



SHELBY COUNTY GOVERNMENT

BOILER MODIFICATIONS

BID PACKAGE #1

140 ADAMS AVENUE - COURTHOUSE

MEMPHIS, TN 38103

06 SEP 13

MEDIAFAC
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COURTHOUSE -140 ADAMS AVENUE - MEMPHIS, TN 38103

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#1



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PROJECT NUMBER
12077

DATE
06 SEP 13

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SHEET TITLE

COVER SHEET

SHEET NUMBER

C1.1

PROJECT SUMMARY

THE COUNTY IS MAKING BOILER UPGRADES TO THE SHELBY COUNTY COURTHOUSE AND THE CRIMINAL JUSTICE CENTER AND REQUIRES ADDITIONAL BUILDING AUTOMATION MONITORING. THE COUNTY IS SOLICITING PROPOSALS FROM CONTRACTORS TO PERFORM THIS WORK. THE WORK CAN BE DESCRIBED IN BRIEF AS FOLLOWS:

BID PACKAGE #1 - 140 ADAMS - COURTHOUSE

REPLACE THE BOILERS AND STEAM HEATING SYSTEM TO THE MAXIMUM EXTENT PRACTICAL USING HIGH EFFICIENCY MODULAR HYDRONIC BOILERS. REUSE RADIATORS AND ASSOCIATED STEAM PIPING. PROVIDE A SMALL HIGH EFFICIENCY BOILER TO SERVE THE RADIATORS. PROVIDE NEW BOILERS, PUMPS AND PIPING TO SERVE THE HVAC SYSTEMS THROUGHOUT THE BUILDING USING VARIABLE FLOW.

BID PACKAGE #2 - 201 POPLAR - CRIMINAL JUSTICE CENTER

PROVIDE HIGH EFFICIENCY MODULAR HYDRONIC BOILERS WITH SYSTEM MODIFICATIONS NECESSARY TO REPLACE THE EXISTING STEAM BOILERS. RETAIN STEAM BOILERS FOR OPERATION ONLY ON FUEL OIL FOR EMERGENCY USE. CONVERT THE DOMESTIC WATER HEATERS FOR HEATING OPERATION USING HVAC HEATING WATER. PROVIDE NEW BOILERS, PUMPS AND PIPING TO SERVE THE HVAC SYSTEMS THROUGHOUT THE BUILDING USING VARIABLE FLOW.

BID PACKAGE #3 - ADDITIONAL BUILDING AUTOMATION MONITORING

INTEGRATE THE BUILDING AUTOMATION SYSTEM AT THE REGIONAL FORENSICS CENTER SO THAT IT IS MONITORED AND CONTROLLED FROM THE COUNTY'S EXISTING REMOTE MONITORING LOCATIONS AT 1600 N MAIN

DOCUMENTS PREPARED IN ACCORDANCE WITH THE FOLLOWING CODES AND ORDINANCES:

- LOCALLY ADOPTED CODES THAT APPLY TO THIS PROJECT
- 1 2009 INTERNATIONAL BUILDING CODE
 - 2 2009 INTERNATIONAL MECHANICAL CODE
 - 3 2009 INTERNATIONAL PLUMBING CODE
 - 4 2009 INTERNATIONAL GAS CODE
 - 5 2009 INTERNATIONAL FIRE PREVENTION CODE
 - 6 2008 NFPA 70 - NATIONAL ELECTRICAL CODE
 - 7 2003 ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES
 - 8 2012 INTERNATIONAL EXISTING BUILDING CODE
 - 9 2010 NFPA 13 STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS.
- ALL OF THE ABOVE INCLUDE COMPLIANCE WITH ALL LOCALLY ADOPTED AMENDMENTS

DRAWING INDEX

- C1.1 COVER SHEET
- D1.1 BASEMENT DEMOLITION PLAN SOUTH
- D1.2 BASEMENT ENLARGED BOILER RM DEMOLITION PLAN
- D1.3 ENLARGED SECOND FLOOR MEZZANINE DEMOLITION PLANS
- D1.4 PENTHOUSE ENLARGED DEMOLITION PLAN
- G1.1 PARTIAL ENLARGED GENERAL CONSTRUCTION PLANS
- G1.2 PARTIAL ENLARGED GENERAL CONSTRUCTION PLANS
- G2.1 DETAILS
- M1.1 BASEMENT MECHANICAL PLAN - NORTH
- M1.2 BASEMENT MECHANICAL PLAN - SOUTH
- M1.3 BASEMENT ENLARGED BOILER RM MECHANICAL PLAN
- M1.4 FIRST FLOOR MECHANICAL PLAN
- M1.5 SECOND FLOOR MECHANICAL PLAN
- M1.6 ENLARGED SECOND FLOOR MEZZANINE MECHANICAL PLANS
- M1.7 THIRD FLOOR MECHANICAL PLAN
- M1.8 PENTHOUSE MECHANICAL PLAN
- M1.9 PENTHOUSE ENLARGED BOILER ROOM MECHANICAL PLANS
- M2.1 PIPING SCHEMATICS
- M3.1 SCHEDULES
- M4.1 DETAILS
- M4.2 DETAILS
- E1.1 BASEMENT ENLARGED BOILER RM ELECTRICAL PLANS
- E1.2 PENTHOUSE ENLARGED BOILER RM ELECTRICAL PLANS



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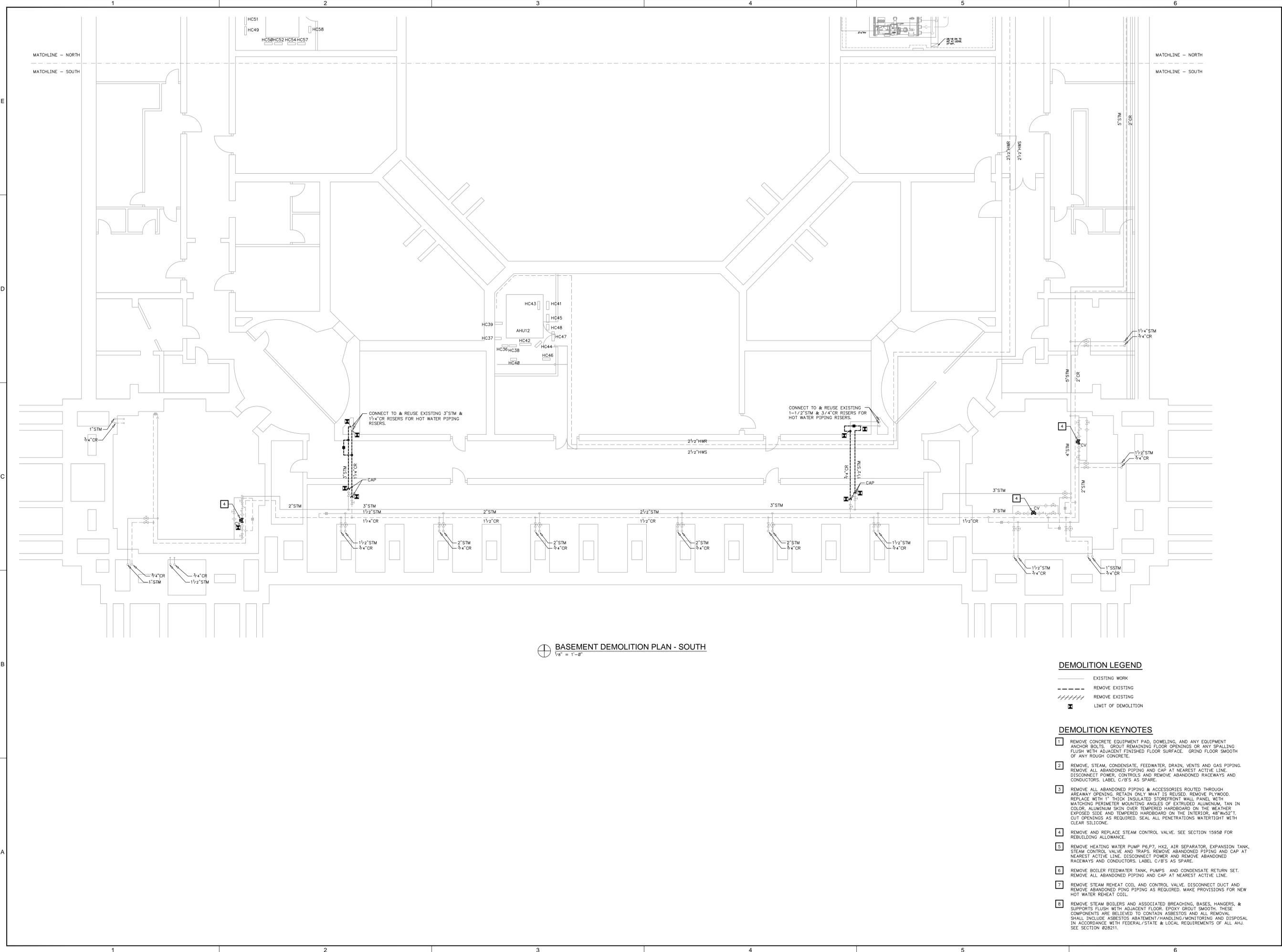
DATE
06 SEP 13

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SHEET TITLE
BASEMENT DEMOLITION PLAN SOUTH

SHEET NUMBER
D1.1



BASEMENT DEMOLITION PLAN - SOUTH
1/8" = 1'-0"

- DEMOLITION LEGEND**
- EXISTING WORK
 - - - REMOVE EXISTING
 - //// REMOVE EXISTING
 - ☒ LIMIT OF DEMOLITION

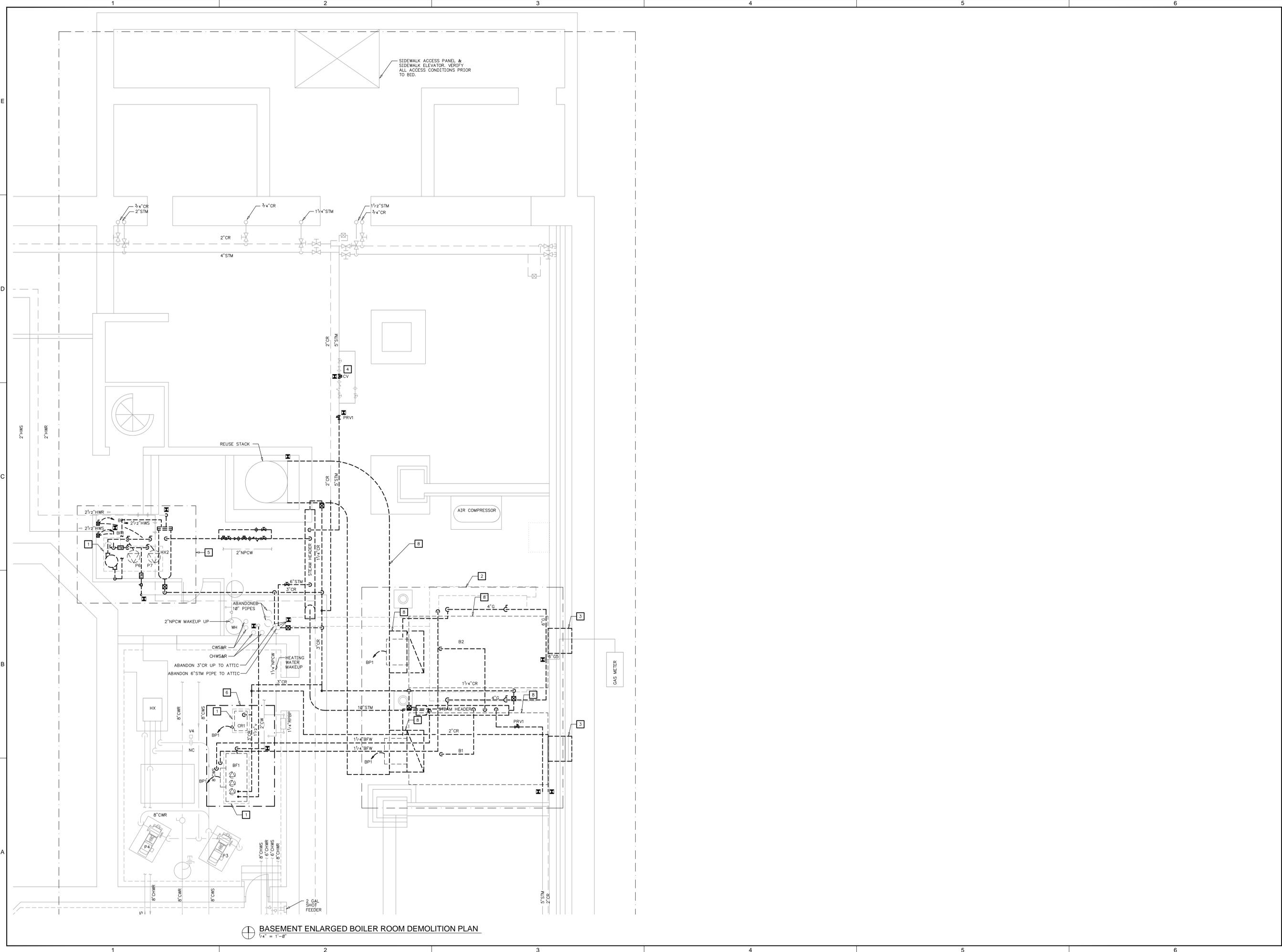
- DEMOLITION KEYNOTES**
- 1 REMOVE CONCRETE EQUIPMENT PAD, DOWELING, AND ANY EQUIPMENT ANCHOR BOLTS. GROUT REMAINING FLOOR OPENINGS OR ANY SPALLING FLUSH WITH ADJACENT FINISHED FLOOR SURFACE. GRIND FLOOR SMOOTH OF ANY ROUGH CONCRETE.
 - 2 REMOVE STEAM, CONDENSATE, FEEDWATER, DRAIN, VENTS AND GAS PIPING. REMOVE ALL ABANDONED PIPING AND CAP AT NEAREST ACTIVE LINE. DISCONNECT POWER, CONTROLS AND REMOVE ABANDONED RACEWAYS AND CONDUCTORS. LABEL C/B'S AS SPARE.
 - 3 REMOVE ALL ABANDONED PIPING & ACCESSORIES ROUTED THROUGH AREAWAY OPENING. RETAIN ONLY WHAT IS REUSED. REMOVE PLYWOOD, REPLACE WITH 1" THICK INSULATED STOREFRONT WALL PANEL WITH MATCHING PERIMETER MOUNTING ANGLES OF EXTRUDED ALUMINUM, TAN IN COLOR, ALUMINUM SKIN OVER TEMPERED HARDBOARD ON THE WEATHER EXPOSED SIDE AND TEMPERED HARDBOARD ON THE INTERIOR. 48"Wx52" T. CUT OPENINGS AS REQUIRED. SEAL ALL PENETRATIONS WATERTIGHT WITH CLEAR SILICONE.
 - 4 REMOVE AND REPLACE STEAM CONTROL VALVE. SEE SECTION 15958 FOR REBUILDING ALLOWANCE.
 - 5 REMOVE HEATING WATER PUMP P6,P7, HX2, AIR SEPARATOR, EXPANSION TANK, STEAM CONTROL VALVE AND TRAPS. REMOVE ABANDONED PIPING AND CAP AT NEAREST ACTIVE LINE. DISCONNECT POWER AND REMOVE ABANDONED RACEWAYS AND CONDUCTORS. LABEL C/B'S AS SPARE.
 - 6 REMOVE BOILER FEEDWATER TANK, PUMPS AND CONDENSATE RETURN SET. REMOVE ALL ABANDONED PIPING AND CAP AT NEAREST ACTIVE LINE.
 - 7 REMOVE STEAM REHEAT COIL AND CONTROL VALVE. DISCONNECT DUCT AND REMOVE ABANDONED PING PIPING AS REQUIRED. MAKE PROVISIONS FOR NEW HOT WATER REHEAT COIL.
 - 8 REMOVE STEAM BOILERS AND ASSOCIATED BRACING, BASES, HANGERS, & SUPPORTS FLUSH WITH ADJACENT FLOOR. EPOXY GROUT SMOOTH. THESE COMPONENTS ARE BELIEVED TO CONTAIN ASBESTOS AND ALL REMOVAL SHALL INCLUDE ASBESTOS ABATMENT/HANDLING/MONITORING AND DISPOSAL IN ACCORDANCE WITH FEDERAL/STATE & LOCAL REQUIREMENTS OF ALL APL. SEE SECTION 028211.



