

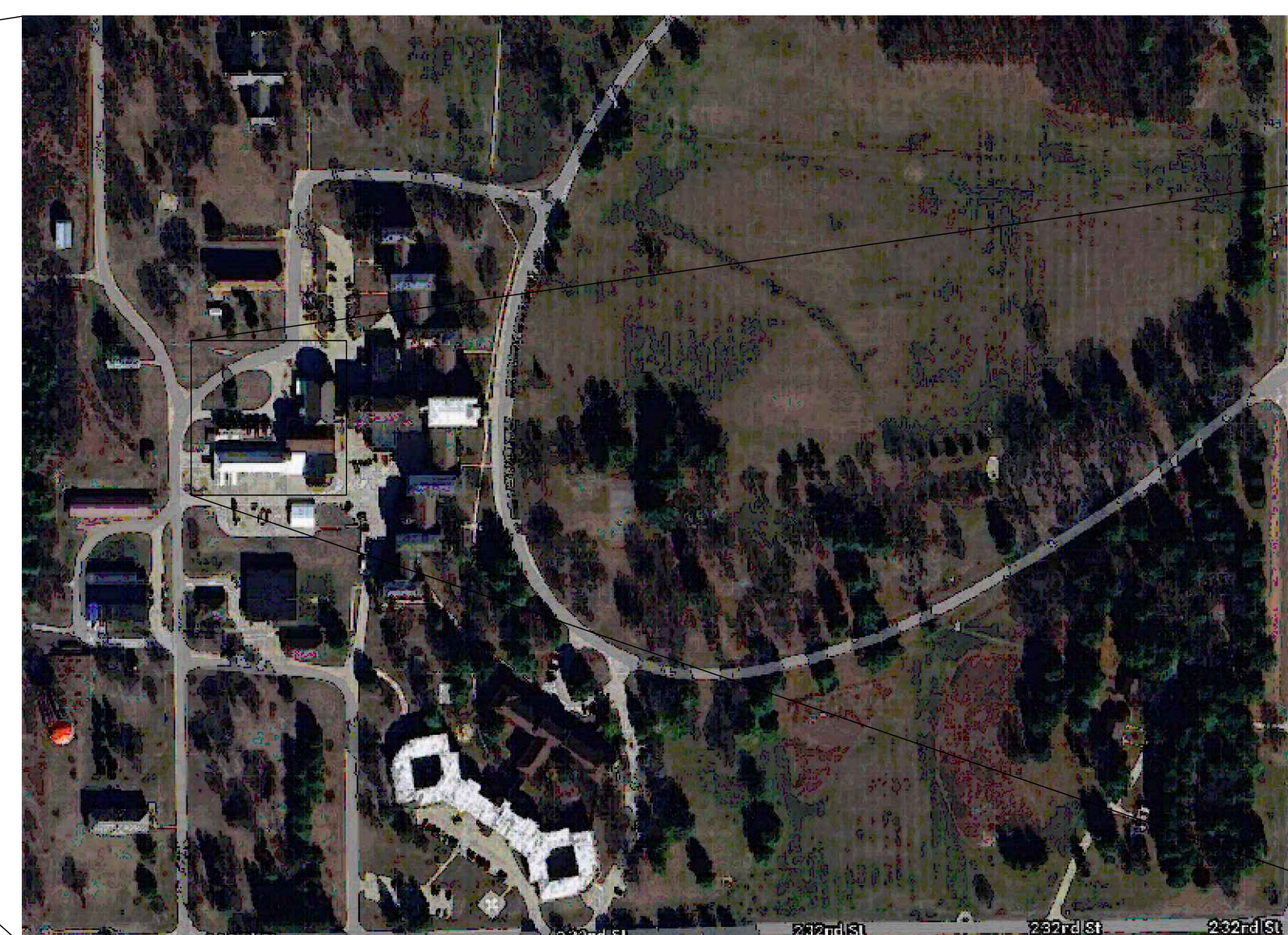
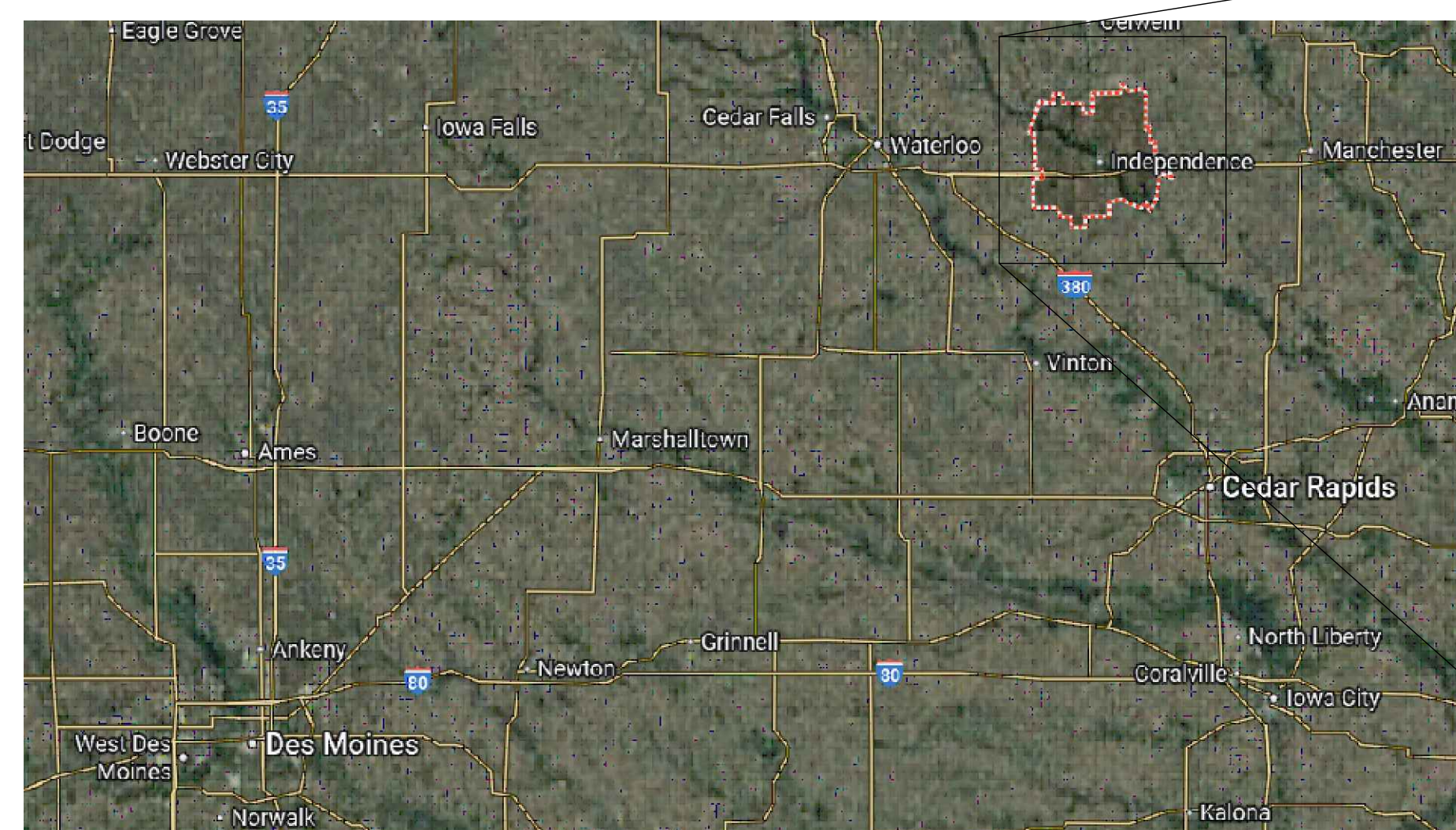
# CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT

## 100% CD SUBMITTAL

### COVER SHEET

#### SHEET INDEX

SHEET NUMBER	SHEET DESCRIPTION
MC	COVER SHEET
M000	GENERAL NOTES AND SYMBOLS
MD100	MECHANICAL DEMO ENLARGED BASEMENT PLAN
MD101	MECHANICAL DEMO ENLARGED FIRST FLOOR PLAN
M100	MECHANICAL ENLARGED BASEMENT PLAN
M101	MECHANICAL ENLARGED FIRST FLOOR PLAN
M300	MECHANICAL PIPING FLOW DIAGRAM
M500	MECHANICAL DETAILS AND SCHEDULES
M501	MECHANICAL PIPING AND INSULATION STANDARDS
M502	MECHANICAL PIPING AND INSULATION STANDARDS
M503	MECHANICAL PIPING AND INSULATION STANDARDS
M504	MECHANICAL PIPING AND INSULATION STANDARDS
S000	STRUCTURAL PLANS AND DETAILS
E000	ELECTRICAL GENERAL NOTES AND SYMBOLS
E100	ELECTRICAL FIRST FLOOR PLAN



SITE PLAN



"POWER HOUSE" BOILER ROOM

CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT

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Sheet Name:

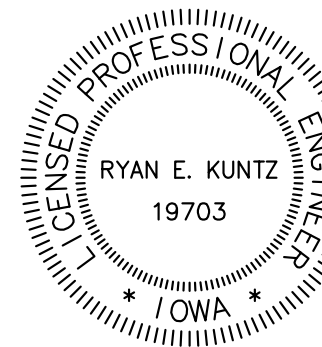
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Scale:

Sheet:

MC

I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Iowa.


 RYAN E. KUNTZ  
19703

Ryan E. Kuntz Reg. No. 19703 Date 11/14/2025

My license renewal date is December 31, 2025.

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 ERIC HEYENEN  
P24706

Eric Heynen, P.E. P24706 11-14-25  
ERIC HEYENEN, P.E. REG. NO. P24706 DATE 11-14-25  
MY LICENSE RENEWAL DATE IS DECEMBER 31, 2026

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 JACOB R. PRICE  
P25379

Jacob Price P25379 11-14-25  
JACOB PRICE REG. NO. P25379 DATE 11-14-25  
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Sheet Name:

GENERAL NOTES AND SYMBOLS

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M000

**PLUMBING - NOTES**

- COORDINATE WORK WITH ALL OTHER TRADES AS DESCRIBED IN MECHANICAL GENERAL NOTE #1.
- PROVIDE A COMPLETE PLUMBING SYSTEM INCLUDING PIPE, INSULATION, HANGERS, SUPPORTS, EQUIPMENT, WATER HEATERS, FIXTURES, MIXING VALVES, VALVES, ACCESSORIES AND SPECIALTIES. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. SIZE AND INSTALL PLUMBING SYSTEM PER PLUMBING CODE. COMPLY WITH ALL STATE CODES AND OWNER'S REQUIREMENTS.
- DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF PLUMBING SYSTEM.
- EXISTING PLUMBING DISTRIBUTION AND EQUIPMENT SHOWN ARE BASED ON NON-DESTRUCTIVE SITE OBSERVATION AND AS-BUILT DOCUMENTS PROVIDED BY THE OWNER. FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING LOCATING UNDER FLOOR PIPING AND PIPING CONCEALED IN BUILDING ASSEMBLIES WHERE WORK IS REQUIRED.
- SEAL ALL WALL PIPE PENETRATIONS. PROVIDE THROUGH-PENETRATION FIRESTOPPING WHERE REQUIRED. REFER TO ENGINEER DRAWINGS FOR WALL, FLOOR, AND CEILING ASSEMBLY RATINGS.
- CONTINUE PIPE INSULATION THROUGH WALL, FLOOR, AND CEILING PENETRATIONS UNBROKEN. SEAL AROUND PIPE INSULATION AT PENETRATIONS.
- VERIFY WITH ENGINEER FOR ANY FIXTURES NOT TAGGED OR PIPED PRIOR TO ANY WORK. CONTRACTOR IS RESPONSIBLE FOR ALL PLUMBING FIXTURES SHOWN ON DRAWINGS, TAGGED OR NOT TAGGED ON PLUMBING / MECHANICAL DRAWINGS UNLESS SPECIFICALLY NOTED AS EXCLUDED FROM SCOPE.

**PIPING LEGEND - PLUMBING**

AV	----	ACID VENT
AW	----	ACID WASTE
CA	----	COMPRESSED AIR
CW	----	DOMESTIC COLD WATER
HW	----	DOMESTIC HOT WATER
DSW	----	DOMESTIC SOFT WATER
GW	----	GREASE WASTE
G	----	NATURAL GAS
GV	----	NATURAL GAS VENT
NPCW	----	NON-POTABLE COLD WATER
NPHW	----	NON-POTABLE HOT WATER
NPSW	----	NON-POTABLE SOFT WATER
OSW	----	OIL / SAND WASTE
PA	----	PROCESSED AIR
LP	----	PROPANE
PD	----	PUMPED DISCHARGE
RHW	----	RECIRCULATING HOT WATER
SAN	----	SANITARY
ST	----	STORM
SO	----	STORM OVERFLOW
P	----	TRAP PRIMER
V	----	VENT

**GENERAL SYMBOLS**

	(E) EXISTING + HALFTONE LINEWORK
	NEW + DARK LINEWORK
	DEMO = DASHED DARK LINEWORK
	BELOW GRADE = LONG DASHED DARK LINEWORK
	POINT OF DISCONNECT OR NEW CONNECTION POINT
	KEYNOTE
	EQUIPMENT IDENTIFICATION TAG
	DETAIL DRAWING REFERENCE TAG, SIM-SIMILAR, TYP-TYPICAL, OPP-OPPOSITE SHEET REFERENCE
	SECTION CUT REFERENCE TAG, SIM-SIMILAR, TYP-TYPICAL, OPP-OPPOSITE SHEET REFERENCE
	INTERIOR ELEVATION DRAWING REFERENCE TAG

**MECHANICAL ABBREVIATIONS**

ABSOR	ABSORPTION	FT	FINTUBE
ACU	AIR CONDITIONING UNIT	FTG	FOOTING
AD	ACCESS DOOR OR AREA	GA	GAGE
AFF	ABOVE FINISHED FLOOR	GAL	GALLON
AFG	ABOVE FINISHED GRADE	GALV	GALVANIZED
AHU	AIR HANDLING UNIT	GC	GENERAL CONTRACTOR
AV	AIR VENT	GW	GREASE WASTE
BOT	BOITOM	GPH	GALLONS PER HOUR
BTU	BRITISH THERMAL UNIT	GM	GALLONS PER MINUTE
BTUH	BTU PER HOUR	HR	HOUR
BV	BALL VALVE	HTG	HEATING
CA	COMPRESSED AIR	HB	HOSE BIBB
CB	CATCH BASIN	ISP	INTERNAL STATIC PRESSURE
CENT	CENTRIFUGAL	JR	JANITOR RECEPTOR
CFM	CUBIC FEET PER MINUTE	LAV	LAVATORY
CI	CAST IRON	LDBT	LEAVING DRY BULB
CL	CENTER LINE	LWT	TEMPERATURE
COND	CONDENSATE	LWT	TEMPERATURE
CO	CLEAN OUT	LWB	LEAVING WET BULB
CONC.	CONCRETE	LWB	TEMPERATURE
CONTR	CONTRACTOR	MB	MOP BASIN
CP	CONDENSATE PUMP/CIRC. PUMP	MBH	1000 BTUH
CJ	COPPER	MC	MECHANICAL CONTRACTOR
CJH	CABINET UNIT HEATER	MECH	MECHANICAL
CWP	CIRCULATING WATER PUMP	MH	MANHOLE
DDC	DIRECT DIGITAL CONTROLS	NIS	NOT TO SCALE
DN	DOWN	OA	OUTSIDE AIR
DR	DRAIN	OD	OVERFLOW ROOF DRAIN
DS	DOWNSPOUT	PC	PLUMBING CONTRACTOR
EA	EXHAUST AIR	PSI	POUNDS PER SQUARE INCH
EAT	EXHAUST AIR TEMPERATURE	PRV	POWER ROOF VENTILATOR
EC	ELECTRICAL CONTRACTOR	PRV	PRESSURE REDUCING VALVE
EDBT	ENTERING DRY BULB	PV	PRESSURE VENT
TEMPERATURE		PVC	POLYVINYL CHLORIDE
EWF	EMERGENCY EYE WASH	RA	RETURN AIR
EF	EXHAUST FAN	RD	ROOF DRAIN
EJ	EXPANSION JOINT	RH	RELATIVE HUMIDITY
EQUIP	EQUIPMENT	RTU	ROOF TOP UNIT
ESE	EMERGENCY SHOWER/EYEWASH	RV	RELIEF VALVE
EST	EXTERNAL STATIC PRESSURE	RTU	ROOF VENT TERMINATION
EWBT	ENTERING WET BULB	SA	SUPPLY AIR
TEMPERATURE		SH	SHOWER
EWC	ELECTRIC WATER COOLER	SO	STORM OVERFLOW
EWT	ENTERING WATER	ST	STORM
TEMPERATURE		TCC	TEMPERATURE CONTROL CONTRACTOR
EX	EXISTING	TYP	TYPICAL
EAH	EXHAUST	UH	UNIT HEATER
EIP	EXPANSION	UR	URINAL
FAI	FRESH AIR INTAKE	UV	UNIT VENTILATOR
FCU	FAN COIL UNIT	VA	VENTILATION AIR
FD	FLOOR DRAIN	VTR	VENT THROUGH ROOF
FDC	FIRE DEPARTMENT CONNECTION	WB	WALL BOX - CONDENSATE
FLEX	FLEXIBLE	WC	WATER CLOSET
FIB	FLOOR	WHA	WATER HAMMER ARRESTOR
FPM	FEET PER MINUTE	WH	WATER HEATER
FPS	FEET PER SECOND		
FS	FLOOR SINK		
FSEC	FOOD SERVICE EQUIPMENT CONSULTANT		

**PIPING LEGEND - MECHANICAL**

BD	----	BOILER BLOWDOWN
BF	----	BOILER FEED
CWR	----	CHILLED WATER RETURN
CWS	----	CHILLED WATER SUPPLY
CD	----	CONDENSATE DRAIN
PC	----	PUMPED CONDENSATE
CR	----	CONDENSER WATER RETURN
CS	----	CONDENSER WATER SUPPLY
EA	----	EXHAUST PIPE - PVC
FOR	----	FUEL OIL RETURN
FOS	----	FUEL OIL SUPPLY
FOV	----	FUEL OIL VENT
HPWR	----	HEAT PUMP WATER RETURN
HPWS	----	HEAT PUMP WATER SUPPLY
HPS	----	HIGH PRESSURE STEAM
HPC	----	HIGH PRESSURE STEAM CONDENSATE
HCR	----	HOT/CHILLED WATER RETURN
HCS	----	HOT/CHILLED WATER SUPPLY
HWR	----	HYDRONIC RETURN
HWS	----	HYDRONIC SUPPLY
LWR	----	LOOP WATER RETURN
LWS	----	LOOP WATER SUPPLY
LPS	----	LOW PRESSURE STEAM
LPC	----	LOW PRESSURE STEAM CONDENSATE
MPS	----	MEDIUM PRESSURE STEAM
MPC	----	MEDIUM PRESSURE STEAM CONDENSATE
RS	----	REFRIGERANT GAS
RHG	----	REFRIGERANT HOT GAS
RL	----	REFRIGERANT LIQUID

**MECHANICAL - GENERAL NOTES**

- COORDINATE MECHANICAL AND ELECTRICAL WORK WITH ALL OTHER TRADES. BEGIN INSTALLATION AND ROUGH-IN AFTER COORDINATION WITH ALL TRADES ASSOCIATED WITH THE INSTALLATION IS COMPLETE. COORDINATE BUILDING STRUCTURE, ARCHITECTURAL ASSEMBLIES, SHEET METAL, ALL PIPING SYSTEMS, LIGHT FIXTURES, CONDUITS, CABLE TRAYS, ETC. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. CONTRACTOR IS RESPONSIBLE FOR REWORK ASSOCIATED WITH FAILURE TO COORDINATE.
- INCORPORATE MECHANICAL SPECIFICATIONS, DRAWINGS AND STATE CODES.
- WARNING - CALL 48 HOURS BEFORE YOU DIG. LAW REQUIRES ANYONE DOING ANY EXCAVATION, FENCING, PLANTING OR DRILLING TO CALL 48 HOURS IN ADVANCE. HAND DIG WITHIN 18 INCHES OF ANY LOCATE MARK OR FLAG. ONE CALL 811. THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK.
- EACH TRADE IS RESPONSIBLE FOR MAKING PENETRATIONS WHERE REQUIRED IN EXISTING WALLS, FLOORS, CEILINGS, AND ROOFS. MAKE PENETRATIONS NEAT, PATCH, CONCEAL, OR CAULK OVERCUT.
- COVER EXPOSED WALL PENETRATIONS WITH ESCUTCHEONS OR SHEET METAL AS APPROPRIATE.
- CAULK ALL CONCEALED AND EXPOSED PIPING AND DUCT WALL PENETRATIONS TO PREVENT NOISE TRANSFER BETWEEN SPACES.
- CREATE OPENINGS IN THE BUILDING THAT ARE REQUIRED TO REMOVE EXISTING ITEMS AND TO BRING IN NEW EQUIPMENT. PATCH ALL OPENINGS CREATED AND FINISHED WITH MATERIALS TO MATCH EXISTING CONDITIONS. INCLUDE THIS WORK IN BID.
- ON COMPLETION OF THE INSTALLATION, COOPERATE WITH THE OWNER TO PROVIDE TESTING, ADJUSTING, AND BALANCING TO OBTAIN PROPER OPERATION OF ALL EQUIPMENT AND SYSTEMS. PROVIDE ALL FACILITIES AND EQUIPMENT AND COMPLETE ALL TESTS REQUIRED FOR ADJUSTMENTS AND BALANCING TO ESTABLISH THE PROPER PERFORMANCE OF EQUIPMENT.

