

Mortensen Engineering, Inc.
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DATE
May 11, 2020

PROJECT TITLE
**MCKINLEY ELEMENTARY SCHOOL
Boiler Replacement Project**
120 West 500 South
Tremonton, Utah 84337
Box Elder School District/DWA Construction

SHEET TITLE
**COVER SHEET
SYMBOL LEGEND &
DRAWING INDEX**

PROJECT NUMBER

REVISIONS

SHEET NUMBER

M0.0

MECHANICAL ABBREVIATIONS			
AD	ACCESS DOOR	NC	NORMALLY CLOSED
AHU	AIR HANDLING UNIT	N/A	NOT APPLICABLE
BD	BALANCING DAMPER	NIC	NOT IN CONTRACT
BHP	BRAKE HORSE POWER	NTS	NOT TO SCALE
BTU	BRITISH THERMAL UNIT	NO	NUMBER
CFM	CUBIC FEET PER MINUTE	OZ	OUNCE
COND	CONDENSER(-ER, -ING, -ATION)	OA	OUTSIDE AIR
CLG	COOLING	PSF	POUNDS PER SQUARE FT.
CW	COLD WATER	PSI	POUNDS PER SQUARE IN.
DP	DEPTH OR DEEP	PSIA	PSI ABSOLUTE
ID	INSIDE DIAMETER	PSIG	PSI GAUGE
OD	OUTSIDE DIAMETER	PRESS	PRESSURE
DB	DRY BULB TEMPERATURE	PD	PRESSURE DIFFERENCE
(E)	EXISTING	SP	STATIC PRESSURE
EFF	EFFICIENCY	RA	RETURN AIR
ELEV	ELEVATION	RPM	REVOLUTIONS PER MIN.
EW	ENTERING WATER TEMP.	SF	SAFETY FACTOR
EVAP	EVAPORATE(-E, -ING, -ED, -OR)	SL	SEA LEVEL
(F)	FUTURE	SH	SENSIBLE HEAT
F	FARENHEIT	SC	SHADING COEFFICIENT
FC	FLEXIBLE CONNECT(-OR, -ION)	SPEC	SPECIFICATION
FD	FIRE DAMPER	SQ	SQUARE
FPS	FEET PER SECOND	STD	STANDARD
FSD	FIRE SMOKE DAMPER	SP	STATIC PRESSURE
FT	FEET	SPLY	SUPPLY
GAL	GALLON(S)	SA	SUPPLY AIR
GP1H	GALLONS PER HOUR	TEMP	TEMPERATURE
GP1M	GALLONS PER MINUTE	TD	TEMP. DROP OR DIFF.
HD	HEAD	R	THERMAL RESISTANCE
HT	HEIGHT	TSTAT	THERMOSTAT
HTG	HEATING	T	TIME
HP	HORSE POWER	VAC	VACUUM
HW	HOT WATER	VAV	VARIABLE AIR VOLUME
LH	LATENT HEAT	VENT	VENT, VENTILATION
LAT	LEAVING AIR TEMPERATURE	VERT	VERTICAL
LWT	LEAVING WATER TEMP.	VOL	VOLUME
LG	LENGTH	WTR	WATER
MAX	MAXIMUM	WT	WEIGHT
MIN	MINIMUM	WB	WET BULB TEMP.
NO	NORMALLY OPEN	YR	YEAR

PIPING	
LOW PRESSURE STEAM	— LPS —
LOW PRESSURE RETURN	— LPC —
PUMP DISCHARGE	— P —
HOT WATER SUPPLY	— HWS —
HOT WATER RETURN	— HWR —
CHILLED WATER SUPPLY	— CWS —
CHILLED WATER RETURN	— CWR —
CONDENSER WATER SUPPLY	— CS —
CONDENSER WATER RETURN	— CR —
DRAIN LINE	— D —
GLYCOL SUPPLY	— GS —
GLYCOL RETURN	— GR —

PIPING	
SOIL, WASTE-ABOVE GRADE	— S —
SOIL, WASTE-BELOW GRADE	— S —
VENT	— V —
COLD WATER	— C —
HOT WATER	— H —
HOT WATER CIRCULATE	— HC —
GAS	— G —
RAIN WATER-ABOVE GRADE	— RW —
RAIN WATER-BELOW GRADE	— RW —
OVERFLOW RAIN WATER-ABOVE GRADE	— ORW —
STORM DRAIN	— SD —
VENT THRU ROOF (VTR)	— VTR —
EXISTING PIPE	— (E) —
EXISTING PIPE TO BE REMOVED	— (E) —
SANITARY SEWER	— S —
WATER	— W —