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SHEET TITLE	BASEMENT ENLARGED BOILER RM DEMOLITION PLAN
SHEET NUMBER	D1.2



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



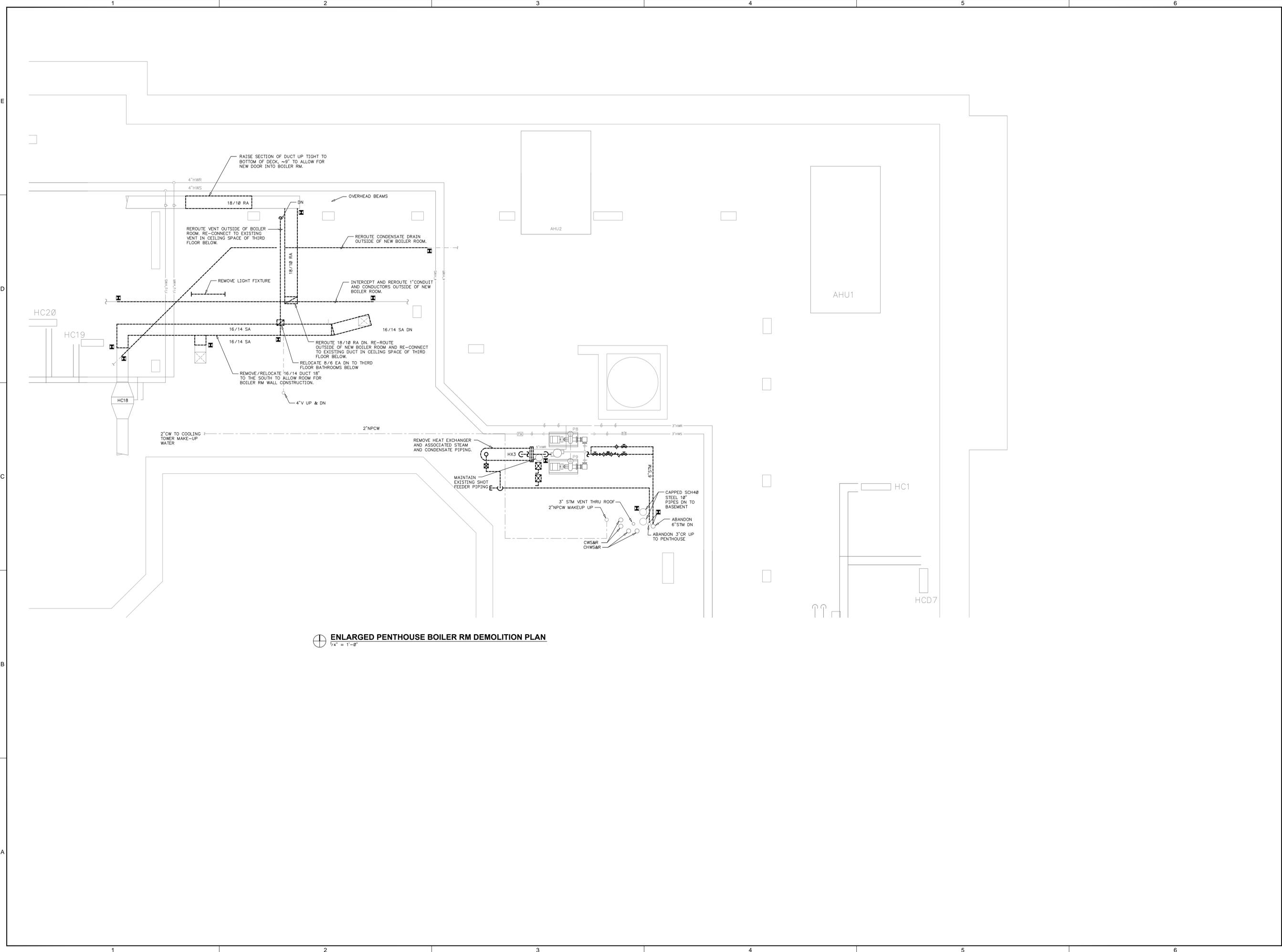
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NO.	DATE	DESCRIPTION

PROJECT NUMBER	12077
DATE	06 SEP 13
DRAWN	CBW
CHECKED	RCH

SHEET TITLE
PENTHOUSE ENLARGED DEMOLITION PLAN

SHEET NUMBER
D1.4



ENLARGED PENTHOUSE BOILER RM DEMOLITION PLAN
1/4" = 1'-0"

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SHEET TITLE
**PARTIAL
ENLARGED
GENERAL
CONSTRUCTION
PLANS**

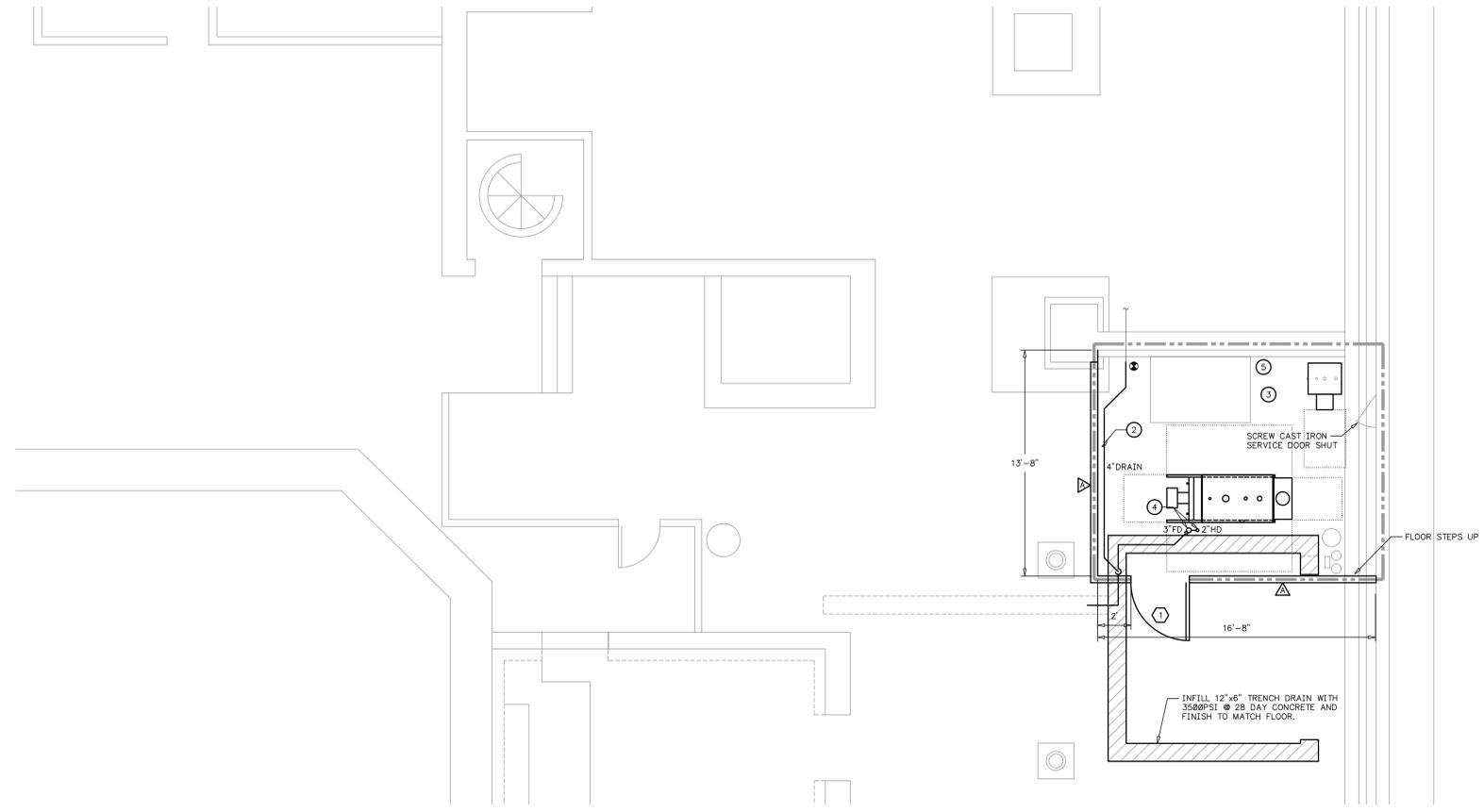
SHEET NUMBER
G1.1

GENERAL KEYNOTES

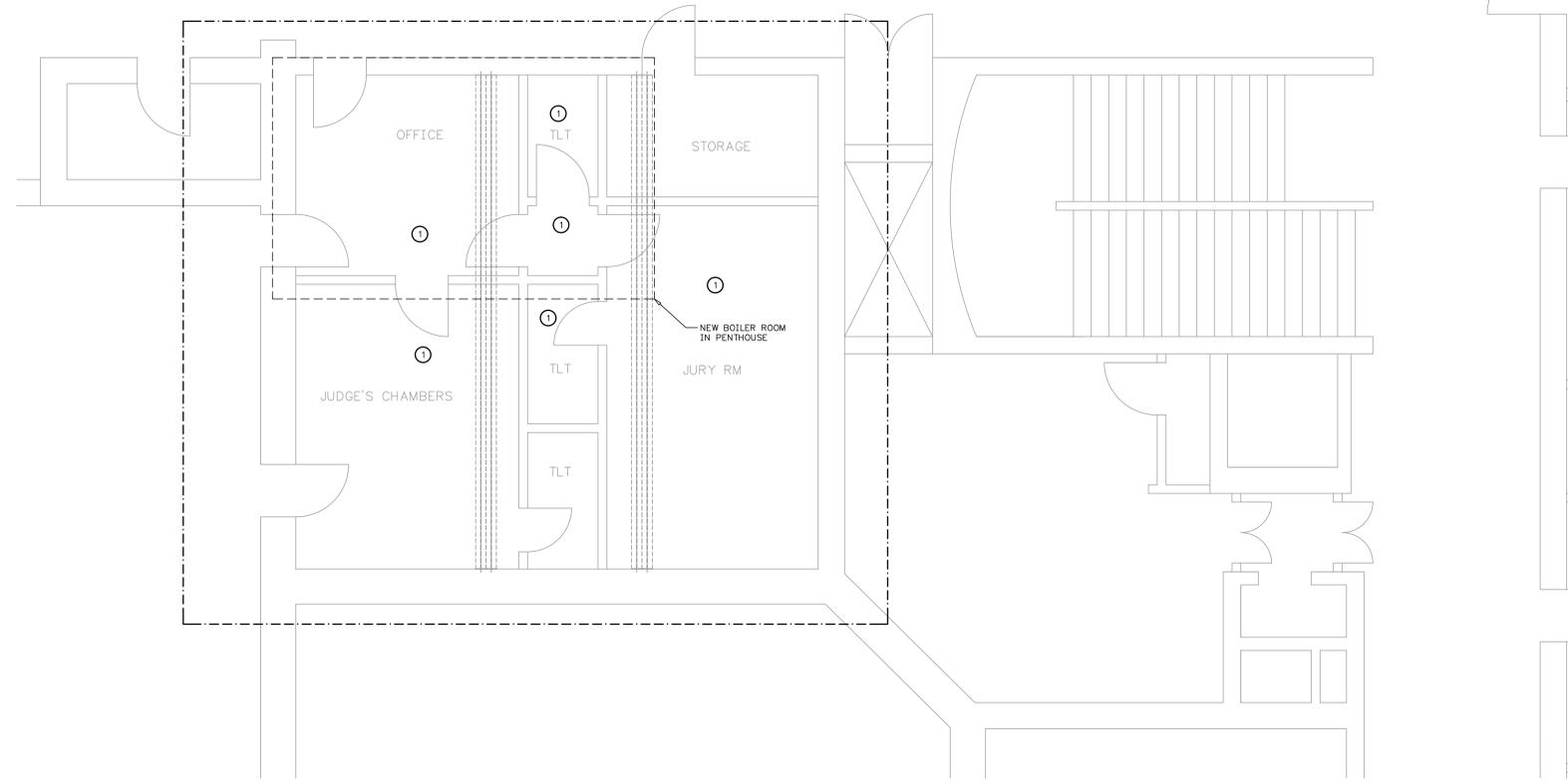
- EXISTING
- NEW WORK
- NEW TO EXISTING
- 1HR FIRE WALL
- 2HR FIRE WALL
- ① DOOR NUMBER. SEE DOOR SCHEDULE.
- △ WALL TYPE

GENERAL CONSTRUCTION KEYNOTES

- ① REMOVE 2'x2' LAY-IN CEILING TILES AND GRID AS REQUIRED FOR MECHANICAL WORK ABOVE CEILINGS. REPLACE AND REPAIR CEILING TILES AND GRID AS REQUIRED. MATCH EXISTING.
- ② RUN NEW 4" DRAIN LINE THROUGH ROOM TIGHT TO WALL USING SERVICE WEIGHT CAST IRON. DROP IN TRENCH AND SPILL INTO ACTIVE TRENCH DRAIN.
- ③ ALLOW FOR 20SF OF 1" THICK CEMENTITIOUS PLASTER PATCH OF CEILING.
- ④ PROVIDE 3" FLOOR DRAIN, ZURN #2507 AND A 2" HUB DRAIN TO SPILL INTO EXISTING TRENCH DRAIN. BUST OUT AND PATCH CONCRETE AS REQUIRED.
- ⑤ PATCH ALL EXISTING WALLS WITH MASONRY GROUT OR DRYWALL TO MAINTAIN 2HR FIRE RATING ON ALL SIDES OF ROOM. SCREW CAST IRON ACCESS DOOR SHUT.



⊕ **PARTIAL ENLARGED BASEMENT GENERAL CONSTRUCTION PLAN**
1/4" = 1'-0"



⊕ **PARTIAL ENLARGED THIRD FLOOR GENERAL CONSTRUCTION PLAN**
1/4" = 1'-0"



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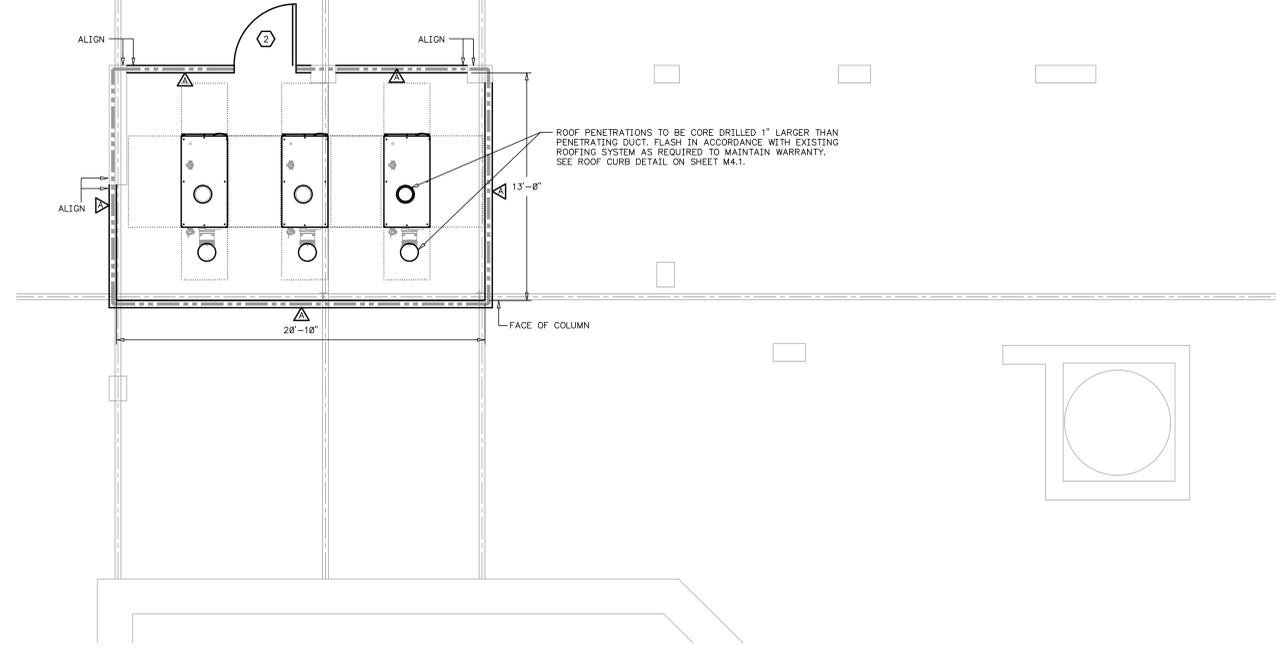
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SHEET TITLE
PARTIAL ENLARGED GENERAL CONSTRUCTION PLANS

SHEET NUMBER
G1.2



PARTIAL ENLARGED PENTHOUSE GENERAL CONSTRUCTION PLAN
 1/4" = 1'-0"

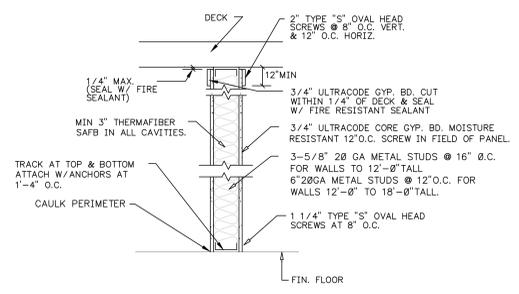
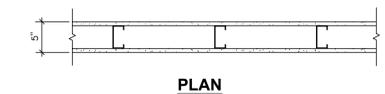
Grid lines 1 through 6 and A through E are shown along the perimeter of the drawing.

