

LEGEND	
	GATE VALVE
	BALL VALVE
	CHECK VALVE
	BUTTERFLY VALVE
	HOSE END DRAIN VALVE
	GAUGE COCK
	AUTOMATIC AIR VENT
	THERMOMETER
	PRESSURE GAUGE
	FLEXIBLE CONNECTOR
	FLANGED JOINT
	UNION
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	PIPING CONNECTION (TEE)
	CHANGE OF PIPE SIZE
	DIRECTION OF FLOW
ABBREVIATIONS	
Ø	DIAMETER (PHASE)
A	AMPS
AFF	ABOVE FINISHED FLOOR
BTU	BRITISH THERMAL UNIT
DFR	DIESEL FUEL RETURN
DFS	DIESEL FUEL SUPPLY
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING
ECR	ENGINE COOLANT RETURN
ECS	ENGINE COOLANT SUPPLY
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GRC	GALVANIZED RIGID CONDUIT
HP	HORSEPOWER
HRR	HEAT RECOVERY RETURN
HRS	HEAT RECOVERY SUPPLY
ID	INSIDE DIAMETER
KW	KILOWATT
LT	LIQUID TIGHT
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MBH	THOUSAND BTU PER HOUR
MIN	MINIMUM
MPT	MALE PIPE THREAD
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OC	ON CENTER
OD	OUTSIDE DIAMETER
PRV	PRESSURE RELIEF VALVE
PSI	POUNDS/PER SQUARE INCH
PSIG	POUNDS/PER SQ INCH GAUGE
SCH	SCHEDULE
TDH	TOTAL DEVELOPED HEAD
TYP	TYPICAL
UOR	USED OIL RETURN
V	VOLTS
W	WATTS
WG	WATER GAUGE
WPD	WATER PRESSURE DROP

WARNING SIGN & INFORMATIONAL PLACARD SCHEDULE:	
10"x14"x0.08" ALUMINUM, 3/16" HOLES IN ALL FOUR CORNERS. WHITE NON-REFLECTIVE VINYL BACKGROUND, 3M 3650-10, WITH 3M SERIES 225 HIGH PERFORMANCE VINYL LETTERS, COLOR AS INDICATED, ONE SIDE ONLY. WARNING LITES OR EQUAL.	
WARNING SIGNS – RED LETTERS ON WHITE BACKGROUND.	
	"DANGER HIGH VOLTAGE, AUTHORIZED PERSONNEL ONLY"
	"CAUTION HEARING & EYE PROTECTION REQUIRED"
	"FUEL OIL DAY TANK ALARM"
	"IN CASE OF FUEL SPILL CALL DEC 1-800-478-9300"
INFORMATIONAL PLACARDS – BLACK LETTERS ON WHITE BACKGROUND.	
	"TO MANUALLY FILL DAY TANK IN CASE OF EMERGENCY: 1) TURN OFF POWER TO THE DAY TANK CONTROL PANEL 2) MANUALLY OPEN ACTUATOR VALVE AT INTERMEDIATE TANK USING A WRENCH 3) OPEN NORMALLY CLOSED VALVE BY HAND PUMP 4) OPERATE HAND PUMP WHILE MONITORING LEVEL GAUGE"
	"TO CHANGE ENGINE OIL: 1) LOCK & TAG GENERATOR OUT OF SERVICE 2) CLOSE NORMALLY OPEN FILL VALVE AT GEN 3) OPEN NORMALLY CLOSED DRAIN VALVE AT GEN 4) TURN ON PUMP TIMER & PUMP OUT ENGINE OIL 5) CHANGE FILTER & PLACE OLD ONE IN HOPPER 6) CLOSE DRAIN VALVE & OPEN FILL VALVE 7) TOP OFF ENGINE & CHECK DIPSTICK 8) PLACE ENGINE BACK IN SERVICE 9) REFILL OIL TANK AS REQUIRED"
INSTALLATION – SECURE EACH SIGN TO WALL OR DOORS WITH STAINLESS STEEL SCREWS.	
NOTE: SEE FIRE SUPPRESSION PLANS AND SPECIFICATIONS FOR ADDITIONAL PLACARDS TO BE PROVIDED WITH FIRE SUPPRESSION SYSTEM. INSTALL ALL SIGNS AS INDICATED.	

VALVE TAG SCHEDULE:	
VALVE TAGS – 3"x5"x.08" ALUMINUM, 3/16" HOLES IN ALL FOUR CORNERS, BLACK GERBER THERMAL TRANSFER FILM PRINTED LETTERS ON GERBER 220 HIGH PERFORMANCE VINYL BACKGROUND, COLOR AS INDICATED, ONE SIDE ONLY. WARNING LITES OR EQUAL.	
SKY BLUE (#2 DIESEL FUEL)	
	"NORMALLY OPEN, CLOSE ONLY FOR EMERGENCIES & TEMPORARY MAINTENANCE OF DAY TANK & DEVICES"
	"NORMALLY CLOSED, OPEN ONLY FOR HAND PRIMING DAY TANK"
	"NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF BLENDER"
	"NORMALLY OPEN, CLOSE ONLY FOR TEMPORARY MAINTENANCE OF ENGINE"
BEIGE (LUBE OIL)	
	"NORMALLY OPEN, CLOSE ONLY FOR ENGINE OIL CHANGE"
	"NORMALLY CLOSED, OPEN ONLY TO FILL OIL TANK"
BROWN (USED OIL)	
	"NORMALLY CLOSED, OPEN ONLY FOR ENGINE OIL CHANGE"
	"FILTER #1, 10 MICRON HYDROSORB"
	"FILTER #2, 10 MICRON HYDROSORB"
	"FILTER #3, 2 MICRON PARTICULATE"
PINK (COOLING/ETHYLENE GLYCOL)	
	"NORMALLY CLOSED, OPEN ONLY FOR ADDING COOLANT – ETHYLENE GLYCOL ONLY"
	"NORMALLY CLOSED, OPEN ONLY ON HIGH COOLANT TEMPERATURE ALARM"
GRAY (HEAT RECOVERY/PROPYLENE GLYCOL)	
	"NORMALLY CLOSED, OPEN ONLY FOR ADDING FLUID – PROPYLENE GLYCOL ONLY"
	"NORMALLY OPEN, HEAT RECOVERY SUPPLY"
	"NORMALLY OPEN, HEAT RECOVERY RETURN"
	"NORMALLY OPEN, HEATING RETURN TO HX"
	"NORMALLY OPEN, HX TO BOILER"
	"NORMALLY CLOSED, HX BYPASS"
TOMATO RED (WARNING)	
	"CAUTION: THIS UNIT STARTS AUTOMATICALLY, LOCK & TAG OUT PRIOR TO SERVICE"
INSTALLATION – SECURE EACH TAG TIGHT TO VALVE, PIPE, OR DEVICE WITH STAINLESS STEEL CABLE TIES OR SAFETY WIRE THROUGH ALL FOUR CORNERS OR FASTEN TO ADJACENT WALL OR SECTION OF STRUT WITH SCREWS.	
NOTE: FOR ALL VALVES NOT INDICATED WITH A SPECIFIC FUNCTION TAG PROVIDE 1-1/2"Ø BRASS TAG LABELED "N.O." FOR NORMALLY OPEN VALVES AND 1"Ø BRASS TAG LABELED "N.C." FOR NORMALLY CLOSED VALVES. SECURE TAGS TO VALVE OR ADJACENT PIPE WITH BEADED BRASS CHAIN.	

COOLANT/HEAT RECOVERY EQUIPMENT SCHEDULE		
R-1 R-2	REMOTE RADIATOR	SINGLE PASS, VERTICAL CORE RADIATOR, 3" FLANGED CONNECTIONS, 2HP MOTOR, 208V, 3PH, 10:1 TURNDOWN RATIO SUITABLE FOR VFD OPERATION. L&M MESABI PART # 113969, NO SUBSTITUTES.
HX-1	POWER PLANT HEAT EXCHANGER	316 STAINLESS STEEL PLATES, ALL BRAZED CONSTRUCTION, 2" NPT PORTS, 250 MBH MIN CAPACITY. AMERIDEX X-10B-100 OR EQUAL. PRIMARY: 50 GPM 195F EWT (50% ETHYLENE GLYCOL) 1.0 PSI MAX WPD SECONDARY: 50 GPM 185F LWT (50% PROPYL. GLYCOL) 1.0 PSI MAX WPD
HX-2	WASHETERIA HEAT EXCHANGER	316 STAINLESS STEEL PLATES, ALL BRAZED CONSTRUCTION, 2" NPT PORTS, 250 MBH MIN CAPACITY. AMERIDEX X-10B-100 OR EQUAL. PRIMARY: 50 GPM 185F EWT (50% PROPYL. GLYCOL) 1.0 PSI MAX WPD SECONDARY: 50 GPM 175F LWT (50% PROPYL. GLYCOL) 1.0 PSI MAX WPD
TV-1	THERMOSTATIC VALVE	3" ANSI 125# FLAT FACED FLANGES, CAST IRON BODY, FACTORY SET NON-ADJUSTABLE FIELD REPLACEABLE THERMOSTATIC ELEMENTS – 185F NOMINAL TEMPERATURE, FPE #A3010-185, NO SUBSTITUTES.
ET-1	COOLANT EXP. TANK	24 GALLON CAPACITY STEEL TANK FABRICATED IN ACCORDANCE WITH AEA STANDARD POWER PLANT TANK FABRICATION DETAILS.
ET-2	HEAT RECOV. EXP. TANK	HORIZONTAL INSTALLATION BLADDER TYPE EXPANSION TANK, 44.4 GALLON TANK VOL, 22.6 GALLON ACCEPTANCE VOL, 100 PSIG WORKING PRES, 12 PSIG PRE-CHARGE. AMTROL AX-80 OR EQUAL. PROVIDE WITH SADDLES.
UH-1	CONTROL ROOM HEAT	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 15 MBH AT 2 GPM 200F EWT AND 60F EAT, 1/25HP, 120V, 1Ø. MODINE HS-24 NO SUBSTITUTES.
UH-2	FIRE HALL HEAT	HORIZONTAL DISCHARGE HOT WATER UNIT HEATER, 73 MBH AT 5 GPM 200F EWT AND 60F EAT, 1/8HP, 120V, 1Ø. MODINE HS-108 NO SUBSTITUTES.
P-HR1	CONTROL ROOM HEAT	2 GPM AT 15' TDH, 1/25HP, 115V, 1Ø. GRUNDFOS UPS15-42F, SPD 3, NO SUBST, WITH 3/4" NPT COMPANION FLANGES, GASKETS, AND BOLTS.
P-HR2	HEAT RECOV. PRIMARY	25 GPM AT 5' TDH, 1/12HP, 115V, 1Ø. GRUNDFOS UP 26-64F, NO SUBSTITUTES, WITH 1-1/2" NPT COMPANION FLANGES, GASKETS, & BOLTS.
P-HR3	HEAT RECOV. SECONDARY	25 GPM AT 14' TDH, 1/6HP, 115V, 1Ø. GRUNDFOS UP 50-75F, NO SUBSTITUTES, WITH 2" NPT COMPANION FLANGES, GASKETS, AND BOLTS.

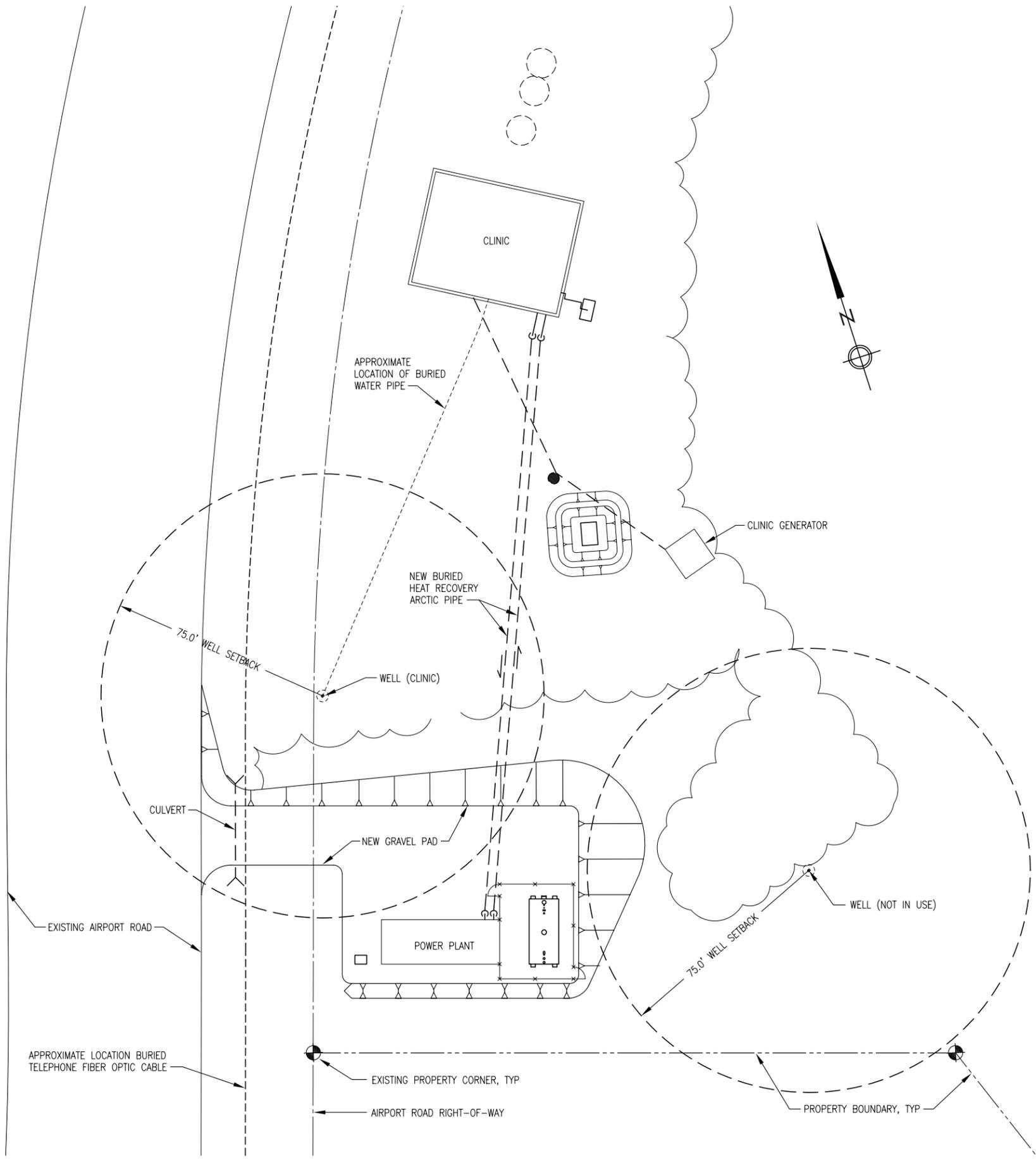
OIL PUMP SCHEDULE		
P-DF1	DAY TANK FILL PUMP	ROTARY GEAR PUMP, 3/8" FPT INLET AND OUTLET, BRONZE CONSTRUCTION WITH STAINLESS STEEL SHAFTS, BUNA-N LIP SEAL, CARBON BEARINGS, DIRECT FLEX COUPLED TO 1725 RPM ODP THERMALLY PROTECTED, AUTO RESET MOTOR, 1/3 HP, 115 V, 1 PH, 60 HZ, 1.98 GPM @ 20 PSID. OBERDORFER N991-32M F01, NO SUBSTITUTES.
P-DF2 P-DF3 P-U01	PUMP DOWN, DIESEL CIRC, & USED OIL DRAIN PUMPS	ROTARY GEAR PUMP, 1/2" FPT INLET AND OUTLET, BRONZE CONSTRUCTION WITH STAINLESS STEEL SHAFTS, BUNA-N SEAL, CARBON BEARINGS, DIRECT FLEX COUPLED TO 1150 RPM ODP THERMALLY PROTECTED, AUTO RESET MOTOR, 1/2 HP, 115 V, 1 PH, 60 HZ, 6.6 GPM @ 20 PSID. PROVIDE WITH 40 PSID INTERNAL PRV. OBERDORFER N994H-J46, NO SUBSTITUTES.
P-U02	USED OIL INJECTION PUMP	ROTARY GEAR PUMP, 1/8" FPT INLET AND OUTLET, STAINLESS STEEL CONSTRUCTION, PEEK GEARS, PTFE SEALS, MAGNETICALLY COUPLED TO 1750 RPM TEFC THERMALLY PROTECTED, AUTO RESET MOTOR, 1/20 HP, 115 V, 1 PH, 60 HZ., 1.2 GPH @ 15 PSID. MICROPUMP GA-V21.JFS.A PUMP WITH #82130 MOTOR, NO SUBSTITUTES.
HAND PUMP	GLYCOL & DIESEL	DOUBLE ACTION PISTON HAND PUMP, ALUM HOUSING, SS PISTON SHAFT & LINER, BUNA-N SEALS, ANTI-SIPHONING VALVE. GPI MODEL HP-100 NO SUBSTITUTES.
HAND PUMP	LUBE OIL	ROTARY STYLE HAND PUMP, ALUM HOUSING, SS SHAFT, THERMOPLASTIC ROTOR, BUNA-N SEALS, ANTI-SIPHONING VALVE. GPI MODEL RP-10 NO SUBSTITUTES.

SCHEDULE OF DRAWINGS:	
M1.1	LEGEND & SCHEDULES
M1.2	SITE PLAN & DETAILS
M2	MECHANICAL SPECIFICATIONS
M3	EQUIPMENT LAYOUT PLAN & GENERATOR INSTALLATION DETAILS
M4	COOLANT PIPING PLAN, ISOMETRICS, & DETAILS
M5	DIESEL FUEL & USED OIL PIPING PLAN & DETAILS
M6	EXHAUST PIPING & MISCELLANEOUS DETAILS
M7	VENTILATION PLAN, DETAILS, & SPECIFICATIONS
MS1	MECHANICAL SUPPORT PLANS & DETAILS
FS1	FIRE SUPPRESSION SYSTEM PLAN, SECTION, & LEGEND
FS2	FIRE SUPPRESSION SYSTEM SPECIFICATIONS

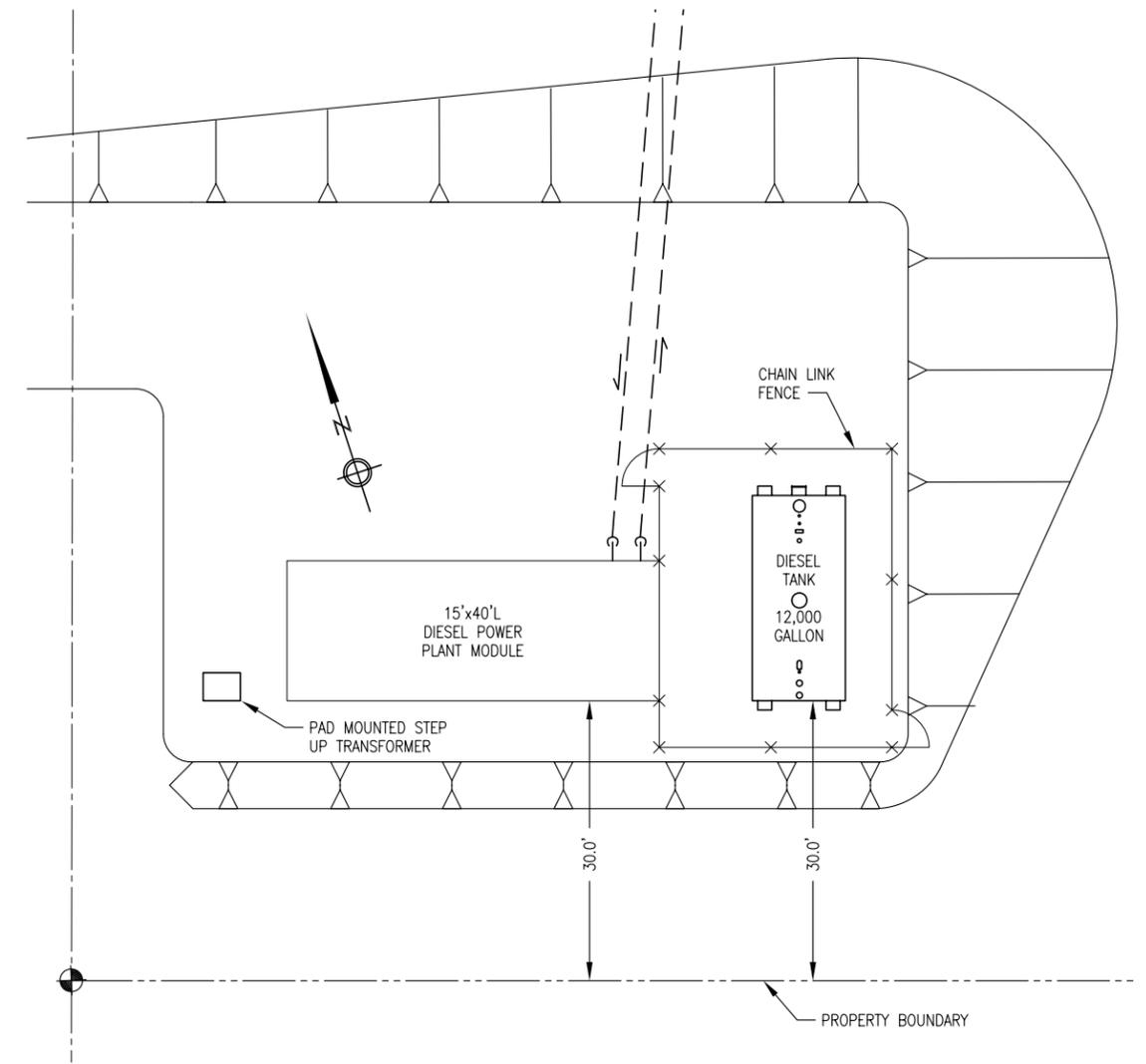
95% DESIGN
REVIEW SET
NOT FOR
CONSTRUCTION



State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 			
PROJECT:		CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT	
TITLE:		LEGEND & SCHEDULES	
ALASKA ENERGY AND ENGINEERING, INC			
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
DRAWN BY: BCG	SCALE: NO SCALE	FILE NAME: CHIT M1	SHEET: M1.1 OF 7
DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #	



1 OVERALL SITE PLAN
M1.2 1"=20'



2 ENLARGED SITE PLAN
M1.2 1"=10'

95% DESIGN REVIEW SET NOT FOR CONSTRUCTION



State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503				
PROJECT: CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT				
TITLE: SITE PLANS				
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100				
DRAWN BY: BCG	SCALE: NO SCALE	FILE NAME: CHIT M1	SHEET: M1.2 OF 7	
DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #		

**** GENERAL CONDITIONS ****

PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITIONS OF THE INTERNATIONAL FIRE CODE AND THE INTERNATIONAL BUILDING CODE INCLUDING STATE OF ALASKA AMENDMENTS. COMPLY WITH ALL APPLICABLE STATE AND FEDERAL REGULATIONS.

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

ALL EQUIPMENT AND MATERIALS SHOWN ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. WHERE ADDITIONAL OR REPLACEMENT ITEMS ARE REQUIRED, PROVIDE LIKE ITEMS BY THE SAME MANUFACTURER TO THE MAXIMUM EXTENT PRACTICAL. INSTALL ALL MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS, UNLESS INDICATED OTHERWISE.

PROTECT ALL MATERIALS AND EQUIPMENT DURING THE ENTIRE DURATION OF CONSTRUCTION WORK AGAINST CONTAMINATION OR DAMAGE. REPLACE OR REPAIR TO ORIGINAL MANUFACTURED CONDITION ANY ITEMS DAMAGED DURING CONSTRUCTION. IMMEDIATELY REPORT TO THE ENGINEER ANY ITEMS FOUND DAMAGED PRIOR TO COMMENCING CONSTRUCTION.

PERFORM WORK WITH SKILLED CRAFTSMEN SPECIALIZING IN SAID WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THESE SPECIFICATIONS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.

DO NOT CUT, DRILL, OR NOTCH STRUCTURAL MEMBERS UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. MINIMIZE PENETRATIONS AND DISRUPTION OF BUILDING FEATURES. WHERE PREVIOUSLY COMPLETED BUILDING SURFACES OR OTHER FEATURES MUST BE CUT, PENETRATED, OR OTHERWISE ALTERED, SUCH WORK SHALL BE CAREFULLY LAID OUT AND PATCHED TO ORIGINAL CONDITION. SEAL ALL EXTERIOR FLOOR AND WALL PENETRATIONS AS INDICATED.

CONTACT THE ENGINEER ONE-WEEK PRIOR TO COMPLETION OF ALL WORK TO SCHEDULE A SUBSTANTIAL COMPLETION INSPECTION. THE ENGINEER WILL GENERATE A PUNCH LIST OF CORRECTIVE ACTION ITEMS DURING THE INSPECTION. WORK WILL NOT BE CONSIDERED COMPLETE UNTIL ALL CORRECTIVE ACTION ITEMS IN THE ENGINEERS PUNCH LIST HAVE BEEN SATISFACTORILY COMPLETED AND PHOTOGRAPHIC OR OTHER POSITIVE DOCUMENTATION HAS BEEN PROVIDED TO THE ENGINEER.

PROVIDE ONE SET OF DRAWINGS CLEARLY MARKED UP WITH ALL AS-BUILT INFORMATION TO THE ENGINEER WITHIN TWO WEEKS OF COMPLETION.

**** SPECIAL CONDITIONS ****

ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK, BURN, ROTATING FANS, PULLEYS, BELTS, HOT MANIFOLDS, NOISE, ETC. ASSOCIATED WITH WORKING NEAR POWER GENERATION AND CONTROL EQUIPMENT.

**** SUPPORTS AND FASTENERS ****

SUPPORT PIPING AND EQUIPMENT AS SHOWN ON PLANS USING SPECIFIED SUPPORTS AND FASTENERS. IF NOT DETAILED ON PLANS, SUPPORT FROM STRUCTURAL MEMBERS WITH PIPE HANGERS, CLAMPS, OR PIPE STRAPS SPECIFICALLY INTENDED FOR THE APPLICATION. DO NOT SUPPORT PIPING FROM CONNECTIONS TO EQUIPMENT. INDEPENDENTLY SUPPORT PUMPS AND EQUIPMENT.

STRUCTURAL STEEL – MISCELLANEOUS SHAPES AND PLATE ASTM A–36. RECTANGULAR TUBING ASTM A–500 GRADE B. STRUCTURAL PIPE ASTM A–53 OR ASTM A–106B. PAINT AS INDICATED.

STRUT – COLD FORMED MILD STEEL CHANNEL STRUT, HOT DIPPED GALVANIZED FINISH AND SLOTTED BACK UNLESS SPECIFICALLY INDICATED OTHERWISE. STANDARD STRUT – 12 GA, 1–5/8" x 1–5/8", B–LINE B22–SH–GALV OR EQUAL. DOUBLE STRUT – 12 GA, 1–5/8" x 3–1/4", B–LINE B22A–SH–GALV OR EQUAL. SHALLOW STRUT – 14 GA, 1–5/8" x 13/16", B–LINE B54–SH–GALV OR EQUAL. WHERE STRUT IS WELDED TO TANKS OR STRUCTURES PROVIDE PLAIN (UN–FINISHED BLACK) SOLID BACK STRUT – 12 GAUGE, 1–5/8" x 1–5/8", B–LINE B22–PLN OR EQUAL. ON ALL EXTERIOR INSTALLATIONS PROVIDE TYPE 304 STAINLESS STEEL STRUT AND FITTINGS.

FITTINGS AND ACCESSORIES – PROVIDE FITTINGS, BRACKETS, CHANNEL NUTS, AND ACCESSORIES DESIGNED SPECIFICALLY FOR USE WITH SPECIFIED CHANNEL STRUT. GALVANIZED OR ZINC–PLATED CARBON STEEL EXCEPT FOR EXTERIOR INSTALLATIONS TYPE 304 STAINLESS STEEL.

PIPE CLAMPS – TWO–PIECE PIPE CLAMP DESIGNED TO SUPPORT PIPE TIGHT TO STRUT. B–LINE B20## OR EQUAL. ZINC–PLATED CARBON STEEL EXCEPT FOR EXTERIOR INSTALLATIONS TYPE 304 STAINLESS STEEL.

PIPE STRAPS – CARBON STEEL TWO–HOLE PIPE STRAP. B–LINE B2400 OR EQUAL.

FASTENERS – ALL BOLTS, NUTS, AND WASHERS ZINC PLATED ZINC–PLATED EXCEPT WHERE SPECIFICALLY INDICATED AS STAINLESS STEEL.

CABLE TIES – TYPE 304 STAINLESS STEEL SELF–LOCKING TIES, 14" NOMINAL LENGTH, PANDUIT MLT4S–CP OR EQUAL.

**** PAINTING ****

PAINTING – PAINT ALL CARBON STEEL PIPE AND FABRICATIONS AND ALL COPPER PIPE THAT IS NOT INSULATED. AFTER COMPLETION OF FABRICATION, SANDBLAST OR WIRE BRUSH TO BARE METAL AND WIPE DOWN WITH SOLVENT. ETCH COPPER PIPE WITH ACID. PRIME WITH UNIVERSAL RED OXIDE PRIMER, DEVCO RUSTGUARD 4140 OR EQUAL, COLOR RED, TO 1.5 MILS DRY FILM THICKNESS. PAINT WITH TWO COATS OF ALKYD ENAMEL, DEVCO 4308 OR EQUAL, COLOR DC2534 MEDIUM GRAY EXCEPT WHEN INDICATED OTHERWISE.

TOUCH UP – FINISH ALL CUT ENDS AND DAMAGED SURFACES OF GALVANIZED AND ZINC PLATED SUPPORTS AND FASTENERS WITH SPRAY ON COLD GALVANIZING COMPOUND, ZRC OR EQUAL. TOUCH UP PAINT ON FABRICATED ITEMS TO MATCH ORIGINAL.

**** INSULATION ****

LOW TEMPERATURE INSULATION – INSULATE GLYCOL COOLANT PIPING MAINS AND CHARGE AIR COOLING SUPPLY TUBING WHERE INDICATED. INSTALL 1" PRE–FORMED RIGID FIBERGLASS PIPE INSULATION, JOHNS–MANVILLE MICRO–LOK OR EQUAL.

MEDIUM TEMPERATURE INSULATION – INSULATE EXHAUST PIPES WHERE INDICATED. INSTALL 1" PRE–FORMED RIGID MINERAL WOOL PIPE INSULATION, ROXUL TECHTON 1200 OR EQUAL.

JACKET – INSTALL ALUMINUM JACKET OVER ALL PIPE INSULATION. EXTERIOR GRADE CORRUGATED 0.016" THICK ALUMINUM JACKETING WITH PRE–FORMED ALUMINUM FITTING COVERS, PABCO OR EQUAL.

**** DIESEL FUEL AND LUBE OIL PIPING AND VALVES ****

OIL PIPING (DFR, DFS, LOS, UOR) – ASTM A106B SCHEDULE 80 SEAMLESS BLACK STEEL PIPE. BUTT WELD JOINTS FOR ALL PIPE 2" DIAMETER AND LARGER. SOCKET WELD OR THREADED JOINTS FOR ALL PIPING SMALLER THAN 2" DIAMETER WITH MINIMUM 3000# FORGED STEEL FITTINGS. PERFORM PIPE WELDING WITH EXPERIENCED WELDER WITH CURRENT API OR EQUIVALENT CERTIFICATION FOR PIPE WELDING IN ALL POSITIONS. PROVIDE SPIRAL WOUND METALLIC GASKETS AND COAT WITH ANTI SEIZE COMPOUND PRIOR TO ASSEMBLING FLANGED JOINTS. REAM THREADED PIPE ENDS AND THOROUGHLY COAT MALE PIPE ENDS WITH HERCULES GRIPP PIPE JOINT COMPOUND PRIOR TO ASSEMBLING. TEST ALL FUEL OIL PIPING JOINTS WITH MINIMUM 50 PSIG AIR, WITH EACH JOINT SOAKED WITH A FOAMING SOAPY WATER SOLUTION, AND VISUALLY INSPECT EACH JOINT FOR LEAKS.

FLEXIBLE CONNECTORS – TYPE 321 STAINLESS STEEL CORRUGATED HOSE, TYPE 304 STAINLESS STEEL WIRE DOUBLE BRAIDED OUTER SHIELD. SCH 80 MPT OR 150# ANSI FLANGED ENDS (FIXED OR FLOATING AS INDICATED) 125 PSIG MINIMUM WORKING PRESSURE, DIAMETER AND LIVE (HOSE) OR OVERALL LENGTH AS INDICATED. PENFLEX PW 721 OR EQUAL. FURNISH WITH CERTIFICATION OF MINIMUM 125 PSIG PRESSURE TEST.

SMALL HOSES – FUEL RATED HOSE, EATON WEATHERHEAD H569 OR EQUAL. SIZE AS INDICATED ON DRAWINGS. PROVIDE RE–USABLE PLATED STEEL JIC SWIVEL ENDS, STRAIGHT OR 90° AS REQUIRED, WITH NPT ADAPTERS.

FLANGED BALL VALVES – REDUCED PORT CARBON STEEL UNI–BODY, ANSI 150# RF FLANGED ENDS, STAINLESS STEEL BALL AND TRIM, GLASS FILLED TEFLON SEAT, GRAPHITE SEALS, LOCKABLE HANDLE, 150 PSIG MINIMUM WORKING PRESSURE, NACE MR0175 CONFORMANCE, FIRE SAFE PER API 607. PBV C–5410–31–2236–GLNL, NO SUBSTITUTES.

THREADED BALL VALVES – CARBON STEEL BODY, THREADED ENDS, STAINLESS STEEL BALL AND TRIM, PTFE SEAT, GRAPHITE SEALS, LOCKABLE HANDLE, 150 PSIG MINIMUM WORKING PRESSURE, NACE MR0175 CONFORMANCE, FIRE SAFE PER API 607. PBV C–5312–38–2236–TL–NC, NO SUBSTITUTES.

FLANGED SWING CHECK VALVES (2" AND LARGER) – CARBON STEEL BODY, ANSI 150# RF FLANGED ENDS, STEEL DISC AND TRIM, 150 PSIG MINIMUM WORKING PRESSURE. CRANE CLASS 150 NO. 147 OR EQUAL.

FLANGED SWING CHECK VALVES (SMALLER THAN 2") – CARBON STEEL BODY, ANSI 150# RF FLANGED ENDS, STAINLESS STEEL TRIM AND SEATS, 150 PSIG MINIMUM WORKING PRESSURE. BONNEY FORGE L1–61 OR EQUAL.

THREADED CHECK VALVES – BRONZE BODY, THREADED ENDS, SWING CHECK STYLE, 150 PSIG MINIMUM WORKING PRESSURE. MILWAUKEE 510–S OR HAMMOND EQUAL, DOMESTIC ONLY.

