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## Solicitation Addendum

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Addendum No.: 5  
Solicitation No.: 23-TA004594DJ  
Project No.: 6097480 and 6097481  
Solicitation Title: Master Lift Station 27A Improvements  
Addendum Date: May 25, 2023  
Procurement Contact: Dave Janney, Procurement Agent III

**IFBC 23-TA004594DJ is amended as set forth herein. Responses to questions posed by prospective bidders are provided below. This Addendum is hereby incorporated in and made a part of IFBC 23-TA004594DJ.**

The deadline to submit all inquiries concerning interpretation, clarification or additional information pertaining to this IFBC was April 14, 2023.

### **REPLACE:**

#### **SECTION C, BID ATTACHMENTS, BID ATTACHMENT 2, TECHNICAL SPECIFICATIONS, SECTION 11150, SUBMERSIBLE PUMPS:**

Replace Bid Attachment 2, Technical Specifications, Section 11150, Submersible Pumps, with Revised Section 11150 Submersible Pumps issued with Addendum No. 5, hereby incorporated into this IFBC.

### **QUESTIONS AND RESPONSES**

**Q1. Since the Prebid meeting has passed, is there a sign in sheet I can view?**

**R1. See attached MLS 27A Non-Mandatory Site Visit Sign In Sheet.**

### **NOTE:**

Deleted items will be ~~struck through~~, added or modified items will be underlined. All other terms and conditions remain as stated in the IFBC.

**INSTRUCTIONS:**

Receipt of this Addendum must be acknowledged as instructed in the solicitation document. Failure to acknowledge receipt of this Addendum may result in the response being deemed non-responsive.

**END OF ADDENDUM**

AUTHORIZED FOR RELEASE

## SECTION 11150 SUBMERSIBLE PUMPS (REVISED)

### PART 1 - GENERAL

**1-1. SCOPE.** This section covers furnishing pedestal-mounted, single-stage, submersible, non-clog, end suction centrifugal pumping units and controls as indicated herein or on the Drawings.

Pump application.	Raw sewage
Number of pumps.	3
Pump tag numbers.	PCL-01/02/03
Pump location.	Dry-pit

Each pumping unit shall be complete with a close-coupled, submersible electric motor, adjustable frequency drive and all other appurtenances specified, or otherwise required for proper operation.

Each pumping unit, including motor and all integral controls, shall be rated and labelled for use in a Class 1, Division 2, Group D area as defined by the National Electric Code.

**1-2. GENERAL.** Equipment furnished under this section shall be fabricated and assembled in full conformity with Drawings, Specifications, engineering data, instructions, and recommendations of the equipment manufacturer, unless exceptions are noted by Engineer. Hydraulic considerations and definition of terms shall be as set forth in the Hydraulic Institute Standards.

**1-2.01. General Equipment Stipulations.** The General Equipment Stipulations shall apply to all equipment furnished under this section. If requirements in this specification differ from those in the General Equipment Stipulations, the requirements specified herein shall take precedence.

**1-2.02. Seismic Design Requirements.** Seismic design requirement for products specified herein shall be as indicated in the Meteorological and Seismic Design Criteria section.

**1-2.03. Tagging.** Each item of equipment and each part shipped separately shall be tagged and identified with indelible markings for the intended service. Tag numbers shall be clearly marked on all shipping labels and on the outside of all containers.

**1-2.04. Power Supply.** Unless otherwise indicated, power supply to the equipment shall be 480 volts, 60 Hz, 3 phases.

**1-2.05. Identification.** Pumps shall be identified in accordance with the Equipment and Valve Identification section.

### **1-3. SUBMITTALS.**

**1-3.01. Drawings and Data.** Complete fabrication and assembly drawings, together with detailed specifications and data covering materials, parts, devices, and accessories forming a part of the equipment furnished, shall be submitted in accordance with the Construction Schedule & Project Restraints section. The data and specifications for each unit shall include, but shall not be limited to, the following:

#### Pumps

- Name of manufacturer.
- Type and model.
- Tag number.
- Pump designation.
- Pump location.
- Rotative speed.
- Size of suction nozzle.
- Size of discharge nozzle.
- Net weight of pump and motor only.
- Net weight with pedestal, when specified.
- Complete performance curves showing capacity versus head, NPSH required, pump efficiency, wire-to-water efficiency, and pump input power.
- Data on shop painting.

