SECTION 46 10 00

WASTEWATER COLLECTION (PRELOS) AND DECENTRALIZED TREATMENT SYSTEMS (ADVANTEX)

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\*\* NOTE TO SPECIFIER \*\* Orenco Systems, Inc.; wastewater technologies.  
This section is based on the products of Orenco Systems, Inc., which is located at:814 Airway Ave.Sutherlin, OR 97479Toll Free Tel: 800-348-9843Tel: 541-459-4449Email: [request info (info@orenco.com)](https://arcat.com/rfi?action=email&company=Orenco%252BSystems%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(11210ore)%253A%2520&coid=46117&spec=11210ore&rep=&fax=)  
Web: <http://www.orenco.com>   
  
 [ [Click Here](https://arcat.com/company/orenco-systems-inc-46117) ] for additional information.  
  
Whether you need wastewater collection, decentralized wastewater treatment systems, greywater treatment systems or all of the above, Orenco has your answer.  
Since 1981, Orenco Systems, Incorporated, has researched, designed and manufactured wastewater collection systems and innovative onsite and decentralized wastewater treatment technologies. Our solutions include liquid-only wastewater collection systems, advanced secondary treatment systems, watertight fiberglass and DCPD tanks, and in-tank pumping and filtration systems. We also manufacture high-quality standard, custom, and OEM controls, along with state-of-the-art fiberglass buildings, and enclosures.  
Orenco's PrelosLiquid-Only Sewer provides resilient, secure, economically sustainable sewer infrastructure. Prelos Sewers can replace gravity sewer and grinder pump systems, especially in septic-to-sewer projects. Typically, no lift stations are required in this scalable solution that can be "surgically" deployed to new and existing homes.  
Orenco's AdvanTex® Treatment Systems were developed for the long-term processing of domestic- and commercial-strength wastewater, as well as greywater, to advanced treatment levels using passive processes with very low energy consumption. The heart of all AdvanTex systems is a multiple-pass, packed-bed, fixed-film media filter that reliably provides high-quality effluent in a wide range of applications. These systems have undergone numerous national and international testing protocols, as well as multiple third-party field verification programs.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not relevant to the project; add others as required.

