

SECTION 336022

STATIONARY BY-PASS PUMP – LIFT STATIONS

PART 1 - GENERAL

1.1 SCOPE

- A. Requirements for providing a permanently installed, diesel-driven, compressor-assisted horizontal wastewater pump at various wastewater lift stations within the City of North Port, FL.

1.2 GENERAL

- A. The specifications herein state the minimum requirements of the City of North Port (the Owner). All bids must be regular in every respect. Unauthorized conditions, limitations, or provisions shall be cause for rejection. The Owner may consider as “irregular” or “non responsive”, any bid not prepared and submitted in accordance with the bid documents and specification, or any bid lacking sufficient technical literature to enable the Owner to make a reasonable determination of compliance to the specification. It shall be the bidder’s responsibility to carefully examine each item of the specification. Failure to offer a completed bid or failure to respond to noted sections of the technical specification as “Compliant” or “Exception” will cause the proposal to be rejected, without review, as “non-responsive”. All variances, exceptions, and/or deviations shall be fully described referencing the appropriate section. The Owner reserves the right to accept or reject any proposals, waive any technicalities or irregularities, and make final decisions on product selection in the best interest of the City of North Port.
- B. INTERPRETATIONS: In order to be fair to all bidders, no oral interpretations will be given to any bidder as to the meaning of the specifications documents or any part thereof. Every request for each as consideration shall be made in writing to the Owner. Based upon such inquiry, the Owner may choose to issue an Addendum in accordance with local public contract laws.
- C. GENERAL SPECIFICATIONS: Units described shall be new, unused, and of the current year’s production. The style of pump being bid must be in production for a minimum of five (5) years (include users list). Unit shall be of the latest design and in current production completely serviced, ready for work and shall include all standard and optional equipment as specified herein. A list of five (5) user contacts including contact names and telephone numbers shall be provided with the bid

submittal. Failure to supply a verifiable users list will be cause for rejection of the bid.

- D. The manufacturer of the diesel pump shall coordinate with a factory-authorized service provider within 100 miles of the City of North Port and shall have a 24-hour response time. This service facility must stock spare parts for the pump model specified, employ a field service technician(s) available for 24/7 service calls, and have a rental fleet comprised of similar pump models. The Owner shall have the right to inspect the facility and shall be the sole judge of its adequacy to fulfill this requirement.
 - i. Compliant to 1.2.D: _____
 - ii. Exception to 1.2.D: _____

- E. Bidders, on request of the Owner, must be prepared to review their specifications with the Owner and must, if requested, also be prepared to provide a unit for tangible evaluation purposes only. These services, if needed, are considered as part of the bidder's proposal and will be provided without cost or obligation to the Owner.

1.3 QUALITY CONTROL

- A. The complete pump set shall be manufactured in a plant that has been assessed and found to be in compliance with the ISO 9001:2015 quality standard. A copy of the ISO 9001:2015 Certificate shall be provided with the bid. Failure to provide the certificate shall result in rejection of the proposed pump.
 - i. Compliant to 1.3.A: _____
 - ii. Exception to 1.3.A: _____

- B. Pumping components shall be manufactured by a pump manufacturer headquartered in the State of Florida, and the pump shall be designated and manufactured in conformance with CPB/AEM Standards.
 - i. Compliant to 1.3.B: _____
 - ii. Exception to 1.3.B: _____

1.4 SYSTEM DESCRIPTION

- A. Provide a sound attenuated, compressor-assisted horizontal sewage pump driven by a water-cooled diesel engine. The pump shall be fully automatic, self-priming from dry conditions and capable of handling large volumes of air, water, and solids. The pump set specified in this section will be used to pump wastewater from a City of North Port pumping station (PS).
- B. The pump set and on-board accessories shall be supplied by the pump manufacturer.

