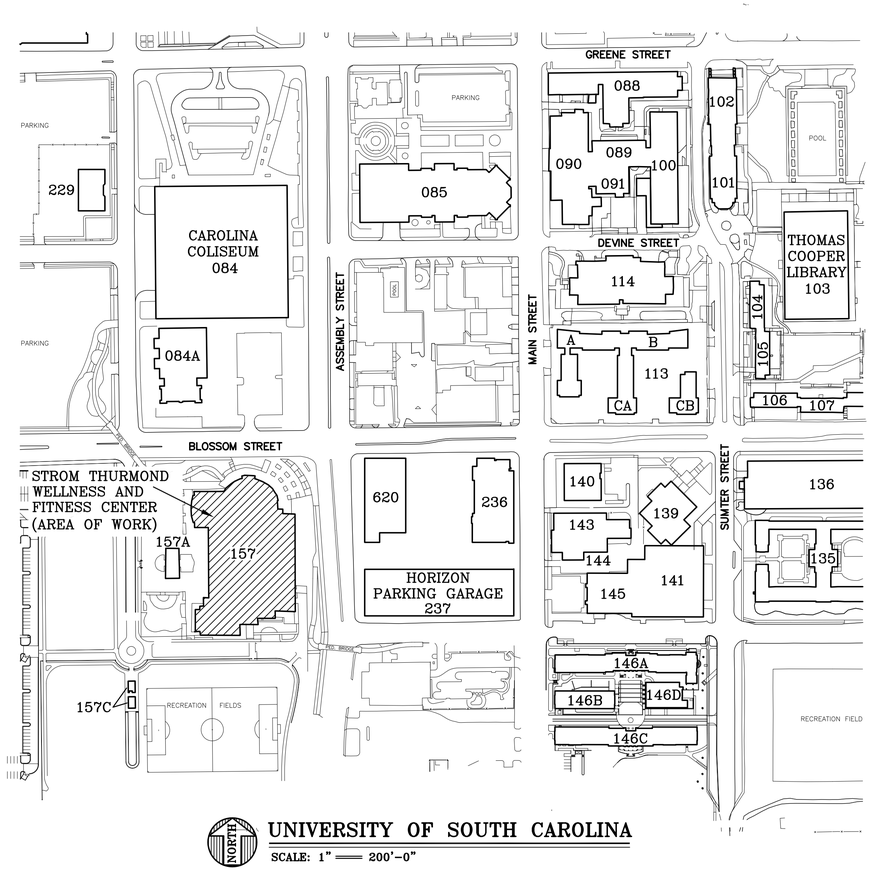
STROM THURMOND - PROJECT

3 WATER HEATERS REPLACED

STATE PROJECT NO. H27-D216-FW

THE UNIVERSITY OF SOUTH CAROLINA
COLUMBIA, SOUTH CAROLINA

FACILITIES PLANNING AND CONSTRUCTION



UNIVERSITY OF SOUTH CAROLINA
SCALE: 1" = 200'-0"

INDEX OF DRAWINGS

MECHANICAL ENGINEER

MECHANICAL DESIGN, INC.
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COLUMBIA, S.C. 29210
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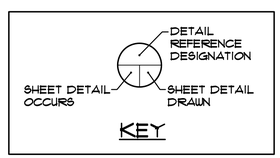
SIMS GROUP

800 COLUMBIANA DRIVE,
SUITE 208
IRMO, S.C. 29063
(803) 765-1007

CODE REVIEW INFORMATION

PROJECT DESIGNED IS ACCORDANCE WITH:

1. International Building Code - 2012 Edition.
2. International Plumbing Code - 2012 Edition.
3. International Mechanical Code - 2012 Edition.
4. National Electric Code - 2011 Edition.
5. Seismic Design Category D



SPECIAL NOTE:

IT IS HIGHLY RECOMMENDED THAT THE CONTRACTOR VISIT THE PROJECT SITE PRIOR TO SUBMITTING BID AND THOROUGHLY FAMILIARIZE HIMSELF WITH ALL EXIST CONDITIONS RELATING TO THIS PROJECT.

SOUTH CAROLINA MECHANICAL DESIGN, INC. Columbia, SC No. C00096 CERTIFICATE OF AUTHORIZATION

MECHANICAL DESIGN INC.
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CONTACT: M. HENDRIX
DATE: 01/27/15 COMM. NO. 143107

CAMPUS PLANNING AND CONSTRUCTION
COLUMBIA, SC 29208
CP00408057/FM00482895

SEAL: CAROLYN WILDS No. 11155 REGISTERED ENGINEER 01/27/15 DANNY

CHECKED BY: MCH
DRAWN BY: JJV
DATE: 27JAN15
DRAWING: T1
BUILDING: 157

PROJECT TITLE: STROM THURMOND - PROJECT 3 WATER HEATERS REPLACED
STATE PROJECT # H27-D216-FW
University of South Carolina

SHEET: T1
SHEET IN SET: 1 OF 5

PLUMBING SPECIFICATIONS

1.0 QUALITY ASSURANCE:

A. Instantaneous steam fired water heaters: Size and performance shall be as indicated in the unit schedule. Units shall be complete with factory furnished components as shown on the drawings. Equipment shall be completely assembled and tested at the factory. Units are factory disassembled at unions for reassembly in the field.

2.0 STEAM–FIRED WATER HEATERS:

A. Commercial steam–fired water heaters shall be as specified below:

WH1: Aerco WaterWizard B+11 06/1.50/EC. Capacities shall be as indicated on drgs.

WH2: Aerco WaterWizard B+11 06/1.50/EC. Capacities shall be as indicated on drgs.

WH3: Aerco WaterWizard B+11 06/1.50/EC. Capacities shall be as indicated on drgs.

B. Each heater shall be furnished with the following:

- 3/16" carbon steel shell with 0.024" sheet copper liner
- Helically wound 0.049" thick copper coils with sub–cooling coil
- No condensate traps or storage tanks required
- ASME Construction
- Copper or Copper Alloy wetted surfaces
- Pilot Operated Electronic Steam Control Valve
- T&P Relief Valve set at 150 psi
- Low–lead compliant
- 2" Bronze Ball Drain Valve
- Steel skid mounted
- 1–1/2" screwed end control valve
- Inlet Side Compound Vacuum/Pressure Gauge
- Condensate Outlet Union Orifice

C. Water heaters shall be furnished complete with factory authorized equipment start–up by a factory trained start–up technician before placing units in operation. Start–up includes all balance and adjustments to each heater as necessary and a written start–up report for each heater. Manufacturer/contractor shall notify Engineer minimum (1) day before scheduling factory start–up and schedule accordingly.

D. Equipment warranty shall include the following:

1. Manufacturer's standard non–prorated 10–yr warranty on Heat Exchanger.
2. Manufacturer's standard non–prorated 20–yr warranty on Pressure Vessel and Integral Demand Anticipator.

3.0 PIPING:

A. Domestic hot and cold water piping and tank drain piping shall be hard drawn type L copper pipe with soldered wrought copper fittings. Use lead–free hard solder (95/5) for all joints located above slab. Use soldering nipples or couplings between screwed and soldered pipe and fittings. Provide flanged adaptors where required.

1. Provide dielectric unions between dissimilar metals.

B. Steam supply piping shall be schedule 40 black steel pipe with welded malleable iron fittings, rated at 150 PSI.

C. Condensate return piping shall be schedule 80 black steel pipe with welded malleable iron fittings, rated at 150 PSI.

D. Equipment locations shown are approximate. Location of equipment shall be as required to replace existing units in place.

Option:

Viega ProPress fittings may be used for this project for the domestic hot and cold water piping only as an alternative to sweat fittings. Provide ProPress adaptors as required for the installation of valves as specified.

4.0 VALVES:

A. Provide cast steel API 600 gate valves (indicating type) for steam and condensate lines. Valves shall be furnished with 410 stainless steel trim and flexible round wedge in lieu of solid wedge design. Valves shall be sized according to line sizes indicated. Valves shall be as manufactured by Velan or accepted equal.

B. Provide lead–free full–port ball valves rated at 600 WOG for domestic hot and cold water piping systems where noted. Valves shall be sized according to line sizes shown.

C. Gate and check valves shall be Class 125 designed for a minimum of 125 PSI steam working pressure. The manufacturer name and the working pressure to be cast on valve body.

D. Install valves with stems upright within 15 degrees of the vertical plane.

E. Gate valve handles shall be malleable iron. Die–cast aluminum handwheels will not be accepted.

F. Valves for plumbing systems to be the product of one of the manufacturers and model numbers shown in the following table:

Gate Valves 3" and smaller (Bronze, sweat)	MSS Spec. No.	Hammond	Apollo	Nibco	Milwaukee
	MSS–SP–80	UP635	101–SLF	S–111–LF	UP149
Ball Valves 3" and smaller (Bronze, Sweat)	Fed Spec. No.	Hammond	Apollo	Nibco	Milwaukee
	WW–V–35, class A, Type II, Style 3	UP8311A	77FLF–200	S–585–80–LF	UPBA450
Check Valves 3" and smaller (Bronze, Sweat)	MSS Spec. No.	Hammond	Apollo	Nibco	Milwaukee
	MSS–SP–80	UP912	161S–LF	S–413–B–LF	UP1509

G. Equal valves by Stockham or Kitz will be accepted.

Option:

Valves for use in domestic water systems that are compatible with Viega ProPress piping systems may be used provided that valves are mfr'd in accordance with the above standards as applicable.

5.0 PIPE HANGERS:

A. Pipe hangers to be the product of one of the manufacturers and model numbers shown in the following table:

Manufacturer	1/2" thru 2"	2–1/2" and larger	Wall Plate Hangers
Grinnell	104C	260	139
Fee & Mason	199	239	302
Elgen	92	12	---

B. Provide oversized pipe hangers over insulated piping. Install 18 gauge galvanized, shield between hanger and insulation. 10" long shield to extend 180 degrees around the bottom of the insulated pipe.

C. Location and method of support subject to Engineer's approval. Threaded rods and supplementary steel to span structural supports to accommodate hangers shall be included.