DOOR SCHEDULE										
DOOR NO.	SIZE			DOOR			FRAME			REMARKS
	WIDTH	HEIGHT	DEPTH	MATERIAL	TYPE	CLOSER	LABEL	MATERIAL	JAMB / HEAD DETAIL	
1	3'-6"	7'-0"	1-3/4"	HM	A	Y	88 MIN	HM	J1	1,2,3
2	3'-6"	6'-0"	1-3/4"	HM	A	Y	88 MIN	HM	J1	1,2,3

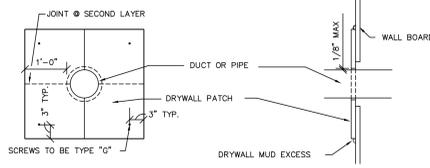
REMARKS: FIELD VERIFY ALL CONDITIONS, PROVIDE HEAVY DUTY HARDWARE TO MEET CODE, ADJUST ALL DOORS, FRAMES & HARDWARE FOR SILENT AND SMOOTH OPERATION IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

- 1 PROVIDE NEW ADA COMPLIANT COMMERCIAL GRADE LEVERS, OUTSIDE LEVER OPERABLE, KNURLED FINISH AND ALWAYS LOCKED, INSIDE LEVER OPERABLE AND ALWAYS UNLOCKED. FIRE RATED LEVER, LOCKSET AND CLOSER.
- 2 MATCH STANDARD CYLINDER KEYING AS DIRECTED BY THE OWNER TO MATCH OWNER STANDARD.
- 3 NEW DOOR AND FRAME
- 4 PROVIDE MEDICO LOCK BOX AND KEY ON DOOR.
- 5 PROVIDE NEW DOOR WITH VIEW LIGHT, WIRE REINFORCED, 12"x12", 60" AFF.

FRAMING AT OPENINGS	JAMB	FRAME TYPE	DOORS
GYPSUM BOARD JAMB	J1 GYPSUM BOARD	A HOLLOW METAL	A HOLLOW METAL



INSTALLATIONS:
 1. PROVIDE THICK COAT OF DRYWALL MUD ON BACK OF PATCH BOARD.
 2. PROVIDE SCREWS AT SPACING SHOWN TO SNUGGLY ANCHOR PATCH TO EXISTING DRYWALL.
 3. DO NOT SCRAPE EXCESS DRYWALL MUD AT THE EDGES WHICH HAVE BEEN SQUEEZED OUT FROM THE TIGHTENING OF THE SCREWS. BY LEAVING THIS DRYWALL MUD THE INSPECTOR CAN TELL THAT THE BACK OF THE PATCH WAS PROPERLY "BUTTERED" BEFORE THE PATCH WAS INSTALLED.
 4. DO NOT ADD DRYWALL TO TOP OF SCREW HEADS AFTER ANCHORAGE OF PATCH.



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SHEET TITLE
 DETAILS

SHEET NUMBER

G2.1



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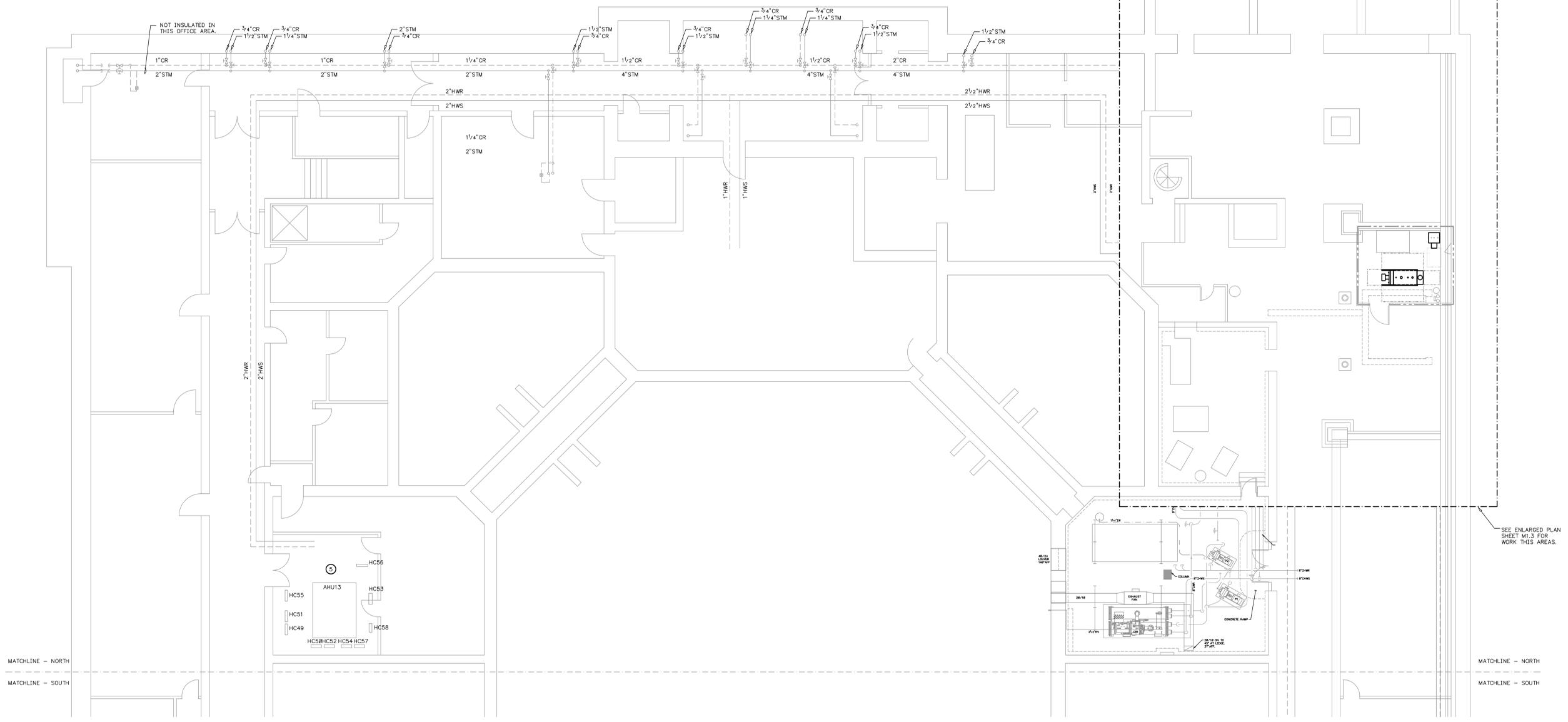
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SHEET TITLE
BASEMENT MECHANICAL PLAN - NORTH

SHEET NUMBER
M1.1



BASEMENT MECHANICAL PLAN - NORTH
1/8" = 1'-0"

LEGEND

- REMOVE EXISTING
- EXISTING
- NEW WORK
- LIMIT OF DEMOLITION
- NEW TO EXISTING
- BALL VALVE
- BUTTERFLY VALVE
- GATE VALVE
- OS&Y VALVE
- PRESSURE RELIEF VALVE
- PLUG VALVE
- CAP
- NON-SLAM CHECK VALVE
- REDUCER / INCREASER
- PUMP
- DRAIN
- GAS PIPING
n = BLANK = 1/4" W.C.
n = 2 = 1/2"
n = 5 = 3/4"
- STM STEAM
- CR STEAM CONDENSATE RETURN
- V VENT - SAFETY RELIEF VALVE
- STEAM TRAP & ACCESSORIES
- STRAINER
- THERMOSTAT/BAS TEMP SENSOR. ARC OR n INDICATES UNIT(S) CONTROLLED
- PRESSURE GAUGE
- BIMETAL THERMOMETER
- VERTICAL FIRE DAMPER & ACCESS DOOR
- HORIZONTAL FIRE DAMPER & ACCESS DOOR

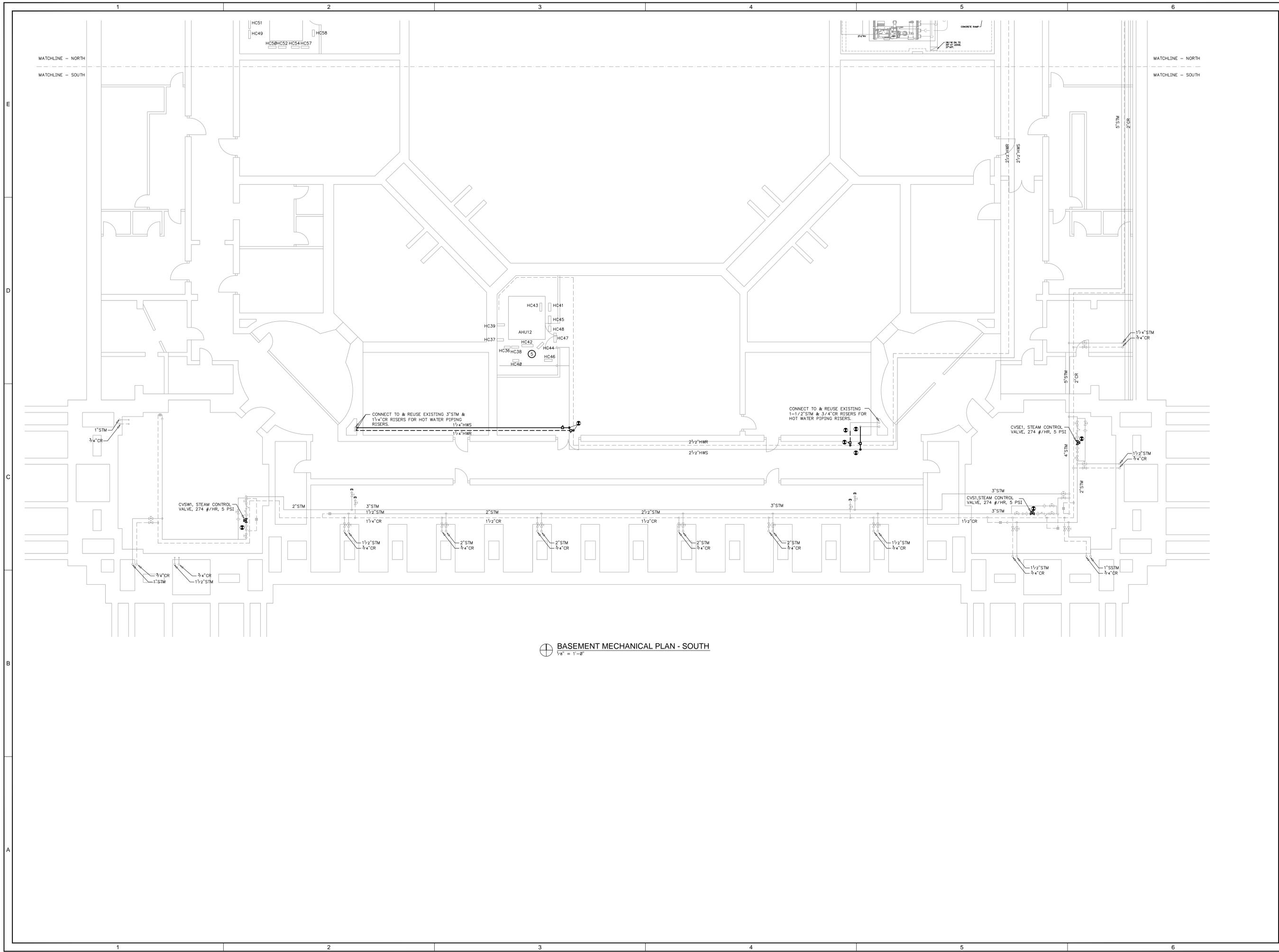
- MOTORIZED CONTROL VALVE
- GATE VALVE
- BUTTERFLY VALVE
- HEATING WATER COIL
- DUAL DUCT TERMINAL UNIT HEATING WATER COIL
- BOI BOTTOM OF INSULATION
- BOP BOTTOM OF PIPE
- MPR MEDIUM PRESSURE REGULATOR
- NPCW NON POTABLE COLD WATER
- PRV PRESSURE RELIEF VALVE

MECHANICAL KEYNOTES

- 1 BOILER VENT: 10" Ø UP THROUGH ROOF CURB. PROVIDE DOUBLE WALL ANSI CATEGORY IV POSITIVE PRESSURE CONDENSING BOILER VENT SYSTEM, UL 1728 (ULG S636 LISTED, 0.015" THICK SUPERFERRITIC STAINLESS STEEL AL 28-4C INNER LINER, 0.018" THICK ALUMINIZED STEEL OUTER JACKET, 6" W.G. / 550F PRESSURE / TEMPERATURE RATED, EQUAL TO HEATFAB SA-1 VENT SC OR METAL FAB CORR/GUARD II. SUPPORTS, EXPANSION JOINTS, APPLIANCE CONNECTORS, DRAINS, VENT TERMINALS, ETC. AS RECOMMENDED BY BOTH BOILER AND VENT MANUFACTURER. SUBMITTAL WITH ANCHORAGES REQUIRED.
- 2 10" Ø COMBUSTION AIR INTAKE DUCT UP THROUGH ROOF CURB. SEE DETAIL.
- 3 NEW HOT WATER REHEAT COIL. MODIFY DUCT AS REQUIRED. EXTEND PIPING TO NEW COIL. SEE HOT WATER REHEAT COIL DETAIL.
- 4 PROVIDE STEAM BOILER, SEE SCHEDULE AND DETAIL. SHUTDOWN INTERLOCK WITH NEW SAIL SWITCH AND CSD-1 SAFETY INTERLOCK. REUSE EXISTING ABANDONED PIPING LEFT BY EXISTING STEAM BOILER DEMOLITION WHERE POSSIBLE. STEAM VENTS CAN REUSE EXISTING OVERSIZED STEAM VENT ELBOWS FROM DEMOLISHED BOILERS. CLEAN AND REPAINT ELBOWS. PROVIDE 1/4" BLOW DOWN PIPED TO NEAREST TRENCH DRAIN.
- 5 PROVIDE BOILER FEED UNIT. SEE SCHEDULE AND DETAIL. 3/4" NPCW TO LOW WATER MAKE UP, 1" FEED WATER TO BOILER, 1.25" OVERFLOW TO NEAREST FLOOR DRAIN, 2" CONDENSATE RETURN TO CONDENSATE RETURN UNIT. BOILER FEED CONTROL INTERLOCKED WITH BOILER FOR PUMP CONTROL. TRAP ALL LOW POINTS IN STEAM PIPING.
- 6 MODIFY ALL EXISTING HOT WATER COILS. CLOSE BYPASS VALVE. REMOVE HANDLE AND REATTACH WITH #16GA GALVANIZED WIRE.