- C. The by-pass pump set shall be manufactured by Thompson Pump & Manufacturing Company, or pre-approved equal. Models of pumps shall be approved by the City in the design report submitted with the pump station design.
 - i. Compliant to 1.4.C: _____
 - ii. Exception to 1.4.C: _____

PART 2 – PRODUCTS

2.1 CENTRIFUGAL PUMP

- A. The centrifugal pump shall be a horizontal end suction solids handling centrifugal pump model.
- B. The pump casing shall be constructed of ASTM A536 grade 65-45-12 ductile iron, tangential discharge, clockwise rotation (viewed from drive end), back pullout design, with cleanout.
- C. The impeller shall be high efficiency enclosed type, constructed of 65-45-12 ductile iron.
 - i. Compliant to 2.1.C: _____
 - ii. Exception to 2.1.C: _____
- D. The suction wear ring shall be of peripheral type requiring no adjustment and constructed of 65-45-12 ductile iron.
- E. The mechanical seal shall be a grease lubricated John Crane tungsten carbide vs. silicon carbide mechanical type with self-adjusting viton elastomers and type 304 stainless steel spring and hardware.
 - i. Compliant to 2.1.E: _____
 - ii. Exception to 2.1.E: _____
- F. The seal chamber shall have a dished backplate to remove solids and abrasive material away from the seal area and purge air and gas pockets.
- G. The shaft shall be constructed of stress proof steel, machined and polished to transmit full drive output.
- H. The shaft sleeve shall be AISI 416 stainless steel. Sleeve designed to be renewable with O-ring and positively locked to prevent rotation on the shaft.
- I. The bearing frame shall be constructed of class 30 cast iron.

- J. Bearings shall be of sufficient size to withstand the radial and axial thrust loads incurred during service. Bearings shall have a minimum L-10 bearing life of 100,000 hours. Bearings shall be grease lubricated.
- K. The pump inlet shall be equipped with an ANSI flange connection. It will be the responsibility of the installer to supply and install enlarged suction piping to minimize suction velocity and reduce friction losses.
- L. The pump outlet shall be equipped with an ANSI flange connection. It will be the responsibility of the installer to supply and install enlarged discharge to minimize discharge velocity and reduce friction losses.

2.2 DESIGN REQUIREMENTS

- A. All design requirements listed below must be clearly displayed on performance pump curves. These performance pump curves shall be based on testing standard established by the hydraulic institute.
- B. The primary and secondary performance duty points of the bypass pump shall be similar to the proposed electric submersible pump. The Engineer of Record (EOR) shall consult with the specified bypass pump manufacturer to provide and plot the performance pump curve based on for intermittent duty. The EOR shall properly calculate the Total Dynamic Head (TDH) required for the by-pass pump, including the dynamic suction lift and additional piping required. Complete Table below:

PERFORMANCE REQUIREMENTS FOR STATIONARY BYPASS PUMP	
HIGH EFFICIENCY IMPELLER DIAMETER (INCHES)	
PUMP SUCTION FLANGE SIZE (INCHES-ID)	
PUMP DISCHARGE FLANGE SIZE (INCHES-ID)	
MAXIMUM OPERATING SPEED (RPM)	
SOLIDS HANDLING CAPABILITY (INCHES)	
MAX FLOW CAPABILITY (GPM)	
MAX HEAD CAPABILITY (TDH)	
PRIMARY PERFORMANCE DUTY POINT (GPM at TDH)	
MAX STATIC SUCTION LIFT AT PRIMARY DUTY POINT (FT)	
EFFICIENCY AT PRIMARY DUTY POINT (%)	
SECONDARY DUTY POINT (GPM @TDH)	
MAX STATIC SUCTION LIFT AT SECONDARY DUTY POINT (FT)	
EFFICIENCY AT SECOND DUTY POINT	
OPTIMAL DISCHARGE DIRECTION (RSD, CSD, or RSD)	