FLANGED PRESSURE RELIEF VALVES – STEEL BODY, ANSI 150# RAISED FACE FLANGE INLET AND OUTLET, 1/2" SOFT SEAT ORIFICE, CLOSED CAP, SIZE AND PRESSURE SETTING AS INDICATED. HYDROSEAL 1FLARV00 OR EQUAL.

THREADED PRESSURE RELIEF VALVES – 1/2" SIZE – STEEL BODY, MPT INLET X FPT OUTLET, CLOSED CAP, SIZE AND PRESSURE SETTING AS INDICATED, HYDROSEAL 4FRV00 OR EQUAL. 1/4" SIZE – BRONZE BODY, FPT INLET AND OUTLET, PRESSURE SETTING AS INDICATED, KINGSTON 112C OR EQUAL.

FUSIBLE LINK VALVES – BRASS BODY, FPT ENDS, 165F FUSIBLE HEAD. FIROMATIC 200F FOR 1/2", FIROMATIC 400F FOR 1", OR EQUAL.

SOLENOID VALVES– 1/2" THREADED END BRASS BODY, 1/2" NPT CONDUIT CONNECTION, 120VAC, SS CORE, MOLDED EPOXY COIL ENCLOSURE, INTERNAL PILOT OPERATED, 150 PSI DIFFERENTIAL OPENING PRESSURE, LIQUID TIGHT AND FULL MODULATION AT 0 PSI DIFFERENTIAL. NORMALLY CLOSED – ASCO CAT. NO. 8210G94, NO SUBSTITUTES. NORMALLY OPEN – ASCO CAT. NO. 8210G34, NO SUBSTITUTES.

ELECTRIC ACTUATOR VALVES – 1" LOW TEMP BALL VALVE, 150# RF FLANGED ENDS, 151 IN–LB OPERATING TORQUE @ –50 DEG F. 150 PSIG MINIMUM WORKING PRESSURE. NUTRON MODEL T3–R10R01LZ–06, NO SUBSTITUTES. ELECTRIC ACTUATOR – NEMA 4 ENCLOSURE WITHOUT MANUAL OVERRIDE SHAFT EXTENSION. PTC SELF REGULATING HEATER, EXXON BEACON 325 SERVED COLD LUBRICANT, 115 VAC, 350 IN–LBS TORQUE, 10 SECOND STROKE TIME, RATED TO –50 DEG F. RCS MODEL SXR–0897, NO SUBSTITUTES. ACTUATOR COUPLING BRACKET, SHAFT, AND FASTENERS – TYPE 304 STAINLESS STEEL. CONFIGURE COUPLING TO ALLOW WRENCH ACCESS FOR MANUAL OPERATION OF VALVE WITHOUT REMOVING ACTUATOR.

**** DIESEL FUEL AND LUBE OIL EQUIPMENT AND SPECIALTIES ****

DAY TANK – RECTANGULAR HEAVY GAUGE WELDED STEEL TANK MANUFACTURED IN ACCORDANCE WITH UL STANDARD 142 AND AEA STANDARD POWER PLANT TANK FABRICATION DETAILS, NOMINAL 100 GALLON CAPACITY. FURNISH COMPLETE WITH ALL CONTROLS AND ACCESSORIES AS INDICATED.

USED OIL/DIESEL FUEL BLENDING SYSTEM – FIELD ASSEMBLED SYSTEM FOR BLENDING USED LUBRICATING OIL WITH DIESEL FUEL, CAPABLE OF AUTOMATIC OPERATION, 1% USED OIL INJECTION RATE, 30 PSIG OPERATING PRESSURE, TESTED TO 50 PSIG. PROVIDE COMPLETE WITH: 1) 20 GALLON USED OIL HOPPER; 2) PUMPS AS INDICATED IN SCHEDULE; 3) THREE STAGE FILTER BANK WITH CIM–TEK TITAN I ELEMENTS, 10 MICRON HYDROSORB ELEMENTS CIM–TEK E–1300HS–10 FIRST AND SECOND STAGE, 2 MICRON PARTICULATE ELEMENT CIM–TEK E–1300–2 FINAL STAGE; 4) 0–15 PSID DIFFERENTIAL PRESSURE GAUGES WITH ADJUSTABLE SPDT SWITCH FOR EACH FILTER, ASHCROFT 25–1132–A–25S–XV6–15, NO SUBSTITUTES; 5) NEMA 1 RATED CONTROL PANEL WITH ALARM AND SHUTDOWN FUNCTIONS; 6) ALL ASSOCIATED PIPING, VALVES, AND HOSES AS INDICATED. FABRICATE HOPPER AND FILTER BANK IN ACCORDANCE AEA STANDARD POWER PLANT TANK FABRICATION DETAILS.

FLANGED STRAINERS – "Y" TYPE CARBON STEEL BODY, ANSI 150# RAISED FACE FLANGED ENDS 150 PSIG WORKING PRESSURE, MUELLER #781 OR EQUAL. PROVIDE WITH OPTIONAL 100 MESH STAINLESS STEEL SCREEN.

THREADED STRAINERS – "Y" TYPE BRONZE BODY, SCREWED ENDS, GASKETED CAP, 20 MESH STAINLESS STEEL SCREEN, 200 PSIG WORKING PRESSURE, MUELLER #351M OR EQUAL.

DAY TANK FILTERS – ZINC TOP, 1" FPT CONNECTIONS, IMPACT RESISTANT "SEE–THRU" BOWL, 150 PSIG WORKING PRESSURE, GOLDEN ROD MODEL NO. 495 – NO SUBSTITUTES. USE STANDARD 10 MICRON FILTER ELEMENT, NO. 470–5. PROVIDE WITH FUEL FILTER WRENCH NO. 491.

DAY TANK METER – 3/4" MPT INLET AND OUTLET, ACCURATE TO +/-1% AT 8 GPH, O–RINGS AND SEALS COMPATIBLE WITH #1 DIESEL FUEL, DIRECT READ REGISTER WITH REED SWITCH PULSER ASSEMBLY. AMCO PART# OIL 92146.

DAY TANK GAUGE – MAGNETIC OPERATED SPIRAL GAUGE FOR #1 DIESEL FUEL, DIE–CAST ZINC HEAD, 1–1/2" MPT CONNECTION, ZINC–PLATED STEEL GUIDE ROD, BRASS CENTER SHAFT, EPOXY COATED CORK FLOAT, HERMETICALLY SEALED SIDE–VIEW DIAL, 25 PSIG MAXIMUM OPERATING PRESSURE, GUIDE ROD (OPERATING) LENGTH AS INDICATED ON DRAWINGS. ROCHESTER MODEL 8660 WITH SIDE–VIEW DIAL #5025S00570.

GAUGE HATCH – BRASS CAP AND CHAIN, BUNA–N GASKET, 2" FPT CONNECTION. MORRISON FIGURE 307 OR EQUAL.

CLOCK–TYPE LIQUID LEVEL GAUGE – ALUMINUM BODY, 2" MPT CONNECTION, STAINLESS STEEL FLOAT SIZED TO PASS THROUGH 2" BUNG OPENING, CLOCK–STYLE GAUGE WITH READOUT IN FEET AND INCHES UP TO 12 FEET, ACCURATE WITHIN 1/4" OVER FULL SCALE. MORRISON FIGURE 818 OR EQUAL.

FILL LIMITERS – 2" FPT FLOAT–TYPE MECHANICAL SHUT–OFF VALVE. ALUMINUM BODY, CLOSED CELL BUNA–N FLOAT, BRASS PLUNGER, STAINLESS STEEL TRIM, 100 PSIG SHUT–OFF PRESSURE. MORRISON FIGURE 9095–A OR EQUAL. PROVIDE WITH 2" ALUMINUM DROP TUBE CUT TO LENGTH AT 45 DEGREES AS REQUIRED TO TERMINATE WITHIN 6" ABOVE TANK BOTTOM.

PRESSURE/VACUUM WHISTLE VENTS – ALUMINUM BODY AND HOOD, STAINLESS STEEL SCREENS AND FLOAT, BRASS INTERNALS, VITON SEALS. 2" FPT CONNECTION, 8 OZ/SQUARE INCH PRESSURE SETTING, 1 OZ/SQUARE INCH VACUUM SETTING. HIGH INTENSITY WHISTLE ALARM ON RISE OF FLOAT AT ADJUSTABLE LEVEL. MORRISON FIGURE 922 OR EQUAL.

EMERGENCY VENTS – ALUMINUM BODY, CAST IRON COVER, 16 OZ/SQUARE INCH PRESSURE SETTING, FLANGED CONNECTION. 8" SIZE – 465,000 CFH RELIEF CAPACITY AT 2.5 PSIG, 10" SIZE – 576,000 CFH RELIEF CAPACITY AT 2.5 PSIG. MORRISON FIGURE 244–F OR EQUAL.

VENT CAPS – ALUMINUM BODY, STAINLESS STEEL SCREEN, FPT CONNECTION, SIZE AS INDICATED. MORRISON FIGURE 155 OR EQUAL.

**** GLYCOL PIPING, VALVES, AND SPECIALTIES ****

GLYCOL PIPING (ECS, ECR, HRS, HRR) – PROVIDE COPPER PIPE AND FITTINGS. PROVIDE FLEXIBLE HOSE FOR CONNECTION TO ALL ENGINES. PROVIDE SMALL DIAMETER AERQUIP HOSE WHERE INDICATED FOR INSTRUMENTATION AND BLEED LINES (SEE DIESEL FUEL PIPING SPECIFICATIONS). HYDROSTATICALLY TEST ALL PIPING AT 100 PSIG MINIMUM FOR ONE HOUR WITH NO NOTICEABLE WATER LEAKS OR PRESSURE DROP EXCEPT AS CAUSED BY TEMPERATURE CHANGE. ISOLATE ENGINES AND RADIATORS PRIOR TO PRESSURE TESTING. FLUSH PIPING WITH FRESH WATER PRIOR TO PLACING IN SERVICE.

COPPER PIPE – TYPE "L" HARD DRAWN COPPER TUBE WITH WROUGHT COPPER FITTINGS. ALL JOINTS SOLDERED WITH 95/5 TIN/ANTIMONY SOLDER OR SILVER SOLDER EXCEPT ON T–DRILL CONNECTIONS USE COPPER BRAZING ROD. REAM ALL CUT ENDS AND THOROUGHLY CLEAN PIPE ENDS AND FITTINGS PRIOR TO SOLDERING.

PROVIDE COPPER COMPANION FLANGES FOR TRANSITION TO STEEL PIPING OR FLANGED VALVES. INSTALL FULL FACED NITRILE RUBBER GASKETS, GARLOCK 9122 OR EQUAL.

ENGINE COOLANT HOSES – SIZE AS INDICATED ON DRAWINGS, SAE J 1527, USCG TYPE B–2, THERMOID BELLOWSFLEX #7910 OR EQUAL. INSTALL WITH STAINLESS STEEL T–BOLT CLAMPS. WHERE HOSE PASSES WITHIN 12" OF HOT EXHAUST COMPONENTS INSTALL HIGH TEMPERATURE SILICONE SLEEVES, EATON WEATHERHEAD A69## OR EQUAL.

**** GLYCOL PIPING, VALVES, AND SPECIALTIES (CONTINUED) ****

BALL VALVES – THREADED OR SOLDER END BRONZE BODY, CHROME PLATED BRONZE OR BRASS BALL, TFE OR VITON PACKING AND SEAT RING, MINIMUM 200 PSIG WOG RATING. DOMESTIC ONLY, HAMMOND OR MILWAUKEE, NO SUBSTITUTES. ON 2" AND SMALLER VALVES PROVIDE FULL PORT BALL. ON VALVES LARGER THAN 2" PROVIDE LARGE PORT BALL.

SWING CHECK VALVES – THREADED OR SOLDER END BRONZE BODY, SWING CHECK STYLE, MINIMUM 200 PSIG WOG RATING. DOMESTIC ONLY, HAMMOND OR MILWAUKEE, NO SUBSTITUTES.

DRAIN VALVES – BRONZE BODY, 3/4" FPT BY 3/4" MALE HOSE ENDS WITH CAP AND JACK CHAIN. WATTS B6000C, OR EQUAL. INSTALL AT ALL DRAIN AND FILL CONNECTIONS AND WHERE INDICATED.

GAUGE COCK – BRASS BODY, MPT BY FPT ENDS, T–HANDLE. LEGEND VALVE ITEM 101–531 (1/4") OR ITEM 101–532 (3/8"), OR EQUAL. INSTALL ON ALL AIR VENTS, PRESSURE GAUGES, SMALL HOSE CONNECTIONS, AND WHERE INDICATED.

PRESSURE RELIEF VALVES – THREADED END BRONZE BODY, NON–FERROUS INTERNAL COMPONENTS, ASME LABELED, 3/4" NPT CONNECTIONS, 500 MBH MINIMUM CAPACITY, SETPOINT AS INDICATED. WATTS 174A OR EQUAL.

GLYCOL FILTER – SCREW–ON CANISTER STYLE FILTER ELEMENT WITH 3/8" NPT CONNECTIONS ON HEAD. WIX #24019 HEAD WITH #24069 ELEMENT OR EQUAL.

AUTOMATIC AIR VENTS – BRASS BODY, SELF–CLOSING FLOAT OPERATED VALVE, SCREW ON CAP, 1/4" NPT CONNECTION. MAID–0–MIST AUTO AIR VENT NO. 75 OR EQUAL. PROVIDE WITH BALL VALVE ISOLATION.

LIQUID LEVEL SIGHT GAUGE – BOROSILICATE GLASS TUBE, ALUMINUM BODY, BUNA N SEALS, 1/2" MPT CONNECTIONS, 9" CENTERS. LUBE DEVICES G607–09–A–1–4 OR EQUAL.

EXPANSION TANK CAP – 2–1/2 PSIG PRESSURE, 1–1/2 OZ. VACUUM, 2" NPT CONNECTION. CIM–TEK 60001 OR EQUAL.

**** INSTRUMENTATION ****

PRESSURE GAUGES – 4" DIAL SIZE, STAINLESS STEEL CASE AND WETTED PARTS, 1/4" NPT BOTTOM CONNECTION, DRY CASE. 0–15 PSI RANGE WIKA #9745378 OR EQUAL. 0–60 PSI RANGE WIKA #9745394 OR EQUAL.

DIFFERENTIAL PRESSURE GAUGES – 2–1/2" DIAMETER DIAL, BRASS BODY, 1/4" IN–LINE CONNECTION, SPDT SWITCH WITH TERMINAL STRIP, 0–15 PSID RANGE. ASHCROFT 25–1132–A–25S–XV6–15, NO SUBSTITUTES. FACTORY SET SWITCH TO ACTIVATE AT 7 PSID

THERMOMETERS – 3" DIAL SIZE BIMETAL TYPE, STAINLESS STEEL CASE AND STEM, 1 % OF FULL SCALE ACCURACY, ADJUSTABLE ANGLE AND SWIVEL HEAD, 20F TO 240F RANGE, 2–1/2" STEM LENGTH. TEL–TRU AA–375R OR EQUAL. PROVIDE WITH 3/4"NPT BRASS THERMOWELL.

**** HEAT RECOVERY PIPING AND SPECIALTIES ****

PROVIDE PRE–INSULATED ARCTIC PIPE SYSTEM FOR NOT TO EXCEED 250F GLYCOL/WATER SERVICE IN DIRECT BURIAL INSTALLATION AS MANUFACTURED BY LOGSTOR ROR. PROVIDE WELD ELS, SHELLS/COUPLINGS, INSULATION, SHRINK SLEEVES, AND ALL OTHER COMPONENTS REQUIRED FOR A COMPLETE INSTALLATION. SCHEDULE 40 WELDED STEEL CARRIER PIPE, 12 METER NOMINAL LENGTHS, DIAMETER AS INDICATED. MINIMUM 1" POLYURETHANE INSULATION WITH HDPE JACKET. ELBOWS TO BE PRE–INSULATED WITH EQUIVALENT CONSTRUCTION TO STRAIGHT PIPE, 1 METER NOMINAL LENGTH BOTH LEGS. STRAIGHT JOINT KITS TO BE COMPRISED OF RIGID POLYURETHANE INSULATION HALF–SHELLS WITH HDPE SHRINK SLEEVES AND FILM TO FORM A CONTINUOUS WATER–TIGHT JACKET. PERMA–PIPE XTRU–THERM UTILIZING SCHEDULE 40 ASTM A53B ERW STEEL CARRIER PIPE WITH CANUSA CSC–X CASING JOINT SYSTEM IS AN ACCEPTABLE ALTERNATE. NO OTHER SUBSTITUTIONS ALLOWED. INSTALL IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

2" FLANGED FLOW METERING UNIT WITH MATCHED TEMPERATURE SENSORS: SIEMENS SITRANS F M MAGFLO MAG 3100 FLOW METER WITH SVM TCF/TSF CF085–C99T TEMPERATURE SENSORS, NO SUBSTITUTES. MULTI–FUNCTION FLOW COMPUTER WITH LCD DISPLAY AND NEMA 12 WALL MOUNT ENCLOSURE: KEP SUPERTRON II, NO SUBSTITUTES. PROVIDE WITH SOFTWARE TO ALLOW RECORDING OF POSITIVE AND NEGATIVE BTU.

**** SYSTEM STARTUP ****

ENGINE COOLANT PIPING – AFTER PRESSURE TESTING AND FLUSHING, FILL SYSTEM WITH A SOLUTION OF EXTENDED LIFE ETHYLENE GLYCOL, SHELL ROTELLA ELC, NO SUBSTITUTES, PREMIXED TO A RATIO OF 50% ETHYLENE GLYCOL TO 50% WATER.

HEAT RECOVERY PIPING – AFTER PRESSURE TESTING AND FLUSHING, BLEED AIR RESERVOIR ON EXPANSION TANK AS REQUIRED TO MAINTAIN 10 PSIG RESIDUAL WITH SYSTEM EMPTY. FILL SYSTEM WITH A PRE–MIXED SOLUTION OF 50% PROPYLENE GLYCOL AND 50% WATER, DOWFROST, SAFE/T/THERM, OR EQUAL. FILL TO 20 PSIG MINIMUM WITH SYSTEM COLD. VENT AIR FROM ALL HIGH POINTS PRIOR TO STARTING CIRCULATING PUMP. CYCLE PUMP ON AND OFF AND VENT HIGH POINTS UNTIL ALL AIR HAS BEEN PURGED FROM PIPING. ADD ADDITIONAL PRE–MIXED GLYCOL SOLUTION AS REQUIRED TO BRING SYSTEM PRESSURE TO 30 PSIG MINIMUM AT EXPANSION TANK AT NORMAL OPERATING TEMPERATURE (180F).

FUEL OIL PIPING – AFTER PRESSURE TESTING PRIME ALL PIPING WITH HAND PRIMING PUMP, FILL FILTERS WITH DIESEL FUEL, AND BLEED OFF AIR PRIOR TO STARTING ELECTRIC PUMPS.

AS COOLING SYSTEM COMES UP TO NORMAL OPERATING TEMPERATURE VERIFY OPERATION OF THERMOSTATIC VALVE. SET VARIABLE FREQUENCY DRIVES TO SPECIFIED TEMPERATURES AND TEST LEAD AND BACKUP FUNCTION BY SHUTTING OFF LEAD RADIATOR. VERIFY OPERATING SETPOINTS BY READING THERMOMETERS IN PIPING MAINS.

VERIFY OPERATION OF ALL FUEL PUMP CONTROLS INCLUDING TIMER, LEVEL ALARMS, AND USED OIL BLENDER.

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

**** SEQUENCE OF OPERATION ****

VENTILATION AIR INTAKE AND EXHAUST MOTORIZED DAMPERS WILL OPEN ANY TIME ASSOCIATED EXHAUST FAN OPERATES. RADIATOR INTAKE AND DISCHARGE DAMPERS WILL OPEN ANY TIME ASSOCIATED RADIATOR FAN OPERATES. ALL DAMPER MOTORS WILL BE NORMALLY CLOSED SPRING RETURN AND WILL CLOSE ON LOSS OF POWER (FIRE ALARM) IN LESS THAN 30 SECONDS.

EXHAUST FANS EF–1 AND EF–2 WILL OPERATE ON A CALL FOR COOLING THROUGH A LINE VOLTAGE THERMOSTAT TO MAINTAIN GENERATING ROOM TEMPERATURE, 70F, ADJUSTABLE.

UNIT HEATER UH–1 AND CIRCULATING PUMP P–HR1 WILL OPERATE ON A CALL FOR HEATING THROUGH A LINE VOLTAGE THERMOSTAT TO MAINTAIN CONTROL ROOM TEMPERATURE, 70F, ADJUSTABLE.

HEAT RECOVERY PUMPS P–HR2 AND P–HR3 WILL OPERATE CONTINUOUSLY UNDER MANUAL CONTROL.

LEAD RADIATOR R–1 VARIABLE FREQUENCY DRIVE WILL MODULATE FAN SPEED TO MAINTAIN ENGINE COOLANT RETURN TEMPERATURE AT 170F, ADJUSTABLE. BACKUP RADIATOR R–2 VARIABLE FREQUENCY DRIVE WILL MODULATE FAN SPEED TO MAINTAIN ENGINE COOLANT RETURN TEMPERATURE AT 180F, ADJUSTABLE. FANS WILL SHUT OFF WHEN SPEED IS BELOW 10%, ADJUSTABLE, OR WHEN COOLANT RETURN TEMPERATURE IS MORE THAN 10F BELOW SETPOINT, ADJUSTABLE.

DAY TANK WILL HAVE AUTOMATIC FILL CONTROLS WITH REDUNDANT HIGH AND LOW LEVEL ALARMS AND TIMERS. SEE FUEL SYSTEM CONTROL DRAWINGS FOR DETAILED SEQUENCE. INTERLOCK USED OIL/DIESEL FUEL BLENDER TO RUN ANY TIME DAY TANK FILL PUMP RUNS.

WHEN THE HEAT RECOVERY RETURN TEMPERATURE IS EQUAL TO OR GREATER THAN THE HEAT RECOVERY SUPPLY TEMPERATURE, AN AMBER LAMP "NO LOAD ON HEAT RECOVERY" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE. WHEN THE HEAT RECOVERY SUPPLY TEMPERATURE IS A MINIMUM OF 1'F GREATER THAN THE HEAT RECOVERY RETURN TEMPERATURE THE LAMP WILL TURN OFF.

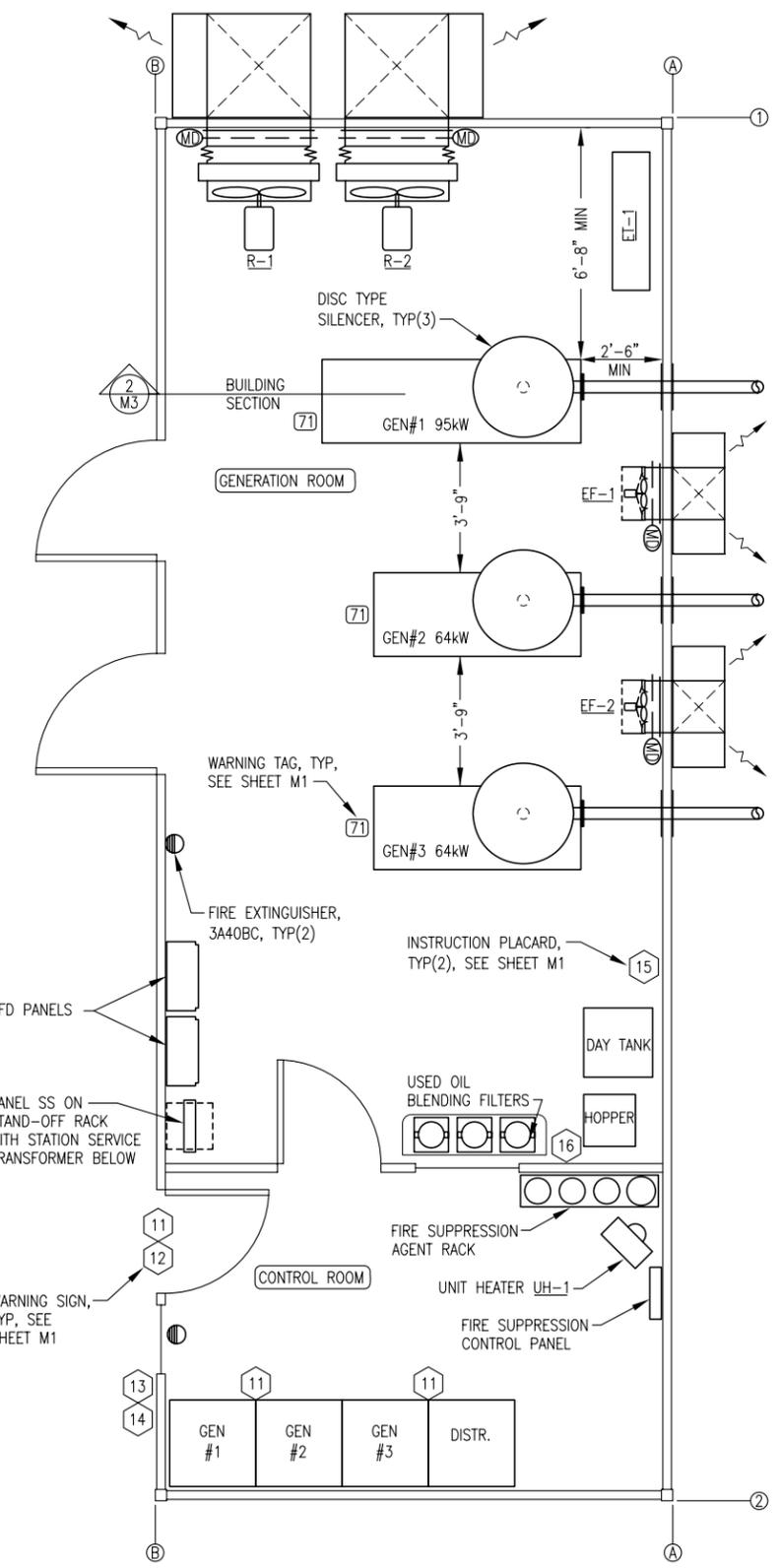
WHEN THE SYSTEM PRESSURE IN THE RECOVERED HEAT PIPING DROPS TO 12 PSIG, ADJUSTABLE, THE NORMALLY OPEN PRESSURE SWITCH WILL CLOSE AND A RED LAMP "HEAT RECOVERY LOSS OF PRESSURE" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

WHEN THE FLOW RATE IN THE PIPING FALLS BELOW 0.3 FEET PER SECOND, ADJUSTABLE, FOR A MINIMUM OF 30 SECONDS, ADJUSTABLE, THE NORMALLY OPEN FLOW SWITCH WILL CLOSE AND A RED LAMP "HEAT RECOVERY LOSS OF FLOW" LOCATED IN THE SWITCHGEAR MASTER SECTION WILL ILLUMINATE.

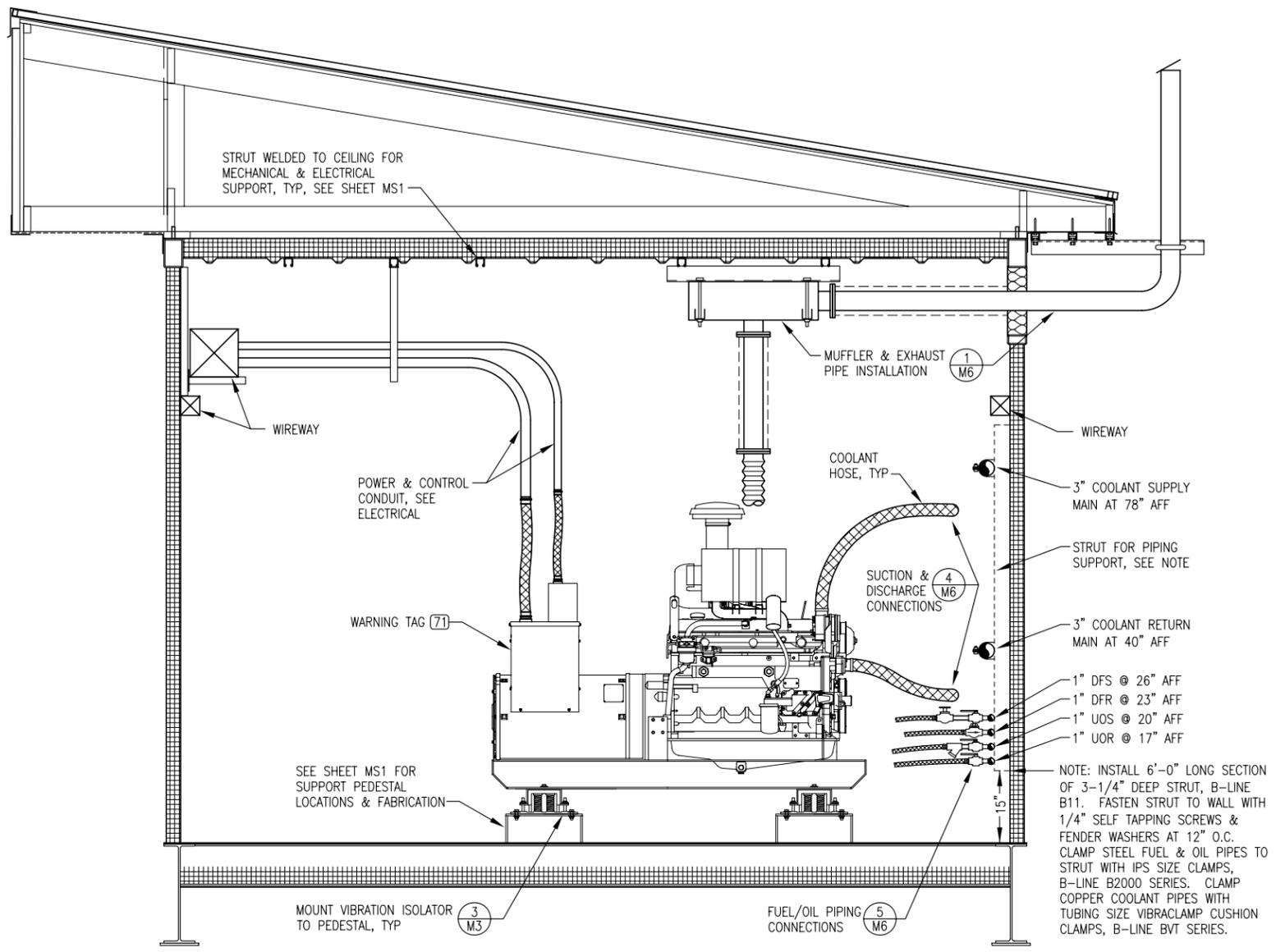
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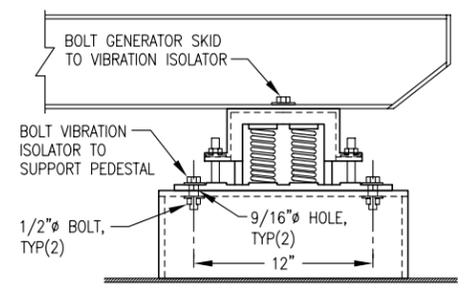
 <p>State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503</p> 			
PROJECT:		CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT	
TITLE:		MECHANICAL SPECIFICATIONS	
ALASKA ENERGY AND ENGINEERING, INC			
P.O. BOX 111405		ANCHORAGE, ALASKA 99511–1405	PHONE (907) 349–0100
DRAWN BY: BCG	SCALE: NO SCALE	FILE NAME: CHIT M2–7	SHEET: OF
DESIGNED BY: BCG	DATE: 12–06–06	PROJECT NUMBER: #	M2 7



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



2 BUILDING SECTION/GENERATOR INSTALLATION
 M3 3/4"=1'-0"



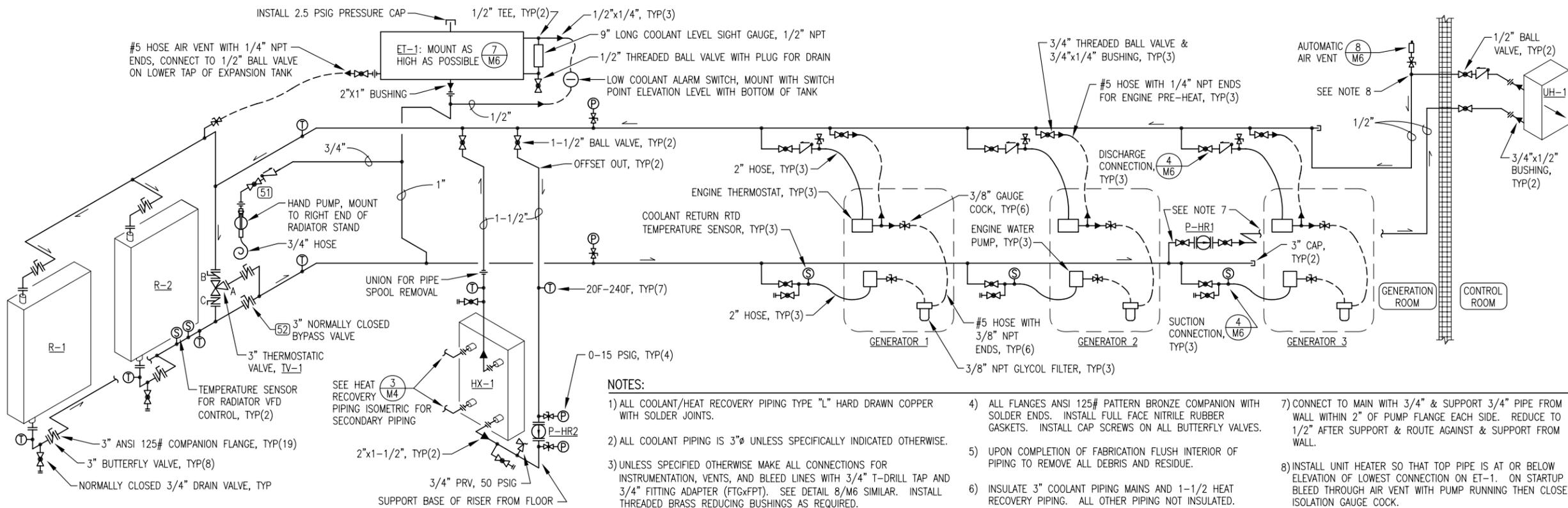
NOTE: VIBRATION ISOLATORS FURNISHED WITH GENERATORS. VERIFY GENERATOR SKID & VIBRATION ISOLATOR BOLTING DIMENSIONS PRIOR TO DRILLING PEDESTALS.