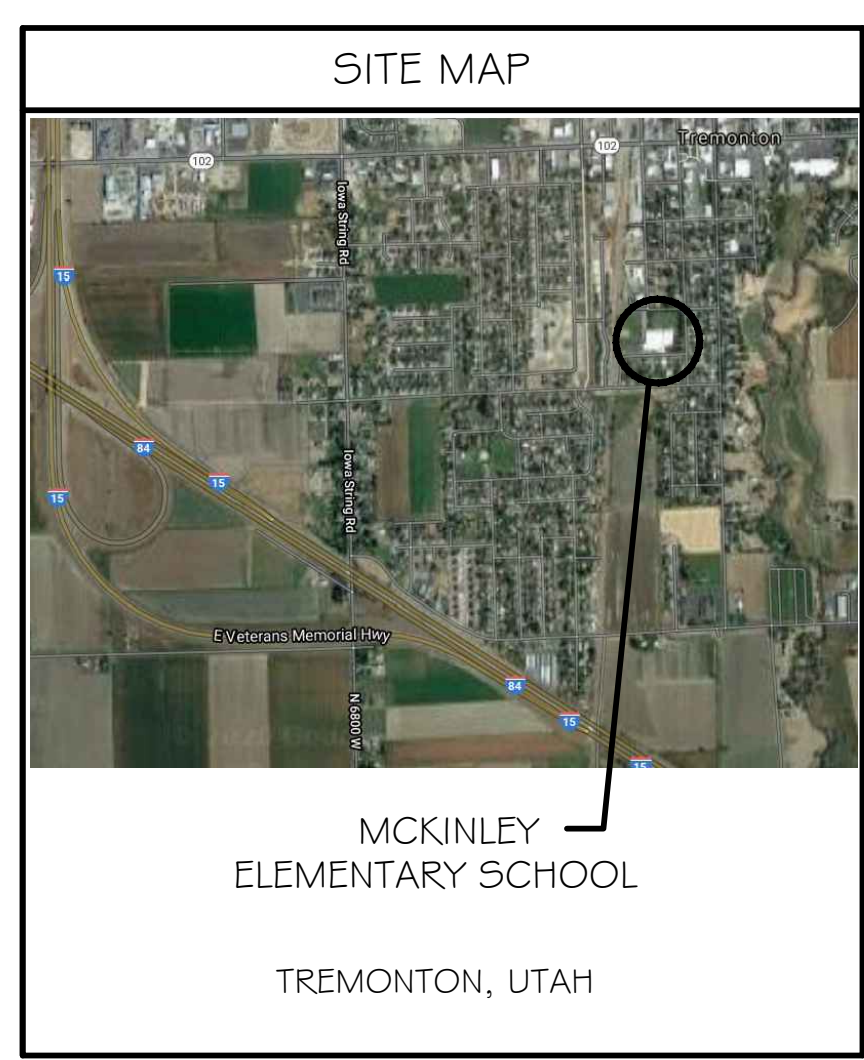
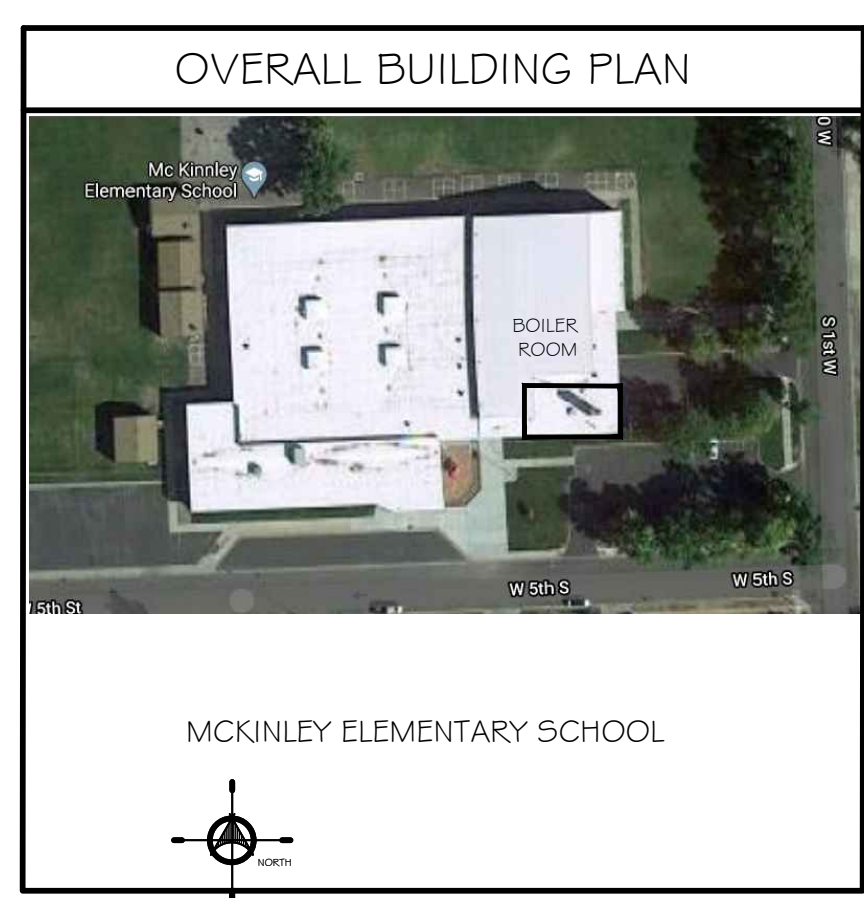
DUCTWORK	
RECTANGULAR SUPPLY DUCT UP	— R —
RECTANGULAR SUPPLY DUCT DOWN	— R —
RECTANGULAR RETURN OR EXHAUST DUCT UP	— R —
RECTANGULAR RETURN OR EXHAUST DUCT DOWN	— R —
ROUND DUCT UP	— R —
ROUND DUCT DOWN	— R —

