TOWN OF HENNIKER

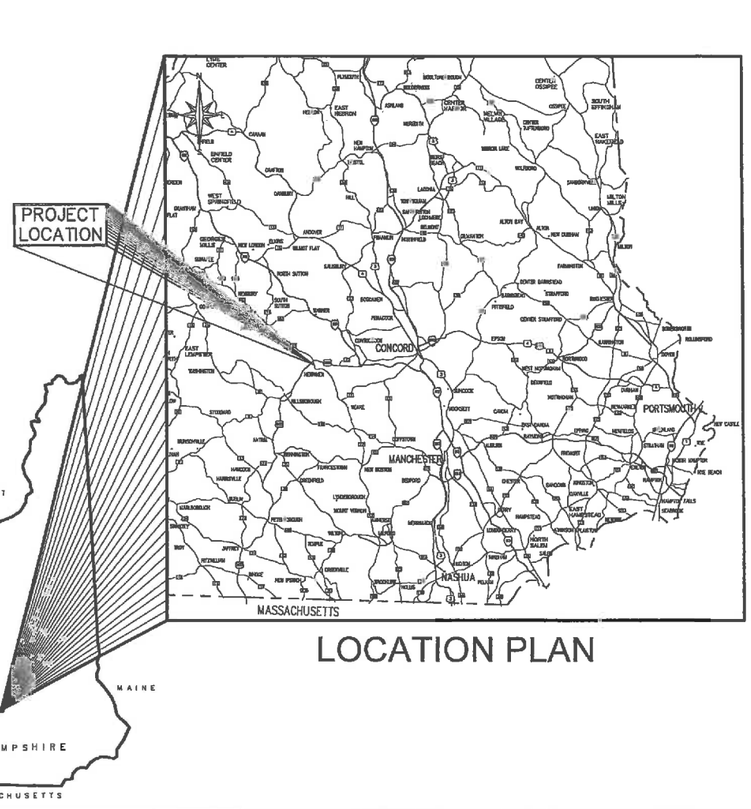
HENNIKER, NEW HAMPSHIRE

CONSTRUCTION DRAWINGS FOR

WWTF BOILER REPLACEMENT

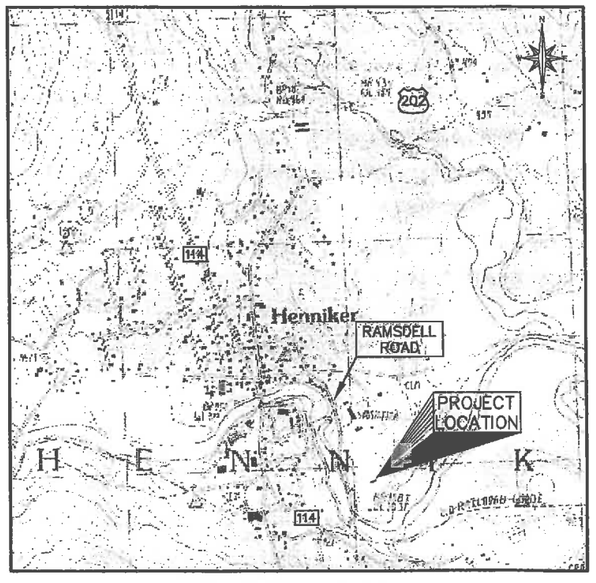
PREPARED BY

UNDERWOOD ENGINEERS, INC.
CONCORD, NEW HAMPSHIRE



LOCATION PLAN

DECEMBER 14, 2011



VICINITY MAP

TABLE OF CONTENTS

UE #1674

UNDERWOOD engineers

GENERAL NOTES:

WORK SHALL CONFORM TO THE FOLLOWING:

A) International Building Code, 2009 edition, with amendments
B) International Plumbing Code, 2009 edition, with amendments
C) International Mechanical Code, 2009 edition, with amendments
D) International Energy Conservation Code, 2009 edition, with amendments
E) National Electrical Code, 2008 edition, with amendment

G1. THESE DRAWINGS ARE INTENDED TO SHOW SCOPE OF PROPOSED WORK, SOME OF WHICH TIES INTO EXISTING SERVICES, AS WELL AS APPROXIMATE SERVICE ROUTINGS. THESE DRAWINGS DO NOT DEPICT EVERY FITTING, DIMENSION, OFFSET, VENT, DRAIN, OR TRANSITION REQUIRED FOR INSTALLATION. PRIOR TO SUBMITTING A BID, CONTRACTOR SHALL SURVEY AND FIELD VERIFY EXISTING CONDITIONS AND OBSERVE PROPOSED ROUTINGS.

I. - NO ADDITIONAL COMPENSATION OR RELIEF FROM SCHEDULE SHALL BE GIVEN FOR DIFFICULT WORKING CONDITIONS.
II - NO ADDITIONAL COMPENSATION SHALL BE GIVEN FOR EXTRA PIPING, DUCTWORK, FITTINGS, OR SUPPORTS REQUIRED TO COMPLETE THE INSTALLATION OF ALL RUNS DESCRIBED AND DEPICTED WITHIN THIS DESIGN PACKAGE.

G2. ALL NEW SERVICES SHALL BE INSTALLED PARALLEL TO BUILDING AND PLUMB ALONGSIDE EXISTING SERVICES, UTILIZING THE SAME SUPPORT STRUCTURES WHEREVER POSSIBLE. SERVICES SHALL BE INSTALLED IN SUCH A MANNER AS TO MAXIMIZE THE AVAILABLE SURROUNDING CLEAR SPACE.

G2A. WHERE CONNECTING TO EXISTING PIPING, IT IS THE INTENT TO MATCH SIZE AND SCHEDULE OF EXISTING PIPING AND INSULATION UNLESS NOTED OTHERWISE. CONTRACTOR SHALL CONFIRM ALL SIZES AND SCHEDULES PRIOR TO COMMENCING WORK AND NOTIFY OWNER IMMEDIATELY OF ANY DISCREPANCIES FROM WHAT IS SHOWN HERE.

G3. CONTRACTOR SHALL WORK AROUND ALL EXISTING PIPING, UTILITIES, SERVICES, WIRING, AND SUPPORTS, ETC. LOCATED IN THE WORK AREA AND NOT SCHEDULED FOR MODIFICATION / RELOCATION.

G4. CONTRACTOR SHALL BE RESPONSIBLE FOR REPAIR OF ANY & ALL DAMAGE TO NEW OR EXISTING EQUIPMENT, STRUCTURES, FLOOR, ETC. INSTALLED OR RELOCATED UNDER THIS CONTRACT. THIS SHALL INCLUDE ALL TOUCH UP PAINTING.

G5. CONTRACTOR SHALL REMOVE ALL DEBRIS RELATIVE TO THE RESPECTIVE TRADE IN A TIMELY FASHION AND PRACTICE GOOD HOUSEKEEPING.

G6. THE CONTRACTOR SHALL STOP WORK AND NOTIFY THE OWNER IMMEDIATELY IF THEY ENCOUNTER EXISTING CONSTRUCTION MATERIALS THAT MAY CONTAIN HAZARDOUS COMPONENTS (ASBESTOS/LEAD).

G7. CONTRACTOR SHALL CLOSELY COORDINATE WORK WITH THE OWNER AND OTHER TRADES IN ORDER TO MINIMIZE INTERFERENCE WITH NORMAL ACTIVITIES. WORK SHALL BE SCHEDULED IN PROPER SEQUENCE TO AVOID OUTAGES (UTILITY, SERVICES, POWER, ETC.) WHEREVER POSSIBLE, AND TO MINIMIZE THE DURATION OF OUTAGES THAT CANNOT BE AVOIDED.

G8. WORK SCHEDULE TO BE CLOSELY COORDINATED WITH OWNER AND DEVELOPED TO MINIMIZE IMPACT TO OCCUPANTS. ADJACENT AREAS WILL REMAIN OCCUPIED DURING PROJECT. THIS COORDINATION SHALL INCLUDE BUT NOT BE LIMITED TO ERECTING AND MAINTAINING TEMPORARY CONSTRUCTION BARRIERS WITH BLOWERS TO MINIMIZE DUST SPREAD WHENEVER APPROPRIATE.

G9. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL NEW EQUIPMENT AS IDENTIFIED BY THESE PROJECT DRAWINGS. THIS SHALL INCLUDE TRANSPORTING, UNLOADING, UNCRATING, RIGGING, AND PLACEMENT OF ALL EQUIPMENT.

G10. CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING ALL NEW SUPPORT STEEL, UNISTRUT RACK, CURBS, CONCRETE PADS THAT ARE REQUIRED FOR EQUIPMENT INSTALLATION.

G11. EQUIPMENT AND MATERIALS INSTALLED UNDER THIS CONTRACT SHALL BE NEW AND WITHOUT FUNCTIONAL OR COSMETIC DEFECT.

G12. ALL WORK SHALL COMPLY WITH FEDERAL, STATE, AND LOCAL CODES.

G13. COORDINATE CUTTING OF NEW OPENINGS AND PATCHING OF EXISTING OPENINGS WITH ALL TRADES.

G14. ALL OPENINGS IN FLOORS, WALLS OR ROOF ARE SIZED ACCORDING TO THE EQUIPMENT USED AS BASIS OF DESIGN. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND REVISING ALL OPENINGS AS REQUIRED TO SUIT ANY EQUIPMENT SUBSTITUTIONS.

G15. PROPERLY TEST, BALANCE AND ADJUST ALL HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS INSTALLED UNDER THIS CONTRACT, INCLUDING THE AUTOMATIC TEMPERATURE CONTROL SYSTEMS. ALL PROCEDURES SHALL BE IN COMPLIANCE WITH THE ASSOCIATED AIR BALANCE COUNCIL (AABC). SUBMIT BALANCE REPORT TO OWNER.

G16. CONTRACTOR SHALL SUBMIT MANUFACTURER'S PRODUCT SPECIFICATIONS FOR MATERIAL TO BE INSTALLED ON THIS PROJECT; INCLUDE DATA SUBSTANTIATING THAT MATERIALS COMPLY WITH REQUIREMENTS. DO NOT ISSUE RESUBMITTALS UNLESS DIRECTED TO DO SO BY PREVIOUS SUBMITTAL REVIEW. CONTRACTOR SHALL MAINTAIN AN ON-SITE BOOK WITH MSDS SHEETS FOR ALL MATERIALS BROUGHT TO THE JOB SITE.

G17. CONTRACTOR SHALL FURNISH AND INSTALL ALL CONTROLS COMPONENTS AS DESCRIBED BY THESE PROJECT DOCUMENTS TO ENSURE ALL SYSTEMS ARE COMPLETE, FULLY OPERATIONAL AND CONFIGURED TO FUNCTION TO MEET ALL OPERATING DESCRIPTIONS LISTED BY DESIGN DOCUMENTS.
THIS SHALL INCLUDE INSTALLING ALL REQUIRED CONTROL WIRING, ANCILLARY DEVICES, AND PROGRAMMING OF CONTROLLERS. COORDINATE WITH ELECTRICAL CONTRACTOR FOR EQUIPMENT INCLUDING STARTERS, DISCONNECTS, FUSE SIZING, ETC.

G18. PROVIDE TEMPORARY CONSTRUCTION LIGHTING AS NECESSARY THROUGHOUT THE CONTRACT AREA. RELOCATE LIGHTING AS NECESSARY TO ACCOMMODATE CHANGING CONDITIONS.

G19. CONTRACTOR SHALL COORDINATE WITH THE ELECTRICAL SUBCONTRACTOR ALL ELECTRICAL REQUIREMENTS FOR EQUIPMENT PROVIDED INCLUDING STARTERS, DISCONNECTS, FUSE SIZING, ETC. ALL ELECTRIC MOTORS SHALL BE PREMIUM EFFICIENCY TYPE.

GENERAL NOTES: CON'T

G21. CONTRACTOR SHALL FURNISH AND INSTALL FLEXIBLE CONNECTORS ON ALL CONNECTIONS TO EQUIPMENT THAT CAN GENERATE VIBRATIONS. SEALTIGHT CAST METAL BOXES SHALL BE USED IN ALL AREAS REQUIRING AIR / WATER TIGHT CONNECTIONS. THIS APPLIES TO ALL ELECTRICAL DEVICES LOCATED OUTDOORS.