3 VIBRATION ISOLATOR INSTALLATION
 M3 1"=6"

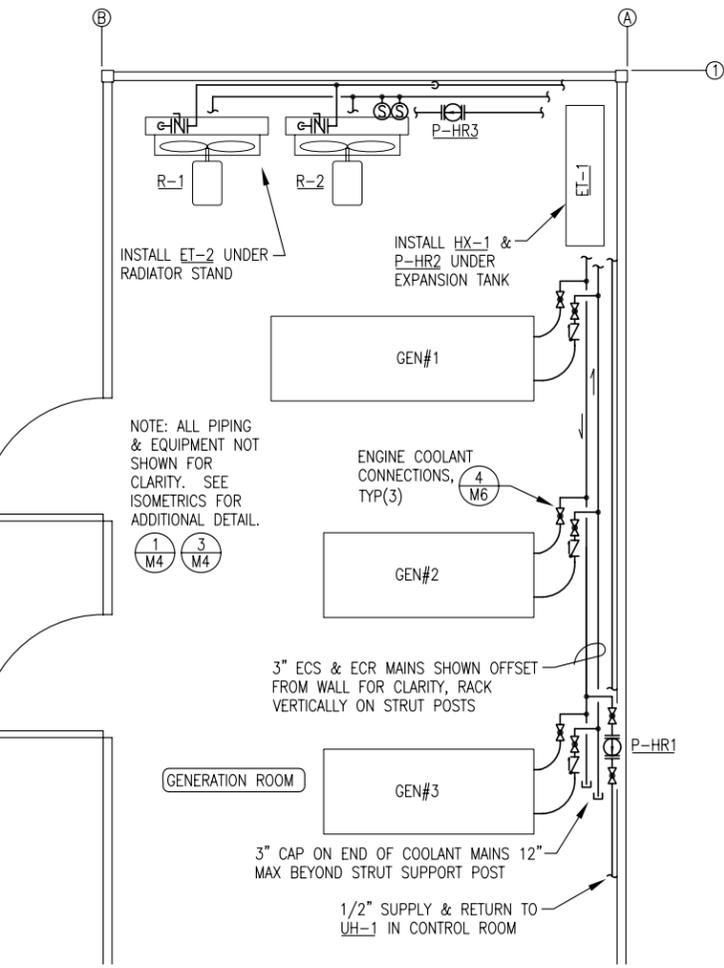
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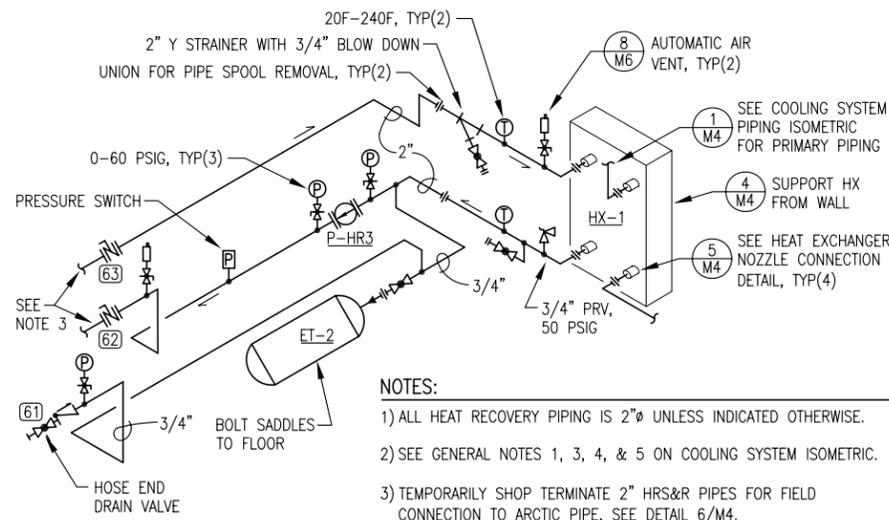
State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503				
PROJECT: CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT				
TITLE: EQUIPMENT LAYOUT PLAN & GENERATOR INSTALLATION DETAILS				
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100				
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DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #	OF 7	



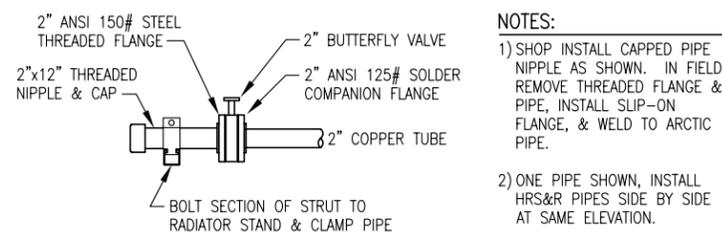
1 COOLING SYSTEM PIPING ISOMETRIC
M4 NO SCALE



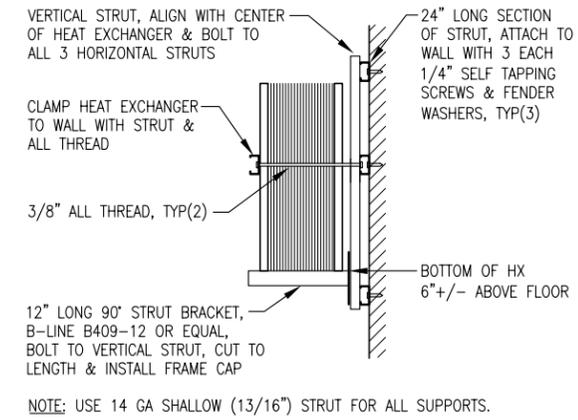
2 COOLANT PIPING PLAN
M4 3/8"=1'-0"



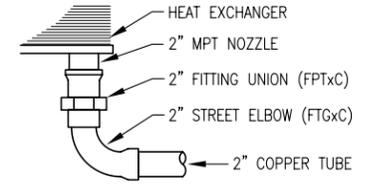
3 HEAT RECOVERY PIPING ISOMETRIC
M4 NO SCALE



6 SHOP TERMINATION OF HEAT RECOVERY PIPE
M4 NO SCALE



4 HEAT EXCHANGER SUPPORT FROM WALL
M4 NO SCALE

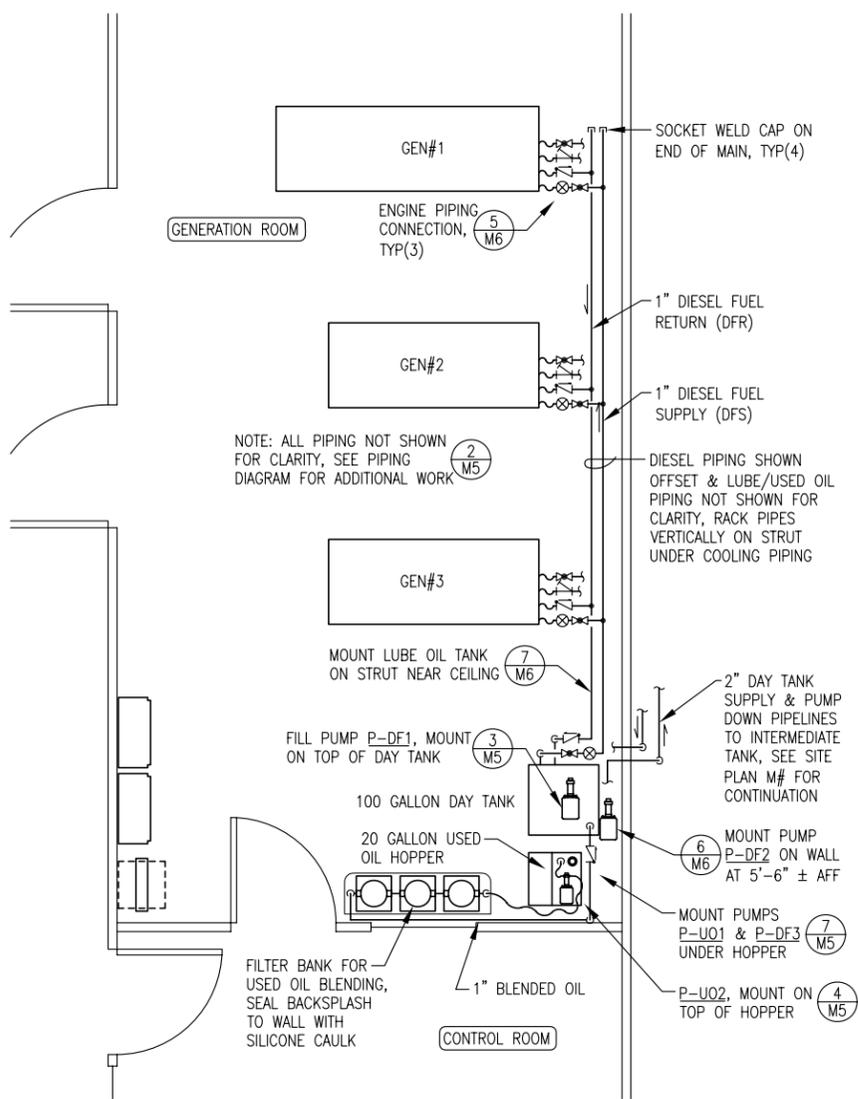


5 TYPICAL HX PIPING CONNECTION
M4 NO SCALE

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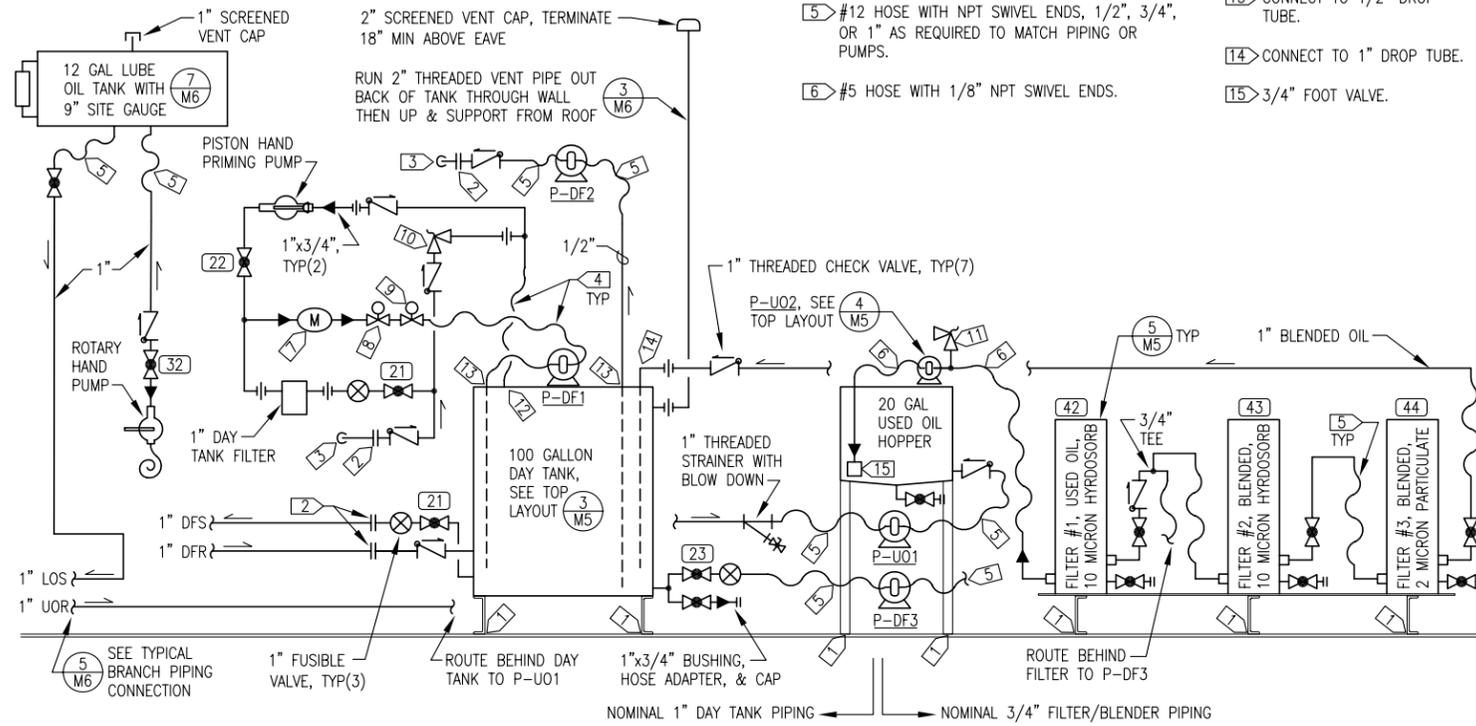


State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503			
PROJECT:		CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT	
TITLE: COOLANT PIPING PLAN, ISOMETRICS, & DETAILS			
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
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DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #	



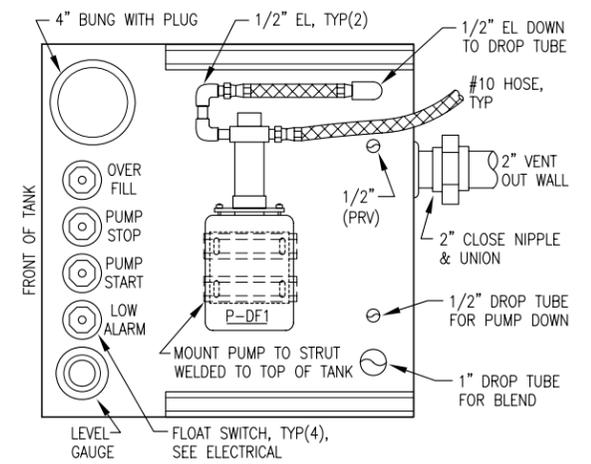
1 DIESEL FUEL & USED OIL PIPING PLAN
 M5 3/8"=1'-0"

- GENERAL NOTES:**
- 1) FABRICATE DAY TANK, LUBE OIL TANK, AND HOPPER IN ACCORDANCE WITH AEA STANDARD POWER PLANT TANK FABRICATION DETAILS. PLUG/CAP ALL SPARE OPENINGS.
 - 2) ALL PIPING BLACK STEEL EXCEPT STAINLESS VENT PIPE AS NOTED. ALL DAY TANK PIPING, VALVES, & FITTINGS 1" THREADED. ALL FILTER/BLENDER PIPING, VALVES, & FITTINGS 3/4" THREADED UNLESS SPECIFICALLY NOTED OTHERWISE. SUPPORT PIPING FROM WALL, SEE DETAIL 6/M6.
 - 3) LABEL TOP OF EACH FILTER WITH NUMBER AND DESCRIPTION SHOWN ON EACH FILTER. INSTALL 0-15 PSI DIFFERENTIAL PRESSURE GAUGE ON EACH FILTER, SET SWITCH TO 7 PSI.
 - 4) UPON FINAL INSTALLATION IN FIELD SEAL ALL PIPING WALL PENETRATIONS.

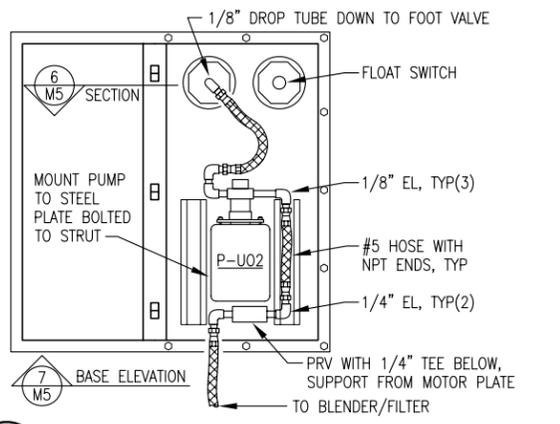


2 DIESEL FUEL & USED OIL PIPING DIAGRAM
 M5 NO SCALE

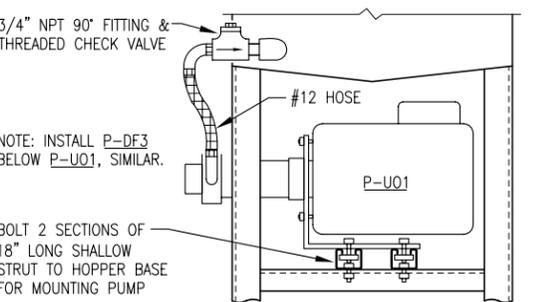
- SPECIFIC NOTES:**
- 1) FASTEN BASE TO FLOOR WITH 3/8" SELF-TAPPING SCREWS.
 - 2) SOCKET WELD/THREADED FLANGE PAIR.
 - 3) 1" DAY TANK SUPPLY/PUMP DOWN OUT WALL. SHOP INSTALL THREADED ELBOW AT WALL PENETRATION. IN FIELD INSTALL THREADED HALF NIPPLE THROUGH WALL FOR CONNECTION TO SOCKET WELD EXTERIOR PIPING.
 - 4) #10 HOSE WITH NPT SWIVEL ENDS, 1/2" NPT EXCEPT ON P-DF1 PROVIDE 3/8" NPT ENDS.
 - 5) #12 HOSE WITH NPT SWIVEL ENDS, 1/2", 3/4", OR 1" AS REQUIRED TO MATCH PIPING OR PUMPS.
 - 6) #5 HOSE WITH 1/8" NPT SWIVEL ENDS.
 - 7) 3/4" DAY TANK METER.
 - 8) 1/2" NO SOLENOID VALVE.
 - 9) 1/2" NC SOLENOID VALVE.
 - 10) 1" THREADED PRV, 25 PSIG.
 - 11) 1/4" THREADED PRV, 30 PSIG.
 - 12) CONNECT HAND PUMP/PRV DISCHARGE TO 1/2" BUNG.
 - 13) CONNECT TO 1/2" DROP TUBE.
 - 14) CONNECT TO 1" DROP TUBE.
 - 15) 3/4" FOOT VALVE.



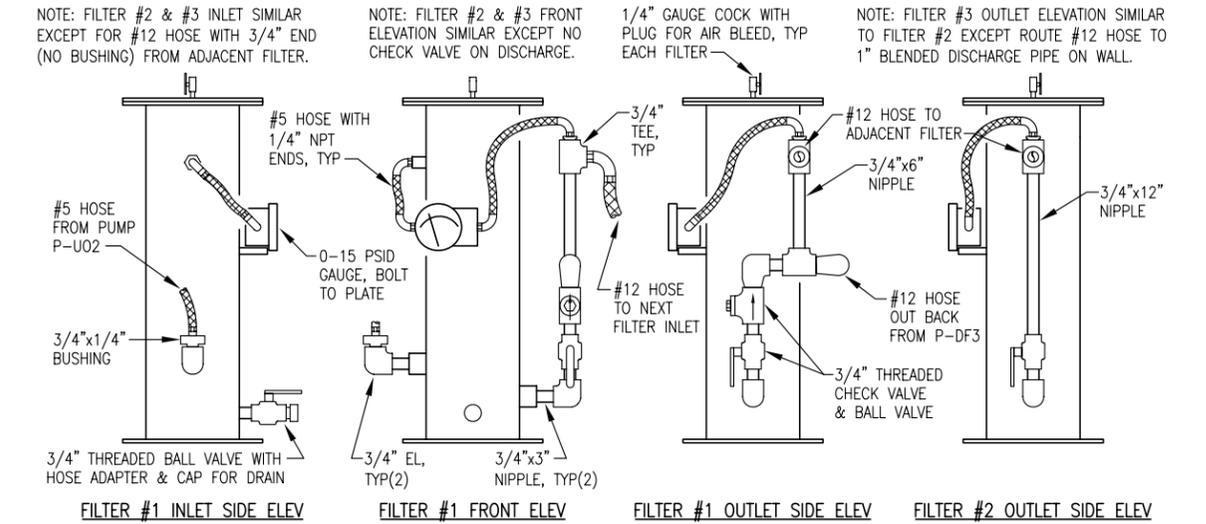
3 TOP OF DAY TANK - PLAN VIEW
 M5 NO SCALE



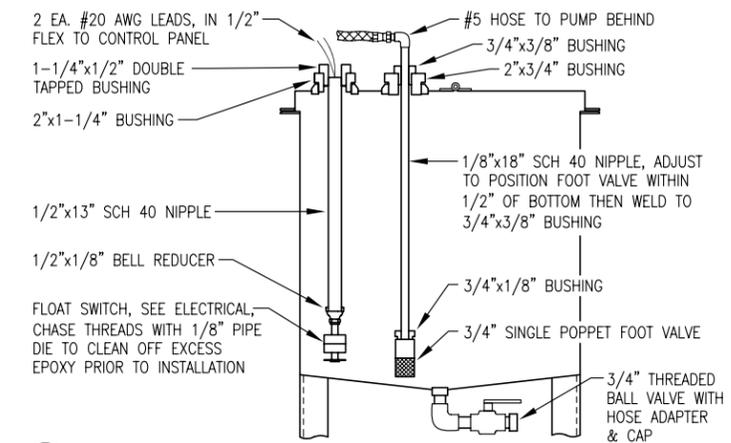
4 TOP OF HOPPER - PLAN VIEW
 M5 NO SCALE



7 HOPPER BASE ELEVATION
 M5 NO SCALE



5 FILTER PIPING ELEVATIONS
 M5 NO SCALE



6 SECTION THROUGH HOPPER
 M5 NO SCALE

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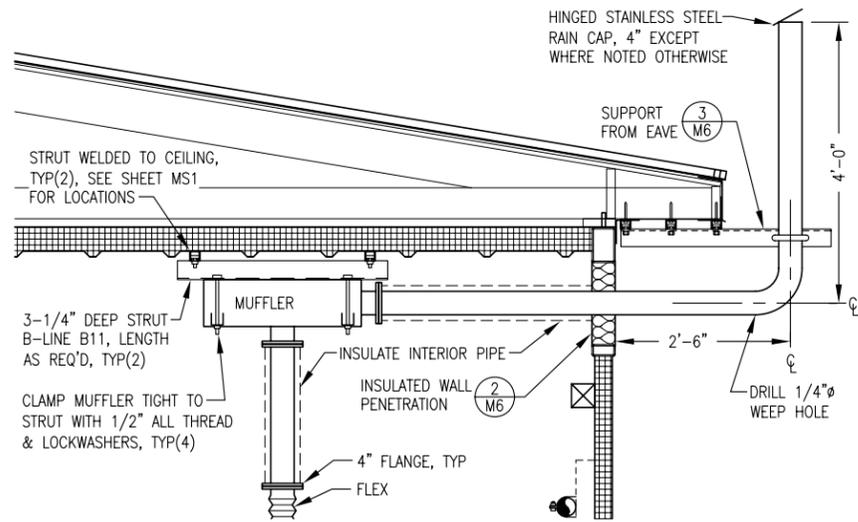
ALASKA ENERGY AUTHORITY

PROJECT: **CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT**

TITLE: **DIESEL FUEL & USED OIL PIPING PLAN & DETAILS**

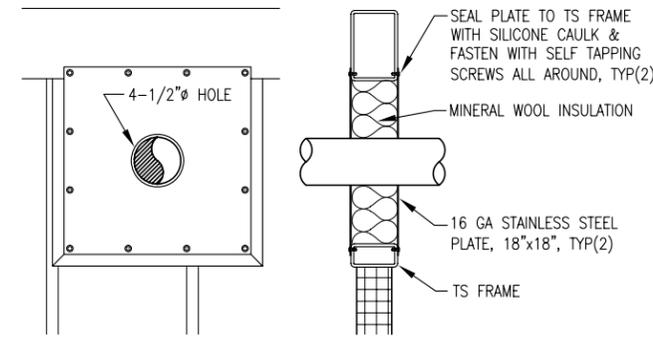
ALASKA ENERGY AND ENGINEERING, INC
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DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #	OF 7

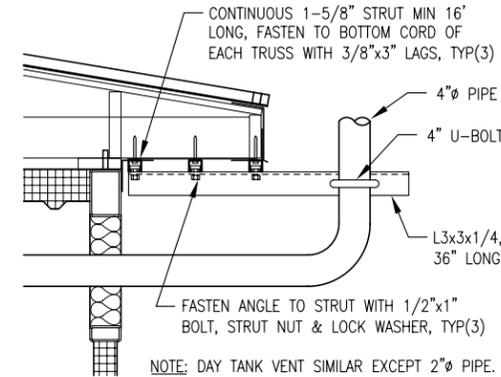


- NOTES:**
- 1) FLEXES FURNISHED WITH GENERATORS. MUFFLERS, CONNECTING PIPE, FLANGES, STRUT, AND ACCESSORIES TO BE FURNISHED AS PART OF MODULE CONSTRUCTION.
 - 2) MUFFLERS TO BE CRITICAL GRADE, INTERNALLY INSULATED DISK STYLE. ALL PIPE 4" SCH 40. ALL FLANGES 4" ANSI 150# FLAT FACED. INSTALL HIGH TEMPERATURE FULL FACE STAINLESS STEEL AND GRAPHITE GASKETS, GARLOCK 312555 OR EQUAL.
 - 3) INSULATE INTERIOR EXHAUST PIPING WITH 1" MEDIUM TEMPERATURE INSULATION FROM FLEX TO MUFFLER AND FROM MUFFLER TO WALL PENETRATION.
 - 4) SHOP FABRICATE AND INSTALL COMPLETE ASSEMBLY AS SHOWN FOR MODULE LOAD TEST. REMOVE OUTLET PIPE FOR SHIPPING. IN FIELD INSTALL EAVE SUPPORT AND RE-INSTALL OUTLET PIPE.
 - 5) ON 37 KW GENERATORS INSTALL 4"x3" CONCENTRIC WELD REDUCER AND 3" CAP. ON ALL OTHER GENERATORS INSTALL 4" CAP.

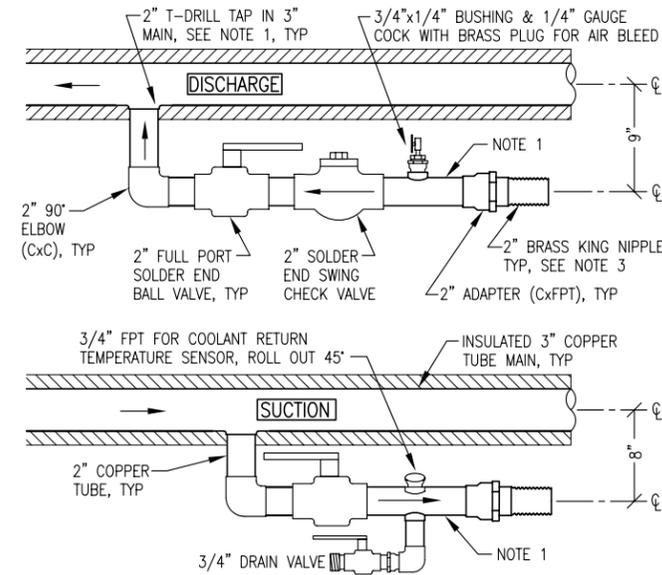
1 M6 MUFFLER & EXHAUST PIPE INSTALLATION
3/4"=1'-0"



2 M6 INSULATED WALL PENETRATION
1'-1/2"=1'-0"

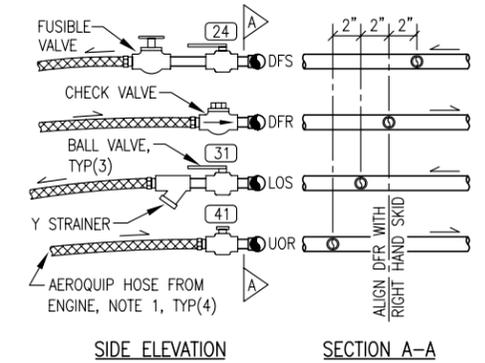


3 M6 OUTLET PIPE SUPPORT
1'-1'-0"



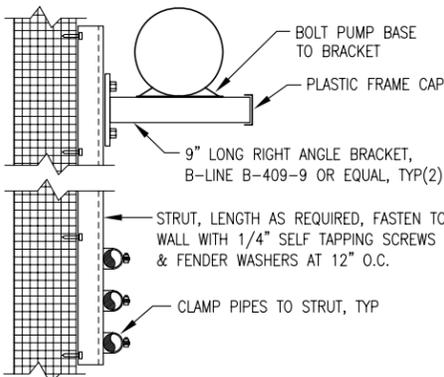
- NOTES:**
- 1) INSTALL 3" MAINS ON WALL THEN LOCATE 2" BRANCH TAPS TO ALIGN VALVES WITH COOLANT HOSES WITH 90° BEND IN HOSE. LAY OUT BRANCH PIPING TO ALLOW 2" PIPE TO BE STRAPPED TO STRUT SUPPORT POST AT ONE POINT DOWNSTREAM OF BALL VALVE.
 - 2) MAKE 3/4" THREADED CONNECTIONS WITH 3/4" FITTING ADAPTER (FTGxFPT) OR 3/4" PIPE & ADAPTER IN 3/4" T-DRILL TAP.
 - 3) FOR 1-7/8" & 1-3/4" HOSES INSTALL CUSTOM FIT 2" KING NIPPLE WITH BARBED END PRESSED TO HOSE I.D. FOR 1-1/2" HOSES INSTALL 2"x1-1/2" BRASS BUSHING AND 1-1/2" KING NIPPLE.

4 M6 TYPICAL ENGINE COOLANT PIPING CONNECTIONS
NO SCALE

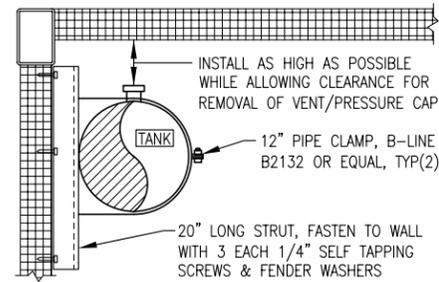


- NOTES:**
- 1) AEROQUIP HOSES PROVIDED WITH ENGINE, SIZE VARIES PER ENGINE & PRODUCT. ALL EQUIPPED WITH 1/2" MPT SWIVEL ENDS. CUT TO LENGTH & INSTALL ENDS.
 - 2) MAKE ALL CONNECTIONS TO 1" MAINS WITH 1/2" THREAD-0-LET.
 - 3) ALL PIPING & NIPPLES SCH 80.
 - 4) ALL VALVES & STRAINERS 1/2" SIZE WITH THREADED ENDS. INSTALL 1/4" GAUGE COCK WITH PLUG ON STRAINER BLOW DOWN.

5 M6 ENGINE FUEL/OIL PIPING CONNECTION
NO SCALE

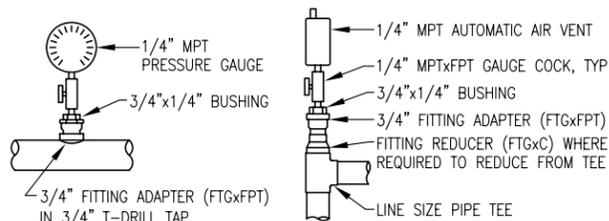


6 M6 DAY TANK PUMP & PIPING SUPPORT
NO SCALE



7 M6 EXPANSION/LUBE OIL TANK SUPPORT
NO SCALE

NOTE: CLOSE GAUGE COCKS ON AIR VENTS AFTER BLEEDING SYSTEM OF AIR. LEAVE GAUGE COCKS OPEN ON PRESSURE GAUGES.

