

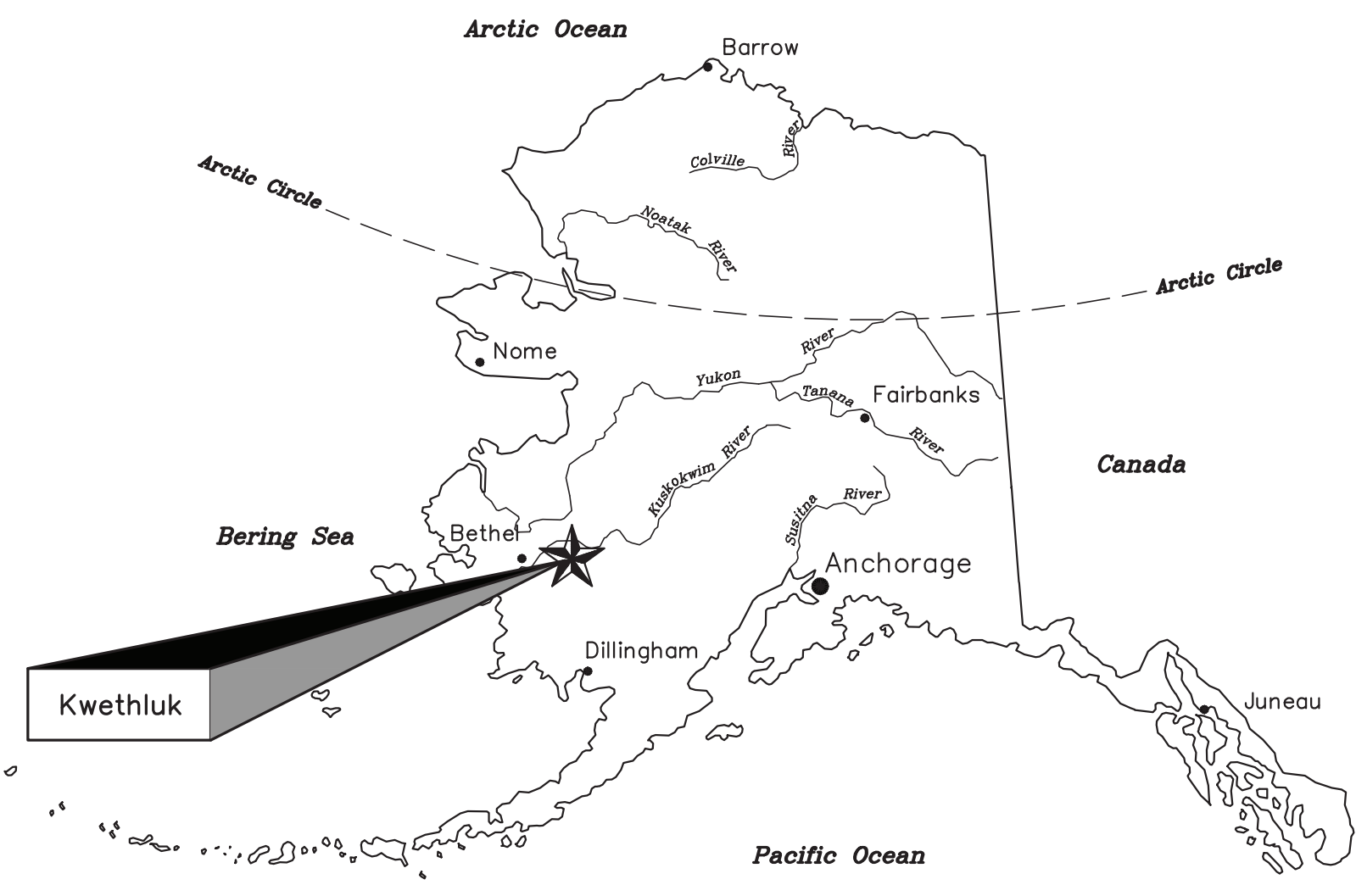
2025 M&I PROJECT DESIGN DRAWINGS – MECHANICAL	
M1.0	LEGEND & SCHEDULES
M3.3	MECHANICAL DEMOLITION PLAN
M3.4	MECHANICAL NEW WORK PLAN & DETAILS
M3.5	GEN#3 INSTALLATION ELEVATION & DETAILS
M3.6	GEN#3 ENGINE-GENERATOR ASSEMBLY & MODIFICATION DETAILS
M4.3	GEN#3 COOLANT PIPING MODIFICATIONS
M5.1	FUEL SYSTEM MODIFICATION PLAN & DETAILS
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M7.1	NEW GEN#3 EXHAUST & CRANK VENT PLAN & DETAILS

2025 M&I PROJECT DESIGN DRAWINGS – ELECTRICAL	
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E3.4	ELECTRICAL NEW WORK PLAN
E3.5	GEN#3 INSTALLATION ELEVATION & DETAILS
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E6.3	RADIATOR VFD REPLACEMENT WIRING
E6.4	CHARGE AIR COOLER VFD REPLACEMENT WIRING
E6.5	GEN#3 ENGINE WIRING J-BOX LAYOUT & BILL OF MATERIALS
E6.6	GEN#3 ENGINE WIRING J-BOX WIRING DIAGRAM & SWITCHGEAR INTERCONNECT
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REFERENCE 2011 ORIGINAL PLANT RECORD DRAWINGS – MECHANICAL	
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M1.2	OVERALL SITE PLAN & DETAILS
M1.3	EXCAVATION & GRADING PLANS
M1.4	ENLARGED SITE PLAN & DETAILS
M1.5	FUEL TANK & SITE WORK DETAILS
M2	MECHANICAL SPECIFICATIONS
M3.1	EQUIPMENT LAYOUT PLAN, SECTION, & DETAILS
M3.2	WALL ELEVATIONS & PIPING DETAILS
M4.1	COOLANT/HEAT RECOVERY PIPING PLAN, ISOMETRICS, & DETAILS
M4.2	SCHOOL HEAT RECOVERY PIPING PLANS, ISOMETRIC, & DETAILS
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M6	CHARGE AIR COOLING PLAN & DETAILS
M7	EXHAUST SYSTEM PLAN & DETAILS
M8.1	VENTILATION PLAN, SPECIFICATIONS, & DETAILS
M8.2	VENTILATION SYSTEM FABRICATION DETAILS



REFERENCE 2011 ORIGINAL PLANT RECORD DRAWINGS – ELECTRICAL	
E1	SITE PLAN & SCHEDULE OF DRAWINGS
E2	SPECIFICATIONS & EQUIPMENT SCHEDULE
E3.1	POWER & CONTROL PLANS & DETAILS
E3.2	WIREWAY PLAN, DATA/COMMUNICATION PLAN, & DETAILS
E4	LIGHTING/RECEPTACLE PLAN & DETAILS
E5	STATION SERVICE PLAN, PANEL, & DETAILS
E6	SWITCHGEAR DETAILS
E7	FUEL SYSTEM CONTROL PANEL 3-LINE DIAGRAM & OIL BLENDER LOGIC
E8	FUEL SYSTEM CONTROL PANEL VFD LOGIC
E9	FUEL SYSTEM CONTROL PANEL DAY TANK FILL LOGIC
E10	FUEL SYSTEM CONTROL PANEL LAYOUT & BILL OF MATERIALS

2023 SWITCHGEAR UPGRADE RECORD DRAWINGS REDLINED FOR 2025 CHANGES	
W-058508-01A	PHYSICAL LAYOUT
W-058508-01B	BASE & SECTIONAL VIEW
W-058508-02	SINGLE LINE DIAGRAM
W-058508-03	NAMEPLATE DETAILS
W-058508-04A	GENERATOR 1 AC SCHEMATIC
W-058508-04B	GENERATOR 2 AC SCHEMATIC
W-058508-04C	GENERATOR 3 AC SCHEMATIC
W-058508-05A	FEEDER BREAKER/MASTER AC SCHEMATIC
W-058508-05B	FEEDER BREAKER/MASTER AC SCHEMATIC
W-058508-05C	VFD AC SCHEMATIC
W-058508-06A	GENERATOR 1 DC CONTROL SCHEMATIC
W-058508-06B	GENERATOR 2 DC CONTROL SCHEMATIC
W-058508-06C	GENERATOR 3 DC CONTROL SCHEMATIC
W-058508-07A	GENERATOR 1 DC CONTROL SCHEMATIC
W-058508-07B	GENERATOR 2 DC CONTROL SCHEMATIC
W-058508-07C	GENERATOR 3 DC CONTROL SCHEMATIC
W-058508-08A	GENERATOR 1 DC CONTROL SCHEMATIC
W-058508-08B	GENERATOR 2 DC CONTROL SCHEMATIC
W-058508-08C	GENERATOR 3 DC CONTROL SCHEMATIC
W-058508-09	MASTER DC CONTROL SCHEMATIC
W-058508-10	MASTER DC CONTROL SCHEMATIC
W-058508-11	MASTER DC CONTROL SCHEMATIC
W-058508-12A	VFD CONTROL SCHEMATIC
W-058508-12B	VFD CONTROL SCHEMATIC
W-058508-13	FEEDER BREAKER DC CONTROL SCHEMATIC
W-058508-14	PLC COMMUNICATION SCHEMATIC
W-058508-15	COMMUNICATION NETWORK SCHEMATIC
W-058508-16	GEN CANBUS COMMUNICATION SCHEMATIC
W-058508-17	HEATER & LIGHTING CONTROL SCHEMATIC
W-058508-18	CONTROL SWITCH TARGET CHART
W-058508-19	INTERCONNECTION DIAGRAM
21116-KWT-BOM	BILL OF MATERIALS



KWETHLUK M&I 2025 IMPROVEMENTS PROJECT ISSUED FOR CONSTRUCTION MAY 2025

REDMARKS ON THE FOLLOWING PAGES ARE REVISIONS MADE JULY 1, 2025, TO INDICATE SCOPE CHANGES FOR ITB 25068

 ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: SCHEDULE OF DRAWINGS		
 Gray Stassel Engineering, Inc. <small>P.O. 111405, Anchorage, AK 99511 (907)349-0100</small>	DRAWN BY: BCG	SCALE: NO SCALE
	DESIGNED BY: BCG	DATE: 5/29/25
	FILE NAME: KWT 2025 M&I	SHEET:
	PROJECT NUMBER:	G1

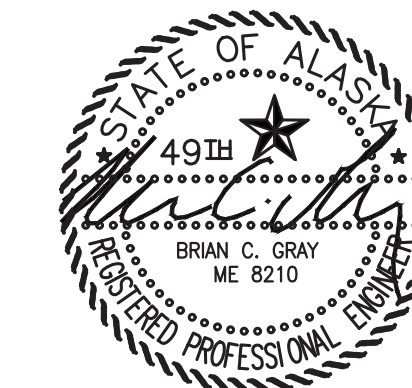
2025 M&I PROJECT DESIGN DRAWINGS	
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M3.3	MECHANICAL DEMOLITION PLAN
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M3.6	GEN#3 ENGINE-GENERATOR ASSEMBLY & MODIFICATION DETAILS
M4.3	GEN#3 COOLANT PIPING MODIFICATIONS
M5.1	FUEL SYSTEM MODIFICATION PLAN & DETAILS
M6.1	NEW GEN#3 CHARGE AIR COOLING PLAN & DETAILS
M7.1	NEW GEN#3 EXHAUST & CRANK VENT PLAN & DETAILS

REFERENCE 2011 RECORD DRAWINGS FROM ORIGINAL PLANT CONSTRUCTION	
M1.1	LEGEND & SCHEDULES
M1.2	OVERALL SITE PLAN & DETAILS
M1.3	EXCAVATION & GRADING PLANS
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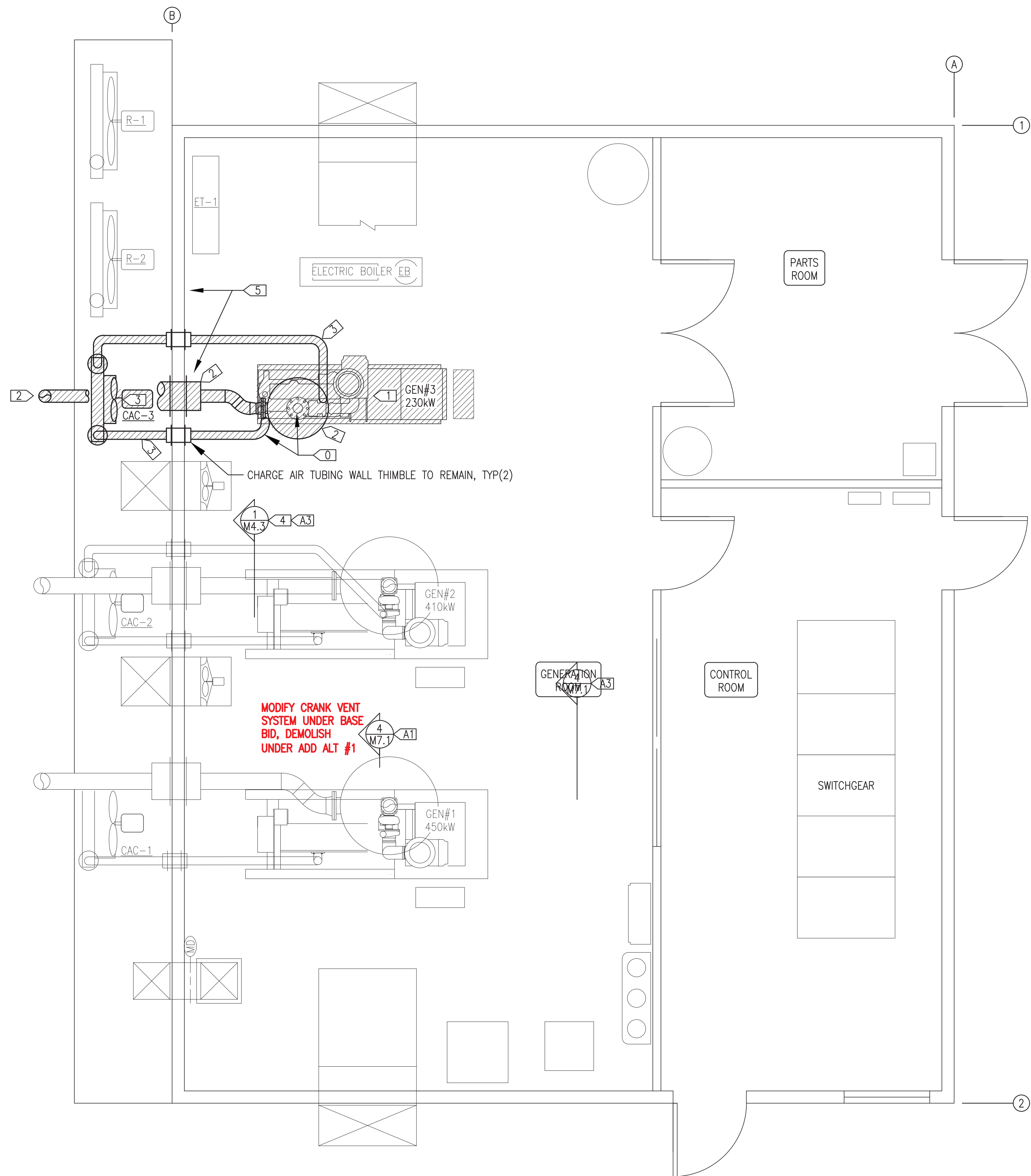
OWNER FURNISHED ENGINE COOLING SYSTEM EQUIPMENT SCHEDULE			
SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
CAC-3	OWNER FURNISHED GEN#3 CHARGE AIR COOLER	SINGLE PASS, VERTICAL ALUMINUM CORE, 4" FLANGED TOP CONNECTIONS, EPOXY COATING, EXPANDED METAL GUARD. 1340 SCFM CHARGE AIR AT 395F IN AND 110F OUT AT 75F AMBIENT, 34" H2O MAX CHARGE AIR PRESSURE DROP. 5 HP, 460 V, 3 PH, MOTOR SUITABLE FOR VFD OPERATION AT 10:1 TURNDOWN RATIO.	DIESEL RADIATOR PART NO. DR3376A
NEW ENGINE COOLING SYSTEM EQUIPMENT SCHEDULE			
SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
TV-1	COOLANT THERMOSTATIC VALVE	4" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS, 175F NOMINAL TEMPERATURE	FPE PART NO. A4010-175
NEW 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 ONE COMPLETE SET OF 10 MICRON AQUABLOC FILTER ELEMENTS AND FURNISH ONE COMPLETE SPARE SET (6 ELEMENTS TOTAL).	RACOR TURBINE 79/1000FV-10 WITH 2020V-10 ELEMENTS
F-SCR	SCREEN FOR EXISTING GOLDENROD FILTER HOUSING	REPLACE EXISTING FUEL FILTER BOWL AND ELEMENT WITH NEW BOWL, NEW GASKET, AND NEW 40 MESH STAINLESS STEEL SCREEN ELEMENT	GOLDENROD 495-4 BOWL 470-7 GASKET 470-15 SCREEN
EXISTING INSTRUMENTATION SCHEDULE (REMOVE & REINSTALL AS INDICATED)			
SYMBOL	SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL
(IAT)	SALVAGED GEN#3 INTAKE AIR TEMPERATURE TRANSMITTER	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
(EGT)	SALVAGED GEN#3 EXHAUST GAS TEMP RTD	2 WIRE 100 OHM RTD, 650°C MIN, 2' HIGH TEMP LEAD WIRE, SPRING STRAIN RELIEF, MALE AND FEMALE CONNECTORS, COMPRESSION FITTING WITH 1/4" MPT ADAPTER	EUSTIS RGB7B203B02X0 WITH NS44 ADAPTER, DEUTZ DT06-2S-E008 & DT04-2P-E008 CONNECTORS
(AFV)	SALVAGED GEN#3 AIR FILTER VACUUM TRANSMITTER	-30"Hg TO 0 PSIG RANGE, 4-20mA OUTPUT, 1/4" NPT PIPING CONNECTION, 1/8" DIAMETER BY 2.5" LONG STEM, HIRSCHMANN ELECTRICAL CONNECTION	NOSHOK 100-30V-1-1-2-7

ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1 (EXISTING)	ENGINE - 450 KW PRIME RATED, CATERPILLAR 3456 WITH WET MANIFOLD MARINE CONVERSION. 24 VDC STARTING & CONTROL. GENERATOR - 540 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434E.
GEN #2 (EXISTING)	ENGINE - 410 KW PRIME RATED, CATERPILLAR 3456 WITH WET MANIFOLD MARINE CONVERSION. 24 VDC STARTING & CONTROL. GENERATOR - 470 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434D.
GEN #3 (NEW THIS PROJECT)	ENGINE - 450 KW PRIME RATED, CATERPILLAR 3456 WITH DRY STOCK MANIFOLD. 24 VDC STARTING & CONTROL. GENERATOR - 540 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434E.

ISSUED FOR
CONSTRUCTION
MAY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: LEGEND & SCHEDULES		
DRAWN BY: JTD	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	SHEET: M1.0
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



MECHANICAL DEMOLITION GENERAL NOTES:

- 1) THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF KWETHLUK. KEEP OUTAGES TO A MINIMUM AND COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY. SEE LIMITED POWER OUTAGE NOTES THIS SHEET.
- 2) ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR DEMOLITION OR TEMPORARY REMOVAL. EXISTING EQUIPMENT AND DEVICES TO BE REMOVED INDICATED BY HATCHING. SEE SPECIFIC NOTES FOR FINAL DISPOSITION OF EXISTING EQUIPMENT TO BE REMOVED WHETHER IT BE DEMOLITION FOR PERMANENT REMOVAL FROM PLANT OR TEMPORARY REMOVAL FOR SALVAGE AND FUTURE REINSTALLATION.
- 3) ONLY MAJOR DEMOLITION ITEMS AND AREAS SHOWN THIS SHEET. REMOVAL OF SMALL EQUIPMENT, COMPONENTS, AND FITTINGS AS REQUIRED FOR MISCELLANEOUS UPGRADES OR LIKE KIND REPLACEMENT SHOWN WITH NEW WORK PLANS AND/OR ON DETAILS.
- 4) TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO GENERATION EQUIPMENT BEING REMOVED DURING DEMOLITION. TARP GENERATORS AND SEAL ALL EXPOSED CONNECTIONS PRIOR TO REMOVING FROM PLANT. TURN ALL REMOVED EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION.
- 5) DRAIN ALL PIPING PRIOR TO DEMOLITION. DRAIN ENGINE BLOCK PRIOR TO REMOVAL. TURN USED OIL AND GLYCOL OVER TO THE UTILITY FOR FINAL DISPOSITION.

MECHANICAL DEMOLITION SPECIFIC NOTES (BASE BID):

- 0) PRIOR TO BEGINNING DEMOLITION CAREFULLY DISCONNECT AND REMOVE EXISTING EXHAUST GAS TEMPERATURE RTD, AIR INTAKE VACUUM TRANSMITTER, AND INTAKE AIR TEMPERATURE TRANSMITTER. SALVAGE ALL THREE DEVICES FOR REUSE IN NEW GEN#3. COORDINATE WITH ELECTRICAL.
- 1) REMOVE EXISTING GEN#3 FROM PLANT IN ITS ENTIRETY AND TURN OVER TO UTILITY. DEMOLISH EXISTING VIBRATION ISOLATORS BUT SALVAGE EXISTING GENERATOR STEEL SUPPORT PEDESTALS.
- 2) REMOVE EXISTING GEN#3 MUFFLER, EXHAUST PIPE, WALL THIMBLE, AND ALL ASSOCIATED CEILING MOUNTED SUPPORTS IN THEIR ENTIRETY.
- 3) DEMOLISH CHARGE AIR COOLER CAC-3 AND CHARGE AIR TUBING IN THEIR ENTIRETY. EXISTING CHARGE AIR TUBING WALL THIMBLES TO REMAIN. SALVAGE EXISTING CHARGE AIR COOLER STEEL SUPPORT PEDESTALS FOR RE-USE.
- 4) DEMOLISH EXISTING GEN#3 CRANK VENT BRANCH PIPING UNDER BASE BID. SEE ELEVATIONS AND DETAILS.
- 5) DRAIN COOLING SYSTEM, DEMOLISH EXISTING GEN#3 COOLANT BRANCH PIPING, AND DEMOLISH EXISTING 4" THERMOSTATIC VALVE. SEE SHEET M4.3.

MECHANICAL NEW WORK SPECIFIC NOTES (ADDITIVE ALTERNATES):

- A1) UNDER ADDITIVE ALTERNATE #1 DEMOLISH EXISTING CRANK VENT SYSTEM AND INSTALL NEW CRANK VENTS ON GEN#1 & GEN#2.
- A2) SEE ELECTRICAL
- A3) SEE ELECTRICAL
- A4) SEE ELECTRICAL

LIMITED POWER OUTAGE NOTES:

- 1) SCHEDULE ALL REQUIRED OUTAGES IN ADVANCE WITH THE UTILITY.
- 2) THIS PROJECT REQUIRES MODIFICATIONS TO THE EXISTING COOLANT SYSTEM PIPING THAT WILL REQUIRE AN OUTAGE FOR THE SYSTEM TO BE DRAINED DOWN. ALL TASKS REQUIRING THE COOLING SYSTEM TO BE DRAINED MUST BE SCHEDULED SIMULTANEOUSLY TO LIMIT TO ONE EXTENDED POWER OUTAGE. IN ORDER TO LIMIT OUTAGE DURATION, PLAN WORK AND PREFABRICATE PARTIAL ASSEMBLIES TO THE MAXIMUM EXTENT POSSIBLE. THE TOTAL SHUT DOWN MUST NOT EXCEED EIGHT HOURS INCLUDING DRAIN DOWN, ALL PIPING MODIFICATIONS, REFILLING THE SYSTEM, AND PLACING A GENERATOR BACK IN SERVICE.
- 3) THIS PROJECT REQUIRES REPLACEMENT OF CURRENT TRANSFORMERS (CT'S) AND TERMINATION OF NEW POWER CONDUCTORS IN THE SWITCHGEAR THAT WILL REQUIRE AN OUTAGE. ALL SWITCHGEAR MODIFICATION TASKS REQUIRING AN OUTAGE MUST BE SCHEDULED SIMULTANEOUSLY TO LIMIT TO ONE EXTENDED POWER OUTAGE. IN ORDER TO LIMIT OUTAGE DURATION, PLAN AND PREPARE WORK. THE TOTAL SHUT DOWN MUST NOT EXCEED EIGHT HOURS.
- 4) OTHER TASKS MAY REQUIRE ADDITIONAL OUTAGES. KEEP THESE OUTAGES AS SHORT AS POSSIBLE.

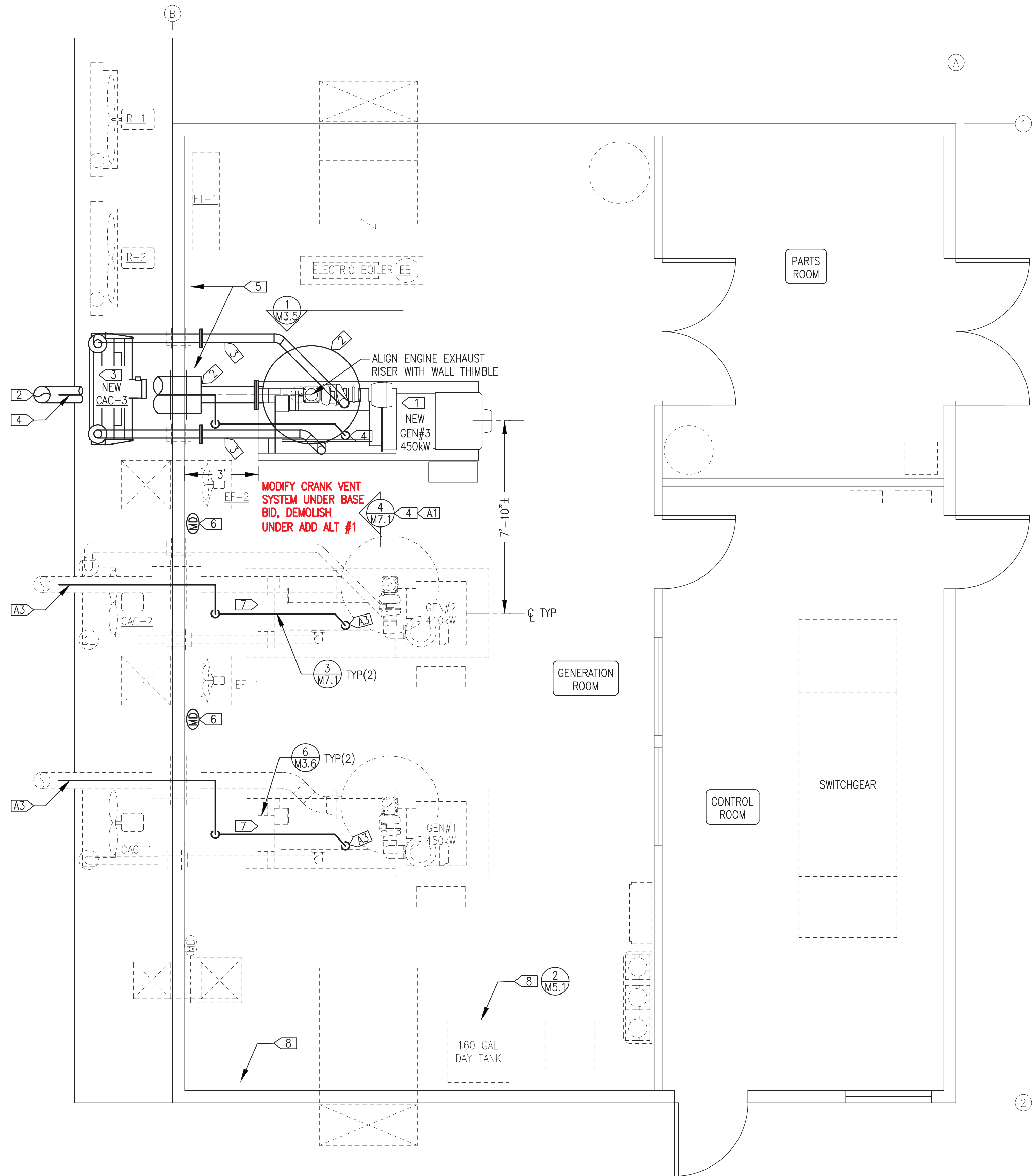
1 MECHANICAL DEMOLITION PLAN
M3.3 3/8"=1'-0"

REV#1
ISSUED
JULY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: MECHANICAL DEMOLITION PLAN		
DRAWN BY: JTD	SCALE: AS NOTED	
DESIGNED BY: BCG	DATE: 5/29/25	
FILE NAME: KWT 2025 M&I	SHEET:	M3.3
PROJECT NUMBER:		





MECHANICAL NEW WORK GENERAL NOTES:

- 1) EXISTING EQUIPMENT AND PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
- 2) NEW/SALVAGED EQUIPMENT AND PIPING TO BE INSTALLED OR MODIFIED SHOWN WITH DARK SOLID LINES.
- 3) NOT ALL EQUIPMENT AND PIPING SHOWN. SEE ATTACHED RECORD DRAWINGS OF ORIGINAL POWER PLANT CONSTRUCTION FOR ADDITIONAL DETAIL ON SYSTEMS NOT BEING MODIFIED.
- 4) OWNER FURNISHED GEN#3 WILL BE SHOP ASSEMBLED. SEE ENGINE-GENERATOR SPECIFICATIONS AND SHEET M3.6 FOR DETAILS.

MECHANICAL NEW WORK SPECIFIC NOTES (BASE BID):

- 1) INSTALL NEW GEN#3. MODIFY COOLANT DISCHARGE AND RETURN BRANCH PIPING. SEE SECTIONS AND DETAILS FOR INSTALLATION. SEE SHEETS M3.5 AND M4.3. COORDINATE WITH ELECTRICAL.
- 2) INSTALL NEW 8" MUFFLER, WALL THIMBLE, AND EXHAUST PIPING. ENLARGE EXISTING WALL OPENING AS REQUIRED FOR INSTALLATION OF NEW LARGER 8" WALL THIMBLE. SEE SHEETS M3.5 AND M7.1. REINSTALL SALVAGED EXHAUST GAS TEMPERATURE RTD. COORDINATE WITH ELECTRICAL.
- 3) INSTALL NEW CHARGE AIR COOLER CAC-3, AND NEW CHARGE AIR TUBING. SEE SHEETS M3.5 AND M7.1. REINSTALL SALVAGED AIR INTAKE VACUUM TRANSMITTER AND INTAKE AIR TEMPERATURE TRANSMITTER. COORDINATE WITH ELECTRICAL.
- 4) MODIFY EXISTING CRANK VENT SYSTEM AND INSTALL NEW CRANK VENT ON GEN#3 UNDER BASE BID. SEE ELEVATIONS AND DETAILS.
- 5) INSTALL NEW GEN#3 COOLANT BRANCH PIPING AND NEW 4" THERMOSTATIC VALVE THEN REFILL COOLING SYSTEM. SEE SHEET M4.3.
- 6) REPLACE EXISTING EXHAUST FAN DISCHARGE DAMPER ACTUATOR WITH NEW BELIMO AFBUP ACTUATOR OR APPROVED EQUAL. ADJUST TO PROVIDE ACTUATION FROM FULLY CLOSED (FAN OFF) TO FULLY OPEN (FAN RUNNING). COORDINATE WITH ELECTRICAL.
- 7) FIELD INSTALL NEW OWNER FURNISHED DAMPER GUARD ON EXISTING GEN#1 AND GEN#2. SEE DETAIL.
- 8) MODIFY EXISTING DAY TANK FILTER AND INSTALL NEW WATER SEPARATING TRIPLE FILTER. SEE SHEET M5.1.