- i. Compliant to 2.2.B: _____
- ii. Exception to 2.2.B: _____

2.3 PRIMING SYSTEM

- A. The priming system shall be fully automatic eliminating the need to pre-fill the pump casing with water to achieve initial prime.
- B. An air separation chamber shall be provided to prevent any carryover of the pumping fluid through the venturi-ejector and into the surrounding environment. Priming systems that require a conduit to recirculate excess fluid back to the wet well, will not be acceptable.
 - i. Compliant to 2.03.B: _____
 - ii. Exception to 2.03.B: _____
- C. The air separation chamber shall contain a single stainless steel float and ball valve assembly mounted on a steel plate that can be easily removed as a unit without tools.
 - i. Compliant to 2.03.C: _____
 - ii. Exception to 2.03.C: _____
- D. The priming shall not include any mesh-type screens between the suction port and the air/water separation chamber that can clog and cause the priming system to fail.
 - i. Compliant to 2.03.D: _____
 - ii. Exception to 2.03.D: _____
- E. The compressor shall be industrial version, pressure lubricated type. Splash lubricated compressors will not be accepted.
 - i. Compliant to 2.03.E: _____
 - ii. Exception to 2.03.E: _____
- F. The compressor shall contain a pressure relief valve for overpressure protection.
- G. The priming system shall contain an in-line serviceable discharge 100% unrestricted flow area with low head loss flapper valve design non-return valve which can be readily cleaned and repaired without having to disconnect the discharge piping. Ball type discharge check valves will not be accepted.
- H. The Venturi-ejector shall be constructed of bronze and be of modular design allowing for replacement of individual components. The Venturi shall be remote mounted on the frame for ease of removal and inspection.
- I. The priming system shall incorporate a manual valve to permit the pump to operate under positive suction head conditions.

- J. The priming system shall be capable of automatically priming the pump with a 28-foot static suction lift with no water in the pump or suction piping.
- K. Priming systems that incorporate an oil-bath lubricated, vacuum pump or diaphragm-style priming systems will not be considered.

2.4 DIESEL ENGINE

- A. The diesel engine shall be an emission compliant, diesel engine, capable of producing enough continuous duty horsepower for each application. Engine may control emission levels via DOC- Diesel Oxidation Catalyst only. Engines requiring SCR, DEF, or DPF to control EPA mandated emissions levels will not be accepted.
 - i. Compliant to 2.4.A: _____
 - ii. Exception to 2.4.A: _____
- B. The engine shall drive the pump via an elastomeric torsion drive coupling.
- C. The engine shall have an industrial type battery with 175-amp hour rating and minimum 990 cold-cranking amps, with 175 amp reserve, mounted in a lockable frame.
- D. A 12-volt starter and alternator charging system shall be provided.
- E. Engine shall have an industrial-style muffler with rain cap.
- F. Engine shall have an electrical type governor.
- G. Engine shall have variable speed throttle control, via manual or auto float operation.
- H. Engine shall have safety shutdown switches for low oil pressure and high temperature.
- I. An instrument panel shall be provided in an enclosure and mounted on rubber isolators.

2.5 MODULAR MOUNTING FRAME/FUEL TANK

- A. The complete power unit shall be mounted on a combination frame/double wall fuel tank constructed of tubular steel, with a minimum fuel capacity of 75 US gallons or greater.
 - i. Compliant to 2.5.A: _____
 - ii. Exception to 2.5.A: _____

- B. Double walled fuel tank shall include fuel gauge and an audible alarm when diesel fuel level reaches 90% full.
- C. Modular double walled fuel tank shall include a primary wall leak sensor to indicate any breach in the primary diesel fuel containment.
- D. The modular frame shall incorporate an integral lifting bail capable of lifting the entire unit.
- E. Modular fuel tank shall have two clean-out ports located at opposite ends of the tank.
- F. Modular fuel tank shall incorporate welded steel mounting tabs with 7/8" holes and rubber vibration isolation pads to secure the pump to the concrete pad.
- G. Modular fuel tank shall have a removable basket strainer mounted in the fill port and a lockable cap

