



May 12, 2015

ADDENDUM #6
IFB 15-71
WATER SYSTEM IMPROVEMENTS PROJECT
DWSRF-3531, CONTRACT 2

The number of this Addendum, Addendum No. 6, must be entered in the space provided on the Bid Form.

NOTICE is hereby given that the Bidding Documents have been modified and replacement pages are issued herewith.

Sincerely

P. Michael Vaughn
Chief Procurement Officer

Attachments

Masonry Filed Sub-Bid Opening
 May 6, 2015, 11:00 A.M. EST
 City of Lowell, Massachusetts
 Water System Improvements, DWSRF 3531, Contract No. 2
 IFB# 15-77

Bidder	Price	Restrictions	
		May only be used by:	May be used by all Bidders except:
BID WITHDRAWN Contracting Specialists Incorporated 453 South Main Street Attleboro, MA 02703	*BID WITHDRAWN* \$83,897.00		TLT, GWW, G&R
Costa Brothers Masonry 2 Lambeth Park Drive Fairhaven, MA 02719	\$123,000.50* *Math error. Bid says \$123,000.00		
Alpha Omega Construction, Inc. 258 Pine Street Seekonk, MA 2771	\$158,964.00		
Folan Waterproofing & Construction Company, Incorporated 795 Washington Street South Easton, MA 02375	\$171,000.00		

Filed Sub-Bid Category: Masonry

1. Provide the name of the factory service manager, their employee number, telephone number with extension and number of years with the company. List also each start-up service technician, their employee number and years of service with the company.

Manufacturer shall provide a start-up service report following testing, start-up, and training.

G. Qualification Statements

1. The manufacturer shall provide statements and documentation meeting qualification in Article 1.06.
- ~~2. Provide a full size photocopy of the manufacturer's combination UL/manufacturer logo Packaged Pumping Station label.~~

H. Warranty

1. Provide the manufacturer's formal warranty policy.

I. Closeout and Maintenance Material Submittals: per Division 01 General Requirements.

1. Complete service manuals including copies of all drawings, description of operation, maintenance data and schedules, and replacement parts lists. Submit manuals in 3-ring binders including table of contents, and heavy duty tab section dividers.
2. The manufacturer shall provide three (3) full- size hard copies and one (1) electronic copy of as-built record drawings of the pump station and all of its components.

1.06 QUALITY ASSURANCE

A. Provide in accordance with Division 01 General Requirements.

B. Qualifications: per Division 01 General Requirements and as follows.

1. The manufacturer of the selected equipment shall be a business regularly engaged in the manufacturing, assembly, construction, start-up and maintenance of water distribution equipment of the type required for this project. The manufacturer shall have at least ten (10) years of successful experience in providing stations of the type, design, function and quality as required for this project and shall have at least ten (10) similar installations.
2. The booster pump station manufacturer shall furnish premises/operations and products/completed operations general

liability insurance from an insurance company with a rating of A-V according to the most recent Best's Key Rating Guide, in an amount equal to \$5,000,000 per occurrence. The insurance certificate must be included with the manufacturer's submittal. The coverage must be provided by an insurance carrier licensed and admitted in the state of manufacturing.

C. Independent Testing

1. Pump and motor vibration analysis

D. Certifications

1. ~~The pump station manufacturer shall be required to affix an Underwriter's Laboratory (UL) Label attesting that the assembled equipment complies with the Packaged Pumping Station (QCZJ) UL Listing Category. This label shall be inclusive of the entire station with enclosure to demonstrate compliance with the Massachusetts Electrical Code (MEC) requirements for working clearances and wiring procedures. Equipment manufactured without this third party certification label or equipment manufactured by an outside source or "brokered equipment" defined as systems not assembled on the premises of the named manufacturer by that company's employees will not be allowed.~~

1.07 DELIVERY, STORAGE, AND HANDLING

A. Provide in accordance with Division 01 General Requirements.

B. Packing, Shipping, Handling, and Unloading

1. Spare parts shall be packed in containers bearing labels clearly designating contents and pieces of equipment for which they are intended.

C. Storage and Protection

1. Manufacturer shall store all equipment in accordance with manufacturer's instruction. Electrical equipment shall be stored in weatherproof, ventilated enclosures.
2. Pump shall not, under any conditions, be allowed to sit out-of-doors unprotected.
3. The Adjustable Frequency Controller shall be protected against damage at all times. The controller shall be stored in a clean, dry environment with temperature and humidity within the range as

Build Epoxoline II or equal consisting of a two-component, high solids, epoxy system formulated for high build application for protection and finishing of steel and having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings.

- d. Following the base coating application, a full finish coating application shall take place. The protective coating shall be Tnemec Series 61 Hi Build Epoxoline or equal, gray in color, consisting of a two-compartment, high solids, epoxy system formulated for high build application for protection and finishing of steel and having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings. The base and finish coats shall provide a total dry mil thickness of 8.0 mils.
- e. The floor area of the completed booster pumping station, not protected by the floor matting, shall receive an additional coat of "non-skid" Tnemec Series 61 Hi-Build Epoxoline or equal. The total dry mil thickness on the unprotected floor area shall provide a 14.0 mil coverage.