D. Support pipes 2" size and under by hangers not over 8'–0" apart. Support pipes over 2" size by hangers not more than 10'–0" apart.

E. Support vertical pipes by clamps not over 12'–0" apart. Protect copper pipes by lead sleeves between pipes and clamps.

F. Provide stand–off brackets where required and as noted on drgs.

G. Equal pipe support system as manufactured by Michigan Pipe Hangers will be accepted.

H. Provide supplementary steel required for support of suspended piping and installation of pipe hangers. All supplementary steel support bracing shall meet seismic design requirements.

1. Seismic systems as manufactured by Amber/Booth or Mason Industries will be accepted.
2. Provide acceptance letter from the manufacturer's agent prior to project closeout indicating manufacturer review of installed seismic piping restraint systems throughout project.
3. Provide approved safety restraining devices and products for water heaters and mixing valve pipe stand. Attach products and devices to the adjoining structures in accordance with specific manufacturer installation instructions.

Shop Drawings: Design of supports will require installation shop drawings furnished by the manufacturer which shall include installation methods, sizes and materials signed and sealed by a registered professional Engineer in the State of South Carolina. Contractor shall furnish shop drawings for review at start of project.

6.0 THERMOSTATIC MIXING VALVES:

A. Provide (2) Symmons 7–500A thermostatic mixing valves complete with 3" dial temperature gauges, bronze construction, with swivel action check stops for hot and cold water inlets. Locate units on metal stand adjacent to column approximately where indicated on drgs.

B. Equal mixing valves as manufactured by Powers, Rada, Lawler or Leonard will be accepted.

C. Contractor shall refer to specific manufacturer's instructions and requirements for the installation of balancing by–pass line recirculation system installations if specified manufacturer is not installed prior to piping up mixing valve and to install piping accordingly. Failure to comply with this requirement for substituted mfr from specified product will require repiping in the field as directed.

7.0 PIPE INSULATION:

A. All insulation material shall have a fire hazard classification not to exceed flame spread of 25 and smoke development rating of 50, as listed by Underwriters Laboratories and acceptable under NFPA standards. This is to apply to the complete system and to the composite insulation with jacket or facings, vapor barrier, joint sealing tapes, mastic and fittings.

B. Insulate steam pipe with 3" rigid pipe insulation. Insulate condensate drain pipes with 2" thick rigid pipe insulation. Insulation shall be Foamglass pipe covering. Pipe insulation sealer shall be Foster 60–25 or equal.

C. Domestic hot and cold water piping shall be insulated with 1" thick one–piece fiberglass insulation with ASJ embossed vapor barrier laminated jacket.

1. Pipe fittings shall be insulated with same material and thickness as pipe. Install PVC jacket for all pipe insulation fittings. Insulation shall conform to HH–1–558B, Form D, Type III, Class 12; NFPA 90A and MIL–1–223.

D. All insulation work shall be performed by a franchised insulation firm. All insulation shall be installed in a workmanlike manner by qualified workers whose sole source of income is from installing pipe insulation for mechanical systems.

E. All seams for rigid pipe insulation shall be sealed with pipe insulation sealer. A light coat of sealer shall be applied over the entire surface of the insulation and embedded with Fab–Cloth in the sealer. This operation shall be applied twice over the insulation. Surface to be smooth when complete. Provisions shall be provided for expansion, as recommended by the insulation manufacturer.

F. Fiberglass pipe insulation shall be covered with a U.L. labeled, 8 ounce cotton canvas and two coats of Childers CP–52 lagging adhesive. Adhesive shall completely seal cloth ready for painting.

8.0 PIPING TESTS:

A. All piping installed shall be hydraulically tested as specified herein. Provide all equipment required to make the tests specified.

B. Piping may be tested a section at a time in order to facilitate the construction.

C. Fill the section of pipe to be tested with water and bring the section up to pressure with a test pump. These tests shall be conducted before any insulation is installed. Remove and insulation installed prior to these tests. Gauges used in the tests shall have been recently calibrated with a dead weight tester.

D. All tests shall apply full test pressure to the piping for a minimum of 2 hours.

E. All tests shall be conducted at the water working pressure of the pipe installed. When schedule 40 or standard weight pipe is used, the test pressure shall be 150 PSI.

F. When the test pressure has fallen over 5% during the 2 hour test period, the point of leakage shall be found, repaired and the test repeated. This procedure shall be followed until the piping system has met requirements above.

9.0 EXPANSION TANK:

A. Provide Taco PAX–130–150, ASME expansion tank where indicated on drawings, 19.0 gallon acceptance capacity at 40 PSI pre–charge to replace existing.

10.0 STEAM ACCESSORIES:

A. Strainers shall be y–type with semi–steel body, .045" type 304 stainless steel screens, 125 PSIG working pressure with blow–down and removable strainer cover. Strainers shall be as manufactured by Hoffman, Sarco, Jenkins, Grinnell or approved equal.

11.0 THERMOMETERS:

A. Thermometers shall be OMEGA type SPT12 Series Solar Powered LCD thermometers with hi–impact ABS case, brass thermowell, 3/8" LCD digit display, 1% accuracy, 10 Lux rating and glass passivated thermistor type sensor. Industrial glass shall have full conformance with Fed Spec GG–T–321D. Bimetallic shall be in full conformance with ASME B40.3 – 1990. "S" dimension shall be 6". Range shall be 20–240°F.

12.0 IDENTIFICATION OF PLUMBING SYSTEMS:

A. Identify each piece of equipment and control device, etc. with nameplates indicating correct identification as shown on drawings. Nameplates shall be minimum 1/16" thick plates with 1/2" high white letters on black background. Nameplates shall be attached securely.

B. All domestic cold water, domestic hot water, condensate and steam piping at water heaters shall be labeled by pipe markers as manufactured by Brady Corp. Pipe markers shall be B–689 high performance pipe markers, pre–coiled with self–adhesive ends. Markers shall include flow arrows and comply with ANSI/OSHA specifications. All wording shall be in capital letters. All wordings, colors, text size and number of occurences shall comply with standard ANSI/OSHA specifications. Markers shall meet 25/50 flame and smoke spread ratings. Markers shall be designed for applicable pipe wall temperatures.

C. Provide standard bronze identification tags as manufactured by Brady Corp. for all valves under this project. Provide valve identification chart (See floor plan for location of chart). Bronze tags shall be attached to the valve by use of brass S–hooks. Tag identification shall be by service and each valve shall be numbered.

NOTE: Some existing valves have tagging. Do not duplicate numbering sequence.

13.0 SUBMITTALS

A. Contractor shall submit detailed shop drgs, equipment materials cutsheets and product data clearly marked for all items listed below. All product data shall be submitted at one time in detail. Partial submission will not be accepted.

1. Pipe Materials including Jointing Materials
2. Pipe Insulation Materials
3. Steam–Fired Water Heaters
4. Identification of Plumbing Systems
5. Steam Accessories
6. Expansion Tank
7. Thermostatic Mixing Valves
8. Thermometers
9. Valves
10. Seismic Products including Shop Drgs

14.0 ENGINEER SITE VISIT REPORTS

A. Engineer site visit reports will be furnished during construction as requested by the Owner.

B. Contractor is responsible for correcting all construction items and to respond in writing to all deficiencies as directed. Contractor shall contact Engineer immediately if there are any questions or conflicts after receipt of written site visit reports.

C. Furnish response to all punchlist items within 5 days of receipt of report including completion status to maintain timely, planned construction progress without delays or problems.

END OF PLUMBING SPECIFICATIONS

GENERAL PLUMBING NOTES

1. DO NOT SCALE DRAWINGS. ROUGH FROM EXISTING CONDITIONS AND EQUIPMENT MFR'S DRAWINGS.
2. COORDINATE PLUMBING SYSTEMS WITH EXIST CONDITIONS TO AVOID INTERFERENCE AND CONFLICTS PRIOR TO INSTALLATION OF PIPING, HEATERS AND EQUIPMENT.
3. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH THE (IBC) BUILDING AND (IPC) PLUMBING CODES, 2012 EDITIONS OF THE (ICC) INTERNATIONAL CODE COUNCIL AND ALL LOCAL CODES AND ORDINANCES.
4. WHENEVER THE WORD "PROVIDE" IS USED, IT SHALL MEAN FURNISH AND INSTALL COMPLETE AND READY FOR USE.
5. EXISTING STEAM SUPPLY SYSTEM DESIGN PRESSURE IS 15 PSI. VERIFY PRIOR TO START OF DEMOLITION AND NOTIFY ENGINEER IMMEDIATELY IF DIFFERENT.
6. ROUTE ALL PIPING AND LOCATE VALVES, ETC. AS REQUIRED TO PERMIT EASY ACCESS. (TYPICAL)
7. CONTRACTOR SHALL VERIFY EXACT SIZES OF EXIST WATER, STEAM AND CONDENSATE LINES PRIOR TO START OF CONSTRUCTION.
8. SEE DEMOLITION SCHEDULE AND CONSTRUCTION SEQUENCE, SHT P1 PRIOR TO START OF CONSTRUCTION.
9. NOTE:
DIMENSIONS FOR REPLACEMENT HEATERS VARY FROM EXIST HEATERS. CONTRACTOR SHALL VERIFY ALL PIPING CONNECTIONS PRIOR TO START OF CONSTRUCTION TO MAINTAIN ACCURATE AND UNIFORM INSTALLATIONS FOR ALL HEATERS.

PLUMBING SYMBOLS

SYMBOL	DESCRIPTION
——— - ———	COLD WATER PIPING
—— 140° ——	HOT WATER PIPING (140°F)
——— - - ———	HOT WATER PIPING (120°F)
——— - - - ———	HOT WATER RECIRC PIPING (120°F)
—— 140°R ——	HOT WATER RECIRC PIPING (140°F)
—— C ——	CONDENSATE DRAIN PIPING
—— S ——	STEAM PIPING
⋈	BALL VALVE
⋈	GATE VALVE
⋈	CHECK VALVE
◕	CONNECT TO EXISTING
⊕	POINT OF DEMOLITION
▶	FLOW ARROW
EFD	EXIST FLOOR DRAIN

ASBESTOS NOTES

A1. EXISTING INSULATION SHALL BE TESTED BY THE UNIVERSITY FOR ASBESTOS CONTAINING MATERIALS.