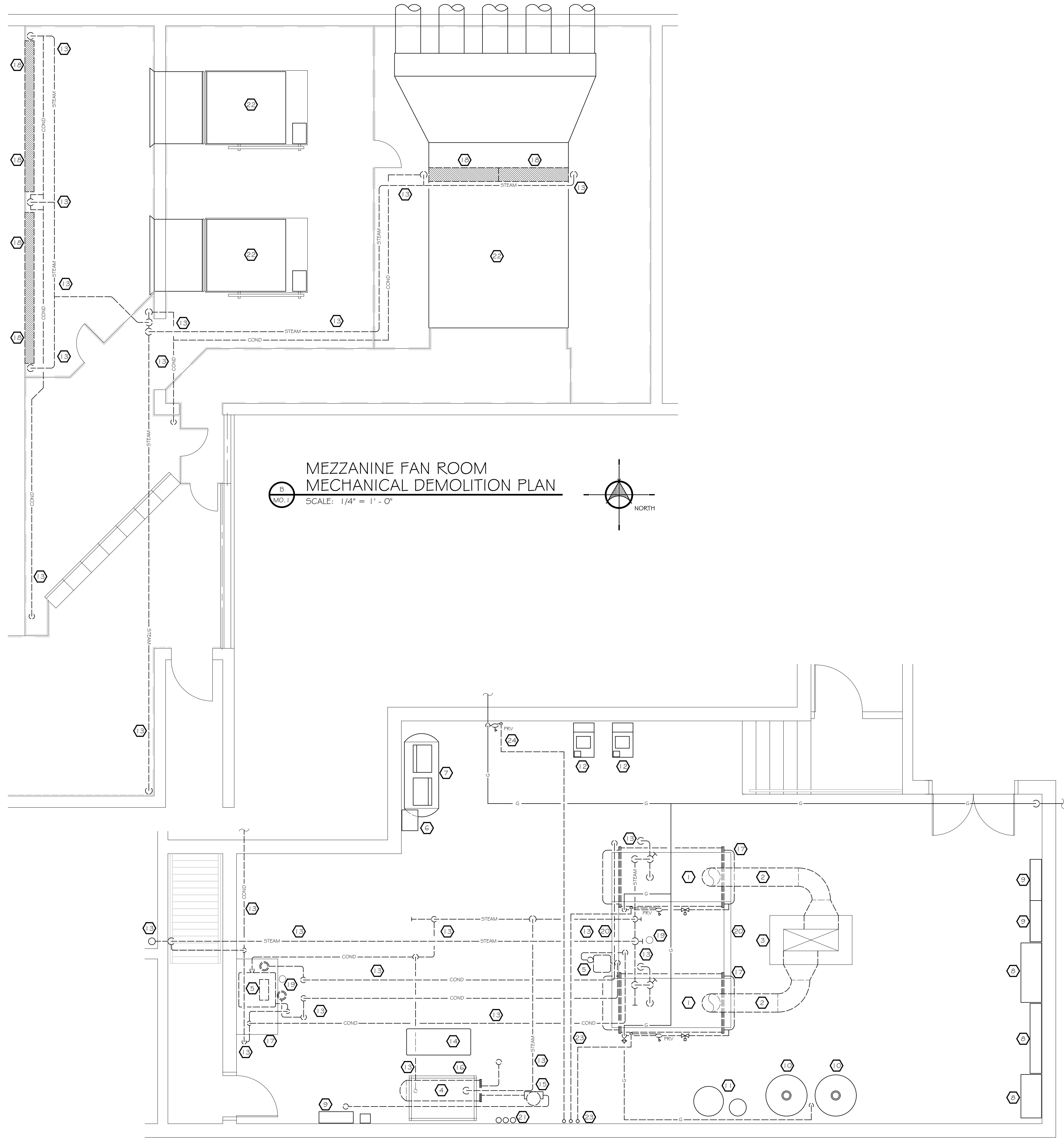
SYMBOLS	
SHUT OFF VALVE	— V —
GATE VALVE	— V —
CHECK VALVE	— V —
AUTO 2-WAY VALVE	— V —
AUTO 3-WAY VALVE	— V —
GLOBE VALVE	— V —
ANGLE VALVE	— V —
VENTURI	— V —
BALANCING OR PLUG COCK	— V —
FLOW SETTER	— V —
GAS COCK	— V —
BUTTERFLY VALVE	— V —
BALL VALVE	— V —
RELIEF VALVE	— V —
CHAIN OPERATED GATE VALVE	— V —
PRESSURE REDUCING VALVE	— V —
GAUGE COCK	— V —
EXPANSION VALVE (REFRIG.)	— V —
STRAINER	— V —
FLEXIBLE CONNECTION	— V —
PRESSURE GAUGE	— V —
THERMOMETER	— V —
VICTUALIC COUPLING	— V —
REDUCER CONCENTRIC	— V —
REDUCER ECCENTRIC	— V —
REFRIGERANT SILE GLASS	— V —
REFRIGERANT STRAINER	— V —
REFRIGERANT FILTER DRIER	— V —
90° ELBOW UP	— V —
90° ELBOW DOWN	— V —
90° TEE UP	— V —
90° TEE DOWN	— V —
UNION	— V —
CAPPED PIPE	— V —
ANCHOR	— V —
THERMOSTAT	— V —
TEMPERATURE SENSOR	— V —
HUMIDISTAT	— V —
CATCH BASIN	— V —
MANHOLE	— V —
WALL HYDRANT	— V —
HOSE BIBB	— V —
CLEANOUT TO GRADE	— V —
FLOOR CLEANOUT	— V —
WALL CLEANOUT	— V —
1/2 GRATE	— V —
3/4 GRATE	— V —
FULL GRATE	— V —
NEW CONNECTION POINT TO EXISTING	— V —