#### Motors

- Name of manufacturer.
- Type and model.
- Type of bearings and method of lubrication.
- Rated size of motor, hp [kW], and service factor.
- Insulation class and temperature rise.
- Full load rotative speed.
- Efficiency at full load and rated pump condition.
- Full load current.
- Locked rotor current.

#### Adjustable Frequency Drives

- As specified in the Adjustable Frequency Drives section.

#### Moisture Detection System

Name of manufacturer.  
Type and model.  
Enclosure rating and layout if an enclosure is specified.  
Electrical schematics and wiring diagram.  
Published descriptive data on each item of equipment and all accessories, indicating all specific characteristics and options.

Seismic Design Requirements

Confirmation of compliance with the requirements of the Meteorological and Seismic Design Criteria section.

**1-3.02. Operation and Maintenance Data and Manuals.** Operation and maintenance manuals shall be submitted in accordance with the Submittals Procedures section. The operation and maintenance manuals shall be in addition to any instructions or parts lists packed with or attached to the equipment when delivered.

**1-4. QUALITY ASSURANCE.**

**1-4.01. Balance.** All rotating parts shall be accurately machined and shall be in as nearly perfect rotational balance as practicable. Excessive vibration shall be sufficient cause for rejection of the equipment. The mass of the unit and its distribution shall be such that resonance at normal operating speeds is avoided. In any case, the unfiltered vibration velocity, as measured at any point on the machine including top of motor, shall not exceed the maximum velocity as indicated in Figure 11.6.9.4 of the governing standard.

At any operating speed, the ratio of rotative speed to the critical speed of a unit or its components shall be less than 0.8 or more than 1.3.

**1-5. SPARE PARTS.** Spare parts shall be provided as follows:

<u>Spare Parts</u>	<u>Quantity</u>
Mechanical seals	1
Casing wearing rings (enclosed impeller only)	1
Impeller wearing rings (enclosed impeller only)	1
Sets of motor bearings	1

Spare parts shall be suitably packaged with labels indicating the contents of each package. Spare parts shall be delivered to Owner as directed.

**PART 2 - PRODUCTS**

**2-1. SERVICE CONDITIONS.** The pumps specified herein will be used to pump raw sewage from the collection system into a forcemain to be delivered to a wastewater treatment facility

The equipment provided under this section shall be suitable for the following service conditions:

Seismic design requirements.	See Meteorological and Seismic Design Criteria section
Maximum ambient air temperature (dry pit).	104 °F
Maximum liquid temperature.	80 °F
Maximum solids concentration, by weight.	0.1 %
Pumps start and stop against a closed valve.	No
Site elevation.	See Meteorological and Seismic Design Criteria section

All equipment furnished shall be designed to meet all specified conditions and to operate satisfactorily at the elevation indicated.

**2-2. PERFORMANCE AND DESIGN REQUIREMENTS.** Pumping units shall be designed for the performance and design requirements as follows:

Pump tag numbers.	PCL-01/02/03
Rated head.	93 ft
Capacity at rated head.	3000 gpm
Operating head range for full speed continuous operation.	58 to 95 ft
Minimum shutoff head.	120 ft
Maximum nominal pump speed.	1800 rpm
Minimum head at reduced speed.	32 ft

Pump tag numbers.	PCL-01/02/03
Capacity at minimum head at reduced speed.	850 gpm
Approximate minimum pump speed.	890 rpm
Maximum power required at pump input shaft at any point from minimum operating head to shutoff head.	100 bhp
Efficiency at rated head, wire to water.	72 %
Adjustable Frequency Drive losses included in the efficiency calculation	No
Pump designed for reverse rotation at rated head.	No
Minimum NSPHA at rated head.	30 ft
Maximum vibration velocity.	HIS
Minimum pump suction nozzle size (pedestal mounted).	10 in
Minimum pump discharge nozzle/elbow size.	8 in
Minimum test sphere diameter.	3 in

All specified conditions shall be at rated speed unless otherwise indicated.