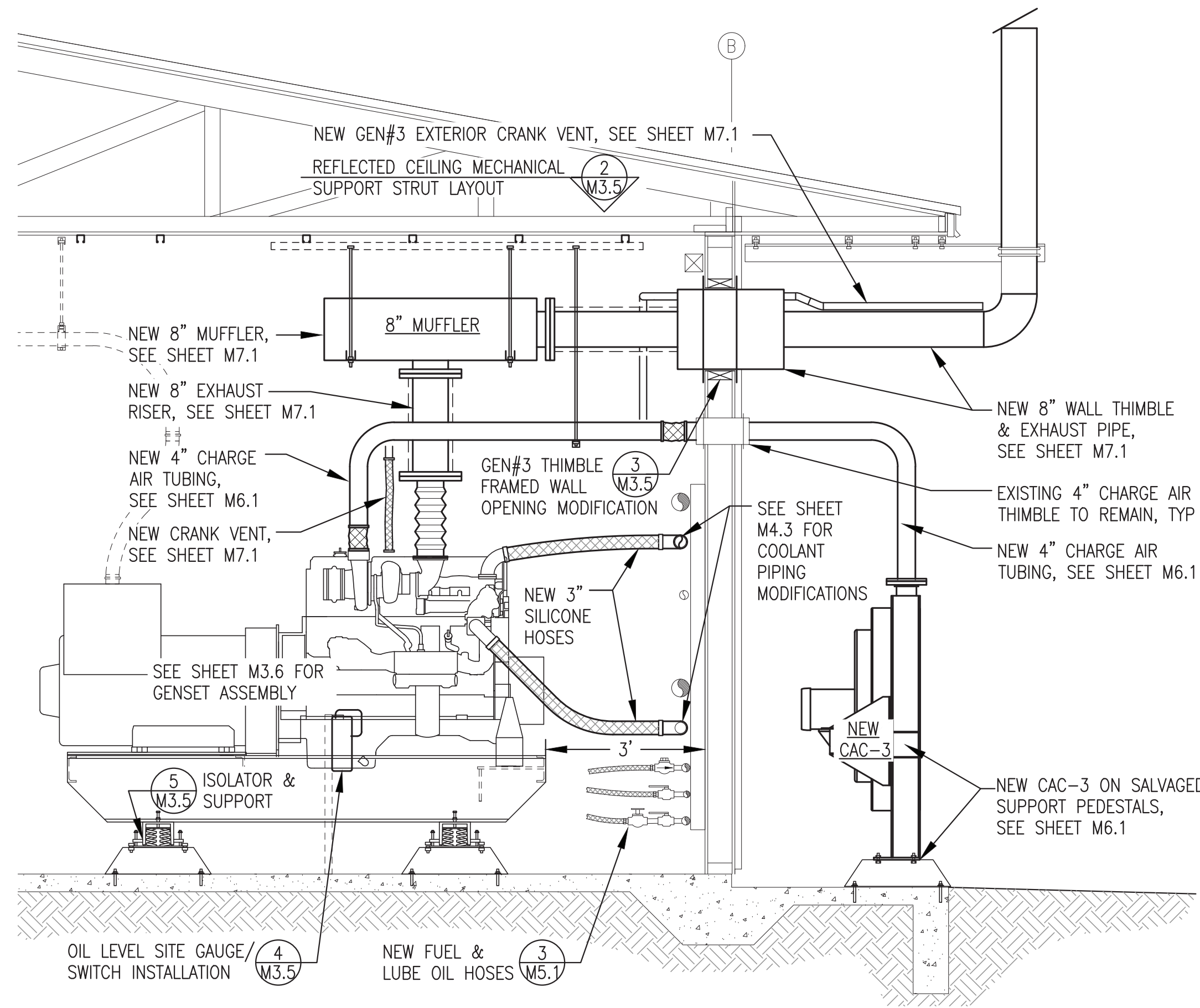
MECHANICAL NEW WORK SPECIFIC NOTES (ADDITIVE ALTERNATES):

- IA1) UNDER ADDITIVE ALTERNATE #1 DEMOLISH EXISTING CRANK VENT SYSTEM AND INSTALL NEW CRANK VENTS ON GEN#1& GEN#2.**
IA2) SEE ELECTRICAL
IA3) SEE ELECTRICAL
IA4) SEE ELECTRICAL

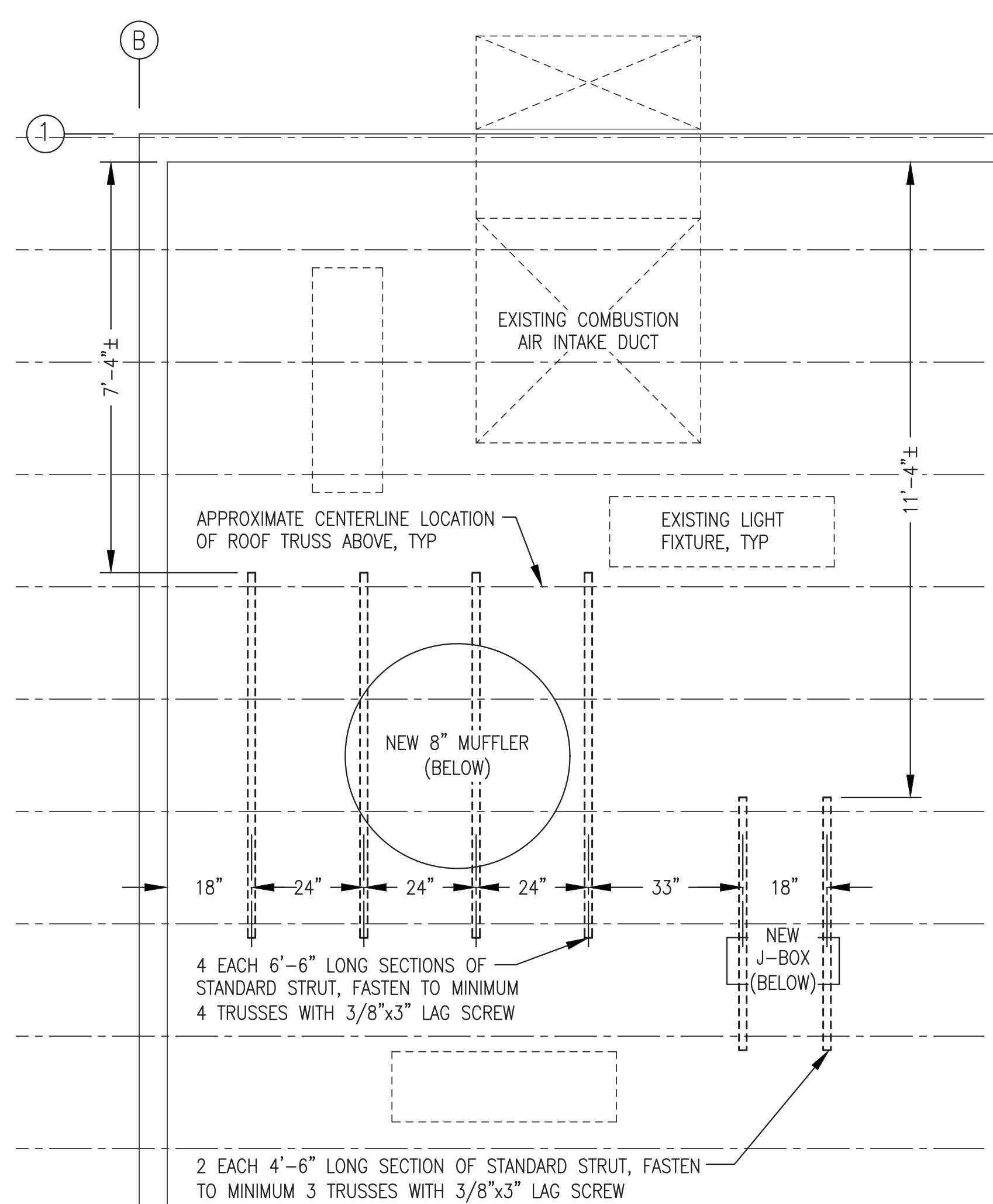
1 MECHANICAL NEW WORK PLAN
 M3.4 3/8"=1'-0"

REV#1
 ISSUED
 JULY 2025

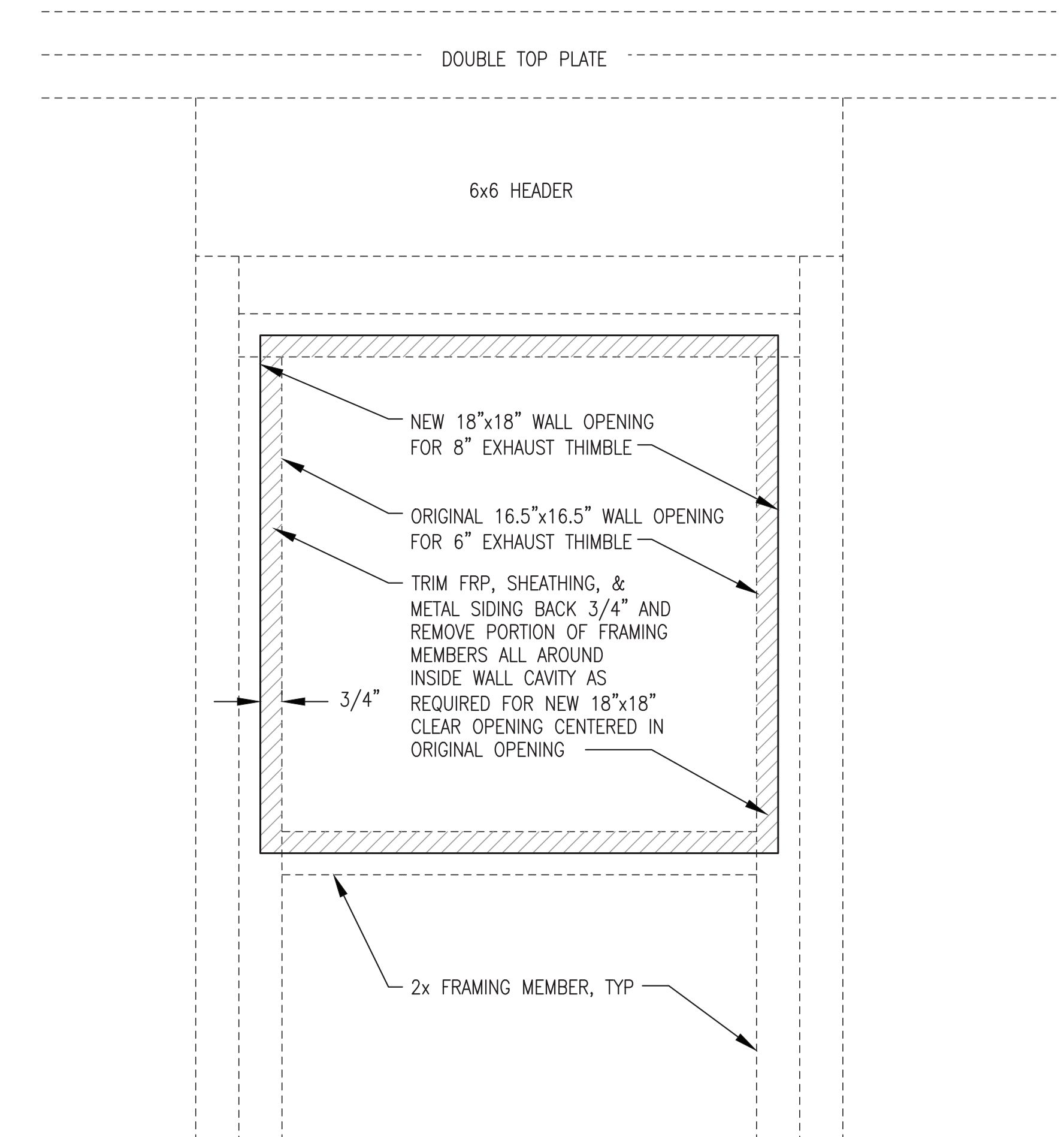
<p>ALASKA ENERGY AUTHORITY</p>		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: MECHANICAL NEW WORK PLAN & DETAILS		
<p>Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100</p>	DRAWN BY: JTD	SCALE: AS NOTED
	DESIGNED BY: BCG	DATE: 5/29/25
	FILE NAME: KWT 2025 M&I	SHEET: M3.4
PROJECT NUMBER:		



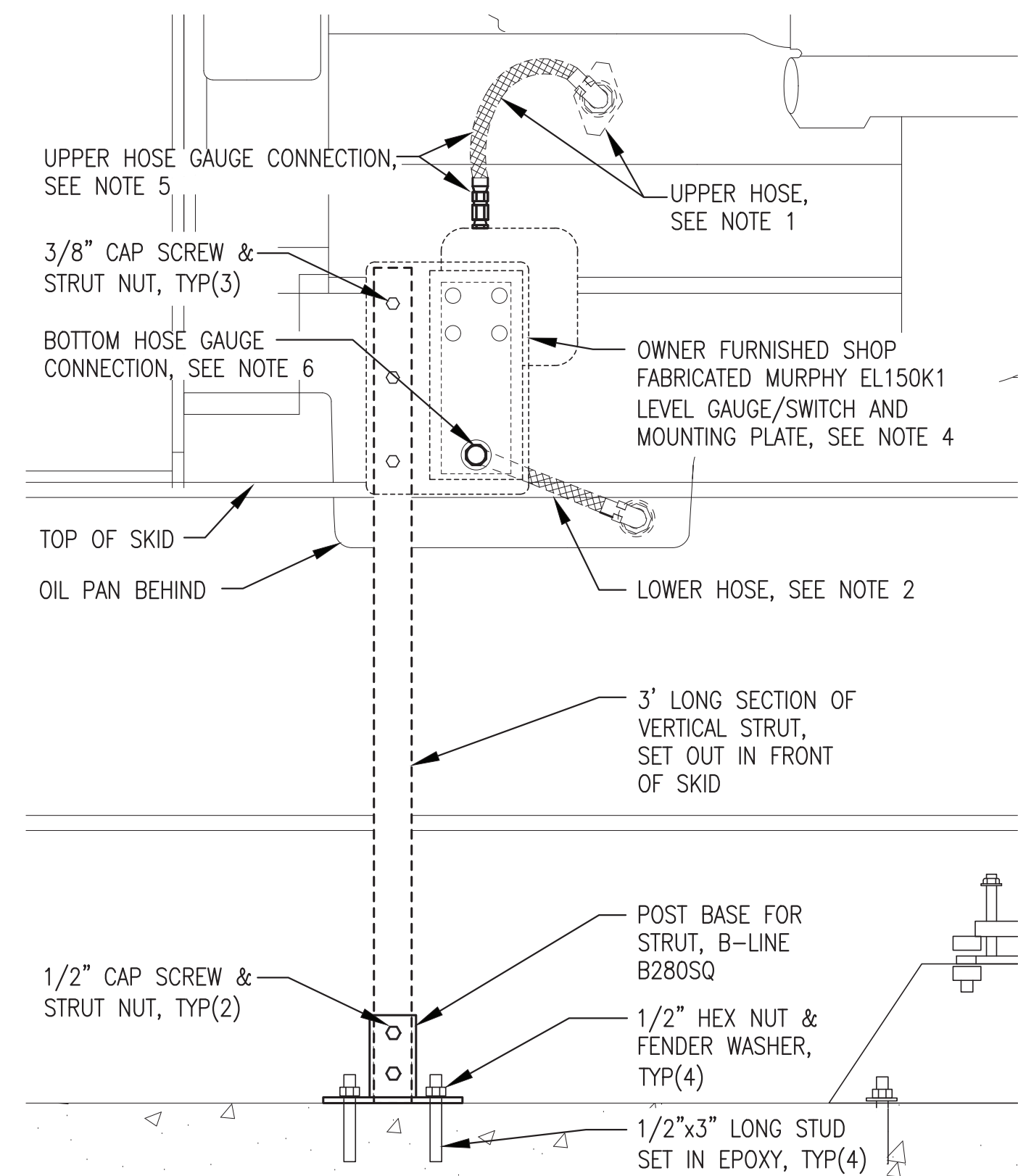
1 NEW GEN#3 INSTALLATION ELEVATION
M3.5 1/2"=1'-0"



2 REFLECTED CEILING MECHANICAL SUPPORT PLAN AT GEN#3
M3.5 1/2"=1'-0"

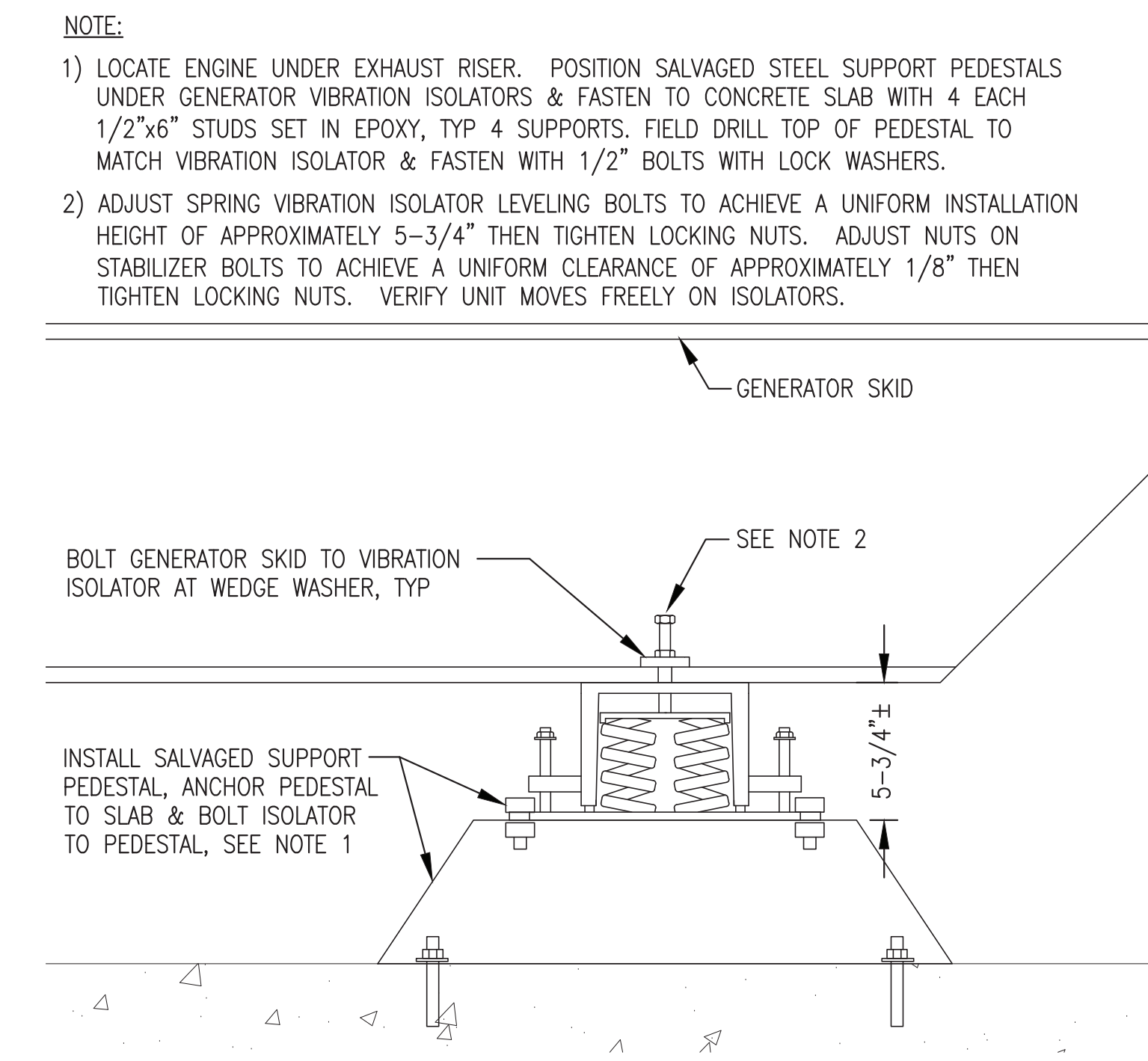


3 GEN#3 THIMBLE FRAMED WALL OPENING MODIFICATION
M3.5 NO SCALE



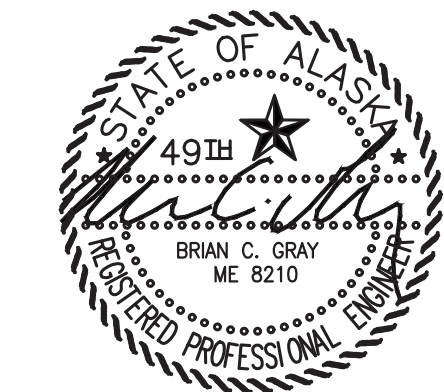
- NOTES:
- SHOP INSTALLED 24" LONG HOSE SHOP CONNECTED TO ENGINE "B PLATE".
 - SHOP INSTALLED 24" LONG HOSE CONNECTED TO ENGINE OIL PAN.
 - INSTALL POST BASE AND STRUT FOR GAUGE/SWITCH SUPPORT FROM FLOOR.
 - DRILL & BOLT MOUNTING PLATE TO VERTICAL STRUT AT HEIGHT AS REQUIRED TO CENTER GAUGE AT NORMAL FULL OIL LEVEL WITH ENGINE RUNNING.
 - AFTER MOUNTING GAUGE AT CORRECT HEIGHT, CUT UPPER HOSE TO LENGTH, INSTALL OWNER FURNISHED END, AND CONNECT TO TOP OF GAUGE. ROUTE UPPER HOSE WITH HIGH POINT ABOVE ENGINE CONNECTION.
 - AFTER MOUNTING GAUGE AT CORRECT HEIGHT, CUT LOWER HOSE TO LENGTH, INSTALL OWNER FURNISHED END, AND CONNECT TO BOTTOM OF GAUGE. ROUTE HOSE BACK TO GAUGE/SWITCH ABOVE TOP OF SKID AND THROUGH PRE-DRILLED HOLE IN STEEL MOUNTING PLATE. DO NOT CREATE HIGH POINT IN HOSE.
 - WITH ENGINE RUNNING AND OIL FULL MARK NORMAL FULL OIL LEVEL WITH GREEN PAINT PEN. ADJUST HIGH SWITCH CONTACT 1/2" ABOVE NORMAL FULL LEVEL AND LOW SWITCH 1/2" BELOW NORMAL FULL LEVEL AND MARK HIGH AND LOW WITH RED PAINT PEN.

4 OIL LEVEL SITE GAUGE/SWITCH INSTALLATION
M3.5 NO SCALE



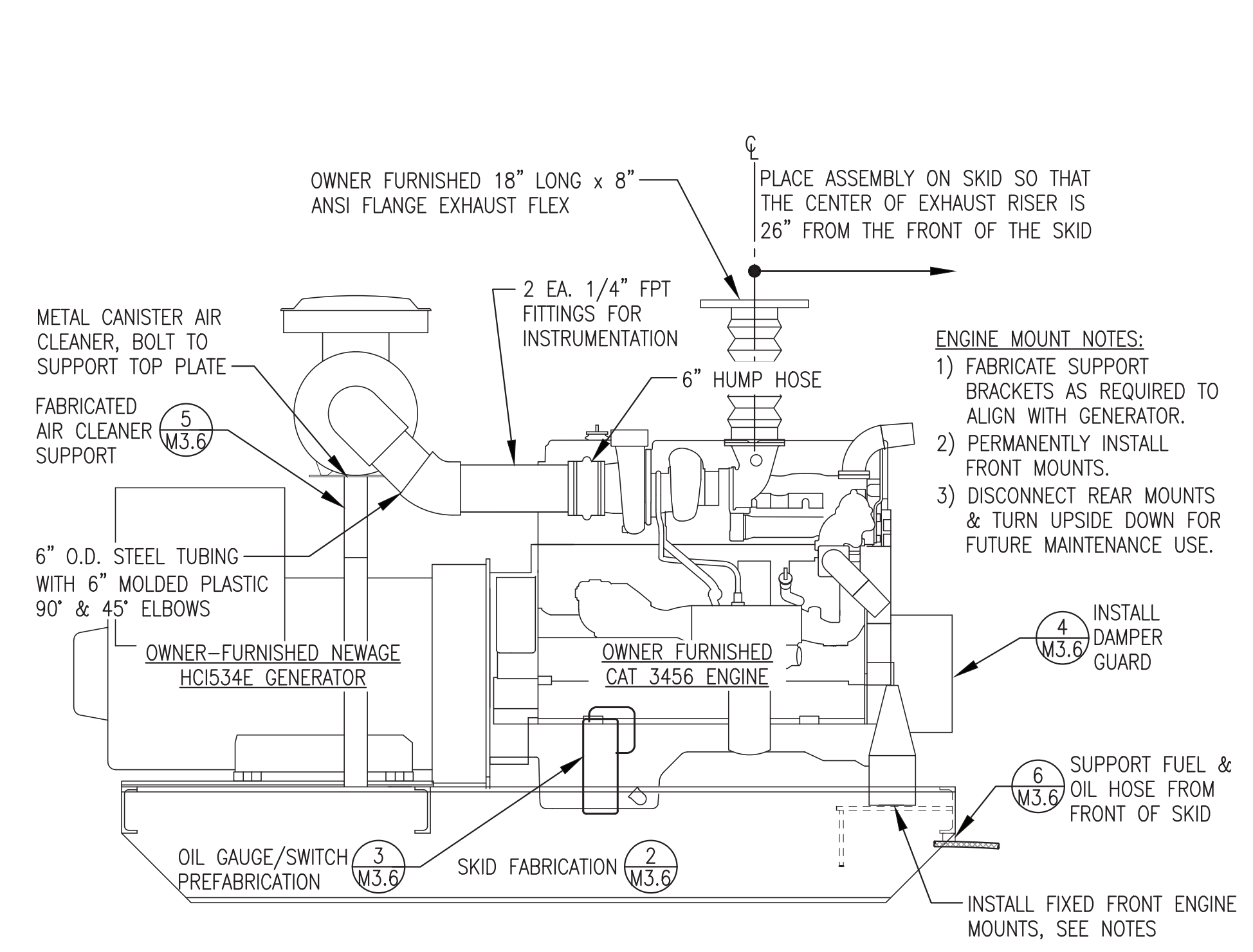
5 GENERATOR VIBRATION ISOLATOR INSTALLATION
M3.5 NO SCALE

ISSUED FOR CONSTRUCTION
MAY 2025



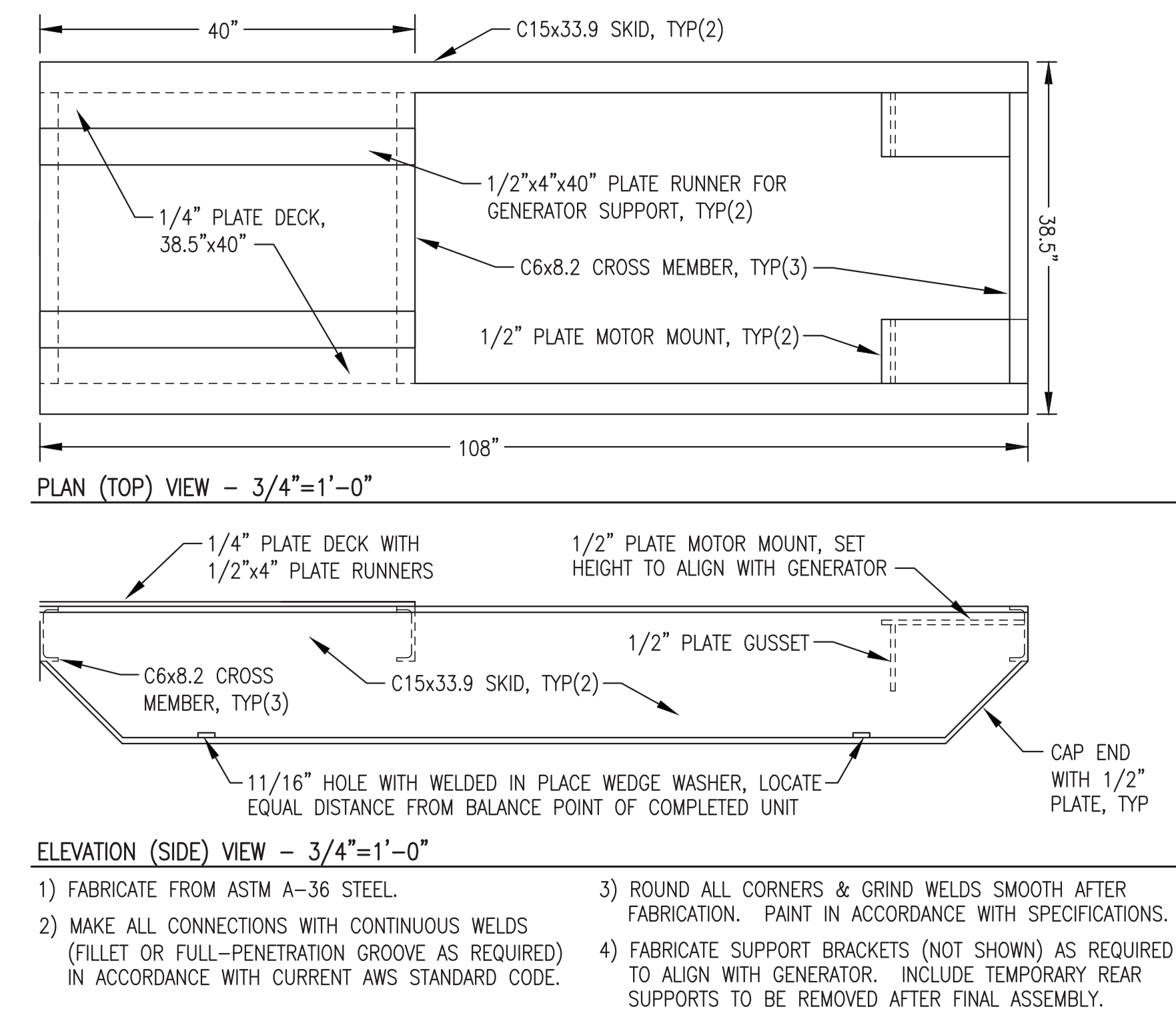
ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: GEN#3 INSTALLATION ELEVATION & DETAILS		
DRAWN BY: JTD	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	DATE: 5/29/25
P.O. 111405, Anchorage, AK 99511 (907)349-0100		SHEET: M3.5

1 GEN#3 ENGINE-GENERATOR ASSEMBLY & MODIFICATION
M3.6 3/4"=1'-0"



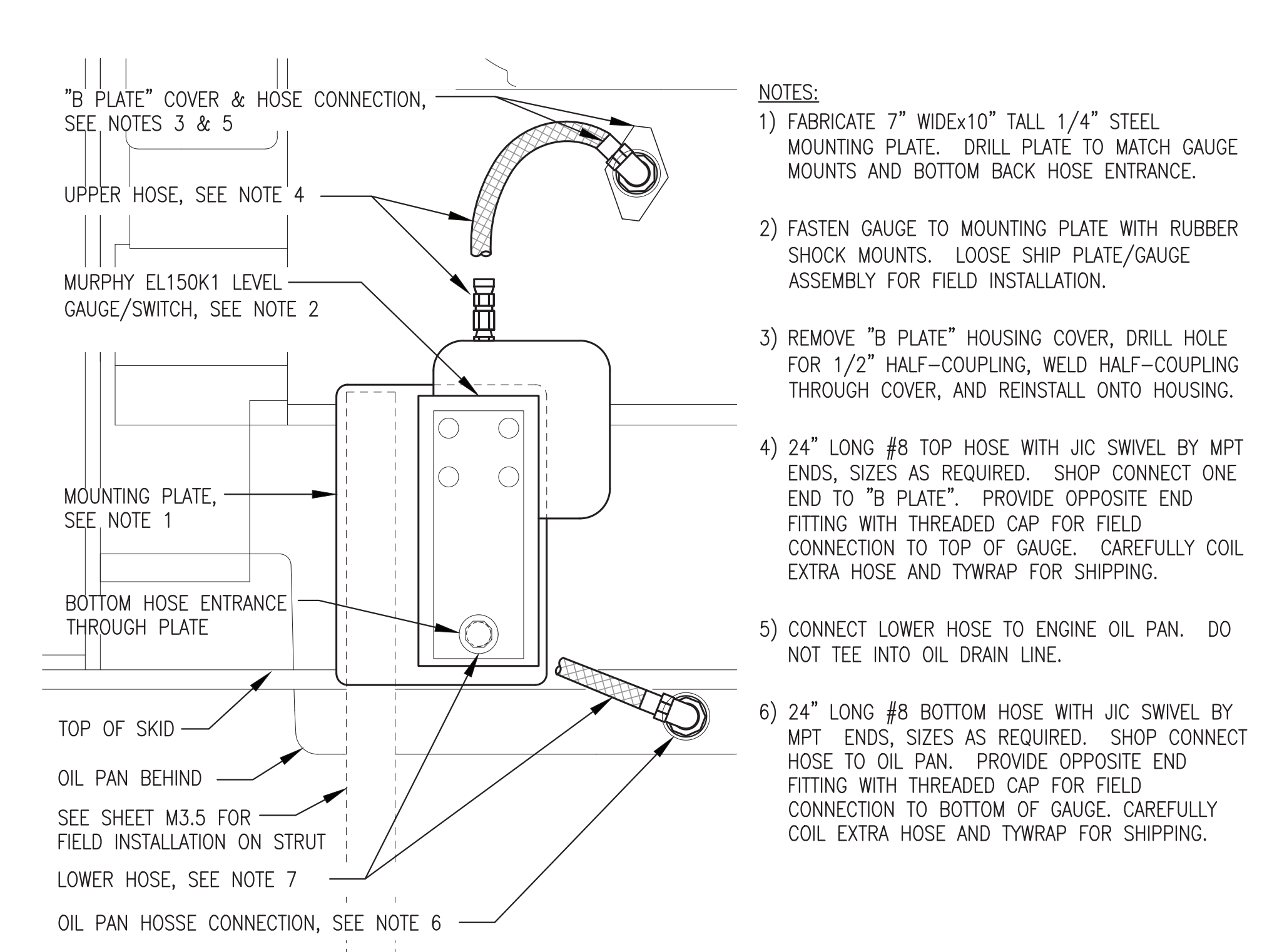
- ENGINE MOUNT NOTES:**
- 1) FABRICATE SUPPORT BRACKETS AS REQUIRED TO ALIGN WITH GENERATOR.
 - 2) PERMANENTLY INSTALL FRONT MOUNTS.
 - 3) DISCONNECT REAR MOUNTS & TURN UPSIDE DOWN FOR FUTURE MAINTENANCE USE.
- INSTALL DAMPER GUARD
- SUPPORT FUEL & OIL HOSE FROM FRONT OF SKID
- INSTALL FIXED FRONT ENGINE MOUNTS, SEE NOTES

2 GEN#3 SKID FABRICATION
M3.6 NO SCALE



- ELEVATION (SIDE) VIEW - 3/4"=1'-0"**
- 1) FABRICATE FROM ASTM A-36 STEEL.
 - 2) 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 IN ACCORDANCE WITH SPECIFICATIONS.
 - 4) FABRICATE SUPPORT BRACKETS (NOT SHOWN) AS REQUIRED TO ALIGN WITH GENERATOR. INCLUDE TEMPORARY REAR SUPPORTS TO BE REMOVED AFTER FINAL ASSEMBLY.

