STIKINE MIDDLE SCHOOL
BOILER REPLACEMENT DESIGN
CITY AND BOROUGH OF WRANGELL
WRANGELL, AK

100% PERMIT DRAWINGS | NOVEMBER 05, 2025

CONTACT INFORMATION

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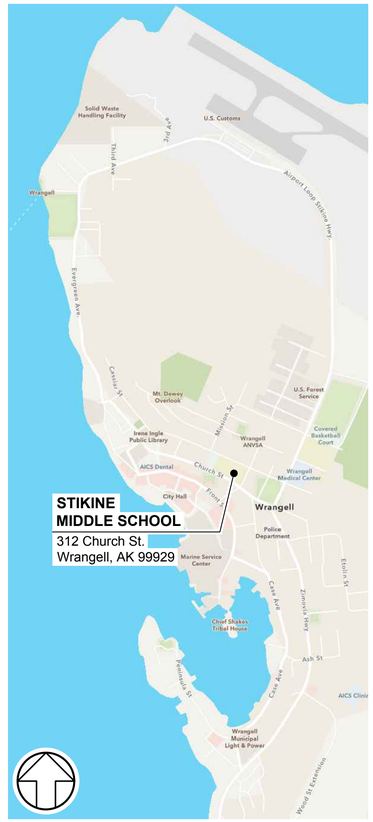
VICINITY MAP



WRANGELL, AK

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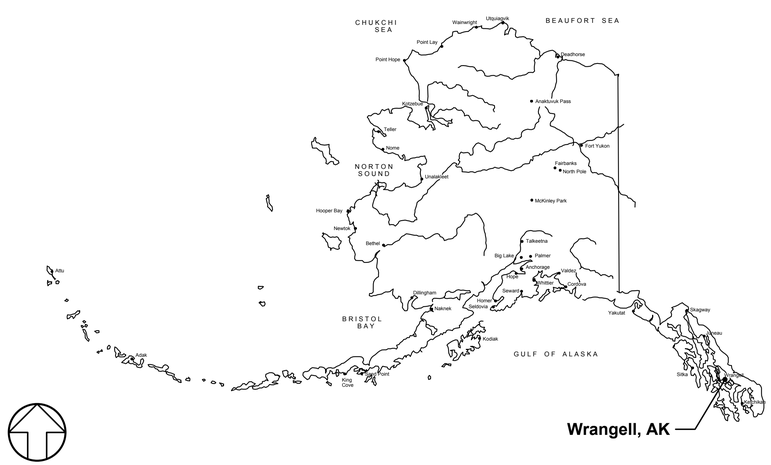
STATE MAP



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Date:	11/05/2025
Project Phase	**100% PERMIT DRAWINGS**
Sheet Title	COVER SHEET
Sheet Number	**G001**

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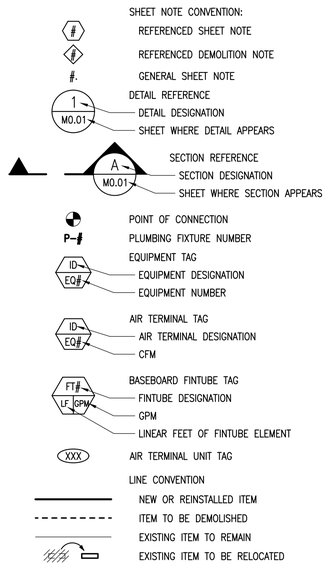
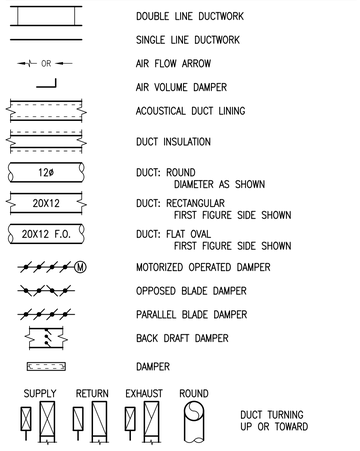
ABBREVIATIONS

@	AT	IN OR "	INCH OR INCHES
&	AND	IN HG	INCHES MERCURY
#	NUMBER	IN WC	INCHES WATER COLUMN
%	PERCENT	INSUL	INSULATION
AD	ACCESS DOOR	IPS	INTERNATIONAL PIPE STANDARD
AAP	AREA ALARM PANEL	K	THERMAL CONDUCTIVITY
ADA	AMERICANS WITH DISABILITIES ACT	KW	KILOWATT
AFF	ABOVE FINISHED FLOOR	KWH	KILOWATT HOUR
AFG	ABOVE FINISHED GRADE	LAT	LEAVING AIR TEMPERATURE
AHJ	AUTHORITY HAVING JURISDICTION	LB/HR	POUNDS PER HOUR
AHU	AIR-HANDLING UNIT	LBS	POUNDS
ALT	ALTERNATE	LF	LINEAR FEET
AMB	AMBIENT	L	LENGTH
AMCA	AIR MOVEMENT AND CONTROL ASSOCIATION	LWT	LEAVING WATER TEMPERATURE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE	LOC	LOCATION/LOCATED
APD	AIR PRESSURE DROP	LP	LOW PRESSURE
APPROX	APPROXIMATE	LR	LONG RADIUS
AR	ACID RESISTANT	MAN	MANUAL
ARCH	ARCHITECTURAL	MAT	MIXED AIR TEMPERATURE
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS	MAV	MANUAL AIR VENT
ATM	ATMOSPHERE	MAX	MAXIMUM
AUTO	AUTOMATIC	MBH	THOUSAND BTU PER HOUR
AVG	AVERAGE	MECH	MECHANICAL
AWG	AMERICAN WIRE GAUGE	MFR	MANUFACTURER
BAS	BUILDING AUTOMATION SYSTEM	MH	MANHOLE
BDD	BACKDRAFT DAMPER	MIN	MINIMUM, MINUTE
BHP	BRAKE HORSEPOWER, BOILER HORSEPOWER	MPH	MILES PER HOUR
BLDG	BUILDING	MTD	MOUNTED
BLW	BELOW	N/A	NOT APPLICABLE
BOD	BOTTOM OF DUCT	NC	NOISE CRITERIA, NORMALLY CLOSED
BOP	BOTTOM OF PIPE	NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
BTU	BRITISH THERMAL UNIT		NOT IN CONTRACT
BTUH	BTU PER HOUR	NO	NORMALLY OPEN, NUMBER
C	COMMON, CONDENSATE	NTS	NOT TO SCALE
C-C	CENTER TO CENTER	OD	OUTSIDE DIAMETER
CAP	CAPACITY, END CAP	OFOI	OWNER FURNISHED, OWNER INSTALLED
CCW	COUNTER-CLOCKWISE	OSA	OUTSIDE AIR
CF	COOLING FAN, CIRCULATING FAN, CUBIC FOOT	OZ	OUNCE
CFM	CUBIC FEET PER MINUTE	PD	PRESSURE DROP OR DIFFERENCE
CI	CAST IRON	PG	PROPYLENE GLYCOL
CL	CENTER LINE	PL	PLATE
CLG	CEILING	PLBG	PLUMBING
CMPR	COMPRESSOR	POC	POINT OF CONNECTION
COEF	COEFFICIENT	PNL	PANEL
CONC	CONCRETE	PH	PHASE (ELECTRICAL)
COND	CONDENSER	PPM	PARTS PER MILLION
CTR	CENTER	PSI	POUNDS PER SQUARE INCH
CU	COPPER, CONDENSING UNIT	PSIA	POUNDS PER SQUARE INCH - ABSOLUTE
CU IN	CUBIC INCH	PSID	POUNDS PER SQUARE INCH - DIFFERENTIAL
CV	VALVE FLOW COEFFICIENT	PSIG	POUNDS PER SQUARE INCH - GAUGE
CW	CLOCKWISE	PRESS	PRESSURE
DB	DECIBEL	PRI	PRIMARY
DBT	DRY-BULB TEMPERATURE	R-407C,	REFRIGERANT (407C,410A,ETC.)
DDC	DIRECT DIGITAL CONTROL	R-410A	
DEG OR °	DEGREE	R/A	RETURN AIR
DEG C	DEGREE CENTIGRADE	RAD	RADIANT OR RADIATION
DEG F	DEGREE FAHRENHEIT	RCVR	RECEIVER
DEMO	DEMOLITION	RECIRC	RECIRCULATE
DENS	DENSITY	RED	REDUCER
DGM	DIAGRAM	REFRIG	REFRIGERATION
DI	DUCTILE IRON	REV	REVOLUTIONS
DIA OR ø	DIAMETER	RF	RELIEF FAN OR RETURN FAN
DIFF	DIFFERENCE OR DELTA	RH	RELATIVE HUMIDITY
DIP	DUCTILE IRON PIPE	RM	ROOM
DISS	DIAMETER-INDEX SAFETY SYSTEM	RPM	REVOLUTIONS PER MINUTE
DN	DOWN	RPS	REVOLUTIONS PER SECOND
DO	DITTO	S/A	SUPPLY AIR
DTL	DETAIL	SAT	SATURATION
DWDI	DOUBLE WIDTH DOUBLE INLET	SCHD	SCHEDULE
DWG	DRAWING	SCFM	STANDARD CUBIC FEET PER MINUTE
(E)	EXISTING	SD	STORM DRAIN
EA	EACH	SEC	SECONDARY
E/A	EXHAUST AIR	SF	SQUARE FEET
EAT	ENTERING AIR TEMPERATURE	SH	SENSIBLE HEAT
EF	EXHAUST FAN	SHG	SENSIBLE HEAT GAIN
EFF	EFFICIENCY	SHR	SENSIBLE HEAT RATIO
EG	ETHYLENE GLYCOL, EXHAUST GRILLE	SHT	SHEET
ELEC	ELECTRICAL	SHWR	SHOWER
ELEV	ELEVATION	SP	STATIC PRESSURE
EMB	EMBEDMENT	SPD	STATIC PRESSURE DROP
ENT	ENTERING	SPEC	SPECIFICATION, SPECIFIED
EQIV FT	EQUIVALENT FEET	SPKLR	SPRINKLER
ESP	EXTERNAL STATIC PRESSURE	SR	SHORT RADIUS
EVAP	EVAPORATOR	SWSI	SINGLE WIDTH SINGLE INLET
EXP	EXPANSION	SQ	SQUARE
EWT	ENTERING WATER TEMPERATURE	SS	STAINLESS STEEL, SANITARY SEWER
°F	FAHRENHEIT	STD	STANDARD
FA	FACE AREA	SUCT	SUCTION
F-F	FACE TO FACE	TA	TRANSFER AIR
FD	FIRE DAMPER	TEMP	TEMPERATURE, TEMPORARY
FLEX	FLEXIBLE	THRU	THROUGH
FLR	FLOOR	TOD	TOP OF DUCT
FOB	FLAT ON BOTTOM	TONS	TONS OF REFRIGERATION
FOT	FLAT ON TOP	TOP	TOP OF PIPE
FP	FREEZING POINT	TYP	TYPICAL
FPM	FEET PER MINUTE	UG	UNDERGROUND
FPS	FEET PER SECOND	UNO	UNLESS NOTED OTHERWISE
FSD	FIRE-SMOKE DAMPER	UPC	UNIFORM PLUMBING CODE
FSDM	FIRE-SMOKE DAMPER, MODULATING	V	VOLTS OR VOLTAGE
FT OR '	FOOT OR FEET	VAC	VACUUM
FV	FACE VELOCITY	VAC	VOLTS (ALTERNATING CURRENT)
GA	GAGE OR GAUGE	VAL	VALVE
GAL	GALLONS	VAP PR	VAPOR PRESSURE
GPD	GALLONS PER DAY	VAR	VARIABLE
GPH	GALLONS PER HOUR	VAV	VARIABLE AIR VOLUME
GPM	GALLONS PER MINUTE	VDC	VOLTS (DIRECT CURRENT)
GR	GRAINS	VEL	VELOCITY
GRD	GRILLES, REGISTERS, DIFFUSERS	VERT	VERTICAL
HD	HEAD	VFD	VARIABLE FREQUENCY DRIVE
HDPE	HIGH DENSITY POLYETHYLENE	VOL	VOLUME
HG	HEAT GAIN	VP	VELOCITY PRESSURE
HT	HEIGHT	VSD	VARIABLE SPEED DRIVE
HP	HORSEPOWER	VTR	VENT THROUGH ROOF
HR	HOUR(S)	W	WATT
HVAC	HEATING, VENTILATING & AIR-CONDITIONING	W/	WITH
HZ	FREQUENCY	W/O	WITHOUT
IAW	IN ACCORDANCE WITH	WB	WET BULB TEMPERATURE
ID	INSIDE DIAMETER	WC	WATER COLUMN
IE	INVERT ELEVATION	WH	WATT-HOUR
IBC	INTERNATIONAL BUILDING CODE	WP	WEATHER PROOF, WATER PROOF
IFC	INTERNATIONAL FIRE CODE	WPD	WATER PRESSURE DROP
IMC	INTERNATIONAL MECHANICAL CODE	WT	WEIGHT
		YD	YARD
		ZVB	ZONE VALVE BOX

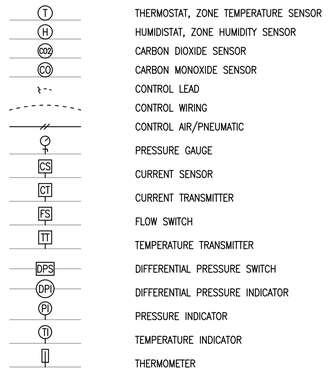
GENERAL



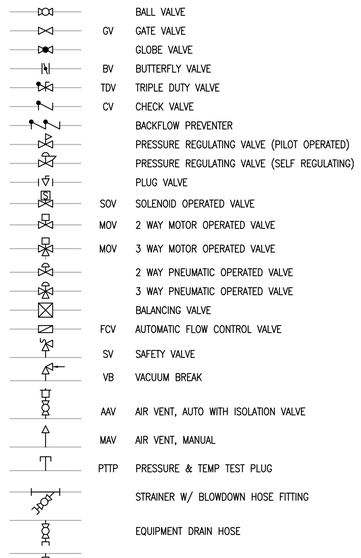
VENTILATION



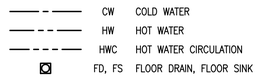
MONITORING AND CONTROLS



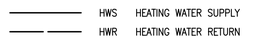
GENERAL PIPING



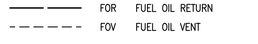
PLUMBING PIPING



HYDRONIC PIPING



FUEL PIPING



MECHANICAL SCHEDULES

MISCELLANEOUS EQUIPMENT SCHEDULE

SYMBOL	LOCATION	MOTOR (HP,V,PH)	WEIGHT (LBS)	REMARKS, BASIS OF DESIGN
AS-1	BOILER ROOM	-	200	HYDRONIC HEATING COMBINATION AIR AND DIRT SEPARATOR: 3 INCH FLANGED CONNECTIONS, MAX WORKING PRESSURE OF 150 PSIG, MAX WORKING TEMPERATURE OF 270 DEG F, COALESCING MEDIA. SPIROTHERM VDT300.

NOTES:
(1) PROVIDE STRUCTURAL AND SEISMIC CALCULATIONS PLUS FASTENING DETAILS AS A DEFERRED STRUCTURAL SUBMITTAL INCLUDING STRUCTURAL ENGINEER'S STAMP AND SIGNATURE.

BOILER SCHEDULE

SYMBOL	LOCATION	MOTOR (HP,V,PH)	INPUT (MBH)	OUTPUT (MBH)	WEIGHT (LBS)	REMARKS, BASIS OF DESIGN
BLR-1	BOILER ROOM	--,120,1	14.8 (GPH OIL)	1,714	4,800	OIL FIRED CAST IRON SECTIONAL WATER BOILER WITH POWER BURNER: 25 PSIG WORKING PRESSURE, 50 PSIG ASME SAFETY RELIEF VALVE, GAUGES AND PACKAGED CONTROLS, TANKLESS HEATER FOR DOM. HOT WATER, TOP FLUE. BURNHAM V911A WITH POWERFLAME C2-OAS BURNER.

NOTES:
(1) PROVIDE STRUCTURAL AND SEISMIC CALCULATIONS PLUS FASTENING DETAILS AS A DEFERRED STRUCTURAL SUBMITTAL INCLUDING STRUCTURAL ENGINEER'S STAMP AND SIGNATURE.

