SYMBOL	ABBREVIATION	DESCRIPTION	
	EX.	EXISTING TO REMAIN	
	REL.	REMOVE AND RELOCATE	
	NEW	NEW WORK	
	DEM.	EXISTING TO BE REMOVED	
	CW	COLD WATER	
	HW	HOT WATER	
	HWC	HOT WATER RECIRCULATION	
W	W	WASTE LINE	
	G	GAS LINES	
 CD	CD	CONDENSATE DRAIN	
	CD		
<u> </u>	_	3-WAY VALVE	
<u> </u>	_	BUTTERFLY VALVE	
<u> </u>	_	2-WAY VALVE	
<del></del>	_	PLUG VALVE	
S -	_	SOLENOID VALVE	
$\overline{\Box}$	_	GATE VALVE	
	_	GLOBE VALVE	
<u> </u>	_	CHECK VALVE	
$\triangle$	_	OS&Y GATE VALVE	
<u> </u>	_	BALL VALVE	
0	_	CIRCUIT SETTER	
Ĥ	_	MANUAL AIR VENT	
X	_	T&P RELIEF VALVE	
	_	PRESSURE REDUCING VALVE	
<del></del>	_	TEE DOWN	
C	_	ELBOW DOWN	
<del></del> O	_	TEE UP	
O	_	ELBOW UP	
[—	_	PIPE CAP	
$\triangleright$	_	CONCENTRIC REDUCER	
	_	ECCENTRIC REDUCER	
- <del></del>	_	STRAINER	
	_	FLEXIBLE CONNECTION	
<b>—</b>	_	FLOW ARROW	
Ø	_	PRESSURE GAGE	
	_	PUMP	
	_	THERMOMETER	
	_	BASKET STRAINER	
	FD	FLOOR DRAIN	
 	_	UNION	
<u> </u>	AFF	ABOVE FINISHED FLOOR	
_	AHC	ABOVE HUNG CEILING	
_	FAI	FRESH AIR INTAKE	
	RP	RECIRCULATION PUMP	
_			
	TYP	TYPICAL	
_	H.W. HTR	HOT WATER HEATER	
_			

## NERAL NOTES

- CONTRACT DRAWINGS INDICATE THE EXTENT AND GENERAL ARRANGEMENTS THE PLUMBING SYSTEMS. IF ANY DEPARTURES FROM THE DRAWINGS ARE EMED NECESSARY BY THE PLUMBING CONTRACTOR, DETAILS OF SUCH PARTURES AND THE REASONS THEREFORE SHALL BE SUBMITTED TO THE INER AND ENGINEER FOR APPROVAL. NO SUCH DEPARTURES SHALL BE MADE THOUT PRIOR WRITTEN APPROVAL OF THE OWNER AND ENGINEER. EQUIPMENT D PIPING ARRANGEMENTS SHALL PROVIDE ADEQUATE AND ACCEPTABLE EARANCES FOR ENTRY, SERVICING, AND MAINTENANCE. ANY CHANGES TO PING AND EQUIPMENT LOCATIONS NECESSARY TO AVOID INTERFERENCE WITH HER TRADES SHALL BE MADE AT NO EXTRA COST.
- PLUMBING WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE TEST EDITION OF THE PREVAILING NEW YORK STATE PLUMBING AND BUILDING DES. IN CASE OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND A VERNING CODE OR ORDINANCE, THE MORE STRINGENT STANDARD SHALL
- PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL CESSARY PERMITS AND FOR PAYING RELATED FEES.
- IOR TO FABRICATION, THIS CONTRACTOR SHALL VERIFY ALL MEASUREMENTS D CONDITIONS ON JOB SITE, AND COORDINATE THIS WORK WITH THE WORK OF OTHER TRADES.
- TCH ALL SANITARY DRAIN PIPING AT MAXIMUM SLOPE POSSIBLE, BUT NOT SS THAN 1/8" PER FOOT FOR PIPING ≥3" AND 1/4" PER FOOT FOR PIPING ≤
- OVIDE DIELECTRIC FITTINGS OR COUPLINGS WHEREVER DISSIMILAR METALS ARE
- WORK SHALL BE PROPERLY TESTED, BALANCED, AND CLEANED AND INFECTED. PROVIDE A ONE YEAR WARRANTY FROM DATE OF FINAL SPECTION ON ALL PARTS AND LABOR.
- CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY NTILATION AND EXHAUST AIR WHEN WELDING OR SOLDERING OPERATIONS ARE RFORMED, AS REQUIRED BY OSHA.

## EQUIPMENT NOTES

- STORAGE TANK (ST-1): SHALL BE AO SMITH MODEL# TJV-120A WITH 119 GAL STORAGE CAPACITY, HIGH DENSITY FOAM INSULATION SAVES ENERGY, HELPS REDUCE STANDBY HEAT LOSS, 160 PSI ASME STANDARD WORKING PRESSURE.
- 2. BOILER PUMP (BP-1,2,3): SHALL BE ARMSTRONG MODEL# 4360-125B INLINE PUMP WITH 0.33 HP CONSTANT SPEED MOTOR CAPABLE OF 45GPM AT 10FT OF HEAD WITH 4.6" IMPELLER. PROVIDE 120V, 20A, 1-POLE CIRCUIT TO PUMP FROM EACH BOILER. PUMPS SHALL BE POWERED AND CONTROLLED FROM EACH BOILER. PROVIDE DISCONNECT SWITCH ON WALL FOR EACH PUMP. INTERLOCK WITH BOILER OPERATION.
- 3. HOT WATER RECIRCULATION PUMP (HWRP-1): SHALL BE ARMSTRONG MODEL# 4380 INLINE PUMP SIZE 1.5X1.5X6 WITH 0.33 HP VARIABLE SPEED MOTOR CAPABLE OF 15GPM AT 20FT OF HEAD WITH 4.7" IMPELLER. THE SCOPE OF WORK IS A PUMP REPLACEMENT IN-KIND. THE EXISTING PUMP CIRCUIT AND ASSOCIATED OVERCURRENT PROTECTION SHALL BE REUSED. SELECT THE NEW PUMP VOLTAGE ACCORDINGLY. IF IT IS FOUND THAT THE NEW PUMP IS NOT COMPATIBLE WITH THE EXISTING CIRCUIT, THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF THE ISSUE AND THE CONTRACTOR SHALL PROVIDE A SOLUTION TO CIRCUIT THE NEW PUMP ACCORDING TO MANUFACTURER'S REQUIREMENTS.
- 4. PROTONODE RER (CONNECTION TO EXISTING ANDOVER BMS): PROVIDE CAMUS MODEL #FPC-N34 WITH BACNET. INSTALL IN LEAD BOILER AS PER MANUFACTURERS GUIDELINES. THE CONTROLLER SHALL BE INSTALLED FOR FUTURE CONNECTION TO BUILDING ANDOVER BMS.
- 5. <u>ELECTRONIC TEMPERING VALVE (ETV):</u> PROVIDE HEAT-TIMER 3-WAY VALVE AND ETV PLATINUM PLUS CONTROL PANEL WITH BACNET. PROVIDE 120V, 20A, 1-POLE CIRCUIT FROM A NEARBY SOURCE TO BE IDENTIFIED IN THE FIELD. PROVIDE 24VAC POWER FROM THE CONTROL PANEL TO THE 3-WAY VALVE.

## MANUFACTURERS STARTUP / INSPECTION

- 1. THE CONTRACTOR SHALL HIRE THE MANUFACTURES CERTIFIED DISTRIBUTOR MJD COMBUSTION SALES (516-327-4870) TO PERFORM STARTUP AND REMEDIATION WORK ON THE (3) EXISTING DOMESTIC HOT WATER HEATERS. THIS SHALL INCLUDE THE FOLLOWING.
- INSPECTION OF ALL COMPONENTS AND CONTROLS. REWIRING AND INSTALLATION OF HOT WATER CIRCULATORS THROUGH THE
- BOILERS. INSPECTION OF VERIFICATION OF ALL BOILER SAFETIES.
- RE—PIPING OF CONDENSATE DRAINS AND NEUTRALIZATION PIPING AND
- PROGRAMMING OF EACH BOILER FOR LEAD / LAG
- PROGRAMMING TO ACHIEVE THE TEMPERATURE CONTROLS SEQUENCE WITH NEW DOMESTIC HOT WATER BUFFER TANK.
- INTERLOCKS WITH FLUE DRAFT CONTROLS.
- PROGRAMMING TO "CASCADE" THE BOILERS IN SEQUENCE.
- PROVIDE A START UP COMMISSIONING REPORT. INSTALLATION OF NEW PROTO NODE CONTROLS CARD FOR INTEGRATION WITH BACNET SYSTEM.
- 2. CHIMNEY DESIGN SOLUTIONS (800-685-7077) SHALL BE CONTRACTED TO PERFORM A FULL STARTUP / INSPECTION OF THE EXISTING INDUCED DRAFT FAN AND EXISTING DRAFT CONTROLLER AND PROVIDE AN ASSOCIATED STARTUP REPORT FOR THE ENGINEER / OWNER. PROVIDE DRAFT CONTROL COMPONENTS INCLUDING ROOM PRESSURE SENSORS AND ALL RELATED CONTROLS. THE DRAFT FAN SHALL BE ARRANGED TO MAINTAIN ADEQUATE DRAFT. MAINTAIN DRAFT SET POINT AS PER BOILER MANUFACTURER RECOMMENDATION.