Overall (wire-to-water) efficiency for variable speed pumps shall include losses in the pump, motor, and if required, adjustable frequency drive, and any transformers supplied as part of the adjustable frequency drive equipment.

The minimum hydrostatic test pressure shall be 1.5 times shutoff head plus max suction pressure.

Pump performance shall be stable and free from cavitation and noise throughout the specified operating head range at minimum suction submergences. The

design running clearance between the impeller inlet and the casing wearing ring (if provided) shall be not less than 0.01 inch or 1 mil per inch of casing wearing ring diameter, whichever is greater.

Pumping units shall be designed so that maximum reverse rotation due to reverse flow at rated head will not cause damage to any component. Pump supplier shall coordinate this provision with the motor supplier.

**2-3. MATERIALS.**

Stator Housing, Oil Chamber Housing, and Impeller Casing	Cast iron, ASTM A48.
Impeller (if enclosed)	Cast iron, ASTM A48.
Casing Wearing Ring	Martensitic stainless steel, Brinell 300+.
Impeller Wearing Ring	Martensitic stainless steel, Brinell 200-250.
Impeller (if semi-open)	Hardened cast iron, ASTM A48, Brinell Hardness of 650+.
Bottom Wearing Plate	Hardened cast iron, ASTM A48 with spiral grooves, Brinell Hardness of 650+.
Shaft	Alloy steel, hard chrome plated; or martensitic stainless steel, AISI Type 416 or 420.
Mechanical Seals	2 tandem single type, oil lubricated with silicon or tungsten carbide seal rings at all points, except the upper rotating seal, which shall be carbon.
Pedestal Base	Cast iron or fabricated steel.
Epoxy Coating	
Primer & Finish Coat	Carboline "Carboguard 891" or Tnemec "Series N140 Pota-Pox Plus".

**2-4. PUMP CONSTRUCTION.**

**2-4.01. Impeller Casing.** The impeller casing shall have well-rounded water passages and smooth interior surfaces free from cracks, porosity, blowholes, or

other irregularities. The discharge nozzle shall be flanged, with dimensions and drilling conforming to ANSI B16.1, Class 125.

**2-4.02. Impeller.** The impeller shall be an enclosed or semi-open one-piece casting with not more than two nonclog passages. The interior water passages shall have uniform sections and smooth surfaces and shall be free from cracks and porosity. The impeller shall be dynamically balanced and securely locked to the shaft by means of a key and self-locking bolt or nut.

**2-4.03. Wearing Rings.** Renewable wearing rings shall be provided in the casing and on the impeller. Wearing rings or wearing plates shall be provided on the casing.

For pumping units with semi open or open impeller a renewable wearing ring or an axially adjustable wearing plate shall be provided in the casing. Casing wearing ring shall be securely fastened to the impeller casing front cover to provide either an axial or radial running clearance. Axially adjustable wearing plate shall be arranged to permit adjustment of the axial running clearance between the impeller and plate. The wearing plate shall have an outward spiralling groove designed to force stringy solids outward and away from the impeller.

**2-4.04. Oil Chamber Housing.** The oil chamber shall contain a drain plug and a vent plug.

**2-4.05. Mechanical Seals.** Each pump shall be provided with two mechanical rotating shaft seals arranged in tandem and running in an oil chamber. Each interface shall be held in contact by an independent spring system designed to withstand maximum suction submergence. The seals shall require neither maintenance nor adjustment and shall be readily accessible for inspection and replacement.

Shaft seals lacking positively driven rotating members or conventional double mechanical seals which utilize a common single or double spring acting between the upper and lower units and requiring a pressure differential to offset external pressure and effect sealing, will not be acceptable. The seals shall not rely upon the pumped media for lubrication and shall not be damaged if the pumps are run unsubmerged for extended periods while pumping under load.