3 OIL LEVEL SITE GAUGE/SWITCH PREFABRICATION
M3.6 NO SCALE

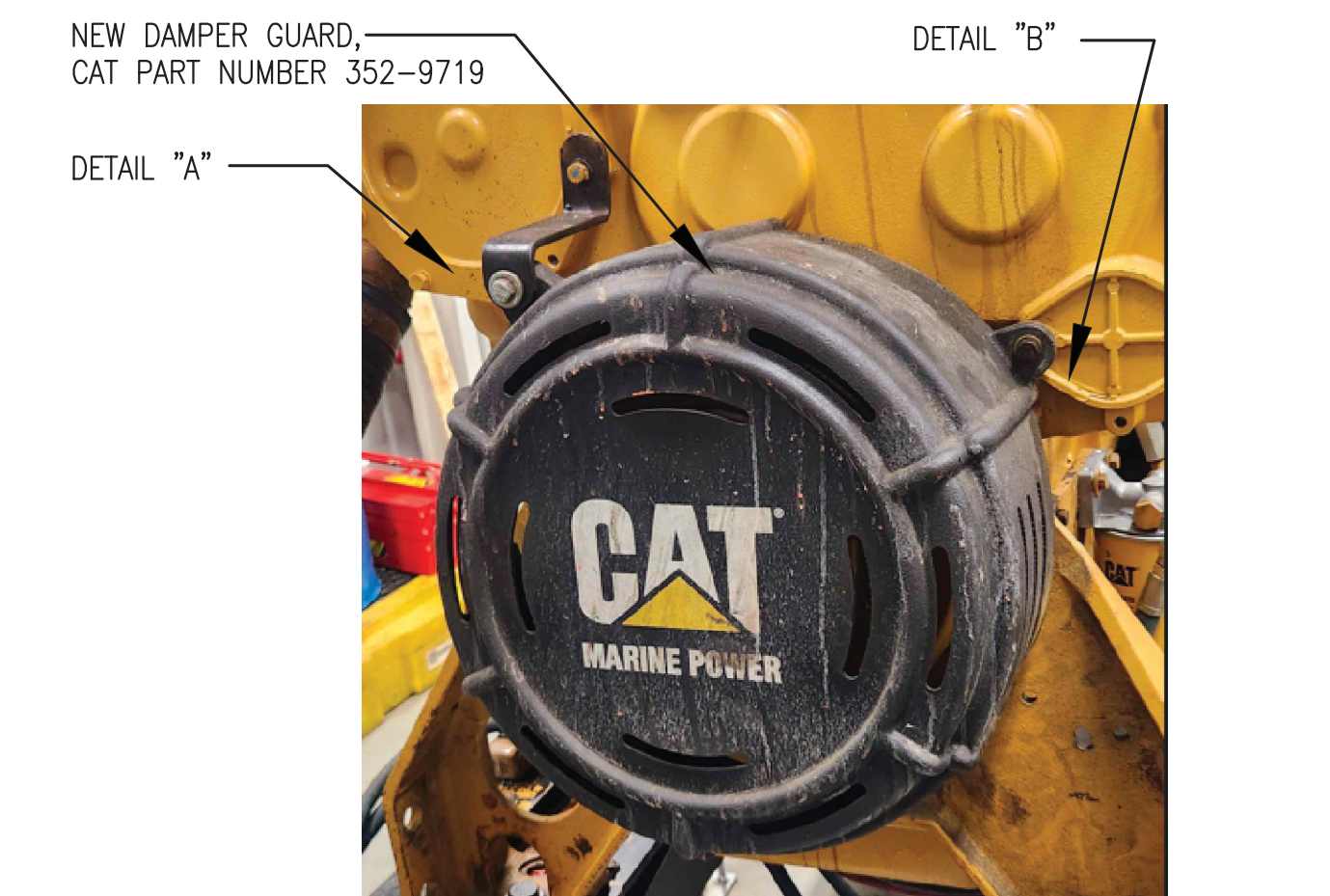


- NOTES:**
- 1) FABRICATE 7" WIDE x 10" TALL 1/4" STEEL MOUNTING PLATE. DRILL PLATE TO MATCH GAUGE MOUNTS AND BOTTOM BACK HOSE ENTRANCE.
 - 2) FASTEN GAUGE TO MOUNTING PLATE WITH RUBBER SHOCK MOUNTS. LOOSE SHIP PLATE/GAUGE ASSEMBLY FOR FIELD INSTALLATION.
 - 3) REMOVE "B PLATE" HOUSING COVER, DRILL HOLE FOR 1/2" HALF-COUPLING, WELD HALF-COUPLING THROUGH COVER, AND REINSTALL ONTO HOUSING.
 - 4) 24" LONG #8 TOP HOSE WITH JIC SWIVEL BY MPT ENDS, SIZES AS REQUIRED. SHOP CONNECT ONE END TO "B PLATE". PROVIDE OPPOSITE END FITTING WITH THREADED CAP FOR FIELD CONNECTION TO TOP OF GAUGE. CAREFULLY COIL EXTRA HOSE AND TYWRAP FOR SHIPPING.
 - 5) CONNECT LOWER HOSE TO ENGINE OIL PAN. DO NOT TEE INTO OIL DRAIN LINE.
 - 6) 24" LONG #8 BOTTOM HOSE WITH JIC SWIVEL BY MPT ENDS, SIZES AS REQUIRED. SHOP CONNECT HOSE TO OIL PAN. PROVIDE OPPOSITE END FITTING WITH THREADED CAP FOR FIELD CONNECTION TO BOTTOM OF GAUGE. CAREFULLY COIL EXTRA HOSE AND TYWRAP FOR SHIPPING.

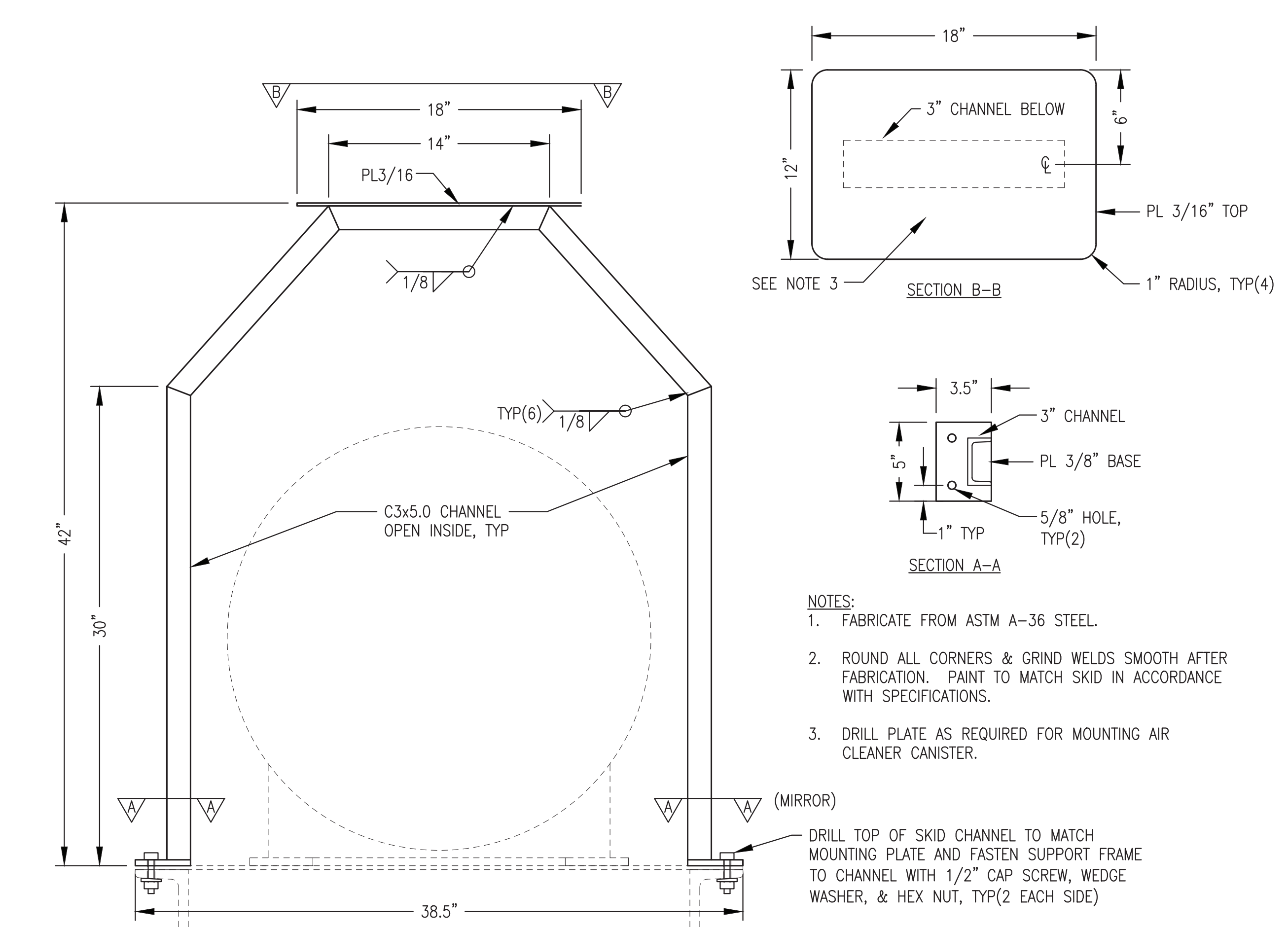
- NOTES:**
- 1) FURNISH & INSTALL ONE COMPLETE DAMPER GUARD ASSEMBLY ON NEW GENSET.
 - 2) FURNISH LOOSE SHIP TWO COMPLETE ASSEMBLIES INCLUDING MOUNTING BRACKETS, ISOLATORS, & FASTENERS FOR FIELD INSTALLATION BY OTHERS.

FABRICATE BENT STEEL BRACKET, LENGTH AS REQUIRED TO SECURE DAMPER GUARD TO WATER PUMP HOUSING

PROVIDE RUBBER SPACERS AT ALL MOUNTING LOCATIONS FOR VIBRATION ISOLATION

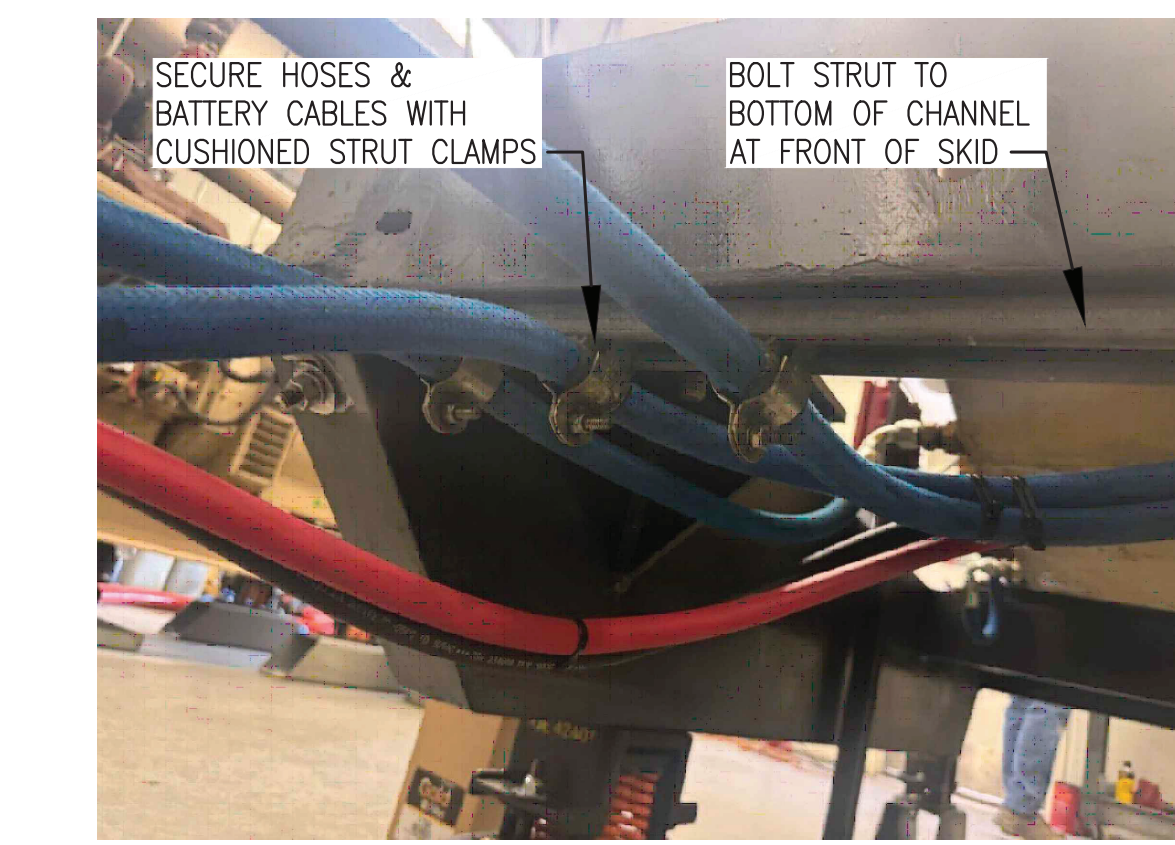


4 DAMPER GUARD INSTALLATION
M3.6 NO SCALE



- NOTES:**
1. FABRICATE FROM ASTM A-36 STEEL.
 2. ROUND ALL CORNERS & GRIND WELDS SMOOTH AFTER FABRICATION. PAINT TO MATCH SKID IN ACCORDANCE WITH SPECIFICATIONS.
 3. DRILL PLATE AS REQUIRED FOR MOUNTING AIR CLEANER CANISTER.

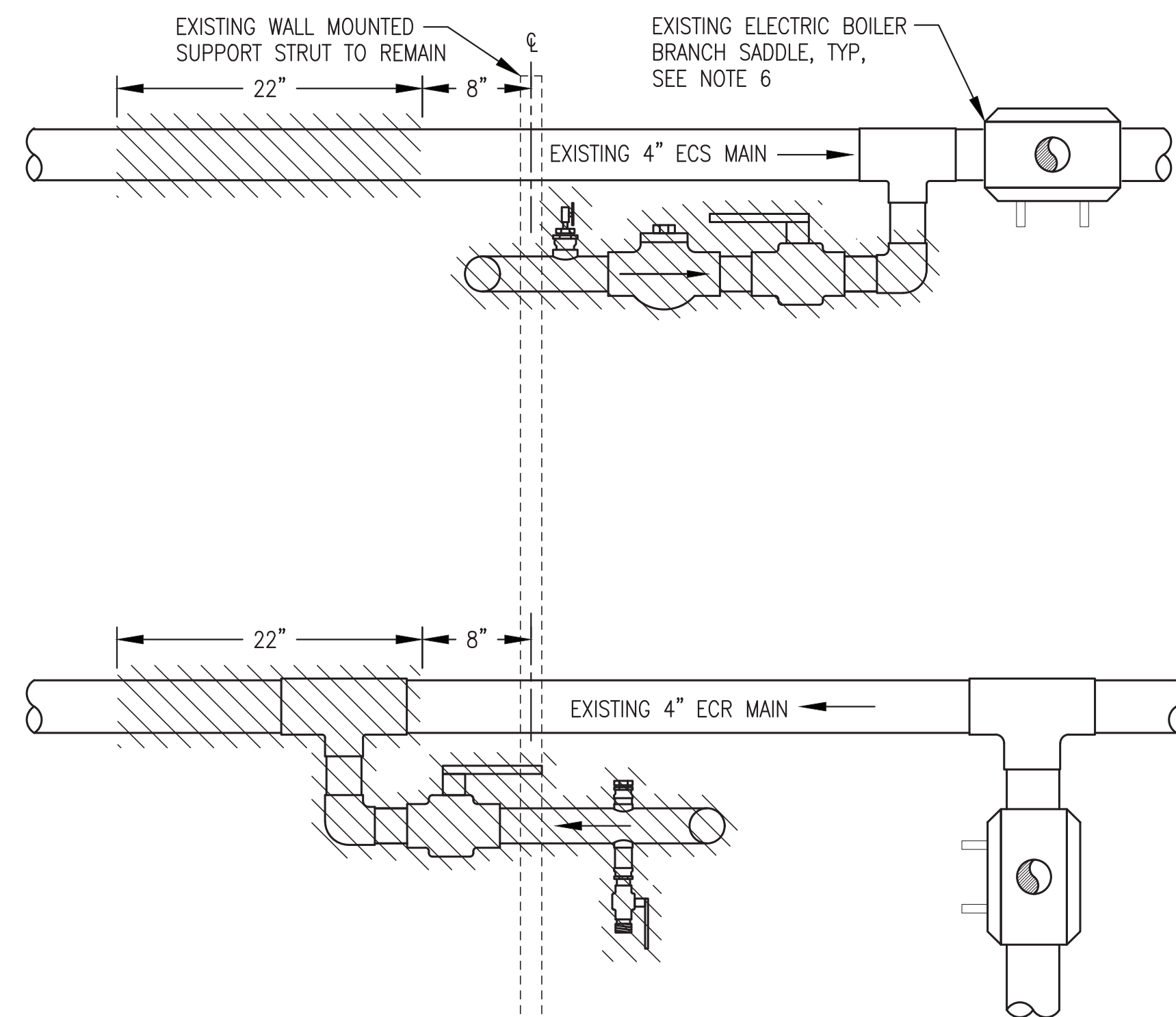
5 AIR CLEANER SUPPORT FABRICATION
M3.6 NO SCALE



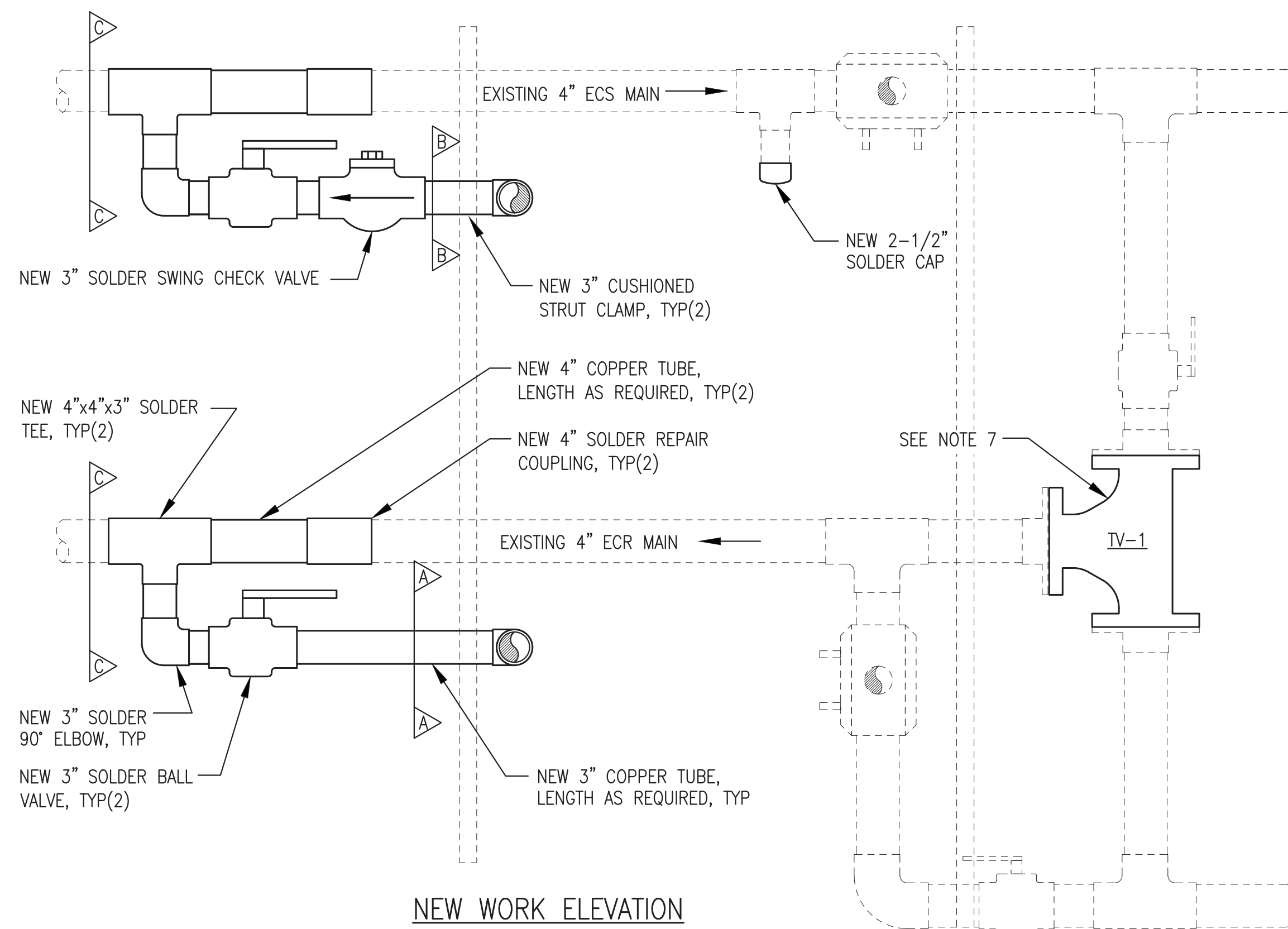
6 FUEL & OIL HOSE SUPPORT
M3.6 NO SCALE

ISSUED FOR CONSTRUCTION
MAY 2025

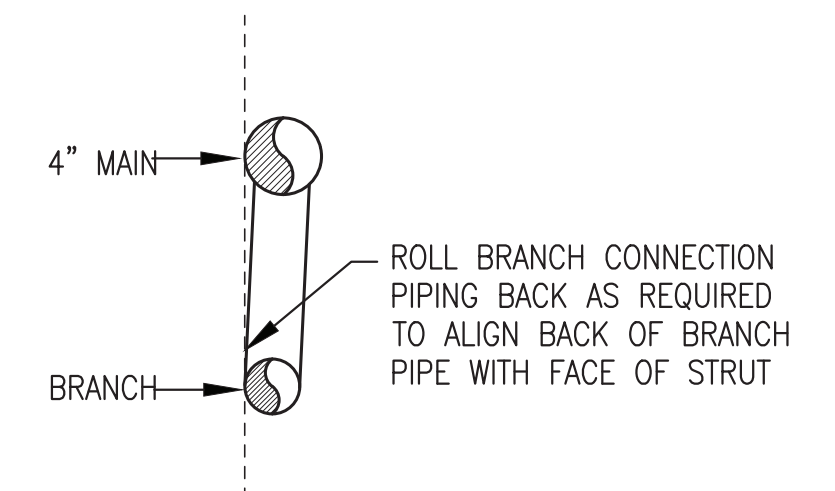
ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: GEN#3 ENGINE-GENERATOR SHOP ASSEMBLY DETAILS		
DESIGNED BY: BCG	DATE: 5/29/25	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	SHEET: M3.6	
PROJECT NUMBER:		
Gray Stassel Engineering, Inc.		
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



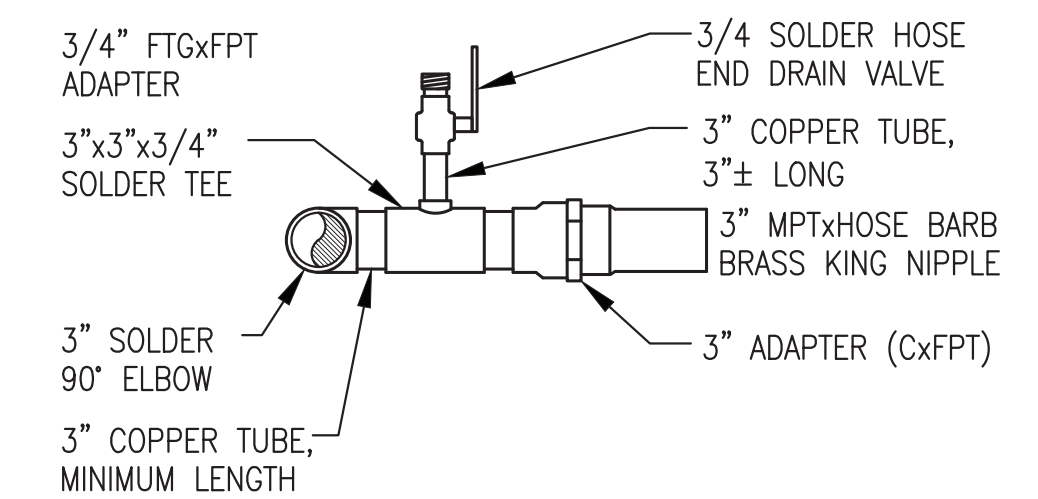
DEMOLITION ELEVATION



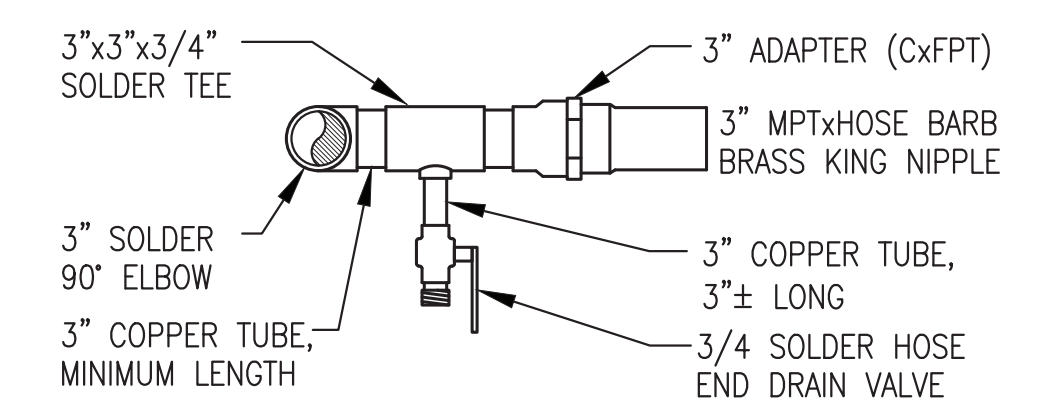
NEW WORK ELEVATION



SECTION C-C



SECTION B-B



SECTION A-A

NOTES:

1. THE PIPING MODIFICATIONS WILL REQUIRE AN OUTAGE TO DRAIN THE SYSTEM. SEE LIMITED POWER OUTAGE NOTES SHEET M3.3.
2. DRAIN COOLANT INTO CLEAN DRUMS OR TOTES AND SAVE FOR REFILLING AFTER COMPLETION.
3. CUT OUT & REMOVE EXIST 4" ENGINE COOLANT MAIN AND 2-1/2" BRANCH CONNECTIONS AS INDICATED BY HATCHING ON DEMOLITION DETAIL.
4. ON NEW WORK DETAILS ALL EXISTING PIPE & FITTINGS TO REMAIN SHOWN WITH LIGHT-DASHED LINES AND ALL NEW PIPE & FITTINGS SHOWN WITH DARK-SOLID LINES.

