SECTION 221343 - FACILITY PACKAGED SEWAGE PUMPING STATIONS

This Section uses the term "Architect." Change this term to match that used to identify the design professional as defined in the General and Supplementary Conditions.

Verify that Section titles referenced in this Section are correct for this Project's Specifications; Section titles may have changed.

1. GENERAL
	* + 1. RELATED DOCUMENTS
				1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
			2. SUMMARY
				1. This Section includes dry-well, packaged pumping stations with [**dry-well**] [**vacuum-primed**] sewage pumps.
				2. This Section includes wet-well, packaged pumping stations with [**submersible**] [**submersible grinder**] [**wet-well-mounting**] sewage pumps.
			3. PERFORMANCE REQUIREMENTS
				1. Pressure Rating of Sewage Pumps and Discharge Piping Components: At least equal to sewage pump discharge pressure, but not less than 125 psig.
				2. Pressure Rating of Other Piping Components: At least equal to system operating pressure.
			4. SUBMITTALS
				1. Submittals for this section are subject to the re-evaluation fee identified in Article 4 of the General Conditions.
				2. Manufacturer’s installation instructions shall be provided along with product data.
				3. Submittals shall be provided in the order in which they are specified and tabbed (for combined submittals).
				4. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories.
				5. Shop Drawings: Show fabrication and installation details for each packaged sewage pumping station. Detail equipment assemblies and indicate dimensions; shipping, installed, and operating weights; loads; required clearances; method of field assembly; components; electrical characteristics; and location and size of each field connection.

Wiring Diagrams: Power, signal, and control wiring.

* + - * 1. Product Certificates: For each type of sewage pump, signed by product manufacturer.

Retain paragraph and subparagraphs below if required by seismic criteria applicable to Project. Coordinate with Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."

* + - * 1. Manufacturer Seismic Qualification Certification: Submit certification that packaged sewage pumping station, accessories, and components will withstand seismic forces defined in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment." Include the following:

Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

Retain one of first two subparagraphs below to define the term "withstand" as it applies to this Project. Definition varies with type of building and occupancy and is critical to valid certification. Second definition is used for essential facilities where equipment must operate immediately after an earthquake.

The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."

The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.

Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

* + - * 1. Qualification Data: For [**Installer**] [**testing agency**].
				2. Source quality-control test reports.

Retain first paragraph below if Contractor is responsible for field quality-control testing.

* + - * 1. Field quality-control test reports.
				2. Warranty: Special warranty specified in this Section.
			1. CLOSEOUT SUBMITTALS
				1. Operation and Maintenance Data: For equipment to include in emergency, operation, and maintenance manuals.
			2. QUALITY ASSURANCE
				1. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

If additional control is needed, use first paragraph below to specify 29 CFR 1910.7 or other more specific criteria (e.g., NETA). 29 CFR 1910.7 defines a nationally recognized testing laboratory as it applies to testing and inspecting for safety, and lists, labels, or accepts equipment and materials that meet certain OSHA criteria.

Retain first paragraph below if Contractor selects testing agency.

* + - * 1. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7 “Definition and Requirements for a Nationally Recognized Testing Laboratory”.
				2. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70 “Standard for Electrical Safety in the Workplace”, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
				3. Comply with HI 1.1-1.2, "Centrifugal Pumps for Nomenclature and Definitions"; HI 1.3, "Centrifugal Pumps for Design and Application"; and HI 1.4, "Centrifugal Pumps for Installation, Operation and Maintenance," for sewage[**and sump**] pumps.
				4. Comply with UL 778, "Motor-Operated Water Pumps," for sewage[**and sump**] pumps.
			1. PROJECT CONDITIONS

Retain paragraph and subparagraphs below if interruption of existing sanitary sewer service is required.

* + - * 1. Interruption of Existing Sanitary Sewer Service: Do not interrupt sanitary sewer service to facilities occupied by Director’s Representative or others unless permitted under the following conditions and then only after arranging to provide temporary sanitary sewer service according to requirements indicated:

Notify [**Director’s Representative**] no fewer than [**two**] <**Insert number**> days in advance of proposed interruption of sanitary sewer service.

Do not proceed with interruption of sanitary sewer service without [**Director’s Representative's**] written permission.

