



Tuesday, December 5, 2023

Addendum #4

CASWELL CENTER

BOILER INSTALLATION AT KENDALL & JOHNSON HALL

SCO ID #: 22-25054-01A Code: 42140 Item: 4S10 | Sigma Project # 22057

This addendum shall become a part of plans and specifications. The contractor shall acknowledge receipt of this addendum in the bid proposal.

ITEM 1 – BID DATE

- a) The bid date has been rescheduled to December 19, 2023 at 2pm, the location is unchanged. Make the following revision to the Advertisement for Bids:
 - 1. Sealed proposals will be received by the DHHS in Raleigh, NC, in the Conference room in the Ashby Building located on Dorothea Dix Park (2104 Umstead Drive - Raleigh, NC 27603), up to 2:00pm December 19, 2023 and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of...

ITEM 2 – CHANGES TO SPECIFICATIONS

- a) SECTION 235216 – CONDENSING BOILERS, Section 2.2 A. Change to read as follows:
 - A. *Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:*
 - 1. Raypak.
 - 2. P-K MACH
 - 3. Lochinivar
 - 4. Laars
- b) SECTION 232114– UNDERGROUND PIPE AND FITTINGS, Add this section in its entirety.

ITEM 3 – CONTRACTOR QUESTIONS

The following questions have been asked during bidding:

- 1. **Q:** It looks to me like the mechanical plans call for the steam and condensate to be capped underneath the new boiler pads, but the plumbing drawings intend for steam service to be maintained until the new hot water boilers and the domestic water heater are running. Would it be OK to cap the existing steam and condensate inside the mechanical room after we're done with it in lieu of running temporary steam and condensate?

A: *Yes, this would be acceptable. Patching the existing hole and providing a watertight seal would need to be provided around the existing pipes.*

2. **Q:** I think notes 12 and 13 where they point to the boiler condensate items on 2/M200 and 2/M210 should be notes 13 and 14. Note 12 is appropriately used indoors to point to the chemical feeder.

A: *This is correct.*

3. **Q:** It appears the new boiler piping will need to run underground for a short distance where it enters the pump room. Would it be OK to use pre-insulated piping for this short run? If so, please send a specification.

A: *Yes, this is acceptable. Refer to attached specification section 232113 Underground Hydronic Piping.*

4. **Q:** What pipe size should be run in the attics?

A: *The heating hot water supply and return in the attic to the new coils shall be 1 ¼".*

End of Addendum

Attachments:

Specification Section 232114 – Underground Pipe and Fittings

SECTION 232114 - UNDERGROUND PIPE AND FITTINGS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Extent of pipe and fittings required by this Section is indicated on drawings and/or specified herein.
- B. Types of pipe and fittings specified in this Section include the following:
 - 1. Piping Materials:
 - a. Pre-insulated steel piping system.
 - 2. Pipe Fittings:
 - a. Pre-insulated steel fittings to match pipe.

1.2 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of pipe and fittings of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. All materials and installation shall be in conformance with the following:
 - 1. ANSI B31.9 "Building Service Piping".

1.3 SUBMITTALS

- A. Product Data: Submit catalog cuts, specifications, installation instructions, stress calculations and dimensioned drawings for each type of pipe, fitting, and joint for each piping system.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Where possible, store materials inside and protected from weather. Where outside storage is necessary, elevate above grade and protect from blowing dirt, sand and prolonged UV exposure. Do not cover with tarp in warm climate.
- B. Protect flanges and fittings from moisture and dirt by inside storage and enclosure or by packaging with durable, waterproof wrapping.

PART 2 - PRODUCTS

2.1 PRE-INSULATED WELDED STEEL PIPING SYSTEM

- A. Piping: Steel pre-insulated pipe shall be used for hot water service. The pipe sections shall be welded. Unless otherwise specified, all pipe, fittings, valves, and accessories shall conform to

the requirements of ANSI B31.1 and shall be of the proper type for the pressure and temperature of the service.