ENGINEERS

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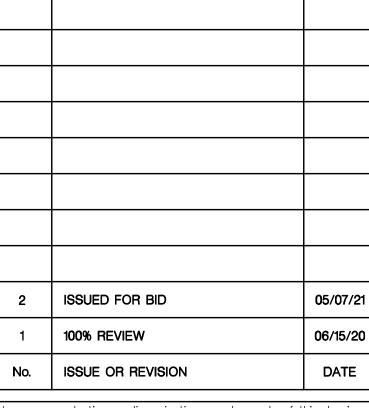
50 Broadway, Hawthorne, NY 10532 914.747.2800

8 West 38th Street, Suite 501 New York, NY 10018 646.849.4110

olace.com



75 Grasslands Rd, Valhalla, NY 10595 914.606-6600



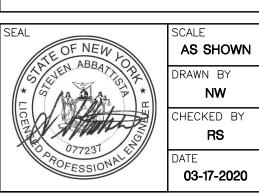
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WCC PHYSICAL EDUCATION BUILDING DOMESTIC HOT WATER UPGRADE 75 Grasslands Rd, Valhalla, NY 10595

PLUMBING SYMBOLS, **ABBREVIATIONS & GENERAL** NOTES

NWCC0008.00

DRAWING NO.



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#### P-1 SCOPE OF WORK

A.) EQUIPMENT NOTES AND SCHEDULES INCLUDED ON THESE PLANS NAME SPECIFIC PIECES OF EQUIPMENT, MANUFACTURERS AND MODEL NUMBERS, AND ESTABLISH THE MINIMUM PERFORMANCE AND QUALITY REQUIREMENTS. ALL MANUFACTURERS SPECIFICATIONS ASSOCIATED WITH NAMED EQUIPMENT SHALL BE INCORPORATED HERE IN AS PART OF THESE SPECIFICATIONS. ALL EQUIPMENT SUBMITTED BY THE CONTRACTOR FOR APPROVAL SHALL MEET THE SPECIFICATIONS OF NAMED EQUIPMENT.

B.) THE CONTRACTOR SHALL PROVIDE ALL MATERIALS, LABOR, EQUIPMENT, TOOLS, APPLIANCES, SERVICES, HOISTING, SCAFFOLDING, SUPERVISION AND OVERHEAD FOR THE FURNISHING AND INSTALLING OF ALL THE PLUMBING AND RELATED WORK, IN ACCORDANCE WITH THE DRAWINGS, SCHEDULES AND SPECIFICATIONS, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

- 1.) NEW HOT WATER BOILER PUMPS.
- 2.) BOILER REMEDIATION.
- 3.) PROGRAMING AND CX.
- 4.) NEW HOT WATER RE-CIRCULATION PUMP.
- 5.) NEW HOT WATER PIPING, VALVES & ACCESSORIES.
- 6.) NEW HOT WATER STORAGE TANK.

# 7.) PIPE INSULATION. P-2 GENERAL REQUIREMENTS

A.) CONSTRUCT ALL APPARATUS OF MATERIALS AND PRESSURE RATINGS SUITABLE FOR THE CONDITIONS ENCOUNTERED DURING CONTINUOUS OPERATION.

B.) WHERE CORROSION CAN OCCUR, APPROPRIATE CORROSION—RESISTANT MATERIALS AND ASSEMBLY METHODS MUST BE USED, INCLUDING ISOLATION OF DISSIMILAR METALS AGAINST GALVANIC INTERACTION. RESISTANCE TO CORROSION MUST BE ACHIEVED BY THE USE OF THE APPROPRIATE BASE MATERIALS COATINGS SHALL BE RESORTED TO ONLY WHEN SPECIFICALLY PERMITTED BY THE SPECIFICATIONS.

C.) CONSTRUCT ALL EQUIPMENT IN ACCORDANCE WITH REQUIREMENTS OF ALL APPLICABLE STATE AND LOCAL CODES. ALL FUEL BURNING EQUIPMENT SHALL MEET OR EXCEED THE ENERGY EFFICIENCY RATING OF ALL APPLICABLE INTERNATIONAL, STATE AND LOCAL ENERGY CONSERVATION CODES. ALL PRESSURE VESSELS AND SAFETY DEVICES THAT FALL WITHIN THE SCOPE OF THE ASME CODE SHALL CONFORM TO THE CODE AND BEAR THE ASME LABEL OR STAMP.

D.) MATCH AND BALANCE ALL SYSTEM COMPONENTS TO ACHIEVE COMPATIBILITY OF EQUIPMENT FOR SATISFACTORY OPERATION AND PERFORMANCE THROUGHOUT THE ENTIRE OPERATING TEMPERATURE AND CONTROL RANGES. ALL INSTALLATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

E.) UPON COMPLETION OF WORK THE ENTIRE PLUMBING SYSTEM SHALL BE OPERATED IN THE PRESENCE OF THE OWNER TO DEMONSTRATE THAT ALL COMPONENTS ARE INSTALLED AND OPERATING PROPERLY.

F.) PROVIDE ALL CONTROLS, WIRING (EXCEPT POWER WIRING FOR MOTORS), PIPING, VALVES, TUBING ACCESSORIES AND OTHER COMPONENTS NECESSARY TO MAKE ALL SYSTEMS COMPLETE AND OPERABLE.

## P-3 DEMOLITION & RUBBISH REMOVAL

A.) REMOVE PIPING, WIRING, AND EQUIPMENT AS INDICATED ON THE DRAWINGS OR AS REQUIRED IN THE FIELD. ALL REMOVALS CAN NOT BE COMPLETELY DETAILED ON THE DRAWINGS. SURVEY THE SITE AND INCLUDE ALL CHANGES IN FORMULATING THE BID. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXISTING WORK AFFECTED BY HIS ALTERATIONS INCLUDING ITEMS NORMALLY COVERED BY ANOTHER TRADE.

B.) THIS WORK SHALL BE EXECUTED IN AN ORDERLY AND CAREFUL MANNER, WITH DUE CONSIDERATION FOR THE PROTECTION OF ADJACENT ACTIVITIES. DUST PRODUCING DEMOLITION SHALL BE ISOLATED WITH PROPER PRECAUTIONS.

C.) THE CONTRACTOR SHALL ASK THE OWNER FOR INSTRUCTIONS IF HE/SHE ENCOUNTERS ANY WORK, THE DEMOLITION OF WHICH MIGHT RESULT IN A HAZARDOUS CONDITION.

D.) EQUIPMENT, PIPING, ETC., SPECIFIED TO BE REMOVED AND RUBBISH CAUSED BY CONSTRUCTION SHALL BE REMOVED FROM THE CONSTRUCTION SITE, IN A CODE COMPLIANT MANNER.

## P-4 DUST PROTECTION

A.) IT IS IMPERATIVE THAT DURING DEMOLITION AND ALSO DURING NORMAL CONSTRUCTION WHERE THERE IS ANY POSSIBILITY OF DUST DUE TO CONSTRUCTION WORK CONTAMINATING THE OWNER'S EQUIPMENT OR CAUSING A NUISANCE TO PERSONNEL, THIS CONTRACTOR SHALL FURNISH AND INSTALL SUITABLE PROTECTION AS REQUIRED.

## P-5 TIME & MANNER

A.) ALL WORK SHALL BE PERFORMED DURING NORMAL WORKING HOURS UNLESS OTHERWISE DIRECTED BY THE OWNERS REPRESENTATIVE.

B.) PRIOR TO THE BEGINNING OF WORK THE CONTRACTOR SHALL SUBMIT A SCHEDULE OF WORK TO THE OWNER. ANY SHUTDOWNS OF EXISTING SYSTEMS MUST BE VERIFIED IN WRITING WITH THE OWNER'S REPRESENTATIVE.

