SECTION 00902
ADDENDUM NO. 02

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TO: Prospective Bidders

This Addendum forms a part of the Contract Documents and modifies the original Bidding Documents. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject Bidder to disqualification.

MISCELLANEOUS

1. N/A

PLANS

2. N/A

SPECIFICATIONS

3. Section 11380 (Positive Displacement Blowers) – Replace existing specification in entirety with revised specification attached to this addendum.

ATTACHMENTS

4. Revised specifications

Approved by: William C. Chandler, PE.
Lockwood, Andrews & Newnam, Inc.

END OF SECTION

ATTACHMENT 4. Revised specifications

SECTION 11380

POSITIVE DISPLACEMENT BLOWERS

PART 1 - G E N E R A L

1.1 SECTION INCLUDES

A. This section includes the requirements for the provision of Positive Displacement Blowers B-1, B-2, B-3 to be located in the existing blower and pump room. All blowers shall be either rotary lobe (straight of helical) or screw type. The blowers shall operate 24/7 at constant speed. The speed shall be adjustable by change of sheave.

B. All equipment specified under this section shall be provided by a single manufacturer/supplier.

C. Manufacturer/supplier shall be responsible for the manufacture, warranty, service, and operation of all equipment specified herein. Moreover, manufacturer/supplier shall, in addition to the Contractor, assume responsibility for the proper function of all equipment, following installation.

1.2 SUBMITTALS

A. Contractor shall provide all submittals in accordance with the requirements of Section 01330 – Submittal Procedures, and Section 01340 – Shop Drawings, Product Data and Samples.

B. Submit complete descriptive product data for all equipment to be provided, including but not limited to, fabrication and installation drawings, electrical, instrumentation and controls component requirements and drawings, pertinent design calculations, and any other related information necessary to facilitate Owner and Owner's Representative review.

C. Lead time estimate. Submit estimate of schedule from time of receipt of approved submittals to delivery of all equipment and materials specified herein to the construction site for installation by Contractor. Estimate shall be signed by Contractor and Manufacturer as endorsement of its accuracy and as commitment to perform thereby.

D. Shop Drawings/Product Data. At a minimum, provide the following:

1. Make, model, weight, and horsepower of major items of equipment.
2. Complete equipment performance curve, including at least three specified performance points. The specified performance points shall correspond to the required points in the provided data sheets. At a minimum, flowrate, pressure, temperature, and efficiency shall be included at these specified performance points.
3. Complete catalog information, descriptive literature, specifications, and identification of materials of construction.
4. Any exceptions to the specifications.
5. Detailed structural, mechanical, and electrical drawings showing the equipment dimensions, size, and locations of connections and weights of associated equipment.
6. Complete motor nameplate data, as defined by NEMA, motor manufacturer, and including any motor modifications. See Section 16222 pertaining to AC Electric Motors for additional submittal requirements.
7. Factory finish system.

E. Quality Control Submittals. At a minimum, provide the following:

1. Location of U. S. factory authorized service centers, and parts inventory location for major components.
2. Special shipping, storage and protection, and handling instructions.

3. Manufacturer's printed installation instructions.
4. Manufacturer's Certificate of Proper Installation.
5. Millwright's certification of proper field alignment.
6. Suggested spare parts list to maintain the equipment in service for a period of 2 years. Include a list of special tools required for checking, testing, parts replacement, and maintenance with current price information.
7. List special tools, materials, and supplies furnished with equipment for use prior to and during startup and for future maintenance.

F. Operation and Maintenance Manuals. Provide complete operation and maintenance manuals for all equipment, in accordance with the requirements of Section 01770 – Closeout Procedures.

1.3 WARRANTY

Provide equipment warranty in accordance with the requirements of Section 01770 – Closeout Procedures.