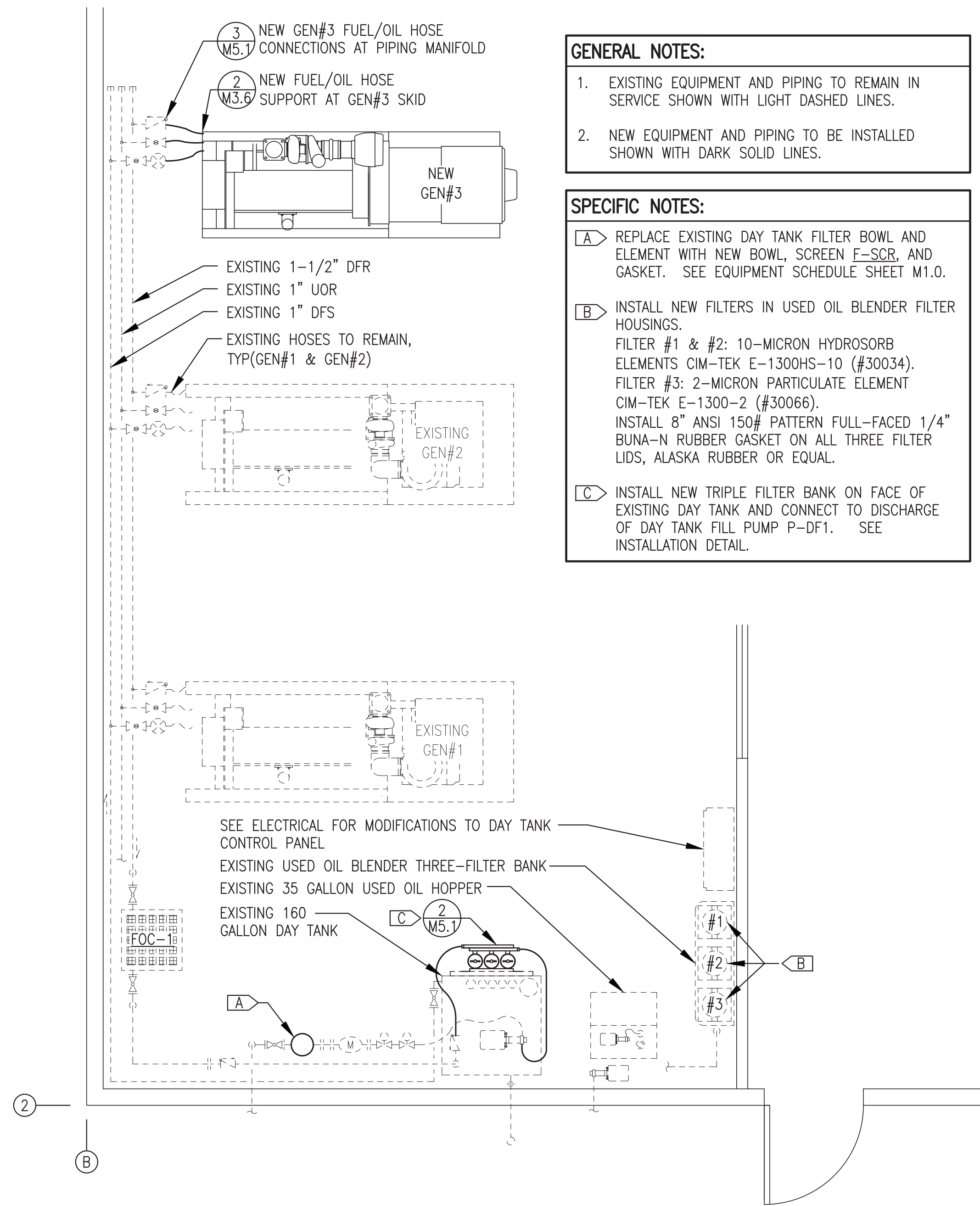
5. THE EXISTING 4" MAINS HAVE FIBERGLASS INSULATION WITH ALUMINUM JACKET. CAREFULLY REMOVE AS REQUIRED FOR PIPING MODIFICATION & REINSTALL UPON COMPLETION. REPLACE DAMAGED INSULATION OR JACKET WITH NEW TO MATCH.
6. THE EXISTING ELECTRIC BOILER SUPPLY & RETURN BRANCH PIPING CONNECTIONS ARE MADE WITH RUBBER GASKETED MECHANICAL SADDLE FITTINGS. DO NOT APPLY TORCH HEAT IN THE VICINITY OF THE SADDLES DURING DEMOLITION AND NEW WORK TO PROTECT THE RUBBER GASKETS FROM DAMAGE.
7. REMOVE EXISTING 4" THERMOSTATIC VALVE AND INSTALL NEW 4" THERMOSTATIC VALVE. PROVIDE NEW 4" FLANGE GASKETS AND BOLTS.

1 GEN#3 COOLANT PIPING MODIFICATIONS
M4.3 NO SCALE

ISSUED FOR
CONSTRUCTION
MAY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: GEN#3 COOLANT PIPING MODIFICATIONS		
DRAWN BY: JTD	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	SHEET: M4.3
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



GENERAL NOTES:

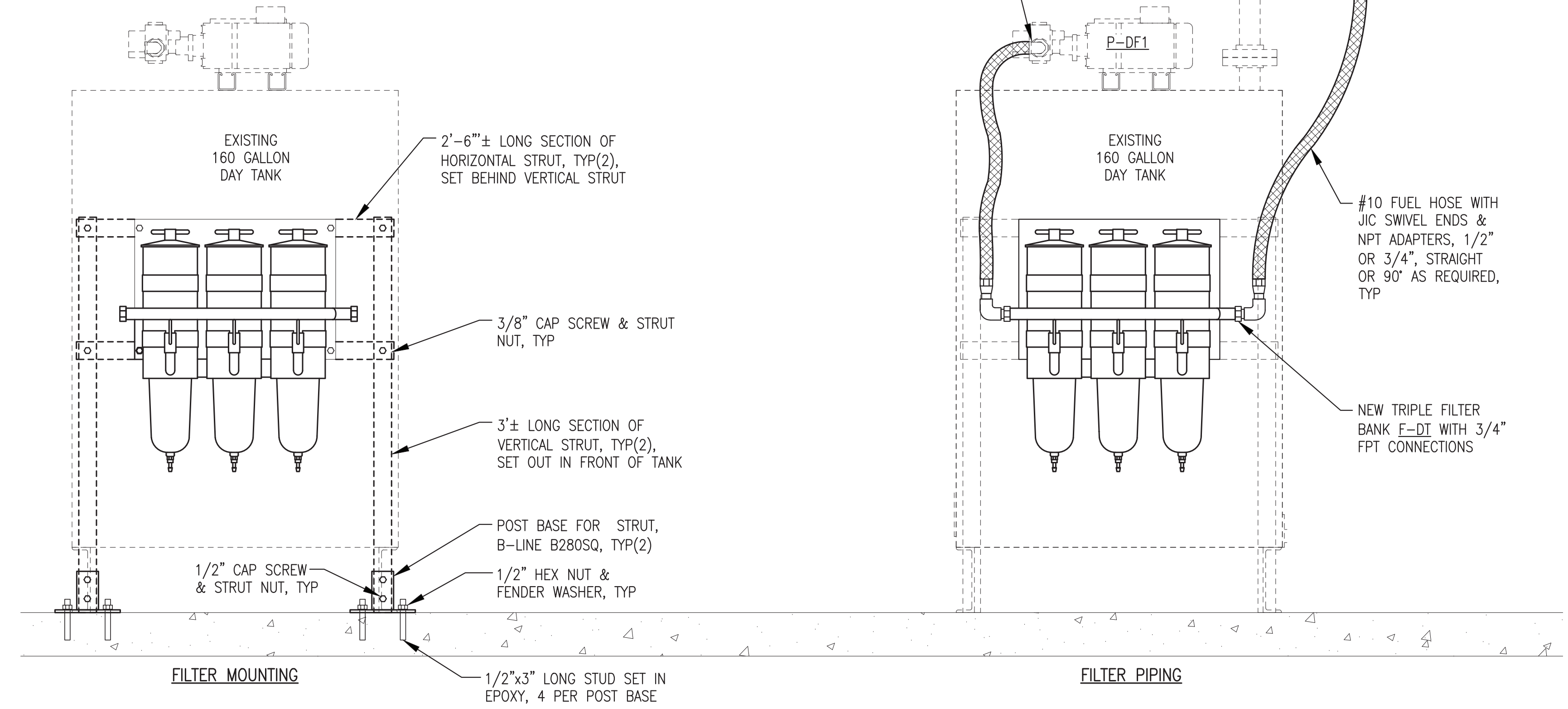
- EXISTING EQUIPMENT AND PIPING TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
- NEW EQUIPMENT AND PIPING TO BE INSTALLED SHOWN WITH DARK SOLID LINES.

SPECIFIC NOTES:

A REPLACE EXISTING DAY TANK FILTER BOWL AND ELEMENT WITH NEW BOWL, SCREEN F-SCR, AND GASKET. SEE EQUIPMENT SCHEDULE SHEET M1.0.

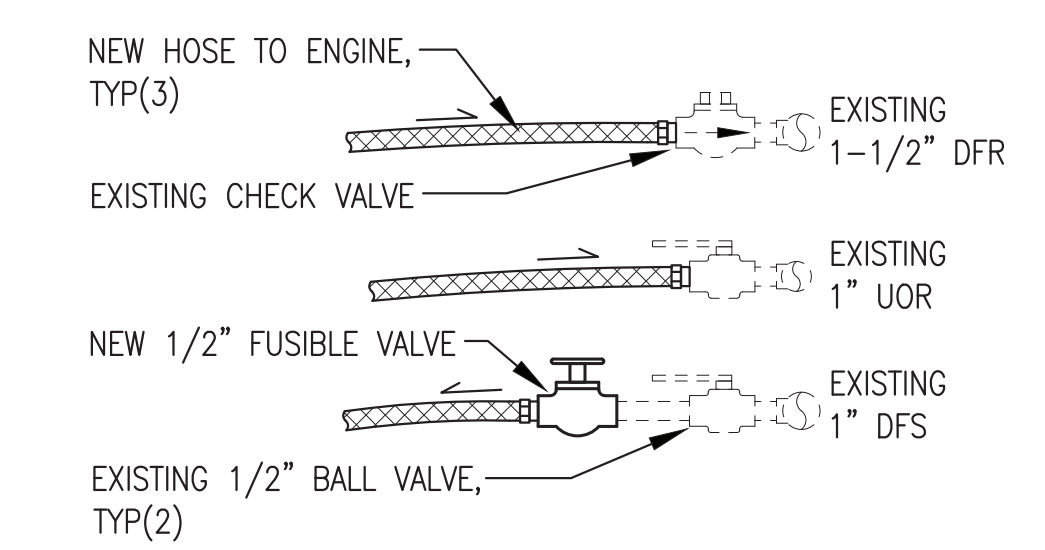
B INSTALL NEW FILTERS IN USED OIL BLENDER FILTER HOUSINGS.
 FILTER #1 & #2: 10-MICRON HYDROSORB ELEMENTS CIM-TEK E-1300HS-10 (#30034).
 FILTER #3: 2-MICRON PARTICULATE ELEMENT CIM-TEK E-1300-2 (#30066).
 INSTALL 8" ANSI 150# PATTERN FULL-FACED 1/4" BUNA-N RUBBER GASKET ON ALL THREE FILTER LIDS, ALASKA RUBBER OR EQUAL.

C INSTALL NEW TRIPLE FILTER BANK ON FACE OF EXISTING DAY TANK AND CONNECT TO DISCHARGE OF DAY TANK FILL PUMP P-DF1. SEE INSTALLATION DETAIL.



2 NEW DAY TANK TRIPLE FILTER INSTALLATION
 M5.1 NO SCALE

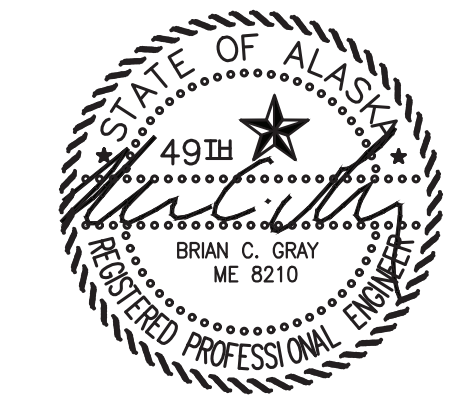
1 FUEL SYSTEM MODIFICATION PLAN
 M5.1 NO SCALE



NOTE:
 FIELD CUT FUEL/OIL HOSES TO LENGTH & INSTALL JIC SWIVEL ENDS WITH 1/2" MPT ADAPTERS.

3 TYPICAL FUEL/OIL HOSE CONNECTIONS
 M5.1 NO SCALE

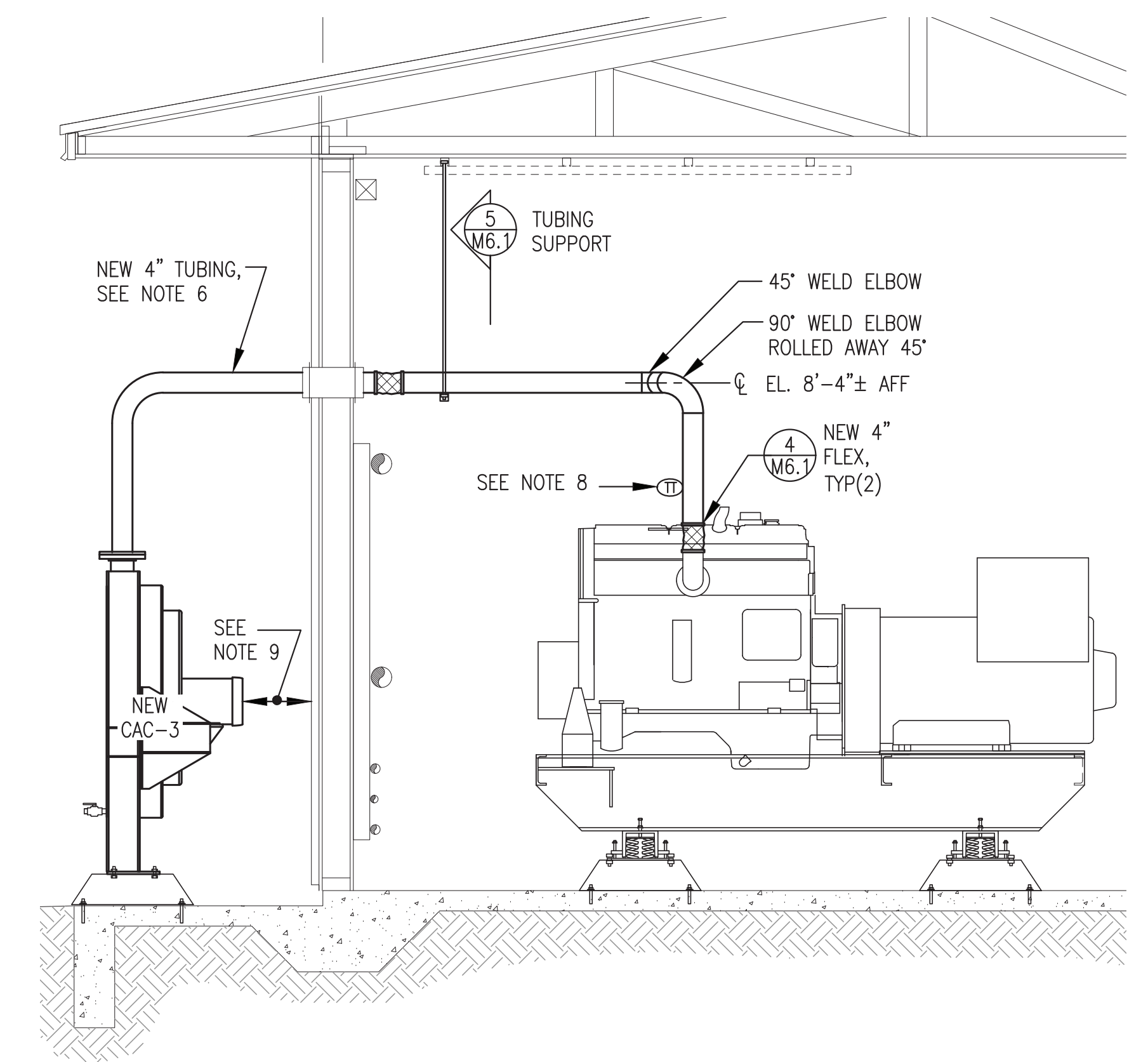
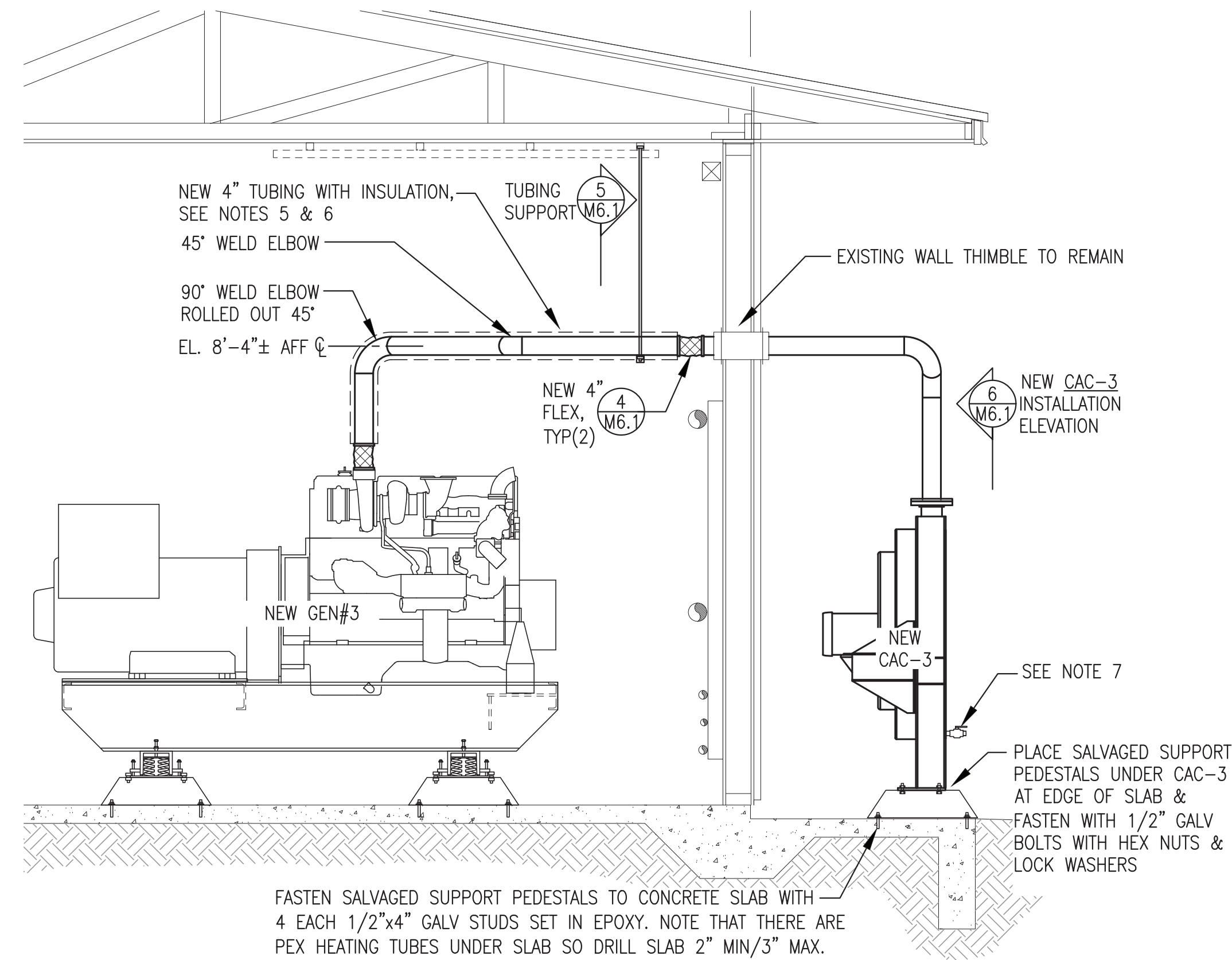
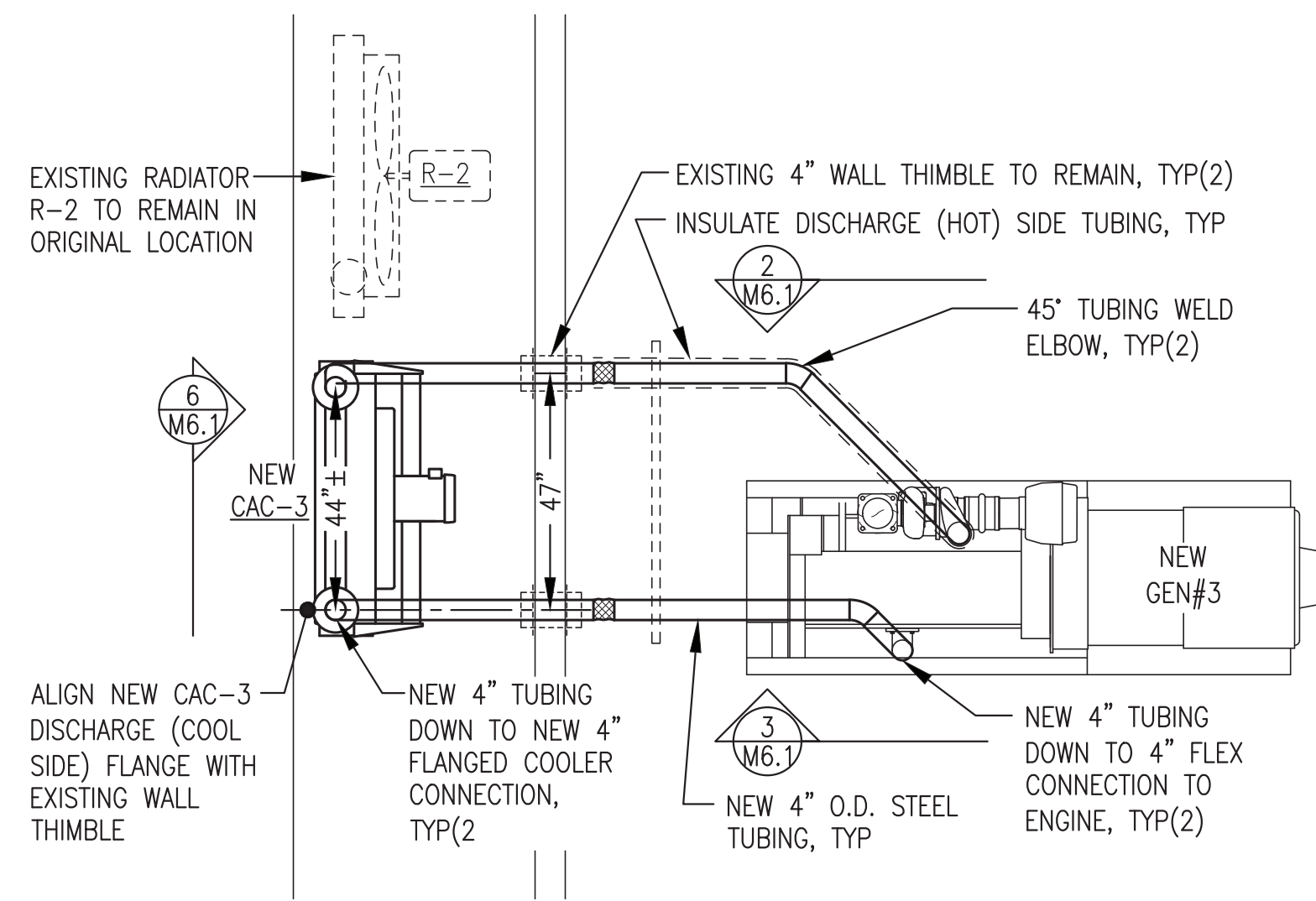
ISSUED FOR CONSTRUCTION
 MAY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: FUEL SYSTEM MODIFICATION PLAN & DETAILS		
	DRAWN BY: JTD	SCALE: AS NOTED
	DESIGNED BY: BCG	DATE: 5/29/25
FILE NAME: KWT 2025 M&I	SHEET:	M5.1
P.O. 111405, Anchorage, AK 99511 (907)349-0100	PROJECT NUMBER:	

CHARGE AIR SYSTEM GENERAL NOTES:

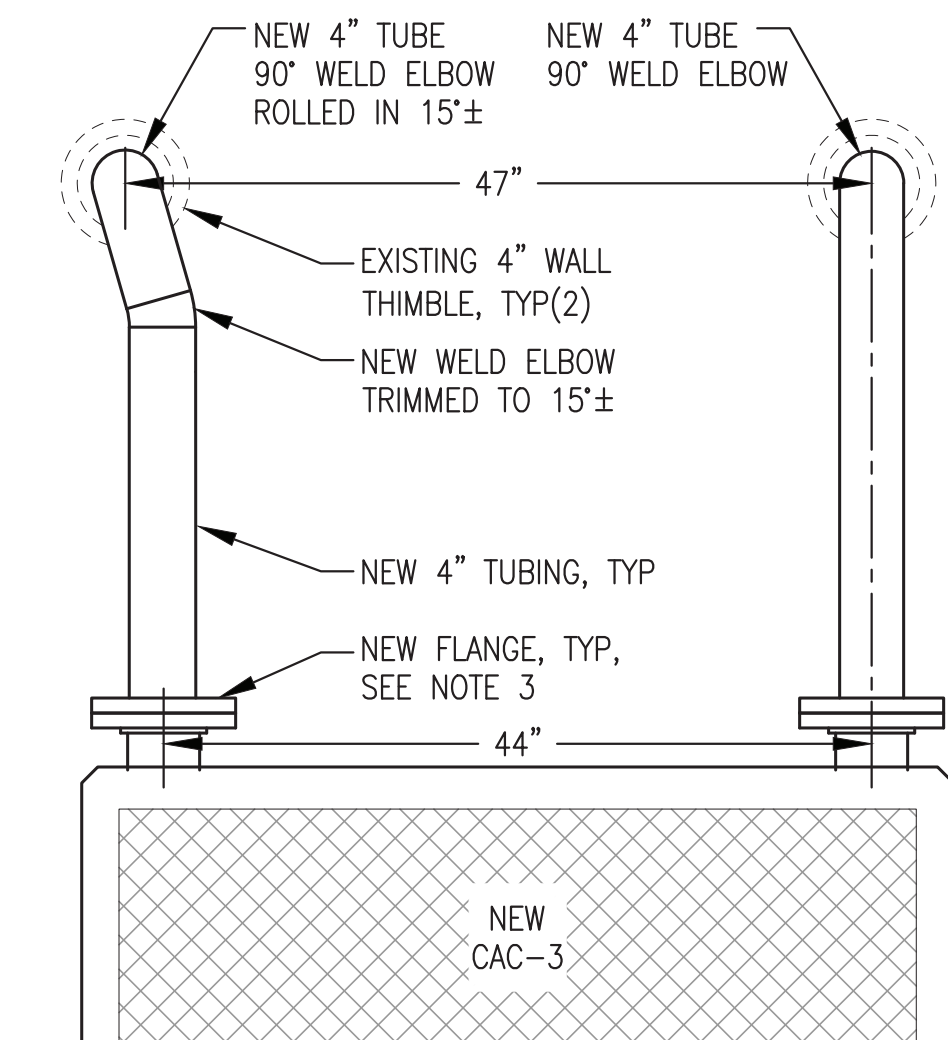
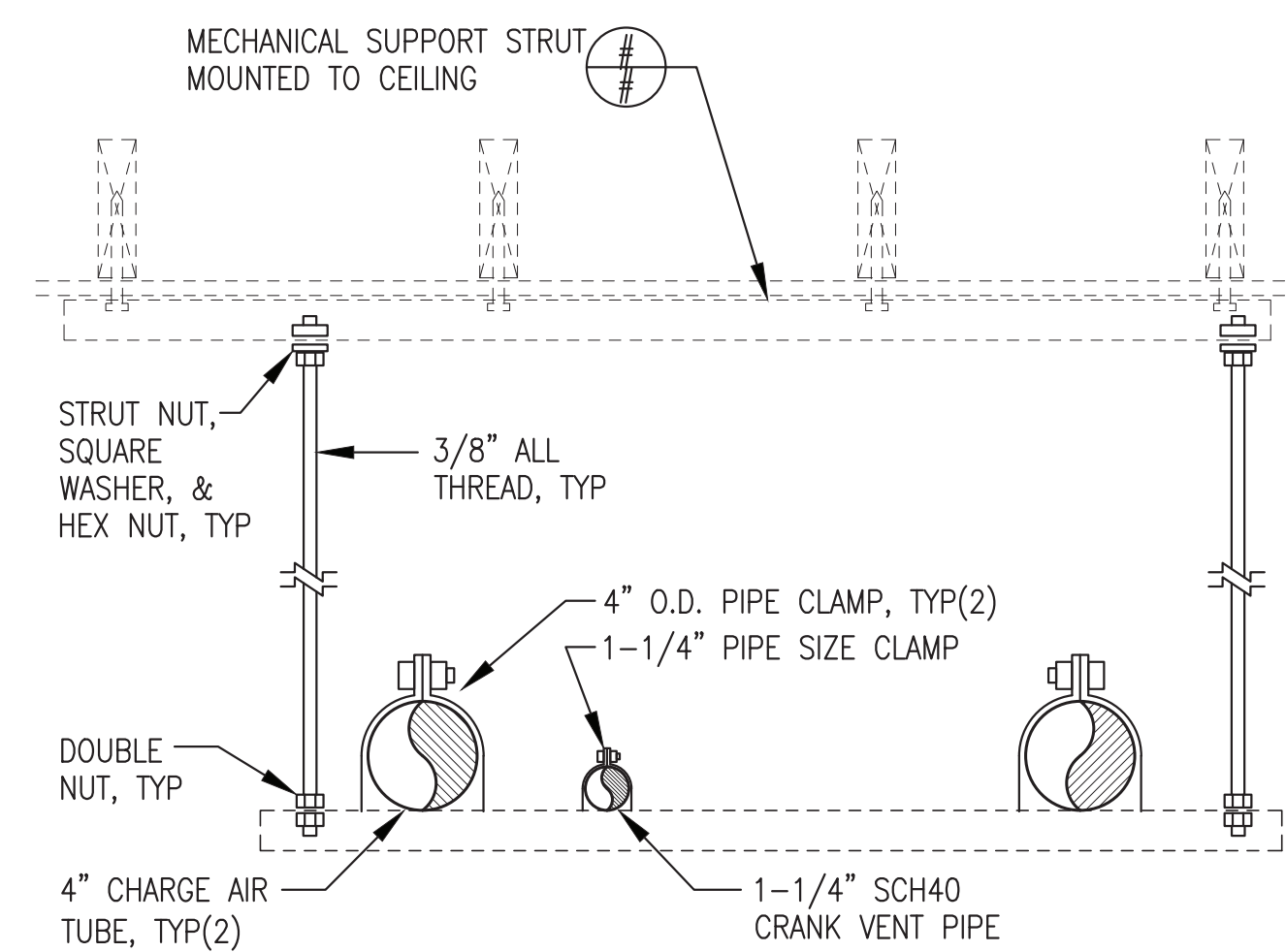
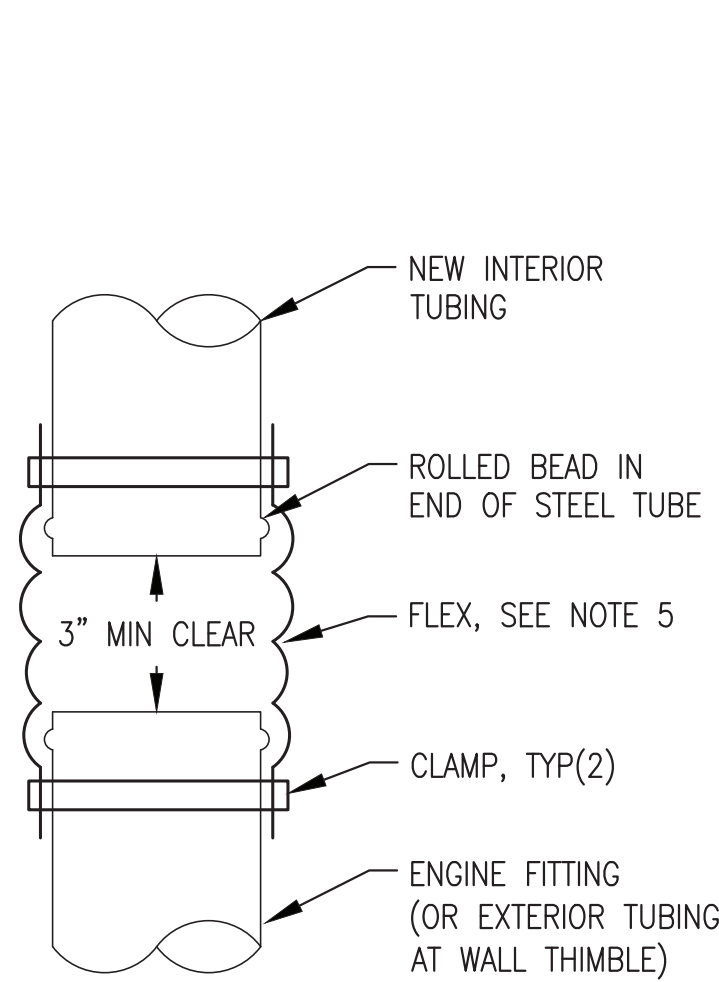
- 1) NEW CAC-3 TO BE OWNER FURNISHED.
- 2) ALL GEN#3 CHARGE AIR TUBING TO BE NEW, LIGHT WALL CARBON STEEL O.D. TUBING. ALL ELBOWS TO BE LONG RADIUS FITTINGS TO MATCH TUBING. ALL JOINTS TO BE WELDED EXCEPT AS INDICATED.
- 3) MAKE NEW COOLER CONNECTIONS TO O.D. TUBE WITH ANSI 125# STEEL PLATE FLANGES, G.T. EXHAUST PART #41 OR EQUAL. INSTALL HIGH TEMPERATURE FULL FACE GASKETS, GARLOCK 4122-FC OR EQUAL. FASTEN WITH HOT DIP GALVANIZED BOLTS AND NUTS. INSTALL GALV FLAT WASHERS ON BOTH SIDES, DO NOT USE LOCK WASHERS. COAT GASKET AND BOLTS WITH HIGH TEMPERATURE ANTI-SEIZE.
- 4) INSTALL ALL NEW, HIGH TEMPERATURE DOUBLE HUMP SILICONE TURBO SLEEVES WITH RINGS, FLEXFAB 7715-0002 OR EQUAL. FASTEN WITH LINED STAINLESS STEEL CLAMPS, IDEAL 5364(3) OR EQUAL.
- 5) INSULATE INTERIOR CHARGE AIR DISCHARGE (HOT SIDE) TUBING FROM FLEX TO FLEX WITH 3" WIDE FIBERGLASS PAD TAPE. SECURE ENDS WITH HOSE CLAMPS.
- 6) COAT ALL EXPOSED TUBING AND FLANGES, BOTH NEW AND EXISTING. WIRE BRUSH, WIPE DOWN WITH SOLVENT, AND PAINT WITH TWO COATS OF COLD GALVANIZING COMPOUND.
- 7) INSTALL 3/4" THREADED BALL VALVE AND PLUG FOR DRAIN ON BOTH SIDES OF COOLER.
- 8) INSTALL SALVAGED CHARGE AIR TEMPERATURE TRANSMITTER IN 1/2" THREAD-0-LET.