B. Steel Carrier Pipe and Fittings:

1. Carrier pipe shall be black steel pipe conforming to ASTM Schedule 40 Grade B. The spigot ends shall be beveled for welding.
2. Fittings shall be pre-insulated. Fittings shall be pre-insulated by the pipe manufacturer using the same insulation thickness and casing as the pipe. Where necessary laid-up fiberglass casing may be substituted on all or part of the fitting and shall structurally match the casing of the pipe. An anchor plate of the proper size shall be provided when required by the design and shall be an integral part of the fitting. Field applied anchor plates shall not be allowed except by special approval of the engineer. End seals on fittings shall be the same as used on the pipe.
3. Expansion shall be compensated for by the use of expansion loops and expansion elbows. The system designer is responsible for properly sizing the expansion fittings. Bolsters or other forms of outside cushions shall not be accepted as expansion fittings.

C. Casing Pipe: Casing for the pre-insulated pipe system shall be HDPE.

High Density Polyethylene (HDPE) casing shall be seamless conforming to ASTM D1248, Type III, Grade P34. The thickness shall be defined by a minimum 1% of its nominal diameter but not less than 150 mils. For example, a 12" pipe cased in a 16" jacket with thickness requirement 16 mils/diameter inch or 1% all result in a thickness of 0.160". Joints shall be insulated with polyurethane foam and the closure sleeve shall be HDPE conforming to ASTM D1248, Type III, Grade P34. The sleeve thickness shall be compatible with and overlap the casing pipe. Joint closure shall be sealed with a heat shrinkable adhesive backed sleeve fabricated from thermally stabilized radiation crosslinked and ultraviolet resistant polyethylene outer layer and high temperature resistant mastic inner layer. The sleeve shall have a minimum tensile strength of 2400 psi per ASTM D412 and shore hardness between 40 and 60 "D" scale per ASTM D.2240.

1. The HDPE casing-foam system shall be suitable for H-20 highway loading with two feet of cover providing that the pipe bedding and backfill material are properly placed and compacted to H-20 specifications.

D. End Seals: End seals for pre-insulated steel pipe shall be certified to resist infiltration of water at 20 feet of head at the intended operating temperature. Mastic end seals which may meet the requirements of the 20-foot test shall not be allowed.

E. Insulation: Insulation shall be polyurethane foam.

1. Polyurethane foam insulation shall meet the following specifications:

Type:	Two component urethane
Compressive Strength:	35 psi parallel min at 5% comp.
Shrinkage:	None at 70°F
Free Rise Density:	2.0 to 3.0 lbs/cubic foot
Aged "K" (70°F - 72 hrs)	0.160 BTU-in/hr-ft ² -°F
Closed Cell Content:	90%

2. Polyurethane insulation thickness when used with PVC casing, as a general guide:

Carrier Pipe Size (in.)	Insulation Thickness (in.)
1.5	1.16
2	0.92
2.5	1.51

3	1.20
4	1.67
5	1.14
6	1.59

3. Insulation concentricity: Carrier pipe shall be concentric to casing pipe. The allowable maximum deviation from center line of carrier pipe shall be plus or minus 1/4 inch at the casing center point and plus or minus 1/16 inch at the end seals.
- F. Wall and Slab Penetration Sleeves: Provide wall penetration sleeves where piping passes through masonry or concrete walls. Sleeves in outside walls below and above grade shall be schedule 40 or standard weight coated black steel pipe or as specified by the Design Engineer. Sleeves shall be held securely in proper position and location during construction. Sleeves shall be of sufficient length to pass through entire thickness of walls or slabs. Refer to typical detail of wall penetration as shown. In existing concrete manholes or building walls, penetrations may be made using the "core drilling" method, providing proper care is taken to drill the holes to the size needed and square to the line of the pipe.
- G. Wall and Slab Penetration Seals: All wall penetrations shall be sealed to prevent water from entering the building.
 1. Mechanical Sleeve Seals: Modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Installation of the piping system shall be done in accordance with the appropriate publications including ANSI B31.1 and the following specifications and instructions. A manufacturer's field representative shall conduct an installation clinic to pre-qualify contractor personnel in the proper procedures for the installation.
- B. Factory furnished lengths of pipe shall be utilized to the maximum extent. Field cutting of pipe shall be kept to a minimum. Pipe shall be worked into place without springing or forcing, properly clearing all openings and equipment. Pipe ends shall have burrs removed by reaming and shall be installed to permit free expansion and contraction without damage to joints. Good workmanlike procedures shall be followed.
- C. Open ends of pipe lines and equipment shall be properly capped or plugged during installation to keep dirt or other foreign matter out of the system.