EXPANSION TANK SCHEDULE

SYMBOL	LOCATION	ACCEPTANCE VOL (GAL)	TANK VOL (GAL)	PRE-CHARGE (PSIG)	WEIGHT (LBS)	REMARKS, BASIS OF DESIGN
ET-1	BOILER ROOM	11.3	16.5	25	200	SECONDARY GLYCOL SYSTEM EXPANSION: ASME STAMPED, STEEL SHELL WITH HEAVY DUTY BUTYL DIAPHRAGM, 125 PSIG MAX WORKING PRESSURE, 240 F MAX OPERATING TEMP. AMTROL EXTROL AX-20-DD.

NOTES:
(1) PROVIDE STRUCTURAL AND SEISMIC CALCULATIONS PLUS FASTENING DETAILS AS A DEFERRED STRUCTURAL SUBMITTAL INCLUDING STRUCTURAL ENGINEER'S STAMP AND SIGNATURE.

PUMP SCHEDULE

SYMBOL	LOCATION	SERVICE	FLUID	TEMP. (DEG F)	GPM	HEAD (FEET)	MOTOR (HP,V,PH)	REMARKS BASIS OF DESIGN
CP-1	BOILER ROOM	AHU COIL HEATING CIRC	WATER	180	38	35	1107W,208,1	INLINE CENTRIFUGAL PUMP: CAST IRON CONSTRUCTION, ECM MOTOR. GRUNDFOS MAGNA1 65-150.
CP-2	BOILER ROOM	BUILDING HEATING CIRC	WATER	180	65	45	1223W,208,1	INLINE CENTRIFUGAL PUMP: CAST IRON CONSTRUCTION, ECM MOTOR. GRUNDFOS MAGNA1 65-150.

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11-5-2025
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STIKINE MIDDLE SCHOOL
BOILER REPLACEMENT DESIGN
CITY AND BOROUGH OF WRANGELL
WRANGELL, AK

Revisions		
No.	Date	Description

1 INCH AT FULL SIZE
1" ACTUAL
IF NOT 1 INCH, SCALE ACCORDINGLY

Designed by:	LAB
Checked by:	MDL
AMC Project No.:	25506
Date:	11/05/2025

Project Phase
100% PERMIT DRAWINGS

Sheet Title
MECHANICAL - LEGEND

Sheet Number
M001

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SPECIFICATIONS

GENERAL REQUIREMENTS

1. PERFORM WORK IN ACCORDANCE WITH THE FOLLOWING CODES: 2021 IBC, 2021 IMC, 2018 UPC, AND 2020 NEC ALONG WITH CITY AND BOROUGH OF WRANGEL LOCAL AMENDMENTS.
2. PROVIDE LABOR, PRODUCTS, AND SERVICE REQUIRED FOR THE COMPLETE AND PROPER OPERATION OF EQUIPMENT AND SYSTEMS SHOWN AND SPECIFIED. THE DRAWINGS ARE PARTLY DIAGRAMMATIC AND DO NOT SHOW EXACT ROUTING, LOCATION, AND DETAILS. WHERE THE WORK OF SEVERAL CRAFTS ARE INVOLVED, COORDINATE WITH RELATED WORK TO PROVIDE EACH SYSTEM IN COMPLETE AND PROPER OPERATING ORDER.
3. WORK SHALL INCLUDE MATERIALS, APPLIANCES, AND APPARATUS NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS, BUT WHICH ARE NECESSARY TO MAKE A COMPLETE, OPERATIONAL INSTALLATION OF SYSTEMS SHOWN ON THE DRAWINGS OR DESCRIBED HEREIN.
4. INSTALL EQUIPMENT, MATERIALS, APPLIANCES, AND APPARATUS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.
5. PROVIDE PRODUCTS NEW, UNUSED AND UNDAMAGED, OF STANDARD MANUFACTURE, OF LATEST DESIGN AND QUALITY, AND SUITABLE FOR THIS INSTALLATION.
6. PROVIDE WORKABLE ACCESS TO SERVICEABLE AND OPERABLE EQUIPMENT.
7. FIELD VERIFY EXISTING CONDITIONS. FIELD COORDINATE EXACT LOCATIONS OF EQUIPMENT, DUCTS, PIPES, AND CONTROLS WITH EXISTING AND NEW WORK; INCLUDING CONSTRUCTION PHASING, STRUCTURAL ELEMENTS, AND ARCHITECTURAL ELEMENTS.
8. IMMEDIATELY NOTIFY THE OWNER'S REPRESENTATIVE SHOULD CLARIFICATION BE REQUIRED DUE TO A CONFLICT OF QUANTITY, COORDINATION, LOCATION, ETC.
9. OBTAIN AND PAY FOR PERMITS AND REQUIRED INSPECTIONS. COMPLY WITH FEDERAL, STATE, AND LOCAL REGULATIONS FOR DISPOSAL, AND SECURE NECESSARY PERMITS.
10. UPON COMPLETION OF INSTALLATION AND PRIOR TO INITIAL OPERATION, REMOVE DEBRIS, AND CLEAN AND WIPE DOWN EQUIPMENT, PIPING, DUCTWORK, AND SURFACES TO ELIMINATE DUST AND DIRT.
11. COORDINATE PHASING REQUIREMENTS AND SERVICE DISRUPTIONS WITH THE OWNER AND OBTAIN SPECIFIC AGREEMENT OF THE TIMES AND DURATIONS OF SYSTEM DISRUPTIONS BEFORE STARTING WORK.
12. BUILDING WILL BE OPERATIONAL DURING CONSTRUCTION. COORDINATE WITH THE OWNER AND PROVIDE TEMPORARY HEATING TO MAINTAIN OCCUPIED PORTIONS OF THE BUILDING BETWEEN 65–75 DEG F AND UNOCCUPIED PORTION ABOVE 55 DEG F DURING THE PROJECT.

DEMOLITION

1. TAB EFFORT WITH A WRITTEN PRE–DEMOLITION TEST REPORT IS REQUIRED PRIOR TO THE START OF DEMOLITION. REFER TO TESTING, ADJUSTING AND BALANCING SECTION BELOW.
2. DEMOLITION WORK SHALL INCLUDE REMOVAL OF EQUIPMENT, FIXTURES, SERVICE AND BRANCH LINES BACK TO MAINS. TERMINATION SHALL BE CAPPED AND IDENTIFIED.
3. PLUG, PATCH, AND REPAIR PENETRATIONS AND SURFACES. REFINISH SURFACES AND ASSEMBLY RATINGS TO MATCH EXISTING. REPAIR OR REPLACE DAMAGED SURFACES, INSULATION, AND FIREPROOFING.
4. REMOVE EXPOSED ABANDONED OR INDICATED FOR DEMOLITION CONTROLS, EQUIPMENT, PIPES, AND DUCTWORK. REMOVE CONDUCTORS, CONDUIT, BRACKETS, STEMS, HANGERS, AND OTHER ACCESSORIES. REMOVE ABANDONED CONTROLS AND ASSOCIATED TUBING, WIRING AND CONDUIT TO SOURCE OF SIGNAL AND SUPPLY.
5. ITEMS REQUIRING RELOCATION OR TEMPORARILY SUPPORTED DURING DEMOLITION OR NEW WORK SHALL BE MAINTAINED AND RE–INSTALLED TO MAINTAIN THEIR LISTING, SERVICEABILITY, AND FUNCTION. REROUTE OR PROVIDE NEW PIPING TO SUPPORT THE NEW EQUIPMENT LOCATIONS. VERIFY THAT EQUIPMENT AND SYSTEMS ARE OPERATIONAL UPON COMPLETION OF WORK.
6. COORDINATE LIMITS OF DEMOLITION WITH NEW WORK.

SUBMITTALS

1. MARK UP A CLEAN SET OF DRAWINGS AS WORK PROGRESSES TO SHOW THE AS–BUILT MECHANICAL WORK. TURN THESE DRAWINGS OVER TO THE OWNER'S REPRESENTATIVE AT THE COMPLETION OF THE PROJECT.
2. SUBMIT PRODUCT DATA FOR PRODUCTS PROVIDED UNDER THIS CONTRACT. PROVIDE ELECTRONIC, PDF FILES WITH BOOKMARKS WITH EVERY SUBMITTAL. SUBMIT SUBMITTALS FOR REVIEW AND APPROVAL BY THE OWNER'S REPRESENTATIVE. OBTAIN OWNER'S APPROVAL OF PRODUCTS PRIOR TO ORDERING OR INSTALLING ANY PART OF THE SYSTEM. DEFERRED SUBMITTALS SHALL BE APPROVED BY AHJ. PRODUCTS SPECIFIED ARE THE BASIS OF DESIGN. ALTERNATE PRODUCTS OF EQUAL QUALITY AND PERFORMANCE MAY BE SUBMITTED FOR APPROVAL.
3. PROVIDE DETAILED SHOP DRAWINGS. DRAWINGS SHALL INCLUDE PLANS, SECTIONS, AND ELEVATIONS TO SHOW THAT MECHANICAL WORK WILL FIT IN THE SPACE ALLOCATED AND OF SUFFICIENT DETAIL TO SHOW CONFORMANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS. SHOW COORDINATION WITH OTHER TRADES.
4. PROVIDE CONTROL SYSTEM SUBMITTAL TO INCLUDE DIAGRAM OF SYSTEM ARCHITECTURE, SEQUENCES OF OPERATION AND CONTROL DIAGRAMS, AND PRODUCTS.
5. SUBMIT INSTALLATION AND OPERATING AND MAINTENANCE (IOM) MANUALS FOR PRODUCTS. INCLUDE MANUFACTURER'S MAINTENANCE INSTRUCTIONS, BROCHURES, CUT SHEETS, SHOP DRAWINGS, VALVE AND EQUIPMENT DIRECTORIES, AND FINAL BALANCE REPORTS. PROVIDE AN ELECTRONIC, PDF FILE WITH BOOKMARKS AND ONE BOUND COPY OF THE FINAL IOM MANUAL.

WARRANTY

1. PROVIDE WARRANTY FOR EQUIPMENT AND SYSTEMS TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR ONE YEAR FROM DATE SYSTEM START–UP.
2. LONGER WARRANTY PERIODS FOR: BOILER PRESSURE VESSEL/HEAT EXCHANGER WARRANTY: 15 YEARS; BOILER CONTROLS: 3 YEARS, BOILER BURNER: 5 YEARS; OTHER BOILER COMPONENTS: 2 YEARS.

LABELING AND TAGGING

1. PROVIDE MECHANICAL IDENTIFICATION CONSISTING OF LABELS, TAGS, AND FLOW ARROWS FOR DUCTS, PIPES, VALVES, AND EQUIPMENT INSTALLED UNDER THIS CONTRACT. PLACE IDENTIFICATION AT WALLS, FLOORS, DIRECTION CHANGE, AND 20–FEET INTERVALS ALONG STRAIGHT RUNS.
2. PROVIDE ENGRAVED EQUIPMENT AND VALVE TAGS.
3. LABEL PIPES WITH CONTENTS AND DIRECTION OF FLOW AT MAXIMUM OF 20 FEET ON CENTER. USE PREMANUFACTURED LABELS OF COMMERCIAL QUALITY.

PENETRATIONS

1. MAKE PENETRATIONS THROUGH THE BUILDING EXTERIOR WALLS, FLOOR, AND ROOF WATERTIGHT AND WEATHERTIGHT.
2. PROVIDE UL–LISTED FIRE STOP SEALANT SYSTEMS FOR PENETRATIONS THROUGH FIRE RATED WALL CONSTRUCTION OF THE MECHANICAL ROOM.
3. FLASHING:
   A. PROVIDE FLASHING AND COUNTER FLASHING WHERE PIPES AND CHIMNEY PENETRATES ROOF ASSEMBLIES.
   B. METAL FLASHING: 26 GAGE (0.5 MM THICK) GALVANIZED STEEL.
   C. METAL COUNTER FLASHING: 22 GAGE (0.8 MM THICK) GALVANIZED STEEL.

SUPPORTS AND SEISMIC RESTRAINTS

1. PROVIDE SEISMIC RESTRAINT AND ANCHORING CALCULATIONS STAMPED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF ALASKA FOR RESTRAINT OF THE BOILERS, AIR SEPARATOR, AND EXPANSION TANK. COORDINATE WITH THE OWNER FOR IBC OR AHJ REQUIRED SPECIAL INSPECTIONS. PROVIDE SEISMIC ANCHORS, AND RESTRAINT DEVICES TO RESIST LOADS PER IBC, CHAPTER 16 AND ASCE 7–16.
2. PROVIDE PIPE HANGERS AND SUPPORTS IN ACCORDANCE WITH MSS SP–58. SPACING AND ADDITIONAL CRITERIA SHALL BE IN ACCORDANCE WITH APPLICABLE CODES AND ASME B31.9 BUILDING SERVICES PIPING. SUPPORT, BRACE, AND ANCHOR PIPES, EQUIPMENT, AND DEVICES TO BUILDING STRUCTURE TO RESIST GRAVITY, OPERATIONAL, AND VIBRATION FORCES. COORDINATE WITH SEISMIC RESTRAINTS.
3. INDEPENDENTLY SUPPORT PIPING AT EQUIPMENT, SO THAT THE EQUIPMENT SUPPORTS NO WEIGHT.
4. INSULATED PIPING SHALL HAVE INSULATION SADDLES OR 18 GAUGE STEEL INSULATION SHIELDS COMBINED WITH SECTIONS OF CALCIUM SILICATE OR CELLULAR GLASS. PIPING SHALL ALWAYS BE SUPPORTED OVER THE INSULATION AND VAPOR BARRIER.
5. INSTALL HANGERS TO PROVIDE MINIMUM 1/2–INCH SPACE BETWEEN FINISHED COVERING AND ADJACENT WORK.
6. PLACE HANGERS WITHIN 12 INCHES OF EACH HORIZONTAL ELBOW.
7. USE HANGERS WITH 1–1/2 INCH MINIMUM VERTICAL ADJUSTMENT.
8. PROVIDE FIELD FABRICATED SUPPORT STANDS (UNISTRUT OR EQUAL) TO SUPPORT EQUIPMENT OR PIPING FROM THE FLOOR OR WALL.

INSULATION

1. INSULATE HYDRONIC HEATING PIPING. PROVIDE 1.5 INCH THICK FIBERGLASS INSULATION WITH ASJ FOR PIPE SIZES UP TO 1–1/4 INCHES IN DIAMETER AND 2 INCHES FOR 1–1/2 INCHES IN DIAMETER AND LARGER. PROVIDE MIN THERMAL CONDUCTIVITY (K) OF 0.25. INSULATE FITTINGS AND PROVIDE FITTING COVERS.
2. INSULATE VALVES WITH REMOVABLE FLEXIBLE VALVE WRAPS; NO SWEAT VALVE WRAPS OR EQUAL.
3. AIR SEPARATOR INSULATION TO BE THE SAME THICKNESS AND TYPE AS PIPE INSULATION.
4. INSULATION PRODUCTS SHALL MEET OR BE LOWER THAN FLAME SPREAD 25, FUEL CONTRIBUTED 50, AND SMOKE DEVELOPED 50.

FIRE PROTECTION

1. REVIEW THE CONTRACT DOCUMENTS AND FIELD VERIFY EXISTING CONDITION TO DETERMINE IF ANY PORTION OF THE EXISTING FIRE PROTECTION SYSTEM WILL BE AFFECTED BY THE TEMPORARY OR PERMANENT IMPLEMENTATION OF ANY PORTION OF THIS WORK.
2. PROVIDE OWNER AND ENGINEER A LIST OF SPECIFIC FIRE PROTECTION AND DETECTION SYSTEMS AFFECTED BEFORE AUTHORIZATION TO PROCEED WITH DESIGN OR DEMOLITION.
3. MODIFY PIPING AND ADD OR RELOCATE SPRINKLER HEADS AS REQUIRED TO PROVIDE COMPLETE WET PIPE SYSTEM COVERAGE FOR THE BOILER ROOM.