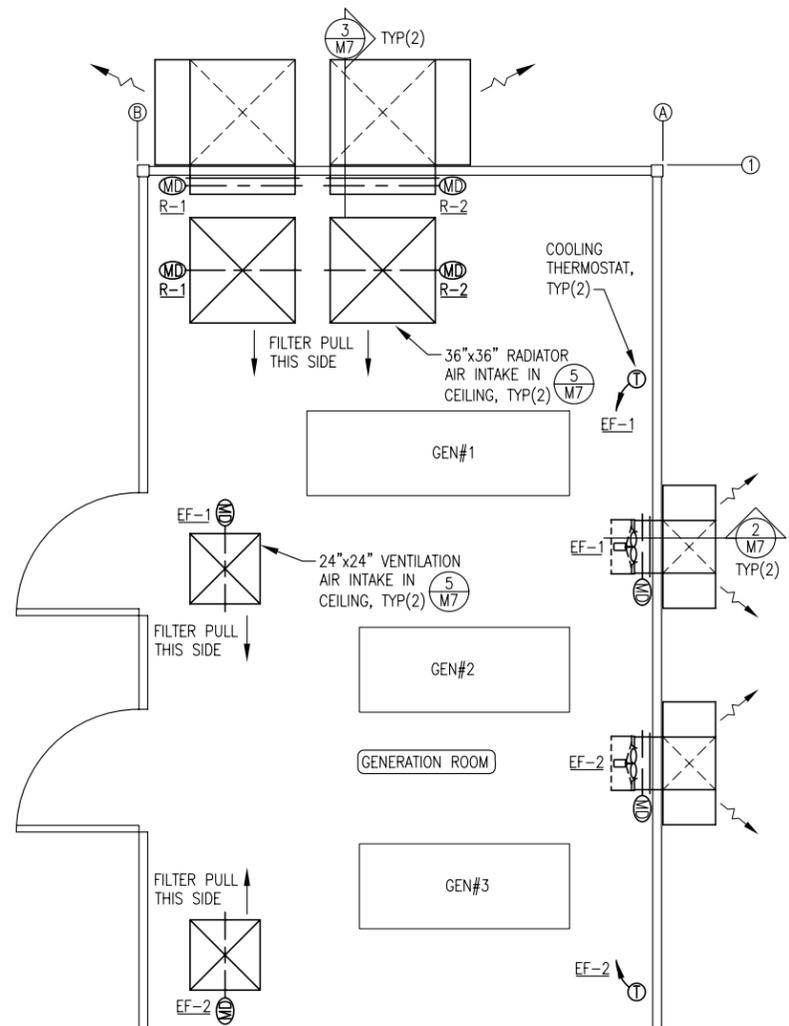


8 M6 TYPICAL AIR VENT & PRESSURE GAUGE
NO SCALE

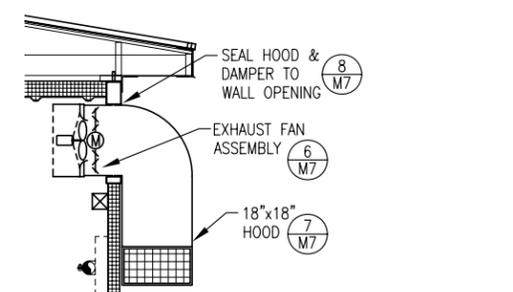
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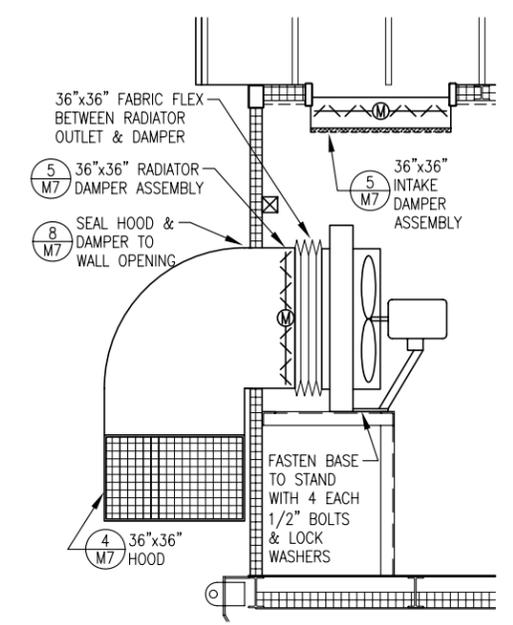
State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503			
PROJECT: CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT			
TITLE: EXHAUST, PIPING, & MISCELLANEOUS DETAILS			
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
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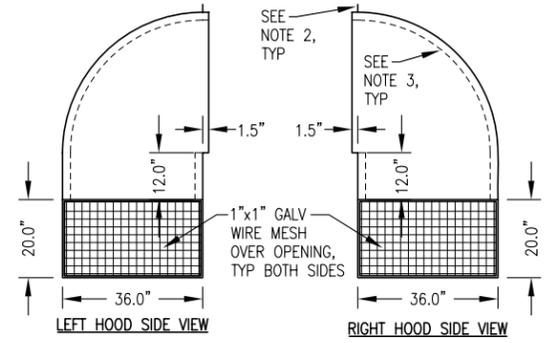
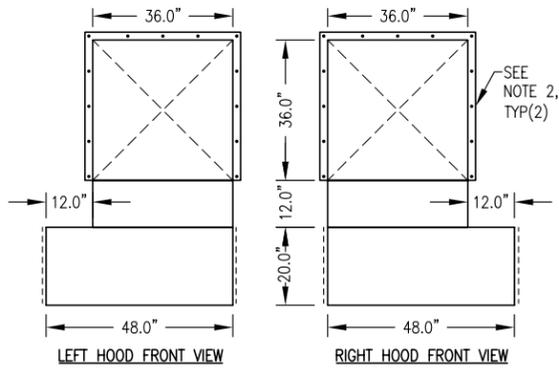
1 VENTILATION PLAN
3/8"=1'-0"



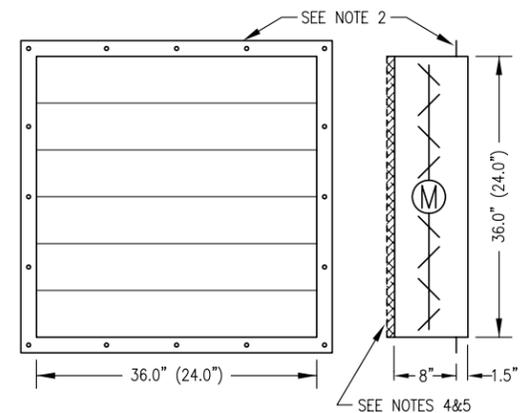
2 EXHAUST FAN INSTALLATION
1/2"=1'-0"



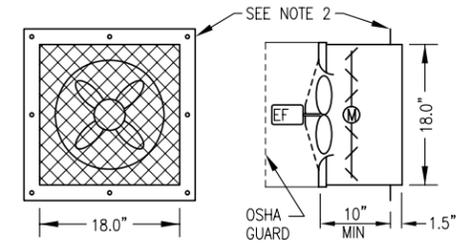
3 RADIATOR INSTALLATION
1/2"=1'-0"



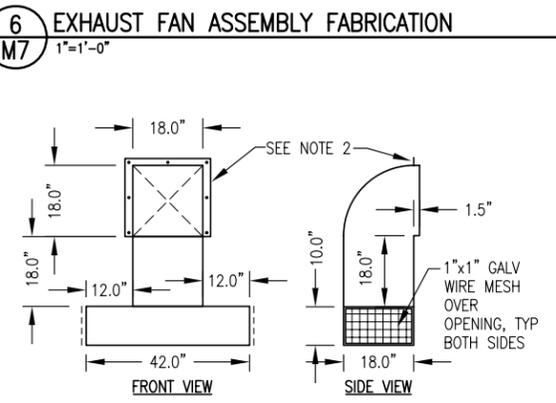
4 RADIATOR HOOD FABRICATION
1/2"=1'-0"



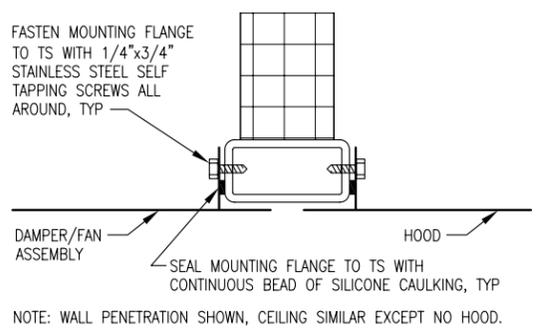
5 INTAKE AIR/RADIATOR DAMPER FABRICATION
1"=1'-0"



6 EXHAUST FAN ASSEMBLY FABRICATION
1"=1'-0"



7 EXHAUST HOOD FABRICATION
1/2"=1'-0"



8 TYPICAL WALL/CEILING PENETRATION
3"=1'-0"

VENTILATION EQUIPMENT SPECIFICATIONS

GENERAL - PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE INTERNATIONAL MECHANICAL CODE AND APPLICABLE SMACNA STANDARDS.

INTERIOR SHEET METAL FABRICATIONS - FABRICATE ALL DAMPER AND FAN ASSEMBLIES FROM MINIMUM 20 GAUGE GALVANIZED SHEET METAL USING STANDARD MECHANICAL JOINTS. SEAL ALL JOINTS AIR TIGHT. PAINTING NOT REQUIRED.

EXTERIOR SHEET METAL FABRICATIONS - FABRICATE ALL HOODS FROM MINIMUM 16 GAUGE GALVANIZED SHEET METAL USING CONTINUOUS SEAL WELDS FOR ALL JOINTS. UPON COMPLETION OF FABRICATION PAINT AS INDICATED BELOW. INSTALL 1" NEOPRENE FACED FIBERGLASS SOUND LINER WHERE INDICATED.

PAINTING - UPON COMPLETION OF FABRICATION OF EXTERIOR ASSEMBLIES, WIRE BRUSH WELD AREAS AND FINISH WITH COLD GALVANIZING COMPOUND, ZRC OR EQUAL. ETCH ENTIRE EXTERIOR SURFACE OF HOOD WITH ACID TO PREPARE FOR PAINTING. PRIME WITH ONE COAT OF EPOXY, DEVOE BAR-RUST 236, NO SUBSTITUTES, COLOR WHITE, TO 6 MILS MINIMUM DRY FILM THICKNESS. FINISH WITH ONE COAT OF ALIPHATIC URETHANE ENAMEL, DEVOE DEVTHANE 389, NO SUBSTITUTES, COLOR WHITE, TO 3 MILS MINIMUM DRY FILM THICKNESS. PERFORM ALL PAINTING IN A WARM DRY ENVIRONMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS INCLUDING DRYING TIME TO RE-COAT.

EXHAUST FANS - DIRECT DRIVE 12"Ø PROPELLER SIDEWALL EXHAUST FAN, 1,280 CFM AT 0.25" SP, 1,750 RPM, 1/4 HP, 115 V, 1 PH. GREENHECK SE1-12-432-A4 OR EQUAL. PROVIDE WITH OSHA APPROVED GUARD.

DAMPERS - OPPOSED BLADE LOW-LEAKAGE CONTROL DAMPER. GALVANIZED STEEL CONSTRUCTION, 304 STAINLESS STEEL BEARINGS AND JAMB SEALS, EPDM BLADE SEALS. GREENHECK VCD-23 OR EQUAL. SEE FABRICATION DETAILS FOR SIZES.

ACTUATORS - INSTALL 120V SPRING RETURN ACTUATOR, BELIMO, NO SUBSTITUTES. SEE FABRICATION DETAILS FOR MODEL NUMBER.

INSTALLATION - SHOP INSTALL ALL FAN AND DAMPER ASSEMBLIES. SHOP VERIFY HOOD FIT BUT SHIP LOOSE FOR FIELD INSTALLATION.

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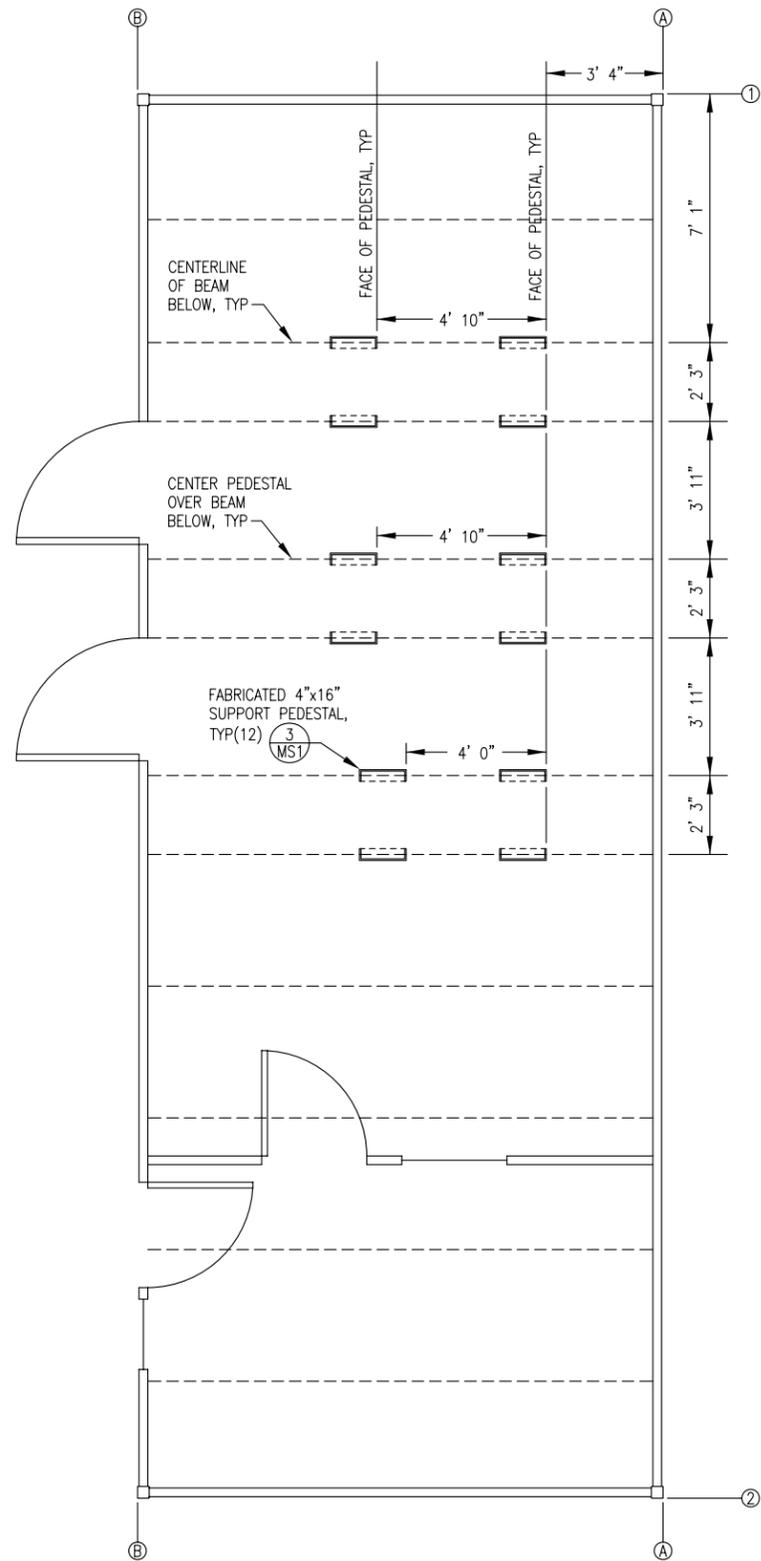
ALASKA ENERGY AUTHORITY

PROJECT: **CHITINA POWER SYSTEM UPGRADE
MODULAR DIESEL POWER PLANT**

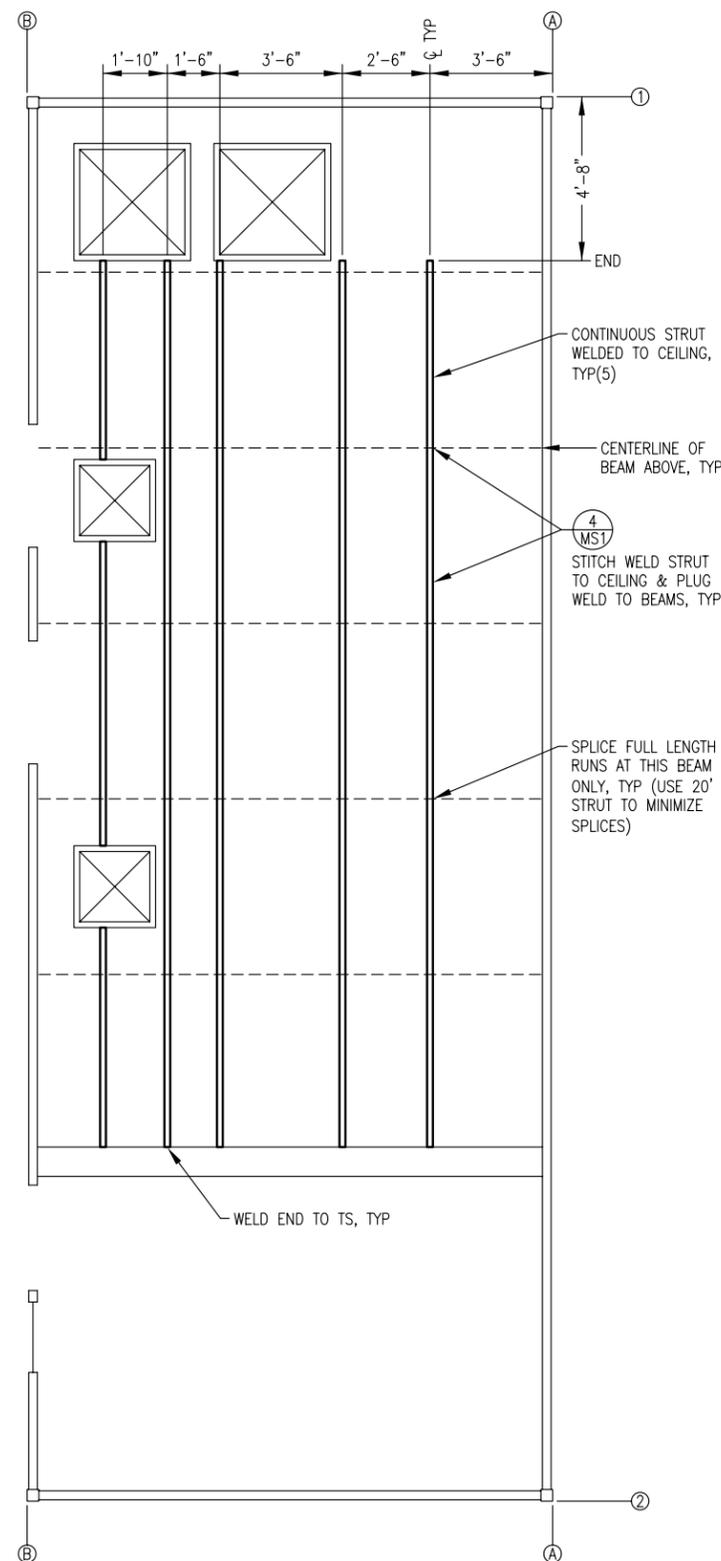
TITLE: **VENTILATION PLAN, DETAILS, & SPECIFICATIONS**

ALASKA ENERGY AND ENGINEERING, INC
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

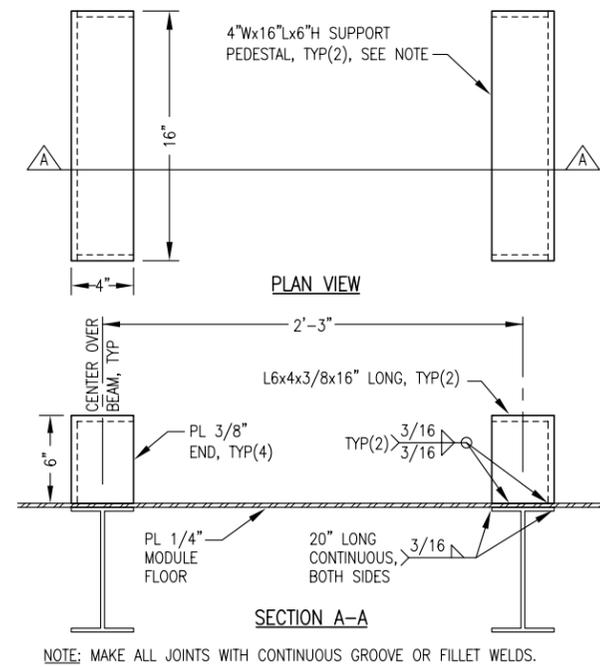
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1 GENERATOR SUPPORT PEDESTAL LAYOUT PLAN
MS1 3/8"=1'-0"



2 CEILING STRUT SUPPORT LAYOUT PLAN
MS1 3/8"=1'-0"



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

3 SUPPORT PEDESTAL FABRICATION
MS1 1"=6"

4 STRUT ATTACHMENT TO CEILING
MS1 NO SCALE

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State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503

ALASKA ENERGY AUTHORITY

PROJECT: CHITINA POWER SYSTEM UPGRADE
MODULAR DIESEL POWER PLANT

TITLE: MECHANICAL SUPPORT PLANS & DETAILS

ALASKA ENERGY AND ENGINEERING, INC
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

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DESIGNED BY: BCG	DATE: 12-06-06	PROJECT NUMBER: #	OF 1

**** GENERAL CONDITIONS ****

PERFORM ALL WORK IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE INCLUDING STATE OF ALASKA AMENDMENTS.

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

ALL EQUIPMENT AND MATERIALS SHOWN ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. WHERE ADDITIONAL OR REPLACEMENT ITEMS ARE REQUIRED, PROVIDE LIKE ITEMS BY THE SAME MANUFACTURER TO THE MAXIMUM EXTENT PRACTICAL. INSTALL ALL MATERIALS IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND INSTRUCTIONS, UNLESS INDICATED OTHERWISE.

PROTECT ALL MATERIALS AND EQUIPMENT DURING THE ENTIRE DURATION OF CONSTRUCTION WORK AGAINST CONTAMINATION OR DAMAGE. REPLACE OR REPAIR TO ORIGINAL MANUFACTURED CONDITION ANY ITEMS DAMAGED DURING CONSTRUCTION. IMMEDIATELY REPORT TO THE ENGINEER ANY ITEMS FOUND DAMAGED PRIOR TO COMMENCING CONSTRUCTION.

PERFORM WORK WITH SKILLED CRAFTSMEN SPECIALIZING IN SAID WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THESE SPECIFICATIONS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.

DO NOT CUT, DRILL, OR NOTCH STRUCTURAL MEMBERS UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. MINIMIZE PENETRATIONS AND DISRUPTION OF BUILDING FEATURES. WHERE PREVIOUSLY COMPLETED BUILDING SURFACES OR OTHER FEATURES MUST BE CUT, PENETRATED, OR OTHERWISE ALTERED, SUCH WORK SHALL BE CAREFULLY LAID OUT AND PERFORMED, AND PATCHED TO ORIGINAL CONDITION. SEAL ALL EXTERIOR FLOOR AND WALL PENETRATIONS AS INDICATED.

CONTACT THE ENGINEER ONE-WEEK PRIOR TO COMPLETION OF ALL WORK TO SCHEDULE A SUBSTANTIAL COMPLETION INSPECTION. THE ENGINEER WILL GENERATE A PUNCH LIST OF CORRECTIVE ACTION ITEMS DURING THE INSPECTION. WORK WILL NOT BE CONSIDERED COMPLETE UNTIL ALL CORRECTIVE ACTION ITEMS IN THE ENGINEERS PUNCH LIST HAVE BEEN SATISFACTORILY COMPLETED AND PHOTOGRAPHIC OR OTHER POSITIVE DOCUMENTATION HAS BEEN PROVIDED TO THE ENGINEER.

PROVIDE ONE SET OF DRAWINGS CLEARLY MARKED UP WITH ALL AS-BUILT INFORMATION TO THE ENGINEER WITHIN TWO WEEKS OF COMPLETION.

**** SPECIAL CONDITIONS ****

ENSURE THAT APPROPRIATE SAFETY MEASURES ARE IMPLEMENTED AND THAT ALL WORKERS ARE AWARE OF THE POTENTIAL HAZARDS FROM ELECTRICAL SHOCK, BURN, ROTATING FANS, PULLEYS, BELTS, HOT MANIFOLDS, NOISE, ETC. ASSOCIATED WITH WORKING NEAR POWER GENERATION AND CONTROL EQUIPMENT.

CHANGE OVER FROM OLD SYSTEMS TO NEW SYSTEMS WILL REQUIRE SHUT DOWN OF THE POWER GENERATION SYSTEM. PLAN OUT AND COORDINATE WORK TO MINIMIZE DISRUPTION OF LOCAL POWER SERVICE. SCHEDULE OUTAGES IN ADVANCE WITH THE VILLAGE OFFICE.

**** DEVICES AND EQUIPMENT ****

DEVICES – LISTED FOR INTENDED SERVICE. MANUFACTURER/MODEL IN THE EQUIPMENT SCHEDULE IS PROVIDED TO INDICATE REQUIRED FEATURES. SUBSTITUTIONS OF EQUIVALENT ITEMS WILL BE ACCEPTED UNLESS ITEM SPECIFICALLY INDICATED NO SUBSTITUTES. INSTALL ALL DEVICES SUCH THAT MINIMUM REQUIRED ACCESS CLEARANCE IS MAINTAINED.

CONTROL PANELS – PROVIDE SHOP FABRICATED CONTROL PANELS AS REQUIRED. WHERE SPECIFICALLY INDICATED ON PANEL DRAWINGS PROVIDE LOGIC, LAYOUT, AND DEVICES AS INDICATED. ALL PANELS SHALL BE LISTED AND LABELED IN ACCORDANCE WITH AN APPROPRIATE THIRD PARTY INDEPENDENT STANDARD. BENCH TEST TO BE PERFORMED AT THE MANUFACTURING FACILITY PRIOR TO SHIPMENT.

NAMEPLATES – LAMACOID TYPE BLACK WITH WHITE CORE, BEVELED EDGES. PROVIDE NAMEPLATES FOR EACH DEVICE, DISCONNECT SWITCH, AND CONTROL PANELS/DEVICES. SPECIFICALLY, LABEL ALL BATTERY CHARGERS FOR THE ASSOCIATED GENERATING UNIT. ATTACH NAMEPLATES WITH EPOXY ADHESIVE OR SELF-TAPPING SCREWS.

SUPPORT – INDEPENDENTLY SUPPORT EACH DEVICE FROM BUILDING STRUCTURAL MEMBERS WITH CHANNEL STRUT OR FABRICATED BRACKETS UTILIZING APPROPRIATE FASTENERS. ALL FASTENERS SHALL BE GALVANIZED OR ZINC PLATED EXCEPT ON EXTERIOR INSTALLATIONS ALL TYPE 316 STAINLESS STEEL.

**** RACEWAYS ****

INTERIOR – ALL INTERIOR LOCATIONS SHALL BE ELECTRICAL METALLIC TUBING (EMT) EXCEPT PANEL SPECIFICALLY INDICATED AS WIREWAY. WIREWAY SHALL BE NEMA 1 WITH HINGED COVER AND MANUFACTURER PROVIDED CONNECTORS AND FITTINGS.

EXTERIOR – ALL EXTERIOR LOCATIONS INCLUDING BURIED AND UNDERFLOOR SHALL BE GALVANIZED RIGID CONDUIT (GRC). PROVIDE LIQUID TIGHT OIL RESISTANT FLEXIBLE CONDUIT WHERE INDICATED AND AS REQUIRED TO ACCOMMODATE MOVEMENT.

TERMINATION – FINAL CONNECTIONS TO DEVICES MAY BE WITH LIQUID TIGHT OIL RESISTANT FLEXIBLE CONDUIT. CONDUITS TERMINATING IN EXTERIOR ENCLOSURES SHALL UTILIZE A WEATHERPROOF CONDUIT HUB. CONDUITS TERMINATING IN INDOOR ENCLOSURES SHALL UTILIZE LOCKNUTS INSIDE AND OUT WITH A METALLIC CONDUIT BUSHING, HUB, OR BOX CONNECTOR INSIDE THE ENCLOSURE.

SUPPORT – SUPPORT CONDUIT FROM BUILDING STRUCTURAL MEMBERS WITH CHANNEL STRUT AND PIPE CLAMPS OR PIPE HANGERS. DO NOT SUPPORT FROM CONNECTIONS TO EQUIPMENT. DO NOT USE PERFORATED STRAPS FOR SUPPORT. ALL STRUT, BRACKETS, HANGERS, AND FASTENERS SHALL BE GALVANIZED OR ZINC PLATED EXCEPT ON EXTERIOR INSTALLATIONS TYPE 304 STAINLESS STEEL.

**** CONDUCTORS ****

GENERATOR LEADS, FEEDERS (480V), BATTERY CABLES, AND CONDUCTORS INSTALLED IN EXTERIOR LOCATIONS – TYPE VW-1, UL LISTED HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE. 600V, 150°C THERMOSET EPDM INSULATION WITH TIN COATED COPPER CONDUCTOR. COBRA WIRE AND CABLE, BELDEN, OR EQUAL. ON GENERATOR LEADS AND COMMUNITY DISTRIBUTION FEEDER 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 THHN INSULATION, 600V AND 75C RATED.

COLOR CODING – COLOR CODING OF CONDUCTORS SHALL BE AS INDICATED ON THE DRAWINGS. IF NO COLOR CODING IS INDICATED, THE FOLLOWING COLOR CODES SHALL BE FOLLOWED:

- 480–VOLT POWER CONDUCTORS
 - PHASE A – BROWN
 - PHASE B – ORANGE
 - PHASE C – YELLOW
 - NEUTRAL – WHITE WITH YELLOW STRIPE
- 120/208–VOLT POWER CONDUCTORS
 - PHASE A – BLACK
 - PHASE B – RED
 - PHASE C – BLUE
 - NEUTRAL – WHITE

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

GROUNDING – PROVIDE A SEPARATE EQUIPMENT GROUNDING CONDUCTOR IN EACH RACEWAY. DO NOT USE THE CONDUIT AS AN EQUIPMENT GROUNDING CONDUCTOR. EQUIPMENT GROUNDING CONDUCTORS SHALL BE CLASS B CONCENTRIC STRANDED, SOFT-DRAWN COPPER OF THE SIZES INDICATED ON THE DRAWINGS. EQUIPMENT GROUNDING CONDUCTORS FOR THE GENERATOR LEADS SHALL BE TYPE VW-1 AS SPECIFIED FOR GENERATOR LEADS. CONDUCTORS NOT INDICATED SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.

GENERATOR CONTROL CONDUCTORS – TYPE VW-1, UL LISTED HIGH TEMPERATURE, EXTRA FLEXIBLE CABLE, 600V, 150°C THERMOSET EPDM INSULATION WITH TIN COATED COPPER CONDUCTOR EXCEPT FOR SPECIALTY CABLE WHERE INDICATED. COBRA WIRE AND CABLE, BELDEN, OR EQUAL. CONTROL CONDUCTORS ROUTED BETWEEN THE TERMINAL BLOCK LOCATED IN THE GENERATOR TERMINAL HOUSING AND THE TERMINAL BLOCKS LOCATED IN THE GENERATOR CONTROL SECTION OF THE SWITCHGEAR SHALL BE COLOR CODED EXACTLY AS INDICATED ON THE DRAWINGS AND PACKAGED INTO A SINGLE CONTROL CABLE BUNDLE INCLUDING SHIELDED AND SPECIALTY CONDUCTORS AS SPECIFIED BELOW.

SHIELDED CONDUCTORS – STRANDED TINNED COPPER CONDUCTORS, 600V POLYETHYLENE INSULATION, 100% COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH A STRANDED TINNED COPPER DRAIN WIRE, AND PVC OUTER JACKET. SINGLE PAIR TWISTED #18 AWG, BELDEN #1120A OR EQUAL. SINGLE TRIAD TWISTED #18 AWG, BELDEN #3089A OR EQUAL. FOUR PAIR TWISTED #18 AWG, BELDEN #1049A OR EQUAL. TWO PAIR CANBUS CABLE #22 AWG AND #24 AWG TWISTED PAIRS, BELDEN 3084A OR EQUAL.

THERMOCOUPLE EXTENSION CABLE – SINGLE PAIR TWISTED #16 AWG SOLID ALLOY PER ANSI MC96.1 FOR TYPE K THERMOCOUPLES, 600V FLAME RETARDANT EPR INSULATION, 100 % COVERAGE ALUMINUM FOIL-POLYESTER TAPE SHIELD WITH A STRANDED TINNED COPPER DRAIN WIRE, AND FLAME RETARDANT CPE OUTER JACKET. GENERAL CABLE 33668XX, OR EQUAL. TERMINATE ON TYPE K THERMOCOUPLE TERMINAL BLOCKS.

ETHERNET CABLE – CATEGORY 5E UNBONDED-PAIR CABLE, FOUR PAIR TWISTED, 24 GAUGE COPPER CONDUCTORS, 300V FEP INSULATION, BELDEN 1585LC OR EQUAL.

**** ENGINE GENERATORS ****

PROVIDE COMPLETE DIESEL ENGINE GENERATOR SETS OF THE PRIME POWER KW CAPACITY INDICATED ON THE DRAWINGS. PROVIDE CATERPILLAR ENGINE/GENERATOR SETS OF PRIME CAPACITY INDICATED, NO SUBSTITUTES. THE ENGINE-GENERATOR SETS SHALL BE MOUNTED ON WELDED STRUCTURAL STEEL BASE COMPLETE WITH VIBRATION ISOLATORS. MATERIALS AND EQUIPMENT SHALL BE NEW AND OF CURRENT DESIGN, DELIVERED TO THE SITE COMPLETELY WIRED, TESTED AND READY FOR INSTALLATION. PROVIDE COMPLETE WITH GOVERNOR, 24VDC STARTING SYSTEM, INSTRUMENT PANEL, CONTROLS, SAFETY SHUT DOWNS, EXHAUST SYSTEM, DRIP PAN, AND ALL OTHER ACCESSORIES AS INDICATED AND REQUIRED. SEE THE ENGINE GENERATOR PURCHASE SPECIFICATIONS FOR ADDITIONAL DETAIL.

**** PARALLELING SWITCHGEAR ****

PROVIDE A FREESTANDING NEMA 1 ENCLOSURE WITH HINGED FRONT-OPENING DOORS. THE PANEL SHALL BE CONFIGURED AS INDICATED IN THE DRAWINGS. PANEL SHALL BE RATED 2,400-AMPERE COPPER, 3-PHASE, 4-WIRE WITH NEUTRAL AND GROUND BUSES. COMPLETE WITH IPROVISIONS FOR THREE GENERATORS, MASTER CONTROL/STATION SERVICE, TWO FEEDERS, AND THREE CHARGE AIR COOLER VFDS AS INDICATED. EQUIPMENT ARRANGEMENT AND SIZES SHALL CONFORM TO THE ONE-LINE DIAGRAM. PANEL SHALL BE PAINTED ANSI 61 GRAY.

PROVIDE THE FOLLOWING FEATURES FOR EACH GENERATING UNIT – (A) GENSET CONTROL PACKAGE (GCP) THAT PROVIDES AUTOMATIC PARALLELING AND SYNCHRONIZATION PLUS COMMUNICATION WITH THE PLC, (B) ENGINE SPEED CONTROL, (C) LOAD SENSOR; (D) AUTOMATIC SYNCHRONIZER, (E) FREQUENCY METER, (F) POWER MONITOR WITH VOLTS, AMPS FREQUENCY, KW, PF, AND TOTAL KWH; (G) IDLE SPEED POTENTIOMETER AND RATED/IDLE SELECTOR SWITCH; (H) DRAW-OUT INSULATED CASE CIRCUIT BREAKER.

PROVIDE THE FOLLOWING PROTECTION FOR EACH GENERATING UNIT – (A) OVERCRANK, (B) OVER/UNDERVOLTAGE, (C) OVER/UNDER FREQUENCY, (D) REVERSE POWER, (E) OVERCURRENT, (F) DEAD BUS RELAY, (G) SYNC CHECK RELAY, (H) HIGH JACKET WATER TEMPERATURE, (I) HIGH LUBE OIL TEMPERATURE, (J) LOW LUBE OIL PRESSURE, (K) LOW LUBE OIL LEVEL, (L) OVERSPEED, (M) ANNUNCIATION PANEL WITH COMPLETE ANNUNCIATION OF FAILURE AND STATUS OF THE GENERATOR DEVICES.

PROVIDE THE FOLLOWING FEATURES IN THE MASTER CONTROL SECTION TO SERVE ALL GENERATING UNITS – (A) PRIMARY PROGRAMMABLE LOGIC CONTROLLER (PLC) FOR AUTOMATIC LOAD CONTROL AND SENSING, (B) BACKUP PROGRAMMABLE LOGIC CONTROLLER, (C) OPERATOR INTERFACE UNIT FOR OPERATOR CHANGES TO THE LOAD CONTROL SET POINTS IN THE PLC, (D) ANNUNCIATION PANEL WITH COMPLETE ANNUNCIATION OF FAILURE AND STATUS OF THE SWITCHGEAR DEVICES.

PROVIDE A MASTER CONTROL AND STATION SERVICE SECTION COMPLETE WITH – (A) MICROPROCESSOR BASED KILOWATT-HOUR METERS FOR THE BUS AND FOR THE STATION SERVICE; (B) MOLDED CASE CIRCUIT BREAKER FOR THE STATION SERVICE. PROVIDE A DISTRIBUTION SECTION COMPLETE WITH – (A) DRAW-OUT INSULATED CASE CIRCUIT BREAKERS FOR THE COMMUNITY FEEDERS; (B) CHARGE AIR COOLER VARIABLE FREQUENCY DRIVES. CIRCUIT BREAKER SIZES SHALL BE AS INDICATED ON THE ONE-LINE DIAGRAM.

OPERATION – THE PARALLELING SWITCHGEAR SHALL ALLOW THE OPERATOR TO SELECT EITHER MANUAL OPERATION OF ANY OR ALL OF THE GENERATING UNITS OR COMPLETE UNATTENDED AUTOMATIC OPERATION. THE CONTROL SYSTEM SHALL ALLOW THE SELECTION OF ALL OF THE GENERATING UNITS TO OPERATE IN MANUAL OR AUTOMATIC MODE OR A PORTION OF THE GENERATING UNITS TO OPERATE IN MANUAL MODE AND THE REMAINDER IN AUTOMATIC MODE. THE OPERATOR SHALL PLACE THE UNIT IN MANUAL OR AUTOMATIC MODE USING THE GCP.