G22. CONTRACTOR SHALL FURNISH AND INSTALL SPRING TYPE VIBRATION ISOLATORS ON ALL SUPPORTS FOR EQUIPMENT THAT CAN GENERATE VIBRATIONS.

G23. AT THE COMPLETION OF THE PROJECT UNUSED MATERIALS, SUPPLIES, EQUIPMENT, TOOLS, ETC SHALL BE REMOVED FROM THE CONTRACT AREA AND THE AREA LEFT IN A CLEAN AND ACCEPTABLE MANNER AS DETERMINED BY THE OWNER OR HIS REPRESENTATIVE.

G24. AT THE COMPLETION OF THE PROJECT, CONTRACTOR SHALL DELIVER TO OWNER AT LEAST ONE COPY OF COMPLETE PROJECT OEM OWNER'S MANUALS, AND UP TO SIX COPIES AS DIRECTED BY OWNER, FOR EACH PIECE OF CONTRACTOR FURNISHED EQUIPMENT INSTALLED BY THE PROJECT. MANUALS SHALL INCLUDE ALL MANUFACTURER WARRANTY INFORMATION, DRAWINGS, CATALOG CUTS, INSTRUCTION MANUALS, SERVICE MANUALS, SPARE PARTS LIST, AND RED-LINED AS-BUILT DRAWINGS.

G25. CONTRACTOR SHALL LEAVE THE WORK IN PROPER WORKING ORDER AND SHALL, WITHOUT ADDITIONAL CHARGE, REPLACE ANY WORK, MATERIALS OR EQUIPMENT FURNISHED AND INSTALLED UNDER THIS CONTRACT WHICH DEVELOPS DEFECTS, EXCEPT FROM ORDINARY WEAR AND TEAR, WITHIN ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE OWNER.

G26. CONTRACTOR SHALL SUPPLY OWNER WITH COMPLETE SET OF DRAWINGS, RED-LINED (MARKED IN COLOR) TO SHOW MODIFICATIONS MADE TO DESIGN DURING CONSTRUCTION WHICH REFLECT "AS-BUILT" CONDITIONS.

G27. FOR ANY WORK TO BE PERFORMED IN A CONFINED SPACE, CONTRACTOR SHALL ENSURE THE NECESSARY PERMITS, TRAINING, SAFETY PROCEDURES AND EQUIPMENT ARE PROVIDED.

MECHANICAL PIPING NOTES:

M1. LOCATION OF VENTS/DRAINS SHALL BE PROVIDED BOTH AS SHOWN AND AS REQUIRED AT ALL HIGH POINTS AND LOW POINTS IN THE PIPING SYSTEM.

M2. WELDING AND SOLDERING REQUIREMENTS: CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY HOT-WORK PERMITS. ALL WELDING AND SOLDERING AREAS SHALL BE SETUP WITH APPROPRIATE SHIELDING AND VENTILATION - HOUSE VENTILATION SYSTEMS ARE NOT BE USED FOR PROVIDING VENTILATION.

M3. COORDINATE ALL WORK WITH ELECTRICAL AND PLUMBING CONTRACTORS.

M4. PROVIDE AND INSTALL PIPE SLEEVES FOR ALL PIPING PENETRATING WALLS AND FLOORS AS DETAILED. PROVIDE PENETRATION SEAL AS REQUIRED TO MAINTAIN WALL RATING FOR FIRE AND/OR SMOKE. PROVIDE ISOLATION VALVES FOR ALL BRANCH PIPING THAT RISES FROM MAIN TO FEED EQUIPMENT. ISOLATION VALVES SHALL BE LOCATED AT AN ACCESSIBLE POINT WHERE THE BRANCH LINE MEETS THE MAIN.

M5. ALL BRANCH PIPING TO BE OFF TOP OF MAIN WHERE POSSIBLE. SIDE TAKEOFFS ARE PERMITTED WHERE TOP TAKE-OFFS ARE NOT POSSIBLE. LOCATING TAKEOFFS ON BOTTOM OF MAINS SHALL BE NOT BE ALLOWED WITHOUT PRIOR APPROVAL.

M6. ALL PIPING PENETRATING EXTERIOR WALLS OR ROOFS SHALL BE FULLY SEALED AND MADE WEATHER TIGHT. ALL ATTACHMENTS TO STRUCTURE, CURBS, POSTS, GUIDES, SUPPORTS, ETC. SHALL BE FULLY FLASHED AND INTEGRATED INTO THE WALL OR ROOFING SYSTEM IN ACCORDANCE WITH ROOFING MANUFACTURERS INSTRUCTIONS AND ALL OTHER ACCEPTED PRACTICES.

M7. CONTRACTOR SHALL PROVIDE EXPANSION LOOPS AND/OR OFFSETS WHERE NECESSARY TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION, WHETHER OR NOT SHOWN ON DRAWINGS.

PLUMBING/PIPING NOTES:

P1. PROVIDE AND INSTALL PIPE SLEEVES FOR ALL PIPING PENETRATING WALLS AND FLOORS. PROVIDE PENETRATION SEAL AS REQUIRED TO MAINTAIN WALL RATING FOR FIRE AND/OR SMOKE.

P2. VERIFY EXACT LOCATION OF ALL IN-SLAB UTILITIES, INCLUDING PIPING, CONDUIT, ETC. PRIOR TO ROUGH-IN.

P3. CONFIRM OR VERIFY EXACT LOCATION AND ACTUAL INVERT OF SANITARY AND STORM DRAIN LINES PRIOR TO INSTALLATION.

P4. LOCATE SHUT-OFF VALVE ABOVE CEILING AND IN LOCATIONS ACCESSIBLE FOR SERVICE. LOCATION SHALL COMPLY WITH THE REQUIREMENTS OF ALL CODES REFERENCED HEREIN. ALL PIPING SHALL SLOPE 1/8" PER FOOT UNLESS NOTED OTHERWISE.

P5. ALL SANITARY/ACID DRAINAGE PIPING 3" AND SMALLER SHALL SLOPE 1/4" PER FOOT UNLESS NOTED OTHERWISE.

P6. INVERT ELEVATIONS ARE CALCULATED FROM A FINISHED FLOOR ELEVATION OF 00.00'. ELEVATIONS BELOW GROUND ARE NOTED IN FEET AND DECIMALS OF FEET.

P7. REFERENCE PLUMBING FIXTURE CONNECTION SCHEDULE(S) FOR LINE SIZES NOT SHOWN TO FIXTURES AND EQUIPMENT.

P8. ALL DRAINAGE PIPING AND PRESSURE SYSTEM PIPING SHALL BE RUN AS HIGH AS POSSIBLE TO BOTTOM OF STRUCTURE, UNLESS NOTED OTHERWISE. COORDINATE PIPE ROUTING WITH ALL OTHER TRADES.

P9. THE FOLLOWING PLUMBING SYSTEMS SHALL BE INSULATED: COLD WATER, HOT WATER, HOT WATER RECIRCULATION, P-TRAPS AND HORIZONTAL PIPING RECEIVING CONDENSATE ABOVE CEILINGS, HORIZONTAL ROOF DRAIN LEADERS.

P10. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THAT ITEMS TO BE FURNISHED FIT THE SPACE AVAILABLE.

P11. THESE DRAWINGS ARE SCHEMATIC IN NATURE AND DO NOT SHOW EXACT LOCATIONS OF FIXTURES AND EQUIPMENT. ALL OFFSETS AND FITTINGS FOR COMPLETE INSTALLATION MAY NOT BE DEFINED ON THE DRAWINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING EXACT DIMENSIONS AT THE BUILDING AND ANY NECESSARY CHANGES MADE IN ACCORDANCE WITH STRUCTURAL CONDITIONS, EQUIPMENT TO BE INSTALLED AND COORDINATION WITH OTHER SYSTEMS. IF CONFLICTS CANNOT BE RESOLVED THEY SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT/ENGINEER.

P12. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CODES AND STANDARDS INSOFAR AS THEY APPLY: NFPA 54, CURRENT STANDARD BUILDING, GAS AND PLUMBING CODES.

P13. CONTRACTOR SHALL SECURE ALL PERMITS, INSPECTIONS, LICENSES AND TESTS REQUIRED FOR THIS WORK AND PAY ALL FEES IN CONNECTION THEREWITH.

P14. ALL MATERIALS SHALL BEAR THE MANUFACTURER'S NAME, TRADE NAME AND BE U.L. LISTED/LABELED IF REQUIRED. UNLESS SPECIFICALLY INDICATED OTHERWISE, ALL EQUIPMENT AND MATERIALS SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER. ALL EQUIPMENT OF A SIMILAR TYPE SHALL BE OF THE SAME MANUFACTURER.

P15. CONTRACTOR SHALL LOCATE AND SIZE ALL OPENINGS REQUIRED FOR PLUMBING EQUIPMENT AND PIPING; AND PROVIDE THIS INFORMATION TO THE GENERAL CONTRACTOR IN TIME NOT TO DELAY BUILDING CONSTRUCTION.

P16. CONTRACTOR SHALL PROVIDE AND LOCATE SLEEVES AND INSERTS REQUIRED BEFORE THE FLOOR AND WALLS ARE BUILT OR SHALL BE RESPONSIBLE FOR THE COST OF CUTTING AND PATCHING REQUIRED FOR PIPES WHERE SLEEVES AND INSERTS WERE NOT INSTALLED OR WHERE THEY WERE INCORRECTLY LOCATED.

P17. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE MEANS, METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES OF CONSTRUCTION SELECTED BY THE CONTRACTOR OR FOR THE SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL TO THE WORK OF THE CONTRACTOR. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR THE FAILURE OF THE CONTRACTOR TO PERFORM THE CONSTRUCTION WORK IN ACCORDANCE WITH THE DRAWINGS.

P18. CONTRACTOR SHALL PROVIDE EXPANSION LOOPS AND/OR OFFSETS WHERE NECESSARY TO COMPENSATE FOR THERMAL EXPANSION AND CONTRACTION, WHETHER OR NOT SHOWN ON DRAWINGS.

P19. ROUTE PLUMBING VENTS, DRAINS, WATER, AND FUEL PIPING AS NECESSARY TO AVOID EXISTING SERVICES.

P20. PLUMBING CONTRACTOR SHALL TEST EACH REDUCED PRESSURE BACKFLOW PREVENTER AND DOUBLE CHECK VALVE INSTALLED USING A CERTIFIED TESTER IN ACCORDANCE WITH APPLICABLE PRIMARY DRINKING WATER REGULATIONS.

P21. CONTRACTOR SHALL INSTALL TRAP PRIMERS AT ALL TRAPS AS REQUIRED FOR CODE COMPLIANCE. TRAP DEPTH SHALL BE SUFFICIENT FOR EACH APPLICATION.