MATCHLINE - NORTH
MATCHLINE - SOUTH

MATCHLINE - NORTH
MATCHLINE - SOUTH



⊕ BASEMENT MECHANICAL PLAN - SOUTH
 1/8" = 1'-0"



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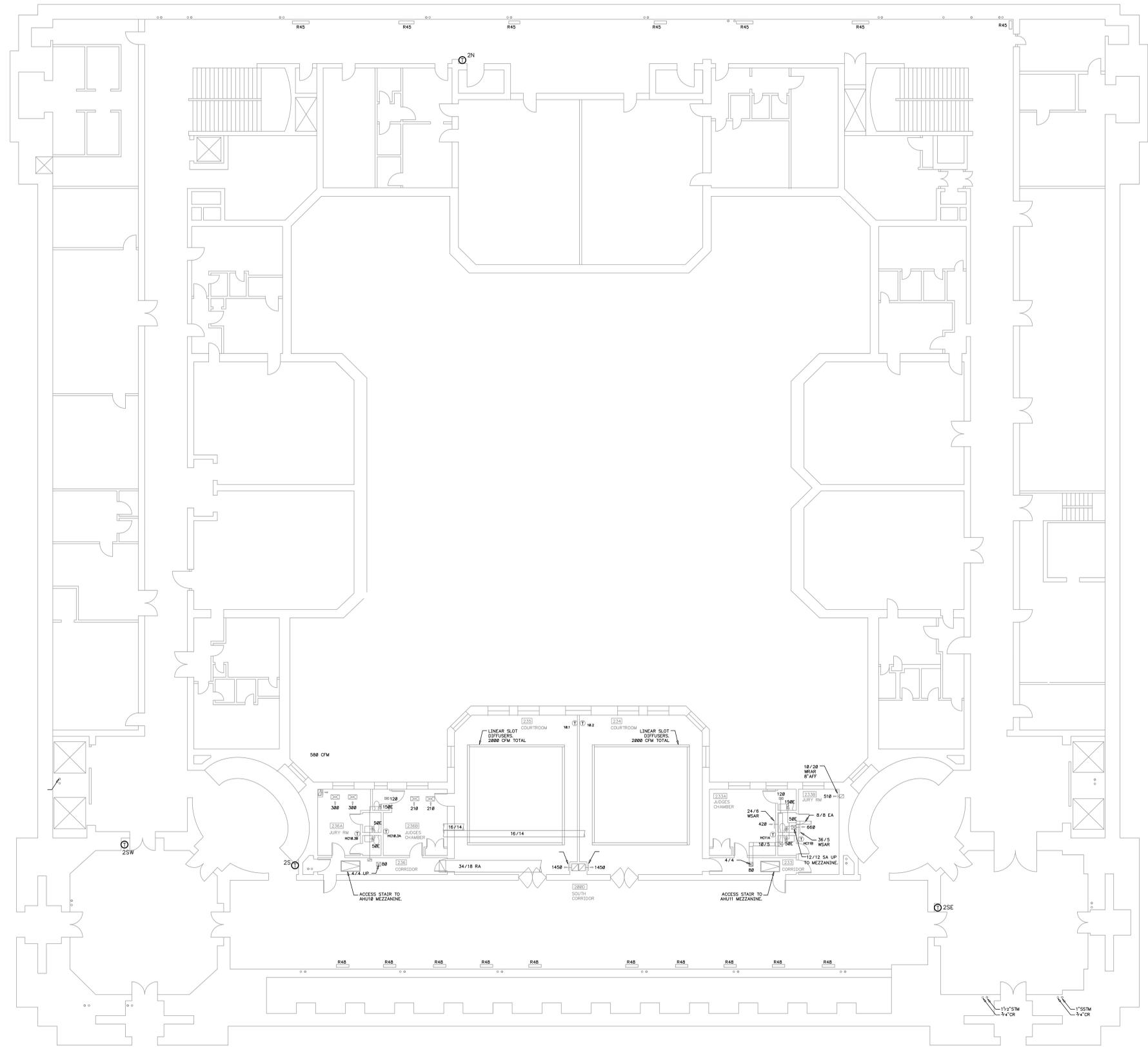
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SHEET TITLE	BASEMENT MECHANICAL PLAN - SOUTH
SHEET NUMBER	M1.2



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SHEET TITLE SECOND FLOOR MECHANICAL PLAN	
SHEET NUMBER M1.5	



⊕ SECOND FLOOR MECHANICAL PLAN
3/32" = 1'-0"



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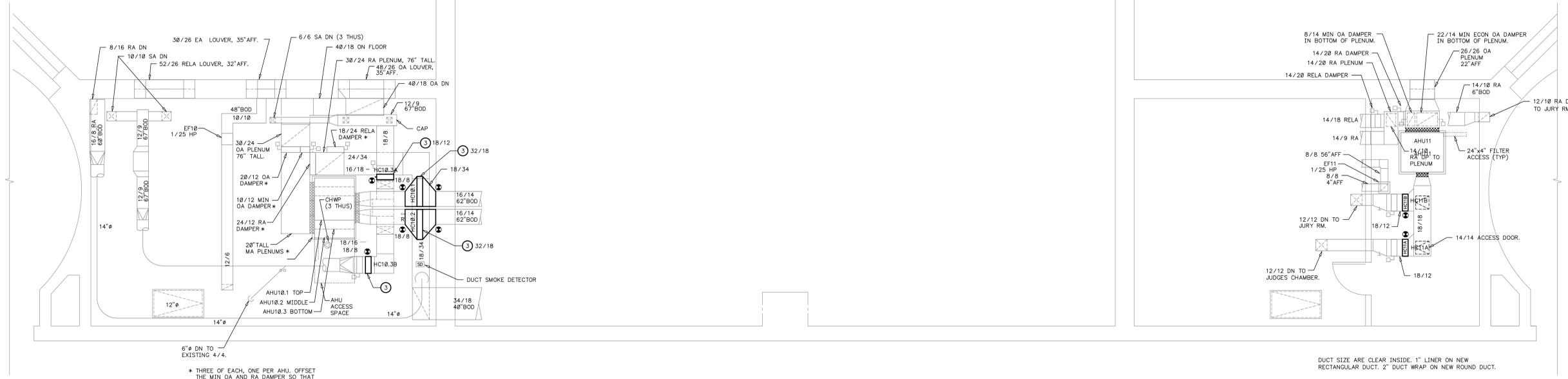
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SHEET TITLE
ENLARGED SECOND FLOOR MEZZANINE MECHANICAL PLANS

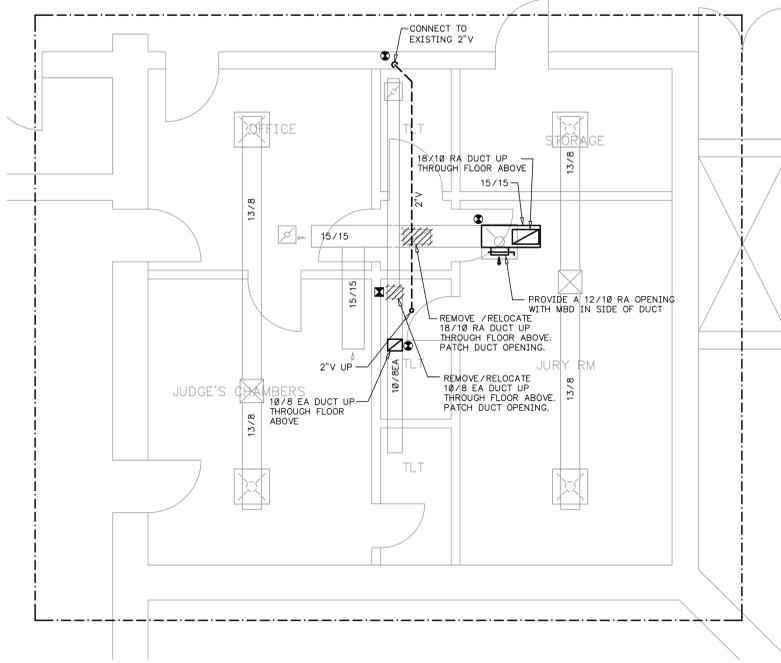
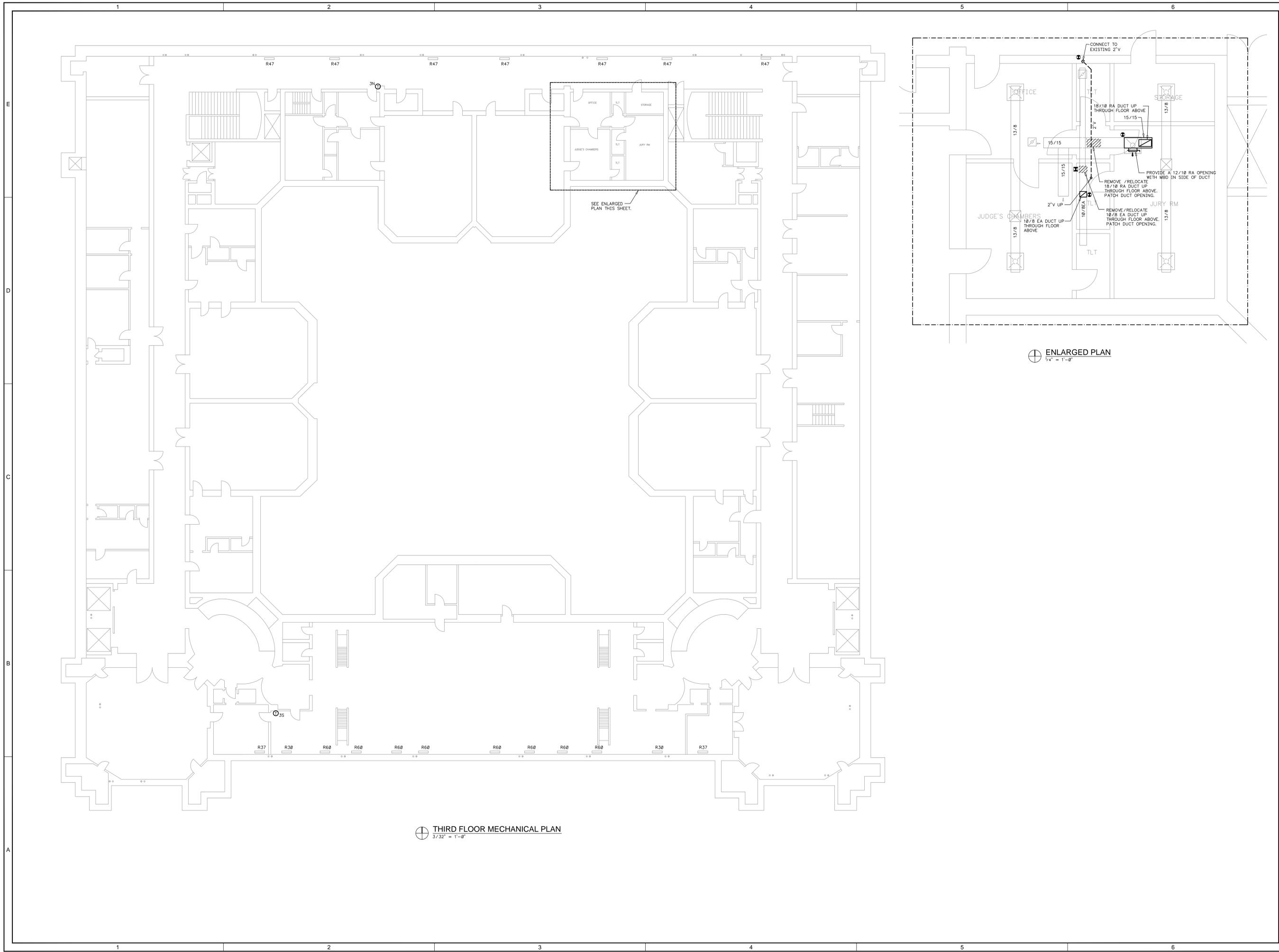
SHEET NUMBER
M1.6



⊕ PARTIAL SECOND FLOOR MEZZANINE MECHANICAL PLAN
1/4" = 1'-0"



⊕ PARTIAL SECOND FLOOR MEZZANINE PIPING PLAN
1/4" = 1'-0"



ENLARGED PLAN
1/4" = 1'-0"

THIRD FLOOR MECHANICAL PLAN
3/32" = 1'-0"



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SHEET TITLE THIRD FLOOR MECHANICAL PLAN	
SHEET NUMBER M1.7	

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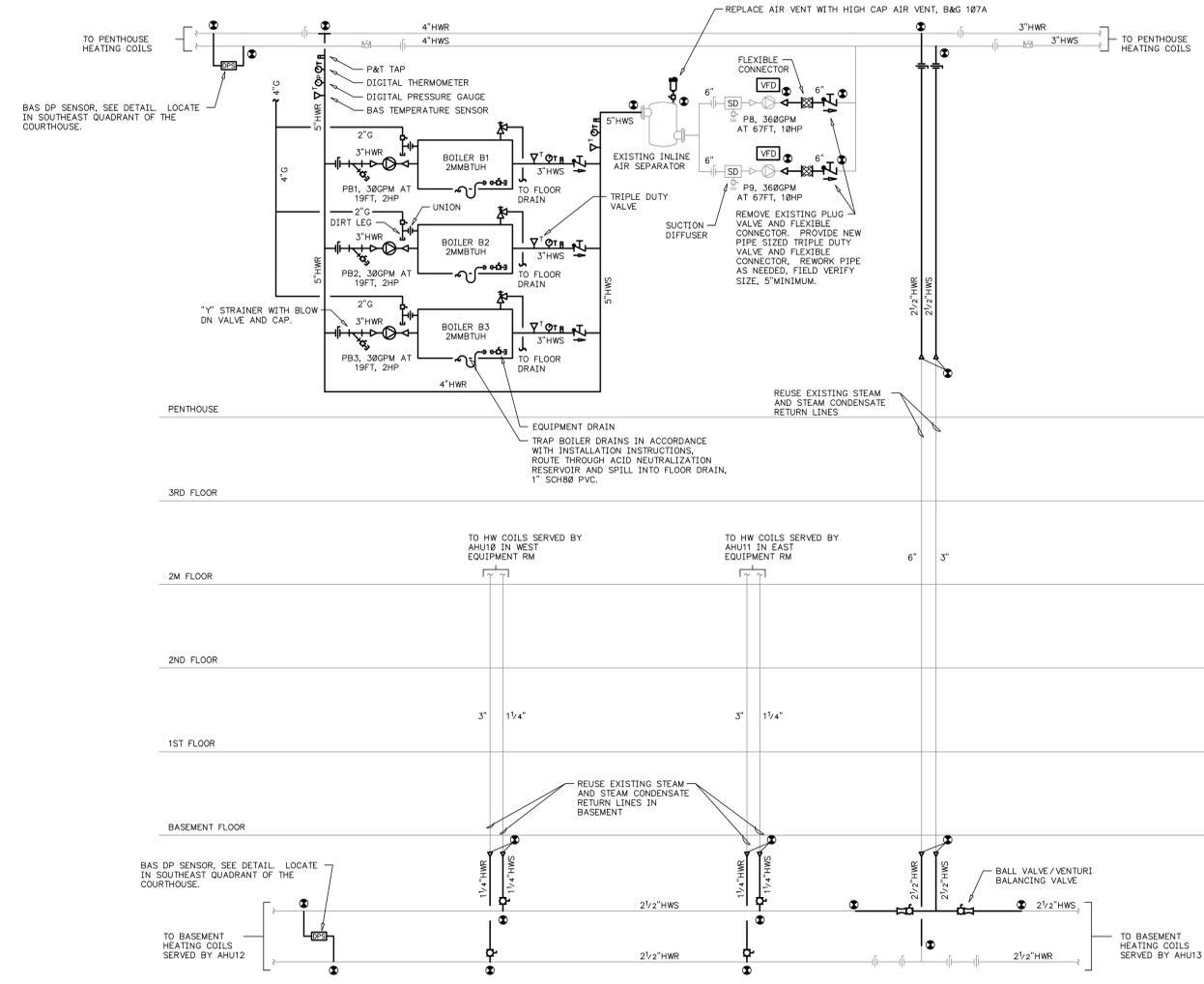
SHEET TITLE

SCHEDULES

SHEET NUMBER

M2.1

GENERAL:
NEW ISOLATION VALVES, TRIPLE DUTY VALVES, STRAINERS, SUCTION DIFFUSER INLETS, ETC. ARE PIPE SIZE. REFER TO EQUIPMENT PIPING / INSTALLATION DETAILS AND EQUIPMENT SCHEDULES FOR ADDITIONAL REQUIREMENTS.
EQUIPMENT DRAINS NOTED AS PIPED TO NEAREST FLOOR DRAIN, 1.25" MINIMUM. EQUIPMENT DRAINS/VENTS SHOWN VALVED AND CAPPED. PROVIDE WATTS B6000-CC, FULL SIZE OF EQUIPMENT OPENING, 3/4" MINIMUM.
PROVIDE FLANGE OR UNION CONNECTIONS TO FACILITATE EQUIPMENT REMOVAL AND SERVICE.
PROVIDE DIELECTRIC CONNECTIONS BETWEEN DISSIMILAR METALS.
INSULATE ALL PIPE, EQUIPMENT, AND ACCESSORIES PER SECTION 15250 OF PROJECT MANUAL.



HEATING WATER PLANT SCHEMATIC
NTS

1 2 3 4 5 6

E

D

C

B

A

1 2 3 4 5 6

STEEL FIRE TUBE STEAM BOILER SCHEDULE														
DRAWING CODE	STEAM LBS/HR	STEAM PSI	HP	INPUT			OUTPUT			HTG SURFACE SF	ELECTRICAL			REMARKS
				MBTUH	EFF	EFF	HP	VOLTS	AMPS		HP	VOLTS	AMPS	
B4	1368	15.8	48	1633	1339	82.8	166	0.58	115				BURNHAM #LN-CL-48-G-PF	1, 2

GENERAL: FACTORY PACKAGED STEEL FIRE TUBE BOILER MANUFACTURED IN STRICT ACCORDANCE WITH ASME POWER BOILER CODE, SECTION IV, AND SHALL BEAR THE ASME STAMP FOR A MAXIMUM WORKING PRESSURE OF 15 PSIG, MINIMUM 5 SF HEATING SURFACE PER BOILER HORSEPOWER.

