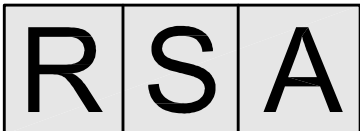


ACS PALMER COURTHOUSE
BOILER REPLACEMENT
Palmer, Alaska

MECHANICAL & ELECTRICAL
ENGINEERING

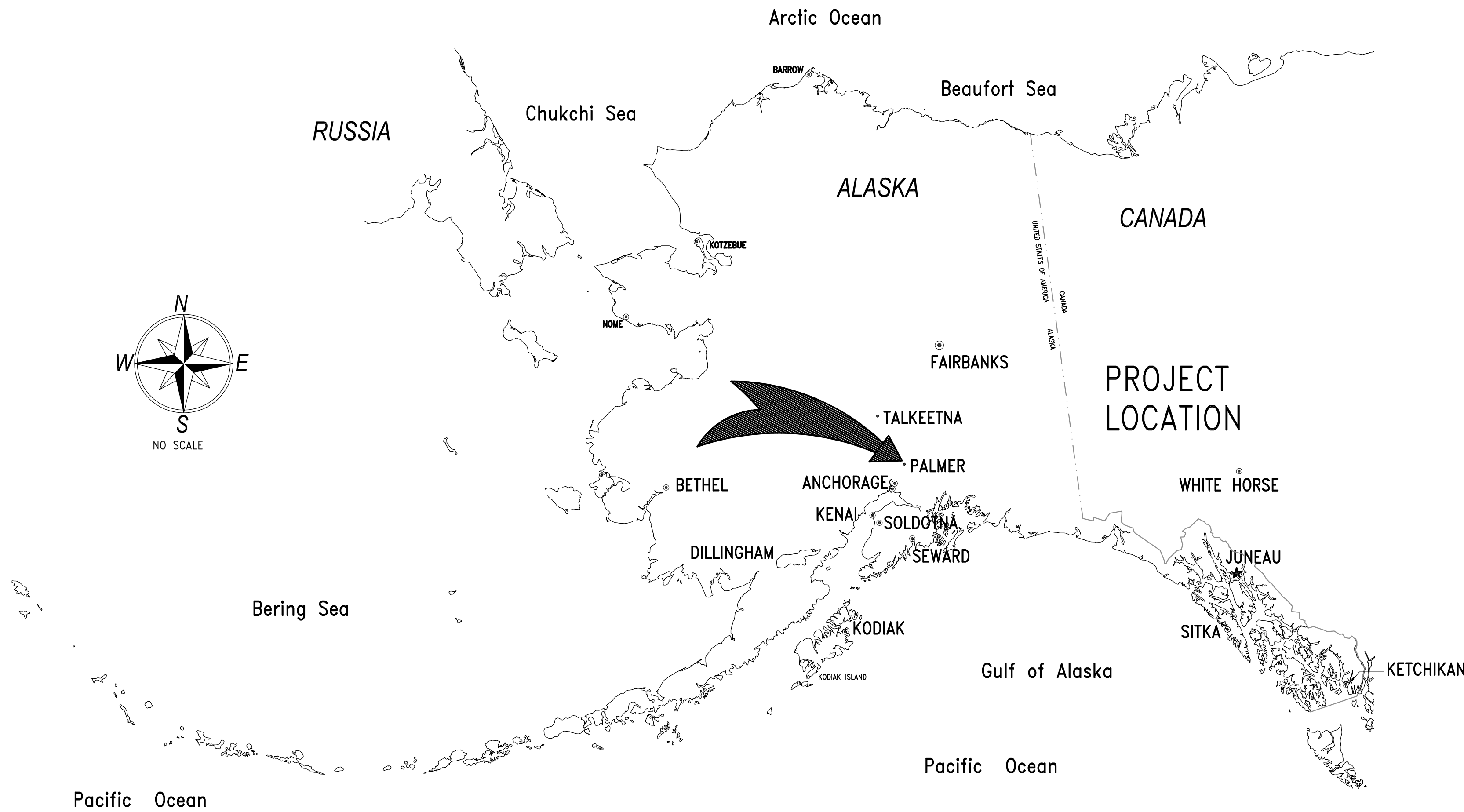


Mechanical and
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SCOPE OF WORK-BASE BID
THE SCOPE OF WORK INCLUDES REPLACEMENT OF THREE CAST IRON BOILERS WITH TWO CAST IRON BOILERS, BOILER CIRCULATION PUMPS, ASSOCIATED PIPING, AND RELATED ACCESSORIES.

SCOPE OF WORK-ALTERNATE
THE SCOPE OF WORK INCLUDES THE BASE SCOPE WORK PLUS THE REPLACEMENT OF THE HEATING SYSTEM PUMPS, ASSOCIATED PIPING, AND RELATED ACCESSORIES.



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0"
1"
2"
3"

PIPING LEGEND

	DENOTES DEMOLITION
	SEE ABBREVIATIONS FOR MEDIA
	PIPE UP
	PIPE DOWN
	TEE UP
	TEE DOWN
	CAP
	UNION
	DIRECTION OF FLOW
	BALL VALVE
	CHECK VALVE
	BALANCE VALVE
	2-WAY CONTROL VALVE
	PRESSURE/TEMPERATURE RELIEF VALVE

	PUMP
	THERMOMETER
	PRESSURE GAUGE W/ ISOLATION COCK
	STRAINER W/ BLOWDOWN

LOGIC

	POINT OF CONNECTION TO EXISTING
	DETAIL NUMBER
	SHEET LOCATED ON
	SHEET NOTES

DUCTWORK LEGEND

	THERMOSTAT
	SUPPLY AIR UP & DOWN
	DUCT SIZE (FIRST FIGURE – SIDE SHOWN) (SECOND FIGURE – SIDE NOT SHOWN)

ABBREVIATIONS

ABV	ABOVE	HWG	HOT WATER GENERATOR	PH	PHASE
AFF	ABOVE FINISHED FLOOR	HWR	HEATING WATER RETURN	PSI	POUND PER SQUARE INCH
AHAP	AS HIGH AS POSSIBLE	HWS	HEATING WATER SUPPLY	PG	PROPYLENE GLYCOL
AS-X	AIR SEPARATOR DESIGNATOR	HOA	HAND-OFF-AUTO	R/A	RETURN AIR
B-X	BOILER DESIGNATOR	HP	HORSEPOWER	RPM	REVOLUTIONS PER MINUTE
BTU	BRITISH THERMAL UNIT	IBC	INTERNATIONAL BUILDING CODE	S/A	SUPPLY AIR
CD	CONDENSATE DRAIN	IN	INCHES	SP	STATIC PRESSURE
CFM	CUBIC FEET PER MINUTE	L	LIQUID	SQ	SQUARE
CP-X	CIRCULATION PUMP DESIGNATOR	LAT	LEAVING AIR TEMPERATURE	TEMP	TEMPERATURE
EAT	ENTERING AIR TEMPERATURE	LF	LINEAL FEET	TOD	TOP OF DUCT
ESP	EXTERNAL STATIC PRESSURE	LWT	LEAVING WATER TEMPERATURE	TSP	TOTAL STATIC PRESSURE
ET-X	EXPANSION TANK DESIGNATOR	MAX	MAXIMUM	T'STAT	THERMOSTAT
FCO	FLOOR CLEAN OUT	MBH	THOUSAND BTUH	TMV	TEMPERING VALVE
FD	FIRE DAMPER	MCA	MINIMUM CIRCUIT AMPACITY	TTL	TOTAL
FD-X	FLOOR DRAIN DESIGNATOR	MFG	MANUFACTURER	TYP	TYPICAL
FF	FINISHED FLOOR	MPG	MEDIUM PRESSURE GAS	UPC	UNIFORM PLUMBING CODE
FIN	FINISHED	M/A	MAKEUP AIR	VAC	VOLT-AC
FLR	FLOOR	MIN	MINIMUM	VDC	VOLT-DC
FPM	FEET PER MINUTE	NC	NOISE CRITERIA	VEL	VELOCITY
FT	FEET	N.C.	NORMALLY CLOSED	W/	WITH
G	GAS	NG	NATURAL GAS	W/O	WITHOUT
GA	GAUGE	NO.	NUMBER	WC	WATER COLUMN
GALV	GALVANIZED	N.O.	NORMALLY OPEN	WPD	WATER PRESSURE DROP
GPM	GALLONS PER MINUTE	NTS	NOT TO SCALE		
GTD	GLYCOL TEMPERATURE DROP	O/A	OUTSIDE AIR		
HD	HEAD	D	PRESSURE DROP		

BOILER SCHEDULE

			HEATED		GROSS INPUT	GROSS OUTPUT	ELECTRICAL			
SYMBOL	MANUFACTURER	MODEL	MEDIUM	FUEL	MBH	MBH	HP	VOLTS/PH	LABEL	REMARKS
B-1,2	DE-DIETRICH	GT-339A	WATER	NATURAL GAS	1442	1229	1/2	120/1	ASME H	PROVIDE WITH RIELLO BURNER MODEL NO. RS38, LOW-HIGH OPERATION. PROVIDE WITH 50 PSI ASME RELIEF VALVE.

PUMP SCHEDULE

				PUMPED		HEAD	ELECTRICAL		
SYMBOL	MANUFACTURER	MODEL	FUNCTION	MEDIUM	GPM	FEET	HP	VOLTS/PH	REMARKS
PMP-1A,1B	TACO	KV 3009D	BUILDING CIRCULATION	GLYCOL	180	70	7.5	208/3	SUPPORT STAND, VFD RATED MOTOR, VFD PROVIDED BY CONTROLS CONTRACTOR.
BP-1,2	TACO	1935	BOILER CIRCULATION	GLYCOL	94	15	0.75	208/3	CONSTANT VOLUME.

AIR SEPARATOR SCHEDULE

SYMBOL	MANUFACTURER	MODEL	SIZE	CONNECTION	MATERIAL	FLUID	REMARKS
AS-1	SPIROTHERM	VDN	400	FLANGED	STEEL	WATER	COMBINATION AIR AND DIRT SEPARATOR, 0.6 FT PRESSURE DROP, 180 GPM.

TANK SCHEDULE

SYMBOL	MANUFACTURER	MODEL	FUNCTION	MEDIUM	MATERIAL	TANK VOLUME (GAL)	ACCEPTANCE (GAL)	DIMENSIONS	REMARKS
ET-1 (E)	AMTROL	600L	HEATING	50% PG	STEEL/BUTYL	158	158	30" DIA X 64" HIGH	EXISTING TANK CHARGE TO 20 PSI PRIOR TO REUSE.

SHEET NOTES:

PMP-1A AND PMP-1B ARE ALTERNATE.

CONTRACTOR TO PROVIDE STRUCTURAL AND SEISMIC CALCULATIONS PLUS FASTENING DETAILS FOR B-1, B-2, PMP-1A AND PMP-1B TO INCLUDE ENGINEER'S STAMP AND SIGNATURE, FOR REVIEW ON A DEFFERED SUBMITTAL BASIS



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REVISIONS:

DRAWN BY: SR
CHECKED BY: AJS
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: MSERIES

DRAWING TITLE:
LEGEND, ABBREVIATION AND SCHEDULES

SHEET:
M001

0"
1"
2"
3"

SECTION 22 05 00: 23 05 00 – COMMON WORK RESULTS FOR MECHANICAL

PLANS – THE CONTRACTOR SHALL PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR A COMPLETE AND OPERABLE SYSTEM. THE DRAWINGS ARE PARTLY DIAGRAMMATIC, NOT NECESSARILY SHOWING ALL OFFSETS OR EXACT LOCATIONS OF PIPING AND DUCTS UNLESS SPECIFICALLY DIMENSIONED. CONTRACTOR IS TO COORDINATE PIPING, DUCTWORK, SPRINKLER HEADS, AND EQUIPMENT LOCATIONS WITH ARCHITECTURAL, STRUCTURAL, AND ELECTRICAL PLANS TO AVOID CONFLICTS. CODES, ORDINANCES, REGULATIONS, STANDARDS, OR MANUFACTURER'S INSTRUCTIONS TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT OR CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS. MAINTAIN CODE MINIMUM MECHANICAL SERVICE TO ALL AREAS IMPACTED BY WORK WHERE STILL OCCUPIED BY THE OWNER.

STANDARDS, CODES, AND REGULATIONS – ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE INTERNATIONAL BUILDING CODE (IBC), INTERNATIONAL MECHANICAL CODE (IMC), INTERNATIONAL FIRE CODE (IFC), UNIFORM PLUMBING CODE (UPC), INTERNATIONAL ENERGY CONSERVATION CODE (IECC), AND NATIONAL ELECTRIC CODE (NEC) AS AMENDED BY THE STATE OF ALASKA. SHEET METAL WORK SHALL BE DONE IN ACCORDANCE WITH SMACNA DUCT CONSTRUCTION STANDARDS.

ELECTRICAL WORK – ALL ELECTRICAL WORK IS TO BE PERFORMED BY A LICENSED ELECTRICIAN AND IN ACCORDANCE WITH NEC STANDARDS.

PERMITS – THE CONTRACTOR SHALL SECURE AND PAY FOR ALL NECESSARY PERMITS AND FEES.

SUBMITTALS – SUBMITTALS SHALL BE IN ELECTRONIC FORM. THE DATA SHALL BE ARRANGED AND BOOKMARKED BY SPECIFICATION SECTION. SUBMIT ON ALL SCHEDULED EQUIPMENT AND ALL MATERIALS AND EQUIPMENT AS NOTED IN THE SPECIFICATIONS.

EQUIPMENT SUBSTITUTIONS – ALL EQUIPMENT LISTED AND SCHEDULED ARE REPRESENTATIVE OF THE STANDARD OF QUALITY AND PERFORMANCE REQUIRED. "OR EQUAL" SUBSTITUTIONS WILL BE CONSIDERED IF SUBSTITUTE DATA SHEETS ARE SUBMITTED AND ARE SHOWN TO BE OF EQUAL OR BETTER QUALITY, INCLUDING EFFICIENCY OF PERFORMANCE, AND SIZE AND WEIGHT. OWNER SHALL HAVE FIRST RIGHT OF REFUSAL FOR ALL SUBSTITUTIONS.

WARRANTY – ALL WORK PERFORMED UNDER THIS CONTRACT SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM PROJECT COMPLETION AND OWNER ACCEPTANCE. ANY FAULTY MATERIALS OR WORKMANSHIP SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER DURING THE WARRANTY PERIOD.

OPERATION AND MAINTENANCE MANUAL – PROVIDE THE OWNER WITH AN OPERATING AND MAINTENANCE MANUAL TO INCLUDE DATA CUTSHEETS MARKED WITH THE SPECIFIC ITEM USED, MANUFACTURER'S SPECIFICATIONS, OPERATING AND MAINTENANCE INSTRUCTIONS, WARRANTY INFORMATION ON EACH PIECE OF EQUIPMENT, RECORD DRAWINGS WITH INSTALLED LOCATIONS NOTED, SOURCE OF SUPPLY FOR SPARE PARTS AND SERVICE. OPERATION AND MAINTENANCE MANUAL SHALL BE IN ELECTRONIC FORM AND SHALL BE SUBMITTED FOR REVIEW. THE DATA SHALL BE ARRANGED AND BOOKMARKED BY SPECIFICATION SECTION.

SEISMIC RESTRAINT – ALL PIPING, AND EQUIPMENT INSTALLED UNDER THIS PROJECT SHALL BE SEISMICALLY RATED AND RESTRAINED FOR A SEISMIC EVENT IN ACCORDANCE WITH THE LATEST ADOPTED EDITION OF THE IBC AND ASCE 7 AS AMENDED BY THE STATE OF ALASKA. THE CONTRACTOR SHALL PROVIDE A DEFERRED SUBMITTAL FOR REVIEW TO THE PROJECT MANAGER FOR SEISMIC RESTRAINT DESIGN WITH CALCULATIONS AND SHOP DRAWINGS. SEISMIC RESTRAINT CALCULATIONS AND SHOP DRAWINGS SHALL INCLUDE A STRUCTURAL ENGINEERS STAMP AND SIGNATURE PRIOR TO INSTALLATION. SEISMIC CATEGORY D, COMPONENT IMPORTANCE FACTOR IP–1.0

MATERIALS – ALL MATERIALS OTHER THAN OWNER SUPPLIED MATERIALS SHALL BE NEW AND UNUSED, INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, AND IN THE BEST PRACTICE OF THE CRAFT. OBTAIN PROJECT MANAGER'S AND ENGINEER'S APPROVAL OF ALL PRODUCTS PRIOR TO ORDERING OR INSTALLING ANY PART OF ANY SYSTEM.

ACCESS – PROVIDE WORKABLE ACCESS TO ALL SERVICEABLE AND/OR OPERABLE EQUIPMENT. PROVIDE ACCESS PANELS OR ACCESS DOORS FOR ALL EQUIPMENT INSTALLED IN CONCEALED LOCATIONS.

EQUIPMENT INSTALLATION – INSTALL ALL EQUIPMENT WHERE NOTED ON THE DRAWINGS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. PROVIDE MISCELLANEOUS APPURTENANCES, ACCESSORIES, SUPPORTS, AND CONTROL CONNECTIONS REQUIRED FOR COMPLETE AND OPERATING SYSTEMS.

DEMOLITION DRAWINGS ARE BASED ON AS-BUILT DRAWINGS AND A NON-DESTRUCTIVE WALK-THROUGH OF THE FACILITY. REPORT DISCREPANCIES TO OWNER BEFORE DISTURBING THE EXISTING INSTALLATION. DISABLE SYSTEMS ONLY TO MAKE SWITCH OVERS AND CONNECTIONS. COORDINATE WITH PHASING PLAN TO PERFORM WORK IN SEQUENCE WITH OTHER TRADES AND MAINTAIN CODE MINIMUM MECHANICAL SERVICE CLEARANCES TO ALL AREAS IMPACTED BY WORK AND STILL OCCUPIED. OBTAIN PERMISSION FROM OWNER AT LEAST 72 HOURS PRIOR TO PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION AND MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREAS. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS. REMOVE, RELOCATE, AND/OR EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTIONS. REMOVE ABANDONED WIRING TO SOURCE OF SUPPLY. REMOVE EXPOSED ABANDONED PIPING, DUCTWORK, INSULATION, HANGERS AND SUPPORTS, CONTROLS AND CONTROL WIRING, AND ANY OTHER ABANDONED MECHANICAL EQUIPMENT. THIS INCLUDES ABANDONED EQUIPMENT ABOVE ACCESSIBLE CEILING FINISHES. WHERE ABANDONED PIPE ENTERS EXISTING SURFACES TO REMAIN, CUT PIPE FLUSH WITH WALLS, AND FLOORS, CAP/PLUG PIPE AND PATCH SURFACES. DEMOLISH ALL DOMESTIC WATER PIPING BACK TO MAINS AND CAP, LEAVE NO DEAD LEGS. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND REMODEL WORK. MAINTAIN ACCESS TO EXISTING MECHANICAL INSTALLATIONS WHICH REMAIN ACTIVE.

SECTION 22 05 53: 23 05 53 – IDENTIFICATION FOR PIPING AND EQUIPMENT

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
 - 1. COLORING SCHEME IN ACCORDANCE WITH ANSI A13.1, SETON OPTI-CODE OR EQUAL.
- C. INSTALLATION:
 - 1. LABEL ALL EQUIPMENT WITH HEAT RESISTANT LAMINATED PLASTIC LABELS HAVING ENGRAVED LETTERING 1/2" HIGH.
 - 2. IDENTIFY PIPING TO INDICATE CONTENTS AND FLOW DIRECTION USING PIPE MARKERS OR BY A LABELED SLEEVES IN LETTERS READABLE FROM FLOOR AT LEAST ONCE IN EACH ROOM AND AT INTERVALS OF NOT MORE THAT 20' APART AND ON EACH SIDE OF PARTITION PENETRATIONS.

SECTION 22 05 29: 23 05 29 – HANGERS & SUPPORTS FOR PIPING & EQUIPMENT

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
 - 1. PIPE HANGERS AND SUPPORTS
 - 1.1. HANGERS FOR PIPES 1/2" TO 1-1/2" – MALLEABLE IRON OR CARBON STEEL, ADJUSTABLE SWIVEL, SPLIT RING FOR STEEL PIPE, COPPER SWIVEL FOR COPPER PIPE.
 - 1.2. HANGERS FOR PIPES 2" TO 4" – CARBON STEEL, ADJUSTABLE CLEVIS.
 - 1.3. MULTIPLE OR TRAPEZE HANGERS – STEEL CHANNELS WITH WELDED SPACERS AND HANGER RODS.
 - 1.4. WALL SUPPORTS FOR PIPES 1/2" TO 3" – CAST IRON HOOK.
 - 1.5. WALL SUPPORTS FOR PIPES 4" AND LARGER – WELDED STEEL BRACKET, WROUGHT STEEL CLAMP W/ ADJUSTABLE STEEL YOKE AND CAST IRON ROLL.
- C. INSTALLATION
 - 1. DESIGNED AND INSTALLED IN ACCORDANCE WITH THE UNIFORM PLUMBING CODE (UPC) FOR DOMESTIC WASTE, VENT, AND WATER PIPING .
 - 2. INSTALL HVAC PIPE HANGERS IN ACCORDANCE WITH THE INTERNATIONAL MECHANICAL CODE (IMC) AND ANSI/MSS–SP–69 AND 89.
 - 3. INSTALLED AS PER THE MANUFACTURERS INSTRUCTIONS. PROVIDE SEISMIC SUPPORT FOR ALL PIPING AND EQUIPMENT IN ACCORDANCE WITH IBC.
 - 4. FABRICATE EQUIPMENT CURBS OF CONCRETE UNLESS SPECIFICALLY CALLED OUT OTHERWISE.

SECTION 23 05 93 – TESTING, ADJUSTING, AND BALANCING FOR HVAC

- A. SUBMITTALS: SUBMIT QUALIFICATIONS, NEBB CERTIFICATIONS OR 5 YEARS DOCUMENTED PROJECT EXPERIENCE OF SIMILAR OR GREATER MAGNITUDE, EQUIPMENT CALIBRATIONS, PRELIMINARY AND FINAL BALANCING REPORTS.
- B. MATERIALS:
 - 1. BALANCING INSTRUMENTS AS NECESSARY TO COMPLETE WORK TO MEASURE AT LEAST THE FOLLOWING: PRESSURE, TEMPERATURE, AND FLOW.
- C. EXECUTION:
 - 1. THE CONTRACTOR SHALL BALANCE HYDRONIC SYSTEMS ACCORDING TO NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB) RECOMMENDED PROCEDURES AND CONTRACT DOCUMENTS, AND TO THE SATISFACTION OF THE OWNER.
 - 2. PRIOR TO THE START OF DEMOLITION TAKE PUMP PRESSURE READINGS ON THE DISCHARGE AND SUCTION OF EACH PUMP. PRESSURE READINGS SHOULD BE TAKEN WITH ALL THE TERMINAL HEATING EQUIPMENT CALLING FOR HEAT. REPLACE/INSTALL PUMP PRESSURE GAUGES AS NEEDED TO OBTAIN ACCURATE READINGS. SUBMIT PRESSURE READINGS TO OWNER.
 - 3. AFTER CONSTRUCTION IS COMPLETE SET HEATING LOOP BALANCING VALVES TO GPMS AS INSTRUCTED BY OWNER. THE OWNER WILL PROVIDE GPMS FOR EACH OF THE LOOPS TO BE BALANCED.

SECTION 22 07 00: 23 07 00 – INSULATION

- A. SUBMITALLS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS
 - 1. PIPING INSULATION – GLASS FIBER, RIGID, MOLDED, NON-COMBUSTIBLE INSULATION; ANSI/ASTM C547; 'K' VALUE OF 0.24 AT 75 DEG F, RATED TO 850 DEG F, VAPOR RETARDER JACKET OF KRAFT PAPER BONDED TO ALUMINUM FOIL; JOHNS MANVILLE "MICRO-LOK" OR EQUAL. COMPLETE WITH VAPOR BARRIER JACKET AND PLASTIC COVERS FOR FITTINGS.
- C. INSTALLATION
 - 1. PIPING
 - 1.1. INSULATE ALL HEATING AND DOMESTIC WATER PIPING WITH PRE-FORMED FIBERGLASS INSULATION, COMPLETE WITH FACTORY VAPOR BARRIER AND PVC JACKETING FOR FITTINGS. PVC JACKETING TO BE PROVIDED FOR ALL PIPING BELOW 10' AFF IN MECHANICAL ROOMS.
 - 1.2. PROVIDE INSULATED PIPING SUPPORTS INSERT FABRICATED OF JOHNS MANVILLE THERMO-12 GOLD OR OTHER HEAVY DENSITY INSULATING MATERIAL SUITABLE FOR TEMPERATURE BETWEEN SUPPORT SHIELD AND PIPING ON PIPING 1-1/2" DIAMETER OR LARGER. INSULATION INSERTS SHALL NOT BE LESS THAN THE FOLLOWING LENGTHS: 1-1/2" TO 2-1/2" PIPE SIZE == 10" LONG.3" TO 6" PIPE SIZE = 12 INCH LONG.
 - 1.2.1. INSULATE ALL HYDRONIC HEATING PIPING SIZE 1-1/4" AND SMALLER WITH 1" INSULATION, SIZE 1-1/2" AND LARGER WITH 1-1/2" INSULATION.
 - 2. INSTALL ALL INSULATION MATERIALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, AND ALL APPLICABLE BUILDING CODES AND INDUSTRY STANDARDS.