A1. IF ASBESTOS IS PRESENT, REMOVAL OF INSULATION PRODUCTS ON HW GENERATORS AND PIPING SHALL BE BY THE UNIVERSITY OF SC.

A2. COORDINATE REMOVAL OF ASBESTOS MATERIALS WITH USC PRIOR TO SCHEDULE OF ANY DEMOLITION WORK AS APPLICABLE.

SOUTH CAROLINA MECHANICAL DESIGN, INC. Columbia, SC No. C00096 CERTIFICATE OF AUTHORIZATION

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CONTACT: M. HENDRIX

DATE: 01/27/15 COMM. NO. 143107

CAMPUS PLANNING AND CONSTRUCTION
COLUMBIA, SC 29208
CP00408057/FM00462895

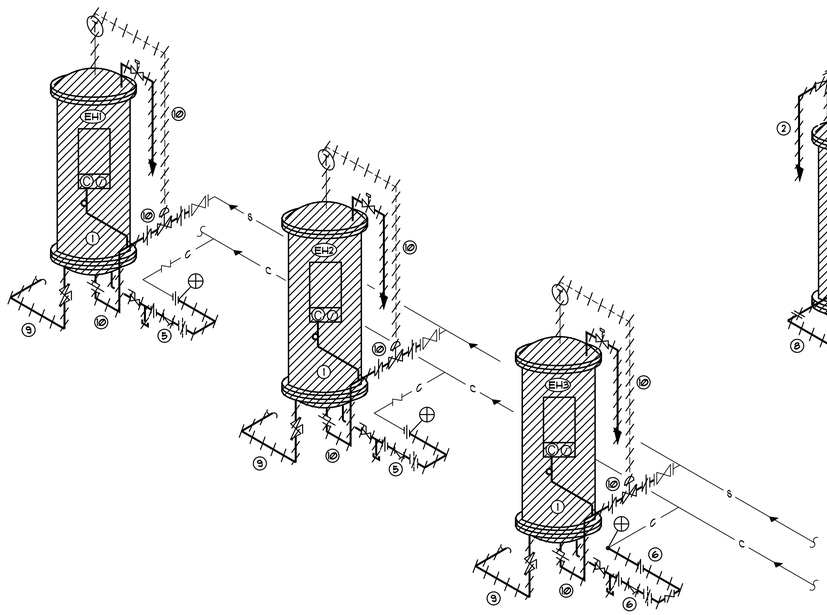
SEAL: SOUTH CAROLINA PROFESSIONAL ENGINEER No. 11155 01/27/15 DANNY WILDS

CHECKED BY: MCH
DRAWN BY: DLF
DATE: 27JAN15
DRAWING: P1
BUILDING: 157

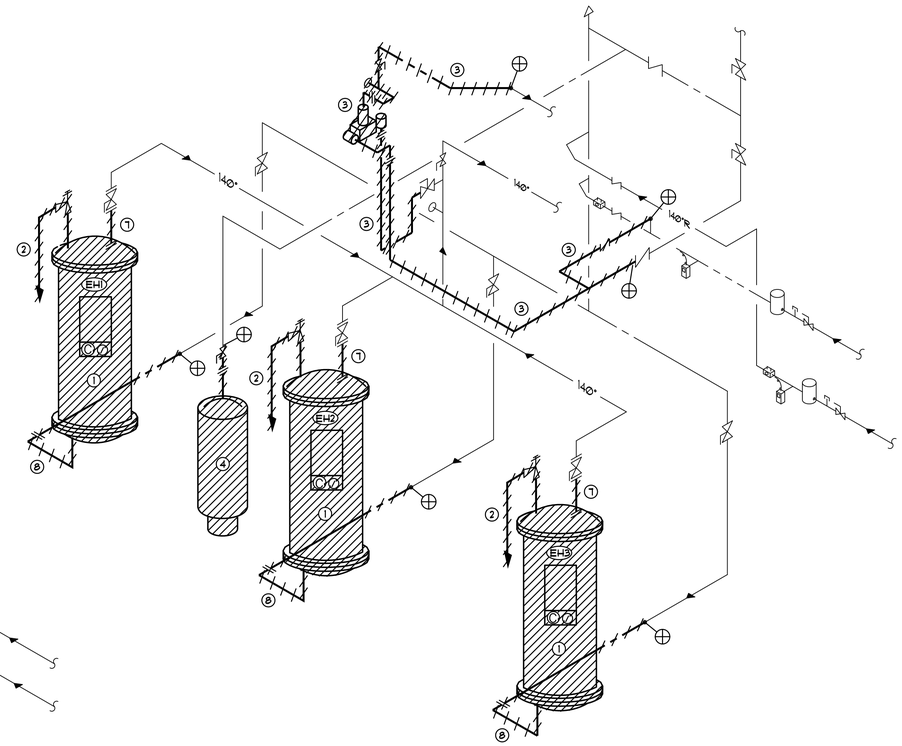
PROJECT TITLE: STROM THURMOND – PROJECT 3 WATER HEATERS REPLACED
STATE PROJECT # H27–D216–FW
University of South Carolina

SHEET: P1 OF 3

SHEET IN SET: 2 OF 5



STEAM AND CONDENSATE



WATER PIPING

DHW P2 | P2

EXISTING HOT WATER GENERATORS - DEMOLITION

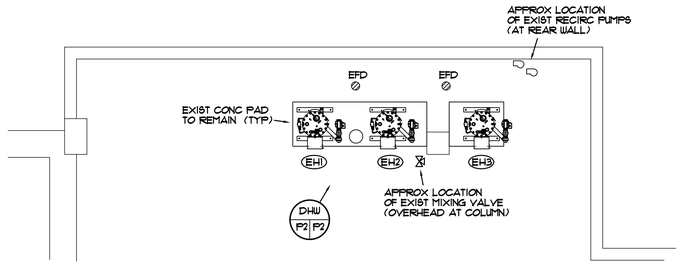
SCHEMATIC

DEMOLITION NOTE: HATCHED PIPING INDICATES PIPING AND MATERIALS TO BE REMOVED.

EXIST STEAM-FIRED WATER HEATER SCHEDULE

MARK	AERCO MODEL	GPH	INLET PRESSURE	STEAM (LB/HR)	ΔT°F	SERVICE	DELIVERY TEMP°F
EH1	B+II 06/1.50/P	1500 ①	15 PSI ②①	996	100°	BUILDING	140°
EH2	B+II 06/1.50/P	1500 ①	15 PSI ②①	996	100°	BUILDING	140°
EH3	B+II 06/1.50/P	1500 ①	15 PSI ②①	996	100°	BUILDING	140°

① 25 GPM
②① ORIGINAL DESIGN PRESSURE



EXIST PLUMBING FLOOR PLAN

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

DEMOLITION NOTES

GENERAL: USC RESERVES THE RIGHT TO CLAIM ANY MATERIALS, PRODUCTS OR EQUIPMENT WHICH ARE REMOVED. ALL SALVAGED ITEMS SHALL BE IDENTIFIED BY USC PRIOR TO START OF DEMOLITION. DISPOSAL OF ALL OTHER ITEMS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. COORDINATE WITH USC AS REQUIRED.

1. DISCONNECT AND REMOVE EXIST HOT WATER GENERATOR.
2. REMOVE EXIST T&P PIPING COMPLETE TO TERMINATION AT FLOOR DRAIN.
3. REMOVE EXISTING MIXING VALVE INCLUDING THERMOMETERS, BY-PASS LINE AND PIPING APPROXIMATELY WHERE INDICATED.
4. REMOVE EXIST EXPANSION TANK COMPLETE INCLUDING BALL VALVE, UNION AND NIPPLE.
5. REMOVE EXIST CONDENSATE PIPING TO UNION.
6. REMOVE EXIST CONDENSATE PIPING TO POINT APPROXIMATELY WHERE INDICATED.
7. REMOVE EXIST HW PIPING TO EXIST FLANGE / VALVE.
8. REMOVE EXIST CW PIPING APPROX AS INDICATED.
9. REMOVE EXIST DRAIN PIPING COMPLETE TO TERMINATION AT FLOOR DRAIN.
10. REMOVE EXIST STEAM PIPING COMPLETE TO GATE VALVE.
11. EXIST CONCRETE PADS TO REMAIN.
12. REMOVE INSULATION PRODUCTS FOR EXIST CW, HW, HWR, STEAM AND CONDENSATE PIPING AS REQUIRED TO POINT OF DEMOLITION APPROX WHERE INDICATED ON FLOOR PLANS. (SEE ASBESTOS NOTES, THIS SHT)
13. REMOVE ALL ASSOCIATED HANGERS, SUPPORTS, BRACKETS, ETC. FOR ALL PIPING, RECIRC PUMPS, COMPONENTS, ETC. BEING REMOVED FOR THIS PROJECT. (SEE ASBESTOS NOTES, THIS SHT)

DEMOLITION SCHEDULE

D1. COORDINATE DEMOLITION AND REMOVAL OF EXIST MATERIALS AND EQUIPMENT WITH USC PERSONNEL PRIOR TO START OF ANY DEMOLITION WORK.

D2. ALL WORK, INCLUDING ELECTRICAL SHALL BE IN PLACE TO MINIMIZE DOWN TIME FOR HOT WATER DELIVERY TO BUILDING. THIS IS CRITICAL.

D3. GENERALLY ALL PIPING SHALL BE REMOVED TO EXIST GATE VALVES AS REQUIRED TO FACILITATE DEMOLITION WITHOUT INTERRUPTING SERVICE TO OTHER AREAS OF THE BUILDING.

D4. COORDINATE DISRUPTION OF EXIST BLDG PLUMBING SYSTEMS OPERATION WITH UNIVERSITY PERSONNEL. SCHEDULE WORK AS DIRECTED BEFORE START OF CONSTRUCTION.