STRUCTURAL STEEL FRAME, WATER COOLED SIDE WALLS WITH 3-PASS FIRETUBE CONSTRUCTION, PROVIDING STEAM QUALITY IN EXCESS OF 99% 2" O.D. STEEL WATER TUBES, 0.085 WALL THICKNESS, TUBES REMOVABLE AND REPLACEABLE. TAPINGS AND INSPECTION OPENINGS TO FACILITATE INTERNAL BOILER INSPECTION AND CLEANING. THE BOILER VESSEL SHALL BE WARRANTED FOR 25 YEARS AGAINST THERMAL SHOCK ON A NON-PRO-RATED BASIS.

FURNACE/COMBUSTION CHAMBER WATER-WALL DESIGN, FULLY ACCESSIBLE INTERIOR, INSULATED WITH 2" MINERAL FIBER MONO BLOCK AND 2" HIGH TEMPERATURE CERAMIC BLANKET INSULATION, FULLY GASKETED FOR PRESSURIZED FIRING FOR A POSITIVE 0.25" W.C. AT THE BOILER FLUE OUTLET WITH A LOCKING MANUAL QUADRANT DAMPER AND THERMOMETER IN THE DISCHARGE.

16 GAUGE ZINC-COATED RUST RESISTANT STEEL METAL JACKET WITH A HEAT RESIST PAINTED FINISH, 1-1/2" FIBERGLASS INSULATION, ALL PANELS EASILY REMOVABLE FOR ACCESS.

BOILER TRIM AND CONTROL EQUIPMENT: STEAM PRESSURE GAUGE, STEAM PRESSURE CONTROL OPERATOR, HIGH LIMIT SAFETY CONTROL, WATER GAUGE GLASS, LOW WATER CUTOFF AND FEED PUMP CONTROL, AUXILIARY PROBE TYPE LOW WATER CUTOFF, GAUGE COCKS, ASME SAFETY RELIEF VALVE(S), MANUAL RESET TYPE HIGH LIMIT, MANUAL RESET TYPE LOW WATER CUTOFF, CSD-1 AND FM, MANUAL BLOWDOWN VALVES.

FORCED DRAFT MODULATING GAS BURNER AND CONTROL, UL LISTED, FLAME RETENTION GAS, COMPLETE WITH INTEGRAL MOTOR AND BLOWER FOR COMBUSTION AIR AND NORMAL VENT CONDITIONS.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE THREE WATER LEVEL SWITCHES FOR MAKE-UP CONTROL AND HIGH/LOW LEVEL ALARMS.
2) PROVIDE BACNET MS/TP COMMUNICATION BUS FOR INTERFACE WITH THE BUILDING BAS.

BOILER FEED UNIT SCHEDULE														
DRAWING CODE	LBS/HR	RECEIVER SIZE GAL	OPERATING PRESS. PSI	HP	FEED WATER PUMPS				MAKE UP WATER HEATING CAPACITY		ELECTRICAL VOLTS	AMPS	MANUFACTURER MODEL NUMBER	REMARKS
					QTY	MIN GPM	HEAD FT	HP	LBS/HR	STM PSI				
BFT	1368	48	5.0	48	2	7	58	0.33	368	5	208/3	5.0	ATLANTIC 58FS	1

GENERAL: FACTORY PACKAGED AND TESTED PRESSURIZED DEAERATING BOILER FEED UNIT. THE SYSTEM SHALL GUARANTEE OXYGEN REMOVAL TO NOT MORE THAN 0.005 CCS O2 / LITER IN THE EFFLUENT FROM 5 TO 100% LOAD. THE DEAERATOR SHALL BE DESIGNED FOR USE FROM 2 TO 15 PSIG, 5 PSIG INITIAL SETPOINT.

PACKAGE SHALL CONSIST OF WELDED 304 STAINLESS STEEL RECEIVER, STAINLESS STEEL SPARGE TUBE, TEMPERATURE SWITCH, STEAM CONTROL VALVE, ELEVATED TO MEET THE NPSH REQUIREMENTS OF THE BOILER FEED PUMPS PLUS 2 FT, SUPPORTED BY A SEISMIC RATED STRUCTURAL STEEL FRAME, INSULATED AND JACKETED, DUPLEX BOILER FEED PUMPS, STEAM CONTROL VALVE SELECTED FOR 5 PSIG STEAM SUPPLY PRESSURE AND CAPABLE OF HEATING 3.5 GPM 35F, DEEP SEAL OVERFLOW DRAIN TRAP, ELECTRICAL CONTROLS AND ACCESSORIES.

RECEIVER TRIM: TOP AND BOTTOM SHUT-OFF WATER LEVEL GAUGE WITH AUTOMATIC SHUT-OFF IF GLASS IS BROKEN, DIAL THERMOMETER WITH WELL, PRESSURE GAUGE, ISOLATION VALVE BETWEEN RECEIVER AND EACH PUMP, VALVE IN EACH PUMP BLEED LINE, STAINLESS STEEL CHEMICAL FEED OULI, MAGNESIUM ANODE, SAMPLING VALVE, OVERFLOW DRAIN, RELIEF VENT, EXTERNALLY MOUNTED HIGH AND LOW LEVEL ALARM SWITCHES AND LOW WATER CUT-OFF, LOW POINT DRAIN VALVES.

PUMP SHALL BE A MULTI-STAGE RIGID COUPLED DESIGN WITH STANDARD C FACE MOTOR AND GUARD, ASA FLANGED SUCTION AND DISCHARGE, SILICON CARBIDE / VITON SEAL, RATED FOR 3000' SERVICE. INDIVIDUAL PUMP SUCTION PIPING AND VALVING TO PERMIT INDIVIDUAL PUMP SERVICE WITHOUT DRAINING RECEIVER. AUTOMATIC FLOW CONTROL VALVE AND PRESSURE GAUGE WITH SNUBBER IN THE DISCHARGE OF EACH PUMP. GRUNDFOS OR ENGINEER APPROVED EQUAL.

THE UNIT MANUFACTURER SHALL FURNISH, MOUNT ON THE UNIT, AND WIRE A NEMA 12 CONTROL CABINET MOUNTED AND WIRED, UL LISTED, WITH COMBINATION MAGNETIC STARTERS, FUSED D/S OR CIRCUIT BREAKERS, H-O-A SELECTOR SWITCH WITH STATUS PILOT LIGHT FOR EACH PUMP, ELECTRICAL ALTERNATOR, CONTROL CIRCUIT DISCONNECT, FUSED CONTROL CIRCUIT TRANSFORMER, SINGLE POINT POWER CONNECTION, MOMENTARY CONTACT HMI PUSH BUTTONS, VISUAL AND AUDIBLE ALARM SIGNAL & SILENCE.

SEQUENCE OF OPERATION: AS WATER LEVEL FALLS IN THE BOILER THE UPPER WATER LEVEL SWITCH WILL START THE LEAD PUMP. WHEN THE LEVEL IS RESTORED THE PUMP WILL STOP. SHOULD THE WATER LEVEL CONTINUE TO REDE, INDICATING A PUMP FAILURE, THE LOWER SWITCH WILL START THE LAG PUMP. AN ELECTRICAL ALTERNATOR WILL ALTERNATE THE LEAD AND LAG PUMP WITH EACH RUN CYCLE.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) MAKE UP WATER WILL TYPICALLY BE PROVIDED BY GRAVITY CONDENSATE FLOW. OPERATE TANK AT 1.5 PSIG MAXIMUM.
ADDITIONALLY PROVIDE A MAKE UP WATER VALVE CONNECTED TO NPWC THAT WILL BE ACTUATED BY LOW WATER CONDITION IN THE RECEIVER. PROVIDE FLOAT OPERATED VALVE/TRAP ON THE RECEIVER OVERFLOW CONNECTION PIPED TO DRAIN.

HEATING WATER - CONDENSING BOILER SCHEDULE											
DRAWING CODE	GPM	INPUT		OUTPUT		BOILER TYPE	ELECTRICAL			MANUFACTURER MODEL NUMBER	REMARKS
		MBTUH	EFF	MBTUH	EFF		VOLTS	AMPS	AMPS		
B1	141	2028.0	1928.0	96.0	96.0	SEALED COMBUSTION NATURAL GAS FIRED	120	15.0		P-K HARSCO C-2800	1
B2	141	2028.0	1928.0	96.0	96.0	SEALED COMBUSTION NATURAL GAS FIRED	120	15.0		P-K HARSCO C-2800	1
B3	141	2028.0	1928.0	96.0	96.0	SEALED COMBUSTION NATURAL GAS FIRED	120	15.0		P-K HARSCO C-2800	1

GENERAL: FACTORY PACKAGED AND TESTED DOWN-FIRED VERTICAL FIRETUBE BOILER, ASME STAMPED AND LABELED FOR MINIMUM WORKING PRESSURE OF 125 PSIG, NATIONAL BOARD AND ANSI Z21.13 / UL 795 LISTED. BOILER SHALL BE BUILT TO IBC 2009 1.0G SEISMIC REQUIREMENTS. NATURAL GAS FIRED, SEALED COMBUSTION SYSTEM WITH FACTORY FILTERING AND ACCOMMODATING DUCTED COMBUSTION AIR, FORCED/INDUCED DRAFT FULLY MODULATING BURNER WITH MINIMUM 5:1 TURNDOWN, REPLACEABLE COMBUSTION AIR FILTER, WATER FLOW PROVING SWITCH, GAS TRAIN SHALL MEET THE REQUIREMENTS OF CSA, ASME CSD-1, AND FM, AND SHALL INCLUDE MANUAL RESET LOW & HIGH GAS PRESSURE SAFETIES, AND COMBUSTION AIR PROVING SWITCH. BOILER TO BE FACTORY EQUIPPED TO NOT ALLOW FREEZING OF OFF LINE EQUIPMENT. AMBIENT CONDITIONS OF 10F, BOILER AMBIENT OF 55F. BOILER TO CLOSE DAMPERS OR START PUMPS AS NECESSARY TO PREVENT FREEZING.

THE BOILER SHALL BE EQUIPPED WITH MICROPROCESSOR-BASED CONTROL SYSTEM TO PROVIDE MODULATION OF THE GAS SUPPLY AND COMBUSTION AIR BLOWER TO THE BURNER, BURNER IGNITION, FLAME SUPERVISION/PROVING, CONTROL OF WATER TEMPERATURE SET POINTS, AND MONITORING OF ALL SAFETY SYSTEMS. THE CONTROLLER SHALL HAVE LCD DISPLAY, KEYPAD / TOUCHSCREEN WITH PASSWORD SECURITY, AND INCLUDE CONTROL LOGIC FOR OUTDOOR RESET, PUMP DELAY WITH FREEZE PROTECTION, PUMP EXERCISE, AND BUILT-IN SEQUENCER TO SEQUENCE AND ROTATE UP TO EIGHT BOILERS WHILE MAINTAINING BURNER MODULATION. ALL PROGRAMMING AND A DISPLAY OF OPERATING AND ALARM STATUS CONDITIONS ACCESSIBLE THROUGH THE KEYPAD / TOUCHSCREEN / LCD DISPLAY. PROVIDE BACNET BAS INTERFACE, E.G. INPUTS FOR BOILER ENABLE AND HEATING WATER SUPPLY TEMPERATURE SETPOINT, OUTPUTS FOR BOILER RUN STATUS, ALARM/RUN FAILURE. BOILER TRIM SHALL INCLUDE 125 PSIG ASME APPROVED SAFETY VALVE(S), TEMPERATURE AND PRESSURE GAUGE ON THE WATER OUTLET, MANUAL RESET LOW WATER CUT-OFF, MANUAL RESET WATER SUPPLY HIGH TEMPERATURE LIMIT.

HEAT EXCHANGER WARRANTED AGAINST THERMAL SHOCK AND MATERIALS / WORKMANSHIP FOR A PERIOD OF 10 YEARS, BURNER 5 YEARS, ALL OTHER PARTS 1 YEAR.

MANUFACTURERS: AERCO, LOCHINVAR, PATTERSON-KELLY, LAARS, RAYPAK.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE CONDENSATE NEUTRALIZATION TANK / TUBE FILLED WITH CALCIUM CARBONATE EQUAL TO JIM BOILER WORKS JM SERIES. PROVIDE ONE PER BOILER, CONNECT VENT AND BOILER DRAINS TO THIS DEVICE PRIOR TO SPILLING INTO FLOOR DRAIN.

HYDRONIC COIL SCHEDULE															
DRAWING CODE	AIR FLOW CFM	Total MBTUH	Sensible MBTUH	EAC		L/A		FACE		W/FD	MINIMUM FACE FINNED AREA WIDTH	OVERALL COIL WIDTH	OVERALL COIL HEIGHT	OVERALL COIL THICKNESS	REMARKS
				db	wb	db	wb	VEL FPM	GPM						
HC18.1	2,800	69,440	58	82	508	4.6	158.0	120.0	18.0	32	18				1
HC18.2	2,800	69,440	58	82	508	4.6	158.0	120.0	18.0	32	18				1
HC18.3A	540	18,749	58	82	368	1.2	158.0	120.0	18.0	18	12				1
HC18.3B	660	23,518	58	82	453	1.6	158.0	120.0	18.0	18	12				1
HC11A	540	18,749	58	82	368	1.2	158.0	120.0	18.0	18	12				1
HC11B	660	22,915	58	82	448	1.5	158.0	120.0	18.0	18	12				1

GENERAL: 1/2" OR 5/8" O.D. 0.025" WALL COPPER TUBES, 0.087" THICK PLATE ALUMINUM FINNS, RED BRASS SCH40 CONNECTIONS, COIL FACE AREA IS A MINIMUM, CASED COIL, CONTRACTOR MAY ADJUST COIL / DUCT WIDTH AND HEIGHT TO BEST FIT IN THE AVAILABLE SPACE AND STILL PROVIDE A SERVICEABLE INSTALLATION. MAXIMUM ALLOWABLE AIR PRESSURE DROP AT DESIGN CFM = 0.15" WC.
1) GALVANIZED CASED COIL WITH COPPER TUBE EXTENSION. PRESSURE TEST COIL TO 400 PSIG WITH AIR UNDER WATER AFTER FABRICATION.

FAN SCHEDULE														
DRAWING CODE	AIR FLOW CFM	EXTERNAL STATIC IN WATER	INLET dBA	OUTLET dBA	SONES	SERVICE	FAN DRIVE		FAN DRIVE			MANUFACTURER MODEL NUMBER	REMARKS	
							MOTOR HP (WATTS)	submittal HP (WATTS)	FAN RPM	TRANS	VOLT/ PHASE			
EF1	658	0.25			6	BOILER RM EXHAUST	A, WM	1/12	1/12	1638	DIRECT	120/1	GREENHECK SE1-12-432-G	1,2
F1	700	0.30			8.8	BSMT BOILER ROOM COMBUSTION AIR	C, IL	1/4	1/4	1638	DIRECT	120/1	GREENHECK SQ95-VG	3

GENERAL: EXTERNAL STATIC IS THE PRESSURE REQUIREMENT BETWEEN THE AIR INLET AND OUTLET ON THE EQUIPMENT AND DOES NOT INCLUDE ACCESSORY DEVICES PROVIDED WITH THE EQUIPMENT (E.G. BACKDRAFT DAMPERS, DISCHARGE SHUTTERS, WIRE GUARDS, HOODS, ETC.), ANY ACCESSORY DEVICES SPECIFIED WITH EQUIPMENT SHALL BE ADDED TO THIS VALUE, TABULATED HP IS MOTOR HP NOT BHP, SINGLE PHASE MOTORS INTERNALLY OVERLOAD PROTECTED, MOTORS GREATER THAN 5 HP PREMIUM EFFICIENCY, REFER TO PROJECT MANUAL, DRAWING NOTES, AND DETAILS FOR ADDITIONAL INFORMATION.

FAN CONFIGURATION:
A - AXIAL FAN
BF - BUTTERFLY DISCHARGE DAMPER WITH MAGNET CLOSURES
C - CENTRIFUGAL FAN
CAB - CABINET WITH INTERNAL INSULATION
CN - CONICAL DISCHARGE NOZZLE 120" AFR
C2 - MINIMUM CLASS II CONSTRUCTION.
C3 - MINIMUM CLASS III CONSTRUCTION.
DB - DOWN BLAST
IL - IN LINE, SEE FLR PLAN FOR MOTOR POSITION
H - HOODED SUPPLY, HINGED FOR DRIVE ACCESS
M - MIXED FLOW
OC - OUTDOOR CONSTRUCTION
RM - ROOF CURB MOUNT
UB - UP BLAST
US - UTILITY SET, ARRANGEMENT 10
WM - WALL MOUNT
FM - INTEGRAL FLOW MEASURING STATION

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE SOLID STATE SPEED CONTROL WITH DISCONNECT, MINIMUM 60 TO 100 PERCENT SPEED ADJUSTMENT RANGE.
2) PROVIDE MOTOR SIDE BELT / BLADE AND DISCHARGE SIDE WIRE GUARD.
3) PROVIDE ECM SPEED CONTROLLABLE MOTOR WITH A READILY ACCESSIBLE DISCONNECT SWITCH AND SPEED ADJUSTMENT POTENTIOMETER ON THE SIDE OF THE FAN.