- ### MECHANICAL GENERAL NOTES
- MECHANICAL PLANS ARE SCHEMATIC IN NATURE AND THEREFORE DO NOT SHOW ALL DROPS, RISERS, AND OFFSETS. THE CONTRACTOR SHALL MAKE ALL REQUIRED MODIFICATIONS TO PROVIDE A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM. MAJOR MODIFICATIONS SHALL BE REVIEWED AND APPROVED BY THE ENGINEER.
 - COMPLY WITH THE REQUIREMENTS OF THE 2018 IBC, IMC, IPC, AND IFGC CODES INCLUDING ALL STATE AMENDMENTS.
 - PROVIDE PIPE HANGERS AND SUPPORTS FOR NEW PIPING IN ACCORDANCE WITH MSS STANDARDS.
 - PROVIDE WELDED GAS AND HEATING WATER PIPING TO MATCH EXISTING PIPING.
 - PROVIDE PIPE TAGGING AND EQUIPMENT LABELING.
 - PROVIDE TESTING, BALANCING, AUTHORIZED FACTORY START UP, AND COMMISSIONING OF NEW BOILERS.
 - COORDINATE ALL WORK WITH OWNER AND GENERAL CONTRACTOR. PROVIDE NOTICE FOR ALL UTILITY SHUTDOWNS INCLUDING WATER, GAS, AND ELECTRICITY.
 - FIELD COORDINATE ALL EXISTING CONDITIONS PRIOR TO INSTALLATION.
 - PATCH AND REPAIR ROOF (BY CMGC) AS REQUIRED FOR INSTALLATION FOR NEW BOILER FLUES. PROVIDE ROOF FLASHING AND NEW ROOFING MATERIALS AS REQUIRED.
 - DO NOT RUN PIPING ABOVE ELECTRICAL PANELS. PROVIDE 4'-0" DEEP X 6'-6" HIGH CLEAR ACCESS SPACE IN FRONT OF PANELS. DO NOT RUN DUCTWORK IN ELECTRICAL ROOMS.
 - PROVIDE 2 SETS OF BOUND OPERATION AND MAINTENANCE MANUALS INCLUDING THE BALANCING AND COMMISSIONING REPORTS.
 - PROVIDE ALL EQUIPMENT, PIPING, MATERIALS, LABOR, PERMITS, AND FEES TO CONSTRUCT A COMPLETE AND OPERATIONAL MECHANICAL SYSTEM FOR THE ENTIRE PROJECT AS SHOWN ON THE DRAWINGS.
 - REFER TO THE DIRECT DIGITAL CONTROL SYSTEM, CONDENSING BOILER, AND BOILER CONTROLS SPECIFICATIONS FOR CONTROL OF NEW BOILER SYSTEM.
 - FIELD VERIFY SIZE AND LOCATION OF ALL EXISTING PIPING PRIOR TO STARTING CONSTRUCTION.
 - IF ASBESTOS IS FOUND DURING CONSTRUCTION, STOP WORK IMMEDIATELY AND NOTIFY THE CMGC.
 - CHEMICALLY CLEAN, FLUSH, PRESSURE TEST AND PROVIDE WATER TREATMENT IN ACCORDANCE WITH THE SCHOOL DISTRICT'S WATER TREATMENT PROVIDER.
 - NOT ALL PIPING IS SHOWN ON THE MECHANICAL ROOM PLANS FOR CLARITY. EXISTING FIRE SPRINKLER SYSTEM, DOMESTIC WATER SYSTEM, AND SOME OF THE HEATING WATER PIPING ARE NOT SHOWN AND ARE TO REMAIN IN PLACE. RELOCATE EXISTING PIPING AS REQUIRED TO ACCOMMODATE THE NEW BOILER INSTALLATION.
 - ELECTRICIAN SHALL PROVIDE NEW SERVICE CONNECTION TO THE NEW BOILERS, EMERGENCY BOILER SHUT-OFF SWITCH, AND ANY MISCELLANEOUS ELECTRICAL ITEMS.
 - REMOVE ALL EXISTING INSULATION IN THE MECHANICAL ROOM FROM ALL EXISTING PIPING. PROVIDE PIPE INSULATION AND JACKET ON ALL NEW AND EXISTING PIPING.
 - ATC CONTROLS MODIFICATIONS TO BE COMPLETED BY BOX ELDER SCHOOL DISTRICT. SEE DIRECT DIGITAL CONTROLS SPECIFICATION FOR LIST OF WORK TO BE COMPLETED BY THE ELECTRICIAN.
 - DOMESTIC WATER PIPING IN THE BOILER ROOM TO BE REVISED TO ACCOMMODATE NEW EQUIPMENT LOCATIONS. PROVIDE AUTOMATIC MAKE-UP WATER CONNECTION WITH A WATER METER FOR THE HEATING HOT WATER SYSTEM.