MECHANICAL SYSTEMS SPECIFICATIONS SUMMARY

(REFER TO DETAILED SPECIFICATION SHEETS FOR MORE INFORMATION)

SYSTEM	MATERIALS DESCRIPTION	INSULATION DESCRIPTION
DOMESTIC WATER PIPING	TYPE L, HARD DRAWN COPPER TUBING WITH SOLDER FITTINGS	1" THICK MINERAL FIBER WITH ASJ
HEATING HOT WATER PIPING	SCH 40 CARBON (BLACK) STEEL, NPT & WELDED FITTINGS	MINERAL FIBER WITH ASJ, 1 1/2" THICK FOR PIPES 1/2" TO 1 1/2", 3" THICK FOR LARGER PIPE SIZES
FUEL OIL PIPING	TYPE L, HARD DRAWN COPPER TUBING, SOLDER & NPT FITTINGS	NONE

LiebertEngineering incorporated
802-425-6476
Fax: 802-329-2283
www.liebertEng.com
P.O. Box 453
Charlotte, VT 05445
Custom Thinking & Practical Solutions

NO.	REVISIONS	APP'D	Date	By
	ISSUE FOR APPROVAL		12/14/2011	DJM
	CONSTRUCTION		12/14/2011	DJM
	RECORD DRAWING			

Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No.
Project No. 1674
Dwg. ID G1.DWG
Scale AS SHOWN

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

GENERAL NOTES
WWTF BOILER REPLACEMENT
TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

DWG NO G-1
SHEET 1 OF 8

ISA SYMBOL DESIGNATION/LEGEND

TYPICAL P&ID LETTER COMBINATIONS

FIRST LETTERS	INITIATING OR MEASURED VARIABLE	CONTROLLERS				READOUT DEVICES		SWITCHES & ALARM DEVICES*			TRANSMITTERS									
		RECORDING	INDICATING	BLIND	SELF-ACTUATED CONTROL VALVES	RECORDING	INDICATING	HIGH **	LOW	COMB	RECORDING	INDICATING	BLIND	SOLENOIDS, RELAYS COMPUTING DEVICES	PRIMARY ELEMENTS	TEST POINTS	WELL OR PROBE	VIEWING DEVICE, GLASS	SAFETY DEVICE	FINAL ELEMENT
A	ANALYSIS	ARC	AIC	AC	-	AR	AI	ASH	ASL	ASHL	ART	AIT	AT	AY	AE	AP	AW	-	-	AV
B	BURNER/COMBUSTION	BRC	BIC	BC	-	BR	BI	BSH	BSL	BSHL	BRT	BIT	BT	BY	BE	-	BW	BG	-	BZ
C	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
E	VOLTAGE	ERC	EIC	EC	-	ER	EI	ESH	ESL	ESHL	ERT	EIT	ET	EY	EE	-	-	-	-	EZ
F	FLOW RATE	FRC	FIC	FC	FCV/FICV	FR	FI	FSH	FSL	FSHL	FRT	FIT	FT	FY	FE	FP	-	FG	-	FV
FQ	FLOW QUANTITY	FQRC	FQIC	-	-	FQR	FQI	FQSH	FQSL	-	-	FQIT	FQT	FQY	FQE	-	-	-	-	FQV
FF	FLOW RATIO	FFRC	FFIC	FFC	-	FFR	FFI	FFSH	FFSL	-	-	-	-	-	-	-	-	-	-	FFV
G	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H	HAND	HIC	HC	HC	-	-	-	-	-	HS	-	-	-	-	-	-	-	-	-	HV
I	CURRENT	IRC	IIC	-	-	IR	II	ISH	ISL	ISHL	IRT	IIT	IT	IY	IE	-	-	-	-	IZ
J	POWER	JRC	JIC	-	-	JR	JI	JSH	JSL	JSHL	JRT	JIT	JT	JY	JE	-	-	-	-	JV
K	TIME	KRC	KIC	KC	KCV	KR	KI	KSH	KSL	KSHL	KRT	KIT	KT	KY	KE	-	-	-	-	KV
L	LEVEL	LRC	LIC	LC	LCV	LR	LI	LSH	LSL	LSHL	LRT	LIT	LT	LY	LE	-	LW	LG	-	LV
M	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
N	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O	USER'S CHOICE	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
P	PRESSURE/VACUUM	PRC	PIC	PC	PCV	PR	PI	PSH	PSL	PSHL	PRT	PIT	PT	PY	PE	PP	-	-	PSV/PSE	PV
PD	PRESSURE/DIFFERENTIAL	PDRC	PDIC	PDC	PDCV	PDR	PDI	PDSH	PDSL	-	PDRT	PDIT	PDT	PDY	PE	PP	-	-	-	PDV
Q	QUANTITY	QRC	QIC	-	-	QR	QI	QSH	QSL	QSHL	QRT	QIT	QT	QY	QE	-	-	-	-	QZ
R	RADIATION	RRC	RIC	RC	-	RR	RI	RSH	RSL	RSHL	RRT	RIT	RT	RY	RE	-	RW	-	-	RZ
S	SPEED/FREQUENCY	SRC	SIC	SC	SCV	SR	SI	SSH	SSL	SSHL	SRT	SIT	ST	SY	SE	-	-	-	-	SV
T	TEMPERATURE	TRC	TIC	TC	TCV	TR	TI	TSH	TSL	TSHL	TRT	TIT	TT	TY	TE	TP	TW	-	TSE	TV
TD	TEMPERATURE/DIFFERENTIAL	TDRC	TDIC	TDC	TDCV	TDR	TDI	TDSH	TDSL	-	TDRT	TDIT	TDT	TDY	TE	TP	TW	-	-	TDV
U	MULTIVARIABLE	-	-	-	-	UR	UI	-	-	-	-	-	-	UY	-	-	-	-	-	UV
V	VIBRATION/MACHINERY/ANLYSIS	-	-	-	-	VR	VI	VSH	VSL	VSHL	VRT	VIT	VT	VY	VE	-	-	-	-	VZ
W	WEIGHT/FORCE	WRC	WIC	WC	WCV	WR	WI	WSH	WSL	WSHL	WRT	WIT	WT	WY	WE	-	-	-	-	WZ
WD	WEIGHT/FORCE/DIFFERENTIAL	WDRC	WDIC	WDC	WDCV	WDR	WDI	WDSH	WDSL	-	WDRT	WDIT	WDT	WDY	WE	-	-	-	-	WDZ
X	UNCLASSIFIED	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y	EVENT/STATE/PRESENCE	-	YIC	YC	-	YR	YI	YSH	YSL	-	-	-	YT	YY	YE	-	-	-	-	YZ
Z	POSITION/DIMENSION	ZRC	ZIC	ZC	ZCV	ZR	ZI	ZSH	ZSL	ZSHL	ZRT	ZIT	ZT	ZY	ZE	-	-	-	-	ZV
ZD	GUAGING/DEVIATION	ZDRC	ZDIC	ZDC	ZDCV	ZDR	ZDI	ZDSH	ZDSL	-	ZDRT	ZDIT	ZDT	ZDY	ZDE	-	-	-	-	ZDV

NOTE: THIS TABLE IS NOT ALL-INCLUSIVE.

* A, ALARM, THE ANNUNCIATING DEVICE, MAY BE USED IN THE SAME FASION AS S, SWITCH, THE ACTUATING DEVICE.

** THE LETTERS H AND L MAY BE OMITTED IN THE UNDEFINED CASE.

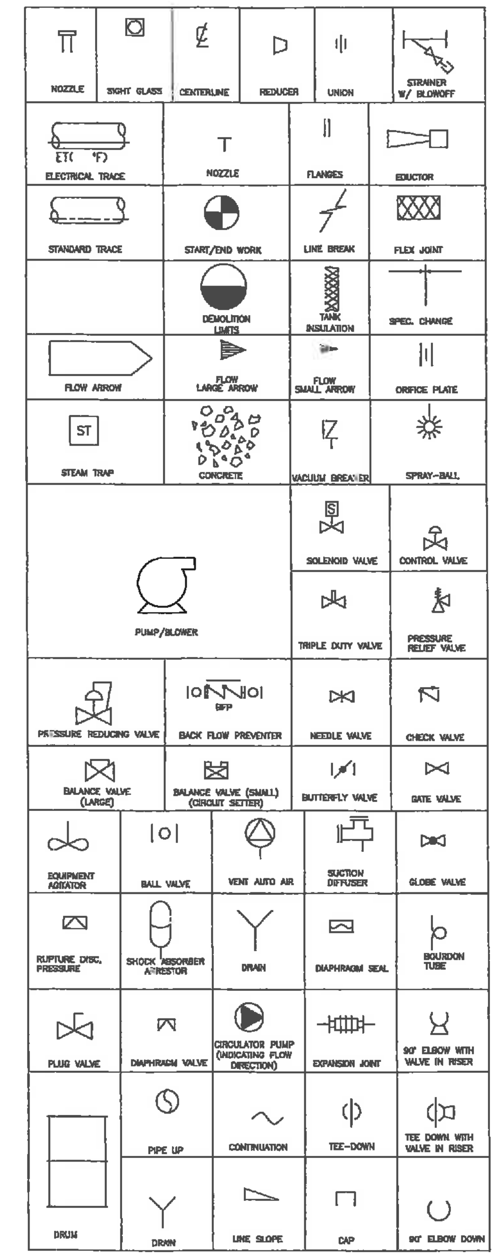
OTHER POSSIBLE COMBINATIONS:

FO	(RESTRICTION ORIFICE)	PFR	(RATIO)
FRK/HIK	(CONTROL STATIONS)	KQI	(RUNNING TIME INDICATOR)
FX	(ACCESSORIES)	QQI	(INDICATING COUNTER)
TJR	(SCANNING RECORDER)	WKIC	(RATE-OF-WEIGHT-LOSS CONTROLLER)
LLH	(PILOT LIGHT)	HMS	(HAND MOMENTARY SWITCH)

ABBREVIATIONS

A	ALARM	DIR	DEIONIZED WATER RETURN	O2	OXYGEN
AFF	ABOVE FINISHED FLOOR	DI	DIGITAL INPUT	O3	OZONE
AG	ABOVE (MEZZANINE) GRATING	DO	DIGITAL OUTPUT	P	PRESSURE
AI	ANALOG INPUT	DIW	DEIONIZED WATER	PE	POLYETHYLENE
AO	ANALOG OUTPUT	EL	ELEVATION	PEN	PENETRATION
A/S	AIR SUPPLY	EXH	EXHAUST	PP	POLYPROPYLENE
BFP	BACKFLOW PREVENTER	FCV	FLOW CONTROL VALVE	PSI	POUNDS PER SQ. INCH (PRESSURE)
BFW	BOILER FEEDWATER	F TO F	FACE TO FACE	PSID	POUNDS PER SQ. INCH (DIFFERENTIAL)
BLR	BOILER	FT	FEET	PVC	POLYVINYL CHLORIDE
BOC	BOTTOM OF CONDUIT	F.C.	FAIL CLOSE	PVDF	POLYVINYLIDENE FLUORIDE
BOD	BOTTOM OF DUCT	F.O.	FAIL OPEN	PW	PURIFIED WATER
BOE	BOTTOM OF EQUIPMENT	FL	FAIL LAST	QTY	QUANTITY
BOP	BOTTOM OF PIPE	FOT	FLAT ON TOP	R/A	RETURN AIR
BR	BRINE	GPM	GALLONS PER MINUTE	S/A	SUPPLY AIR
CA	COMPRESSED AIR	HPS	HIGH PRESSURE STEAM	S	STEAM
CDA	CLEAN DRY AIR	HWP	HOT WATER PUMP	SF	SQUARE FEET
CFM	CUBIC FEET PER MINUTE	HWS/R	(HEATING) HOT WATER SUPPLY/RETURN	SPRK	SPRINKLER
CHP	CENTRAL HEATING PLANT	IA	INSTRUMENT AIR	SS	STAINLESS STEEL
CHWR	CHILLED WATER RETURN	LB/HR	POUNDS / HOUR	SW	SOFT WATER
CHWS	CHILLED WATER SUPPLY	LF	LINEAR FEET	T	TEMPERATURE
COND	CONDESATE	LPS	LOW PRESSURE STEAM	TW	THERMOWELL
CO	CARBON MONOXIDE	MBH	BTU/HOUR (1000)	TOP	TOP OF PIPE
CO2	CARBON DIOXIDE	MOD	MOTER OPERATED DAMPER	TCV	TEMPERATURE CONTROL VALVE
CR	CONDENSATE RETURN	MPS	MED. PRESS. STEAM	UV	ULTRA VIOLET
CS	CARBON STEEL	N2	NITROGEN	VD	VOLUME DAMPER
CWS/R	CONDENSOR WATER SUPPLY/RTN	N.C.	NORMALLY CLOSED	VFD	VARIABLE FREQUENCY DRIVE
DA	DEAERATOR	N.O.	NORMALLY OPEN	WC	WATER COLUMN
DC	DOUBLE CONTAINED	OCC	OCCUPANCY/OCCUPANTS		
DCW	DOMESTIC COLD WATER	OA	OUTSIDE AIR		
DFP	DEAERATOR FEED PUMP	OS	OCCUPANCY SENSOR		
DFW	DEAERATOR FEEDWATER	OZ	OZONE		