* + 1. Processor tanks.
    2. Tank access equipment.
    3. Single-family Prelos gravity effluent discharge (PGED) assemblies.
    4. Pressurized effluent discharge (PPED) system for single-family residences.
    5. Pressurized effluent discharge (PPED) system for commercial connections.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section -
    2. Section 22 14 26.13 - Roof Drains.
  1. REFERENCES
     1. Underwriters Laboratories (UL):
        1. UL 508 - UL Standard for Industrial Control Equipment.
        2. UL 913 - UL Standard for Safety Intrinsically Safe Apparatus and Associated Apparatus for Use in Class I, II, and III, Division 1, Hazardous (Classified) Locations.
  2. DEFINITIONS
     1. Bid: The offer or proposal of a Bidder, submitted on the prescribed form, setting forth the prices for the work to be performed.
     2. Bidder: An individual or entity who submits a Bid directly to the Owner.
     3. Building Sewer: The horizontal piping of a drainage system extending beyond ends of the building drain and receives discharge of building drain and conveys it to a public sewer, private sewer, individual sewage disposal system, or other point of disposal.
     4. Contractor: The individual or entity with whom the Owner has entered into an agreement to install a Prelos Sewer.
     5. Effluent Sewer: A wastewater pretreatment and collection system designed to provide onsite solids retention and reduction and to convey primary-treated liquid effluent to a centralized facility for treatment.
     6. Engineer: The individual or entity responsible for preparation and certification of the construction plans and/or construction management.
     7. Inspector: The specific individual designated by the Owner, Engineer, Contractor, and Manufacturer to ensure quality control by inspecting and certifying that each Prelos Sewer package is in compliance with the Manufacturer's recommendations and requirements.
     8. Liquid-Only Sewer: An advanced form of Effluent Sewer.
     9. Manufacturer: A supplier, fabricator, distributor, or vendor having a direct or indirect contract with Contractor or Owner to furnish materials or equipment to be incorporated in the work by Contractor.
     10. Manufacturer's Representative: A firm under contract with the Manufacturer to sell or solicit sales and/or represent the Manufacturer as a limited agent for the Manufacturer's products.
     11. Owner: The individual or entity that has entered into the direct or indirect contract and for whom the work is to be performed.
     12. Prelos Gravity Effluent Discharge (PGED): Prelos Sewer equipment used at sites where the elevation allows effluent discharge into a pressurized collection main without the use of a pump.
     13. Prelos Pressurized Effluent Discharge (PPED): Prelos Sewer equipment used at sites where a pump is used to discharge effluent into a pressurized collection main.
     14. Prelos Processor: A fully integrated unit that provides onsite storage, filtration, pumping, and primary treatment as part of a Liquid-Only Sewer system. The Prelos Processor includes a meander tank, fiberglass risers, ClickTight electrical connections for pumps and control floats, a hanging pump discharge assembly, and a passive self-cleaning Biotube filter.
     15. Prelos Sewer: A Liquid-Only Sewer system that relies on Prelos Processors and Prelos technology.
  3. SUBMITTALS
     1. Submit under provisions of Section 01 30 00.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern, and color.
    2. Shop Drawings: Include details of materials, construction and finish. Include relationship with adjacent construction.
       1. Manufacturer or Manufacturer's Representative shall submit an electronic set of shop drawings and technical data sheets. The submittals shall clearly specify the materials of construction and equipment compatibility, along with drawings for each unique package being supplied. There shall be no alternatives or substitutions considered.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: The equipment furnished is to be manufactured and supplied by a company experienced in the design and manufacture of Liquid-Only or Effluent Sewer systems.
        1. Manufacturer must have ten (10) years' experience in design and manufacture of Effluent Sewer systems of similar size and equipment specified.
        2. Manufacturer must have twenty-five (25) successful installations of Effluent Sewer systems, five (5) of which must have more than 100 connections or be at least the size of the system being bid, whichever is smaller.
           1. In lieu of this experience, the system Manufacturer is required to submit a 5 year performance bond for 150 percent of the cost of the equipment, to guarantee replacement of equipment in case of failure.
        3. Experienced support staff dedicated to supporting the project through design, construction, and Operation and Maintenance.
        4. Asset management department dedicated to assisting operators with operational and maintenance activities.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.
  2. PRE-INSTALLATION CONFERENCE
     1. Before any work at the site is started, a conference attended by Owner, Contractor, Engineer, Manufacturer or Manufacturer's Representative, and others, as appropriate, will be held to establish a working understanding among the parties as to the work involved for installing each Prelos Sewer unit.
        1. At this conference, Owner, Contractor, Engineer, and Manufacturer will designate, in writing, a specific individual to act as Inspector for the installation of each Prelos Sewer unit. Any cost or fees associated with the services of the Inspector or the Engineer during construction will be the responsibility of the Owner.
  3. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  4. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  5. WARRANTY
     1. Manufacturer warrants all component products comprising a Prelos Processor are free from defects in materials or workmanship that cause the product to lose structural integrity or electrically or mechanically operate improperly for a period of five (5) years from the date of installation.
     2. A Prelos pump, that is an Orenco multi-stage, high-head, submersible turbine pump, will be warranted for ten (10) years from the date of manufacture for the liquid end of the effluent pump.
     3. Manufacturer will submit details of limitations and exclusions that may apply to the warranty. The warranty will be documented in product literature. Use of any non-Prelos components during the warranty period shall render the warranty null and void.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: Orenco Systems, Inc., which is located at:814 Airway Ave.Sutherlin, OR 97479Toll Free Tel: 800-348-9843Tel: 541-459-4449Email: [request info (info@orenco.com)](https://arcat.com/rfi?action=email&company=Orenco%252BSystems%252C%252BInc.&message=RE%253A%2520Spec%2520Question%2520(11210ore)%253A%2520&coid=46117&spec=11210ore&rep=&fax=);Web: <http://www.orenco.com>
      2. Substitutions: Not permitted.
   2. GENERAL DESCRIPTION
      1. Prelos Sewer Package: An Orenco Prelos Processor, installed in accordance with plans and specifications. The Prelos Processor is unique, both in its fabrication and its function.
         1. A factory-built and -tested Prelos Processor:
            1. Round meander tank.
            2. Fiberglass risers.
            3. ClickTight electrical connections for pumps and control floats.
            4. Hanging pump discharge assembly.
            5. Passive self-cleaning Biotube filter.
         2. An integrated package provided by a single manufacturer.
         3. Completely serviceable, with easy access to pumps, filter, and float switches.
            1. Pumps: Lightweight, less than 31 lbs (14 kg). Designed for easy removal without removing filter and float switches.

Consist of a motor, a liquid end, and an electrical cable.

Repairable by replacing impellers and diffusers.

Serviceable, and cleanable.

* 1. PROCESSOR TANKS
     1. Basis of Design: Prelos Processor Tanks as manufactured by Orenco Systems Inc. Manufacturer must provide the structural design and certification to Engineer for review.
        1. Design: In accordance with accepted engineering practice.
        2. Molded Tank Material: Thermoset dicyclopentadiene (DCPD); reaction injection molding (RIM) process.
        3. Permanent Metal Parts: 300 series stainless steel.
        4. Tank Sizing: 1000 gallon Prelos Processors are suitable for residential applications up to four bedrooms. 1500 gallon Prelos Processors and/or supplemental tanks shall be utilized for homes greater than 4 bedrooms.
           1. Homes Larger than Four Bedrooms: Tank sizing will be at discretion of Engineer and in accordance with applicable regulations.
     2. Loading Criteria:
        1. Tank Rating: 500 lbs per sq ft (2445 kg per sq m).
           1. Loading Criteria Based on the Following:

Saturated backfill: 140 lbs per cu ft (2245 kg per cu m).