PART 2 - P R O D U C T S

2.1 DESIGN CRITERIA

A. See the data sheet for the blowers B-1, B-2, B-3, attached.

2.2 ACCEPTABLE MANUFACTURERS

Provide equipment from one of the following acceptable manufacturers:

A. Screw Blowers:

1. Gardner Denver
2. Aerzen
3. Atlas Copco
4. Kaeser
5. Approved Substitution

2.3 QUALITY ASSURANCE

A. The Manufacturer shall have been in the business of manufacturing/design of blowers for a minimum of 5 years, and in the design of screw blowers for 5 years through direct experience, or through the purchase of design technology.

2.4 PRODUCT DESCRIPTION

A. Blowers: Provide positive displacement type blowers of the rotary lobe (straight or helical) or rotary screw type with complete assemblies including: motors with couplings or belt drives, base plates, filter/silencers, expanders, valves, controls, gauges and related items.

1. Materials:

a. Casing: ASTM A48 Class 30 close-grained cast iron.
b. Seals: labyrinth or ring type.
c. Base and Motor Pedestal: Structural and formed steel. Base shall include motor auto-tension device for ease of drive installation.
d. Head plates, Gear Cover, End Cover: ASTM A48 Class 30 close-grained cast iron.

2. Casing: The blower casing shall be of one-piece construction, with separate head plates, and shall be made of close-grained ductile iron suitably ribbed for heat dissipation and to prevent distortion under the specified operating conditions.

3. Impellers and Shafts: The impellers shall be of the lobe or screw involute type and shall operate without rubbing or liquid seals or lubrication. The impellers shall be statically and dynamically balanced by removing metal from the impeller body. Each impeller/shaft shall be supported by cylindrical roller bearings, and fixed to control the axial location of the impeller/shaft in the unit. A double sealing arrangement shall be provided to prevent lubricant from contaminating the air stream.
4. Timing Gears: The impellers shall be timed by a pair of carburized and ground steel spur gears, mounted on the shafts with a tapered fit, and secured by a locknut or wedge rings.
5. Lubrication: There will be provided a positive oil seal at each bearing, designed to prevent lubricant from leaking into the air stream. Rotary piston ring shaft seals (or equivalent) shall be provided at the point where the shaft passes through the headplate. Further provision shall be made to vent the impeller side of the oil seal to atmosphere to eliminate any possible carryover of lubricant into the air stream. The timing gears and the bearings shall be oil lubricated.
6. Drive System: The blower shall be mounted in a horizontal position as shown on the drawings. A suitable guard meeting OSHA specifications shall be supplied.
7. Drive Motor: Provide TEFC motor, sized for horsepower as shown in data sheets, in accordance with Section 16222 – AC Electric Motors Less Than 100 HP, or Section 16223 – AC Electric Motors 100 HP and Above, as applicable. Motor rating will be 460 volt, 3 phase, 60 hertz.

B. OIL SYSTEM

1. Lubrication of timing gears and bearings shall be provided by splash lubrication. Formed steel splash plates shall be directly fastened to the impeller shafts to provide positive oil lubrication at all operating speeds. Oil seals of piston ring and oil flinger design shall be provided on each internal impeller shaft to prevent leakage from the oil reservoirs. The drive seal shall be a high temperature elastomer lip type seal to prevent oil leakage from the oil reservoir.
2. The blower shall have a complete oil system generally comprised of the following:
   a. Oil sump
   b. Oil Breather
   c. Slash lubrication
   ~~**d. Air cooled oil cooler**~~
   ~~**e. Oil filter**~~
   ~~**f. Instrumentation (Pressure & Temperature)**~~

2.5 CONTROL PANELS

Provide three local freestanding control panels, one for each blower.

A. Controls shall be**:** mounted in a NEMA 4X cabinet**; or, manufacturer standard PLC controller designed for use with specific equipment arrangement provided herein and warranted for installation within and requiring no modifications to the existing enclosure in which the blowers are to be installed.**

B. The control panels shall contain the following as a minimum for each blower:
1. Local Start-Stop pushbuttons.
2. Excessive filter differential pressure indication and protection.
3. Differential Temperature protection.
4. Service information (hour meter).
~~**5. Oil level and oil temperature protection.**~~
6. Run-Off indicating lights.
~~**7. Shutdown relay connected to temperature, and pressure sensors.**~~
8. Alarm light for each item that can result in shutdown.
9. Dry contact for common alarm function for each blower for remote monitoring.
10. Provide all conduit and wiring between control panel and all field devices in accordance with applicable sections of Division 16, unless otherwise noted or shown in drawings.