B. Source Quality Control

1. Provide in accordance with Division 01 General Requirements.

2.02 END SUCTION PUMPS

- A. Description: Horizontal end suction, centrifugal type pumps complete with electric motor, baseplate, couplings, and all necessary appurtenances.
- B. Service Conditions: The pumps will be used to pump treated (chlorinated) potable drinking water. Pump materials and design shall be such to meet all regulations for service fluid. The following conditions of service shall be strictly adhered to:

1.	Name:	Pump #1	Pump #2, Pump #3
2.	Number of Units:	One (1)	Two (2)
3.	Type of Drive:	Variable Speed	Variable Speed
4.	Discharge Size, min:	3 IN.	6 IN.
5.	Suction Size, min:	4 IN.	8 IN.
6.	Design Capacity:	500 US GPM	1,600 US GPM
7.	Design Head:	<u>210-214</u> -FT TDH	<u>210-214</u> -FT TDH

8.	<u>Shutoff Head, max</u>	<u>240 FT</u>	<u>240 FT</u>
8. 9.	<u>Efficiency at Design, min:</u>	<u>73.79.61%</u>	<u>80.83.33%</u>
9. 10.	<u>Rotational Speed, max:</u>	<u>3,580 RPM</u>	<u>1,790 RPM</u>
10. 11.	<u>Impeller Size, min:</u>	<u>7.76 IN.</u>	<u>14.67 IN.</u>
11. 12.	<u>Drive Horsepower, max:</u>	<u>40 BHP</u>	<u>150 BHP</u>
12. 13.	<u>NPSHR at Design, max:</u>	<u>19.3 FT</u>	<u>9.3 FT</u>

C. Materials of Construction: The pumps shall be of lead-free construction and be of the following material types, or approved equal:

1. Name: Pump #1, Pump #2, and Pump #3
2. Casing: Ductile Iron (ASTM A536 GR65)
3. Impeller: Bronze (ASTM B584-844)
4. Shaft: High Grade Steel (SAE 1045)
5. Shaft Sleeve: 316 SS
6. Mechanical Seals: Refer to Mechanical Seal details, below
7. O-rings: Buna N
8. Case Wear Rings: 316 SS
9. Bearing Housings: Cast Iron
10. Baseplate: Steel

D. Casing: Volute type, bolted to adapter, with recessed lock fit to insure alignment. No stud or bolt holes are tapped through casing to liquid ways. Tapping openings provided for priming, venting, draining and suction and discharge gauge connections. Casings shall be shop tested under a hydrostatic pressure of at least 150% of the specified design head. The interior of the casing shall be smooth and free from defects. A coating shall be applied to the pump interior and shall be NSF 61 certified. Drilling and dimensions of the flanges shall conform to the ANSI/ASME B16.1 standard, Class 250 rating.

E. Impeller: Enclosed, single suction type, cast in one piece. All impellers are to be statically balanced to insure smooth operation, also hydraulically balanced except in some small sizes where end thrust is but a minor factor.

F. Wearing Rings: Renewable type; maintain proper running clearance with impeller hubs to minimize leakage between suction and discharge.

- G. Shaft Sleeves: To be shouldered on shaft near impeller and covers full length of shaft from impeller hub to motor end bracket. Seals by compression between shaft sleeve and impeller hub, also between sleeve and shoulder on shaft, protecting shaft from contact with liquid.
- H. Stuffing Box: The stuffing box shall be cast integral with the pump casing. The stuffing box shall contain a mechanical seal, as specified below. Adequate space shall be available for access to the seal area for maintenance and adjustment.
- I. Mechanical Seal
1. All mechanical seal components shall be split in half except for seal faces. Seal faces shall be solid (un-split) for initial installation at rotating equipment manufacturers only.
 2. Materials of Construction: The mechanical seals shall be of the following material types, or approved equal
 - a. Gland and rotary holder: 316 stainless steel
 - b. Springs: Elgiloy
 - c. The rotary face: solid silicon carbide or alumina ceramic
 - d. The stationary seal face: solid silicon carbide or carbon
 - e. Elastomers: Fluoroelastomer, EPR or Aflas
 3. The seal shall be installed outside of the sealing chamber/stuffing box. Repair/replacement of the seal shall be accomplished without any rotating equipment disassembly.
 4. The seal shall be of stationary, hydraulically balanced, o-ring design to reduce heat generation, face wear and minimize horsepower consumption. The design will seal both positive pressure and vacuum.
 5. The seal shall be mechanically loaded with multiple springs. The springs will be isolated from the pumped product to eliminate corrosion or clogging problems.
 6. Two flush ports with standard 3/8" NPT tapped connections shall be provided in the gland.
 7. The rotary holder shall have a drive pin to ensure positive drive of rotating parts.
 8. The seal shall be capable of sealing up to 28 inches of vacuum to 400 PSIG, dependent upon size and materials.