**MECHANICAL - DEMOLITION NOTES**

- MECHANICAL DEMOLITION DRAWINGS SHOWING EXISTING CONDITIONS HAVE BEEN PREPARED BASED ON NON-DESTRUCTIVE FIELD OBSERVATION AND AS-BUILT DRAWINGS PROVIDED BY THE OWNER. FIELD VERIFY EXISTING SYSTEMS BEFORE BEGINNING WORK. NOTIFY ENGINEER IF EXISTING CONDITIONS ARE MATERIALLY DIFFERENT THAN THOSE SHOWN ON THE PLANS.
- BE FAMILIAR WITH EXISTING MECHANICAL SYSTEMS THAT WILL BE AFFECTED BY THE DEMOLITION WORK. OBTAIN PERMISSION FROM THE OWNER'S REPRESENTATIVE TO SHUT OFF SERVICES OR SYSTEMS THAT AFFECT AREAS BEYOND THE LIMITS OF THE IMMEDIATE DEMOLITION AREA. INFORM THE OWNER'S REPRESENTATIVE OF THE REASON FOR AND DURATION OF THE SHUTDOWN. MINIMIZE IMPACT TO OTHER AREAS. PROCEED WITH THE SHUT-DOWN AFTER PERMISSION FROM THE OWNER IS GRANTED.
- REMOVE PIPING, HANGERS, DUCTWORK, GRILLES, REGISTERS, DIFFUSERS, ETC. THAT ARE INDICATED TO BE REMOVED IN A TIMELY MANNER IN ACCORDANCE WITH THE GENERAL DEMOLITION SPECIFICATIONS. COORDINATE WITH THE OWNER AND OTHER CONTRACTORS.
- UNLESS EQUIPMENT TO BE REMOVED IS NOTED AS OWNER'S SALVAGE, DISPOSE OF EQUIPMENT AND/OR MATERIALS INDICATED TO BE REMOVED PROMPTLY.
- REMOVE ALL ABANDONED PIPING AND DUCTWORK THAT IS EXPOSED OR ACCESSIBLE WITHOUT WALL OR CEILING DEMOLITION. REFER TO ENGINEER PLANS FOR CEILINGS TO BE REMOVED.

**HVAC - NOTES**

- COORDINATE WORK WITH ALL OTHER TRADES AS DESCRIBED IN MECHANICAL GENERAL NOTE #1.
- PROVIDE A COMPLETE HVAC SYSTEM, INCLUDING SUPPLY, RETURN, EXHAUST, AND VENTILATION DUCTWORK; MECHANICAL EQUIPMENT, SUPPORTS, HANGERS, DIFFUSERS, GRILLES, REGISTERS, AND ALL APPURTENANCES. INSTALL ALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. INSTALL SYSTEM TO MEET ALL STATE CODES AND REQUIREMENTS.
- DRAWING PLANS, SCHEMATICS, AND DIAGRAMS INDICATE GENERAL LOCATION AND ARRANGEMENT OF DUCT SYSTEM. INDICATED DUCT LOCATIONS, CONFIGURATIONS, AND ARRANGEMENTS WERE USED TO SIZE DUCTS AND CALCULATE FRICTION LOSS FOR AIR-HANDLING EQUIPMENT SIZING AND FOR OTHER DESIGN CONSIDERATIONS. INSTALL ALL DUCT SYSTEMS AS INDICATED UNLESS DEVIATIONS TO LAYOUT ARE APPROVED BY ENGINEER.
- ALL DUCT DIMENSIONS INDICATED ARE INTERIOR FREE AREA DUCT DIMENSIONS AND DO NOT INCLUDE INSULATION REQUIREMENTS.
- SEAL ALL WALL AND FLOOR DUCT PENETRATIONS. PROVIDE FIRE CAULKING ASSEMBLIES FOR PENETRATIONS OF RATED ASSEMBLIES. REFER TO DRAWINGS FOR ASSEMBLY RATINGS.
- CONTINUE DUCT AND PIPE INSULATION THROUGH WALLS, FLOORS, AND CEILING PENETRATIONS UNBROKEN, EXCEPT WHERE FIRE OR FIRE/SMOKE DAMPERS ARE INSTALLED IN DUCTWORK. SEAL AROUND DUCT INSULATION AT WALL PENETRATIONS.

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Revisions	Date	No.
REV 0	11-14-2025	

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Sheet Name:

MECHANICAL DEMO  
ENLARGED BASEMENT PLAN

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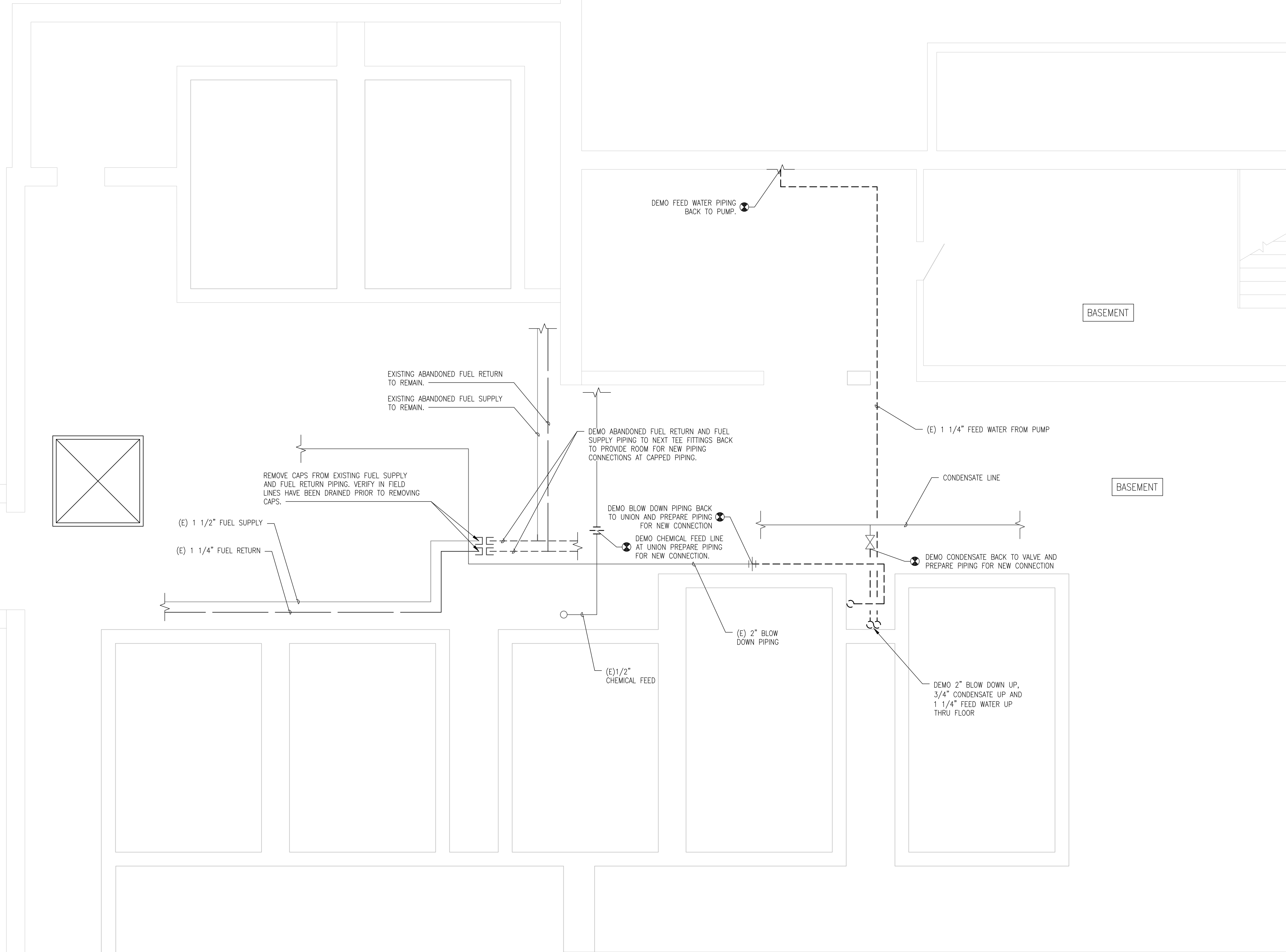
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MD100

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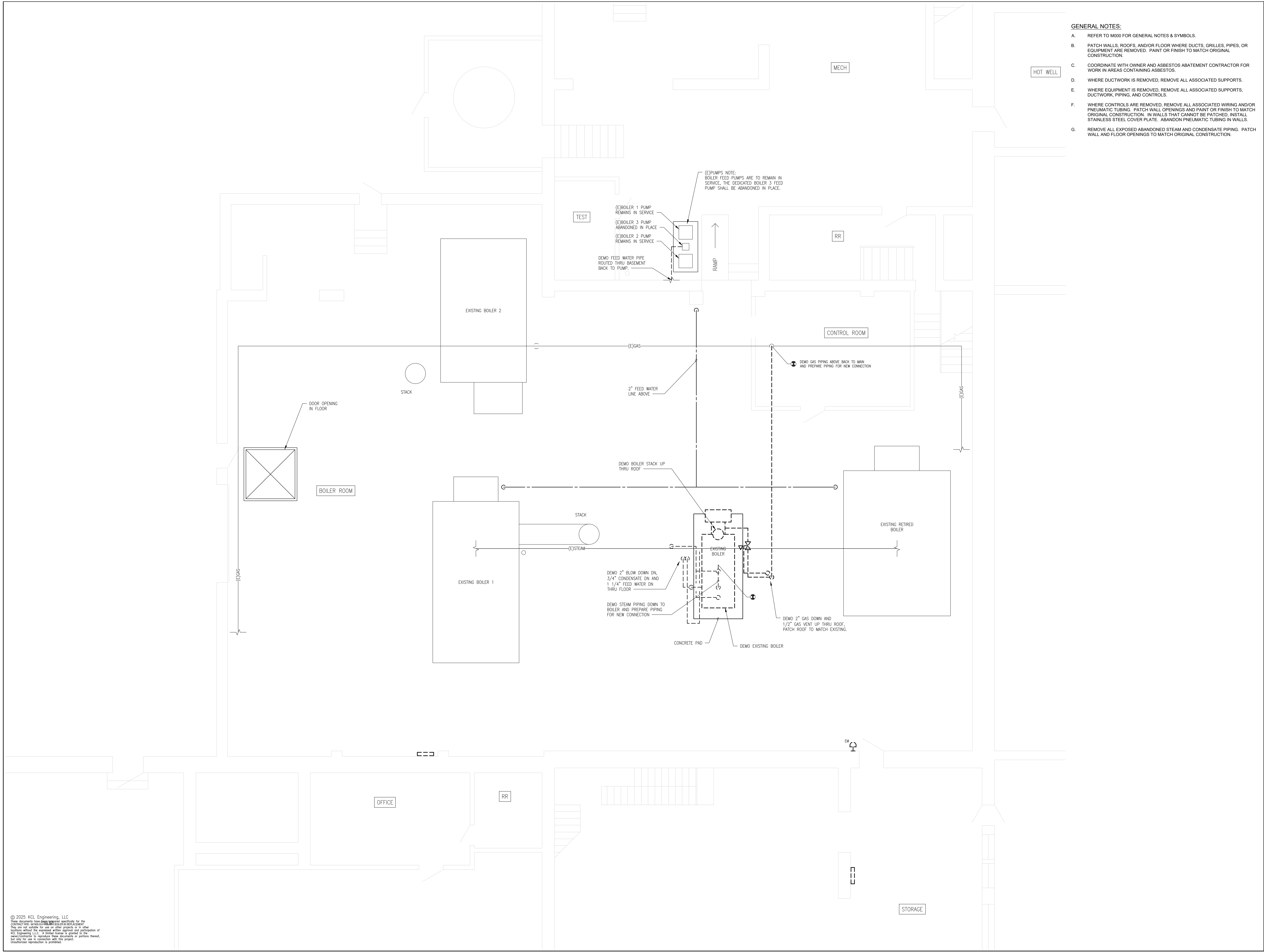
- A. REFER TO M000 FOR GENERAL NOTES & SYMBOLS.
- B. PATCH WALLS, ROOFS, AND/OR FLOOR WHERE DUCTS, GRILLES, PIPES, OR EQUIPMENT ARE REMOVED. PAINT OR FINISH TO MATCH ORIGINAL CONSTRUCTION.
- C. COORDINATE WITH OWNER AND ASBESTOS ABATEMENT CONTRACTOR FOR WORK IN AREAS CONTAINING ASBESTOS.
- D. WHERE DUCTWORK IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS.
- E. WHERE EQUIPMENT IS REMOVED, REMOVE ALL ASSOCIATED SUPPORTS, DUCTWORK, PIPING, AND CONTROLS.
- F. WHERE CONTROLS ARE REMOVED, REMOVE ALL ASSOCIATED WIRING AND/OR PNEUMATIC TUBING. PATCH WALL OPENINGS AND PAINT OR FINISH TO MATCH ORIGINAL CONSTRUCTION. IN WALLS THAT CANNOT BE PATCHED, INSTALL STAINLESS STEEL COVER PLATE. ABANDON PNEUMATIC TUBING IN WALLS.
- G. REMOVE ALL EXPOSED ABANDONED STEAM AND CONDENSATE PIPING. PATCH WALL AND FLOOR OPENINGS TO MATCH ORIGINAL CONSTRUCTION.



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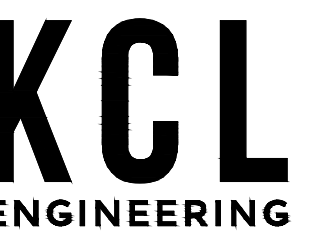
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- B. REFER TO M300 & M500 FOR MECHANICAL DETAILS.
- C. REFER TO M501 - M504 FOR MECHANICAL SCHEDULES.
- D. BRANCH DUCT SIZES TO AIR TERMINALS SHALL MATCH NECK SIZE OF GRILLE, REGISTER, OR DIFFUSER UNLESS NOTED OTHERWISE.
- E. MAXIMUM FLEXIBLE DUCT LENGTH TO DIFFUSERS SHALL BE 60', WITH MAXIMUM OF ONE 90 DEGREE ELBOW.



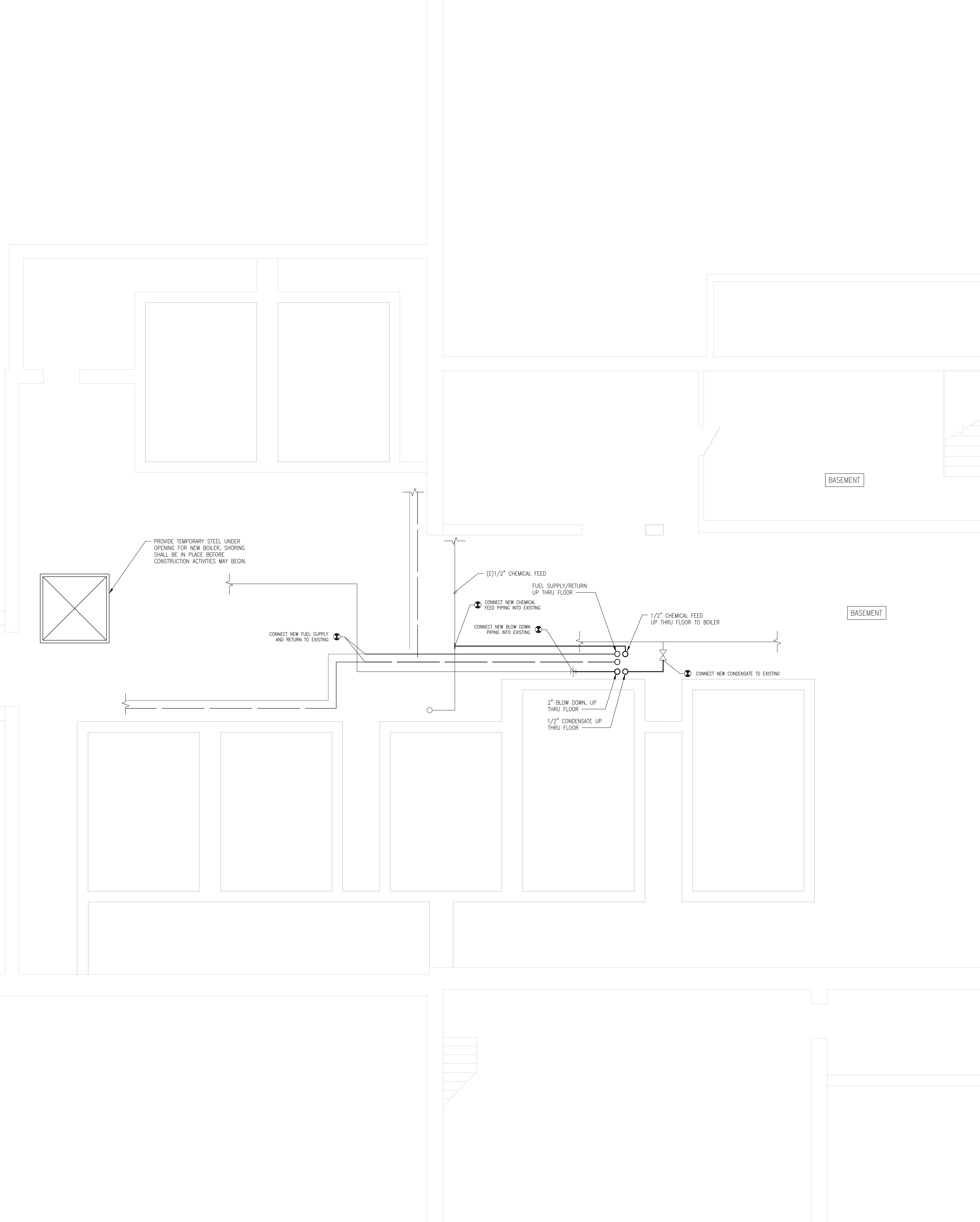
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KCL Project Number: 25224  
Date: 11-14-2025  
Drawn By: C.J.C.  
Checked By: KCL