SECTION 23 09 00 – INSTRUMENTATION AND CONTROL FOR HVAC

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
 - 1. THERMOMETERS:
 - 1.1. STEM TYPE – 9 INCH SCALE, UNIVERSAL ADJUSTABLE ANGLE, RED APPEARING MERCURY, LENS FRONT TUBE, CAST ALUMINUM CASE WITH METALLIC FINISH AND CLEAR LEXAN WINDOW, EXTENDED BRASS STEM, CAST ALUMINUM ADJUSTABLE JOINT WITH POSITIVE LOCKING DEVICE, 2 PERCENT OF SCALE ACCURACY TO ASTM E77, SCALE CALIBRATED IN BOTH DEGREES F AND DEGREES C. TRERICE "BX9" OR APPROVED EQUAL.
 - 2. PRESSURE GAUGES – 4-1/2" DIAMETER CAST ALUMINUM CASE, PHOSPHOR BRONZE BOURBON TUBE, ROTARY BRONZE MOVEMENT, BRASS SOCKET, SILICONE FLUID DAMPENING BLACK FIGURES ON WHITE BACKGROUND, 1% MID-SCALE ACCURACY, CALIBRATED IN PSI. TRERICE "600CB" OR APPROVED EQUAL.
- C. INSTALLATION:
 - 1. ALL DEVICES SHALL BE INSTALLED IN ACCORDANCE W/ MANUFACTURERS INSTRUCTIONS.
 - 2. ALL WIRING SHALL BE PER THE NEC. PROVIDE PROPER GROUNDING OF ALL CONTROL WIRING.
 - 3. PROVIDE TWO PRESSURE GAUGES PER PUMP, INSTALLING TAPS BEFORE STRAINERS AND ON SUCTION AND DISCHARGE OF PIPE. PIPE TO GAUGE WITH ISOLATION VALVE TO EACH TAPPING.

- 4. INSTALL THERMOMETERS IN PIPING SYSTEMS IN SOCKETS WITH SHORT COUPLING. SELECT BULB LENGTH TO REACH CENTERLINE OF PIPE.
- 5. ALL INSTRUMENTS SHALL BE PROVIDED WITH SCALE RANGES ACCORDING TO LARGEST PRESSURE IN SYSTEM SERVED.
- 6. INSTALL ALL GAUGES AND THERMOMETERS IN LOCATIONS WHERE THEY ARE EASILY READ.
- 7. ALL CONTROLLERS, TRANSMITTERS, SWITCHES, THERMOSTATS, GAUGES AND DEVICES WITH ADJUSTABLE SETPOINTS SHALL BE PERMANENTLY TAGGED WITH IDENTIFICATION COORDINATED WITH THE CONTROL DRAWINGS.

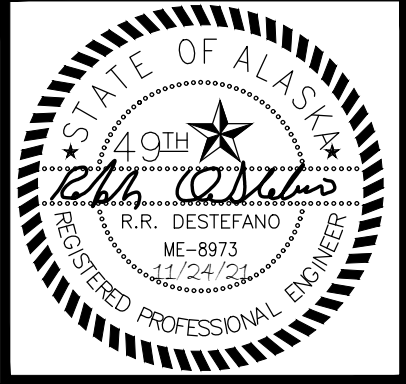
SECTION 23 21 16 – HYDRONIC SPECIALTIES

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
 - 1. AIR VENTS:
 - 1.1. MANUAL TYPE – DISK TYPE VENT WITH BUILT-IN CHECK VALVE FOR MANUAL OR AUTOMATIC OPERATION, DISCS REPLACEABLE WITHOUT DRAINING SYSTEM, 1/8 INCH SHANK, RATED AT 50 PSI; HOFFMAN "MODEL 508" OR APPROVED EQUAL.
 - 1.2. FLOAT TYPE: MAINTENANCE FREE SOLID BRASS CONSTRUCTION, CONTINUOUS AIR VENTING, 150 PSIG STANDARD WORKING PRESSURE, 240° F MAXIMUM TEMPERATURE, 1/2 INCH MALE THREAD AT VENT POINT FOR PRESSURE TESTING OR REMOTE VENTING, 1/2 OR 3/4 INCH FEMALE THREADED CONNECTIONS. PROVIDE WITH MINI BALL VALVE FOR ISOLATION. TACO "409 VENT", SPIROTHERM "SPIROTOP VTP" OR APPROVED EQUAL.
 - 2. STRAINERS:
 - 2.1. SIZE 2" AND SMALLER – SCREWED BRASS OR IRON BODY FOR 175 PSIG WORKING PRESSURE, Y PATTERN WITH 1/32 INCH STAINLESS STEEL PERFORATED SCREEN.
 - 2.2. SIZES 2-1/2" TO 4" – FLANGED IRON BODY FOR 175 PSIG WORKING PRESSURE, Y-PATTERN WITH 3/64 INCH STAINLESS STEEL PERFORATED SCREEN.
 - 3. BALANCE VALVES – ANGLE OR STRAIGHT PATTERN, INSIDE SCREW GLOBE VALVE FOR 125 PSIG WORKING PRESSURE, WITH BRONZE BODY AND INTEGRAL UNION FOR SCREWED CONNECTIONS, RENEWABLE COMPOSITION DISC, PLASTIC WHEEL HANDLE FOR SHUT-OFF SERVICE, AND LOCKSHIELD KEY CAP FOR BALANCING SERVICE. BELL & GOSSETT "CIRCUIT SETTER PLUS" OR APPROVED EQUAL.
 - 6. FLOW METER – INLINE ELECTROMAGNETIC FLOW METER, ANSI CLASS 150 FLANGES, EPOXY PAINTED CARBON STEEL OUTER BODY, 304 STAINLESS STEEL FLOW TUBE, INTEGRAL LINER TO BE SELECTED BASED ON OPERATING TEMPERATURE AND FLUID. MAX 580 PSIG MAXIMUM PRESSURE, 266°F MAXIMUM TEMPERATURE. ELETROMAGNETIC SENSING ELEMENT WITH MINIMUM TWO 316L STAINLESS STEEL ELECTRODES MEASURING AVERAGE FLUID VELOCITY. INDIVIDUAL CALIBRATION TAG SHALL BE ATTACHED INDICATING CALIBRATION AND PROGRAMMING INFORMATION. ACCURACY SHALL BE +/- 0.2% FROM 1.6 TO 33.0 FT/S FLUID VELOCITY. ONICON "FT-3200" OR APPROVED EQUAL.
- C. INSTALLATION:
 - 1. PROVIDE CLEARANCE FOR INSTALLATION OF INSULATION AND ACCESS TO VALVES AND FITTINGS.
 - 2. INSTALL AIR VENTS AT HIGH POINTS, AND RETURN PIPE DOWN TURNED ELBOWS, AND IN ACCESSIBLE LOCATIONS.

SECTION 23 11 23 – FACILITY NATURAL GAS PIPING

- A. SUBMITTALS: SUBMIT ON PRODUCT DATA FOR APPROVAL, PIPING SYSTEM PRESSURE TEST RESULTS.
- B. MATERIALS
 - 1. ABOVE GRADE PIPING – STEEL PIPE, ASTM A53, SCHEDULE 40 BLACK. FITTINGS: ANSI/ASME B16.3, MALLEABLE IRON, OR ASTM A234, STEEL WELDING TYPE. JOINTS: VEIGA MEGAPRESS-G OR SCREWED FOR PIPE 2" AND SMALLER AND IF LOW PRESSURE. IF MEDIUM PRESSURE, OUTSIDE BUILDING, OR 2-1/2" ANSI/AWS D1.1, WELDED.
 - 2. GAS COCKS:
 - 2.1. SIZES 2" AND SMALLER – BRONZE BODY, BRONZE TAPERED PLUG, NON-LUBRICATED, TEFLON PACKING, THREADED OR PRESS-FIT ENDS..
 - 2.2. SIZES 2-1/2" – IRON BODY AND PLUG, NON-LUBRICATED, TEFLON PACKING, FLANGED OR PRESS-FIT ENDS.
 - 3. BALL VALVES:
 - 3.1. SIZES 2" AND SMALLER – BRONZE, TWO-PIECE BODY, FULL PORT, FORGED BRASS CHROME PLATED BALL, TEFLON SEATS AND STUFFING BOX RING, LEVER HANDLED, SOLDER, THREADED, OR PRESS FIT ENDS.
 - 3.2. SIZE 2-1/2" – CAST STEEL, TWO-PIECE BODY, FULL PORT CHROME PLATED STEEL BALL, TEFLON SEAT AND STUFFING BOX SEALS, LEVER HANDLE, FLANGED, THREADED, OR PRESS-FIT ENDS.
- C. INSTALLATION
 - 1. INSTALL ALL PIPING IN CRAFTSMANSHIP LIKE MANNER, PLUMB AND PARALLEL TO BUILDING LINES. GROUP PIPING AT COMMON ELEVATIONS WHERE PRACTICAL.
 - 2. PROVIDE CLEARANCE FOR ACCESS TO VALVES AND FITTINGS.
 - 3. INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED.
 - 4. INSTALL BALL VALVES FOR SHUT-OFF TO ISOLATE EQUIPMENT.
 - 5. INSTALL HANGERS AND SUPPORTS IN ACCORDANCE WITH MSS–SP–69 AND 89.

TEST ALL PIPING IN ACCORDANCE WITH IFGC AND UPC REQUIREMENTS.



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**ACS PALMER COURTHOUSE BOILER
REPLACEMENT**
435 S DENALI STREET
PALMIER, ALASKA 99645

REVISIONS:

DRAWN BY: SR
CHECKED BY: AJS
DATE: 11/24/2021
JOB NUMBER: M1195.00
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DRAWING TITLE:
MECHANICAL
SPECIFICATIONS

SHEET:
M002

0"
1"
2"
3"

SECTION 23 21 13 – HYDRONIC PIPING

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL, PIPING SYSTEM PRESSURE TEST RESULTS.
- B. MATERIALS:
- COPPER TUBING – ASTM B88, TYPE L, HARD DRAWN. FITTINGS: ANSI/ASME B16.18 CAST BRONZE OF ASME B16.22 WROUGHT COPPER. JOINTS: ASTM B32, SOLDER, GRADE 95TA OR ANSI/AWS A5.8, BCUF SILVER BRAZE; FLUX: ASTM B813 OR VIEGA PRO PRESS SYSTEM.
 - POLYPROPYLENE PIPING – SDR 11, IN ACCORDANCE WITH ASTM F2389. NSF 14 & 61 LISTED. PIPE AND FITTINGS SHALL BE MANUFACTURED FROM A BETA CRYSTALLINE PP-RCT RESIN MEETING THE SHORT-TERM PROPERTIES AND LONG-TERM STRENGTH REQUIREMENTS OF ASTM F 2389 AND CSA B137.11. PIPING SHALL BE EXTRUDED WITH A MIDDLE LAYER THAT HAS GLASS FIBER CONTENT TO RESTRICT THERMAL EXPANSION. ELECTRO-FUSION FITTINGS. AQUATHERM "BLUE PIPE", NUPI NIRON "CLIMA PIPE", OR APPROVED EQUAL.
 - BALL VALVES:
 - SIZES 2" AND SMALLER – BRONZE TWO-PIECE BODY, FULL PORT, FORGED BRASS, CHROME PLATED BALL, TEFLON SEATS AND STUFFING BOX RING, LEVER HANDLE. SOLDER, THREADED, OR PRESS-FIT ENDS.
 - SIZES 2-1/2" AND LARGER – CAST STEEL TWO-PIECE BODY, FULL PORT CHROME PLATED STEEL BALL, TEFLON SEAT AND STUFFING BOX SEALS, LEVER HANDLE. FLANGED, SOLDER, THREADED, OR PRESS-FIT ENDS.
 - BUTTERFLY VALVES – ONLY OVER 2", ONE PIECE WAFER, LUG OR DOUBLE FLANGED DESIGN WITH EXTENDED NECK TO ALLOW FOR 2" OF PIPING INSULATION. ASME 150 FLANGE. PROVIDED WITH TOP AND BOTTOM STEM BEARINGS CONSISTING OF A 316 STAINLESS STEEL SHELL WITH A TFE/GLASS FABRIC LINER BEARING SURFACE. EQUIPPED WITH AN EXTERNALLY ADJUSTABLE STEM PACKING SYSTEM THAT ALLOWS PACKING ADJUSTMENT WITHOUT REMOVING THE ACTUATOR. INTERNAL OVER-TRAVEL STOP SHALL BE PROVIDED TO PREVENT OVER-TRAVEL OF THE DISC AND MINIMIZE POSSIBLE SEAT DAMAGE. DISC: DISC SHALL BE HARD POLISHED FOR MINIMUM TORQUE AND MAXIMUM SEALING CAPABILITY. STEM: ONE PIECE DESIGN PROVIDED WITH BLOW OUT PROOF STEM RETENTION SYSTEM TO ASSURE FULL RETENTION OF THE STEM IN THE UNLIKELY EVENT OF AN INTERNAL STEM FAILURE. SEAT: DESIGN SHALL CONSIST OF A RESILIENT ENERGIZER TOTALLY ENCAPSULATED BY THE SEAT. SEAT RETAINER SHALL BE FULLY FACED AND FIRMLY ATTACHED BY BOLTS LOCATED OUTSIDE THE SEALING AREA TO PROTECT THEM FROM CORROSION. THE SEAT ASSEMBLY SHALL BE LOCKED IN THE BODY RECESS BY THE FULL FACED RETAINER. THE SEAT SHALL BE SELF ADJUSTING FOR WEAR AND TEMPERATURE CHANGES. THE SEAT SHALL BE EASILY FIELD REPLACEABLE. VALVE SHALL BE TESTED FOR TIGHT SHUTOFF PER API 598 REQUIREMENTS. PROVIDE WITH MULTI POSITION VALVE OPERATOR/LEVER HANDLE. BRAY/MCCANNALOK HIGH PERFORMANCE BUTTERFLY VALVE OR APPROVED EQUAL.
 - SWING CHECK VALVES:
 - SIZES 2" AND SMALLER – BRONZE SWING DISC. SOLDER, SCREWED, OR PRESS FIT ENDS.
 - SIZES 2-1/2" AND LARGER – IRON BODY, SWING DISC, RENEWABLE DISC AND SEAT, FLANGED ENDS.
 - SPRING LOADED CHECK VALVES – IRON BODY, BRONZE TRIM, STAINLESS STEEL SPRING, RENEWABLE COMPOSITION DISC. SCREWED, WAFER, OR FLANGED ENDS.
 - FLANGES, UNIONS, AND COUPLINGS – BRONZE UNIONS FOR COPPER PIPE, SOLDERED JOINTS.
 - RELIEF VALVES – BRONZE BODY, TEFLON SEAT, STAINLESS STEEL STEM AND SPRINGS, AUTOMATIC, DIRECT PRESSURE ACTUATED, CAPACITIES ASME CERTIFIED AND LABELED.
- C. INSTALLATION:
- INSTALL ALL PIPING IN CRAFTSMANSHIP LIKE MANNER, PLUMB AND PARALLEL TO BUILDING LINES. GROUP PIPING AT COMMON ELEVATIONS WHERE PRACTICAL.
 - PROVIDE CLEARANCE FOR INSTALLATION OF INSULATION AND ACCESS TO VALVES AND FITTINGS.
 - INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL, NOT INVERTED.
 - INSTALL BALL VALVES FOR SHUT-OFF TO ISOLATE EQUIPMENT.
 - PROVIDE 3/4" DRAIN VALVES AT EQUIPMENT AND PIPING LOW POINTS FOR DRAINING OF SYSTEM.
 - NO POLYPROPYLENE PIPING SHALL BE INSTALLED OR ROUTED THROUGH PLENUMS.
 - PRIOR TO FLUSHING SYSTEM, VERIFY SYSTEM IS COMPLETE. THOROUGHLY FLUSH AND CLEAN THE SYSTEM. DRAIN ALL LOW POINTS AND REMOVE AND CLEAN ANY STRAINER BASKETS. UPON COMPLETION OF FLUSHING, FEED HEATING MEDIUM INTO SYSTEM THROUGH MAKE-UP LINE WITH PRESSURE REGULATOR WHILE VENTING HIGH POINTS. SET INITIAL FILL PRESSURE TO 5 PSIG. ADJUST PRESSURE AS NECESSARY TO ACHIEVE 20 PSIG DURING SYSTEM OPERATION.

SECTION 23 51 00 – BREECHINGS, CHIMNEYS, & STACKS

- A. SUBMITTALS: SUBMIT PRODUCT DATA, SHOP DRAWINGS, AND STACK SIZING CALCULATIONS FOR APPROVAL.
- B. MATERIALS:
- TYPE A, DOUBLE WALL STACK FOR GAS FIRED EQUIPMENT – UL 103HT LISTED, NFPA 211 COMPLIANT. TYPE 430 STAINLESS STEEL INNER JACKET, 28 GAUGE. TYPE 430 STAINLESS STEEL OUTER JACKET, 28 GAUGE. MINIMUM 1" AIR SPACE BETWEEN INNER AND OUTER SHELLS. SELKIRK OR EQUAL.
- C. INSTALLATION:
- INSTALL IN ACCORDANCE WITH MANUFACTURER’S INSTRUCTIONS.
 - MAINTAIN UL LISTED MINIMUM CLEARANCE FROM COMBUSTIBLES. NO SINGLE WALL VENTS ARE PERMITTED.

SECTION 23 52 23 – CAST IRON BOILERS

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. CAST IRON BOILERS:
- CAST IRON 3-PASS, HIGH EFFICIENCY, LARGE NET OUTPUT, LOW OPERATING TEMPERATURE, DESIGNED BOILER.
 - EQUIPPED WITH A SIMPLIFIED CONTROL PANEL WITH BUILT-IN ON/OFF LIMIT, HIGH LIMIT, MANUAL RESET LIMIT AND TEMPERATURE GAUGE.
 - THREE PASS DESIGN WITH LARGE COMBUSTION CHAMBER AND HORIZONTAL FLUE PASSES WITH FINS.
 - LOW WATER OUTLET TEMPERATURE DOWN TO 85°F.
 - HINGED DOOR FOR BURNER AND FLUE ACCESS. DOORS CAN BE HINGED RIGHT OR LEFT BASED.
 - FOUR INCH INSULATION FEATURING REINFORCED FIBERGLASS WOOL.

- CONTROL PANEL. THE STANDARD CONTROL PANEL SUPPLIED IS DESIGNED FOR HEATING ONLY. THE PANEL IS EQUIPPED WITH A BOILER THERMOMETER, ON/OFF LIMIT, HIGH LIMIT AND MANUAL RESET LIMIT. CAN BE INTEGRATED EASILY WITH THIRD PARTY ENERGY MANAGEMENT SYSTEMS.
- C. BURNER:
- GAS BURNER: FORCED DRAFT TYPE FOR NATURAL GAS ADJUSTABLE COMBUSTION AIR SUPPLY, PRESSURE REGULATOR, GAS VALVES, MANUAL SHUT-OFF, INTERMITTENT SPARK OR GLOW COIL IGNITION, FLAME SENSING DEVICE, AND AUTOMATIC 100 PERCENT SHUT-OFF.
 - GAS BURNER SAFETY CONTROLS: ENERGIZE IGNITION, LIMIT TIME FOR ESTABLISHMENT OF FLAME, PREVENT OPENING OF GAS VALVE UNTIL PILOT FLAME IS PROVEN, STOP GAS FLOW ON IGNITION FAILURE, ENERGIZE BLOWER MOTOR, AND AFTER AIR FLOW PROVEN AND SLIGHT DELAY, ALLOW GAS VALVE TO OPEN.
 - CONTROLS: PRE-WIRED, FACTORY ASSEMBLED ELECTRONIC CONTROLS IN CONTROL CABINET WITH FLAME SCANNER OR DETECTOR, PROGRAMMING CONTROL, RELAYS, AND SWITCHES. PROVIDE PRE-PURGE AND POST-PURGE IGNITION AND SHUT-DOWN OF BURNER IN EVENT OF IGNITION PILOT AND MAIN FLAME FAILURE WITH MANUAL RESET.
- D. INSTALLATION:
- INSTALL PER MANUFACTURER’S DIRECTIONS.
 - SUBMIT RESULTS OF COMBUSTION TEST PRIOR TO FINAL ACCEPTANCE, INCLUDING: OVERFIRE AND FLUE COLLAR DRAFT, CO₂ (CO FOR GAS), NET STACK TEMPERATURE, SMOKE NUMBER, AND PERCENT EFFICIENCY. TESTS ARE TO BE RUN BY APPROVED TECHNICIAN SPECIALIZING IN BOILER MAINTENANCE.

SECTION 23 09 23 – DIRECT DIGITAL CONTROL SYSTEM FOR HVAC

- A. SUBMITTALS: SUBMIT ON PRODUCT DATA AND CONTROLS SHOP DRAWINGS FOR APPROVAL.
- B. DDC GENERAL REQUIREMENTS:
- THE CONTROL SYSTEM SHALL BE DESIGNED, FURNISHED, INSTALLED, TESTED, AND PLACED INTO SERVICE BY SIEMENS INDUSTRY, INC. LOCATED IN ANCHORAGE, AK. NO SUBSTITUTIONS ALLOWED.
 - PROVIDE A COMPLETE DIRECT DIGITAL CONTROL SYSTEM TO ACCOMPLISH THE SEQUENCE OF OPERATIONS. PROVIDE ALL CONTROLLERS, TEMPERATURE SENSORS, THERMOSTATS, TRANSFORMERS, WIRING AND ALL OTHER ASSOCIATED COMPONENTS. THE CONTRACTOR SHALL MAINTAIN THE EXISTING BAS SYSTEM AS OPERATIONAL DURING THE RENOVATION WORK. THE RENOVATED AREAS WILL BE BROUGHT ONLINE AND CONNECTED TO THE EXISTING BAS SERVER TO ALLOW MONITORING AND CONTROL OF THE SYSTEM AT THE HEAD END SERVER. THE DDC SYSTEM SHALL BE COMPLETE WITH GRAPHICS DISPLAYING EQUIPMENT, INDICATIONS, AND ALARMS AS NOTED IN THE SEQUENCE OF OPERATIONS.
- C. MATERIALS:
- EMERGENCY BOILER SHUTDOWN – CONTACT PUSHBUTTON WITH 60 MILLIMETER DIAMETER RED MUSHROOM HEAD, MOUNTED ON STAINLESS STEEL 1-GANG PLATE IN RECESSED BOX. MOUNT RED ENGRAVED NAMEPLATE WITH WHITE LETTERS THAT READS "BOILER EMERGENCY STOP" ON FACEPLATE OR WALL ABOVE BUTTON. PROVIDE NO OR NC CONTACT BLOCKS AS REQUIRED TO PERFORM THE SPECIFIED SEQUENCE OF OPERATION. KELE "ST120" OR APPROVED EQUAL.
 - VARIABLE FREQUENCY DRIVES – PROVIDE A COMPLETE VARIABLE FREQUENCY DRIVE (VFD) CONSISTING OF A PULSE WIDTH MODULATED (PWM) INVERTER DESIGNED FOR USE WITH BOTH ASYNCHRONOUS AND PERMANENT MAGNET MOTORS. THE DRIVE MANUFACTURER SHALL SUPPLY THE DRIVE AND ALL NECESSARY OPTIONS AS NOTED IN THE SCHEDULES AND SPECIFICATIONS.
 - DRIVES SHALL BE UL LISTED AS A COMPLETE ASSEMBLY; THE BASE VFD SHALL BE UL LISTED.
 - DROVES SHALL BE ENCLOSED IN A UL TYPE ENCLOSURE.
 - THE DRIVE SHALL PROVIDE FULL RATED OUTPUT FROM A LINE OF +10% TO -15% OF NOMINAL VOLTAGE ACROSS AN AMBIENT TEMPERATURE RANGE OF 5°F TO 104°F.
 - IF MORE THAN ONE DRIVE IS PROVIDED, ALL SHALL UTILIZE THE SAME USER INTERFACE. USER INTERFACE SHALL BE AN EASILY REMOVABLE AND REMOTE MOUNTED ADVANCED CONTROL PANEL WITH DISPLAY AND KEYPAD FOR I/O PROGRAMMING COMPLETE WITH BLUETOOTH COMMUNICATION.
 - ON-BOARD HARDWARE SHALL INCLUDE 2 ANALOG OUTPUTS, 2 ANALOG INPUTS, 6 PROGRAMMABLE DIGITAL INPUTS, 3 PROGRAMMABLE FORM-C RELAY OUTPUTS, ISOLATED USB PORT FOR INTERFACE WITH PORTABLE EQUIPMENT, 24VDC AUXILIARY POWER SUPPLY, INTERNAL IMPEDANCE TO REDUCE POWER LINE HARMONICS, AND VARIABLE SPEED COOLING FANS.
 - THE DRIVE SHALL BE RATED FOR USE IN REMOTE LOCATED SETUPS.
 - THE DRIVE SHALL HAVE AN EIA-485 PORT WITH REMOVABLE TERMINAL BLOCKS. ONBOARD COMMUNICATIONS PROTOCOLS SHALL INCLUDE AT A MINIMUM BACNET MS/TP AND SHALL BE CAPABLE OF COMMUNICATING AT LEAST TWO PROTOCOLS SIMULTANEOUSLY.
 - DRIVE SHALL BE PROVIDED WITH A DOOR/COVER INTERLOCKED DISCONNECT SWITCH.
 - THE DRIVE SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO INSTALL AND PROVIDE THE ELECTRICAL CONNECTIONS NECESSARY AS REQUIRED BY THE MANUFACTURERS INSTALLATION INSTRUCTIONS.