C.) ANY SHUTDOWN OF EXISTING SYSTEMS WHERE SUCH SHUTDOWN IS REQUIRED FOR THE PERFORMANCE OF THE WORK UNDER THE CONTRACT SHALL BE AT SUCH TIMES AS DESIGNATED BY OWNER'S REPRESENTATIVE. RESTORE SYSTEMS TO ORIGINAL CONDITION AFTER PERFORMANCE OF WORK. THE INTENT IS TO INSURE MINIMUM INTERFERENCE WITH OPERATION OF EXISTING FACILITIES.

## P-6 PAINTING

A.) ALL PUMPS, HOT WATER HEATERS AND ALL OTHER FACTORY MANUFACTURED AND ASSEMBLED APPARATUS SHALL BE FACTORY COATED WITH ONE COAT OF PRIMER AND ONE COAT OF MACHINERY ENAMEL STANDARD COLOR AT THE ACTUARY, AND AFTER INSTALLATION, SHALL BE CLEANED AND TOUCHED UP TO REPAIR ANY DAMAGE INCURRED DURING CONSTRUCTION.

B.) ALL EXPOSED IRON AND SUPPLEMENTARY DUNNAGE STEEL SHALL BE PAINTED WITH TWO (2) COATS OF RUST PREVENTIVE PAINT.

## P-7 CUTTING & PATCHING

A.) PENETRATIONS FOR PIPING SHALL BE MADE BY CORE DRILLING WHENEVER POSSIBLE.

B.) PATCHING SHALL BE PROVIDED BY THE GENERAL CONTRACTOR EXCEPT WHERE DAMAGE AND/OR REPAIRS ARE NECESSITATED DUE TO ERROR OR

#### P-8 SITE INSPECTION

A.) VISIT SITE BEFORE SUBMITTING BID. INSPECT AND VERIFY ALL CONDITIONS WHICH MAY AFFECT COST OF INSTALLATION. VERIFY EXACT LOCATION OF ALL EXISTING PIPES, DUCTS, BEAMS, ETC., WHETHER SHOWN ON THE DRAWINGS OR NOT, SO FAR AS THESE LOCATIONS RELATE TO THE NEW WORK. PROVIDE ANY OFFSETS IN NEW PIPING OR DUCTS AS MAY BE REQUIRED FOR PROPER CLEARANCES TO AVOID EXISTING DUCTS, CABLES OR OTHER OBSTRUCTION.

B.) THE PLUMBING CONTRACTOR SHALL KEEP HIMSELF FULLY INFORMED AS TO THE SHAPE, SIZE, AND POSITION OF ALL OPENINGS AND FOUNDATIONS REQUIRED FOR HIS APPARATUS AND SHALL GIVE FULL INFORMATION TO THE GENERAL CONTRACTOR SUFFICIENTLY IN ADVANCE OF THE WORK, SO THAT ALL SUCH OPENINGS AND FOUNDATION MAY BE BUILT IN ADVANCE. HE SHALL ALSO FURNISH ALL SLEEVES AND SUPPORTS HEREIN SPECIFIED OR REQUIRED, SO THE GENERAL CONTRACTOR MAY BUILD SAME IN PLACE.

#### P-9 SHOP DRAWINGS & SUBMITTALS REQUIRED

A.) MANUFACTURER'S DATA OR SHOP DRAWINGS OF THE FOLLOWING APPARATUS GIVING FULL INFORMATION AS TO CATALOG NUMBERS, DIMENSIONS, MATERIALS AND ALL INFORMATION PERTINENT TO THE ADEQUACY OF THE SUBMITTED EQUIPMENT SHALL BE SUBMITTED FOR REVIEW:

- 1.) PIPING LAYOUTS (3/8" SCALE).
- 2.) EQUIPMENT INCLUDING PUMPS AND STORAGE TANKS.
- 3.) PIPING MATERIALS, FITTINGS, AND VALVES.4.) INSULATION.
- 4.) INSULATION.
  5.) ALL OTHER SPECIALTIES.
- 6.) STARTERS.
- D.) STARTERS.
- 7.) DISCONNECTS. 8.) CONTROLS.

#### P-10 IDENTIFICATION

A.) IDENTIFY ALL EQUIPMENT; IDENTIFY ALL NEW AND EXISTING EQUIPMENT INCLUDING PUMPS, WATER HEATERS AND STORAGE TANKS CONSISTENT WITH DESIGNATION ON PLANS. SMALL DEVICES, SUCH AS IN-LINE PUMPS, MAY BE IDENTIFIED WITH METAL TAGS. IDENTIFY SERVICE OF ALL EQUIPMENT. FOR EXAMPLE, "CELLAR LEVEL SOUTH WING". INSTALL PLASTIC NAMEPLATES WITH CORROSIVE RESISTANT MECHANICAL FASTENERS, OR ADHESIVE OVER FINISH PAINT OR INSULATION.

B.) IDENTIFY CONTROLS; IDENTIFY ALL NEW AND EXISTING PANELS AND MAJOR CONTROL COMPONENTS OUTSIDE PANELS WITH NAMEPLATES. PROVIDE PERMANENT LABELS FOR ALL CONTROLS AND LIMITS WHICH STATE FUNCTION OF EACH CONTROLLER AND CONTROL SET—POINTS. LABEL AUTOMATIC CONTROLS, INSTRUMENTS, RELAYS AND DEVICES. PROVIDE 3 COPIES OF A CONTROLS SCHEMATIC PLAN AND A KEY TO ABBREVIATIONS. PLAN SHALL BE 11"x17" AND LAMINATED IN PLASTIC.

C.) <u>IDENTIFY VALVES</u>; IDENTIFY ALL NEW AND EXISTING VALVES IN MAIN AND BRANCH PIPING WITH BRASS TAGS. INSTALL TAGS USING CORROSION RESISTANT CHAIN. NUMBER TAGS CONSECUTIVELY BY LOCATION AND SERVICE.

D.) IDENTIFY PIPING; IDENTIFY ALL NEW AND EXISTING PIPING WITH MARKERS. USE TAGS ON PIPING 3/4 INCH DIAMETER AND SMALLER. IDENTIFY SERVICE, FLOW DIRECTION, AND PRESSURE. INSTALL IN CLEAR VIEW AND ALIGN WITH AXIS OF PIPING. DISTANCE BETWEEN MARKERS NOT TO EXCEED 20 FEET, INCLUDING RISERS AND DROPS. PLACE MARKERS ADJACENT TO VALVE AND TEE, AND AT EACH SIDE OF A WALL PENETRATION. LABELING SHALL BE IN CONFORMANCE WITH OSHA AND ANSI A13.1. COLOR SHALL CONFORM TO ANSI/ASME A13. APPLY PAINT, PRIMER OR INSULATION BEFORE APPLYING LABELS. DEGREASE AND CLEAN SURFACES TO RECEIVE ADHESIVE FOR IDENTIFICATION MATERIALS.

CONTRACTOR TO PROVIDE OPTI-CODE LABELS FOR ALL NEW PIPING. LETTERS AND ARROWS INDICATING FLOW SHALL BE 2 1/2" HIGH, PLACED EVERY 10' AND SHALL BE WHITE ON A GREEN BACKGROUND AND SHALL CONFORM TO ANSI AND OSHA STANDARDS. LABEL ALL COLD WATER, HOT WATER PIPING AS FOLLOWS: "COLD WATER", "HOT WATER". APPLY OVER INSULATION ONLY.

E.) <u>PROVIDE VALVE SCHEDULE</u>; MINIMUM OF 8.5" X 11" IN ALUMINUM FRAME WITH CLEAR GLASS FACE. INSTALL IN THE BOILER ROOM OR AT LOCATION AS DIRECTED BY THE OWNER. INDICATE VALVE #, SIZE, SERVICE AND N.O. OR N.C. GROUP BY SERVICE. EXAMPLE SCHEDULE AS FOLLOWS:

"EXAMPLE" VALVE TAG SCHEDULE					
NUMBER	SIZE	SERVICE	N.O./N.C.		

## F.) MANUFACTURER:

- 1.) W.H. BRADY CO., SIGNMARK DIVISION.
- 2.) ATLANTIC ENGRAVING COMPANY.3.) SETON NAME PLATE CO.
- 3.) SETON NAME PLATE (

P-11 MOTOR CONTROLS & WIRING

## 4.) MSI SERVICES.

A.) SUITABLE STARTING AND CONTROLLING EQUIPMENT AND DEVICES SHALL BE FURNISHED AND INSTALLED AS SPECIFIED OR INDICATED ON PLAN AND AS REQUIRED TO OBTAIN THE MANNER OF CONTROL AND MONITORING AS DESCRIBED IN THE SEQUENCE OF OPERATIONS. THE INSTALLATION OF ALL EQUIPMENT AND WIRING SHALL CONFORM TO THE REQUIREMENTS OF STATE AND LOCAL CODES, NEMA, AND THE NEC.