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Revisions	Date	No.
REV. 0	11-14-2025	



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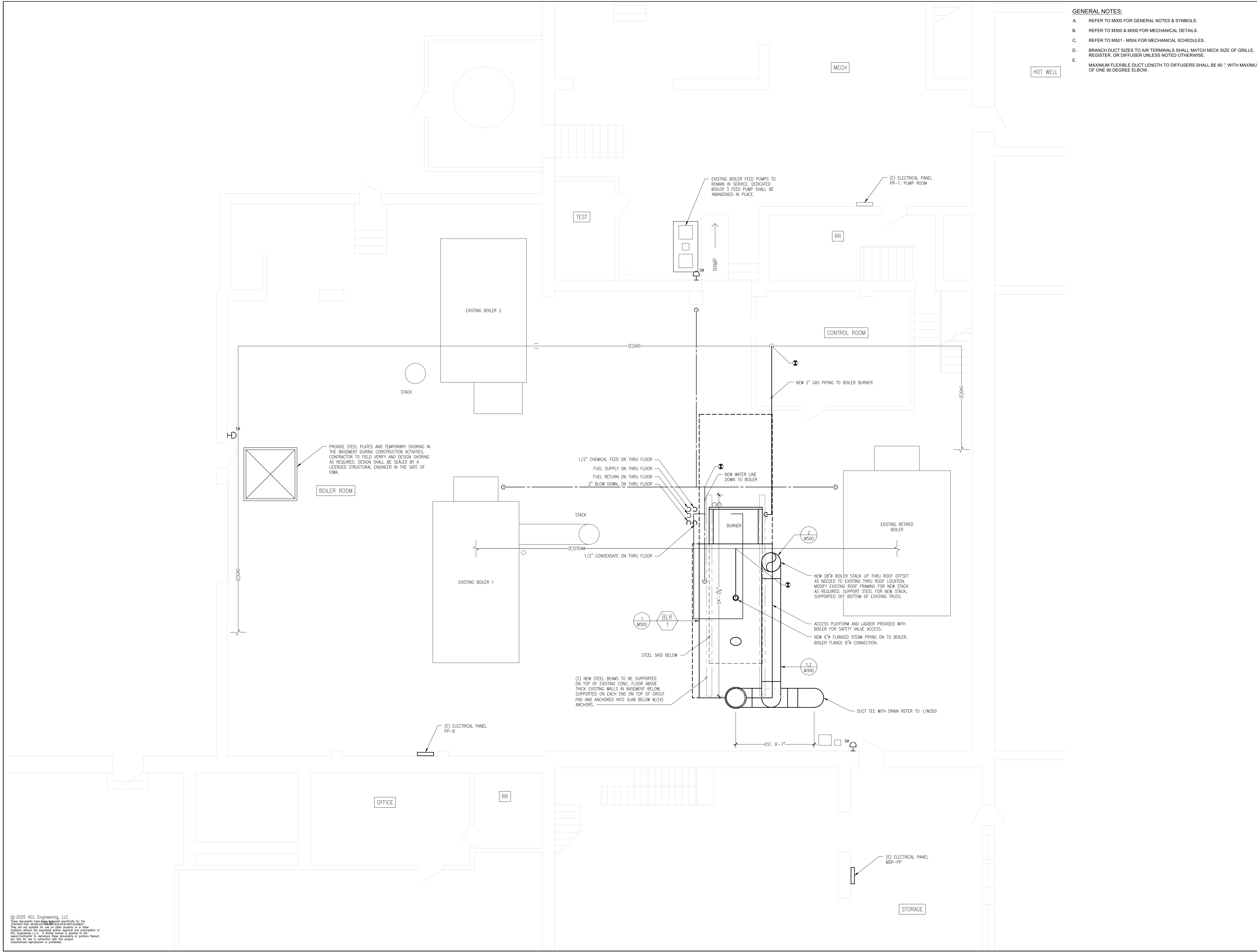
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Sheet Name:	MECHANICAL ENLARGED BASEMENT PLAN
Scale:	1/4" = 1'-0"
Sheet:	

M100

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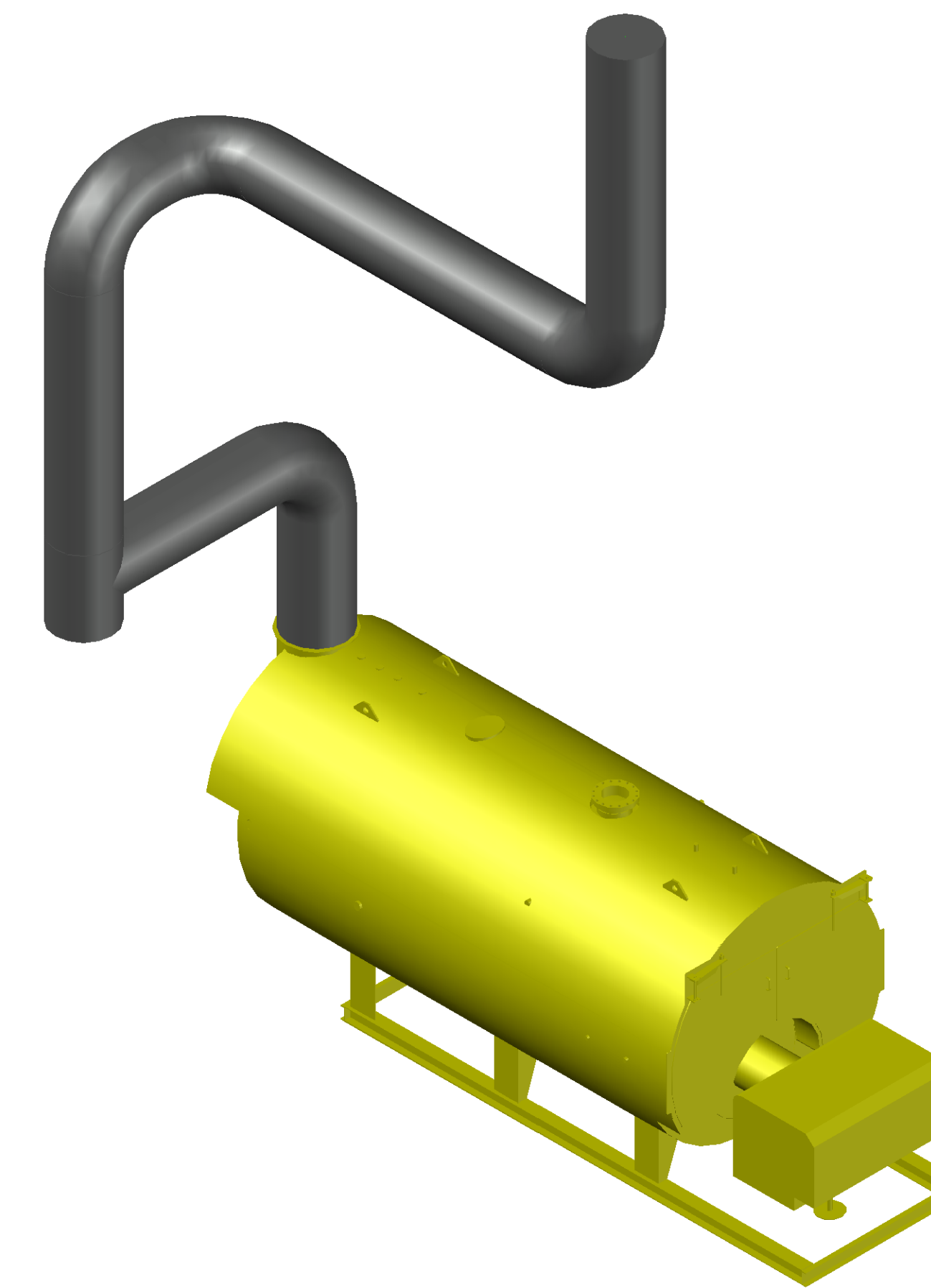


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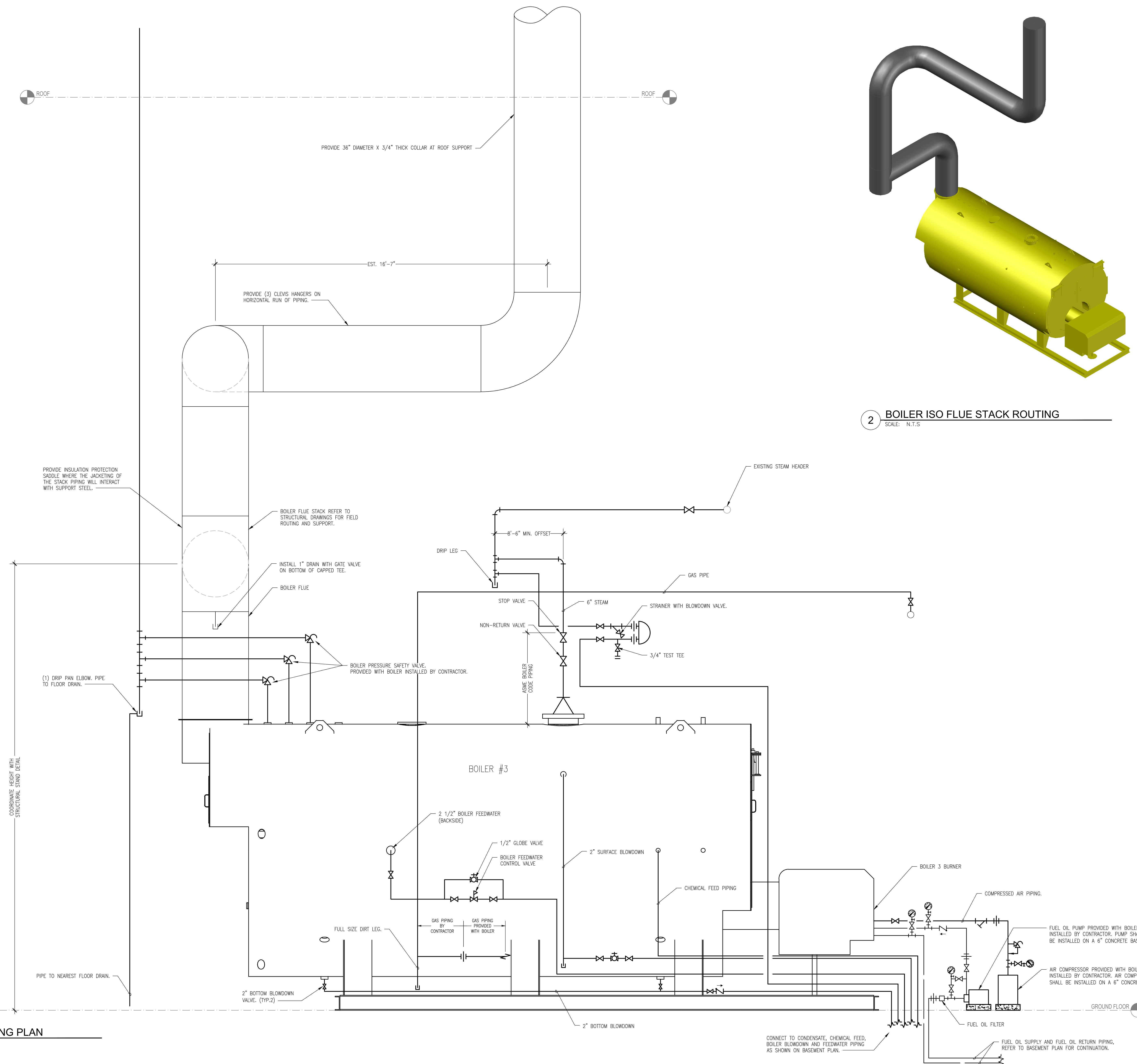
CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT

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Sheet Name:	MECHANICAL ENLARGED FIRST FLOOR PLAN
Scale:	1/4" = 1'-0"
Sheet:	M101

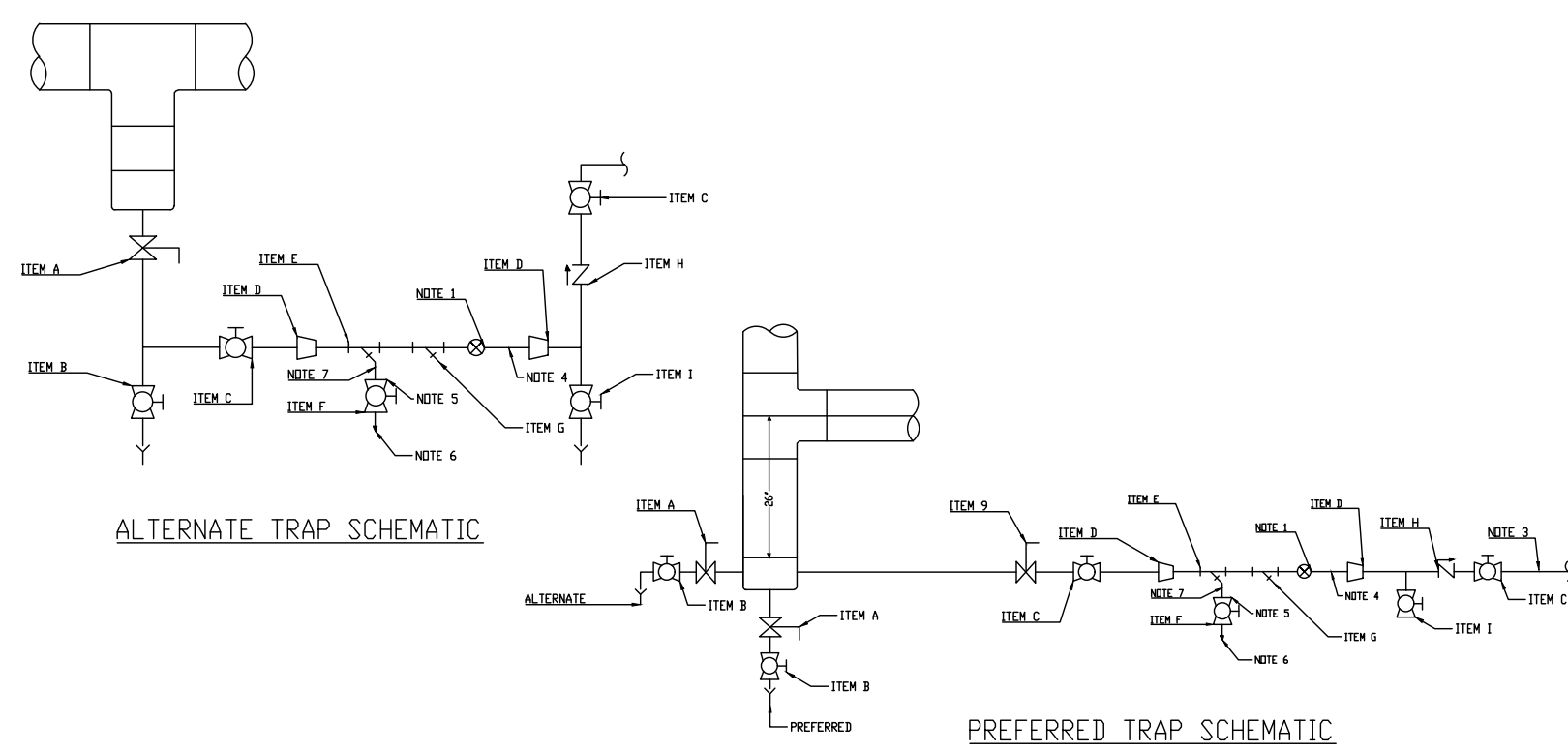


**2 BOILER ISO FLUE STACK ROUTING**  
SCALE: N.T.S.



**1 BOILER SCHEMATIC PIPING PLAN**  
SCALE: N.T.S.

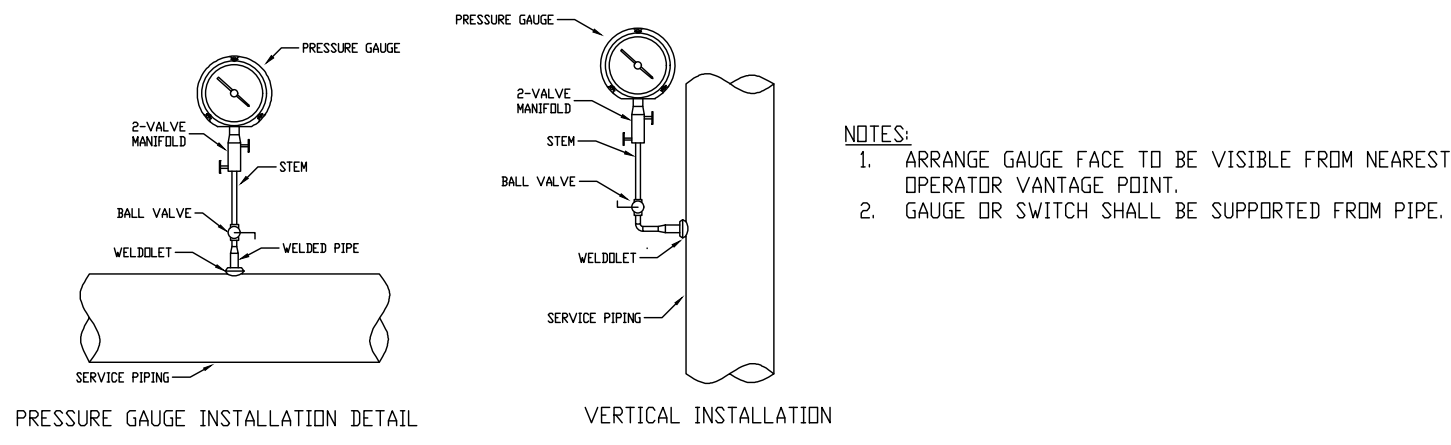
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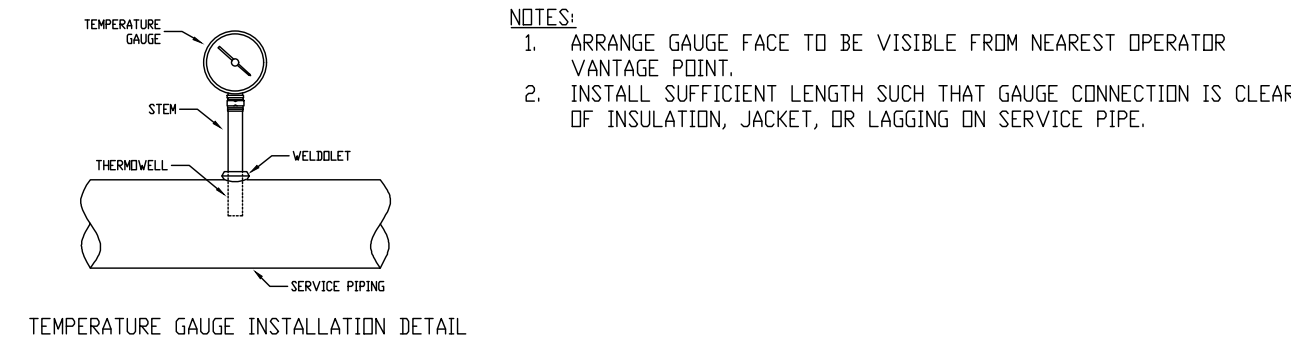
- NOTES:**
- CONDENSATE LINE SIZE SHALL BE SAME AS TRAP SIZE OR 3/4" WHICHEVER IS GREATER
  - TRAP SHALL BE SAME MATERIAL AND PRESSURE CLASS AS IN-BUILDING
  - TRAP SHALL BE 1/2" PIPE SIZE LARGER THAN TRAP CONNECTION, BUT NOT LESS THAN 3/4"
  - PROVIDE UNIVERSAL STRAINER CONNECTOR ON TRAP TO BE SOCKET WELDED INTO CONDENSATE PIPING
  - BLow VALVES FOR STRAINER BLOW SHALL BE LOCATED IN ACCESSIBLE AREA AND AT ACCESSIBLE ELEVATION
  - EXTEND STRAINER BLOW OFF PIPING TO NEAREST DRAIN LINE OR DRAIN POINT
  - INSTALL STRAINER BLOW OFF IN VERTICAL CONFIGURATION TO PREVENT UNSAFE DISCHARGE DIRECTION
  - LOCATE TRAP STATINGS SUCH THAT THEY ARE ACCESSIBLE FROM NEAREST FLOOR OR ELEVATION
  - IF ACCESSIBLE PLATFORM AVOID INSTALLING TRAP STATINGS WITHIN WALKWAYS, AISLES OR SPACES RESERVED FOR EQUIPMENT MAINTENANCE
  - TRAP CONNECTIONS SHALL BE SEAL WELDED, EXCEPT FOR THOSE ON TRAP BODIES
  - CONDENSATE PIPING SHALL BE SELF DRAINING
  - DRIP LEG SAME SIZE PIPE UP TO 6' FOR PIPING LARGER THAN 6'; USE 6' DRIP LEG

**4 REMOTE PRESSURE DETAIL**

SCALE: N.T.S.