- D. INSTALLATION:
- CONTROL CONTRACTOR SHALL PROVIDE (11X17) SCHEMATIC CONTROL DIAGRAMS IN AUTOCAD FORMAT. CLEARLY INDICATE WIRE AND TERMINAL LABELS, SET POINTS, RESET SCHEDULES, SWITCH OVER POINTS, SIGNAL RANGES, AND OTHER POINTS REQUIRED TO COMPLETELY DESCRIBE THE SYSTEM. DEPICT CIRCUITRY ON SCHEMATIC CONTROL DIAGRAMS TO ALLOW CIRCUITS TO BE TRACED FROM CONNECTION TO CONNECTION. INSTALL ALL WIRING IN ACCORDANCE WITH THE NEC.
 - TEST ALL SYSTEMS; VERIFY ALL SYSTEMS OPERATE AS SPECIFIED IN THE SEQUENCE OF OPERATIONS AND RECORD INITIAL SETTINGS AND OPERATING POINTS IN O&M MANUALS. PROVIDE OPERATOR INTERFACE TO ALLOW FOR LOCAL SCHEDULE ADJUSTMENT, SETPOINT ADJUSTMENT, AND SYSTEM MONITORING.
 - INSTALL THERMOMETERS AND PRESSURE GAUGES WHERE INDICATED ON SCHEMATICS AND PLANS. INSTALL IN LOCATIONS WHERE THEY CAN BE EASILY READ BY MAINTENANCE PERSONNEL.
 - ALL CONTROLLERS, SWITCHES, RELAYS, THERMOSTATS, SENSORS, AND ACTUATORS SHALL BE PERMANENTLY TAGGED FOR IDENTIFICATION TO MATCH THE EXISTING FACILITY IDENTIFICATION SCHEME. THE TAGGING SCHEME SHALL BE REFLECTED ON THE CONTROL DRAWINGS.
 - THE CONTRACTOR WILL COMPLETELY CHECK-OUT, CALIBRATE, AND TEST ALL CONNECTED HARDWARE AND SOFTWARE TO ENSURE THAT THE SYSTEM PERFORMS IN ACCORDANCE WITH THE APPROVED SPECIFICATIONS AND SEQUENCE OF OPERATIONS.
 - TRAINING – INSTRUCT OWNERS REPRESENTATIVE(S) IN THE OPERATION, CARE, AND MAINTENANCE OF ALL SYSTEMS AND EQUIPMENT PROVIDED. PROVIDE CONTROL SYSTEMS DEMONSTRATIONS AND MINIMUM 4 HOURS OF HANDS ON TRAINING TO OWNERS REPRESENTATIVE(S) PRIOR TO SUBSTANTIAL COMPLETION.

SEQUENCE OF OPERATIONS

HEATING SYSTEM – B-1,2 BP-1,2 PMP-1A,1B:

- A. ALARMS:
- LOW SUPPLY HEATING GLYCOL TEMPERATURE
 - LOW SYSTEM PRESSURE
 - BOILER FAILURE
 - BOILER CIRC PUMP FAILURE
 - BUILDING CIRCULATION PUMP FAILURE
 - BOILER EMERGENCY SHUTDOWN
- B. THE DDC SHALL MONITOR THE FOLLOWING POINTS:
- OUTSIDE AIR TEMPERATURE
 - SUPPLY HEATING GLYCOL TEMPERATURE
 - RETURN HEATING GLYCOL TEMPERATURE
 - BOILER SUPPLY SETPOINT
 - BOILER STATUS
 - BOILER CIRCULATION PUMP STATUS
 - BP-1,2 START/STOP
 - BP-1,2 STATUS
 - PMP-1A,B START/STOP
 - PMP-1A,B STATUS
- C. AUTOMATED CONTROL:
- | | OUTSIDE TEMPERATURE | LOOP HGS TEMPERATURE |
|--|---------------------|----------------------|
| | 0 DEG F | 180 DEG F |
| | 65 DEG F | 150 DEG F |
- DDC SHALL OPERATE BOILER PUMPS, BP-1/2, WHENEVER ASSOCIATED BOILER IS FIRING. BOILER PUMP SHALL START BEFORE BOILER FIRES AND CONTINUE TO RUN FOR 3 MINUTES AFTER THE BURNER SHUTS OFF.
 - DDC SYSTEM SHALL OPERATE ~~PMP-1A,1B~~ IN LEAD-LAG FASHION. ROTATE LEAD PUMP EVERY WEEK OF OPERATION. PUMP SHALL OPERATE VIA VFD TO MAINTAIN DIFFERENTIAL PRESSURE IN EACH OF THE THREE MAIN LOOPS. LOCATE DIFFERENTIAL PRESSURE SENSORS NEAR THE END OF EACH LOOP.
 - PROVIDE RED MUSHROOM PUSH BUTTON SWITCH FOR EMERGENCY SHUT-DOWN OF BOILERS. INTERLOCK SWITCH TO SHUT DOWN BOTH BOILERS. LABEL SWITCH "EMERGENCY BOILER SHUTDOWN".



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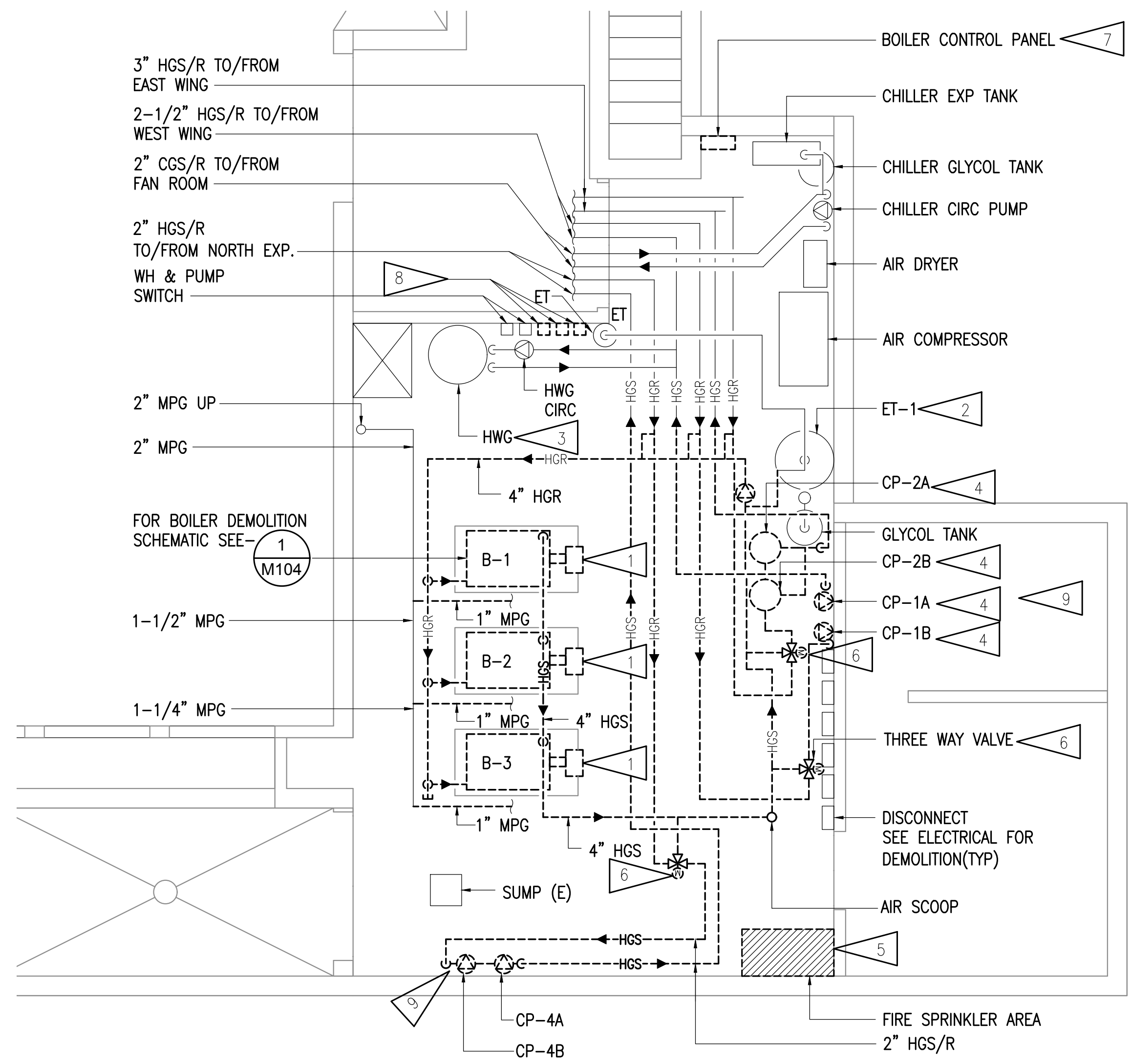
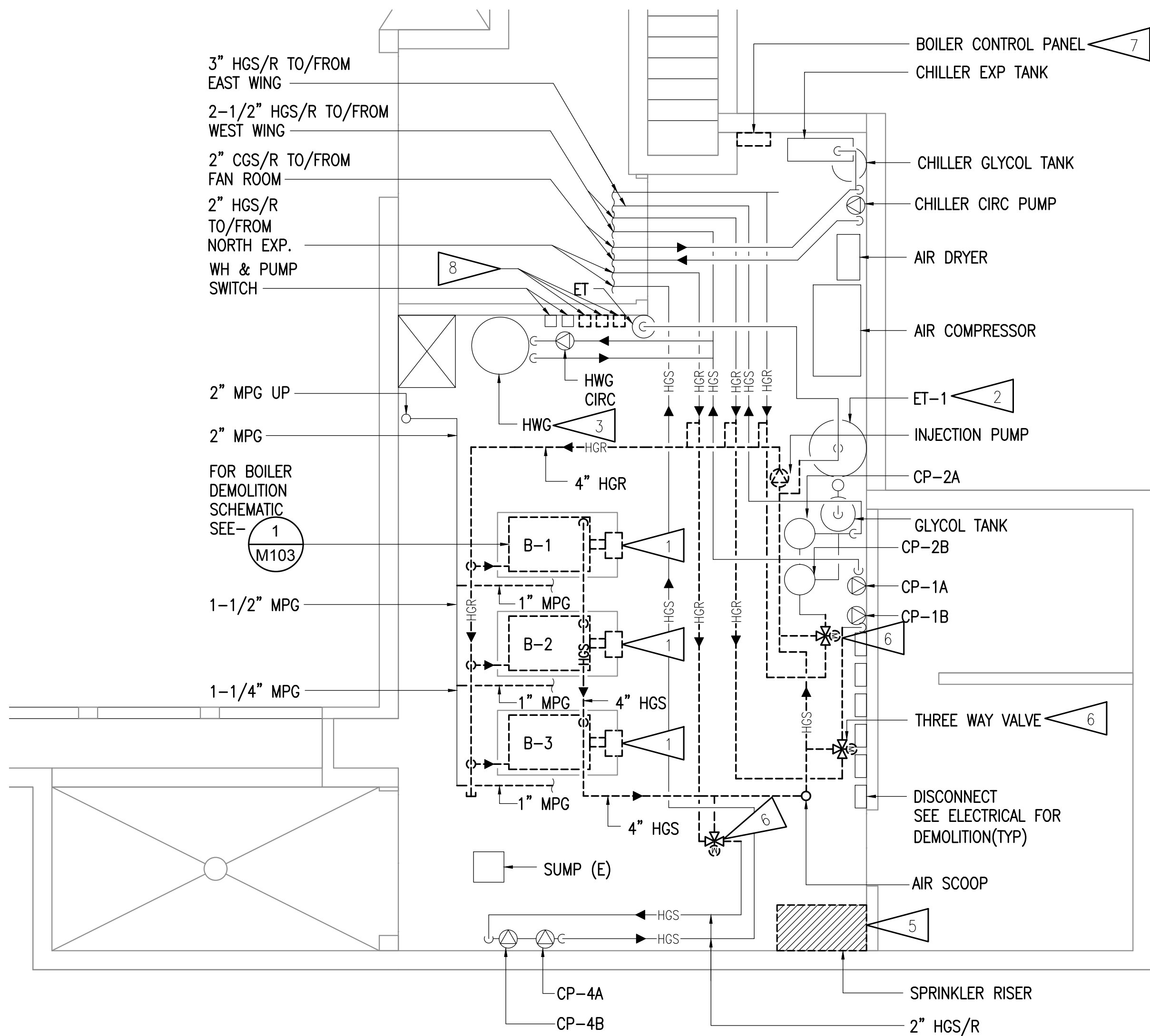
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MECHANICAL
SPECIFICATIONS

SHEET:

M003

0"
1"
2"
3"



1 BOILER ROOM HEATING DEMOLITION PLAN
1/4" = 1'-0"

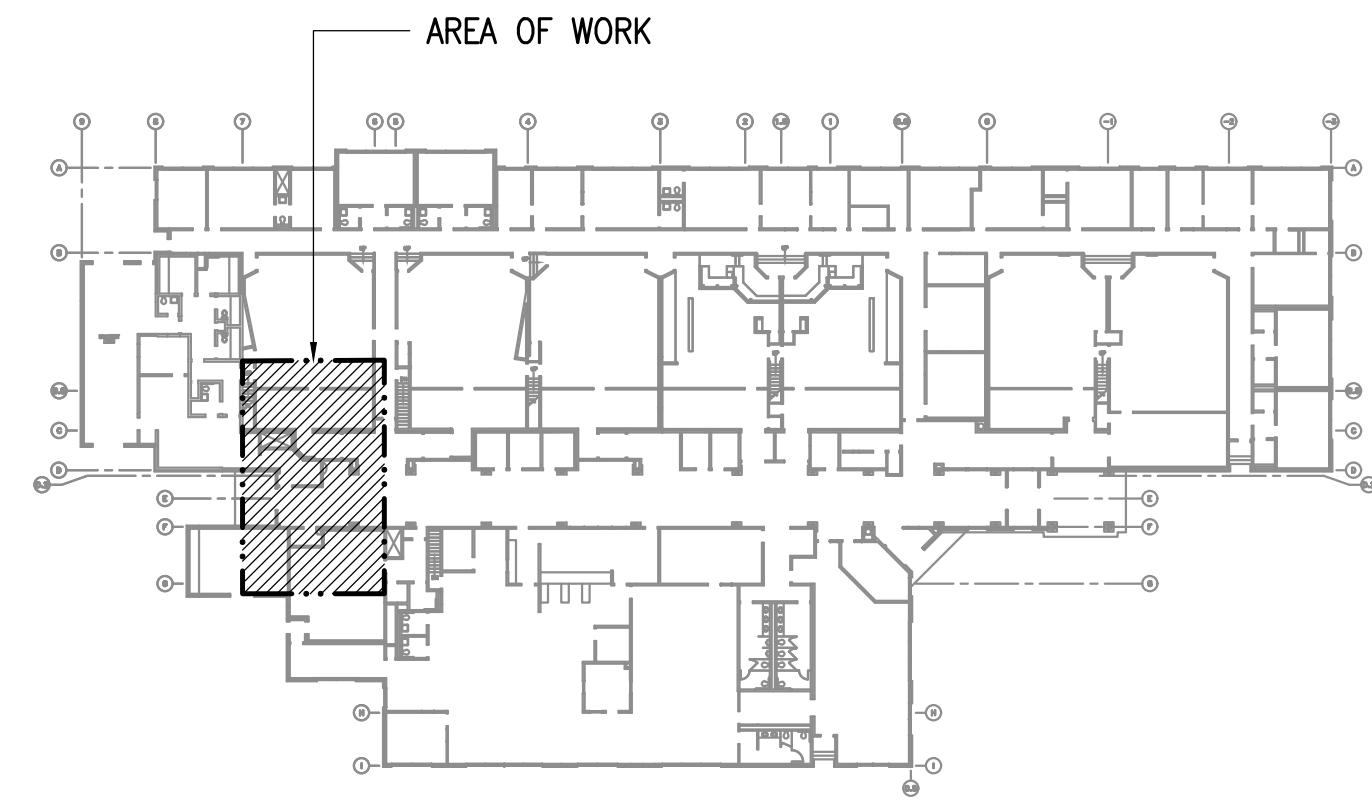
2 BOILER ROOM HEATING DEMOLITION PLAN - ALTERNATE
1/4" = 1'-0"

SHEET NOTES:

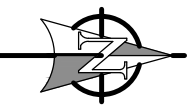
- 1 DEMOLISH BOILER, BURNER, PIPING AND ALL ASSOCIATED APPURTENANCES.
- 2 EXPANSION TANK (ET-1) TO REMAIN FOR REUSE.
- 3 HOT WATER GENERATOR, TEMPERING VALVE, HOT WATER RECIRCULATION PUMP, HOT WATER EXPANSION TANK TO REMAIN.
- 4 DEMOLISH HEATING CIRCULATION PUMPS AND ALL ASSOCIATED APPURTENANCES.
- 5 WATER SERVICE ENTRANCE, ASSOCIATED PIPING, AND APPURTENANCES TO REMAIN.
- 6 DEMOLISH 3 WAY VALVE AND ASSOCIATED APPURTENANCES.
- 7 DEMOLISH BOILER CONTROL PANEL AND ALL ASSOCIATED WIRING.
- 8 DEMOLISH BOILER-1,2,3 SHUTDOWN SWITCHES, SEE ELECTRICAL.
- 9 DETERMINE MAXIMUM PUMP FLOW PRIOR TO DEMOLISHING PUMPS. REFER TO SPECIFICATIONS ON M002.

GENERAL NOTES:

- A. THE INFORMATION SHOWN ON THIS DRAWING IS TAKEN FROM AS BUILT DRAWINGS AND A NON-DESTRUCTIVE WALK THROUGH OF THE FACILITY. THERE IS NO WARRANTY OR GUARANTEE AS TO THE ACCURACY OF THE INFORMATION SHOWN HERE-IN. THE CONTRACTOR SHALL FIELD VERIFY ALL ITEMS SCHEDULED FOR DEMOLITION PRIOR TO START OF WORK.
- B. THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL SALVAGEABLE MATERIALS THE CONTRACTOR SHALL DELIVER SALVAGED MATERIALS TO A LOCATION AS DIRECTED BY THE OWNER IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- C. DASHED OR DOTTED LINES INDICATE ITEMS TO BE REMOVED. SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.



KEY PLAN
NO SCALE



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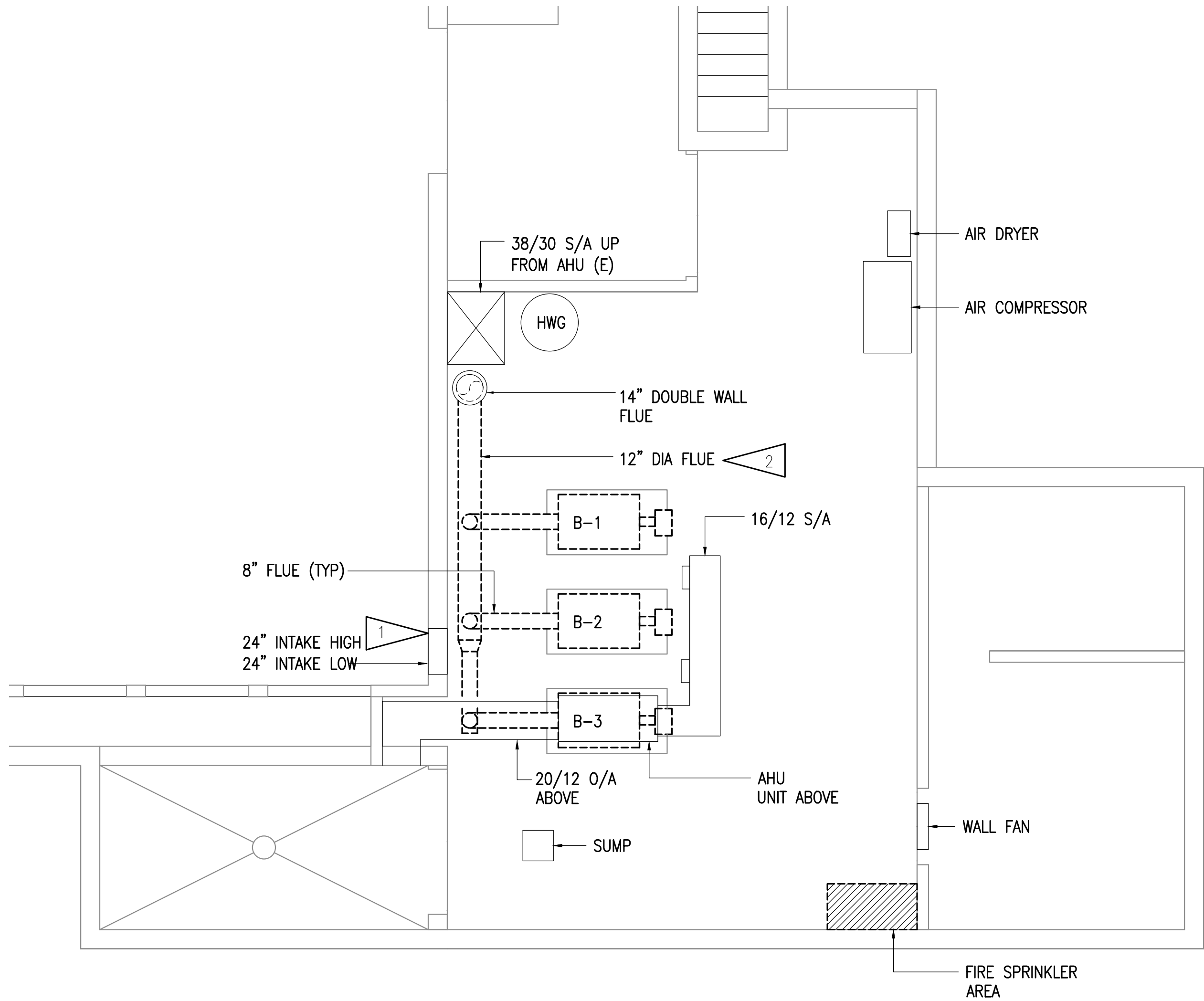
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BOILER ROOM DEMOLITION PLANS

SHEET:
M101

0"
1"
2"
3"



1 BOILER ROOM VENTILATION AND GAS DEMOLITION PLAN

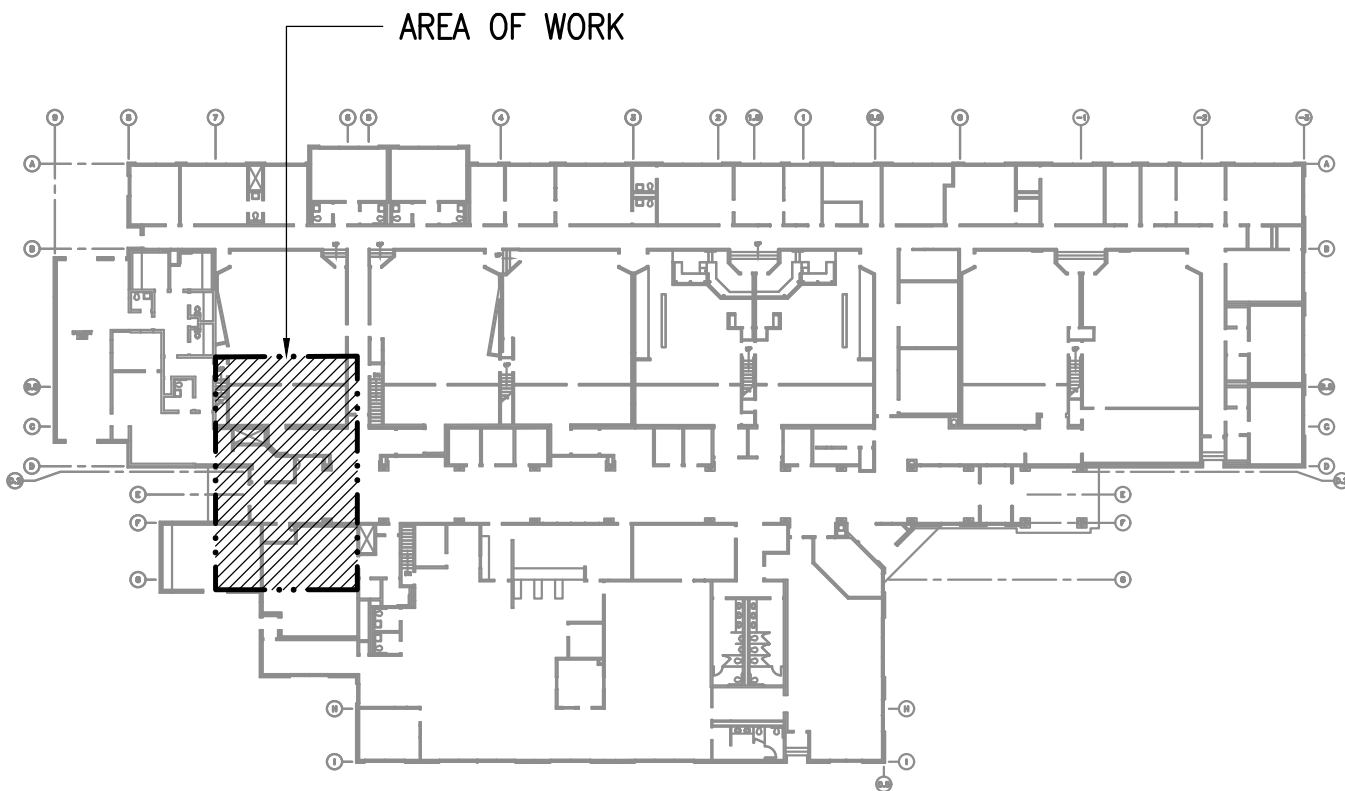
1/4" = 1'-0"

SHEET NOTES:

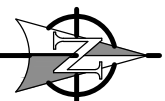
- 1 COMBUSTION AIR INTAKES DUCTWORK TO REMAIN.
- 2 DEMOLISH BOILER FLUE AND ALL ASSOCIATED APPURTENANCES UP TO CHIMNEY.