**2-4.06. Sealing of Mating Surfaces.** All mating surfaces of major components shall be machined and fitted with O-rings where watertight sealing is needed. Sealing shall be accomplished by O-ring contact on four surfaces and O-ring compression in two planes, without reliance on a specific fastener torque or tension to obtain a watertight joint. The use of elliptical O-rings, gaskets, or seals requiring a specific fastener torque value to obtain and maintain compression and watertightness will not be acceptable. The use of secondary sealing compounds,

gasket cement, grease, or other devices to obtain watertight joints will not be acceptable.

**2-4.07. Guiderail Mounted Base.** Not used.

**2-4.08. Pedestal Mounted Base.** Unless otherwise indicated or specified, all equipment will be installed on concrete bases at least 6 inches high. Each pedestal mounted pump shall be mounted on a pedestal base extending from the impeller casing to below the bottom of the suction elbow inlet flange. All seams and contact surfaces between steel shapes and plates of fabricated steel pedestals shall be continuously welded and ground smooth. Each pedestal shall be suitable for grouting and bolting to the floor of the wetwell.

**2-4.08.01. Suction Elbow.** Each pedestal-mounted pump shall be provided with a flanged suction elbow complete with a cleanout handhole with contoured interior surfaces. The elbow may be integral with the pedestal base. The diameter and drilling of the inlet flange shall conform to ANSI B16.1, Class 125.

**2-4.09. Skid Mounted Base.** Not used.

**2-4.10. Access Hatch Cover.** Not used.

**2-4.11. Shop Painting.** All iron and steel parts which will be in contact with pumped liquid or submerged after installation, including the inside of the casing and the discharge elbow, shall be shop cleaned in accordance with the coating manufacturer's recommendations. The exterior of the pump shall be painted with the epoxy coating system specified. The coating shall have a dry film thickness of at least 10 mils and shall consist of a prime (first) coat and one or more finish coats. At least 1 quart of the finish coat material shall be furnished with each pump for field touch-up.

All iron and steel parts inside the pump, including the surfaces of cast iron impellers, shall be painted with a suitable rust protective coating to protect the impeller during shipment, storage, and installation.

The shop painting of other surfaces shall be in accordance with the shop painting requirements in the General Equipment Stipulations.

For potable water applications, all coatings shall be NSF approved.

**2-4.12. Hoist Assembly.** Not used.

**2-5. ELECTRIC MOTORS.** Each pump shall be driven by an air-filled, totally submersible electric motor provided by the pump manufacturer. Motor nameplate rating shall exceed the maximum power required by the pump in the operating

head range. Each motor shall be rated for the power supply provided to the pump, and shall have a service factor of 1.15. The stator housing shall be an air-filled, watertight casing. A cooling jacket shall encase the motor housing for each pump where needed to maintain adequate cooling. The cooling jacket shall require no external source of cooling water. Motor insulation shall be moisture resistant, Class H, 155°C. Each motor shall be NEMA Design B for continuous duty at 40°C ambient temperature, and designed for at least 10 starts per hour.

The motor bearings shall be antifriction, permanently lubricated type. The lower bearing shall be fixed to carry the pump thrust and the upper bearing free to move axially. The bearings shall have a calculated ABMA L<sub>10</sub> Life Rating of 40,000 hours when operating at maximum operating head. Maximum shaft runout at the mechanical seals shall not exceed 2 mils at any point in the operating head range.

Each motor installed in a drypit shall be capable of continuous operation in air under pump full load conditions, without exceeding the temperature rise limits for the motor insulation system.

Each pump shall be equipped with one or more multiconductor cable assemblies for power and control. Each multiconductor assembly containing power cables shall be provided with a separate grounding conductor. Each cable assembly shall bear a permanently embossed code or legend indicating the cable is suitable for submerged use. Cable sizing shall conform to NEC requirements.

All cables for drywell mounted pumps shall be of sufficient length to terminate in a junction box as indicated on the Drawings, with 10 feet of slack which will be coiled at the motor.