CENTRIFUGAL PUMP SCHEDULE													
DRAWING CODE	GPM	HEAD FT	NPSHR	PUMP EFF	MOTOR HP	PUMP RPM	SYSTEM PIPE SIZE	PUMP CONFIGURATION	SERVICE	MANUFACTURER MODEL NUMBER	REMARKS		
												BP1	125
BP2	125	30	19.2	67.4	2	1760	3	VERTICAL CLOSE COUPLED INLINE	BOILER B2 PRIMARY HEATING WATER	PATTERSON #V2B7A-CC			
BP3	125	30	19.2	67.4	2	1760	3	VERTICAL CLOSE COUPLED INLINE	BOILER B3 PRIMARY HEATING WATER	PATTERSON #V2B7A-CC			
HWP8	368	67			10	1750		CENTRIFUGAL PUMP	HEATING WATER	BELL & GOSSETT SERIES 1510	5		
HWP9	368	67			10	1750		CENTRIFUGAL PUMP	HEATING WATER	BELL & GOSSETT SERIES 1510	5		

GENERAL: PUMPS CENTRIFUGAL BRONZE FITTED WITH MECHANICAL SEALS, 175 PSIG / 225 DEG MINIMUM WORKING PRESSURE AND TEMPERATURE, SELECT MOTOR FOR NON-OVERLOADING CONDITIONS, TABULATED HP IS MOTOR HP NOT BHP, MOTORS LESS THAN 1 HP 120 VAC / 1 PHASE INTERNALLY OVERLOAD PROTECTED, MOTORS 1 HP AND GREATER 208 VAC / 3 PHASE COP, MOTORS GREATER THAN 5 HP PREMIUM EFFICIENCY.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE SUCTION DIFFUSER, INLET SIZE = SYSTEM PIPE SIZE, OUTLET SIZE = PUMP SUCTION SIZE.
2) PROVIDE SUCTION SIDE "Y" STRAINER, SIZE = SYSTEM PIPE SIZE.
3) PROVIDE TRIPLE DUTY VALVE, INLET SIZE = SYSTEM PIPE SIZE, OUTLET SIZE = SYSTEM PIPE SIZE.
4) PROVIDE INVERTER DUTY MOTOR MEETING NEMA MG 1-1993, SECTION IV, PART 31.4B.4.2 REQUIREMENTS, CLASS F INSULATION, AND CIV RATING 1600 VOLTS AT RATED OPERATING TEMPERATURE.
5) EXISTING PUMP.

VARIABLE FREQUENCY DRIVE SCHEDULE						
DRAWING CODE	CONTROLLED EQUIPMENT CODE	NOMINAL HP	ELECTRICAL		MANUFACTURER MODEL NUMBER	REMARKS
			VOLTS/ PHASE	DANFOSS		
VFD-HWP8	HEATING WATER PUMP 8	10	208 / 3		ACH550	1,2,3
VFD-HWP9	HEATING WATER PUMP 9	10	208 / 3		ACH550	1,2,3

DESCRIPTION: FULLY DIGITAL PWM, IGBT SWITCHING, MICROPROCESSOR BASED FOR STEP LESS MOTOR CONTROL FROM 0.1% TO 110% OF MOTOR BASE SPEED, UL AND CSA / CUL LABELED, NO DERATING TO 9 KHZ CARRIER FREQUENCY, 115% OF NAMEPLATE OVERLOAD RATING FOR 1 MINUTE WITHOUT DAMAGE TO DRIVE. ALPHANUMERIC BACKLIT LCD DISPLAY FOR RUN STATUS, SPEED, SPEED UNITS, W/OAD, H/OA STATUS, SOURCE OF SPEED REFERENCE, START PENDING, FAULTS, VOLTAGE, AND PROGRAMMING PARAMETERS WITH HOA AND PUSHBUTTON SWITCHES FOR LOCAL CONTROL AND PROGRAMMING.

LOGIC CONTROLS: AUTOMATIC RESTART, CURRENT LIMIT ADJUSTMENT, CRITICAL SPEED AVOIDANCE SETTINGS, BRAKING AND RESTART CONTROL OF A SPINNING MOTOR, BAS COMMUNICATION PORT, NON-VOLATILE MEMORY OF 8 MOST RECENT FAULTS AND COINCIDENT ACTIVITY.

PROTECTIVE CIRCUITS: PHASE-TO-GROUND OR 3-PHASE SHORT CIRCUIT, OVER CURRENT, UNDER VOLTAGE, OVERVOLTAGE, OVER TEMPERATURE, THERMAL OVERLOAD, AND EXTERNAL FAULT TRIPS.

INPUTS AND OUTPUTS: ANALOG OUTPUTS PROPORTIONAL TO SPEED AND LOAD, THREE PROGRAMMABLE FORM C RELAYS, 4-20 mA / 0-10 VDC INPUTS FOR SPEED SETPOINT, LOCAL REMOTE RUN, AUTO/MAN, RESET, AND FIREARMING OVERRIDE (AHUS AND FANS).

MANUFACTURERS: ABB, YASKAWA, CUTLER HAMMER, SQUARE D OR DANFOSS.

REMARKS:
1) PROVIDE BACNET COMMUNICATION CARD.
2) PROVIDE CONTACTOR BYPASS, ELECTRICALLY INTERLOCKED, UL LISTED, 50,000 AIC, NEC MOTOR PROTECTION IN BOTH THE "VFD" AND "BYPASS" MODE BY MOTOR OVERLOAD RELAYS). CONTACTOR BELOW VFD, VERTICAL CONFIGURATION (NEMA 1 APPLICATIONS).
3) DOOR INTERLOCKED MAIN POWER INPUT FUSED DISCONNECT OR CIRCUIT BREAKER PROVIDING POSITIVE SHUTDOWN OF ALL POWER TO BOTH THE BYPASS CIRCUITRY AND THE VFD.
4) PROVIDE FACTORY NEMA 3R ENCLOSURE WITH CABINET VENTILATION FAN, HEATER, AND ASSOCIATED CONTROLS.

MEDIUM PRESSURE GAS REGULATOR SCHEDULE									
DRAWING CODE	FLOW CFH	CAPACITY		ACCURACY PERCENT	VALVE LOCATION	EQUIPMENT SERVED	EQUAL TO MFG AND M/N	REMARKS	
		INLET PRESSURE PSIG	OUTLET PRESSURE IN W.C.						
MPR1	1,833	5.0	14.0	1.0	+/-0.5	BASEMENT EQUIP RM	BOILER B4, WATER HEATER	SENSUS 243 SERIES	1
MPR2	6,000	5.0	2 PSI	5.0	+/-0.5	BASEMENT EQUIP RM	BOILER B1,2,3	SENSUS 243 SERIES	1
MPR3	6,000	2.0	14.0	1.0	+/-0.5	PENTHOUSE EQUIP RM	BOILER B1,2,3	SENSUS 243 SERIES	1

GENERAL NOTES:
ALUMINUM ALLOY OR CAST IRON BODY BODY, ALUMINUM DIAPHRAGM CASE, REINFORCED BUNA-N DIAPHRAGM, BUNA-N VALVE SEAT FOR POSITIVE LOCKUP, INTERCHANGEABLE ORIFICE, INTERNAL RELIEF TO VENT ANY GAS PRESSURE BUILD UP DURING LONG PERIODS OF INACTIVITY, SUITABLE FOR OPERATING AT 15 PSIG INLET PRESSURE WITHOUT DAMAGE, -20 TO 150F OPERATING TEMPERATURE, MINIMUM 50% TO 125% ADJUSTABLE OUTLET PRESSURE BY REPLACING SPRINGS ONLY.

SIZE AND INSTALL REGULATOR IN ACCORDANCE WITH MANUFACTURER'S INSTALLATION INSTRUCTIONS.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE MINIMUM 3/4" VENT TO OUTDOORS, SCREENED INSECT RESISTANT WEATHER CAP.

ELECTRIC HEATER SCHEDULE									
DRAWING CODE	SUPPLY AIR CFM	HEATING BTUH	HEATING KW	ELECTRICAL		UNIT CONFIGURATION	MANUFACTURER MODEL NUMBER	REMARKS	
				VOLTS/1 PHA	FLA				
EDH1	780	29,828	8.58	208/3	24	12/12 DUCT HEATER, SCR CONTROLLED	INDECO QUA		

GENERAL: WALL / CEILING AUTOMATIC FAN FORCED HEATERS: ALUMINUM PROP, SURFACE OR RECESS MOUNTING AS NOTED, UL LISTED, BACKBOX SUITABLE FOR MASONRY, FRAME, OR CEILING INSTALLATION, CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL, HEATER HOUSING HEAVY GAUGE STEEL, HEATING ELEMENT NON-GLOWING DESIGN CONSISTING OF AN 80/20 NICKEL-CHROMIUM RESISTANCE WIRE ENCLOSED IN A STEEL SHEATH WITH PLATE FINNS, WARRANTED FOR 5 YEARS, DISCONNECT SWITCH, FAN MOTOR SHALL BE IMPEDANCE PROTECTED PERMANENTLY LUBRICATED OVERLOAD PROTECTED TOTALLY ENCLOSED, FAN CONTROL BI-METALLIC SNAP ACTION THERMOSTAT TO ACTIVATE FAN AFTER HEATING ELEMENT REACHES OPERATING TEMPERATURE AND CONTINUE TO OPERATE THE FAN UNTIL ALL HEATED AIR IS DISCHARGED, LUBRATED HEAVY GAUGE STEEL FRONT COVER WITH A POWDER PAINT FINISH, INTEGRAL TAMPER RESISTANT THERMOSTAT.

DUCT HEATERS: NICKEL CHROMIUM OPEN COIL ON STAINLESS STEEL TERMINALS, CERAMIC BUSHING SUPPORTS, NEMA 1 CONTROL ENCLOSURE, AUTOMATIC RESET TEMPERATURE HIGH LIMIT, AIR FLOW PROVING SWITCH, CONTACTORS, CONTROL CIRCUIT TRANSFORMER, INTEGRAL DOOR INTERLOCKED AND FUSED DISCONNECT, ALL ELECTRICAL MEETING REQUIREMENTS OF NEC, UL LISTED FOR ZERO CLEARANCE, SCR CONTROL WITH ELECTRONIC COMMERCIAL QUALITY HEATING ONLY SPACE THERMOSTAT.

REMARKS: REFER TO RIGHT HAND COLUMN IN EQUIPMENT SCHEDULE FOR REMARK APPLICABILITY.
1) PROVIDE RECESSED MOUNTING KIT AND 14 GAUGE SECURITY FRONT COVER AND GRILLE.
2) PROVIDE SURFACE MOUNTING KIT AND TRIM.
3) PROVIDE SEMI-RECESSED MOUNTING KIT.
4) PROVIDE RECESSED MOUNTING ENCLOSURE AND TRIM RINGS FOR MOUNTING IN HARD CEILING.
5) PROVIDE RECESSED MOUNTING ENCLOSURE FOR MOUNTING IN T-BAR CEILING.

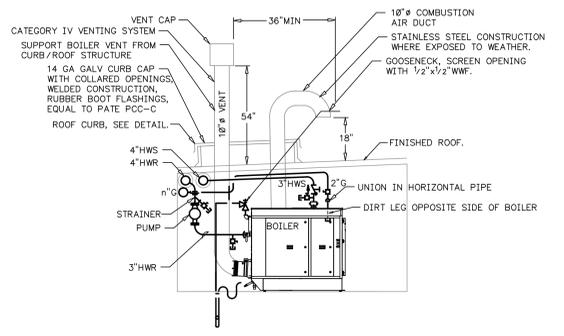


SHELBY COUNTY GOVERNMENT
BOILER MODIFICATIONS - BID PACKAGE #1
COURTHOUSE - 140 ADAMS AVENUE - MEMPHIS, TN 38103

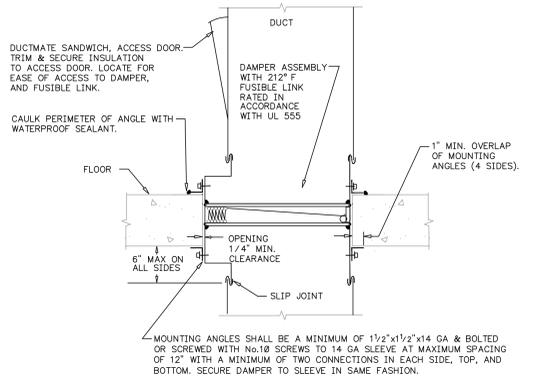
BID PACKAGE #1



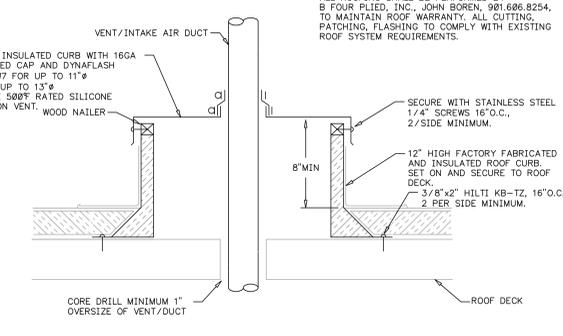
REVISIONS
2012 MEDFAC ENGINEERING LLC Changes, written material, and design concepts shall be in order requested by vendor or client Contractor shall check and verify all dimensions and conditions at job site. 2" IF REPRODUCED ACCURATELY
PROJECT NUMBER 12077
DATE 06 SEP 13
DRAWN CBW
CHECKED RCH
SHEET TITLE SCHEDULES
SHEET NUMBER M3.1