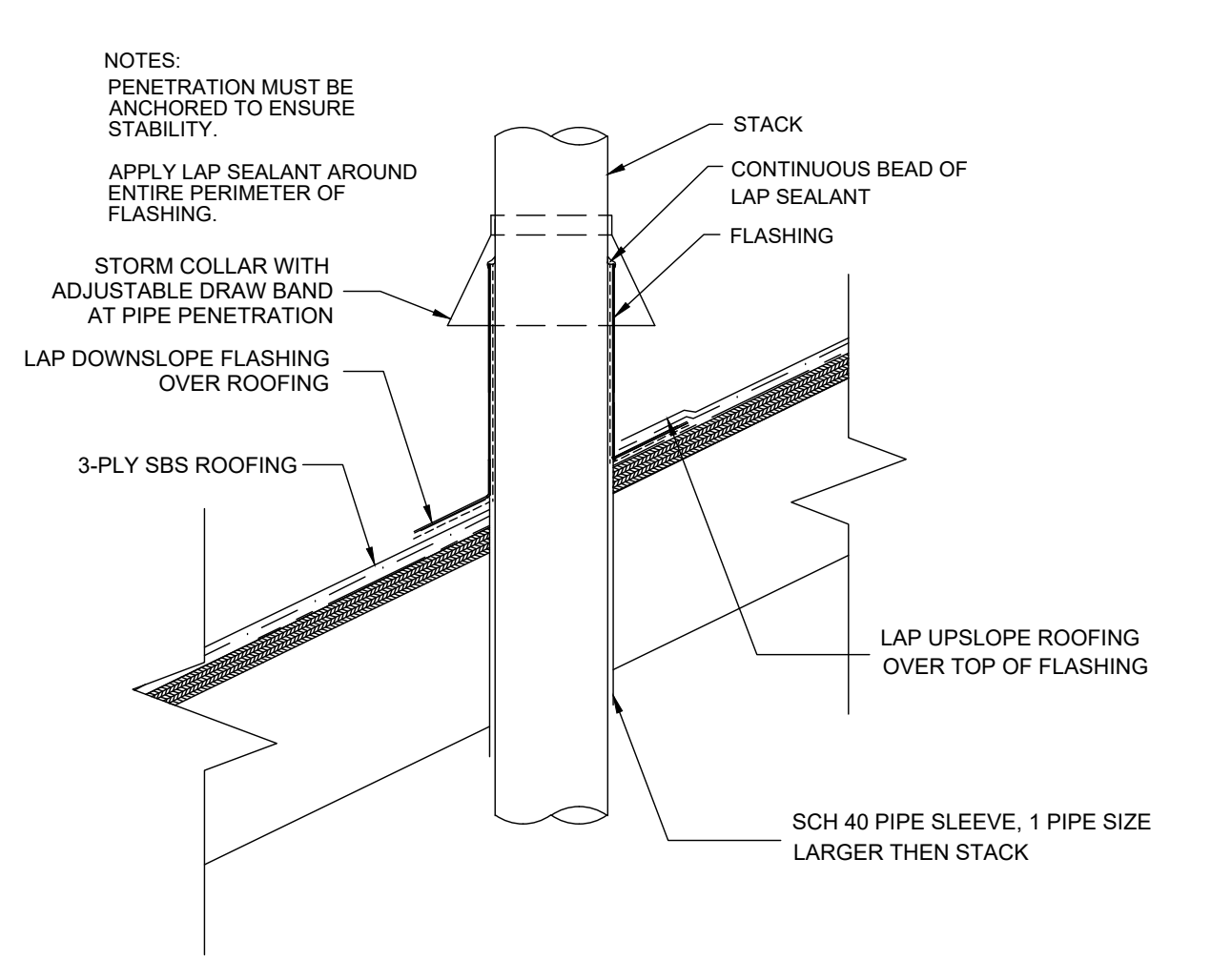
- NOTES:**
- ARRANGE GAUGE FACE TO BE VISIBLE FROM NEAREST OPERATOR VANTAGE POINT
  - GAUGE OR SWITCH SHALL BE SUPPORTED FROM PIPE.



- NOTES:**
- ARRANGE GAUGE FACE TO BE VISIBLE FROM NEAREST OPERATOR VANTAGE POINT
  - INSTALL SUFFICIENT LENGTH SUCH THAT GAUGE CONNECTION IS CLEAR OF INSULATION, JACKET, OR LAGGING ON SERVICE PIPE.

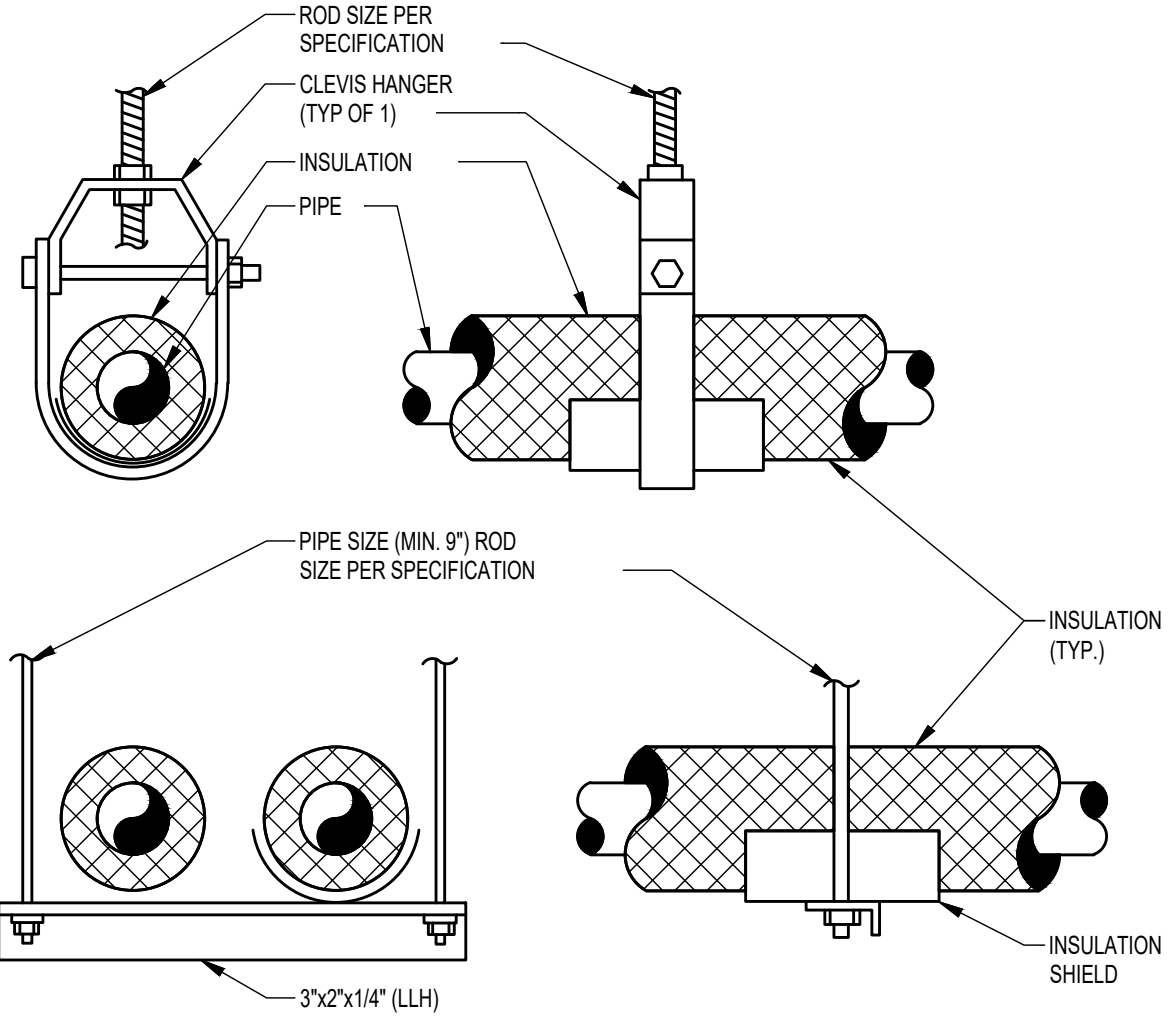
**5 TEMPERATURE & PRESSURE GAUGE DETAIL**

SCALE: N.T.S.



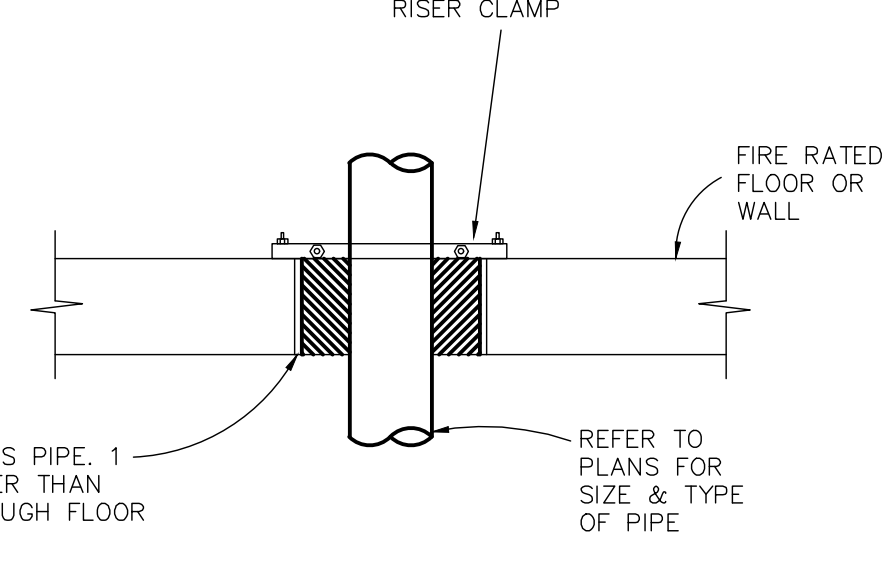
**2 PENETRATION FLASHING DETAIL**

SCALE: N.T.S.



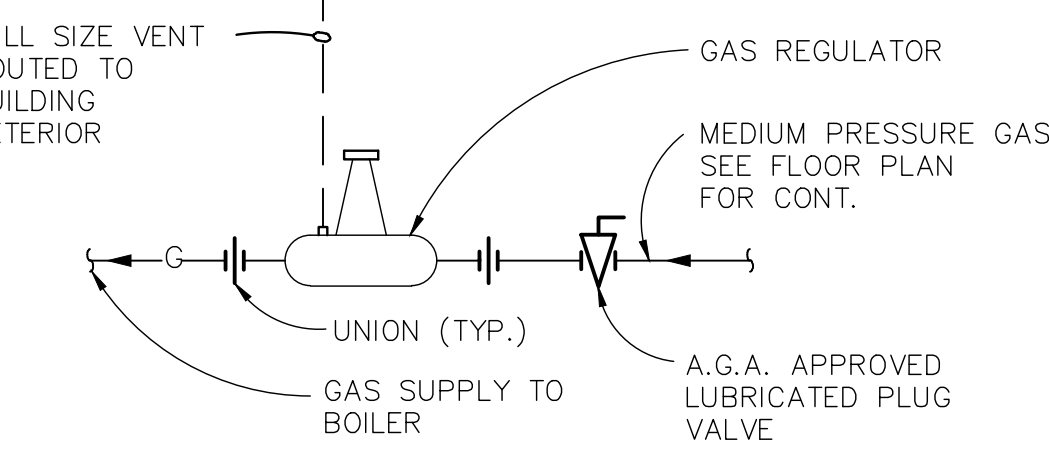
**3 PIPE HANGER DETAIL**

SCALE: N.T.S.



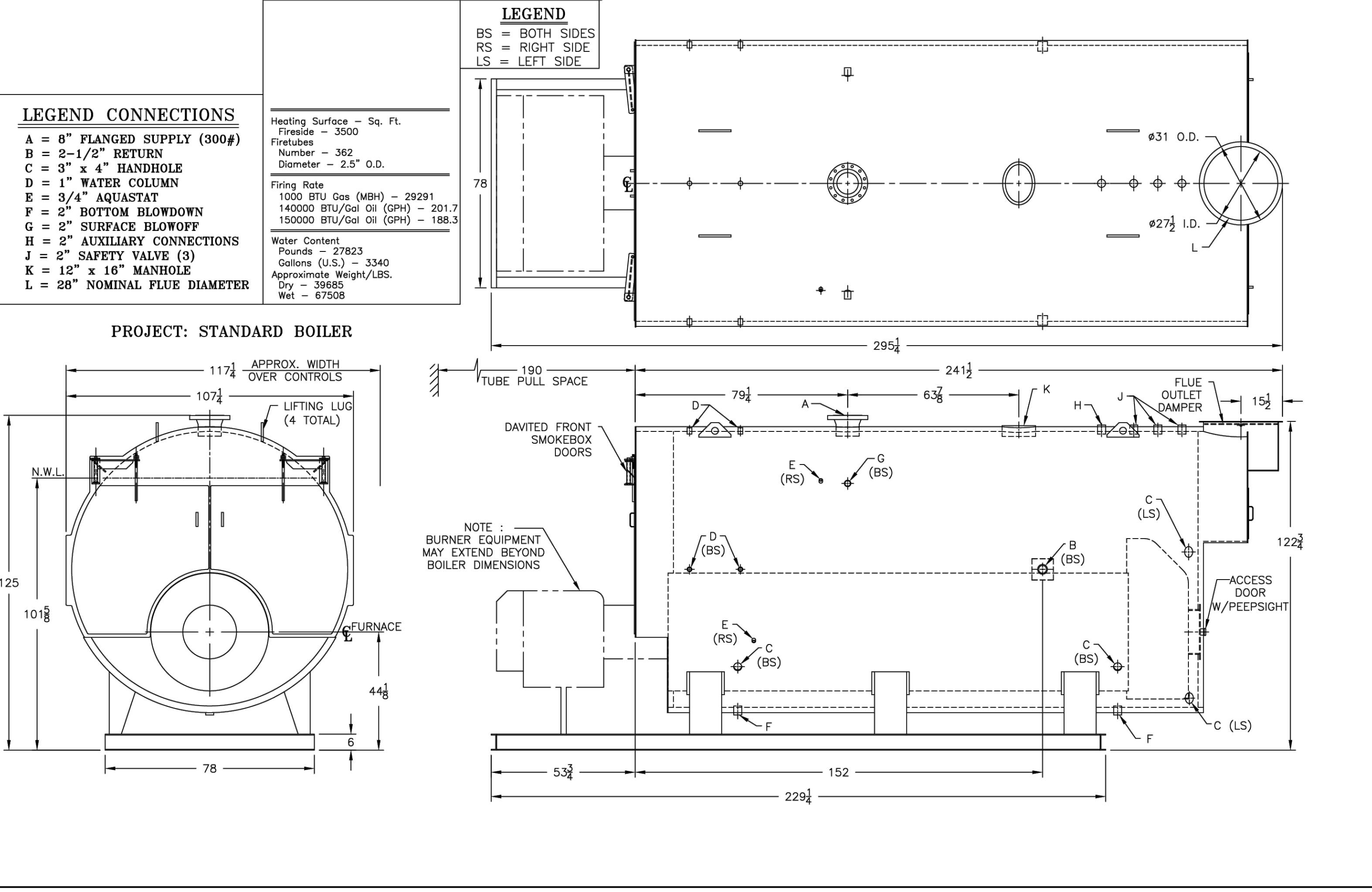
**6 PIPE THROUGH FLOOR DETAIL**

SCALE: N.T.S.



**7 GAS REGULATOR STATION DETAIL**

SCALE: N.T.S.



**1 BOILER DETAIL**

SCALE: N.T.S.