Unsaturated backfill: 127. lbs per cu ft (2037 kg per cu m).

* + - 1. Lateral Loading: 62.4 lbs per cu ft (1000 kg per cu m). Determined from ground surface.
      2. Concentrated Wheel Load: 2500 lbs (1136 kg).
    1. Four Typical Loading conditions to be Analyzed:
       1. Condition One: 5 foot (1500 mm) bury, plus full exterior hydrostatic load.
       2. Condition Two: 5 foot (1500 mm) bury, plus full exterior hydrostatic load, plus 2500 lbs (1136 kg) wheel load.
       3. Condition Three: 1 foot (300 mm) bury, plus 2500 lbs (1136 kg) wheel load.
       4. Condition Four: Interior hydrostatic load with tank full and unsupported by soil. This condition represents the tank full of liquid at 62.4 lbs per cu ft (1000 kg per cu m) and addresses seam and haunch stress-strain relationships that occur during watertightness testing, as well as poor soil bedding conditions that provide inadequate support.
    2. Tank Burial: Soil cover of 12 inches (300 mm), unless specified otherwise by Manufacturer.
       1. Tanks requiring deep burial greater than 60 inches (1500 mm) or subject to truck or heavy traffic loading require special consideration.
    3. Tank Construction: Structurally sound and watertight, capable of withstanding long-term hydrostatic loading with a water table maintained at ground level in addition to soil loading.
       1. Tank Access Opening: One access opening capable of accepting a 30 inch (750 mm) diameter access riser of configuration shown on Manufacturer's drawings.
          1. Provide access to inlet and outlet/discharge pumping equipment.
          2. Modification of completed tanks will not be permitted.
       2. Inlet Plumbing: Includes an inlet tee penetrating 18 inches (450 mm) into liquid from inlet flow line.
          1. Depth may vary depending on tank's height. In all cases, the inlet is to extend to a level below the bottom of the maximum scum depth.
          2. Allow for natural ventilation back through the building sewer and vent stack.
       3. Tank Penetrations: Provided by Manufacturer.
       4. Tank Weight: Specified by Manufacturer's engineer e.g., 450 lbs (205 kg) plus or minus for 1000 gal (3,800 L) tanks.
       5. Joining Tank Wall and Inlet Piping: A Manufacturer supplied EPDM grommet, methacrylate structural adhesive, ABS inlet adapter, or approved equal.
    4. Finite Element Analysis of Tanks:
       1. Tanks must be analyzed using finite element analysis for buried structures, and calculations shall address the following:
          1. Strength.
          2. Buckling.
          3. Deflection of 5 percent of tank diameter, based on service load, including long-term deflection lag.
          4. Buoyancy.
       2. Material Properties and Laminates Considered in Analysis: To be DCPD.
          1. Resin: Must be considered acceptable for use with tank construction.
          2. Thicknesses for different regions of tanks must be described and shown in shop drawings for each individual tank.
          3. Typical design strength properties are as follows:

Design tensile strength: 2,300 psi (46,195 kPa).

Design flexural strength: 3,500 psi (72,395 kPa).

Design compressive strength: 3,100 psi (63,432 kPa).

Design shear in-plane: 2,400 psi (49,504 kPa).

Flexural modulus: 274,000 psi (1,889,164 kPa).

* 1. TANK ACCESS EQUIPMENT
     1. Risers: Required for access to internal components and to tanks for septage pumping. Risers to extend 2 to 3 inches (50 to 75 mm) above final grade, or as directed by applicable regulations or codes, allowing for settlement and ensuring positive drainage away from the access.
        1. Construction: Fiberglass and watertight.
        2. Tank Attachment: Adhered such that a watertight seal is achieved.
           1. Required Adhesive: Two-component methacrylate structural adhesive or Manufacturer approved equal.
     2. Lids: One lid with each riser. Designed to form a watertight seal with top of riser.
        1. Basis of Design: DuraFiber Model FLD30G, as manufactured by Orenco Systems, Inc.
        2. Material: Fiberglass with green finish.
        3. Fasteners: Stainless steel tamper resistant bolts and wrench.
           1. Include recessed drives, such as hex, Torx, and square.
           2. Fasteners removable with screwdrivers, such as slotted and Phillips, or removable with pliers or crescent wrenches, are not considered tamper-resistant.
           3. Fasteners must not extend above lid surface.
        4. Provide evidence lid designs have been used successfully in continuous field service for a minimum of five (5) years.
        5. Construction: Waterproof, corrosion-resistant, and UV-resistant.
           1. Flat, with no noticeable upward dome. Lids are not to allow water to pond on top of them.

A crown or dome of no more than 1/8 inch (3 mm) is allowable.