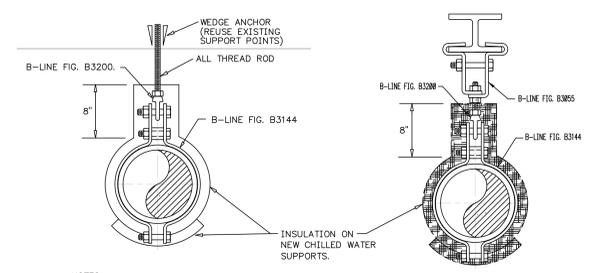
140 ADAMS BOILER VENTING/COMBUSTION AIR SECTION
NTS



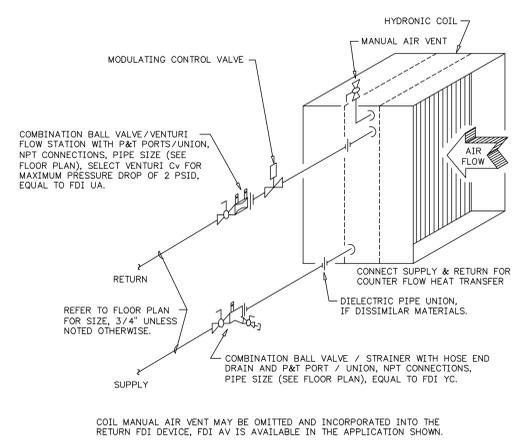
HORIZONTAL FIRE DAMPER INSTALLATION DETAIL
FD NTS



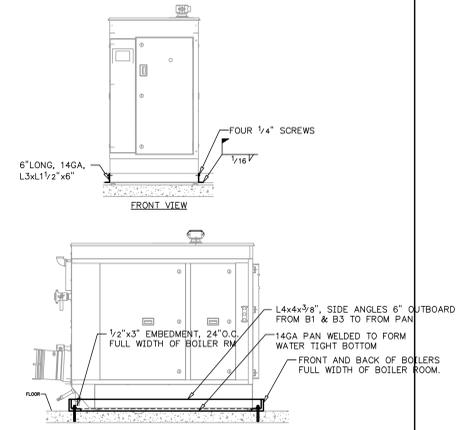
140 ADAMS ROOF CURB DETAIL
NTS



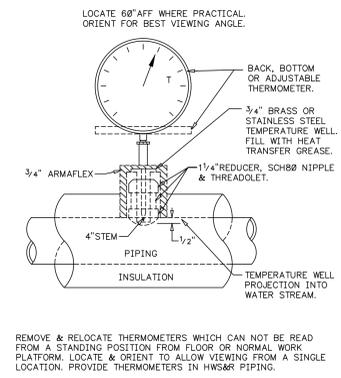
PIPE HANGER SUPPORT DETAILS - 4\"/>



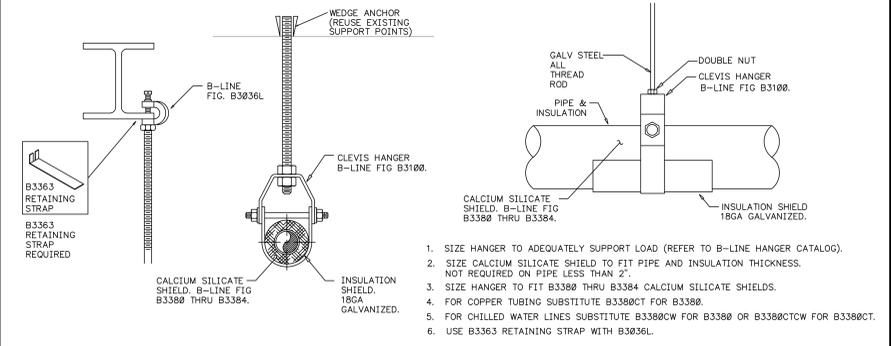
HYDRONIC COIL PIPING DETAIL
NTS



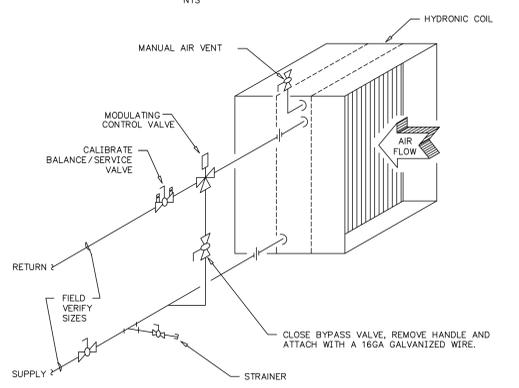
BOILER MOUNTING - B1/B2/B3
NTS



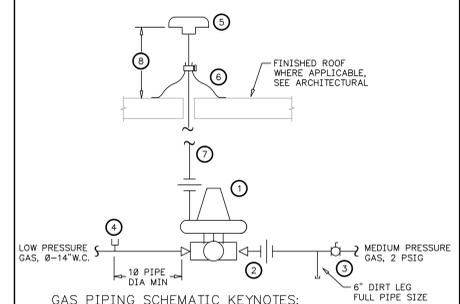
THERMOMETER
NTS



PIPE HANGER SUPPORT DETAILS - 3\"/>



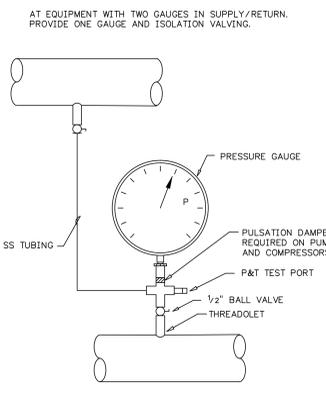
EXISTING HYDRONIC COIL PIPING MODIFICATIONS
NTS



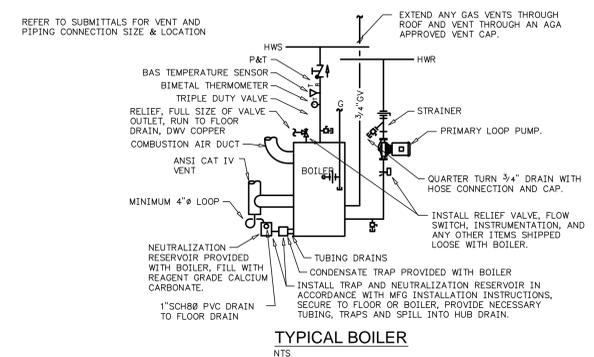
GAS PIPING SCHEMATIC KEYNOTES:

- 1 GAS PRESSURE REGULATOR, SEE SCHEDULE.
 - 2 FLANGE/UNION, NUMBER AND CONFIGURATION TO FACILITATE PRESSURE REGULATOR REMOVAL / SERVICE.
 - 3 BALL VALVE, AGA/UL SANCTIONED FOR NATURAL GAS SERVICE.
 - 4 PRESSURE AND TEMPERATURE PLUG, MINIMUM 1/2" PIPE DIAMETERS FROM REGULATOR.
 - 5 SCREENED VENT, AGA/UL SANCTIONED FOR NATURAL GAS SERVICE. MORRISON FIG 155
 - 6 RUBBER BOOT FLASHING, FLASH INTO ROOF SYSTEM IN ACCORDANCE WITH ROOF SYSTEM, SEE ARCHITECTURAL.
 - 7 VENT/RELIEF PIPE, FULL SIZE OF VALVE CONNECTION, 3/4" MINIMUM.
 - 8 18" ABOVE FINISHED ROOF OR 24" ABOVE RTU OUTSIDE AIR INTAKE WHERE VENT FALLS WITHIN 15FT OF RTU INTAKE; BRACE VENT PIPING FROM ADJACENT EQUIPMENT OR BUILDING STRUCTURE FOR RIGID ASSEMBLY. PAINT WEATHER EXPOSED PIPING YELLOW, DO NOT LOCATE WITHIN SERVICE SPACE OF EQUIPMENT. SEE RTU ELEVATION.
- 18 FT MINIMUM ABOVE GRADE ON WALL VENT, 15 FT MINIMUM FOR DOORS/WINDOWS OR BUILDING OUTSIDE AIR INTAKE.
- ITEMS 3, 6, AND 7 MAY BE OMITTED WHEN PRESSURE REGULATOR IS EQUIPPED WITH AUTOMATIC VENT LIMITING DEVICE TO LIMIT GAS ESCAPEMENT TO ANSI LIMITS ON DIAPHRAGM FAILURE. REGULATORS ARE SPECIFIED WITH THIS FEATURE IF AVAILABLE, SEE SCHEDULE.
- ALTERNATE PIPING CONFIGURATIONS ARE ALLOWED AS NEEDED TO SUIT FIELD CONDITIONS. REGULATORS WITH VENT LIMITERS ARE POSITION SENSITIVE. INSTALL IN STRICT ACCORDANCE WITH MANUFACTURERS INSTALLATION INSTRUCTIONS.

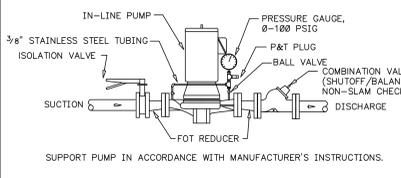
MEDIUM PRESSURE GAS REGULATOR
NTS



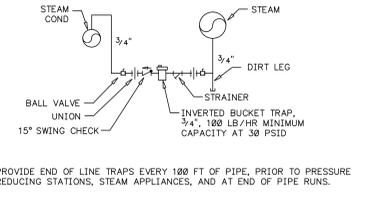
PRESSURE GAUGE
NTS



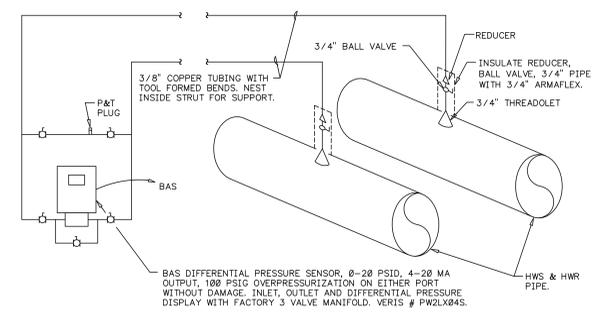
TYPICAL BOILER
NTS



IN-LINE CIRCULATING PUMP
NTS



STEAM PIPE TRAPPING DETAIL
NTS



DIFFERENTIAL PRESSURE SENSOR
NTS



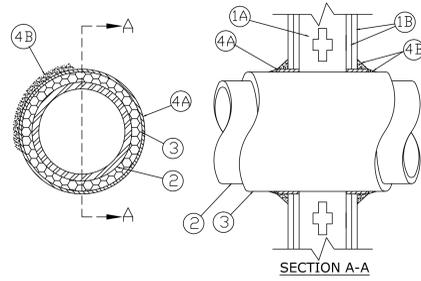
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PROJECT NUMBER	12077
DATE	06 SEP 13
DRAWN	CWB
CHECKED	RCH

SHEET TITLE
DETAILS

SHEET NUMBER
M4.1



1. Wall Assembly - The 1 or 2 hr fire-rated gypsum wallboard/stud wall assembly shall be constructed of the materials and in the manner described in the individual U300 or U400 Series Wall or Partition Design in the UL Fire Resistance Directory and shall include the following construction features:

- A. Studs** - Wall framing may consist of either wood studs or steel channel studs. Wood studs to consist of non 2 in. by 4 in. (25 mm by 102 mm) lumber spaced 16 in. (406 mm) OC with non 2 by 4 in. lumber end plates and cross braces. Steel studs to be min 3-5/8 in. (92 mm) wide by 1-3/8 in. (35 mm) deep channels spaced max 24 in. (610 mm) OC.
- B. Gypsum Board*** - Non 5/8 in. (16 mm) thick, 4 ft (122 cm) wide with square or tapered edges. The gypsum wallboard type, thickness, number of layers, fastener type and sheet orientation shall be as specified in the individual U300 or U400 Series Design in the UL Fire Resistance Directory. Max diam of opening is 14-1/2 in. (368 mm) for wood stud walls and 18 in. (457 mm) for steel stud walls.

The hourly F Rating of the firestop system is 1 hr when installed in a 1 hr fire rated wall and 2 hr when installed in a 2 hr fire rated wall.

2. Through Penetrants - One metallic pipe or tubing to be centered within the firestop system. Pipe or tubing to be rigidly supported on both sides of wall assembly. The following types and sizes of metallic pipes or tubing may be used:

- A. Steel Pipe** - Non 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe.
- B. Copper Tubing** - Non 6 in. (152 mm) diam (or smaller) Type L (or heavier) copper tubing.
- C. Copper Pipe** - Non 6 in. (152 mm) diam (or smaller) Regular (or heavier) copper pipe.

3. Pipe Covering* - Non 1 in. or 2 in. (25 mm or 51 mm) thick hollow cylindrical heavy density glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints sealed with metal fasteners or with butt strip tape supplied with the product. When non 1 in. (25 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum wallboard layers on each side of the wall shall be min 1/4 in. to max 3/8 in. (6 mm to max 10 mm). When non 2 in. (51 mm) thick pipe covering is used, the annular space between the pipe covering and the circular cutout in the gypsum wallboard layers on each side of the wall shall be min 1/2 in. to max 3/4 in. (13 mm to max 19 mm).

See **Pipe and Equipment Covering** - Materials (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

The hourly T Rating of the firestop system is 3/4 hr when non 1 in. (25 mm) thick pipe covering is used.
The hourly T Rating of the firestop system is 1 hr and 1-1/2 hr when non 2 in. (51 mm) thick pipe covering is used with 1 hr and 2 hr fire rated walls, respectively.

4. Firestop System - Installed symmetrically on both sides of wall assembly. The details of the firestop system shall be as follows:

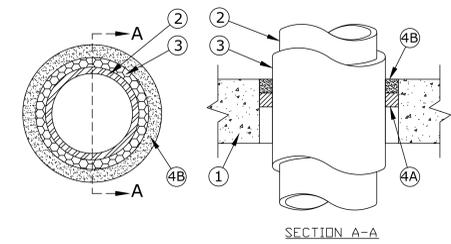
- A. Fill, Void or Cavity Materials* - Wrap Strip** - Non 1/4 in. (6 mm) thick intumescent elastomeric material faced on one side with aluminum foil, supplied in 2 in. (51 mm) wide strips. Non 2 in. (51 mm) wide strip tightly wrapped around pipe covering (foil side out) with seam butted. Wrap strip layer securely bound with steel wire or aluminum foil tape and slid into annular space approx 1-1/4 in. (32 mm) such that approx 3/4 in. (19 mm) of the wrap strip width protrudes from the wall surface. One layer of wrap strip is required when non 1 in. (25 mm) thick pipe covering is used. Two layers of wrap strip are required when non 2 in. (51 mm) thick pipe covering is used.

3M COMPANY - FS-195+
B. Fill, Void or Cavity Materials* - Caulk or Sealant - Min 1/4 in. (6 mm) diam continuous bead applied to the wrap strip/wall interface and to the exposed edge of the wrap strip layer approx 3/4 in. (19 mm) from the wall surface.

3M COMPANY - CP 25WB+, IC 15WB+, FireDan 150+ caulk or FB-3000 WT sealant
 *Bearing the UL Classification Marking

System No. W-L-5001
 May 19, 2005
 (Formerly System No. 147)
 F Ratings - 1 and 2 Hr (See Item 1)
 T Ratings - 3/4, 1 and 1-1/2 Hr (See Item 3)
 L Rating At Ambient - 2 CFM/sq ft
 L Rating At 400 F - less than 1 CFM/sq ft

SYSTEM NO. W-L-5001



1. Floor or Wall Assembly - Min 2-1/2 in. (64 mm) thick reinforced lightweight or normal weight (100-150 pcf or 1600-2400 kg/m3) concrete. Wall may also be constructed of any UL Classified Concrete Blocks*. Max diam of opening is 18 in. (457 mm).

See Concrete Blocks (CAZT) category in the Fire Resistance Directory for names of manufacturers.

1A. Steel Sleeve (Optional, not shown) - Non 10 in. (254 mm) (or smaller) Schedule 10 (or heavier) steel sleeve cast or grouted into floor or wall assembly. Sleeve may extend a max of 2 in. (51 mm) above top of floor or beyond either surface of wall.

T Rating is 0 Hr when sleeve is used.

2. Through Penetrant - Non 4 in. (102 mm) diam (or smaller) Type L (or heavier) copper pipe, non 12 in. (305 mm) diam (or smaller) service weight (or heavier) cast iron soil pipe, non 12 in. (305 mm) diam (or smaller) Class 50 (or heavier) ductile iron pressure pipe or non 12 in. (305 mm) diam (or smaller) Schedule 10 (or heavier) steel pipe centered in the opening and rigidly supported on both sides of the floor or wall assembly.

3. Pipe Covering* - Non 1/2 in. to 2 in. (13 mm to 51 mm) thick hollow cylindrical heavy density (min 3.5 pcf or 56 kg/m3) glass fiber units jacketed on the outside with an all service jacket. Longitudinal joints sealed with metal fasteners or factory-applied self-sealing lap tape. Transverse joints secured with metal fasteners or with butt strip tape supplied with the product.

See **Pipe and Equipment Covering** - Materials* (BRGU) category in Building Materials Directory for names of manufacturers. Any pipe covering material meeting the above specifications and bearing the UL Classification Marking with a Flame Spread Index of 25 or less and a Smoke Developed Index of 50 or less may be used.

4. Firestop System - The details of the firestop system shall be as follows:
 A. Packing Material - Min 1 in. (25 mm) thickness of firmly packed mineral wool batt insulation used as a permanent form. Packing material to be recessed from top surface of floor or sleeve or from both surfaces of wall as required to accommodate the required thickness of caulk fill material (Item B).
 B. Fill, Void or Cavity Material* - Caulk or Sealant - Applied to fill the annular space flush with the top surface of the floor or sleeve or flush with both surfaces of wall. When non pipe covering thickness is 2 in. (51 mm), min thickness of caulk fill material is 2 in. (51 mm). When non pipe covering thickness is 1-1/2 in. (38 mm) or less, min thickness of caulk fill material is 1 in. (25 mm).

The hourly F and T Ratings of the firestop system are dependent upon the thickness of the floor or wall, the size of the pipe, the thickness of pipe covering material and the size of the annular space (between the pipe covering material and the edge of the circular through opening), as shown in the following table:

Min Floor or Wall Thkns in. (mm)	Max Pipe Diam in. (mm)	Non Pipe Covering Thkns in. (mm)	Annular Space in. (mm)	F Rating Hr	T Rating Hr
2-1/2 (64)	4 (102)	1 or 1-1/2 (25 or 38)	1/2 to 2-3/8 (13 to 60)	2	1
4-1/2 (114)	4 (102)	2 (51)	1/4 to 3-5/8 (6 to 92)	2	1-1/2
2-1/2 (64)	12 (305)	1 (25)	1/2 to 1-1/2 (13 to 38)	2	1/2
4-1/2 (114)	12 (305)	1 (25)	1/2 to 2-3/8 (13 to 60)	3	1
2-1/2 (64)	12 (305)	1/2 (13)	1/2 to 2-3/8 (13 to 60)	2	0

3M COMPANY - CP 25WB+ caulk or FB-3000 WT sealant.