3.2 RECEIVING AND HANDLING SHIPMENTS

- A. Inspection: Each shipment shall be inspected upon arrival at the jobsite. It is the responsibility of the installing contractor to ascertain whether there has been any loss or damage. The carrier is the contractor's agent. Any pipe or equipment that arrives damaged or is lost in shipment shall be reported by the contractor. Make overall inspection of the load. If load is intact, ordinary inspection while unloading should be enough to make sure that the pipe has arrived in good condition. It is the responsibility of the receiver to make certain that there has been no loss or damage. Note specifically that any end packaging shall not show signs of damage. If the load

has shifted or end packing is damaged, then each piece shall be carefully inspected for damage. The ends specifically shall be inspected for scars, nicks, etc. Other obvious damage shall also be cause for rejection. Check total quantities of each item against tally sheet (pipe, fittings, etc.). Any damaged or missing items shall be noted on delivery receipt and the receipt returned to the carrier. Notify the carrier immediately and make claim in accordance with the carrier's instructions. Do not dispose of damaged material; follow procedure as directed by the carrier.

- B. Unloading Instructions: The means by which the pipes are unloaded in the field is the decision and responsibility of the installing contractor. To prevent the possibility of the core pipe from shifting within the casing pipe, do not stand a length on one end or raise it vertically. Under no condition shall a pipe be dragged along the ground. Do not lift fittings or pipe by inserting a bar, pipe, etc., inside of the core since damage to the pipe may result. If any pipe is damaged in unloading and handling, mark the damaged area and set it aside. Manufacturer's representative shall determine whether damaged casing can be repaired in the field and shall determine exact method for repair and instruct contractor in making repair.
- C. Storage: Store pipe on dunnage in a flat area. Support the barrel of the casing evenly. Spigot ends shall overhang dunnage. Store random lengths separately where they will be readily available. Individual lengths of pipe shall be stacked in piles no higher than 5 feet. Protect pipe during long exposures (several months) to sunlight by covering it with canvas or other opaque material. (Do not use clear plastic material). Provide for air circulation under the sheets.

3.3 EXCAVATION

- A. Excavation shall take into account the need for anchors where they may be required. The trench bottom shall give uniform support along the entire length of any pipelines. Where several pipelines are located in a common trench, the trench shall be wide enough to maintain the specified distances between adjacent lines, a minimum of 6" in pipe sizes up to 6" diameter and 12" minimum in sizes 8" and larger. The excavation shall be in a straight line, except where fittings are located.

3.4 TRENCHING

- A. The trench depth shall allow for a minimum cover height of 24" over the top of the casing pipe. Keep excavations free of water during construction. If it is necessary to remove unsuitable material to a depth greater than specified, refill over excavated area to the proper depth with specified bedding material and compact in 6" lifts to 95% of maximum density in accordance with ASTM D1557, Method D. Excavate and replace soil disturbed and weakened by the Contractor's operations or soils permitted to soften from exposure to weather with bedding material and compact it with a plate-type vibratory compactor.
- B. The width of the trench at the top of the pipe shall be held to the minimum required for efficient and proper installation. The minimum recommended trench width at the top of the pipe shall be one foot greater than the outside diameter of the casing. Where two or more pipes are in the same trench, use the distance between outside casing of the outside pipes plus one foot. To determine the maximum trench width, use above method for minimum plus two feet.

3.5 DISTRIBUTING PIPE ALONG TRENCH

- A. Pipe lengths may be strung along the line of the trench so as to minimize additional handling during installation.

3.6 PLACING PIPE IN THE TRENCH

- A. The pipe may be passed into the trench by hand or mechanically. The latest state and federal safety regulations shall be understood and observed. If slings are necessary, use only canvas straps. Do not use cable or chain slings.

3.7 BEDDING

- A. Bedding material shall be sand, pea gravel, or other materials free of sharp objects, heavy clods, boulders, or frozen lumps as specified by the design engineer. The approved bedding shall be used 6" under, around and over the pipe. Utilize the best professional practices that apply to buried pressure piping.