* + - * 1. Finish: Non-skid finish.
        2. Loading: Capable of withstanding truck wheel load 81 sq inches (0.52 sq m) of 2500 (1136 kg) for 60 minutes with a maximum vertical deflection of 3/4 inch (19 mm).

\*\* NOTE TO SPECIFIER \*\* The traffic bearing lid and foam-insulated lid are optional. Delete option not required or delete both.

* + - 1. Traffic-Bearing Lid: Cast iron frame and cover. Part Number 6024, 3060, and 4036, as manufactured by Sather Manufacturing Co., Inc., or approved equal, which will fit over a standard lid. The cover shall have the word "SEWER" cast into it.
      2. Foam-Insulated Lid: Rigid closed-cell foam insulation of 2 or 4 inch (50 or 100 mm) thickness attached to underside of lid.
         1. Fasteners must be made of corrosion-resistant stainless steel.
         2. Insulation R Value: 10 per 2 inch (50 mm) increment.
    1. Prelos Gravity Effluent Discharge (PGED) Assemblies: Supplied by reputable Manufacturer with ten (10) years of experience in supplying equipment for Liquid-Only Sewers or effluent sewers.
       1. Effluent Filter Systems:
          1. Prevent particles larger than 1/8 inch (3 mm) diameter from leaving the tank.
          2. Solid bottom or deflecting device preventing vertically rising solids from reaching filtering surface area during ebullition due to sludge bulking.
  1. SINGLE-FAMILY PRELOS GRAVITY EFFLUENT DISCHARGE (PGED) ASSEMBLIES
     1. Effluent Filters: For Prelos Gravity Effluent Discharge (PGED) Tanks for single-family dwellings of fewer than four bedrooms.
        1. Basis of Design: Prelos 4 inch Biotube Effluent Filter, FT04 Model series as manufactured by Orenco Systems Inc. or Engineer-approved equal.
           1. Tanks: Minimum of 1000 gallon (3,786 liters).
           2. Filter shall consist of a 4-inch diameter PVC vault with eight (8) 1-1/8 inch diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70% of minimum liquid level).
           3. Biotube Cartridge: Made with 1/8 inch (3 mm) mesh polypropylene and solid base to prevent solids from entering through bottom during ebullition.

Housed inside the PVC vault.

Effective Filter Area: 5.1 sq ft (0.47 sq m) plus or minus 5 percent.

* + - * 1. The lateral from tank to collection line is to be laid to a uniform grade with no high points.
        2. Direct-coupled outlet containing two(2) 1/2 inch (13 mm) diameter flow-modulating orifices and one (1) 1/2 inch (13 mm) diameter vent hole.
    1. Effluent Filters: For Prelos Gravity Effluent Discharge (PGED) Tanks for single-family dwellings of four bedrooms or more.
       1. Basis of Design: Prelos 8 inch Biotube Effluent Filter, FT08 Model series as manufactured by Orenco Systems Inc. or Engineer approved equal.
          1. Tanks: Minimum of 1500 gallon (5,678 liters).
          2. Filter: 8 inch (200 mm) diameter PVC vault with eight 1-3/8 inch (35 mm) diameter holes evenly spaced around perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping; approximately 70 percent of minimum liquid level.
          3. Biotube Cartridge: Made with 1/8 inch (3 mm) mesh polypropylene and solid base to prevent solids from entering through bottom during ebullition.

Housed inside the PVC vault.

Effective Filter Area: 14.6 sq ft (1.4 sq m) plus or minus 5 percent.

* + - * 1. The lateral from the tank to the collection line shall be laid to a uniform grade with no high points.
        2. Direct-coupled outlet containing two 1-1/8 inch (29 mm) diameter flow-modulating orifices and one 3/4 inch (19 mm) diameter vent hole.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + 1. Alarm Float: Mercury-free float switch Model MFP from Orenco Systems, Inc.
       1. Mounted on PVC stem and attached to filter housing.
       2. Float: Adjustable and removable without removing filter cartridge.
       3. High-Level Alarm: Preset as shown in Engineer's plans.
       4. Float Lead: Secured with nylon strain-relief bushing at splice box.

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + 1. External Electrical Splice Box: Model SBEX-Series from Orenco Systems, Inc. or Engineer-approved equal.
       1. UL-approved for wet locations.
       2. Equipped with up to four electrical cord grips and two 3/4 inch (19 mm) outlet fittings.
       3. UL-listed, waterproof wire nuts.
       4. UL-approved conduit seal kit, accessible above ground, is required to prevent passage of gases, vapors, or flames through the conduit to the control panel.
       5. An additional UL-classified sealant shall be added to the splice box coupling to prevent condensation accumulation in the splice box.
          1. The following UL-approved sealants shall be used:

UL-classified moisture-cure polyurethane quick-drying foam or Engineer-approved equal with an RSI rating of 0.88 per 1 inch (25 mm) of foam.

UL-classified silicone sealant or Engineer-approved equal consisting of a neutral-cure, non-acetic, non-corrosive silicone capable of withstanding temperatures to 450 degrees F (232 degrees C).