GENERAL PIPING SYMBOLS



LiebertEngineering Incorporated

802-425-5476
Fax. 802-329-2283
www.liebertengineering.com
104 Bown Lane
P.O. Box 486
Charlotte, VT 05445

Custom Thinking & Practical Solutions

ISSUE FOR

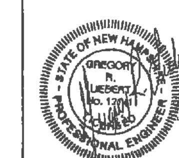
APPROVAL — Date 12/14/2011 By DJM

CONSTRUCTION — Date 12/14/2011 By DJM

RECORD DRAWING — Date By

NO.	REVISIONS	APP'D

Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No. -
Project No. 1674
Dwg. ID G2.DWG
Scale AS SHOWN



UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

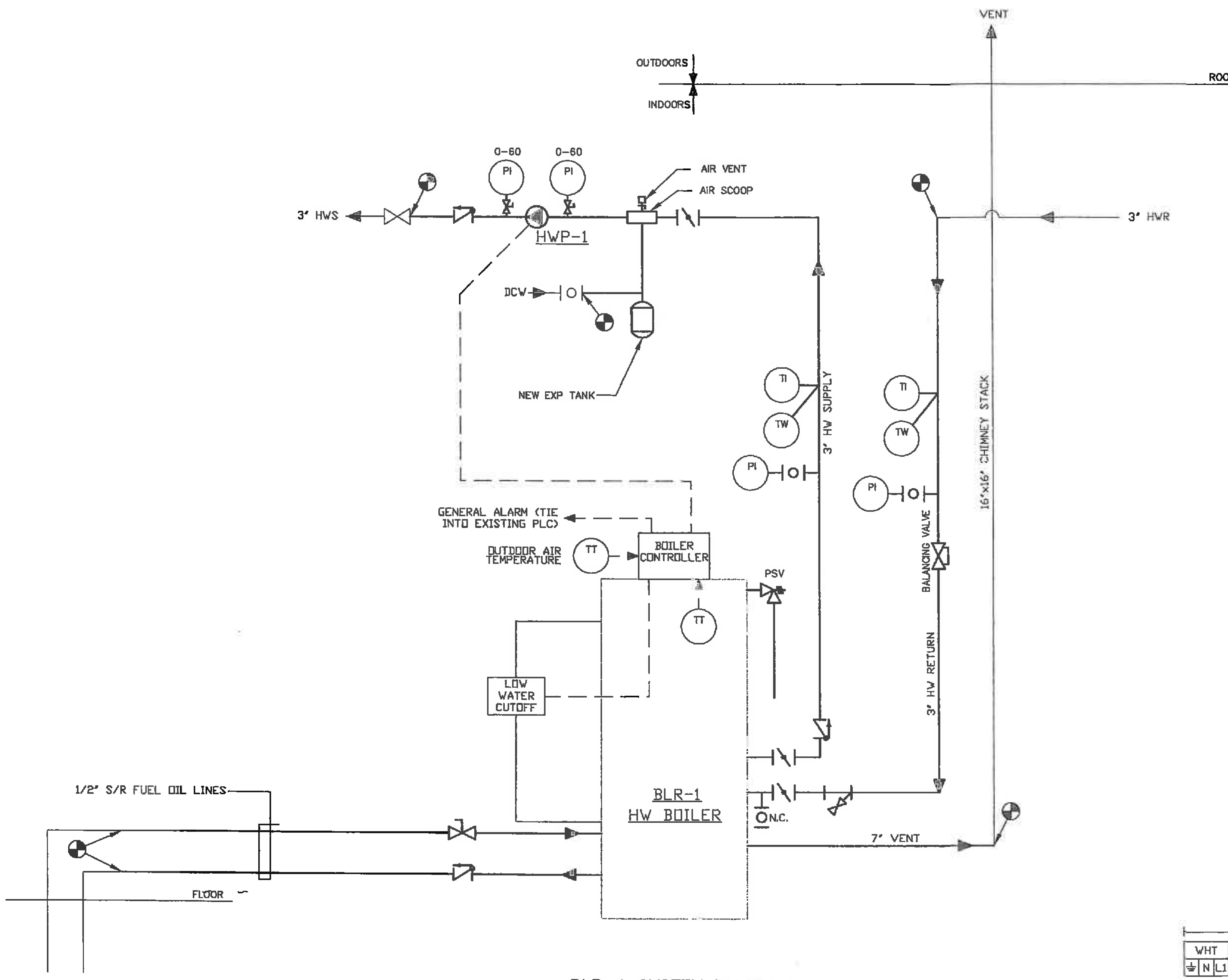
SYMBOLS, LEGENDS, AND ABBREVIATIONS

WWTF BOILER REPLACEMENT

TOWN OF HENNIKER

HENNIKER, NEW HAMPSHIRE

DWG NO	SHEET
G-2	2 OF 8



BLR-1 SYSTEM DIAGRAM

NOTES:

CONTRACTOR SHALL DISCONNECT AND REMOVE ALL BOILER CONTROLS MADE OBSOLETE BY THE WORK BEING PERFORMED UNDER THIS CONTRACT. THIS SHALL INCLUDE, BUT IS NOT LIMITED TO:

- OUTDOOR AIR TEMPERATURE SENSOR
- BOILER SUPPLY WATER TEMPERATURE SENSOR
- 3-WAY CONTROL VALVE AND ACTUATOR
- BOILER CONTROLLER
- FUEL LEVEL SENSING GAUGE
- ALL ASSOCIATED BOXES, CONDUIT, WIRING, TRANSFORMERS, SWITCHES, RELAYS, ETC. ASSOCIATED WITH THESE DEVICES.

EXISTING CONTROLS FOR BASEBOARD RADIATION UNITS, AND AIR HANDLER FANS, HEATING COILS, AND EXHAUST FANS SHALL REMAIN UNCHANGED EXEPT AS SPECIFICALLY NOTED ON DRAWING M-4.,

INSTALL BOILER AND ALL ASSOCIATED WATER PIPING, FUEL OIL PIPING, CONTROLS COMPONENTS (INCLUDING ALL REQUIRED SAFETY DEVICES), AND VENTING IN ACCORDANCE WITH ALL MANUFACTURER INSTRUCTIONS AND STATE & LOCAL CODE REQUREMENTS.

FURNISH, INSTALL, AND CONFIGURE BOILER CONTROLLER PER MANUFACTURERS INSTRUCTIONS. CONFIGURE SYSTEM AS FOLLOWS:

- PUMP AND BOILER SHALL RUN WHENEVER THE BOILER SYSTEM CONTROL SWITCH IS IN THE "AUTO" MODE AND THERE IS A CALL FOR HEAT <u>OR</u> WHENEVER THE BOILER SYSTEM CONTROL SWITCH IS IN THE "HAND" MODE. REFER TO DRAWING M-4 FOR ADDITIONAL INFORMATION.

- BOILER BURNER SHALL FIRE AS REQUIRED TO MAINTAIN HOT WATER SUPPLY TEMPERATURE SETPOINT.

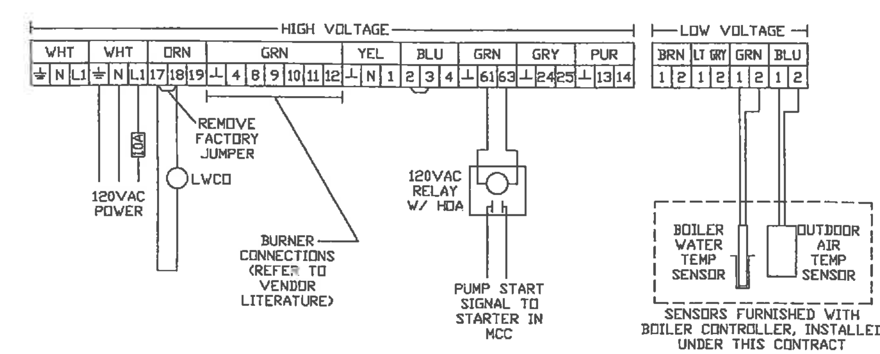
- HOT WATER SUPPLY TEMPERATURE SETPOINT SHALL VARY LINEARLY BASED ON OUTDOOR AIR TEMPERATURE. (OA @ 65 DEG F = HWS @ 120 DEG F, OA @ 0 DEG F OR BELOW = HWS @ 180 DEG F)

FURNISH AND INSTALL ALL NECESARY INSTRUMENTATION AND CONTROL COMPONENTS FOR A COMPLETE, AND FULLY OPERATIONAL SYSTEM.

VERIFY ALL CONTROL WIRING DEVICES AND TERMINATIONS WITH PRODUCT DOCUMENTATION PROVIDED WITH EQUIPMENT.

PROVIDE SUBMITTALS INCLUDING WIRING DIAGRAMS FOR ALL INSTRUMENTATION AND CONTROLS.

BOILER CONTROLLER WIRING DIAGRAM



IN ADDITION TO WIRING CONNECTIONS SHOWN HERE, PROVIDE A GENERAL ALARM OUTPUT FROM THE BOILER CONTROLLER TO THE EXISTING PLC LOCATED IN THE ELECTRICAL ROOM.

LiebertEngineering Incorporated
802-425-5478
Fax: 802-329-2283
www.lieberteng.com
104 Bown Lane
P.O. Box 486
Charlotte, VT 05445
Custom Thinking & Practical Solutions

ISSUE FOR
APPROVAL Date 12/14/2011 By DJM
CONSTRUCTION Date 12/14/2011 By DJM
RECORD DRAWING Date By

NO.	REVISIONS	APP'D

Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No. -
Project No. 1674
Dwg. ID PID-1.DWG
Scale AS SHOWN

STATE OF NEW HAMPSHIRE GREGORY LIEBERT No. 12141 LICENSED PROFESSIONAL ENGINEER

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

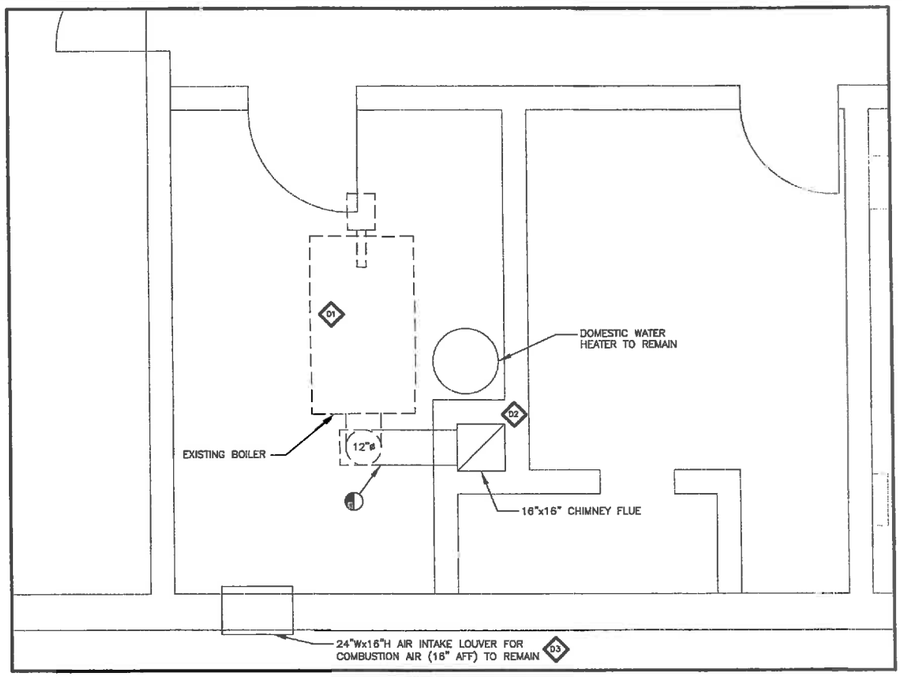
BOILER SYSTEM PIPING AND INSTRUMENTATION DRAWING

WWTF BOILER REPLACEMENT

TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

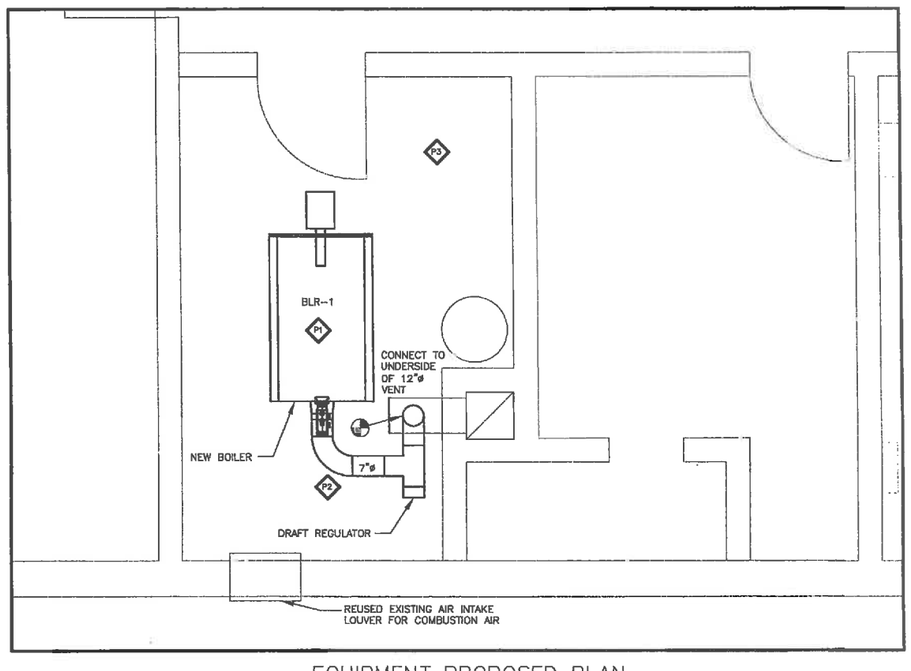
DWG NO PID-1

SHEET 3 OF 8



EQUIPMENT DEMOLITION PLAN

SCALE: 1/2"=1'-0"