B.) FURNISH AND TURN OVER THE ELECTRICAL CONTRACTOR WHO SHALL ERECT AND WIRE THE SAME, SUITABLE STARTING CONTROLLING EQUIPMENT, AND DISCONNECT SWITCHES FOR EACH MOTOR AND EACH ELECTRICALLY OPERATED PIECE OF EQUIPMENT.

C.) THE ELECTRICAL CONTRACTOR WILL ERECT ALL STARTING EQUIPMENT FURNISHED UNDER THIS SECTION, EXCEPT STARTERS SPECIFIED TO BE FACTORY MOUNTED AND WIRED AS ALL INTEGRAL PART OF THE EQUIPMENT, AND WILL DO ALL WIRING NECESSARY TO SUPPLY POWER TO THE ELECTRIC MOTOR PROVIDED UNDER THIS SECTION, INCLUDING POWER TO THE STARTERS AND CONNECTIONS FROM STARTERS TO THE MOTORS. THE ELECTRICAL CONTRACTOR SHALL FURNISH 120V POWER TO TEMPERATURE CONTROL PANELS, VAV BOXES AND EQUIPMENT REQUIRING SEPARATE 120V CONTROL POWER SOURCE. POWER FOR CONTROL CIRCUITS FOR ALL DEVICES CONNECTING TO MOTOR STARTERS SHALL BE OBTAINED FROM STARTERS.

D.) THIS CONTRACTOR SHALL INSTALL ALL MOTOR CONTROL, TEMPERATURE CONTROL WIRING AND INTERLOCK CONTROL WIRING BETWEEN MOTORS AND STARTERS, EXCLUSIVE OF MOTOR POWER WIRING.

E.) ALL CONTROLLERS SHALL BE ALLEN-BRADLEY, CUTLER-HAMMER, OR GENERAL ELECTRIC, FULLY ENCLOSED IN NEATLY FURNISHED VENTILATED BOXES. CONTROLLERS SHALL BE OF THE COMBINATION STARTER AND UNFUSED SWITCH TYPE.

F.) UNLESS OTHERWISE INDICATED. NEMA ENCLOSURES FOR MOTORS LOCATED INDOORS SHALL BE DRIP PROOF AND FOR MOTORS LOCATED OUTDOORS SHALL BE TOTALLY ENCLOSED FAN COOLED. OPEN DRIP PROOF MOTORS SHALL MEET THE FOLLOWING:

<u>HP</u> <u>%EFF</u> 1.0 85.5

#### P-12 PIPING MATERIALS

PIPING MATERIALS					
SERVICE	SIZE (IN)	MATERIAL	TYPE/WEIGHT	STANDARD	
HOT WATER	THRU 2"	COPPER	TYPE L/HRD TMPR	ASTM B88 ASTM	
COLD WATER	ALL	COPPER	TYPE L/ HARD TEMPER	ASTM B88	
DRAIN	THRU 2"	PVC	DWV	ASTM D 2665 ASTM D 2949 CSA B 181.2 CSA B 182.2	
PIPE FITTINGS					
SERVICE	SIZE (IN)	MATERIAL	TYPE/WEIGHT	STANDARD	
HOT WATER	THRU 2"	COPPER	95/5 SOLDER	ASME B16.9	
COLD WATER	ALL	COPPER	95/5 SOLDER STANDARD	ASME B16.22	
DRAIN	THRU 2"	PVC	DWV	ASTM D 2665 ASTM D 2949 CSA B 181.2 CSA B 182.2	

#### P-13 PIPE INSULATION

A.) INSULATE ALL NEW PIPING, AND EXISTING PIPING AS PER THE SCHEDULE BELOW. INSULATION SHALL BE APPLIED IN SUCH A WAY AS TO PERMIT EXPANSION OR CONTRACTION OF PIPING WITHOUT CAUSING DAMAGE TO INSULATION OR SURFACE FINISH. REFER TO INSULATION GENERAL REQUIREMENTS FOR ADDITIONAL REQUIREMENTS.

B.) VALVES, STRAINERS, FITTINGS AND FLANGES SHALL BE INSULATED WITH IDENTICAL MATERIAL DENSITY, THICKNESS AND SURFACE FINISH AS THE PIPING INSULATION. PREMOLDED INSULATION MATERIAL SHALL BE USED WHERE AVAILABLE, OTHERWISE SHAPED BLOCK SEGMENTS WIRED ON WITH ALL EDGES FILLED WITH INSULATION CEMENT OR FILLER SHALL BE USED.

C.) VALVES SHALL BE INSULATED UP TO AND INCLUDING BONNETS. A COLLAR OF SECTIONAL BLOCK INSULATION SHALL BE PROVIDED OVER THE FLANGES AND EXTEND A MINIMUM OF 2" OVER THE ADJACENT PIPE INSULATION, FASTEN IN SUCH A WAY AS TO PERMIT EASY REMOVAL. ANNULAR SPACES SHALL BE FILLED WITH LOOSE INSULATION. STRAINERS SHALL BE INSULATED TO PERMIT REMOVAL OF THE BASKET WITHOUT DISTURBING THE INSULATION OF THE STRAINER BODY.

D.) HOT & COLD WATER: GLASS FIBER INSULATION; ANSI/ASTM C547; 'K' VALUE OF 0.23 AT 75° F; NONCOMBUSTIBLE. MINIMUM DENSITY OF 3.5 LBS./CU. FT.; TEMPERATURE RANGE 35° F TO 450° F THICKNESS AS PER SCHEDULE.

E.) FACTORY APPLIED, WHITE, FLAME RETARDANT, ALL SERVICE (ASJ) VAPOR BARRIER JACKET OF .001" ALUMINUM FOIL LAMINATED TO KRAFT PAPER WITH A FLAME RETARDANT SNUFFER TYPE ADHESIVE REINFORCED WITH GLASS FIBERS AND HAVING A SELF SEALING LAP. PROVIDE 2" LONGITUDINAL LAP AND 4" CIRCUMFERENTIAL SEALING STRIPS. PERMEABILITY .02 PERM. INSULATION AND VAPOR BARRIER SHALL BE CONTINUOUS THROUGH HANGERS AND SLEEVES.

F.) FOR ALL PIPING 2" OR LARGER FURNISH SHIELDS OF GALVANIZED STEEL BETWEEN PIPE HANGERS OR PIPE HANGER ROLLS AND INSERTS BETWEEN SUPPORT SHIELD AND PIPING AND UNDER THE FINISH JACKET. FURNISH INSERTS A MINIMUM 6 INCHES LONG, OF SAME THICKNESS AND CONTOUR AS ADJOINING INSULATION, INSERT MATERIAL SHALL BE HYDROUS CALCIUM SILICATE INSULATION OR OTHER HEAVY DENSITY INSULATING MATERIAL SUITABLE FOR THE PLANNED TEMPERATURE RANGE.

G.) ALL PIPING, VALVES AND FITTINGS INSTALLED IN MECHANICAL EQUIPMENT ROOMS OR THAT ARE EXPOSED, NOT ENCLOSED WITHIN WALLS OR ABOVE FINISHED CEILING SHALL BE JACKED WITH GLOSS WHITE PVC JACKETS. ZESTON 2000 BY JOHNS MANVILLE OR EQUAL.

H.) LABEL ALL NEW PIPING WITH SETON ULTRA-MARK WEATHER RESISTANT FOR OUTDOOR APPLICATIONS, OPTI-CODE FOR INDOOR APPLICATIONS. INDICATE FLOW DIRECTION WITH ARROWS, AND CONTENTS WITH ABBREVIATIONS CONSISTENT WITH PLANS OR BUILDING STANDARDS. LABEL PIPING EVERY 25'. LABELS SIZE AND COLORS SHALL CONFORM TO OSHA AND ANSI STANDARDS. APPLY OVER INSULATION.