CONSTRUCTION SEQUENCE

GENERAL:

CONSTRUCTION SEQUENCE INDICATED BELOW IS FOR REFERENCE ONLY. CONTRACTOR SHALL COORDINATE SCHEDULE OF WORK WITH UNIVERSITY PERSONNEL AND ENGINEER PRIOR TO START OF DEMOLITION. PROVIDE DEMOLITION, PIPING AND CONNECTIONS TO EXIST SERVICE LINES AND EQPT IN A MANNER TO ALLOW FOR MINIMUM DISRUPTION TO BUILDING OPERATION.

1. COORDINATE TEMPORARY SHUT-DOWN OF HW SYSTEMS INCLUDING STEAM AND CONDENSATE PIPING WITH THE OWNER FOR REMOVAL OF ASBESTOS INSULATION IF APPLICABLE. PROVIDE VALVES AT ALL FINAL CONNECTION POINTS IN EXIST PIPING TO ALLOW WORK TO BE COMPLETED WITHOUT ANOTHER SHUT-DOWN UNTIL INSTALLATION OF INSULATION AND FINAL CONNECTIONS.
2. DISCONNECT EXIST HOT WATER GENERATOR (EH1) AND REPLACE (WH1).
3. DISCONNECT EXIST HOT WATER GENERATOR (EH2) AND REPLACE (WH2).
4. DISCONNECT EXIST HOT WATER GENERATOR (EH3) AND REPLACE (WH3).
5. DISCONNECT EXIST EXPANSION TANK AND REPLACE.
6. CONSTRUCT AND INSTALL PIPE STAND WITH (2) THERMOSTATIC MIXING VALVES AS DETAILED AND LOCATE APPROXIMATELY WHERE INDICATED ON DRGS.
7. REMOVE EXIST THERMOSTATIC MIXING VALVE AND PROVIDE FINAL PIPING TIE-INS TO H&CW INCLUDING RECIRC BALANCING LINE.
8. HOT WATER GENERATORS SHALL BE DISCONNECTED, REMOVED AND REPLACED ONE AT A TIME INCLUDING INSTALLATION OF INSULATION AND FACTORY START-UP TO ALLOW (2) UNITS TO BE FUNCTIONING AT ALL TIMES TO MAINTAIN HW SERVICE TO BUILDING. ANY DOWN TIME FOR HW SHALL BE CLOSELY COORDINATED WITH UNIVERSITY PERSONNEL.

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DATE: 01/27/15 COMM. NO. 143107

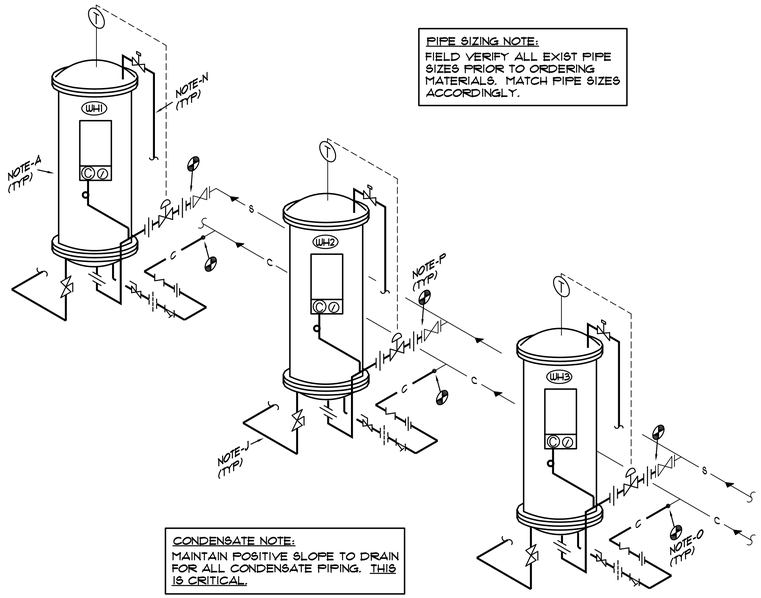
CAMPUS PLANNING AND CONSTRUCTION
COLUMBIA, SC 29208
CP00408057/FM00462895

SEAL: CAROLYN SUE HUDIS No. 11155 REGISTERED ENGINEER 01/27/15 SCOTT WILSON DANNER

CHECKED BY: MCH
DRAWN BY: DLF
DATE: 27JAN15
DRAWING: P2
BUILDING: 157

PROJECT TITLE: STROM THURMOND – PROJECT 3 WATER HEATERS REPLACED
STATE PROJECT # H27-D216-FW
University of South Carolina

SHEET: P2 OF 3
SHEET IN SET: 3 OF 5



PIPE SIZING NOTE:
FIELD VERIFY ALL EXIST PIPE SIZES PRIOR TO ORDERING MATERIALS. MATCH PIPE SIZES ACCORDINGLY.

CONDENSATE NOTE:
MAINTAIN POSITIVE SLOPE TO DRAIN FOR ALL CONDENSATE PIPING. THIS IS CRITICAL.

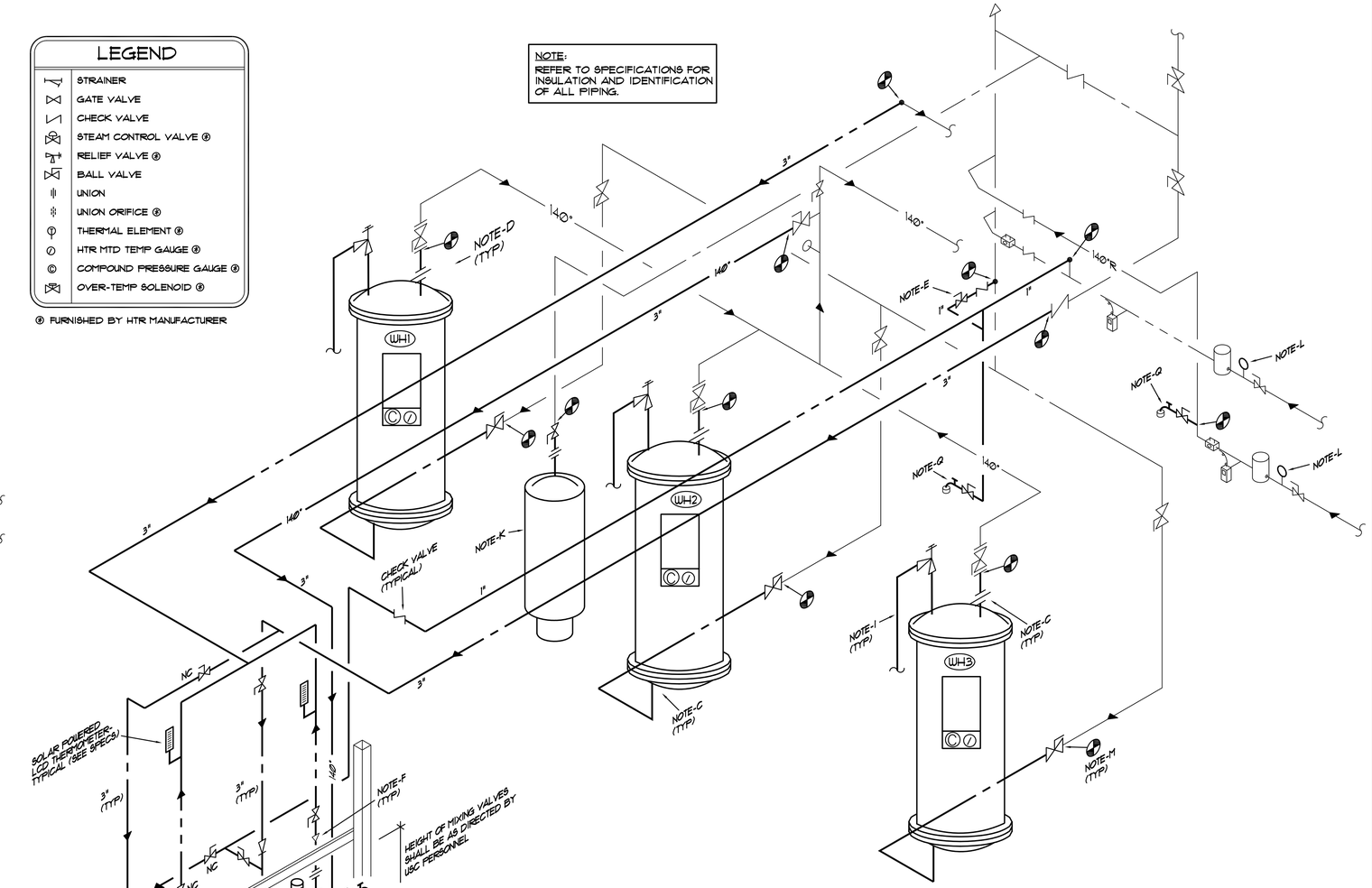
STEAM AND CONDENSATE

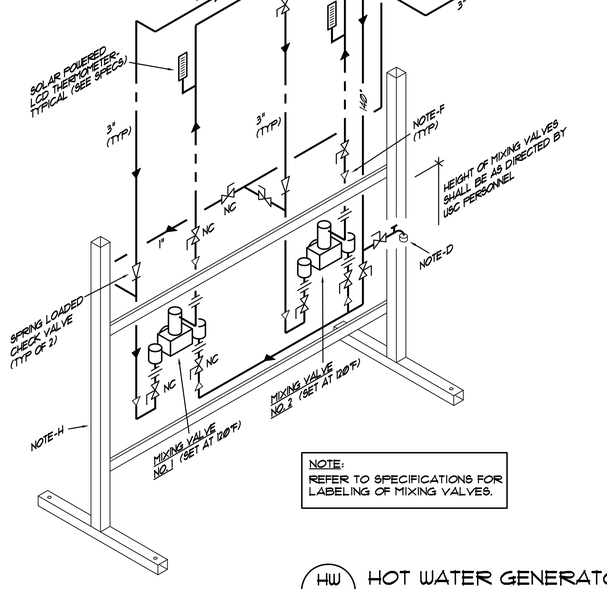
LEGEND

	STRAINER
	GATE VALVE
	CHECK VALVE
(P)	STEAM CONTROL VALVE (P)
(P)	RELIEF VALVE (P)
	BALL VALVE
	UNION
	UNION ORIFICE (P)
(P)	THERMAL ELEMENT (P)
(P)	HTR MTD TEMP GAUGE (P)
(P)	COMPOUND PRESSURE GAUGE (P)
(P)	OVER-TEMP SOLENOID (P)

(P) FURNISHED BY HTR MANUFACTURER

NOTE:
REFER TO SPECIFICATIONS FOR INSULATION AND IDENTIFICATION OF ALL PIPING.