BOILER SCHEDULE	
REFERENCE	BLR-1
SERVES	ENTIRE CAMPUS
WET WEIGHT (LBS)	67,508
DIMENSIONS - L x W x H (INCHES)	295x117x125
NOMINAL BHP	700
FUEL	NAT GAS/NO. 2 FUEL OIL
INPUT (MBH)	29,291
OPERATING CAPACITY (MBH)	23,433
MEDIA	STEAM
OPERATING PRESSURE (PSI)	120
ELECTRICAL DATA	
VOLTAGE - PHASE	460-3
MCA	47.5
MOCP	70
NOTES	1,2

- NOTES:**
- PROVIDE SINGLE POINT ELECTRICAL CONNECTION.
  - REFER TO CONTROL DRAWINGS FOR ADDITIONAL DETAILS.
  - PROVIDE WITH NATURAL GAS/OIL BURNER, OPTIONS INCLUDING MODULATING FEEDWATER CONTROLS, LINKAGELESS BURNER, REMOTE PUMP SET, AIR COMPRESSOR, CONTINUOUS SURFACE BLOWOFF PACKAGE, ASME SECTION 1 VALVE PACKAGE, CATWALK SUPPORTS AND LADDER AND PLATFORM

Revisions	Date	No.
REV. 0	11-14-2025	

PIPING SPECIFICATION		PROCESS:	DESIGN CONDITIONS:		
<b>T1</b>	PIPE SIZE (NPS)	INSTRUMENT AIR	150 PSIG AT 150°F		
	WEIGHT/SCHEDULE	1/4" THRU 3/4"			
PIPE: ASME B36.10M	MATERIAL	1/4" THRU 1/2" - 0.035" MINIMUM WALL THICKNESS 5/8" THRU 3/4" - 0.049" MINIMUM WALL THICKNESS			
	PIPE SIZE (NPS)	TYPE 316 SS, SEAMLESS			
FITTINGS:	CONSTRUCTION	1/4" THRU 3/4"			
	WALL THICKNESS	PARKER, COMPRESSION TYPE, 2 PIECE FERRULE			
PIPING JOINTS:	MATERIAL	TYPE 316 SS			
	TYPE	PARKER, COMPRESSION TYPE, 2 PIECE FERRULE, TYPE 316 SS			
SOLDER/FLANGES:	OTHER				
	CONSTRUCTION				
	WALL THICKNESS	--			
SOLDER/FLANGE BOLTS:	MATERIAL				
	CONSTRUCTION	--			
PRESS FIT/FLANGE NUTS:	CONSTRUCTION				
	MATERIAL	--			
PRESS FIT/GASKETS:	CONSTRUCTION				
	MATERIAL				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:	
STAINLESS STEEL	ASTM A511M	ASME B31.1 (2024)	0	9/2/2025	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
<b>T1</b>	AS NOTED	SEE RATING BELOW	ASME B31.1	ASME B16.34	
	PIPE SIZE (NPS)	1/4" TO 3/4"			
GATE VALVE	CONNECTION AND RATING	--			
	CONSTRUCTION	--			
BUTTERFLY VALVE	VALVE SELECTION	--			
	CONNECTION AND RATING	--			
NEEDLE VALVE	CONSTRUCTION	5000 PSIG CWP, COMPRESSION FITTING BODY: ASTM A182 TYPE F316 PACKING NUT: ASTM A479 TYPE 316 PACKING: PTFE STEM: ASTM A276 TYPE 316			
	VALVE SELECTION	PARKER OR SWAGELOK OR EQUIVALENT			
BALL VALVE	CONNECTION AND RATING	3000 PSIG CWP, COMPRESSION FITTING BODY: ASTM A276 TYPE 316 STEM: ASTM A276 TYPE 316 HOLLOW INSERT: 316 SS PACKING NUT: ASTM A479 TYPE 316 SOLID INSERT: 316 SS SEAT/PACKING: PFA			
	VALVE SELECTION	PARKER OR SWAGELOK OR EQUIVALENT			
NOTES:	(1) TUBING SUPPORTS SHALL BE UNISTRUT TUBING CLAMPS WITH UNICUSHION ISOLATION MATERIAL. (2) TUBING SUPPORT SPACING SHALL BE IN ACCORDANCE WITH MSS SP-58.				

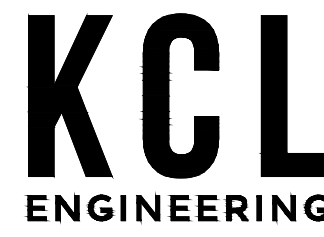
T1 STAINLESS STEEL TUBING - INSTRUMENT AIR SERVICE 150# OPERATION

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

PIPING SPECIFICATION		PROCESS:	DESIGN CONDITIONS:		
<b>T2</b>	PIPE SIZE (NPS)	COOLING WATER	150 PSIG AT 150°F		
	WEIGHT/SCHEDULE	1/4" THRU 3/4"			
PIPE: ASME B36.10M	MATERIAL	1/4" THRU 1/2" - 0.035" MINIMUM WALL THICKNESS 5/8" THRU 3/4" - 0.049" MINIMUM WALL THICKNESS			
	PIPE SIZE (NPS)	TYPE 316 SS, SEAMLESS			
FITTINGS:	CONSTRUCTION	1/4" THRU 3/4"			
	WALL THICKNESS	PARKER, COMPRESSION TYPE, 2 PIECE FERRULE			
PIPING JOINTS:	MATERIAL	TYPE 316 SS			
	TYPE	PARKER, COMPRESSION TYPE, 2 PIECE FERRULE, TYPE 316 SS			
SOLDER/FLANGES:	OTHER				
	CONSTRUCTION				
	WALL THICKNESS	--			
SOLDER/FLANGE BOLTS:	MATERIAL				
	CONSTRUCTION	--			
PRESS FIT/FLANGE NUTS:	CONSTRUCTION				
	MATERIAL	--			
PRESS FIT/GASKETS:	CONSTRUCTION				
	MATERIAL				
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:	
STAINLESS STEEL	ASTM A511M	ASME B31.1 (2024)	0	9/2/2025	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
<b>T2</b>	AS NOTED	SEE RATING BELOW	ASME B31.1	ASME B16.34	
	PIPE SIZE (NPS)	1/4" TO 3/4"			
GATE VALVE	CONNECTION AND RATING	--			
	CONSTRUCTION	--			
BUTTERFLY VALVE	VALVE SELECTION	--			
	CONNECTION AND RATING	--			
NEEDLE VALVE	CONSTRUCTION	5000 PSIG CWP, COMPRESSION FITTING BODY: ASTM A182 TYPE F316 PACKING NUT: ASTM A479 TYPE 316 PACKING: PTFE STEM: ASTM A276 TYPE 316			
	VALVE SELECTION	PARKER OR SWAGELOK OR EQUIVALENT			
BALL VALVE	CONNECTION AND RATING	3000 PSIG CWP, COMPRESSION FITTING BODY: ASTM A276 TYPE 316 STEM: ASTM A276 TYPE 316 HOLLOW INSERT: 316 SS PACKING NUT: ASTM A479 TYPE 316 SOLID INSERT: 316 SS SEAT/PACKING: PFA			
	VALVE SELECTION	PARKER OR SWAGELOK OR EQUIVALENT			
NOTES:	(1) TUBING SUPPORTS SHALL BE UNISTRUT TUBING CLAMPS WITH UNICUSHION ISOLATION MATERIAL. (2) TUBING SUPPORT SPACING SHALL BE IN ACCORDANCE WITH MSS SP-58.				

T2 STAINLESS STEEL TUBING - COOLING WATER SERVICE 150# OPERATION

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.



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KCL Project Number: 25224

Date: 11-14-2025

Drawn By: C.J.C

Checked By: KCL

NOT FOR CONSTRUCTION

Revisions	Date	No.
REV 0	11-14-2025	

CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT

2277 IOWA AVE.  
INDEPENDENCE - IOWA - 50644

Sheet Name:

MECHANICAL PIPING AND INSULATION STANDARDS

Scale:

N.T.S.

Sheet:

M501

PIPING SPECIFICATION		PROCESS:		DESIGN CONDITIONS:	
<b>GS1</b>	PIPE SIZE (NPS)	GENERAL		125 PSIG AT 220°F	
	WEIGHT/SCHEDULE	3/8" THRU 24"			
PIPE:	ASME B36.10M			STD WEIGHT	
	MATERIAL	A53 A GALVANIZED			
PIPE	PIPE SIZE (NPS)	3/8" THRU 2"		2 1/2" THRU 24"	
	CONSTRUCTION	THREADED		FLANGED	
FITTINGS:	WALL THICKNESS	CLASS 150		CLASS 125	
	MATERIAL	A197 GALVANIZED		A126 A OR B GALVANIZED	
	TYPE	THREADED		FLANGED	
PIPING JOINTS:	OTHER	--		--	
	CONSTRUCTION	--			
UNIONS:	WALL THICKNESS	--			
	MATERIAL	--			
	CONSTRUCTION	CLASS 125 - FLAT FACE - ASME B16.5			
FLANGES:	WALL THICKNESS	SAME AS ADJOINING PIPE			
	MATERIAL	A105 GALVANIZED			
	CONSTRUCTION	ASTM A307 B			
FLANGE BOLTS:	CONSTRUCTION	ASTM A194 2H			
FLANGE NUTS:	CONSTRUCTION	F436			
GASKETS:	CONSTRUCTION	HIGH PURITY GRAPHITE LAMINATE REINFORCED WITH A TANKED STAINLESS STEEL CORE			
	MATERIAL	FLEXICARB ST - GRAPHITE FOIL FACING - 01 mm THICK TANGED 316 SS			
THERMOWELLS:	MATERIAL	INSERTION THERMOWELLS - ASTM A105 - 3000 PSIG PRESSURE CLASS - SEAL WELDED WELLS			
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME B31.1 (2024)	0	9/2/2025	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
	CARBON STEEL	SEE RATING BELOW	ASME B31.1	ASME B16.34	
<b>GS1</b>	PIPE SIZE (NPS)	2" AND SMALLER		2 1/2" AND LARGER	
	CONNECTION AND RATING	CLASS 150, THREADED		CLASS 125, FLANGED	
GATE VALVE	CONSTRUCTION	BODY: B62 BRONZE BONNET: SREWED B62 BRONZE STEM: B371 C69400 PACKING GRAPHITE		BODY: A126-B CAST IRON BONNET: BOLTED A126-B CAST IRON WEDGE: A126-B CAST IRON	
	VALVE SELECTION	POWELL OR EQUAL		POWELL OR EQUAL	
	CONNECTION AND RATING	--		--	
BUTTERFLY VALVE	CONSTRUCTION	--		--	
	VALVE SELECTION	--		--	
	CONNECTION AND RATING	CLASS 125, THREADED		CLASS 125, FLANGED	
CHECK VALVE	CONSTRUCTION	BODY: B62 BRONZE CAP: B62 BRONZE DISC: B62 BRONZE		BODY: A126-B CAST IRON CAP: A126-B CAST IRON DISC: A126-B OR A536	
	VALVE SELECTION	POWELL OR EQUAL		POWELL OR EQUAL	
	CONNECTION AND RATING	600 PSI CWP THREADED (5)		--	
BALL VALVE	CONSTRUCTION	BODY: ASTM B61 BRONZE 316 STAINLESS STEEL BALL FULL PORT TEFLON SEAT RINGS BLOWOUT-PROOF STEM 2-PIECE CONSTRUCTION		--	
	VALVE SELECTION	APOLLO OR EQUIVALENT BY WATTS OR JAMESBURY		--	
	CONNECTION AND RATING	CLASS 125, THREADED		CLASS 125, FLANGED	
GLOBE VALVE	CONSTRUCTION	BODY: B62 BRONZE BONNET: SREWED B62 BRONZE DISC: B62 BRONZE STEM: B371 C69400 PACKING: GRAPHITE		BODY: A126-B CAST IRON BONNET: BOLTED A126-B CAST IRON DISK: B62 OR A-126-B	
	VALVE SELECTION	POWELL OR EQUAL		POWELL OR EQUAL	
	NOTES:				

GS1 GENERAL SERVICE PIPING 125 PSIG 220°F

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

PIPING SPECIFICATION		PROCESS:		DESIGN CONDITIONS:	
<b>AS1</b>	PIPE SIZE (NPS)	INSTRUMENT AIR		120 PSIG AT 120°F	
	WEIGHT/SCHEDULE	2" AND SMALLER		2 1/2" THRU 24"	
PIPE: ASME B36.10M	MATERIAL	ASTM B88 COPPER, TYPE L, HARD DRAWN		ASTM A53 GRADE B - SEAMLESS	
	PIPE SIZE (NPS)	1/4" THRU 2"		2 1/2" AND LARGER	
FITTINGS:	CONSTRUCTION	SOLDERED OR PRESS FIT		BUTTWELD - ASME B16.9	
	WALL THICKNESS	SAME AS ADJOINING PIPE		SAME AS ADJOINING PIPE	
PIPING JOINTS:	MATERIAL	ASME B16.18 CAST COPPER OR ASME B16.22 WROUGHT COPPER ALLOY		BUTTWELD FITTING - ASTM A234 GRADE B - SEAMLESS	
	TYPE	SOLDERED OR PRESS FIT		BUTTWELD - END PREP PER B16.25	
SOLDER/FLANGES:	OTHER	SEE BELOW FROM JOINT DETAILS		---	
	CONSTRUCTION	SOLDER: ASTM B32 ALLOY, GRADE 95-5 95/5 TIN-ANTIMONY, LEAD FREE OR: ASTM B32 ALLOY, GRADE 95-5 95/5 TIN-SILVER, LEAD FREE		CLASS 150 - WELD NECK - ASME B16.5	
SOLDER/FLANGE BOLTS:	WALL THICKNESS	---		SAME AS ADJOINING PIPE	
	MATERIAL	---		FORGED STEEL - ASTM A105	
PRESS FIT/FLANGE NUTS:	CONSTRUCTION	SOLDER: FILLER METAL LEAD-FREE - WATER-FLUSHABLE FLUX ASTM B613 - SILVER BRAZING FILLER METAL SHALL BE BCUP SERIES, COPPER PHOSPHORUS ALLOYS FOR GENERAL DUTY BRAZING - AWS A5.8		STUD - FULL-LENGTH ASME B1.1 HIGH-STRENGTH STEEL - ASTM A193 - GRADE B7, FULL LENGTH STUD	
	MATERIAL	---		HEAVY HEX - ASME B1.1 - CLASS 2B THREADS CARBON STEEL - ASTM A194 GRADE 2H HEAVY - F436 WASHERS	
PRESS FIT/GASKETS:	CONSTRUCTION	PRESS FIT: MATERIALS CONFORM TO ASME B16.18 OR: ASME B16.22 AND CRITERIA UNDER APMP0 P5 117 - SEALING ELEMENTS: EPDM - SEALING ELEMENTS FACTORY INSTALLED - FITTINGS SHALL BE PRESSED BY TOOLS RECOMMENDED BY FITTING MANUFACTURER		SPIRAL WOUND TYPE 304 SS - FULL FACE - FLEXITALLIC FLEXICARB	
	MATERIAL	---		---	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:		REVISION:	DATE REVISED:
COPPER	ASTM B36.10M	ASME B31.1 (2024)		0	9/2/2025
<b>AS1</b>	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
	AS NOTED	SEE RATING BELOW	ASME B31.1	ASME B16.34	
GATE VALVE	PIPE SIZE (NPS)	2" AND SMALLER		2 1/2" AND LARGER	
	CONNECTION AND RATING	---		CLASS 150 BUTTWELDED ENDS	
BUTTERFLY VALVE	CONSTRUCTION	---		BODY/BONNET: A105 OR A216 GR. WCB API TRIM 8 BOLTED BONNET	
	VALVE SELECTION	---		VELAN OR EQUIVALENT	
CHECK VALVE	CONSTRUCTION	SOLDERED OR PRESS FIT BODY/BONNET: BRONZE DISC: BRONZE HINGE PIN AND PLUG: BRONZE ASTM B140 ALLOY DISC HANGER: SAME AS BODY		BODY/CAP: A216 GR. WCB (BOLTED) API TRIM 8	
	VALVE SELECTION	NIBCO OR EQUAL		VELAN OR EQUIVALENT	
BALL VALVE	CONSTRUCTION	SOLDERED OR PRESS FIT BODY: CAST BRONZE, FULL PORT BALL: CHROME PLATED BRONZE STEM: BRONZE SEATS/SEALS: RPTFE PACKING: RPTFE LOCKABLE, QUARTER TURN LEVER HANDLE		CLASS 150 BUTTWELDED ENDS (UP TO 6") BODY/BONNET: A105 OR WCB (BOLTED) SEAT: SS 316/STELLITE BALL: SS 316/HC STEM: SS 316 PACKING: GRAPHITE BODY SEAL: SS 316 GRAPHITE	
	VALVE SELECTION	APOLLO OR EQUAL		VELAN OR JAMESBURY OR EQUIVALENT	
<b>NOTES:</b>					

AS1 AIR SYSTEMS, INSTRUMENT AND SERVICE AIR, POTABLE WATER

PIPING SPECIFICATION		PROCESS:		DESIGN CONDITIONS:	
<b>SC1</b>	PIPE SIZE (NPS)	STEAM AND CONDENSATE		150 PSIG AT 400°F	
	WEIGHT/SCHEDULE	2" AND SMALLER		2 1/2" THRU 6"	
PIPE: ASME B36.10M	MATERIAL	CND XS, STM STD		CND XS, STM STD	
	PIPE SIZE (NPS)	1/4" THRU 2"		2 1/2" AND LARGER	
FITTINGS:	CONSTRUCTION	CLASS 3000 - SOCKETWELD - B16.11		BUTTWELD - ASME B16.9	
	WALL THICKNESS	SAME AS ADJOINING PIPE		SAME AS ADJOINING PIPE	
PIPING JOINTS:	MATERIAL	SOCKET WELDED FITTING - ASTM A105 - SEAMLESS		BUTTWELD FITTING - ASTM A234 GRADE B - SEAMLESS	
	TYPE	SOCKET WELDED		BUTTWELD - END PREP PER B16.25	
UNIONS:	OTHER	WHERE FLANGE REQUIRED		WHERE FLANGE REQUIRED	
	CONSTRUCTION	CLASS 3000 - SW - B16.11 - GROUND JOINT		NOT PERMITTED	
FLANGES:	WALL THICKNESS	SAME AS ADJOINING PIPE		---	
	MATERIAL	FORGED CARBON STEEL - ASTM A105		---	
FLANGE BOLTS:	CONSTRUCTION	CLASS 150 - WELD NECK - ASME B16.5		---	
	WALL THICKNESS	SAME AS ADJOINING PIPE		---	
FLANGE NUTS:	MATERIAL	FORGED CARBON STEEL - ASTM A105		---	
	CONSTRUCTION	ALLOY STEEL, AISI 4140/4142 QUENCHED AND TEMPERED, A193 GRADE B7, STUD - FULL LENGTH		---	
WASHER:	CONSTRUCTION	HEAVY HEX - A194 GRADE 2H		---	
	MATERIAL	F436		---	
GASKETS:	CONSTRUCTION	SPIRAL WOUND - SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES		---	
	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 304 STAINLESS - FLEXICARB FILLER		---	
THERMOWELLS:	CONSTRUCTION	INSERTION THERMOWELLS - ASTM A105 - 3000 PSIG PRESSURE CLASS - SEAL WELDED WELLS		---	
	MATERIAL	---		---	
PIPE MATERIAL:	PIPE CODE:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:	
CARBON STEEL	ASTM B36.10M	ASME B31.1 (2024)	0	9/2/2025	
<b>SC1</b>	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
	CARBON STEEL	SEE RATING BELOW	ASME B31.1	ASME B16.34	
GATE VALVE	PIPE SIZE (NPS)	2" AND SMALLER		2 1/2" AND LARGER	
	CONNECTION AND RATING	CLASS 800 SOCKETWELDED ENDS		CLASS 150 BUTTWELDED ENDS	
BUTTERFLY VALVE	CONSTRUCTION	BODY/BONNET: A105N, API TRIM #8 OUTSIDE SCREW & YOKE, STANDARD PORT		BODY/BONNET: A105 OR A216 GR. WCB API TRIM 8 BOLTED BONNET	
	VALVE SELECTION	BONNEY FORGE OR EQUIVALENT		POWELL OR EQUIVALENT	
CHECK VALVE	CONSTRUCTION	---		CLASS 150 BUTTWELDED ENDS	
	VALVE SELECTION	---		ADAMS MAK OR EQUIVALENT	
BALL VALVE	CONSTRUCTION	CLASS 800 SOCKETWELDED ENDS		CLASS 150 BUTTWELDED ENDS (UP TO 6")	
	CONSTRUCTION	BODY/CAP: A105N (BOLTED) PISTON CHECK; API TRIM #8 STANDARD PORT		BODY/CAP: A216 GR. WCB (BOLTED) API TRIM 8	
GLOBE VALVE	CONSTRUCTION	BODY/BONNET: A105N, API TRIM #8 OUTSIDE SCREW & YOKE, STANDARD PORT		BODY/CAP: A216 GR. WCB (BOLTED) API TRIM 8	
	VALVE SELECTION	BONNEY FORGE OR EQUIVALENT		POWELL OR EQUIVALENT	
<b>NOTES:</b>					