1 NEW GEN#3 CHARGE AIR COOLING SYSTEM PLAN
M6.1 3/8"=1'-0"

2 NEW GEN#3 CHARGE AIR COOLING SYSTEM RIGHT SIDE ELEVATION
M6.1 1/2"=1'-0"

3 NEW GEN#3 CHARGE AIR COOLING SYSTEM LEFT SIDE ELEVATION
M6.1 1/2"=1'-0"



4 TYPICAL CHARGE AIR FLEX
M6.1 NO SCALE

5 TUBING SUPPORT FROM CEILING
M6.1 NO SCALE

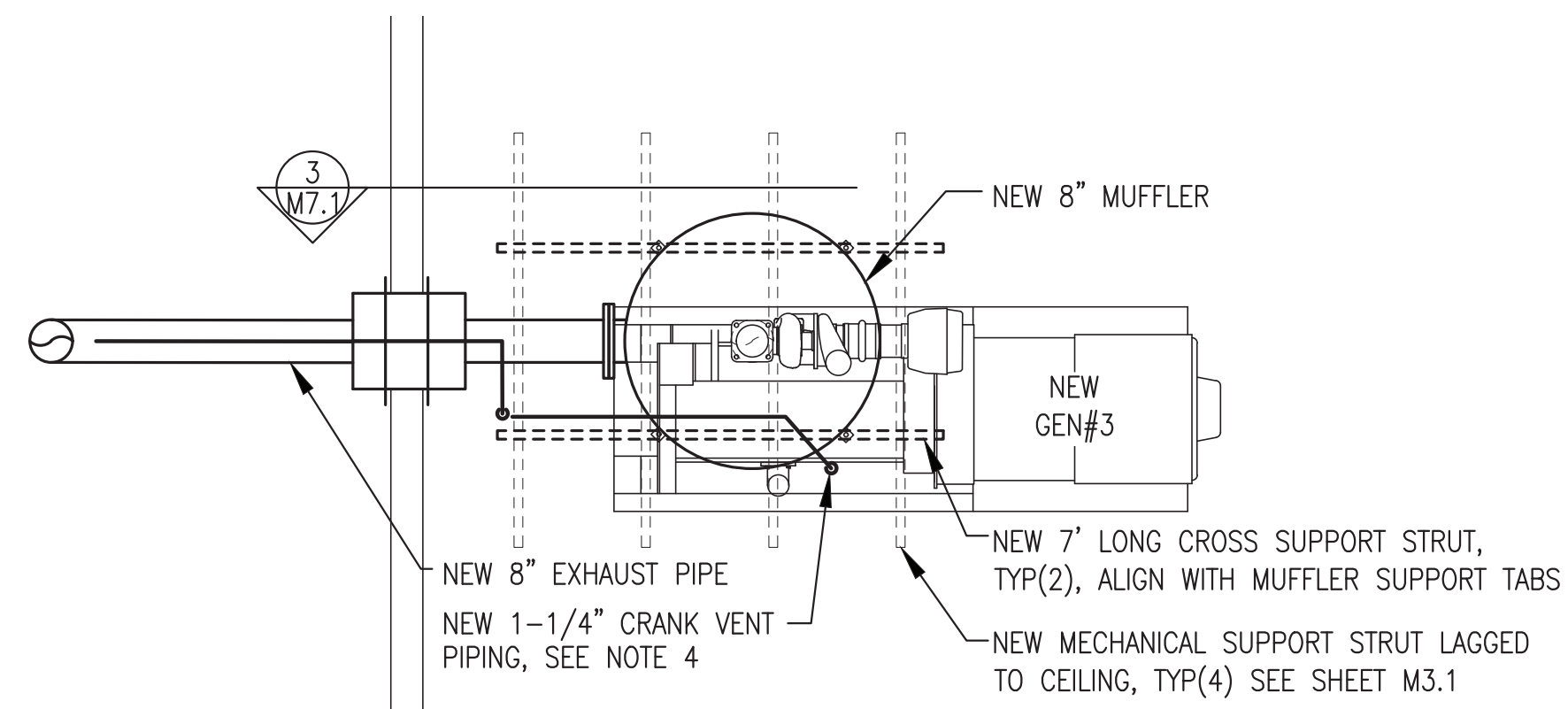
6 NEW CAC #3/ TUBING CONNECTIONS
M6.1 1"=1'-0"

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MAY 2025

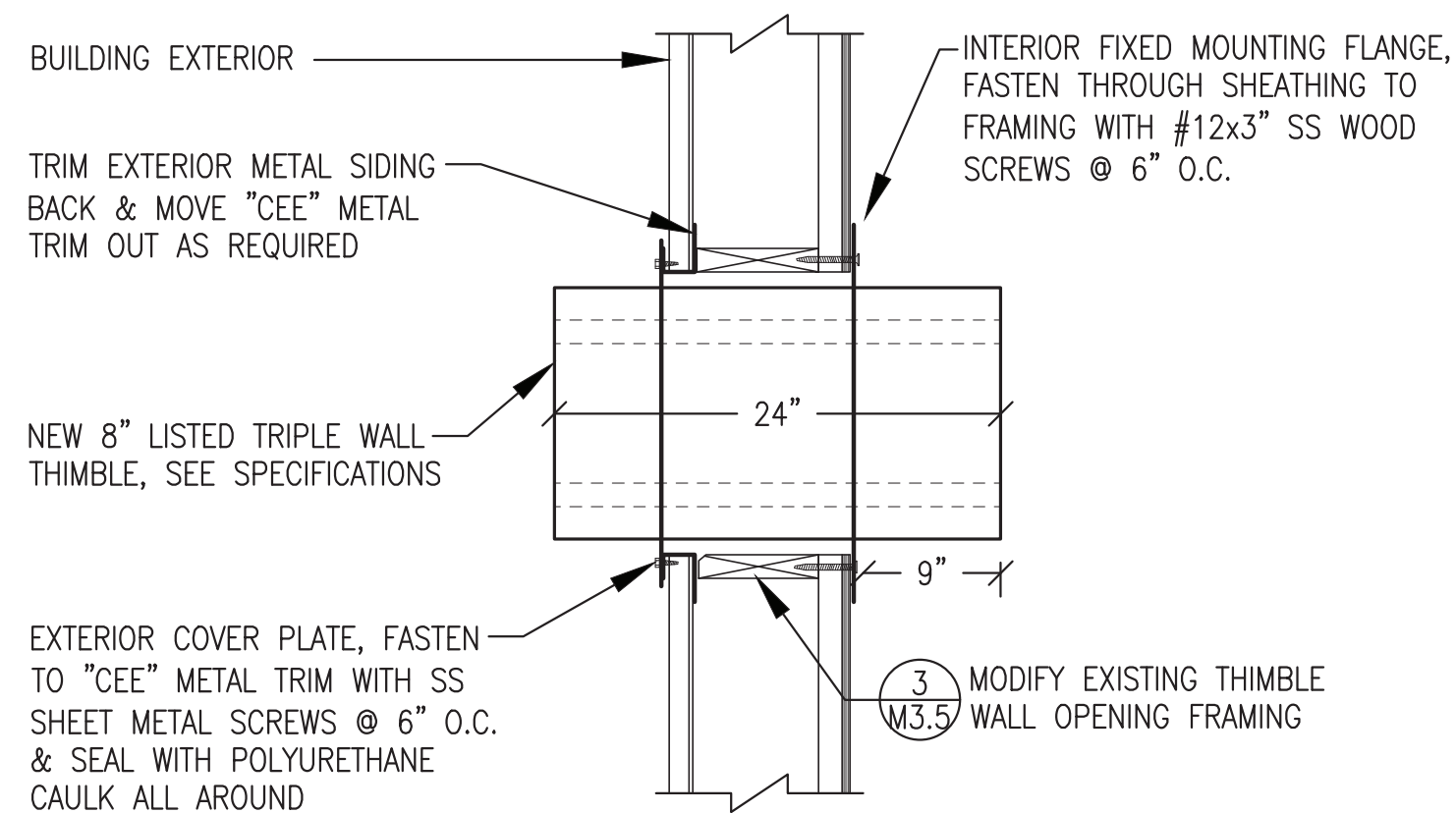


PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: NEW GEN#3 CHARGE AIR COOLING PLAN & DETAILS		
DRAWN BY: JTD	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	DATE: 5/29/25
SHEET: M6.1		

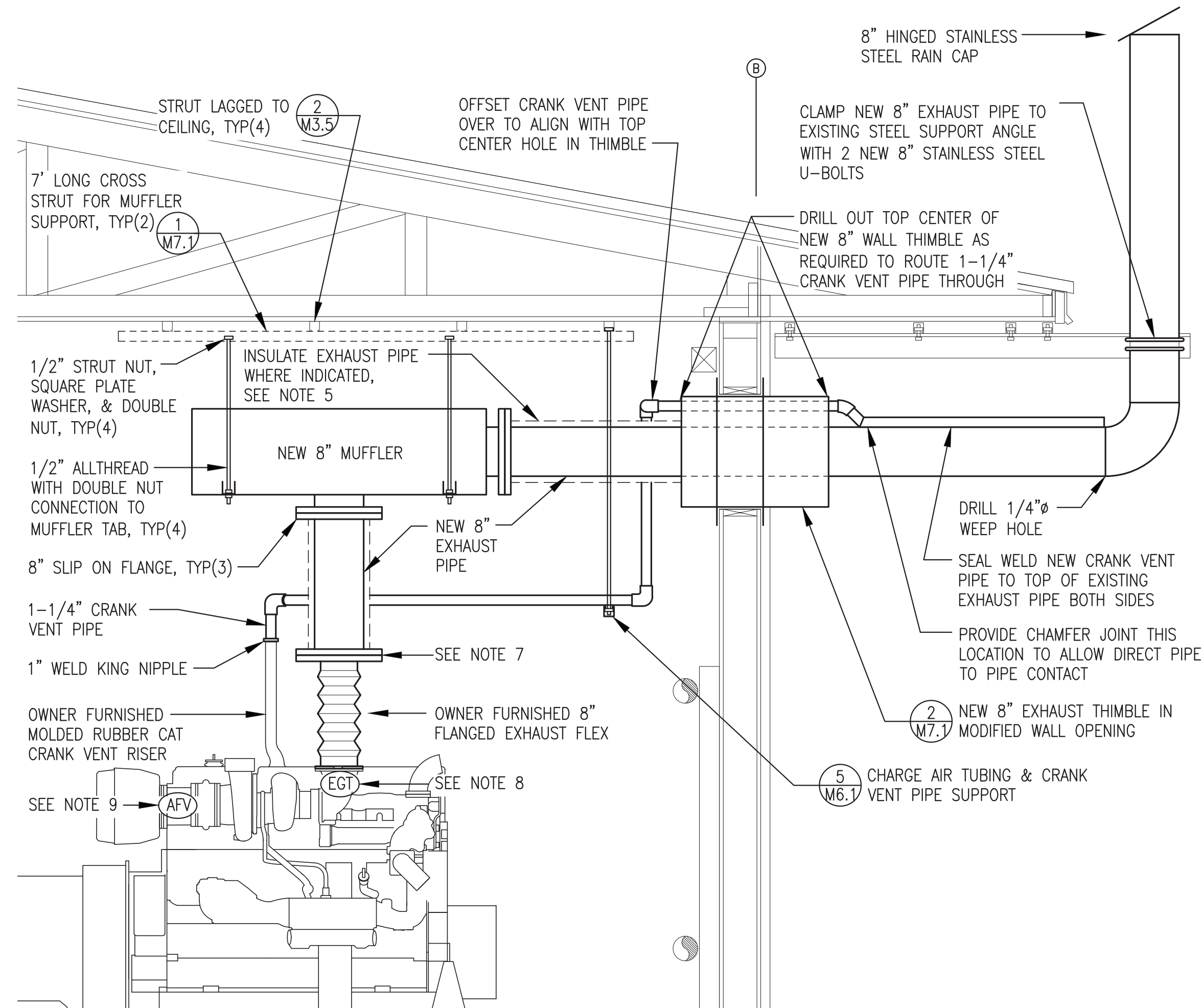




1 NEW GEN#3 EXHAUST & CRANKCASE VENTILATION PIPING PLAN
M7.1 3/8"=1'-0"



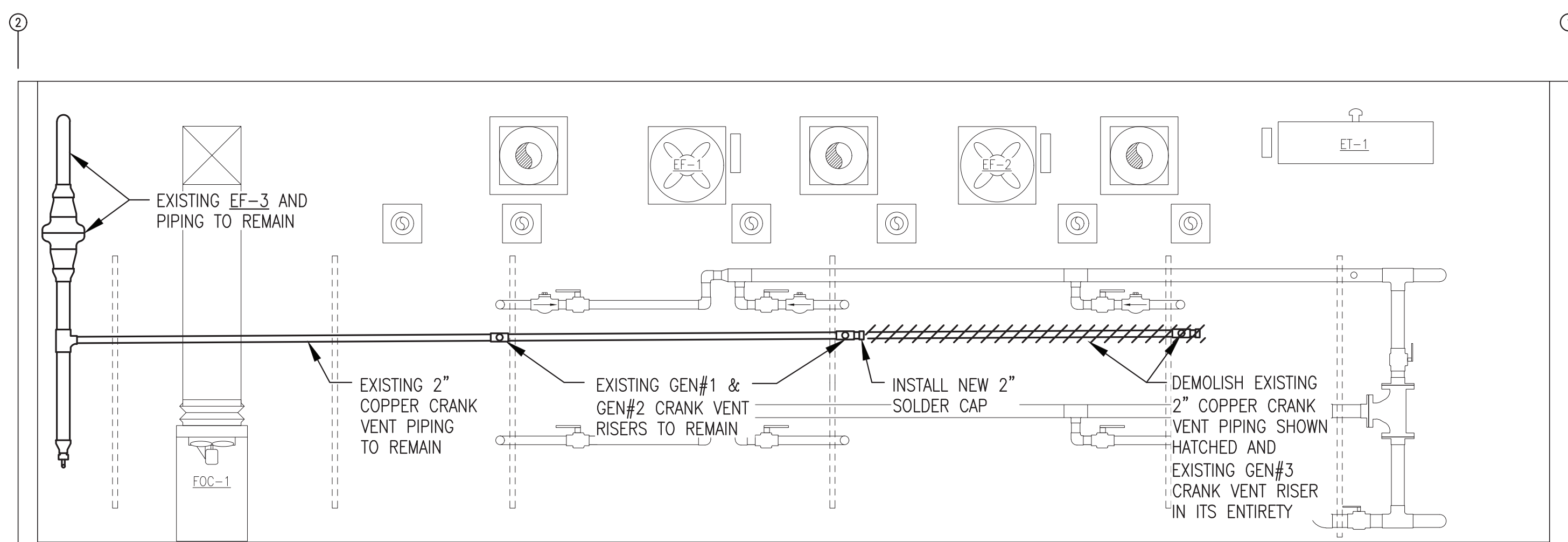
2 NEW GEN#3 EXHAUST THIMBLE INSTALLATION
M7.1 NO SCALE



3 NEW GEN#3 EXHAUST & CRANKCASE VENTILATION ELEVATION
M7.1 3/4"=1'-0"

EXHAUST AND CRANKCASE VENT SYSTEM GENERAL NOTES:

- 1) SEE SHEET M3.4 FOR GENERATOR AND EXHAUST RISER LAYOUT.
- 2) GEN#3 MUFFLER IS NEW, PACKED DISC STYLE, BOTTOM CENTER IN AND SIDE OUT, SIZE AS INDICATED.
- 3) NEW EXHAUST PIPE TO BE ASTM A53B SCH 20 (1/4 WALL) CARBON STEEL. ALL FLANGES ANSI 150# FLAT FACED SLIP-ON. INSTALL HIGH TEMPERATURE FULL FACE GASKETS, GARLOCK 4122-FC OR EQUAL. FASTEN WITH PLAIN CARBON STEEL (BLACK) OR STAINLESS STEEL BOLTS AND NUTS. INSTALL FLAT WASHERS ON BOTH SIDES, DO NOT USE LOCK WASHERS. COAT BOLTS WITH HIGH TEMPERATURE ANTI-SEIZE.
- 4) CRANK VENT PIPING TO BE 1-1/4" A106B SCHEDULE 40 SEAMLESS CARBON STEEL PIPE WITH SOCKET WELD JOINTS EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE.
- 5) INSULATE NEW INTERIOR EXHAUST PIPE WITH 1-1/2" MEDIUM TEMPERATURE RIGID INSULATION WITH ALUMINUM JACKET FROM FLEX TO MUFFLER AND FROM MUFFLER TO THIMBLE. INSULATE FLEX INCLUDING TURBO EL AND FLANGE WITH BLANKET INSULATION. SEE SPECIFICATIONS.
- 6) ROUTE CRANK VENT PIPE TO AVOID INTERFERENCE WITH CHARGE AIR TUBING, SEE CHARGE AIR TUBING INSTALLATION SHEET M6.1.
- 7) ENSURE THAT ALL 4 GEN#3 VIBRATION ISOLATORS HAVE BEEN PROPERLY INSTALLED AND ADJUSTED PER DETAIL 5/M3.5 AND THE NEW 8" MUFFLER IS FULLY SUPPORTED IN ITS FINAL POSITION PRIOR TO DETERMINING LENGTH OF EXHAUST RISER. AFTER COMPLETION OF THESE TASKS, FABRICATE THE EXHAUST RISER WITH 1/8" GAP GAP AT FLEX. EVENLY TIGHTEN FLANGE BOLTS TO PLACE FLEX IN TENSION WHEN COLD.
- 8) REINSTALL EXISTING EXHAUST TEMPERATURE RTD SALVAGED DURING DEMOLITION.
- 9) REINSTALL EXISTING AIR CLEANER VACUUM TRANSMITTER SALVAGED DURING DEMOLITION.



BASE BID:
UNDER THE BASE BID A NEW CRANK VENT SYSTEM WILL BE INSTALLED ON GEN#3 ONLY. MODIFY EXISTING CRANK VENT PIPING SYSTEM AS SHOWN IN THIS DETAIL.

ADDITIVE ALTERNATE #1:
UNDER ADDITIVE ALTERNATE #1 A NEW CRANK VENT SYSTEM WILL BE INSTALLED FOR EXISTING GEN#1 AND GEN#2. DEMOLISH THE COMPLETE EXISTING CRANK VENT SYSTEM, INFILL THE EXISTING WALL PENETRATION, AND SEAL WEATHER TIGHT INSIDE AND OUT.

4 EXISTING CRANK VENT SYSTEM MODIFICATION ELEVATION
M7.1 NO SCALE

REV#1
ISSUED
JULY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: NEW GEN#3 EXHAUST & CRANK VENT PLAN & DETAILS		
DRAWN BY: JTD	DESIGNED BY: BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	SHEET: M7.1
P.O. 111405, Anchorage, AK 99511 (907)349-0100		

2025 M&I PROJECT DESIGN DRAWINGS	
E1.0	LEGEND & SCHEDULES
E3.3	ELECTRICAL DEMOLITION PLAN
E3.4	ELECTRICAL NEW WORK PLAN
E3.5	GEN#3 INSTALLATION ELEVATION & DETAILS
E6.1	SWITCHGEAR MODIFICATION ONE-LINE DIAGRAM
E6.2	SWITCHGEAR SETING TABLE & SEQUENCE OF OPERATIONS SUMMARY
E6.3	RADIATOR VFD REPLACEMENT WIRING
E6.4	CHARGE AIR COOLER VFD REPLACEMENT WIRING
E6.5	GEN#3 ENGINE WIRING J-BOX LAYOUT & BILL OF MATERIALS
E6.6	GEN#3 ENGINE WIRING J-BOX WIRING DIAGRAM & SWITCHGEAR INTERCONNECT
E7.1	EXISTING FUEL SYSTEM CONTROL PANEL LOGIC MODIFICATIONS FOR FUEL POLISHING FUNCTION

REFERENCE 2011 RECORD DRAWINGS FROM ORIGINAL PLANT CONSTRUCTION	
E1	SITE PLAN & SCHEDULE OF DRAWINGS
E2	SPECIFICATIONS & EQUIPMENT SCHEDULE
E3.1	POWER & CONTROL PLANS & DETAILS
E3.2	WIREWAY PLAN, DATA/COMMUNICATION PLAN, & DETAILS
E4	LIGHTING/RECEPTACLE PLAN & DETAILS
E5	STATION SERVICE PLAN, PANEL, & DETAILS
E6	SWITCHGEAR DETAILS
E7	FUEL SYSTEM CONTROL PANEL 3-LINE DIAGRAM & OIL BLENDER LOGIC
E8	FUEL SYSTEM CONTROL PANEL VFD LOGIC
E9	FUEL SYSTEM CONTROL PANEL DAY TANK FILL LOGIC
E10	FUEL SYSTEM CONTROL PANEL LAYOUT & BILL OF MATERIALS

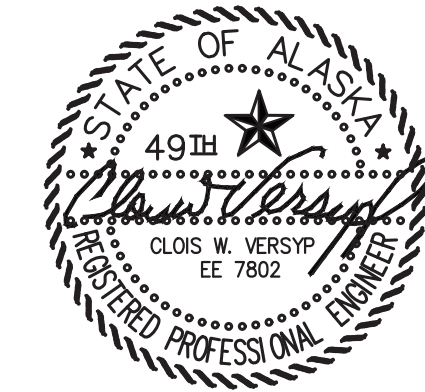
WIRING & DEVICE SYMBOL LEGEND	
SYMBOL	DESCRIPTION
SS-## 	HOME RUN TO PANEL & BREAKER(S) INDICATED. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL CONDUCTOR, CURVED DASH INDICATES GROUND CONDUCTOR. IF NOT SPECIFICALLY INDICATED, PROVIDE 2#12 AWG & 1#12 AWG GROUND.
	ELECTRICAL ITEM - SEE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

EXISTING INSTRUMENTATION LEGEND		
SYMBOL	SERVICE/FUNCTION	MANUFACTURER/MODEL
	SALVAGED GEN#3 INTAKE AIR TEMPERATURE TRANSMITTER	NOSHOK 800-20/240-1-1-8-8-025-6
	SALVAGED GEN#3 EXHAUST GAS TEMP RTD	EUSTIS RGB7B203B02X0 WITH NS44 ADAPTER, DEUTZ DT06-2S-E008 & DT04-2P-E008 CONNECTORS
	SALVAGED GEN#3 AIR FILTER VACUUM TRANSMITTER	NOSHOK 100-30V-1-1-2-7

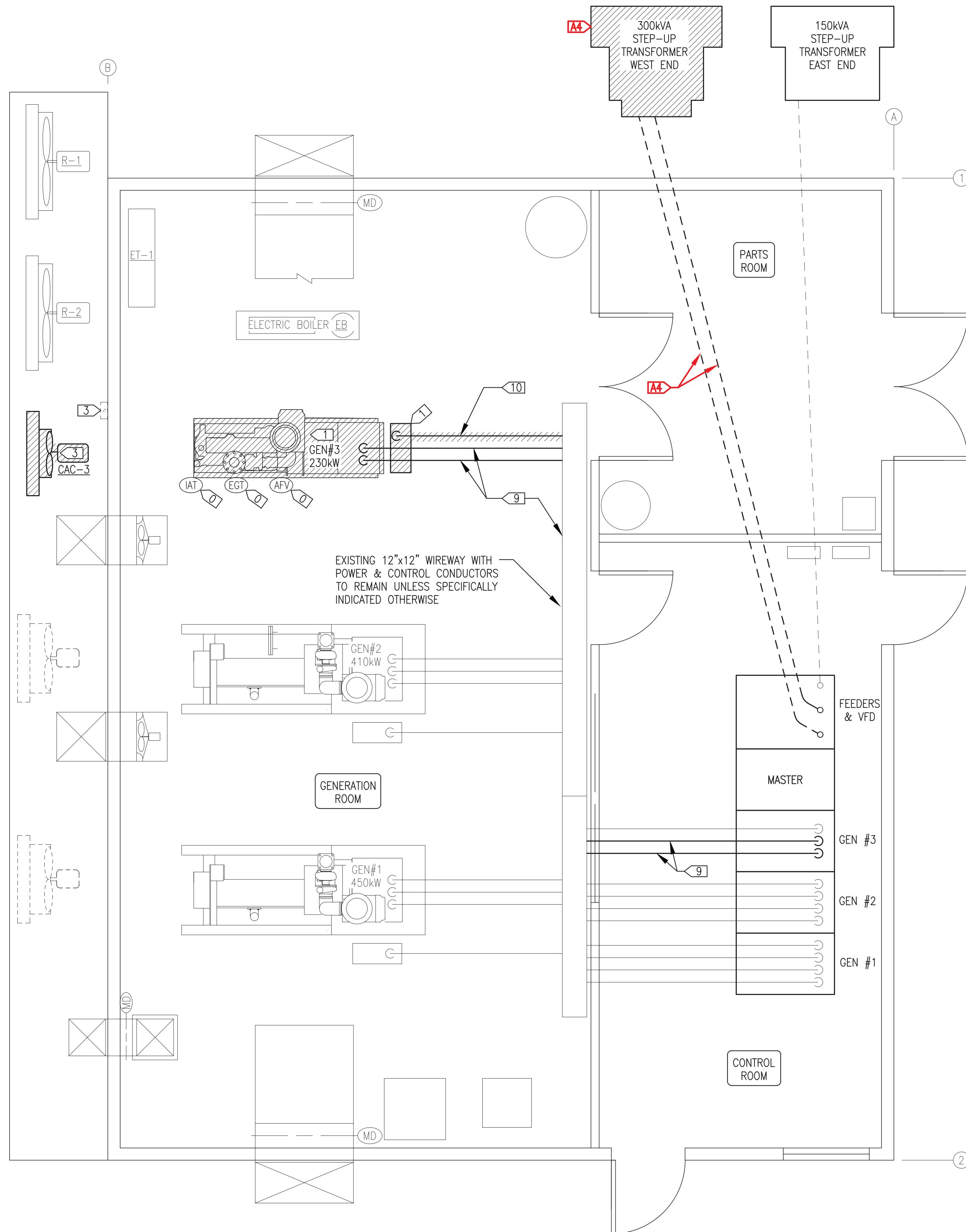
ELECTRICAL CONDUCTOR SCHEDULE			
SERVICE/FUNCTION	DESCRIPTION	MANUFACTURER/MODEL	NOTES:
NEW GENERATOR & TRANSFORMER 480V POWER CONDUCTORS	HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, TIN COATED COPPER CONDUCTOR, THERMOSET EPDM INSULATION, UL 3340/3374, MINIMUM 600V, LISTED 150°C FOR NON-FLEXING	COBRA CABLE, 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 XHHW2 INSULATION, 600V AND 90C RATED.		
SHIELDED/TWISTED INSTRUMENT & CONTROL & CANBUS CONDUCTORS	#18 AWG STRANDED TINNED COPPER CONDUCTORS, 600V POLYETHYLENE INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE & PVC OUTER JACKET	BELDEN PART #'S SINGLE PAIR: #1120A FOUR PAIR: #1049A	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY.
EHTERNET (CAT5e) COMMUNICATION CONDUCTORS	SOLID BARE COPPER CONDUCTORS, 300V FEP INSULATION & JACKET, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH STRANDED TINNED COPPER DRAIN WIRE	FOUR PAIR #24 BELDEN 1585LC	GROUND SHIELD DRAIN WIRE AT PANEL END ONLY. ROUTE ALL DEVICENET & CAT5e CABLES IN SEPARATE DEDICATED RACEWAY.
UNLESS INDICATED OTHERWISE ALL CONDUCTORS SHALL USE THE FOLLOWING COLOR CODE: 480-VOLT POWER (PHASE) CONDUCTORS PHASE A: BROWN PHASE B: ORANGE PHASE C: YELLOW 120/208-VOLT POWER (PHASE) CONDUCTORS PHASE A: BLACK PHASE B: RED PHASE C: BLUE NEUTRAL: WHITE, NO EXCEPTIONS GROUND: GREEN OR BARE, NO EXCEPTIONS 24 VOLT DC CONDUCTORS +24VDC: RED or RED W/GRAY STRIPE -24VDC: BLACK or BLACK W/GRAY STRIPE CONTROL AND INSTRUMENT CONDUCTORS MAY BE COLOR CODED PER MANUFACTURER'S STANDARD		NOTES: 1) COLOR CODING FOR NO. 6 AWG AND SMALLER CONDUCTORS SHALL BE BY USING CONDUCTORS WITH CONTINUOUS COLOR EMBEDDED IN THE INSULATION. 2) COLOR CODING FOR CONDUCTORS LARGER THAN NO. 6, SHALL BE BY: A) CONTINUOUS COLOR EMBEDDED IN THE INSULATION, OR B) BLACK CABLE WITH SCOTCH 35 OR APPROVED EQUAL MARKING (PHASE) TAPE. AT EVERY ACCESSIBLE LOCATION A MINIMUM 3" LONG SECTION OF CONDUCTOR SHALL BE SPIRAL WRAPPED. NOTE THAT PHASE TAPE MAY NOT BE USED ON COLORED CABLE, BLACK CABLE ONLY. 3) 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.	