NOTE:
REFER TO SPECIFICATIONS FOR LABELING OF MIXING VALVES.

WATER PIPING

WATER HEATER NOTES:

A. REFER TO SPECIFIATIONS FOR HEATERS TO REPLACE EXISTING. RECONNECT EXIST PIPING AS NOTED BELOW. SECURE SKIDS TO EXIST CONC SLAB USING MINIMUM 1/2" STAINLESS STEEL ANCHORS AS DIRECTED BY SEISMIC EQUIPMENT SUPPLIER.

B. FIELD VERIFY EXACT LOCATIONS AND SIZES OF EXIST WATER, STEAM AND CONDENSATE LINES AND POINTS OF CONNECTION PRIOR TO START OF CONSTRUCTION.

C. PROVIDE DIELECTRIC UNIONS AT ALL CONNECTIONS TO WATER HEATERS WHERE DISSIMILAR METALS EXIST.

D. PROVIDE HAMMOND 2002 3/4" HOSEBIBB WITH WATTS 8A VACUUM BREAKER FOR SYSTEM DRAIN AND TEST AND FACTORY START-UP OF HEATERS.

E. BALL VALVE FOR BALANCING RECIRC SYSTEM.

F. PROVIDE REDUCING FITTINGS FOR FINAL CONNECTIONS TO MIXING VALVE AS REQUIRED.

G. "NC" DENOTES NORMALLY CLOSED VALVES FOR MIXING VALVE BYPASS.

H. PROVIDE STAND FOR INSTALLATION OF MIXING VALVES. STAND SHALL BE WELDED 2" TUBE STEEL WITH (2) 2"x1/4" PLATES WELDED TO UPRIGHTS AND 3/4" THICK MARINE GRADE PLYWOOD ATTACHED TO PLATES. SECURE MIXING VALVES TO PLYWOOD USING STAND-OFF BRACKETS. PAINT STAND INCLUDING PLYWOOD WITH MIN. (2) COATS PRIMER AND (2) GLASS BLACK ENAMEL. SECURE STAND TO EXIST CONCRETE FLOOR USING MINIMUM 1/2" STAINLESS STEEL ANCHORS AS DIRECTED BY SEISMIC EQUIPMENT SUPPLIER.

I. PIPE T&P RELIEF VALVE TO EXISTING FLOOR DRAIN (EFD) AND ELBOW DOWN. (TYPE L COPPER)

J. PIPE DRAIN VALVE TO EXISTING FLOOR DRAIN (EFD) AND ELBOW DOWN. (TYPE L COPPER)

K. PROVIDE TACO PAX-130-150 ASME EXPANSION TANK TO REPLACE EXIST.

L. PROVIDE THERMOMETER AS SPECIFIED AT EXIST CAPPED PIPING.

M. CONNECT TO EXIST CW PIPING WITH BALL VALVE.

N. PIPE DRAIN FROM OVER-TEMP SOLENOID TO EXISTING FLOOR DRAIN (EFD) AND ELBOW DOWN. (TYPE L COPPER)

O. PROVIDE CONNECTION TO ECCENTRIC FITTING AT CONDENSATE MAIN AS REQUIRED.

P. PROVIDE CONNECTION TO UNION / FLANGE AT EXIST STEAM VALVE AS REQUIRED.

Q. PROVIDE HAMMOND 2002 3/4" HOSEBIBB WITH WATTS 8A VACUUM BREAKER FOR RECIRC SYSTEM TEST. LOCATE FOR EASY ACCESS.

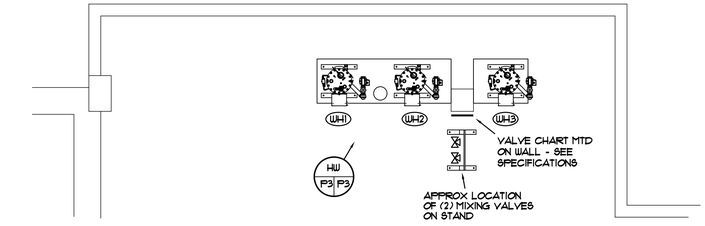
HW P3 P3 HOT WATER GENERATORS SCHEMATIC

NO SCALE

STEAM-FIRED WATER HEATER SCHEDULE

MARK	AERCO MODEL	GPH	INLET PRESSURE	STEAM (LB/HR)	ΔT°F	SERVICE	DELIVERY TEMP°F
WH-1	B+11 06/150/EC	1500 (P)	15 PSI	936	100°	BUILDING	140°
WH-2	B+11 06/150/EC	1500 (P)	15 PSI	936	100°	BUILDING	140°
WH-3	B+11 06/150/EC	1500 (P)	15 PSI	936	100°	BUILDING	140°

(P) 25 GPM



PLUMBING FLOOR PLAN

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

SOUTH CAROLINA MECHANICAL DESIGN, INC. Columbia, SC No. C00096 CERTIFICATE OF AUTHORIZATION

MECHANICAL DESIGN INC.
4403 Broad River Road
Columbia, S.C. 29210
(803) 731-9834
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CONTACT: M. HENDRIX
DATE: 01/27/15 COMM. NO. 143107

CAMPUS PLANNING AND CONSTRUCTION
COLUMBIA, SC 29206
CP00408057/FM00462895

SEAL: SOUTH CAROLINA PROFESSIONAL ENGINEER No. 11155 01/27/15 DANNY WILSON

CHECKED BY: DLF MCH
DRAWN BY:
DATE: 27JAN15
DRAWING: P3
BUILDING: 157

PROJECT TITLE: STROM THURMOND – PROJECT 3 WATER HEATERS REPLACED

STATE PROJECT # H27-D216-FW

University of South Carolina

SHEET: P3 OF 3

SHEET IN SET: 4 OF 5

SECTION 260500 – ELECTRICAL BASIC MATERIALS AND METHODS

PART 1 – GENERAL REQUIREMENTS

1–01 SCOPE OF WORK

WORK INCLUDED: Furnish all necessary labor, material, plant and equipment, including materials and equipment not specifically mentioned but necessary to complete the work in a neat, correct, and workmanlike manner, to include:

1) Complete branch circuit wiring system for equipment, and outlets as shown on the electrical drawings.
2) Line voltage connections to equipment furnished under other Sections of these specifications, including disconnects, where indicated.

1–02 EQUIPMENT WIRING

Furnish and install power circuits to and line voltage connections to all equipment furnished and installed by other trades, including disconnects, where indicated.

Furnish and install receptacles for equipment furnished with cord and plug.

CONTROL WIRING: Raceways, wiring, and control devices (thermostats, pressure switches, program clocks, etc) for low voltage HVAC control systems and other mechanical and plumbing systems shall be furnished and installed under Division 23, unless otherwise indicated on the drawings or specified in this Division.

VOLTAGE: The Electrical Contractor shall supply power to equipment at the voltage indicated on the electrical drawings. The Electrical Contractor and the other applicable trades will be held responsible for coordinating the equipment voltages, the control equipment wiring, and the location and type of disconnect required to comply with the equipment manufacturer's requirements, the National Electric Code, and applicable local building codes. IF EQUIPMENT IS SUPPLIED AT A VOLTAGE OTHER THAN THAT PROVIDED, THE GENERAL CONTRACTOR AND SUBCONTRACTORS WILL BE HELD RESPONSIBLE FOR MAKING ANY NECESSARY ADJUSTMENTS TO CORRECT THE CONFLICT, AT NO COST TO THE OWNER, TO THE SATISFACTION OF THE ELECTRICAL ENGINEER.

1–03 EXISTING CONDITIONS

The Contractor will be held responsible for having visited the site and having familiarized himself with the existing conditions prior to submitting his bid.

1–04 COORDINATION

OTHER TRADES: All work under this Section shall be coordinated with other trades to insure proper location of outlets and equipment connections, and to minimize conflicts with structural members, duct work, piping, etc. Conflicts between equipment and/or material locations shall be corrected as directed by the Architect–Engineer at no additional cost to the Owner.

UTILITIES: The service locations, arrangement and metering for electrical and telephone service entrances shall be coordinated in detail with those utilities. All provisions necessary for these services shall be provided in the Electrical Contractor's bid, unless otherwise indicated.

1–05 CODES AND PERMITS

Installation and materials shall be in accordance with the applicable versions of the National Electrical Code, the International Building Code, and all local codes.

1–06 DRAWINGS

The drawings and specifications shall be considered as complementary, one to the other, so that materials and labor indicated, called for, or implied by either shall be furnished and installed as if required by both. Where a disagreement exists between the plans and specifications, the item or arrangements of better quality, greater quantity, or higher cost shall be included in the base bid. Any discrepancies between the drawings, specifications, and field conditions shall be resolved with the Engineer prior to commencing work. All agreements shall be verified in writing.

RECORD DRAWINGS: The Contractor shall maintain one set of clean blueprints for "RECORD" drawings. All changes, revisions, or modifications to the project shall be recorded daily on these drawings with redline pencil. Upon completion of the project, these redline drawings shall be turned over to the Engineer for preparation of final Record Drawings.

1–07 GUARANTEE

All materials and labor furnished under this Section of the specifications shall be guaranteed by the Contractor to be free from defects for a period of one year from the date of acceptance. The Contractor shall repair or replace any deficiencies reported in the guarantee period promptly after notification, without any additional compensation from the Owner. Lamps are excluded from this warranty, except that all lamps shall be operational on the date of acceptance.