AUTOMATIC – WHEN THE UNIT IS IN THE AUTOMATIC MODE, THE PROGRAMMABLE LOGIC CONTROLLER (PLC) SHALL SENSE THE DEMAND ON THE SYSTEM AND SHALL AUTOMATICALLY SELECT THE MOST APPROPRIATE ENGINE/GENERATOR UNIT OR COMBINATION OF UNITS TO MEET THE DEMAND. THE PLC SHALL AUTOMATICALLY START THE ENGINE/GENERATOR UNITS, BRING THEM TO THE PROPER SPEED, SYNCHRONIZE THE UNITS, AND CLOSE THE GENERATOR CIRCUIT BREAKER. WHEN THE PLC REMOVES AN ENGINE/GENERATOR FROM THE BUS, THE PLC SHALL REMOVE THE UNIT FROM THE BUS AND ALLOW THE ENGINE TO OPERATE FOR A COOLDOWN PERIOD BEFORE STOPPING THE ENGINE.

MANUAL – IN THE MANUAL MODE, THE OPERATOR SHALL BE ABLE TO START THE ENGINE/GENERATOR THROUGH THE GCP. THE GCP WILL START THE ENGINE/GENERATOR, BRING THE ENGINE UP TO SPEED, AND SYNCHRONIZE THE GENERATOR TO THE BUS. THIS SHALL BE ACCOMPLISHED INDEPENDENTLY FROM THE PLC.

EMERGENCY SHUTDOWN – UPON RECEIPT OF A CONTACT CLOSURE FROM THE FIRE SUPPRESSION SYSTEM, THE LOW COOLANT LEVEL SWITCH, OR THE EMERGENCY STOP PUSHBUTTON ALL OPERATING ENGINES SHALL BE IMMEDIATELY SHUT DOWN WITHOUT GOING THROUGH A SHUTDOWN PROCEDURE. THE SYSTEM SHALL REMAIN IN A LOCKOUT CONDITION UNTIL ALL ALARMS ARE CLEARED.

LOW FUEL LEVEL ALARM – A NORMALLY CLOSED CONTACT ON THE DAY TANK CONTROL PANEL SHALL OPEN ON A LOW FUEL LEVEL. THE LOW FUEL LEVEL INDICATION SHALL START A TIME DELAY RELAY, 2 HOURS, ADJUSTABLE, AND ILLUMINATE A RED LAMP "LOW FUEL LEVEL". IF THE FUEL LEVEL HAS NOT BEEN CORRECTED BY THE END OF THE TIMED INTERVAL THE ENGINES SHALL BE SHUT DOWN AND THE ALARM LAMP SHALL REMAIN ILLUMINATED. A MANUAL RESET BUTTON ON THE FRONT OF THE SWITCHGEAR SHALL BE PROVIDED TO RESET THE TIMER RELAY FOR ANOTHER INTERVAL AND PLACE THE ENGINES BACK IN SERVICE (IF TIMED OUT). THE RESET FUNCTION SHALL WORK ANY TIME DURING OR AFTER EXPIRATION OF THE TIMED INTERVAL.

SEE THE AUTOMATIC PARALLELING SWITCHGEAR PURCHASE SPECIFICATIONS FOR ADDITIONAL DETAIL.

**** TESTING AND STARTUP****

EACH ENGINE/GENERATOR UNIT SHALL BE LOAD TESTED AT THE FACTORY FOR A MINIMUM OF 8 HOURS.

THE PARALLELING SWITCHGEAR SHALL BE FACTORY TESTED TO VERIFY ALL CONTROL AND ALARM FEATURES.

THE ENTIRE GENERATION PACKAGE SHALL BE FIELD TESTED WITH A LOAD BANK PRIOR TO PLACING IN SERVICE. FIELD TESTING SHALL INCLUDE ALL FEATURES OF BOTH AUTOMATIC AND MANUAL MODES PLUS ALL ALARM AND SHUTDOWN FUNCTIONS. LOCAL PLANT OPERATORS SHALL PARTICIPATE IN ALL TESTING.

ALL STATION SERVICE EQUIPMENT SHALL BE TESTED TO VERIFY PROPER OPERATION. ALL CONTROL AND ALARM FUNCTIONS SHALL BE VERIFIED.

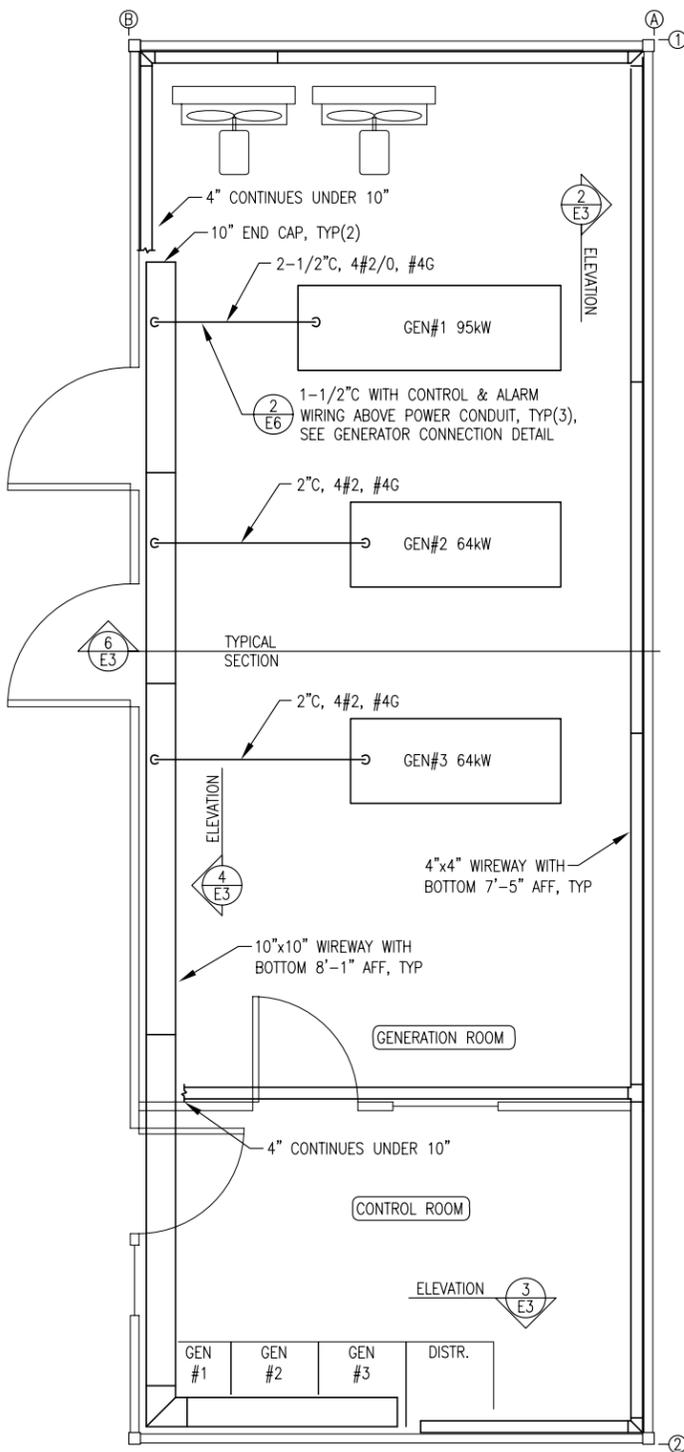
UPON SUCCESSFUL COMPLETION OF TESTING, THE PLANT SHALL BE PLACED IN SERVICE. A MINIMUM OF ONE WEEK OF SYSTEM PERFORMANCE MONITORING AND LOCAL OPERATOR TRAINING SHALL BE PROVIDED UPON SYSTEM STARTUP PRIOR TO LEAVING THE PROJECT SITE.

ELECTRICAL EQUIPMENT SCHEDULE		
ITEM NO.	DESCRIPTION	MANUFACTURER
1	MULTI-TONE ALARM WITH STROBE, 115V, NEMA 3R, WEATHER RESISTANT SURFACE MOUNT BELL BOX	WHEELOCK MT4-115-WH-VNS
2	DAY TANK VERTICAL ACTION FLOAT SWITCH, REVERSIBLE 70VASPST NC/NO SWITCH, 1/8" NPT, 1"MAX Ø BUNA-N FLOAT FOR S.G=47, MINIMUM 60" LONG PVC COATED #20 AWG LEAD WIRES	INNOVATIVE COMPONENTS LS-12-111/2
3	MODERATE TEMPERATURE RANGE, 3 WIRE, PLATINUM RTD, 100 OHMS +/- 0.12%, 0.00385 TEMPERATURE COEFFICIENT, 1/2" NPT REDUCED TIP TYPE 316 SS THERMOWELL, 2-1/2" IMMERSION LENGTH.	MURPHY RTD-225-400-100
4	LINE VOLTAGE HEATING/COOLING THERMOSTAT, 120V, 9.8 FLA, SPDT, 44F TO 86F RANGE.	HONEYWELL T651A3000
5	EMERGENCY FIXTURE, WALL MOUNT, 20 GA STEEL ENCLOSURE, LEAD-CALCIUM BATTERY, 120V INPUT, 12VDC, 150W, DUAL 12W HALOGEN LAMPS	PATHWAY 12D150-2L-H12 NO SUBSTITUTES
6	EMERGENCY FIXTURE WITH EXIT SIGN, WALL MOUNT, 20 GA STEEL ENCLOSURE, LEAD-CALCIUM BATTERY, 120V INPUT, DUAL 6V LAMPS, OPTION M1 STYLE MOUNT WITH LIGHT BEHIND SIGN	PATHWAY LEP12X1CR-M1 NO SUBSTITUTES
7	SURFACE MOUNTED/SUSPENDED FLOURESCENT FIXTURE WITH WRAP AROUND CLEAR LENS, 2 TUBE F32WT8 LAMP, INSTANT START MULTI VOLTAGE ENERGY SAVING BALLAST, COMPLETE WITH LAMPS	LITHONIA LB2-32 MVOLT 1/4GE610IS
8	150W HIGH PRESSURE SODIUM WALL MOUNT FIXTURE, MULTI-TAP BALLAST. PROVIDE WITH 120V PHOTO CELL CONTROL AND TWO LAMPS (ONE SPARE).	LITHONIA TWH150STB
9	0-5 MINUTE TIMER SWITCH, 120V, 20A, 1HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER.	INTERMATIC FF5M
10	SINGLE POLE SNAP SWITCH, 120V, 20A, METAL, 1-1/2HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER, WORY.	HUBBELL 1221-I
11	SINGLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 120V, 20A, 1-1/2HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER	HUBBELL 1221-PL
12	DOUBLE POLE SNAP SWITCH WITH RED PILOT LIGHT, 240V, 30A, 2HP RATED, INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER	HUBBELL 3032-PL
13	STATION SERVICE TRANSFORMER – ENERGY STAR COMPLIANT, ENCLOSURE TYPE 1, 30KVA, HV 480 DELTA, LV 208Y/120	EGS ELECTRICAL GROUP CAT. NO. ET2H30S
14	STATION SERVICE PANELBOARD, 3-PHASE MAIN BREAKER WITH COPPER BUS, 4 WIRE, 120/208V, 150A, 42 CIRCUITS, BOLT-IN BREAKERS, SURFACE MOUNT, NEMA 1	SIEMENS
15	SURFACE MOUNT 125V NEMA 5-20R RECEPTACLE. INSTALL IN 4"x4" PRESSED STEEL BOX WITH METAL COVER.	HUBBELL 5362I
16	125V NEMA 5-20R RECEPTACLE. MOUNT IN CAST FDA BOX WITH WEATHERPROOF COVER.	HUBBELL 5362I WITH CROUSE HINDS WLRD-1 COVER
17	52" DIAMETER PADDLE FAN, CEILING MOUNTED WITH DOWN ROD, WHITE, 120V PROVIDE WITH VARIABLE SPEED CONTROL	EMERSON FAN CF705WW LUTRON FS5EWH CONTROL
18	29" DIAMETER PADDLE FAN, CEILING MOUNTED WITH DOWN ROD, WHITE, 120V PROVIDE WITH VARIABLE SPEED CONTROL	EMERSON FAN CF702WW LUTRON FS5EWH CONTROL
19	24-VOLT 20-AMP AUTO-EQUALIZING BATTERY CHARGER FOR 120 VOLT AC INPUT POWER, WITH OPTIONAL HIGH/LOW VOLTAGE, AC POWER FAILURE, & REMOTE SUMMARY ALARM RELAYS	CHARLES INDUSTRIES MODEL AA2420-HLPR
20	SPDT PRESSURE SWITCH, 5-50 PSIG ADJUSTABLE SETPOINT RANGE, ADJUSTABLE DEADBAND, 316 STAINLESS STEEL DIAPHRAGM, 1/4" NPT CONNECTION	HONEYWELL L404F1078
21	SINGLE POLE ENCLOSED CONTACTOR, NEMA SIZE 0, 240V, 18A, 1HP, CLASS 10 SOLID STATE OVERLOAD RELAY, NEMA TYPE 1 ENCLOSURE	ALLEN-BRADLEY 509-AAXD-S1B
22	NON-FUSED LOCKABLE SAFETY SWITCH, NEMA 3R ENCLOSURE, 3PST, 600V, 30A, MIN 5HP RATED	SQUARE D HJ361RB

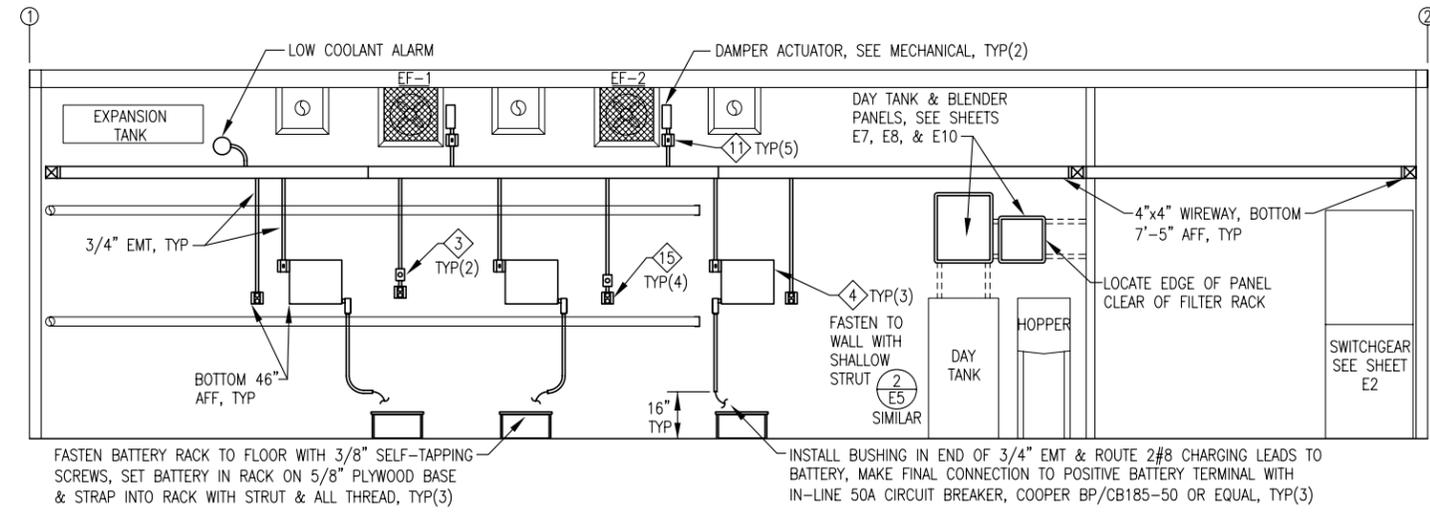
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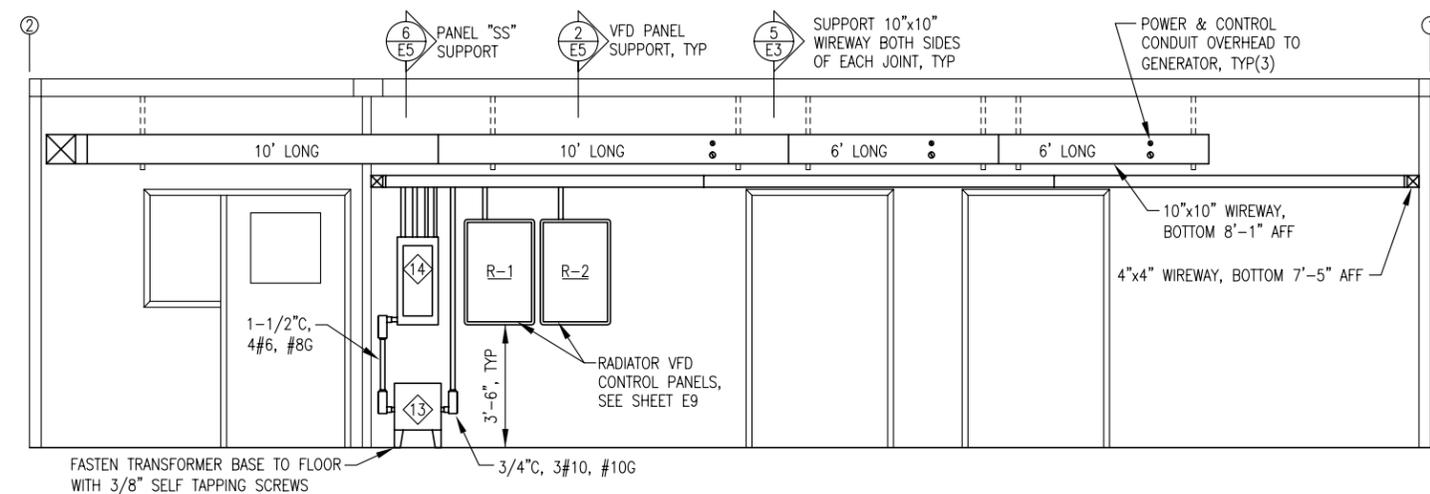
State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 			
PROJECT: CHITINA POWER SYSTEM UPGRADE MODULAR DIESEL POWER PLANT			
TITLE: SPECIFICATIONS & EQUIPMENT SCHEDULE			
ALASKA ENERGY AND ENGINEERING, INC			
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
DRAWN BY: BCG	SCALE: AS NOTED	FILE NAME: CHIT E2-6	SHEET: E2 OF #
DESIGNED BY: CWV/BCG	DATE: 12-06-06	PROJECT NUMBER: #	#



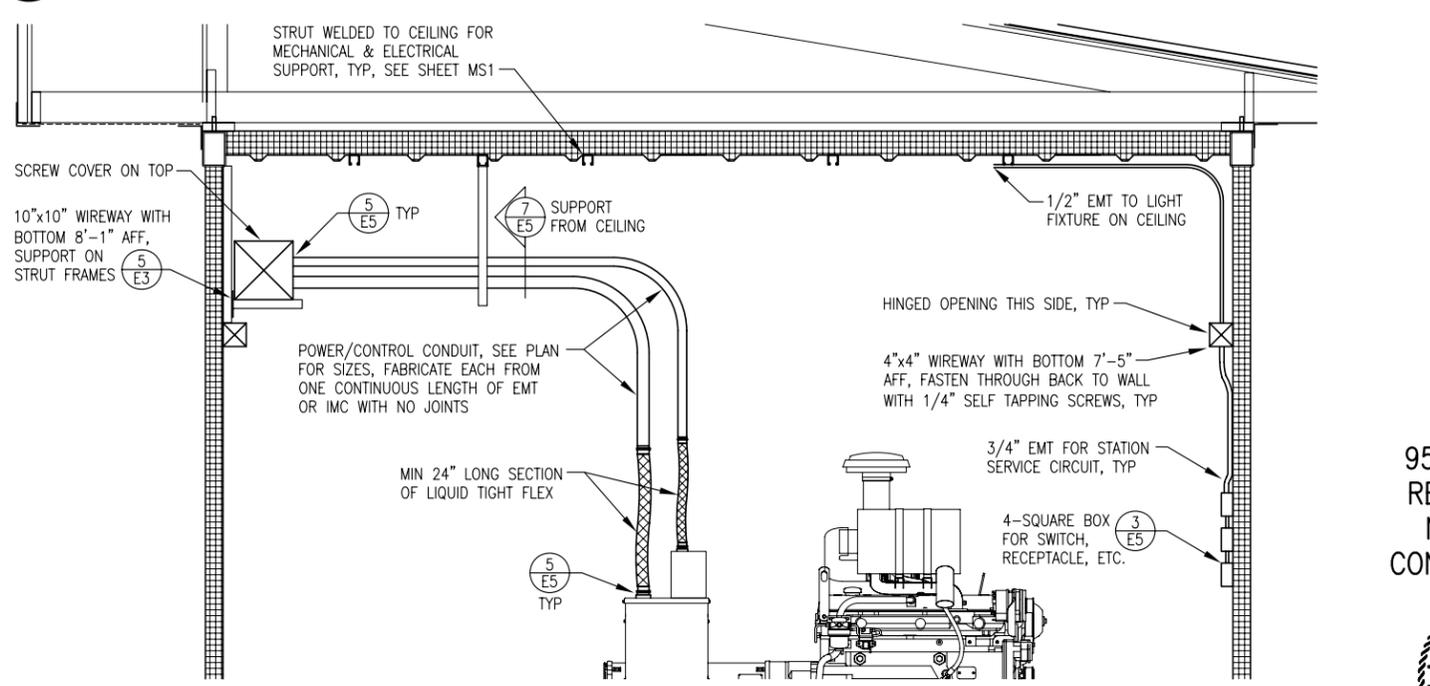
1 WIREWAY PLAN
3/8"=1'-0"



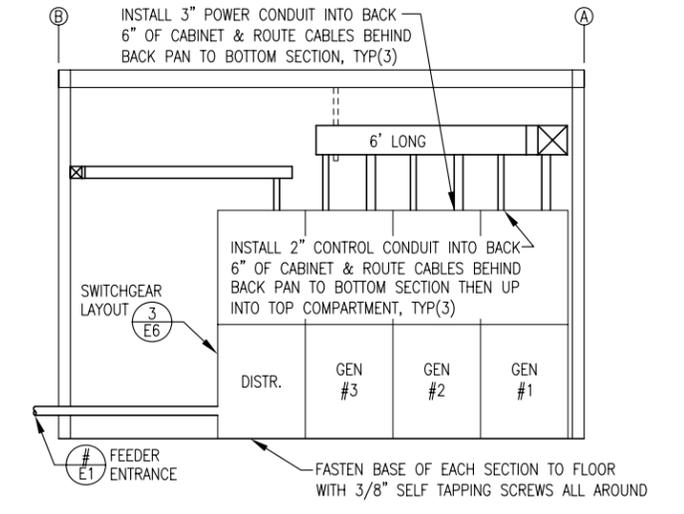
2 WALL ELEVATION AT GRID A
3/8"=1'-0"



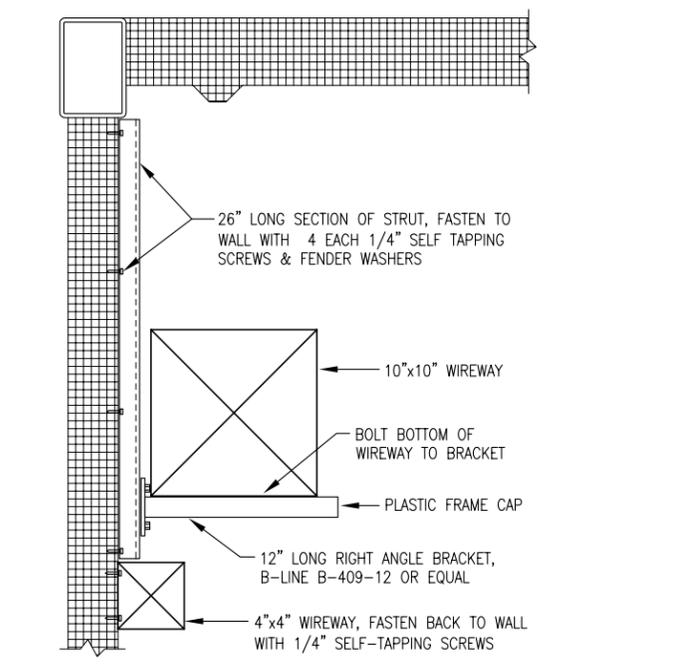
4 WALL ELEVATION AT GRID B
3/8"=1'-0"



5 WIREWAY SUPPORT FROM WALL
NO SCALE



6 TYPICAL SECTION AT GENERATOR
3/4"=1'-0"



7 WIREWAY PLAN
3/8"=1'-0"

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Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
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Anchorage, Alaska 99503

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PROJECT: **CHITINA POWER SYSTEM UPGRADE
MODULAR DIESEL POWER PLANT**

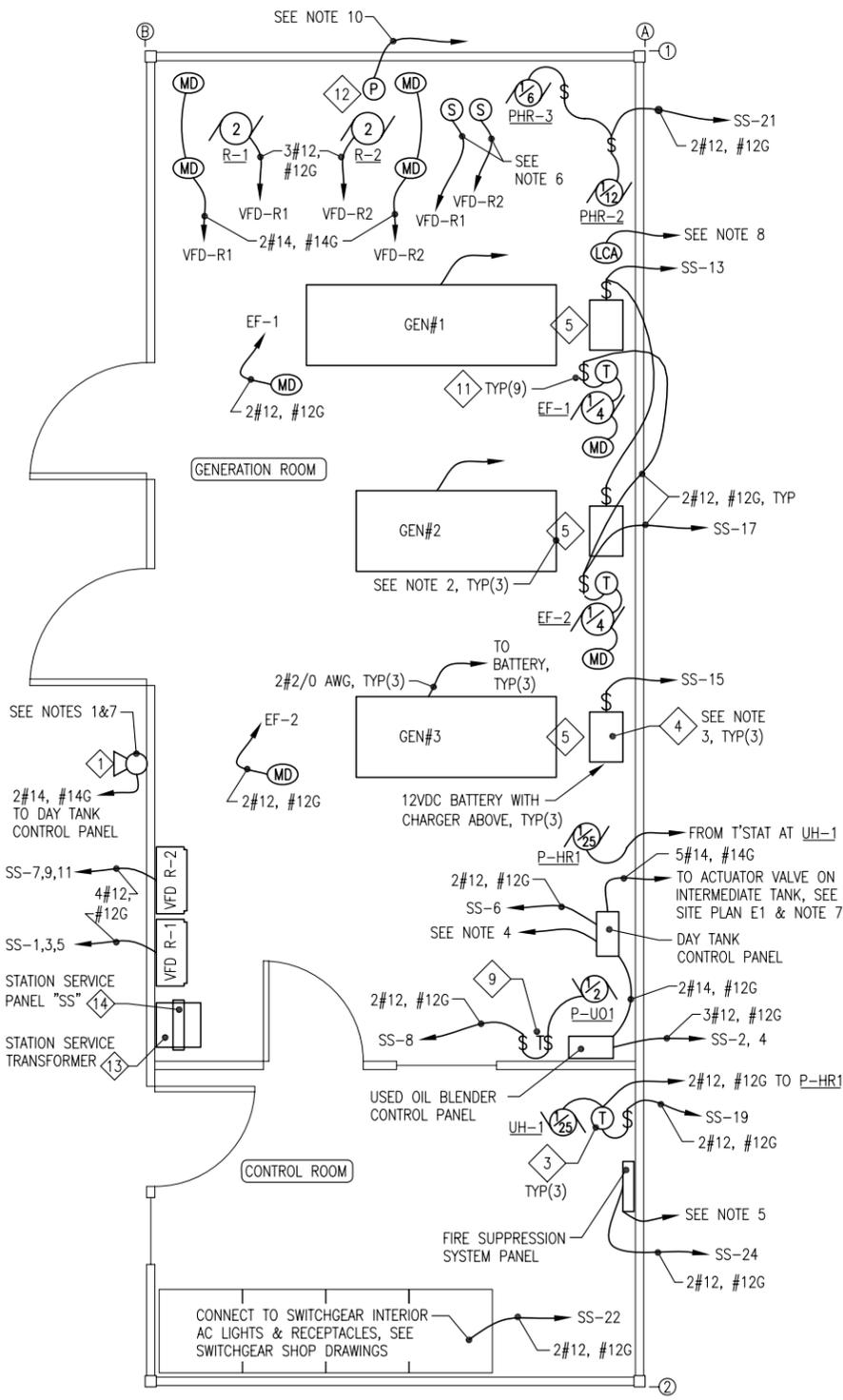
TITLE: **WIREWAY PLAN, ELEVATIONS, & SECTION**

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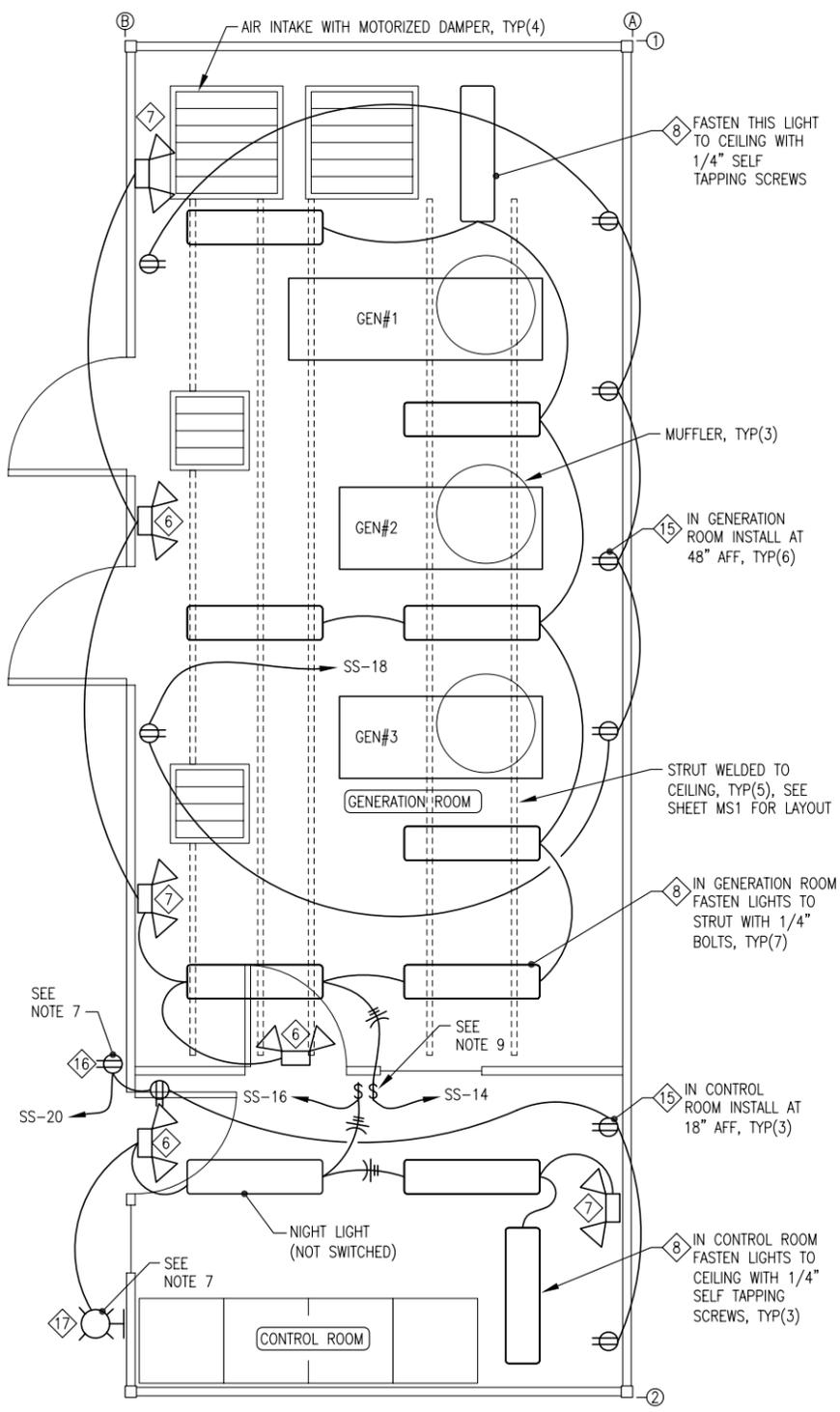
DRAWN BY: BCG SCALE: AS NOTED FILE NAME: CHIT E2-6 SHEET: **E3** OF #
DESIGNED BY: CWV/BCG DATE: 12-06-06 PROJECT NUMBER: #

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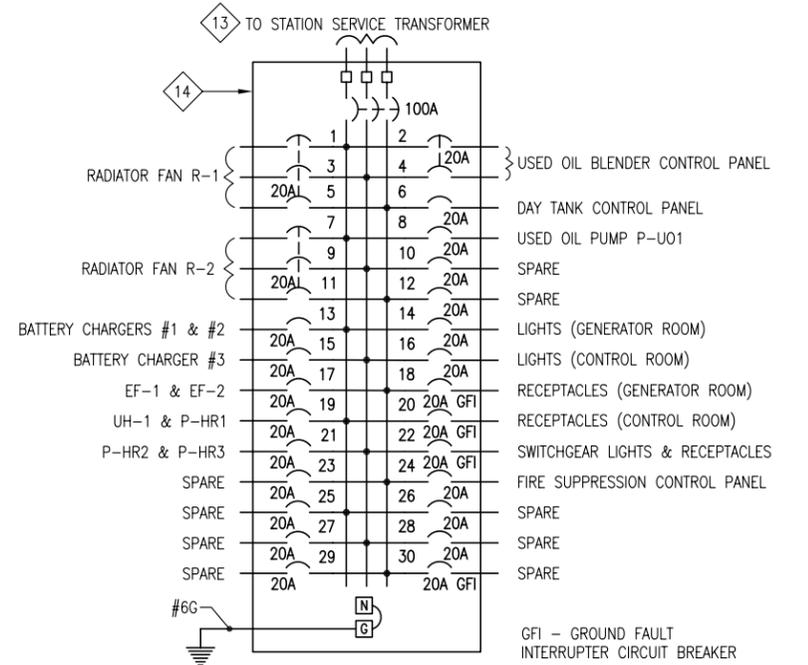
STATE OF ALASKA
49th
CLOS. W. VERSWY
EE 7819
REGISTERED PROFESSIONAL ENGINEER



1
E4 STATION SERVICE PLAN
3/8"=1'-0"



2
E4 LIGHTING/RECEPTACLE & REFLECTED CEILING PLAN
3/8"=1'-0"



3
E4 STATION SERVICE PANEL "SS"
NO SCALE

BUILDING PLANS SYMBOL LEGEND	
SYMBOL	DESCRIPTION
SS-##	HOME RUN TO PANEL & BREAKER(S) INDICATED. SHORT DASH INDICATES HOT CONDUCTOR, LONG DASH INDICATES NEUTRAL CONDUCTOR, CURVED DASH INDICATES GROUND CONDUCTOR. IF NOT SPECIFICALLY INDICATED, PROVIDE 2#12 AWG & 1#12 AWG GROUND.
#	ELECTRICAL ITEM - SEE EQUIPMENT SCHEDULE ON SHEET E6
1/4	MOTOR (HORSEPOWER INDICATED)
MD	MOTORIZED DAMPER - SEE MECHANICAL
⊖	125V, 20A, DUPLEX RECEPTACLE
T	LINE VOLTAGE THERMOSTAT
\$	SNAP SWITCH / SMALL MOTOR DISCONNECT
T\$	TIMER SWITCH
⏚	GROUND

- NOTES:**
- 1) INSTALL PLACARD, SEE SHEET M1.
 - 2) INSTALL RTD TEMPERATURE SENSOR IN COOLANT RETURN PIPE AND ROUTE SHIELDED TRIAD TO GENERATOR TERMINAL STRIP, SEE 2/E2.
 - 3) MOUNT BATTERY CHARGER TO WALL AND INSTALL BATTERY ON FLOOR BELOW, SEE ELEVATION 2/E3. ROUTE 2#14 FROM CHARGER ALARM CONTACTS TO ASSOCIATED SWITCHGEAR GENERATOR SECTION, SEE TERMINAL STRIP DRAWING 2/E6.
 - 4) ROUTE 2#14 FOR ENGINE RUN-DRY PREVENTION AND #18 SHIELDED/TWISTED PAIR FOR DAY TANK METER PULSER TO SWITCHGEAR MASTER SECTION.
 - 5) ROUTE 2#14 TO SWITCHGEAR MASTER SECTION FOR FIRE ALARM SHUT DOWN.
 - 6) INSTALL TEMPERATURE SENSORS PROVIDED WITH RADIATOR VFD CONTROLS WHERE SHOWN ON COOLING PIPING ISOMETRIC. ROUTE #18 SHIELDED PAIR FROM EACH SENSOR TO ASSOCIATED VFD PANEL.
 - 7) SEE DETAIL 4/E5 FOR TYPICAL EXTERIOR WALL PENETRATION.
 - 8) LOW COOLANT LEVEL ALARM SWITCH FURNISHED WITH GENERATORS AND INSTALLED AT EXPANSION TANK, SEE MECHANICAL. ROUTE 2#14 TO SWITCHGEAR MASTER SECTION.
 - 9) INSTALL LIGHTING REMOTE CONTROL CONTACTOR ABOVE LIGHT SWITCHES, SEE DETAIL 8/E5.
 - 10) INSTALL LOSS OF PRESSURE SWITCH IN HEAT RECOVERY PIPES WHERE SHOWN ON HEAT RECOVERY PIPING ISOMETRIC. ROUTE 2#14 TO SWITCHGEAR MASTER SECTION.