\*\* NOTE TO SPECIFIER \*\* Optional. Delete if not required.

* + 1. Alarm Panels: AM Series as supplied by Orenco Systems, Inc.
       1. Listed per UL 508. Rated for indoor and outdoor use.
       2. Most Applications: Model AMAHW or Engineer-approved equal meeting the following specifications.
          1. Enclosure (HxWxD): 6 x 6 x 4 inch (150 x 150 x 100 mm). UL Type 4X; (IP 66).
          2. Audio Alarm: 95 dB at 24 inch (625 mm). Warble-tone sound. Gasketed. UL Type 4X; (IP 66).
          3. Visual Alarm: Red Lens 7/8 inch (22 mm) diameter "Push-to-Silence." UL Type 4X, 1 Watt LED bulb. 120 VAC.
          4. Audible Alarm Silence Relay: 120 VAC, automatic reset.
  1. PRELOS PRESSURIZED EFFLUENT DISCHARGE (PPED) SYSTEM FOR SINGLE-FAMILY RESIDENCES
     1. Collection System On-Lot Package: Certified manufactured by Orenco Systems, Inc.
        1. Manufacturer will provide a unique Certificate of Origin with each package.
        2. Certificates of Origin:
           1. List products in collection system on-lot package.
           2. Warrant products to be free from defects in materials and workmanship causing products to lose structural integrity or to operate improperly; electrically or mechanically, for a five year period from date of equipment installation.
           3. Manufacturer will submit detailed limitations and exclusions from the warranty.
     2. Prelos Processor Pumping System:
        1. Prelos Processor Pumping System: A complete, integrated system as manufactured by Orenco Systems, Inc. designed for use in the Prelos Processor tank.
        2. Integrated System Components:
           1. Pump Vault: Manufactured of sturdy, corrosion-proof polyethylene.

Effective Screen Area: 13.5 sq ft (1.3 sq m).

Sloped inlet port to pull from tank's clear zone.

Allow for solids to slough or settle out during resting periods.

Allow for solids to be flushed out during servicing.

Filter: Serviceable and cleanable without removing pumps or entire vault.

* + - * 1. Pump: Model PF100511CV, 60 Hz Submersible, high-head pump from Orenco Systems, Inc. unless otherwise specified by the design Engineer.

Pump Weight: Less than 31 lbs (14 kg) for easy removal and maintenance.

Intake Screen: 1/8 inch (3 mm) mesh polypropylene.

Internal thermal overload and lightning protection.

Wet Testing: Pumps undergo 3 point, dead-head, design-flow, and design flow plus 30 percent testing at factory to confirm performance.

Pump Motor: 1/2 hp (0.37 kW), 115 VAC, single phase, 60 Hz, two-wire motor, with 10 ft long (3 meter), extra-heavy-duty (SOOW) electrical cord with ground, terminating in a ClickTight-compatible male plug.

Rated for continuous use and frequent cycling; 300 cycles per day.

Male Plug: Glass-filled thermoplastic with a silicone gasket, 3-pole, and a max load of 13 amps at 240 volts.

Motor Cable: Suitable for Class I, Division 1 and 2 applications.

Pump Discharge: To include a check valve and capable of delivering 18 gpm (1.1 L/sec) at a pressure of 14 feet (4 meters head), 10 gpm (0.6 L/sec) at 171 ft (52 meters head) and have a shut off head of 250 feet (76 meters head.

When used in conjunction with a flow controller, the pump shall be capable of providing 5 gpm (0.3 L/sec) against a head of 190 feet (58 meters head).

UL and CSA listed for use with Prelos.

Pump Liquid Ends: Minimum 24-hour run-dry capability without water lubrication while submerged in water.

Must be repairable by replacing impellers and diffusers.

Bypass Orifice: 1/8 inches (3 mm) ensuring flow circulation for motor cooling and to prevent air bind.

Floating Impeller: To protect against up-thrust and increase pump life.

* + - * 1. Discharge Piping System: Model HDAS30125FCASLC hanging-style discharge assembly or Engineer-approved equal.

Discharge Assembly: 1-1/4 inches (32 mm) diameter.

Anti-siphon mechanism flow control disk.

High-pressure reinforced EPDM flex hose; working pressure of 250 psi (1723 kPa).

Quick Disconnect: 1-1/4 inch (32 mm).

Line check valve.

Schedule 80 PVC pipe.

* + - * 1. High-Pressure External Flex Hose: Model HVX125PR series or Engineer-approved equal. Reinforced EPDM and constructed of a special elastomer compound.

Working Pressure: 250 psi (1723 kPa).

Hose Connections: Clamped with Oetiker stainless steel, two-ear clamps or Engineer-approved equal.

* + - * 1. Float Switches: Mercury-free, Model MF2P. Two mechanical float switches mounted on a PVC stem and attached to the filter. Rated for 1.0 amps at 120 VAC.