9. Provide one spare parts kit for each mechanical seal.
- J. Adapter: Maintains rigid assembly between motor and casing. Machined lock between adapter and motor end bracket keeps adapter & casing in permanent alignment with motor and extended motor shaft.
- K. Motor: The motor shall be horizontal and designed, manufactured, and tested in accordance with the latest applicable NEMA (specifically NEMA Standard No. MG-1), ANSI, IEE, and ASTM standards, and shall have the following characteristics:
1. Enclosure: TEFC
 2. Number of Phases: Three (3)
 3. Cycles: 60 Hz
 4. Voltage: 480 Volt
 5. Speed: 3,600 RPM (Pump #1), 1,800 RPM (Pump #2, #3)
 6. Service Factor: 1.15 (minimum)
 - a. The service factor is reserved for variations in voltage and frequency.
 7. Motor Size: 40 HP (Pump #1), 150 HP (Pumps #2, #3)
 - a. Each motor shall have a sufficient horsepower rating to operate the pump at any point on the pump's head-capacity curve without overloading the nameplate horsepower rating of the motor, regardless of service factor.
 8. Premium Efficiency Inverter Duty Rated
 9. Provide resistive temperature devices (RTDs) for thermal protection of motor and upper and lower bearings. The RTDs shall be interlocked to the pump circuit within the drive cabinet in order to shut down the pump upon high motor temperature or high bearing temperature.
 10. Shaft grounding brushes.
 11. Provide vibration sensors equal to Robert Shaw Model 376A with dry contacts to wire to VFD or SCADA system.
- L. Pump/Motor Vibration Isolation Pads: The pump/motor assembly shall be mounted to a fabricated steel base built specifically for the pump/motor to be mounted. Each mounting or attachment point shall be complete with a vibration isolation pad. The pad will be in two (2) parts, a 1/4" base layer followed by a 5/8" upper layer and be a nominal 2" x 2" square size for pump/motor combinations weighing up to 1500 pounds.

- M. Equipment, including pump, motor and baseplate shall be surface prepared and finished painted with manufacturer's standard finish compatible with the requirements of Section 09 90 00.
- N. Manufacturer
1. Armstrong
 2. Flowserve
 3. Hayes
 4. American-Marsh
 5. Ruhrpumpen
 6. Weinman
 - 6.7. Engineer approved equal
- O. Source Quality Control
1. Provide in accordance with Division 01 General Requirements.
 2. Tests and Inspections
 - a. Pumps should undergo hydrostatic testing and factory performance testing, and pass, prior to shipment to the pump station manufacturer.
 - b. Each pump shall be factory tested in accordance with the latest version of the Hydraulic Institute Standards. Certified copies of Hydrostatic Test Report shall be supplied prior to conducting pump performances tests.
 - c. Each pump shall be tested and data recorded at its operating conditions of service as stated herein. Sufficient test point readings shall be made to establish complete head, flow capacity, efficiency and brake horsepower curves for each pump.
 - d. One pump of each size shall be tested at five additional equally spaced speeds between minimum and maximum speeds.
 - e. All gauges and other test instruments shall be calibrated within 30 days of the scheduled test and certified calibration data shall be provided. All flow meters shall be calibrated within 2 years of the scheduled test and certified calibration data shall be provided.
 - f. A complete test report, including certified characteristic curves shall be submitted and approved prior to shipment of pumps.
 3. . Factory pressure testing of process piping

- a. When the station plumbing is completed, the pressure piping within the station (including valves, pumps, control valves, and fittings), connections as make up the entire system shall be hydrostatically tested at a pressure of 1.5 times the working pressure. The test pressure shall be applied for a minimum of 20 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.
- b. The results of this testing shall be transmitted in writing to the Engineer prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

2.03 INTERIOR PROCESS PIPING

A. General

1. All interior water piping shall be steel pipe conforming to the specifications below, ductile iron pipe per Specification Section 40 05 13 Process Pipe, Fittings, and Appurtenances, or approved equal.
2. Steel Piping shall be flanged or shop welded.
- 2.3. Ductile iron piping shall be flanged and cement-lined or fuse-bonded epoxy coated per ANSI/AWWA C116/A21.16.

B. Performance/Design Criteria

1. Steel pipe shall conform to material specification ASTM A-53(CW) for nominal pipe size four (4) inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size five (5) inches and larger.
2. Steel butt-welding fittings shall conform to material specification ASTM A-234 Grade WPB and to the dimensions and tolerances of ANSI Standards B16.9 and B16.28 respectively.
3. Forged steel flanges shall conform to material specification ASTM A-105 Class 60 and/or ASTM A-181 for carbon steel forgings and to the dimensions and tolerances of ANSI Standards B16.5 as amended in 1992 for Class 150 and Class 300 flanges.
4. The piping sizes shall be as shown on the drawing.
 - a. Size 10 inch and below Schedule 40
 - b. Size 12 inch and above Standard weight (.375" wall)