HYDRONIC PIPING AND SPECIALTIES

1. PIPING:
   A. TYPE L COPPER PIPING. BRAZED OR SOLDER TYPE WROUGHT COPPER FITTINGS. FIT JOINTS USING LEAD–FREE SOLDER WITH WATER–SOLUBLE FLUX. MECHANICAL PRESS FITTINGS ACCEPTABLE.
   B. PROVIDE DIELETRIC FLANGE KITS FOR 4 INCH OR LARGER OR DIELETRIC NIPPLE BETWEEN DISSIMILAR METALS.
2. VALVES:
   A. BALL VALVES: PROVIDE TWO–PIECE FORGED BRASS BODY, EXTRUDED BRASS STEM, HARD CHROME PLATED BRASS BALL, FULL PORT, 150 PSI WSP, INTERNALS SUITABLE FOR GLYCOL SERVICE. APOLLO 70–200 SERIES OR EQUAL.
   B. DRAIN VALVES: HOSE END BALL VALVE WITH HOSE CONNECTION AND CAP.
   C. CHECK VALVES: CAST IRON WAFER STYLE, RENEWABLE SEAT AND DISC, SPRING ACTUATED CHECK VALVE. 200 PSI WORKING PRESSURE, PROVIDE MINIMUM UPSTREAM STRAIGHT PIPE AS RECOMMENDED BY THE MANUFACTURER. NIBCO W–910 OR EQUAL.
   D. MANUFACTURERS: CRANE, DEZURIK, DEMCO, NIBCO, HAMMOND, JENKINS, JOMAR, GRINNELL, MILWAUKEE, STOCKHAM, KEYSTONE, NORRIS.
3. AIR AND DIRT SEPARATOR (AS–1):
   A. ASME RATED WELDED STEEL SHELL BODY, FLANGED CONNECTIONS, COPPER COALESCING MEDIUM, 150 PSIG WORKING PRESSURE AT 270 F, DRAIN VALVE, AUTOMATIC AIR VENT. SPIROTHERM VDT, NO SUBSTITUTES.
4. EXPANSION TANK (ET–1):
   A. ASME RATED STEEL SHELL BODY, BUTYL BLADDER, 125 PSIG WORKING PRESSURE AT 240 F, DRAIN VALVE. AMTROL OR EQUAL.
   B. CHECK AND ADJUST EXPANSION TANK PRE–CHARGE PRESSURE (25 PSIG) BEFORE REFILLING THE SYSTEM.
5. THERMOMETERS: PROVIDE DIGITAL SELF POWER TYPE. WEISS DVU OR EQUAL.
6. PRESSURE GAUGES: PROVIDE BOURDON TUBE TYPE WITH 4–1/2–INCH DIAL, GAUGE COCK, AND SNUBBER.
7. PIPING SYSTEMS TO BE CLEANED, FLUSHED, AND MEET OR EXCEED ASME B31.9 MATERIALS, INSTALLATION, AND TESTING REQUIREMENTS.
8. FLUSH EXISTING HYDRONIC SYSTEM PIPING THOROUGHLY PRIOR TO CONNECTING NEW PORTION OF THE SYSTEM UTILIZING CH2O, PRODUCT 6149 OR APPROVED EQUAL, OR OTHER FLUSHING PRODUCT RECOMMENDED BY CH2O FOR THIS APPLICATION.
9. COMPLETELY REPLACE THE HYDRONIC SYSTEM FLUID. WATER SOLUTION IS USED. VERIFY SYSTEM VOLUME DURING DRAINING EFFORT.
10. PROVIDE A TEMPORARY BYPASS AROUND THE BOILERS TO ALLOW CIRCULATION OF THE BUILDING LOOP THROUGH THE NEW AIR AND DIRT SEPARATOR (AS–1) FOR A MINIMUM OF 24 HOURS PRIOR TO CIRCULATING SYSTEM FLUID THROUGH THE BOILERS. BLOWDOWN THE AIR SEPARATOR FREQUENTLY DURING THIS PERIOD TO REMOVE AS MUCH DEBRIS AS POSSIBLE.
11. WHEN PIPING SYSTEM IS FILLED AND PRESSURIZED, TAKE A FLUID SAMPLE TO CONFIRM WATER SOLUTION AND PROVIDE A FULL HYDRONIC FLUID CHEMICAL ANALYSIS. PROVIDE INHIBITOR PACKAGE RECOMMENDATION. CH2O OR OTHER QUALIFIED TESTING COMPANY.

FUEL OIL SYSTEM

1. ABOVE GRADE FUEL OIL PIPING: FUEL OIL SYSTEM WITH WELDED SCHEDULE 40 STEEL PIPE AND FITTINGS. 1–1/2–INCH AND SMALLER ASME A53 B WITH WELDED FORGED SOCKET WELD FITTINGS. THREADED SCH 40 PIPING ALLOWED FOR VENT PIPING.
2. PROVIDE MATCHED FLANGE CONNECTIONS FOR FLANGED EQUIPMENT AND NTP CONNECTIONS FOR THREAD MOUNTED EQUIPMENT, GASKETS AND THREAD SEALANT FOR USE WITH DIESEL FUEL.
3. VALVES: FUSIBLE, AND ISOLATION BALL VALVES SHALL BE SELECTED FOR SYSTEM OPERATIONS.
4. FUSIBLE VALVES, CHECK VALVES, AND ISOLATION BALL VALVES SHALL BE SELECTED FOR SYSTEM OPERATIONS, SAME AS EXISTING FUEL OIL SYSTEM FOR EQUIPMENT UNIFORMITY, UNLESS NOTED OTHERWISE. EQUIPMENT, VALVES, AND APPURTENANCES REMOVED FOR WORK SHALL NOT BE REUSED WITHOUT OWNER VERIFICATION FOR REINSTALLATION. WHERE ITEM IS DAMAGED, REPLACE WITH SIMILAR.
5. FUEL OIL PIPE MINIMUM SIZE SHALL BE 3/4–INCH. LINES SHALL BE FIELD ROUTED TO MINIMIZE VERTICAL OFFSETS AND BENDS AND SLOPPED FOR DRAINAGE AND AIR RELEASE. PROVIDE OFFSETS AND CONNECTIONS TO MATCH EXISTING FUEL OIL SUPPLY PIPE SYSTEMS.
6. FUEL OIL PIPING SYSTEM TO MEET OR EXCEED ASME B31.9 MATERIALS, INSTALLATION, AND TESTING REQUIREMENTS, AND INTERNATIONAL FIRE CODE REQUIREMENTS.
7. PROVIDE ISOLATION VALVES, DRAIN VALVES, AND AIR RELEASE FOR FLUSHING, CLEANING, AND TESTING OF PIPING; PHASING, AND FUTURE SYSTEM MAINTENANCE AND REPAIRS.
8. FLUSH AND CLEAN PIPING TO REMOVE GREASE AND MAGNETIC OXIDE. PRESSURE TEST PIPING TO 100 PSIG WITH CLEAN FLUID. SYSTEM MUST HOLD TEST PRESSURE FOR TWO HOUR PERIOD WITH NO PRESSURE DROP TO PASS TEST. INSPECT SYSTEM DURING TEST AND REPAIR LEAKS.
9. INSTALL SYSTEM IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.

PUMPS (CP–1, CP–2)

1. PERFORMANCE AS SCHEDULED. GRUNDFOS, OR EQUAL.

BOILERS (BLR–1) AND SPECIALTIES

1. PROVIDE NEW PACKAGED BOILER WITH SALIENT PERFORMANCE AND OPERATING CHARACTERISTICS AS SCHEDULED AND LISTED.
2. INTEGRATED CONTROLS TO CONTROL BOILER OPERATION TO MAINTAIN BUILDING SUPPLY TEMPERATURE SETPOINT. PROVIDE TEMPERATURE SENSOR FOR FIELD INSTALLATION.
3. PROVIDE FUEL OIL BURNER AND FUEL OIL SUPPLY CONNECTION WITH TIGER LOOP TO EXISTING FUEL OIL DAY TANK.
4. COORDINATE REQUIREMENTS FOR BAS SYSTEM CONNECTION. BAS TO PROVIDE ENABLE/DISABLE AND TEMPERATURE SETPOINT INPUTS AND MONITOR ALARMS OUTPUTS.
5. PROVIDE START–UP REPORT FROM A FACTORY AUTHORIZED START–UP TECHNICIAN.
6. PROVIDE INSULATED, STAINLESS STEEL DOUBLE WALL VENT STACK. STACK ASSEMBLY SHALL BE LISTED FOR PRESSURIZED VENT APPLICATION PER UL 103 AND COMPATIBLE WITH THE BOILER. SELKIRK OR EQUAL.
7. BURNHAM V911A WITH POWERFLAME C2–OAS BURNER, OR EQUAL.

TESTING, ADJUSTING, AND BALANCING

1. OBTAIN THE SERVICES OF A NEBB CERTIFIED TESTING, ADJUSTING, AND BALANCING AGENCY TO PERFORM TESTING AND BALANCING WORK. PERFORM WORK IN ACCORDANCE WITH THE RECOMMENDED PROCEDURES SPECIFIED IN THE NEBB STANDARDS.
2. PRIOR TO DEMOLITION, MEASURE THE FLOWRATE OF THE MAIN HYDRONIC SYSTEM BUILDING LOOP CIRCULATION PUMPS AT THE CURRENT OPERATING CONDITION. NOTE THE OUTSIDE AIR TEMPERATURE. RECORD THE PUMP MAKE AND MODEL AND THE SUCTION AND DISCHARGE PRESSURE. MEASURE THE FLOWRATE WITH ALL SYSTEM CONTROL VALVES FULLY OPEN. RECORD THE PUMP SUCTION AND DISCHARGE PRESSURE. PROVIDE A WRITTEN PRE–DEMOLITION TEST REPORT.
3. TEST, ADJUST AND BALANCE THE HYDRONIC SYSTEM.
4. TEST AND ADJUST THE AIRFLOW FROM THE EXISTING COOLING FAN (VF–1). NOTE THE DAMPER POSITION REQUIRED FOR MINIMUM OSA OF 700 CFM.
5. SUBMIT A FINAL REPORT IDENTIFYING FINAL BALANCED CONDITIONS.

BAS CONTROLS AND SEQUENCES OF OPERATION

1. EXISTING BAS SYSTEM IS MERIDIAN SYSTEMS. NEW CONTROLS SHALL BE COMPATIBLE WITH EXISTING BAS. NO SUBSTITUTES.
2. PROVIDE BAS SENSORS, PANELS AND EQUIPMENT TO ACCOMPLISH THE SEQUENCES OF OPERATION.
3. PROVIDE NEW TEMPERATURE SENSORS AND SENSOR WELLS FOR MONITORING HEATING SUPPLY TEMPERATURES.
4. CONNECT NEW EQUIPMENT TO THE BAS NETWORK TO ALLOW MONITORING AND CONTROL FROM THE CENTRAL SERVER.
5. PROVIDE BAS SYSTEM GRAPHICS FOR THE NEW EQUIPMENT IN ACCORDANCE WITH CITY AND BOROUGH OF WRANGELL BAS STANDARDS. UPDATE THE EXISTING BAS SERVER DATABASE TO INCLUDE CHANGES MADE DURING THIS PROJECT. PROVIDE A DATABASE BACKUP AT THE COMPLETION OF THE PROJECT.
6. BOILER, BLR–1:
   A. BOILER IS CONTROLLED BY ONBOARD FACTORY CONTROLS TO MAINTAIN A HEATING SUPPLY TEMPERATURE SETPOINT, INITIALLY SET TO 180 DEGREES F.
   B. UTILIZE PACKAGED CONTROLS AND BAS INTERFACE TO REPLICATE EXISTING SEQUENCES OF OPERATION.
   C. CONNECT TO THE BOILER CONTROLLER VIA BACNET IP PROTOCOL. PROVIDE ENABLE/DISABLE INPUT AND TEMPERATURE SETPOINT INPUT TO THE BOILER CONTROLLER AND MONITOR THE BOILER ALARM(S) AND OPERATION. GENERATE A BAS ALARM IF BOILER IS IN ALARM AND NOTIFY BOROUGH FACILITIES PER STANDARD BAS NOTIFICATION PROCEDURE.
   D. PROVIDE AN OUTSIDE AIR TEMPERATURE SENSOR. SUPPLY TEMPERATURE SETPOINT TO BE RESET BASED ON OUTSIDE AIR TEMPERATURE.
   E. MONITOR SYSTEM PRESSURE. GENERATE AN ALARM IF SYSTEM PRESSURE EXCEEDS SETPOINT BY +/– 5 PSIG.
7. BUILDING HEATING PUMP CONTROL (CP–1 AND CP–2):
   A. CONNECT TO THE ECM PUMP FOR ENABLE/DISABLE, SPEED INPUT, AND RUN STATUS FEEDBACK. PUMP SPEED WILL BE ESTABLISHED DURING TAB EFFORT AND WILL NOT MODULATE.
   B. WHEN THE HYDRONIC SYSTEM IS ENABLED TO OPERATE BOTH PUMPS OPERATE CONTINUOUSLY.
   C. GENERATE AN ALARM IF A PUMP FAILS TO OPERATE WHEN COMMANDED ON.
8. EXISTING BOILER ROOM FAN (VF–1):
   A. EXISTING SEQUENCE OF OPERATIONS TO REMAIN.
   B. THE EXISTING FAN SYSTEM OPERATES TO COOL THE BOILER ROOM, PROVIDE COMBUSTION AIR, AND MAINTAIN ROOM TEMPERATURE LESS THAN 85 DEGREES F.
   C. COOLING MODE:
      a. FAN OPERATES WHEN THE ROOM TEMPERATURE EXCEEDS 85 DEGREES F.
      b. MODULATE RETURN DAMPER TO MAINTAIN DISCHARGE TEMPERATURE SETPOINT.
   D. COMBUSTION MODE:
      a. FAN OPERATES WHEN THE BOILER IS FIRING.
      b. A MINIMUM OF 700 CFM FOR COMBUSTION AIR IS REQUIRED.
      c. MAINTAIN THE MINIMUM DAMPER POSITION DETERMINED BY THE TAB EFFORT.

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STATE OF ALASKA 49TH
Mark D. Landberg
11-5-2025
ME-8055
REGISTERED PROFESSIONAL ENGINEER
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STIKINE MIDDLE SCHOOL
BOILER REPLACEMENT DESIGN
CITY AND BOROUGH OF WRANGELL
WRANGELL, AK

Revisions

No.	Date	Description

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1" ACTUAL
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Designed by:	LAB
Checked by:	MDL
AMC Project No.:	25506
Date:	11/05/2025

Project Phase
100% PERMIT DRAWINGS

Sheet Title
MECHANICAL SPECIFICATIONS

Sheet Number
M002

FILE NAME: X:\25506 SMSBOIL\Dwgs\Mdwg\Sheet Files\25506 - M002.dwg
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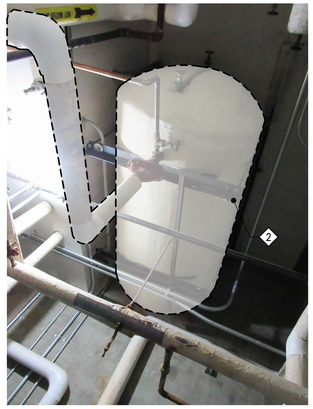
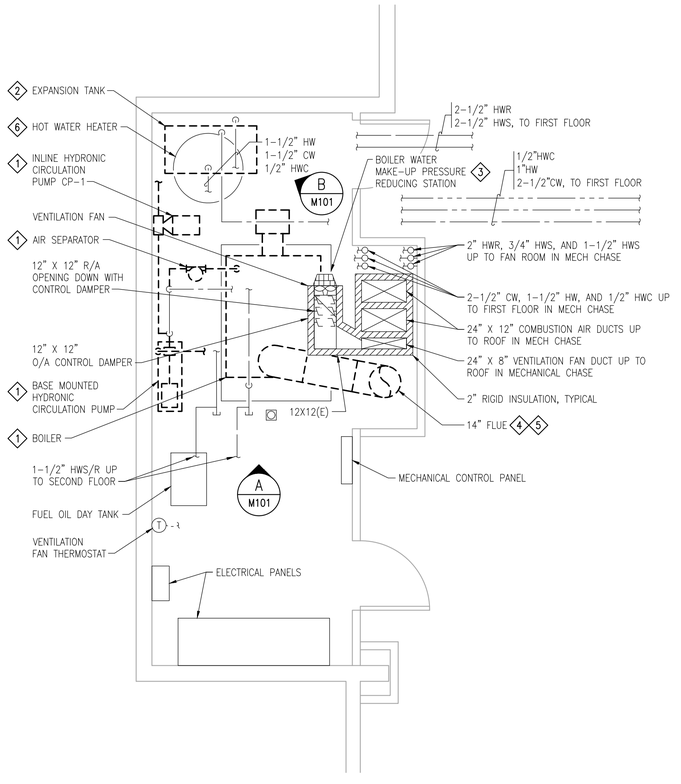
A PHOTO - BOILER, PUMPS, AND AIR SEPERATOR