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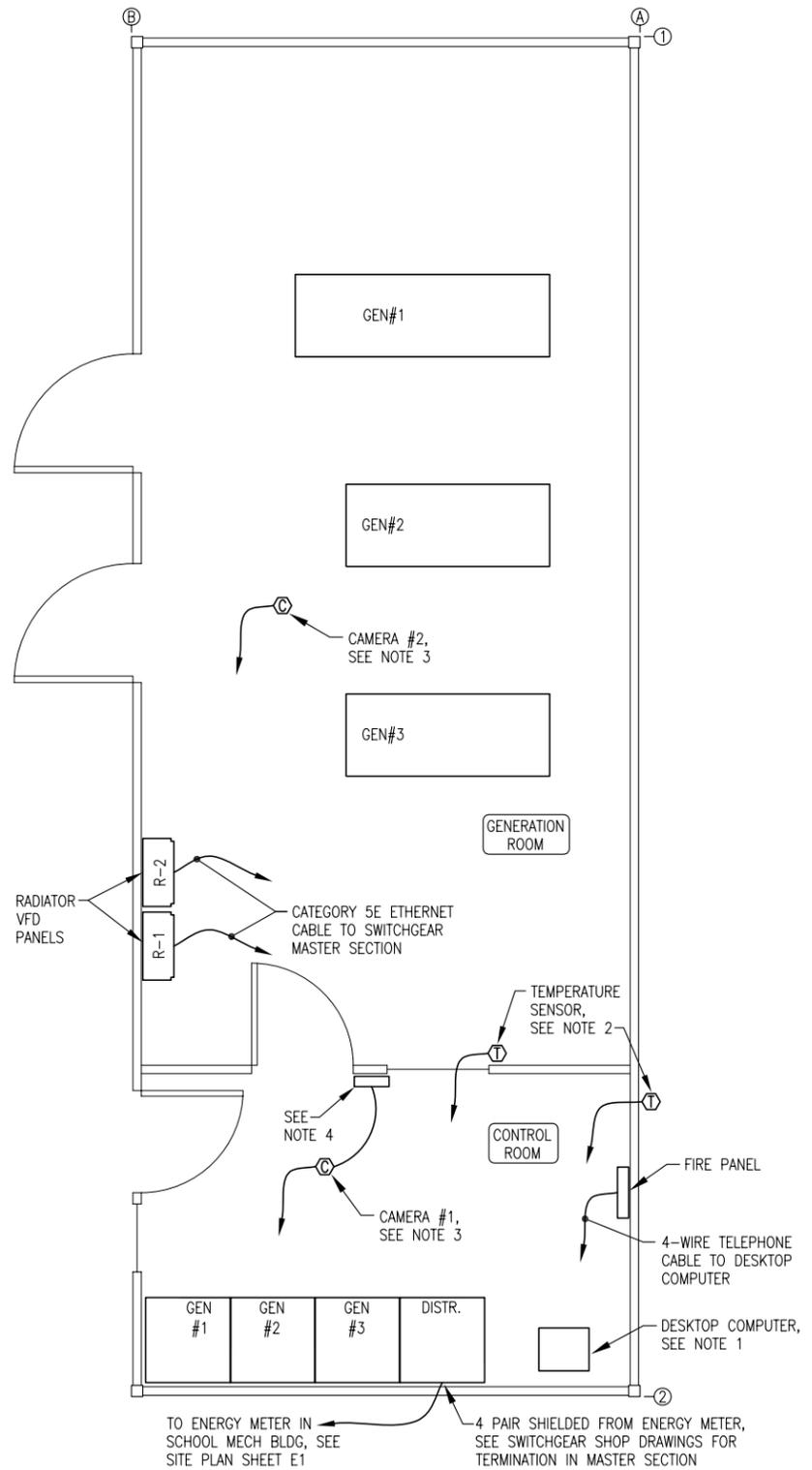
ALASKA ENERGY AUTHORITY

PROJECT: **CHITINA POWER SYSTEM UPGRADE
MODULAR DIESEL POWER PLANT**

TITLE: **BUILDING PLANS & STATION SERVICE PANEL**

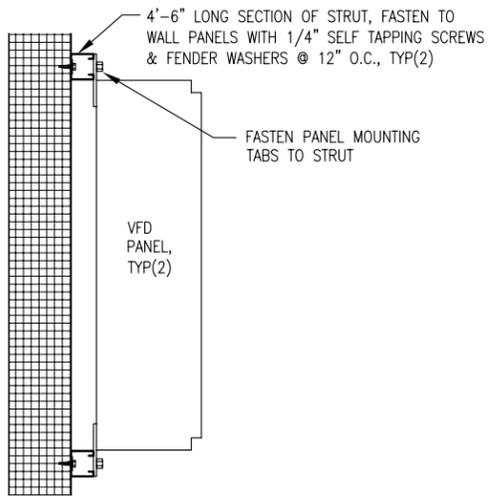
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DESIGNED BY: CWV/BCG	DATE: 12-06-06	PROJECT NUMBER: #	OF #

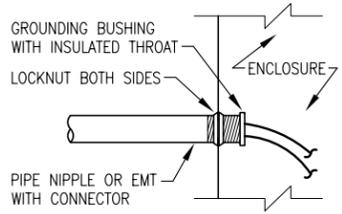


- NOTES:**
- 1) PROVIDE TELEPHONE AND HIGH SPEED INTERNET SERVICE CONNECTIONS THIS AREA.
 - 2) RTD TEMPERATURE SENSOR, ROUTE #18 SHIELDED TRIAD TO SWITCHGEAR MASTER SECTION.
 - 3) PROVIDE POWER TO CAMERA FROM DESKTOP COMPUTER UPS. ROUTE ETHERNET FROM CAMERA TO DESKTOP COMPUTER.
 - 4) INSTALL CONTACTOR WITH TIMER RELAY FOR REMOTE LIGHTING CONTROL. OPERATE FROM DRY CONTACT ON CAMERA #1. SET TIMER TO TURN LIGHTS ON FOR 5 MINUTES EACH TIME CAMERA IS OPERATED. SEE SCHEMATIC 8/E5.

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

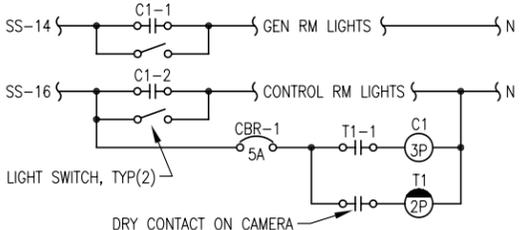


2 VFD PANEL SUPPORT
E5 NO SCALE



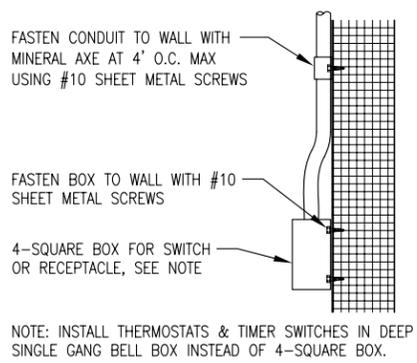
- NOTES:**
- 1) THIS DETAIL APPLIES TO ALL CONNECTIONS TO WIREWAY, GENERATOR ENCLOSURES, SWITCHGEAR, AND PANELS.
 - 2) ON GENERATOR ENCLOSURES MAKE ALL CONNECTIONS AS TIGHT AS POSSIBLE TO WITHSTAND VIBRATION & INSTALL ADDITIONAL LOCKNUT AGAINST LB.

5 CONDUIT CONNECTION TO ENCLOSURE
E5 NO SCALE

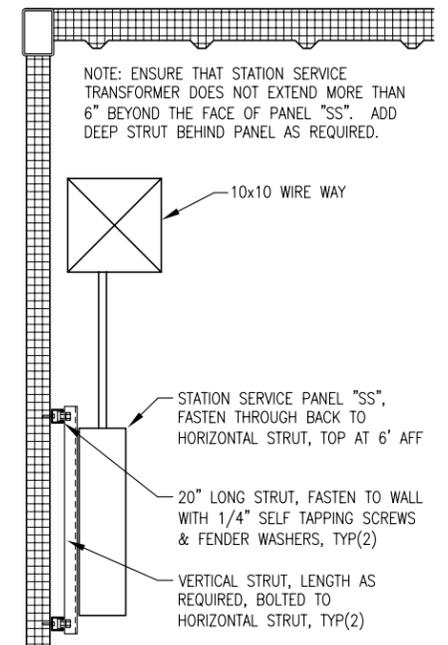


- NOTES:**
- 1) INSTALL CONTACTOR, TIMER RELAY, AND CIRCUIT BREAKER IN 12"x12"x6" NEMA 1 JUNCTION BOX ON WALL ABOVE LIGHT SWITCHES.
 - 2) ALL LIGHTING CIRCUIT WIRING MIN #12 AWG. ALL 5A CONTROL CIRCUIT WIRING MIN #16AWG.
 - 3) SET TIMER FOR 5 MINUTES, SINGLE SHOT MODE.
- BILL OF MATERIALS:**
- CB1: 5A, 1P, RAIL MOUNT CIRCUIT BREAKER. ALLEN BRADLEY 1489-A1-050.
- C1: 23A, 3P CONTACTOR, 120V COIL. ALLEN BRADLEY 100-C23D10.
- T1: 10A, DPDT RELAY, 120V COIL, WITH SOCKET BASE AND TIMING MODULE. ALLEN BRADLEY 700-HA32A1 RELAY WITH 700HN204 BASE AND 700HT3 SERIES B TIMING MODULE.

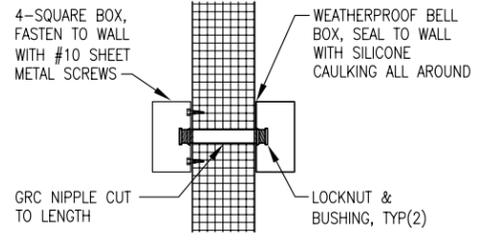
8 LIGHTING REMOTE CONTROL SCHEMATIC
E5 NO SCALE



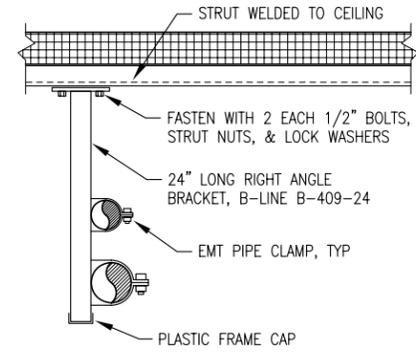
3 TYPICAL DEVICE MOUNTING
E5 NO SCALE



6 STATION SERVICE PANEL SUPPORT
E5 NO SCALE



4 TYPICAL EXTERIOR WALL PENETRATION
E5 NO SCALE



7 CONDUIT SUPPORT FROM CEILING
E5 NO SCALE

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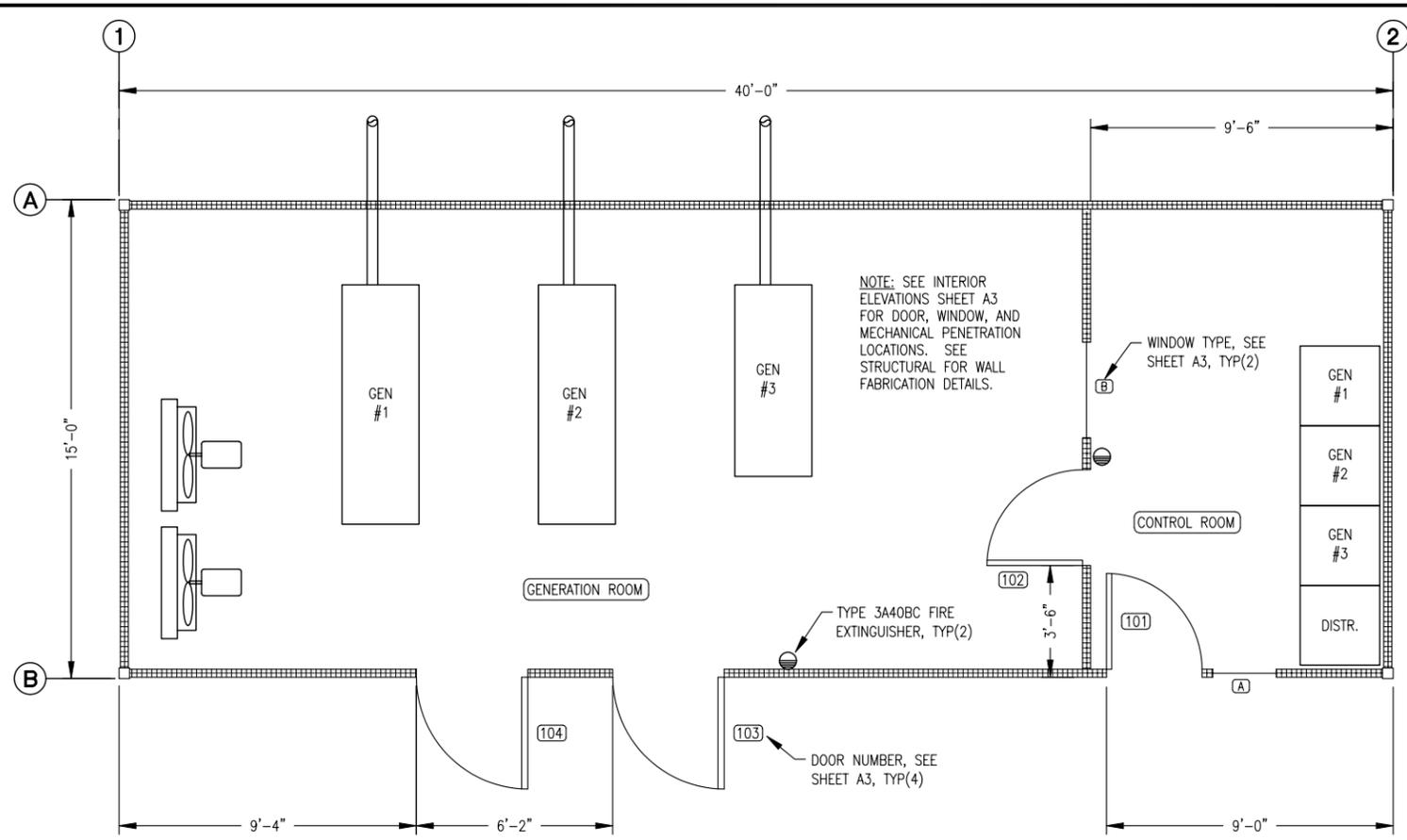
ALASKA ENERGY AUTHORITY

PROJECT: **CHITINA POWER SYSTEM UPGRADE
MODULAR DIESEL POWER PLANT**

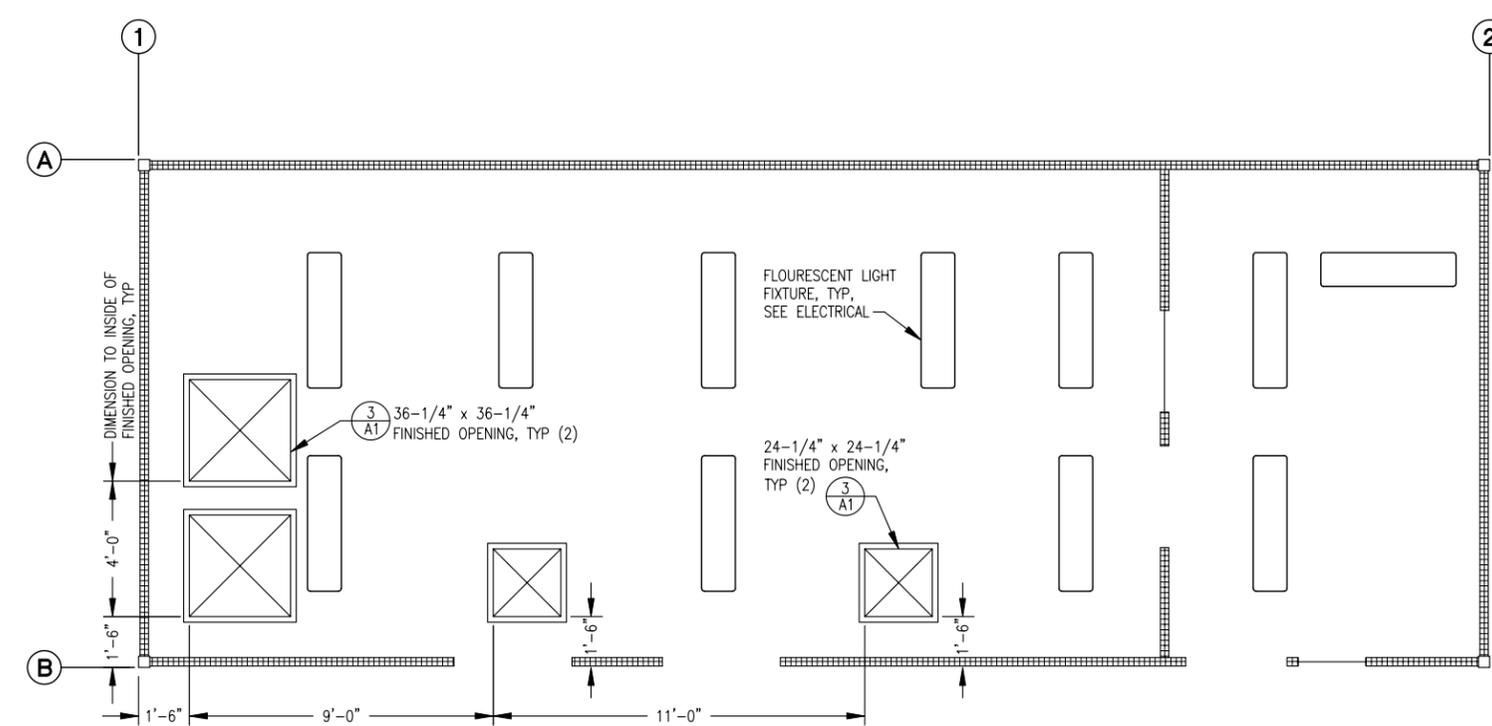
TITLE: **DATA/COMMUNICATION PLAN & DETAILS**

ALASKA ENERGY AND ENGINEERING, INC
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

DRAWN BY: BCG	SCALE: AS NOTED	FILE NAME: CHIT E2-6	SHEET: E5
DESIGNED BY: CWV/BCG	DATE: 12-06-06	PROJECT NUMBER: #	OF #



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



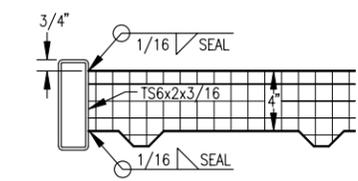
2 REFLECTED CEILING PLAN
3/8"=1'-0"

CODE ANALYSIS – 2003 EDITION INTERNATIONAL BUILDING CODE

OCCUPANCY CLASSIFICATION		REF: IBC-2003, SEC. 306.2
GROUP F-1: FACTORY INDUSTRIAL MODERATE HAZARD – ELECTRIC GENERATION PLANT		
TYPE OF CONSTRUCTION		REF: IBC-2003, TABLE 601
TYPE V-B (NON-RATED)		REF: IBC-2003, SEC. 602.5
BUILDING HEIGHTS AND AREAS		REF: IBC-2003, TABLE 503
ALLOWED	40'-0" 1 STORY 8,500 S.F.	PROVIDED: 16'-3" 1 STORY 565 S.F.
FIRE RESISTANCE RATING REQUIREMENTS		REF: IBC-2003, TABLE 601
FLOOR CONSTRUCTION	0 HR STRUCTURAL FRAME 0 HR NONBEARING WALLS: EXTERIOR – ≥10 <30 0 HR	
ROOF CONSTRUCTION	0 HR BEARING WALLS – EXTERIOR & INTERIOR 0 HR INTERIOR 0 HR	
FIRE PROTECTION SYSTEM		REF: IBC-2003, SEC. 903.2.3
FIRE PROTECTION NOT REQUIRED. WATER MIST FIRE SUPPRESSION SYSTEM PROVIDED (SEE MECHANICAL).		
OCCUPANT LOAD		REF: IBC-2003, TABLE 1004.1.2
MECHANICAL/STORAGE	= 300 S.F./PERSON 565 S.F./300 S.F. PER OCCUPANT = 2 OCCUPANTS	
MEANS OF EGRESS – TRAVEL DISTANCE		REF: IBC-2003, TABLE 1015.1
REQUIRED	200'	PROVIDED 18'

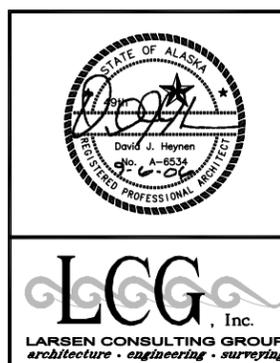
ARCHITECTURAL GENERAL NOTES:

- 1) PROVIDE A COMPLETE AND OPERATIONAL FACILITY. ALL WORK TO BE IN ACCORDANCE WITH CURRENT APPROVED EDITIONS OF THE IBC, IMC, IFC, AND NEC INCLUDING STATE OF ALASKA AMENDMENTS.
- 2) PROJECT MANAGER SHALL BE RESPONSIBLE FOR ALL BUILDING PERMITS, LETTERS OF NON-OBJECTION, UTILITY SERVICES AND APPLICATIONS AS REQUIRED.
- 3) PROJECT MANAGER TO BE RESPONSIBLE FOR ALL REQUIRED SAFETY PRECAUTIONS, METHODS AND TECHNIQUES.
- 4) DO NOT BLOCK OR OBSTRUCT ACCESS, REQUIRED PARKING AREAS, OR REQUIRED EGRESS FROM NEIGHBORING FACILITIES. PROVIDE TEMPORARY BARRICADES OR OTHER FORMS OF PROTECTION TO PROTECT EMPLOYEES, RESIDENTS, AND VISITORS FROM INJURIES DURING CONSTRUCTION ACTIVITIES
- 5) FINISH GRADE TO SLOPE DOWN 6 INCHES MINIMUM WITHIN 10 FEET OF BUILDING PERIMETER TO PROVIDE POSITIVE DRAINAGE AWAY FROM BUILDING.
- 6) GRID LINES LOCATED ON OUTSIDE CORNER OF STEEL COLUMNS AND FLOOR/CEILING DECK. DIMENSIONS TO FACE OF STRUCTURAL STEEL WALL AND CEILING PANELS, CENTERLINE OF STRUCTURAL STEEL, AND INSIDE EDGE OF FRAMED OPENINGS UNLESS OTHERWISE NOTED.
- 7) UPON COMPLETION OF FABRICATION ROUND ALL CORNERS AND GRIND EDGES SMOOTH AND PAINT ALL INTERIOR AND EXTERIOR EXPOSED STEEL. PERFORM ALL PAINTING IN A WARM DRY ENVIRONMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS INCLUDING DRYING TIME TO RE-COAT.
- 8) SANDBLAST EXTERIOR SURFACE TO SSPC-SP-10. PRIME WITH ONE COAT OF REINFORCED INORGANIC ZINC PRIMER, DEVOE CATHA-COAT 302, NO SUBSTITUTES, COLOR GREEN, TO 3 MILS DRY FILM THICKNESS. COVER WITH ONE COAT OF EPOXY, DEVOE BAR-RUST 236, NO SUBSTITUTES, COLOR WHITE, TO 6 MILS DRY FILM THICKNESS. FINISH WITH ONE COAT OF ALIPHATIC URETHANE ENAMEL, DEVOE DEVTHANE 389, NO SUBSTITUTES, COLOR WHITE, TO 3 MILS DRY FILM THICKNESS.
- 9) SANDBLAST INTERIOR SURFACE TO SSPC-SP-6. PRIME WITH ONE COAT OF EPOXY, DEVOE BAR-RUST 236, NO SUBSTITUTES, COLOR WHITE, TO 6 MILS DRY FILM THICKNESS. FINISH WITH ONE COAT OF ALKYL ENAMEL, DEVOE DEVGUARD 4308, NO SUBSTITUTES, COLOR WHITE, TO 3 MILS DRY FILM THICKNESS.
- 10) METAL ROOFING TO BE A MINIMUM OF 24 GAUGE GALVANIZED STEEL WITH FACTORY SMP FINISH AND STANDING SEAMS, COLOR JADE GREEN. ROOFING TO BE APPLIED OVER BITUTHENE 3000 MEMBRANE OR EQUAL.
- 11) BOX RIB SIDING FOR ROOF FACIA TO BE A MINIMUM OF 24 GAUGE GALVANIZED STEEL WITH FACTORY SMP FINISH. FLASHING AND TRIM TO BE A MINIMUM OF 24 GAUGE GALVANIZED STEEL WITH FACTORY FINISH. SIDING AND FLASHING COLOR JADE GREEN TO MATCH ROOFING.
- 12) ALL EXTERIOR FASTENERS FOR SIDING, ROOFING, SOFFIT, FLASHING, TRIM, ETC TO BE CORROSION RESISTANT, STAINLESS STEEL SCREWS AND ALUMINUM RIVETS.
- 13) SEAL AND FLASH ALL EXTERIOR SEAMS TO FORM CONTINUOUS WEATHERPROOF SEAL.
- 14) INSULATE ALL WALLS, FLOORS, AND CEILINGS WITH HIGH TEMPERATURE MINERAL FIBER ACOUSTICAL FIRE BATT INSULATION, MIN R VALUE 4 PER INCH, MIN 2000F MELTING TEMP. ROXUL AFB OR EQUAL. FILL ALL PANEL VOIDS OR PROVIDE THICKNESS AS INDICATED ON DRAWINGS.



- NOTES:
- 1) FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
 - 2) FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON REFLECTED CEILING PLAN.

3 CEILING PENETRATION
2"=1'-0"



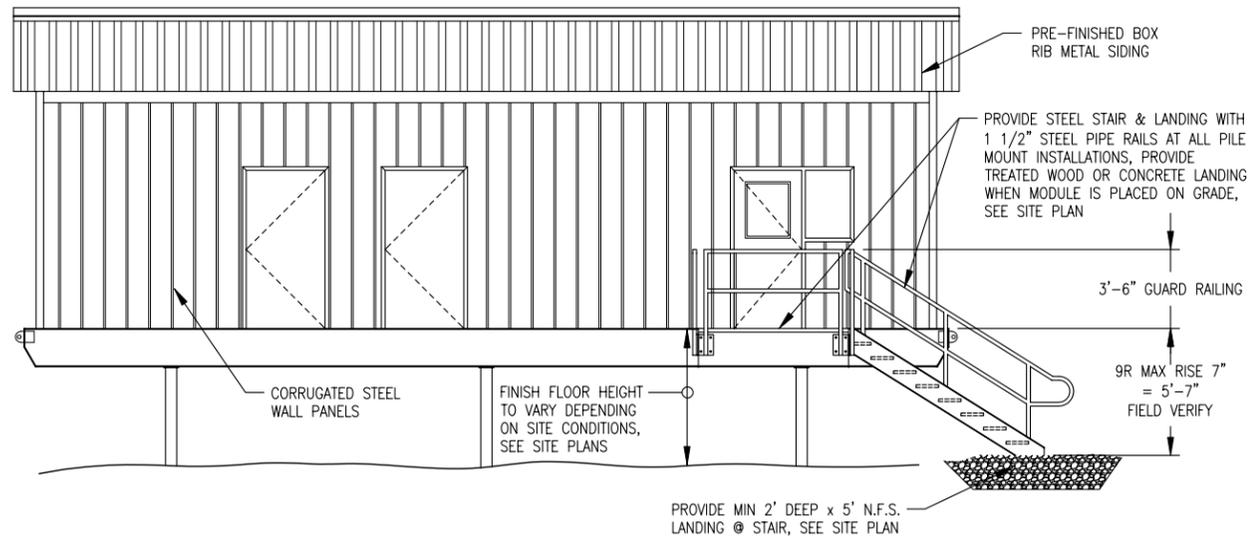
State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: **AEA STANDARD 15x40
THREE ENGINE MODULAR POWER PLANT**

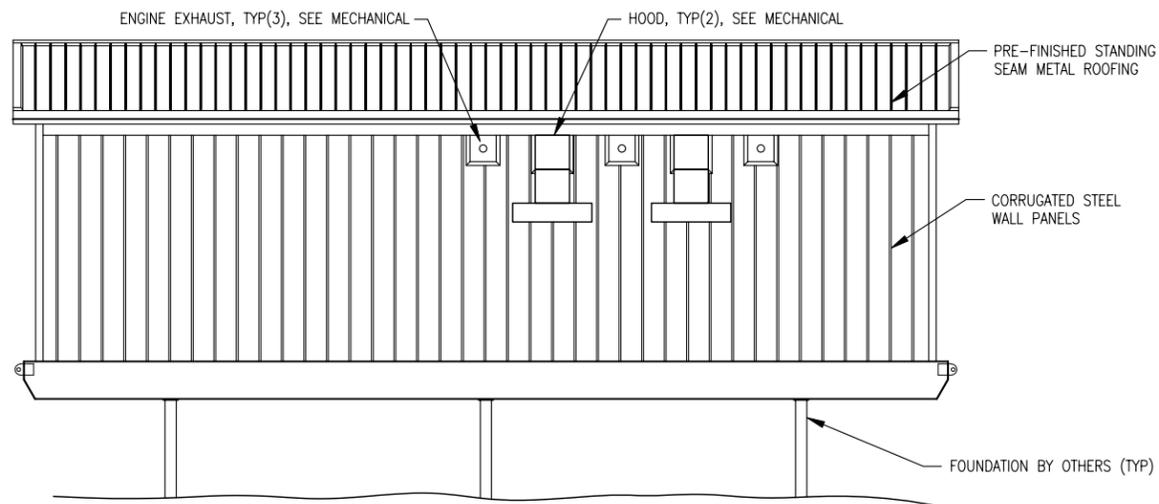
TITLE: **FLOOR PLAN, REFLECTED CEILING PLAN,
CODE ANALYSIS, & GENERAL NOTES**

ALASKA ENERGY AND ENGINEERING, INC
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

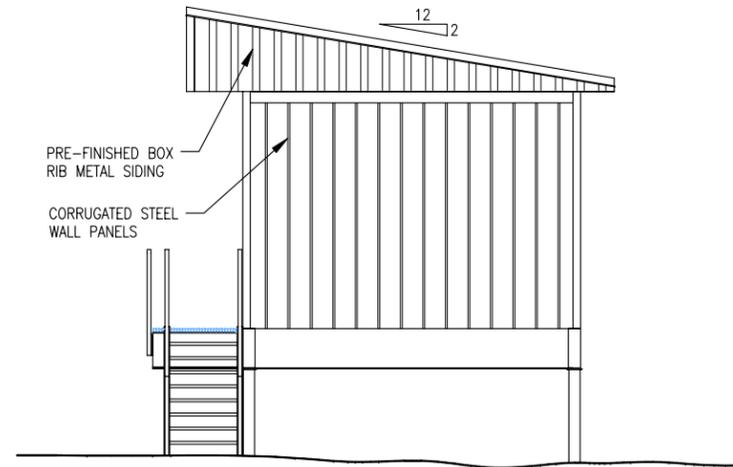
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DESIGNED BY: DJH DATE: 09/06/06 PROJECT NUMBER:



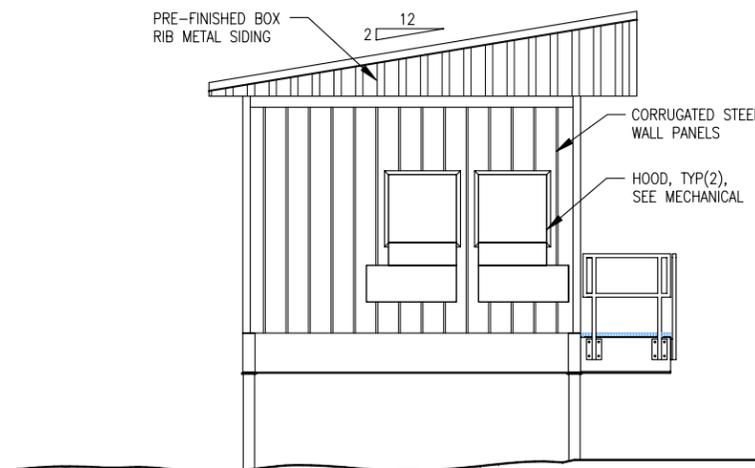
1 FRONT ELEVATION
A2 1/4"=1'-0"