2.6 SOUND ENCLOSURE

- A. The entire unit including the pump and engine shall be completely enclosed in a lockable enclosure. Units not meeting this requirement are not acceptable.
 - i. Compliant to 2.6.A: _____
 - ii. Exception to 2.6.A: _____
- B. The enclosure shall reduce operating noise according to the table listed below when measured at 7 meters @ full speed (exceeding the EPA Standard 40CFR204). Units not meeting this requirement are not acceptable.
 - i. Compliant to 2.05.B: _____
 - ii. Exception to 2.05.B: _____

Pump Outlet Size	Max Sound Rating Allowed
4"	68 dBA
6"	70 dBA
8"	72 dBA
10"	74 dBA
12"	76 dBA

- C. The enclosure shall be constructed with a modular frame and reinforced galvaneel panels. Fiberglass or plastic enclosures are not acceptable.

- D. The individual panels shall be constructed of a sandwich construction solid galvaneel outer shell, with 1.5" thick 8-lb density mineral wool fill encapsulated with an aluminum foil moisture barrier, and 0.050 gauge perforated aluminum inner liner, type 3003-H14 with a mill finish. Air vents and openings are lined with open-cell foam with perforated aluminum liner.
 - i. Compliant to 2.6.D: _____
 - ii. Exception to 2.6.D: _____

- E. The enclosure shall contain a minimum of 6 lockable-hinged doors; three sides, two rear doors, and one hydraulic-assisted, door above the pump and priming system. This will allow unrestricted access to all compartments for servicing without having to disassemble and remove panels. The enclosure shall contain a modular lift off panel on top. Enclosures that must be disassembled in order to facilitate routine maintenance are not acceptable.
 - i. Compliant to 2.6.E: _____
 - ii. Exception to 2.6.E: _____

- F. The enclosure shall contain two rear doors that can be opened and permit complete access to the pump and priming system for routine maintenance without having to disconnect the suction or discharge piping.

- G. Enclosure shall utilize 1" thick open-cell foam, or 1/8" thick neoprene rubber, surrounding all piping penetrations.

- H. The enclosure shall be fully detachable as a single unit to facilitate major repairs such as replacing the engine or pump.

- I. The finished color of the enclosure coating shall be confirmed by the City of North Port based on each application.

2.7 CONTROL PANEL

- A. An automatic engine controller shall be provided to start and stop the diesel engine in response to varying liquid levels via float switches.

- B. The automatic start-stop engine controller shall be part of the main instrument panel. Multiple control panels shall not be considered.

- C. The automatic engine controller shall be housed inside a UL Certified, NEMA 4x enclosure.

- D. The automatic engine controller display shall be fully visible, day or night, without the need to open the housing listed above.

- E. The automatic engine controller shall contain the RS485 and J1939 communication ports.
- F. The automatic engine controller shall be mounted on rubber shock mounts.
- G. The system shall contain a safety back-up feature allowing the unit to be operated manually and retain safety shutdown protection in the event of automatic engine controller failure.
- H. The automatic engine controller shall be fully field programmable and contain pass code protection.
- I. The automatic engine controller shall contain automatic and manual start modes.
- J. Records up to 32 events related to warning lights
- K. The automatic engine controller shall have programmable relays.
- L. Sixty (60) selectable features
- M. The automatic start-stop system shall contain two mechanically activated hermetically sealed liquid level control floats; one to turn the pump on and one to turn the pump off. Single float designs that are prone to frequent cycling leading to excessive component wear shall not be considered.
- N. The floats shall be clearly marked, top or bottom, for easy installation into wet well. Floats shall be provided with 65-feet of cable.
- O. The two floats shall be connected together with a single pin terminal for easy connection to control box.
- P. The pump shall include a lockable stainless steel enclosure mounted to the outside of the sound enclosure incorporating labeled SCADA interface dry contact connections. Each dry contact will monitor pre-set alarm conditions within the pump set, and will be hard-wired by the installation contractor. The SCADA interface will consist of 6 coil based relays, SPDT, 12VDC/24VDC input. Output terminal strip for each signal required, 12VDC/24VDC. SCADA Interface shall monitor the following N/O alarms:
 - i. Pump Start
 - ii. Low Battery Charge
 - iii. Low Fuel Level
 - iv. Inner Wall Fuel Leak