GENERAL NOTES:

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BOILER ROOM VENTILATION DEMOLITION PLAN

SHEET:
M102



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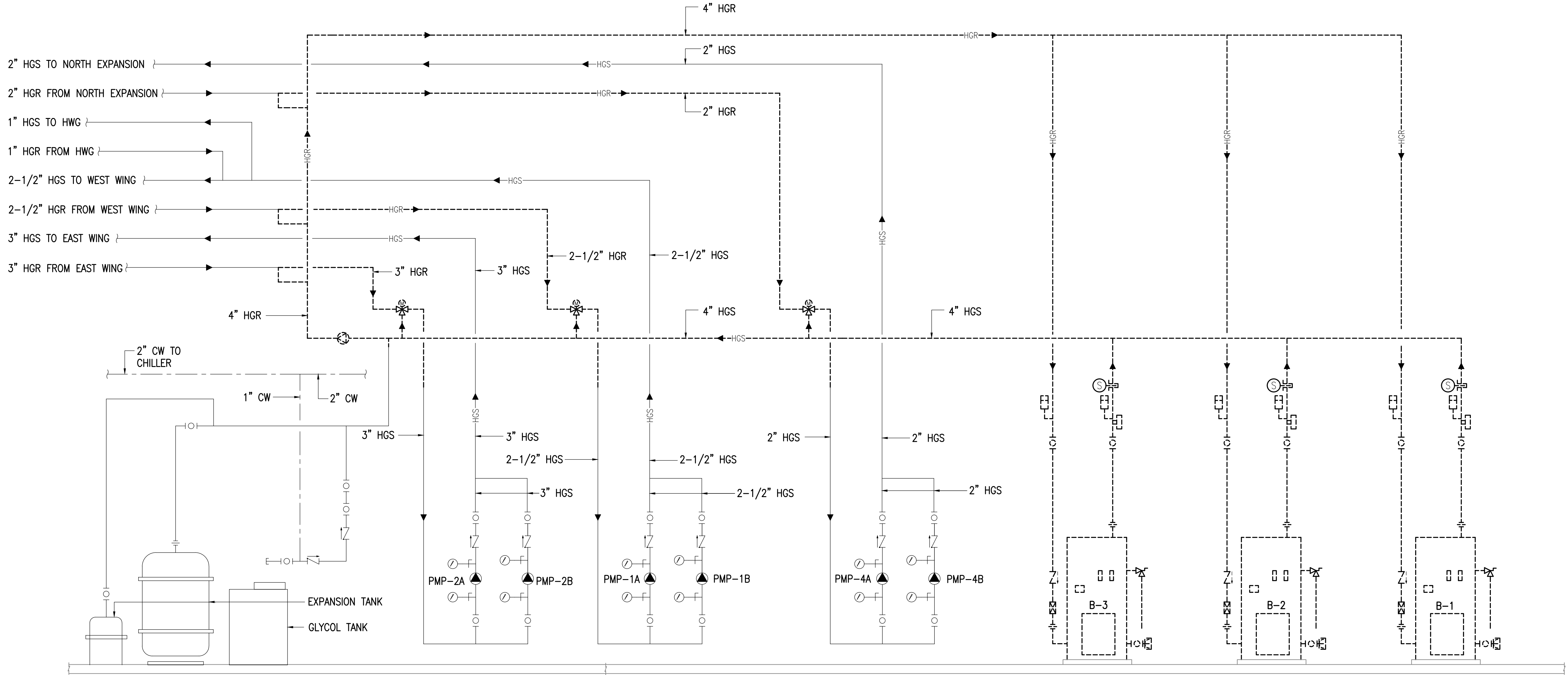
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DRAWING TITLE:
BOILER ROOM
DEMOLITION
SCHEMATIC

SHEET:
M103

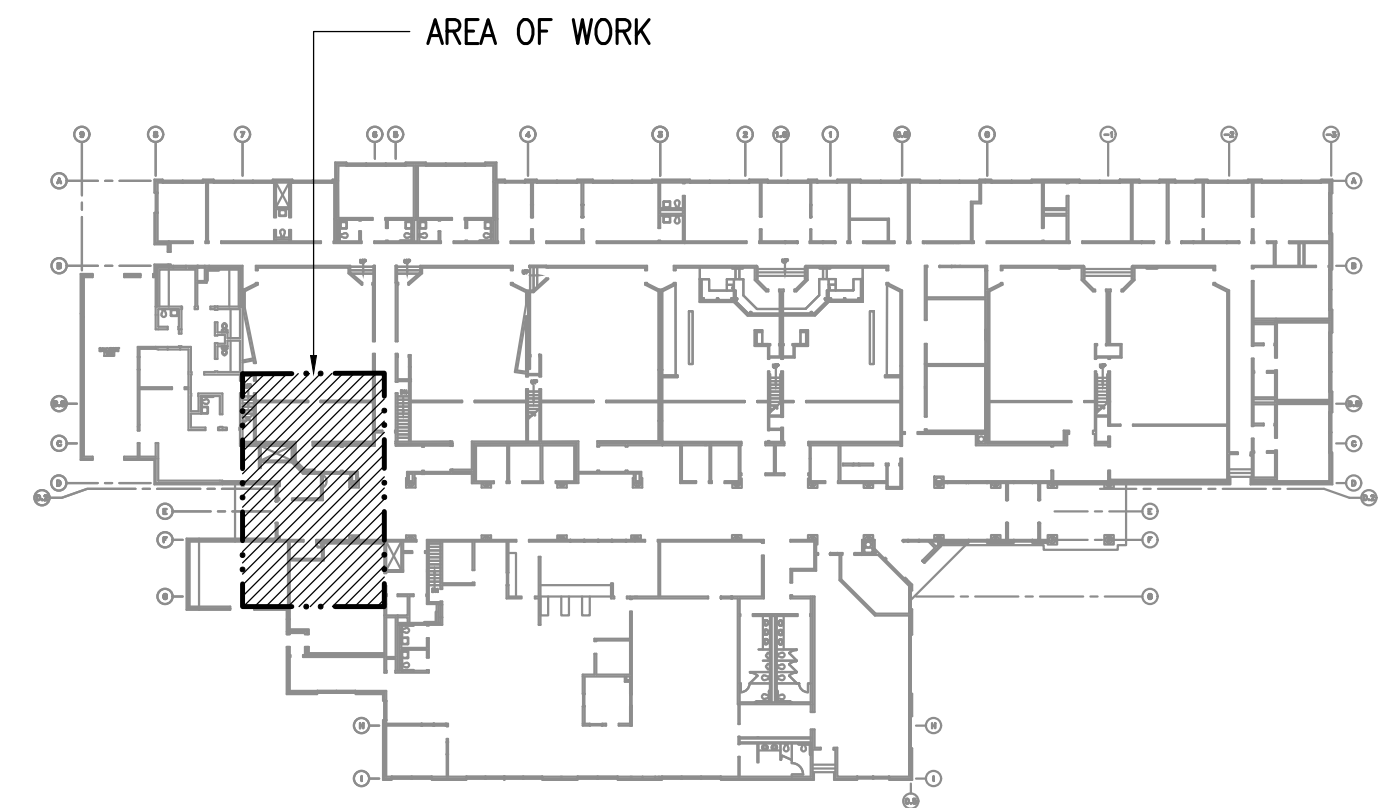


1 BOILER PIPING DEMOLITION SCHEMATIC

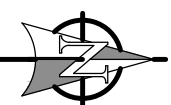
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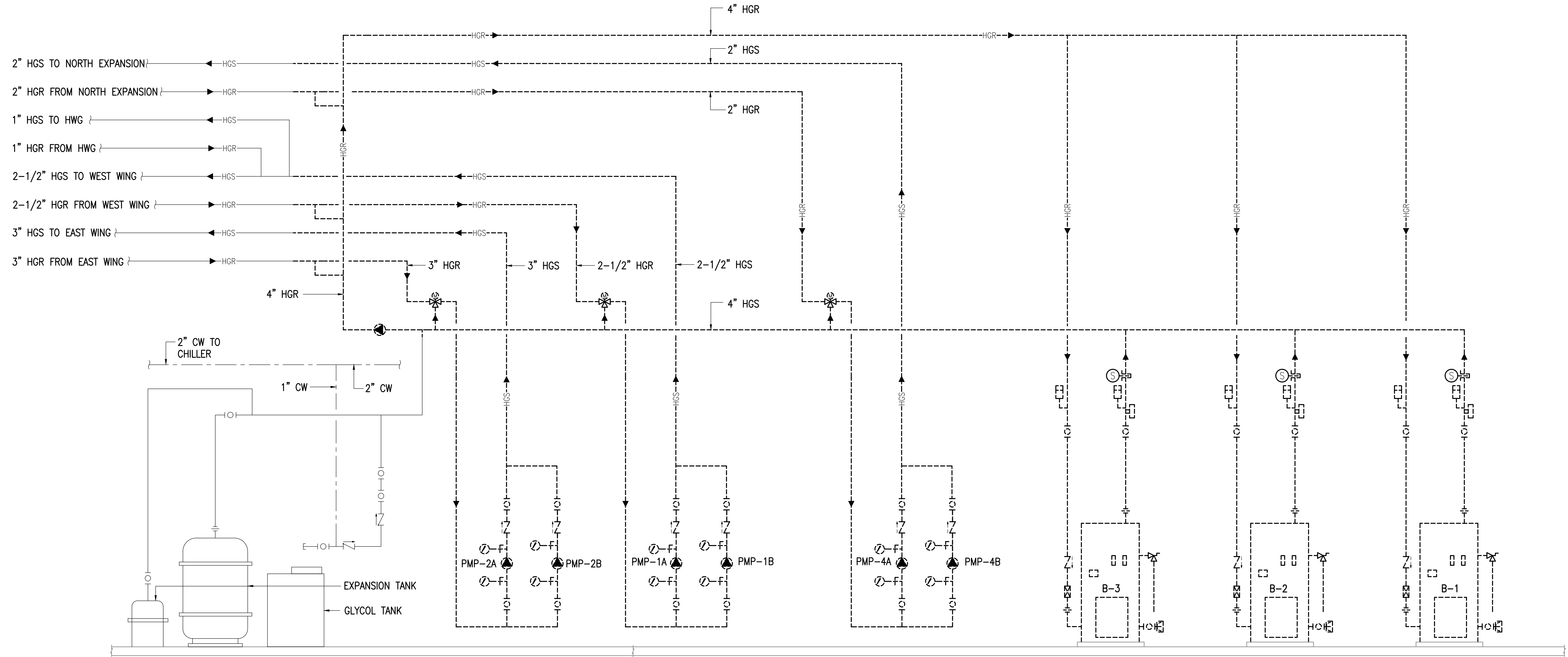
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BOILER ROOM
DEMOLITION
SCHEMATIC -
ALTERNATE

SHEET:
M104

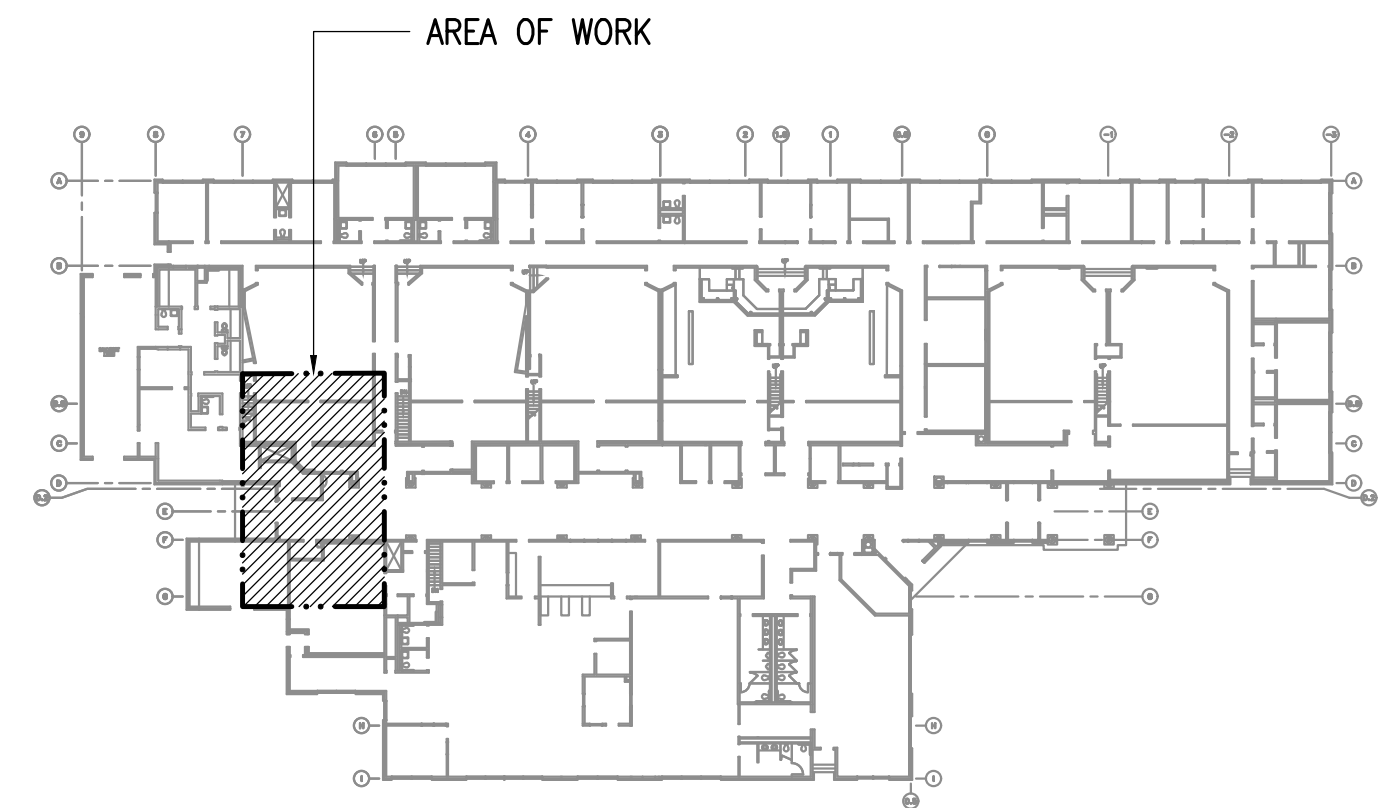


1 BOILER PIPING DEMOLITION SCHEMATIC - ALTERNATE

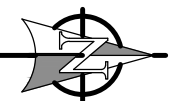
NO SCALE

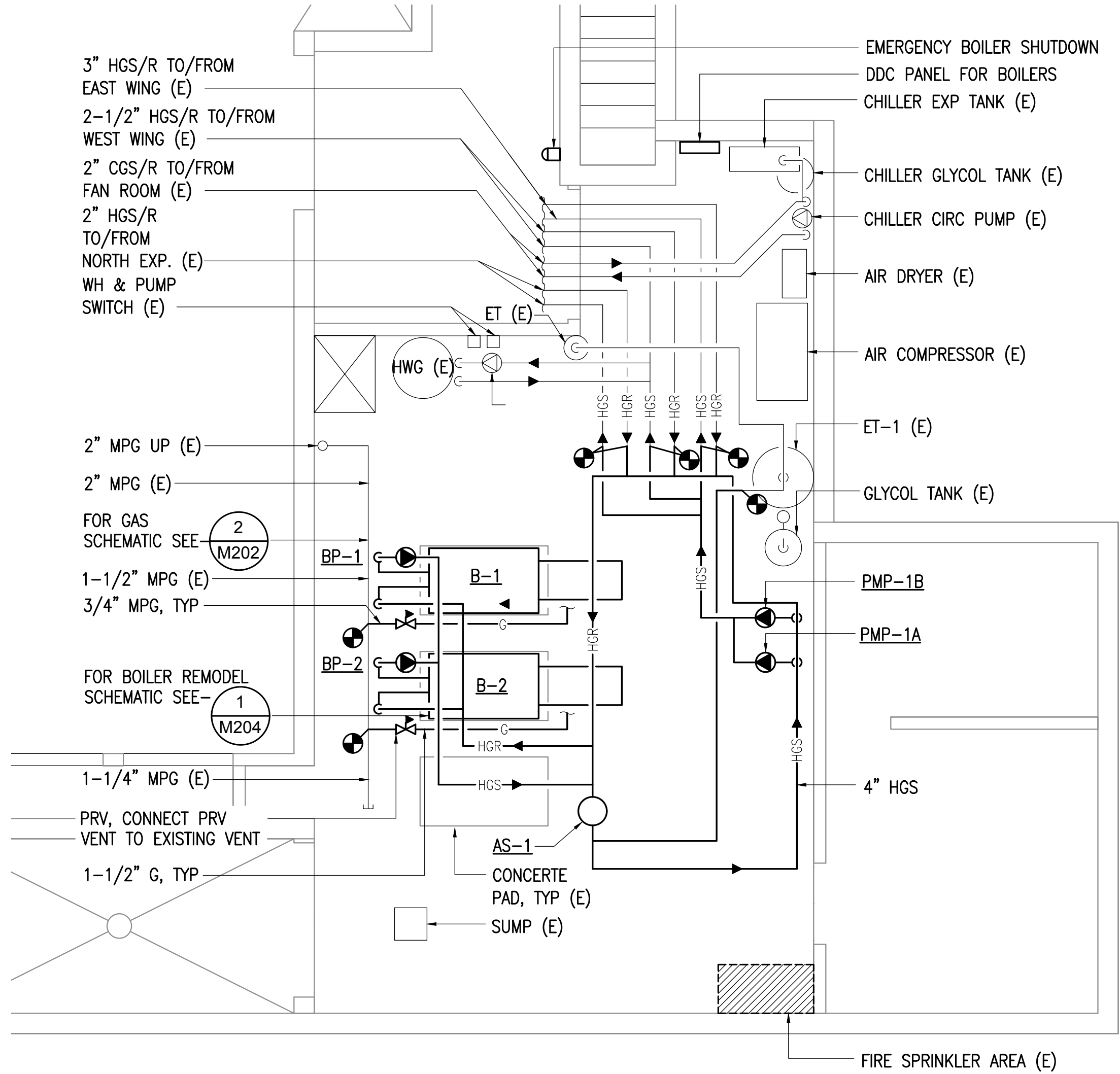
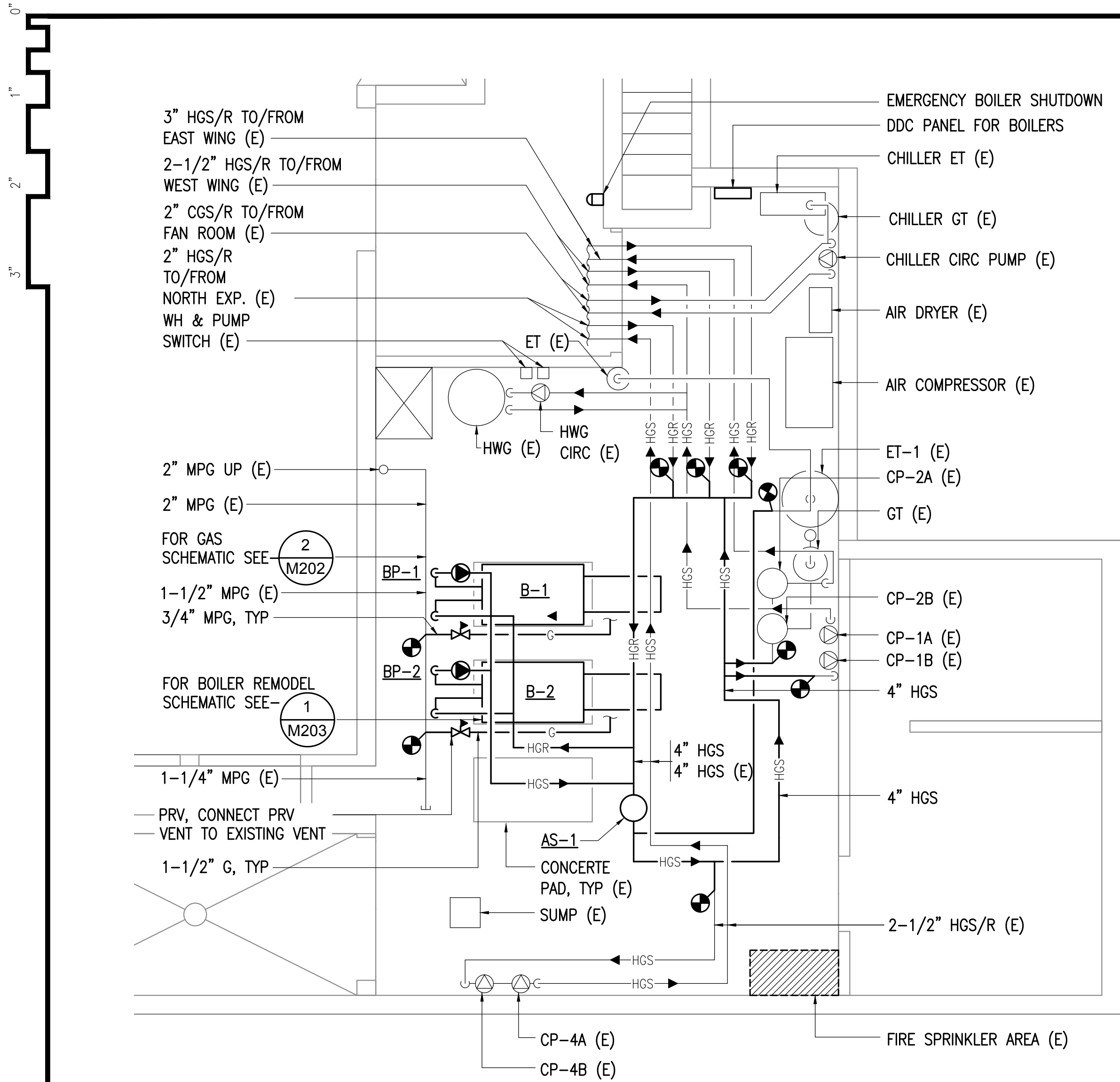
GENERAL NOTES:

- THE INFORMATION SHOWN ON THIS DRAWING IS TAKEN FROM AS BUILT DRAWINGS AND A NON-DESTRUCTIVE WALK THROUGH OF THE FACILITY. THERE IS NO WARRANTY OR GUARANTEE AS TO THE ACCURACY OF THE INFORMATION SHOWN HERE-IN. THE CONTRACTOR SHALL FIELD VERIFY ALL ITEMS SCHEDULED FOR DEMOLITION PRIOR TO START OF WORK.
- THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL SALVAGEABLE MATERIALS. THE CONTRACTOR SHALL DELIVER SALVAGED MATERIALS TO A LOCATION AS DIRECTED BY THE OWNER IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- DASHED OR DOTTED LINES INDICATE ITEMS TO BE REMOVED. SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.