DRAWING INDEX

M0.0	COVER SHEET, SYMBOL LEGEND, & DRAWING INDEX
M0.1	LARGE SCALE MECHANICAL DEMOLITION PLANS
M1.1	LARGE SCALE MECHANICAL PLANS
M2.1	MECHANICAL DETAILS
M2.2	MECHANICAL SCHEDULES



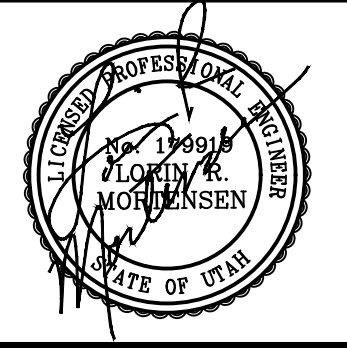


**MEZZANINE FAN ROOM
MECHANICAL DEMOLITION PLAN**
SCALE: 1/4" = 1' - 0"

MECHANICAL ROOM DEMOLITION PLAN
SCALE: 1/4" = 1' - 0"

REFERENCE NOTES

- 1 REMOVE STEAM EXISTING BOILER AND ACCESSORIES COMPLETE. DISCONNECT ALL PIPING, FLUES, AND PLUMBING CONNECTIONS FOR REMOVAL BY ASBESTOS ABATEMENT CONTRACTORS.
- 2 REMOVE EXISTING BOILER FLUES.
- 3 EXISTING CHIMNEY TO REMAIN.
- 4 REMOVE EXISTING STEAM - TO - HW HEAT EXCHANGER.
- 5 REMOVE EXISTING CONDENSATE RECEIVER TANK AND PUMPS.
- 6 EXISTING AIR DRYER TO REMAIN.
- 7 EXISTING AIR COMPRESSOR TO REMAIN.
- 8 EXISTING ELECTRICAL PANEL TO REMAIN.
- 9 EXISTING ATC CONTROL PANEL TO REMAIN.
- 10 EXISTING DOMESTIC HOT WATER HEATER TO REMAIN.
- 11 EXISTING WATER SOFTENER AND BRINE TANK TO REMAIN.
- 12 EXISTING CONDENSING UNIT TO REMAIN.
- 13 REMOVE EXISTING STEAM AND CONDENSATE PIPING.
- 14 EXISTING DOMESTIC WATER EXPANSION TANK TO REMAIN.
- 15 REMOVE EXISTING AIR SEPARATOR.
- 16 REMOVE EXISTING SUPPORT STRUCTURE COMPLETE.
- 17 EXISTING CONCRETE EQUIPMENT PAD TO REMAIN.
- 18 REMOVE EXISTING STEAM HEATING COIL.
- 19 EXISTING FLOOR DRAIN TO REMAIN.
- 20 REMOVE EXISTING CONCRETE CURB.
- 21 EXISTING DOMESTIC WATER PIPING TO REMAIN.
- 22 EXISTING SUPPLY FAN/AIR HANDLER TO REMAIN.
- 23 RE-USE EXISTING GAS PRV VENT LINES.
- 24 EXISTING GAS PRV AND VENT LINE TO REMAIN.