- v. Pump Start Failure: (in auto mode and failed to start)
- vi. High Level

2.8 ACCESSORY ITEMS FOR STATIONARY BY-PASS PUMPS

- A. 120V BATTERY CHARGER: The pump set shall be equipped with a 10 amp, 120vac/12vdc,60Hz battery charger. The charger shall be fully automatic, and meet ISO 8846 Marine and Ignition protection standards. The charger shall be able to fully charge the battery in less than 12 hours. Existing AC power at the lift station shall be wired directly to a single 15 amp outlet, mounted inside the pump enclosure. This AC power outlet shall be used for the battery charger.
- B. SOLAR TRICKLE CHARGER: The pump set shall be equipped with a solar powered trickle charger to maintain the battery charge in the event station power is lost for an extended period of time. The charger controller must incorporate a desulfator, and the solar panel will be secured to the top of the sound attenuated enclosure. The solar charger will serve as a back-up to the 120V battery charger.
- C. INSIDE WORK LIGHTS: The pump set shall be equipped with (2) switch operated 12VDC LED lights, mounted inside the sound attenuated enclosure.
- D. AUTO THROTTLE: The unit/s shall include one (1) automatic throttle controller integrated into (2) relays in the engine control panel. The auto-throttle control panel combination shall allow the pump to ramp up to the target RPM given a start command and ramp down to idle given a stop command in auto start mode.

2.9 PAINTING

- A. A minimum 2-5 mil thick layer of Industrial Polyamide Epoxy primer shall be factory applied to the entire pump set prior to the finish coat.
- B. A minimum 2-5 mil thick layer of Industrial Aliphatic Acrylic Polyurethane Paint shall be factory applied over the primer coat.
- C. The finished color of the pump set coating shall be confirmed by the City of North Port based on each application.

PART 3 – EXECUTION

3.1 FACTORY TESTING

- A. The complete pump set shall be factory tested according to ANSI/HI 1.61994 by a certified quality technician. The pump shall be sound

tested according to ISO 3744, ANSI/HI9.4 and CPB Sound Level Measurement Standard.

3.2 OPERATIONS AND MAINTENANCE MANUALS

- A. The pump O&M manual shall include, but not be limited to, exploded views of pump components, operation, maintenance instructions, and spare parts lists giving manufacturer's stock or part number for each replaceable item.
- B. Provide (1) spiral bound hard copy of pump O&M manual, (1) spiral bound hard copy of engine O&M manual.
- C. Provide (1) copy of engine and pump O&M manual on a flash drive.
- D. Hard copies and flash drive will be placed inside a rainproof document box, furnished with the unit.

3.3 START-UP REPORTING AND TRAINING

- A. Manufacture of pump system shall instruct the owner's operating personnel in the proper operation and maintenance of the system for a period of not less than four (4) hours after installation is complete.
- B. Manufacturer of the pump system shall inspect the installation and provide a complete a signed certificate of installation, inspection, and start-up services to Engineer of Record (EOR) and Owner for review and final approval.

3.4 WARRANTY

- A. A copy of the engine manufacturer's parts and labor warranty.
- B. The manufacturer of the pumping unit shall warrant for a period of (3) years from the date of final project completion that the entire unit and all equipment therein shall be free from defects in design, material, and workmanship. Warranty registration forms must be included with the Operation and Maintenance Manuals.
- C. Venturi-ejector device, specified in section 2.3.H of the specification, shall include a full warranty for the life of the pumping system.

END OF SECTION