EQUIPMENT PROPOSED PLAN

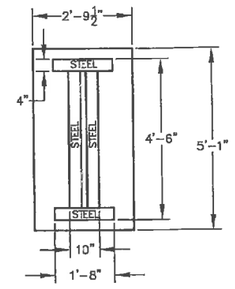
SCALE: 1/2"=1'-0"

DEMOLITION – SCOPE OF WORK:

01 CONTRACTOR SHALL DISSASSEMBLE, REMOVE, AND DISPOSE OF ONE HOT WATER BOILER (WEIL MCLAIN BL-884) AND BURNER AND ALL ASSOCIATED FUEL PIPING, VENTS, HOT WATER PIPING, DRAINS, ETC. TO THE EXTENT AS REQUIRED TO ALLOW FOR BOILER REMOVAL AND REPLACEMENT WITH NEW OIL-FIRED BOILER. SEE PROPOSED PLAN. REMOVE EXISTING BOILER EQUIPMENT PAD. (STRUCTURALLY SOUND PORTIONS OF EXISTING PAD ENCASED BY NEW PAD MAY REMAIN PROVIDED THEY DO NOT IMPACT STRUCTURAL INTEGRITY OF NEW PAD.)

02 EXISTING CHIMNEY AND FLUE ARE TO REMAIN TO PROVIDE VENTING FOR NEW BOILER, BLR-1. REMOVE FLUE PIPE BACK TO POINT APPROXIMATELY AS SHOWN TO PREPARE FOR CONNECTING TO NEW BOILER VENTING.

03 EXISTING COMBUSTION AIR INTAKE LOUVER SHALL REMAIN. (CONTRACTOR SHALL FIELD VERIFY THAT THE FREE AREA OF THE EXISTING LOUVER IS AT LEAST 58% FOR COMPLIANCE WITH NFPA 31. NOTIFY ENGINEER/OWNER OF ANY DISCREPENCY.)



NOTES:

1) NEW BOILER PAD SHALL BE CONSTRUCTED IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.

2) BOILER PAD SHALL BE A MINIMUM OF 4" HIGH WITH ¾" CHAMFERED EDGES.

3) 4" WIDE X ⅜" THICK FLAT STEEL PLATE SHALL BE CAST INTO TOP SURFACE OF PAD AT LOCATIONS SHOWN.

4) THE EXISTING CONCRETE FLOOR SHALL BE PATCHED AND SMOOTHED WHERE OLD BOILER PAD WAS REMOVED.

5) REFER ALSO TO INTERIOR EQUIPMENT PAD DETAIL ON DRAWING M-3 FOR REINFORCEMENT AND ANCHORING DETAILS.

BOILER PAD DETAIL

SCALE: 1/2"=1'-0"

PROPOSED – SCOPE OF WORK:

P1 CONTRACTOR SHALL FURNISH AND INSTALL ONE NEW OIL-FIRED BOILER, BLR-1, AND ALL ASSOCIATED FUEL PIPING, VENTS, WATER PIPING, DRAINS, BOILER CONTROLS, ETC. REFER TO SCHEDULE FOR BOILER AND BURNER SPECIFICATIONS. PROVIDE 4" HIGH REINFORCED EQUIPMENT PAD FOR NEW BOILER PER MANUFACTURER'S INSTRUCTIONS. (REFER TO DETAIL THIS SHEET) ENSURE ALL MANUFACTURER REQUIRED CLEARANCES ARE MAINTAINED.

P2 INSTALL NEW VENTING FROM BOILER CONNECTION TO EXISTING 12"ø VENT AT APPROXIMATE LOCATION SHOWN. BOILER VENT SHALL BE GALVANIZED METAL, TYPE L, INSTALLED IN COMPLIANCE WITH STATE AND LOCAL CODES.

P3 CONTRACTOR SHALL GRIND, PREP, PRIME, AND PAINT FLOOR PER SPECIFICATION SECTION 03912. COLOR TO BE SELECTED BY OWNER.

BOILER SCHEDULE

REF. NO.	RATING INPUT (GPH)	RATING OUTPUT (MBH)	BOILER HP	WATER TEMP. °F ENT.	WATER TEMP. °F LVG.	FUEL TYPE	FUEL COMB. EFF.	FLUE CONN. DIA. IN.	COMBUSTION AIR / VENT CONFIGURATION	MFR / MODEL
BLR-1	6.4	768	22.9	160	180	FUEL OIL[1]	87%	7"	EXISTING LOUVER / EXISTING CHIMNEY	BUDERAS / G315/9

NOTES:

1. THE FUEL OIL TO BE USED IS A LOW-SULFUR, "OFF-ROAD" GRADE DIESEL FUEL OIL.

2. BLR-1 IS AN OIL-FIRED SECTIONAL CAST IRON BOILER. BOILER SHALL BE FACTORY ASSEMBLED AND EQUIPPED WITH MODULATING BURNER (BECKET CF1400 SERIES OR EQUAL). BURNER SHALL INCLUDE LOW-HIGH-LOW OPERATING MODE.

3. PROVIDE LOGAMATIC 2107 SINGLE BOILER CONTROLLER WITH OUTSIDE AIR RESET CONTROLS

4. BOILERS SHALL BE CONFIGURED WITH ALL REQUIRED STANDARD SAFETY DEVICES, INCLUDING LOW WATER CUT-OFF, AQUASTAT, RELIEF VALVES, SAFETY SWITCHES, ETC. AS DEPICTED ON MFR LITERATURE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY ANY COMPONENTS NOT FURNISHED BY BOILER MFR, AND FURNISH AND INSTALL TO MEET ALL CODE REQUIREMENTS FOR PROPER BOILER INSTALLATION.

5. ALL ASSOCIATED SYSTEMS (HOT WATER PIPING, COMBUSTION AIR, EXHAUST VENTING, FUEL PIPING) SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THESE PROJECT DOCUMENTS, MANUFACTURER'S INSTALLATION REQUIRMENTS, AND APPLICABLE STATE / LOCAL CODES.

6. BOILER INSTALLATION MAY BE PERFORMED BY CONTRACTOR, OR BY BOILER MFR'S QUALIFIED REPRESENTATIVE. REGARDLESS OF INSTALLER, A QUALIFIED MANUFACTURER'S REPRESENTATIVE SHALL BE REQUIRED TO PERFORM ON-SITE INSPECTION OF BOILER TO CONFIRM PROPER INSTALLATION, AND SHALL ASSIST WITH START-UP AND CONFIGURATION OF BOILER TO PERFORM AS REQUIRED.

0 1' 2' 4' 8'
SCALE: 1/2 = 1'-0"

LiebertEngineering Incorporated
Custom Thinking & Practical Solutions
802-425-5476
Fax: 802-399-2393
www.liebertengineering.com
104 Brown Lane
P.O. Box 488
Charlotte, VT 05445

ISSUE FOR
APPROVAL Date 12/14/2011 By DJM
CONSTRUCTION Date 12/14/2011 By DJM
RECORD DRAWING Date By

NO.	REVISIONS	APP'D

Drawn/Chk. SAD
Designed DCS
Checked GBL
Approved GBL
Date 12/14/2011
Book No. -
Project No. 1074
Dwg. ID. M1.DWG
Scale AS SHOWN

STATE OF NEW HAMPSHIRE — GREGORY B. LIBERTY — No. 11141 — LICENSED PROFESSIONAL ENGINEER

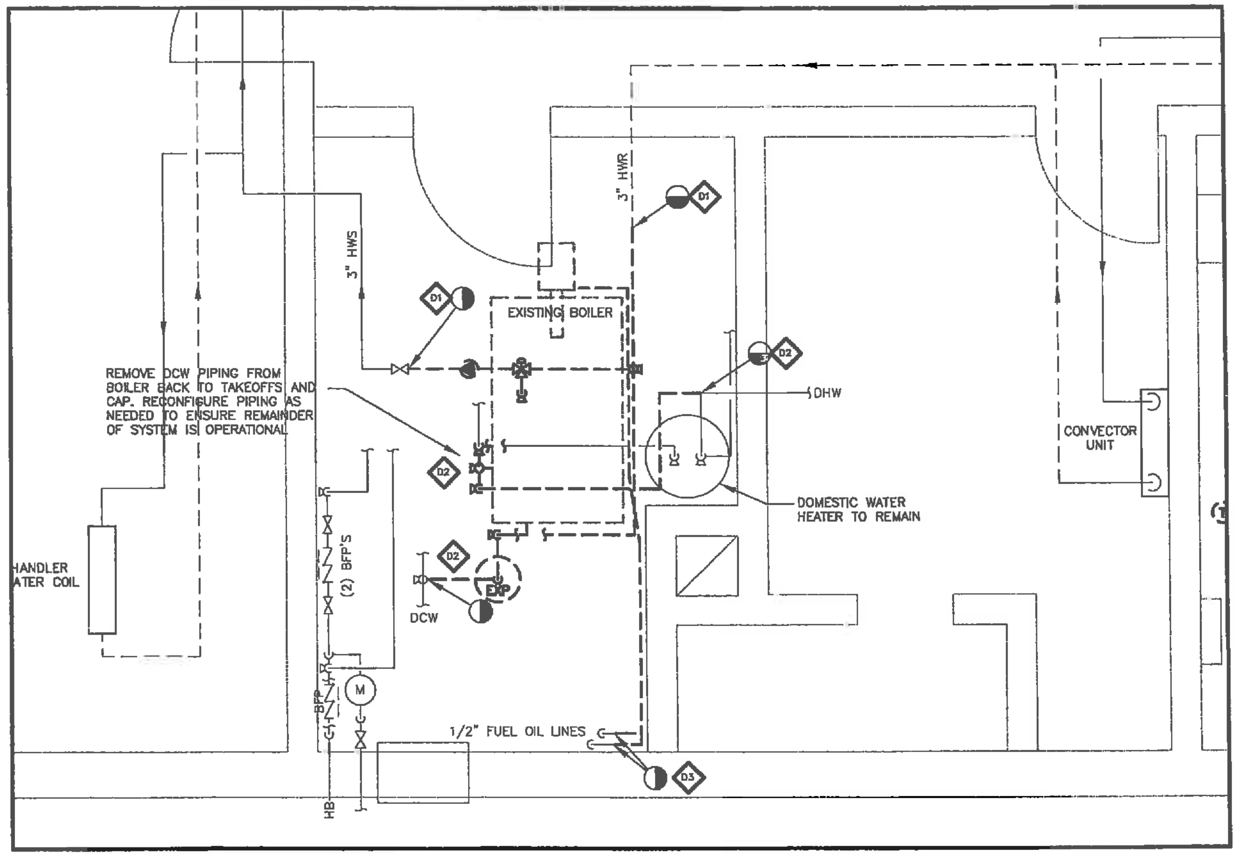
UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