M101 SCALE: NONE



B PHOTO - EXPANSION TANK

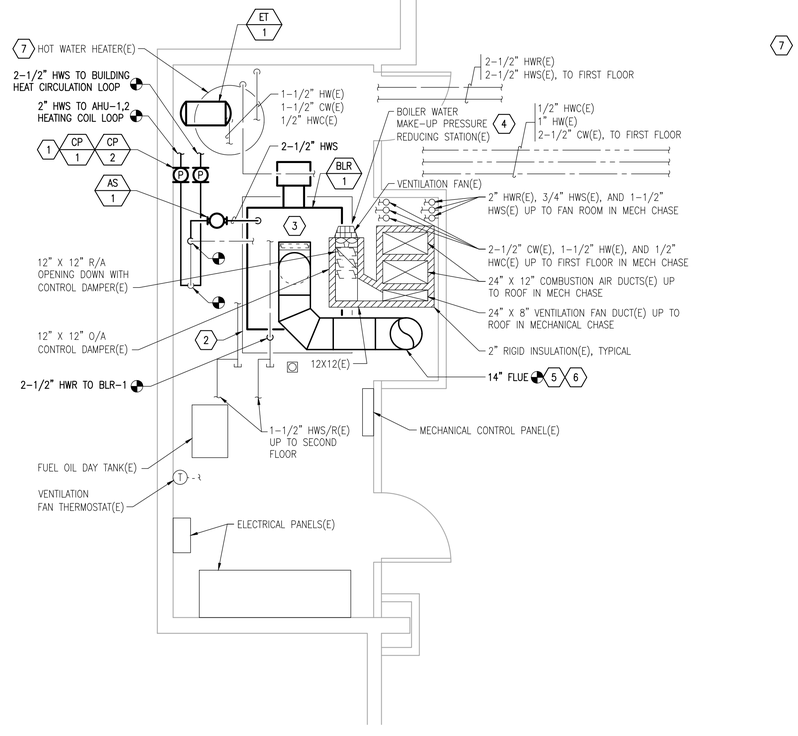
M101 SCALE: NONE



1 ENLARGED PLAN - BOILER ROOM - DEMOLITION

M101 SCALE: 1/4"=1'-0"

0 2' 4' 8' 12'



2 ENLARGED PLAN - BOILER ROOM

M101 SCALE: 1/4"=1'-0"

0 2' 4' 8' 12'

GENERAL NOTES

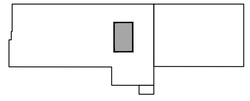
1. DRAWINGS ARE BASED ON LIMITIED FIELD VERIFICATION AND OWNER FURNISHED DOCUMENTS [DATED 04/08/1991].
2. FIELD VERIFY EXISTING CONDITIONS.
3. COORDINATE LIMITS OF DEMOLITION WITH NEW WORK.
4. FOR HYDRONIC PIPING DIAGRAM DEMOLITION, SEE 1/M201.
5. FOR HYDRONIC PIPING DIAGRAM, SEE 2/M201.

DEMOLITION NOTES

1. DEMOLISH BOILER, AIR SEPARATOR, 3-WAY CONTROL VALVE, CIRCULATION PUMPS, AND HWS/HWR PIPING.
2. DEMOLISH EXPANSION TANK AND HWS PIPING.
3. DEMOLISH SUPPORT ASSEMBLY FOR BOILER WATER MAKE-UP PRESSURE REDUCING STATION.
4. BASE BID: DEMOLISH 14ø BOILER STACK UP TO VERTICAL 14ø BOILER STACK IN CHASE.
5. ADDITIVE ALTERNATE #1: DEMOLISH 14ø BOILER STACK UP TO FLUE TERMINATION ABOVE PENTHOUSE ROOF. PREPARE ARCHITECTURAL CURB FOR NEW BOILER STACK. SEE EXHIBITION DRAWING ON M301.
6. DISCONNECT HWS/HWR PIPING FROM TANKLESS SIDEARM HEATER ON THE BOILER. DEMOLISH PIPING NEEDED TO ACCOMMODATE BLR-1 INSTALLATION AND CONNECTION TO NEW TANKLESS HEATER ON BLR-1.

SHEET NOTES

1. PUMPS SHOWN OFFSET FOR CLARITY. MOUNT PUMPS ALONG WALL.
2. EXTEND EXISTING HOUSEKEEPING PAD AS NECESSARY TO ACCOMMODATE BOILER ASSEMBLY. EXISTING HOUSEKEEPING PAD DIMENSIONS ARE 43 INCHES WIDE BY 81 INCHES LONG.
3. PROVIDE BAROMETRIC DAMPER.
4. PROVIDE UNISTRUT SUPPORT ASSEMBLY FOR EXISTING BOILER WATER MAKE-UP PRESSURE REDUCING STATION.
5. BASE BID: CONNECT 14ø BOILER STACK TO EXISTING VERTICAL 14ø BOILER STACK IN CHASE AND PROVIDE A DRAINAGE TEE AT BASE OF STACK. PRIOR TO CONNECTING TO EXISTING STACK, CLEAN INSIDE OF EXISTING STACK TO REMOVE SOOT BUILD-UP.
6. ADDITIVE ALTERNATE #1: PROVIDE 14ø BOILER STACK UP THROUGH EXISTING ARCHITECTURAL CURB AND TERMINATE FLUE 36 INCHES ABOVE PENTHOUSE ROOF. PROVIDE DRAINAGE TEE AT BASE OF STACK, STACK CAP AT FLUE TERMINATION, AND COUNTER FLASHING AT EXISTING ARCHITECTURAL CURB PER MANUFACTURER'S RECOMMENDATIONS. SEAL ROOF PENETRATION WEATHER TIGHT AND VAPOR TIGHT.
7. EXTEND AND CONNECT HWS/HWR PIPING FEEDING DOMESTIC WATER HEATER TO THE TANKLESS HEATER ON BLR-1.



KEYPLAN

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STATE OF ALASKA 49TH
Mark D. Landberg
11-5-2025
ME-8055
REGISTERED PROFESSIONAL ENGINEER

STIKINE MIDDLE SCHOOL BOILER REPLACEMENT DESIGN

CITY AND BOROUGH OF WRANGELL, AK

Revisions

No.	Date	Description

1 INCH AT FULL SIZE
1" ACTUAL
IF NOT 1 INCH, SCALE ACCORDINGLY

Designed by:	LAB
Checked by:	MDL
AMC Project No.:	25506
Date:	11/05/2025

Project Phase
100% PERMIT DRAWINGS

Sheet Title
ENLARGED PLAN - BOILER ROOM

Sheet Number
M101

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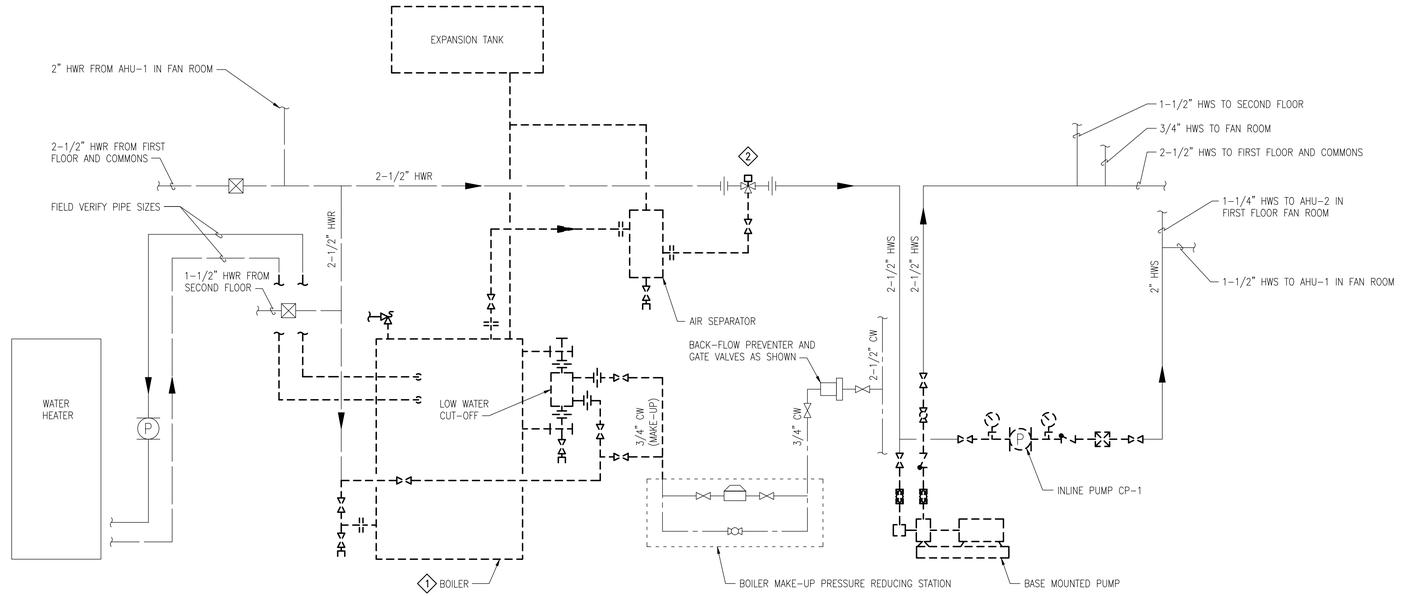
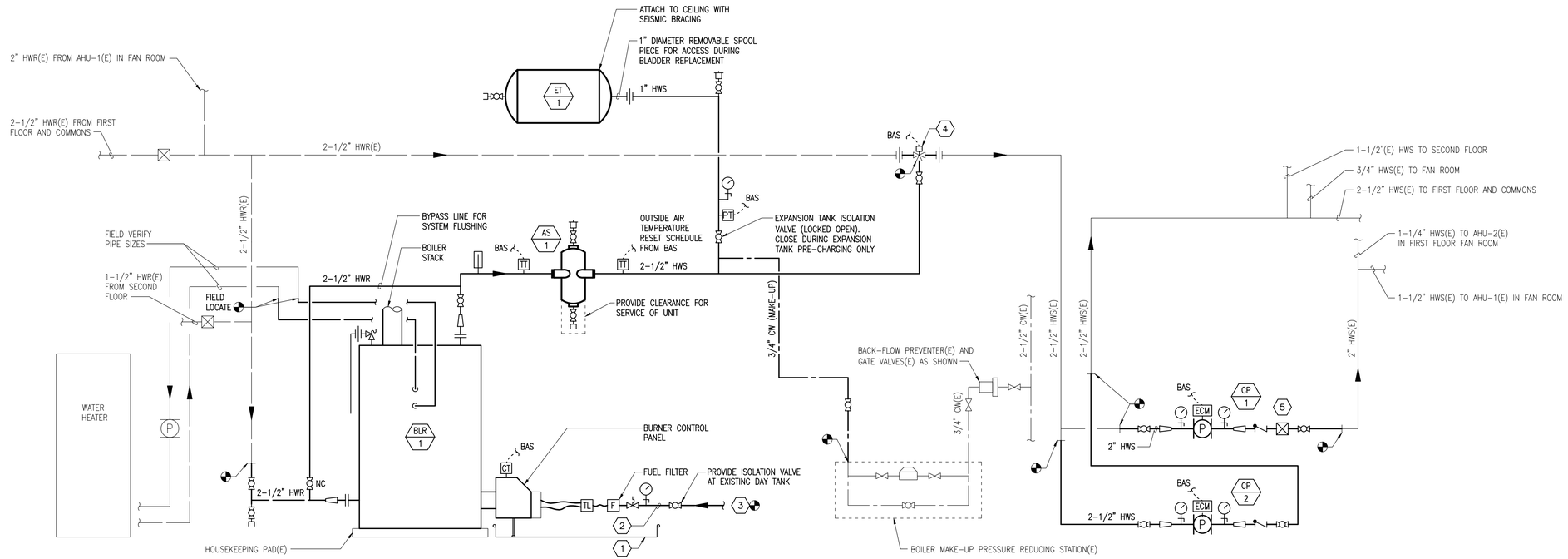


1 M201 MECHANICAL ROOM - HYDRONIC PIPING DIAGRAM - DEMOLITION

SCALE: 1'=1'-0"



2 M201 MECHANICAL ROOM - HYDRONIC PIPING DIAGRAM

SCALE: 1'=1'-0"

GENERAL NOTES

1. DRAWINGS ARE BASED ON LIMITIED FIELD VERIFICATION AND OWNER FURNISHED DOCUMENTS [DATED 04/08/1991].
2. FIELD VERIFY EXISTING CONDITIONS.
3. COORDINATE DEMOLITION WITH NEW WORK.

DEMOLITION NOTES ◇

1. DEMOLISH FUEL OIL PIPING, VALVES, SUPPORTS, AND APPURTENANCES BACK TO DAY TANK.
2. DEMOLISH 3-WAY MOTOR OPERATED VALVE ACTUATOR AND PREPARE VALVE BODY FOR NEW ACTUATOR.

SHEET NOTES ⬡

1. FIELD FABRICATED, OIL-TIGHT OIL PAN WITH ROLLED 4" LIP. LOCATE UNDERNEATH BURNER, PUMP AND FILTER.
2. PROVIDE ISOLATION VALVE, FUEL FILTER, CHECK VALVE AND TIGER LOOP AS SHOWN.
3. ROUTE FUEL OIL SUPPLY TO EXISTING DAY TANK AND CONNECT.
4. PROVIDE NEW ACTUATOR FOR EXISTING 3-WAY MOTOR OPERATED VALVE BODY.
5. ADJUST BALANCING VALVE PER PRE-DEMOLITION TESTING, ADJUSTING, AND BALANCE REPORT.

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STIKINE MIDDLE SCHOOL BOILER REPLACEMENT DESIGN

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Project Phase
100% PERMIT DRAWINGS

Sheet Title
DIAGRAMS - PIPING

Sheet Number
M201

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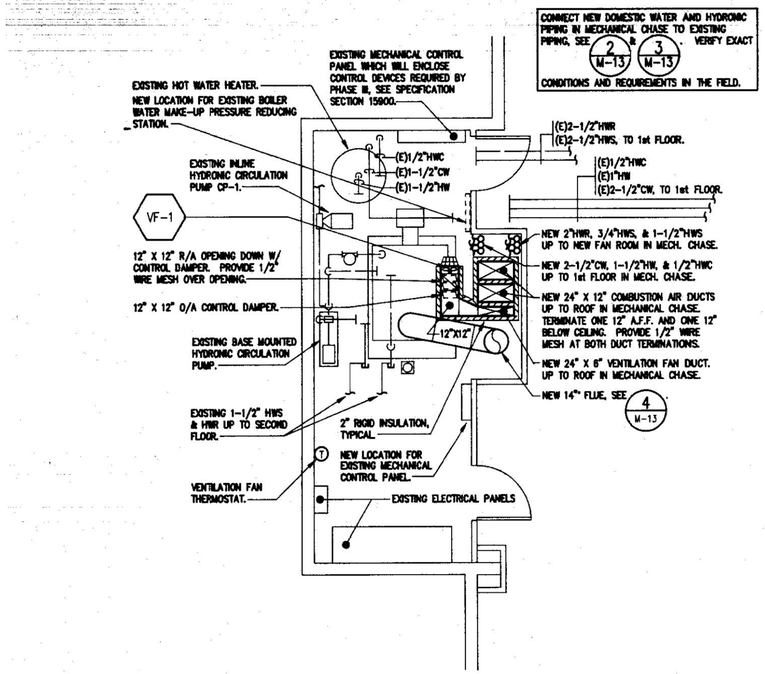
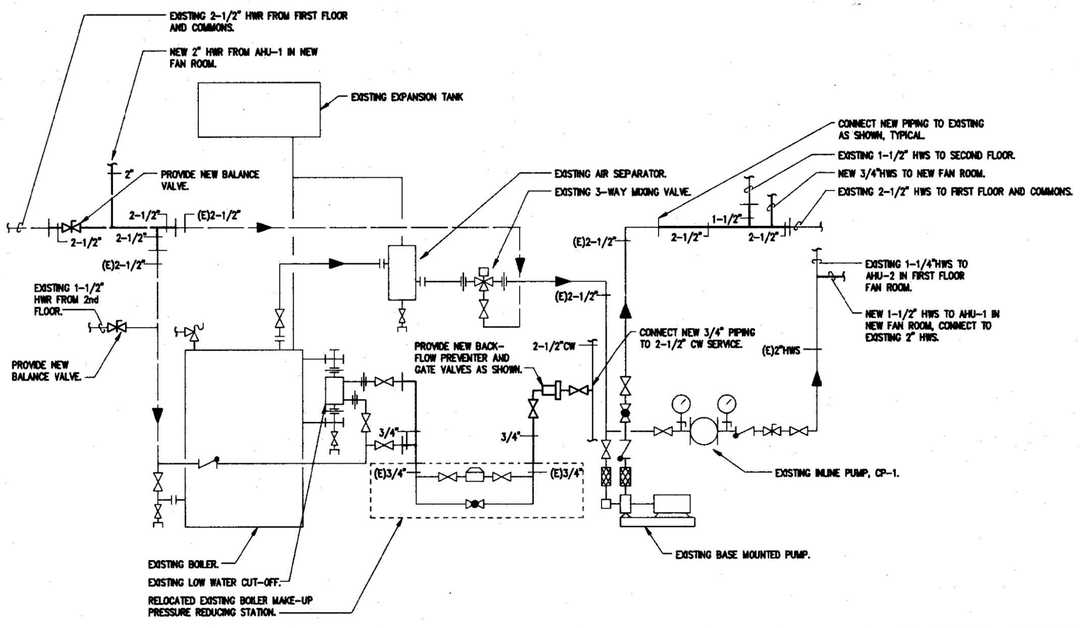