Adjustable and removable without removing pump vault.

Cords must terminate in a ClickTight-compatible male plug.

Male Plug: Glass-filled thermoplastic with a silicone gasket, 2 pole, and rated for 1.0 amps at 120 VAC.

High-Level Alarm and ON/OFF Function: Preset as in Engineer's plans.

* + - * 1. Wiring Connection System: ClickTightModel CLK-2-60 or Engineer-approved equal.

Pre-wired with 60 feet (19 m) of direct-burial PVC/nylon cable, with 14 AWG wire for pump and 18 AWG wire for float switches.

Housing: UL listed for wet locations and have three female plugs.

Two Female Plugs: Capable of accepting male plugs from float switches.

One Female Plug: Capable of accepting male plug from pump.

* + - * 1. Controls and Alarms:

Listed per UL 508.

\*\* NOTE TO SPECIFIER \*\* For most single-family home applications.

Panels: Model S1 (60 Hz) HR series with high-water redundant ON/OFF feature, or Engineer-approved equal. Repairable in field without soldering irons or substantial disassembly.

Standard Components:

Motor-Start Contactor: 120 VAC, 1 hp, 16 FLA, 60 Hz, 2.5 million cycles at FLA (10 million at 50 percent of FLA).

Toggle Switch: Single-pole, double-throw HOA switch, 20 amps, 1 hp.

Controls Circuit Breaker: 10 amps, OFF/ON switch, single-pole 120 VAC, DIN rail mounting with thermal magnetic tripping characteristics.

Pump Circuit Breaker: 20 amps, OFF/ON switch, single-pole 120 VAC, DIN rail mounting with thermal magnetic tripping characteristics.

Audio Alarm: 95 dB at 24 inches (600 mm), warble-tone sound.

Visual Alarm: 7/8-inch diameter red lens, "push-to-silence," UL Type 4X, 1-watt LED bulb, 120 VAC.

Panel Enclosure: Measures 11.5 inches high x 9.3 inches wide x 5.4 inches deep, UL Type 4X rated or Type 3R when using a generator receptacle, constructed of UV-resistant fiberglass, stainless steel hinges and latch.

S1 Panel Ratings: 120 VAC, 1 hp, 14 amps, single phase, 60 Hz.

Optional Components:

Redundant Off Relay: 120 VAC, secondary off, sounds alarm on low-level condition, DIN rail mount.

Pump Run Light: 7/8-inch green lens, UL Type 4X, 1-watt LED bulb, 120 VAC.

Heater: Anti-condensation, self-adjusting; radiates additional wattage as temperature drops.

3-Way, main, auto, off, Manual Transfer/Disconnect Switch

Generator receptacle.

Event Counter: 120 VAC, 6-digit, non-resettable.

Elapsed Time Meter: 120 VAC, 7-digit, non-resettable, limit of 99,999 hours, accurate to 0.01 hours.

Larger Panel Enclosure (as required). Size to be determined by Manufacturer.

Panel Location: Mounted on an exterior wall near tank and pump.

Wall should be a garage or outbuilding where sound of motor contactor engaging will not be noticed.

Include use of sound-deadening insulation if garage or outbuilding is not available.

Panel may be mounted on a post.

Mount panel within 50 ft (15 m) of, and in sight of, pump motor.

Provided lockable disconnect switch.

Mount in shade and protected from weather.

Installation Height: 45 to 60 inches (1.2 to 1.5 m) above final grade, accessible for maintenance.

* 1. PRELOS PRESSURIZED EFFLUENT DISCHARGE (PPED) SYSTEM FOR COMMERCIAL CONNECTIONS
     1. Prelos Processor Pumping System:
        1. Prelos Processor Pumping System: A complete, integrated system as manufactured by Orenco Systems, Inc. designed for use in the Prelos Processor tank.
        2. Integrated System Components:
           1. Pump Vault: Manufactured of sturdy, corrosion-proof polyethylene.

Effective Screen Area: 14 sq ft (1.3 sq m).

Sloped inlet port to pull from tank's clear zone.

Allow for solids to slough or settle out during resting periods.

Allow for solids to be flushed out during servicing.

Filter: Serviceable and cleanable without removing pumps or entire vault.

\*\* NOTE TO SPECIFIER \*\* Only to be used when called for in plans and specifications. Delete if not required.

* + - * 1. Optional Biotube On-Lot Pumping System (Commercial Applications) certified manufactured by Orenco Systems, Inc., or Engineer-approved equal.

An integrated package designed for use in concrete, fiberglass, or polyethylene tanks.

Integrated components of the system:

Universal Biotube Pump Vault: Model PVU series installed in conformance with the Engineer's plans.

Filter Effective Screen Area: No less than 14 sq ft (1.3 sq m).

The Biotube pump vault shall consist of a 12 inch diameter polyethylene vault with eight (8) 2 inch diameter holes evenly spaced around the perimeter, located appropriately to allow for maximum sludge and scum accumulation before requiring pumping (approximately 70 percent of minimum liquid level).