3 BACK ELEVATION
A2 1/4"=1'-0"



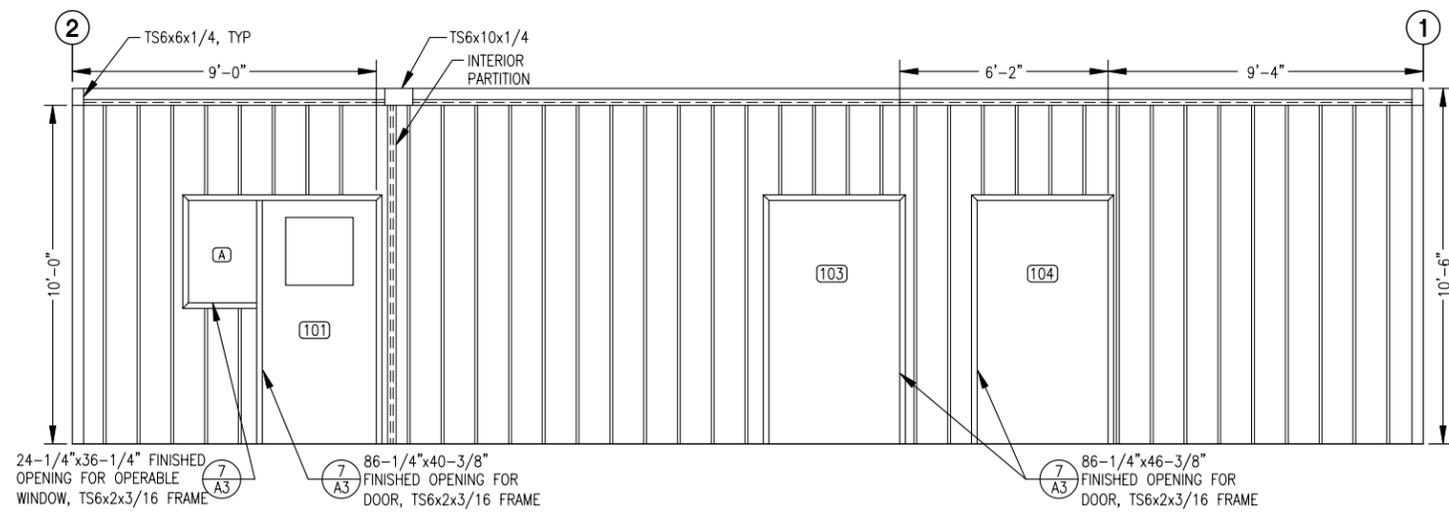
2 SIDE ELEVATION
A2 1/4"=1'-0"



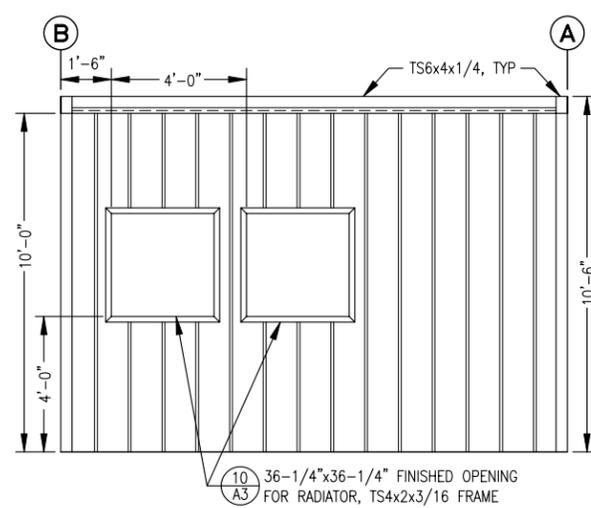
4 SIDE ELEVATION
A2 1/4"=1'-0"



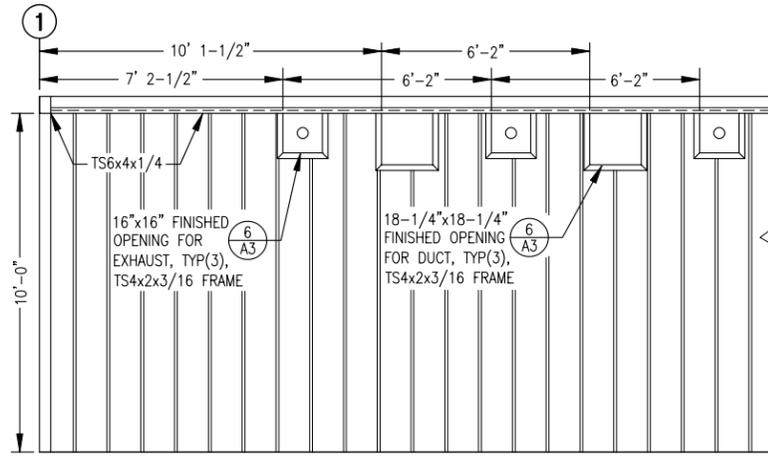
State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503			
PROJECT:		AEA STANDARD 15x40 THREE ENGINE MODULAR POWER PLANT	
TITLE: EXTERIOR ELEVATIONS			
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
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DESIGNED BY: DJH	DATE: 09/06/06	PROJECT NUMBER:	



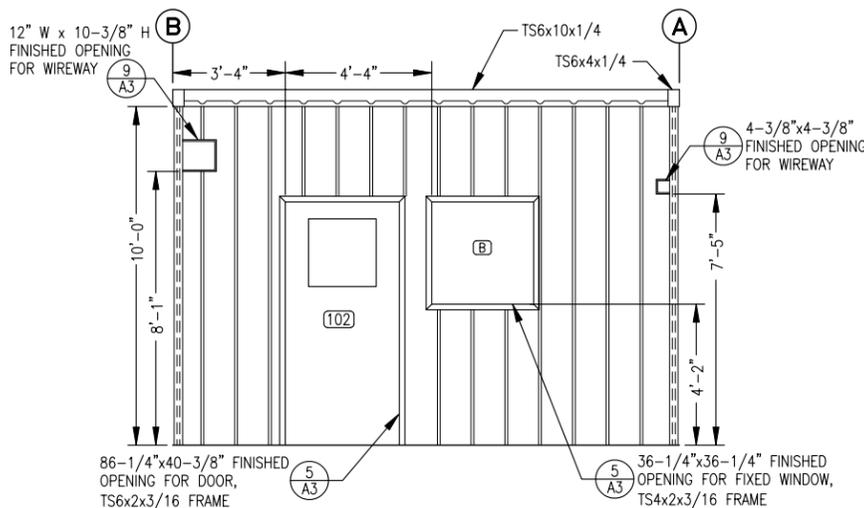
1 FRONT WALL ELEVATION
A3 3/8"=1'-0"



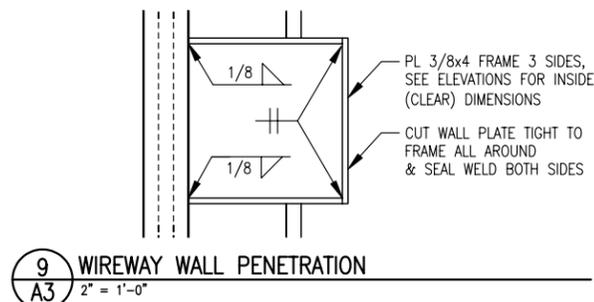
2 GENERATOR ROOM END WALL ELEVATION
A3 3/8"=1'-0"



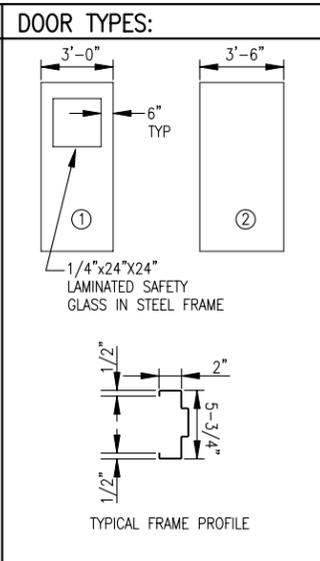
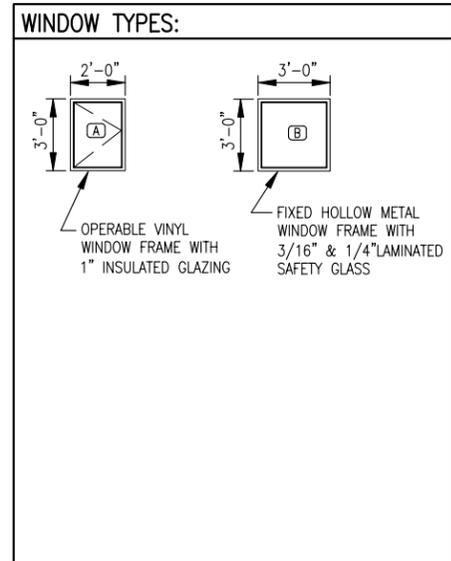
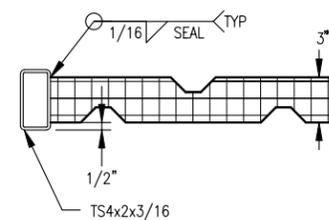
3 PARTIAL GENERATOR ROOM BACK WALL ELEVATION
A3 3/8"=1'-0"



8 CONTROL ROOM INTERIOR WALL ELEVATION
A3 3/8"=1'-0"



- NOTES:
- FABRICATE FRAMED OPENING WITH MITERED CORNERS AND FULL PENETRATION GROOVE WELDS.
 - FABRICATE TO FINISHED INSIDE (CLEAR) DIMENSIONS INDICATED ON ELEVATIONS.
 - DOOR FRAME INSTALLATION SIMILAR EXCEPT FOR TS6x2x3/16 AS SHOWN.

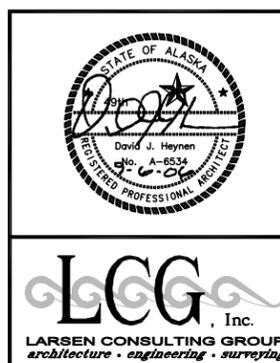
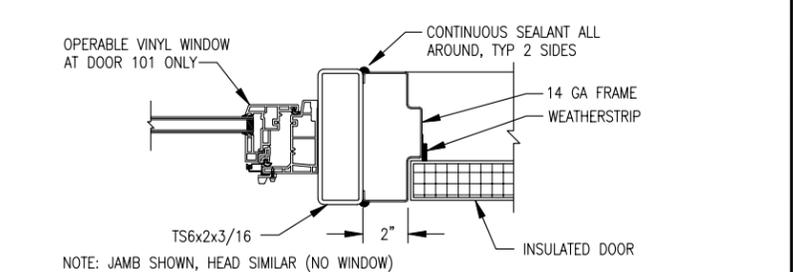
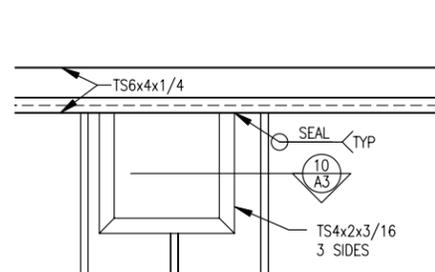
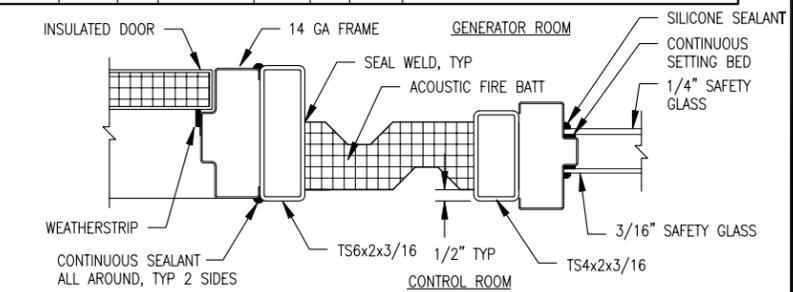
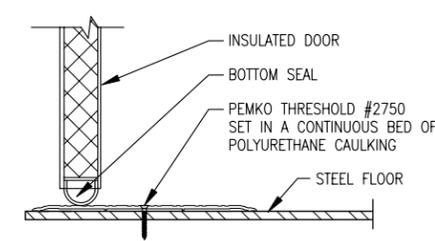


DOOR HARDWARE:

HW-1		HAGER		BB1191 4.5 x 4.5 x 630	
3 EA	HINGES	SCHLAGE	ND53PD x RHODES x 626		
1 EA	LOCKSET	LCN	4041EDA x 689		
1 EA	DOOR CLOSER	ROCKWOOD	403 x 630		
1 EA	WALL STOP	ROCKWOOD	K1050 10 x 33-3/4 x 630		
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 35-1/4 x 630		
1 EA	MOP PLATE	PEMCO	2891AS x 36 (HEAD)		
1 EA	WEATHER SEAL	PEMCO	290AS x 84 (SIDE JAMBS)		
2 EA	WEATHER SEAL	PEMCO	345AP x 36		
1 EA	BOTTOM SWEEP	PEMCO	2750A x 36		
1 EA	THRESHOLD				
HW-2		HAGER		BB1191 4.5 x 4.5NRP x 630	
3 EA	HINGES	SCHLAGE	ND25D x RHODES x 626		
1 EA	EXIT LOCK	LCN	4041EDA x 689		
1 EA	KICK PLATE	ROCKWOOD	K1050 10 x 39-3/4 x 630		
1 EA	MOP PLATE	ROCKWOOD	K1050 10 x 41-1/4 x 630		
1 EA	WEATHER SEAL	PEMCO	2891AS x 42 (HEAD)		
2 EA	WEATHER SEAL	PEMCO	290AS x 84 (SIDE JAMBS)		
1 EA	THRESHOLD	PEMCO	2750A x 42		

DOOR FRAME, FINISH, & HARDWARE SCHEDULE:

DOOR										FRAME					
DOOR NO.	WIDTH	HEIGHT	THICK NESS	TYPE	MATERIAL	CORE	FINISH	HEAD/JAMB DETAIL	SILL DETAIL	TYPE	MATERIAL	FINISH	FIRE RTG	HWR	REMARKS
101	3'-0"	7'-0"	1-3/4"	1	16 GA. H.M.	INSULATED	PAINT	7/A3	4/A3	1	14 GA. H.M.	PAINT	-	HW-1	
102	3'-0"	7'-0"	1-3/4"	1	16 GA. H.M.	INSULATED	PAINT	5/A3	4/A3	1	14 GA. H.M.	PAINT	-	HW-1	
103	3'-6"	7'-0"	1-3/4"	2	16 GA. H.M.	INSULATED	PAINT	7/A3	4/A3	2	14 GA. H.M.	PAINT	-	HW-2	
104	3'-6"	7'-0"	1-3/4"	2	16 GA. H.M.	INSULATED	PAINT	7/A3	4/A3	2	14 GA. H.M.	PAINT	-	HW-2	



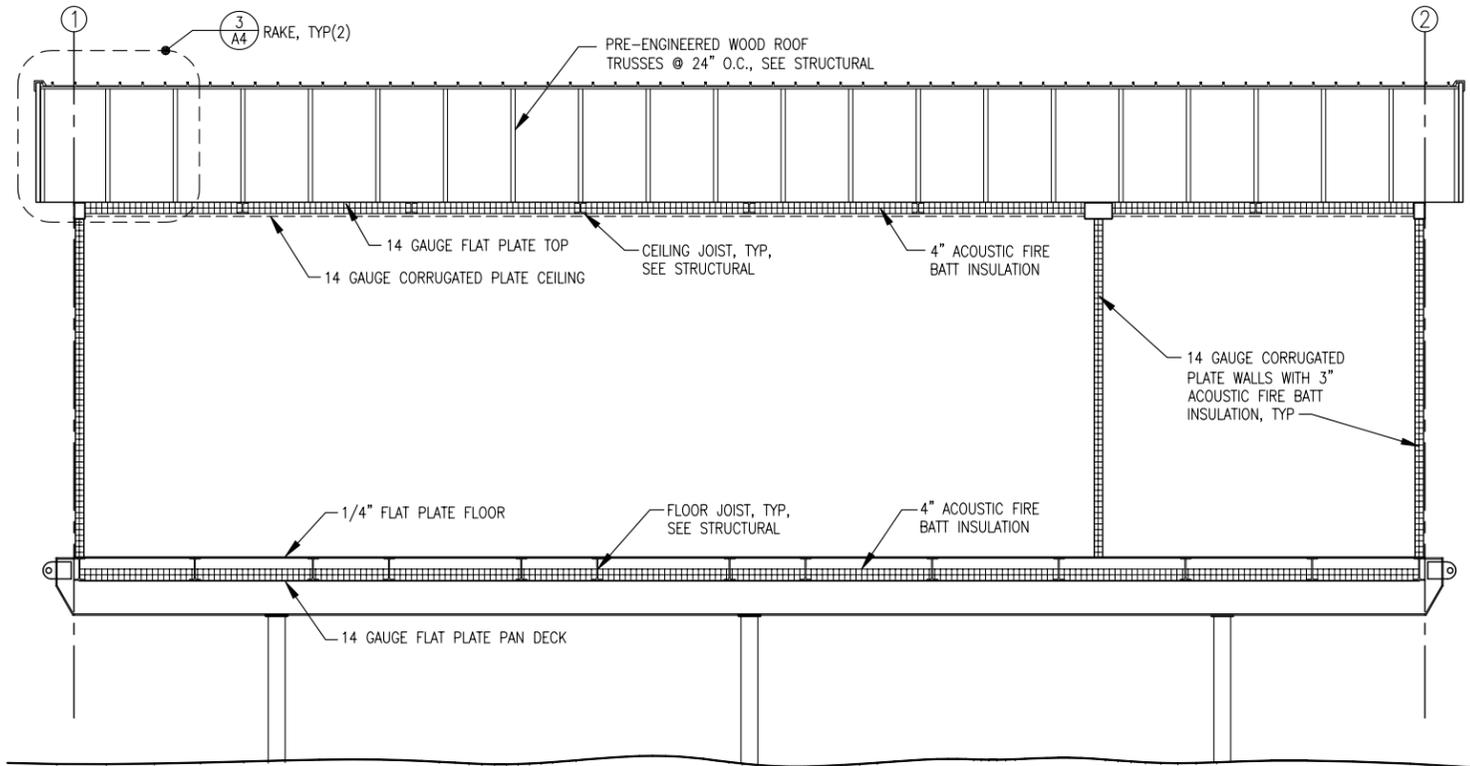
State of Alaska
Department of Community and Economic Development
AIDEA/AEA
Rural Energy Group
813 West Northern Lights Blvd.
Anchorage, Alaska 99503
ALASKA ENERGY AUTHORITY

PROJECT: AEA STANDARD 15x40
THREE ENGINE MODULAR POWER PLANT

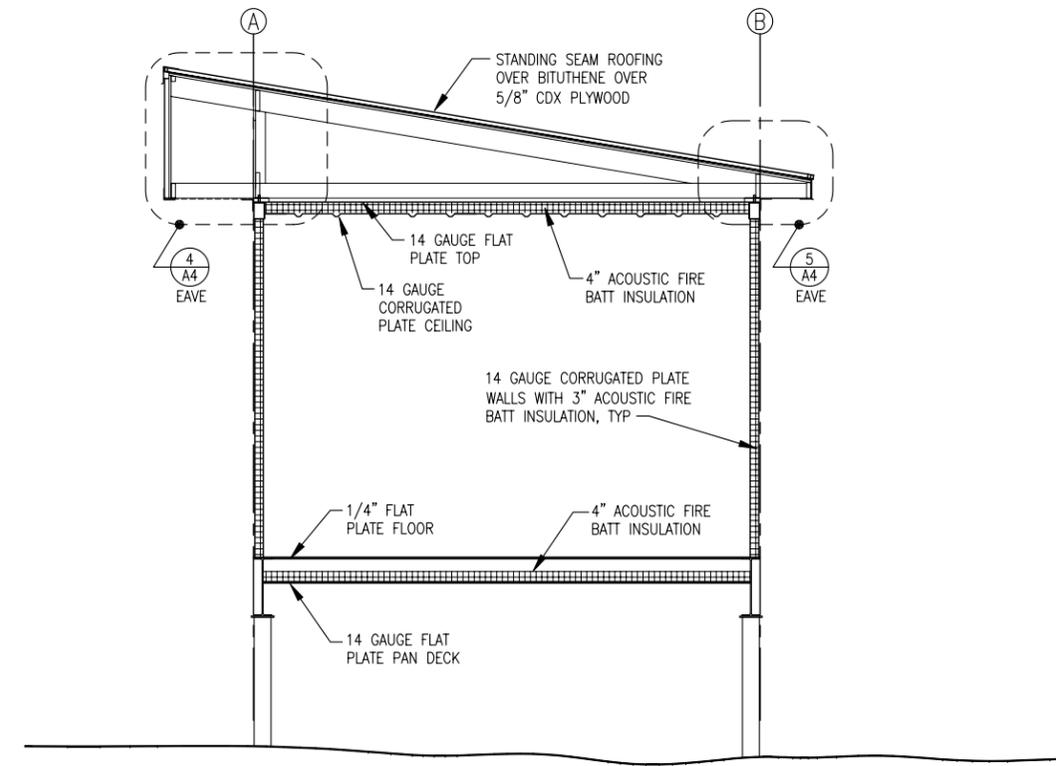
TITLE: INTERIOR ELEVATIONS & DOOR/WINDOW DETAILS

ALASKA ENERGY AND ENGINEERING, INC
P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

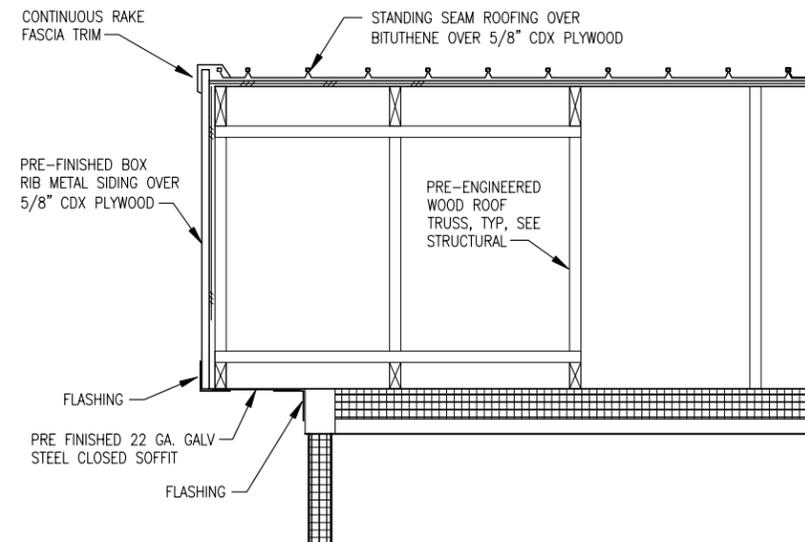
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DESIGNED BY: DJH DATE: 09/06/06 PROJECT NUMBER:



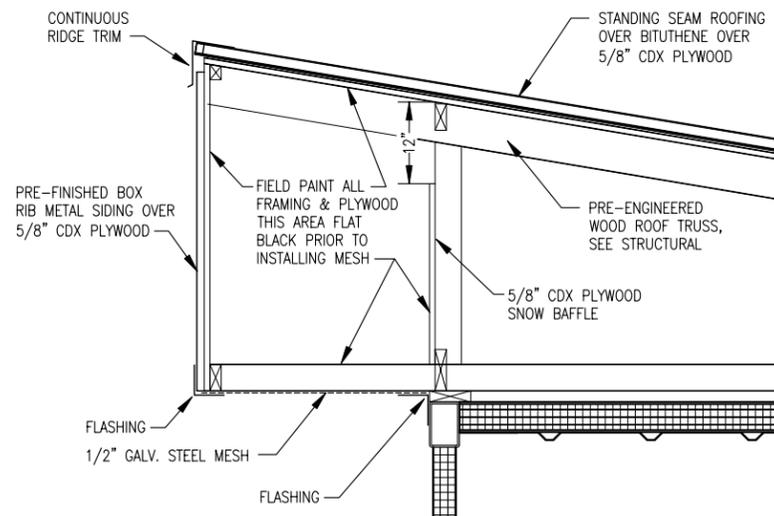
1 BUILDING SECTION
A4 1/4"=1'-0"



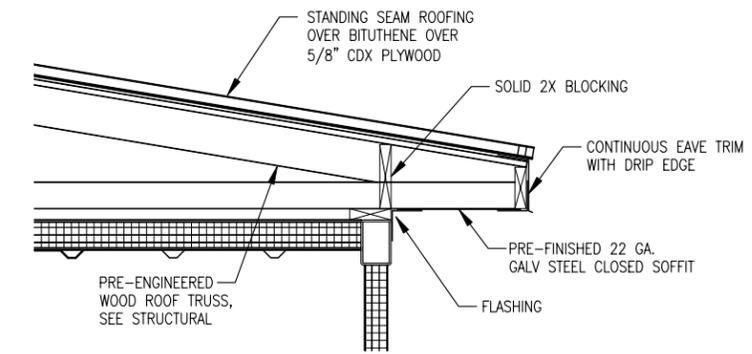
2 BUILDING SECTION
A4 1/4"=1'-0"



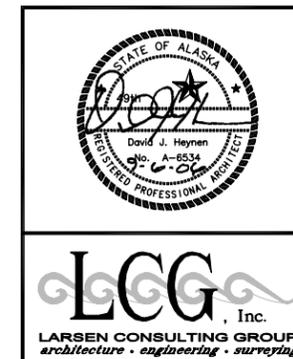
3 RAKE DETAIL
A4 1"=1'-0"



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



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



State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503			
PROJECT:		AEA STANDARD 15x40 THREE ENGINE MODULAR POWER PLANT	
TITLE:			
BUILDING SECTIONS & DETAILS			
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
DRAWN BY: BCG	SCALE: AS NOTED	FILE NAME:	SHEET:
DESIGNED BY: DJH	DATE: 09/06/06	PROJECT NUMBER:	A4 OF 4

STRUCTURAL GENERAL NOTES:

1.0 DESIGN LOADS:

- A. BUILDING CODE: 2003 INTERNATIONAL BUILDING CODE (IBC 2003)
- B. FLOOR LIVE LOADS: (IBC TABLE 1607.1)
 LIGHT STORAGE/MANUFACTURING 125 PSF OR 2000 POUND POINT LOAD
 MAXIMUM GENERATOR UNIT WEIGHT 5,000 POUNDS
- C. SNOW LOADS: (ASCE 7-02)
 GROUND SNOW LOAD, $P_g =$ 60 PSF
 COEFFICIENT OF EXPOSURE, $C_e =$ 1.0, PARTIALLY EXPOSED
 SNOW IMPORTANCE FACTOR, $I_s =$ 1.1, CATEGORY III
 THERMAL COEFFICIENT, $C_t =$ 1.1, COLD, VENTILATED ROOF
 ROOF/FLAT SNOW LOAD, $P_f =$
- D. WIND LOADS:
 BASIC WIND SPEED = 130 MPH, 3 SECOND GUST
 WIND IMPORTANCE FACTOR, $I_w =$ 1.15, CATEGORY III
 EXPOSURE CLASSIFICATION = EXPOSURE D
- E. SEISMIC LOADING:
 SEISMIC = $S_s = 0.59$ $S_1 = 0.15$
 SEISMIC IMPORTANCE FACTOR = 1.25, CATEGORY III

 SITE CLASS "D"
 BASIC SEISMIC FORCE RESISTANCE SYSTEM = BUILDING - BEARING WALL WITH SHEAR PANELS
 FOUNDATION - ORDINARY STEEL BRACED FRAME

 SEISMIC RESPONSE COEFFICIENT, $R =$ 5.0

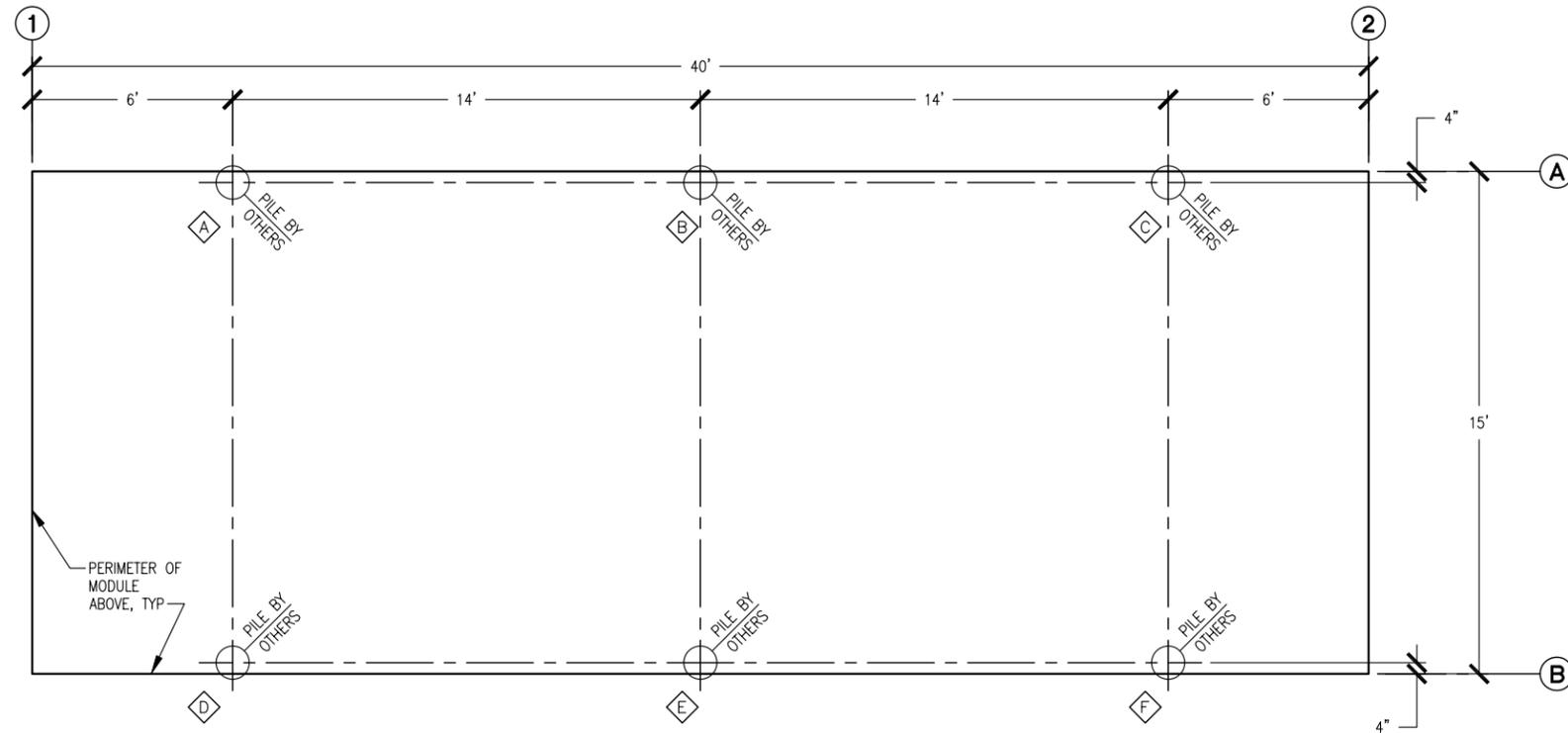
2.0 PILE FOUNDATIONS: SEE SITE/FOUNDATION PLANS BY OTHERS

3.0 STRUCTURAL STEEL:

- A. THE DESIGN, FABRICATION, AND ERECTION OF ALL STRUCTURAL STEEL SHALL COMPLY WITH THE CODE OF STANDARD PRACTICE OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION.
- B. ALL STEEL PLATE, SHAPES, AND ROLLED SECTIONS SHALL BE ASTM A36. ALL STEEL TUBING SHALL BE ASTM A500, GRADE B. ALL STEEL PIPE SHALL BE ASTM A53, GRADE B.
- C. ALL METAL TO METAL CONNECTIONS SHALL BE EQUAL TO STANDARD CONNECTION, OR AS DETAILED USING A325 BOLTS (BEARING TYPE CONNECTIONS). TIGHTEN HIGH STRENGTH BOLTS WITH PROPERLY CALIBRATED WRENCHES, BY TURN-OF-THE-NUT METHOD, OR BY LOAD WASHERS. ALL CONNECTIONS UNLESS OTHERWISE DETAILED, SHALL HAVE THE MAXIMUM NUMBER OF 3/4" DIAMETER BOLTS USING STANDARD GAUGES AND CLEARANCES.
- D. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH THE CURRENT CODE OF THE AMERICAN WELDING SOCIETY. MINIMUM FILLET WELD SHALL BE 3/16". USE AWS 5.1 E70XX ELECTRODES.
- E. ALL EXPOSED STEEL SURFACES SHALL BE PAINTED AS INDICATED IN THE ARCHITECTURAL DRAWINGS.