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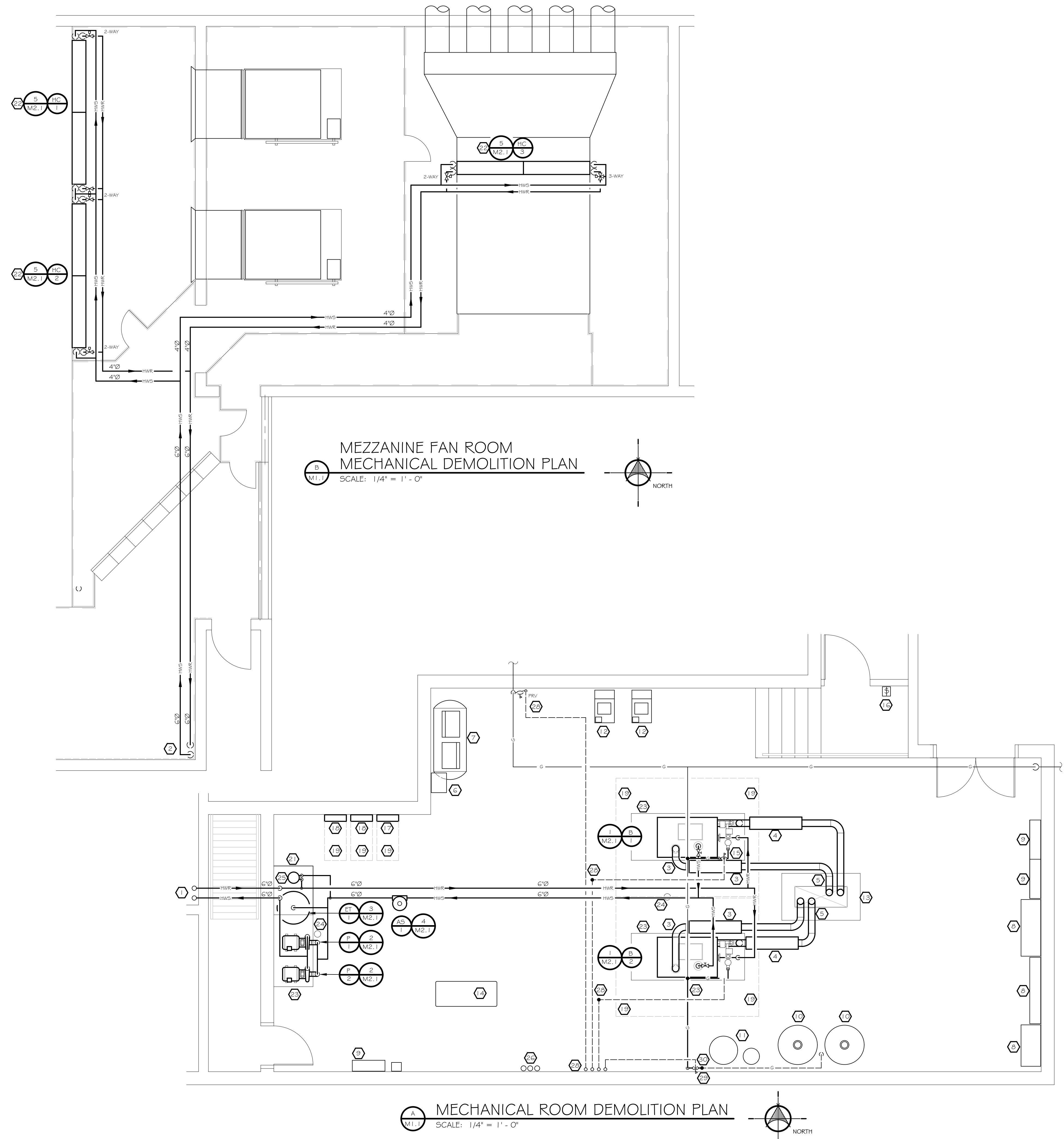
SHEET TITLE
LARGE SCALE
MECHANICAL
DEMOLITION
PLANS