The Biotube assembly, consisting of 1/8 inch mesh polypropylene tubes, shall be housed inside the polyethylene vault.

Attached to the vault is a flow inducer to accept one or two high-head effluent pumps.

* + - 1. Duplex, 2-pump systems for redundancy, unless specified otherwise by the Engineer.

Model PF (60 HZ) series high-head pump.

Motor: \_\_\_ hp (\_\_ kW), \_\_\_ VAC, single-phase, Hz, two-wire motor, with 10-foot-long (3-meter), extra heavy-duty (SOOW) electrical cord with ground with ground.

Rated for continuous use and frequent cycling.

100 cycles per day.

Motor Cable: Suitable for Class I Division 1 and 2 applications.

Pump to be capable of delivering \_\_\_ gpm (\_\_ L/sec) at a pressure of \_\_\_ ft of water (\_\_ meters).

UL and CSA listed for use with Prelos.

Lightweight for easy removal and maintenance.

Pump Liquid Ends: 24-hour run-dry capability without water lubrication while submerged in water.

Must be repairable by replacing impellers and/or diffusers for better long-term cost of ownership.

Bypass Orifice: 1/8 inch (3 mm) to ensure flow circulation for motor cooling and to prevent air bind.

Floating Impeller: To protect against up-thrust and to increase pump life.

Intake Screen: 1/8 inch (3 mm) mesh polypropylene.

Internal thermal overload protection and internal lightning protection.

Testing: Pumps to undergo 3 point; dead head, design flow, and design flow plus 30 percent wet testing at the factory to confirm performance.

* + - * 1. Discharge assembly shall be Orenco Systems, Inc. Model HDAD30125CASLC hanging style discharge assembly. or Engineer equal.

Working Pressure: 250 psi (1723 kPa).

Hose Connections: Clamped with Oetiker stainless steel, two-ear clamps or Engineer-approved equal.

Shall include bronze check valve anti-siphon mechanism and EPDM flex hose.

The high-pressure external flex hose shall be Orenco Systems, Inc. Model HVX125PR series or Engineer-approved equal.

* + - * 1. Float Switches: Mercury-free, Model MF4P. Four mechanical float switches mounted on a PVC stem and attached to the filter. Rated for 1.0 amps at 120 VAC.

Adjustable and removable without removing pump vault.

High/lag, pump on, pump off and low-level alarms: Preset as in Engineer's plans.

\*\* NOTE TO SPECIFIER \*\* The model SBEX splice box below is standard. The SBX and is an alternative. Delete option not required.

* + - * 1. Wiring Connection System: External Splice Box Model SBEX series or Engineer-approved equal.

UL-approved for wet locations.

Up to four electrical cord grips and two 3/4-inch (19 mm) outlet fittings.

UL-listed waterproof wire nuts.

UL-approved conduit seal kit, accessible above ground, to prevent passage of gases, vapors, or flames through conduit to control panel.

UL-classified sealant must be added to splice box coupling to prevent condensation accumulation.

UL-classified, moisture-cure, polyurethane quick-drying foam or Engineer-approved equal.

RSI Rating: 0.88 per 1 inch (25 mm) of foam.

UL-classified silicone sealant or Engineer-approved equal.

Neutral-cure, non-acetic, non-corrosive silicone able to withstand temperatures to 450 degrees F (232 degrees C).

* + - * 1. Wiring Connection System: Class 1, Division 1 External Splice Box Model SBX or Engineer-approved equal.

UL-approved for Class I Division 1 Type D gas applications.

Equip with one quick-disconnect, aluminum receptacle, and malleable iron mounting box.

Explosion-proof fitting for pump wire connections.

Corrosion resistant.

Contains a ground screw within the hub.

Sealing Fitting: Sealed using Chico "A" sealing compound.

* + - * 1. Controls and Alarms:

Listed per UL 508.

Panels: Model MVP DAX series duplex control panel or Engineer-approved equal. Repairable in field without soldering irons or substantial disassembly.

Standard Components:

Programmable Logic Unit: 120/240 VAC programmable logic unit with built-in LCD screen and programming keys, providing control functions and timing for panel operation.

Motor-Start Contactor: 120 VAC 17 FLA, 1 hp, 60 Hz, 2.5 million cycles at FLA (10 million at 50 percent FLA). 240 VAC 17 FLA, 3 hp, 60 Hz, 2.5 million cycles at FLA (10 million at 50 percent FLA).

Toggle Switch: Single-pole, double-throw HOA switch, 20 amps, 1 hp.

Controls Circuit Breaker: 10 amps, OFF/ON switch, single-pole 120 VAC, DIN rail mounting with thermal magnetic tripping characteristics.

Pump Circuit Breaker: 20 Amps, OFF/ON switch, single-pole 120 VAC, double-pole 240 VAC, DIN rail mounting with thermal magnetic tripping characteristics; power supplied by a 30 Amp breaker.