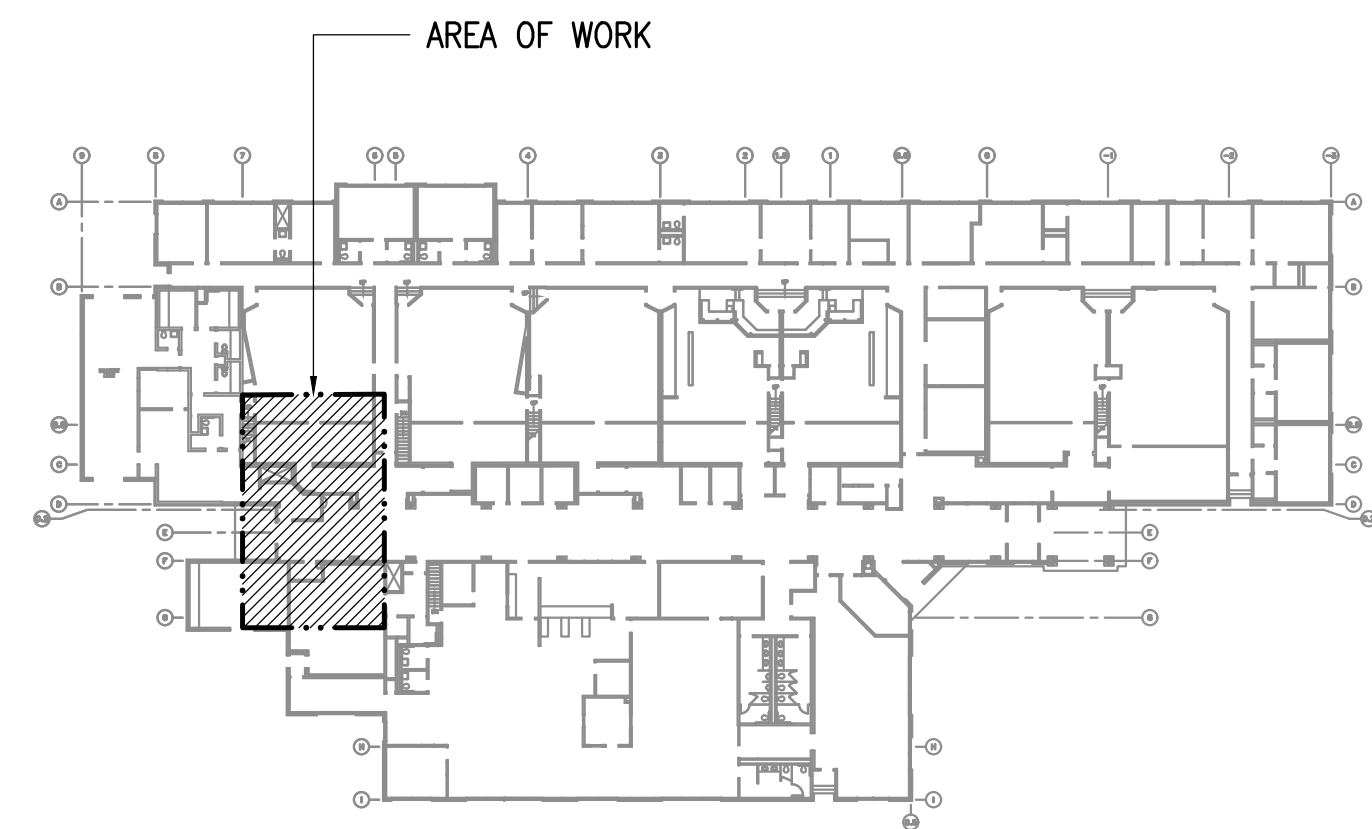
KEY PLAN
NO SCALE



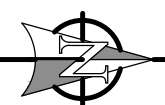


1 BOILER ROOM HEATING REMODEL PLAN
1/4" = 1'-0"

2 BOILER ROOM HEATING REMODEL PLAN - ALTERNATE
1/4" = 1'-0"



KEY PLAN
NO SCALE



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Phone (907) 276-0521
Corporate No.: AECC542

ACS PALMER COURTHOUSE BOILER REPLACEMENT

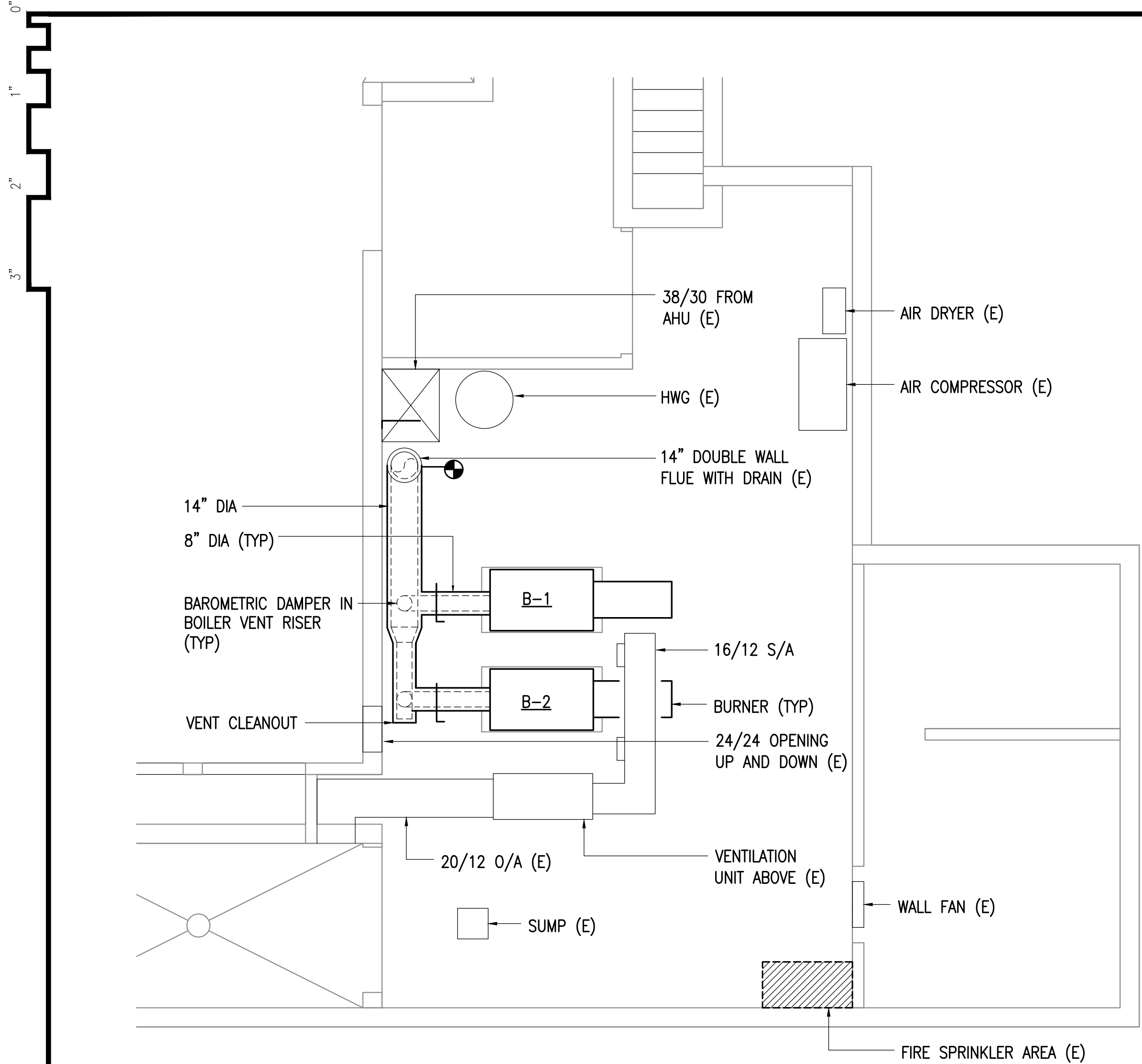
435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

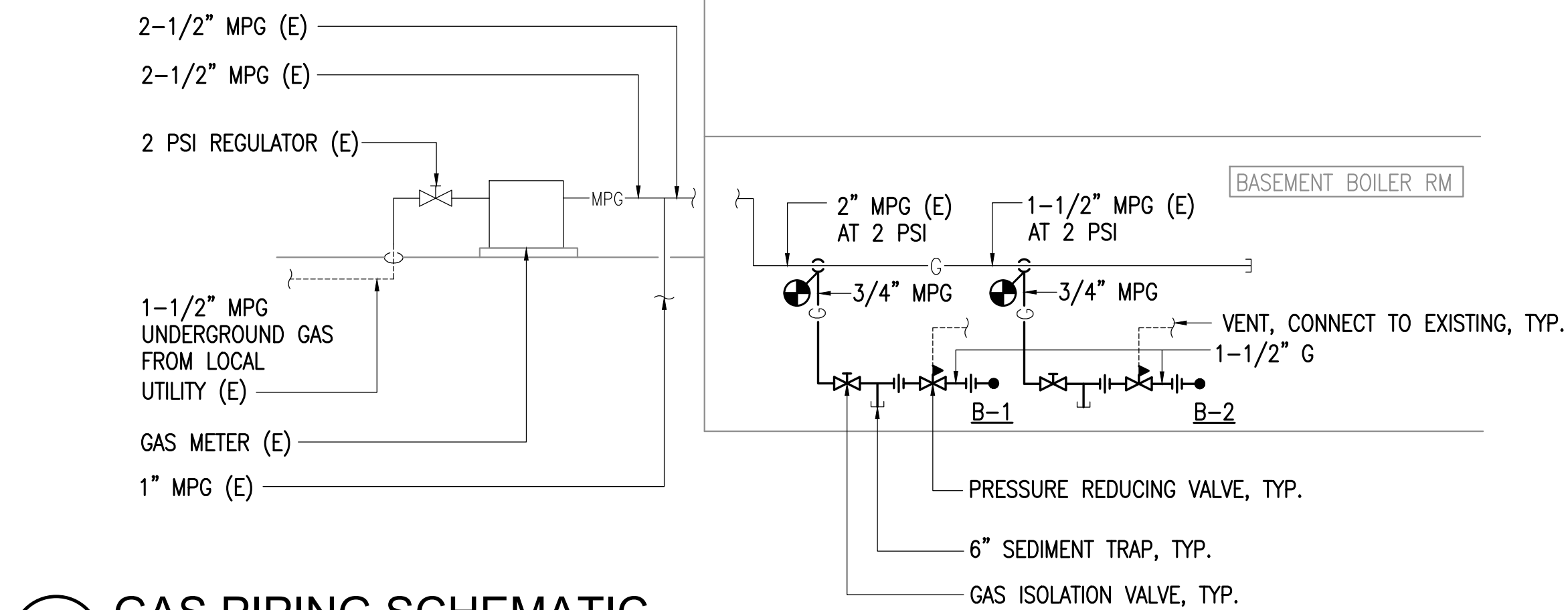
DRAWN BY: SR
CHECKED BY: AJS
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: MSERIES

DRAWING TITLE:
BOILER ROOM
REMODEL PLANS

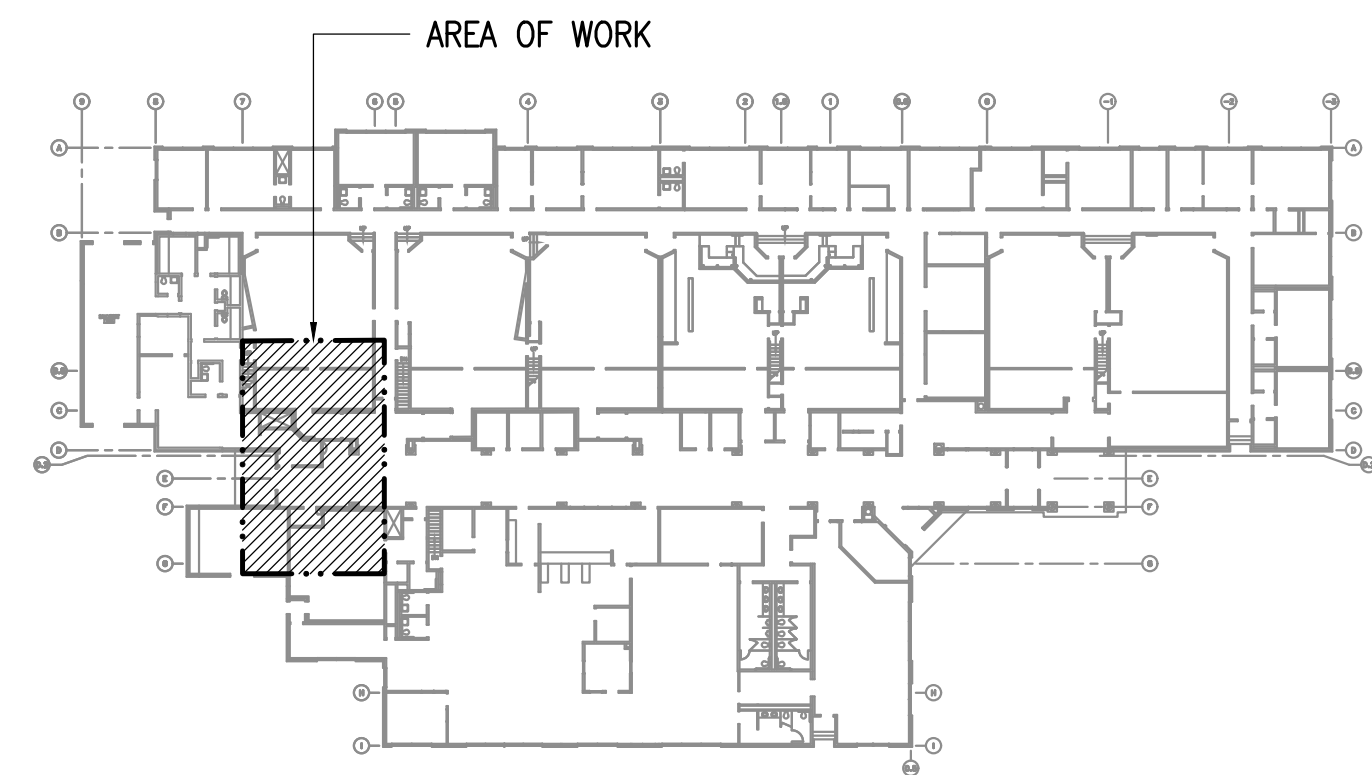
SHEET:
M201



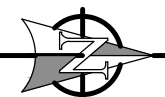
1 BOILER ROOM VENTILATION REMODEL PLAN
1/4" = 1'-0"



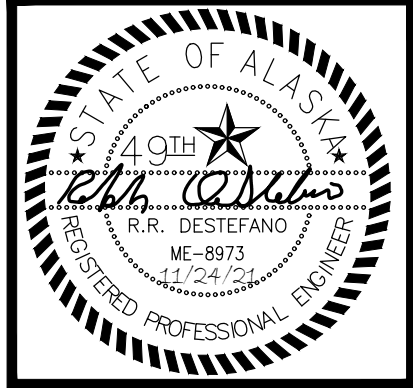
2 GAS PIPING SCHEMATIC
NO SCALE



KEY PLAN
NO SCALE



REMOVED LOAD	
BOILER, B-1,2	: 794 CFH
BOILER, B-3	: 783 CFH
TOTAL REMOVED LOAD	: 2371 CFH
GAS PIPING SIZED IN ACCORDANCE WITH 2018 UPC TABLE 1215.2(4) AND 1215.2(1)	
NEW BOILER B-1	: 1442 CFH
NEW BOILER B-2	: 1442 CFH
TOTAL ADDED LOAD	: 2884 CFH
TOTAL DEVELOPED LENGTH:	: 40 FT



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ACS PALMER COURTHOUSE BOILER REPLACEMENT
435 S DENALI STREET
PALMER, ALASKA 99645

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DRAWING TITLE:
BOILER ROOM VENTILATION REMODEL PLAN

SHEET:
M202



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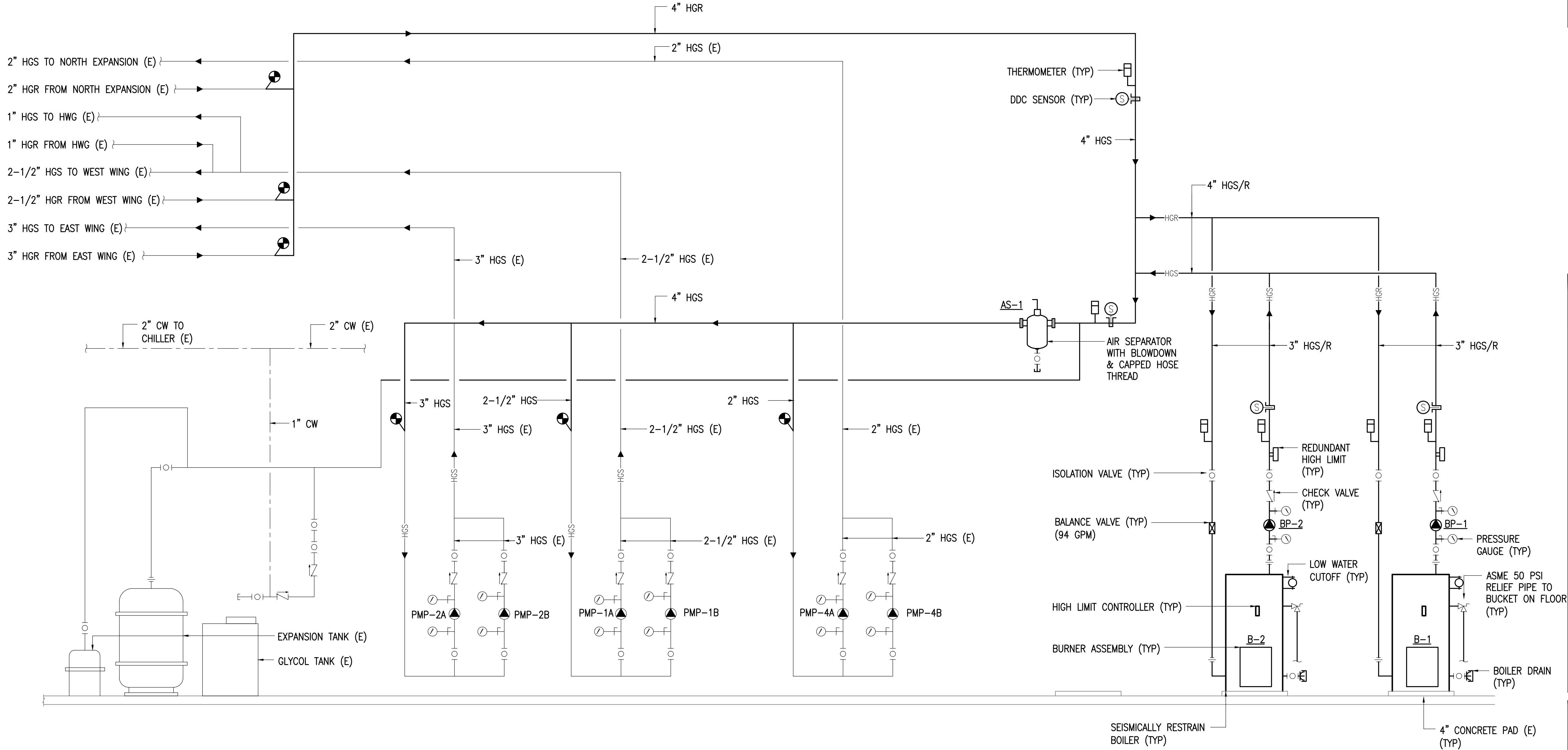
ACS PALMER COURTHOUSE BOILER REPLACEMENT
435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

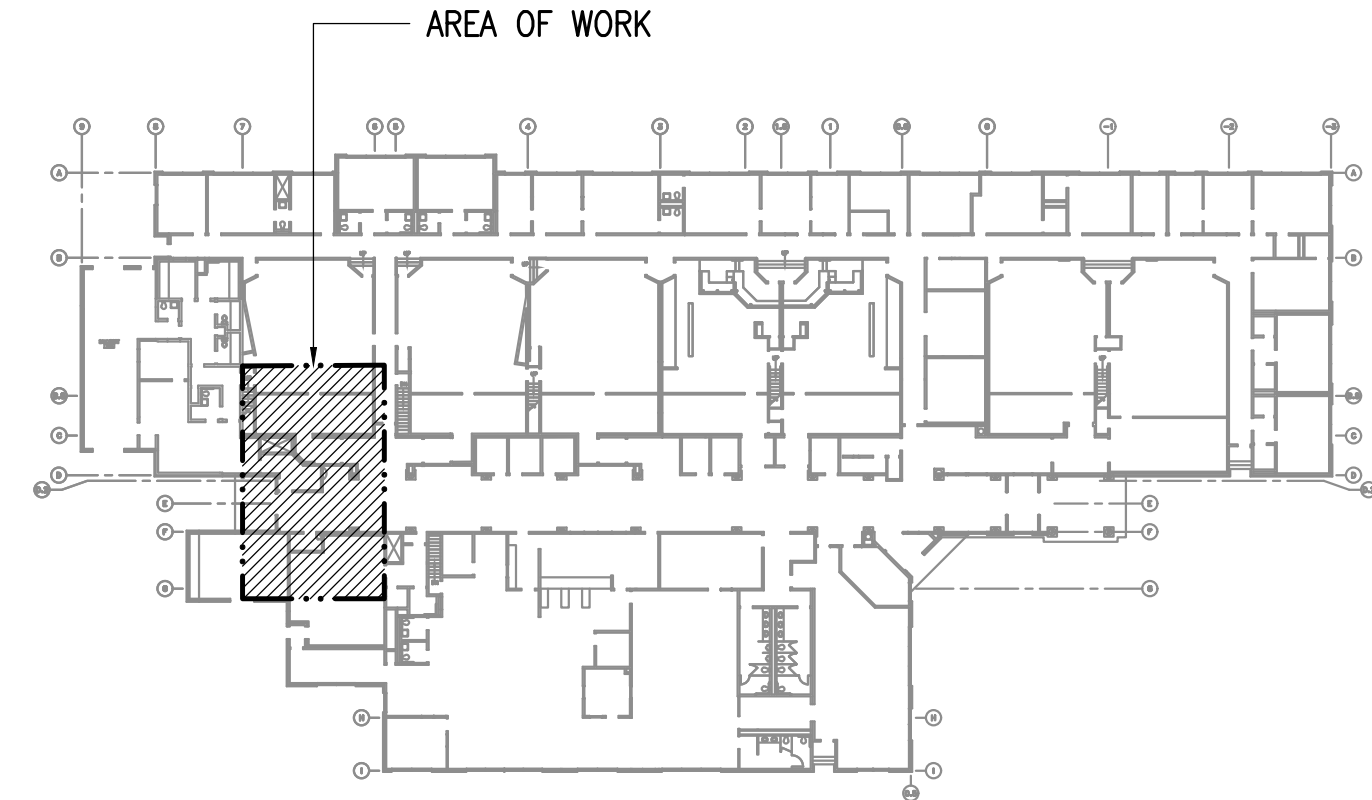
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CHECKED BY: AJS
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: MSERIES

DRAWING TITLE:
BOILER ROOM
REMODEL
SCHEMATIC

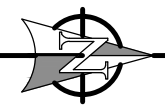
SHEET:
M203



1 BOILER PIPING REMODEL SCHEMATIC
NO SCALE



KEY PLAN
NO SCALE





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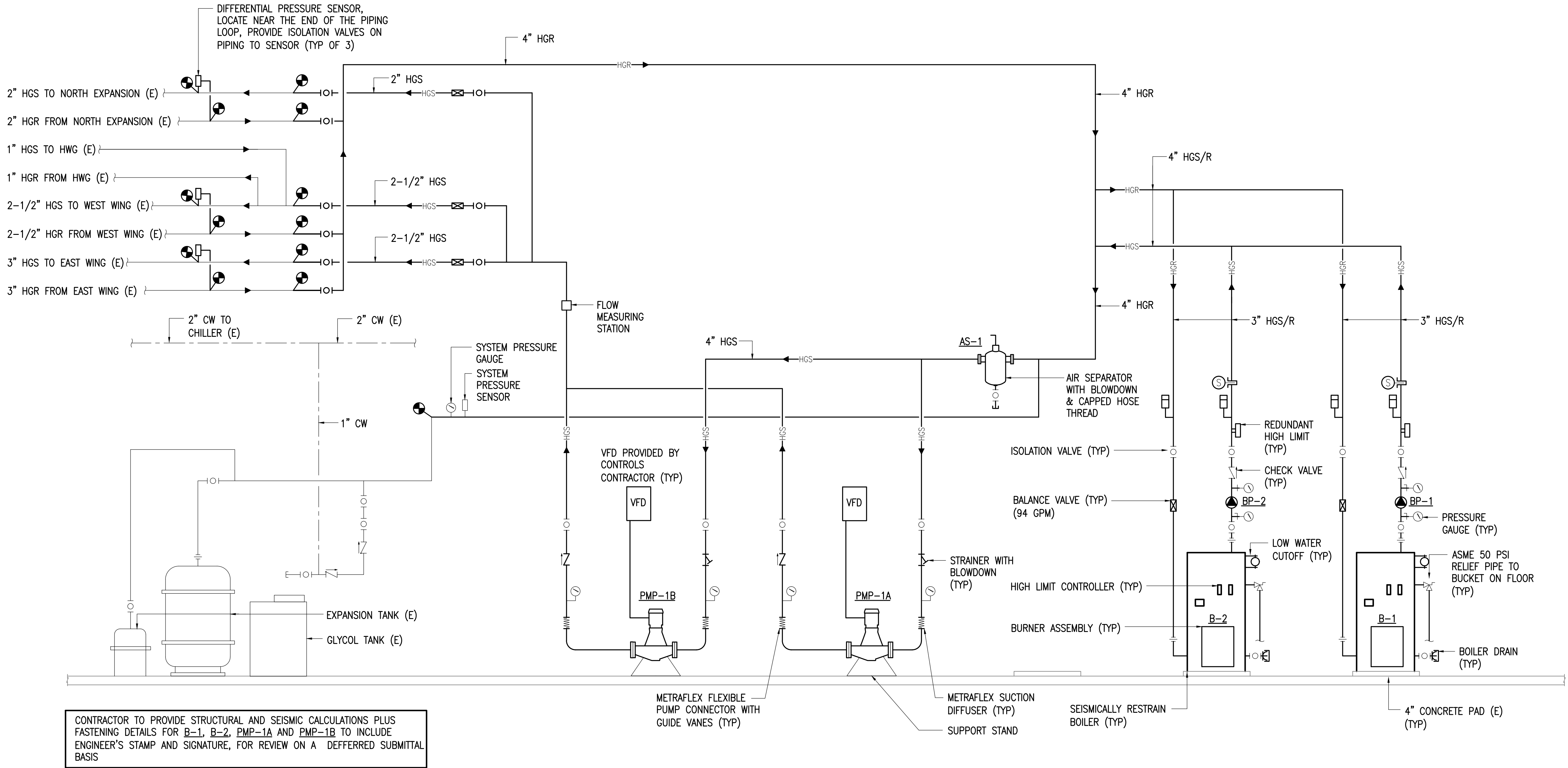
ACS PALMER COURTHOUSE BOILER REPLACEMENT
435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