* + - 1. COORDINATION
				1. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Section 033000 "Cast-in-Place Concrete."
			2. WARRANTY

When warranties are required, verify with Director's Representative that special warranties stated in this Article are not less than remedies available to Director’s Representative under prevailing local laws.

* + - * 1. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged sewage pumping stations that fail in materials or workmanship within specified warranty period.

Failures include, but are not limited to, the following:

Structural failures including shell.

Faulty operation of sewage pumps, controls, or accessories.

Deterioration of metals, metal finishes, and other materials beyond normal use.

Verify available warranties for units and components and insert number in subparagraphs below.

Warranty Period for Shells: <**Insert number**> years from date of Substantial Completion.

Warranty Period for Sewage Pumps and Controls: <**Insert number**> years from date of Substantial Completion.

Warranty Period for Accessories: <**Insert number**> years from date of Substantial Completion.

1. PRODUCTS

Manufacturers and products listed in SpecAgent and MasterWorks Paragraph Builder are neither recommended nor endorsed by the AIA or Deltek. Before inserting names, verify that manufacturers and products listed there comply with requirements retained or revised in descriptions and are both available and suitable for the intended applications.

* + - 1. DRY-WELL, PACKAGED SEWAGE PUMPING STATIONS
				1. Dry-Well, Packaged Sewage Pumping Stations with Dry-Well Sewage Pumps:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2245) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Dakota Pump Incorporated](http://www.specagent.com/Lookup?uid=123457132470).

[Gorman-Rupp Company (The)](http://www.specagent.com/Lookup?uid=123457132471).

[PumpTech, Inc](http://www.specagent.com/Lookup?uid=123457132467).

Or equal.

Description: Factory fabricated, assembled, and tested with wet well for [**comminutor and**]collection of sanitary sewage and with dry equipment chamber for sewage pumps, controls, and accessories.

Orientation: Shell underground with dry equipment chamber [underground with top flush with grade] [partially recessed underground] [above grade] [underground with entrance tube to grade] <Insert orientation>.

Shell: Factory fabricated from [**structural-steel plate**] [**fiberglass**].

Retain subparagraph below if shell orientation requires an entrance tube.

Entrance Tube: From dry compartment to entrance at grade, and of size required to replace largest piece of equipment, but not smaller than [**36 inches**] <**Insert dimension**> in diameter.

Retain subparagraph below only for steel shells.

Cathodic Protection: <**Insert number**> exterior magnesium anode(s).

Retain first subparagraph below if required.

Comminutor: Full size of sewage inlet pipe.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> dry-well-type, nonclog sewage pumps with controls and piping. Include ASTM A48 “Standard Specification for Gray Iron Castings”, Class 25, nonclog, cast-iron impeller capable of passing solids of 3-inch minimum diameter; mechanical or stuffing-box seals; and pedestal-mounted motor.

If Project has more than one dry-well, packaged sewage pumping station with dry-well sewage pumps, delete subparagraph and associated subparagraphs below and schedule pumping stations on Drawings.

Capacities and Characteristics:

Diameter or Dimensions of Shell: <Insert **inches** or other dimensions.>

Height of Shell Base Section: <**Insert inches.**>

Pumping Station, Inlet Pipe Size: <**Insert NPS.**>

Pumping Station, Discharge Pipe Size: <**Insert NPS.**>

Comminutor:

Required: [No] [Yes].

Capacity: <Insert gpm.>

Pipe Size: <Insert NPS.>

Motor Size: <Insert value.>

Electrical Characteristics:

Volts: [240] [277] [480] <Insert value> V.

Phases: [Single] [Three].

Hertz: 60.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> required.

Each Sewage Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Impeller:

Type: <Insert type.>

Diameter: <Insert **inches**.>

Solids Size Design: <**Insert inches.**>

Inlet Size: <Insert **NPS**.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sump Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Pumping Station Electrical Characteristics:

Full-Load Amperes: <**Insert value.**>

Minimum Circuit Ampacity: <**Insert value.**>

Maximum Overcurrent Protection: <**Insert amperage.**>

* + - * 1. Dry-Well, Packaged Sewage Pumping Stations with Vacuum-Primed Sewage Pumps:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2247) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Dakota Pump Incorporated](http://www.specagent.com/Lookup?uid=123457132472).