PROJECT NUMBER

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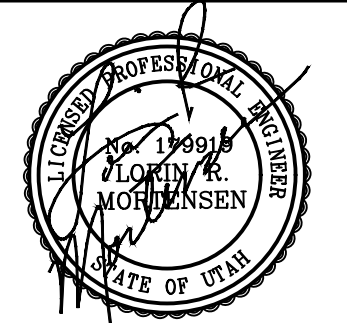
SHEET NUMBER

M0.1



REFERENCE NOTES

- 1 HEATING WATER PIPING UP TO MEZZANINE. SEE MEZZANINE FAN ROOM MECHANICAL PLAN THIS SHEET FOR CONTINUATION.
- 2 HEATING WATER PIPING UP TO MEZZANINE. SEE MEZZANINE FAN ROOM MECHANICAL PLAN THIS SHEET FOR CONTINUATION.
- 3 NEW 6" PVC BOILER INTAKE AIR PIPING. INSTALL INTAKE MUFFLER. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 4 NEW 6" AL294 VENTING PIPING. INSTALL EXHAUST MUFFLER. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 5 EXTEND 6" BOILER INTAKE AIR AND EXHAUST PIPING UP IN EXISTING CHIMNEY. EXTEND EXHAUST PIPING UP ABOVE ALL PIPE TERMINATIONS. PROVIDE GOOSENECK CONNECTION ON ROOF FOR AIR INTAKE PIPING. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- 6 EXISTING AIR DRYER TO REMAIN.
- 7 EXISTING AIR COMPRESSOR TO REMAIN.
- 8 EXISTING ELECTRICAL PANEL TO REMAIN.
- 9 EXISTING ATC CONTROL PANEL TO REMAIN.
- 10 EXISTING DOMESTIC HOT WATER HEATER TO REMAIN.
- 11 EXISTING WATER SOFTENER AND BRINE TANK TO REMAIN.
- 12 EXISTING CONDENSING UNIT TO REMAIN.
- 13 EXISTING CHIMNEY TO REMAIN. PATCH OPENINGS AS REQ'D.
- 14 EXISTING DOMESTIC WATER EXPANSION TANK TO REMAIN.
- 15 NEW GAS PRV 5 PSIG - TO - 1/2 IN. VENT TO OUTSIDE
- 16 BOILER EMERGENCY SHUT-OFF SWITCH.
- 17 NEW FULTON MOD-SYNC CONTROL PANEL.
- 18 NEW PUMP VARIABLE FREQUENCY DRIVE (VFD).
- 19 EQUIPMENT SERVICE ACCESS SPACE.
- 20 BOILER CONDENSATE TRAP. PIPE AS PER MFG'S INSTRUCTIONS.
- 21 NEW CONCRETE EQUIPMENT PAD TO MATCH EXISTING PAD HEIGHT.
- 22 REPLACE EXISTING STEAM HEATING COIL WITH NEW HEATING HOT WATER COIL. FIELD VERIFY EXISTING AHU DIMENSIONS.
- 23 EXISTING CONCRETE EQUIPMENT PAD TO REMAIN.
- 24 EXISTING FLOOR DRAIN TO REMAIN.
- 25 INSTALL NEW CHEMICAL POT FEEDER FOR HEATING HOT WATER SYSTEM.
- 26 EXISTING DOMESTIC WATER PIPING TO REMAIN.
- 27 EXISTING GAS PRV AND VENT PIPING TO REMAIN.
- 28 EXTEND GAS PRESSURE REGULATOR VENTS TO OUTSIDE. RE-USE EXISTING VENTS WHERE AVAILABLE.
- 29 VENT NEW GAS PRV TO OUTSIDE.
- 30 NEW GAS PRV 5 PSIG - TO - 4 OZ. VENT TO OUTSIDE



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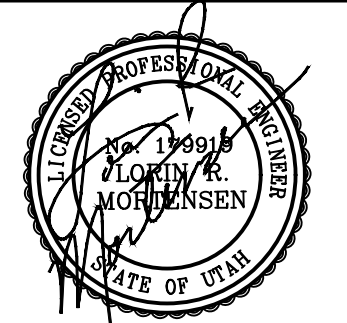
SHEET TITLE
**LARGE SCALE
MECHANICAL
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M1.1



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SHEET TITLE
**MECHANICAL
 SCHEDULES**