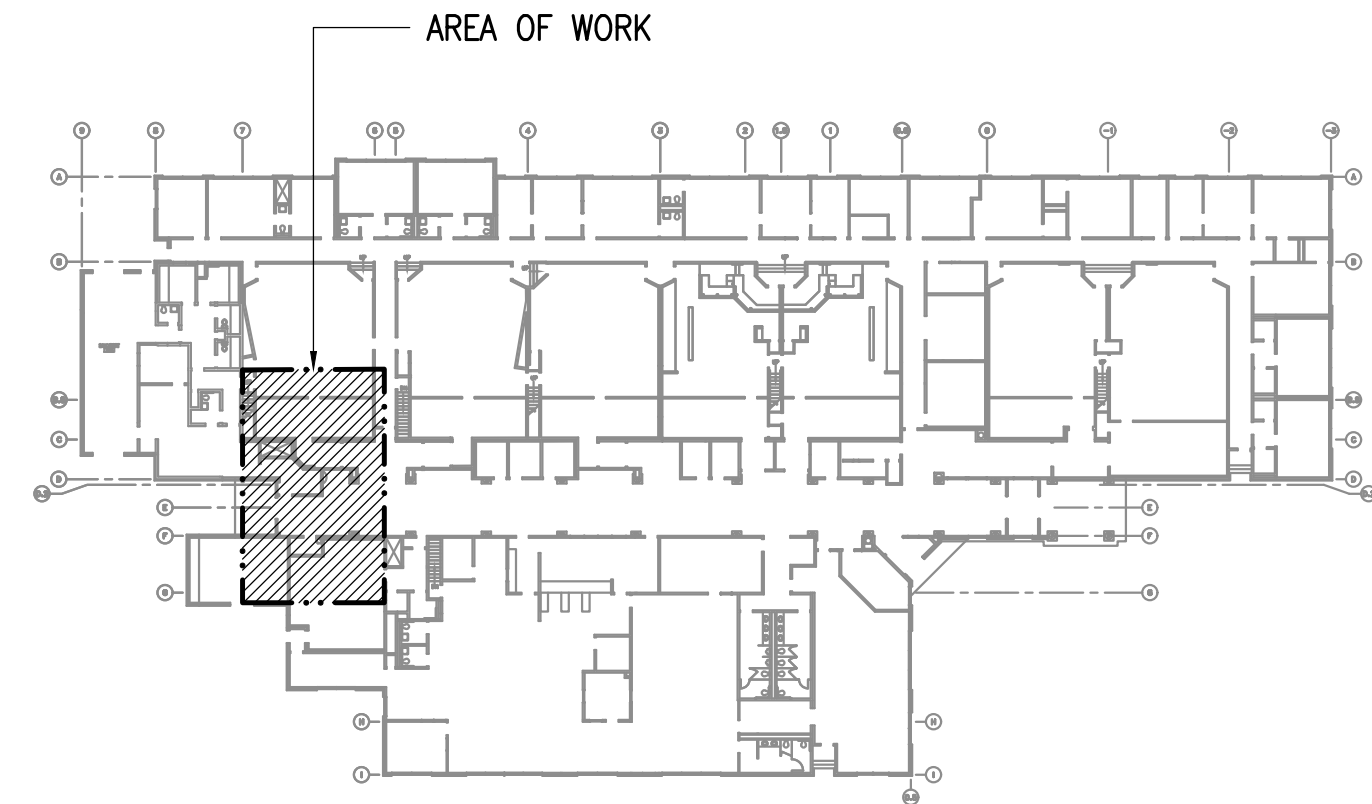
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CHECKED BY: AJS
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: MSERIES

DRAWING TITLE:
BOILER ROOM
REMODEL
SCHEMATIC -
ALTERNATE

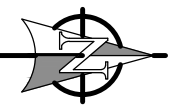
SHEET:
M204



1 BOILER PIPING REMODEL SCHEMATIC - ALTERNATE
NO SCALE



KEY PLAN
NO SCALE



0"
1"
2"
3"

LEGEND			
\$	SINGLE POLE SWITCH		VARIABLE FREQUENCY DRIVE WITH INTEGRAL DISCONNECT
	CONDUIT, SURFACE MOUNTED		DUPLEX RECEPTACLE TO BE REMOVED (DASHED OR DOTTED LINES INDICATE ITEMS TO BE REMOVED TYPICAL)
 #10	NUMBER AND SIZE OF WIRES (NO MARKS = 3 #12)		NOTE TAG (No. INDICATES NOTE)
A-2 	HOMERUN TO PANEL (PANEL AND CIRCUIT No.)	AFF	ABOVE FINISHED FLOOR
	EXISTING PANEL	C	CONDUIT
	DUPLEX RECEPTACLE	E	DENOTES EXISTING ITEM
	DUPLEX RECEPTACLE WITH GROUND FAULT CIRCUIT INTERRUPTER	GFCI	GROUND FAULT CIRCUIT INTERRUPTER
	JUNCTION BOX	GRSC	GALVANIZED RIGID STEEL CONDUIT
	EMERGENCY PUSHBUTTON SWITCH	NEC	NATIONAL ELECTRICAL CODE
	MOTOR (SIZED AS NOTED)	NTS	NOT TO SCALE
	FRACTIONAL HORSEPOWER MOTOR STARTER	R	DENOTES EXISTING ITEM THAT HAS BEEN RELOCATED
	DISCONNECT SWITCH	TYP	TYPICAL
	DISCONNECT SWITCH (FUSED)	UON	UNLESS OTHERWISE NOTED
	COMBINATION DISCONNECT/MAGNETIC MOTOR STARTER		



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ACS PALMER COURTHOUSE BOILER
REPLACEMENT

435 S DENALI STREET
PALMER, ALASKA 99645

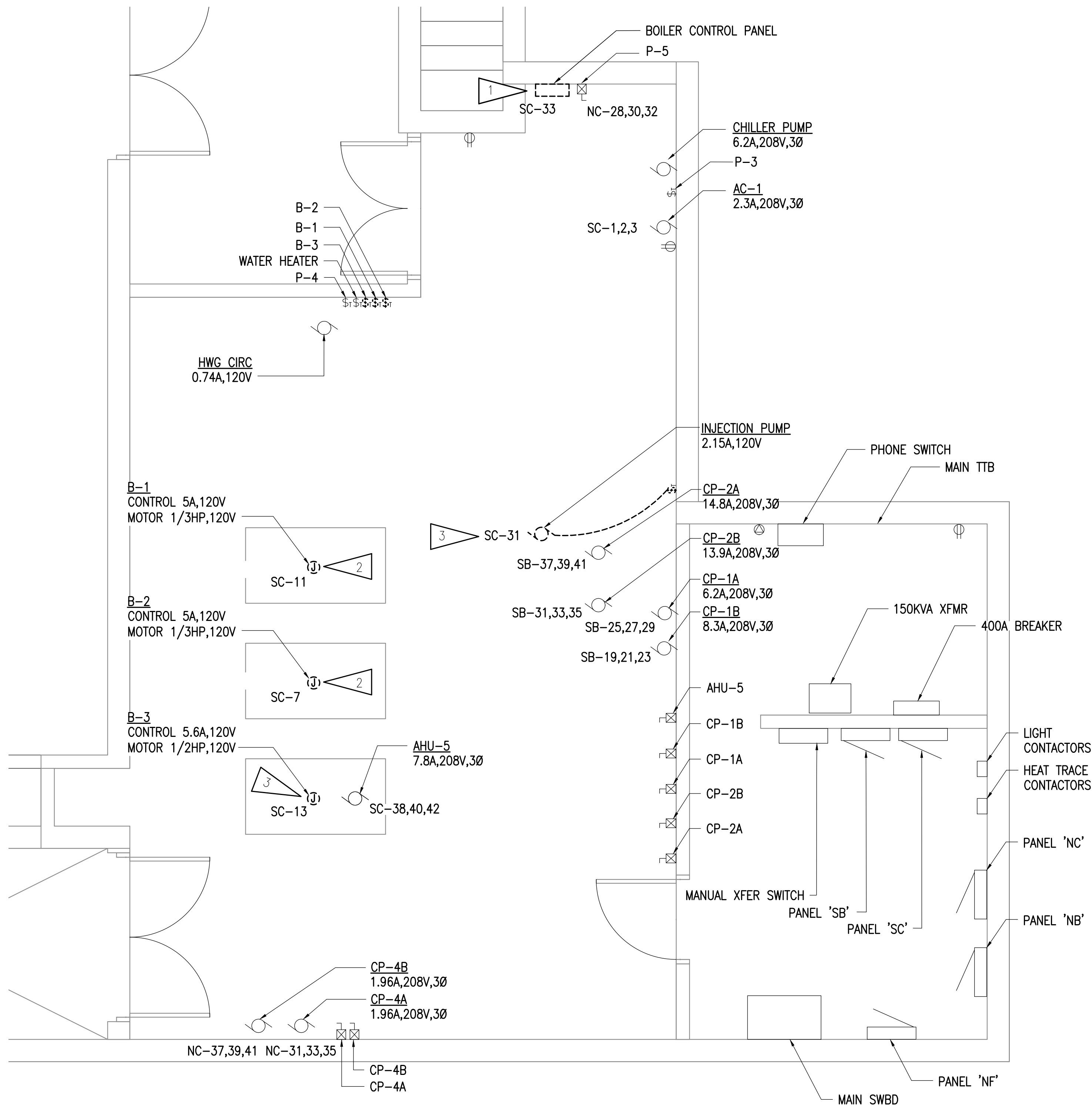
REVISIONS:

DRAWN BY: CSZ
CHECKED BY: DAO, CPL
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: ESERIES

DRAWING TITLE:
ELECTRICAL LEGEND

SHEET:
E001

0"
1"
2"
3"



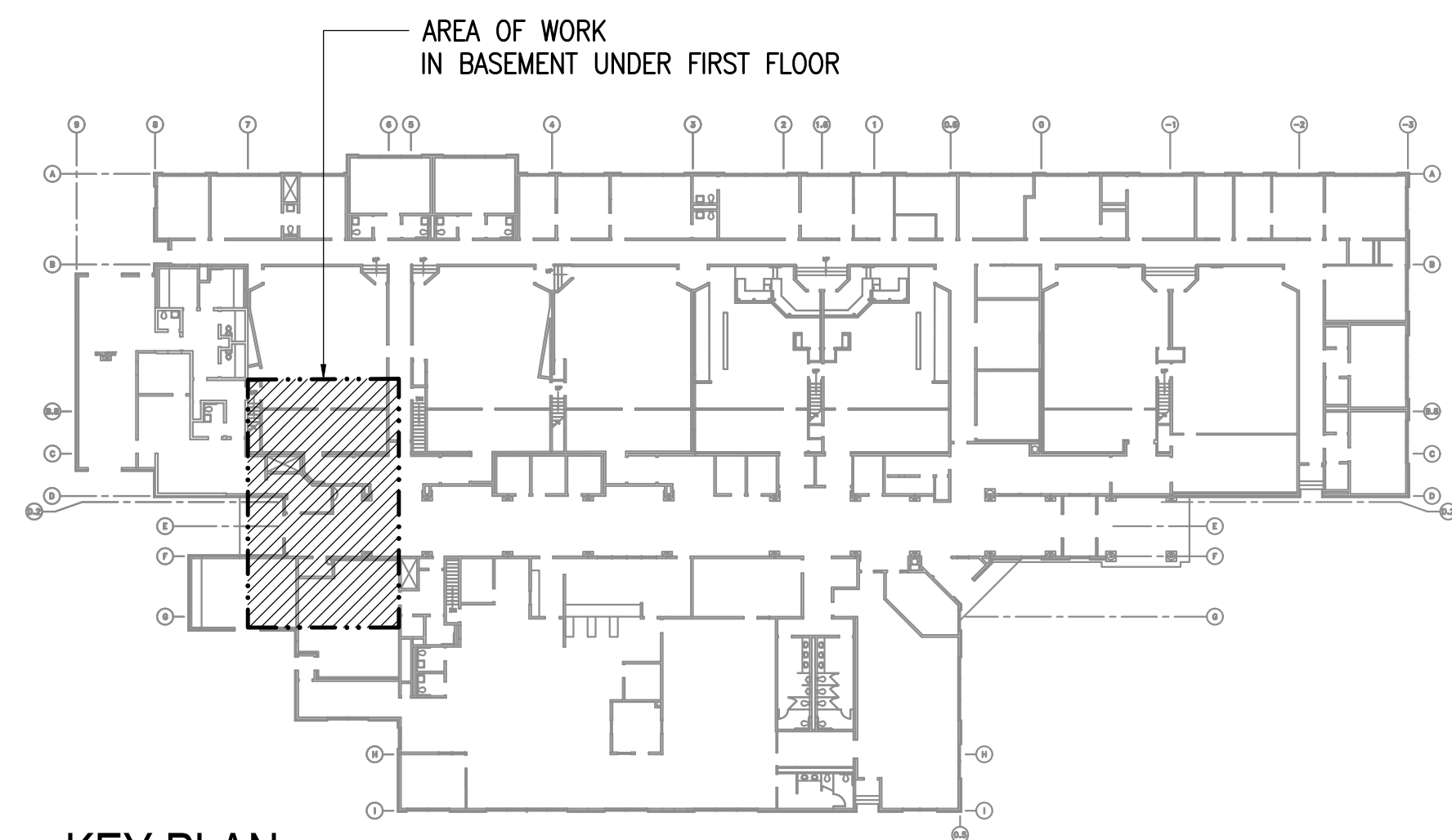
1 BOILER ROOM DEMOLITION PLAN BASE BID - BASEMENT
3/8" = 1'-0"

GENERAL NOTES:

1. THE INFORMATION SHOWN ON THIS DRAWING IS TAKEN FROM AS-BUILT DRAWINGS AND A NON-DESTRUCTIVE WALK THROUGH OF THE FACILITY. THERE IS NO WARRANTY OR GUARANTEE AS TO THE ACCURACY OF THE INFORMATION SHOWN HERE-IN. THE CONTRACTOR SHALL FIELD VERIFY ALL ITEMS SCHEDULED FOR DEMOLITION PRIOR TO START OF WORK.
2. THE OWNER SHALL HAVE FIRST RIGHT OF REFUSAL ON ALL SALVAGEABLE MATERIALS. THE CONTRACTOR SHALL DELIVER SALVAGED MATERIALS TO A WAREHOUSE AS DIRECTED BY THE OWNER. THE CONTRACTOR SHALL DISPOSE OF, OFF SITE, ALL UNWANTED MATERIALS.
3. DASHED OR DOTTED LINES INDICATE ITEMS TO BE REMOVED. SOLID LINES INDICATE EXISTING ITEMS TO REMAIN.

SHEET NOTES

1. SALVAGE CIRCUIT FOR EXTENSION TO REPLACEMENT CONTROL PANEL. FIELD COORDINATE WITH MECHANICAL FOR NEW PANEL LOCATION.
2. SALVAGE CIRCUIT FOR EXTENSION AND CONNECTION TO NEW BOILER. SEE E201.
3. DEMOLISH CIRCUIT BACK TO SOURCE. LABEL BREAKER AS SPARE.



KEY PLAN
NO SCALE



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ACS PALMER COURTHOUSE BOILER REPLACEMENT

435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

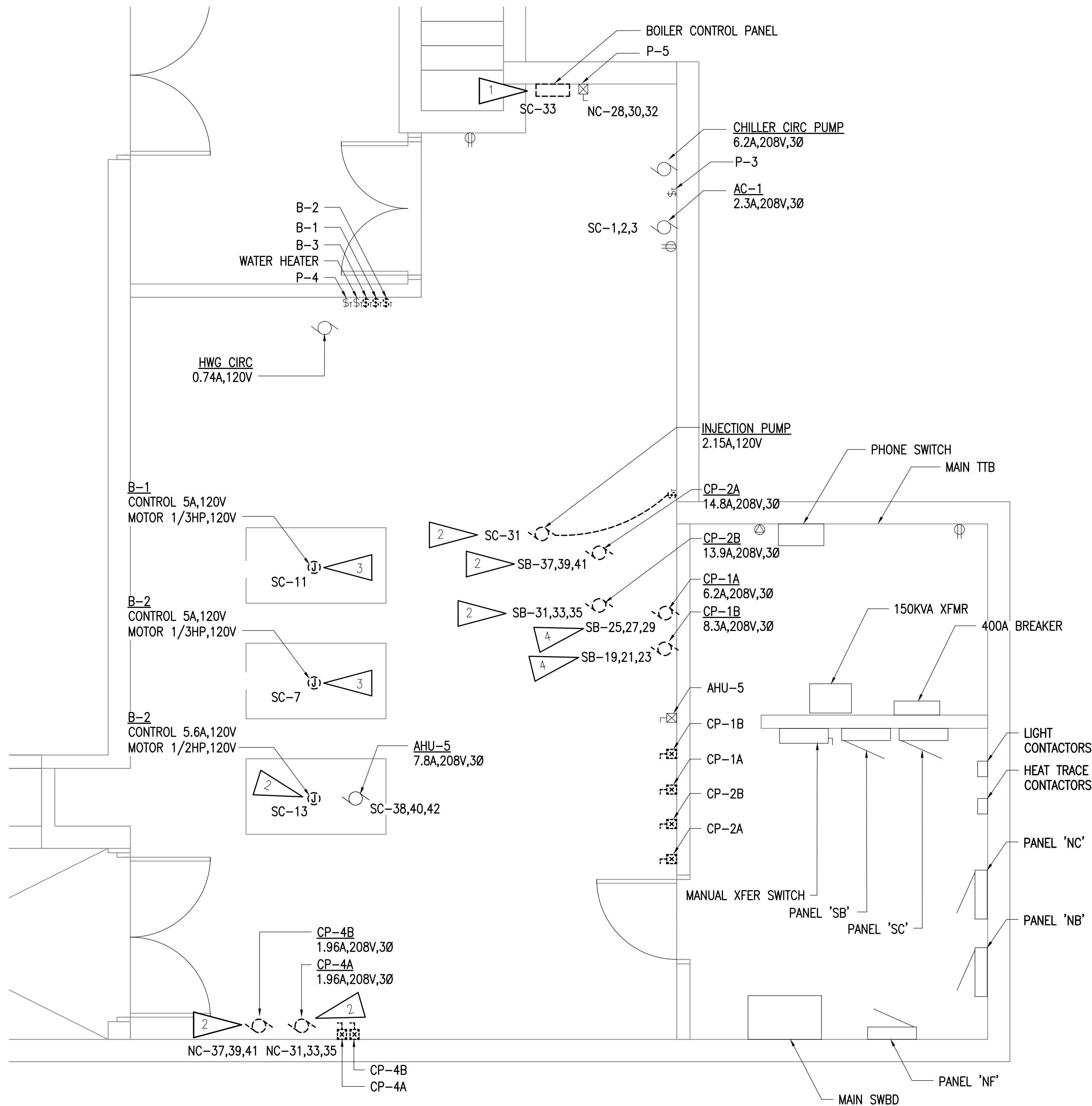
DRAWN BY: CSZ
CHECKED BY: DAO, CPL
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: ESERIES

DRAWING TITLE:
BOILER ROOM
DEMOLITION PLAN
BASE BID - BASEMENT

SHEET:

E101

0"
1"
2"
3"



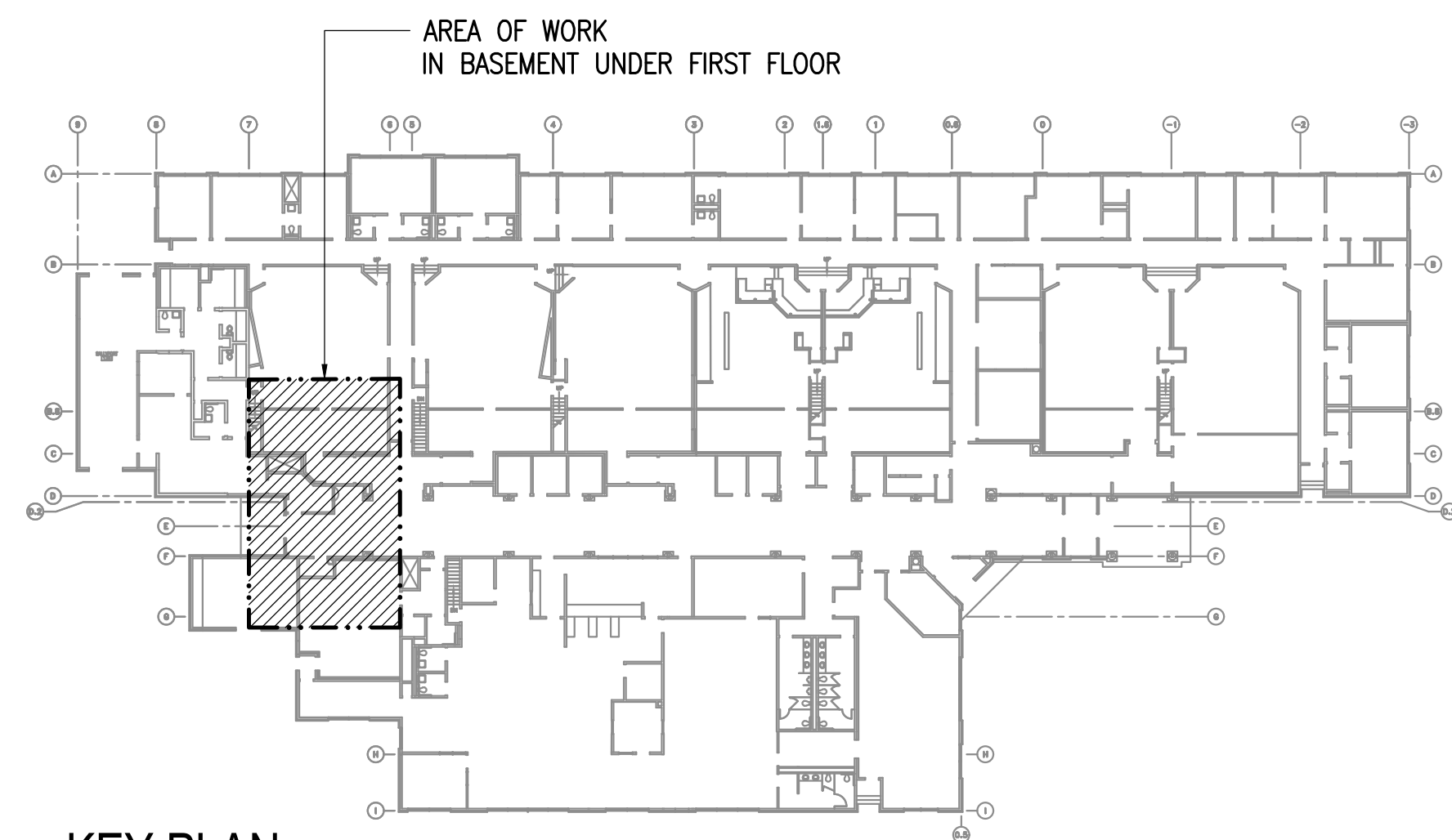
1 BOILER ROOM DEMOLITION PLAN ALTERNATE - BASEMENT
3/8" = 1'-0"

GENERAL NOTES:

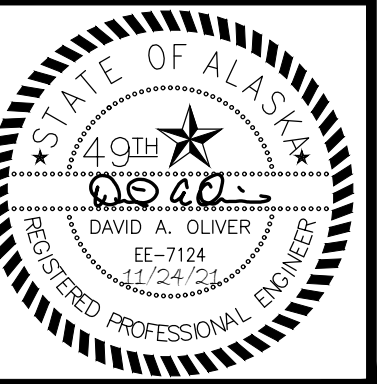
1. SEE E101 FOR GENERAL NOTES.

SHEET NOTES

1. SALVAGE CIRCUIT FOR EXTENSION TO REPLACEMENT CONTROL PANEL. FIELD COORDINATE WITH MECHANICAL FOR NEW PANEL LOCATION.
2. DEMOLISH CIRCUIT BACK TO SOURCE. LABEL BREAKER AS SPARE.
3. SALVAGE CIRCUIT FOR EXTENSION AND CONNECTION TO NEW BOILER. SEE E202.
4. UPGRADE EXISTING CONDUCTORS AND CIRCUIT BREAKER FOR USE WITH NEW PUMPS. SEE E202 AND E301.