1/M-13 LARGE SCALE MECHANICAL ROOM – PLAN
1/4"=1'-0"



2/M-13 MECHANICAL ROOM HYDRONIC PIPING DIAGRAM
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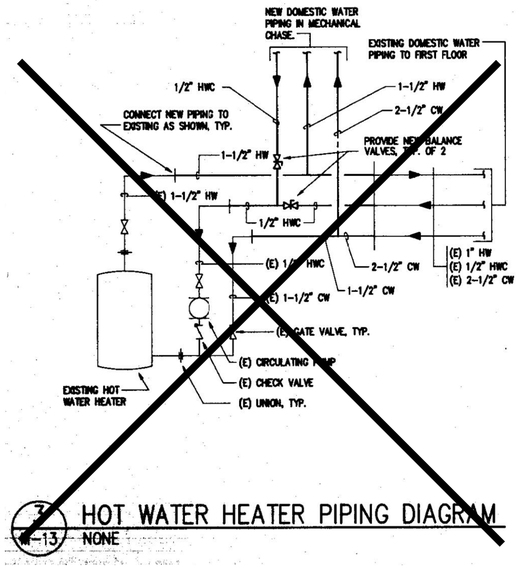

3/M-13 HOT WATER HEATER PIPING DIAGRAM
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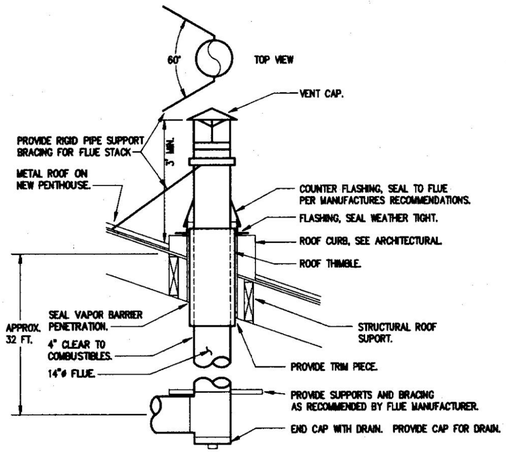

4/M-13 FLUE ROOF PENETRATION – DETAIL
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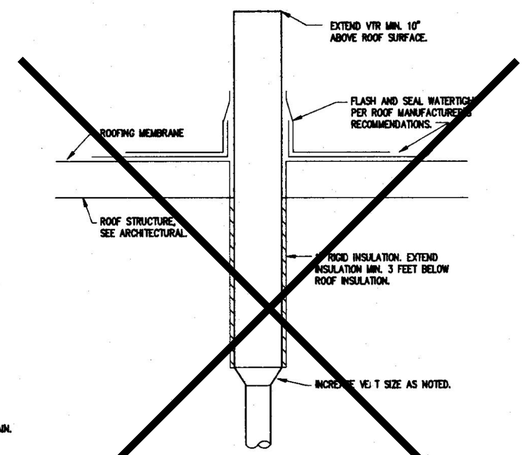

5/M-13 TYPICAL VENT ROOF PENETRATION
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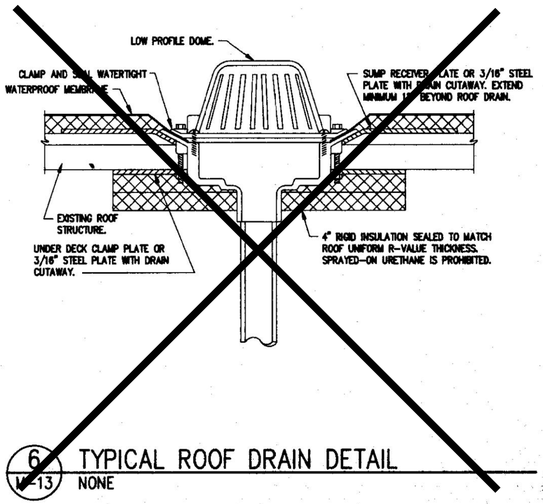

6/M-13 TYPICAL ROOF DRAIN DETAIL
NONE

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Project Phase
100% PERMIT DRAWINGS

Sheet Title
EXHIBIT DRAWING OF M-13

Sheet Number
M301

FILE NAME: X:\25506 SMSBOILD\wgs\Mdwg\Sheet Files\25506 - M301.dwg
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GENERAL

SHEET NOTE CONVENTION:

- (#) REFERENCED SHEET NOTE
- (#) REFERENCED DEMOLITION NOTE
- #. GENERAL SHEET NOTE

(#) FEEDER IDENTIFICATION TAG
- FEEDER NUMBER

1 / E0.01 DETAIL REFERENCE
- DETAIL DESIGNATION
- SHEET WHERE DETAIL APPEARS

A / E0.01 SECTION REFERENCE
- SECTION DESIGNATION
- SHEET WHERE SECTION APPEARS

LINE WORK CONVENTION:

- NEW OR REINSTALLED ITEM
- ITEM TO BE DEMOLISHED
- EXISTING ITEM TO REMAIN
- FUTURE ITEM
- EXISTING ITEM TO BE RELOCATED

CONDUIT/FEEDER LINE CONVENTION:

- CONCEALED
- UNDERGROUND OR CONCEALED IN FLOOR
- EXPOSED
- FLEXIBLE CONDUIT

P-1,3 CIRCUITING CONVENTION
- CIRCUIT NUMBER(S)
- PANEL

BRANCH CIRCUIT HOMERUN TO PANELBOARD
- NUMBER OF MARKS INDICATE NUMBER OF CONDUCTORS IN RACEWAY, NOT COUNTING GROUNDING CONDUCTORS. (ABSENCE OF MARKS INDICATE TWO CONDUCTORS, PLUS REQUIRED GROUNDS)
- UNSWITCHED CONDUCTORS SHOWN ON HOMERUN SIDE OF NEUTRAL
- NEUTRAL
- SWITCHED CONDUCTORS SHOWN ON LOAD SIDE OF NEUTRAL

ABBREVIATIONS

ACS	ACCESS CONTROL SYSTEM
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AL	ALUMINUM
APPROX	APPROXIMATE
AHJ	AUTHORITY HAVING JURISDICTION
BAS	BUILDING AUTOMATION SYSTEM
CKT	CIRCUIT
CCTV	CLOSED CIRCUIT TELEVISION
CMH	COMMUNICATIONS MANHOLE
C.	CONDUIT
C.O.	CONDUIT ONLY
CU	COPPER
(D)	DEMOLISH
DB	DECIBEL
EL	EMERGENCY LIGHT
ELU	EMERGENCY LIGHTING UNIT
ENL	EMERGENCY NIGHT LIGHT
(E)	EXISTING
(F)	FUTURE
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FO	FIBER OPTIC
FOPP	FIBER OPTIC PATCH PANEL
FSD	FIRE/SMOKE DAMPER
HZ	FREQUENCY
HP	HORSEPOWER
IAW	IN ACCORDANCE WITH
K	KELVIN
KVA	KILO VOLT-AMPS
KW	KILOWATT
LCP	LIGHTING CONTROL PANEL
MCC	MOTOR CONTROL CENTER
MCP	MOTOR CONTROL PANEL
MDS	MAIN DISTRIBUTION SWITCHBOARD
MIN	MINIMUM
MM	MULTIMODE FIBER OPTIC CABLE
MTR	MAIN TELECOM ROOM
NEC	NATIONAL ELECTRICAL CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NL	NIGHT LIGHT
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OFC	OPTICAL FIBER CABLE
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
PA	PUBLIC ADDRESS
PH	PHASE (ELECTRICAL)
PLC	PROGRAMMABLE LOGIC CONTROLLER
PMCS	POWER MONITORING CONTROL SYSTEM
SM	SINGLEMODE FIBER OPTIC CABLE
SMR	SURFACE MOUNTED RACEWAY
SPD	SURGE PROTECTIVE DEVICE
TELECOM	TELECOMMUNICATION
TR	TELECOMMUNICATION ROOM
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
VR	VANDAL RESISTANT
VSD	VARIABLE SPEED DRIVE
VAC	VOLTS (ALTERNATING CURRENT)
VDC	VOLTS (DIRECT CURRENT)
V	VOLTS OR VOLTAGE
W	WATT
WP	WEATHERPROOF
WG	WIRE GUARD

LIGHTING

- LIGHTING FIXTURE
- LIGHTING FIXTURE – WALL MOUNTED
- LIGHTING FIXTURE – SURFACE OR PENDANT MOUNTED
- LIGHTING FIXTURE – RECESS MOUNTED
- NL LIGHTING FIXTURE CONNECTED TO EMERGENCY POWER CIRCUIT, NIGHT LIGHT
- LIGHTING FIXTURE CONNECTED TO EMERGENCY POWER CIRCUIT
- EXIT FIXTURE – WALL MOUNTED SHADED AREA(S) DENOTE FACE(S) OF SIGN, ARROWS AS NOTED (FIXTURE TYPE EX)
- EXIT FIXTURE – CEILING MOUNTED SHADED AREA(S) DENOTE FACE(S) OF SIGN, ARROWS AS NOTED (FIXTURE TYPE EX)
- EMERGENCY LIGHTING UNIT – WALL MOUNTED (FIXTURE TYPE XA)
- EMERGENCY LIGHTING UNIT – CEILING MOUNTED (FIXTURE TYPE XA)
- SITE LIGHTING – POLE MOUNTED
- $ SINGLE POLE SWITCH
- $3 THREE-WAY SWITCH
- $D DIMMER SWITCH
- $a SWITCH FOR FIXTURES MARKED 'a',
- OCCUPANCY SENSOR – WALL MOUNTED
- OCCUPANCY SENSOR – CEILING MOUNTED

POWER

RECEPTACLE MOUNTING:

- RECEPTACLE – WALL MOUNTED (SEE "RECEPTACLE TYPES" BELOW)
- RECEPTACLE – WALL MOUNTED, HORIZONTAL (SEE "RECEPTACLE TYPES" BELOW)
- RECEPTACLE – FLOOR MOUNTED (SEE "RECEPTACLE TYPES" BELOW)
- RECEPTACLE – CEILING MOUNTED (SEE "RECEPTACLE TYPES" BELOW)

RECEPTACLE TYPES:

NORMAL POWER / EMERGENCY POWER
- DUPLEX RECEPTACLE
- GROUND FAULT INTERRUPTER, DUPLEX RECEPTACLE
- DOUBLE DUPLEX RECEPTACLE
- GROUND FAULT INTERRUPTER, DOUBLE DUPLEX RECEPTACLE

ELECTRICAL DEVICES:

- $T SWITCH – THERMAL TRIP WITH HEATER
- FUSED DISCONNECT
- NON-FUSED DISCONNECT
- COMBINATION STARTER/FUSED DISCONNECT
- STARTER OR CONTACTOR
- J JUNCTION BOX AND/OR CONNECTION TO EQUIPMENT
- M METERING DEVICE
- VSD VARIABLE SPEED DRIVE
- PANEL – SURFACE MOUNTED
- PANEL – FLUSH MOUNTED
- TRANSFORMER

COMMUNICATIONS

- X TELECOMMUNICATION OUTLET – (X DENOTES NUMBER OF PORTS)
- X TELECOMMUNICATION OUTLET – FLOOR MOUNTED (X DENOTES NUMBER OF PORTS)
- WP WIRELESS ACCESS POINT

FIRE ALARM

- X FIRE ALARM STROBE – WALL MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM STROBE – CEILING MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- H FIRE ALARM HORN – WALL MOUNTED
- H FIRE ALARM HORN – CEILING MOUNTED
- S FIRE ALARM SPEAKER – WALL MOUNTED
- S FIRE ALARM SPEAKER – CEILING MOUNTED
- BELL – WALL MOUNTED
- X FIRE ALARM HORN/STROBE – WALL MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM HORN/STROBE – CEILING MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM SPEAKER/STROBE – WALL MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM SPEAKER/STROBE – CEILING MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM CHIME/STROBE – WALL MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- X FIRE ALARM CHIME/STROBE – CEILING MOUNTED (X DENOTES CANDELA RATING IF OTHER THAN 15cd)
- F FIRE ALARM MANUAL PULL STATION
- MULTI-TECHNOLOGY SMOKE DETECTOR
- MAGNETIC DOOR HOLDER
- FACP FIRE ALARM CONTROL PANEL
- FAA FIRE ALARM ANNUNCIATOR

L3

EXISTING GE A SERIES PANEL

LOCATION: MECHANICAL 155
FED FROM: MAIN DISTRIBUTION SWITCHBOARD
MOUNTING: SURFACE

VOLTS: 208/120 Wye
PHASES: 3
WIRES: 4

A.I.C. RATING: MATCH EXISTING
MAINS TYPE: LUGS
RATING: 100A

CKT#	CIRCUIT DESCRIPTION	AMP	POLE	VA-PHASE A		VA-PHASE B		VA-PHASE C		POLE	AMP	CIRCUIT DESCRIPTION	CKT#
1	LTG: ELEVATOR	20	1	200	1200					1	20	LTG: COMMON, NEAR KITCHEN, EXTERIOR	2
3	REC: KITCHEN, CLASS RM, AHU RM	20	1			720	720			1	20	REC: SHOP SIDE WALL	4
5	LTG: ENTRANCES	20	1					500	1200	1	20	LTG: MIDDLE, EXTERIOR	6
7	REC: KITCHGEN GFCI BY SINK	20	1	360	500					1	20	AHU-1 BAS	8
9	REC: KITCHEN	20	1			720	720			1	20	EXISTING LOAD	10
11	EXISTING LOAD	20	1					720	720	1	20	EXISTING LOAD	12
13	EXISTING LOAD	20	1	720	3603					3	50	EXISTING LOAD	14
15	REC: CLASS MICROWAVE	20	1			1200	3603			--	--	---	
17	REC: STAIRS MICROWAVE	20	1					1200	3603	--	--	---	
19	EXISTING LOAD	20	1	720						3	15	**SPARE (NOTE 1)**	16
21	SPARE	20	1							--	--	---	
23	SPARE	20	1							--	--	---	
25	EF-1	15	3	937						1	20	SPARE	18
–	---	--	--			937	720			1	20	EXISTING LOAD	20
–	---	--	--					937	720	1	20	EXISTING LOAD	22
27	AHU-2	15	3	937	720					1	20	EXISTING LOAD	24
–	---	--	--			937	300			1	20	LTG/REC: AHU-2	26
–	---	--	--					937	720	1	20	EXISTING LOAD	28
29	SPACE				**562**					**2**	**15**	**CP-2 BOILER ROOM (NOTE 2)**	30
31	SPACE						**562**			--	--	---	32
33	SPACE											SPACE	34

PANEL	LOAD	PHASE A	PHASE B	PHASE C
		10.5 kVA	**11.1** kVA	**11.3** kVA
	AMPS	**87** A	**93** A	**94** A

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	TOTAL LOAD WITH NEC FACTORS
CONTINUOUS	720 VA	125%	900
LIGHTING	1000 VA	100%	1000
MOTOR	9960 VA	107%	10663
NON-CONTINUOUS	13208 VA	100%	13208
RECEPTACLE	7963 VA	100%	7963

PANEL TOTALS	
CONNECTED LOAD:	**32.9** kVA
NEC LOAD:	**33.7** kVA
CONNECTED AMPS:	**91.2** A
NEC AMPS:	**93.6** A

NOTES: 1. EXISTING LOAD DEMOLISHED AND CIRCUIT BREAKER MADE SPARE
2. NEW LOAD CONNECTED TO CIRCUIT BREAKER PROVIDED IN EXISTING SPACE