4.0 WOOD:

- A. PLYWOOD ROOF DECK AND WALL SHEATHING SHALL BE CDX WITH EXTERIOR GLUE, OR BETTER, UNLESS OTHERWISE INDICATED ON THE DRAWINGS. 5/8" PLYWOOD SHALL HAVE A PANEL SPAN RATING OF 32/16 - MINIMUM NAILING FOR PANELS, UNLESS OTHERWISE NOTED, SHALL EQUAL 10d NAILS AT 4" CENTERS AROUND PLYWOOD PANEL EDGES AND 10d'S @ 12" CENTERS ALONG INTERMEDIATE FRAMING. BLOCK ALL DIAPHRAGM PANEL EDGES WITH 2X4 FLAT BLOCKING. OSB PANELS WILL NOT BE ACCEPTED AS SUBSTITUTION FOR PLYWOOD.
- B. FRAMING MATERIAL: DOUGLAS FIR, NO. 2 OR BETTER MINIMUM FOR JOISTS, STUDS, PANEL JOINTS, WOOD PLATES, BLOCKING, AND HEADERS. MAXIMUM MOISTURE CONTENT SHALL BE 19%.
- C. ALL METAL TO WOOD OR WOOD TO WOOD CONNECTIONS SHALL BE STANDARD OR AS DETAILED ON THE DRAWINGS USING A307 BOLTS. ALL BOLTS AND LAG SCREW HEADS IN CONTACT WITH WOOD SHALL HAVE 2"X2"X3/16" PLATE WASHERS AT A MINIMUM OR AS OTHERWISE DETAILED.
- D. ALL METAL FRAMING ANCHORS AND HANGERS SHALL SUPPORT THE LOADS INDICATED ON THE DRAWINGS. HANGERS INDICATED ON THE DRAWINGS ARE "SIMPSON COMPANY" OR EQUAL.
- E. LAG SCREWS SHALL BE PREDRILLED WITH LEAD HOLES AS FOLLOWS"
 1.) THE LEAD HOLE FOR THE SHANK SHALL HAVE THE SAME DIAMETER AS THE SHANK, AND THE SAME DEPTH AS THE LENGTH OF THE UNTHREADED SHANK.
 2.) THE LEAD HOLE FOR THE THREADED PORTION SHALL HAVE A DIAMETER EQUAL TO 60% TO 70% OF THE SHANK DIAMETER AND A LENGTH EQUAL TO AT LEAST THE LENGTH OF THE THREADED PORTION.
- F. WOOD SCREWS SHALL BE PREDRILLED WITH LEAD HOLES. THE PART OF THE HOLE RECEIVING THE SHANK SHALL BE ABOUT 7/8X THE DIAMETER OF THE SHANK AND THAT FOR THE THREADED PORTION SHALL BE ABOUT 7/8X THE DIAMETER OF THE SCREW AT THE ROOT OF THE THREAD.
- G. ERECT WOOD FRAMING MEMBERS TRUE TO LINES AND LEVELS. DO NOT DEVIATE FROM TRUE ALIGNMENT MORE THAN 1/4 INCH.
- H. MINIMUM NAILING SHALL EQUAL THAT INDICATED IN INTERNATIONAL BUILDING CODE TABLE 2304.9.1 UNLESS OTHERWISE INDICATED ON THE DRAWINGS.
- I. PREMANUFACTURED ROOF TRUSSES: ALL PREMANUFACTURED WOOD TRUSSES SHALL BE "GANG NAIL" OR EQUAL AND DESIGNED FOR THE GRAVITY LOADS, LATERAL LOADS, AND SUPPORT CONDITIONS AS INDICATED ON THE DRAWINGS. SUBMIT TRUSS DESIGNS STAMPED BY AN ENGINEER LICENSED TO PRACTICE IN THE STATE OF ALASKA. ALL FRAMING TO BE DOUGLAS FIR NO. 2 OR BETTER MINIMUM. NO DURATION OF LOAD INCREASE IN STRESSES WILL BE ALLOWED FOR SNOW LOADING. UNBALANCED SNOW AND DRIFT LOADING IS REQUIRED.



1 PILE LOAD PLAN
 S1 3/8"=1'-0"

PILE LOADS						
MARK	DEAD (K)	FLOOR LIVE (K)	SNOW (K)	TOTAL (K)	WIND (K)	SEISMIC (K)
⬡	4.31	3.51	5.85	13.67	2.26 H 3.46 V±	4.22H
⬢	6.83	4.71	6.3	17.84	2.68 H 2.08 V±	3.09H
⬣	3.86	3.76	5.85	13.47	2.26 H 3.46 V±	4.22H
⬤	4.31	3.51	5.85	13.67	2.26 H 3.46 V±	4.22H
⬥	6.83	4.71	6.3	17.84	2.68 H 2.08 V±	3.09H
⬦	3.86	3.76	5.85	13.67	2.26 H 3.46 V±	4.22H

NOTES: 1) DEAD LOAD INCLUDES EQUIPMENT LOADS.
 2) FOUNDATION TYPE IS ONLY SUGGESTIVE BASED ON PREVIOUS PROJECTS. A COMPLETE FOUNDATION SYSTEM MUST BE ENGINEERED FOR ALL GRAVITY AND LATERAL LOAD COMBINATIONS FOR THE ACTUAL SITE.



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 AIDEA/AEA
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 Anchorage, Alaska 99503

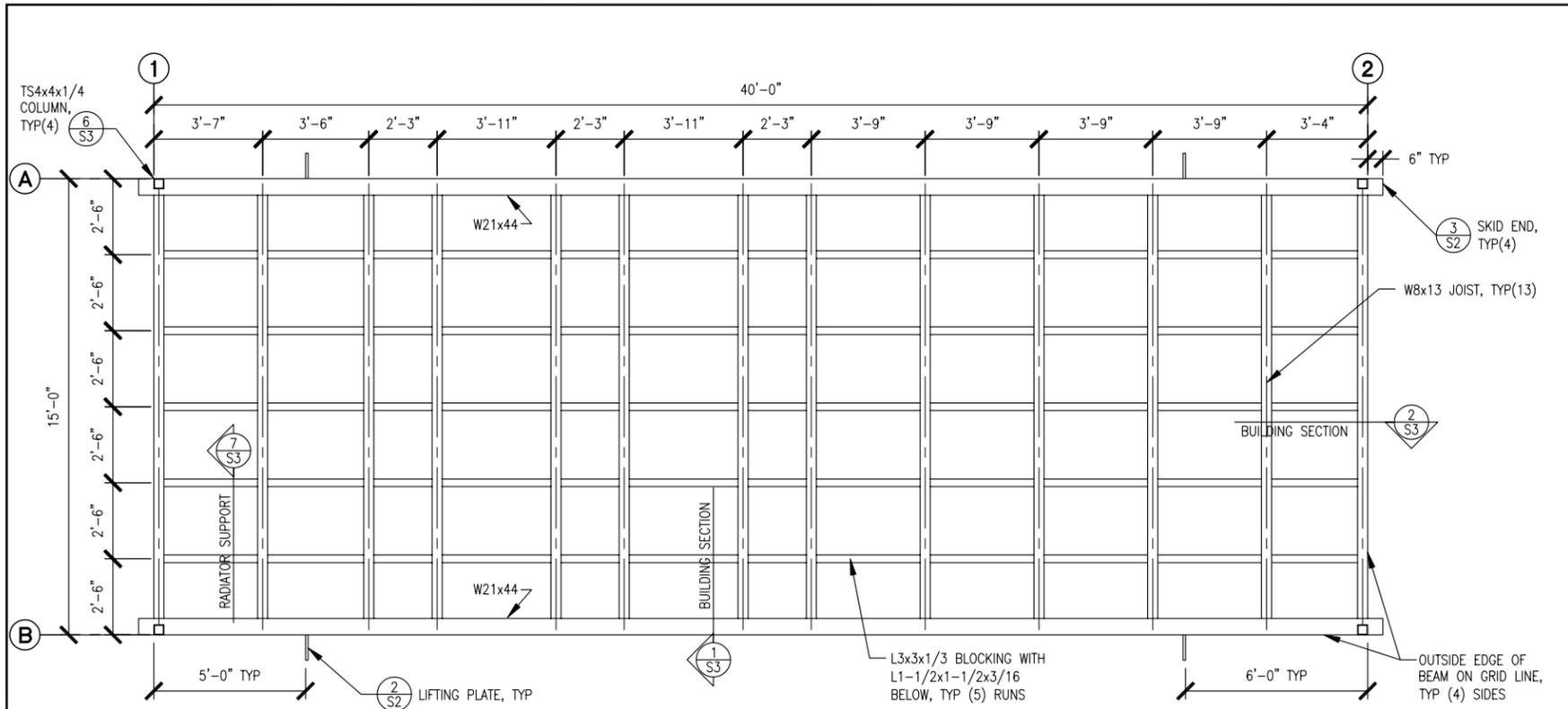
ALASKA ENERGY AUTHORITY

PROJECT: **AEA STANDARD 15x40
 THREE ENGINE MODULAR POWER PLANT**

TITLE: **GENERAL NOTES & PILE LOAD PLAN**

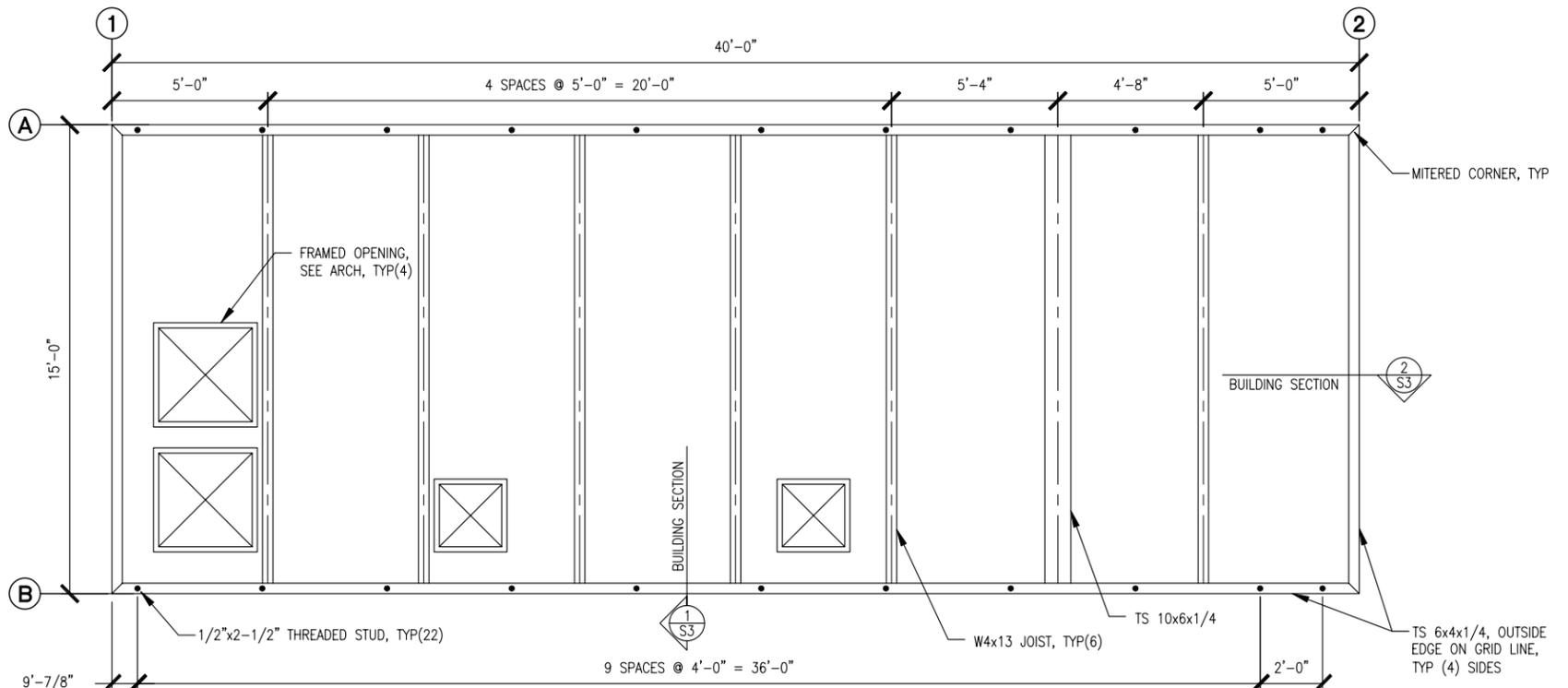
ALASKA ENERGY AND ENGINEERING, INC
 P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100

DRAWN BY: BCG	SCALE: AS NOTED	FILE NAME:	SHEET: S1
DESIGNED BY: DG	DATE: 09/06/06	PROJECT NUMBER:	OF 4



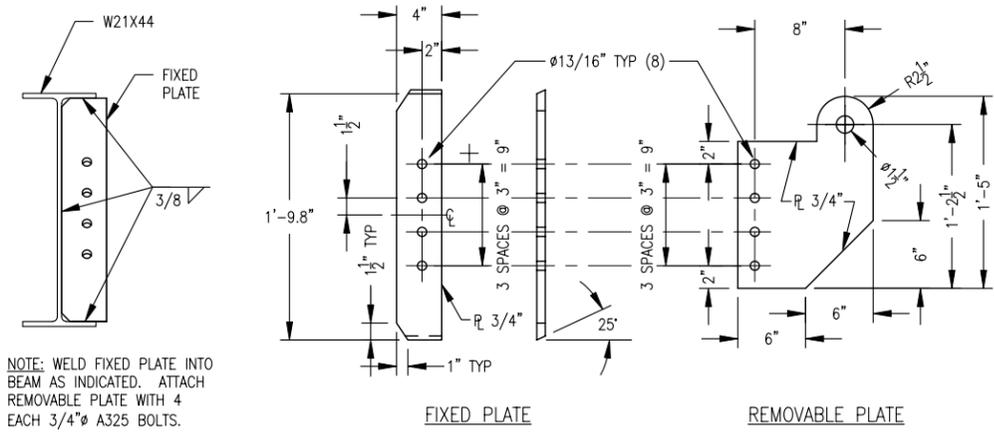
NOTES: 1) FABRICATE FLOOR AND PAN DECKS USING 5'x40' SHEETS WITH ALL JOINTS CENTERED ON BLOCKING.
 2) SEE MECHANICAL SUPPORT PLAN FOR GENERATOR SUPPORT PEDESTAL LOCATION AND FABRICATION.

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



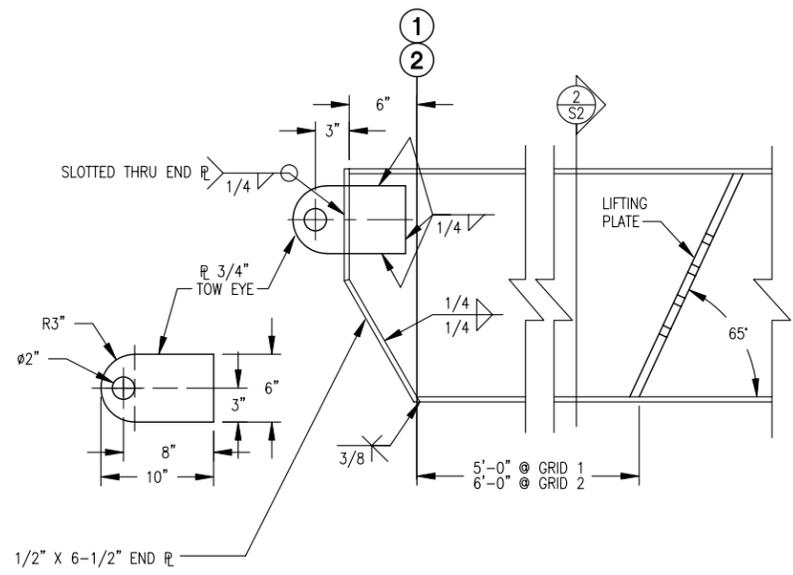
NOTES: 1) FABRICATE CEILING ASSEMBLY USING 5'x14' SHEETS WITH ALL JOINTS CENTERED ON JOISTS.
 2) SEE MECHANICAL SUPPORT PLAN FOR STRUT SUPPORT LOCATION AND INSTALLATION.

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



NOTE: WELD FIXED PLATE INTO BEAM AS INDICATED. ATTACH REMOVABLE PLATE WITH 4 EACH 3/4"Ø A325 BOLTS.

2 TYPICAL LIFTING PLATE
 S2 1-1/2"=1'-0"

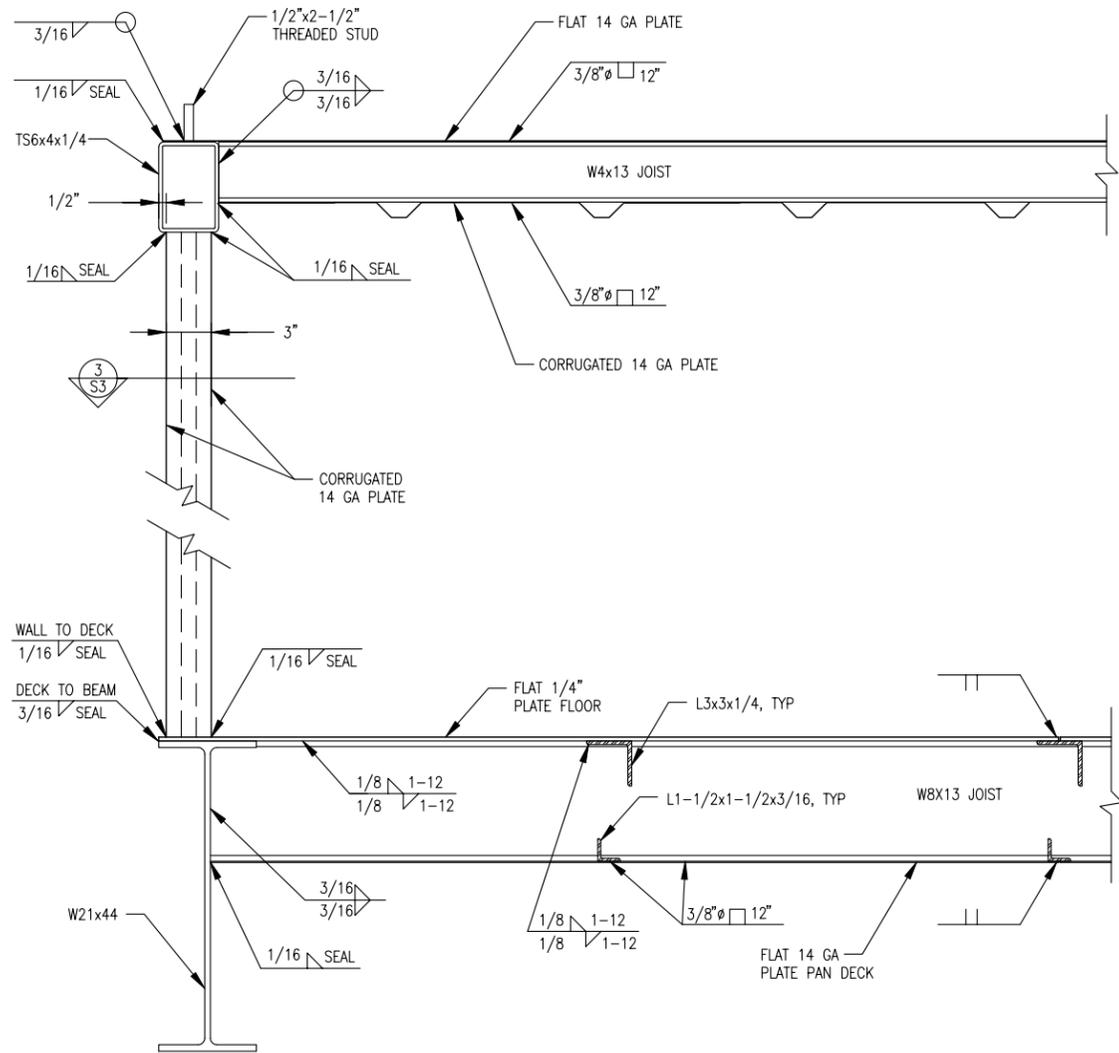


3 TYPICAL SKID END
 S2 1-1/2"=1'-0"

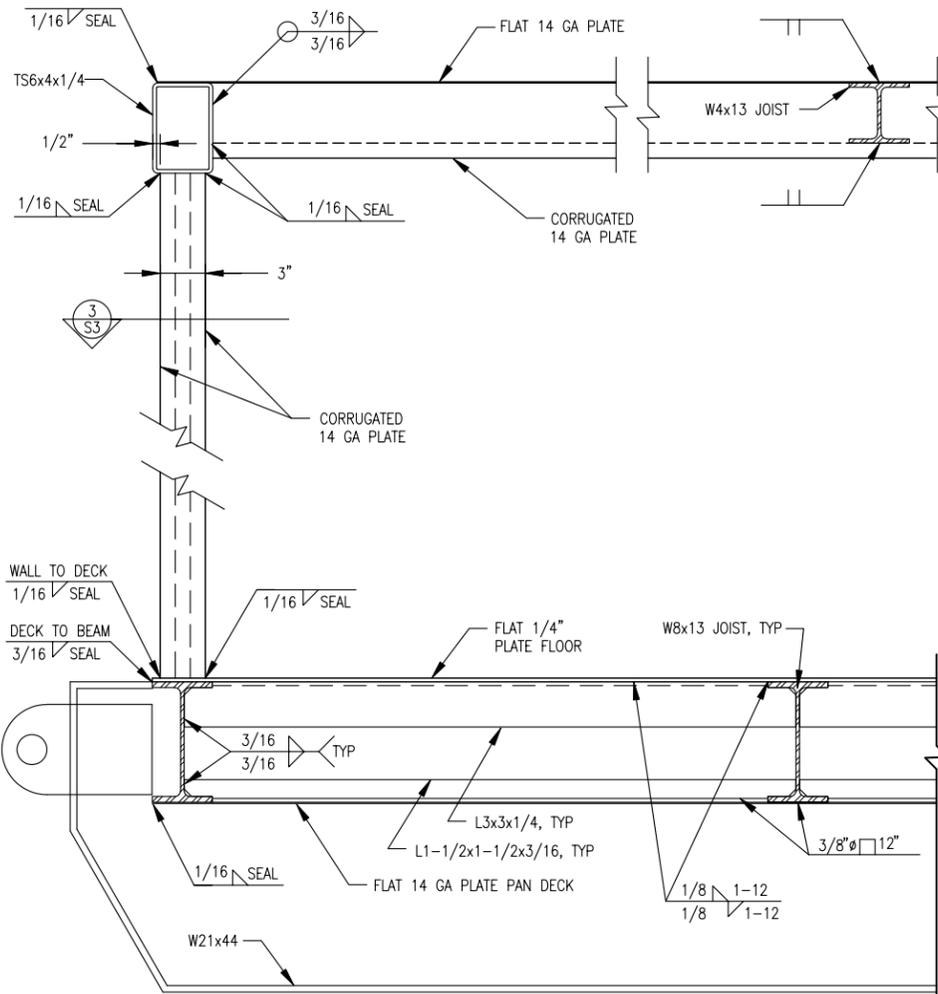


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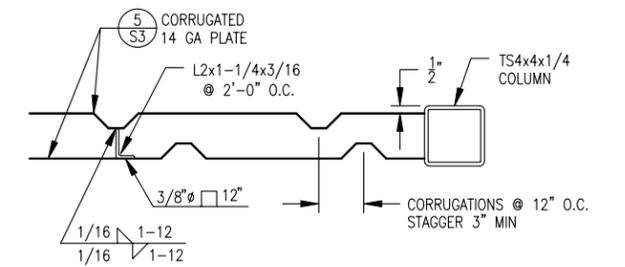
State of Alaska Department of Community and Economic Development AIDEA/AEA Rural Energy Group 813 West Northern Lights Blvd. Anchorage, Alaska 99503 			
PROJECT: AEA STANDARD 15x40 THREE ENGINE MODULAR POWER PLANT			
TITLE: FRAMING PLANS & DETAILS			
ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
DRAWN BY: BCG DESIGNED BY: DG	SCALE: AS NOTED DATE: 09/06/06	FILE NAME: PROJECT NUMBER:	SHEET: S2 OF 4



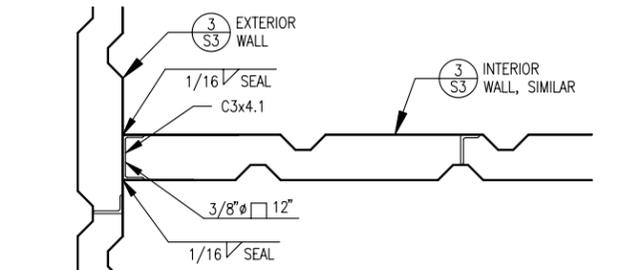
1
S3
TYPICAL BUILDING SECTION
2'-1'-0"



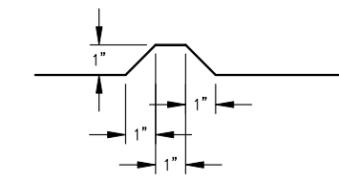
2
S3
TYPICAL BUILDING SECTION
2'-1'-0"



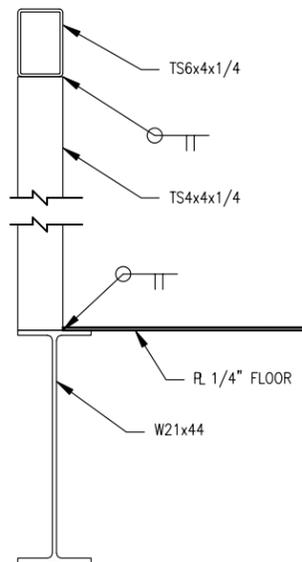
3
S3
TYPICAL EXTERIOR WALL - PLAN VIEW
2'-1'-0"



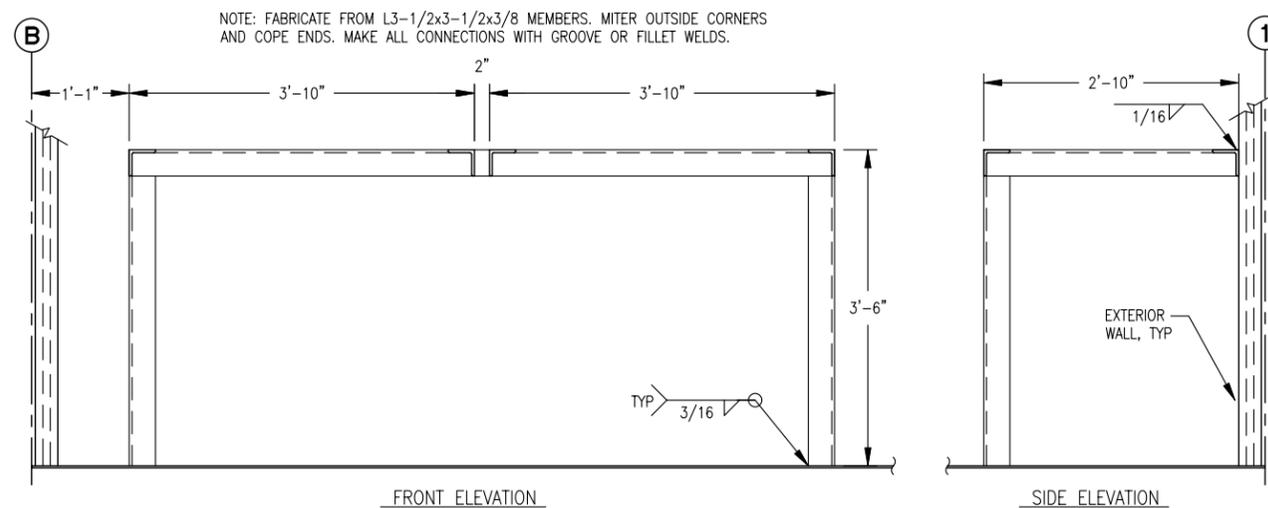
4
S3
INTERIOR/EXTERIOR WALL CONNECTION - PLAN
2'-1'-0"



5
S3
TYPICAL CORRUGATION
6'-1'-0"



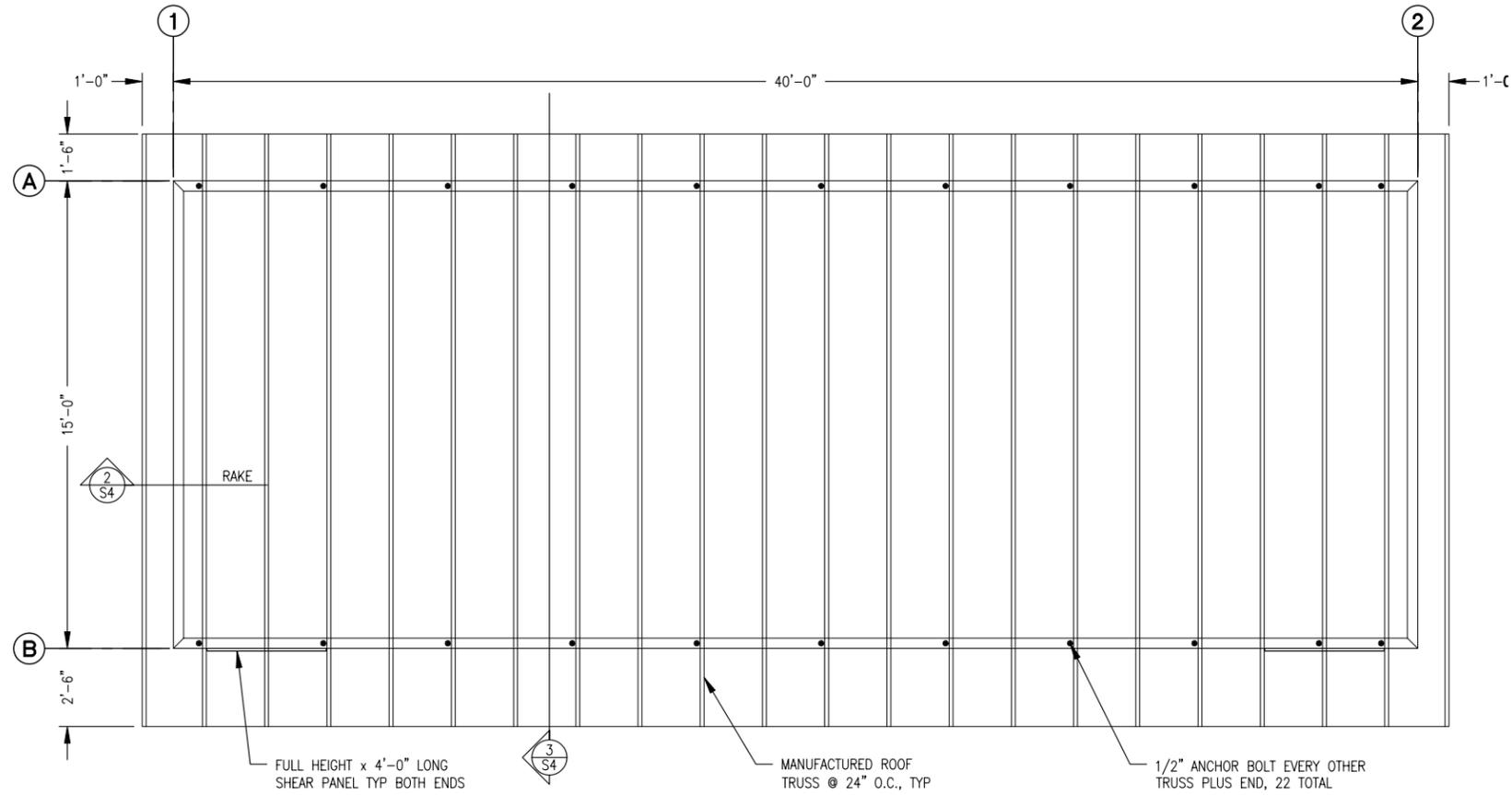
6
S3
TYPICAL CORNER COLUMN
1-1/2'-1'-0"



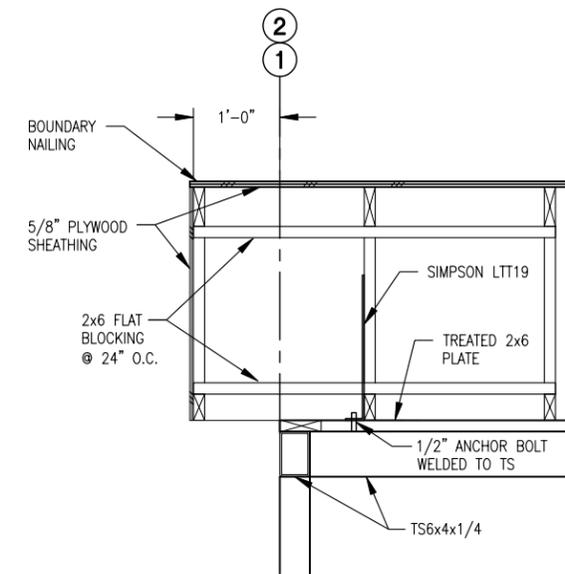
7
S3
RADIATOR SUPPORT
1'-1'-0"



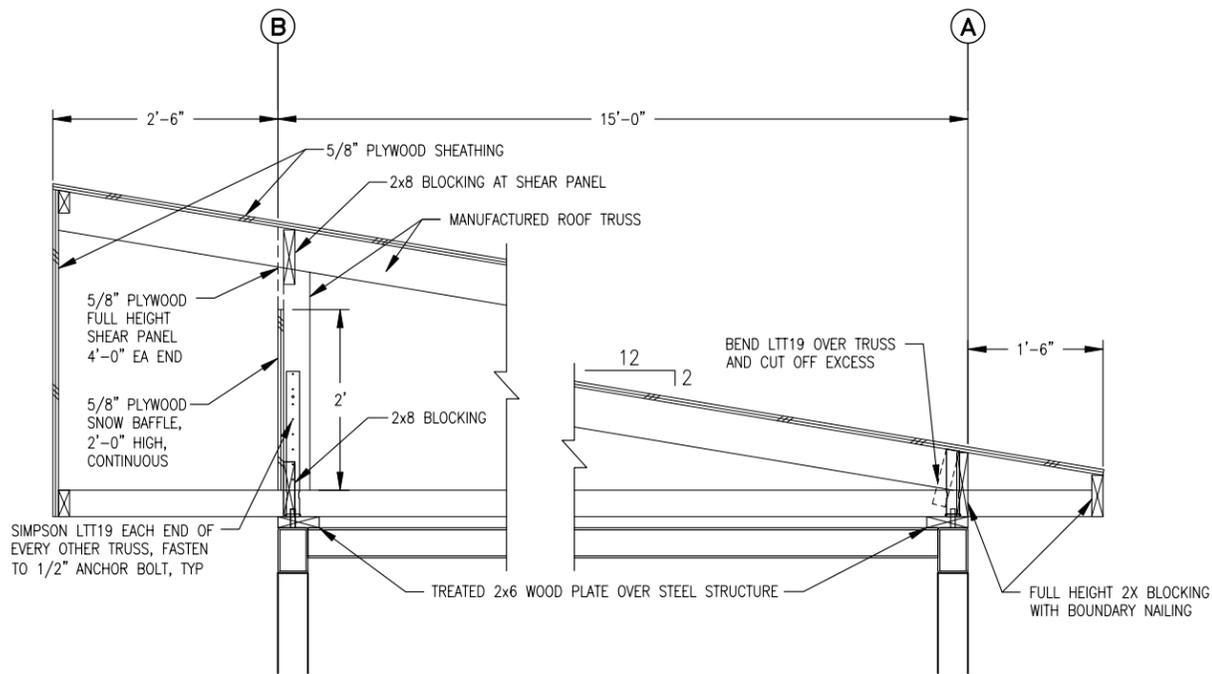
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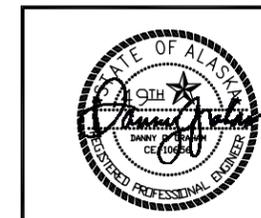
1 ROOF FRAMING PLAN
S4 3/8"=1'-0"



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



3 ROOF TRUSS INSTALLATION
S4 1"=1'-0"



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ALASKA ENERGY AND ENGINEERING, INC P.O. BOX 111405 ANCHORAGE, ALASKA 99511-1405 PHONE (907) 349-0100			
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DESIGNED BY: DG	DATE: 09/06/06	PROJECT NUMBER:	