PROJECT NUMBER

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M2.2

HEATING COIL SCHEDULE														
SYMBOL	HEATING CFM	MAXIMUM CFM	MAX. FACE VELOCITY (FPM)	MAX. S.P. LOSS (\"WG.)	TOTAL CAPACITY (MBTUH)	ENT. AIR (\"F)	LVG. AIR (\"F)	CIRCULATING FLUID					COIL SIZE (H x L)	ACCESSORIES AND REMARKS
								FLUID	GPM	TEMP. IN (\"F)	TEMP. OUT (\"F)	MAX. LOSS (FT. FLUID)		
HC 1	18,500	18,500	500	0.7	936	40	95	30% P.G.	125	140	120	10	-	(1)(2)
HC 2	18,500	18,500	500	0.7	936	40	95	30% P.G.	125	140	120	10	-	(1)(2)
HC 3	15,100	15,100	500	0.7	765	32	95	30% P.G.	105	140	120	10	-	(1)(2)

- (1) CAPACITY AT 4300 FT. ELEVATION.
- (2) FIELD VERIFY EXACT COIL DIMENSIONS.

CHEMICAL FEED SYSTEM SCHEDULE											
ID	MANUFACTURER AND MODEL NUMBER	LOCATION	TYPE	OPERATOR	PUMP				PHYSICAL		NOTES
					PRESSURE RATING (PSIG)	DISCHARGE PRESSURE (PSIG)	HP	VOLTI/PHZ	DIAMETER / HEIGHT (IN)	TANK SIZE (GAL)	
CFE 1	POWER ENG GCT	GYM MECHANICAL	30% PPG	HOT WATER	3.8	40	1/3	115/180	2333	50	(1)

- (1) SET FILL PRESSURE TO MATCH ASSOCIATED EXPANSION TANK SCHEDULED FILL PRESSURE.

PUMP SCHEDULE									
PUMP NO.	MANUFACTURER AND MODEL NO.	GPM	HEAD FT.	H.P.	RPM	VOLTS/PHASE/ CYCLE	EQUIPMENT OR AREA SERVED	EFFICIENCY	COMMENTS
P 1	PATTERSON E2.5F9A-CC	355	60	10	1760	208/3/60	HEATING HOT WATER	75.8	(1)(2)
P 2	PATTERSON E2.5F9A-CC	355	60	10	1760	208/3/60	HEATING HOT WATER	75.8	(1)(2)

- (1) NON OVERLOADING MOTOR - VARIABLE FREQUENCY DRIVE - SEE SPECIFICATIONS.
- (2) PRIMARY/STANDBY

AIR SEPARATOR SCHEDULE								
SYMBOL	MANUFACTURER	MODEL	FLOW GPM	P.D. FT. HD.	STRAINER	AIR VENT	SYSTEM	COMMENTS
AS 1	PATTERSON	TAS006	350	0.9	NO	AUTO AIR VENT	HEATING WATER	WATER

EXPANSION TANK SCHEDULE										
SYMBOL	MANUFACTURER	MODEL	VOLUME		DIAMETER	LENGTH	INITIAL PRESS. PSI	FINAL PRESS. PSI	RELIEF PRESS. PSI	COMMENTS
			TOTAL	ACCEPT.						
ET 1	PATTERSON	NLA-600	158	158	30"	65'	15.8	55.0	60.0	HEATING WATER SYSTEM

HOT WATER BOILER SCHEDULE (GAS-FIRED) (OWNER FURNISHED)											
SYMBOL	DESCRIPTION	MANUFACTURER & MODEL NO.	MBH INPUT	MBH OUTPUT	ELECTRICAL			GPM	TEMP. IN	TEMP. OUT	COMMENTS
					H.P.	VOLT	PHASE				
B 1	DIRECT VENT CONDENSING	FULTON FHW2000	2,000	1,890	-	120	1	232	120	180	(1)(2)(3)(4)(5)(6)
B 2	DIRECT VENT CONDENSING	FULTON FHW2000	2,000	1,890	-	120	1	232	120	180	(1)(2)(3)(4)(5)(6)

- (1) CAPACITIES BASED ON 4300 FEET ELEVATION.
- (2) DIRECT VENT CONDENSING BOILER.
- (3) 60 PSI ASME PRESSURE RATING.
- (4) PROVIDE NEW MODSYNC SEQUENCING SYSTEM, OUTSIDE AIR SENSOR, LEADLAG, PACKAGED DISCHARGE WATER TEMPERATURE, AND OUTSIDE AIR RESET CONTROLS. COORDINATE WITH BUILDING BAS CONTROL SYSTEM. MODSYNC TO MAINTAIN SYSTEM SETPOINT PRESSURE BY CONTROLLING THE SYSTEM PUMPS AND VFD'S.
- (5) PROVIDE RELAY FOR ATC EMERGENCY STOP.
- (6) BOILERS AND MUFFLERS ARE OWNER FURNISHED. PROVIDE ALL VENT AND INTAKE PIPING.