SC1 STEAM AND CONDENSATE 150 PSIG

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

PIPING SPECIFICATION		PROCESS:		DESIGN CONDITIONS:	
<b>NG1</b>	PIPE SIZE (NPS)	NATURAL GAS (150PSIG OR LESS)		150 PSIG AT 150°F	
	WEIGHT/SCHEDULE	2" AND SMALLER		2 1/2" AND LARGER	
PIPE:	MATERIAL	XS		SCH 40	
PIPE:	PIPE SIZE (NPS)	2" AND SMALLER		2 1/2" AND LARGER	
CONSTRUCTION	MATERIAL	CLASS 3000 - SOCKETWELD - B16.11		ASTM A53 GRADE B, SEAMLESS	
FITTINGS:	WALL THICKNESS	SAME AS ADJOINING PIPE		BUTTWELD - ASME B16.9 (3)	
	MATERIAL	SOCKET WELDED FITTING - ASTM A105		SEAMLESS	
PIPING JOINTS:	TYPE	SOCKET WELDED (S)		BUTTWELD - END PREP PER B16.25	
	OTHER	WHERE FLANGE REQUIRED		WHERE FLANGE REQUIRED	
UNIONS:	CONSTRUCTION	CLASS 3000 - B16.11 - FLAT FACE WITH SPIRAL WOUND GASKET DESIGN		NOT PERMITTED	
	WALL THICKNESS	SAME AS ADJOINING PIPE		---	
FLANGES:	MATERIAL	FORGED CARBON STEEL - ASTM A105		---	
	CONSTRUCTION	CLASS 150 - WELD NECK - ASME B16.5		---	
FLANGE BOLTS:	CONSTRUCTION	ALLOY STEEL, AISI 4140/4142 QUENCHED AND TEMPERED, A193 GRADE B7, STUD - FULL LENGTH		---	
	CONSTRUCTION	HEAVY HEX - A194 GRADE 2H		---	
WASHER:	CONSTRUCTION	F436		---	
GASKETS:	CONSTRUCTION	SPIRAL WOUND - SUITABLE FOR RAISED-FACE OR FLAT-FACE FLANGES		---	
	MATERIAL	FLEXITALLIC STYLE CGI - TYPE 304 STAINLESS - FLEXICARB FILLER		---	
TERMOWELLS:	MATERIAL	INSERTION TERMOWELLS - ASTM A105 - 3000 PSIG PRESSURE CLASS - SEAL WELDED WELLS		---	
PIPE MATERIAL:	DESIGN/CONSTRUCTION CODE:	REVISION:	DATE REVISED:		
CARBON STEEL	ASME B16.34	ASME B31.1	0	9/2/2025	
VALVE SPECIFICATION:	SPECIFICATION MATERIAL:	PRESSURE CLASS:	DESIGN CODE:		
	CARBON STEEL	SEE RATING BELOW	ASME B31.1	ASME B16.34	
<b>NG1</b>	PIPE SIZE (NPS)	2" AND SMALLER		2 1/2" AND LARGER	
	CONNECTION AND RATING	CLASS 150 BUTTWELDED ENDS			
BALL VALVE	CONSTRUCTION	BODY: A106B API TRIM 8			
	VALVE SELECTION	BONNEY FORGE OR EQUIVALENT	APOLLO OR EQUIVALENT	MAXON OR JAMESBURY OR EQUIVALENT	
NOTES:	1. ALL THREADED PIPE SHALL BE SEAMLESS (TYPE S) 2. BRONZE BODY VALVES MAY BE USED FOR PIPE SIZES 1/4" - 2" IN LIEU OF SOCKET WELDED VALVES. 3. NO BACKING RING 4. REFER TO 23 52 33 FOR THE SPECIFICATION FOR AUTOMATED VALVES				

NG1 NATURAL GAS AND FUEL OIL 150 PSIG OR LESS

INSULATION REFERENCE	PIPE SIZE	INSULATION THICKNESS							
		200°F	300°F	400°F	500°F	600°F	800°F	1000°F	1200°F
MINERAL WOOL WITH PVC JACKETING	2"	0.5"	0.5"	1"	N/A	N/A	N/A	N/A	N/A
	4"	0.5"	0.5"	1"	N/A	N/A	N/A	N/A	N/A
	6"	0.5"	0.5"	1"	N/A	N/A	N/A	N/A	N/A
	8"	0.5"	0.5"	1"	N/A	N/A	N/A	N/A	N/A
	10"	0.5"	1"	1"	N/A	N/A	N/A	N/A	N/A
	12"	0.5"	0.5"	1"	N/A	N/A	N/A	N/A	N/A
MINERAL WOOL WITH BRIGHT ALUMINUM JACKETING	2"	0.5"	0.5"	1"	1.5"	2"	3.5"	5"	7.5"
	4"	0.5"	1"	1.5"	2"	2.5"	4.5"	6.5"	9"
	6"	0.5"	1"	1.5"	2.5"	3"	5"	7.5"	N/A
	8"	0.5"	1"	1.5"	2.5"	3"	5.5"	8"	N/A
	10"	0.5"	1"	2"	2.5"	3.5"	6"	8.5"	N/A
	12"	0.5"	1"	2"	3"	4"	6"	9"	N/A
CLOSED CELL FOAM WITH PVC JACKETING	2"	1"	2"	N/A	N/A	N/A	N/A	N/A	N/A
	4"	1"	2"	N/A	N/A	N/A	N/A	N/A	N/A
	6"	1"	2.5"	N/A	N/A	N/A	N/A	N/A	N/A
	8"	1"	2.5"	N/A	N/A	N/A	N/A	N/A	N/A
	10"	1"	2.5"	N/A	N/A	N/A	N/A	N/A	N/A
	12"	1"	2.5"	N/A	N/A	N/A	N/A	N/A	N/A

REV: 0 ISSUED DATE: 09/02/2025

CALCULATION INPUTS:  
 1) PROCESS TEMPERATURE: 200°F - 1200°F  
 2) AMBIENT TEMPERATURE: 100°F  
 3) WIND SPEED: 2 MPH  
 4) INSULATION SURFACE TEMPERATURE: 140°F  
 5) JACKET MATERIAL: NEW BRIGHT ALUMINUM, ITW INS. SYSTEMS ALUMINUM SHEET WITH STUCCO FINISH, JOHNS MANVILLE PVC JACKETING  
 6) INSULATION: JOHNS MANVILLE MINERAL WOOL (1200°F PIPE), ARMACELL ARMAFLEX CLOSED CELL FOAM

INSULATION THICKNESS TABLE

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

INSULATION STANDARD	PLANT SERVICE	DESIGN TEMPERATURE (°F)	INSULATION TYPE	INSULATION DESIGN STANDARD	INSULATION THICKNESS (IN.)	THERMAL CONDUCTIVITY (BTU IN/HR-FT <sup>2</sup> -°F @79°F)	MAXIMUM TEMPERATURE (°F)	VAPOR BARRIER JACKET	ASTM E84 FLAME SPREAD	ASTM E84 SMOKE DEVELOPMENT	MANUFACTURER	INSULATION CONSTRUCTION	LABEL AND LETTER COLOR	JACKET TYPE	JACKET THICKNESS	JACKET DESIGN STANDARDS	JACKET JOINING METHOD	JACKET FITTINGS	MOSTURE BARRIER	BANDING	MANUFACTURERS
STM	STEAM	400	MINERAL WOOL PIPE INSULATION	ASTM C547	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	WHITE LABEL BLACK TEXT	ALUMINUM SHEET	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS; INSTALL ON 12" CENTERS	ITW INSULATION SYSTEMS OR EQUAL
CND	CONDENSATE	300	MINERAL WOOL PIPE INSULATION	ASTM C547	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	WHITE LABEL BLACK TEXT	ALUMINUM SHEET	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS; INSTALL ON 12" CENTERS	ITW INSULATION SYSTEMS OR EQUAL
BFW	BOILER FEEDWATER	300	MINERAL WOOL PIPE INSULATION	ASTM C547	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	WHITE LABEL BLACK TEXT	ALUMINUM SHEET	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS; INSTALL ON 12" CENTERS	ITW INSULATION SYSTEMS OR EQUAL
CW	COOLING WATER	70	CLOSED CELL FOAM INSULATION	ASTM C533	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.25	220	VAPOR BARRIER REQUIRED	N/A	N/A	ARMACELL - ARMAFLEX OR EQUAL	N/A	WHITE LABEL BLACK TEXT	WB FINISH WITH POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL
PW	POTABLE WATER	70	CLOSED CELL FOAM INSULATION	ASTM C534	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.25	220	VAPOR BARRIER REQUIRED	N/A	N/A	ARMACELL - ARMAFLEX OR EQUAL	N/A	WHITE LABEL BLACK TEXT	WB FINISH WITH POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL
MUW	MAKEUP WATER	120	CLOSED CELL FOAM INSULATION	ASTM C534	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.25	220	VAPOR BARRIER REQUIRED	N/A	N/A	ARMACELL - ARMAFLEX OR EQUAL	N/A	WHITE LABEL BLACK TEXT	WB FINISH WITH POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL
NG	NATURAL GAS	120	FIBERGLASS PIPE INSULATION	ASTM C547	REFERENCE INSULATION THICKNESS STANDARD TABLE	0.23	850	FACTORY-APPLIED FOIL KRAFT PER ASTM C1136 WITH SELF-SEALING ADHESIVE JOINTS	N/A	N/A	INDUSTRIAL INSULATION GROUP - MICRO-LOK HP OR EQUAL	N/A	WHITE LABEL BLACK TEXT	WB FINISH WITH POLYVINYL CHLORIDE (PVC)	30 MIL	ASTM D1784	SOLVENT-WELDED ADHESIVE, STAINLESS STEEL TACKS OR PRESSURE-SENSITIVE COLOR MATCHING VINYL TAPE	ONE-PIECE MOLDED TYPE FITTING COVERS	N/A	N/A	JOHNS MANVILLE ZESTON 2000 OR EQUAL
VENT	BOILER FLUE	400	MINERAL WOOL PIPE INSULATION	ASTM C547	2"	0.22	1200	N/A	<25	<50	INDUSTRIAL INSULATION GROUP - MINWOOL 1200 PIPE, OR EQUAL	N/A	WHITE LABEL BLACK TEXT	ALUMINUM SHEET	0.024"	ASTM B209 & ASTM C1729	LONGITUDINAL SLIP JOINT - 2" LAP	DIE-SHAPED FITTING COVERS OR PRE-FORMED GORE-TYPE ALUMINUM COVERS WHEN DIE-SHAPED COVERS ARE NOT AVAILABLE	3 MIL THICK POLYSURLYN, BOTH SIDES	METAL JACKET BANDS: 1/2" WIDE 0.02" THICK TYPE 304SS WITH 0.032" THICK SEALS; INSTALL ON 12" CENTERS	ITW INSULATION SYSTEMS OR EQUAL

INSULATION SYSTEMS TABLE

NOTE:  
ALL PRODUCTS NEED TO BASIS OF DESIGN, WITH PRE-APPROVED EQUIVALENTS AS SUBMITTED PRIOR TO BID.

CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT

2277 IOWA AVE.  
INDEPENDENCE - IOWA - 50644

Sheet Name:

MECHANICAL PIPING AND INSULATION STANDARDS

Scale:

N.T.S.

Sheet:

M504

**GENERAL NOTES:**

**CODES, STANDARDS, AND SPECIFICATIONS**

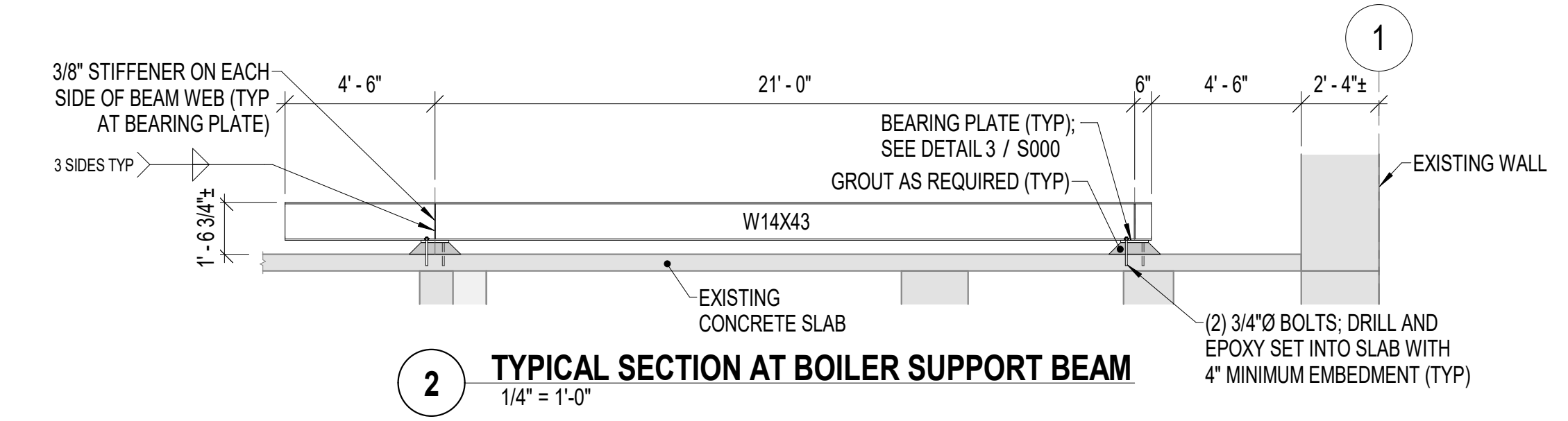
- DESIGN AND CONSTRUCTION OF THIS PROJECT SHALL CONFORM TO THE REQUIREMENTS OF THE 2018 EDITION OF THE INTERNATIONAL BUILDING CODE (IBC) AND ANY APPLICABLE AMENDMENTS, AS ADOPTED BY THE AUTHORITY HAVING JURISDICTION
- DESIGN REQUIREMENTS FOR THE MATERIALS OF CONSTRUCTION BASED ON THE REFERENCED STANDARDS IN CHAPTER 35 OF THE IBC
- OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA) 29 CFR 1910 - STANDARDS FOR GENERAL INDUSTRY AND CFR 1926 - SAFETY AND HEALTH REGULATIONS FOR CONSTRUCTION HAVE BEEN REFERENCED FOR REQUIREMENTS RELATED TO WORKPLACE SAFETY

**GENERAL STRUCTURAL NOTES**

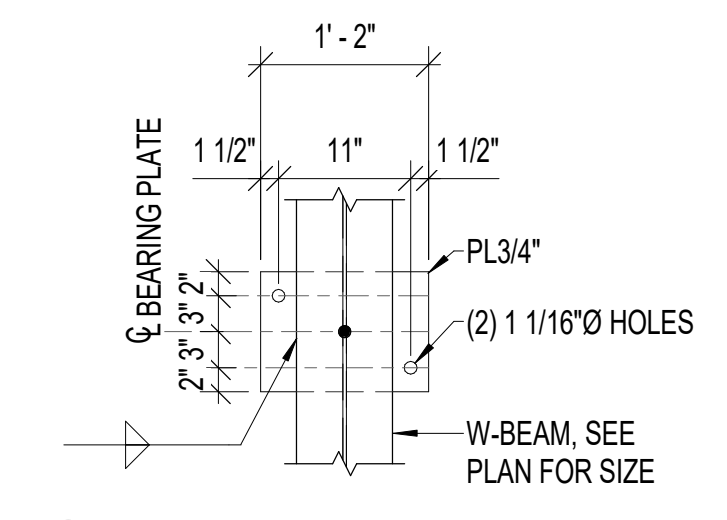
- ALL WORK SHALL CONFORM TO ALL APPLICABLE BUILDING CODES, ORDINANCES, AND REGULATIONS AS ADOPTED BY LOCAL AUTHORITIES HAVING JURISDICTIONS
- ENGINEER SHALL NOT HAVE CONTROL OR CHARGE OF, AND SHALL NOT BE RESPONSIBLE FOR: CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES, OR PROCEDURES, FOR SAFETY PRECAUTIONS AND PROGRAMS IN CONNECTION WITH THE WORK, FOR THE ACTS OR OMISSION OF THE CONTRACTOR, SUBCONTRACTOR, OR ANY OTHER PERSONS PERFORMING ANY OF THE WORK, OR FOR THE FAILURE OF ANY OF THEM TO CARRY OUT THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS, DIMENSIONS, AND ELEVATIONS AT THE SITE. IF ACTUAL CONDITIONS DIFFER FROM THOSE SHOWN ON CONTRACT DOCUMENTS, CONSTRUCTION OF ANY AFFECTED ELEMENTS SHALL NOT COMMENCE WITHOUT APPROVAL OF DESIGN ENGINEER
- THE LOCATION OF ANY EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE TAKEN FROM EXISTING RECORDS. ADDITIONAL UTILITIES MAY BE ENCOUNTERED DURING CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING ALL UTILITIES WHICH COME IN CONFLICT WITH THE PROPOSED CONSTRUCTION
- THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST TO THE DESIGN ENGINEER FOR APPROVAL BEFORE PROCEEDING WITH ANY CHANGES, MODIFICATIONS OR SUBSTITUTIONS DIFFERING FROM CONTRACT DOCUMENTS
- THE CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY SHORING AND BRACING FOR ALL STRUCTURAL ELEMENTS UNTIL THE ENTIRE STRUCTURAL SYSTEM IS PLUMB AND SECURED
- THE CONTRACTOR SHALL VERIFY THE POSITION, ELEVATION, AND ORIENTATION OF PROCESS EQUIPMENT PRIOR TO FABRICATION. THIS INCLUDES ANCHOR BOLT SIZES AND LOCATIONS, FLOOR PENETRATIONS, AND REQUIRED CLEARANCES TO ADJACENT WALLS, FRAMING, AND OTHER OBSTRUCTIONS
- WHERE NEW CONSTRUCTION INTERFACES WITH EXISTING, FIELD VERIFY EXISTING DIMENSIONS, MEMBER SIZES, AND ELEVATIONS SHOWN ON THE DRAWINGS PRIOR TO STARTING CONSTRUCTION. ALL DISCREPANCIES SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE DESIGN ENGINEER.
- DO NOT SCALE DIMENSIONS FROM DRAWINGS. INTERPRETATION OF PLANS, DETAILS, DIMENSIONS, OR OTHER ITEMS PROVIDED IN THE CONTRACT DOCUMENTS ARE TO BE COMPLETED BY THE DESIGN ENGINEER
- DETAILED SHOP DRAWINGS SHALL BE SUBMITTED FOR APPROVAL, BY THE OWNER AND DESIGN ENGINEER, PRIOR TO FABRICATION FOR ALL STRUCTURAL ITEMS INCLUDING: CONCRETE AND MASONRY REINFORCEMENT, EMBEDDED STEEL ITEMS, STRUCTURAL STEEL, STEEL STACKS, STEEL JOISTS, STEEL DECKING, METAL GRATING, GUARDRAILS AND STAIRS
- ALL OPEN EXCAVATIONS SHALL CONFORM TO OSHA STANDARDS FOR THE CONSTRUCTION INDUSTRY
- WHERE APPLICATION IS MADE TO THE BUILDING OFFICIAL FOR CONSTRUCTION, THE OWNER SHALL EMPLOY A SPECIAL INSPECTOR TO PROVIDE INSPECTIONS AND TESTS PER THE REQUIREMENTS OF CHAPTER 17 OF THE IBC UNLESS WAIVED BY THE BUILDING OFFICIAL
- PERIODIC SITE OBSERVATION BY THE ENGINEER IS SOLELY FOR THE PURPOSE OF DETERMINING IF WORK IS PROCEEDING IN ACCORDANCE WITH STRUCTURAL CONTRACT DOCUMENTS. THIS LIMITED SITE OBSERVATION SHOULD NOT BE CONSTRUED AS EXHAUSTIVE OR CONTINUOUS TO CHECK THE QUALITY OF WORK, BUT RATHER AS PERIODIC IN AN EFFORT TO REVIEW THE PROGRESS OF THE CONTRACTOR