3.8 ASSEMBLY OF PIPE AND FITTINGS

- A. Pipe and fittings shall be assembled in strict accordance with the manufacturer's printed directions by personnel who have been instructed in installation procedures by the manufacturer's representative.
- B. A field representative of the carrier pipe manufacturer shall conduct a construction seminar at the site to instruct Contractor's personnel in the proper methods and procedures for making field joints. [Certification of instruction and competence shall be issued to those personnel so trained and only those so certified shall be permitted to perform work on the pipe.]

3.9 TESTING

- A. Testing shall be performed and system proven tight before closure of insulated field joints or backfilling. Prior to testing, flush pipe system with fresh water until piping is free of dirt and foreign matter. Use only fresh water for field tests. Air must be removed from system before starting tests. A hydrostatic test of 150 psi or 1 1/2 times working pressure, whichever is greater, shall be placed on the system for a period of two hours.
- B. During pressure testing, examine system for leaks. Repair joint leaks, replace damaged or porous pipe and fittings, and repeat all tests until satisfactory tests are achieved.

3.10 BACKFILLING

- A. Backfilling of trenches shall progress as rapidly as construction, testing, and acceptance of work permits. Uniformly compact and grade bottom of trenches. After installation of pipe and bedding material, backfill as follows. Place initial backfill in layers to a depth of 12" of the initial bedding. Compact the material to a density equivalent to the surrounding undisturbed soil or to 90% of maximum density (ASTM D1557, Method D), whichever is greater. Backfill remainder of trench in one-foot lifts and compact to 90% maximum density (ASTM D1557, Method D). For trenches excavated in roads, streets, or located under structures, place backfill in 6" layers to top of trench and compact each layer to at least 95% maximum density (ASTM D1557, Method D).

3.11 FIELD CUTTING PIPE TO A SPECIFIC LENGTH

- A. Field cutting of pipe shall be performed in strict accordance with the manufacturer's printed directions by personnel who have been instructed in installation procedures by the manufacturer's representative.

3.12 ANCHOR BLOCKS

- A. Anchor blocks shall be installed wherever expansion must be contained so as to activate expansion loops, expansion elbows at changes of size, at reducers and some crosses and tees; at stops as a dead end; and where thrust must be curtailed, as at a valve or similar equipment. The above situations may occur either where the fittings, etc., are directly buried in the soil or where they are located in a manhole.
- B. Anchor blocks shall be designed for maximum anticipated thermal forces. Size and type of anchor block, as shown on the contract drawings, depends on expected expansion, pipe size, and the type of soil.
- C. Anchor blocks shall be installed using a concrete having a compressive strength of not less than 3000 psi minimum ultimate 28 days compressive strength, air entrained, with water reducing admixture. Anchor blocks shall be poured on and against undisturbed soil or soil tamped to 95% proctor density.
- D. Safe Bearing Loads: The approximate safe bearing loads of various soils given in the following table are for horizontal thrusts when the depth of cover over the top of the pipe exceeds 2 feet.
- | SOIL | SAFE BEARING LOAD (lbs./sq. ft.) |
|------------------------------------|----------------------------------|
| Soft Clay | 1,000 |
| Sand | 2,000 |
| Sand and Gravel | 3,000 |
| Sand and Gravel Cemented with Clay | 4,000 |
| Hard Shale | 10,000 |
- E. Pre-insulated fittings shall be provided with anchor plates designed to transfer expansion loads from the steel pipe to the concrete anchor blocks. The entire surface of the steel plates shall be coated. During manufacture steel plates shall be sealed against the casing.

3.13 STARTUP PROCEDURE

- A. Startup procedure shall conform to generally accepted practices and be done in a workmanlike manner. The line shall be filled slowly from any available low-pressure source. The water may be introduced from lines in service directly through valved connections or by temporary connections to taps made in the new line. All valves and other control points in the line that are open as the line filling begins shall be closed gradually to avoid the possibility of water hammer.
- B. Manufacturer's Written Certification: After testing and prior to start-up of the system, the manufacturer must certify in writing that the system was installed per the manufacturer's installation instructions.

END OF SECTION 232114