I.) ALTERNATE INSULATION MANUFACTURERS:

## 1.) KNAUF

- 2.) OWENS—CORNING
- 2.) OWENS-CORNING
  3.) CERTAIN TEED "SNAP-ON" 500 WITH SSL.
- 4.) JOHNS-MANSVILLE MICRO-LOK 650-AP-T

## J.) INSULATION SCHEDULE

INSULATION SCHEDULE					
PIPING SYSTEM	THROUGH 1.5"	OVER 1.5"			
HOT WATER	1.5"	2"			
HOT WATER RECIRC	1.5"	2"			
COLD WATER	1.5"	1.5"			

#### P-14 PIPE INSTALLATION

#### A.) GENERAL REQUIREMENTS

1.) REFER TO DRAWINGS FOR REQUIRED PIPING LAYOUTS. CONNECTION DETAILS INDICATE REQUIRED PIPING AT VARIOUS PIECES OF EQUIPMENT. FLOOR PLANS INDICATE GENERAL ROUTING OF PIPING. SPECIFICATIONS DEFINE MATERIALS, INSTALLATION REQUIREMENTS, AND SUPPLEMENTARY REQUIREMENTS TO THOSE SHOWN ON DRAWINGS. CONTRACTOR IS RESPONSIBLE FOR PROVIDING A COMPLETE SYSTEM OF PIPING AND VALVES FOR A COMPLETE WORKING AND CODE COMPLIANT SYSTEM BASED ON ALL DOCUMENTATION PROVIDED.

2.) ALL PIPE SHALL BE NEW, CLEAN, OF DOMESTIC MANUFACTURE, AND MARKED WITH APPROPRIATE STANDARD.

3.) ECCENTRIC REDUCING FITTINGS OR ECCENTRIC REDUCING COUPLINGS SHALL BE USED WHERE REQUIRED BY THE CONTRACT DOCUMENTS OR WHERE REQUIRED TO PREVENT POCKETING OF LIQUID OR NON— CONDENSIBLES.

4.) ELECTROLYTIC COUPLINGS OR UNIONS SHALL BE INSTALLED BETWEEN COPPER AND STEEL PIPE.

5.) ALL JOINTS SHALL BE MADE IN A WORKMANLIKE MANNER USING CLEAN THREADS, DEBURRED PIPE AND PROPER MATERIALS. ALL JOINTS SHALL CONFORM TO THE APPLICABLE ANSI AND ASTM STANDARDS.

6.) PIPING SHALL BE INSTALLED IN STRAIGHT PARALLEL RUNS, PARALLEL TO PIPING OF OTHER TRADES. ROUTING SHALL BE COORDINATED WITH PIPING AND CONDUIT RUNS OF OTHER TRADES.

7.) WATER PIPING SHALL PITCH 1" IN 60 FEET, UPWARD IN DIRECTION OF FLOW. PROPER PROVISION SHALL BE MADE FOR EXPANSION AND CONTRACTION IN ALL PORTIONS OF PIPEWORK, TO PREVENT UNDUE STRAINS ON PIPING OR EQUIPMENT. ALL PIPE SHALL BE SUITABLY REINFORCED AT ALL ANCHOR POINTS. ALL RISERS SHALL BE INSTALLED WITH SWING JOINTS COMPRISED OF AT LEAST 4 ELBOWS.

8.) ALL CHANGES IN SIZE AND DIRECTION OF PIPING SHALL BE MADE WITH FITTINGS. DO NOT USE MITER FITTINGS, FACE OR FLUSH BUSHINGS, CLOSE NIPPLES OR STREET ELBOWS. ALL NIPPLES (PIPE LESS THAN 3" LONG) SHALL BE EXTRA HEAVY.

9.) ALL BRANCH CONNECTIONS SHALL BE MADE WITH TEES, EXCEPT THAT ON STEEL PIPING FORGED STEEL "WELDOLETS" AND "LATROLETS" AS MANUFACTURED BY BONNEY FORGE MAY BE USED WHERE THE BRANCH PIPE IS AT LEAST TWO NOMINAL PIPE SIZES LESS THAN THE MAIN PIPE.

10.) FITTINGS SHALL BE FACTORY MANUFACTURED. SHOP OR FIELD FABRICATED FITTINGS ARE NOT ACCEPTABLE. WELDING FITTINGS SHALL BE "TUBE—TURNS" OR EQUIVALENT. FITTINGS SHALL HAVE THE SAME PRESSURE RATING AS THE SYSTEM IN WHICH THEY ARE INSTALLED.

11.) QUALIFY WELDERS TO THE CODE FOR PRESSURE PIPING ANSI SPECIFICATIONS B31.1, WITH CERTIFICATION BY THE WELDING BUREAU OF HEATING, PIPING AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION. ASME STAMP SHALL BE PROVIDED AS REQUIRED.

## B.) JOINTS AND CONNECTIONS

1.) SOLDERED OR SWEAT: SOLDERED OR SWEAT JOINTS FOR TUBING SHALL BE MADE WITH APPROVED FITTINGS. SURFACES TO BE SOLDERED OR SWEATED SHALL BE PROPERLY CLEANED AND REAMED. THE JOINTS SHALL BE PROPERLY FLUXED AND MADE WITH APPROVED SOLDER. JOINTS IN COPPER WATER TUBING SHALL BE MADE BY APPROPRIATE USE OF APPROVED BRASS OR WROUGHT COPPER WATER FITTINGS IN ACCORDANCE WITH ANSI B16.22, PROPERLY SWEATED OR SOLDERED TOGETHER.

2.) UNIONS: UNIONS IN THE WATER SUPPLY SYSTEM SHALL BE METAL—TO—METAL WITH GROUND SEATS. UNIONS ON DRAINAGE SYSTEMS MAY BE USED ONLY IN THE TRAP SEAL OR ON THE INLET SIDE OF THE TRAP. UNIONS SHALL HAVE METAL—TO—METAL GROUND SEATS.

3.) DIELECTRIC UNIONS/COUPLINGS: INSULATED UNION/COUPLINGS SHALL BE PROVIDED FOR CONNECTING DISSIMILAR MATERIALS. UNION SHALL HAVE A WATER IMPERVIOUS INSULATION BARRIER CAPABLE OF LIMITING GALVANIC CURRENT TO ONE PERCENT OF THE SHORT CIRCUIT CURRENT IN A CORRESPONDING BIMETALLIC JOINT. WHEN DRY, INSULATION BARRIER SHALL BE ABLE TO WITHSTAND A 600-VOLT BREAK DOWN TEST.

C.) PIPING CONNECTIONS TO EQUIPMENT FOR EXPANSION COMPENSATION

1.) FLANGES, UNIONS AND ISOLATION VALVES SHALL BE PROVIDED AT ALL FINAL CONNECTIONS TO EQUIPMENT AND CONTROL VALVES TO FACILITATE DISMANTLING. FLEXIBLE CONNECTIONS AND OFFSETS SHALL BE PROVIDED AND ARRANGED SO THAT THE EQUIPMENT MAY BE SERVED OR REMOVED WITHOUT DISTURBING THE PIPING.

2.) ALL AUTOMATIC VALVES SHALL BE PROVIDED WITH AN ISOLATION VALVE AND A STRAINER ON THE INLET SIDE.

3.) INSTALL ALL SUPPLY PIPING TO EQUIPMENT INCLUDING VALVES AND STRAINERS AT LINE SIZE WITH THE REDUCTION IN SIZE BEING MADE ONLY AT THE INLET TO THE CONTROL VALVE OR PUMP. INSTALL THE OUTLET PIPING FROM THE CONTROL VALVE AT THE FULL SIZE OF THE TAPPING IN THE EQUIPMENT SERVED.

4.) FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT CONNECTIONS TO PUMPS AND EQUIPMENT AND WHEREVER INDICATED ON DRAWING AND DETAILS. MASON INDUSTRIES TYPE BSS STAINLESS STEAL BRAIDED FLEXIBLE HOSE CONNECTIONS OR EQUIVALENT SHALL BE PROVIDED.

5.) HANGERS AND SUPPORTS FOR CONNECTED EQUIPMENT SHALL CONFORM TO THE CRITERIA FOR PIPING. NO WIRE, TAPE OR METAL BANDS ARE PERMITTED.

6.) FOR EQUIPMENT MOUNTED ON ISOLATION BASES AND WHEREVER INDICATED ON DRAWING AND DETAILS MERCER RUBBER CO./ MASON INDUSTRIES TYPE EM-RF-150 STAINLESS STEAL BRAIDED FLEXIBLE CONNECTIONS OR EQUIVALENT SHALL BE PROVIDED.