KEY PLAN
NO SCALE



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ACS PALMER COURTHOUSE BOILER
REPLACEMENT

435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

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DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: ESERIES

DRAWING TITLE:
BOILER ROOM
DEMOLITION PLAN
ALTERNATE - BASEMENT

SHEET:

E102



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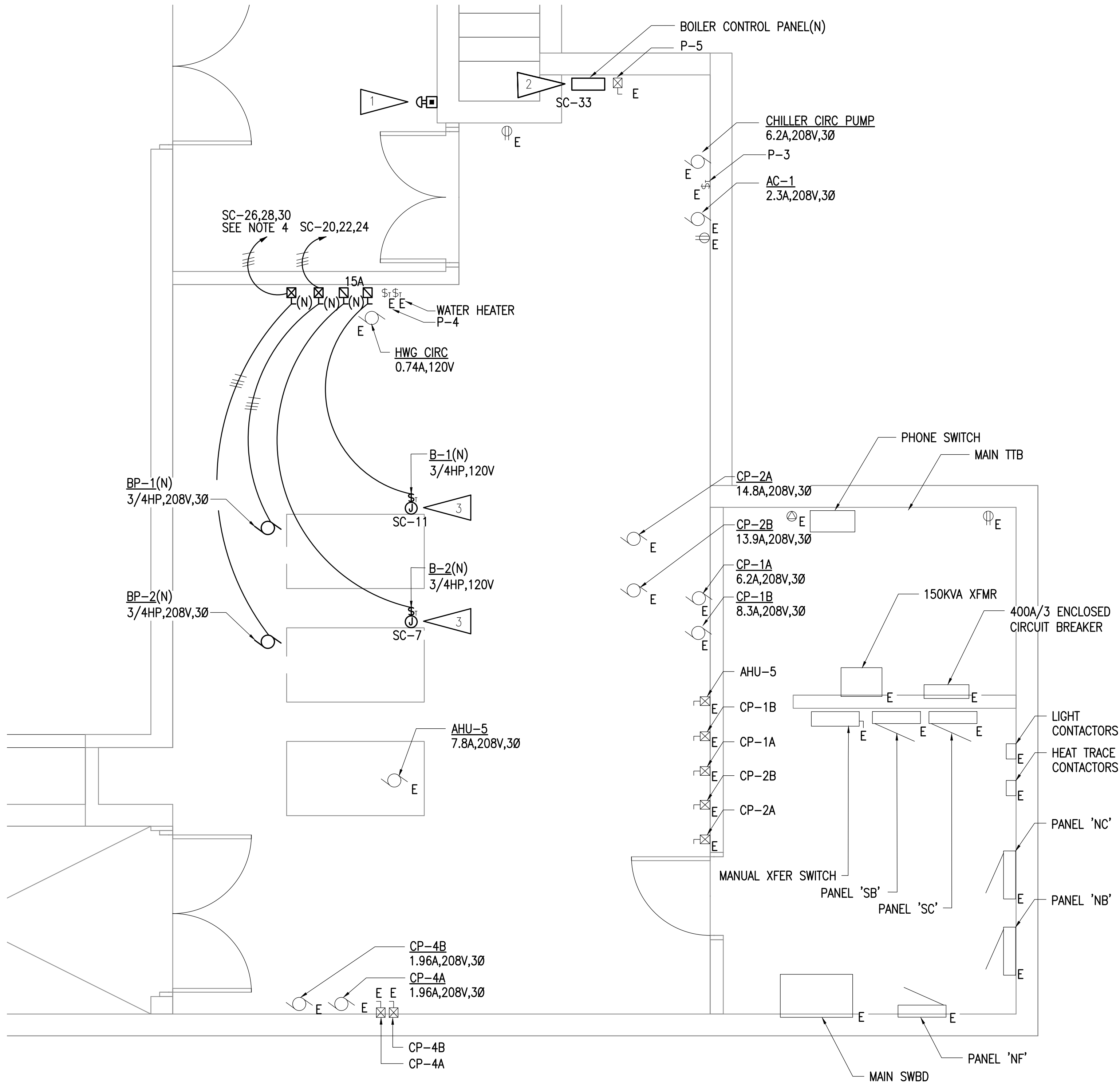
ACS PALMER COURTHOUSE BOILER REPLACEMENT
435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

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CHECKED BY: DAO, CPL
DATE: 11/24/2021
JOB NUMBER: M1195.00
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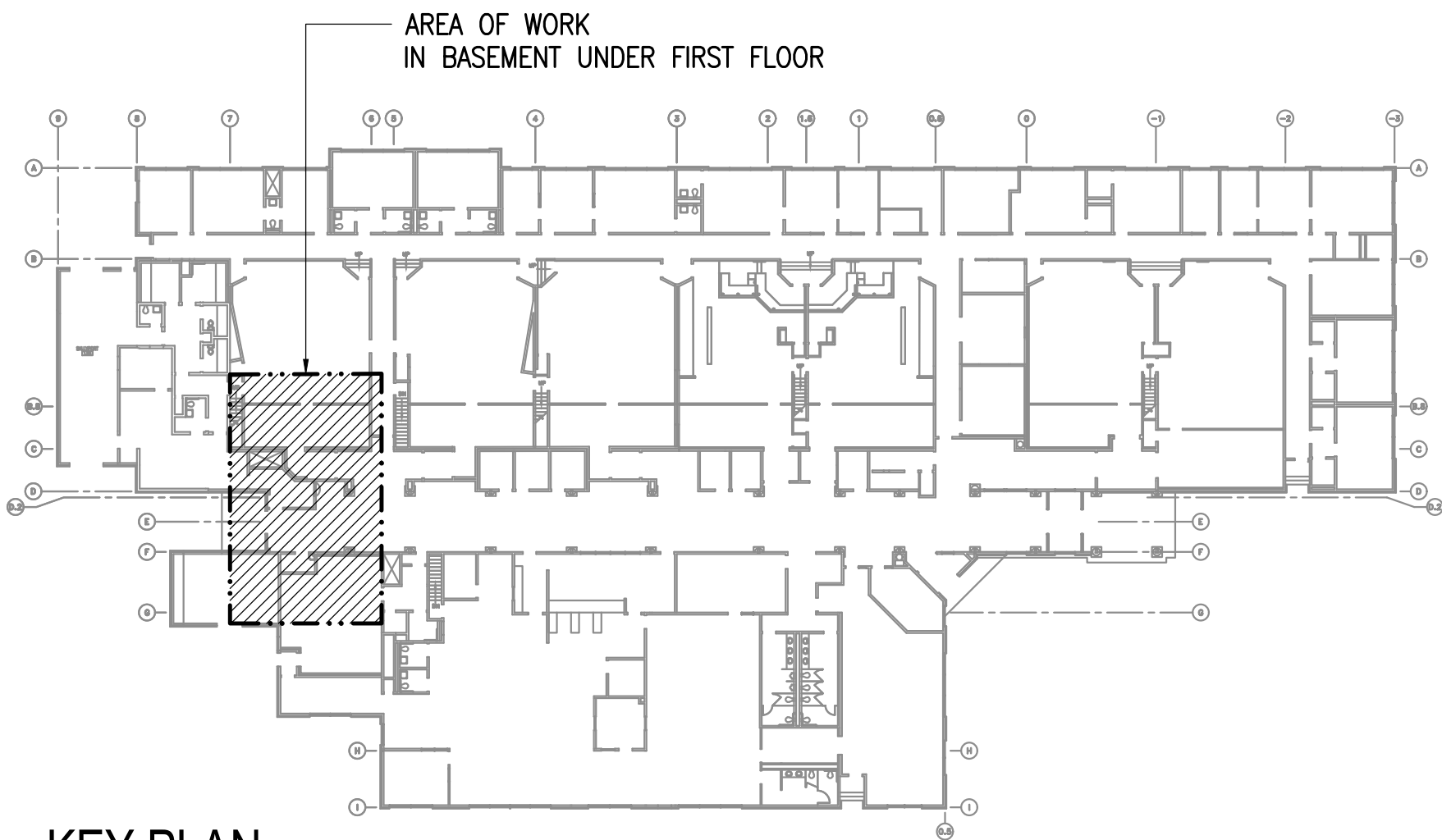
DRAWING TITLE:
BOILER ROOM REMODEL
PLAN BASE BID - BASEMENT

SHEET:
E201



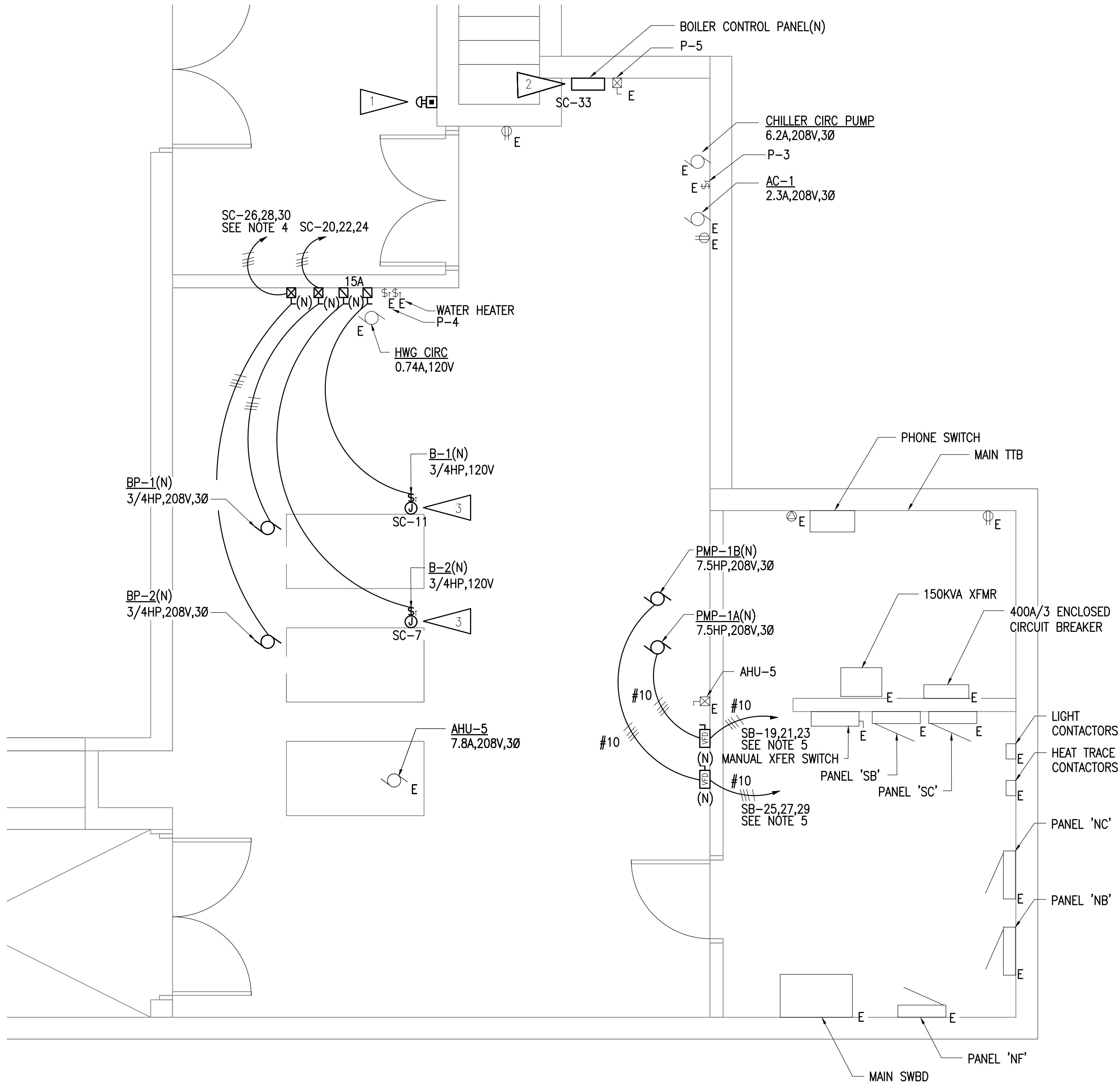
SHEET NOTES

1. CONNECT EMERGENCY SHUT-OFF PUSHBUTTON TO NEW SAFETY SHUT-OFF CIRCUIT ON NEW BOILERS. CONNECT PER BOILER MANUFACTURER'S INSTRUCTIONS.
2. NEW BOILER CONTROL PANEL. EXTEND EXISTING CIRCUIT AS REQUIRED AND CONNECT NEW CONTROL PANEL. FIELD COORDINATE WITH MECHANICAL FOR EXACT LOCATION AND POWER REQUIREMENTS.
3. EXTEND EXISTING CIRCUIT AS REQUIRED AND CONNECT TO NEW BOILER. FIELD COORDINATE WITH BOILER INSTALLER FOR EXACT LOCATION OF NEW CONNECTION.
4. CONNECT BP-2 TO EXISTING SPARE 15A, 3P BREAKER IN PANEL 'SC'.



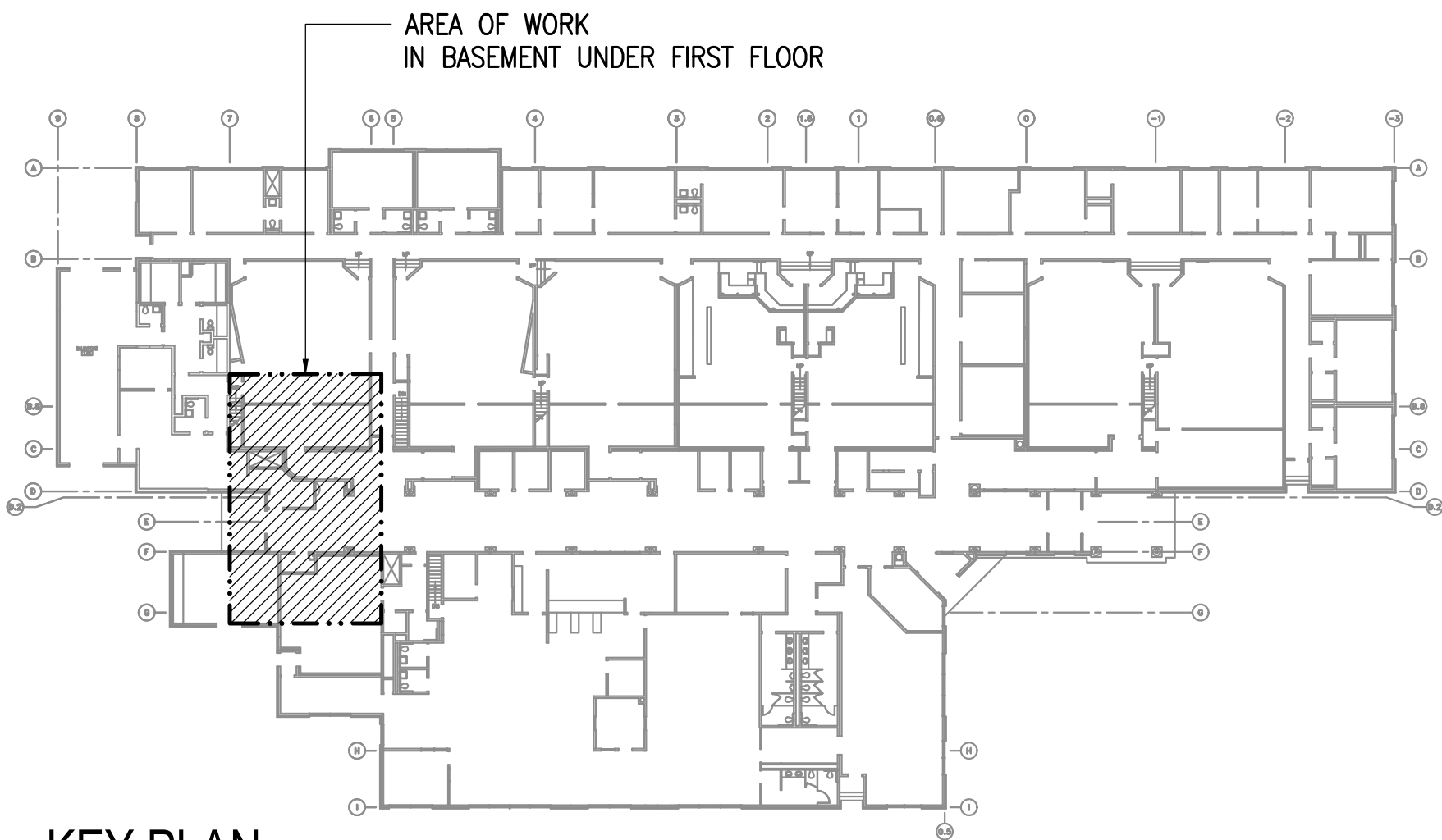
KEY PLAN
NO SCALE

1 BOILER ROOM REMODEL PLAN BASE BID - BASEMENT
3/8" = 1'-0"



SHEET NOTES

1. CONNECT EMERGENCY SHUT-OFF PUSHBUTTON TO NEW SAFETY SHUT-OFF CIRCUIT ON NEW BOILERS. CONNECT PER BOILER MANUFACTURER'S INSTRUCTIONS.
2. NEW BOILER CONTROL PANEL. EXTEND EXISTING CIRCUIT AS REQUIRED AND CONNECT NEW CONTROL PANEL. FIELD COORDINATE WITH MECHANICAL FOR EXACT LOCATION AND POWER REQUIREMENTS.
3. EXTEND EXISTING CIRCUIT AS REQUIRED AND CONNECT TO NEW BOILER. FIELD COORDINATE WITH BOILER INSTALLER FOR EXACT LOCATION OF NEW CONNECTION.
4. CONNECT BP-2 TO EXISTING SPARE 15A, 3P BREAKER IN PANEL 'SC'.
5. UPGRADE EXISTING CONDUCTORS AND CIRCUIT BREAKER FOR USE WITH NEW PUMPS. SEE E102 AND E301.



KEY PLAN
NO SCALE

1 BOILER ROOM REMODEL PLAN ALTERNATE - BASEMENT
3/8" = 1'-0"

0"
1"
2"
3"

(E) PANEL 'SC'																		
MFR/MODEL: SIEMENS I-T-E TYPE CDP-7						VOLTS: 120/208V,3PH,4W				ENCLOSURE: NEMA 1				400 A				
						VOLT-AMPS				MTG: SURFACE								
NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	A		B		C		TYPE	SERVICE		AMPS	POLE	CIRC	NOTE
a	1	3	15	AIR COMPRESSOR - 3HP									DRY SPRINKLER, AIR COMPRESSOR		15	1	2	a
a	3	3	15	AAA									SUMO SYSTEM		15	1	4	a
a	5	3	15	AAA									RECP - TTB		20	1	6	a
b	7	1	25	BOILER 2	HEAT	1656							RECP - BOILER, EF-7		20	1	8	a
a	9	1	20	EXISTING LOAD									RECP - BOILER, FAN RM		20	1	10	a
b	11	1	25	BOILER 1	HEAT					1656			EXISTING LOAD		20	1	12	a
	13	1	20	SPARE									EXISTING LOAD		20	1	14	a
a	15	1	20	EXISTING LOAD									EXISTING LOAD		20	1	16	a
a	17	1	30	UPS PHONE RM									TEL UNIT		20	1	18	a
a	19	3	60	AHU-3			444						MOTR	BP-1	15	1	20	b
a	21	3	60	AAA					444				MOTR	AAA	15	1	22	b
a	23	3	60	AAA							444		MOTR	AAA	15	1	24	b
a	25	3	100	PANEL 'SD'			444						MOTR	BP-2	15	3	26	c
a	27	3	100	AAA					444				MOTR	AAA	15	3	28	c
a	29	3	100	AAA							444		MOTR	AAA	15	3	30	c
a	31	1	20	SPARE									SPARE		20	3	32	
	33	1	15	BOILER CONTROL PANEL	MISC				250				AAA		20	3	34	
a	35	1	15	EXISTING LOAD									AAA		20	3	36	
PANEL NOTES: a EXISTING LOAD b INSTALL NEW CIRCUIT BREAKER IN SPACE AVAILABLE IN THE PANEL. THE NEW CIRCUIT BREAKER SHALL BE COMPATIBLE WITH AND LISTED FOR USE IN THE PANEL AND SHALL HAVE A MINIMUM SHORT CIRCUIT AIC RATING TO MATCH THE LOWEST RATED EXISTING DEVICE IN THE PANEL. c NEW LOAD CONNECTED TO EXISTING BREAKER.												PANEL OPTIONS: MAIN LUGS ONLY PANEL INCLUDES 200/3 SUB FEED BREAKER						

1

BASE BID PANEL SCHEDULE

NO SCALE

(E) PANEL 'SB'																		
MFR/MODEL: SIEMENS I-T-E TYPE CDP-7						VOLTS: 120/208V,3PH,4W				ENCLOSURE: NEMA 1				400 A				
						VOLT-AMPS				MTG: SURFACE								
NOTE	CIRC	POLE	AMPS	SERVICE	TYPE	A		B		C		TYPE	SERVICE		AMPS	POLE	CIRC	NOTE
a	1	1	20	LTG FAN RM, BSMT, CORR									POWER CONDITIONER		50	1	2	a
a	3	1	20	LTG - BOILER, ELECT, TEL RM									AAA		50	1	4	a
a	5	1	20	LTG RM 66,67									AAA		50	1	6	a
a	7	1	20	LTG RM 66,									FACP AND SPRINKLER BELL		20	1	8	a
a	9	1	20	LTG RM 66									FC-2, FC-3		15	1	10	a
a	11	1	20	LTG RM 65,66									SPARE		20	1	12	
a	13	1	20	LTG RM 66									AHU-1 (3HP)		35	3	14	a
a	15	1	20	LTG RM 66									AAA		35	3	16	a
a	17	1	20	LTG RM 66									AAA		35	3	18	a
b	19	3	50	PMP-1B	MOTR	3036							AHU-2 (3HP)		20	3	20	a
b	21	3	50	AAA	MOTR			3036					AAA		20	3	22	a
b	23	3	50	AAA	MOTR					3036			AAA		20	3	24	a
b	25	3	50	PMP-1A	MOTR	3036							EXISTING LOAD		40	3	26	a
b	27	3	50	AAA	MOTR			3036					AAA		40	3	28	a
b	29	3	50	AAA	MOTR					3036			AAA		40	3	30	a
	31	3	35	SPARE									AHU-4		40	3	32	a
	33	3	35	AAA									AAA		40	3	34	a
	35	3	35	AAA									AAA		40	3	36	a
	37	3	35	SPARE									AHU-5		15	3	38	a
	39	3	35	AAA									AAA		15	3	40	a
	41	3	35	AAA									AAA		15	3	42	a
PANEL NOTES: a EXISTING LOAD b REPLACE EXISTING 15A, 3P BREAKER WITH NEW 50A, 3P BREAKER TO FEED NEW PUMPS. THE NEW CIRCUIT BREAKER SHALL BE COMPATIBLE WITH AND LISTED FOR USE IN THE PANEL AND SHALL HAVE A MINIMUM SHORT CIRCUIT AIC RATING TO MATCH THE LOWEST RATED EXISTING DEVICE IN THE PANEL.												PANEL OPTIONS: MAIN LUGS ONLY						

2

ADDITIVE ALTERNATE PANEL SCHEDULE

NO SCALE

ELECTRICAL LOAD CALCULATION	
EXISTING PANEL SB - BASE BID:	400 A, 208 V, 3 PH
EXISTING CONNECTED LOAD (PER PANEL SCHEDULE)	101 KVA
EXISTING LOADS REMOVED (IN KVA):	
BOILER B1	1.46 KVA
BOILER B2	1.46 KVA
BOILER B3	1.85 KVA
INJECTION PUMP CP-3	0.26 KVA
SUBTOTAL:	5.03 KVA
TOTAL LOADS REMOVED:	-5.03 KVA
TOTAL LOADS REMOVED (IN AMPS):	-14 A
NEW LOADS ADDED (IN KVA)	
BOILER B1	1.66 KVA
BOILER B2	1.66 KVA
PUMP BP-1	1.33 KVA
PUMP BP-2	1.33 KVA
SUBTOTAL:	5.98 KVA
TOTAL LOADS ADDED:	5.98 KVA
TOTAL LOADS ADDED (IN AMPS):	17 A
NET LOAD CHANGE:	0.94 KVA
NET LOAD CHANGE (IN AMPS):	3 A
NEW TOTAL NEC DEMAND LOAD:	127.3 KVA
NEW TOTAL NEC DEMAND LOAD:	353 A
SPARE CAPACITY:	47 A
RESULT: THE EXISTING FEEDER TO PANEL 'SB' HAS ADEQUATE CAPACITY FOR THE ADDITIONAL BASE BID LOADS ADDED.	
EXISTING PANEL 'SB' - ALTERNATE	400 A, 208 V, 3 PH
EXISTING CONNECTED LOAD (PER PANEL SCHEDULE)	101 KVA
EXISTING LOADS REMOVED (IN KVA)	
BASE BID LOAD	5.03 KVA
PUMP CP-1A	2.23 KVA
PUMP CP-1B	2.99 KVA
PUMP CP-2A	5.33 KVA
PUMP CP-2B	5.01 KVA
SUBTOTAL:	20.60 KVA
TOTAL LOADS REMOVED:	#### KVA
TOTAL LOADS REMOVED (IN AMPS):	-57 A
NEW LOADS ADDED (IN KVA)	
BASE BID LOAD	5.98 KVA
PUMP PMP-1A	9.11 KVA
PUMP PMP-1B	9.11 KVA
SUBTOTAL:	24.21 KVA
TOTAL LOADS ADDED:	24.21 KVA
TOTAL LOADS ADDED (IN AMPS):	67 A
NET LOAD CHANGE:	3.61 KVA
NET LOAD CHANGE (IN AMPS):	10 A
NEW TOTAL NEC DEMAND LOAD:	130.0 KVA
NEW TOTAL NEC DEMAND LOAD (IN AMPS):	361 A
SPARE CAPACITY:	39 A
RESULT: THE EXISTING FEEDER TO PANEL 'SB' HAS ADEQUATE CAPACITY FOR THE ADDITIONAL ALTERNATE LOADS ADDED.	