1–08 MATERIALS

UL LISTING: All materials shall be listed by Underwriter's Laboratories, or an approved equal testing laboratory, and shall bear the "UL" Label, where applicable.

SUBSTITUTIONS: Specific reference in the specifications to any article, device, product, material, fixture, form or type of construction, etc., by name, make or catalog number, with or without the words "or equal" shall be interpreted as establishing a standard of quality and shall not be construed as limiting competition and the Contractor in such cases may, at his option, use any article, device, product, material, fixture, form or type of construction, which in the judgement of the Architect–Engineer, expressed in writing prior to bidding as specified below, is equal to that herein named.

Requests to substitute materials or equipment considered by the Contractor as equal to those specified shall be submitted for review to the Architect–Engineer ten (10) days before bids are taken. Requests shall be accompanied by samples, descriptive literature, and engineering information, as necessary to fully identify and appraise the product. No increase in the contract sum will be considered when requests are not accepted. If the item is found to be equal, the Architect–Engineer will issue an Addendum making it a part of the Contract Documents prior to bidding.

1–09 SUBMITTALS

Electrical shop drawings shall be submitted in one complete package containing all items required by this specification. Partial shop drawing submittals may be rejected by the Architect–Engineer.

Within 30 days after award of contract and before any materials are delivered to the site, submit one (1) digital set in pdf format to the Architect–Engineer on the following materials:

1) Section 260500 – Raceways, Fittings, and Surface Wiring Systems.
2) Section 260500 – Wire and Cable.
3) Section 260500 – Boxes and Wireways.
4) Section 260500 – Existing Panelboard, new circuit breakers for new circuits.
5) Section 260500 – Fire Wall Penetration Assembly where applicable.

No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

Digital submittal to be pdf documents and to include a separate transmittal letter indicating project name and address, date, Electrical Contractor name and address, General Contractor name and address, Construction Manager name and address (if applicable), list of submittals, and remarks, and signature of transmitter.

The digital submittal shall be divided into submittal categories as indicated above, with each category tabbed separately with a cover sheet indicating project name and name and address of firm or entity that prepared submittal.

Failure to comply with the above criteria my result in rejection of the submittal by the Architect–Engineer. Refer to Division 1 for additional Submittal requirements.

PART 2 – MATERIALS

2–01 RACEWAYS AND FITTINGS

GALVANIZED RIGID CONDUIT (GRC): UL 6 and ASA C80.1 with full weight screwed fittings. Bushings shall be malleable iron. Bushings 1 1/4" and larger shall have insulated throat and grounding lug.

ELECTRICAL METALLIC TUBING (EMT): UL 797 and ASA C80.3 with steel compression or set–screw type fittings. Die–cast fittings are not acceptable. Fittings 1 1/4" and larger shall have nylon insulated throat. Indented or drive–on fittings are not acceptable. Conduit used for Fire Alarm System wiring shall be red, similar to Allied Fire Alarm EMT.

FLEXIBLE STEEL CONDUIT (GREENFIELD): UL 1. Fittings shall be steel.

LIQUIDTIGHT FLEXIBLE STEEL CONDUIT (SEALTITE): UL 360. Fittings shall be steel compression type.

2–02 WIRE AND CABLE

UL STANDARDS: UL 44 and UL 83.

CONDUCTOR: Copper, soft drawn, per ASTM B3. Sizes No. 12 and 10 shall be solid conductor. Sizes No. 8 and larger shall have Class B concentric stranding per ASTM B8. Stranded conductors may not be used on No. 12 and No. 10 circuits.

INSULATION: 600 Volt, 75 Deg C rated. Type THHN_THWN_MTW, unless noted otherwise.

SPLICING MATERIALS:

No. 10 and smaller: Acceptable wire nuts or insulated crimped splice caps.
No. 8 and larger: Bronze or copper split bolts, or tinned compression connectors.
(Polaris insulated splice blocks may not be used on this project).

Insulation shall be Scotch No. 23 rubber tape and Scotch No. 33 plastic tape, or approved equivalent method.

2–03 BOXES AND WIREWAYS

OUTLET BOXES: Galvanized sheet steel per UL 514. "Through–wall" boxes SHALL NOT BE USED. Back–to–back mounting of boxes is not permitted. All outlet boxes 4"x4" or smaller located on opposite sides of a rated wall shall have a minimum of 24" horizontal spacing or shall be protected with listed putty pads. All outlet boxes larger than 4"x4" (communications outlets, etc.) located in rated walls shall be protected with listed putty pads.

Box sizes shall be as follows:

1) Wall Receptacle Outlets: 4" square by 2 1/8" deep with plaster ring as required.
2) Ceiling outlets: 4" square or octagonal by 1 1/2" or 2 1/8" deep with stud or ears where required for fixture support.
3) Exposed Outlets: Malleable iron or heavy duty cast aluminum with threaded hubs, Type FS, FD, or GS. Manufactured by Crouse Hinds, Appleton, Killark, or approved equal. Die cast boxes are not acceptable.

WIREWAYS, PULL BOXES AND JUNCTION BOXES: UL 50. Code gage galvanized sheet steel, aluminum, or steel primed and painted after fabrication. Manufactured by Square D, Austin Berryhill, Hoffman Engineering, B_Line Systems, or approved equal. Wireways shall have hinged covers.

2–04 PANELBOARDS

MANUFACTURERS: Match existing type.

CIRCUIT BREAKERS: Match existing type. Breakers shall be rated for the specified panelboard interrupting capacity rating in RMS symmetrical amperes. Two and three pole breakers shall have common internal trip. Branch mounted main breakers are not permitted unless specifically noted on the drawings.

PART 3 – EXECUTION

3–01 GENERAL REQUIREMENTS

WORKMANSHIP: All work shall be installed in a neat and orderly manner. Devices, cabinets, covers, fixtures, exposed raceways, etc., shall be aligned parallel or perpendicular to the building walls, ceiling, and floor. Wiring in panelboards and cabinets shall be neatly looped and laced, and not wadded. The Owner reserves the right to require repair or replacement of defective workmanship and material without additional compensation to the Contractor.

SUPPORTS: Conduits, boxes, cabinets, enclosures, lighting fixtures, etc., shall be securely supported by structural members or structural walls at intervals required by the NEC or as recommended by the manufacturer. Plaster, gypsum board, acoustical tile, and other ceiling and wall finish materials shall not be used for support.

CUTTING, PATCHING, AND PAINTING: The Electrical Contractor shall perform all boring, drilling, and cutting of walls, ceilings, and floors as required to install and support his raceways and equipment. Provide rough patching to seal penetrations through walls, ceilings, and floors. Finish patching and painting will be performed by the General Contractor.

3–02 GROUNDING

CODE: Entire system shall be grounded and bonded in accordance with the requirements of Article 250 of the National Electrical Code.

FEEDERS AND BRANCH CIRCUITS: Each feeder raceway shall be bonded to every cabinet, pull box, etc., to which it is connected by grounding bushings and bonding jumpers sized per NEC Table 250.122. Each branch circuit raceway must be connected to every cabinet, pull box, outlet box, etc., with double locknuts. Separate grounding conductors shall be installed on all feeders and on all lighting, receptacle and equipment branch circuits, whether indicated on the drawings or not. Size per NEC 250.122.

3–03 RACEWAYS

WIRING: All wiring shall be installed in raceways, unless noted. Raceways shall be run concealed, unless noted.

BRANCH CIRCUITS:

1) Branch circuits shall be run concealed where practical.
2) Branch circuits run concealed in walls or ceilings shall be run in EMT or GRC.
3) Branch circuits run exposed to weather on exterior walls or on roofs shall be run in GRC with screwed fittings.
4) Branch circuits run exposed in damp locations, unfinished spaces (attics), and unoccupied spaces (storage room, equipment rooms, janitor's closet) may be run in EMT in lieu of Wiremold.
5) All interior conduit homeruns to panelboards shall be run overhead in EMT or GRC unless noted otherwise on the drawings.
6) Metal conduits installed in contact with earth shall be painted with 2 coats Rustoleum paint or other acceptable preservative.

Final connections to motors, motor driven equipment, transformers, and vibrating equipment shall be made thru flexible conduit, 36" maximum length. "Sealtite" flexible metal conduit shall be installed outdoors, in equipment rooms, and in wet locations.

PULL WIRES: Raceways for wiring by others or for future shall contain a No. 14 galvanized steel pull wire or equivalent plastic cord with 200 lb. tensile strength.

INSTALLATION: Ream raceways, butt ends into couplings, 3 quarter bends per run maximum, plug raceways until wiring is pulled in place. Exposed conduits shall be run parallel and perpendicular to walls, floor, and ceiling. Multiple conduit runs shall be racked using Unistrut or Kindorf channels and pipe clamps. Install conduits in concrete slabs between the top and bottom layers of reinforcing steel. Maximum size of conduits in slabs is 1 inch. Crossing of conduits in slabs shall be avoided, if possible.

PULL BOXES: Maximum length between pull points shall be 200 ft. for pulls with two 90 degree bends, and 100 ft for pulls with three 90 degree bends. Furnish and install pullboxes, junction boxes, handholes, or conduit bodies where bends or pulling lengths exceed these specifications.

EXPANSION JOINTS: Furnish and install expansion joints where conduit crosses building expansion joints and for straight runs exceeding 100 ft. in length.

MINIMUM SIZE: Home runs to panelboards shall be 3/4" minimum, otherwise raceways shall be 1/2" minimum, except that flexible conduit shall be 3/8" minimum.

3–04 WIRE AND CABLE

MINIMUM SIZE: No. 12 for power circuits, No. 14 for control circuits, unless noted. Where home run exceeds 75 ft. length on 120 volt circuits, use No. 10 minimum.