EQUIPMENT PLANS
DEMO AND PROPOSED

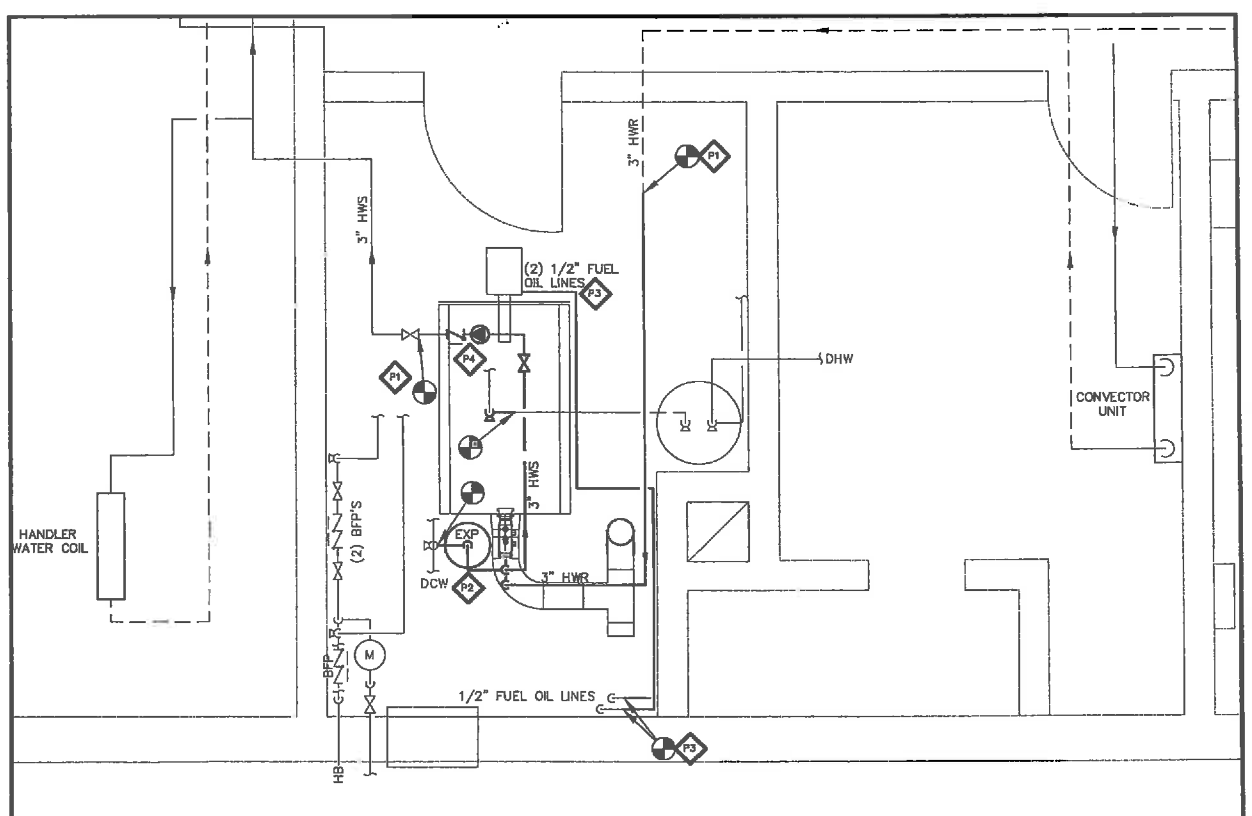
WWTF BOILER REPLACEMENT

TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

DWG NO M-1
SHEET 4 OF 8



PIPING DEMOLITION PLAN
SCALE: 1/2"=1'-0"



PIPING PROPOSED PLAN
SCALE: 1/2"=1'-0"

DEMOLITION – SCOPE OF WORK:

D1 CONTRACTOR SHALL REMOVE HOT WATER SUPPLY AND RETURN PIPING FROM THE EXISTING BOILER AS SHOWN TO THE APPROXIMATE LIMITS INDICATED FOR RECONFIGURATION WITH THE NEW BOILER (SEE PROPOSED PIPING PLAN).

D2 CONTRACTOR SHALL REMOVE DOMESTIC WATER PIPING FROM EXISTING BOILER AS SHOWN TO THE APPROXIMATE LIMITS INDICATED FOR RECONFIGURATION WITH THE NEW BOILER (SEE PROPOSED PLAN).

D3 REMOVE ALL FUEL OIL PIPING BACK TO STUBS THROUGH FLOOR NEAR WALL AS SHOWN INCLUDING EXISTING FUEL OIL GAUGE. NEW PIPING TO BE INSTALLED FROM LIMITS OF DEMOLITION TO NEW BURNER – SEE PROPOSED PLAN.

D4 REMOVE ALL PIPING THAT WILL BE MADE OBSOLETE BY THE INSTALLATION OF THE NEW BOILER BACK TO NEAREST BRANCH TAKEOFF AND CAP. COORDINATE ANY REQUIRED PIPING SYSTEM SHUTDOWN WITH THE OWNER.

PROPOSED – SCOPE OF WORK:

P1 CONTRACTOR SHALL FURNISH AND INSTALL NEW HOT WATER SUPPLY AND RETURN PIPING AS INDICATED AND CONNECT TO BOILER. PIPING SHALL BE CONFIGURED IN A TYPICAL SINGLE BOILER ARRANGEMENT AS DEPICTED IN MANUFACTURER'S ENGINEERING MANUAL.

P2 FURNISH AND INSTALL NEW EXPANSTION TANK (AMTROL AX–20V OR EQUAL) AND CONNECT TO THE HOT WATER SUPPLY PIPING APPROXIMATELY AS SHOWN (DOWNSTREAM OF BOILER, AND UPSTREAM OF DISTRIBUTION PUMP). PROVIDE NEW AIR SCOOP AND VENT AT EXPANSION TANK CONNECTION TO HOT WATER LOOP.

P3 INSTALL NEW FUEL OIL PIPING FROM LIMITS OF DEMOLITION TO NEW BOILER BURNER. ROUTE ALONG FLOOR, KEEPING OUT OF THE WAY AS MUCH AS POSSIBLE. MAKE CONNECTIONS TO BURNER IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS AND NFPA 58.

P4 CONTRACTOR SHALL FURNISH AND INSTALL A NEW HW CIRCULATOR PUMP AS SCHEDULED.

PUMP SCHEDULE

REF. No.	SYSTEM SERVED	GPM	PRESS. FT. HD.	FLUID	MOTOR				TYPE	MFR / MODEL
					HP	RPM	VOLTS	PHASE		
HWP–1	HW LOOP	80	40	WATER (180° F)	1.5	3450	208–230/460	3	IN–LINE CENTRIFUGAL	GRUNDFOS / TP–50–160/2

NOTES:
1. PUMP MOTOR SHALL BE PREMIUM EFFICIENT. FINAL MOTOR HP SELECTION SHALL BE AS RECOMMENDED BY PUMP MFR FOR LISTED OPERATING POINT.
2. MANUFACTURERS OFFERING SIMILAR PRODUCTS MAY BE SUBSTITUTED WITH OWNER / ENGINEER APPROVAL.
3. SUBMIT PUMP FOR APPROVAL. SUBMITTALS SHALL INCLUDE PERFORMANCE CURVE FOR PUMP OPERATING AT DESIGN POINT, AND SHALL REPRESENT PERFORMANCE FOR SPECIFIED FLUID AT THE EXPECTED OPERATING TEMPERATURE. INCLUDE VFD CURVES WHERE APPLICABLE.

0 1' 2' 4' 8'
SCALE: 1/2 = 1'-0"

LiebertEngineering Incorporated
802-425-5476
Fax: 802-329-2283
www.lieberteng.com
104 Bown Lane
P.O. Box 488
Charlotte, VT 054?5
Custom Thinking & Practical Solutions

ISSUE FOR	
APPROVAL	Date 12/14/2011 By DJM
CONSTRUCTION	Date 12/14/2011 By DJM
RECORD DRAWING	Date By

NO.	REVISIONS	APP'D

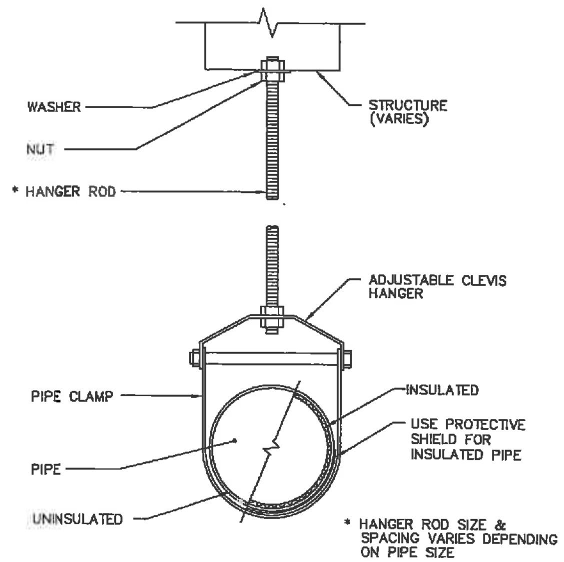
Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No. –
Project No. 1674
Dwg. ID M2.DWG
Scale AS SHOWN

STATE OF NEW HAMPSHIRE GREGORY R. LIEBERT No. 12741 LICENSED PROFESSIONAL ENGINEER

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

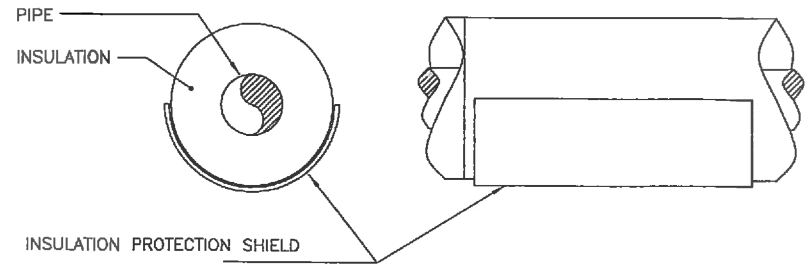
PIPING PLANS DEMO AND PROPOSED
WWTF BOILER REPLACEMENT
TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

DWG NO M–2
SHEET 5 OF 8



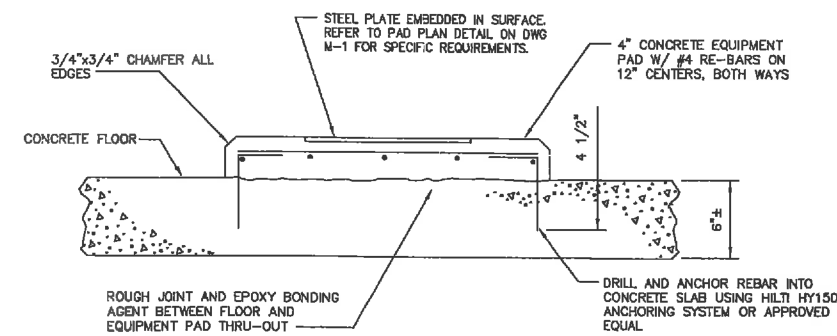
TYPICAL PIPE HANGER INSTALLATION

NO SCALE



INSULATION PROTECTION SHIELD DETAIL

NO SCALE



NOTES:

PAD DIMENSIONS AND ANCHOR BOLT TO SUIT EQUIPMENT.