3

BASE BID AND ADDITIVE ALTERNATE LOAD CALC

NO SCALE



RSA

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ACS PALMER COURTHOUSE BOILER REPLACEMENT

435 S DENALI STREET
PALMER, ALASKA 99645

REVISIONS:

DRAWN BY: CSZ
CHECKED BY: DAO, CPL
DATE: 11/24/2021
JOB NUMBER: M1195.00
DWG FILE: ESERIES

DRAWING TITLE:
PANEL SCHEDULES

SHEET:
E301

0"
1"
2"
3"

ELECTRICAL SPECIFICATIONS

26 05 00 – COMMON WORK RESULTS FOR ELECTRICAL

- A. SCOPE OF WORK: FURNISH AND INSTALL ALL MATERIAL AND EQUIPMENT TO MODIFY THE EXISTING ELECTRICAL SYSTEM AS INDICATED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
- B. STANDARDS, CODES AND REGULATIONS: COMPLY WITH THE LATEST ADOPTED EDITION OF THE NATIONAL ELECTRICAL CODE, INTERNATIONAL BUILDING CODE, AND INTERNATIONAL FIRE INCLUDING ALL STATE AND LOCAL AMENDMENTS TO THESE CODES. COMPLY WITH THE LATEST PUBLISHED VERSION OF THE NECA STANDARD OF INSTALLATION.
- C. DRAWINGS: THE DRAWINGS ARE DIAGRAMMATIC, NOT NECESSARILY SHOWING ALL OFFSETS OR EXACT LOCATIONS OF FIXTURES, EQUIPMENT, ETC. UNLESS SPECIFICALLY DIMENSIONED. REVIEW THE DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT FURNISHED BY OTHER CRAFTS BUT INSTALLED IN ACCORDANCE WITH THIS SECTION. BRING QUESTIONABLE OR OBSCURE ITEMS, APPARENT CONFLICTS BETWEEN PLANS AND SPECIFICATIONS, GOVERNING CODES OR UTILITIES REGULATIONS TO THE ATTENTION OF THE OWNER. CODES, ORDINANCES, REGULATIONS, MANUFACTURER'S INSTRUCTIONS OR STANDARDS TAKE PRECEDENCE WHEN THEY ARE MORE STRINGENT OR CONFLICT WITH THE DRAWINGS AND SPECIFICATIONS.
- D. RECORD DRAWINGS: MARK UP A CLEAN SET OF DRAWINGS AS THE WORK PROGRESSES TO SHOW THE DIMENSIONED LOCATION AND ROUTING OF ALL ELECTRICAL WORK WHICH WILL BECOME PERMANENTLY CONCEALED. SHOW ROUTING OF WORK IN PERMANENTLY CONCEALED BLIND SPACES WITHIN THE BUILDING. SHOW COMPLETE ROUTING AND SIZING OF ANY SIGNIFICANT REVISIONS TO THE SYSTEMS SHOWN.
- E. WORKMANSHIP: INSTALLATION OF ALL WORK SHALL BE MADE SO THAT ITS SEVERAL COMPONENT PARTS SHALL FUNCTION AS A WORKABLE SYSTEM COMPLETE WITH ALL ACCESSORIES NECESSARY FOR ITS OPERATION. ALL MATERIAL AND EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS AND/OR INSTALLATION DRAWINGS AND IN ACCORDANCE WITH NECA STANDARDS. MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL CONFORM WITH APPLICABLE INDUSTRY STANDARDS, NEMA STANDARDS AND UNDERWRITERS LABORATORIES STANDARDS WHERE APPLICABLE.
- F. SUBMITTALS: PROVIDE MATERIAL AND EQUIPMENT SUBMITTALS CONTAINING A COMPLETE LISTING OF MATERIAL AND EQUIPMENT SHOWN ON THE DRAWINGS. INCLUDE CATALOG NUMBERS, WIRING DIAGRAMS, ROUGH-IN DIMENSIONS AND PERFORMANCE DATA FOR ALL MATERIAL AND EQUIPMENT. SUBMITTALS SHALL BE IN ELECTRONIC .PDF FORMAT, SEPARATE FROM WORK FURNISHED UNDER OTHER DIVISIONS. INDEX AND CLEARLY IDENTIFY ALL MATERIAL AND EQUIPMENT BY ITEM, NAME OR DESIGNATION USED ON THE DRAWINGS. SUBMITTAL REVIEW IS FOR GENERAL DESIGN AND ARRANGEMENT ONLY AND DOES NOT RELIEVE THE CONTRACTOR FROM ANY REQUIREMENTS OF THE CONTRACT DOCUMENTS. THE SUBMITTALS ARE NOT CHECKED FOR QUANTITY, DIMENSION, OR FOR PROPER OPERATION. WHERE DEVIATIONS OF A SUBSTITUTE PRODUCT OR SYSTEM PERFORMANCE HAVE NOT BEEN SPECIFICALLY NOTED IN THE SUBMITTAL BY THE CONTRACTOR, PROVISIONS OF A COMPLETE AND SATISFACTORY WORKING INSTALLATION IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- G. WARRANTY: THE CONTRACTOR SHALL GUARANTEE ALL WORK EXECUTED UNDER THIS CONTRACT TO BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM BENEFICIAL OCCUPANCY. ANY FAULTY MATERIALS OR WORKMANSHIP SHALL BE REPAIRED OR REPLACED TO THE SATISFACTION OF THE OWNER DURING THE GUARANTEE PERIOD.
- H. PERMITS: SECURE AND PAY FOR ALL FEES, PERMITS, ETC. REQUIRED BY LOCAL AND STATE AGENCIES.
- I. REFERENCE SYMBOLS: THE ELECTRICAL "LEGEND" ON THE DRAWINGS IS A STANDARDIZED VERSION, AND ALL SYMBOLS SHOWN MAY NOT BE USED. USE THE "LEGEND" AS A REFERENCE FOR THE SYMBOLS USED ON THE DRAWINGS.
- J. PENETRATION OF FIRE BARRIERS: ALL ELECTRICAL PENETRATIONS THROUGH FIRE RATED BARRIERS SHALL BE SEALED IN ACCORDANCE WITH NEC ARTICLE 300.21 AND THE FOLLOWING:
1. ALL HOLES OR VOIDS CREATED TO EXTEND ELECTRICAL SYSTEMS THROUGH FIRE RATED FLOORS, WALLS OR CEILING SHALL BE SEALED WITH AN ASBESTOS-FREE INTUMESCENT FIRE STOPPING MATERIAL CAPABLE OF EXPANDING 8 TO 10 TIMES WHEN EXPOSED TO TEMPERATURES 250 DEGREES F OR HIGHER.
 2. MATERIALS SHALL BE SUITABLE FOR THE FIRE STOPPING OF PENETRATIONS MADE BY STEEL, GLASS, PLASTIC AND SHALL BE CAPABLE OF MAINTAINING AN EFFECTIVE BARRIER AGAINST FLAME, SMOKE AND GASES IN COMPLIANCE WITH THE REQUIREMENTS OF ASTM E814, UL 1479 AND THE UL FIRE RESISTANCE DIRECTORY REQUIREMENTS FOR THROUGH-PENETRATION FIRESTOP DEVICES (XHCR).
 3. THE RATING OF THE FIRE STOPS SHALL BE THE SAME AS THE TIME-RATED FLOOR, WALL OR CEILING ASSEMBLY.
 4. INSTALL FIRE STOPPING MATERIALS IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.

26 05 05 – SELECTIVE DEMOLITION FOR ELECTRICAL

- A. DEMOLITION DRAWINGS ARE BASED ON A NON-DESTRUCTIVE FIELD OBSERVATION AND EXISTING RECORD DRAWING. REPORT DISCREPANCIES TO OWNER BEFORE DISTURBING THE EXISTING INSTALLATION. DISCONNECT ELECTRICAL SYSTEMS FOR EQUIPMENT SCHEDULED FOR REMOVAL. PROVIDE TEMPORARY WIRING AND CONNECTIONS TO MAINTAIN ALL EXISTING ELECTRICAL SYSTEMS IN SERVICE DURING CONSTRUCTION. DISABLE SYSTEMS ONLY TO MAKE SWITCHOVERS AND CONNECTIONS.
- B. OBTAIN PERMISSION FROM OWNER AT LEAST 24 HOURS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION AND MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA. WHEN WORK MUST BE PERFORMED ON ENERGIZED EQUIPMENT OR CIRCUITS, USE PERSONNEL EXPERIENCED IN SUCH OPERATIONS.
- C. REMOVE, RELOCATE AND EXTEND EXISTING INSTALLATIONS TO ACCOMMODATE NEW CONSTRUCTION. REMOVE ABANDONED WIRING TO SOURCE OF SUPPLY. REMOVE EXPOSED ABANDONED CONDUIT, INCLUDING ABANDONED CONDUIT ABOVE ACCESSIBLE CEILING FINISHES. WHERE ABANDONED CONDUIT ENTERS EXISTING SURFACES TO REMAIN, CUT CONDUIT FLUSH WITH WALLS AND FLOORS, AND PATCH SURFACES. DISCONNECT ABANDONED OUTLETS AND REMOVE DEVICES. REMOVE ABANDONED OUTLETS IF CONDUIT SERVICING THEM IS ABANDONED AND REMOVED. PROVIDE BLANK COVER FOR ABANDONED OUTLETS WHICH ARE NOT REMOVED.

- D. DISCONNECT AND REMOVE ELECTRICAL DEVICES AND EQUIPMENT SERVING UTILIZATION EQUIPMENT THAT HAS BEEN REMOVED. REPAIR ADJACENT CONSTRUCTION AND FINISHES DAMAGED DURING DEMOLITION AND EXTENSION WORK. MAINTAIN ACCESS TO EXISTING ELECTRICAL INSTALLATIONS WHICH REMAIN ACTIVE.

26 05 19 – WIRE AND CABLE

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIALS:
1. ALL CONDUCTORS SHALL BE COPPER WITH TYPE XHHW, THWN, THW OR THHN INSULATION. MINIMUM BRANCH CIRCUIT CONDUCTOR SIZE SHALL BE #12 AWG. MINIMUM CONTROL CIRCUIT CONDUCTOR SIZE SHALL BE #18 AWG.
 2. CONTROL CIRCUITS SHALL BE COPPER, STRANDED CONDUCTOR, 600V INSULATION, THHN/THWN, MINIMUM SIZE #18 AWG.
- C. INSTALLATION:
1. COLOR CODE WIRES BY LINE OR PHASE. COLOR CODE THE 120/208V CONDUCTORS BLACK, RED, BLUE, AND WHITE.
 2. DO NOT SHARE NEUTRAL CONDUCTORS. PROVIDE A DEDICATED NEUTRAL CONDUCTOR FOR EACH BRANCH CIRCUIT THAT REQUIRES A NEUTRAL.
 3. USE PROPERLY SIZED INSULATED SPRING WIRE CONNECTORS WITH PLASTIC CAPS FOR ALL CONDUCTORS #8 AWG AND SMALLER. TERMINATE #6 AWG AND LARGER CONDUCTORS WITH CRIMP OR COMPRESSION TYPE CONNECTORS INSTALLED WITH TOOL RECOMMENDED BY CONNECTION MANUFACTURER AND INSULATE WITH PROPERLY SIZED 600 VOLT RATED HEAT SHRINK TUBING.
 4. INSTALLATION SCHEDULE: BUILDING WIRE IN RACEWAYS AT ALL LOCATIONS UNLESS OTHERWISE NOTED. PROVIDE XHHW-2 IN EXTERIOR LOCATIONS.

26 05 26 – GROUNDING AND BONDING

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR GROUND RODS.
- B. INSTALLATION:
1. PROVIDE A SEPARATE, INSULATED EQUIPMENT GROUNDING CONDUCTOR IN ALL NEW BRANCH CIRCUITS AND FEEDERS. TERMINATE EACH END ON A GROUNDING LUG, BUS, OR BUSHING.
 2. MECHANICAL CONNECTORS: NON-REVERSIBLE CRIMP TYPE LUGS ONLY. USE FACTORY MADE COMPRESSION LUG FOR ALL TERMINATIONS.

26 05 29 – HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIAL: SUPPORT CHANNEL SHALL BE GALVANIZED OR PAINTED STEEL. HARDWARE SHALL BE CORROSION RESISTANT.
- C. INSTALLATION: EQUIPMENT WEIGHING MORE THAN 50 POUNDS SHALL BE ADEQUATELY ANCHORED TO THE BUILDING STRUCTURE TO RESIST LATERAL EARTHQUAKE FORCES.

26 05 33 – RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIALS:
1. RIGID STEEL CONDUIT: ANSI C80.1. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; THREADED TYPE WITH INSULATED THROAT BUSHINGS, MATERIAL TO MATCH CONDUIT.
 2. INTERMEDIATE METAL CONDUIT (IMC): GALVANIZED STEEL. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; USE FITTINGS AND CONDUIT BODIES SPECIFIED ABOVE FOR RIGID STEEL CONDUIT.
 3. ELECTRICAL METALLIC TUBING CONDUIT (EMT): ANSI C80.3. GALVANIZED TUBING. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; STEEL OR MALLEABLE IRON, COMPRESSION TYPE OR SET SCREW FITTINGS WITH INSULATED THROAT BUSHINGS. DIE-CAST FITTINGS ARE NOT ACCEPTABLE. MAXIMUM SIZE SHALL BE 2". PROVIDE FACTORY ELBOWS ON SIZES 1-1/2" AND LARGER.
 4. FLEXIBLE METAL CONDUIT: FS WW-C-566; STEEL, FULL WALL OR REDUCED WALL THICKNESS. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; STEEL OR MALLEABLE IRON WITH INSULATED THROAT BUSHINGS. DIE CAST FITTINGS ARE NOT ACCEPTABLE.
 5. LIQUIDTIGHT FLEXIBLE CONDUIT: FLEXIBLE METAL CONDUIT WITH PVC JACKET. FITTINGS AND CONDUIT BODIES: ANSI/NEMA FB 1; STEEL OR MALLEABLE IRON WITH INSULATED THROAT BUSHINGS. DIE CAST FITTINGS ARE NOT ACCEPTABLE.
 6. PROVIDE GALVANIZED OR CADMIUM PLATED, ONE PIECE PRESSED STEEL OUTLET BOXES 4 INCH SQUARE OR OCTAGONAL, 1-1/2 INCHES DEEP MINIMUM SIZE FOR USE IN INTERIOR AREAS.
 7. PROVIDE CAST ALUMINUM OR FERALLOY TYPE BOXES WITH GASKETED COVER, THREADED HUBS AND NEMA 3R RATING FOR USE IN EXTERIOR OR WET LOCATIONS.
- C. INSTALLATION:
1. INSTALL CONDUIT FOR ALL SYSTEMS UNLESS OTHERWISE NOTED, 1/2 INCH MINIMUM SIZE, EXCEPT CONDUIT FOR SPECIAL SYSTEMS SHALL BE 3/4" MINIMUM. ALL LOCATIONS SHALL BE RIGID STEEL CONDUIT OR INTERMEDIATE METAL CONDUIT.
 2. MOTOR AND EQUIPMENT CONNECTIONS SHALL BE SHORT EXTENSIONS OF LIQUIDTIGHT FLEXIBLE METAL CONDUIT TO ALLOW FOR VIBRATION.
 3. PROVIDE OUTLET BOXES AS SHOWN ON THE DRAWINGS, AND AS REQUIRED FOR SPLICES, TAPS, WIRE PULLING, EQUIPMENT CONNECTIONS, DEVICE INSTALLATION AND CODE COMPLIANCE.
 4. INSTALL FITTINGS AND FLEXIBLE METAL CONDUIT TO ACCOMMODATE 3-AXIS MOVEMENTS WHERE RACEWAY CROSSES SEISMIC JOINTS. INSTALL FITTINGS DESIGNED AND LISTED TO ACCOMMODATE EXPANSION AND CONTRACTION WHERE RACEWAY CROSSES CONTROL AND EXPANSION JOINTS.
 5. USE MULTIPLE-GANG BOXES WHERE MORE THAN ONE DEVICE ARE MOUNTED TOGETHER; DO NOT USE SECTIONAL BOXES.
 6. SUPPORT BOXES INDEPENDENTLY OF CONDUIT.

26 05 53 – IDENTIFICATION FOR ELECTRICAL SYSTEMS

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIALS:
1. NAMEPLATES: ENGRAVED THREE-LAYER LAMINATED PLASTIC, WHITE LETTERS ON A BLACK BACKGROUND. NAMEPLATES SHALL BE PROVIDED TO IDENTIFY ALL NEW ELECTRICAL EQUIPMENT AND LOADS SERVED.
 2. TAPE LABELS: ADHESIVE TAPE LABELS, WITH 3/16 INCH BOLD BLACK LETTERS ON CLEAR BACKGROUND MADE USING DYMO RHINO SERIES OR EQUAL LABEL PRINTER.
 3. WIRE AND CABLE MARKERS: CLOTH MARKERS, SPLIT SLEEVE OR TUBING TYPE.

C. INSTALLATION:

1. GEAR: PROVIDE ENGRAVED THREE-LAYER LAMINATED PLASTIC NAMEPLATES WITH WHITE LETTERS ON A BLACK BACKGROUND TO IDENTIFY ALL MOTOR STARTERS, DISCONNECT SWITCHES AND CONTROL EQUIPMENT.
2. CONDUITS: MARK ALL CONDUITS ENTERING OR LEAVING PANELBOARDS WITH INDELIBLE BLACK MAGIC MARKER WITH THE CIRCUIT NUMBERS OF THE CIRCUITS CONTAINED INSIDE.
3. JUNCTION BOXES: MARK ALL CIRCUIT NUMBERS OF WIRING ON ALL JUNCTION BOXES WITH SHEET STEEL COVERS. MARK WITH INDELIBLE BLACK MARKER. ON EXPOSED JUNCTION BOXES IN PUBLIC AREAS, MARK ON INSIDE OF COVER.
4. WIRE IDENTIFICATION: PROVIDE WIRE MARKERS ON EACH CONDUCTOR IN PANELBOARD GUTTERS, PULL BOXES, OUTLET AND JUNCTION BOXES, AND AT LOAD CONNECTION. MARKERS SHALL BE LOCATED WITHIN ONE INCH OF EACH CABLE END, EXCEPT AT PANELBOARDS, WHERE MARKERS FOR BRANCH CIRCUIT CONDUCTORS SHALL BE VISIBLE WITHOUT REMOVING PANEL DEADFRONT.

26 05 83 – WIRING CONNECTIONS

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIALS: NOT USED.
- C. INSTALLATION:
1. OBTAIN AND REVIEW SHOP DRAWINGS, PRODUCT DATA, MANUFACTURER'S WIRING DIAGRAMS, AND MANUFACTURER'S INSTRUCTIONS FOR EQUIPMENT FURNISHED UNDER OTHER SECTIONS. DETERMINE CONNECTION LOCATIONS AND REQUIREMENTS. SEQUENCE ROUGH-IN OF ELECTRICAL CONNECTIONS TO COORDINATE WITH INSTALLATION OF EQUIPMENT. SEQUENCE ELECTRICAL CONNECTIONS TO COORDINATE WITH START-UP OF EQUIPMENT
 2. USE WIRE AND CABLE WITH INSULATION SUITABLE FOR TEMPERATURES ENCOUNTERED IN HEAT-PRODUCING EQUIPMENT.
 3. MAKE CONDUIT CONNECTIONS TO EQUIPMENT THAT IS SUBJECT TO VIBRATION OR MOVEMENT USING FLEXIBLE CONDUIT. USE LIQUIDTIGHT FLEXIBLE CONDUIT IN DAMP OR WET LOCATIONS.
 4. MAKE WIRING CONNECTIONS IN CONTROL PANEL OR IN WIRING COMPARTMENT OF PRE-WIRED EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. PROVIDE INTERCONNECTING WIRING WHERE REQUIRED.
 5. INSTALL DISCONNECT SWITCHES, CONTROLLERS, CONTROL STATIONS, AND CONTROL DEVICES AND CONNECT WITH CONDUIT AND WIRING AS INDICATED IN THE EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS.
 6. WHERE RECONNECTING EXISTING EQUIPMENT, EXTEND CONNECTIONS USING MATERIALS AND METHODS COMPATIBLE WITH EXISTING ELECTRICAL INSTALLATIONS, OR AS SPECIFIED

26 24 16 – PANELBOARDS

- A. SUBMITTALS: NONE REQUIRED FOR THIS SECTION.
- B. MATERIAL:
1. MANUFACTURERS: SQUARE D, GE, EATON, OR EQUAL.
 2. NEW BREAKERS IN EXISTING PANELS: NEMA AB 1; UL LISTED FOR USE IN THE PANEL, AMPERE RATING AND NUMBER OF POLES AS INDICATED ON PLANS. AIC RATING SHALL MATCH THE LOWEST RATED DEVICE IN THE PANEL.
- C. INSTALLATION:
1. PROVIDE UPDATED, TYPED CIRCUIT DIRECTORIES FOR EACH PANELBOARD IN WHICH CHANGES HAVE BEEN MADE.
 2. INSTALL NEW BREAKER(S) IN EXISTING PANEL(S) AND TEST FOR PROPER OPERATION.

26 28 19 – ENCLOSED SWITCHES

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
1. MANUFACTURERS: SQUARE D, GE, EATON, OR EQUAL
 2. FUSIBLE SWITCH ASSEMBLIES: NEMA KS 1; TYPE HD; QUICK-MAKE, QUICK-BREAK, HEAVY-DUTY LOAD INTERRUPTER ENCLOSED KNIFE SWITCH WITH EXTERNALLY OPERABLE HANDLE INTERLOCKED TO PREVENT OPENING FRONT COVER WITH SWITCH IN ON POSITION. HANDLE LOCKABLE IN OFF POSITION. ENCLOSURE SHALL BE NEMA KS 1; TYPE 1, 3R OR 4 AS INDICATED ON DRAWINGS. FUSES SHALL BE CLASS RK1; RK5; DUAL ELEMENT, CURRENT LIMITING, TIME DELAY, ONE-TIME FUSES, 600V, WITH AN INTERRUPTING RATING OF 200,000 RMS AMPERES.
 3. NONFUSIBLE SWITCH ASSEMBLIES: SAME CRITERIA AS ABOVE WITHOUT THE FUSES.
- C. INSTALLATION:
1. INSTALL DISCONNECT SWITCHES IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS. FIELD LOCATE FINAL LOCATION OF DISCONNECTS TO ALLOW READY ACCESS AND NEC 110.26 WORKING CLEARANCES WHERE APPLICABLE.
 2. ALL FUSED DISCONNECTS SHALL HAVE SIGNAGE FOR ARC HAZARD INSTALLED. THE MARKING SHALL BE LOCATED TO BE CLEARLY VISIBLE TO QUALIFIED PERSONNEL BEFORE EXAMINATION, ADJUSTMENT, SERVICING OR MAINTENANCE OF THE EQUIPMENT. AT A MINIMUM THE 3-LINE SIGNAGE SHALL STATE THE FOLLOWING: WARNING – ARC FLASH AND SHOCK HAZARD – APPROPRIATE PPE REQUIRED

26 29 13 – ENCLOSED CONTROLLERS

- A. SUBMITTALS: SUBMIT PRODUCT DATA FOR APPROVAL.
- B. MATERIALS:
1. MANUFACTURERS: SQUARE D, GE, EATON, OR EQUAL
 2. MANUAL AND FRACTIONAL MOTOR STARTERS: NEMA ICS 2, AC GENERAL PURPOSE CLASS A, MANUALLY OPERATED UNIT WITH NUMBER OF POLES AS REQUIRED BY THE LOAD SERVED, FULL-VOLTAGE CONTROLLER FOR FRACTIONAL HORSEPOWER INDUCTION MOTORS, WITH THERMAL OVERLOAD UNIT, RED PILOT LIGHT, AND TOGGLE OPERATOR.
 3. MAGNETIC MOTOR STARTERS: NEMA ICS 2; AC GENERAL-PURPOSE CLASS A, FULL VOLTAGE STARTING, NON-REVERSING TYPE MAGNETIC CONTROLLER FOR INDUCTION MOTORS RATED IN HORSEPOWER. PROVIDE BI-METAL THERMAL OVERLOAD RELAY. COMBINE MOTOR STARTERS IN COMMON ENCLOSURE WITH MOTOR CIRCUIT PROTECTOR THAT HAS INTEGRAL INSTANTANEOUS MAGNETIC TRIP IN EACH POLE. INCLUDE TWO FIELD CONVERTIBLE CONTACTS IN ADDITION TO SEAL-IN CONTACT, RED LED LIGHT, AND HAND/OFF/AUTO SELECTOR SWITCH IN FRONT COVER. INCLUDE A THREE PHASE POWER MONITOR IN EACH THREE PHASE MAGNETIC STARTER CONNECTED TO SHUT DOWN THE MOTOR ON LOSS OF ANY PHASE, PHASE REVERSAL, OR LOW VOLTAGE ON ANY PHASE. POWER MONITOR SHALL AUTOMATICALLY RESET AND RESTART MOTOR WHEN PHASE AND VOLTAGE CONDITIONS RETURN TO NORMAL. PROVIDE OVERSIZE STARTER ENCLOSURES AS REQUIRED TO INSTALL POWER MONITOR.

C. INSTALLATION

1. SELECT AND INSTALL HEATER ELEMENTS IN MOTOR STARTERS TO MATCH INSTALLED MOTOR CHARACTERISTICS.
2. FIELD ADJUST THE TRIP SETTINGS OF ALL MOTOR STARTER MAGNETIC TRIP ONLY CIRCUIT BREAKERS TO APPROXIMATELY 11 TIMES MOTOR FULL LOAD CURRENT. DETERMINE FULL LOAD CURRENT FROM MOTOR NAMEPLATE FOLLOWING INSTALLATION.
3. AFTER FINAL CONNECTIONS ARE MADE, CHECK AND CORRECT THE ROTATION OF ALL MOTORS.
4. MOTOR STARTING EQUIPMENT SHALL BE LISTED FOR USE AND PROPERLY SIZED FOR OPERATION WITH THE MOTORS SPECIFIED BY MECHANICAL.



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REPLACEMENT**

**435 S DENALI STREET
PALMER, ALASKA 99645**

REVISIONS:

DRAWN BY: CSZ
CHECKED BY: DAO, CPL
DATE: 11/24/2021
JOB NUMBER: M1195.00
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SPECIFICATIONS

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E401