E

EXISTING SQUARE D NQOB PANEL

LOCATION: WOOD SHOP 113
FED FROM: MAIN DISTRIBUTION SWITCHBOARD
MOUNTING: FLUSH

VOLTS: 208/120 Wye
PHASES: 3
WIRES: 4

A.I.C. RATING: MATCH EXISTING
MAINS TYPE: LUGS
RATING: 100A

CKT#	CIRCUIT DESCRIPTION	AMP	POLE	VA-PHASE A		VA-PHASE B		VA-PHASE C		POLE	AMP	CIRCUIT DESCRIPTION	CKT#
1	**SPARE (NOTE 1)**	15	3		300					1	20	FIRE ALARM PANEL	2
3	---	--	--				1920			1	20	LTG: UPPER LEVEL	4
5	---	--	--							1	20	**SPARE (NOTE 1)**	6
7	LTG: WOOD SHOP	20	1	1920	**562**					2	20	**CP-1 BOILER ROOM (NOTE 3)**	8
9	LTG: METAL SHOP	20	1			1920	**562**			--	--	---	10
11	SPARE	20	1							1	20	SPARE	12
13	LTG: PAINT & SPRINKLER RMS, UH: SPRINK	20	1	1920						1	20	SPARE	14
15	**BOILER (NOTE 2)**	**20**	**3**			**961**				--	--	SPACE	16
17	**---**	**--**	**--**				**961**			--	--	SPACE	18
19	**---**	**--**	**--**	**961**						--	--	SPACE	20

PANEL	LOAD	PHASE A	PHASE B	PHASE C
		5.7 kVA	**5.4** kVA	**1.0** kVA
	AMPS	**47** A	**45** A	**8** A

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	TOTAL LOAD WITH NEC FACTORS
CONTINUOUS	300 VA	125%	375
LIGHTING	7680 VA	100%	7680
MOTOR	4005 VA	118%	4726
NON-CONTINUOUS	0 VA	100%	0
RECEPTACLE	0 VA	0%	0

PANEL TOTALS	
CONNECTED LOAD:	**12.0** kVA
NEC LOAD:	**12.8** kVA
CONNECTED AMPS:	**33.3** A
NEC AMPS:	**35.5** A

NOTES: 1. EXISTING LOAD DEMOLISHED AND CIRCUIT BREAKER MADE SPARE
2. NEW LOAD CONNECTED TO CIRCUIT BREAKER PROVIDED IN EXISTING SPACE
3. EXISTING LOAD DEMOLISHED AND NEW LOAD CONNECTED TO EXISTING CIRCUIT BREAKER

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11-5-2025
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REGISTERED PROFESSIONAL ENGINEER
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STIKINE MIDDLE SCHOOL BOILER REPLACEMENT DESIGN

CITY AND BOROUGH OF WRANGELL, AK

Revisions

No.	Date	Description

1 INCH AT FULL SIZE
1" ACTUAL
IF NOT 1 INCH, SCALE ACCORDINGLY

Designed by: TRC
Checked by: KTR
AMC Project No.: 25506
Date: 11/05/2025

Project Phase
100% PERMIT DRAWINGS

Sheet Title
ELECTRICAL LEGEND, PANEL SCHEDULES

Sheet Number
E001

FILE NAME: X:\25506 SMSBOILD\wgs\E\dwg\Sheet Files\25506 - E001.dwg
PLOTTED: tcorey 11/5/2025 9:32 AM

SPECIFICATIONS

26 00 00 ELECTRICAL GENERAL REQUIREMENTS

1. PROVIDE A COMPLETE AND FULLY OPERATIONAL SYSTEM IN ACCORDANCE WITH THESE SPECIFICATIONS.
2. PROVIDE MATERIALS, LABOR, SERVICES, TOOLS, APPLIANCES AND APPARATUS NOT SPECIFICALLY MENTIONED IN THE CONTRACT DOCUMENTS, BUT WHICH ARE REQUIRED FOR A COMPLETE AND FULLY OPERATIONAL SYSTEM.
3. CONNECT EQUIPMENT AND DEVICES FURNISHED OR INSTALLED BY OTHER TRADES OR FURNISHED BY THE OWNER IN ACCORDANCE WITH THE REQUIREMENTS OF THIS SPECIFICATION.
4. PROVIDE LABOR, MATERIAL AND EQUIPMENT REQUIRED FOR COMPLETE, SAFE WORKABLE ELECTRICAL SYSTEMS AS INDICATED ON THE DRAWINGS AND IN THE SPECIFICATIONS. COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE AND APPLICABLE LOCAL, STATE AND NATIONAL CODES AND STANDARDS.
5. EMPLOY WORKMEN SKILLED IN THE TRADE AND FAMILIAR WITH TECHNIQUES REQUIRED TO COMPLETE THE WORK IN A NEAT AND WORKMANLIKE MANNER. WORKMANSHIP IS SUBJECT TO APPROVAL BY THE OWNER.
6. OBTAIN AND PAY FOR LICENSES, PERMITS AND INSPECTIONS REQUIRED BY LAW, ORDINANCES AND RULES GOVERNING WORK SPECIFIED HEREIN. ARRANGE INSPECTION OF WORK AS REQUIRED BY THE AUTHORITY HAVING JURISDICITON AND GIVE THE INSPECTORS NECESSARY ASSISTANCE TO COMPLETE THEIR INSPECTION.
7. USE THE DRAWINGS AS A GUIDE FOR QUANTITY, APPROXIMATE EQUIPMENT LOCATIONS AND DESIGN CRITERIA. COORDINATE WORK WITH OTHER TRADES AND ARCHITECTURAL FEATURES TO PROVIDE SYMMETRICAL APPEARANCE. IMMEDIATELY NOTIFY THE OWNER IN WRITING SHOULD CLARIFICATION BE REQUIRED DUE TO A CONFLICT OF QUANTITY, COORDINATION, LOCATION, ETC. THE OWNER'S DECISION IS FINAL AND BINDING. EXTRA COSTS INVOLVED TO COMPLY WITH THE SPECIFICATIONS AND DRAWINGS CAUSED BY A CONFLICT NOT BROUGHT TO THE ATTENTION OF THE OWNER IMMEDIATELY UPON DISCOVERY SHALL BE BORNE BY THE CONTRACTOR UNLESS EXTRA COST IS APPROVED IN WRITING.
8. OBTAIN SUBMITTALS AND SHOP DRAWINGS OF EQUIPMENT WITH ELECTRICAL CONNECTIONS FURNISHED UNDER OTHER DIVISIONS AND/OR BY THE OWNER AND COORDINATE EXACT REQUIREMENTS WITH EQUIPMENT PROVIDED.
9. MATERIALS SHALL BE NEW, FULL WEIGHT AND BEAR THE UL LABEL.
10. FURNISH A ONE YEAR GUARANTEE FOR ELECTRICAL MATERIALS AND LABOR. GUARANTEE SHALL COMMENCE AT FINAL PAYMENT. MAKE NECESSARY REPAIRS IN A TIMELY MANNER AT NO COST TO THE OWNER.
11. PROVIDE DISRUPTION REQUESTS FOR WORK REQUIRING DISRUPTION TO OWNER. SUBMIT DISRUPTION REQUESTS NOT LESS THAN TWO WEEKS PRIOR TO PROPOSED DISRUPTION. ADHERE TO OWNER POLICIES FOR SERVICE DISRUPTION.
12. SUBMITTALS AND SHOP DRAWINGS: PROVIDE SUBMITTALS AND SHOP DRAWINGS WITH ENOUGH TIME TO ALLOW FOR A TWO WEEK REVIEW BY ENGINEER PRIOR TO ORDERING PRODUCT OR BEGINNING WORK AND NO LATER THAN TWO WORKING WEEKS AFTER AWARD OF CONTRACT. PROVIDE SUBMITTALS IN ELECTRONIC (PDF) FORMAT. SUBMIT THE FOLLOWING:
   - A. PRODUCT INFORMATION:
     - i. INDICATE EACH PRODUCT AS "BASIS OF DESIGN", "AS SPECIFIED" OR AS "PROPOSED SUBSTITUTION."
     - ii. IDENTIFY CATALOG DESIGNATION AND/OR MODEL NUMBER.
     - iii. NEATLY ANNOTATE EACH SALIENT CHARACTERISTIC AND DESIGN OPTIONS OF THE PRODUCT TO DEMONSTRATE COMPLIANCE WITH THE CONTRACT DOCUMENTS TO INCLUDE: SCHEDULED INFORMATION, DRAWING INFORMATION AND SPECIFIED INFORMATION. CLEARLY INDICATE PRODUCT DEVIATIONS FROM THE CONTRACT DOCUMENTS AND MARK OUT NON-APPLICABLE ITEMS ON CUT-SHEETS.
     - iv. INCLUDE MANUFACTURER PROVIDED DIMENSIONED EQUIPMENT DRAWINGS WITH MECHANICAL AND ELECTRICAL ROUGH-IN CONNECTIONS.
     - v. INCLUDE OPERATIONAL CHARACTERISTICS, PERFORMANCE CURVES AND RATED CAPACITIES.
     - vi. INCLUDE MOTOR CHARACTERISTICS AND WIRING DIAGRAMS FOR THE SPECIFIC SYSTEM.
     - vii. PROVIDE BASIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   - B. REQUIRED METERING REPORTS, TEST RESULTS, AND/OR STUDIES.
   - C. O&M MANUAL(S) FOR INSTALLED EQUIPMENT 2 WEEKS PRIOR TO SUBSTANTIAL COMPLETION. INFORMATION INCLUDED SHALL BE THE EXACT EQUIPMENT INSTALLED. O&M MANUALS SHALL CONTAIN SUBMITTAL INFORMATION AND INFORMATION NEEDED TO OPERATE AND MAINTAIN SYSTEMS AND EQUIPMENT PROVIDED AND/OR MODIFIED IN THE PROJECT. COORDINATE WITH OWNER FOR MINIMUM REQUIREMENTS.
   - D. AT PROJECT COMPLETION PROVIDE RECORD DRAWINGS, UPDATED PANEL SCHEDULES, TELECOM CIRCUIT LIST AND OTHER DOCUMENTATION REQUIRED IN CONTRACT DOCUMENTS.
13. CONTINUALLY RECORD THE ELECTRICAL INSTALLATION ON A SET OF PRINTS READILY AVAILABLE AT THE PROJECT SITE. MARK RECORD DRAWINGS WITH RED ERASABLE PENCIL. ACCURATELY LOCATE ELECTRICAL DEVICES WITHIN AREA OF WORK (NEW AND EXISTING) WITH DIMENSIONS. SHOW PHYSICAL DEVICE CIRCUITING, INDICATE DEVICE CIRCUITS, JUNCTION BOX LOCATIONS, CONDUITS OVER 1 INCH IN DIAMETER, SYSTEM DEVICES, AND ELECTRICAL APPURTENANCES.
14. IDENTIFICATION AND LABELING
   - A. PROVIDE LAMINATED PLASTIC NAMEPLATES RIVETED OR SCREWED TO ELECTRICAL EQUIPMENT FOR EACH SWITCHBOARD, PANELBOARD, MOTOR CONTROL CENTER, EQUIPMENT ENCLOSURE, MOTOR STARTER, DISCONNECT SWITCH, TRANSFORMER AND OTHER EQUIPMENT WITH AN EQUIPMENT DESIGNATION. NAMEPLATE MATERIAL SHALL BE 0.125 INCH THICK PLASTIC. NORMAL POWER SYSTEM – WHITE LETTERS ON BLACK BACKGROUND. STANDBY POWER SYSTEM – BLACK LETTERS ON YELLOW BACKGROUND. EMERGENCY POWER SYSTEM – WHITE LETTERS ON RED BACKGROUND. SEE DRAWINGS FOR EQUIPMENT LABEL TEXT, SUBMIT LIST OF EQUIPMENT NOT LABELED IN DRAWINGS TO ENGINEER FOR LABEL TEXT.
     - i. MINIMUM LETTER SIZE OF 0.5 INCH FOR SWITCHBOARDS, PANELBOARDS, TRANSFORMERS, MOTOR CONTROL CENTERS, AUTOMATIC TRANSFER SWITCHES, DISCONNECTS, STARTERS, VFDS, CONTACTORS, ETC.
   - B. PROVIDE 3/16 INCH MINIMUM HEIGHT LETTERS ON RECEPTACLE AND LIGHT SWITCH DEVICE PLATES. PROVIDE CLEAR ADHESIVE LABEL (BLACK LETTER ON CLEAR BACKGROUND) INDICATING BRANCH CIRCUIT DESIGNATION (PANEL AND CIRCUIT NUMBER) ON RECEPTACLE AND LIGHT SWITCH DEVICE PLATES. LABELS SHALL BE PRINTED NOT HANDWRITTEN.
   - C. IN ACCESSIBLE CEILING SPACES AND EXPOSED UNFINISHED AREAS, USE AN INDELIBLE MARKING PEN TO LABEL JUNCTION BOX COVERS WITH CIRCUIT(S) AS FOLLOWS:
     - i. FED FROM: "PANEL"–"CIRCUIT(S)"
     - ii. "BUILDING" "FLOOR"–"ROOM"
   - D. IN ACCESSIBLE CEILING SPACES AND EXPOSED UNFINISHED AREAS, USING INDELIBLE MARKING PEN, LABEL CONDUITS 1 INCH OR LARGER WITH PANEL AND CIRCUIT NUMBERS OF CONDUCTORS ROUTED THROUGH THE CONDUIT, SIMILAR TO JUNCTION BOX LABELING. LABEL CONDUIT AT 50-FOOT INTERVALS, EXCEPT FOR EMERGENCY POWER SUPPLY SYSTEM CONDUITS, WHICH SHALL BE LABELED AT 25-FOOT INTERVALS PER NEC REQUIREMENTS. ADDITIONALLY, LABEL CONDUITS AT WALL PENETRATIONS (BOTH SIDES) AND CONNECTIONS TO PANELS, JUNCTION BOXES, AND OTHER EQUIPMENT SERVED.
15. BASIC MATERIALS AND METHODS
   - A. APPLY FIRESTOPPING TO ELECTRICAL PENETRATIONS THROUGH FIRE RATED FLOOR AND WALL ASSEMBLIES TO MAINTAIN FIRE RESISTANCE RATING OF ASSEMBLY.
   - B. WHERE ELECTRICAL RACEWAYS OR OTHER FEATURES PENETRATE WALLS THAT EXTEND TO STRUCTURE, THEY SHALL MAINTAIN THE INTEGRITY OF THE BUILDING SURFACE BEING PENETRATED FOR SOUND ISOLATION BY SEALING WITH FIRESTOPPING. NOTE THAT THIS REQUIREMENT EXISTS REGARDLESS OF WHETHER THE BUILDING SURFACE BEING PENETRATED HAS A FIRE RATING.
   - C. BOXES (ELECTRICAL BOXES, OUTLET BOXES AND TELECOMMUNICATION BOXES, ETC) PENETRATING WALL TYPES THAT EXTEND TO STRUCTURE OR THAT CONTAIN BATTS SHALL BE SEALED AIRTIGHT USING STI SERIES SSP FIRESTOP PUTTY PADS TO REDUCE SOUND TRANSMISSION. MOLD PUTTY PADS AROUND ELECTRICAL JUNCTION BOXES AND CONDUITS TO FORM AN AIRTIGHT SEAL IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.
   - D. PROVIDE STI EZ-PATH FOR PENETRATIONS THROUGH FIRE RATED BARRIERS CONTAINING TELECOMMUNICATIONS CABLING.
   - E. COMPLY WITH SEISMIC-RESTRAINT REQUIREMENTS OF THE AHJ UNLESS REQUIREMENTS IN THESE CONTRACT DOCUMENTS ARE MORE STRINGENT.
   - F. MULTIWIRE BRANCH CIRCUITS SHALL NOT BE USED ON THIS PROJECT. EACH BRANCH CIRCUIT SHALL BE PROVIDED WITH ITS OWN DEDICATED NEUTRAL CONDUCTOR.
16. EXAMINATION
   - A. DRAWINGS INVOLVING EXISTING CONDITIONS ARE BASED ON BUILDING RECORD DRAWINGS AND/OR LIMITED FIELD OBSERVATION. REPORT DISCREPANCIES TO THE OWNER BEFORE DISTURBING EXISTING INSTALLATION. VERIFY FIELD MEASUREMENTS AND CIRCUITING ARRANGEMENTS. VERIFY THAT ABANDONED WIRING AND EQUIPMENT SERVE ONLY ABANDONED FACILITIES. BEGINNING OF DEMOLITION IMPLIES CONTRACTOR ACCEPTS EXISTING CONDITIONS.
17. DEMOLITION OF EXISTING ELECTRICAL WORK
   - A. REMOVE, RELOCATE, AND EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTION.
   - B. REMOVE ABANDONED, EXPOSED OR UNUSED WIRING, CONDUIT AND HARDWARE TO SOURCE OF SUPPLY. REMOVE EXPOSED AND ACCESSIBLE CONDUIT TO THE POINT WHERE IT BECOMES INACCESSIBLE. CONCEALED CONDUIT WHICH CAN NOT BE REMOVED WITHIN REASON SHALL BE CUT FLUSH AND SURFACE PATCHED AND/OR SEALED AS APPLICABLE.
   - C. DISCONNECT AND REMOVE ABANDONED DEVICES WITH ASSOCIATED CONDUIT, WIRE AND HARDWARE AS IDENTIFIED ON DRAWINGS. NOTIFY ENGINEER OF ANY DEVICES NOT SHOWN ON DRAWINGS THAT ARE WITHIN AREA OF WORK. DISCONNECT AND REMOVE ABANDONED PANELBOARDS AND DISTRIBUTION EQUIPMENT. REWORK CONDUIT, WIRE AND HARDWARE AS NEEDED TO ACCOMMODATE REMOVAL.
   - D. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK.
   - E. MAINTAIN ACCESS TO EXISTING ELECTRICAL INSTALLATIONS WHICH REMAIN ACTIVE. MODIFY INSTALLATION OR PROVIDE ACCESS PANELS AS APPROPRIATE.
   - F. RESTORE CIRCUITS AND SYSTEMS THAT REMAIN THAT ARE AFFECTED IN ANY WAY BY DEMOLITION WORK SUCH AS LOADS DOWNSTREAM OF DEMOLISHED EQUIPMENT, SWITCHED LIGHTING CIRCUITS WHERE SELECTED LIGHT FIXTURES ARE DEMOLISHED, ETC.
   - G. PROVIDE TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN EXISTING SYSTEMS IN SERVICE DURING CONSTRUCTION. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS.
18. CLEANING AND REPAIR
   - A. CLEAN AND REPAIR EXISTING MATERIALS AND EQUIPMENT WHICH REMAIN OR ARE TO BE REUSED OR ARE AFFECTED BY THIS WORK.
   - B. PANELBOARDS: CLEAN EXPOSED SURFACES AND INTERIOR OF CABINET. PROVIDE NEATLY TYPED, FULLY DETAILED BRANCH CIRCUIT DIRECTORY IN PANELS WITH UPDATED LOADS. ODD CIRCUITS ON LEFT, EVEN ON RIGHT.