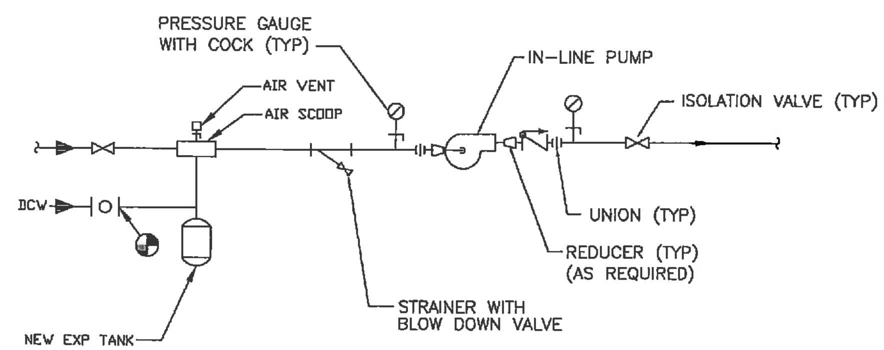
PAD SHALL BE CONSTRUCTED USING 3,000 PSI CONCRETE.

REFER ALSO TO PAD DETAIL ON DWG M-1 FOR ADDITIONAL REQUIREMENTS.

INTERIOR EQUIPMENT PAD DETAIL

NO SCALE

SUPPORT PUMP FROM STRUCTURE ABOVE, WITH RIGID LATERAL SUPPORTS & VIBRATION ISOLATERS TO MINIMIZE VIBRATION. FOLLOW ALL PUMP MFR REQUIREMENTS FOR INSTALLATION.



IN-LINE PUMP PIPING DETAIL

NO SCALE

PIPING COMPONENT SCHEDULE

HEATING HOT WATER PIPING COMPONENTS							
ITEM	COMPONENT DESCRIPTION	SIZE	SPECIFICATIONS	MANUFACTURER*	MODEL*	QTY	NOTES
	Isolation Valves (Ball)	Up to 2"	Bronze ball valve, optional stainless steel ball, 2-piece design, NPT end connections, lockable lever handle.	Apollo (Conbraco)	70-100 series	Per Drawings	
	Isolation Valves (Butterfly)	2 1/2" and Up	Metal seated, lugged style, lockable lever handle (up to 6") gear operator (8" and larger), 150 lb flange class.	Adams Valve USA	WAK series	Per Drawings	
	Isolation Valves (Butterfly)	3" and Up	Cast iron body, lugged style, resilient seated, 316 SS disc, lockable lever handle (up to 6") gear operator (for 8" and up)	Milwaukee	ML series	Per Drawings	
	High Point Vents & Low Point Drains	1/2" & 3/4"	Bronze ball valve, optional SS ball, 2-piece design, NPT end connections, cap with chain, lockable lever handle.	Apollo (Conbraco)	78-100 series	As Required	
	Check Valves (Globe Style - small)	Up to 2"	Cast iron body, silent globe style, NPT end connections, stainless steel spring, Class 250.	Mueller Steam	303-AP	Per Drawings	
	Check Valves (Globe Style - large)	2" and Up	Carbon steel body, silent globe style, flanged ends, stainless steel trim & spring.	Mueller Steam	105MDT	Per Drawings	
	Check Valves (Swing Style - small)	Up to 3"	Bronze construction, Y-pattern style, bronze disc, NPT end connections, Class 150, screwed cap.	Jenkins (Crane)	Figure 4092J	Per Drawings	
	Check Valves (Swing Style - large)	4" and UP	Iron body with bronze trim, bolted cover, Class 125, flanged end connections.	Jenkins (Crane)	Figure 587J	Per Drawings	
	Balancing Valves (self adjusting, small)	1/2" to 1"	Brass body, NPT ends, EPDM O-ring and diaphragm, P/T ports, 2 to 80 psig inlet pressure, changeable flow cartridges, +/- 10% accuracy	Hays Fluid Controls	Mesuflow 2510 series	Per Drawings	For flow rates 0.5 gpm to 9 gpm
	Balancing Valves (self adjusting, largel)	1" to 1 1/2"	Brass body, NPT ends, EPDM O-ring and diaphragm, P/T ports, 2 to 80 psig inlet pressure, changeable flow cartridges, +/- 10% accuracy	Hays Fluid Controls	Mesuflow 2520 series	Per Drawings	For flow rates 0.5 gpm to 25 gpm
	Strainer (small)	Up to 2 1/2"	Cast iron body, stainless steel 20 mesh screen, NPT end connections.	Spirax Sarco	IT series	Per Drawings	Include blowdown valve with cap for each.
	Strainer (large)	3" and Up	Cast iron body, 1/8" SS perforations for 4" and up, SS 20 mesh for 2" to 3", flanged, Class 125.	Spirax Sarco	CI-125 series	Per Drawings	Include blowdown valve with cap for each.
	Thermometer (dial type)	N / A	Bimetal style, stainless steel case, 5" dial, 0-200 F, 1/2" NPT rear connection	Ashcroft	Code 50-EL-60-E-040-0/200	Per Drawings	Include thermowell sized for pipe.
	Pressure Gauge	N / A	Direct drive, black, 4 1/2" dial, 1/4" bottom NPT connection, optional SS tag, 0-100 psig range, external zero adjust.	Perma-Cal	#1-1-1... series	Per Drawings	
	Expansion Tank (HW System)	TBD	Vertical style, ASME rated, maximum working pressure of 125 psig, size to match existing. Provide with air scoop and air vent assembly.	Amtrol	Therm-X-Trol	1	

*Manufacturers offering similar products may be substituted for components listed here contingent upon approval of owner

LiebertEngineering Incorporated
802-425-5475
Fax: 802-329-2283
www.liebertteng.com
104 Bown Lane
P.O. Box 406
Charlotte, VT 05445
Custom Thinking & Practical Solutions

ISSUE FOR	
APPROVAL	Date 12/14/2011 By DJM
CONSTRUCTION	Date 12/14/2011 By DJM
RECORD DRAWING	Date By

NO.	REVISIONS	APP'D

Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No. -
Project No. 1674
Dwg. ID M3.DWG
Scale AS SHOWN

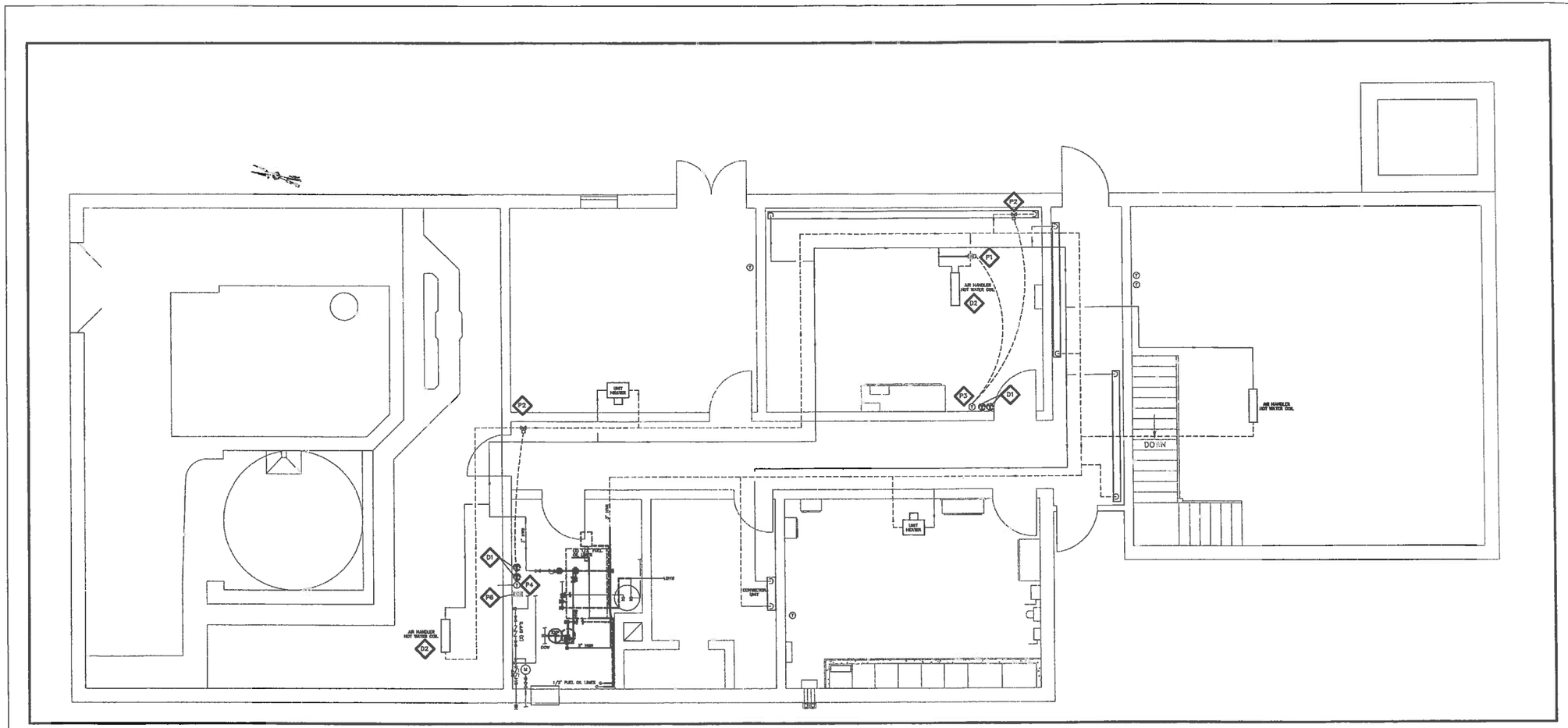
UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

SCHEDULES AND MECHANICAL DETAILS

WWTF BOILER REPLACEMENT

TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

DWG NO	SHEET
M-3	6 OF 8



HVAC CONTROLS DEMOLITION / PROPOSED PLAN

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

DEMOLITION – SCOPE OF WORK:

D1 CONTRACTOR SHALL REMOVE EXISTING LINE VOLTAGE THERMOSTATS, SWITCHES, CONDUIT, WIRING, AND MISC CONTROL COMPONENTS MADE OBSOLETE UNDER THIS CONTRACT.

D2 CONTRACTOR SHALL DISCONNECT EXISTING FACE AND BYPASS DAMPER ACTUATOR AND FIX DAMPERS IN THE "FACE" POSITION, TO DIRECT ALL AIR THROUGH THE HEATING COILS.

PROPOSED – SCOPE OF WORK:

P1 CONTRACTOR SHALL FURNISH AND INSTALL NEW 3-WAY HOT WATER CONTROL VALVES AND ASSOCIATED PIPING AND BRANCH CONNECTIONS IN LOCATIONS SHOWN. NEW VALVES SHALL BE SCHNEIDER ELECTRIC MODEL VB3 WITH MODULATING, SPRING RETURN, 24VAC ELECTRIC ACTUATOR.

P2 CONTRACTOR SHALL FURNISH AND INSTALL NEW 2-WAY HOT WATER CONTROL VALVES IN LOCATIONS SHOWN. NEW VALVES SHALL BE SCHNEIDER ELECTRIC MODEL VB2 WITH MODULATING, SPRING RETURN, 24VAC ELECTRIC ACTUATOR.

P3 CONTRACTOR SHALL FURNISH AND INSTALL NEW PROGRAMMABLE THERMOSTATS WITH LOCAL BACKLIT LCD DISPLAY, AND AUX CONTACT. THERMOSTATS SHALL BE CONFIGURED TO MODULATE NEW PROPORTIONAL HW VALVES AND TO SEND A CALL FOR HEAT SIGNAL TO THE BOILER CONTROLLER. (SEE NOTE P5 BELOW)

P4 CONTRACTOR SHALL FURNISH AND INSTALL NEW PROGRAMMABLE THERMOSTAT WITH LOCAL BACKLIT LCD DISPLAY, AUX CONTACT, AND REMOTE SENSOR BULB SUITABLE FOR INSTALLATION IN THE HAZARDOUS CLASSIFIED AREA. THERMOSTATS SHALL BE CONFIGURED TO MODULATE NEW PROPORTIONAL HW VALVE AND TO SEND A CALL FOR HEAT SIGNAL TO THE BOILER CONTROLLER. (SEE NOTE P5 BELOW)

P5 CONTRACTOR SHALL WIRE IN PARRALLEL, THE AUX CONTACTS FROM ALL NEW THERMOSTATS THROUGH A COMMON RELAY SUCH THAT A CALL FOR HEAT AT ANY THERMOSTAT RESULTS IN A COMMON CALL FOR HEAT COMMAND AT THE BOILER CONTROLLER.