[Gorman-Rupp Company (The)](http://www.specagent.com/Lookup?uid=123457132473).

[PumpTech, Inc](http://www.specagent.com/Lookup?uid=123457132474).

Or equal.

Description: Factory fabricated, assembled, and tested with wet well for [**comminutor and**]collection of sanitary sewage and with dry equipment chamber for sewage pumps, vacuum pumps, controls, and accessories.

Orientation: Shell underground with dry equipment chamber [underground with top flush with grade] [partially recessed underground] [above grade] [underground with entrance tube to grade] <Insert orientation>.

Shell: Factory fabricated from [**structural-steel plate**] [**fiberglass**].

Retain subparagraph below if shell orientation requires an entrance tube.

Entrance Tube: From dry compartment to entrance at grade, and of size required to replace largest piece of equipment, but not smaller than [**36 inches**] <**Insert dimension**> in diameter.

retain subparagraph below only for steel shells.

Cathodic Protection: <**Insert number**> exterior magnesium anode(s).

Retain first subparagraph below if required.

Comminutor: Full size of sewage inlet pipe.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> dry-chamber-mounting, vacuum-primed, nonclog sewage pumps located in dry compartment above wet pit, with controls and piping. Include ASTM A48 “Standard Specification for Gray Iron Castings”, Class 25, nonclog, cast-iron impeller capable of passing solids of 3-inch minimum diameter; mechanical or stuffing-box seals; pedestal-mounted motor; and suction piping extending to bottom of wet pit.

Vacuum Pumps: Duplex arrangement with controls, vacuum piping, and vent piping of size and capacity required for system. Include automatic alternator, with manual disconnect switch, to change sequence of lead-lag vacuum pumps at completion of each cycle.

If Project has more than one dry-well, packaged sewage pumping station with vacuum-primed sewage pumps, delete subparagraph and associated subparagraphs below and schedule pumping stations on Drawings.

Capacities and Characteristics:

Diameter or Dimensions of Shell: <Insert **inches** or other dimensions.>

Height of Shell Base Section: <**Insert inches.**>

Pumping Station, Inlet Pipe Size: <**Insert NPS.**>

Pumping Station, Discharge Pipe Size: <**Insert NPS.**>

Comminutor:

Required: [**No**] [**Yes**].

Capacity: <Insert **gpm**.>

Pipe Size: <Insert **NPS**.>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> required.

Each Sewage Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Impeller:

Type: <Insert type.>

Diameter: <Insert **inches**.>

Solids Size Design: <**Insert inches.**>

Inlet Size: <Insert **NPS**.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sump Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Pumping Station Electrical Characteristics:

Full-Load Amperes: <**Insert value.**>

Minimum Circuit Ampacity: <**Insert value.**>

Maximum Overcurrent Protection: <**Insert amperage.**>

* + - 1. WET-WELL, PACKAGED SEWAGE PUMPING STATIONS
				1. Wet-Well, Packaged Sewage Pumping Stations with Submersible Sewage Pumps:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2249) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Gorman-Rupp Company (The)](http://www.specagent.com/Lookup?uid=123457132455).

[PumpTech, Inc](http://www.specagent.com/Lookup?uid=123457132457).

[Yeomans Chicago Corporation](http://www.specagent.com/Lookup?uid=123457132459).

Or equal.

Description: Factory fabricated, assembled, and tested with wet well for [**comminutor,**]sewage pumps and collection of sanitary sewage and with sewage pumps and dry equipment chamber for controls and accessories.

Orientation: Shell underground with dry equipment chamber [underground with top flush with grade] [partially recessed underground] [above grade] [underground with entrance tube to grade] <Insert orientation>.

Shell: Factory fabricated from [**structural-steel plate**] [**fiberglass**].

Retain subparagraph below if shell orientation requires an entrance tube.

Entrance Tube: From dry compartment to entrance at grade, and of size required to replace largest piece of equipment, but not smaller than [**36 inches**] <**Insert dimension**> in diameter.

Retain subparagraph below only for steel shells.

Cathodic Protection: <**Insert number**> exterior magnesium anode(s).

Retain first subparagraph below if required.

Comminutor: Full size of sewage inlet pipe.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> submersible-type sewage pumps, with guide rail, quick-disconnect system, controls, and piping. Include ASTM A48 “Standard Specification for Gray Iron Castings”, Class 25, nonclog, cast-iron impeller capable of passing solids of 3-inch minimum diameter; and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable.

If Project has more than one wet-well, packaged sewage pumping station with submersible sewage pumps, delete subparagraph and associated subparagraphs below and schedule pumping stations on Drawings.

Capacities and Characteristics:

Diameter or Dimensions of Shell: <Insert **inches** or other dimensions.>

Height of Shell Base Section: <**Insert inches.**>

Pumping Station, Inlet Pipe Size: <**Insert NPS.**>

Pumping Station, Discharge Pipe Size: <**Insert NPS.**>

Comminutor:

Required: [**No**] [**Yes**].

Capacity: <Insert **gpm**.>

Pipe Size: <Insert **NPS**.>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> required.

Each Sewage Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Impeller:

Type: <Insert type.>

Diameter: <Insert **inches**.>

Solids Size Design: <**Insert inches.**>

Inlet Size: <Insert **NPS**.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sump Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Pumping Station Electrical Characteristics:

Full-Load Amperes: <**Insert value.**>

Minimum Circuit Ampacity: <**Insert value.**>

Maximum Overcurrent Protection: <**Insert amperage.**>

* + - * 1. Wet-Well, Packaged Sewage Pumping Stations with Submersible Grinder Sewage Pumps:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2250) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Gorman-Rupp Company (The)](http://www.specagent.com/Lookup?uid=123457132462).

[Pentair Aurora; Pentair Pump Group](http://www.specagent.com/Lookup?uid=123457132465).

[PumpTech, Inc](http://www.specagent.com/Lookup?uid=123457132463).

Or equal.

Description: Factory fabricated, assembled, and tested with wet well for sewage pumps and collection of sanitary sewage and with dry equipment chamber for controls and accessories

Orientation: Shell underground with dry equipment chamber [underground with top flush with grade] [partially recessed underground] [above grade] [underground with entrance tube to grade] <Insert orientation>.

Shell: Factory fabricated from [**structural-steel plate**] [**fiberglass**].

Retain subparagraph below if shell orientation requires an entrance tube.

Entrance Tube: From dry compartment to entrance at grade, and of size required to replace largest piece of equipment, but not smaller than [**36 inches**] <**Insert dimension**> in diameter.

Retain first subparagraph below only for steel shells.

Cathodic Protection: <**Insert number**> exterior magnesium anode(s).

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> submersible grinder-type sewage pumps, with guide rail, quick-disconnect system, controls, and piping. Include stainless-steel grinder impeller and hermetically sealed motor with moisture-sensing probe, mechanical seals, and waterproof power cable.

If Project has more than one wet-well, packaged sewage pumping station with submersible grinder sewage pumps, delete subparagraph and associated subparagraphs below and schedule pumping stations on Drawings.

Capacities and Characteristics:

Diameter or Dimensions of Shell: <Insert **inches** or other dimensions.>

Height of Shell Base Section: <**Insert inches.**>

Pumping Station, Inlet Pipe Size: <**Insert NPS.**>

Pumping Station, Discharge Pipe Size: <**Insert NPS.**>

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> required.

Each Sewage Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Impeller: [Cutter] [Cutter or grinder] [Grinder] type.

Inlet Size: <Insert **NPS**.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sump Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Pumping Station Electrical Characteristics:

Full-Load Amperes: <**Insert value.**>

Minimum Circuit Ampacity: <**Insert value.**>

Maximum Overcurrent Protection: <**Insert amperage.**>

* + - * 1. Wet-Well, Packaged Sewage Pumping Stations with Wet-Well-Mounting Sewage Pumps:

[Manufacturers:](http://www.specagent.com/Lookup?ulid=2252) Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

[Dakota Pump Incorporated](http://www.specagent.com/Lookup?uid=123457132476).

[Gorman-Rupp Company (The)](http://www.specagent.com/Lookup?uid=123457132479).

[PumpTech, Inc](http://www.specagent.com/Lookup?uid=123457132477).

Or equal.

Description: Factory fabricated, assembled, and tested with wet well for [**comminutor,**]sewage pumps and collection of sanitary sewage and with suspended sewage pumps and dry equipment chamber for pump motors, controls, and accessories.

Orientation: Shell underground with dry equipment chamber [underground with top flush with grade] [partially recessed underground] [above grade] [underground with entrance tube to grade] <Insert orientation>.

Shell: Factory fabricated from [**structural-steel plate**] [**fiberglass**].

Retain subparagraph below if shell orientation requires an entrance tube.

Entrance Tube: From dry compartment to entrance at grade, and of size required to replace largest piece of equipment, but not smaller than [**36 inches**] <**Insert dimension**> in diameter.

Retain subparagraph below only for steel shells.

Cathodic Protection: <**Insert number**> exterior magnesium anode(s).

Retain first subparagraph below if required.

Comminutor: Full size of sewage inlet pipe.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> wet-well-mounting-type, nonclog sewage pumps suspended from dry-compartment floor, with controls and piping. Include ASTM A48 “Standard Specification for Gray Iron Castings”, Class 25, nonclog, cast-iron impeller capable of passing solids of 3-inch minimum diameter; grease-lubricated bearings and stuffing-box seal; shaft coupling; and pedestal-mounted motor.

If Project has more than one wet-well, packaged sewage pumping station with wet-well-mounting sewage pumps, delete subparagraph and associated subparagraphs below and schedule pumping stations on Drawings.

Capacities and Characteristics:

Diameter or Dimensions of Shell: <Insert **inches** or other dimensions.>

Height of Shell Base Section: <**Insert inches.**>

Pumping Station, Inlet Pipe Size: <**Insert NPS.**>

Pumping Station, Discharge Pipe Size: <**Insert NPS.**>

Comminutor:

Required: [**No**] [**Yes**].

Capacity: <Insert **gpm**.>

Pipe Size: <Insert **NPS**.>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sewage Pumps: [**Two**] [**Three**] <**Insert number**> required.

Each Sewage Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Impeller:

Type: <Insert type.>

Diameter: <Insert **inches**.>

Solids Size Design: <**Insert inches.**>

Inlet Size: <Insert **NPS**.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Sump Pump:

Capacity: <Insert **gpm**.>

Total Dynamic Head: <**Insert feet.**>

Speed: <Insert rpm.>

Discharge Size: <**Insert NPS.**>

Motor Size: <**Insert value**> hp.

Electrical Characteristics:

Volts: [**120**] [**240**] [**277**] [**480**] <**Insert value**> V.

Phases: [**Single**] [**Three**].

Hertz: 60.

Pumping Station Electrical Characteristics:

Full-Load Amperes: <**Insert value.**>

Minimum Circuit Ampacity: <**Insert value.**>

Maximum Overcurrent Protection: <**Insert amperage.**>

* + - 1. COMMINUTORS

Retain this Article only if comminutors are required for sewage shredding and grinding. Delete if grinder, chopper, or cutter pumps are specified.

* + - * 1. Comminutors:

Description: Motor-operated, single- or twin-shaft, cutter- or grinder-design unit with controls; for pipeline installation.

Body: Stainless steel or ductile iron with flanged ends and access plate.

Cutting Elements: Motor-driven rotor and stationary cutters or grinders of hardened stainless or heat-treated steel.

Motor: Explosion proof, directly connected to body.

Control Panel: NEMA 250 “Enclosures for Electrical Equipment”, Type 12 enclosure for installation in dry equipment chamber.

Add special control features below; for example, unit operation when pumps are running.

<Insert special control features.>

* + - 1. CONTROLS

Retain and revise this Article to suit Project. Other controls are available. See Evaluations for a more comprehensive discussion. paragraph below is for two sewage pumps; revise if three or more sewage pumps are required.

* + - * 1. Control Sequence of Operation: Cycle each sewage pump on and off automatically to maintain wet-well sewage level. Automatic control operates both pumps in parallel if wet-well level rises above starting point of low-level pump, until shutoff level is reached. Automatic alternator, with manual disconnect switch, changes sequence of lead-lag sewage pumps at completion of each pumping cycle.

Select one or both of first two paragraphs below.

* + - * 1. Self-Purging, Air-Bubbler System: Senses variations of sewage level in wet well. Include duplex-arrangement oilless air compressors to furnish bubbler air; filters; air-storage reservoir; piping; airflow meter with needle valve adjustment for airflow regulation; sewage depth gage; air-bubbler piping to wet well; and pressure-sensing, dustproof mercury switches.

In first paragraph below, select one option or allow for several sensors.

* + - * 1. [**Electrode**] [**Float-Switch**] [**Pressure-Switch**] [**Ultrasonic**] System: Senses variations of sewage level in wet well. Include high and low adjustments capable of operating on 6-inch minimum differential of liquid level.
				2. Motor Controllers: Magnetic, full voltage, nonreversing. Include undervoltage release, thermal-overload heaters in each phase, manual reset buttons, and hand-automatic selector switches. Include circuit breakers to provide branch-circuit protection for each controller.
				3. 120-V accessory controls with 15-A, single-phase circuit breakers or fuses for each item.
				4. Control Panel: Enclosure complying with UL 508A “Standard for Safety for Industrial Control Equipment “[**and with UL 508A, Supplement SB**] with separate compartments and covers for controllers, circuit breakers, transformers, alternators, and single-phase controls. Include 20-A duplex receptacle in NEMA WD 1, Configuration 5-20R mounted on exterior of control panel.

Mounting: [Inside, on dry-chamber wall] [Outside, on pedestal, at grade] <Insert building description and room number>.

Revise enclosure type in subparagraph below if another type is required or more suitable.

Enclosure: NEMA 250, Type [**1**] [**4**] [**4X**] <**Insert type**>.

* + - * 1. Install labels on panel face to identify switches and controls.
				2. Wiring: Tin-copper wiring.
				3. Connection for Portable Generator: Nonautomatic (manual) transfer switch with receptacle matching generator electrical power requirements. Nonautomatic transfer switches are specified in Section 263600 "Transfer Switches" and receptacles are specified in Section 262726 "Wiring Devices."
			1. ACCESSORIES

Retain and revise this Article to suit Project.

* + - * 1. Lighting: Minimum of 2, UL 1571 “Standard for Safety Incandescent Lighting Fixtures”, heavy-duty, cast-metal, wet-location-type fixtures with 100-W bulbs and guards in service area. Locate switches, with pilot lights, at chamber entrance.
				2. Submersible Sump Pump:

Discharge Size: NPS 1-1/4 minimum.

Pump End Bell and Motor Shell: Cast iron.

Revise horsepower in first subparagraph below and add voltage and phase if required; or delete horsepower here and insert horsepower, voltage, and phase in schedule if required.

Motor: 1/3 hp, 1750-rpm, hermetically sealed, capacitor-start, with built-in overload protection.

Impeller: ASTM B584 “Standard Specification for Copper Alloy Sand Castings for General Applications”, cast bronze or ASTM B36 “Standard Specification for Brass Plate, Sheet, Strip, and Rolled Bar”, brass.

Shaft: Stainless steel.

Bearings: Grease-lubricated, factory-sealed ball bearings.

Seals: Mechanical.

Accessories: Inlet strainer.

Controls: Float switch.

Dehumidifier in first paragraph below is needed to protect accessories, controls, and piping.

* + - * 1. Dehumidifier: Electric refrigeration system, adjustable humidistat, reverse-acting thermostat for low-temperature cutoff controls, and condensate pump with drain piping to sump.

Revise subparagraph below to suit Project.

Dehumidification system capacity adequate to remove at least 15 pints of water per day from service area air that is 80 deg F with a relative humidity of 60 percent.

* + - * 1. Ventilation: Electrically powered ventilation system. Include centrifugal blower with 4-inch- round exhaust vent designed to keep out rain, insects, and other foreign matter; limit switch to start blower if entrance door or lid is opened; 0- to 15-minute timer; and separate manual switch.

Revise subparagraph below to suit Project.

Ventilating system capacity to change air in dry equipment chamber every two minutes.

Delete first paragraph below if no heater. If retaining, increase heater capacity to suit Project.

* + - * 1. Heater: Electric, 1.5 kW minimum, with fan and thermostat control.
				2. High-Water Audio Alarm: Horn for audio indication of station high-water level, energized by separate level-detecting device. Include alarm silencer switch and relay in station.
				3. Remote Alarm Circuit: Include contacts for connection to remote alarm panel.
			1. MOTORS

Motor characteristics such as NEMA designation, temperature rating, service factor, enclosure type, and efficiency are specified in Section 220513 "Common Motor Requirements for Plumbing Equipment." If different characteristics are required, add paragraphs to this Article to suit Project.

* + - * 1. General requirements for motors are specified in Section 220513 "Common Motor Requirements for Plumbing Equipment."
			1. MISCELLANEOUS MATERIALS
				1. Structural Steel: ASTM A6 “Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Sheet Piling”, W or HP shapes, or ASTM A36 “Standard Specification for Carbon Structural Steel”, plates or beams.
				2. Grout: ASTM C1107 “Standard Specification for Packaged Dry, Hydraulic-Cement Grout”, Grade B, nonshrink cement grout.

Design Mix: 5000-psi, 28-day compressive strength.

* + - * 1. Concrete: Concrete is specified in Section 033000 "Cast-in-Place Concrete."
			1. PACKAGED SEWAGE PUMPING STATION FABRICATION

Retain only one of two shell paragraphs below and revise associated subparagraphs to suit Project.

Paragraph and subparagraphs below specify steel shell construction.

* + - * 1. Fabricate shell from structural-steel plate with continuous welds to make watertight and gastight construction.

Walls: 1/4-inch minimum thickness.

Top and Bottom Heads: 3/8-inch minimum thickness. Weld reinforcing steel to top and bottom heads.

Delete first subparagraph below if not required.

Entrance-Tube Walls: 1/4-inch minimum thickness.

Weld steel access ladder and air vent to shell[**and entrance tube**].

Apply three coats of epoxy resin to interior and exterior surfaces.

Increase number of anodes in subparagraph below for cathodic protection of large chambers.

Include [**at least two**] [**four**] <**Insert number**> exterior magnesium anode(s) for cathodic protection.

First paragraph and subparagraphs below specify fiberglass shell construction.

* + - * 1. Fabricate shell from fiberglass with structural-steel reinforcement.

Attach structural-steel reinforcement to top and bottom heads.

Fabricate shell with continuous joints to make watertight and gastight construction.

Attach air vent to pump chamber[**and entrance tube**].

Ladder: [Steel] [Fiberglass].

* + - * 1. Install sump, 18 inches in diameter by 10 inches deep in dry-chamber floor. Slope floor toward sump and fasten rubber mat to floor walkway with cement.

Delete first paragraph below if entrance tube is not required.

* + - * 1. Entrance tube may be furnished separately for field installation.
				2. Entrance Cover: Waterproof and corrosion resistant, with lock. Include way to open cover from inside tube if cover is locked.
				3. Air Vent: Duct fabricated from corrosion-resistant material, extended to above grade, outlet turned down, and with insect screen in outlet.
				4. Factory fabricate piping between unit components.

Use galvanized-steel pipe and cast-iron fittings or ductile-iron pipe and fittings.

Use fittings for changes in direction and branch connections.

Flanged and union joints may be used instead of joints specified.

Use dielectric fittings for connections between ferrous- and copper-alloy piping.

* + - * 1. Piping Connections: Unless otherwise indicated, make the following piping connections:

Install unions, in piping NPS 2 and smaller, adjacent to each valve and at final connection to each piece of equipment having NPS 2 or smaller threaded pipe connection.

Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.

* + - * 1. Valves: Ferrous alloy.

Sewage Pump Piping: Include gate valve on each pump inlet and gate and check valves on each discharge pipe.

Delete three subparagraphs below if not required.

Sump Pump Piping: Include ball or gate and check valves on discharge pipe.

Compressed-Air Piping: Include ball and check valves on discharge pipe from each air compressor.

Vacuum Piping: Include ball and check valves on inlet pipe to each vacuum pump.

* + - * 1. Wiring: Tin-coated copper.
			1. SOURCE QUALITY CONTROL
				1. Test and inspect sewage[**and sump**] pumps according to ANSI Standard/HI 1.6, "Centrifugal Pump Tests." Include test recordings that substantiate correct performance of pumps at design head, capacity, suction lift, speed, and horsepower.
1. Test accessories and controls through complete cycle. Include test recordings that substantiate correct performance.
2. EXECUTION
	* + 1. EXAMINATION
				1. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
				2. Examine roughing-in of sewerage piping systems to verify actual locations of piping connections before packaged sewage pumping station installation.
				3. Proceed with installation only after unsatisfactory conditions have been corrected.
			2. INSTALLATION
				1. Install packaged sewage pumping station components where indicated, according to specific equipment and piping arrangement indicated.

Coordinate sizes and locations of concrete bases in first paragraph below with pumping stations. Verify structural requirements with Structural Engineer.

* + - * 1. Shell Base Supports: Form from structural-steel beams, of number and lengths required to support bottom of shell and to anchor beams to concrete foundation.

Delete subparagraph below if dry-chamber floor is sloped down toward sump.

Use elevator blocks attached to bottom of shell to slope station floor 1 inch in 10 feet down toward sump.

* + - * 1. Grout under and around shell. Ensure that there are no voids between foundation slab and underslab of pumping station.
				2. Fill voids between shell sidewalls, sleeves, and piping and make watertight seal with grout.

Retain three paragraphs below for steel shells; delete for fiberglass shells.

* + - * 1. Connect anode conductors to grounding lugs on steel housing.
				2. Join separate sections of housing by field welding.

Retain paragraph below if shell is installed completely below grade.

* + - * 1. Field weld entrance tube to housing.
			1. CONNECTIONS

Coordinate piping installations and specialty arrangements with schematics on Drawings and with requirements specified. If Drawings are explicit enough, these requirements may be reduced or omitted.

* + - * 1. Sanitary sewer piping installation requirements are specified in Section 221313 "Facility Sanitary Sewers." Drawings indicate general arrangement of piping.
				2. Install piping adjacent to machine to allow service and maintenance.
				3. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
				4. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
			1. IDENTIFICATION
				1. Install identifying labels permanently attached to equipment.
				2. Install operating instruction signs permanently attached to equipment or on pumping station wall near equipment.
				3. Arrange for installing green[**warning tape or**] detectable warning tape over outside edges of underground packaged sewage pumping stations.
			2. PAINTING
				1. Prepare and paint ferrous piping in wet wells, structural-steel supports, and anchor devices with coal-tar epoxy-polyamide paint according to SSPC-Paint 16.
				2. Paint field-welded areas to match factory coating.
			3. FIELD QUALITY CONTROL

Retain one of three paragraphs below. If retaining second option in first paragraph, or if retaining second or third paragraph, retain requirement for field quality-control test reports in Part 1 "Informational Submittals" Article.

* + - * 1. Testing Agency: [**Director’s Representative will engage**] [**Engage**] a qualified testing agency to perform field tests and inspections and prepare test reports.

Retain paragraph below to require a Company Service Advisor to perform inspections, tests, and adjustments.

* + - * 1. Manufacturer's Field Service: Engage a Company Field Advisor per OGS Spec Section 014216 to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

Retain paragraph and subparagraph below to require Contractor to perform tests and inspections.

* + - * 1. Perform tests and inspections and prepare test reports.

Retain subparagraph below to require a Company Service Advisor to assist Contractor with inspections, tests, and adjustments.

Manufacturer's Field Service: Engage a Company Service Advisor to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

Retain first paragraph and subparagraphs below to describe tests and inspections to be performed by any of the entities in three paragraphs above.

* + - * 1. Tests and Inspections:

After installing packaged sewage pumping stations and after electrical circuitry has been energized, test for compliance with requirements. Furnish water required for pump tests.

Leak Test: After installation, charge systems and test for leaks. Repair leaks and retest until no leaks exist.

Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

* + - * 1. Remove and replace packaged sewage pumping stations that do not pass tests and inspections and retest as specified above.
			1. STARTUP SERVICE

Retain this Article if Company Service Advisor is required.

* + - * 1. Engage a Company Field Advisor per OGS Spec Section 014216 to perform startup service.

Complete installation and startup checks according to manufacturer's written instructions.

Adjust pump, accessory, and control settings, and safety and alarm devices.

<Insert, in separate subparagraphs, startup steps.>

* + - 1. DEMONSTRATION
				1. Engage a Company Field Advisor per OGS Spec Section 014216 to train Facility’s maintenance personnel to adjust, operate, and maintain packaged sewage pumping stations.

END OF SECTION 221343