COLOR CODE: No. 12 and No. 10 shall have color–coded insulation. No. 8 and larger shall be marked at all terminals and joints with color–coded tape. Color code as follows:

Voltage	Phase A	Phase B	Phase C	Neutral	Grounding
240/120	Black	Orange	Blue	White	Green
208/120	Black	Red	Blue	White	Green
480/277	Brown	Orange	Yellow	Gray	Green

INSTALLATION: Insure that raceway system is complete and that conductors will be free from moisture or physical damage prior to installing conductors. Install all conductors at the same time. Do not exceed cable manufacturer's recommended pulling tension for conductors. Where required, lubricate cables with Ideal Yellow 77, Burndy Slikon, or other acceptable cable lubricant. Do not use lubricants that are not acceptable to the Architect–Engineer.

SPLICING: Splices on Sizes No. 10 and smaller shall be made with wire nuts. Splices on Sizes No. 8 and larger shall be made with split bolt connectors, compression connectors, or solderless lugs. Splices shall be insulated with two or more layers of Scotch 23 rubber tape covered with two or more layers of Scotch 33 plastic tape, or acceptable equivalent method.

MULTIWIRE BRANCH CIRCUITS: Shared or common neutrals are not permitted on this project for multiwire branch circuits. The Contractor shall pull a separate neutral for all 120V & 277V circuits.

3–05 BOXES

WALL OUTLETS: Flush mounted, unless noted. Boxes shall be securely mounted to wall studs or be grouted in masonry. Boxes shall have single or multi–gang plaster rings, as required. "Through–wall" boxes SHALL NOT BE USED. Back–to–back mounting of boxes is not permitted. Boxes on opposite sides of a rated wall shall have a minimum of 24" horizontal spacing or shall be protected with listed putty pads.

CEILING OUTLETS: Flush mounted or concealed above ceiling. Boxes for fixture support shall have studs or ears as required and shall be securely supported by adjustable bar hangers or steel angle.

JUNCTION BOXES, PULL BOXES, AND WIREWAYS: Shall be sized and installed as indicated on the drawings or where required by NEC for pulling or splicing wiring. All junction boxes and pull boxes shall be accessible. Junction boxes and pull boxes shall not be located above inaccessible ceilings.

LOCATIONS: Verify door swings and mount switches on strike side, 6" from jamb. Verify counter heights and arrangement prior to setting boxes. The Owner reserves the right to move any outlet by as much as 10 ft. from its indicated location at no additional cost, provided the Contractor is notified prior to roughing in.

3–06 PANELBOARDS

DIRECTORY: Provide typewritten circuit directory for each panel identifying load served and room location. Identify all spare breakers and turn off. Panelboard schedules must comply with NEC 408.4, including listing room description and room number for each load.

3–07 COMPLETION OF WORK

TESTS AND FINAL REVIEW: Upon completion of work, the entire system shall be completely operational and tested to conform with these specifications and drawings, and shall be reviewed by the Architect–Engineer. All defects in workmanship and material shall be immediately corrected without additional compensation to the Contractor.

The final review of the electrical installation by the Engineer cannot be provided until the following items have been submitted to the Engineer for review:

1) Letter from the Electrical Contractor on company letterhead indicating that the installation is complete and ready for a final review.

Failure to submit the above documentation prior to requesting the Engineer's Final Review of the project may result in delays in providing the final review. The Engineer assumes no liability for delays in the project resulting from failure to provide the proper documentation.

The system will not be considered complete until Record Documents are provided and training of facility personnel on the system operation is complete. This facet of the services to be provided by the Contractor is deemed very important to the satisfactory completion of the contract and the installation cannot be deemed complete until these services have been provided in accordance with the Contract Documents.

CLEAN UP: Upon completion of all installations and prior to final acceptance by the Owner, remove all debris from the site. Clean and touch up paint on fixture lenses and trims, cabinets, enclosures, cover plates, etc.

END OF SECTION 260500

ELECTRICAL DEMOLITION NOTES

A. THE ELECTRICAL CONTRACTOR SHALL ASSIST THE PLUMBING/MECHANICAL SUBS IN REMOVAL OF EQUIPMENT WITH ELECTRICAL CONNECTIONS AS REQUIRED.

B. PRIOR TO SUBMITTING BID, THE CONTRACTOR SHALL SURVEY THE EXISTING BUILDING AND MAKE NOTE OF ANY ADDITIONAL DEMOLITION AND/OR ANY ADDITIONAL REMOVAL AND RELOCATION WHICH MAY BE REQ'D IN ORDER TO ACCOMPLISH RENOVATIONS INDICATED IN CONTRACT DOCUMENTS. NO CHANGE ORDER WILL BE ISSUED FOR ADDITIONAL WORK REQUIRED FOR DEMOLITION, REMOVAL, OR RELOCATION WORK NOT INDICATED ON THESE DRAWINGS BUT NECESSARY TO COMPLETE WORK.

C. NO EXISTING ELECTRICAL MATERIALS, EQUIPMENT, WIRING, OR CONDUIT BEING REMOVED MAY BE REUSED ON THIS PROJECT UNLESS SPECIFICALLY NOTED OTHERWISE ON THESE DRAWINGS. ALL EXISTING ELECTRICAL MATERIALS AND EQUIPMENT NOT BEING REUSED SHALL BE DISPOSED OF AS INDICATED IN GENERAL NOTES.

SCOPE OF WORK

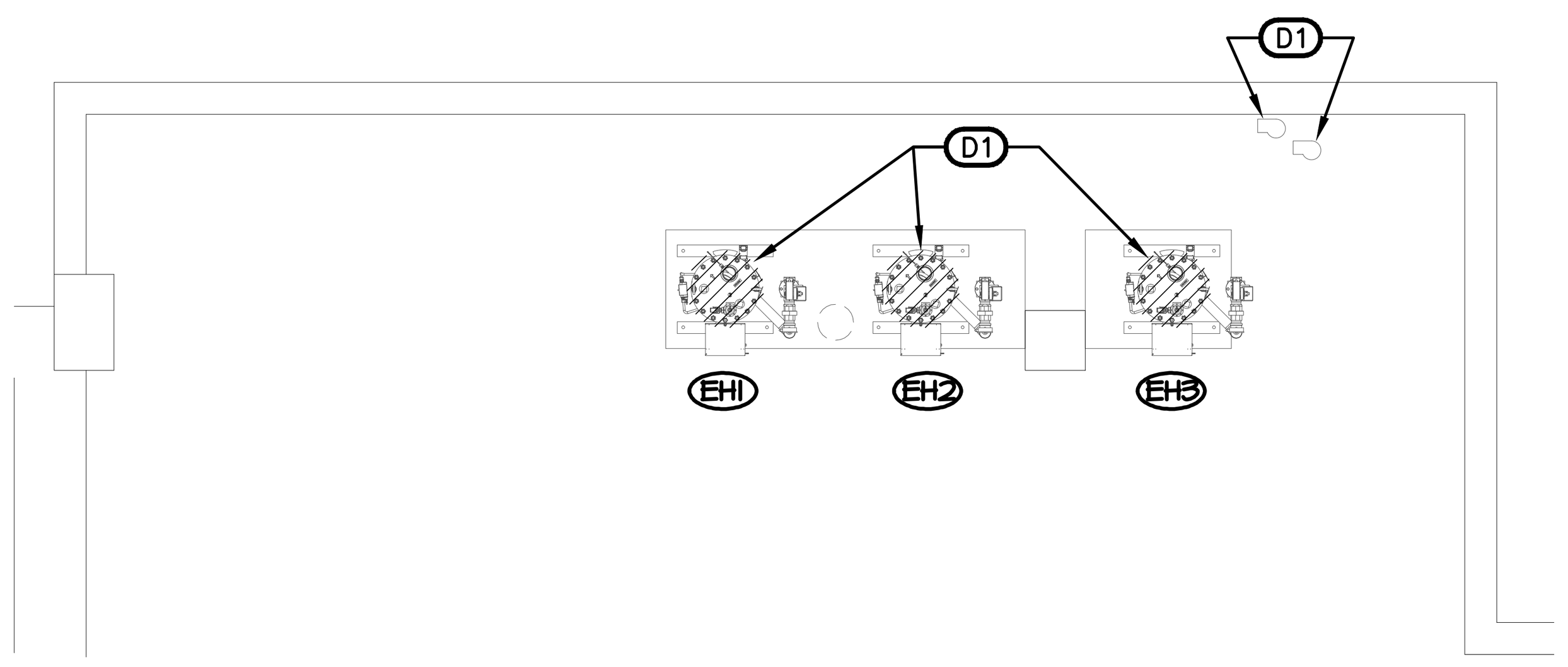
THE WORK OF THIS SECTION SHALL PROVIDE COMPLETE ELECTRICAL SYSTEMS WHICH SHALL INCLUDE THE PROVIDING OF ALL CONDUCTORS, RACEWAYS, FITTINGS, CIRCUIT PROTECTIVE DEVICES, BOXES, SUPPORTS, AND ALL ASSOCIATED APPURTENANCES AND MISCELLANEOUS EQUIPMENT NECESSARY, ALL OF WHICH SHALL BE COMPLETELY CONNECTED, TESTED, ADJUSTED AND LEFT IN PROPER OPERATING CONDITION. THE ELECTRICAL SYSTEM TO BE PROVIDED SHALL INCLUDE SERVICE AND DISTRIBUTION FACILITIES POWER FOR MOTOR OPERATED EQUIPMENT AND AQUASTATS.

