SECTION 11320

VERTICAL AXIAL FLOW PROPELLER PUMPS

1. PART 1 GENERAL

1.1 SECTION INCLUDES

A. Furnishing, Installing, and Startup of Two Vertical Axial Flow Propeller Pumps as Specified Herein, as Indicated on the Plans.

1.2 RELATED SECTIONS

A. Section 01300 – Submittals.

B. Section 01400 – Quality Control.

C. Section 01700 – Contract Closeout.

1.3 REFERENCES

A. National Electrical Code.

B. ANSI/NFPA.

C. Underwriters Laboratory.

D. Hydraulic Institute Standards.

E. ASTM - American Society for Testing and Materials.

F. AISI - American Iron and Steel Institute.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300 - Submittals.

B. Product Data:
1. Indicate pump type, capacity and power requirements.
2. Submit certified pump curves showing pump performance characteristics with duty point plotted. Include NPSH curve.
3. Submit pump layout with dimensions including base plate and discharge piping.

C. Submit manufacturer's instructions for delivery, storage, assembly, installation, start-up, operation, adjusting and finishing.

D. Submit electrical control wiring diagrams.

E. Submit complete shop drawings of all work in this Section showing dimensions and locations of all items and clearance requirements, including but not limited to pump size, piping location and elevations, base plate and mounting hole dimensions, and other pertinent information.

1.5 UNIT PRICE – MEASUREMENT AND PAYMENT

A. Vertical Axial Flow Propeller Pump:
   1. Basis of Measurement: At the unit price each as stated in the proposal.
   2. Basis of Payment: Includes all labor, equipment, material, freight to the job Site and installation for complete pumping system as shown on the proposed plans. Including but not limited to axial flow pump, discharge elbow and bowl assembly, drip-feed oil system with oil reservoir, electric motor with non-reverse ratchet assembly and "dresser" style coupling for discharge pipe.

1.6 OPERATION AND MAINTENANCE DATA

A. Submit operation and maintenance data under provisions of Section 1700 - Contract Closeout.

B. Include operation, maintenance, and inspection data, replacement part numbers and availability, and manufacturer's service representative with address and phone number.

1.7 QUALITY ASSURANCE

A. Manufacturer: Company specializing in the manufacture of vertical axial flow propeller for a minimum of 5 years with a minimum of 20 similar installations in operation.

B. Provide nameplate identifying the manufacturer's name, model number, rating/capacity, and electrical requirements.

C. Electrical work shall conform to the latest NEC, State, local and power company standards.

D. All electrical equipment UL approved and labeled.

1.8 DELIVERY, STORAGE AND HANDLING

A. Deliver, store, protect and handle products to Site under provisions of Section 01600 – Material and Equipment.

B. Accept equipment on Site in original factory packaging; inspect for damage.

C. Pump and motor shall be coupled together and tested at the factory. Separate delivery of pump and motor for assembly on Site will not be permitted.

1.9 SEQUENCING, SCHEDULING AND COORDINATION

A. Pumps may not be used by Contractor for dewatering or controlling water level at Site during construction.

1.10 WARRANTY

A. Provide 1 year manufacturer's warranty commencing on the date of acceptance against defects in workmanship and materials under normal use operation and service manufacturer shall warrant that the equipment will perform the process function as specified.

B. Provide for manufacturer's replacement of defective parts.

C. Warranty shall be in published form and apply to all similar units.

D. Submit Warranty under provisions of Section 01700 - Contract Closeout.

2. PART 2 PRODUCTS

2.1 VERTICAL AXIAL FLOW PROPELLER PUMP

A. Manufacturers:
1. Cascade Pump Company, Inc. Type 12AF12 axial flow pump.
2. Substitutions: Under provisions of Section 01600.

B. Pump Performance and General Requirements:
1. Designed to pump storm water. Pumps will sit inside a control structure. Each pump discharges separately into an open concrete wet well.
2. Quantity and Duty Point: Two (2) complete pumps with 10 HP, 1175 RPM motor with weatherproof enclosure. Pump Duty Point is 4000 GPM @ 7.0 FT. TDH.
3. Minimum efficiency: 75 percent.
4. Pump will be suspended from a mounting base plate at elevation shown on drawings. Motor will be mounted at a higher elevation.
5. Pumping element will be suspended on a sufficient length of column to permit dewatering of the sump as shown on plans.
6. Centerline of the horizontal discharge pipe of 12 ¾ inch diameter shall be below the mounting base plate as shown on the plans. Provide plain end discharge pipe suitable for coupling.
7. Discharge pipe shall be sized such that velocity of water being pumped at maximum capacity will not exceed 12 feet per second (fps).
8. Suction inlet shall be flared to resist formation of damaging vortices.
9. The pump driver shall use a thrust bearing capable of withstanding the hydraulic thrust produced by the pump when operating at any condition in the specified head range of the pump.
10. Pump design shall be such that no damage will occur in the event of reverse rotation caused by backflow of water through the pump.
11. The complete pump-motor unit shall be free of excessive vibration, cavitation and noise when operating within the specified head range.
12. Pump weight of 1400 pounds and motor weight of 280 pounds for Cascade Pump Model 12AF12 was used to design the support system for mounting as shown on plans.
13. Contractor shall be responsible for any engineering and construction related changes required to the pump-motor system including the support beams and grating if pump or motor model is different than what is specified above.

C. Components and Materials:
1. Suction and discharge bowl of cast iron with minimum tensile strength of 30,000 p.s.i.
2. Impeller/propeller shall be cast bronze and locked to the pump shaft by a key and thrust collar.
3. Pump shaft shall be made from type 416 stainless steel and polished at each bearing journal.
4. Discharge elbow and column fabricated of mild steel with a minimum thickness of ¼ inch. Elbow shall be 45-degree insert right angle.
5. Size of the shaft shall be sufficient to safely transmit the required brake horsepower to the impeller to produce specified performance.

6. Bronze bushings shall be provided above and below the impeller/propeller.
7. Lineshaft shall be carbon steel and supported by bearings. Lineshaft bearings shall be threaded externally to act as a coupling for extra heavy steel enclosing tubes.
8. Lineshaft bearings shall be bronze of the removable type and capable of passing oil from one bearing to the next. A means shall be provided for tension loading of the enclosing tube.
9. Provided a drip-feed oil system using an oil reservoir, solenoid valve and needle valve dripper for lubrication of lineshaft bearings. Solenoid valve voltage shall be compatible with 480-volt pump motor and starter. Oil reservoir shall be mounted at accessible motor elevation.
10. Motor:
    a. 10 horsepower, 1200 RPM.
    b. 460 volt, 3 phase, 60 hertz.
11. Painting:
    a. Manufacturer shall prepare, prime and finish coat pump in accordance with standard practice and colors.
    b. Touch up nicks and scratches after installation prior to final inspection.

3. PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that associated piping is constructed to contract and shop drawings and is ready to accept pump installation.

B. Beginning of installation means acceptance of existing conditions.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with the requirements indicated on the Contract plans and Engineer approved shop drawings.

C. Verify alignment and operation of moving parts.

D. Verify correct impeller rotation.

E. Replace damaged components.

F. Coordinate with piping and electrical work.

3.3 FIELD QUALITY CONTROL

A. In accordance with Section 01400 - Quality Control.

3.4 ADJUSTING

A. Adjust work under provisions of Section 01700 – Contract Closeout.

B. Adjust equipment to achieve specified requirements.

END OF SECTION