ENGINE GENERATOR SCHEDULE	
GENSET	DESCRIPTION
GEN #1 (EXISTING)	ENGINE - 450 EKW PRIME RATED, CATERPILLAR 3456 WITH WET MANIFOLD MARINE CONVERSION. 24 VDC STARTING & CONTROL. GENERATOR - 540 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434E.
GEN #2 (EXISTING)	ENGINE - 410 EKW PRIME RATED, CATERPILLAR 3456 WITH WET MANIFOLD MARINE CONVERSION. 24 VDC STARTING & CONTROL. GENERATOR - 470 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434D.
GEN #3 (NEW THIS PROJECT)	ENGINE - 450 EKW PRIME RATED, CATERPILLAR 3456 WITH DRY STOCK MANIFOLD. 24 VDC STARTING & CONTROL. GENERATOR - 540 KW CONTINUOUS AT 105°C RISE, NEWAGE/STAMFORD HC1434E.

ISSUED FOR
CONSTRUCTION
MAY 2025



ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: LEGEND & SCHEDULES		
DRAWN BY: JTD	DESIGNED BY: CWV/BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	SHEET: E1.0
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



ELECTRICAL DEMOLITION GENERAL NOTES:

- 1) THIS PLANT PROVIDES PRIME POWER TO THE COMMUNITY OF KWETHLUK. KEEP OUTAGES TO A MINIMUM AND COORDINATE ALL REQUIRED OUTAGES WITH THE UTILITY. SEE LIMITED POWER OUTAGE NOTES THIS SHEET.
- 2) ALL ITEMS TO REMAIN UNLESS SPECIFICALLY INDICATED FOR DEMOLITION OR TEMPORARY REMOVAL. EXISTING EQUIPMENT AND DEVICES TO BE REMOVED INDICATED BY HATCHING. SEE SPECIFIC NOTES FOR FINAL DISPOSITION OF EXISTING EQUIPMENT TO BE REMOVED WHETHER IT BE DEMOLITION FOR PERMANENT REMOVAL FROM PLANT OR TEMPORARY REMOVAL FOR SALVAGE AND FUTURE REINSTALLATION.
- 3) ONLY MAJOR DEMOLITION ITEMS AND AREAS SHOWN THIS SHEET. REMOVAL OF SMALL EQUIPMENT, COMPONENTS, AND FITTINGS AS REQUIRED FOR MISCELLANEOUS UPGRADES OR LIKE KIND REPLACEMENT SHOWN WITH NEW WORK PLANS AND/OR ON DETAILS.
- 4) TAKE ALL PRECAUTIONS TO MINIMIZE DAMAGE TO GENERATION EQUIPMENT BEING REMOVED DURING DEMOLITION. TARP GENERATORS AND SEAL ALL EXPOSED CONNECTIONS PRIOR TO REMOVING FROM PLANT. TURN ALL REMOVED EQUIPMENT OVER TO THE UTILITY FOR FINAL DISPOSITION.
- 5) 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.

ELECTRICAL DEMOLITION SPECIFIC NOTES:

- 0) PRIOR TO BEGINNING DEMOLITION CAREFULLY DISCONNECT AND REMOVE EXISTING EXHAUST GAS TEMPERATURE RTD, AIR INTAKE VACUUM TRANSMITTER, AND INTAKE AIR TEMPERATURE TRANSMITTER. COORDINATE WITH MECHANICAL. SALVAGE ALL THREE DEVICES FOR REUSE IN NEW GEN#3. TAPE ENDS OF CONDUCTORS AND COIL IN SAFE LOCATION FOR RECONNECTION.
- 1) REMOVE EXISTING GEN#3 AND ENGINE WIRING J-BOX FROM PLANT IN ITS ENTIRETY AND TURN OVER TO UTILITY.
- 2) SEE MECHANICAL.
- 3) REMOVE EXISTING CHARGE AIR COOLER CAC-3 AND TURN OVER TO UTILITY. COORDINATE WITH MECHANICAL. EXISTING CONDUIT, CONDUCTORS, AND DISCONNECTS TO REMAIN FOR CONNECTION TO NEW. TAPE ENDS OF CONDUCTORS AND COIL IN SAFE LOCATION FOR RECONNECTION.
- 4) THROUGH 7) SEE MECHANICAL.
- 8) SEE ELECTRICAL NEW WORK PLAN
- 9) TWO EXISTING OVERHEAD 3" EMT CONDUIT TO REMAIN. CAREFULLY REMOVE EXISTING 4 EA. #2/0 PHASE CONDUCTORS & 1 EA. #4G IN THEIR ENTIRETY. SALVAGE #2/0 FOR POSSIBLE REUSE IN WEST END TRANSFORMER FEEDER. SEE NEW WORK 13)
- 10) PRIOR TO REMOVING EXISTING GEN#3 AND ENGINE WIRING, CAREFULLY DISCONNECT ALL CONTROL CONDUCTORS, PULL BACK THROUGH EXISTING 1-1/2" EMT INTO 12x12 WIREWAY, TAPE ENDS, AND TEMPORARILY COIL IN WIREWAY TO PROTECT FROM DAMAGE. AFTER REMOVING ALL CONTROL CONDUCTORS, DEMOLISH 1-1/2" EMT BACK TO 10x10 WIREWAY AND PLUG HOLE IN SIDE OF WIREWAY.
- 11) THROUGH 14) SEE ELECTRICAL NEW WORK PLAN.

ELECTRICAL NEW WORK SPECIFIC NOTES (ADDITIVE ALTERNATES):

- A1) SEE MECHANICAL.
- A2) SEE ELECTRICAL NEW WORK PLAN.
- A3) SEE ELECTRICAL NEW WORK PLAN.
- A4) UNDER ADDITIVE ALTERNATE #4 REPLACE WEST END STEP UP TRANSFORMER AND FEEDER CONDUCTORS AS FOLLOWS:
 REMOVE EXISTING 300kVA PADMOUNT TRANSFORMER. EXISTING GROUND SLEEVE TO REMAIN. SEE SHEET E3.5.
 TWO EXISTING UNDERSLAB 3" PVC CONDUIT TO REMAIN. CAREFULLY REMOVE EXISTING #3/0 POWER CONDUCTORS IN THEIR ENTIRETY AND TURN OVER TO THE UTILITY.

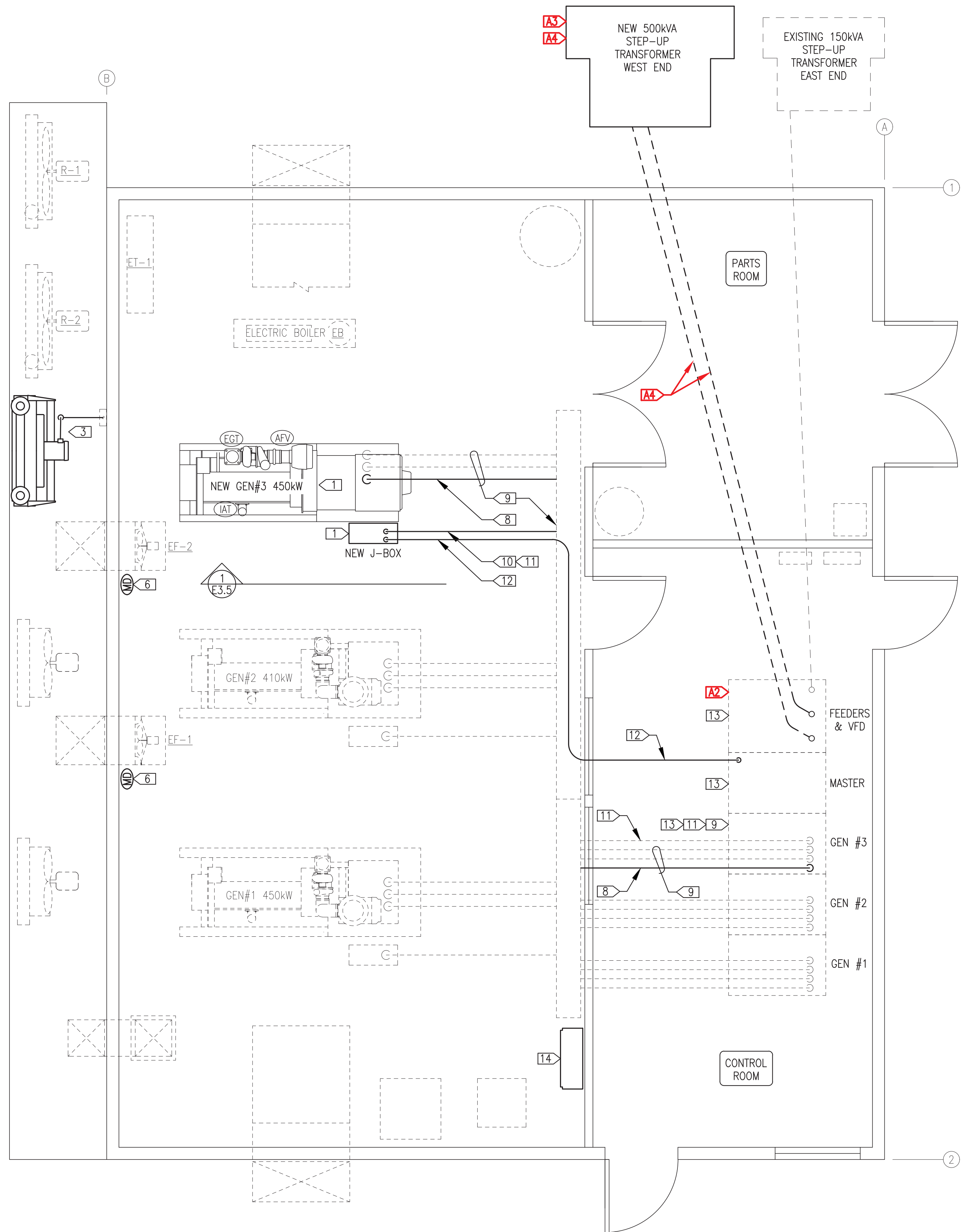
LIMITED POWER OUTAGE NOTES:

- 1) SCHEDULE ALL REQUIRED OUTAGES IN ADVANCE WITH THE UTILITY.
- 2) THIS PROJECT REQUIRES MODIFICATIONS TO THE EXISTING COOLANT SYSTEM PIPING THAT WILL REQUIRE AN OUTAGE FOR THE SYSTEM TO BE DRAINED DOWN. ALL TASKS REQUIRING THE COOLING SYSTEM TO BE DRAINED MUST BE SCHEDULED SIMULTANEOUSLY TO LIMIT TO ONE EXTENDED POWER OUTAGE. IN ORDER TO LIMIT OUTAGE DURATION, PLAN WORK AND PREFABRICATE PARTIAL ASSEMBLIES TO THE MAXIMUM EXTENT POSSIBLE. THE TOTAL SHUT DOWN MUST NOT EXCEED EIGHT HOURS INCLUDING DRAIN DOWN, ALL PIPING MODIFICATIONS, REFILLING THE SYSTEM, AND PLACING A GENERATOR BACK IN SERVICE.
- 3) THIS PROJECT REQUIRES REPLACEMENT OF CURRENT TRANSFORMERS AND TERMINATION OF NEW POWER CONDUCTORS IN THE SWITCHGEAR THAT WILL REQUIRE AN OUTAGE. ALL SWITCHGEAR MODIFICATION TASKS REQUIRING AN OUTAGE MUST BE SCHEDULED SIMULTANEOUSLY TO LIMIT TO ONE EXTENDED POWER OUTAGE. IN ORDER TO LIMIT OUTAGE DURATION, PLAN AND PREPARE WORK. THE TOTAL SHUT DOWN MUST NOT EXCEED EIGHT HOURS.
- 4) OTHER TASKS MAY REQUIRE ADDITIONAL OUTAGES. KEEP THESE OUTAGES AS SHORT AS POSSIBLE.
- 5) ADDITIVE ALTERNATE #1 OF THIS PROJECT REQUIRES REPLACEMENT OF THE WEST FEEDER STEP UP TRANSFORMERS AND TERMINATION OF NEW POWER CONDUCTORS IN THE SWITCHGEAR THAT WILL REQUIRE AN OUTAGE OF AT LEAST A PORTION OF THE COMMUNITY. IN ORDER TO LIMIT OUTAGE DURATION, PLAN AND PREPARE WORK. THE TOTAL SHUT DOWN MUST NOT EXCEED EIGHT HOURS

REV#1
 ISSUED
 JULY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: ELECTRICAL DEMOLITION PLAN & NOTES		
DRAWN BY: JTD	DESIGNED BY: CWV/BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	DATE: 5/29/25
P.O. 111405, Anchorage, AK 99511 (907)349-0100		SHEET: E3.3



ELECTRICAL NEW WORK GENERAL NOTES:

- 1) EXISTING EQUIPMENT AND RACEWAYS TO REMAIN IN SERVICE SHOWN WITH LIGHT DASHED LINES.
- 2) NEW/SALVAGED EQUIPMENT AND RACEWAYS TO BE INSTALLED OR MODIFIED SHOWN WITH DARK SOLID LINES.
- 3) NOT ALL EQUIPMENT AND RACEWAYS SHOWN. SEE ATTACHED RECORD DRAWINGS OF ORIGINAL POWER PLANT CONSTRUCTION FOR ADDITIONAL DETAIL ON SYSTEMS NOT BEING MODIFIED.
- 4) OWNER FURNISHED GEN#3 WILL BE SHOP ASSEMBLED. SEE ENGINE-GENERATOR SPECIFICATIONS AND SHEET M3.6 FOR DETAILS.
- 5) TERMINATE ALL EX-FLEX CABLE WITH COMPRESSION LUGS RATED FOR FULL CABLE AMPACITY AT 150°C.

ELECTRICAL NEW WORK SPECIFIC NOTES (BASE BID):

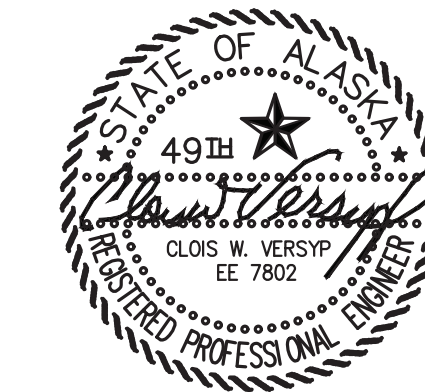
- 1) INSTALL NEW GEN#3, J-BOX. REINSTALL SALVAGED EXHAUST RTD, AIR INTAKE VACUUM TRANSMITTER, AND INTAKE AIR TEMPERATURE TRANSMITTER AND CONNECT TO J-BOX. SEE SHEET E3.5. COORDINATE WITH MECHANICAL.
- 2) SEE MECHANICAL.
- 3) INSTALL NEW CHARGE AIR COOLER CAC-3 AND RECONNECT EXISTING POWER CONDUCTORS. SEE SHEET E3.5.
- 4) THROUGH 5) SEE MECHANICAL.
- 6) CONNECT EXISTING CONDUCTORS TO NEW MOTORIZED DAMPER ON EXISTING EXHAUST FAN, TYP(2). COORDINATE WITH MECHANICAL.
- 7) SEE MECHANICAL.
- 8) INSTALL NEW 3" EMT CONDUIT FROM EXISTING WIREWAY AT GEN#3 AND ABOVE SWITCHGEAR FOR NEW RUN OF POWER CONDUCTORS. SEE SHEET E3.5.
- 9) INSTALL 3 NEW RUNS OF 4#3/0, #2G 150°C EX-FLEX CONDUCTOR IN 3" EMT AND 12x12 WIREWAY BETWEEN GEN#3 AND SWITCHGEAR. CONNECT TO GEN#3 AND SWITCHGEAR.
- 10) INSTALL NEW 1-1/2" CONDUIT FROM NEW GEN#3 J-BOX IN NEW LOCATION TO 12x12 WIREWAY. SEE SHEET E3.5.
- 11) REINSTALL EXISTING CONTROL CONDUCTORS AND PROVIDE 4 EACH NEW #18 SHIELDED PAIRS IN 1-1/2" CONDUIT AND 12x12 WIREWAY BETWEEN GEN#3 J-BOX AND SWITCHGEAR. SEE SWITCHGEAR INTERCONNECT DIAGRAM SHEET E6.6 AND SWITCHGEAR RECORD DRAWING MARKUPS FOR CONDUCTOR COUNT AND TERMINATIONS.
- 12) PROVIDE NEW 3/4" EMT WITH NEW CAT5e CABLE FROM NEW GEN#3 J-BOX TO EXISTING SWITCHGEAR MASTER SECTION. SEE SWITCHGEAR INTERCONNECT DIAGRAM SHEET E6.6 AND SWITCHGEAR RECORD DRAWING MARKUPS FOR TERMINATIONS.
- 13) INSTALL NEW DEVICES, MODIFY DEVICES AND SETTINGS, AND PROGRAM DEVICES AS REQUIRED FOR INTEGRATION OF NEW GEN#3 AND WEST FEEDER TRANSFORMER. SEE SHEET E6.1 AND ATTACHED SWITCHGEAR RECORD DRAWINGS MARKUPS.
- 14) MODIFY EXISTING FUEL SYSTEM CONTROL PANEL WIRING AS REQUIRED TO PROVIDE ENHANCED WATER REMOVAL "POLISHING" FUNCTION. SEE SHEET E7.1.

ELECTRICAL NEW WORK SPECIFIC NOTES (ADDITIVE ALTERNATES):

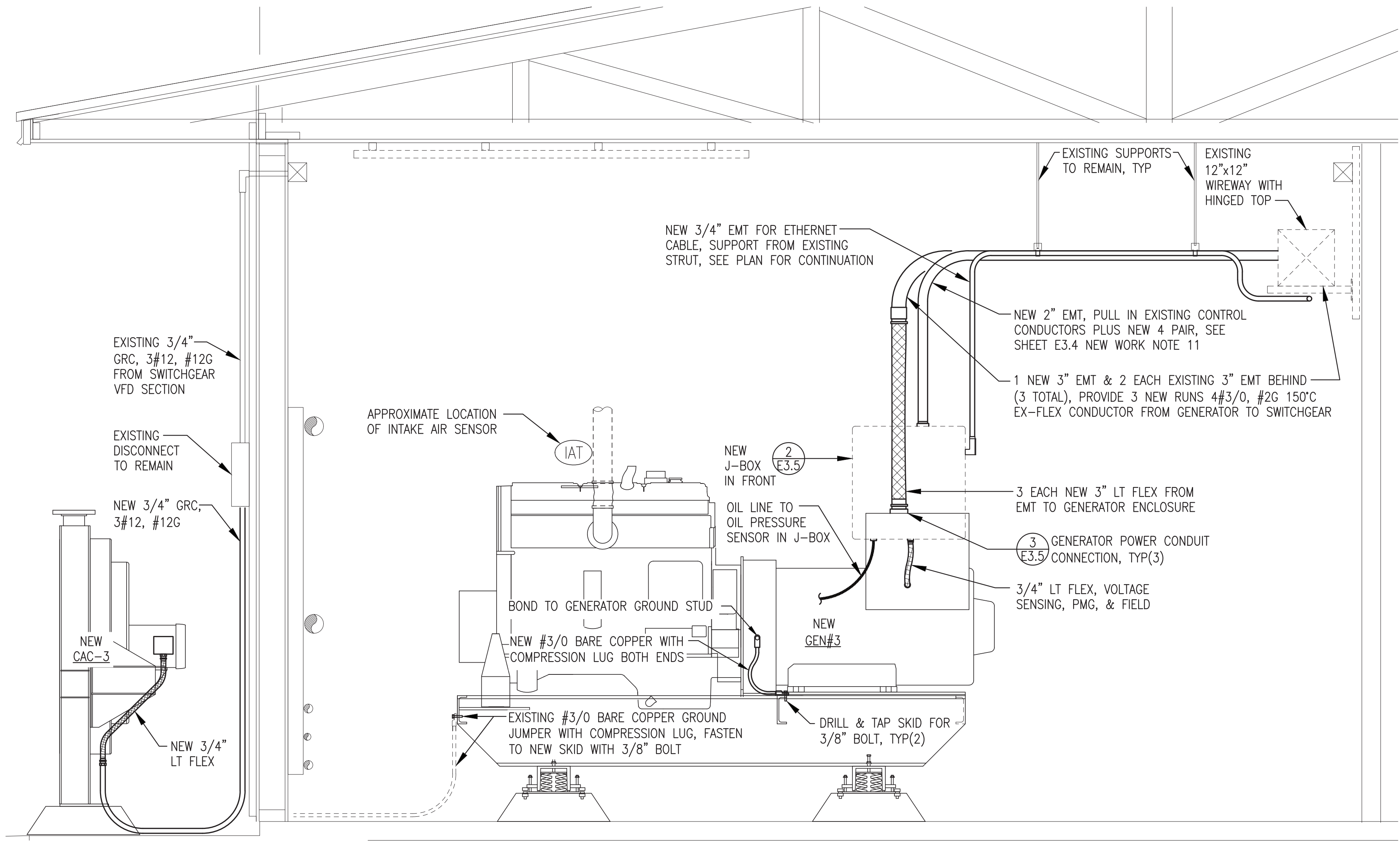
- A1) SEE MECHANICAL.
- A2) UNDER ADDITIVE ALTERNATE #2 REPLACE TWO EACH RADIATOR AND THREE EACH CHARGE AIR COOLER VARIABLE FREQUENCY DRIVES (VFD's) IN SWITCHGEAR, FIVE TOTAL. SEE SHEETS E6.3, E6.4 AND SWITCHGEAR RECORD DRAWING MARKUPS.
- A3) MOBILIZE 500kVA WEST END STEP UP TRANSFORMER FROM ANCHORAGE TO KWETHLUK.
- A4) UNDER ADDITIVE ALTERNATE #4 REPLACE WEST END STEP UP TRANSFORMER AND FEEDER CONDUCTORS AS FOLLOWS:
INSTALL NEW 500kVA PADMOUNT TRANSFORMER ON EXISTING GROUND SLEEVE. SEE SHEET E3.5.

TWO EXISTING UNDERSLAB 3" PVC CONDUIT. PULL 8#2/0, #2G 150°C EX-FLEX CONDUCTORS IN EACH CONDUIT (16#2/0, 2#2G TOTAL) FOR TRANSFORMER FEEDER. CONNECT TO TRANSFORMER AND SWITCHGEAR. NOTE THAT 4#2/0 SALVAGED FROM EXISTING GEN#3 DEMOLITION MAY BE RE-USED FOR ONE RUN AT CONTRACTOR'S OPTION IF DETERMINED TO BE OF ADEQUATE LENGTH AND IN GOOD CONDITION AFTER REMOVAL.

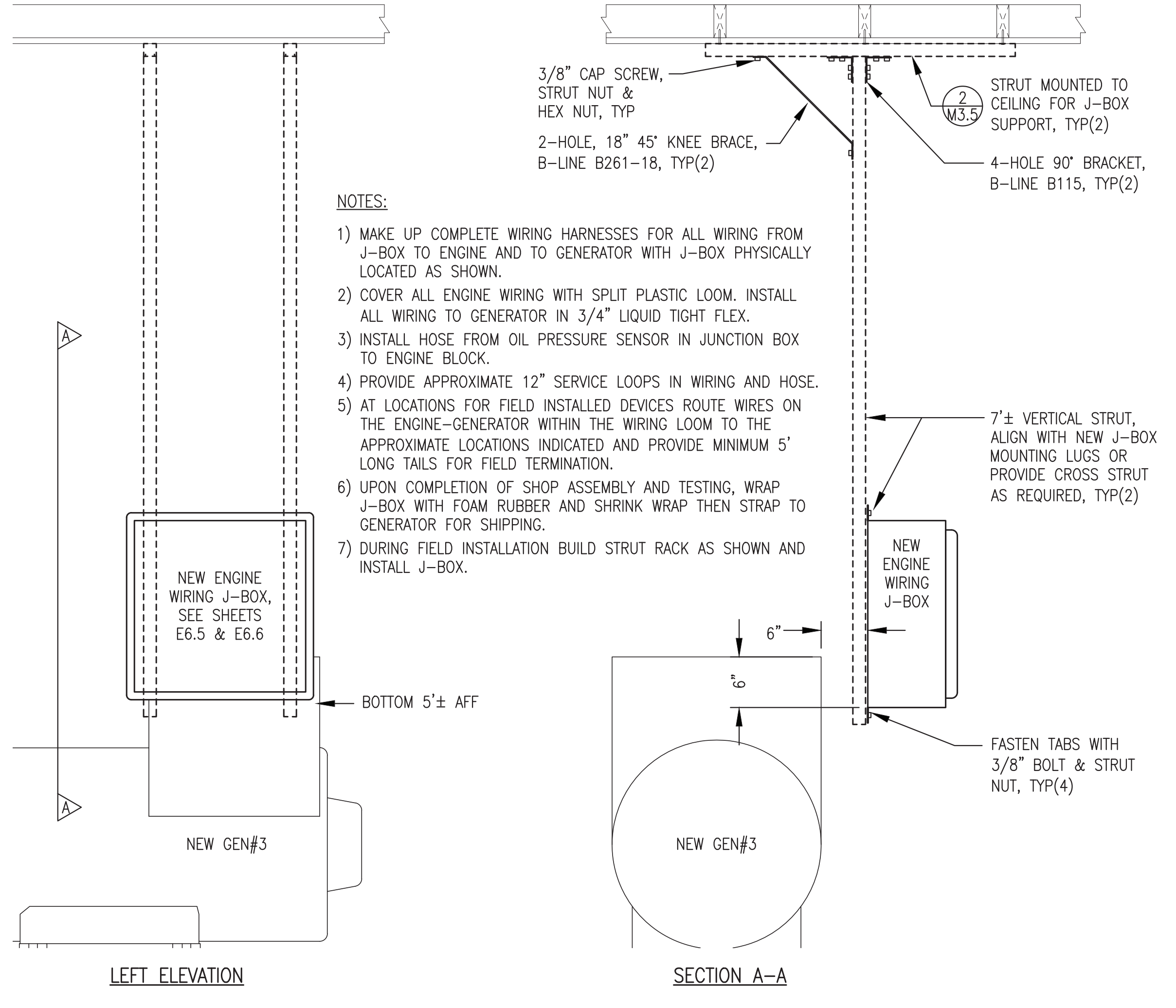
REV#1
ISSUED
JULY 2025



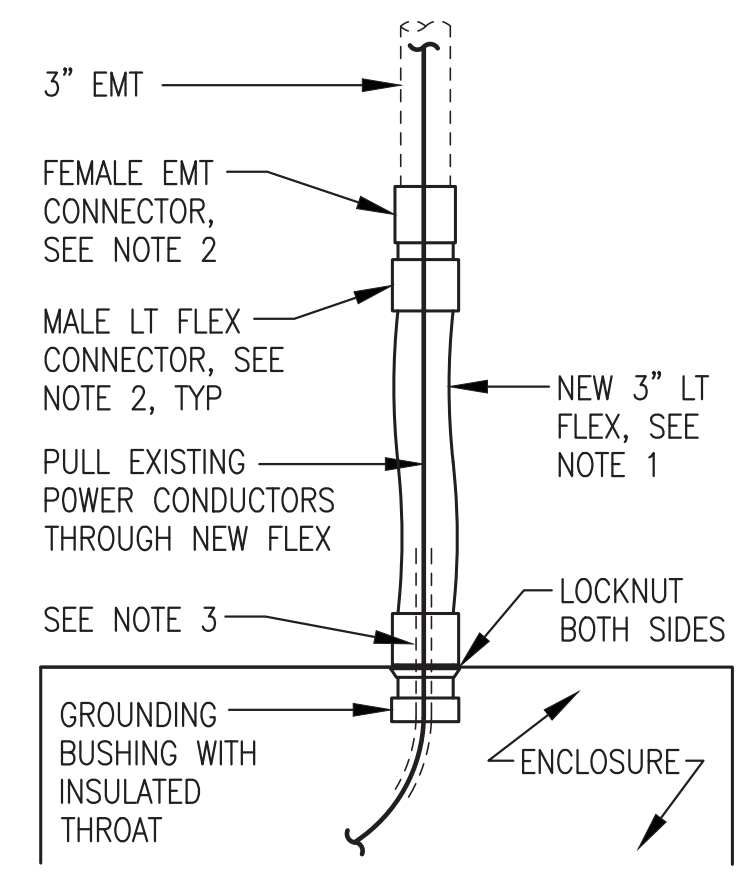
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: ELECTRICAL NEW WORK PLAN & NOTES		
DRAWN BY: JTD	DESIGNED BY: CWV/BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	SHEET: E3.4
P.O. 111405, Anchorage, AK 99511 (907)349-0100		



1 NEW GEN#3 INSTALLATION ELEVATION
E3.5 3/4"=1'-0"

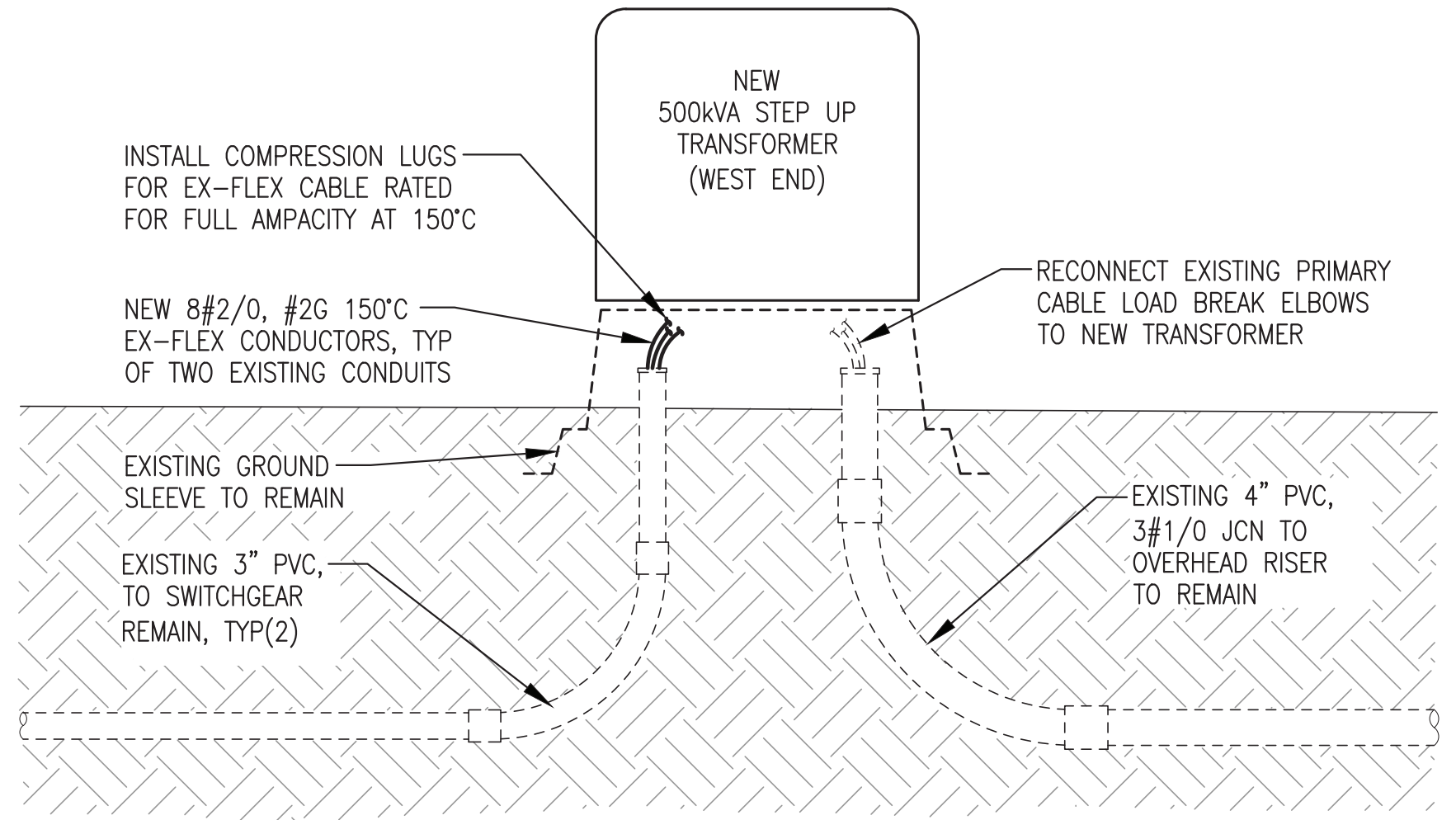


2 NEW ENGINE J-BOX INSTALLATION
E3.5 NO SCALE



- NOTES:**
- 1) ONE CONDUIT CONNECTION SHOWN, PROVIDE THREE IDENTICAL.
 - 2) THE NEW GENERATOR WILL BE TALLER THAN THE EXISTING SO TWO EXISTING 3" LT FLEX CAN BE SALVAGED AND CUT SHORTER ALONG WITH ONE NEW 3" LT FLEX TO MAKE THREE FINAL CONNECTIONS. IT IS ESTIMATED THAT 30"-36" WILL BE REQUIRED FOR EACH CONNECTION.
 - 3) SALVAGE EXISTING FLEX CONNECTORS, EMT CONNECTORS, AND GROUNDING BUSHINGS FROM TWO EXISTING CONNECTIONS DURING DEMOLITION AND REINSTALL WITH NEW AS REQUIRED.
 - 4) PROTECT CABLES FROM WEAR BY INSTALLING 1 EACH 12" LONG LAYER OF HEAT SHRINK, CENTERED IN CONNECTOR.