ENGINEERS

# OLA Consulting Engineers

50 Broadway, Hawthorne, NY 10532

914.747.2800 8 West 38th Street, Suite 501

New York, NY 10018

olace.com

646.849.4110



75 Grasslands Rd, Valhalla, NY 10595 914.606-6600

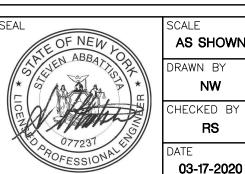
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DOMESTIC HOT WATER

OMESTIC HOT WAT UPGRADE 75 Grasslands Rd, Valhalla, NY 10595

PLUMBING SPECIFICATIONS



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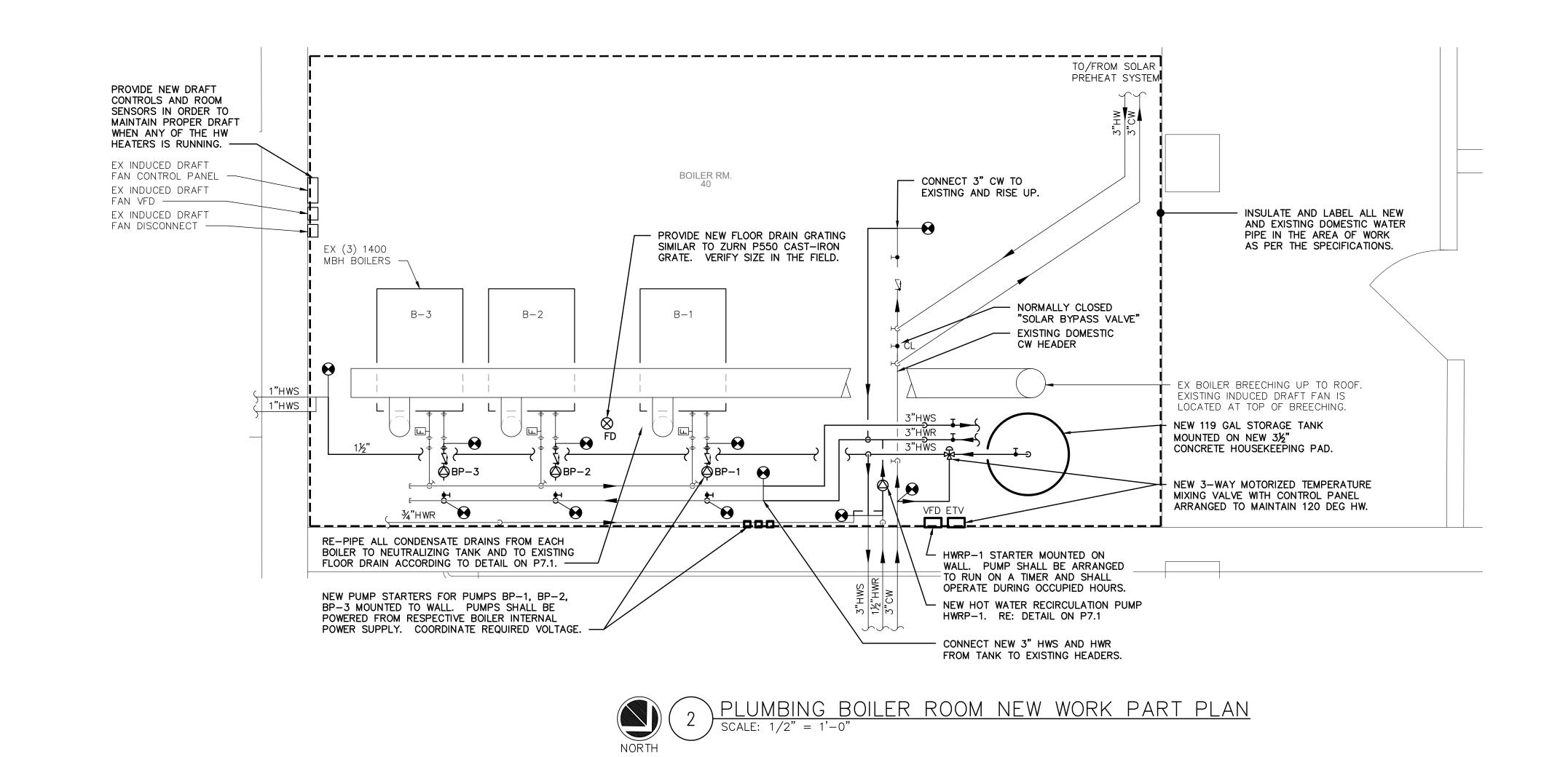
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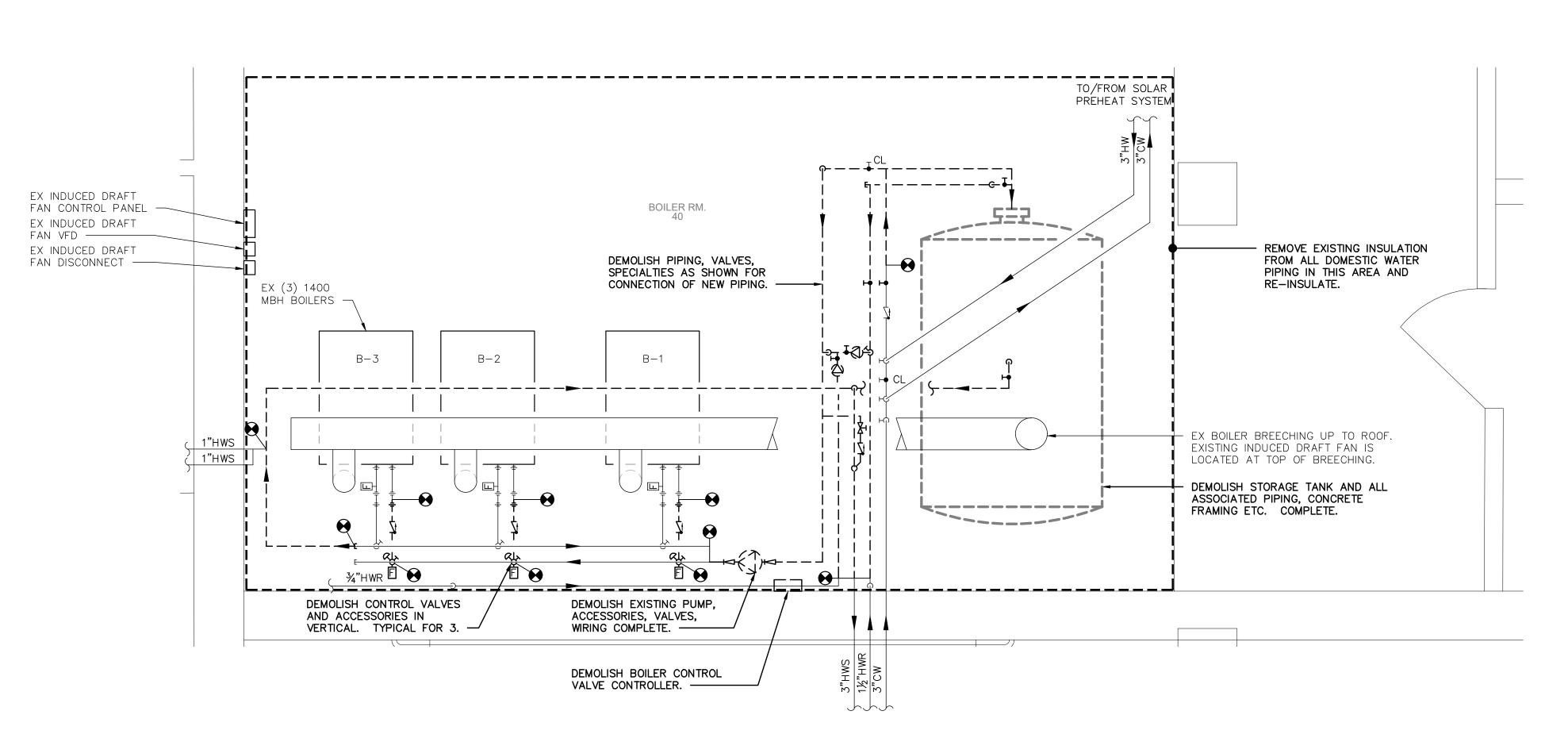
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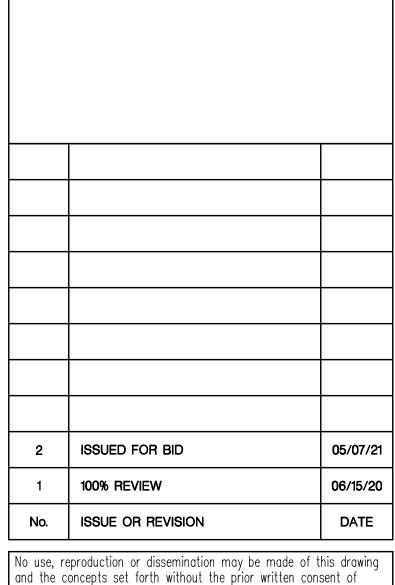
8 West 38th Street, Suite 501 New York, NY 10018 646.849.4110