**STRUCTURAL STEEL**

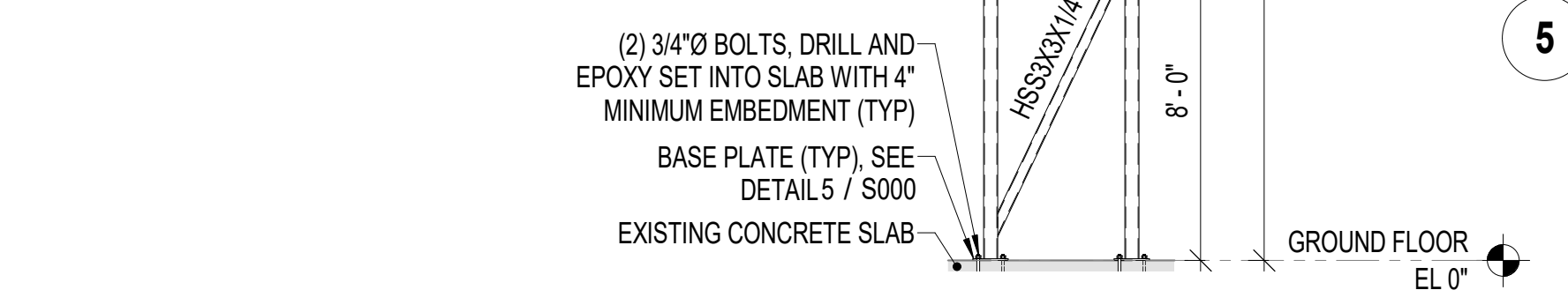
- MATERIALS:  
WIDE FLANGE (W AND WT) - ASTM A992  
ANGLES (L), CHANNELS (C AND MC), BEAMS (S AND M) - ASTM A36  
PLATES (PL) AND BARS - ASTM A36  
HP SHAPES (HP) - ASTM A572 GR. 50  
SQUARE/RECTANGULAR HSS - ASTM A500 GR. C  
ROUND HOLLOW STRUCTURAL SECTIONS - ASTM A500 GR. C  
STANDARD STEEL PIPE - ASTM A53 GR. B  
RAISED-PATTERN FLOOR PLATE - ASTM A786 COMMERCIAL GRADE  
STEEL CONNECTION BOLTS - ASTM F3125 GR. A325 (TYP) OR GR. A490  
WELD MATERIAL - AWS A5.1 E70XX  
ANCHOR BOLTS - ASTM F1554 GR. 36  
STAINLESS STEEL SHAPES - ASTM A276 TYPE 304 Fy = 30 KSI  
HEADED WELDED STEEL STUDS - ASTM A108, TYPE B  
HEAVY HEX NUTS - ASTM A563  
WASHERS - ASTM F436  
GROUT - ASTM C827
- FABRICATION AND ERECTION TO BE IN ACCORDANCE WITH AISC 360 SPECIFICATIONS
- BEAM CONNECTIONS ARE TO BE EQUAL TO OR GREATER THAN ONE HALF THE UNIFORM LOAD CAPACITY OF THE BEAM. THE LENGTH OF CONNECTION ANGLES SHALL NOT BE LESS THAN HALF THE "T" DISTANCE OF THE BEAM WEB. ALL MAJOR BOLTED CONNECTIONS ARE TO BE BEARING TYPE CONNECTIONS USING DOUBLE CLIP ANGLES AND 3/4" A325N BOLTS AND NUTS UNLESS NOTED OTHERWISE.
- FIELD CUTTING OR OTHER FIELD MODIFICATIONS TO STRUCTURAL STEEL SHALL NOT BE MADE WITHOUT SPECIFIC PRIOR WRITTEN APPROVAL OF THE ENGINEER
- ALL STRUCTURAL STEEL PLAN DIMENSIONS ARE TO CENTER LINE OF BEAMS AND COLUMNS AND TO THE BACK OF CHANNELS AND ANGLES, UNO. FOR HSS HORIZONTAL BRACING, ELEVATIONS ARE GIVEN TO CENTERLINE OF THE STRUCTURAL MEMBER, UNO. FOR ALL OTHER MEMBERS, ELEVATIONS ARE GIVEN TO TOP OF STRUCTURAL MEMBER, UNO
- THE CENTER OF GRAVITY OF BRACES AND SUPPORT MEMBERS ARE TO INTERSECT IN A MANNER TO AVOID ECCENTRICITY WHERE PRACTICAL; OTHERWISE FASTENERS AND SUPPORT MEMBERS ARE TO ACCOMMODATE STRESS DUE TO ECCENTRICITY, INCLUDING PRYING ACTION IN FRAMING ANGLES OR FLANGED GUSSETS
- CAPACITY OF CONNECTIONS FOR BRACING MEMBERS TO BE CAPABLE OF DEVELOPING THE NET SECTION STRENGTH OF THE MEMBERS IN COMPRESSION, UNO
- ALL WELDING AND TESTING OF WELDS SHALL BE IN ACCORDANCE WITH THE LATEST AWS CODES AND RECOMMENDATIONS AND SHALL BE COMPLETED BY AWS QUALIFIED WELDERS WITH CURRENT AWS CERTIFICATION
- WELDING ELECTRODES SHALL BE IN ACCORDANCE WITH AWS D1.1 AWS A5.1 OR A5.5 E70XX ARE GENERALLY REQUIRED FOR SHIELDED METAL ARC WELDING, AWS A5.17 OR AWS A5.23 F7X-EXXX FOR SUBMERGED ARC WELDING, AWS A5.18, ER70S-X FOR GAS METAL ARC WELDING, AND AWS A5.0 E7XT-X FOR FLUX-CORED ARC WELDING
- FABRICATION AND ERECTION WELDING TECHNIQUES SHALL CONFORM TO AWS D1.1; WELDERS SHALL BE QUALIFIED AND CERTIFIED TO PERFORM THE WORK REQUIRED IN ACCORDANCE WITH AWS D1.1 OR SIMILAR REQUIREMENTS
- UNLESS NOTED OTHERWISE, ALL WELDS SHALL BE CONTINUOUS 3/16" FILLET WELDS
- ALL BASE PLATES SUPPORTING STEEL COLUMNS SHALL BE GROUTED SOLID WITH HIGH STRENGTH (8,000 PSI MIN), NON-SHRINK GROUT IMMEDIATELY AFTER STRUCTURAL STEEL IS IN PLACE AND PLUMB AND PRIOR TO PLACING ANY CONCRETE FOR THE ELEVATED FLOORS SUPPORTED BY THE RESPECTIVE COLUMNS
- UPON COMPLETION OF INSTALLATION OF ALL ITEMS TO BE FIELD PAINTED. ALL PAINTED SURFACES DAMAGED DURING CONSTRUCTION AND ALL FIELD WELDED AREAS SHALL BE PREPPED IN ACCORDANCE WITH PAINT MANUFACTURER'S RECOMMENDATIONS. FIELD APPLY THE SPECIFIED PAINT SYSTEM IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS TO PROVIDE A CLEAN UNIFORM APPEARANCE
- DAMAGE TO ANY GALVANIZED MATERIAL SHALL BE TOUCHED UP AS REQUIRED WITH A ZINC RICH PAINT
- GRATING SHALL BE 1 1/4" X 3 1/8" 19-W-4 OR EQUAL. ATTACHED WITH CLIPS PER MANUFACTURER'S REQUIREMENTS, UNO. INTERIOR GRATING SHALL BE PRIMED AND PAINTED PER OWNER SPECIFICATIONS, EXTERIOR GRATING SHALL BE SERRATED AND GALVANIZED. GRATING SHALL BE FABRICATED SO THAT CROSS BARS OF ADJACENT PANELS ARE ALIGNED WHEN INSTALLED. EACH HOLE OR OPENING GREATER THAN 8" SHALL BE Banded WITH 1 1/4" X 3 1/8" BAND WELDED TO CUT PORTIONS OF GRATING
- ALL STRUCTURAL STEEL SURFACES TO BE PREPARED TO SSPC-SP6 STANDARDS PRIOR TO APPLYING THE FOLLOWING COATINGS:  
A. STEEL SHALL BE SHOP PRIMED WITH SHERWIN WILLIAMS PRO-CRYL UNIVERSAL ACRYLIC PRIMER WITH MINIMUM DFT OF 2.0 MIL  
B. STEEL SHALL BE SHOP PAINTED WITH SHERWIN WILLIAMS WATERBORNE ACRYLIC DRY FALL WITH MINIMUM DFT OF 3.0 MIL



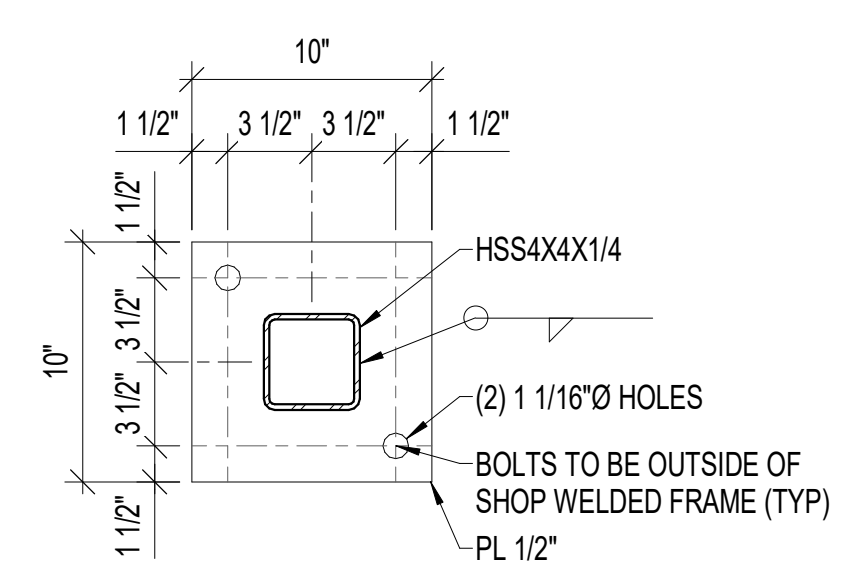
**2 TYPICAL SECTION AT BOILER SUPPORT BEAM**  
1/4" = 1'-0"



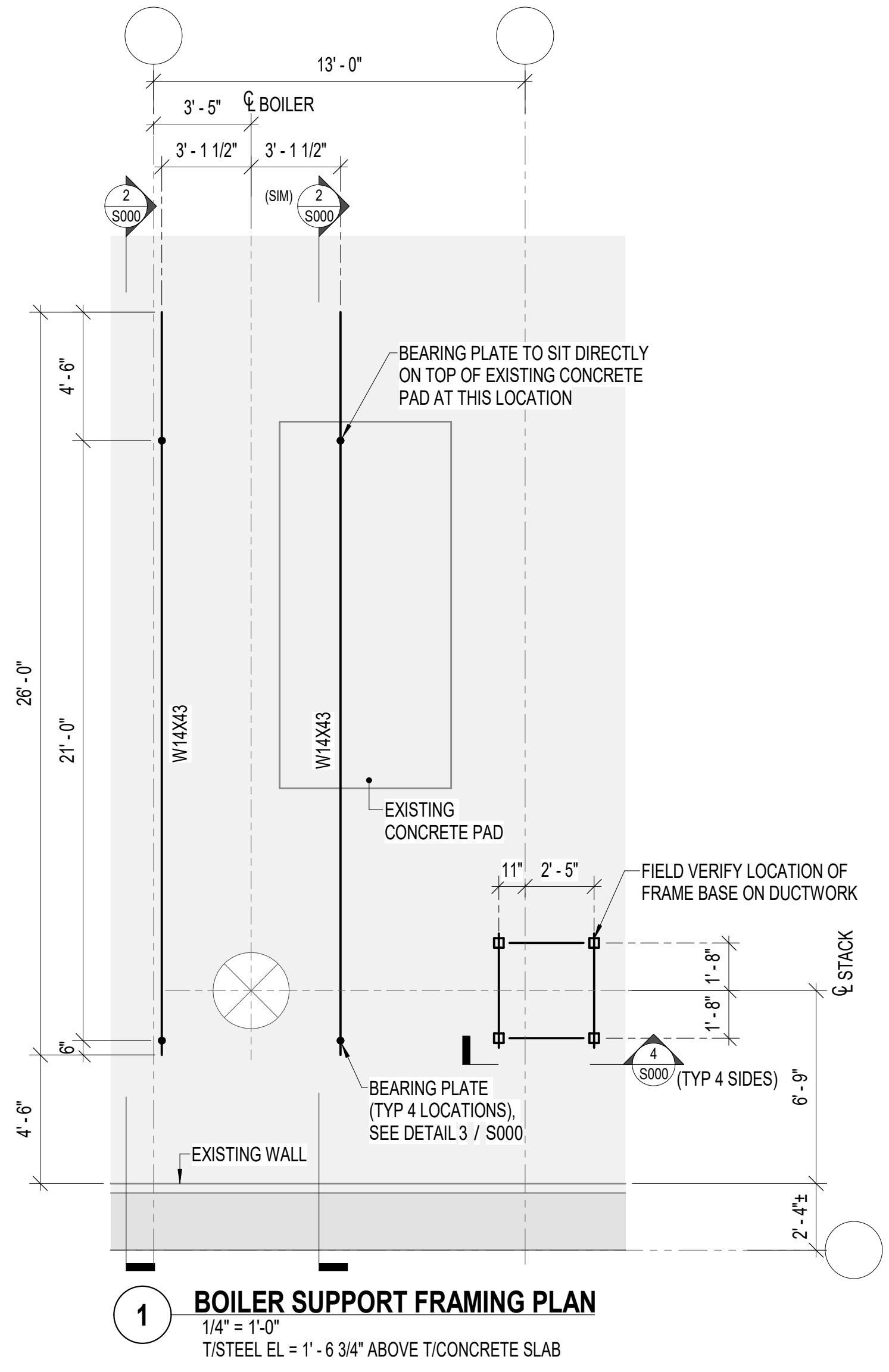
**3 BEARING PLATE DETAIL**  
3/4" = 1'-0"