3 GENERATOR POWER CONDUIT CONNECTION
E3.5 NO SCALE

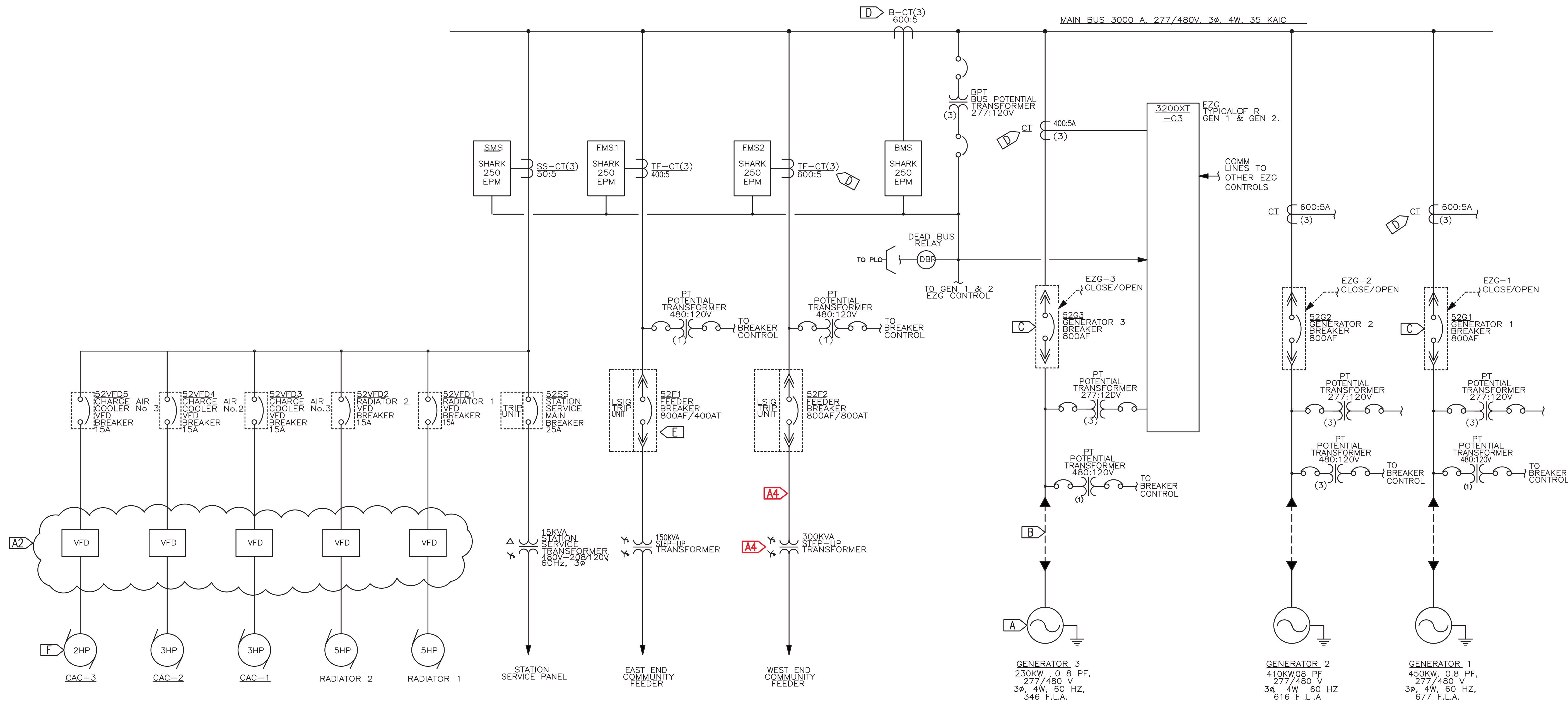


4 NEW 500kVA WEST FEEDER TRANSFORMER INSTALLATION
E3.5 NO SCALE

ISSUED FOR CONSTRUCTION
MAY 2025



ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: GEN#3 INSTALLATION ELEVATION & DETAILS		
DRAWN BY: JTD	SCALE: AS NOTED	DESIGNED BY: CWV/BCG
FILE NAME: KWT 2025 M&I	SHEET: E3.5	PROJECT NUMBER:
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 ADDITIONAL TECHNICAL DATA ON NEW DEVICES AND EQUIPMENT.

SWITCHGEAR MODIFICATION BASE BID SPECIFIC NOTES:

- [A] REMOVE EXISTING 230kW GEN#3. SEE DEMOLITION AND NEW WORK PLANS.
- [B] REMOVE EXISTING GEN#3 POWER CONDUCTORS AND INSTALL 3 EACH RUNS OF NEW 4#3/0, #2G 150C CONDUCTORS. SEE DEMOLITION AND NEW WORK PLANS.
- [C] EXISTING GEN#1 AND GEN#3 BREAKERS ARE CONTROLLED BY THE ASSOCIATED EZGN. SET TRIP TO 800A. SEE SETTINGS TABLE SHEET E6.2.
- [D] REPLACE EXISTING CT WITH NEW 800:5 CT FOR WEST END FEEDER, BUS, GEN#1, AND GEN#3. ITI 110-801 OR APPROVED EQUAL.
- [E] REDUCE THE EAST END FEEDER BREAKER TRIP UNIT CURRENT SETTING FROM 400A TO 250A FOR PROTECTION OF 288A RATED FEEDER CONDUCTORS. SQUARE D MASTERPACT MODEL NT 08 N BREAKER WITH MICROLOGIC MODEL 6.0 A TRIP UNIT.
- [F] REMOVE EXISTING 2HP CAC-3 AND INSTALL NEW 3HP CAC-3. SEE DEMOLITION AND NEW WORK PLANS.

SWITCHGEAR MODIFICATION ADDITIVE ALTERNATE SPECIFIC NOTES:

- [A2] UNDER ADDITIVE ALTERNATE #2 REPLACE TWO EACH RADIATOR AND THREE EACH CHARGE AIR COOLER VARIABLE FREQUENCY DRIVES (VFD'S) IN SWITCHGEAR, FIVE TOTAL. SEE SHEETS E6.3, E6.4 AND SWITCHGEAR RECORD DRAWING MARKUPS.
- [A4] UNDER ADDITIVE ALTERNATE #4 REPLACE WEST END STEP UP TRANSFORMER AND FEEDER CONDUCTORS AS FOLLOWS:
 INSTALL NEW 500KVA PADMOUNT TRANSFORMER ON EXISTING GROUND SLEEVE. SEE SHEET E3.5.
 TWO EXISTING UNDERSLAB 3" PVC CONDUIT. PULL 8#2/0, #2G 150°C EX-FLEX CONDUCTORS IN EACH CONDUIT (16#2/0, 2#2G TOTAL) FOR TRANSFORMER FEEDER. CONNECT TO TRANSFORMER AND SWITCHGEAR. NOTE THAT 4#2/0 SALVAGED FROM EXISTING GEN#3 DEMOLITION MAY BE RE-USED FOR ONE RUN AT CONTRACTOR'S OPTION IF DETERMINED TO BE OF ADEQUATE LENGTH AND IN GOOD CONDITION AFTER REMOVAL.

NOTE: THE SWITCHGEAR WAS UPGRADED IN 2023 AND THE 2023 UPGRADE RECORD DRAWINGS HAVE BEEN REDMARKED TO SHOW DETAILED CHANGES THIS PROJECT. THIS DRAWING SHOWS AN OVERVIEW OF MODIFICATIONS. SEE THE SPECIFICATIONS AND THE SWITCHGEAR RECORD DRAWINGS FOR ADDITIONAL DETAIL.

REV#1
ISSUED
JULY 2025



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: SWITCHGEAR MODIFICATION ONE-LINE DIAGRAM		
	DRAWN BY: JTD	SCALE: AS NOTED
	DESIGNED BY: CWV/BCG	DATE: 5/29/25
	FILE NAME: KWT 2025 M&I	SHEET: E6.1
	PROJECT NUMBER:	
P.O. 111405, Anchorage, AK 99511 (907)349-0100		

Demand Control Table (PLC)				
Demand Control	Generator(s) On Line	On-line kW (Overload)	Level Increase	Level Decrease
Level 1	#2	410	375	---
Level 2	#1 or #3	450	425	350
Level 3	#2 & #1 or #3	860	800	400
Level 4	All	1270	---	750

Note : Gen #1 & #3 are equal capacity. Manually select lead unit.

Engine-Generator Alarm Settings (EZGN Genset Controller)			
Function	Normal Range	Pre-Alarm	Shut Down
Oil Pressure	50-70 PSI	14.5 PSI	10 PSI
Air Filter Vacuum	1-10" H2O	15" H2O	20" H2O
Coolant Temp.	180-200°F	210°F	215°F
Exhaust Temp.	500-900°F	1000°F	-----
Charge Air Temp.	80-120°F	150°F	160°F
Under Frequency	59.5-60.5 Hz	----	58.2 Hz
Over Frequency	59.5-60.5 Hz	----	61.8 Hz
Under Voltage	470-490 V	----	432 V
Over Voltage	470-490 V	----	528 V
Reverse Power	0	----	10%

Generator Breaker Settings (EZGN Genset Controller)	
Function	Setting
Gen #1 Breaker Rated Current	800 A
Gen #2 Breaker Rated Current	600 A
Gen #3 Breaker Rated Current	800 A
Gen Breaker Level 1 (100%) Time Over Current	3 sec.
Gen Breaker Level 2 (120%) Time Over Current	1 sec.
Gen Breaker Level 3 (250%) Time Over Current	0.4 sec.

Feeder Breaker Settings (With On Board Trip Unit)	
Function	Setting
West End Feeder Breaker Rated Current Trip Setting	800A
East End Feeder Breaker Rated Current Trip Setting	250A

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

Charge Air Cooler VFD Settings (Additive Alternate #1)	
Function	Setting
Min PID Feedback	20
Max PID Feedback	240
rSL (Wake UP Threshold)	Not Used
PID Reference Temperature	100°F
Proportional Gain	0.2
Integral Gain	0.1
Derivative	0
Minimum Speed	10 Hz.
Low Speed Timeout	Not Used
Loss of Phase	Ignore

This power plant is designed to operate in automatic mode under control of the Programmable Logic Controller (PLC). Each engine is controlled by an individual Easygen (EZGN) genset controller located in each generator section. Monitoring and control is primarily done through the Operator Interface Unit (OIU). In an emergency such as a failure of the PLC it can also be operated in manual mode. Following are instructions for operating the system. See the O&M Manual for more detailed sequences and operating instructions.

AUTOMATIC OPERATION BLACK START PROCEDURE:

- Temporarily set the System Mode Switch on the master section to MAN. Check the master section for any faults as indicated by the alarm lamps or banners on the EZGN. Correct the cause of the fault (emergency stop, low coolant level, feeder breaker tripped, etc.) Press the ALARM RESET button on the master section and verify that the alarms clear.
- Check each generator section for any faults. For engine-generator related faults correct the cause of the fault (low oil level, high temperature, circuit breaker tripped, etc.). To clear any alarms:
 - Press "STOP" button then press the "HOME" button to get to the main screen.
 - Press the "ALARM" button in the upper right corner. Scroll down to any active alarms and press the "√" button two times to clear each alarm. Press the "HOME" button.
- Place each available generator in service by pressing the EZGN AUTO button. If a generator is out of service for repair, verify the STOP button is illuminated.
- Change the System Mode Switch on the master section to AUTO.
- The PLC will automatically start all generators in AUTO and parallel them to the bus. As soon as the bus is energized the station service power will turn on. Note that the EZGN indicates frequency with a circular arrow, voltage with a '~' symbol, and the 'eye symbol' indicates the EZGN is monitoring alarm functions.
- After the available generators are on line, the PLC will wait for a brief interval (usually 15 seconds) and close feeder breaker #1 then after another brief interval close feeder breaker #2.

AUTOMATIC DEMAND CONTROL OPERATION:

- The Demand Control system will become active after a time delay of about one minute. The PLC will then automatically unload and shutdown any generators that are not needed to meet the community load.
- As the community electric load increases, the PLC will step up to a larger generator and as the load decreases the PLC will step down to a smaller generator. Multiple generators can operate in parallel to meet a peak demand.
- Generators 1 and 3 are equal capacity. On the switchgear Operator Interface Unit (OIU) under the Demand tab select one generator to operate as the lead unit. The other generator will operate when the lead unit is not available.

MANUAL OPERATION BLACK START PROCEDURE:

- Place the Master Control "System Mode" switch in the MANUAL position.
- Check the master and generator sections for any faults and clear as described under Automatic Operation Steps 1 and 2.
- To place a generator in service, press the EZGN MAN button, then press the "I" (start) button. After the engine starts and stabilizes, press the contactor close button on the EZGN. The red BREAKER CLOSED lamp will illuminate.
- Repeat this process for at least one more generator.
- With two generators on line rotate the feeder breaker control knob for one of the feeder breakers to the CLOSE position to energize the community. Repeat this process for the other feeder breaker. Monitor the load on the system for one minute then select the appropriate generator to match the load.
- Take any generator(s) not needed off line by pressing the EZGN STOP button. The engine will cool down for three minutes then shut off. Note that pressing the STOP button twice will immediately shutdown the generator.
- To manually switch to a different generator as the load changes repeat Steps 3 and 6.

SERVICE DUE / OIL CHANGE PROCEDURE:

The following tasks need to be performed on each engine after every 500 hours of run time. If the required maintenance cannot be performed at the scheduled time, take the engine out of service until all work has been completed. Note that under Automatic Operation, whenever the service time has been exceeded the generator will automatically be taken off line (as long as another generator is available in AUTO), a SERVICE ENGINE message will display, and the red "ENGINE ALARM" lamp will illuminate.

- If the switchgear is in MANUAL Mode, perform Manual Operation Step 3 to place another generator on line in MAN mode. Perform Manual Operation Step 6 on the generator to be serviced to take it off line then continue at Step 3 below (lock out).
- If the switchgear is in AUTOMATIC Mode, press the EZGN MAN button on the generator to be serviced. The PLC will start another generator. Once the other generator is on line, press the EZGN STOP button on the generator to be serviced. Note that if the STOP button is pressed before another unit is online, an outage will occur.
- Lock the unit out using the key switch and tag out of service.
- Service engine (oil change, fuel filter, air filter, etc.).
- Remove tag and turn the Generator Lockout switch to RUN
- Reset the Service Engine interval to 250 Hours.
 - Press the "HOME" button to get to the main screen then press the Next Page button.
 - Then when the new screen appears press the Counters and Service button.
 - When the new screen appears press the wrench symbol button.
 - Use the arrow down to scroll down to highlight "Reset Maintenance Period Hrs".
 - Press the "Enter" button, Then press the "+" button to select "Yes".
 - Press the "Enter" button again then press the "Home" button.
- Press the "ALARM" button in the upper right corner. Scroll down to any active alarms and press the "√" button two times to clear each alarm. Press the "HOME" button.
- Start the engine by pressing the MAN button and then pressing the "I" (start) button.
 - After the engine comes up to speed verify that the engine oil pressure is in the normal range.
 - Check the oil filter for leaks.
- After the engine runs for one minute press the STOP button.
- Check the oil level using the dipstick and add oil as required.
- Place the generator back in service by pressing the AUTO button.

NOTE:

THE SWITCHGEAR WAS UPGRADED IN 2023 AND RECORD DRAWINGS OF THE UPGRADE ARE ATTACHED. THE SWITCHGEAR RECORD DRAWINGS HAVE REDMARKS INDICATING DETAILED CHANGES THIS PROJECT. THE SWITCHGEAR SPECIFICATIONS DESCRIBE CHANGES TO FUNCTION AND OPERATION AND LIST NEW EQUIPMENT. THIS DRAWING SHOWS AN OVERVIEW OF FINAL SETTINGS AND SEQUENCE. REVISE PROGRAMMING ON EXISTING PLC, REVISE SETTINGS ON EXISTING EASYGEN GENSET CONTROLLERS, AND PROGRAM NEW VARIABLE FREQUENCY DRIVES (IF INSTALLED UNDER ADD ALT #2) TO PERFORM ALL SEQUENCES LISTED ON THIS SHEET AS DETAILED IN THE SPECIFICATIONS.

ENGINE-GENERATOR PROTECTION ALARMS:

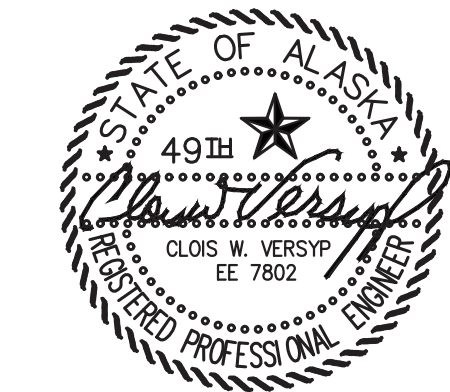
See the tables this sheet for alarm level setpoints and breaker trip settings at the time of commissioning.

ENGINE COOLING VARIABLE FREQUENCY DRIVES

Radiators – Radiator fan motors will operate under variable frequency drive (VFD) control. When the coolant return temp reaches the PID reference setpoint the motor will start at minimum speed and ramp up to the required speed, using PID control, the VFD will modulate the fan speed as required to maintain coolant return temp at the PID reference setpoint. as the coolant return temp rises, the VFD will increase the speed of the fan motor up to 100%. Once the fan reaches the minimum speed, the VFD will maintain that speed until the low speed time out expires. When the low speed time out expires the motor will stop. The motor will remain off until the coolant return temp rises to the PID reference setpoint. See the radiator VFD settings table this sheet for setpoints at the time of commissioning.

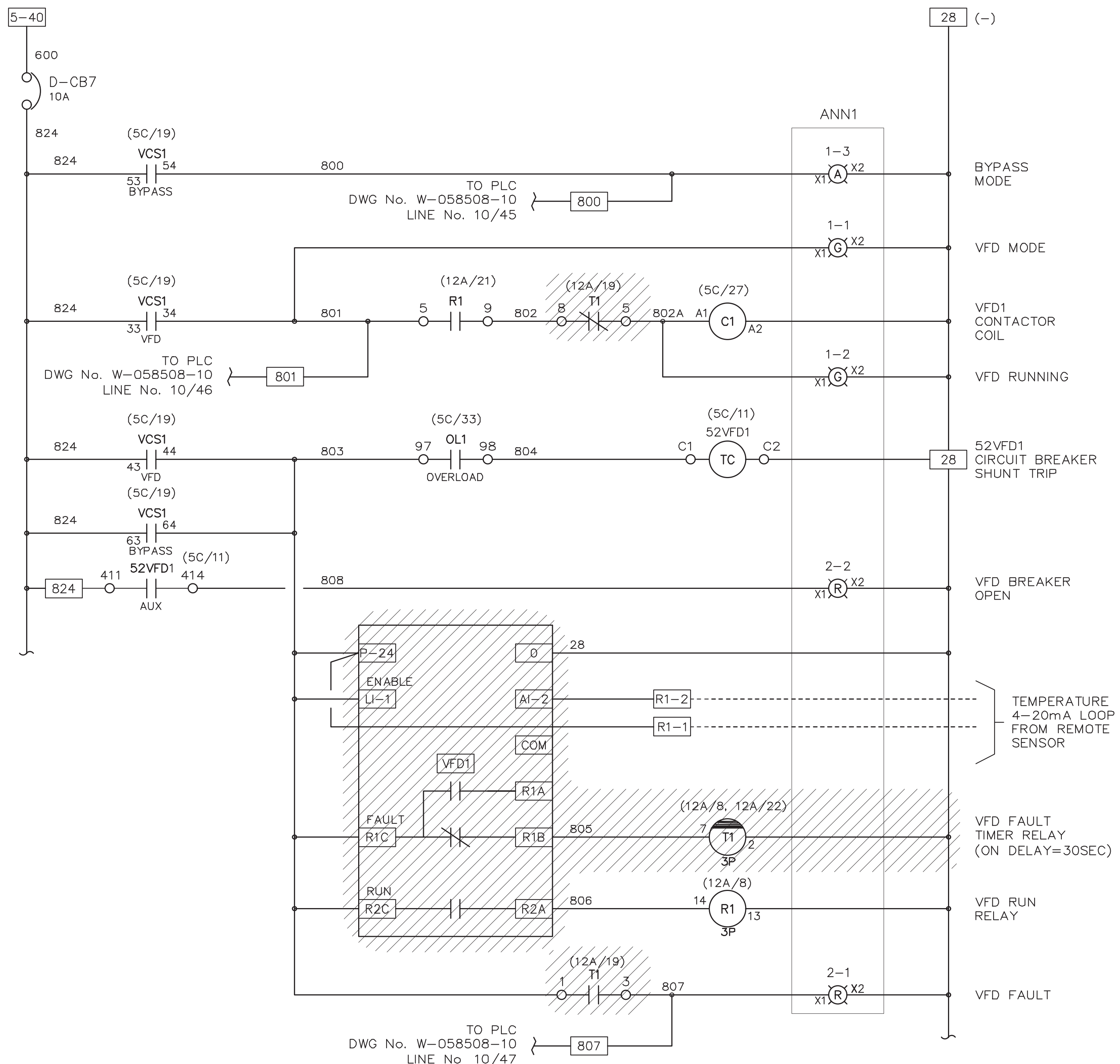
Charge Air Coolers (CAC) – CAC fans will operate continuously any time associated engine runs and stop when the engine stops. variable frequency drives will operate at full speed for 30 seconds upon startup and then will modulate fan speed to maintain engine intake manifold air temperature operating setpoint. See the Radiator VFD settings table this sheet for setpoints at the time of commissioning.

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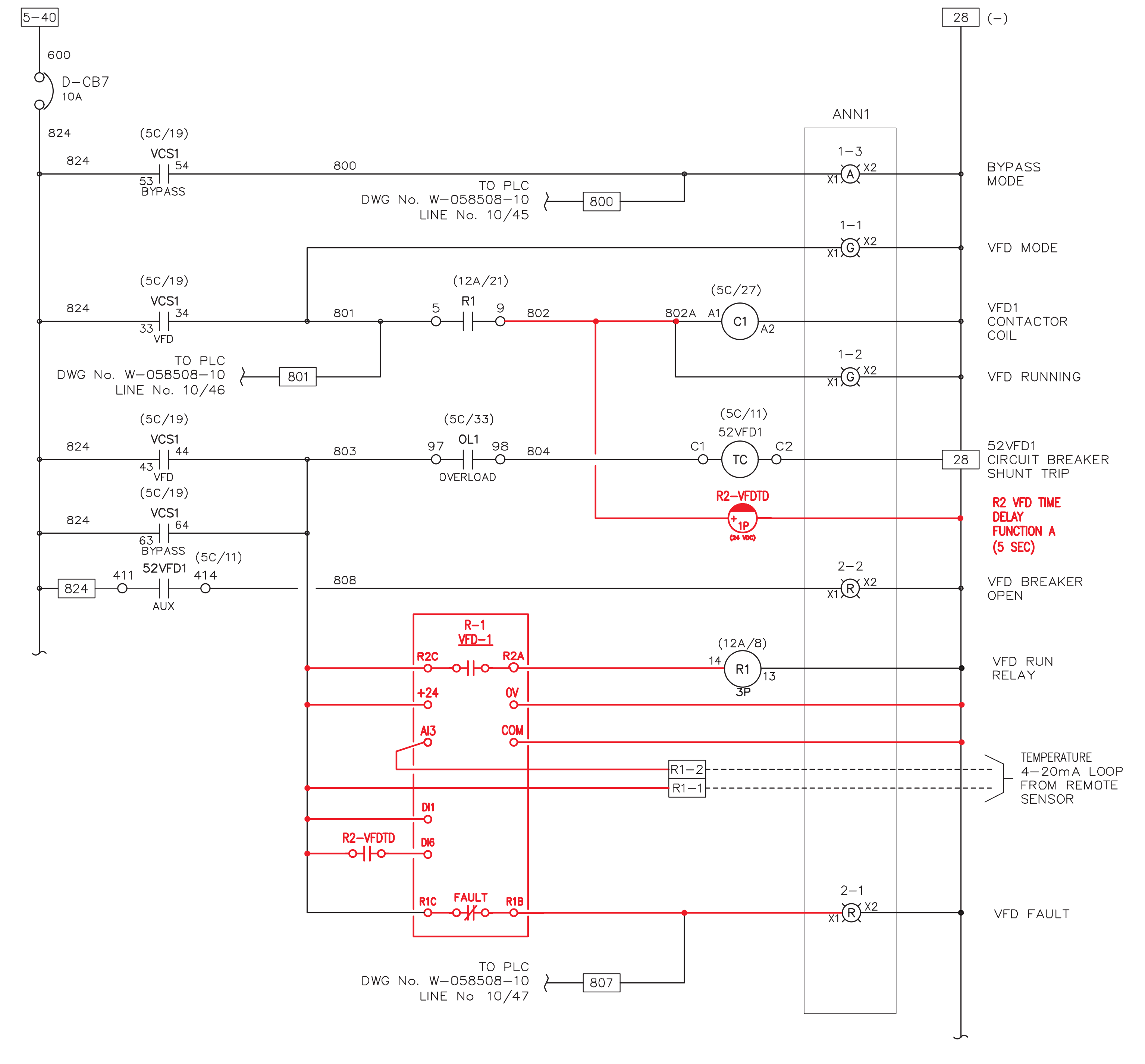


PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: SWITCHGEAR SETING TABLE & SEQUENCE OF OPERATIONS SUMMARY		
DRAWN BY: JTD	DESIGNED BY: CWV/BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	DATE: 5/29/25
SHEET: E6.2		





1 TYPICAL RADIATOR VFD DEMOLITION (R-1 VFD-1 SHOWN, R-2 VFD-2 SIMILAR)
E6.3 NO SCALE

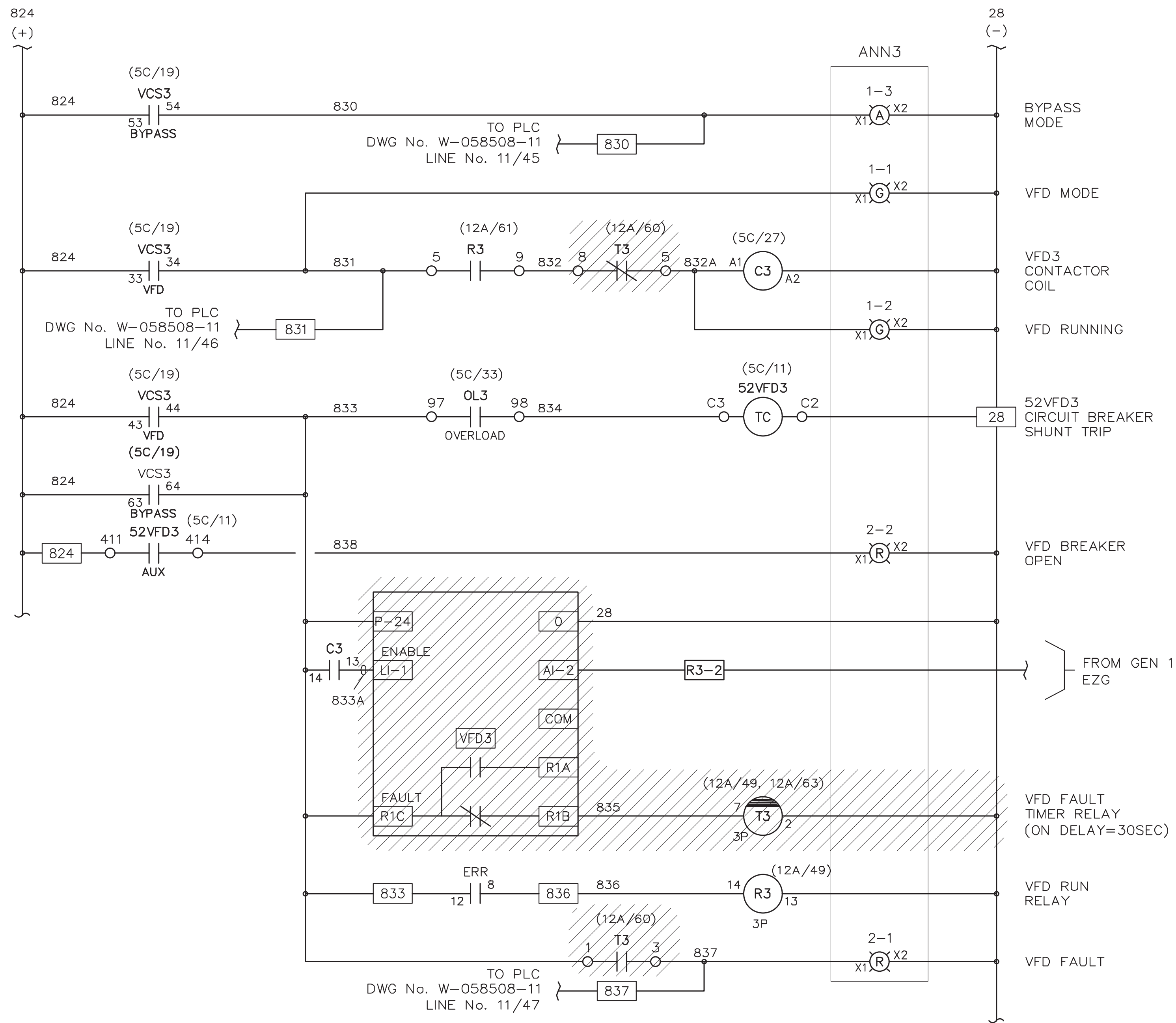


2 TYPICAL NEW RADIATOR VFD INSTALLATION (R-1 VFD-1 SHOWN, R-2 VFD-2 SIMILAR)
E6.3 NO SCALE

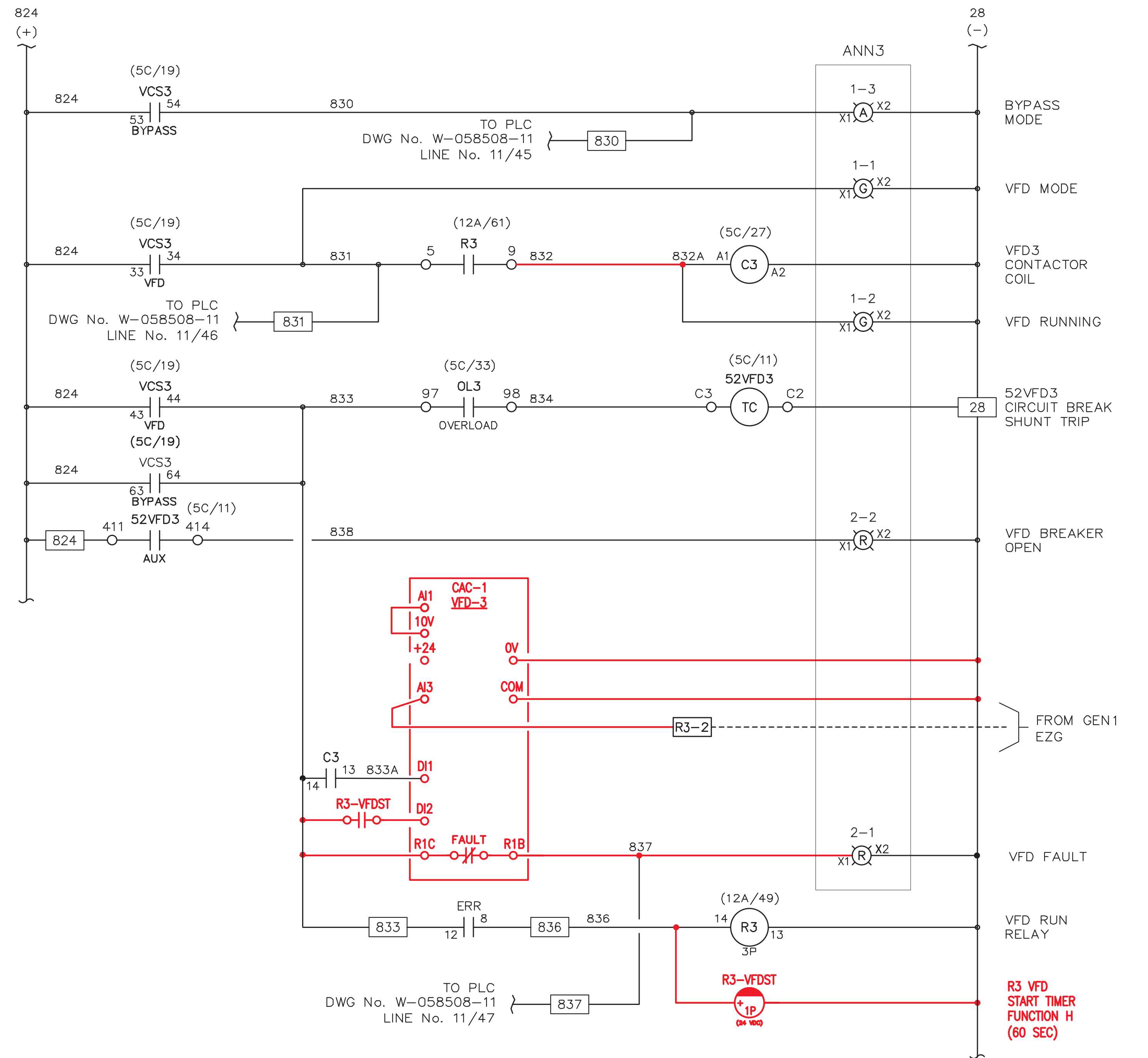
ISSUED FOR
CONSTRUCTION
MAY 2025



ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: RADIATOR VFD REPLACEMENT WIRING		
DRAWN BY: JTD	SCALE: AS NOTED	
DESIGNED BY: CWV/BCG	DATE: 5/29/25	
FILE NAME: KWT 2025 M&I	SHEET:	
P.O. 111405, Anchorage, AK 99511 (907)349-0100	PROJECT NUMBER:	E6.3