GENERAL NOTES:

1. ALL ELECTRICAL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE 2011 NATIONAL ELECTRICAL CODE (NEC), THE 2012 INTERNATIONAL BUILDING CODE (IBC), AND ANY LOCAL CODES, LAWS AND ORDINANCES WHICH MAY APPLY. WHERE DIFFERENCES EXIST BETWEEN THE CODES, THE STRICTER CODE SHALL APPLY.
2. ALL CONDUITS SHALL CONTAIN A GROUNDING CONDUCTOR REGARDLESS OF USE.
3. THE CONTRACTOR FOR THE WORK UNDER THIS SECTION SHALL PROCURE AND PAY FOR ALL PERMITS, FEES, AND LICENSES REQUIRED FOR THE EXECUTION OF THIS WORK. SATISFACTORY EVIDENCE OF COMPLIANCE WITH THE REQUIREMENT AND ALL CERTIFICATES OF INSPECTION SHALL BE DELIVERED TO THE OWNER PROMPTLY UPON REQUEST.
4. TYPE MC CABLE MAY NOT BE USED ON THIS PROJECT, EXCEPT THAT METAL CLAD CABLE SHALL BE PERMITTED FOR LIGHT FIXTURE WHIPS PROVIDED THEY DO NOT EXCEED 6–FEET IN LENGTH AND ARE PROVIDED BY THE LIGHT FIXTURE MANUFACTURER.
5. UNLESS OTHERWISE NOTED FOR 120–VOLT, 20–AMP CKTS:
   #10 AWG SHALL BE USED FOR HOMERUNS LONGER THAN 75 FEET
   #12 AWG SHALL BE USED FOR HOMERUNS 75 FEET OR SHORTER
6. MULTIWIRE BRANCH CIRCUITS USING A SHARED OR COMMON NEUTRAL ARE NOT PERMITTED ON THIS PROJECT. THE CONTRACTOR SHALL PULL A SEPARATE NEUTRAL FOR ALL CIRCUITS.
7. ELECTRICAL METALLIC TUBING AND RIGID GALVANIZED STEEL CONDUIT SHALL BE THE ONLY TYPES OF CONDUIT INSTALLED WITHIN THE BUILDING.
8. BRANCH CIRCUITS RUN EXPOSED IN DAMP LOCATIONS AND EQUIPMENT ROOMS, SHALL BE RUN IN EMT.
9. CONDUIT HOMERUNS TO PANELBOARDS AND CONDUITS SHOWN WITH MULTIPLE CIRCUITS SHALL BE 3/4" MINIMUM, OTHERWISE RACEWAYS SHALL BE 1/2" MINIMUM, EXCEPT THAT FLEXIBLE CONDUIT SHALL BE 3/8" MINIMUM.
10. INTERIOR CONDUIT HOMERUNS TO PANELBOARDS SHALL BE RUN OVERHEAD IN EMT OR GRC UNLESS NOTED OTHERWISE ON THE DRAWINGS.
11. INSTALL ALL MATERIALS PER MANUFACTURER'S INSTRUCTIONS.
12. IDENTIFY MAJOR EQUIPMENT INSTALLED WITH LAMICOR LABELS.
13. VISIT SITE TO DETERMINE EXISTING CONDITIONS PRIOR TO SUBMITTING BID.
14. ALL RACEWAYS, FIXTURES, WIRING, DEVICES, AND EQUIPMENT RENDERED USELESS BY THIS WORK SHALL BE REMOVED AND DELIVERED TO THE OWNER'S STORAGE FACILITY AS DIRECTED. ANY MATERIAL NOT WANTED BY THE OWNER SHALL BE DISPOSED OF BY THE CONTRACTOR.
15. WHERE DISAGREEMENTS EXISTS ON THE DESIGN DOCUMENTS, THE ITEM OR ARRANGEMENTS OF BETTER QUALITY, GREATER QUANTITY, OR HIGHER COST SHALL BE INCLUDED IN THE BASE BID. ANY DISCREPANCIES BETWEEN THE DRAWINGS, SPECIFICATIONS, AND FIELD CONDITIONS SHALL BE RESOLVED WITH THE ENGINEER PRIOR TO COMMENCING WORK. ALL AGREEMENTS SHALL BE VERIFIED IN WRITING.
16. ALL WORK UNDER THIS SECTION SHALL BE COORDINATED WITH OTHER TRADES TO INSURE PROPER LOCATION OF OUTLETS AND EQUIPMENT CONNECTIONS, AND TO MINIMIZE CONFLICTS WITH STRUCTURAL MEMBERS, DUCT WORK, PIPING, ETC. CONFLICTS BETWEEN EQUIPMENT AND/OR MATERIAL LOCATIONS SHALL BE CORRECTED AS DIRECTED BY THE ARCHITECT–ENGINEER AT NO ADDITIONAL COST TO THE OWNER.
17. PROVIDE NEW TYPEWRITTEN PANEL DIRECTORIES. TURN OFF SPARE BREAKERS.
18. REFER TO PLUMBING DRAWINGS FOR SEQUENCE OF CONSTRUCTION.

ELECTRICAL SYMBOLS

Symbol	Description
(J) wall / (J) ceiling	WALL OR CEILING MOUNTED JUNCTION BOX.
Home run arrow, A–1,3	BRANCH CIRCUIT WIRING RUN CONCEALED IN WALLS OR CEILING, 1#12G, 2#12 UNLESS NOTED OTHERWISE. ARROW DENOTES HOME RUN AND NUMERAL DENOTES CIRCUIT NUMBER. WHERE MORE THAN TWO CONDUCTORS ARE REQUIRED, SLASH MARKS INDICATE NUMBER OF #12 CONDUCTORS: SHORT SLASH DENOTES HOT OR SWITCH LEG, LONG SLASH DENOTES NEUTRAL, "L" DENOTES GROUNDING WIRE. MULTIWIRE BRANCH CIRCUITS USING A SHARED OR COMMON NEUTRAL ARE NOT PERMITTED ON THIS PROJECT. THE CONTRACTOR SHALL PULL A SEPARATE NEUTRAL FOR ALL 120V AND 277V CIRCUITS. CONDUIT HOMERUNS TO PANELBOARDS SHALL BE 3/4" MINIMUM, OTHERWISE RACEWAYS SHALL BE 1/2" MINIMUM, EXCEPT THAT FLEXIBLE CONDUIT SHALL BE 3/8" MINIMUM.
Dashed line	SAME, EXCEPT RUN UNDERGROUND OR UNDERFLOOR.
Dash-dot line	SAME, EXCEPT RUN EXPOSED.

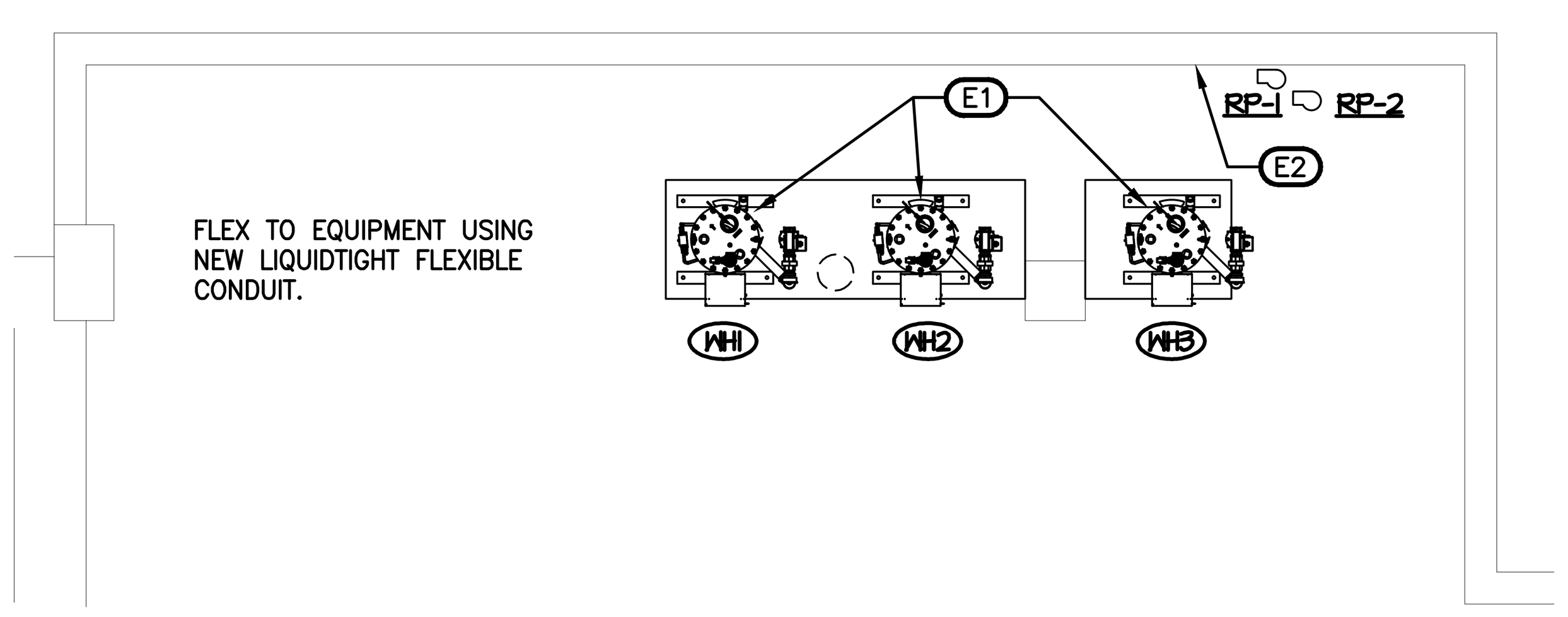


ELECTRICAL DEMOLITION PLAN

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

DEMOLITION NOTES

(D1) EXISTING HOT WATER GENERATORS (EH1, EH2 & EH3) TO BE REMOVED, REFER TO PLUMBING DRAWING. MAINTAIN EXISTING WIRING FOR HOT WATER GENERATORS, RECIRC. PUMPS AND AQUASTATS.



POWER FLOOR PLAN

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

ELECTRICAL NOTES

(E1) RECONNECT HOT WATER GENERATOR TO EXISTING WIRING COMPLETE.

(E2) PROVIDE NEW COVERPLATE ON EXISTING JUNCTION BOX.

CAMPUS PLANNING AND CONSTRUCTION
COLUMBIA, SC 29208
CP00408057/FM00462895

SEAL: 01/27/2015

CHECKED BY: CLP
DRAWN BY: JWB
DATE: 27JAN15
DRAWING: E1
BUILDING: 157

PROJECT TITLE: STROM THURMOND – PROJECT 3 WATER HEATERS REPLACED
STATE PROJECT # H27-D216-FW
University of South Carolina

CONSTRUCTION SET | C14041

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