olace.com

914.747.2800



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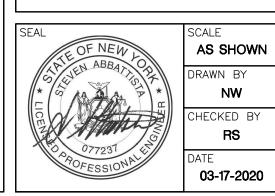
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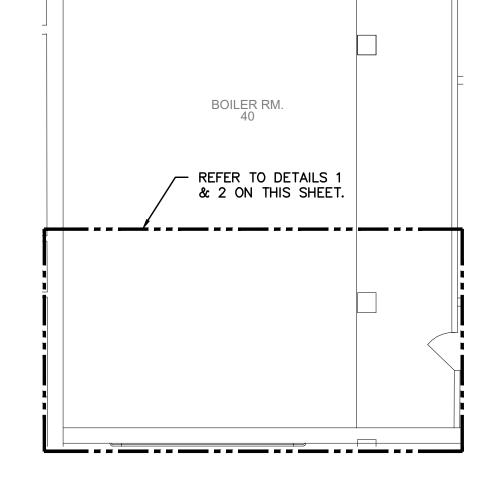
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PLUMBING BOILER ROOM
PART PLANS

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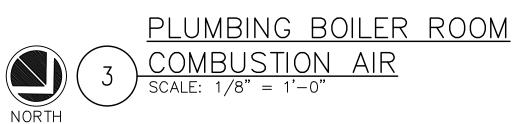


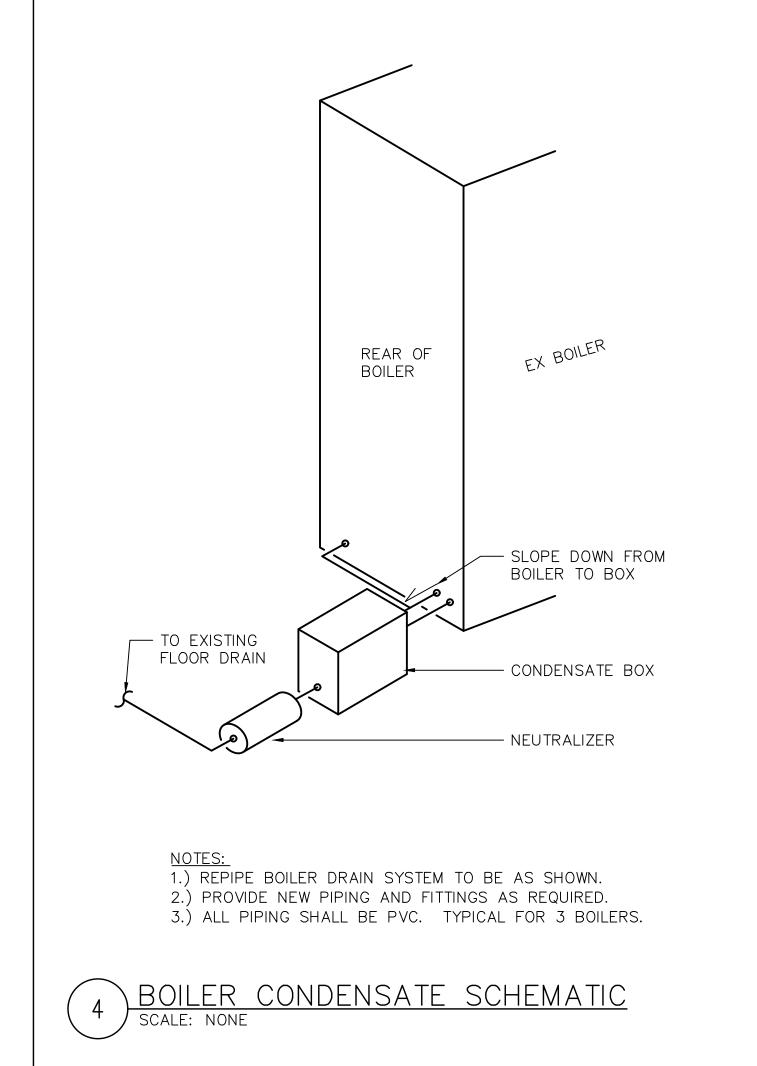


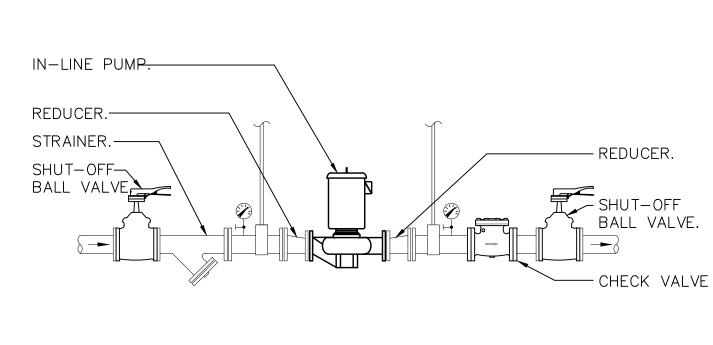
EX 86X24 LOUVER. LOUVER SHALL BE LOCKED OPEN TO

PROVIDE COMBUSTION AIR FOR

THE DOMESTIC WATER BOILERS.

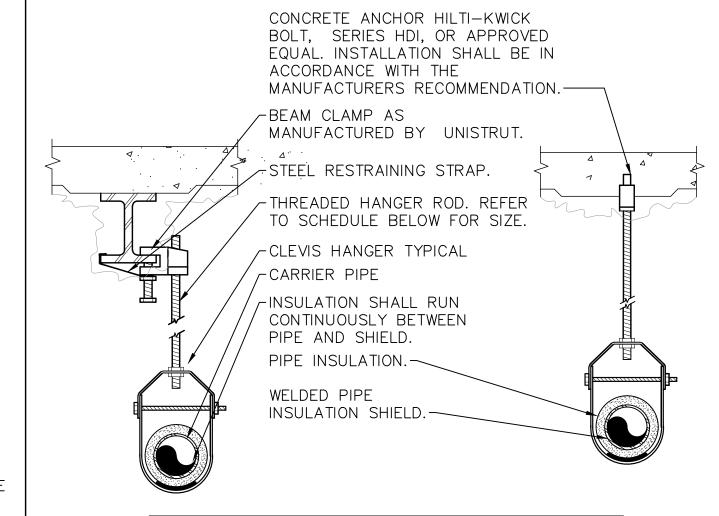






NOTES:
1.) REFER TO PLANS FOR PIPE SIZES.

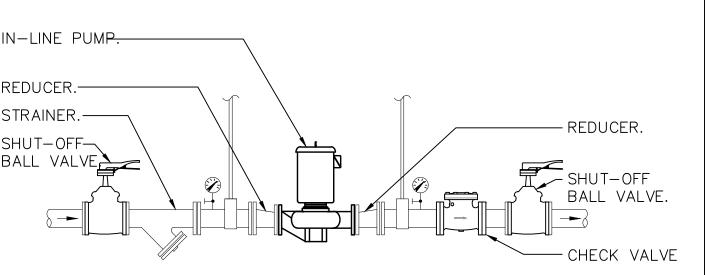
TYPICAL IN-LINE PUMP SCHEMATIC

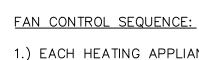


PIPE HANGER SCHEDULE PIPE DIA. 3/4"-2" 2 1/2"-3" 4"-5" 6" 8"-12" HANGER DIA. 3/8" 1/2" 5/8" 3/4" 7/8"

- 1.) CLEVIS HANGERS WITH WELDED INSULATION SHIELDS SIMILAR TO RAUCH
- FIG. 100SH ON ALL PIPES LARGER THAN 1". 2.) FOR PIPES 1" OR SMALLER, A BAND HANGER WITH INSULATION SHIELD MAY BE USED SIMILAR TO RAUCH FIG. NO. 1ASH.
- 3.) FOR NON-INSULATED PIPE, INSULATION SHIELDS MAY BE OMITTED. 4.) ALL PIPE HANGERS SHALL BE GALVANIZED STEEL OR FACTORY PAINTED
- BLACK WITH ENAMEL. 5.) FOR NON FERROUS PIPING WITHOUT INSULATION, ALL HANGERS SHALL BE
- COPPER PLATED OR FURNISHED WITH A DI-ELECTRIC BETWEEN PIPE AND HANGERS. 6.) WHERE EXISTING BUILDING STRUCTURAL COMPONENTS HAVE FIREPROOF
- MATERIAL, ANY AREA THAT IS DISTURBED OR DAMAGED AS A RESULT OF HANGER INSTALLATION SHALL BE PATCHED WITH UL AND FM APPROVED FIREPROOFING TO MATCH EXISTING.