1
E6.4 TYPICAL CHARGE AIR COOLER VFD DEMOLITION (VFD-3 SHOWN, VFD-4 & VFD-5 SIMILAR)
NO SCALE



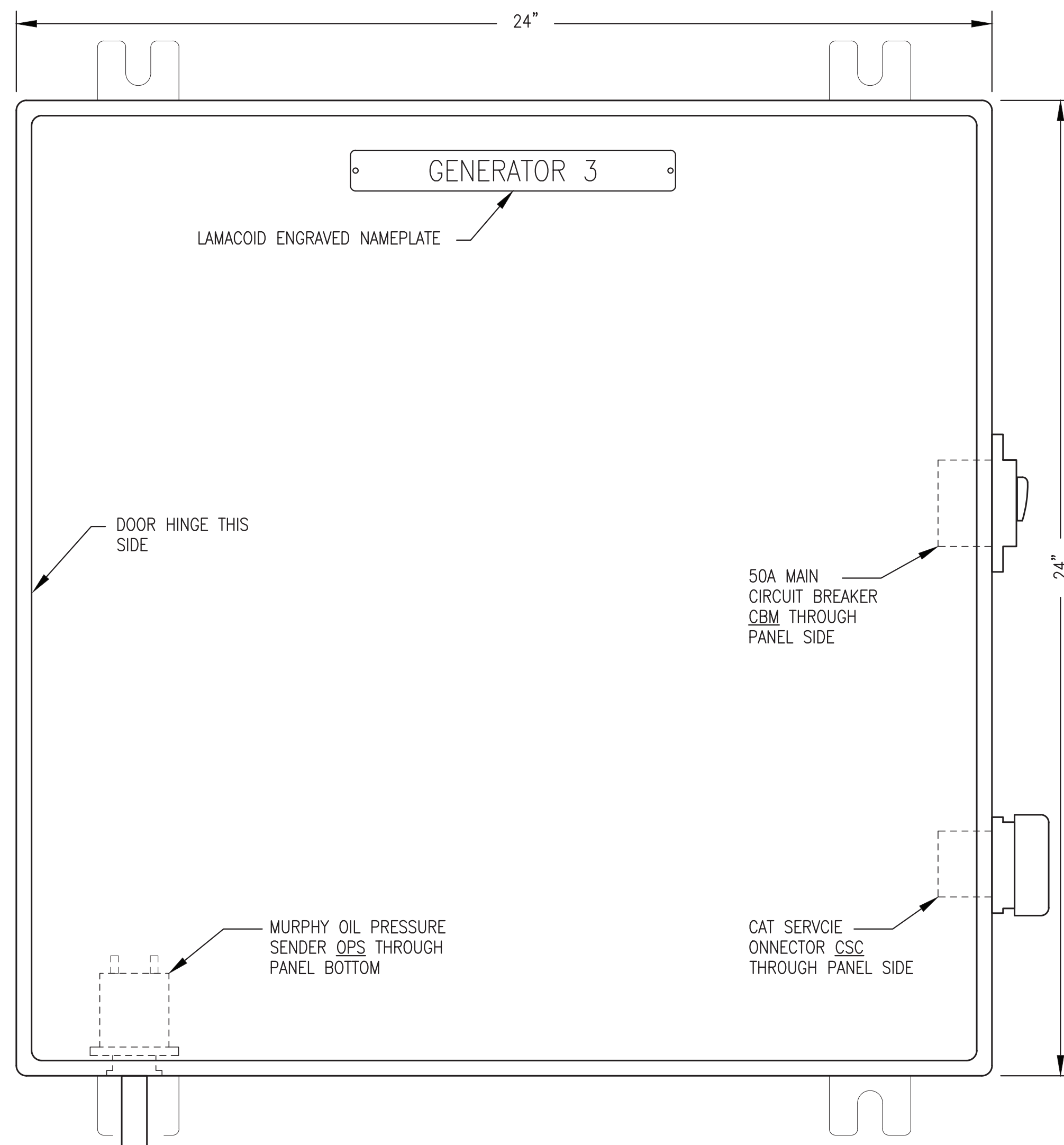
2
E6.4 TYPICAL NEW CHARGE AIR COOLER VFD INSTALLATION (VFD-3 SHOWN, VFD-4 & VFD-5 SIMILAR)
NO SCALE

ISSUED FOR
CONSTRUCTION
MAY 2025

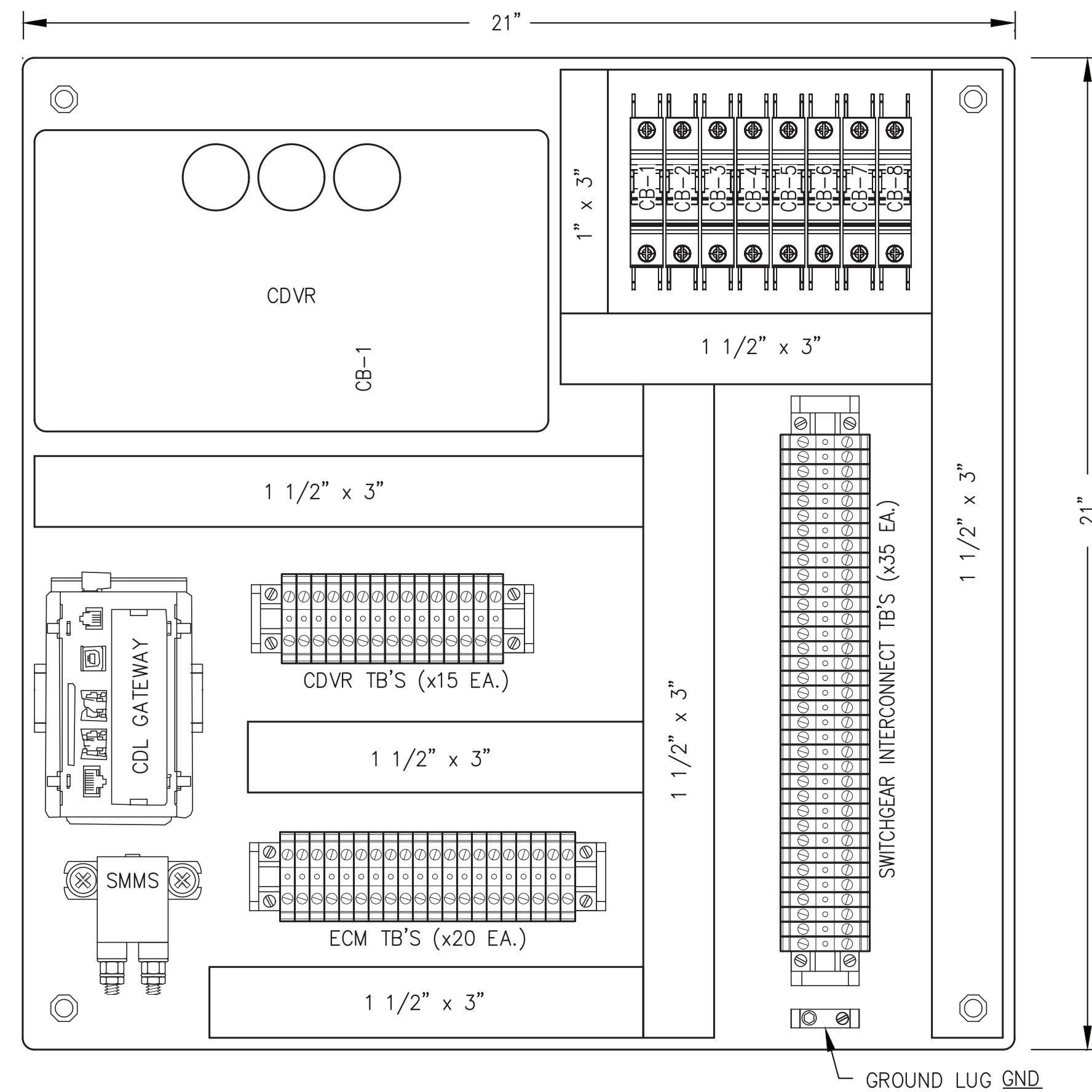


PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: CHARGE AIR COOLER VFD REPLACEMENT WIRING		
DRAWN BY: JTD	SCALE: AS NOTED	
DESIGNED BY: CWV/BCG	DATE: 5/29/25	
FILE NAME: KWT 2025 M&I	SHEET:	
PROJECT NUMBER:	E6.4	





1 JUNCTION BOX FRONT PANEL LAYOUT
E6.5 NO SCALE



2 JUNCTION BOX SUB PANEL LAYOUT
E6.5 NO SCALE

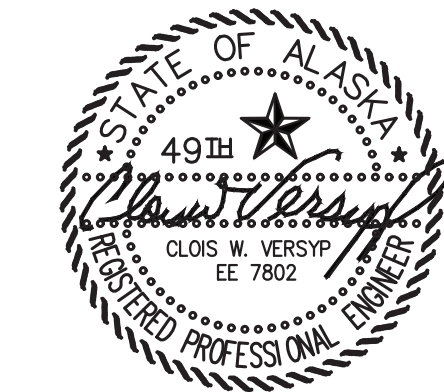
BILL OF MATERIALS			
TAG	MANUFACTURER	MODEL	DESCRIPTION
CBM	BLUE SEA SYSTEM	CB187P-50	PANEL MOUNT CIRCUIT BREAKER, 1P, 50A
CB-6,7,8	ALLEN-BRADLEY	1489-M1-D010	RAIL MOUNT CIRCUIT BREAKER, 1P, 1A
CB-1,2,3,4,5	ALLEN-BRADLEY	1489-M1-D100	RAIL MOUNT CIRCUIT BREAKER, 1P, 10A
CDL GATEWAY	MONICO	CDL-MCLE-MB-30K	CAT DATA LINK TO MODBUS TCP GATEWAY CABLE
CDVR	MONICO	CBL-CDL-7	CABLE
	CAT	314-7755	CAT DIGITAL VOLTAGE REGULATOR
CSC	CUSTOM	CDVR WIRE HARNESS	
	DEUTSCH	HD10-9-96P-B009	DIAGNOSTIC CONNECTOR, 9-PIN
ENCL.	DEUTSCH	HD18-009	CONNECTOR STRAIN RELIEF
	DEUTSCH	HDC16-9	CONNECTOR PROTECTIVE DUST CAP
	DEUTSCH	HD10-9-GKT	CONNECTOR GASKET
	DEUTSCH	JDL082397	CONNECTOR LANYARD
	DEUTSCH	0460-215-16141	14 AWG PINS
	DEUTSCH	0460-202-16141	16 AWG PINS
	SAGINAW	SCE-24EL2408LP	24x24x8" NEMA 12
	SAGINAW	SCE-24P24	BACK PANEL 21"x21"
	SAGINAW	SCE-ELMFK4	WALL MOUNT KIT
	GND	BURNDY	KA2U
OPS	MURPHY	ES2P-100	OIL PRESSURE SENSOR
SMMS	CAT	9X8124	STARTER AUXILIARY SOLENOID, 24V
TB-1	IDEC	BNH15LW	15A DIN RAIL-MOUNT TERMINAL BLOCK
TB-2	IDEC	BNH50W	50A DIN RAIL-MOUNT TERMINAL BLOCK


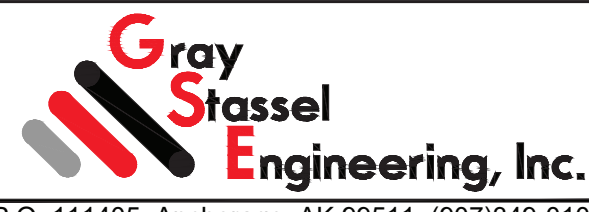
BRAND SPECIFIC NOTE: SPECIFIC PARTS MANUFACTURER AND MODEL SELECTED NOT ONLY TO MEET PERFORMANCE FUNCTION BUT ALSO TO COORDINATE AND INTERFACE WITH OTHER DEVICES AND SYSTEMS. APPROVED EQUAL SUBSTITUTIONS WILL BE ALLOWED ONLY BY ENGINEER'S APPROVAL. TO OBTAIN APPROVAL, SUBMITTALS MUST CLEARLY DEMONSTRATE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

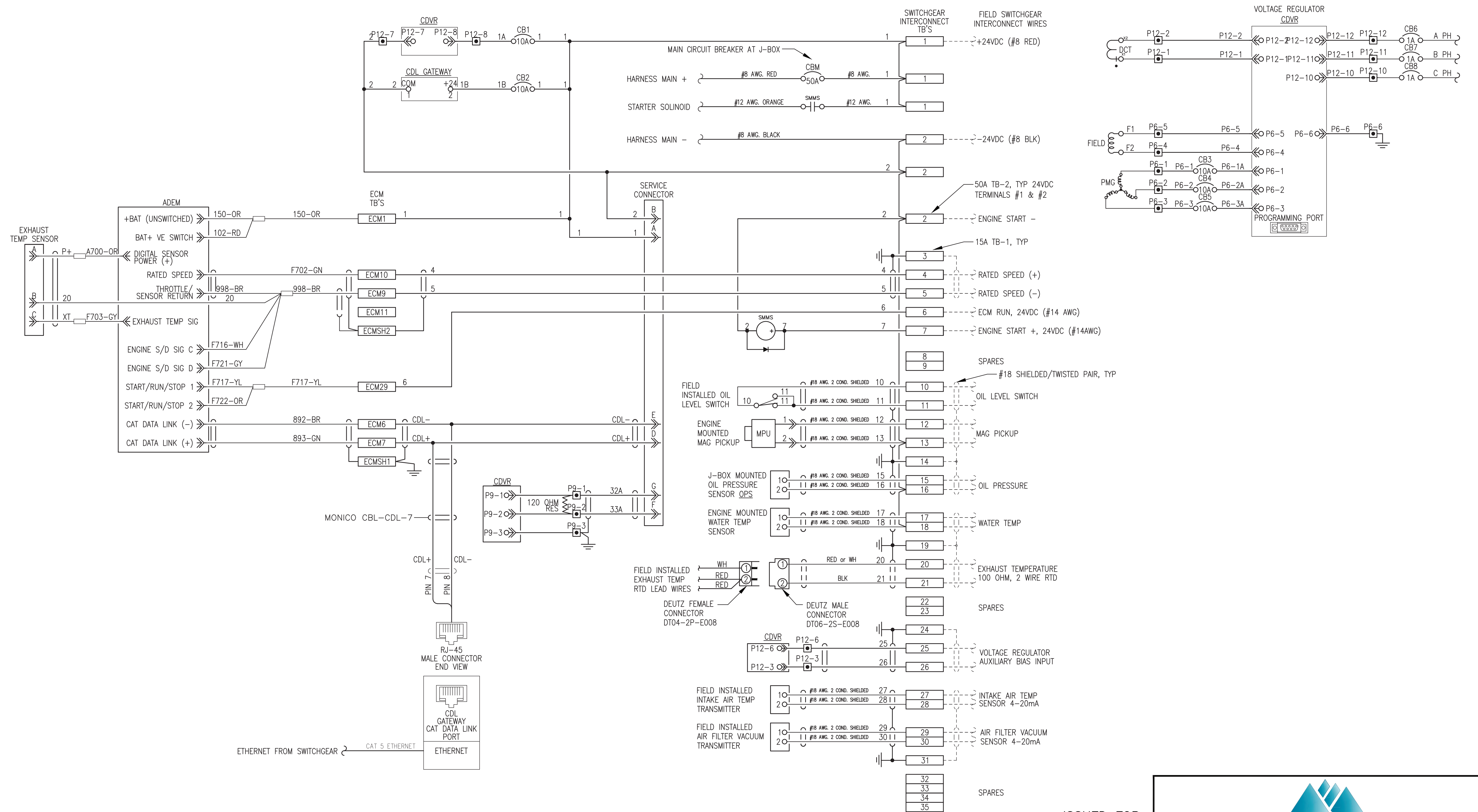
- SHOP FABRICATION NOTES:**
- 1) PROVIDE ASSEMBLY WITH ALL DEVICES AND WIRING INDICATED.
 - 2) INSTALL IN A 24"x24"x8" NEMA 12 WALL MOUNT ENCLOSURE WITH MOUNTING FLANGES AT BACK, A MIN 14 GAUGE INTERIOR BACK PANEL AND HINGED LOCKABLE DOOR.
 - 3) PROVIDE DIN RAIL, TERMINAL END PLATES, TERMINAL END STOPS, TERMINAL DUST COVERS AND OTHER MISCELLANEOUS HARDWARE AS REQUIRED TO MATCH TERMINALS. LABEL ALL TERMINALS EXACTLY AS INDICATED ON THE DETAILS.
 - 4) ALL WIRE #14AWG EXCEPT WHERE SPECIFICALLY INDICATED OTHERWISE. LABEL BOTH ENDS OF ALL JUMPERS WITH THE ENGINE PANEL TERMINAL NUMBER.
 - 5) PROVIDE MECHANICAL GROUND LUGS FASTENED TO BACK PANEL AND GROUNDED TO ENGINE-GENERATOR. GROUND ALL SHIELD DRAIN WIRES TO LUGS AT BACK PANEL ONLY.
 - 6) PROVIDE WIRING HARNESSSES 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.

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

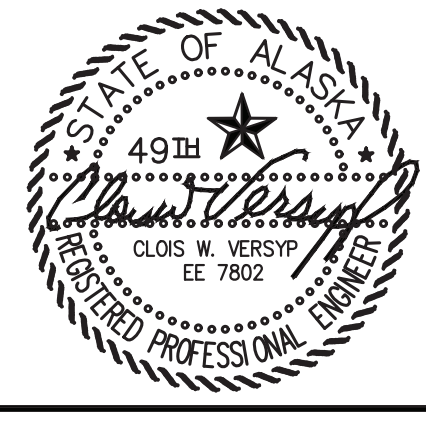
ISSUED FOR
CONSTRUCTION
MAY 2025




 ALASKA ENERGY AUTHORITY		
PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: GEN#3 ENGINE WIRING J-BOX LAYOUT & BILL OF MATERIALS		
 Gray Stassel Engineering, Inc. P.O. 111405, Anchorage, AK 99511 (907)349-0100	DRAWN BY: JTD DESIGNED BY: CWV/BCG FILE NAME: KWT 2025 M&I PROJECT NUMBER:	SCALE: AS NOTED DATE: 5/29/25 SHEET: E6.5



ISSUED FOR CONSTRUCTION
MAY 2025



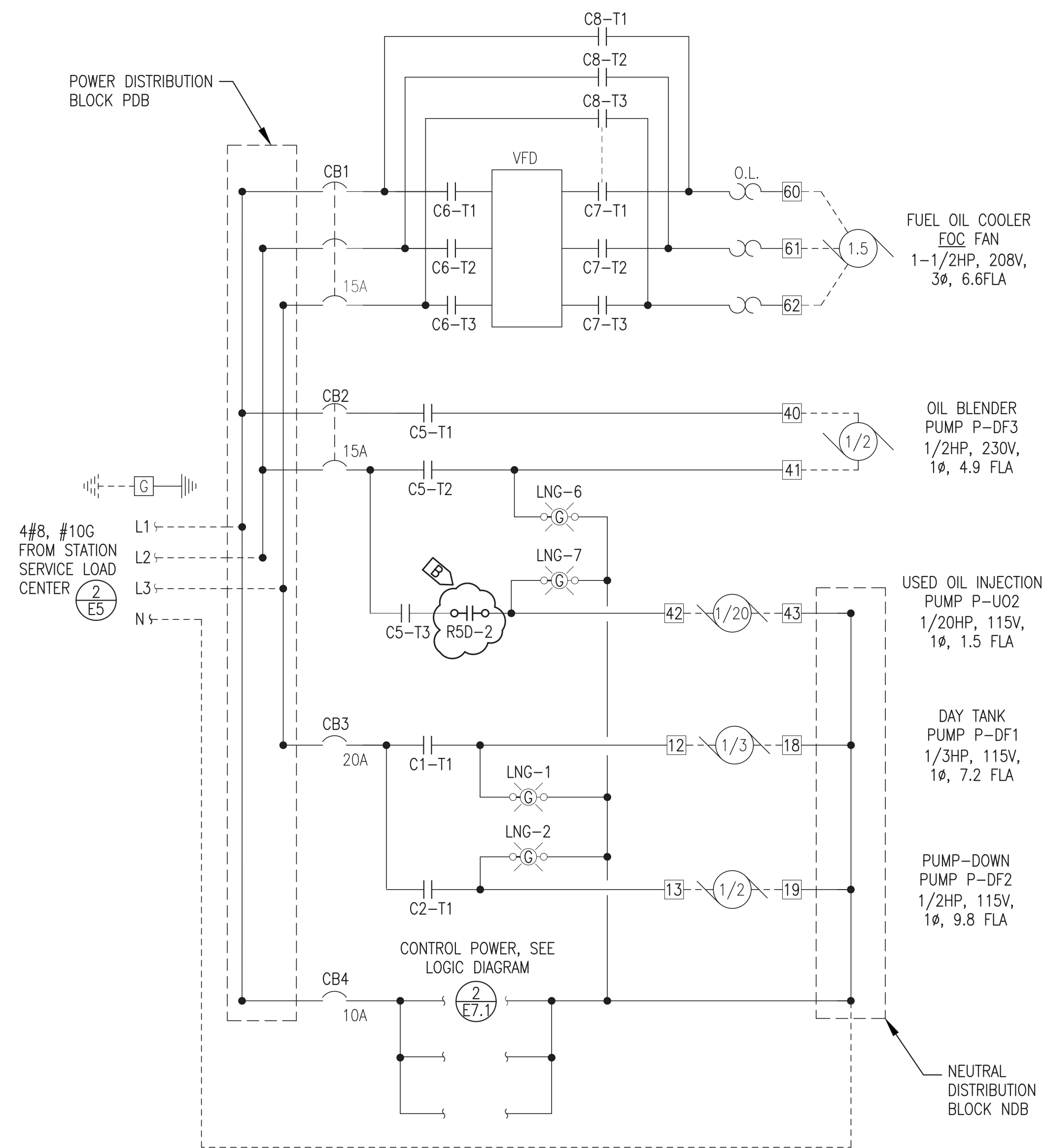

ALASKA ENERGY AUTHORITY

PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS

TITLE: GEN#3 ENGINE WIRING J-BOX
WIRING DIAGRAM & SWITCHGEAR INTERCONNECT

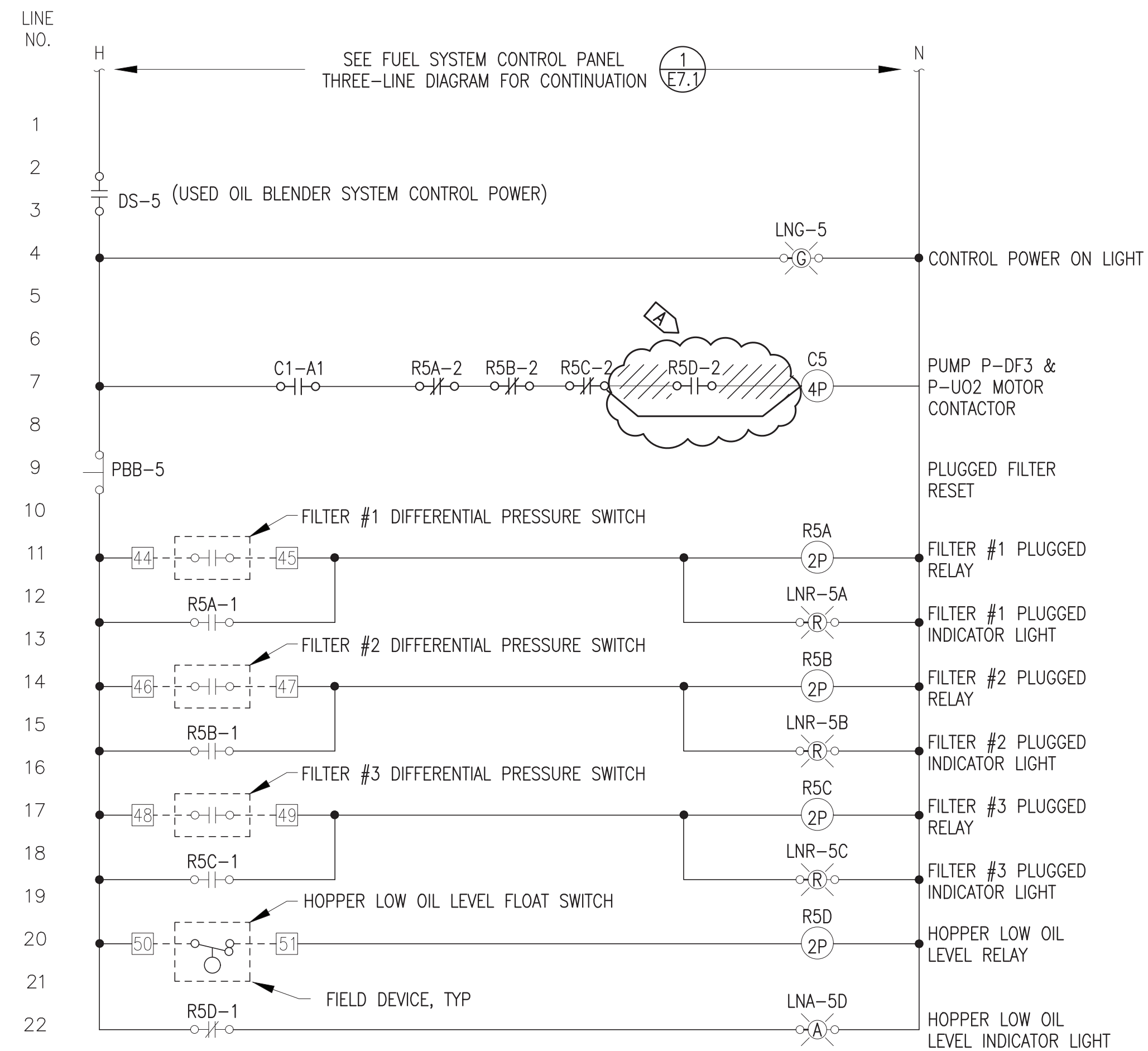
DRAWN BY: JTD	SCALE: AS NOTED
DESIGNED BY: CWV/BCG	DATE: 5/29/25
FILE NAME: KWT 2025 M&I	SHEET: E6.6
PROJECT NUMBER:	

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



NOTE: ALL 1/2HP AND UNDER MOTORS EQUIPPED WITH INTEGRAL THERMAL PROTECTION.

1 FUEL SYSTEM CONTROL PANEL THREE-LINE MODIFICATION DIAGRAM
E7.1 NO SCALE



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

GENERAL NOTES:

1. THE PURPOSE OF THE MODIFICATIONS IS TO ENABLE THE BLENDER TO ACT AS A DAY TANK FUEL "POLISHING" FILTER EVERY TIME THE DAY TANK FILLS. THE MODIFICATIONS WILL CHANGE THE PANEL FUNCTION SO ONLY PUMP P-UO2 STOPS ON A LOW HOPPER OIL LEVEL. P-DF3 WILL CONTINUE TO RUN WHEN THE HOPPER OIL LEVEL IS LOW
2. THIS WORK CONSISTS OF REMOVING EXISTING WIRE JUMPERS AND INSTALLING NEW WIRE JUMPERS AS INDICATED. ALL EXISTING CONTROL DEVICES TO REMAIN.
3. MODIFICATION AREAS ARE SHOWN CLOUDED WITH SPECIFIC NOTES INDICATED.

FUEL SYSTEM CONTROL PANEL MODIFICATION SPECIFIC NOTES:

- A DEMOLISH JUMPERS TO TAKE R5D N.O. CONTACT OUT OF C5 COIL CIRCUIT AND INSTALL NEW JUMPER TO CONNECT C5 COIL DIRECTLY TO R5C N.C. CONTACT.
- B INSTALL NEW JUMPERS TO CONNECT R5D N.O. CONTACT BETWEEN C5-T3 AND PUMP P-UO2 MOTOR AND ASSOCIATED LAMP LNG-7.

95% DESIGN
NOT FOR
CONSTRUCTION



PROJECT: KWETHLUK M&I 2025 IMPROVEMENTS		
TITLE: EXISTING FUEL SYSTEM CONTROL PANEL LOGIC MODIFICATIONS FOR FUEL POLISHING FUNCTION		
DRAWN BY: JTD	DESIGNED BY: CWV/BCG	SCALE: AS NOTED
FILE NAME: KWT 2025 M&I	PROJECT NUMBER:	DATE: 4/21/25
P.O. 111405, Anchorage, AK 99511 (907)349-0100		SHEET: E7.1