C. Control points back to the plant SCADA system shall include:

1. Dirty Inlet Filter Alarm
2. Inlet pressure gauge.

3. Inlet temperature gauge.
4. Outlet pressure gauge.
5. Outlet temperature gauge.
6. Run-Off indicating lights.
7. In Remote indicating lights.
8. Blower Speed indicator.
~~**9. Vibration monitor and alarm.**~~
~~**10. Bearing oil temperature.**~~
~~**11. Bearing oil pressure**~~
12. Alarm light for each item that can result in shutdown.

2.6 ACCESSORIES

A. Each unit shall be furnished with the following accessory items:

1. V-belt Drive with Belt Guard: The motor base shall incorporate auto tensioning capability to eliminate the need for regular field maintenance tensioning of the drive system. Belt tension status indicator shall advise when belt replacement is required.
2. Dry-type inlet filter with pressure differential indicator, chamber type inlet and discharge silencers, flex connectors between blowers and silencers.
3. Pressure/Vacuum Relief Valve: Relief valve shall be a spring type valve. Pressure Relief Valve is to be set to 1.2 psi above operating pressure or 9.0 PSIG, not to exceed 2 psi above maximum pressure rating of the blower. The valve shall be mounted to the discharge silencer
4. OSHA certified belt guard, spring-type relief valves, discharge pressure gauge, flanged check valve, butterfly valve and other related items to provide a complete blower system. Inlet filter to be factory installed as part of blower package; not to be shipped loose.
5. Suitable flanged, reinforced flexible rubber isolation connection for both inlet and outlet or as required by the drawings.
6. Inlet air filter/silencer rated for 120 percent of design volume. Filter elements to be cleanable and replaceable. Filter and silencer to be adequately supported independently of blower.
7. Dial-face pressure indicators for compressor intake and discharge calibrated for gauge pressure readings in the appropriate range.
~~**8. Pressure transducers for intake and discharge calibrated for gauge pressure readings in the appropriate range.**~~
~~**9. Temperature transducers for intake and discharge calibrated for degrees Fahrenheit readings in the appropriate range.**~~

2.7 COATING

A. Provide manufacturer's standard coating for equipment being placed in corrosive environments. Refer to Sections 09928 – Protective Coatings for Wastewater Systems.

PART 3 - E X E C U T I O N

3.1 DELIVERY AND STORAGE

A. Deliver, handle, store, and protect all equipment in accordance with the requirements of Section 01600 – Materials and Equipment.

B. Deliver, handle, store, and protect all equipment in full accordance with manufacturer/supplier recommendations and/or instructions.

3.2 FACTORY TEST AND CERTIFICATION

A. All equipment to be supplied as specified herein shall be tested at the factory for correct operation. Field tests for all equipment shall be made over the components complete operating range, from shutoff to maximum capacity. Results of all performance tests, as well as all data taken at the time of testing, shall be submitted for Owner and Owner's Representative review.

B. Certification of all factory testing data and results shall be submitted for Owner and Owner's Representative review.

3.3 INSTALLATION

Install all equipment in full accordance with manufacturer/supplier recommendations and/or instructions.

3.4 INSPECTION AND TESTING

A. Equipment shall be completely assembled, installed, painted, and approved by the manufacturer's factory representative. The equipment shall also be approved by the Owner's Representative.

B. Following installation approval, equipment shall be placed in operation under the supervision of manufacturer's factory representative. Manufacturer's factory representative shall subsequently provide written certification of proper equipment installation and operation to Owner and Owner's Representative.

3.5 START-UP AND TRAINING

A. Perform equipment start-up in accordance with the requirements of Section 01655 – Starting of Systems.

B. Provide field instruction/training regarding equipment operation in accordance with the requirements of Section 01661 – Instruction of Operation and Maintenance Personnel.