*Bearing the UL Classification Marking

System No. C-AJ-5001
 June 15, 2005
 (Formerly System No. 91)
 F Ratings - 1-1/2, 2 and 3 Hr (See Item 4)
 L Rating At 400 F - less than 1 CFM per sq ft
 T Ratings - 0, 1/2, 3/4 and 1 Hr (See Items 1A and 4)
 L Rating At Ambient - 2 CFM per sq ft

SYSTEM NO. C-AJ-5001



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12077

DATE
06 SEP 13

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SHEET TITLE
DETAILS

SHEET NUMBER

M4.2



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SHEET TITLE
BASEMENT ENLARGED BOILER RM ELECTRICAL PLANS

SHEET NUMBER
E1.1

LEGEND

- REMOVE EXISTING
- EXISTING
- NEW WORK
- LIMIT OF DEMOLITION
- NEW TO EXISTING
- 1HR FIRE WALL
- 2HR FIRE WALL
- HOMERUN TO PANELBOARD
- RACEWAY CONCEALED IN WALLS, CEILING OR FLOORS.
- EXPOSED RACEWAY

- n = T = DIGITAL TIMER SWITCH, TIMEOUT RANGE FROM (5MIN-12HR), FLASH LIGHTS FOR VISUAL WARNING PRIOR TO TIME-OUT, 120VAC, EQUAL TO WATT STOPPER #75-480.
- 120VAC, 20A, NEMA 5-20R DUPLEX SPECIFICATION GRADE STRAIGHT BLADE RECEPTACLES. NOTES INDICATE ALTERNATE RATINGS AND/OR MOUNTING HEIGHTS.
- n.g.i.g.w.x.x* MOUNT WITH GROUND PIN UP.
- ELEVATION AFF. AC-ABOVE COUNTER
- WEATHER PROOF COVER
- ISOLATED GROUND TYPE WITH ORANGE INDICATOR
- INTEGRAL GROUND FAULT PROTECTION OR ON GROUND FAULT PROTECTED CIRCUIT.
- CIRCUIT NUMBER
- AC - ABOVE COUNTER

- FUSED DISCONNECT SWITCH, 3-POLE, HEAVY DUTY, NEMA-1 ENCLOSURE INDOORS, NEMA-3R ENCLOSURE OUTDOORS, VARIATIONS AS NOTED, EQUAL TO SQUARE "D" CLASS 3110 (250VAC FOR 120, 200, & 240VAC APPLICATIONS 600VAC FOR 277, 480VAC APPLICATIONS). FUSE IN ACCORDANCE WITH MANUFACTURER'S NAMEPLATE.

- NON-FUSED DISCONNECT SWITCH, 3-POLE, HEAVY DUTY, NEMA-1 ENCLOSURE INDOORS, NEMA-3R ENCLOSURE OUTDOORS, VARIATIONS AS NOTED, EQUAL TO SQUARE "D" CLASS 3110 (250VAC FOR 120, 200, & 240VAC APPLICATIONS 600VAC FOR 277, 480VAC APPLICATIONS).

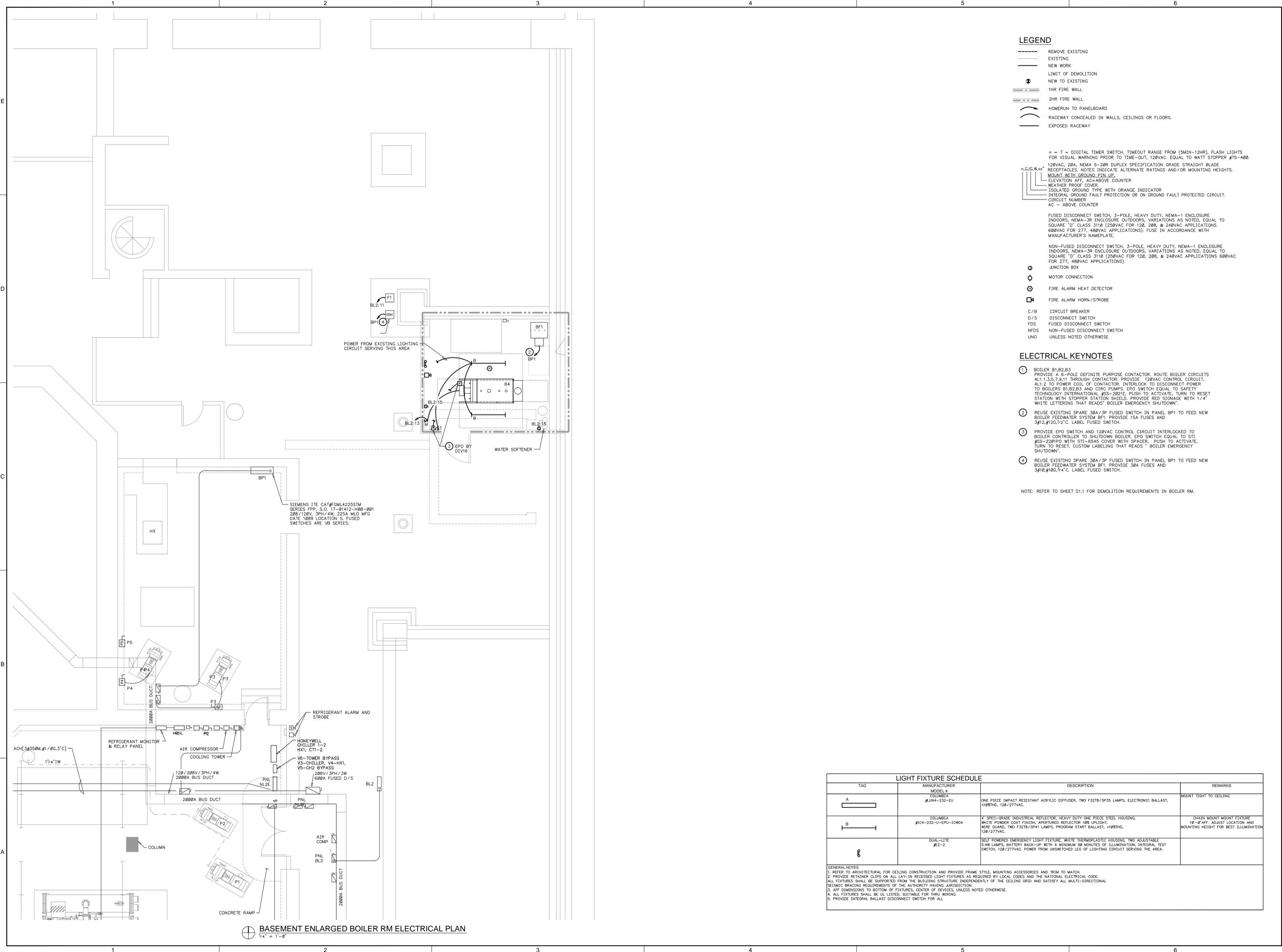
- JUNCTION BOX
- MOTOR CONNECTION
- FIRE ALARM HEAT DETECTOR
- FIRE ALARM HORN/STROBE

- C/B CIRCUIT BREAKER
- D/S DISCONNECT SWITCH
- FDS FUSED DISCONNECT SWITCH
- NFDS NON-FUSED DISCONNECT SWITCH
- UNO UNLESS NOTED OTHERWISE

ELECTRICAL KEYNOTES

1. BOILER B1,B2,B3 PROVIDE A 6-POLE DEFINITE PURPOSE CONTACTOR. ROUTE BOILER CIRCUITS 4L1-1,3,5,7,9,11 THROUGH CONTACTOR. PROVIDE 120VAC CONTROL CIRCUIT, 4L1-2 TO POWER COIL OF CONTACTOR. INTERLOCK TO DISCONNECT POWER TO BOILERS B1,B2,B3 AND CIRC PUMPS. EPO SWITCH EQUAL TO SAFETY TECHNOLOGY INTERNATIONAL #SS-2021E, PUSH TO ACTIVATE, TURN TO RESET STATION WITH STOPPER STATION SHIELD. PROVIDE RED SIGNAGE WITH 1/4" WHITE LETTERING THAT READS "BOILER EMERGENCY SHUTDOWN".
2. REUSE EXISTING SPARE 30A/3P FUSED SWITCH IN PANEL BP1 TO FEED NEW BOILER FEEDWATER SYSTEM BF1. PROVIDE 15A FUSES AND 3/12,#100,1/2" C. LABEL FUSED SWITCH.
3. PROVIDE EPO SWITCH AND 120VAC CONTROL CIRCUIT INTERLOCKED TO BOILER CONTROLLER TO SHUTDOWN BOILER. EPO SWITCH EQUAL TO STI #SS-2281PO WITH STI-6545 COVER WITH SPACER, PUSH TO ACTIVATE, TURN TO RESET, CUSTOM LABELING THAT READS "BOILER EMERGENCY SHUTDOWN".
4. REUSE EXISTING SPARE 30A/3P FUSED SWITCH IN PANEL BP1 TO FEED NEW BOILER FEEDWATER SYSTEM BF1. PROVIDE 30A FUSES AND 3/10,#100,3/4" C. LABEL FUSED SWITCH.

NOTE: REFER TO SHEET D1.1 FOR DEMOLITION REQUIREMENTS IN BOILER RM.



LIGHT FIXTURE SCHEDULE			
TAG	MANUFACTURER	DESCRIPTION	REMARKS
A	COLUMBIA #LUM4-232-EU	ONE PIECE IMPACT RESISTANT ACRYLIC DIFFUSER, TWO F32T8/SP35 LAMPS, ELECTRONIC BALLAST, <100XTHD, 120/277VAC.	MOUNT TIGHT TO CEILING.
B	COLUMBIA #IC4-232-U-EPU-ICWG4	4' SPEC-GRADE INDUSTRIAL REFLECTOR, HEAVY DUTY ONE PIECE STEEL HOUSING, WHITE POWDER COAT FINISH, APERTURED REFLECTOR 100% UPLIGHT, WIRE GUARD, TWO F32T8/SP41 LAMPS, PROGRAM START BALLAST, <100XTHD, 120/277VAC.	CHAIN MOUNT MOUNT FIXTURE 18"-8" AFF. ADJUST LOCATION AND MOUNTING HEIGHT FOR BEST ILLUMINATION
C	DUAL-LITE #E2-2	SELF POWERED EMERGENCY LIGHT FIXTURE, WHITE THERMOPLASTIC HOUSING, TWO ADJUSTABLE 5.4W LAMPS, BATTERY BACK-UP WITH A MINIMUM 90 MINUTES OF ILLUMINATION, INTEGRAL TEST SWITCH, 120/277VAC. POWER FROM UNSWITCHED LEG OF LIGHTING CIRCUIT SERVING THE AREA.	

- GENERAL NOTES**
1. REFER TO ARCHITECTURAL FOR CEILING CONSTRUCTION AND PROVIDE FRAME STYLE, MOUNTING ACCESSORIES AND TRIM TO MATCH.
 2. PROVIDE RETAINER CLIPS ON ALL LAY-IN RECESSED LIGHT FIXTURES AS REQUIRED BY LOCAL CODES AND THE NATIONAL ELECTRICAL CODE.
 3. ALL FIXTURES SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE INDEPENDENTLY OF THE CEILING GRID AND SATISFY ALL MULTI-DIRECTIONAL SEISMIC BRACING REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
 4. AFF DIMENSIONS TO BOTTOM OF FIXTURES, CENTER OF DEVICES, UNLESS NOTED OTHERWISE.
 5. PROVIDE INTEGRAL BALLAST DISCONNECT SWITCH FOR ALL.

BASEMENT ENLARGED BOILER RM ELECTRICAL PLAN
1/4" = 1'-0"



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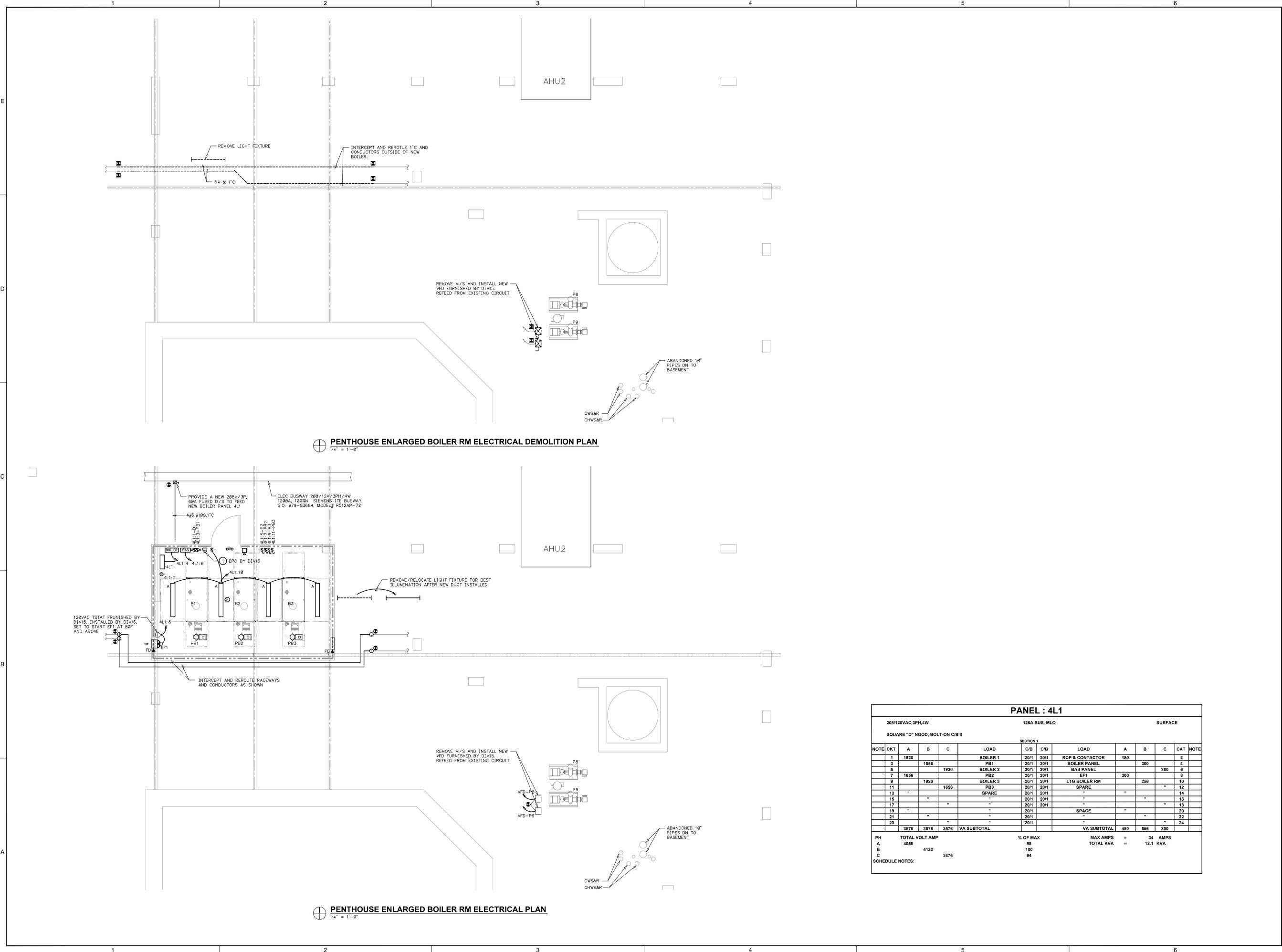
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SHEET NUMBER
E1.2



PENTHOUSE ENLARGED BOILER RM ELECTRICAL DEMOLITION PLAN
1/4" = 1'-0"

PENTHOUSE ENLARGED BOILER RM ELECTRICAL PLAN
1/4" = 1'-0"

PANEL : 4L1													
208/120VAC,3PH,4W				125A BUS, MLO				SURFACE					
SQUARE "D" NQOD, BOLT-ON C/B'S													
SECTION 1													
NOTE	CKT	A	B	C	LOAD	C/B	C/B	LOAD	A	B	C	CKT	NOTE
	1	1920			BOILER 1	20/1	20/1	RCP & CONTACTOR	180			2	
	3		1656		PB1	20/1	20/1	BOILER PANEL		300		4	
	5			1920	BOILER 2	20/1	20/1	BAS PANEL			300	6	
	7	1656			PB2	20/1	20/1	EF1	300			8	
	9		1920		BOILER 3	20/1	20/1	LTG BOILER RM		256		10	
	11			1656	PB3	20/1	20/1	SPARE				12	
	13				SPARE	20/1	20/1					14	
	15					20/1	20/1					16	
	17					20/1	20/1					18	
	19					20/1		SPACE				20	
	21					20/1						22	
	23					20/1						24	
		3576	3576	3576	VA SUBTOTAL				480	556	300		
PH		TOTAL VOLT AMP				% OF MAX			MAX AMPS			= 34 AMPS	
A		4056				98			TOTAL KVA			= 12.1 KVA	
B		4132				100							
C		3876				94							

SCHEDULE NOTES: