ENDS OF ALL FIELD WIRING WITH THE ENGINE PANEL TERMINAL NUMBER.
- 2) ALL FIELD-INSTALLED DEVICES AND CONDUCTOR SHOWN WITH DASHED LINES. ALL SHOP-INSTALLED DEVICES AND CONDUCTOR SHOWN WITH SOLID LINES.
- 3) ON SHIELDED CONDUCTORS GROUND ALL SHIELD DRAIN WIRES TO LUGS AT PANEL END ONLY.

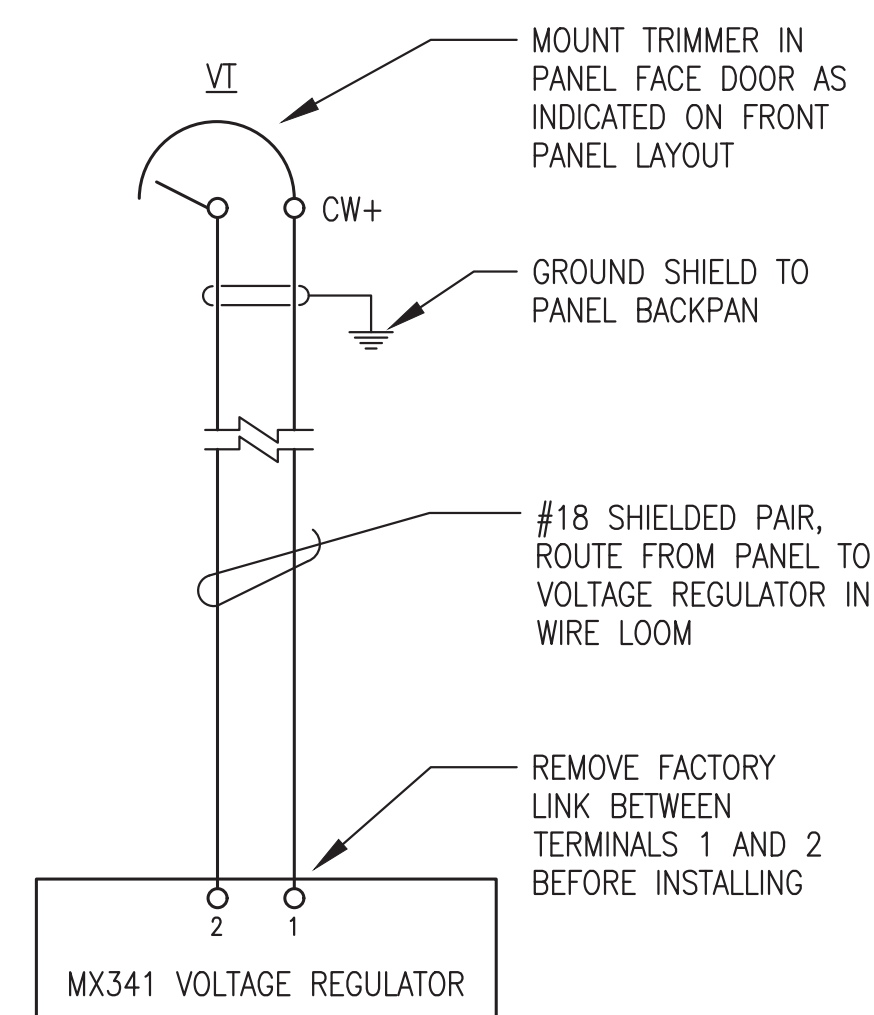
1 GENERATOR #1 12V CONTROL PANEL WIRING DIAGRAM
E4 NO SCALE



2 FRONT PANEL LAYOUT
E4 NO SCALE



3 SUB PANEL LAYOUT
E4 NO SCALE



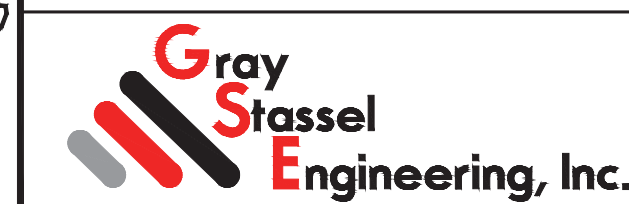
NOTE: ZERO TRIM IS APPLIED WHEN TRIMMER DIAL IS IN FULL COUNTER CLOCKWISE POSITION AND FULL TRIM IS APPLIED WHEN IN THE FULL CLOCKWISE POSITION. INITIAL SET UP IS PERFORMED WITH TRIMMER DIAL IN CENTER POSITION. SEE MANUFACTURERS VOLTAGE REGULATOR SET UP INSTRUCTIONS.

4 VOLTAGE TRIMMER WIRING DETAIL
E4 NO SCALE

ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECTS PLATINUM POWER PLANT UPGRADE		
TITLE: GEN#1 12V CONTROL PANEL		
DRAWN BY: JTD	SCALE: AS NOTED	
DESIGNED BY: CWV/BCG	DATE: 4/20/22	
FILE NAME: PLAT DERA E1-4	SHEET: E4	
PROJECT NUMBER:		



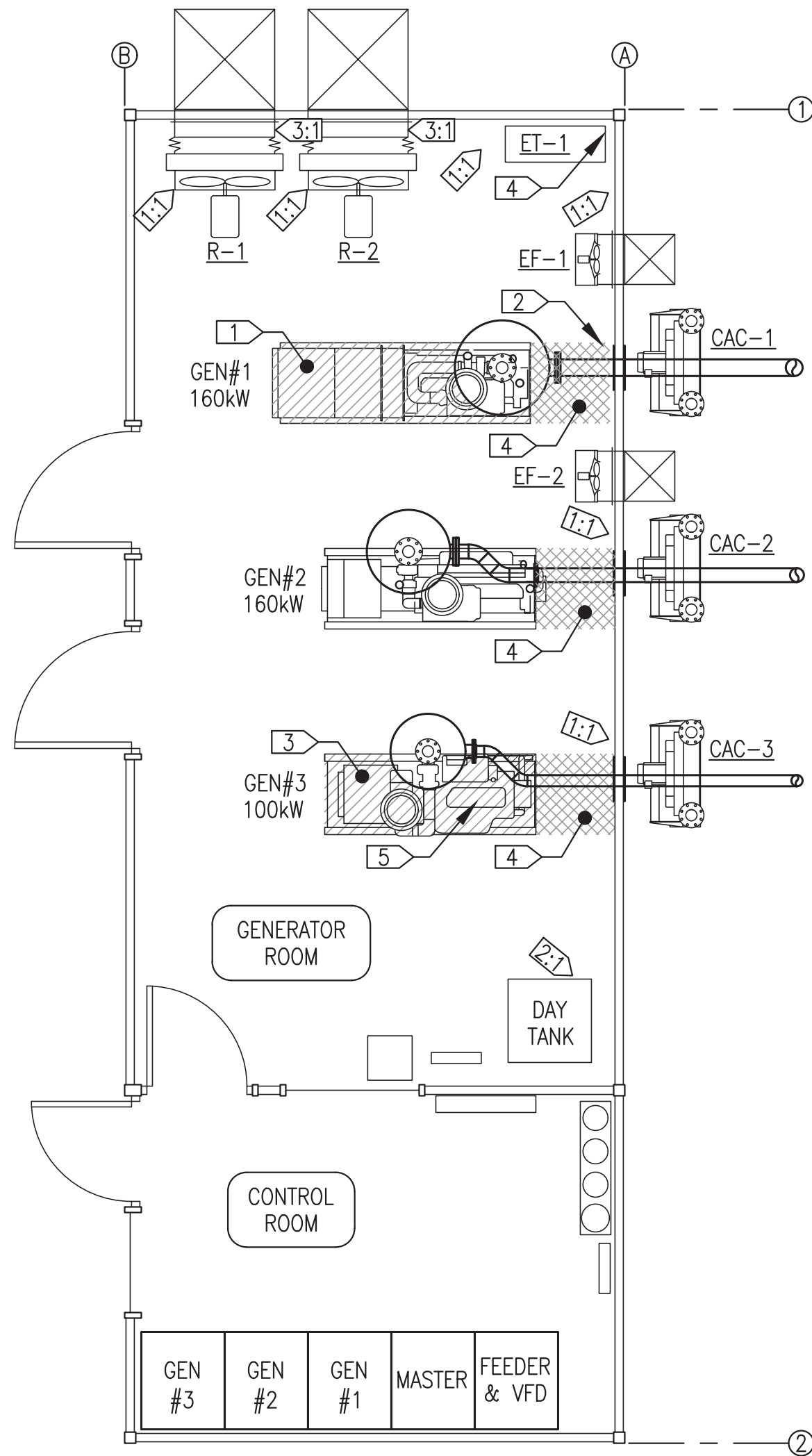
P.O. 111405, Anchorage, AK 99511 (907)349-0100

DEMOLITION GENERAL NOTES:

- THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF RUBY. KEEP OUTAGES TO A MINIMUM AND COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY.
- ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL. AREAS CONTAINING EXISTING EQUIPMENT AND PIPING TO BE REMOVED INDICATED BY HATCHING.
- TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO GENERATION EQUIPMENT BEING REMOVED DURING DEMOLITION EXCEPT ENGINE BLOCKS, SEE GENERAL NOTE 5. TARP GENERATORS AND SEAL ALL EXPOSED CONNECTIONS PRIOR TO REMOVING FROM PLANT. TURN ALL REMOVED EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION.
- DRAIN ALL PIPING PRIOR TO DEMOLITION. DRAIN ENGINE BLOCKS PRIOR TO REMOVAL. TURN USED OIL AND GLYCOL OVER TO THE UTILITY FOR FINAL DISPOSITION.
- RENDER EXISTING GEN #1 & GEN #3 ENGINE BLOCKS UNUSABLE BY CUTTING A MINIMUM 3"x3" HOLE IN ENGINE CRANK CASE. FILL OUT A CERTIFICATE OF DESTRUCTION FOR EACH ENGINE AND INCLUDE PHOTOGRAPHIC DOCUMENTATION OF THE HOLE AND THE ASSOCIATED ENGINE NAMEPLATE.

DEMOLITION SPECIFIC NOTES:

- BASE BID**
- REMOVE EXISTING GENSET, DEMOLISH EXHAUST RISER PIPE FROM ENGINE TO MUFFLER, & DEMOLISH ALL 3" CHARGE AIR TUBING FROM ENGINE THROUGH WALL PENETRATION. SEE SHEETS M2.1 & M2.2.
 - REMOVE A PORTION OF THE COPPER SUCTION CONNECTION AT GEN#1. SEE SHEET M2.1.
 - REMOVE EXISTING GENSET & A PORTION OF THE EXHAUST PIPING AS REQUIRED FOR NEW CONNECTION. SEE SHEET M2.3.
 - REMOVE ALL EXISTING ENGINE COOLANT, PREHEAT, & VENT HOSES AT GEN#1, GEN#2, GEN#3, & ET-1. SEE SHEET M4.
 - REMOVE EXISTING CRANK VENT HOSE & MODIFY PIPING ON GENSET #3. SEE SHEET M2.3.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
- ADDITIVE ALTERNATE #1**
- DRAIN COOLANT SYSTEM & REMOVE MINOR COMPONENTS FOR REPLACEMENT. SEE SHEET M4.
- ADDITIVE ALTERNATE #2**
- REMOVE FUEL HOSES FOR INSTALLATION OF NEW TRIPLE FILTER. SEE SHEET M3.
- ADDITIVE ALTERNATE #3**
- REMOVE EXISTING RADIATOR DISCHARGE DAMPER ACTUATOR.

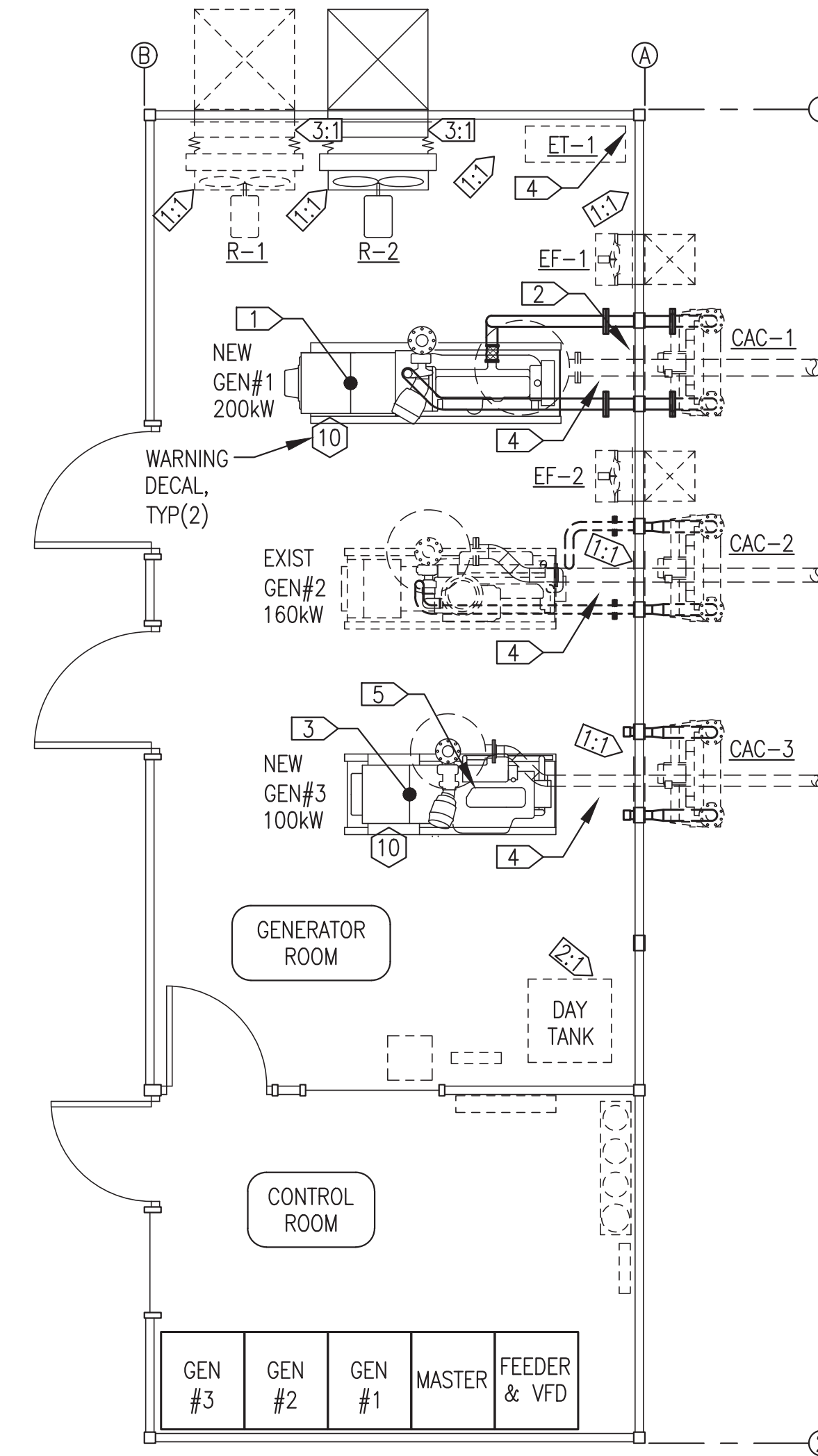


NEW WORK GENERAL NOTES:

- EXISTING EQUIPMENT & PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
- NEW EQUIPMENT & PIPING TO BE INSTALLED SHOWN WITH DARK SOLID LINES.
- UNDER BASE BID FURNISH 20 GALLONS OF NEW EXTENDED LIFE ETHYLENE GLYCOL SOLUTION PRE-MIXED TO A RATIO OF 60% GLYCOL TO 40% WATER. NOTE THAT UNDER ADDITIVE ALTERNATE #1 THIS QUANTITY IS DELETED.

NEW WORK SPECIFIC NOTES:

- BASE BID**
- INSTALL COMPLETE NEW GENSET #1 INCLUDING COOLANT, FUEL, EXHAUST, CHARGE AIR, & CRANK VENT CONNECTIONS. SEE SHEETS M2.1 & M2.2.
 - REPLACE A PORTION OF THE COPPER SUCTION CONNECTION AT GEN#1. SEE SHEET M2.1.
 - INSTALL COMPLETE NEW GENSET #3 INCLUDING COOLANT, FUEL, EXHAUST, AND CRANK VENT CONNECTIONS. SEE SHEET M2.3.
 - REPLACE ALL EXISTING ENGINE COOLANT, PREHEAT, & VENT HOSES AT GEN#1, GEN#2, GEN#3, & ET-1. SEE SHEET M4.
 - INSTALL NEW CRANK VENT CONDENSATE TRAP ON GENSET #3. SEE SHEET M2.3.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
 - SEE ELECTRICAL.
- ADDITIVE ALTERNATE #1**
- CLEAN RADIATORS, FLUSH COOLANT SYSTEM, REPLACE MINOR COMPONENTS, & REFILL WITH NEW GLYCOL. SEE SHEET M4.
- ADDITIVE ALTERNATE #2**
- INSTALL NEW TRIPLE FILTER IN DAY TANK SUPPLY PIPING. SEE SHEET M3.
- ADDITIVE ALTERNATE #3**
- INSTALL NEW RADIATOR DISCHARGE DAMPER ACTUATOR. BELIMO AFBUP OR APPROVED EQUAL. ADJUST TO PROVIDE ACTUATION FROM FULLY CLOSED (RADIATOR OFF) TO FULLY OPEN (RADIATOR RUNNING).



SCHEDULE OF DRAWINGS:

- M1 MECHANICAL DEMOLITION & NEW WORK PLANS
- M2.1 GEN #1 INSTALLATION
- M2.2 GEN #1 CHARGE AIR MODIFICATIONS
- M2.3 GEN #3 INSTALLATION
- M3 FUEL FILTER INSTALLATION
- M4 ENGINE COOLING SYSTEM UPGRADES
- M5 ENGINE-GENERATOR FABRICATION DETAILS
- E1 ELECTRICAL DEMOLITION & NEW WORK PLANS
- E2 TYPICAL GENERATOR INSTALLATION & MISCELLANEOUS DETAILS
- E3 SWITCHGEAR MODIFICATIONS

1 DEMOLITION PLAN & NOTES
M1 1/4"=1'-0"

2 NEW WORK PLAN & NOTES
M1 1/4"=1'-0"

GENSET	DESCRIPTION
GEN #1 (NEW)	ENGINE - 319 HP, 238 EKW PRIME, JOHN DEERE 6090AFM85, TIER 3 MARINE. STARTING AND CONTROL VOLTAGE = 24 VDC. GENERATOR - 284KW CONTINUOUS AT 105°C RISE, NEWAGE S4LD-D41. *LOAD LIMITED IN SWITCHGEAR TO 200kW
GEN #2 (EXISTING)	ENGINE - 317 HP, 236 EKW PRIME, JOHN DEERE 6081HF070. STARTING AND CONTROL VOLTAGE = 12 VDC. GENERATOR - 180KW CONTINUOUS AT 105°C RISE, MARATHON 431PSL6258. *LOAD LIMITED IN SWITCHGEAR TO 160kW
GEN #3 (NEW)	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UC1274E.

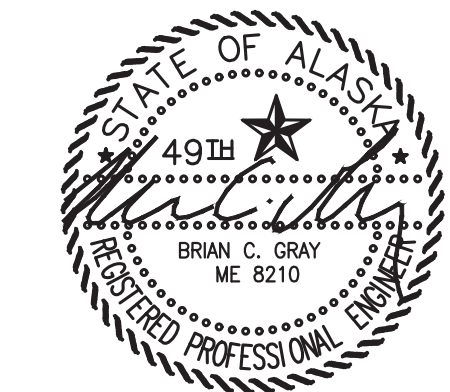
#	DECALS
10	"CAUTION: THIS UNIT STARTS AUTOMATICALLY, LOCK & TAG OUT PRIOR TO SERVICE"

WARNING SIGN & INFORMATIONAL PLACARD SCHEDULE:

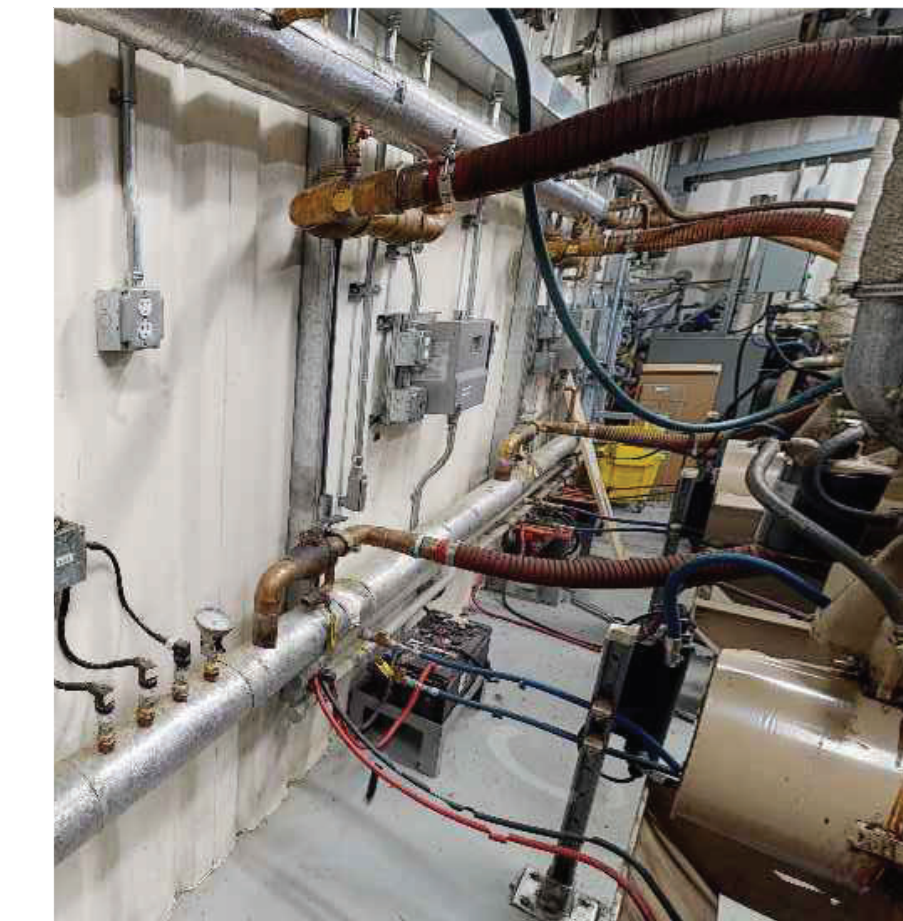
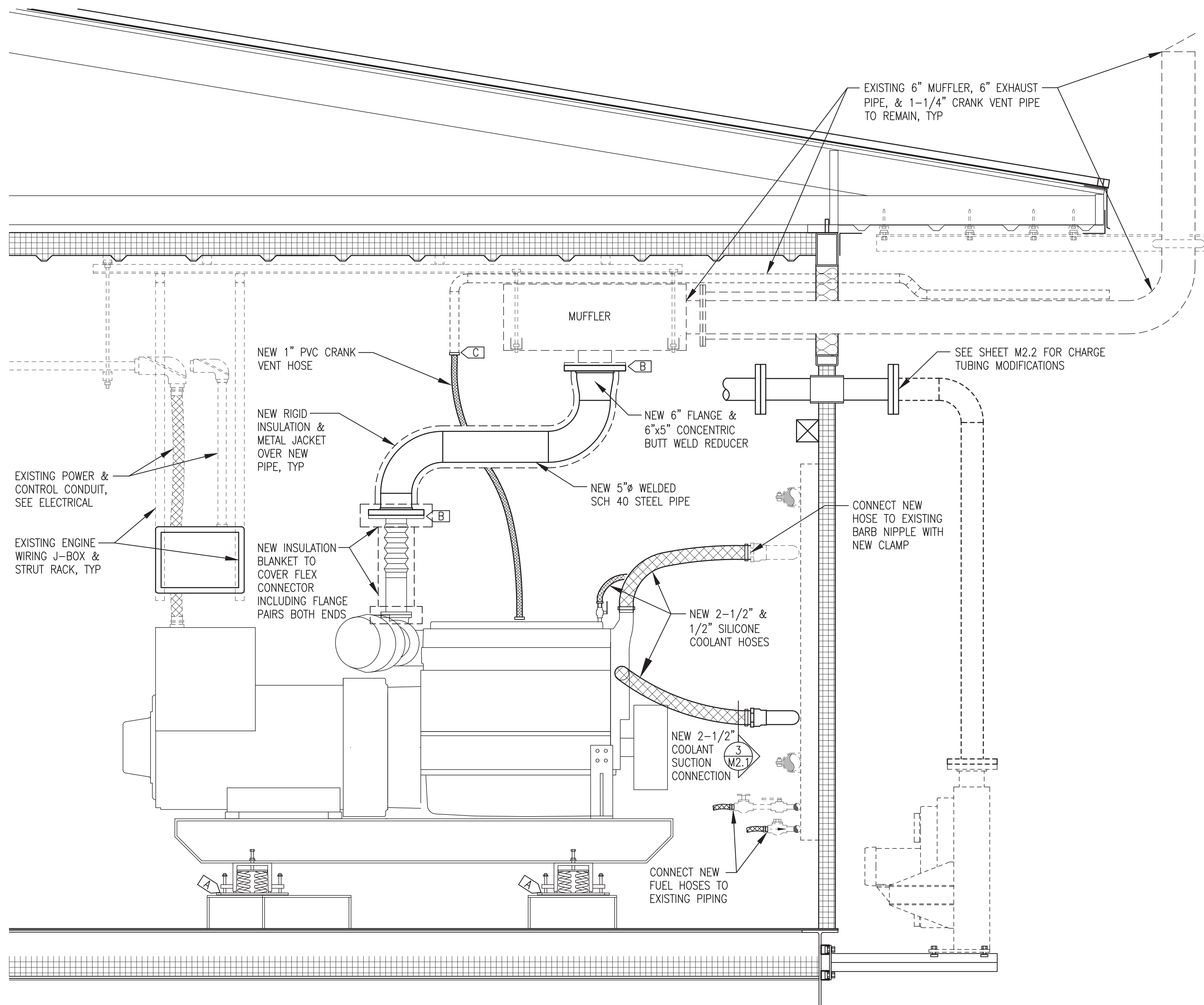
DECALS TO BE WHITE NON-REFLECTIVE VINYL BACKGROUND, 3M 3650-10, WITH 3M SERIES 225 HIGH PERFORMANCE VINYL LETTERS, ONE SIDE ONLY, SELF ADHESIVE BACK. NOMINAL 10"x14" SIZE UNLESS INDICATED OTHERWISE OR REQUIRED TO BE LARGER FOR SPECIFIED LETTER SIZE. WARNING LITES OR EQUAL. INSTALL ON FACE OF DOORS OR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

WARNING SIGNS - RED LETTERING ON WHITE BACKGROUND.

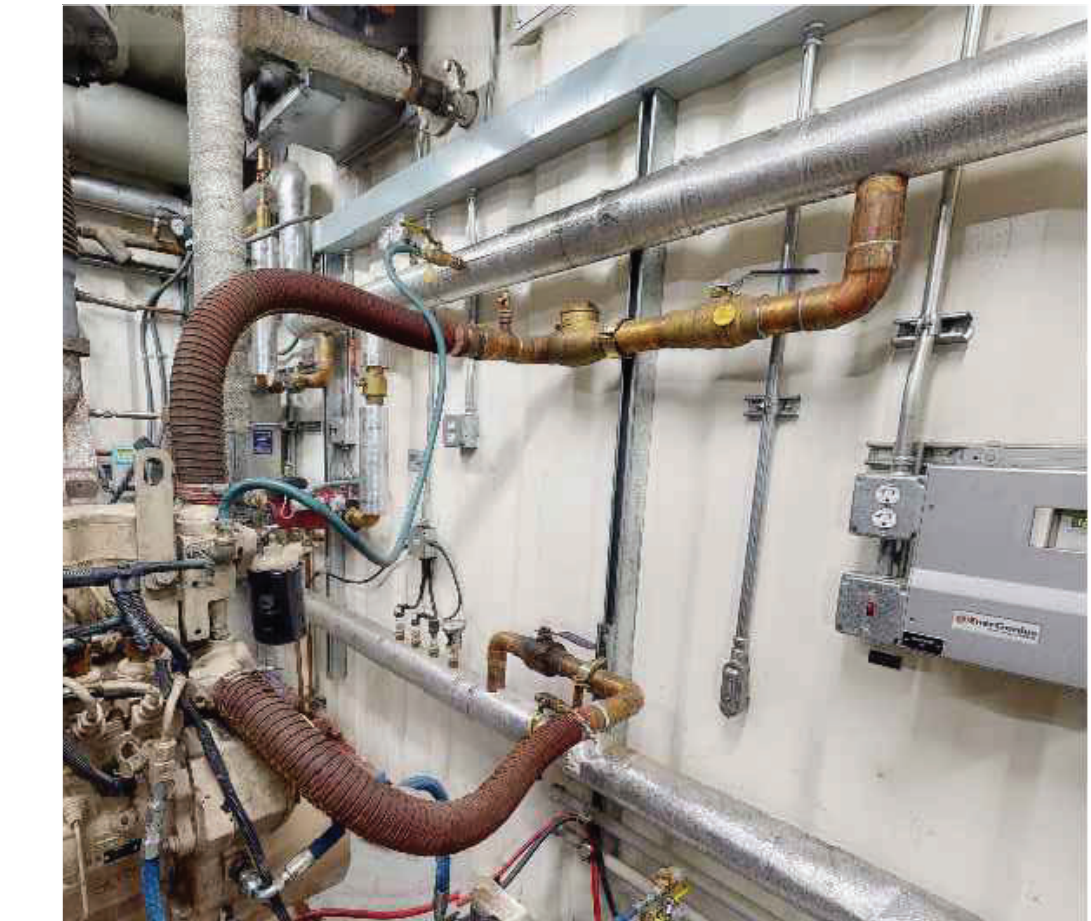
ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT:	FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE	
TITLE:	MECHANICAL DEMOLITION & NEW WORK PLANS	
DRAWN BY: BCG	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBYDERA M1-5	PROJECT NUMBER:	SHEET: M1
P.O. 111405, Anchorage, AK 99511 (907)349-0100		

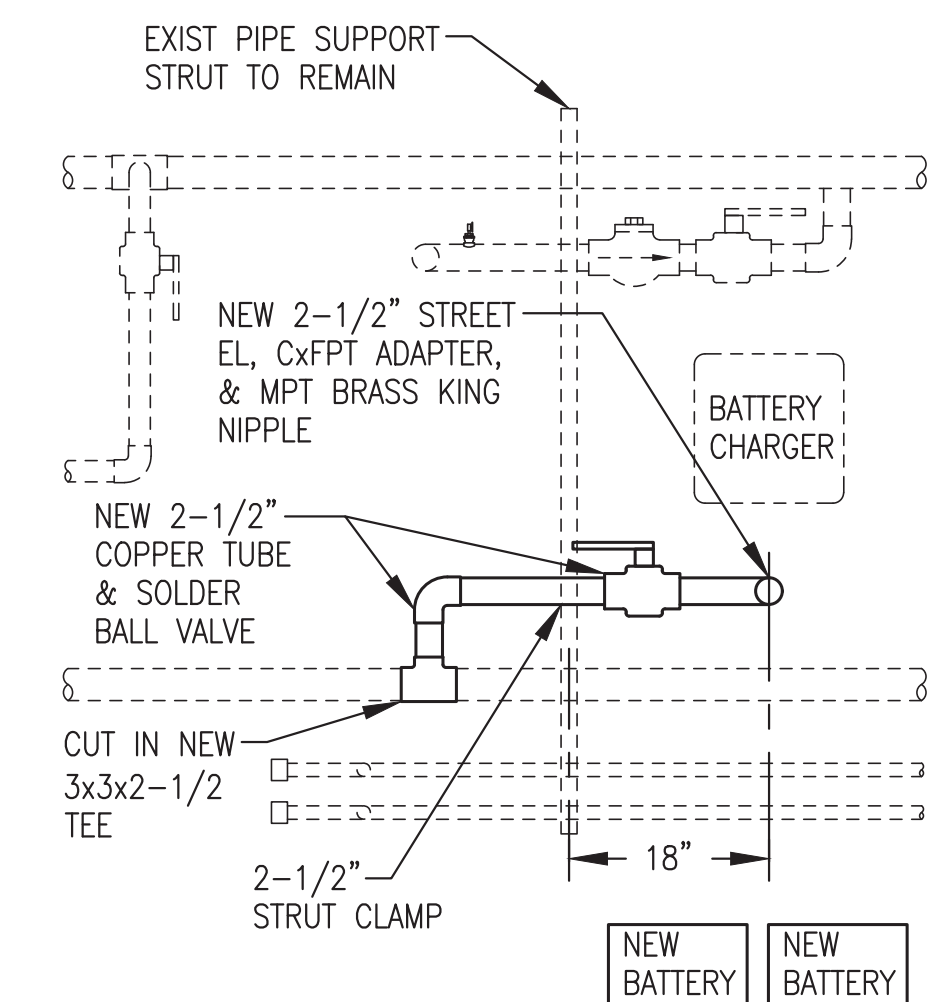
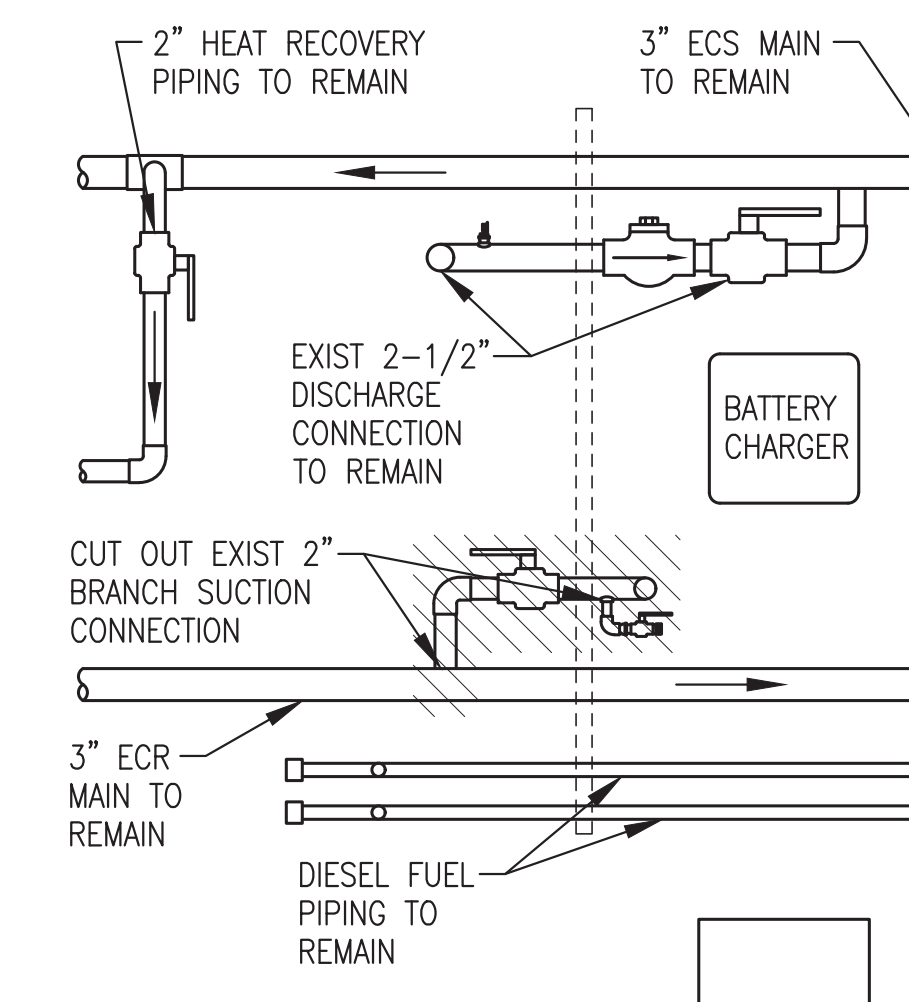


VIEW FROM LEFT



VIEW FROM RIGHT

2 GEN #1 COOLANT EXISTING PIPING CONNECTIONS
M2.1 NO SCALE



3 GEN #1 COOLANT SUCTION CONNECTION MODIFICATION
M2.1 NO SCALE

- GENERATOR INSTALLATION GENERAL NOTES:**
- EXISTING EQUIPMENT AND PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
 - NEW EQUIPMENT AND PIPING TO BE INSTALLED SHOWN WITH DARK SOLID LINES.
 - ALL EXHAUST AND CRANK VENT PIPING SCHEDULE 40 STEEL WITH BUTT WELD JOINTS, SIZE AS INDICATED.
 - NOT ALL COOLANT PIPE, HOSE AND FITTINGS SHOWN FOR CLARITY, SEE PIPING ISOMETRIC 1/M4 FOR ADDITIONAL DETAILS.

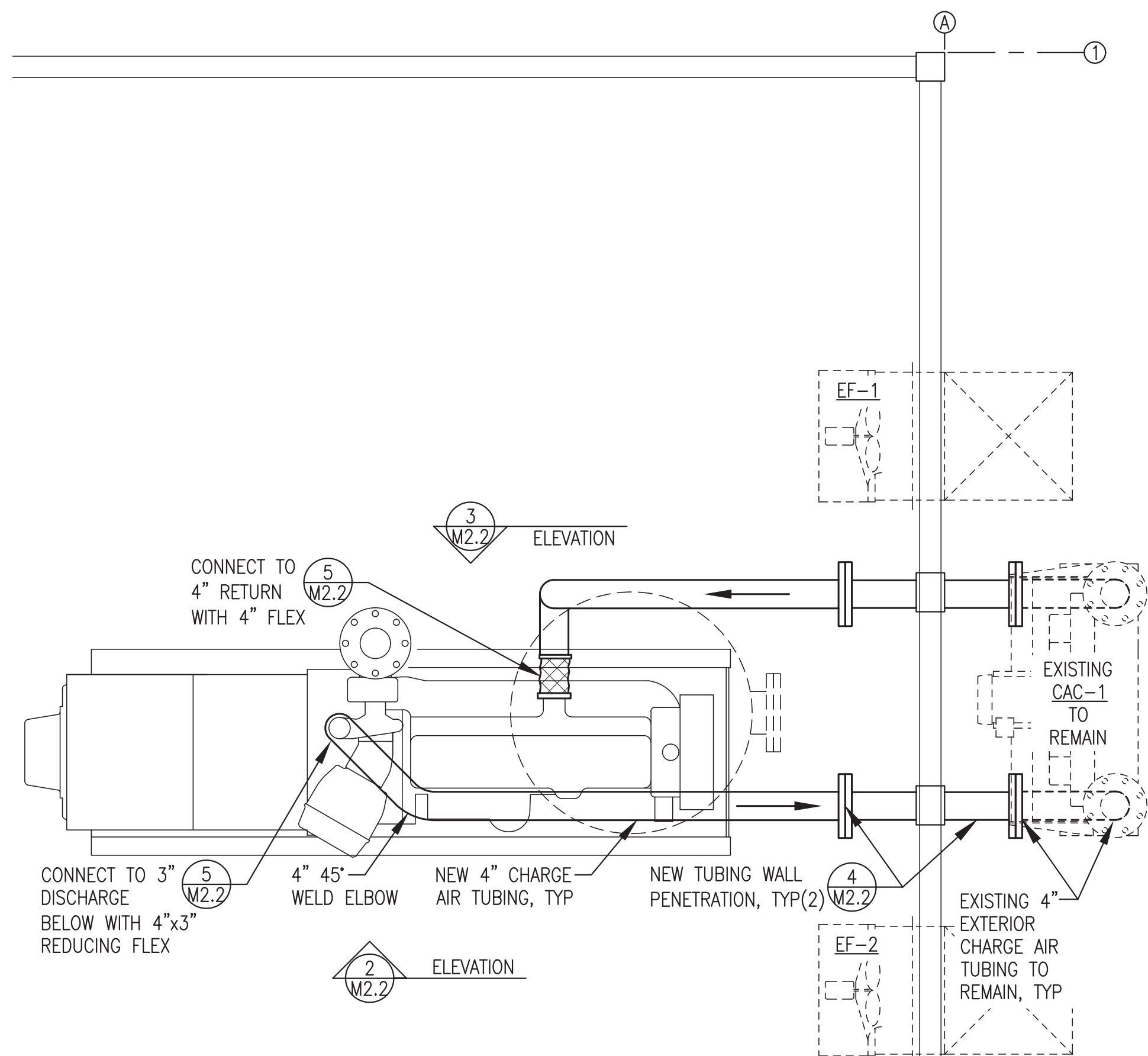
- GENERATOR INSTALLATION SPECIFIC NOTES:**
- [A] CENTER VIBRATION ISOLATORS OVER EXISTING HOLES IN PEDESTALS AND FASTEN WITH 1/2" BOLTS. ADJUST SPRING VIBRATION ISOLATOR LEVELING BOLTS TO ACHIEVE A UNIFORM INSTALLATION HEIGHT OF APPROXIMATELY 5-3/4" THEN TIGHTEN LOCKING NUTS. ADJUST NUTS ON STABILIZER BOLTS TO ACHIEVE A UNIFORM CLEARANCE OF APPROXIMATELY 1/8" THEN TIGHTEN LOCKING NUTS. VERIFY UNIT MOVES FREELY ON ISOLATORS.
 - [B] AFTER ADJUSTING ISOLATORS, FABRICATE EXHAUST RISER FROM NEW FLEX TO EXISTING MUFFLER. REINSTALL WITH NEW HIGH TEMP FLANGE GASKETS, NEW BOLT SETS, NEW ROCKWOOL INSULATION, AND NEW METAL JACKET.
 - [C] CUT BACK EXISTING 1-1/4" STEEL CRANK VENT PIPE AS REQUIRED AND WELD NEW 1" BARBED NIPPLE.

1 GEN #1 INSTALLATION
M2.1 1"=1'-0"

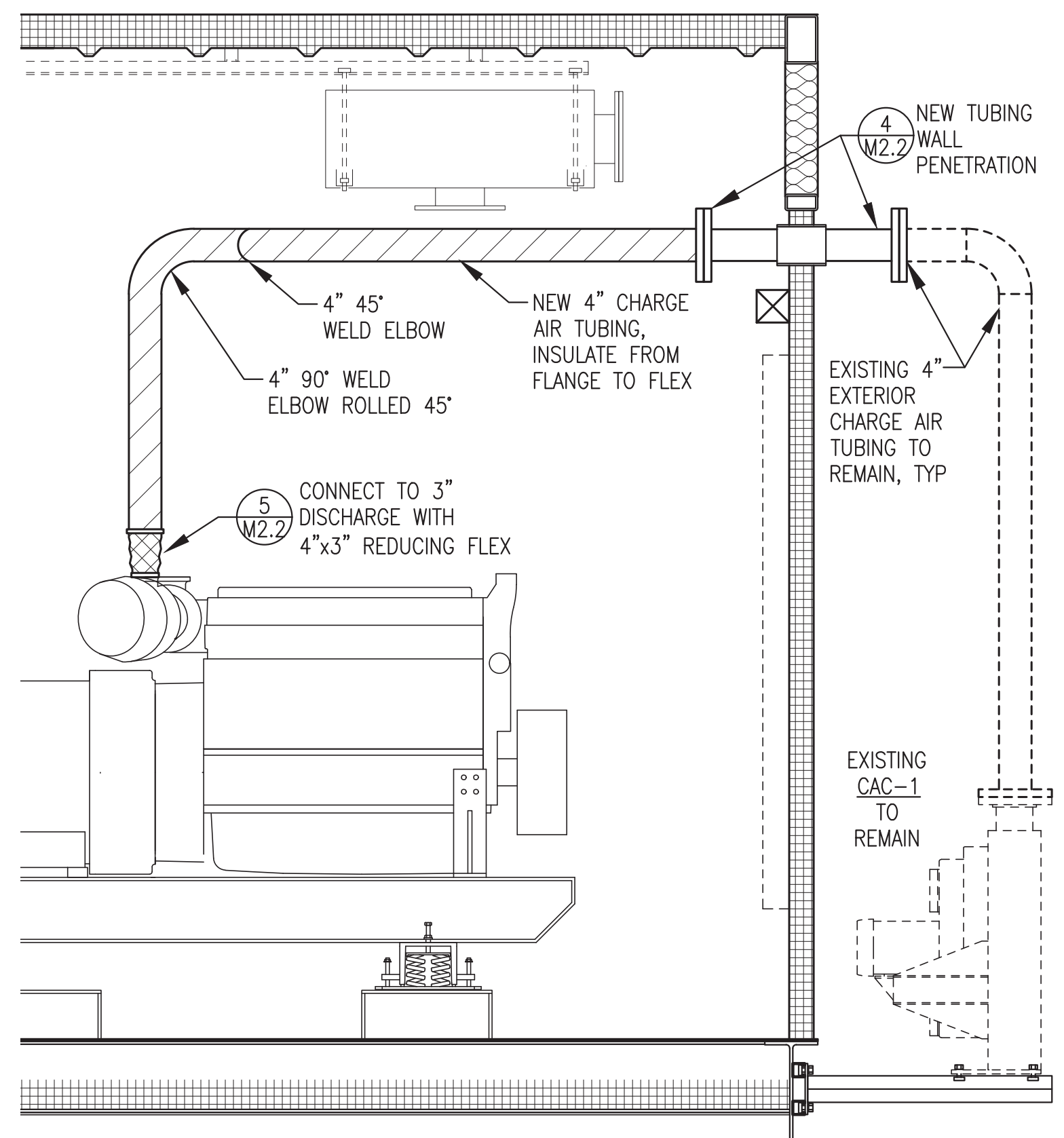
ISSUED FOR CONSTRUCTION
APRIL 2022



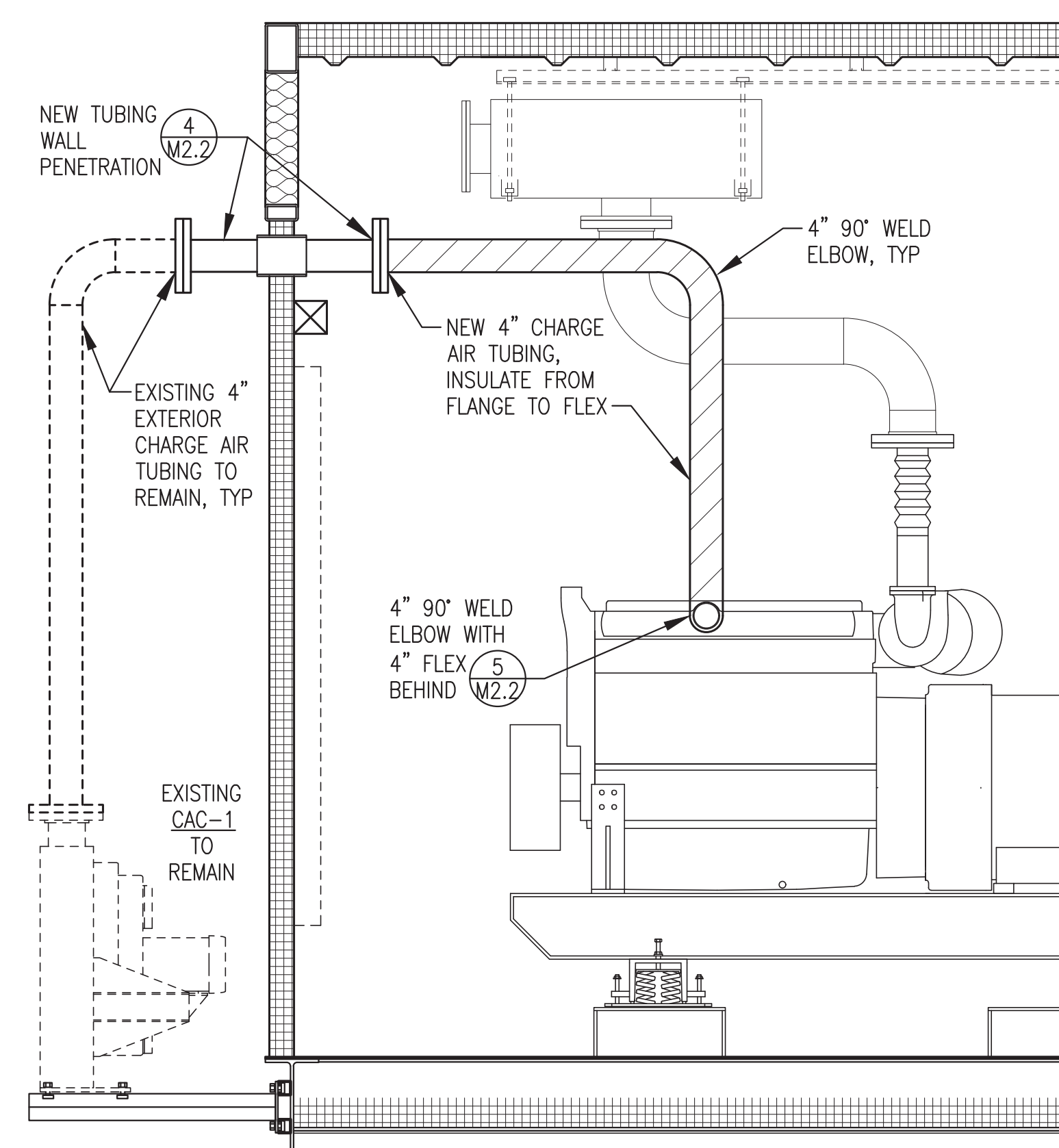
ALASKA ENERGY AUTHORITY		
PROJECT:	FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE	
TITLE:	GEN #1 INSTALLATION	
DRAWN BY: BCG	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBYDERA M1-5	PROJECT NUMBER:	DATE: 4/20/22
P.O. 111405, Anchorage, AK 99511 (907)349-0100		SHEET: M2.1



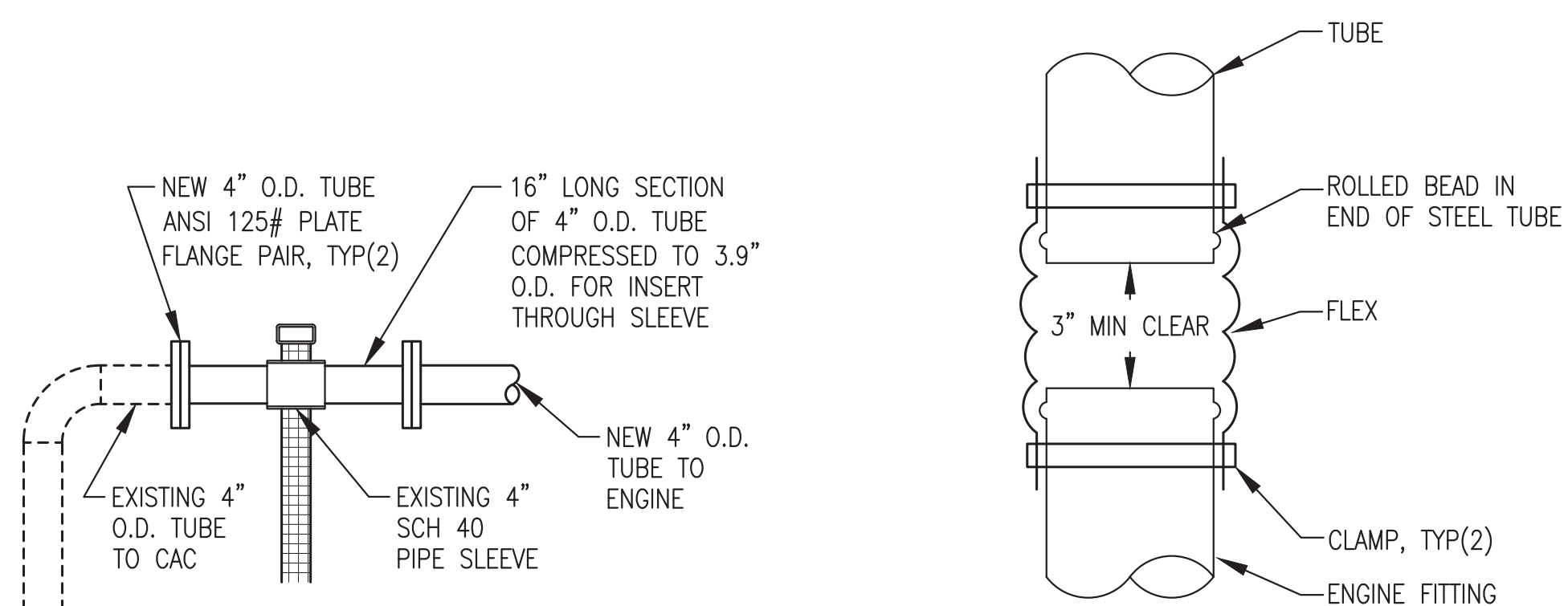
1 GEN #1 CHARGE AIR PLAN
M2.2 3/4"=1'-0"



2 GEN #1 RIGHT SIDE ELEVATION (HOT DISCHARGE)
M2.2 3/4"=1'-0"



3 GEN #1 LEFT SIDE ELEVATION (COLD RETURN)
M2.2 3/4"=1'-0"



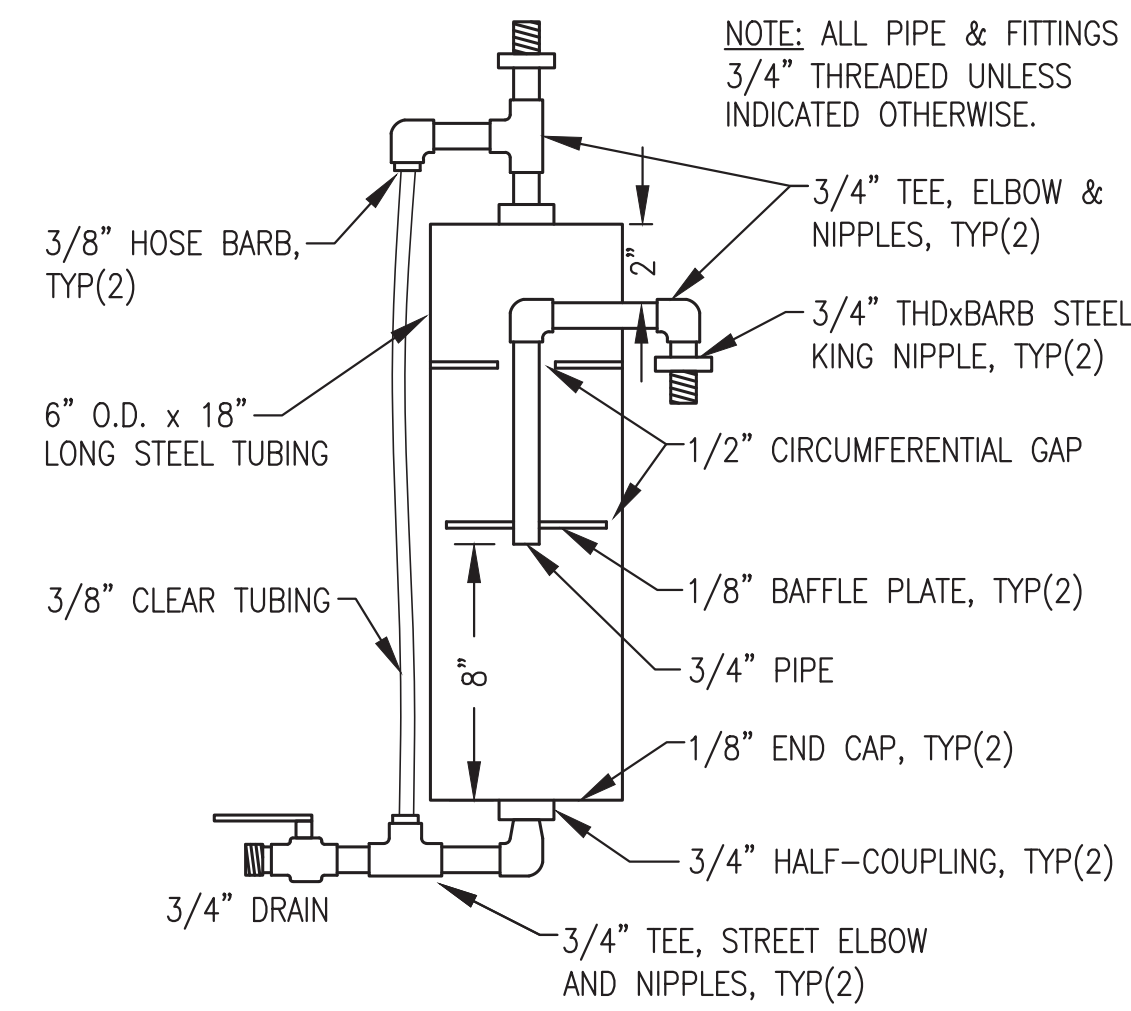
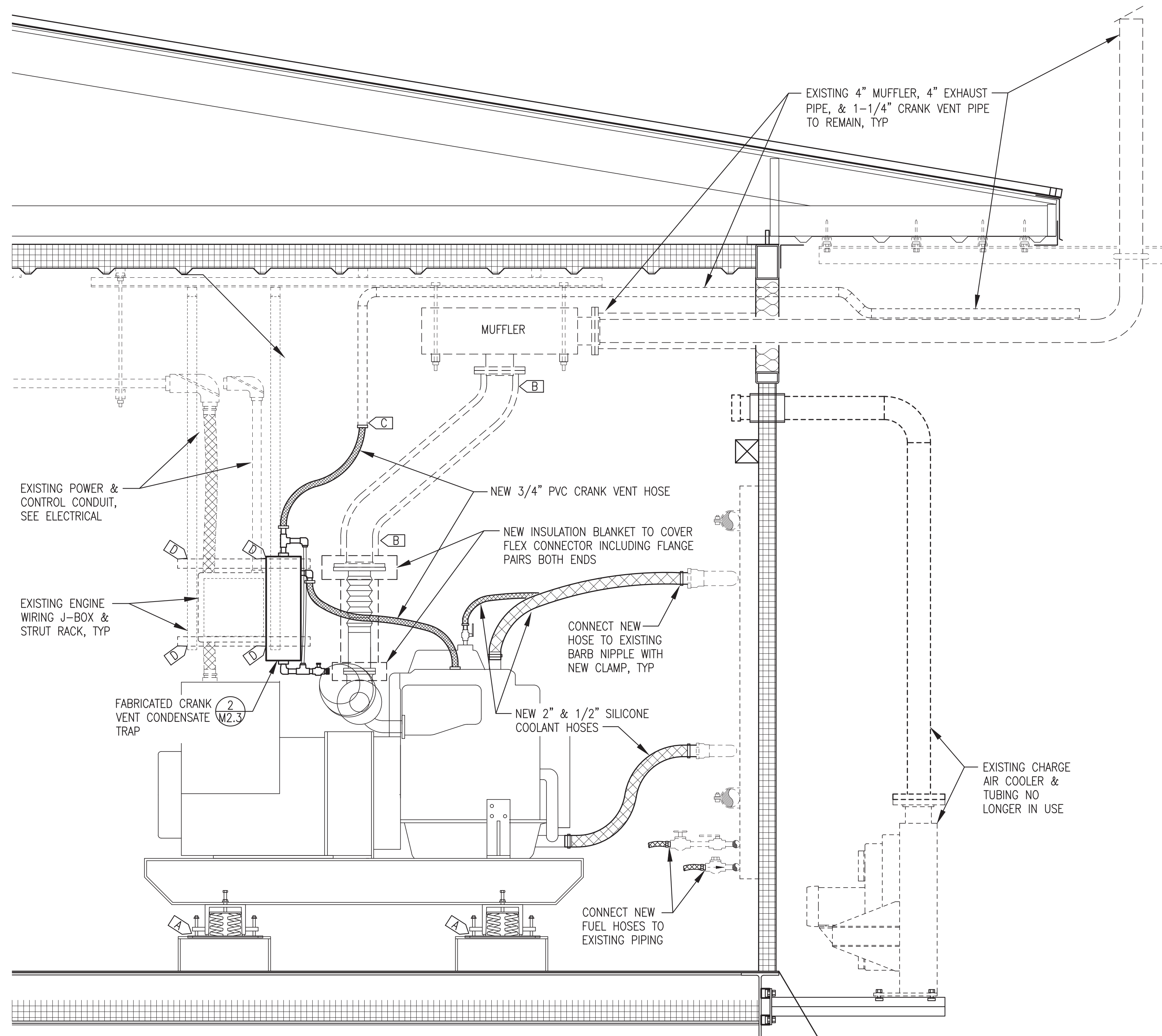
4 CAC TUBE WALL PENETRATION
M2.2 NO SCALE

5 TYPICAL CHARGE AIR FLEX
M2.2 NO SCALE

ISSUED FOR
CONSTRUCTION
APRIL 2022



PROJECT:	FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE	
TITLE:	GEN #1 CHARGE AIR MODIFICATIONS	
DRAWN BY: BCG	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBYDERA M1-5	PROJECT NUMBER:	SHEET: M2.2
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



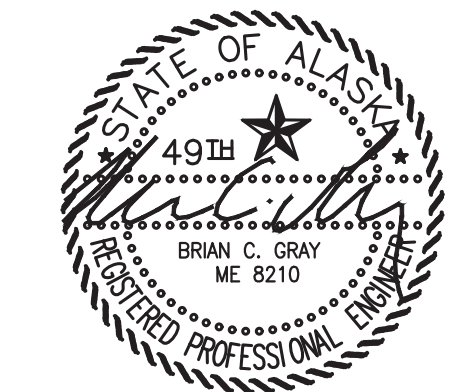
2 CONDENSATE TRAP FABRICATION
M2.3 NO SCALE

- GENERATOR INSTALLATION GENERAL NOTES:**
- EXISTING EQUIPMENT AND PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
 - NEW EQUIPMENT AND PIPING TO BE INSTALLED SHOWN WITH DARK SOLID LINES.
 - ALL EXHAUST PIPING SCHEDULE 40 STEEL WITH BUTT WELD JOINTS, SIZE AS INDICATED. ALL CRANK VENT PIPING COPPER TUBE WITH SOLDER JOINTS.
 - NOT ALL COOLANT PIPE, HOSE AND FITTINGS SHOWN FOR CLARITY, SEE PIPING ISOMETRIC 1/M4 FOR ADDITIONAL DETAILS.

- GENERATOR INSTALLATION SPECIFIC NOTES:**
- [A]** CENTER VIBRATION ISOLATORS OVER EXISTING HOLES IN PEDESTALS AND FASTEN WITH 1/2" BOLTS. 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.
 - [B]** EXISTING 4" EXHAUST RISER PIPE SHOULD MATCH HORIZONTAL LOCATION OF NEW ENGINE EXHAUST PIPE BUT MAY NOT MATCH VERTICAL HEIGHT. AFTER ADJUSTING ISOLATORS VERIFY POSITION AND MODIFY RISER PIPE AS REQUIRED. REINSTALL WITH NEW HIGH TEMP FLANGE GASKETS AND REINSTALL INSULATION AND METAL JACKET.
 - [C]** CUT BACK EXISTING 1-1/4" STEEL CRANK VENT PIPE AS REQUIRED AND WELD NEW OR EXISTING 3/4" BARBED NIPPLE.
 - [D]** BOLT 24"± LONG HORIZONTAL STRUT TO EXISTING VERTICAL STRUT RACK AND FASTEN CONDENSATE TRAP WITH 6" TUBING SIZE STRUT CLAMPS.

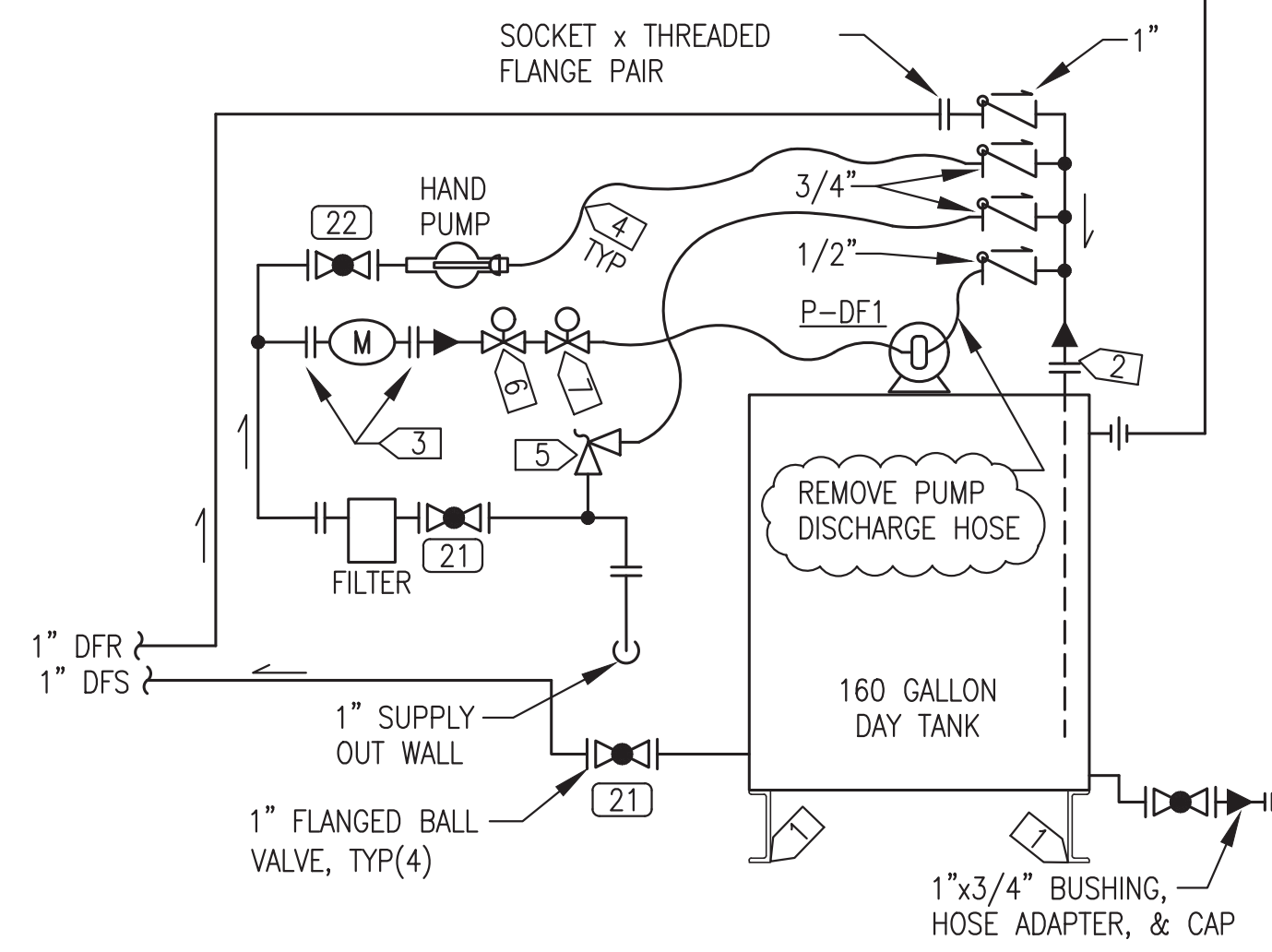
1 GEN #3 INSTALLATION
M2.3 1"=1'-0"

ISSUED FOR
 CONSTRUCTION
 APRIL 2022



 ALASKA ENERGY AUTHORITY		
PROJECT: FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE		
TITLE: GEN #3 INSTALLATION		
 Gray Stassel Engineering, Inc.	DRAWN BY: BCG DESIGNED BY: BCG FILE NAME: RUBYDERA M1-5 PROJECT NUMBER:	SCALE: AS NOTED DATE: 4/20/22 SHEET: M2.3
P.O. 111405, Anchorage, AK 99511 (907)349-0100		

2" THREADED VENT PIPE, SUPPORT FROM SOFFIT, TERMINATE MIN 18" ABOVE ROOF WITH SCREENED VENT CAP



PIPING DIAGRAM GENERAL NOTES:

- 1) FABRICATE DAY TANK IN ACCORDANCE WITH AEA STANDARD POWER PLANT TANK FABRICATION DETAILS. PLUG/CAP ALL SPARE OPENINGS.
- 2) SUPPLY AND RETURN PIPING 1" SOCKET WELDED. VENT PIPING 2" THREADED. ALL FLANGES ANSI 150# RAISED FACE EXCEPT FOR METER AS NOTED.
- 3) SUPPORT ALL PIPING FROM WALL WITH STRUT & PIPE CLAMPS, SEE DETAIL 4/M5, SIMILAR. INDEPENDENTLY SUPPORT PUMPS AND EQUIPMENT AS INDICATED.

PIPING DIAGRAM SPECIFIC NOTES:

- 1 FASTEN BASE TO FLOOR WITH 4 EACH 3/8" SELF TAPPING SCREWS.
- 2 CONNECT TO DAY TANK WITH 1-1/2" WELD NECK FLANGE & 1-1/2"x1" CONCENTRIC REDUCER.
- 3 DAY TANK METER EQUIPPED WITH 300# FLANGED ENDS, PROVIDE 1" ANSI 300# FLANGES & GASKETS, SOCKET WELD FLANGE UPSTREAM & THREADED FLANGE WITH 1"x1/2" BUSHING DOWNSTREAM.
- 4 #10 HOSE WITH 37" JIC FEMALE SWIVEL FITTINGS & MALE FLARE CONNECTOR, 3/8", 1/2", 3/4" OR 1" NPT AS REQUIRED TO MATCH PIPING OR PUMPS.
- 5 3/8"MPT INLET BY 3/4" FPT OUTLET PRV, 10 PSIG SETPOINT.
- 6 1/2" NO SOLENOID VALVE.
- 7 1/2" NC SOLENOID VALVE.

DAY TANK RECORD INSTALLATION NOTES PROVIDED FOR REFERENCE ONLY, NO WORK THIS DETAIL EXCEPT FOR DISCHARGE HOSE REMOVAL AS INDICATED

1 EXISTING DAY TANK PIPING DIAGRAM (REMOVE HOSE AS INDICATED)
M3 NO SCALE

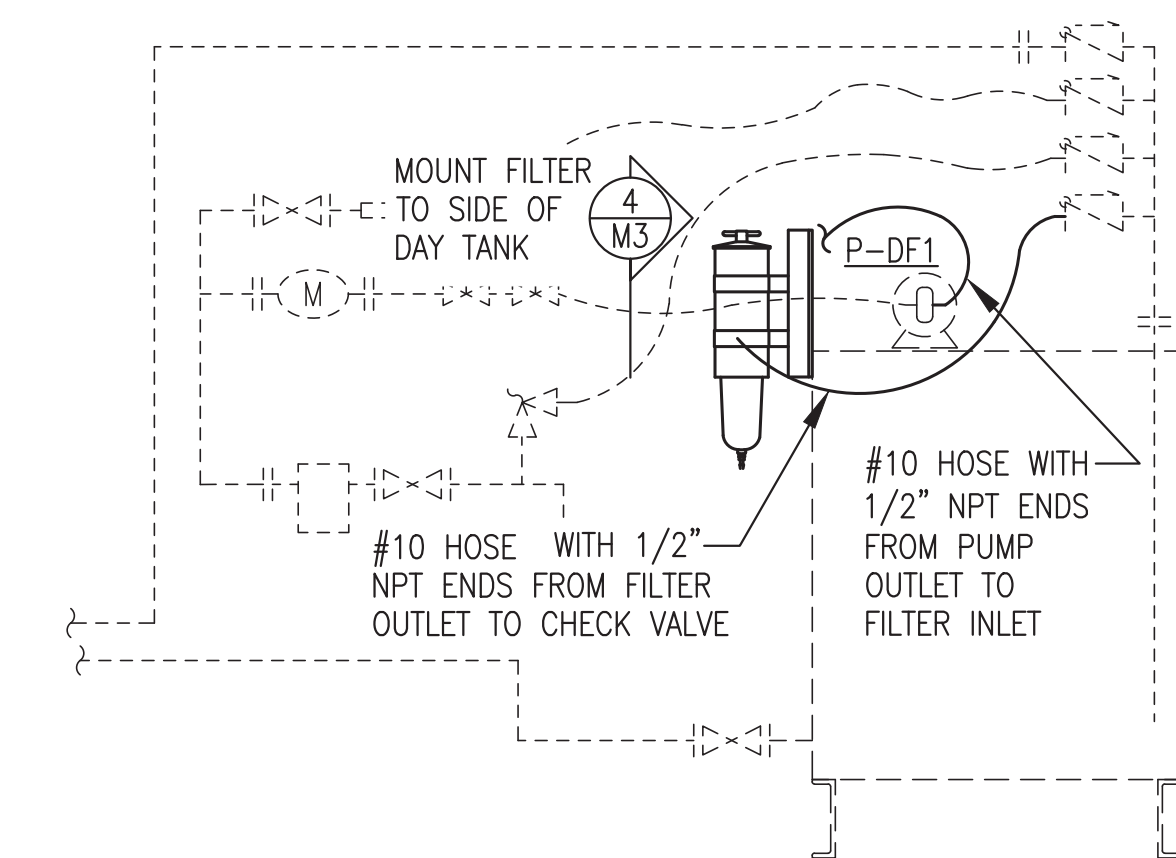


VIEW FROM LEFT

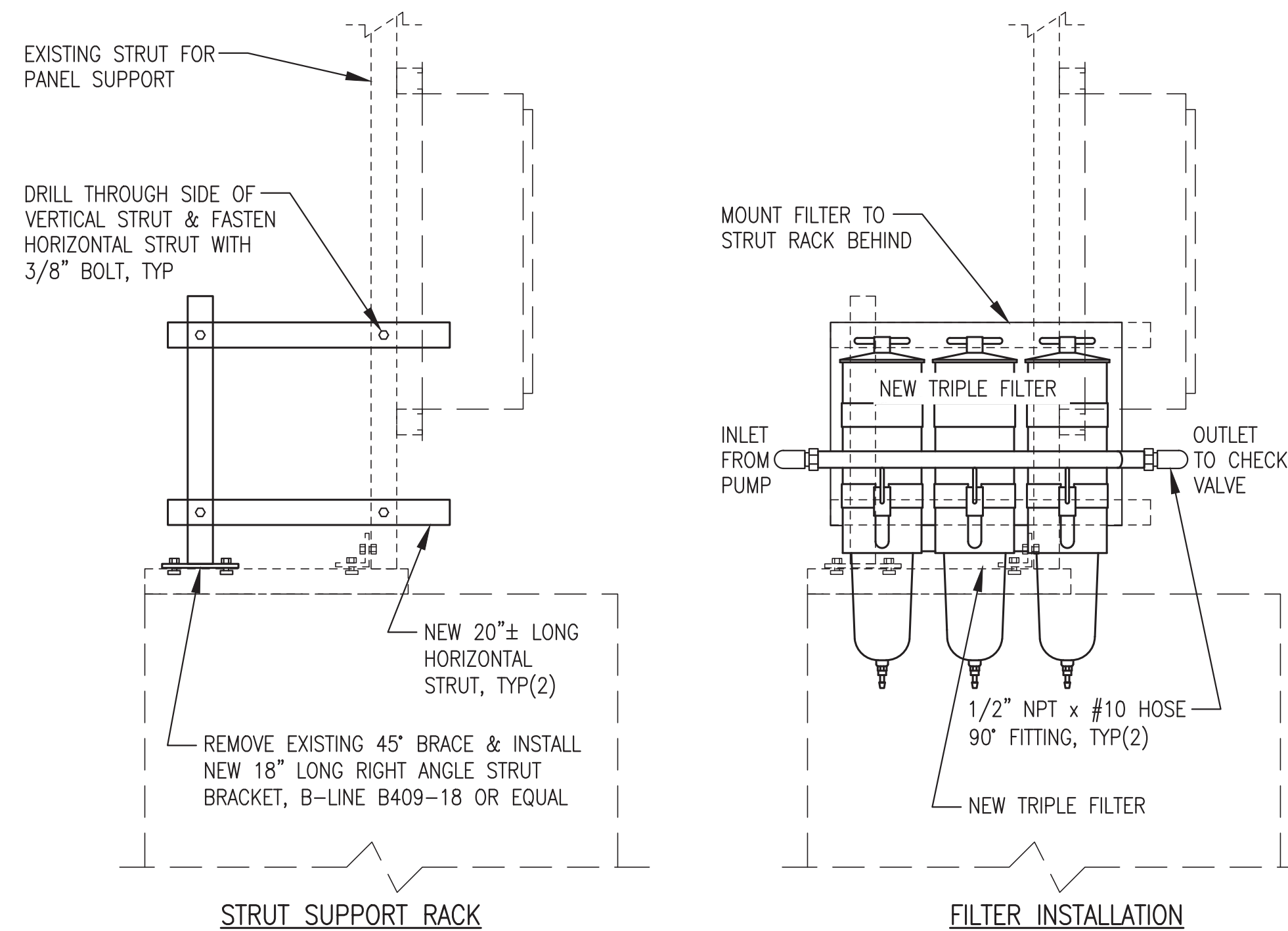


VIEW FROM FRONT

2 EXISTING DAY TANK IMAGES
M3 NO SCALE



3 NEW TRIPLE FILTER PIPING DIAGRAM
M3 NO SCALE



4 NEW TRIPLE FILTER INSTALLATION ON DAY TANK LEFT SIDE
M3 NO SCALE

TRIPLE FILTER INSTALLATION NOTES:

- 1) FURNISH SIX FILTER ELEMENTS, ONE SET INSTALLED PLUS ONE SPARE SET.
- 2) INSTALLATION OF THE FILTER WILL TEMPORARILY DISRUPT FUEL SUPPLY TO THE POWER PLANT. PRIOR TO INSTALLING COORDINATE WITH THE PLANT OPERATOR TO ENSURE ADEQUATE FUEL SUPPLY TO KEEP POWER ON.

FUEL SYSTEM EQUIPMENT SCHEDULE			
SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
F-TR	TRIPLE FUEL FILTER	THREE FILTER BANK WITH INDIVIDUAL ISOLATION VALVES, IMPACT RESISTANT "SEE-THRU" BOWLS, 15 PSIG WORKING PRESSURE. INSTALL 10 MICRON AQUABLOC FILTER ELEMENTS.	RACOR TURBINE 79/1000FGV WITH 2020TM-OR ELEMENTS

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APRIL 2022



ALASKA ENERGY AUTHORITY

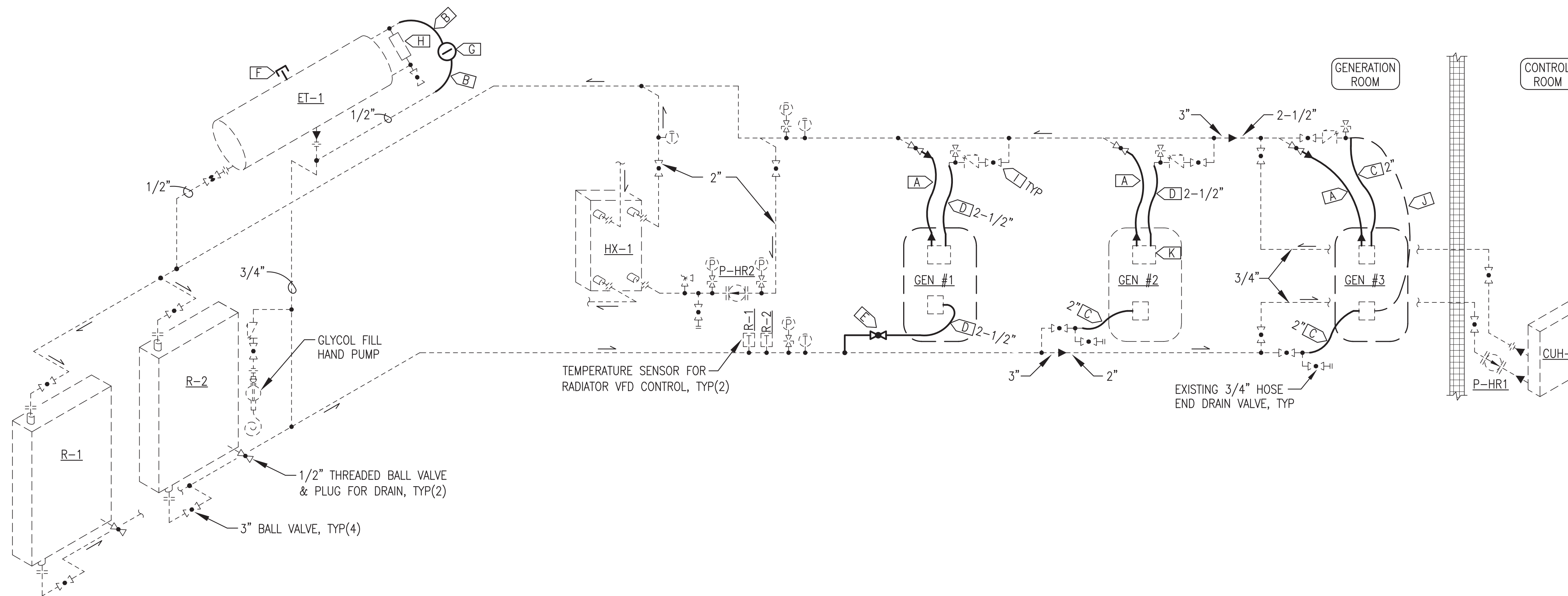
PROJECT: **FFY20 DERA PROJECTS
RUBY POWER PLANT UPGRADE**

TITLE: **FUEL FILTER INSTALLATION**

DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBYDERA M1-5	SHEET: M3
PROJECT NUMBER:	

DRAWN BY: BCG
DESIGNED BY: BCG
FILE NAME: RUBYDERA M1-5
PROJECT NUMBER:

P.O. 111405, Anchorage, AK 99511 (907)349-0100



1 COOLING SYSTEM PIPING ISOMETRIC
M4 NO SCALE

ADDITIVE ALTERNATE ENGINE COOLING SYSTEM FLUSH & GLYCOL REPLACEMENT INSTRUCTIONS

ENGINE COOLING SYSTEM GLYCOL REPLACEMENT GENERAL NOTES:

- ENGINE COOLANT SYSTEM VOLUME IS APPROXIMATELY 90 GALLONS. PROVIDE A MINIMUM OF 4 EACH EMPTY 55 GALLON DRUMS TO CONTAIN CONTAMINATED COOLANT AND CLEANING SOLUTION.
- FURNISH 2 EACH 55 GALLON DRUMS OF NEW EXTENDED LIFE ETHYLENE GLYCOL SOLUTION PRE-MIXED TO A RATIO OF 50% GLYCOL TO 50% WATER.
- PLAN WORK TO MINIMIZE OUTAGES AND SCHEDULE ALL OUTAGES IN ADVANCE WITH THE UTILITY.
- WHEN DRAINING FLUID AS NOTED BELOW, DRAIN FROM ALL LOW POINTS AND USE LOW PRESSURE AIR AS REQUIRED TO CLEAR ISOLATED SECTIONS.
- GEN #2 HAS THE BEST WORKING ENGINE SO THE FLUSH WILL NEED TO BE PERFORMED USING GEN #2. TEMPORARILY CREATE A BYPASS AT GEN #3 TO ENSURE CIRCULATION THROUGH PIPING MAINS.

STEP 1: ENGINE COOLING SYSTEM DRAIN/CLEAN

- LOCK/TAG OUT GEN #1 AND GEN #3 FOR THE DURATION OF THE FLUSH. SHUT DOWN GEN #2 AND LOCK/TAG OUT. TURN OFF PUMPS P-HR1 AND P-HR2.
- DRAIN THE EXISTING COOLANT INTO DRUMS AND TURN OVER TO UTILITY.
- CLEAN AND DEGREASE RADIATOR AIR SURFACES. PRESSURE WASH TO REMOVE ALL DEBRIS.
- REMOVE GEN #2 THERMOSTAT TO ENSURE FULL FLOW IN PIPING FROM ENGINE WATER PUMP. SEE SPECIFIC NOTE <K>.
- VALVE OFF GEN #1 CONNECTIONS AND REMOVE HOSES TO ISOLATE.
- CREATE TEMPORARY BYPASS AT GEN #3 CONNECTION TO ALLOW CIRCULATION THROUGH MAINS TO END. SEE SPECIFIC NOTE <J>.
- FILL SYSTEM WITH FRESH WATER AND HEAVY DUTY ALKALINE-BASED ENGINE CLEANING SOLUTION, CUMMINS FLEETGUARD RESTORE, OR EQUAL, 1 GALLON PER 10 GALLONS OF FRESH WATER.
- START GEN #2 TO CIRCULATE THE CLEANING SOLUTION. TURN ON PUMPS P-HR1 AND P-HR2. BRING SYSTEM UP TO OPERATING TEMPERATURE AND OPERATE FOR 24 HOURS MINIMUM.
- SHUT DOWN GEN #2 AND LOCK/TAG OUT. TURN OFF PUMPS P-HR1 AND P-HR2.

STEP 2: ENGINE COOLING SYSTEM DRAIN/FLUSH/DRAIN

- DRAIN THE USED CLEANING SOLUTION FROM THE SYSTEM WITHIN 1/2 HOUR OF ENGINE SHUT DOWN TO AVOID SETTLING OUT SOLIDS. DRAIN INTO DRUMS AND TURN OVER TO UTILITY.
- FILL SYSTEM WITH FRESH WATER.
- START GEN #2 TO PROVIDE SYSTEM FLUSH. TURN ON PUMPS P-HR1 AND P-HR2. BRING SYSTEM UP TO OPERATING TEMPERATURE AND OPERATE FOR 2 HOURS MINIMUM. CAREFULLY INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS WHILE FLUSHING. IF ANY LEAKS ARE DETECTED, SHUT OFF GEN #2, REPAIR AS REQUIRED, AND BEGIN THIS STEP OVER.
- SHUT DOWN GEN #2 AND LOCK/TAG OUT. TURN OFF PUMPS P-HR1 AND P-HR2.
- DRAIN THE WATER.
- INSTALL NEW EXPANSION TANK PRESSURE CAP, CLEAN SITE GAUGE, REPLACE LOW COOLANT LEVEL SWITCH, AND REPLACE SMALL HOSES.
- AT GEN #3 REMOVE WEDGE FROM CHECK VALVE AND REMOVE BYPASS HOSE.

STEP 3: ENGINE COOLING SYSTEM FILL/COMMISSION

- REINSTALL GEN #2 THERMOSTAT WITH A NEW GASKET.
- INSTALL NEW HOSES ON GEN #2.
- FILL SYSTEM WITH NEW 50% EXTENDED LIFE ETHYLENE GLYCOL SOLUTION.
- START GEN #2 TO PROVIDE SYSTEM FINAL TEST. TURN ON PUMPS P-HR1 AND P-HR2. BRING SYSTEM UP TO OPERATING TEMPERATURE. OPERATE FOR AN ADDITIONAL 2 HOURS MINIMUM. CAREFULLY PURGE ALL AIR FROM SYSTEM AND INSPECT THE ENTIRE SYSTEM FOR ANY LEAKS. ENSURE THAT COOLANT LEVEL IS MID WAY ON EXPANSION TANK SITE GAUGE AT CONCLUSION OF TEST.
- COMPLETE INSTALLATION OF NEW ENGINES ON GEN #1 AND GEN #3. INSTALL NEW COOLANT HOSES. TEST NEW ENGINES AND PLACE IN SERVICE.

COOLING SYSTEM UPGRADES GENERAL NOTES:

- EXISTING ENGINE COOLING SYSTEM PIPING AND DEVICES TO REMAIN UNCHANGED SHOWN WITH LIGHT DASHED LINES.
- PIPING MODIFICATIONS AND NEW HOSES SHOWN WITH DARK SOLID LINES.
- PERFORM TASKS UNDER BASE BID OR ADDITIVE ALTERNATE AS INDICATED BY SPECIFIC NOTES.
- THIS WORK WILL LIKELY REQUIRE MULTIPLE POWER OUTAGES. PLAN WORK TO MINIMIZE OUTAGES AND SCHEDULE ALL OUTAGES IN ADVANCE WITH THE UTILITY.

BASE BID COOLING SYSTEM UPGRADES SPECIFIC NOTES:

- <A> REPLACE ENGINE VENT/PREHEAT HOSES WITH NEW 1/2" SILICONE HOSE AND CLAMPS. CONNECT ONE END TO EXISTING 3/4" BALL VALVE ON COOLING MANIFOLD WITH 3/4" MPT x 1/2" BARB BRASS KING NIPPLE. CONNECT OTHER END TO GAUGE COCK ON ENGINE WITH 1/2" BARB BRASS KING NIPPLE.
- REPLACE ALL OTHER SMALL DIAMETER GLYCOL HOSE AS INDICATED ON ISOMETRIC. PROVIDE NEW 1/2" SILICONE HOSE & CLAMPS. INSTALL ON 1/2" BARB x NPT BRASS KING NIPPLES, SIZE AS REQUIRED.
- <C> REPLACE ENGINE SUCTION/DISCHARGE HOSES WITH NEW 2" SILICONE HOSE AND CLAMPS.
- <D> REPLACE ENGINE SUCTION/DISCHARGE HOSES WITH NEW 2-1/2" SILICONE HOSE AND CLAMPS.
- <E> REPLACE 2" SUCTION CONNECTION WITH NEW 2-1/2" PIPING CONNECTION, SEE SHEET M2.1.
- <F> REMOVE EXISTING 2 PSI EXPANSION TANK CAP AND INSTALL NEW 12 PSI PRESSURE CAP ON NEW 2" MPT ADAPTER. INSTALL 3/8" DISCHARGE HOSE TO WITHIN 6" OF FLOOR. TYWRAP HOSE TO EXISTING VERTICAL STRUT.

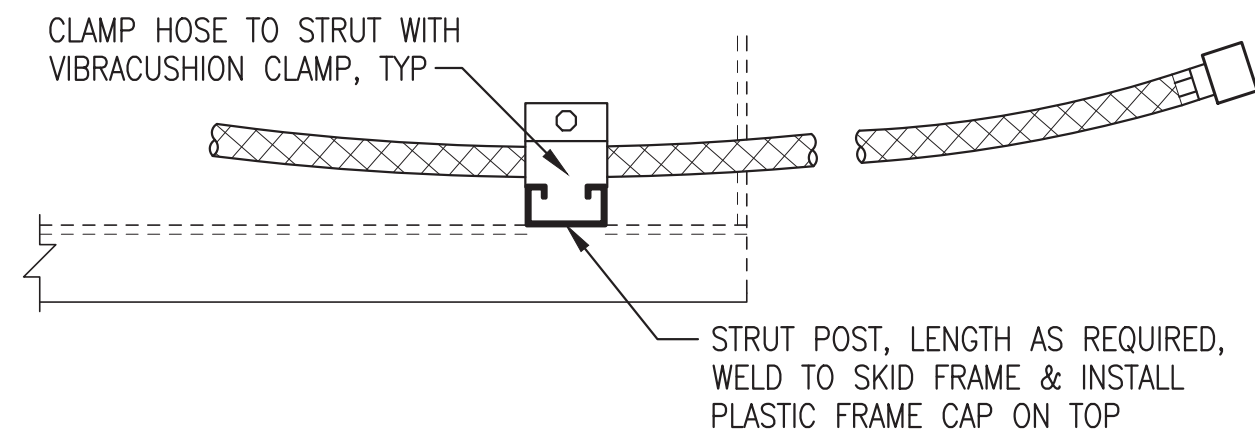
ADDITIVE ALTERNATE #1 COOLING SYSTEM UPGRADES SPECIFIC NOTES:

- <G> INSTALL NEW MURPHY EL150-K1 LEVEL SWITCH TO REPLACE EXISTING.
- <H> REMOVE SITE GAUGE, CLEAN GLASS, AND REINSTALL.
- <I> VALVE OFF GEN #1 DURING FLUSHING AND REMOVE OLD HOSES.
- <J> CREATE TEMPORARY BYPASS AT GEN #3 TO ALLOW CIRCULATION TO END OF MAINS FOR FLUSHING. TEMPORARILY WEDGE CHECK VALVE FLAPPER OPEN. TEMPORARILY SPLICE EXISTING 2" DISCHARGE AND SUCTION HOSES. LEAVE BYPASS IN PLACE UNTIL SYSTEM IS READY TO BE FILLED WITH GLYCOL. AFTER FINAL FLUSH AND DRAIN REMOVE CHECK VALVE WEDGE AND INSTALL NEW HOSES.
- <K> REMOVE EXISTING ENGINE THERMOSTAT FOR FLUSHING AND REINSTALL WITH NEW GASKET WHEN COMPLETE. EXISTING ENGINE IS A JOHN DEERE 6081HF070, SERIAL # RG6081H296676.

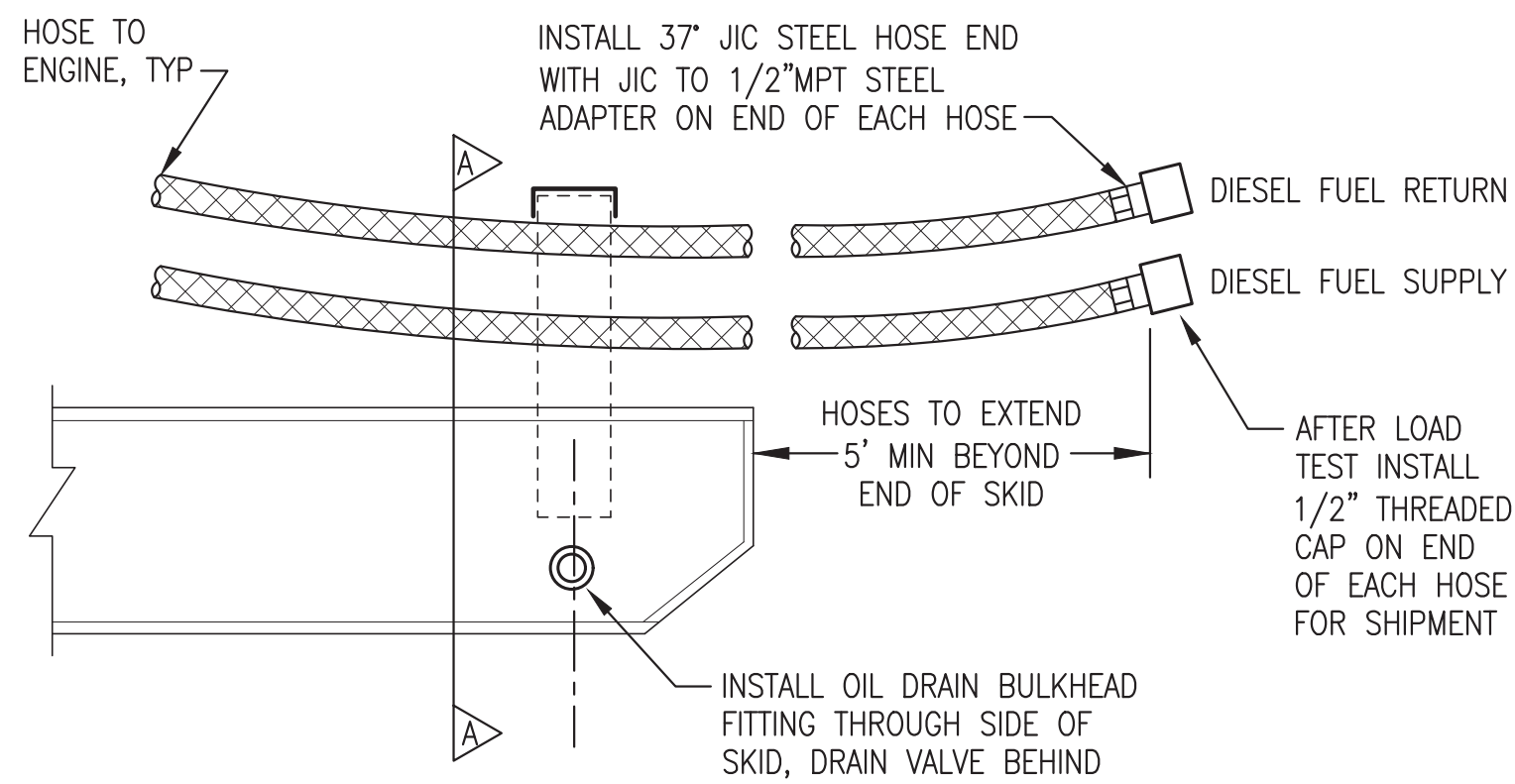
ISSUED FOR
 CONSTRUCTION
 APRIL 2022



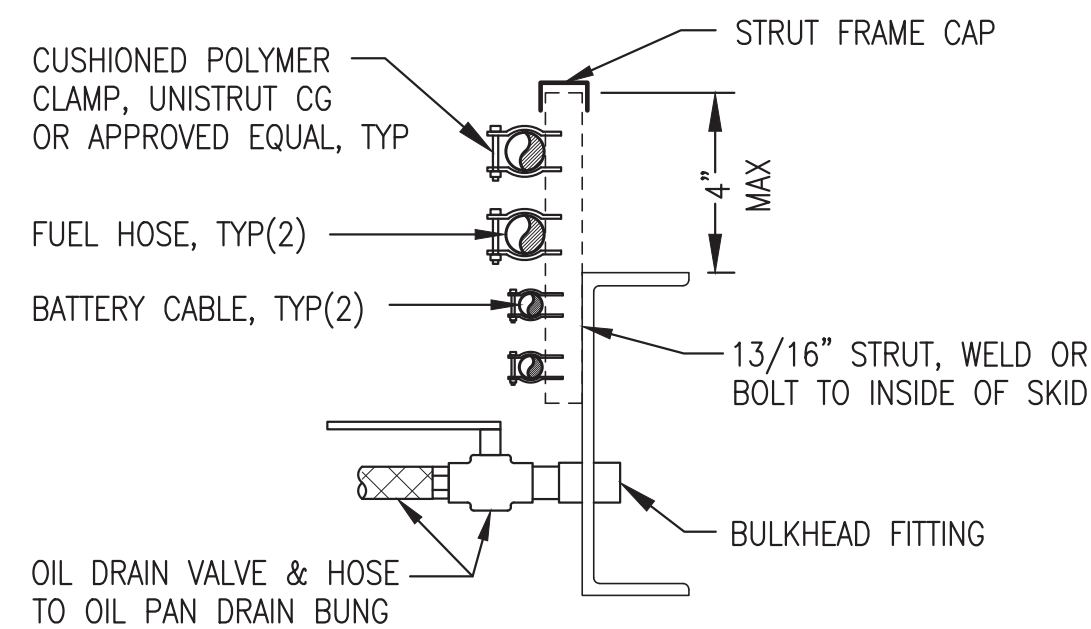
PROJECT: FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE	
TITLE: ENGINE COOLING SYSTEM UPGRADES	
DRAWN BY: BCG	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/20/22
FILE NAME: RUBYDERA M1-5	SHEET: M4
P.O. 111405, Anchorage, AK 99511 (907)349-0100	



RIGHT SKID PLAN (TOP) VIEW

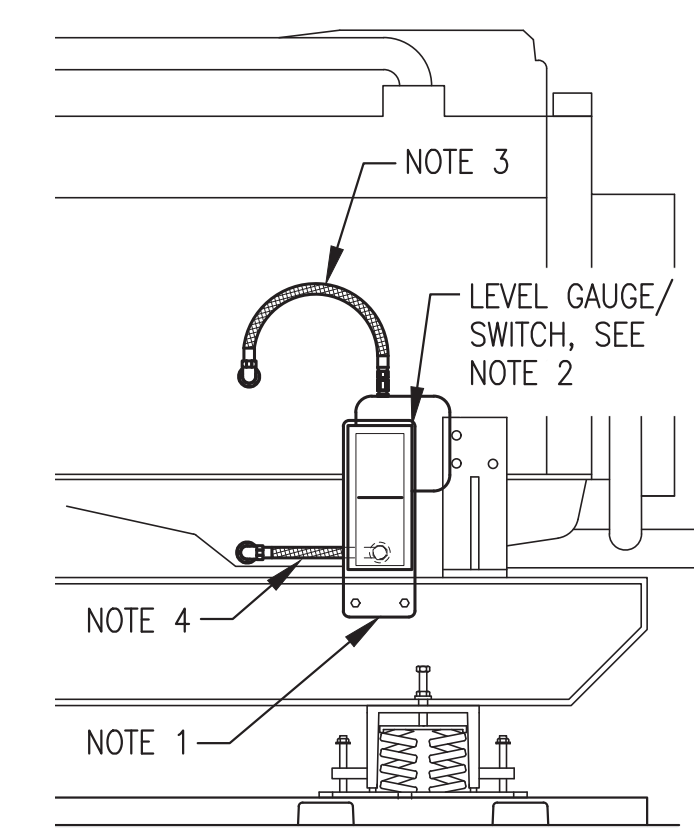


RIGHT SKID ELEVATION



RIGHT SKID SECTION A-A

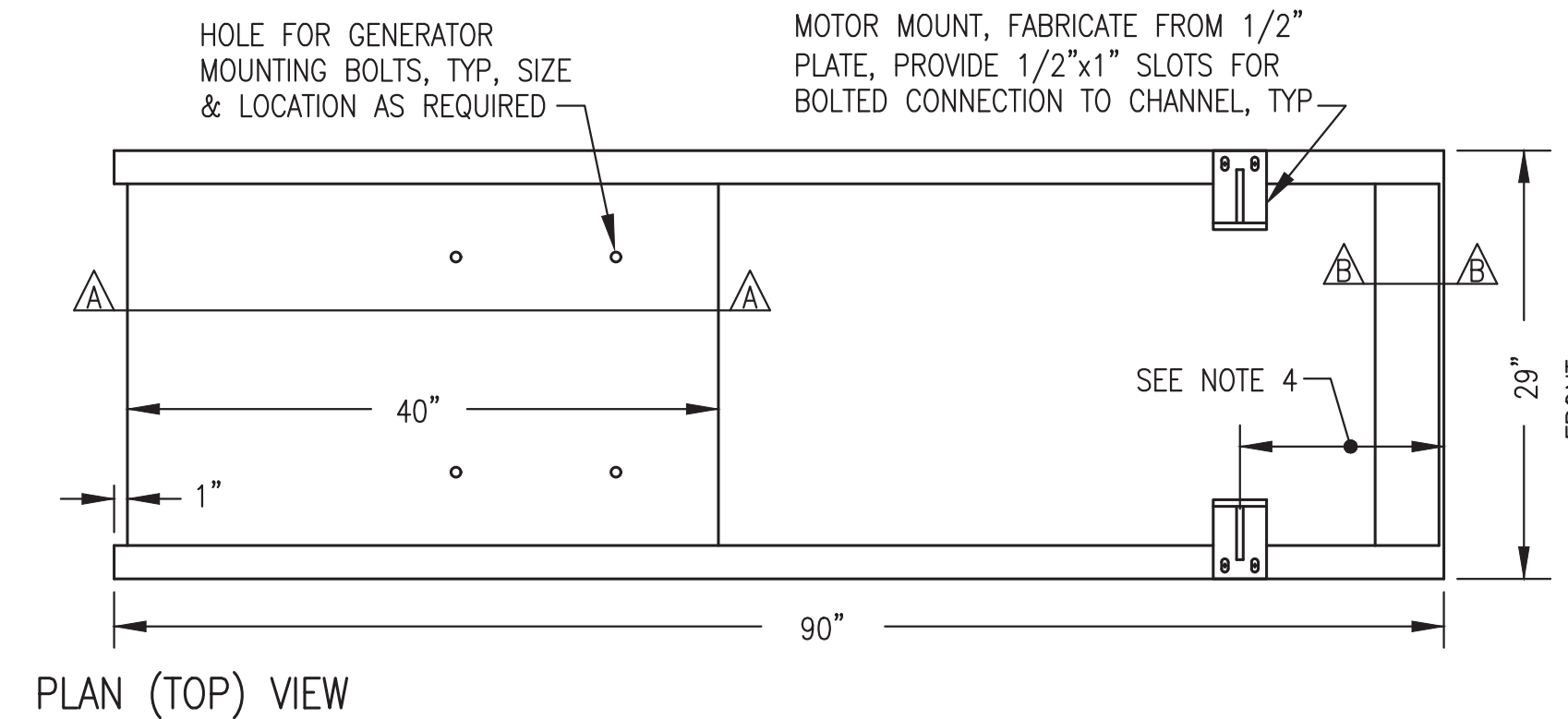
1 FUEL & OIL HOSE TERMINATIONS
M5 NO SCALE



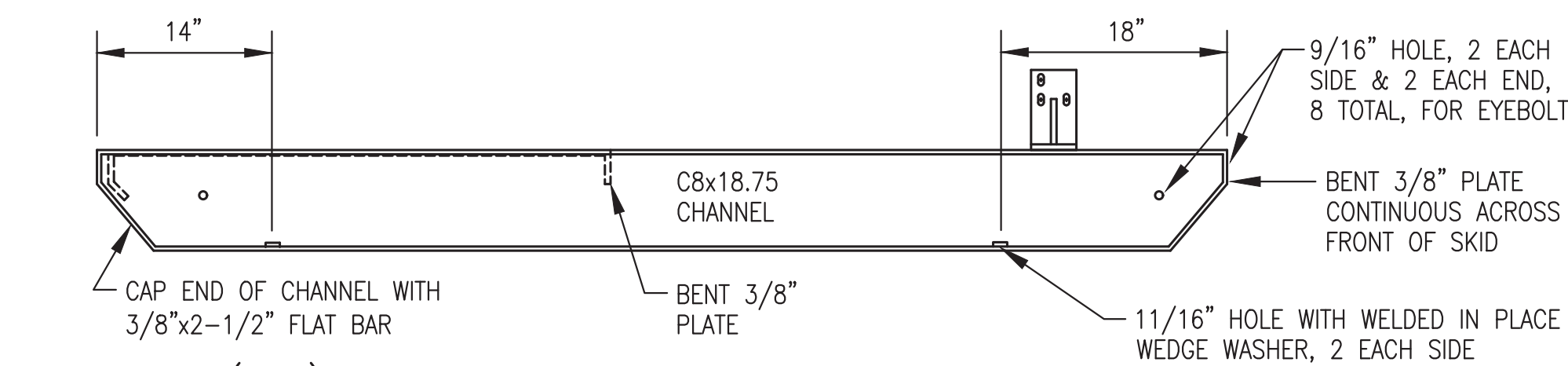
NOTES:

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

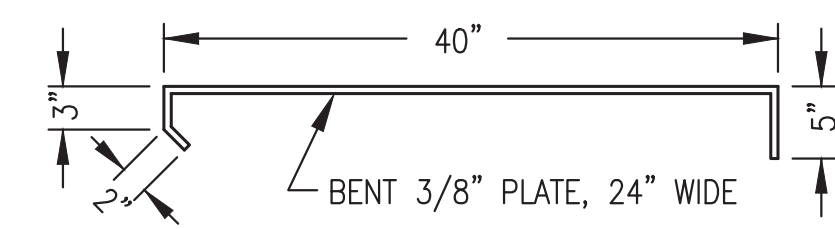
4 OIL LEVEL GAUGE/SWITCH INSTALLATION
M5 NO SCALE



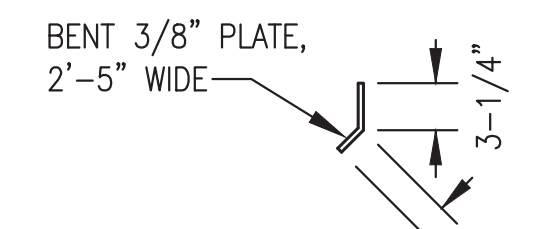
PLAN (TOP) VIEW



ELEVATION (SIDE) VIEW



SECTION A-A

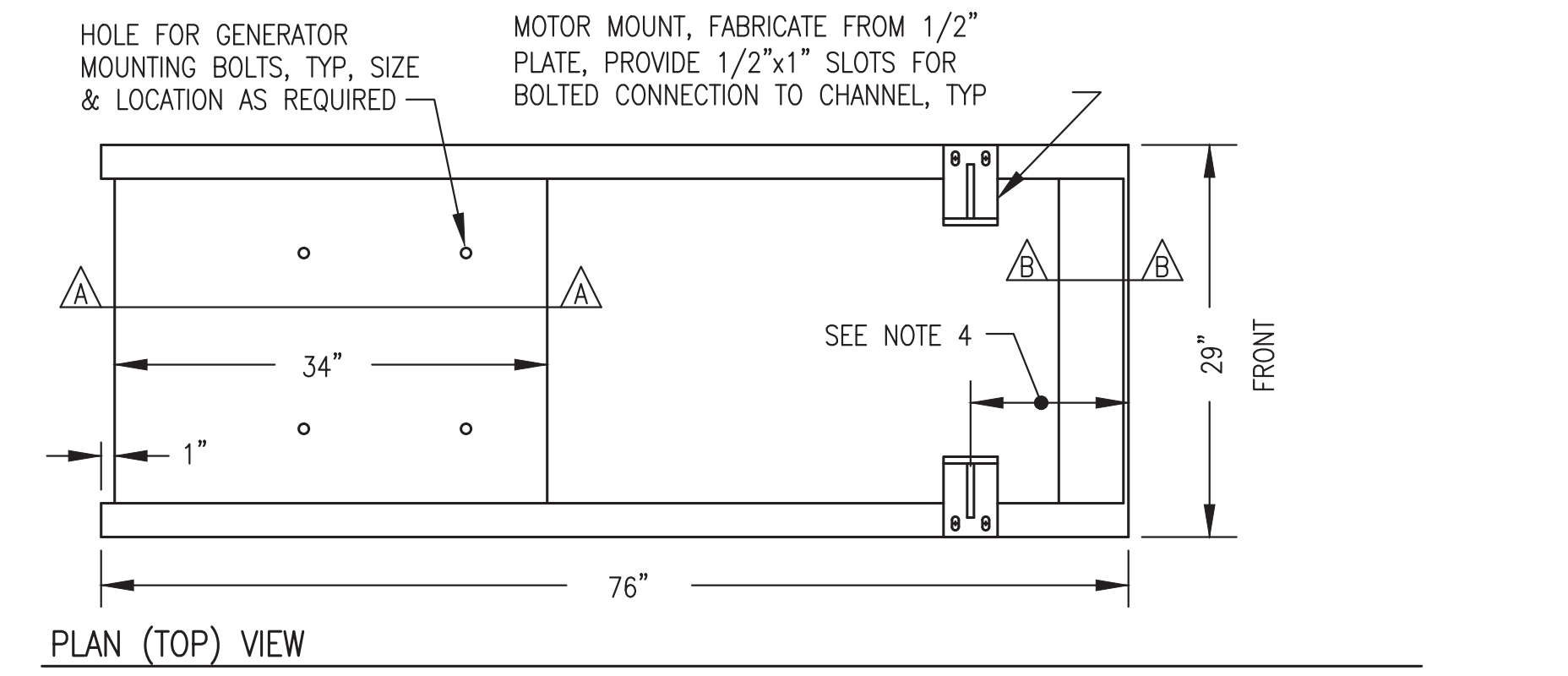


SECTION B-B

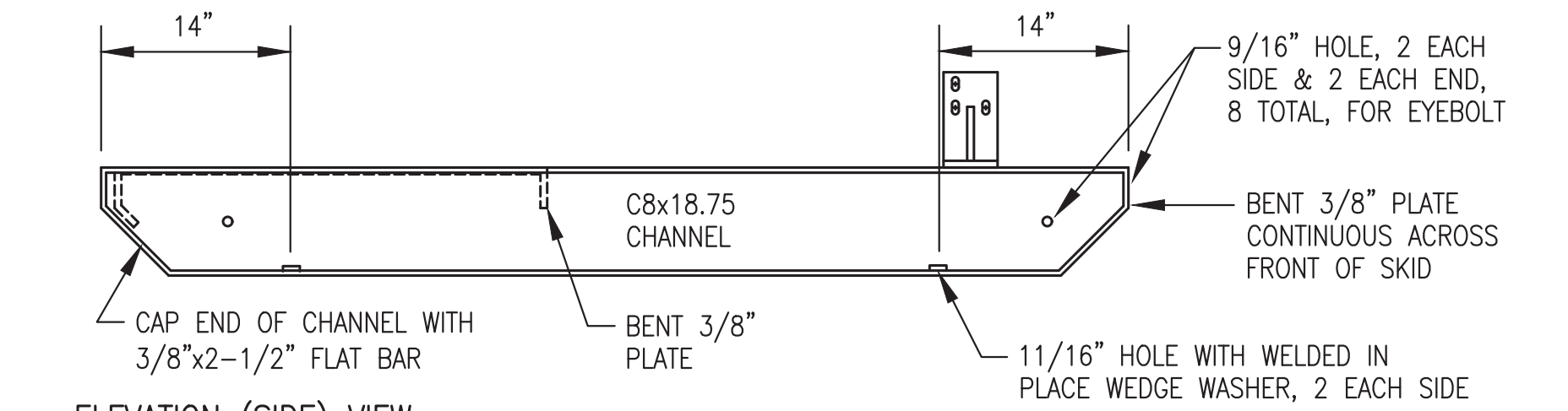
NOTES:

- 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 CENTERLINE OF THE EXHAUST RISER IS 50" FROM THE FRONT OF THE SKID.

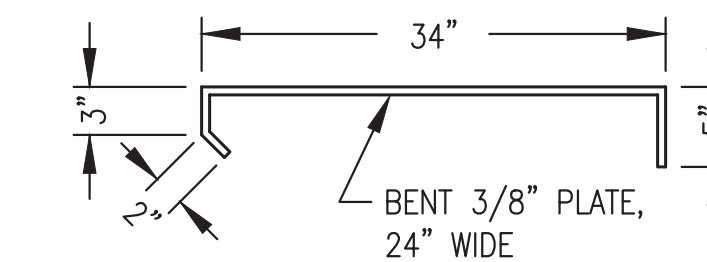
2 GEN#1 (JOHN DEERE 6090) SKID DESIGN
M5 NO SCALE



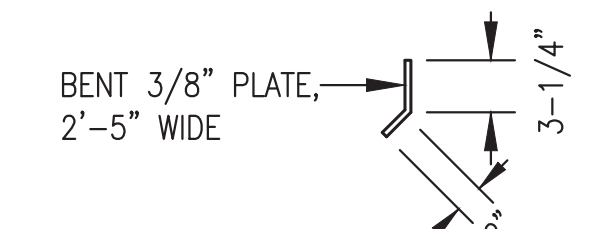
PLAN (TOP) VIEW



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 ENGINE ON SKID SO THAT THE CENTERLINE OF THE EXHAUST RISER IS 39" FROM THE FRONT OF THE SKID.

3 GEN#3 (JOHN DEERE 4045) SKID DESIGN
M5 NO SCALE

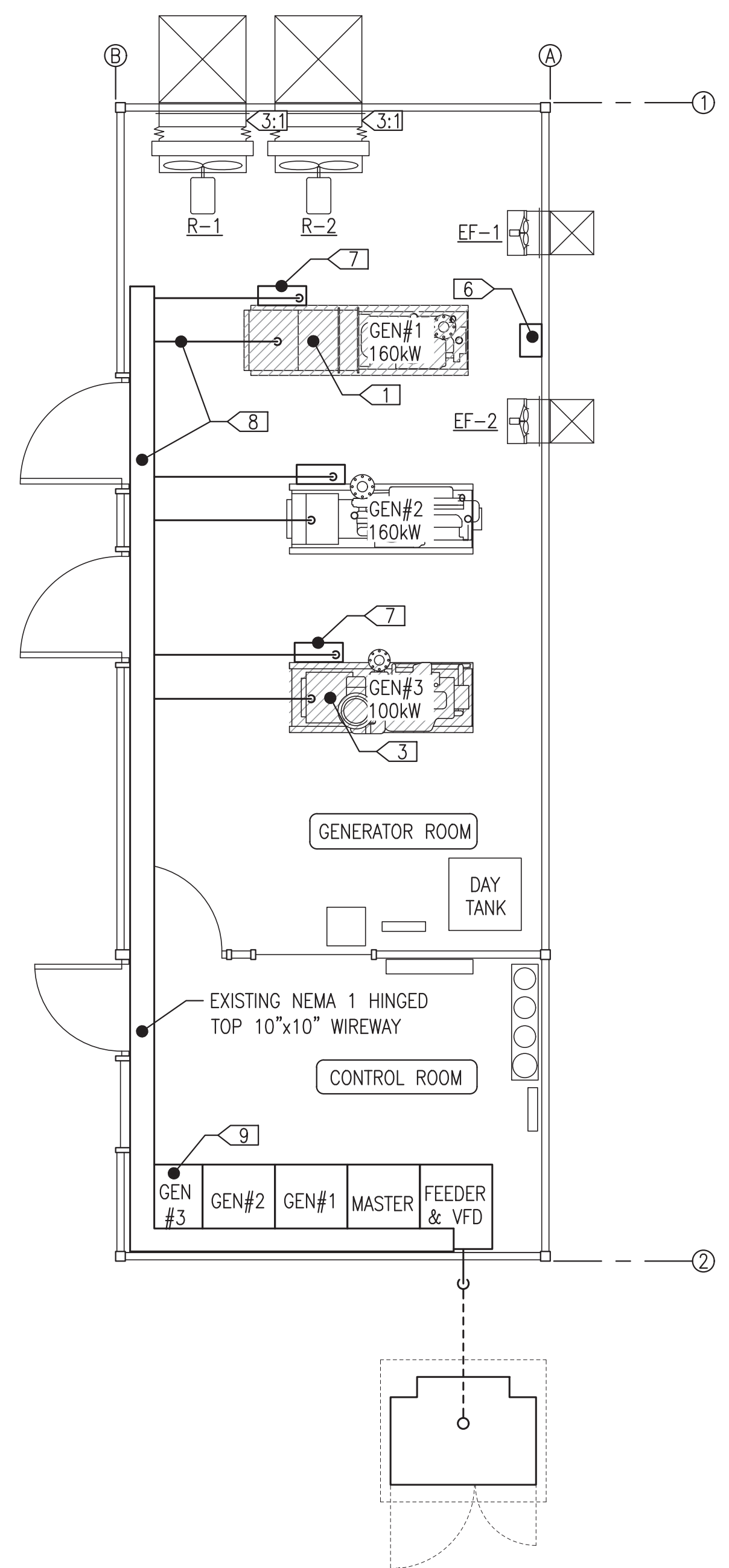
ISSUED FOR CONSTRUCTION
APRIL 2022



PROJECT: FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE	
TITLE: ENGINE-GENERATOR FABRICATION DETAILS	
DRAWN BY: BCG	SCALE: AS NOTED
DESIGNED BY: BCG	DATE: 4/20/22
FILE NAME: RUBYDERA M1-5	SHEET: M5
P.O. 111405, Anchorage, AK 99511 (907)349-0100	PROJECT NUMBER:

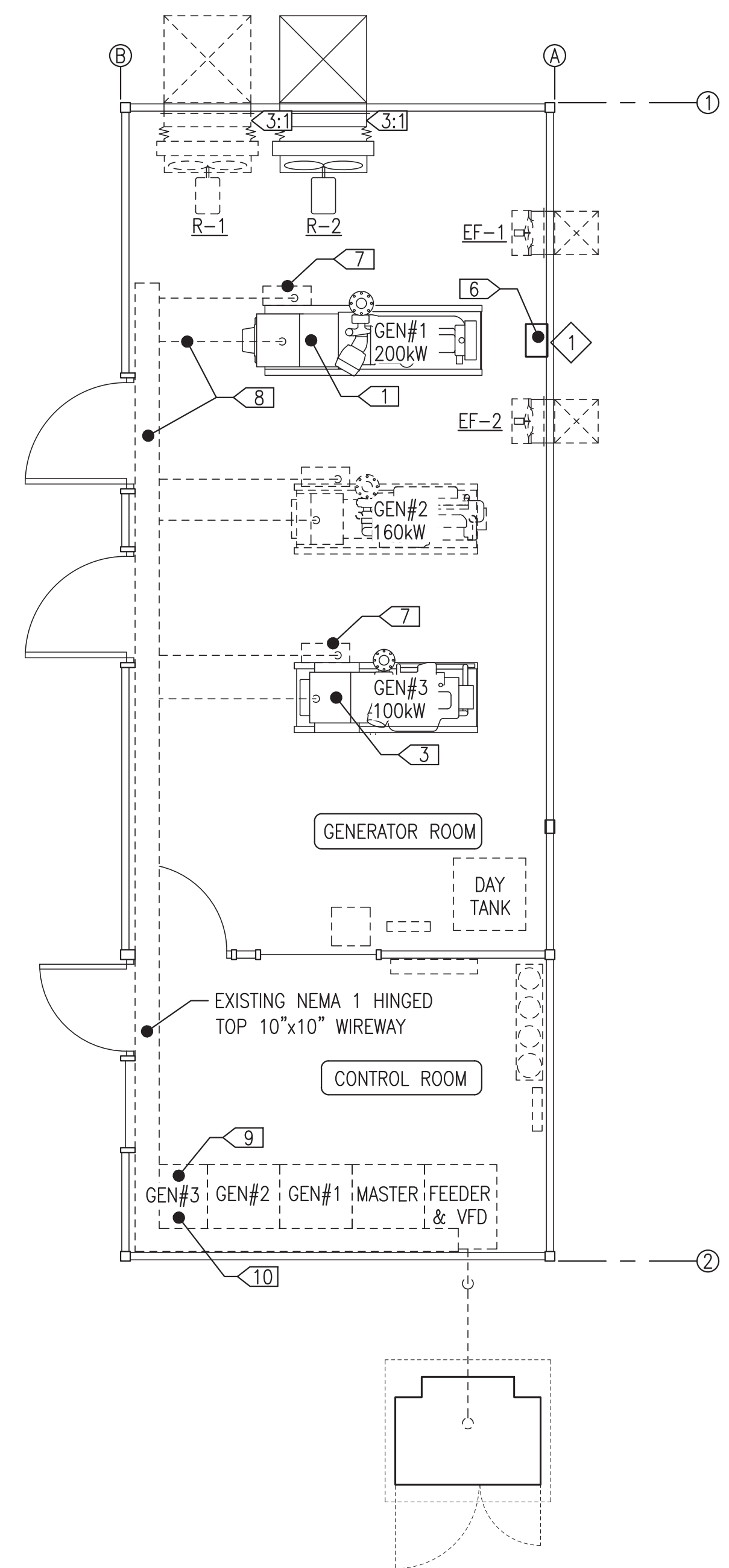
- DEMOLITION GENERAL NOTES:**
- THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF RUBY. KEEP OUTAGES TO A MINIMUM & COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY.
 - ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL. AREAS CONTAINING EXISTING EQUIPMENT TO BE REMOVED INDICATED BY HATCHING.
 - ENSURE ALL EQUIPMENT & CIRCUITS TO BE REMOVED ARE DE-ENERGIZED PRIOR TO BEGINNING DEMOLITION. LOCK & TAG OUT ALL AFFECTED CIRCUIT BREAKERS & DISCONNECTS.
 - TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO ELECTRICAL EQUIPMENT AND CONDUCTORS BEING SALVAGED FOR REUSE. TURN ALL REMOVED MATERIALS AND EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION IF NOT REUSED.

- DEMOLITION SPECIFIC NOTES:**
- BASE BID**
- REMOVE EXISTING GENSET IN ITS ENTIRETY. REMOVE EXISTING POWER CONDUCTORS, SEE SPECIFIC NOTE 8. EXISTING CONTROL CONDUCTORS TO REMAIN. TAPE ENDS OF EXISTING CONDUCTORS & COIL IN SECURE LOCATION TO PROTECT FROM DAMAGE DURING GENSET REPLACEMENT.
 - SEE MECHANICAL.
 - REMOVE EXISTING GENSET IN ITS ENTIRETY. ALL POWER & CONTROL CONDUCTORS TO REMAIN IN SERVICE. TAPE ENDS OF EXISTING CONDUCTORS & COIL IN SECURE LOCATION TO PROTECT FROM DAMAGE DURING GENSET REPLACEMENT.
 - SEE MECHANICAL.
 - SEE MECHANICAL.
 - REMOVE BATTERY CHARGER GENSET #1. REMOVE BATTERIES AT GENSET #1 & #3.
 - EXISTING ENGINE WIRING J-BOX TO REMAIN. SEE NEW WORK SPECIFIC NOTE 10.
 - REMOVE 3 EACH #1 150C GEN#1 CONDUCTORS & SALVAGE 2 EACH #1 150C GEN#1 CONDUCTORS FOR RE-USE. SEE NEW WORK SPECIFIC NOTE 8.
 - EXISTING GEN #1 BREAKER IS A 400A FRAME G. E. SGHA36AT0400. REMOVE EXISTING 250A TRIP PLUG. REMOVE 3 EACH 200:5 CT'S. SEE NEW WORK SPECIFIC NOTE 9.
 - SEE NEW WORK SPECIFIC NOTE 10.
- ADDITIVE ALTERNATE #1**
- SEE MECHANICAL.
- ADDITIVE ALTERNATE #2**
- SEE MECHANICAL.
- ADDITIVE ALTERNATE #3**
- DISCONNECT EXISTING CONDUIT & CONDUCTORS FROM RADIATOR DISCHARGE DAMPER ACTUATOR & SAVE FOR RECONNECTION.



- NEW WORK GENERAL NOTES:**
- EXISTING EQUIPMENT TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
 - NEW EQUIPMENT TO BE INSTALLED SHOWN WITH DARK SOLID LINES.
 - RECONNECT EXISTING POWER & CONTROL CONDUCTORS & ASSOCIATED CONDUIT & FITTINGS TO NEW GENSETS AS INDICATED.

- NEW WORK SPECIFIC NOTES:**
- BASE BID**
- CONNECT EXISTING LT FLEX, EXISTING CONTROL CONDUCTORS, & NEW POWER CONDUCTORS TO NEW GENSET. SEE ELEVATION 1/E2 & SPECIFIC NOTES 7 & 8.
 - SEE MECHANICAL.
 - CONNECT EXISTING LT FLEX & POWER & CONTROL CONDUCTORS TO NEW GENSET. SEE ELEVATION 1/E2 & SPECIFIC NOTE 7.
 - SEE MECHANICAL.
 - SEE MECHANICAL.
 - INSTALL NEW 24V BATTERY CHARGER, TWO NEW BATTERIES, & STARTER CABLES FOR NEW GENSET #1. SEE DETAIL 3/E2.
 - CONNECT NEW ENGINE & GENERATOR CONTROL & MONITORING CONDUCTORS FROM GEN#1 & GEN#3 TO EXISTING ENGINE WIRING J-BOX. SEE DETAIL 2/E2. EXISTING CONTROL CONDUCTORS FROM J-BOX TO SWITCHGEAR TO REMAIN.
 - INSTALL 3 EACH NEW #4/0 150C (PHASE) & 2 EACH SALVAGED #1 (NEUTRAL & GROUND) CONDUCTORS FROM GEN #1 TO BREAKER IN GEN #1 SECTION OF SWITCHGEAR & TERMINATE WITH COMPRESSION LUGS RATED FOR 150C.
 - EXISTING GEN #1 BREAKER IS A 400A FRAME G. E. SGHA36AT0400. INSTALL NEW 300A TRIP PLUG, G. E. SRPG400A300. INSTALL 3 EACH NEW 300:5 RATIO RELAY CLASS 100 CT'S.
 - REVISE 24 VDC CONTROL POWER IN GEN#1 SWITCHGEAR SECTION. SEE DETAIL 2/E3.
- ADDITIVE ALTERNATE #1**
- SEE MECHANICAL.
- ADDITIVE ALTERNATE #2**
- SEE MECHANICAL.
- ADDITIVE ALTERNATE #3**
- RE-CONNECT EXISTING CONDUIT & CONDUCTORS TO NEW RADIATOR DISCHARGE DAMPER ACTUATOR.



1 DEMOLITION PLAN & NOTES
E1 1/4"=1'-0"

2 NEW WORK PLAN & NOTES
E1 1/4"=1'-0"

SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
GENERATOR 480V POWER LEADS (ENGINE STARTER CABLES SIMILAR)	HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, TIN COATED COPPER CONDUCTOR. THERMOSET EPDM INSULATION, UL 3340/3374, MINIMUM 600V, LISTED 150°C FOR NON-FLEXING	COBRA CABLE, BELDEN, OR OMNI	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.		

NOTES:

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

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

480-VOLT POWER CONDUCTORS
 PHASE A - BROWN
 PHASE B - ORANGE
 PHASE C - YELLOW
 NEUTRAL - WHITE W/YELLOW STRIPE

120/208-VOLT POWER CONDUCTORS
 PHASE A - BLACK
 PHASE B - RED
 PHASE C - BLUE
 NEUTRAL - WHITE

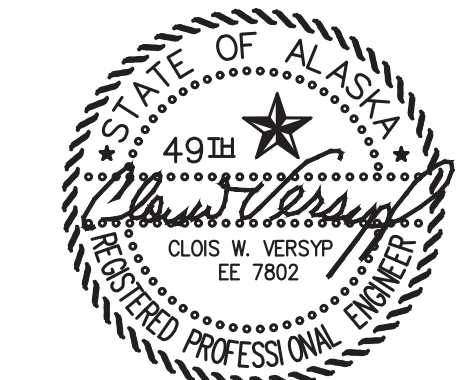
24 VOLT DC CONDUCTORS
 +24VDC - RED
 -24VDC - BLACK

CONTROL & INSTRUMENT CONDUCTORS
 COLOR CODED PER MANUFACTURER'S STANDARD

GENSET	DESCRIPTION
GEN #1 (NEW)	ENGINE - 319 HP, 238 EKW PRIME, JOHN DEERE 6090AFM85, TIER 3 MARINE. STARTING AND CONTROL VOLTAGE = 24 VDC. GENERATOR - 284KW CONTINUOUS AT 105°C RISE, NEWAGE S4LD-D41. *LOAD LIMITED IN SWITCHGEAR TO 200kW
GEN #2 (EXISTING)	ENGINE - 317 HP, 236 EKW PRIME, JOHN DEERE 6081HF070. STARTING AND CONTROL VOLTAGE = 12 VDC. GENERATOR - 180KW CONTINUOUS AT 105°C RISE, MARATHON 431PSL6258. *LOAD LIMITED IN SWITCHGEAR TO 160kW
GEN #3 (NEW)	ENGINE - 148 HP, 100 EKW PRIME, JOHN DEERE 4045AFM85, TIER 3 MARINE. 24 VDC STARTING & CONTROL. GENERATOR - MINIMUM 125 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD UCI274E.

SYMBOL	DESCRIPTION	MANUFACTURER/MODEL
1	12/24-VOLT SOLID STATE 20-AMP AUTO-EQUALIZING BATTERY CHARGER, 120 VAC INPUT, WITH OPTIONAL REMOTE SUMMARY ALARM RELAYS FOR HIGH/LOW VOLT AND AC POWER FAILURE	SENS NRG22-20-RCLS OR APPROVED EQUAL.

ISSUED FOR CONSTRUCTION
APRIL 2022



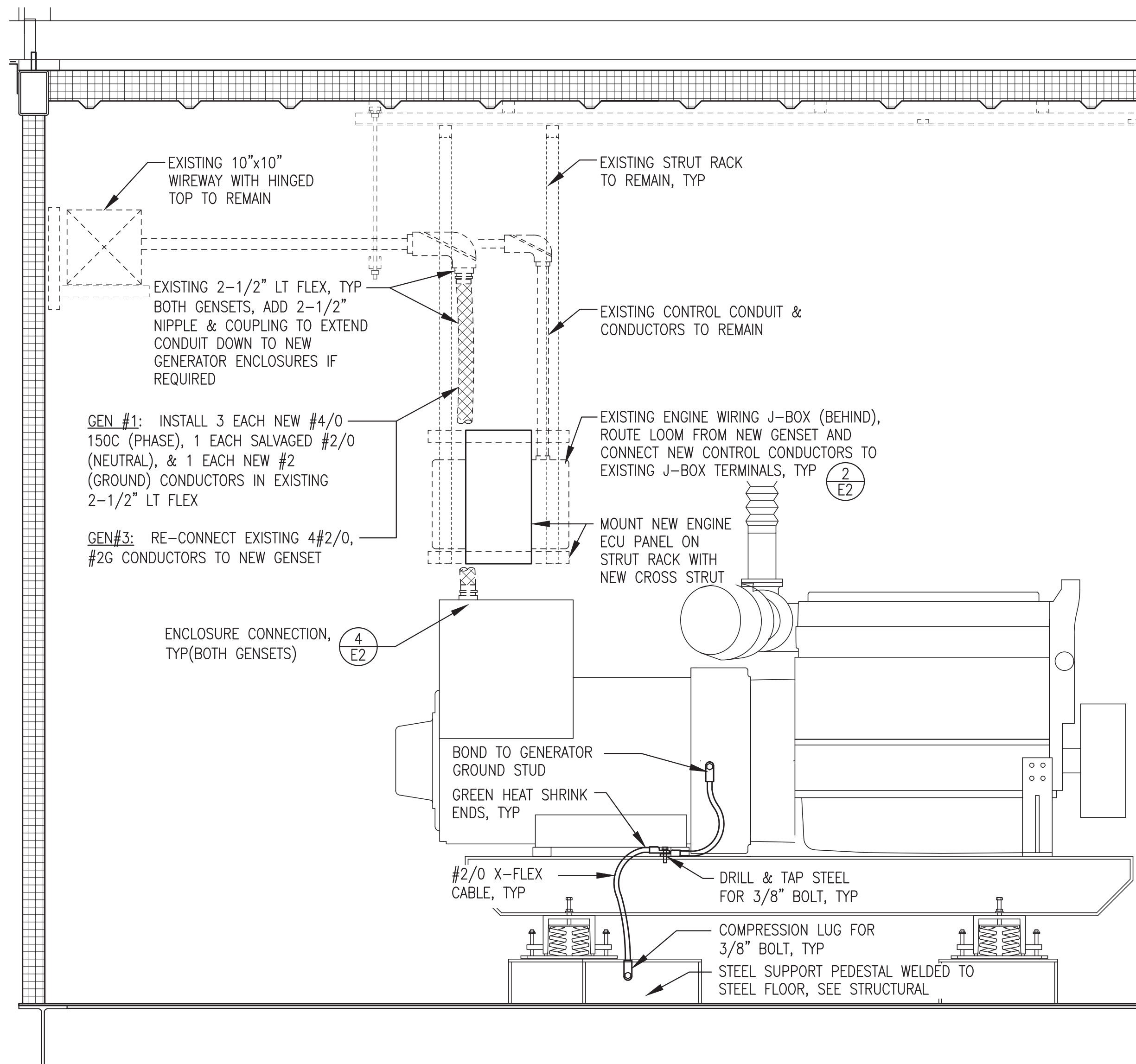
ALASKA ENERGY AUTHORITY

PROJECT: **FFY20 DERA PROJECTS
RUBY POWER PLANT UPGRADE**

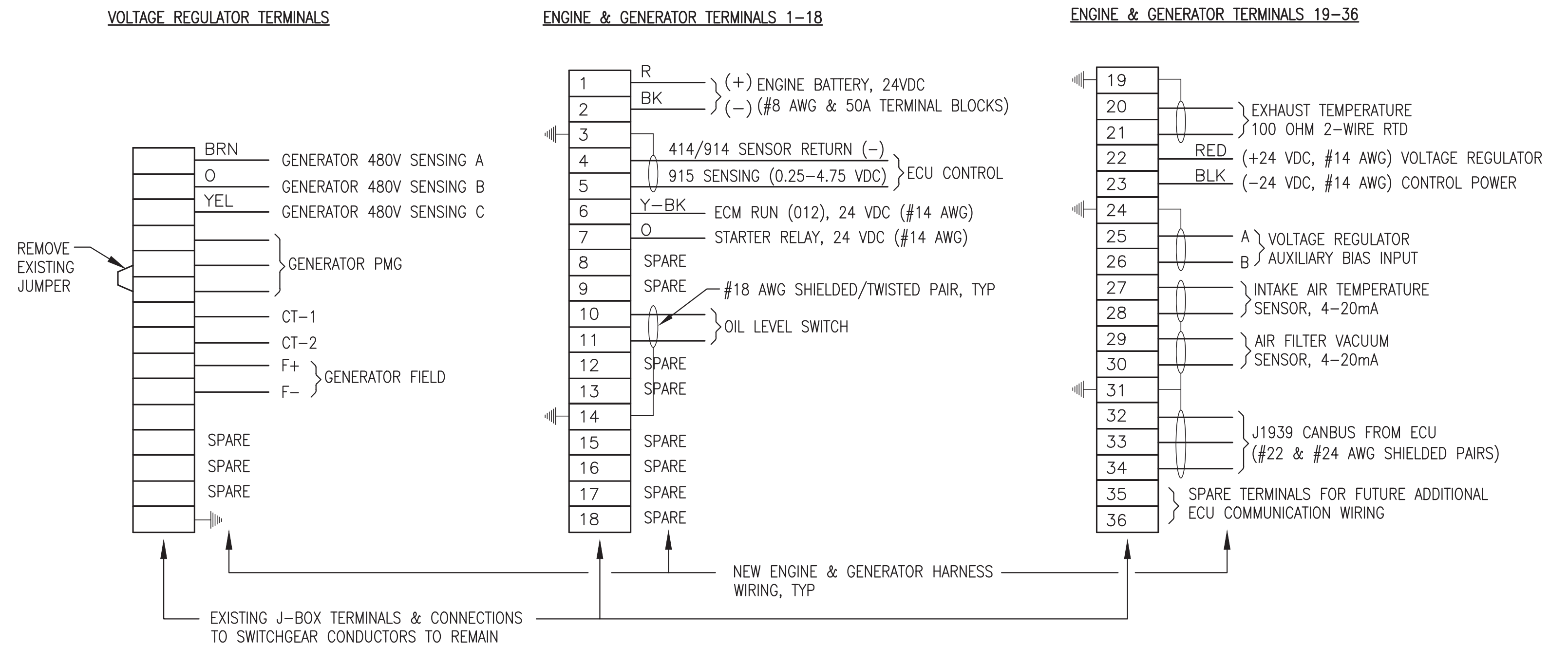
TITLE: **ELECTRICAL DEMOLITION & NEW WORK PLANS**

DESIGNED BY: CWV/BCG	SCALE: AS NOTED
DATE: 4/20/22	
FILE NAME: RUBY DERA E1-3	SHEET: E1
PROJECT NUMBER:	

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



1
E2
TYPICAL GENERATOR INSTALLATION
1-1/2"=1'-0"



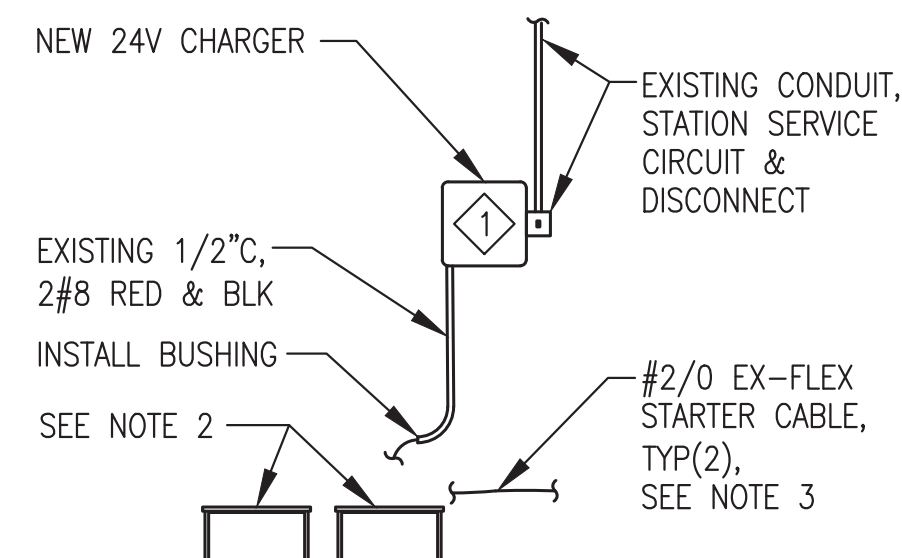
2
E2
TYPICAL EXISTING J-BOX RECONNECTION DETAILS
NO SCALE

NEW CHARGER SETTINGS:

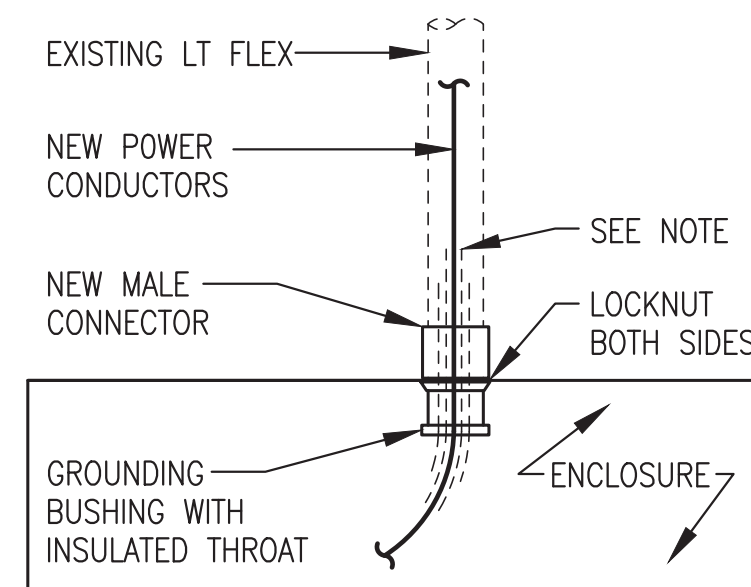
- AC LINE VOLTAGE SWITCH TO "115V".
- AUTO BOOST JUMPER TO "NORM".
- FLOAT VOLTAGE JUMPER TO "13.50/27.00" (GEL CELL).
- BATTERY RANGE JUMPER TO "24V".

NOTES:

1. AT GEN #1 INSTALL NEW OWNER FURNISHED CHARGER AS SHOWN. AT GEN #3 EXISTING CHARGER TO REMAIN. RECONNECT CHARGING LEADS TO NEW BATTERIES.
2. INSTALL TWO EACH NEW OWNER FURNISHED OPTIMA RED TOP NAPA PART# BAT N993478RED BATTERIES IN EXISTING RACK.
3. ROUTE BATTERY CABLES TO FRONT OF SKID, SEE SHEET M5. ROUTE FROM SKID DIRECTLY UNDER FUEL HOSES TO WALL AND TYWRAP CABLES TO FUEL PIPES ALONG WALL. CUT TO PROVIDE 6"± SERVICE LOOP FOR FINAL TERMINATION ON BATTERIES. CONNECT TO BATTERIES WITH STRAIGHT CRIMP TERMINAL FITTINGS AND TOP MOUNT TERMINAL COVERS, POLAR WIRE OR EQUAL.



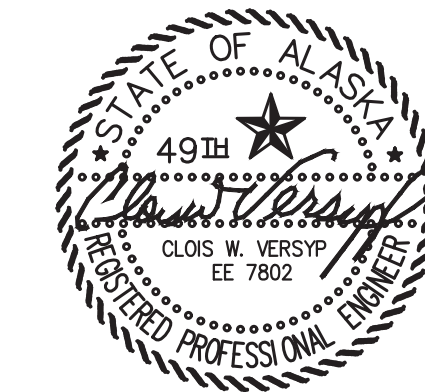
3
E2
BATTERY, CHARGER & CABLES INSTALLATION
NO SCALE



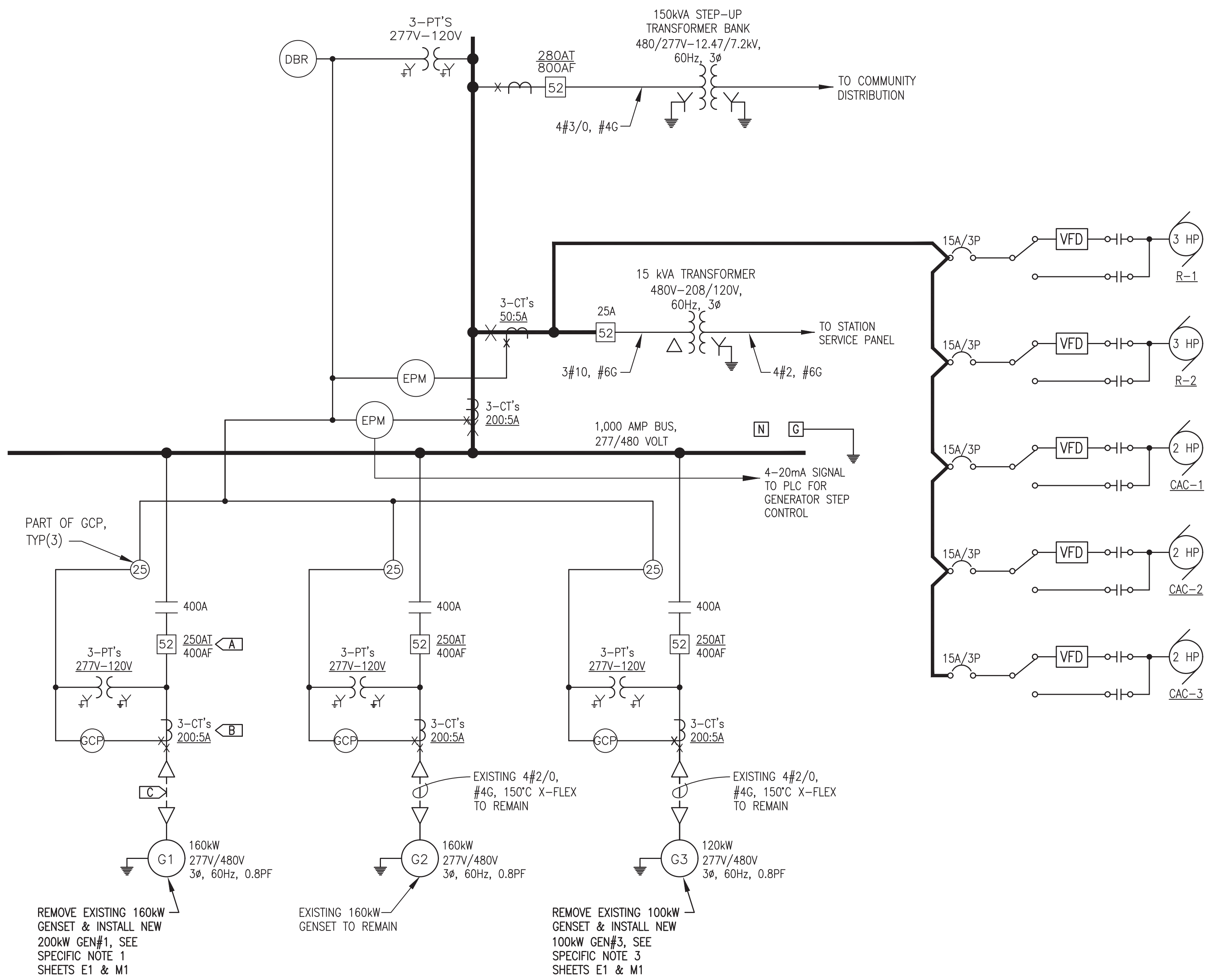
NOTE: PROTECT CABLES FROM WEAR BY INSTALLING 2 LAYERS OF HEAVY WALL HEAT SHRINK. BASE LAYER 12" LONG & SECOND LAYER 8" LONG, CENTERED IN CONNECTOR.

4
E2
TYPICAL GENERATOR ENCLOSURE CONNECTION
NO SCALE

ISSUED FOR
CONSTRUCTION
APRIL 2022



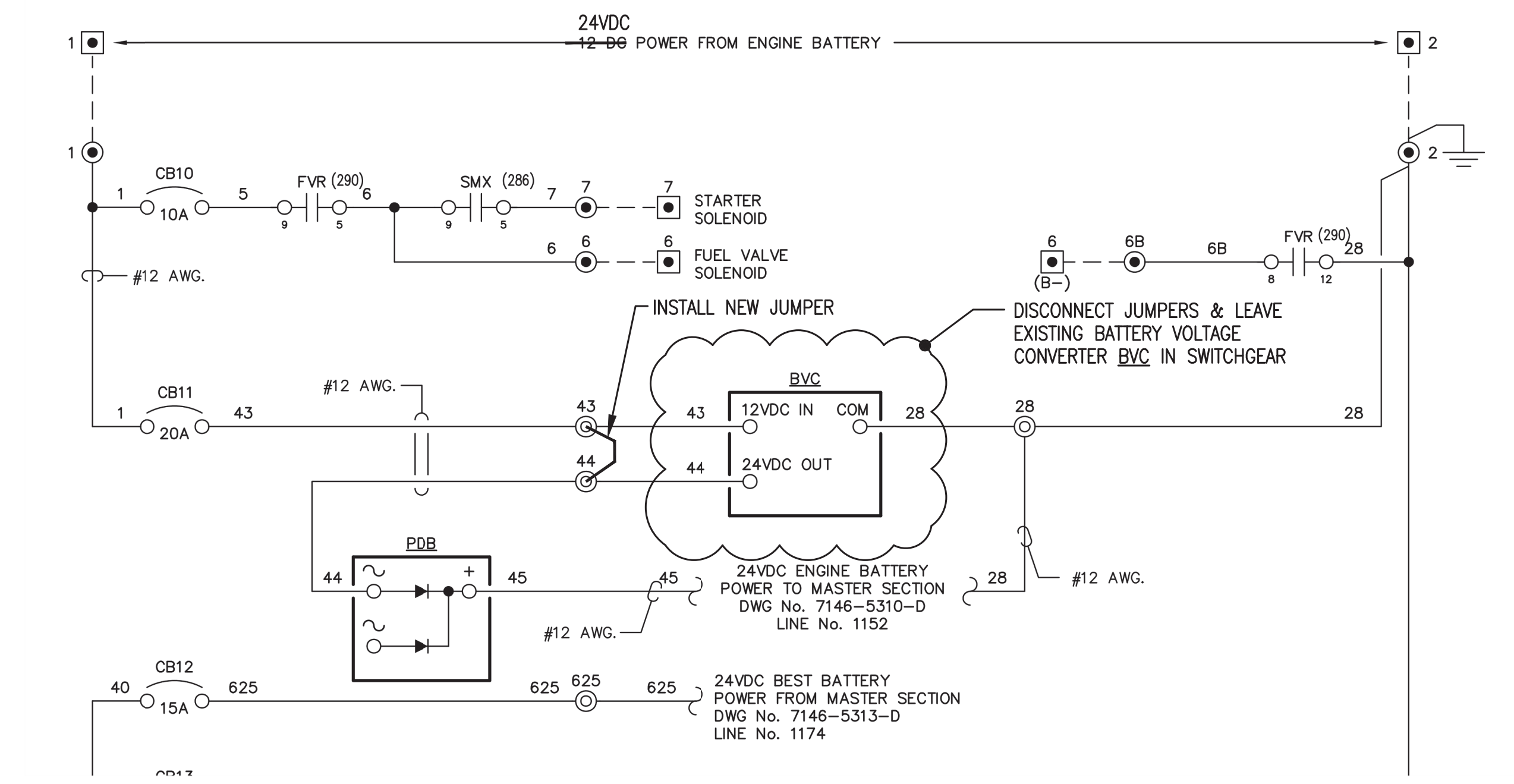
PROJECT: FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE		
TITLE: TYPICAL GENERATOR INSTALLATION & MISCELLANEOUS DETAILS		
DRAWN BY: CWV/BCG	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBY DERA E1-3	PROJECT NUMBER:	SHEET: E2
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



- SWITCHGEAR MODIFICATION GENERAL NOTES:**
- 1) ALL WORK THIS SHEET TO PERFORMED UNDER BASE BID EXCEPT AS SPECIFICALLY NOTED.
 - 2) ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR REMOVAL OR REPLACEMENT.
 - 3) ENSURE ALL EQUIPMENT AND CIRCUITS TO BE REMOVED ARE DE-ENERGIZED PRIOR TO BEGINNING DEMOLITION. LOCK AND TAG OUT ALL AFFECTED CIRCUIT BREAKERS AND DISCONNECTS.
 - 4) SEE SPECIFICATIONS FOR DETAIL ON NEW DEVICES AND EQUIPMENT.

- SWITCHGEAR MODIFICATION SPECIFIC NOTES:**
- A) EXISTING GEN #1 BREAKER IS A 400A FRAME G. E. SGHA36AT0400. INSTALL NEW 300A TRIP PLUG, G. E. SRPG400A300. SEE SPECIFIC NOTE 9, SHEET E1.
 - B) REPLACE 3 EACH 200:5 CT'S WITH NEW 300:5 RATIO RELAY CLASS 100 CT'S. ITI 112:301 OR APPROVED EQUAL.
 - C) INSTALL 3 EACH NEW #4/0 150C (PHASE) & 2 EACH SALVAGED #1 (NEUTRAL & GROUND) CONDUCTORS. SEE SPECIFIC NOTE 8, SHEET E1.

1 SWITCHGEAR AC POWER MODIFICATION ONE-LINE DIAGRAM
E3 NO SCALE



2 GEN#1 SWITCHGEAR SECTION 24VDC CONTROL POWER MODIFICATIONS
E3 NO SCALE

ISSUED FOR CONSTRUCTION
APRIL 2022



ALASKA ENERGY AUTHORITY		
PROJECT: FFY20 DERA PROJECTS RUBY POWER PLANT UPGRADE		
TITLE: SWITCHGEAR MODIFICATIONS		
DRAWN BY: CWV/BCG	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: RUBY DERA E1-3		SHEET: E3
PROJECT NUMBER:		
P.O. 111405, Anchorage, AK 99511 (907)349-0100		