The cable entry water seal shall include a strain relief and a grommet type seal designed so that a specific fastener torque is not required to ensure a watertight, submersible seal. The cable entry junction box and motor shall be separated by a stator lead sealing gland or a terminal board. The junction box shall isolate the motor interior from moisture gaining access through the top of the stator housing.

Motors shall be specifically selected for service with an adjustable frequency type speed controller and shall be derated to compensate for harmonic heating effects and reduced self-cooling capability at low speed operation so that the motor does not exceed Class B temperature rise when operating in the installed condition at load with power received from the adjustable frequency drive. All motors driven by adjustable frequency drives shall be supplied with full phase insulation on the end turns and shall meet the requirements of NEMA MG 1, Part 31. In addition to the requirements of NEMA MG 1, Part 31, motors shall be designed to be continually pulsed at the motor terminals with a voltage of 1600 volts ac.

**2-5.01. Adjustable Frequency Drives.** Adjustable frequency drives shall be provided and shall be coordinated with the requirements of the pumping unit. The pump manufacturer shall be responsible for furnishing the adjustable frequency drive, for matching the motor and the drive, and for coordinating the collection of data and the design to limit harmonics to the levels specified.

Adjustable frequency drives shall be design as specified in the Adjustable Frequency Drives section.

## **2-6. SHOP TESTS.**

Each pump shall be tested at the factory for capacity, power requirements, and efficiency at specified rated head, shutoff head, operating head extremes, and at as many other points as necessary for accurate performance curve plotting. All tests and test reports shall be made in conformity with the requirements and recommendations of the Hydraulic Institute Standards. Acceptance testing shall be per Table 11.6.5.4 Grade 1U, with no minus tolerance or margin allowed.

Five certified copies of a report covering each test shall be prepared by the pump manufacturer and delivered to Engineer not less than 10 days prior to the shipment of the equipment from the factory. The report shall include data and test information as stipulated in the Hydraulic Institute Standards, copies of the test log originals, test reading to curve conversion equations, and certified performance curves. The curves shall include head, bhp, pump efficiency, and shop test NPSH available, plotted against capacity. The curves shall be easily read and plotted to scales consistent with performance requirements. All test points shall be clearly shown.

**2-7. APPROVED MANUFACTURERS.** Submersible pump shall be manufactured by KSB.

## **PART 3 - EXECUTION**

**3-1. INSTALLATION.** Each pumping unit shall be installed in accordance with the Hydraulic Institute Standards, the Equipment Installation section, and as specified herein.

The equipment base for dry pit type pumping units shall be grouted after initial fitting and alignment, but before final bolting of connecting piping. Special care shall be taken to maintain alignment of pumping unit components. No stresses shall be transmitted to the pump flanges. After final alignment and bolting, connections to pumping equipment shall be tested for applied piping stresses by loosening the flange bolts. If any movement or opening of the joints is observed, piping shall be adjusted to proper fit.

Control cables shall be supported to prevent tension and damage. Mounting of cable supports in wetwells shall be coordinated by the pump supplier. Liquid level sensors shall operate freely and shall be adjusted to the levels indicated in the respective pump schedules, or in the electrical schematics or P&ID's. Each system of sensors shall be installed complete with all required mounting brackets, weights, galvanized steel mounting pipes and accessories, control panel transformers, auxiliary relays, cables, and junction boxes.

### **3-2. FIELD QUALITY CONTROL.**

**3-2.01. Installation Check.** An experienced, competent, and authorized representative of the manufacturer shall visit the site of the Work and inspect, check, adjust if necessary, and approve the equipment installation. The representative shall be present when the equipment is placed in operation in accordance with Section 01650, Startup Requirements, and shall revisit the job site as often as necessary until all trouble is corrected and the equipment installation and operation are satisfactory in the opinion of Engineer.

The manufacturer's representative shall furnish a written report certifying that the equipment has been properly installed and lubricated; is in accurate alignment; is free from any undue stress imposed by connecting piping or anchor bolts; and has been operated under full load conditions and that it operated satisfactorily.

**3-2.02. Installation Supervision.** Installation supervision by the manufacturer is not required.

**END OF SECTION**