26 05 19 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

1. BRANCH CIRCUIT WIRING SHALL BE 600 VOLT INSULATED AND SHALL HAVE THE FOLLOWING INSULATION TYPES:
   - A. HEATED INDOOR SPACES – THHN/THWN OR XHHW
   - B. OUTDOORS, WET LOCATIONS AND UNHEATED SPACES – XHHW
2. FEEDER WIRING SHALL BE 600 VOLT INSULATED AND SHALL HAVE THE FOLLOWING INSULATION TYPES:
   - A. HEATED INDOOR SPACES – THHN/THWN OR XHHW-2
   - B. OUTDOORS, WET LOCATIONS AND UNHEATED SPACES – XHHW-2
3. CONDUCTORS SHALL BE COPPER, SOLID OR STRANDED FOR WIRING #10 OR SMALLER, STRANDED FOR #8 OR LARGER.
4. MINIMUM CONDUCTOR SIZE AS FOLLOWS:
   - A. #12 AWG FOR BRANCH CIRCUITS.
   - B. #16 AWG FOR LIGHTING FIXTURE WHIPS.
5. PROVIDE PROPERLY SIZED AND BONDED GROUNDING CONDUCTORS WITH POWER CIRCUITS.
6. BRANCH CIRCUIT CONDUCTORS SHOWN ON THE DRAWINGS ARE SIZED FOR AMPACITY ONLY UNLESS OTHERWISE NOTED. THE CONTRACTOR SHALL INCREASE FEEDER SIZES IF REQUIRED TO PREVENT FEEDER VOLTAGE DROP FROM EXCEEDING 3%. VOLTAGE DROP AT OUTLETS SHALL NOT EXCEED 5%.

26 05 26 GROUNDING AND BONDING OF ELECTRICAL SYSTEMS

1. GROUNDING CONDUCTORS, GROUND RODS, AND EQUIPMENT REQUIRED FOR GROUND SYSTEMS SHALL BE LISTED FOR THE PURPOSE INTENDED AND APPROVED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), AND BE IN ACCORDANCE WITH U.L. 467.
2. GROUNDING CONDUCTORS SHALL BE COPPER.
3. CLAMPS, LUGS, CONNECTORS, BONDING BUSHINGS, AND OTHER SUCH GROUNDING DEVICES SHALL BE MADE (BOTH BODY AND HARDWARE) OF HOT DIP GALVANIZED STEEL, BRONZE, OR OTHER CORROSION RESISTANT ALLOY (EXCEPT BUSHING THROATS SHALL BE PLASTIC).
4. THE RACEWAY SYSTEM SHALL BE BONDED IN CONFORMITY WITH NEC REQUIREMENTS TO PROVIDE A CONTINUOUS GROUND PATH.
5. PROVIDE AN EQUIPMENT GROUNDING CONDUCTOR SIZED IN CONFORMITY WITH TABLE 250.122 OF THE NEC FOR FEEDER AND BRANCH CIRCUITS.
6. CORDS AND NONMETALLIC CABLES SHALL BE FURNISHED WITH INTEGRAL CODE-SIZED GROUNDING CONDUCTOR.
7. EXTERNAL BONDING JUMPERS ARE NOT PERMITTED; BONDING JUMPERS SHALL BE RUN INSIDE THE RACEWAYS FOR THE CIRCUITS THEY SERVE.

26 05 29 HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

1. PRE-ENGINEERED SUPPORT SYSTEMS MATERIAL SHALL BE COLD WORKED STEEL. PROVIDE TYPE 304 STAINLESS STEEL FOR USE WITH PVC, LIQUID-TIGHT FLEX, OR PLASTIC-COATED CONDUIT INSTALLED ON WOOD CONSTRUCTION IN OUTDOOR, DAMP, CORROSIVE OR MARINE ENVIRONMENTS.
2. FINISH FOR PRE-ENGINEERED SUPPORT SYSTEMS AS FOLLOWS:
   - A. HEATED INDOOR AREAS: PRE-GALVANIZED ZINC COATING.
   - B. OUTDOOR AREAS: HOT DIPPED GALVANIZED FINISH. IN ADDITION, COAT HOT DIPPED GALVANIZED FINISH CHANNEL FIELD CUTS WITH ZINC RICH PAINT PROVIDED BY THE SUPPORT SYSTEM MANUFACTURER.
   - C. PAINTED AREAS: PAINTABLE GALVANIZING OR PHOSPHATIZED AND PRIMED.
3. PROVIDE ACCESSORIES FROM THE SUPPORT SYSTEM MANUFACTURER DESIGNED FOR THE SPECIFIC EQUIPMENT TO BE SUPPORTED TO INCLUDE BUT NOT LIMITED TO: LIGHT FIXTURE HANGERS, OUTLET BOX ADAPTERS, SNAP-IN CLOSURES, CONDUIT CONNECTION PLATES, JUNCTION BOX ADAPTERS AND STRUT JOINERS.

26 05 33 RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

1. CONDUIT TYPES SPECIFICALLY APPROVED FOR USE ON THIS PROJECT SHALL BE OF THE TYPES LISTED HEREIN OR OTHER TYPES SPECIFICALLY IDENTIFIED ON THE DRAWINGS.
2. GALVANIZED RIGID METAL CONDUIT – GRC OR RMC.
   - A. LOCATIONS PERMITTED: UNDERGROUND, UNDER SLAB, ENCASED IN CONCRETE, OUTDOORS ABOVEGROUND, DAMP LOCATIONS OR DRY INDOOR LOCATIONS CONCEALED OR EXPOSED.
   - B. MINIMUM SIZE: 3/4 INCH.
   - C. FITTINGS SHALL BE GALVANIZED STEEL OR IRON AND SHALL BE THREADED. CONDUIT BUSHINGS SHALL BE PROVIDED AND SHALL BE OF THE INSULATED TYPES. WHERE GROUNDING BUSHINGS ARE REQUIRED, PROVIDE INSULATED GROUNDING BUSHINGS WITH INTEGRAL PRESSURE TYPE GROUND LUGS.
3. INTERMEDIATE METAL CONDUIT – IMC.
   - A. LOCATIONS PERMITTED: DRY INDOOR LOCATIONS CONCEALED OR EXPOSED, WHERE NOT SUSCEPTIBLE TO PHYSICAL DAMAGE.
   - B. MINIMUM SIZE: 3/4 INCH.
   - C. FITTINGS SHALL BE GALVANIZED STEEL OR IRON AND SHALL BE THREADED. CONDUIT BUSHINGS SHALL BE PROVIDED AND SHALL BE OF THE INSULATED TYPES. WHERE GROUNDING BUSHINGS ARE REQUIRED, PROVIDE INSULATED GROUNDING BUSHINGS WITH INTEGRAL PRESSURE TYPE GROUND LUGS.
4. ELECTRICAL METALLIC TUBING – EMT
   - A. LOCATIONS PERMITTED: DRY INDOOR LOCATIONS CONCEALED OR EXPOSED, WHERE NOT SUSCEPTIBLE TO PHYSICAL DAMAGE.
   - B. MINIMUM SIZE: 1/2 INCH.
   - C. COUPLINGS AND CONNECTORS SHALL BE MADE OF STEEL OR MALLEABLE IRON. DIE-CAST PRODUCTS SHALL NOT BE USED. CONNECTORS SHALL HAVE INSULATED THROATS. CONNECTORS AND COUPLINGS SHALL BE SETSCREW OR COMPRESSION TYPE.
5. FLEXIBLE METAL (STEEL) CONDUIT – FMC OR FLEX.
   - A. LOCATIONS PERMITTED: MOTOR AND EQUIPMENT FLEXIBLE CONNECTIONS WHERE INSTALLED IN PLENUM SPACES
   - B. MINIMUM SIZE: 1/2 INCH, EXCEPT FIXTURE WHIPS MAY BE 3/8 INCH AS ALLOWED BY THE NEC.
   - C. LENGTH OF FMC FOR CONNECTION TO EQUIPMENT SHALL NOT EXCEED 36 INCHES, EXCEPT FOR LIGHTING FIXTURE WHIPS AND WHERE SPECIFICALLY NOTED. FIXTURE WHIPS SHALL NOT EXCEED 72 INCHES.
   - D. FITTINGS SHALL BE STEEL OR MALLEABLE IRON. THROATS SHALL BE INSULATED.
6. LIQUID-TIGHT FLEXIBLE STEEL CONDUIT – LFMC.
   - A. LOCATIONS PERMITTED: MOTOR AND EQUIPMENT FLEXIBLE CONNECTIONS
   - B. MINIMUM SIZE: 1/2 INCH, EXCEPT FIXTURE WHIPS MAY BE 3/8 INCH AS ALLOWED BY THE NEC.
   - C. LENGTH OF LFMC FOR CONNECTION TO EQUIPMENT SHALL NOT EXCEED 36 INCHES, EXCEPT FOR LIGHTING FIXTURE WHIPS AND WHERE SPECIFICALLY NOTED. FIXTURE WHIPS SHALL NOT EXCEED 72 INCHES.
   - D. FITTINGS SHALL BE STEEL OR MALLEABLE IRON AND SHALL INCORPORATE A THREADED GROUNDING CONE, NYLON OR PLASTIC COMPRESSION RING, AND A TIGHTENING GLAND, PROVIDING A LOW RESISTANCE GROUND CONNECTION. THROATS SHALL BE INSULATED.
   - E. EXTREME TEMPERATURE LFMC SHALL HAVE TEMPERATURE RATING OF -67 DEGREES F TO +220 DEGREES F, LIQUATITE "ATLA", OR AS APPROVED.
7. CAST BOXES WITH THREADED HUBS, EXTERNAL MOUNTING BRACKETS OR HOLES, AND GASKETED COVERS SHALL BE USED IN THE FOLLOWING LOCATIONS:
   - A. EXTERIOR LOCATIONS.
   - B. WET OR DAMP LOCATIONS.
   - C. WHERE EXPOSED TO DAMAGE.
8. GALVANIZED PRESSED STEEL BOXES MAY BE USED WHEREVER THEY ARE PERMITTED BY CODE, EXCEPT IN AREAS INDICATED IN THE PRECEDING PARAGRAPH. FLUSH MOUNTED, PRESSED STEEL BOXES SHALL BE EQUIPPED WITH EXTERNAL MOUNTING BRACKETS FOR ATTACHMENT TO FRAMING MEMBERS WITH SCREWS OR NAILS.
9. CEILING BOXES AND WALL BOXES FOR BRACKET LIGHTS SHALL BE NOT LESS THAN 4 INCH IN DIAMETER BY 1 ¼ INCH DEEP AND SHALL HAVE 3/8 INCH MALLEABLE IRON FIXTURE STUDS IF REQUIRED.
10. IN OCCUPIED AREAS, CONDUIT AND RACEWAYS SHALL BE CONCEALED UNLESS SPECIFICALLY NOTED OTHERWISE. IN SERVICE SPACES (MECHANICAL EQUIPMENT ROOMS, ELECTRICAL ROOMS, STORAGE CLOSETS, ETC.), RACEWAYS MAY BE SURFACE MOUNTED FOR CONNECTION TO EQUIPMENT.
11. WHERE SPECIFICALLY NOTED ON THE DRAWINGS, RACEWAYS MAY BE MOUNTED ON THE SURFACE OF WALLS AND CEILINGS IN OCCUPIED AREAS. EXPOSED RACEWAYS SHALL BE PAINTED TO MATCH THE SURROUNDING SURFACES.
12. PULL STRING SHALL BE PROVIDED IN SPARE AND UNUSED CONDUITS. NYLON "JET-LINE" OR AS APPROVED. TO/FROM INFORMATION SHALL BE PROVIDED AT EACH END.
13. PROVIDE FLEXIBLE CONDUIT CONNECTION AT SEISMIC JOINTS TO ALLOW FOR DISPLACEMENT OF CONDUIT IN ALL THREE AXES. PROVIDE APPROPRIATE LENGTHS OF FLEXIBLE CONDUITS AT SEISMIC JOINTS AND APPROPRIATE AMOUNTS OF SLACK IN CONDUIT TO ALLOW MOVEMENT OF CONDUIT/CABLING IN ACCORDANCE WITH THE DESIGN OF THE SEISMIC JOINT.

26 27 26 WIRING DEVICES

1. COLOR OF RECEPTACLES AND SWITCHES SHALL MATCH EXISTING WIRING DEVICES IN AREA OF WORK.
2. DEVICE PLATES SHALL MATCH EXISTING DEVICE PLATES IN AREA OF WORK..
3. THE CATALOG NUMBERS LISTED BELOW ARE THE BASIS OF DESIGN. EQUAL DEVICES MANUFACTURED BY ARROW HART, PASS AND SEYMOUR, LEVITON AND BRYANT ARE ACCEPTABLE.
   - A. SINGLE POLE LIGHT SWITCH: HUBBELL WIRING PART NUMBER 1221
   - B. THREE-WAY LIGHT SWITCH: HUBBELL WIRING PART NUMBER 1223
   - C. NEMA 5-20, 20A, 125V: HUBBELL WIRING PART NUMBER HBL5362
   - D. NEMA 5-20, 20A, 125V GFCI: HUBBELL WIRING PART NUMBER GF20
   - E. NEMA 5-20, 20A, 125V TAMPER RESISTANT: HUBBELL WIRING PART NUMBER HBL5362TR
   - F. NEMA 5-20, 20A, 125V TAMPER RESISTANT GFCI: HUBBELL WIRING PART NUMBER GF5362SG

26 28 00 LOW-VOLTAGE CIRCUIT PROTECTIVE DEVICES

1. MOLDED CASE CIRCUIT BREAKERS
   - A. WHERE INSTALLED IN AN EXISTING PANELBOARD, CIRCUIT BREAKER SHALL BE OF THE SAME MANUFACTURER AS PANELBOARD AND LISTED FOR USE IN EXISTING PANELBOARD.
   - B. CIRCUIT BREAKERS SHALL HAVE A PERMANENT TRIP UNIT CONTAINING INDIVIDUAL THERMAL AND MAGNETIC TRIP ELEMENTS IN EACH POLE.
   - C. AMPERAGE INTERRUPT RATING SHALL BE EQUAL TO OR GREATER THAN THE SHORT CIRCUIT CURRENT RATING OF THE PANEL AND CLEARLY POSTED WITHOUT REMOVAL OF PANEL COVER. SERIES RATING SHALL BE ALLOWED ONLY BY APPROVAL OF ENGINEER OR AS INDICATED IN CONTRACT DOCUMENTS.
   - D. RATINGS SHALL BE AS SHOWN ON PANEL SCHEDULES AND/OR DRAWINGS.
   - E. EQUIPMENT PROTECTION DEVICE BREAKER TYPE (EPD) SHALL BE 30MA TRIP.