P6 CONTRACTOR SHALL FURNISH AND INSTALL ONE (1) NEW HAND-OFF-AUTO SWITCH TO ACTIVATE BOILER AND ASSOCIATED CIRCULATOR PUMP OPERATION. IN "AUTO" MODE, BOILER SYSTEM SHALL BE ACTIVATED WHENEVER THERE IS A CALL FOR HEAT AS DESCRIBED IN NOTE P5 ABOVE. IN "HAND" MODE, THE BOILER SYSTEM SHALL BE ACTIVATED AND WILL MAINTAIN DISCHARGE WATER TEMPERATURE THROUGH ITS OWN INTERNAL CONTROLLER.

P7 CONTRACTOR SHALL FURNISH AND INSTALL ALL POWER SUPPLIES, RELAYS, ENCLOSURES, WIRING, CONDUIT ETC. FOR A COMPLETE AND FUNCTIONAL SYSTEM. SUBMIT COMPONENT CUT SHEETS AND CONTROL WIRING DIAGRAMS FOR APPROVAL. ALL 120V AND 24V WIRING ASSOCIATED WITH THIS CONTROLS UPGRADE SHALL BE INCLUDED IN THE SCOPE OF WORK.

0 2' 4' 8' 16'
SCALE: 1/4 = 1'-0"

LiebertEngineering incorporated
802-325-5472
Fax: 802-325-2283
www.liebertengineering.com
104 Bowen Lane
P.O. Box 466
Chelsea, VT 05045
Custom Thinking & Practical Solutions

ISSUE FOR

NO.	REVISIONS	APP'D	Date	By
			12/14/2011	DJM
			12/14/2011	DJM
			Date	By

RECORD DRAWING

Drawn/Chk. SAD
Designed DCS
Checked GRL
Approved GRL
Date 12/14/2011
Book No. -
Project No. 1874
Dwg. ID M4.DWG
Scale AS SHOWN

GREGORY R. LIEBERT No. 10191 LICENSED PROFESSIONAL ENGINEER – STATE OF NEW HAMPSHIRE

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

HVAC CONTROLS PLAN DEMO AND PROPOSED

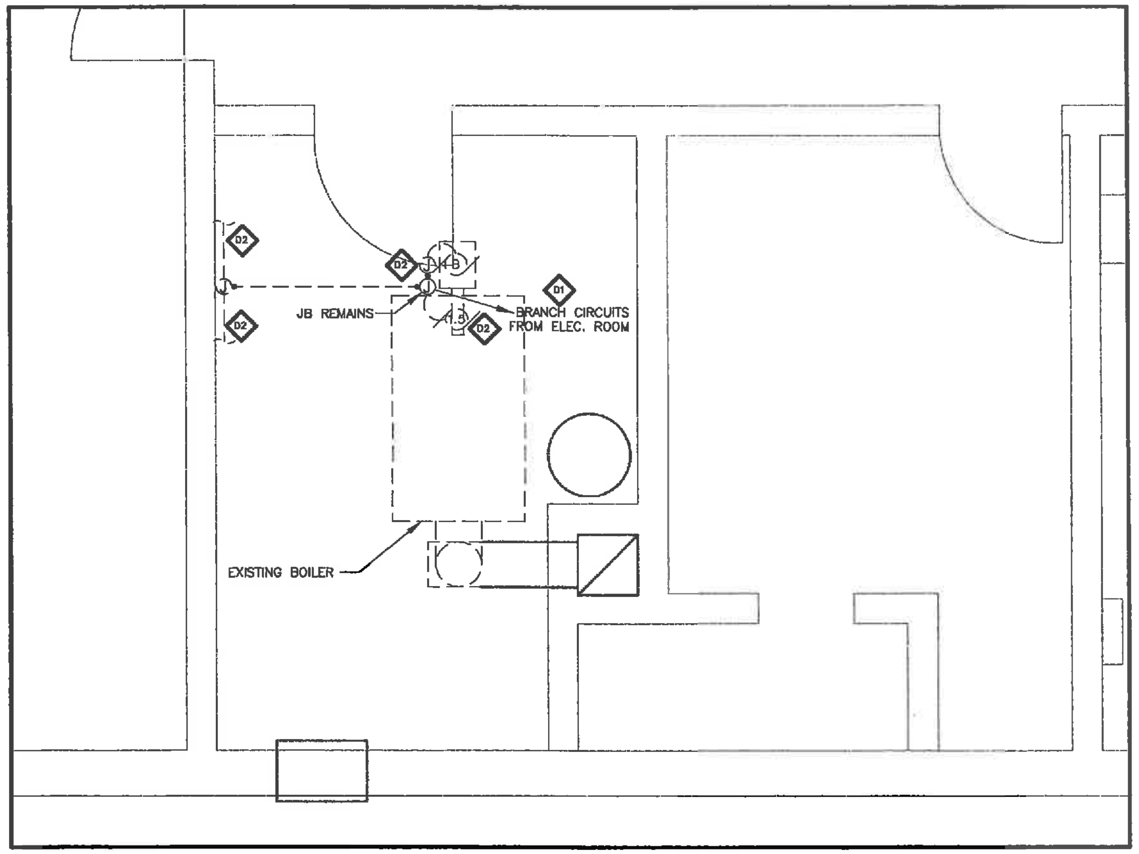
WWTF BOILER REPLACEMENT

TOWN OF HENNIKER

HENNIKER, NEW HAMPSHIRE

DWG NO M-4

SHEET 7 OF 8



ELECTRICAL DEMOLITION PLAN
SCALE: 1/2"=1'-0"

DEMOLITION – SCOPE OF WORK:

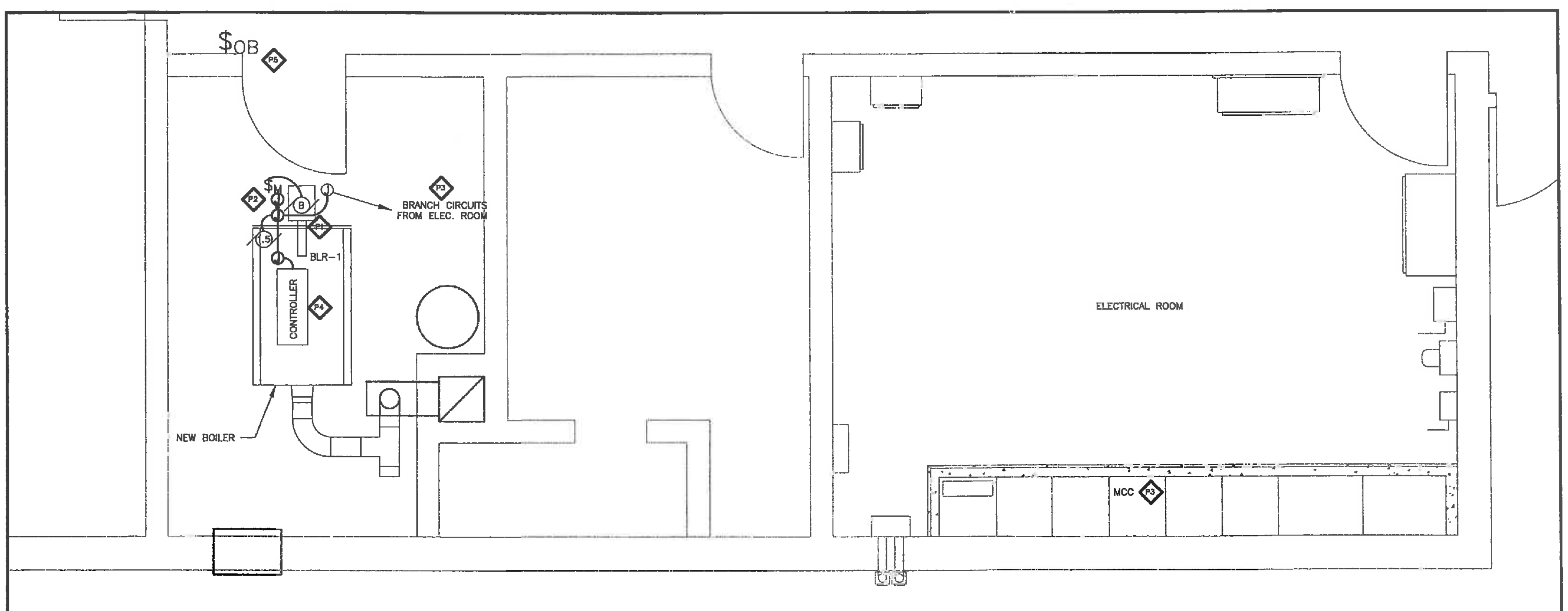
- D1 VERIFY BRANCH CIRCUITS FOR BOILER AND CIRCULATOR PUMP IN ELECTRICAL ROOM (SEE PROPOSED PLAN FOR ROOM LOCATION).
- D2 CONTRACTOR SHALL DISCONNECT AND REMOVE ALL CONDUIT AND WIRING AS REQUIRED TO FACILITATE REMOVAL OF BOILER AND PUMP BY MECHANICAL CONTRACTOR. COORDINATE WITH MECHANICAL AND CONTROLS CONTRACTOR. REMOVE INDIVIDUAL BRANCH CIRCUITS FOR PUMP AND BOILER BACK TO REMAINING JUNCTION BOX. CIRCUITS TO BE REUSED.

GENERAL NOTES:

1. ALL ELECTRICAL WORK IS TO BE PERFORMED AS PER N.E.C AND ALL APPLICABLE STATE AND LOCAL CODES.
2. ELECTRICAL DEVICES AND FIXTURES ARE SHOWN DIAGRAMATIC ONLY. CONFIRM ACTUAL LOCATIONS BEFORE BEGINNING INSTALLATION.
3. EQUIPMENT CONNECTIONS INCLUDE WIRING TO CONTROLS, DISCONNECTS, STARTERS, CONTROLLERS, ETC.
4. ALL CONDUCTORS ARE TO BE COPPER, MINIMUM SIZE #12.
5. MINIMUM CONDUIT SIZE IS TO BE 3/4".

PROPOSED – SCOPE OF WORK:

- P1 PROVIDE WIRE, CONDUIT AND DEVICES AS INDICATED TO EXTEND EXISTING BRANCH CIRCUITS TO NEW BOILER LOCATION.
- P2 PROVIDE FRACTIONAL HORSEPOWER MOTOR SWITCH WITH OVERLOAD RELAY.
- P3 VERIFY SIZING AND REPLACE FUSES AND/OR OVERLOADS IN MCC BUCKET FOR NEW CIRCULATOR PUMP AS REQUIRED.
- P4 USE BOILER BRANCH CIRCUIT TO FEED CONTROLLER.
- P5 WIRE BOILER CIRCUIT THROUGH NEW BURNER EMERGENCY SHUT OFF SWITCH TO BE LOCATED JUST OUTSIDE THE BOILER ROOM DOOR.



ELECTRICAL PROPOSED PLAN
SCALE: 1/2"=1'-0"

0 1' 2' 4' 8'
SCALE: 1/2 = 1'-0"

LiebertEngineering Incorporated
802-425-3476
Fax: 802-329-2283
www.liebertseng.com
104 Bown Lane
P.O. Box 466
Charlotte, VT 05445
Custom Thinking & Practical Solutions

ISSUE FOR
APPROVAL Date 12/14/2011 By DJM
CONSTRUCTION Date 12/14/2011 By DJM
RECORD DRAWING Date By

NO.	REVISIONS	APP'D
△		
△		
△		
△		
△		

Drawn/Chk. CP
Designed CP
Checked WB
Approved WB
Date 12/14/2011
Book No. –
Project No. 1674
Dwg. ID E1.DWG
Scale AS SHOWN

UNDERWOOD engineers
99 North State Street, Concord, N.H. 03301
Tel. 603-230-9898 Fax. 603-230-9899

ELECTRICAL PLANS
DEMO AND PROPOSED
WWTF BOILER REPLACEMENT
TOWN OF HENNIKER
HENNIKER, NEW HAMPSHIRE

DWG NO E-1
SHEET 8 OF 8