**4 BOILER FLUE SUPPORT FRAME SECTION**  
1/4" = 1'-0"  
NOTE: ENTIRE FRAME TO BE SHOP WELDED TOGETHER

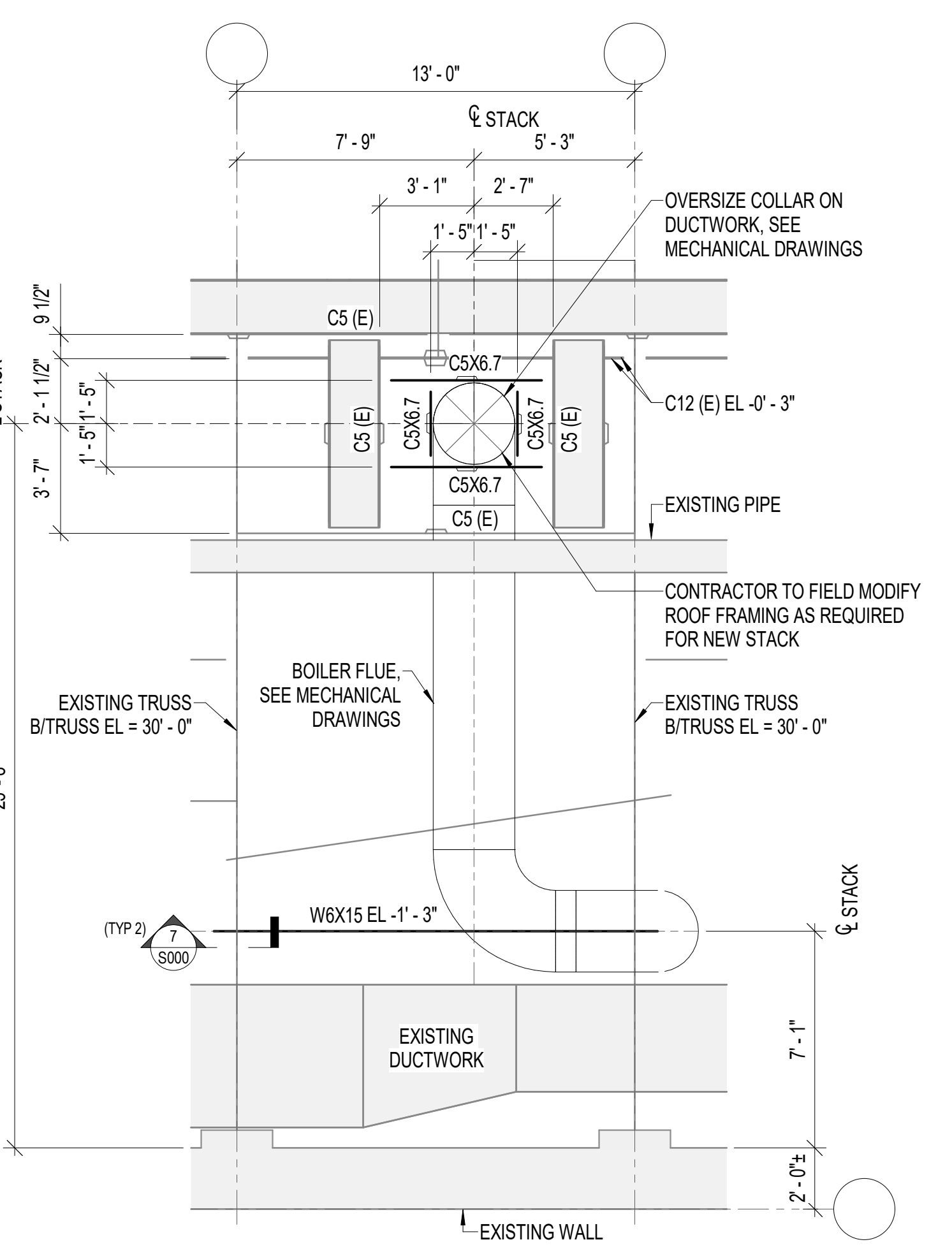


**5 HSS COLUMN SQUARE BASE PLATE DETAIL**  
1 1/2" = 1'-0"

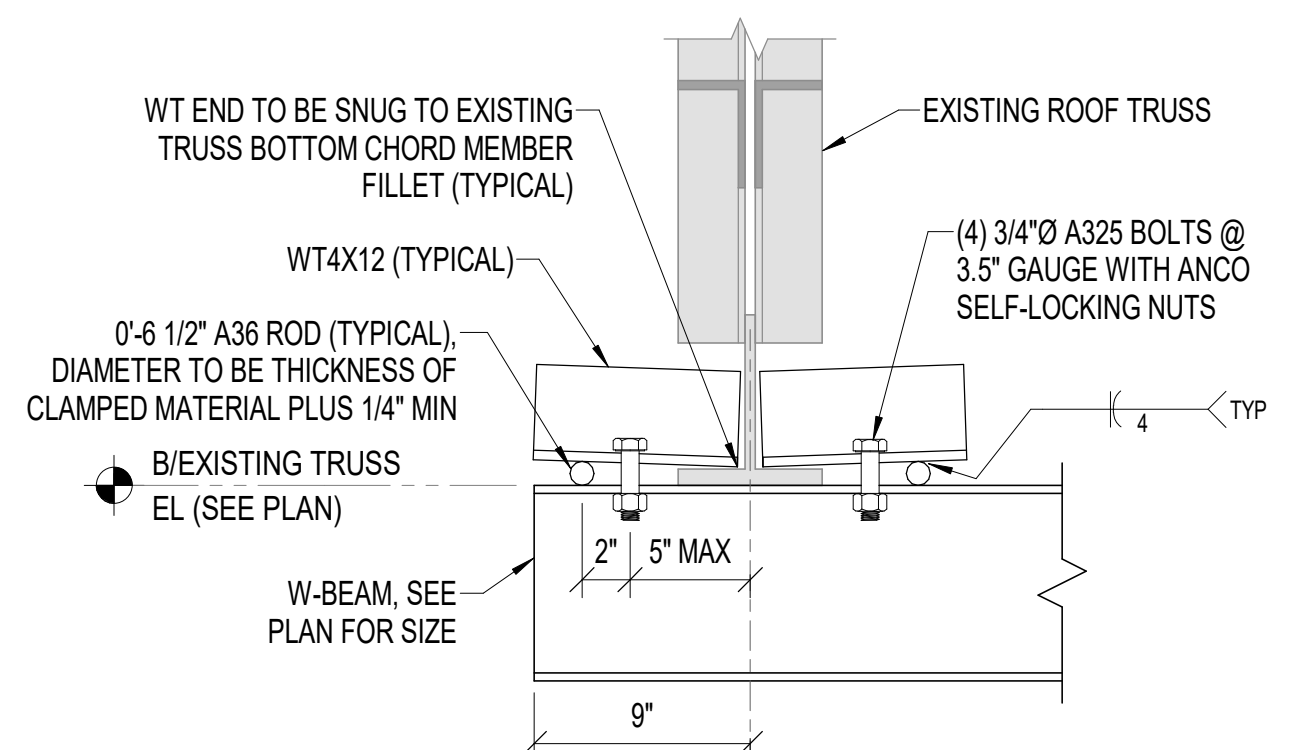


**1 BOILER SUPPORT FRAMING PLAN**  
1/4" = 1'-0"  
1/8" STEEL EL = 1'-6 3/4" ABOVE T/CONCRETE SLAB

**NOTE: DIMENSIONS TO BE VERIFIED WITH FINAL EQUIPMENT**



**6 STACK LATERAL SUPPORT FRAMING PLAN**  
1/4" = 1'-0"  
1/8" STEEL EL = 31'-3" UNO



**7 BEAM CLAMP DETAIL**  
1 1/2" = 1'-0"  
\*CLAMP TO BE LOCATED 1'-0" MAX FROM TRUSS PANEL POINT

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**ELECTRICAL ABBREVIATIONS**

A	DEVICE MOUNTED 4" ABOVE COUNTER TOP (VERIFY LOCATION)	NIC	NOT IN CONTRACT
AFF	ABOVE FINISHED FLOOR	NM	NONMETALLIC
ATS	AUTOMATIC TRANSFER SWITCH	NTS	NOT TO SCALE
C	CEILING	OC	ON CENTER
CB	CIRCUIT BREAKER	OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
CT	CURRENT TRANSFORMER	OFOI	OWNER FURNISHED, OWNER INSTALLED
E	EXISTING ITEM TO REMAIN	R	EXISTING ITEM TO BE REMOVED
EC	ELECTRICAL CONTRACTOR	RR	EXISTING ITEM TO BE REMOVED AND RELOCATED
EM	EMERGENCY LIGHT FIXTURE	RN	EXISTING ITEM TO BE REMOVED AND REPLACED WITH NEW
ER	NEW LOCATION OF EXISTING ITEM	SCCR	SHORT CIRCUIT CURRENT RATING
F	ROUGH-IN FOR FUTURE DEVICE	T	TAMPER PROOF DEVICE
FAAP	FIRE ALARM ANNUNCIATOR PANEL	TCC	TEMPERATURE CONTROL CONTRACTOR
FACP	FIRE ALARM CONTROL PANEL	TV	TELEVISION
FSD	FIRE SMOKE DAMPER	TYP	TYPICAL
G	GROUND FAULT CIRCUIT INTERRUPTER	UPS	UNINTERRUPTIBLE POWER SUPPLY
GND	GROUND	V	VOLTS
KVA	KILO-VOLT-AMPERES	VA	VOLT-AMPERES
KW	KILOWATTS	WG	WIRING GUARD COVER
MC	MECHANICAL CONTRACTOR	WP	WEATHERPROOF DEVICE
MCB	MAIN CIRCUIT BREAKER	WR	WEATHER RESISTANT DEVICE
MDP	MAIN DISTRIBUTION PANEL	+24"	INDICATES MOUNTING HEIGHT CENTER LINE OF DEVICE TO FINISHED FLOOR
MLO	MAIN LUGS ONLY		
N	NEW ITEM		

**CODE NOTES - ELECTRICAL**

- PROVIDE ELECTRICAL INSTALLATION IN ACCORDANCE WITH ALL LOCAL, STATE, AND NATIONAL CODES.
- THE CURRENT ADOPTED EDITION OF THE ELECTRICAL CODE IS THE STANDARD FOR THE ELECTRICAL INSTALLATION. VERIFY WITH LOCAL OFFICIALS WHEN PERMITS ARE OBTAINED. NOTIFY DESIGN TEAM OF ANY DISCREPANCIES BETWEEN THE PROJECT MANUAL OR DRAWINGS AND THE GOVERNING CODE.
- REFER TO PROJECT MANUAL AND PROJECT CODE REVIEW SHEET FOR LIST OF APPLICABLE CODES.
- PER NEC EVERY CIRCUIT AND CIRCUIT MODIFICATION SHALL BE LEGIBLY IDENTIFIED AS TO ITS CLEAR, EVIDENT AND SPECIFIC PURPOSE OR USE. CONTRACTOR TO PROVIDE FINAL CIRCUIT IDENTIFICATION FOR ALL NEW AND MODIFIED CIRCUITS AT PROJECT COMPLETION.

ELECTRICAL PANEL SPECIFICATIONS -										PANEL MDP-PP				DAS Independence Boiler	
LOAD DESCRIPTION	LOAD (VA)	TY	BRKR			PHASE			CTK	BRKR			TY	LOAD (VA)	LOAD DESCRIPTION
			AMP	P	NO	A	B	C		NO	AMP	P			
EMPTY					3	1						2		3	EMPTY
												4			
												5			
					3	7						8		3	EMPTY
												9			
												10			
												11			
												12			
					3	13						14		3	EMPTY
												15			
												16			
												17			
(E) ELEVATOR TRANSFORMER (DONT USE)			110	3	19							20	100	3	(E) BOILER ROOM MAIN, SE CORNER
												21			
												22			
												23			
(N) XFMR BOILER BLR-1*	33620		125	3	25	11207						26	125	3	(E) PANEL PP2
							11207					28			
								11207				30			
												32	200	3	(E) BOILER FEED PUMP, NE CORNER
(E) PANEL XPDE			200	3	31							33			
												34			
												35			
												36			
(E) NO1, NO2 BOILER			200	3	37							38	200	3	(E) GROUNDING SHOP
												39			
												40			
												41			
(E) ACTIVITY CENTER			200	3	43							44	225	3	(E) PANEL PP1
												45			
												47			

\* Breaker for the Boiler BLR-1 must be lockable and labeled XFMR Boiler BLR-1

ELECTRICAL PANEL SPECIFICATIONS -										PANEL PP-8				DAS Independence Boiler	
LOAD DESCRIPTION	LOAD (VA)	TY	BRKR			PHASE			CTK	BRKR			TY	LOAD (VA)	LOAD DESCRIPTION
			AMP	P	NO	A	B	C		NO	AMP	P			
(E) 1-A OIL PUMP			15	3	1							2	20	1	(E) HEATER IN WEST CORNER
												4	20	1	(E) LIGHS ON WEST WALL
												5	20	1	(E) LIGHTS ON SOUTH WALL
(E) 2-A OIL PUMP			15	3	7							8	30	1	(E) BATHROOM IN DRIVERS
												9	30	1	(E) OUTLET WORK BENCH
												10	30	1	SPACE
												11	15	1	SPACE
(E) 1-B OIL PUMP			20	3	13							14	20	1	(E) OUTLETS ON SOUTH WALL
												15	20	1	(E) OUTLETS ON SOUTH WALL
												16	20	1	(E) OUTLETS ON SOUTH WALL
												17	20	1	(E) OUTLETS ON WES WALL
(E) 2-B OIL PUMP			20	3	19							20	20	1	(N) Boiler Estop
												21			SPACE
												22			SPACE
												23			SPACE
(E) SMALL OIL PUMP			30	3	25							26			SPACE
												27			SPACE
												28			SPACE
												29			SPACE
												30			SPACE
(E) #2 BOILER			60	3	31							32	15	3	GRINDER
												33			
												34			
												35			
(E) #1 BOILER			60	3	37							36	50	3	WELDER
												38			
												39			
												40			
												41			
												42			

CABLE SCHEDULE				
TAG	AMPS	PHASE/NEUTRAL	GROUND	CONDUIT
A	130	(3) - #1	#6	1 1/2"
B	25	(2) - #12	#12	3/4"
C	65	(3) - #6	#8	3/4"

**NOTES:**

- CONDUCTORS SHALL BE THWN COPPER, UNLESS DESIGNATED "AL" FOR ALUMINUM
- TAGS WITH "UG" INDICATE UNDERGROUND FEEDS IN RIGID CONDUIT. ALL OTHER FEEDS ASSUMED TO BE ABOVE-GROUND IN RIGID CONDUIT.
- CABLE TERMINATIONS/LUGS SHALL BE VERIFIED TO BE RATED FOR 75°C

**INSTALLATION NOTES - ELECTRICAL**

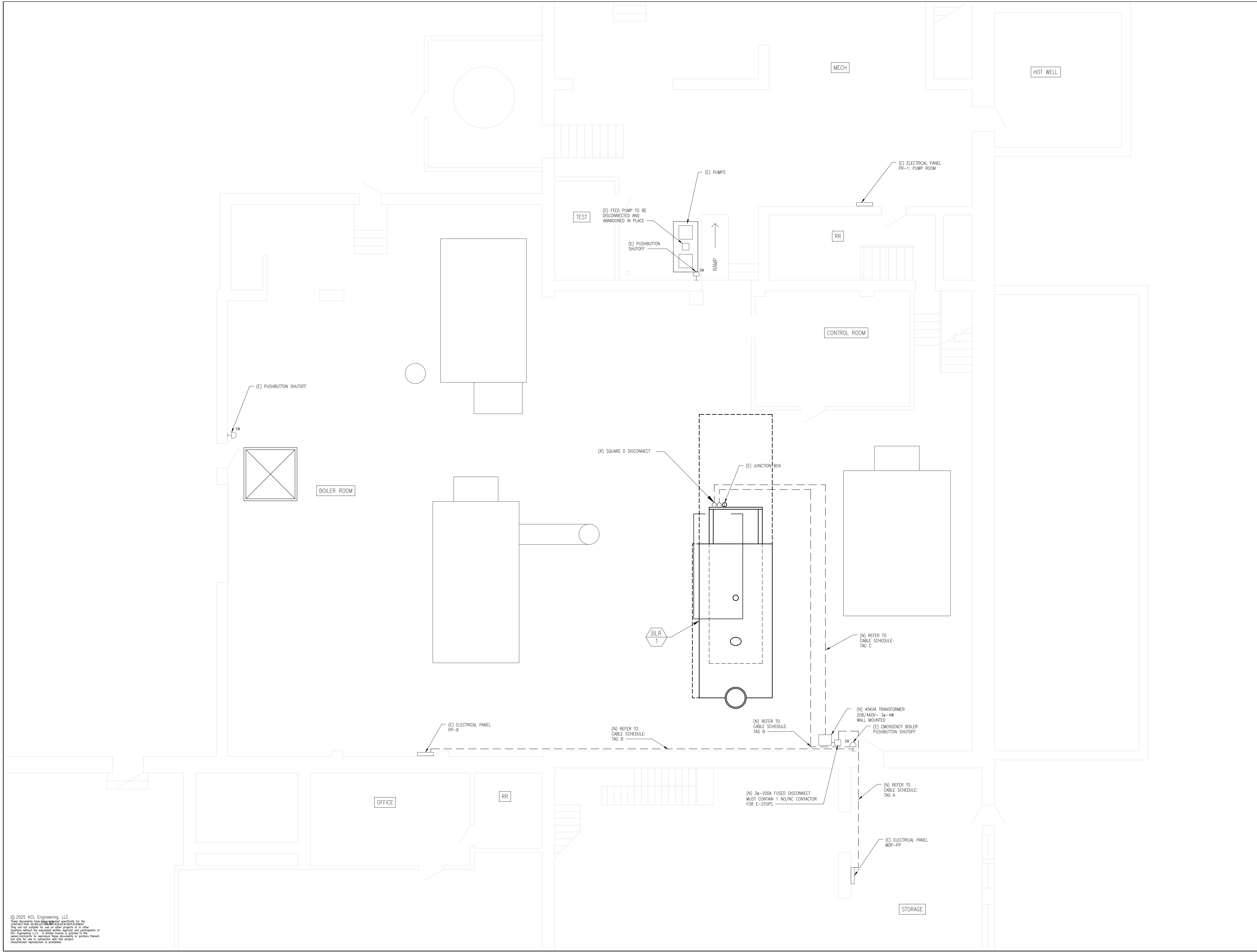
- INCREASE CONDUCTOR SIZES ON 20A 120V-1 PHASE CIRCUITS EXCEEDING 100 FEET TO CENTER OF LOAD TO ACCOUNT FOR VOLTAGE DROP.
- RACEWAYS AND BOXES ARE SHOWN DIAGRAMMATICALLY ONLY AND INDICATE GENERAL AND APPROXIMATE LOCATIONS. LAYOUTS DO NOT ALWAYS SHOW THE TOTAL NUMBER OF RACEWAYS OR BOXES FOR THE CIRCUITS REQUIRED, NOR ARE THE LOCATIONS OF INDICATED RUNS INTENDED TO SHOW THE ACTUAL ROUTING OF THE RACEWAYS.
- LIGHT FIXTURES, SWITCHES, DEVICES, ETC. ARE SHOWN IN PREFERRED LOCATION. MODIFY CONDUIT, HANGERS, CIRCUITING, ETC. TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.
- PROVIDE A DEDICATED GREEN INSULATED GROUND CONDUCTOR TO ALL DEVICES. DO NOT USE CONDUIT SYSTEM AS THE ONLY EQUIPMENT GROUNDING METHOD.
- DO NOT INSTALL BOXES BACK-TO-BACK ON OPPOSITE SIDES OF THE SAME WALL. MAINTAIN MINIMUM OF 8" DISTANCE BETWEEN BOXES WHEREVER APPLICABLE.
- BALANCE PANEL LOADS DURING INSTALLATION. CIRCUIT NUMBERING SHOWN ON PLANS MAY BE ADJUSTED TO ACCOMMODATE.
- PROVIDE TYPED PANEL DIRECTORY AT PROJECT COMPLETION FOR NEW PANELS AND EXISTING PANELS WITH CIRCUITS MODIFIED DURING PROJECT. USE OWNER'S CURRENT ROOM NUMBERS AND EQUIPMENT NAMES. PROVIDE UNIQUE CIRCUIT IDENTIFICATION PER NEC 408.4(A)
- CONTRACTOR IS RESPONSIBLE FOR OPENINGS IN WALLS, FLOORS, CEILINGS, AND ROOFS THAT ARE REQUIRED TO COMPLETE THEIR SCOPE OF WORK. SEAL PENETRATIONS IN ACCORDANCE WITH THE RATING OF THE AFFECTED ASSEMBLY. REFER TO ARCHITECTURAL CODE PLAN FOR RATED WALLS, FLOORS, AND CEILINGS.

**GENERAL NOTES - ELECTRICAL**

- COORDINATE LOCATION/INSTALLATION OF MECHANICAL AND ELECTRICAL WORK WITH ALL OTHER TRADES. BEGIN INSTALLATION AND ROUGH-IN ONLY AFTER PROPER AND TIMELY COORDINATION WITH ALL TRADES ASSOCIATED WITH THE INSTALLATION IS COMPLETE. COORDINATE WITH BUILDING STRUCTURE, ARCHITECTURE, MECHANICAL, SHEET METAL, ALL PIPING SYSTEMS, LIGHT FIXTURES, CONDUITS, CABLE TRAYS, EQUIPMENT ACCESS/CLEARANCE, ETC. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT. CONTRACTOR IS RESPONSIBLE FOR REWORK OF INSTALLED EQUIPMENT RESULTING FROM INSUFFICIENT COORDINATION.
- ELECTRICAL DRAWINGS ARE ONLY A PORTION OF THE COMPLETE SET OF PLANS AND CONTRACT DOCUMENTS. THE ELECTRICAL SCOPE OF WORK IS DEFINED BY THE COMPLETE SET OF CONTRACT DOCUMENTS. THIS INCLUDES BUT IS NOT LIMITED TO REFERENCING: ARCHITECTURAL PLANS FOR DIMENSIONS AND DETAILS; EQUIPMENT PLANS FOR ROUGH-IN REQUIREMENTS; MECHANICAL PLANS FOR EQUIPMENT SIZES AND LOCATIONS.
- ELECTRICAL WORK TO BE COMPLETED BY INDIVIDUALS LICENSED BY THE STATE OF IOWA.

**DEVICE INSTALLATION AND MATERIALS - ELECTRICAL**

- PROVIDE NORMAL WIRING DEVICES AS GRAY UNLESS OTHERWISE NOTED.
- PROVIDE DEVICES COVER PLATES AS STAINLESS STEEL. MATCH WIRING DEVICES COLOR.
- PROVIDE GFCI TYPE RECEPTACLES AT ALL LOCATIONS REQUIRED BY THE NEC.
- INSTALL WALL MOUNTED RECEPTACLES AT +18" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.
- INSTALL WALL MOUNTED LIGHT SWITCHES AT +46" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. EXCEPTION: INSTALL DEVICES ABOVE AN OBSTRUCTED HIGH FORWARD REACH OBSTACLE GREATER THEN 20 INCHES IN DEPTH AT +42"



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**CONTRACT RFB - 947400-01 - HHS IMHI BOILER #3 REPLACEMENT**  
 2277 IOWA AVE.  
 INDEPENDENCE - IOWA - 50644