26 28 16 ENCLOSED SWITCHES AND CIRCUIT BREAKERS

1. SAFETY SWITCHES
   - A. SAFETY SWITCHES, FUSIBLE AND NON-FUSIBLE, SHALL CONFORM TO NEMA STANDARD KS1 FOR TYPE HD (HEAVY DUTY) UNLESS OTHERWISE NOTED.
   - B. SWITCH INTERIOR: SWITCHES SHALL HAVE SWITCH BLADES THAT ARE FULLY VISIBLE IN THE OFF POSITION WHEN THE DOOR IS OPEN. SWITCHES SHALL BE OF DEAD FRONT CONSTRUCTION WITH PERMANENTLY ATTACHED ARC SUPPRESSERS. LUGS SHALL BE UL LISTED FOR COPPER AND/OR ALUMINUM CABLES AND BE FRONT REMOVABLE.
   - C. SWITCH MECHANISM: SWITCHES SHALL HAVE A QUICK-MAKE AND QUICK-BREAK OPERATING HANDLE AND MECHANISM THAT SHALL BE AN INTEGRAL PART OF THE BOX, NOT THE COVER. SWITCHES SHALL HAVE A DEFEATABLE DUAL COVER INTERLOCK TO PREVENT UNAUTHORIZED OPENING OF THE SWITCH DOOR IN THE ON POSITION OR CLOSING OF THE SWITCH MECHANISM WITH THE DOOR OPEN. THE SWITCH SHALL BE CAPABLE OF BEING LOCKED IN THE OFF POSITION WITH THREE (3) PADLOCKS.
   - D. ENCLOSURES: SWITCH ENCLOSURE SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH THE SWITCH IS MOUNTED. NEMA 1 ENCLOSURE SHALL BE CODE GAUGE, UL-98, SHEET STEEL, TREATED WITH A RUST INHIBITING PHOSPHATE AND FINISHED IN GRAY, BAKED ENAMEL. NEMA 3R ENCLOSURE--SAME REQUIREMENTS AS NEMA 1 EXCEPT GALVANIZED PRIOR TO PAINTING.
   - E. RATING: AMPERE, VOLT AND HORSEPOWER RATINGS, AS WELL AS NUMBER OF POLES AND PRESENCE OF NEUTRAL BAR SHALL BE SHOWN ON THE NAMEPLATE.
2. ENCLOSED CIRCUIT BREAKERS
   - A. ENCLOSED CIRCUIT BREAKERS SHALL MEET REQUIREMENTS SPECIFIED IN SECTION 26 2800 – LOW VOLTAGE CIRCUIT PROTECTIVE DEVICES.
   - B. ENCLOSURE SHALL BE SUITABLE FOR THE ENVIRONMENT IN WHICH IT IS MOUNTED. NEMA 1 ENCLOSURE SHALL BE CODE GAUGE, UL-98, SHEET STEEL, TREATED WITH A RUST INHIBITING PHOSPHATE AND FINISHED IN GRAY, BAKED ENAMEL. NEMA 3R ENCLOSURE--SAME REQUIREMENTS AS NEMA 1 EXCEPT GALVANIZED PRIOR TO PAINTING.

26 29 00 LOW VOLTAGE CONTROLLERS

1. AC FRACTIONAL HORSEPOWER MANUAL STARTERS
   - A. PROVIDE MANUAL STARTERS FOR FRACTIONAL HORSEPOWER MOTORS CONSISTING OF A MANUALLY OPERATED TOGGLE SWITCH EQUIPPED WITH RED PILOT LIGHT AND MELTING ALLOY TYPE THERMAL OVERLOAD RELAY.
   - B. THERMAL UNIT SHALL BE ONE PIECE CONSTRUCTION AND INTERCHANGEABLE. STARTER SHALL BE INOPERATIVE IF THERMAL UNIT IS REMOVED.
2. AC COMBINATION STARTERS WITH FUSIBLE DISCONNECT SWITCH OR CIRCUIT BREAKER
   - A. COMBINATION STARTERS SHALL BE MANUFACTURED IN ACCORDANCE WITH THE LATEST PUBLISHED NEMA STANDARDS, SIZES AND HORSEPOWER RATINGS.
   - B. COMBINATION STARTERS WITH DISCONNECT SWITCH SHALL CONSIST OF A VISIBLE BLADE DISCONNECT SWITCH AND A MOTOR STARTER.
   - C. COMBINATION STARTERS SHALL BE MOUNTED IN NEMA 1 GENERAL PURPOSE ENCLOSURES UNLESS OTHERWISE INDICATED ON THE PLANS OR REQUIRED BY THE CONDITIONS OF THE AREA IN WHICH THEY ARE INSTALLED.
   - D. THE DISCONNECT HANDLE USED ON COMBINATION STARTERS SHALL ALWAYS BE IN CONTROL OF THE DISCONNECT DEVICE WITH THE DOOR OPENED OR CLOSED. THE DISCONNECT HANDLE SHALL BE CLEARLY MARKED AS TO WHETHER THE DISCONNECT DEVICE IS "ON" OR "OFF".

26 50 00 LIGHTING

1. LIGHTING FIXTURES SHALL COMPLY WITH THE REQUIREMENTS OF N.E.C. ARTICLE 410. PROVIDE LIGHTING FIXTURES IN ACCORDANCE WITH LIGHTING FIXTURE SCHEDULE. PROVIDE SAFETY HANGAR WIRES FOR FIXTURES, AS FOLLOWS:
   - A. PROVIDE SAFETY WIRES (A MINIMUM OF TWO 12 GAUGE HANGERS) OR EQUIVALENT CHAINS FOR EACH LIGHT FIXTURE WEIGHING LESS THAN 56 POUNDS INSTALLED IN T-BAR OR OTHER CEILING SUSPENSION SYSTEMS. SAFETY WIRES AND CHAINS SHALL BE SECURELY ATTACHED TO DIAGONALLY OPPOSITE CORNERS OF EACH FIXTURE AND TO STRUCTURE. FIXTURES WEIGHING 56 POUNDS OR MORE SHALL BE SUPPORTED FROM STRUCTURE.
   - B. SURFACE MOUNTED LIGHTING FIXTURES SUPPORTED FROM T-BAR GRID SHALL BE ATTACHED TO THE GRID WITH A POSITIVE CLAMP DEVICE THAT COMPLETELY SURROUNDS THE SUPPORTING MEMBER SIMILAR TO CADDY "IDS". PROVIDE SAFETY WIRES AS SPECIFIED IN THE FOREGOING.
   - C. PROVIDE SAFETY WIRES (A MINIMUM OF TWO 12 GAUGE HANGERS) OR EQUIVALENT AIRCRAFT CABLE FOR EACH PENDANT MOUNTED FIXTURE. HANGARS OR CABLE SHALL BE SECURELY ATTACHED TO FIXTURE, THEN ROUTED THROUGH STEM AND SECURELY ATTACHED TO STRUCTURE.
2. PROVIDE BALLAST/DRIVER DISCONNECTING MEANS IN ACCORDANCE WITH NEC ARTICLE 410.

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REGISTERED PROFESSIONAL ENGINEER
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STIKINE MIDDLE SCHOOL
BOILER REPLACEMENT DESIGN
CITY AND BOROUGH OF WRANGELL
WRANGELL, AK

Revisions

No.	Date	Description

1 INCH AT FULL SIZE
1" ACTUAL
IF NOT 1 INCH, SCALE ACCORDINGLY

Designed by: TRC
Checked by: KTR
AMC Project No.: 25506
Date: 11/05/2025
Project Phase
100% PERMIT DRAWINGS
Sheet Title
ELECTRICAL SPECIFICATIONS
Sheet Number
E002

FILE NAME: X:\25506 SMSBOIL\Dwgs\Edwg\Sheet Files\25506 - E002.dwg
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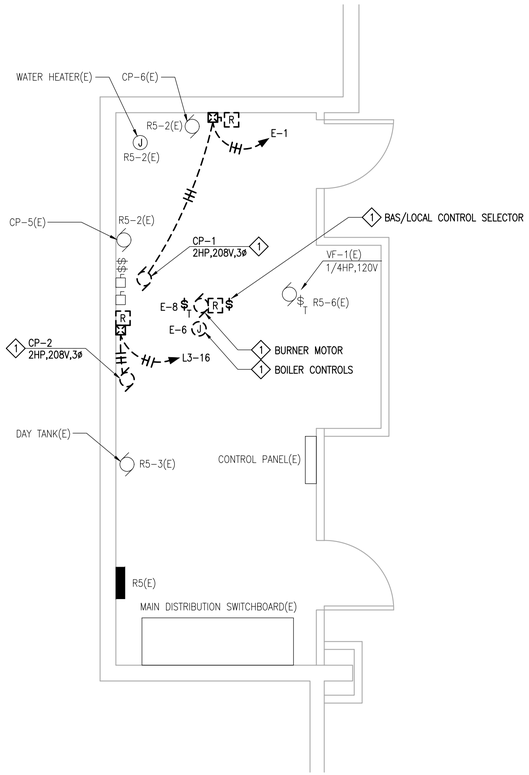
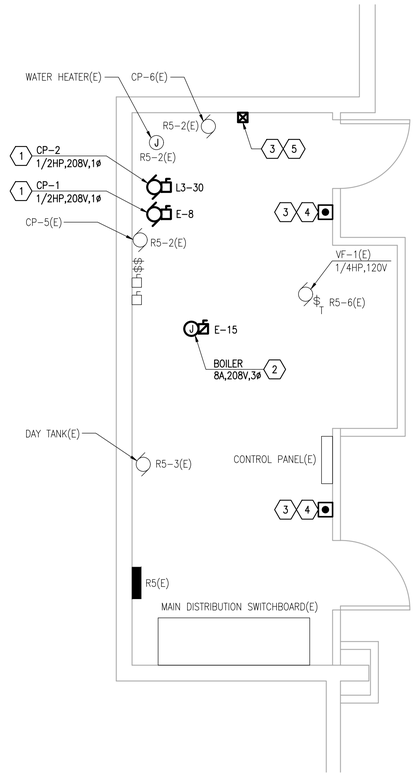


1 E101 ENLARGED PLAN - BOILER ROOM - DEMOLITION

SCALE: 1/4"=1'-0"

0 2' 4' 8' 12'



2 E101 ENLARGED PLAN - BOILER ROOM - REVISED

SCALE: 1/4"=1'-0"

0 2' 4' 8' 12'

GENERAL NOTES

1. CIRCUIT INFORMATION IS BASED ON AVAILABLE RECORD DRAWINGS AND/OR LIMITED FIELD OBSERVATION – FIELD VERIFY.
2. REFER TO SHEET E001 FOR PANEL SCHEDULES.

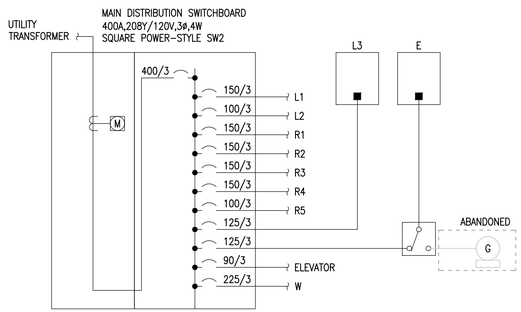
DEMOLITION NOTES ◇

1. DEMOLISH POWER AND LINE VOLTAGE CONTROLS CONNECTIONS TO EQUIPMENT. DEMOLISH ASSOCIATED STARTER, DISCONNECT, RELAYS, AND CONDUCTORS. CONDUITS IN GOOD CONDITION MAY BE RETAINED FOR REUSE. DEMOLISH UNUSED CONDUITS AND JUNCTION BOXES.

SHEET NOTES ⬡

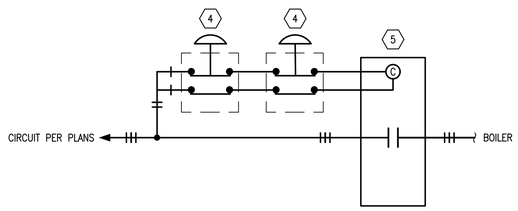
1. PROVIDE DISCONNECT AND CONNECT EQUIPMENT TO CIRCUIT NOTED VIA DISCONNECT. PROVIDE CONDUCTORS BACK TO PANELBOARD. EXISTING CONDUIT MAY BE REUSED.
2. PROVIDE FUSED DISCONNECT WITH PROVISIONS FOR LOCKING IN THE OPEN POSITION AND CONNECT MECHANICAL EQUIPMENT TO CIRCUIT NOTED VIA DISCONNECT. PROVIDE CONDUCTORS BACK TO PANELBOARD. EXISTING CONDUIT MAY BE REUSED. BRANCH CIRCUIT CONDUCTORS AND OVERCURRENT ARE BASED ON ASSUMING A SINGLE POINT CONNECTION WITH THE FOLLOWING CONNECTED LOADS:
   - CONTROL POWER
   - 3/4HP BLOWER MOTOR
   - 1/3HP FUEL OIL PUMP

   COORDINATE ELECTRICAL REQUIREMENTS WITH THE MECHANICAL CONTRACTOR AND BOILER INSTALLATION INSTRUCTIONS.
3. PROVIDE EQUIPMENT FOR BOILER EMERGENCY SHUTDOWN IN ACCORDANCE WITH DETAIL 4 ON THIS SHEET.
4. PROVIDE 2 POSITION, PULL OR TURN TO RESET, RED KNOB, MUSHROOM TYPE BUTTON WITH "PUSH EMERGENCY STOP" PRINTED ON KNOB. FOR REMOTE SHUTDOWN OF BOILERS. PROVIDE FLIP UP POLYCARBONATE COVER SUCH THAT LIFTING UP ON THE COVER WILL GAIN ACCESS TO EMERGENCY SHUTDOWN BUTTON. PROVIDE LABEL: "BOILER EMERGENCY SHUTDOWN".
5. PROVIDE ELECTRICALLY HELD CONTACTOR, 4 POLE, 20AMP, 208V COIL, WITH OFF-AUTO (O.A.) SWITCH AND ON/OFF PILOT LIGHTS. CONTACTOR SHALL NOT HAVE "HAND" FUNCTION (MANUAL ON OVERRIDE CONTROL). PROVIDE ENGRAVED NAMEPLATE ON CONTACTOR "BOILER EMERGENCY SHUTDOWN".



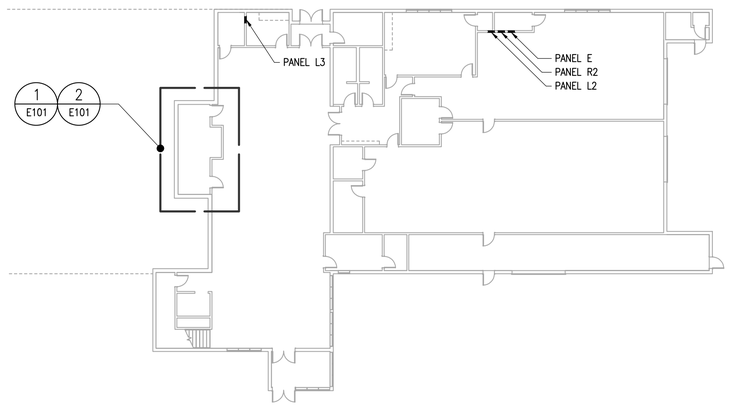
3 E101 PARTIAL POWER ONE-LINE

SCALE: NONE



4 E101 DETAIL - BOILER SHUTDOWN

SCALE: NONE



5 E101 OVERALL FLOOR PLAN - LEVEL 1

SCALE: 1" = 20'

0 10' 20' 40' 60'

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Checked by:	KTR
AMC Project No.:	25506
Date:	11/05/2025

Project Phase
100% PERMIT DRAWINGS

Sheet Title
FLOOR PLANS, DETAILS, AND DIAGRAMS

Sheet Number
E101

FILE NAME: X:\25506 SMSBOILD\wgs\E\dwg\Sheet Files\25506 - E101.dwg
PLOTTED: tcorey 11/5/2025 9:33 AM