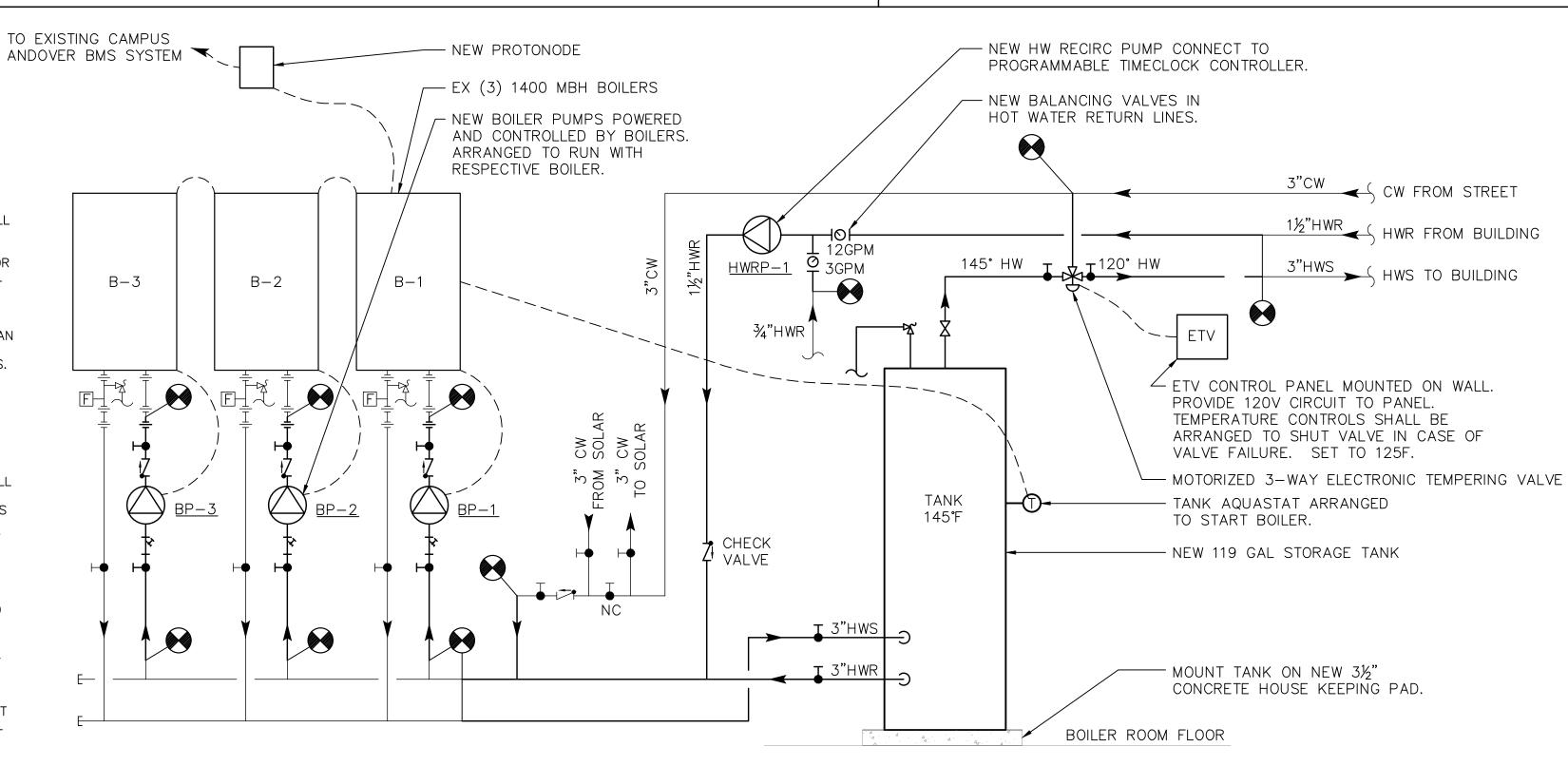




BMS SYSTEM.

1.) EACH HEATING APPLIANCE SHALL BE INTERLOCKED WITH THE EXISTING INDUCED DRAFT FAN CONTROL PANEL. UPON A CALL FOR HEAT, THE CONTROL PANEL SHALL ACTIVATE THE EXISTING INDUCED DRAFT FAN TO ESTABLISH DRAFT IN THE CHIMNEY SYSTEM. ONCE DRAFT CONDITIONS ARE MET, THE CONTROL SYSTEM WILL RELEASE THE FLAME PROGRAMMER OR GAS VALVE OF THE APPLIANCE CALLING FOR HEAT. THE SEQUENCE IS REPEATED EVERY TIME AN INITIAL APPLIANCE CALLS FOR HEAT, EACH ADDITIONAL CALL FOR HEAT, THE CONTROL WILL NOT DELAY THE SEQUENCING OF THE ADDITIONAL HEATING APPLIANCES.

- 2.) WHEN APPLIANCES SHUT DOWN, THE INDUCED DRAFT FAN WILL CONTINUE TO RUN IN POST-PURGE MODE FOR A SET PERIOD OF TIME TO REMOVE RESIDUAL FLUE GASES.
- 3.) ONCE THE POST-PURGE CYCLE IS COMPLETED THE SYSTEM SECURES AND THE CONTROL PANEL ENTERS STAND-BY MODE.
- 4.) IF PROPER DRAFT CANNOT BE MAINTAINED OR AN EXTERNAL MECHANICAL LIMIT OPENS BECAUSE OF MECHANICAL OR ELECTRICAL FAILURE, THE CONTROL WILL GO IN ALARM MODE AND THE INTEGRATED PROVEN DRAFT FUNCTION WILL SHUT DOWN ALL THE APPLIANCES WITHIN 15 SECONDS. WHILE IN ALARM MODE, THE CONTROL CONSTANTLY MONITORS THE DRAFT AND LIMIT INPUTS. IF THE FAILURE CORRECTS ITSELF OR IS CORRECTED VIA INTERVENTION, THE SYSTEM WILL RESTART AUTOMATICALLY. IF THE FAILURE IS NOT CORRECTED BEFORE THE ADJUSTABLE SYSTEM RELEASE FAULT TIMER EXPIRES, THE CONTROL WILL DISABLE AND LOCKOUT THE SYSTEM FOR FREEZE PROTECTION.
- 5.) WHEN THE FAN TEST IS ENABLED, THE CONTROL PANEL WILL RUN A SELF DIAGNOSTIC ON THE STATUS OF THE VENT SYSTEM EACH HEATING CYCLE TO VERIFY THAT THE SYSTEM IS FUNCTIONING PROPERLY. IF THE FAN TEST FAILS, THE CONTROL PANEL WILL ALARM, LOCKOUT THE SYSTEM AND ANNUNCIATE THE TEST FAILURE. ALL ALARMS SHALL BE VISIBLE ON THE EXISTING CAMPUS

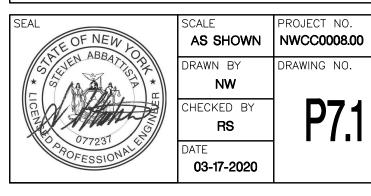


1) PROVIDE PROGRAMMABLE TIMECLOCK CONTROLLER FOR HWRP-1. 2) CONTROLS SHALL BE PROVIDED TO FOLLOW THE SEQUENCE LISTED BELOW:

## **BOILER SEQUENCE:**

- UPON A DROP IN TANK TEMPERATURE, BOILER (B-1) SHALL BE ENERGIZED. BOILER B-1 SHALL INITIATE BOILER PUMP (BP-1) TO START.
- UPON CONFIRMATION OF FLOW FROM BP-1, BOILER B-1 SHALL START FIRING. IF BOILER TEMPERATURE CONTINUES TO DROP, THERE SHALL BE CASCADING CONTROLS INTERNAL TO THE BOILERS FROM THE BOILER MANUFACTURER TO INITIATE THE OTHER BOILERS TO ENERGIZE.

DOMESTIC HOT WATER PIPING SCHEMATIC SCALE: NONE



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**OLA Consulting Engineers** 

Hawthorne, NY 10532

8 West 38th Street,

New York, NY 10018

50 Broadway,

914.747.2800

646.849.4110

Community College

State University of New York

75 Grasslands Rd, Valhalla, NY 10595 914.606-6600

Suite 501

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