Audio Alarm: 95 dB at 24 inches (600 mm), warble-tone sound.

Visual Alarm: 7/8-inch diameter red lens, "push-to-silence," UL Type 4X, 1-watt LED bulb, 120 VAC.

Panel Enclosure: UL Type 4X rated or Type 3R when using generator receptacles with stainless steel hinges, latch, and conduit couplings provided.

MVP Panel: Ratings of 120 VAC, 1 hp, 16 amps, single phase, 60 Hz and 240 VAC, 3 hp, 16 amps, single phase, 60 Hz.

\*\* NOTE TO SPECIFIER \*\* Delete options not required.

Optional Components:

Pump Run Light: 7/8 inch green lens, UL Type 4X, 1-watt LED bulb, 120 VAC.

Flashing Light: Red, Lexan lens, flanged based, UL-recognized.

3-Way, main, auto, off, Manual Power Transfer/Disconnect Switch.

Generator Receptacle.

120 VAC Ground Fault Interrupter (GFI).

Surge Arrestor: AG2401 120/230V, three 18-inch leads, rated for a maximum of 32,000 amps, UL/CSA-listed.

Heater: Anti-condensation, self-adjusting; radiates additional wattage as temperature drops.

Intrinsically Safe Controls Relays: Larger enclosure required; 120 VAC; listed per UL 913; for Class I, Div. I, Groups A, B, C, and D hazardous locations.

Current Sensor: 120 VAC, go/no-go operation, pump fail indicator light on panel, manual reset switch.

Panel Location: Mounted on an exterior wall near tank and pump.

Wall should be on a room or outbuilding where sound of motor contactor engaging will not be noticed.

Include use of sound-deadening insulation if sound of motor contactor engaging is of concern.

Panel may be mounted on a post.

Mount panel within 50 ft (15 m) of, and in sight of, pump motor.

Provided lockable disconnect switch.

Mount in shade and protected from weather.

Installation Height: 48 to 60 inches (1.2 to 1.5 m) above final grade, accessible for maintenance.

* + 1. Access Risers: See "Tank Access Equipment" Article.
    2. Service Connection: Model SC100 1 inch (25 mm), SC125 1.25 inches (32 mm), SC150 1.50 inches (38 mm), or SC200 2 inches (50 mm) or Engineer-approved equal. Include a swing-check valve, factory-connected to a ball valve. Components to be PVC Schedule 40 and rated for 150 psi (1034 kPa).
       1. Enclosed in PVC access riser from Orenco Systems, Inc., or Engineer-approved equal.
       2. Risers: Extend to 3 inches (75 mm) above ground surface to allow for settlement.
          1. Nominal Diameter: 8 inch (200 mm) minimum.
       3. Lid: Furnished with each access riser. Model FL8G or Engineer-approved equal.
          1. Material: Acrylonitrile styrene acrylate (ASA), with green non-skid finish.
    3. Service Line Testing:
       1. An air compressor may be used to bring the line to its test pressure.
       2. Successful Test: If pressure holds for 60 seconds or more.
          1. Any leakage will require line to be repaired and retested.
          2. When the service line can be filled with water from the tank test, particularly if the service line is short and does not require a large volume to fill it, a small hand pump with pressure gauge can be employed for the pressure test.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01, the "Force Main Components and Testing" Article, the "Support, Training, Testing, and Oversight" Article, and the "Prelos Sewer Installation Checklist" Article.
      2. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
      3. Support, Training, Testing, and Oversight:
         1. Installation and Field-Testing Training:
            1. Manufacturer will provide the services of a trained representative for one eight-hour day at beginning of construction.

Representative will instruct regarding proper installation and field-testing of sewer units per Manufacturer's recommendations and requirements.

The representative or inspector will inspect and submit an inspection checklist report for the first complete installation.

Subsequent installations will not commence until the first installation is inspected and accepted by Engineer.

* + - 1. Quality Control:
         1. Manufacturer will provide services of a trained representative for a minimum of one eight-hour day for purpose of quality control during construction.
         2. Equipment and materials to perform testing is responsibility of Contractor.
         3. Inspector: Will inspect and certify an initial installation of each sewer unit is in compliance with Manufacturer's recommendations and requirements, using the form provided in the "Prelos Sewer Installation Checklist" Article.

The completed inspection checklist must be signed by Inspector and copies faxed, emailed, or mailed to Engineer and Manufacturer within one week of each Prelos Sewer unit being installed and prior to system commissioning.

* + - * 1. Upon Completion of Inspection: Inspector, in coordination with Engineer, will perform or direct Contractor to perform any required adjustments to equipment and place it into operation under supervision of Engineer.
      1. System Commissioning:
         1. Manufacturer will provide the services of a trained representative for training the Owner's service provider, and, when directed, randomly inspecting sewer installations throughout the project.

Inspection will include items covered in the "Prelos Sewer Installation Checklist" Article, as well as the Prelos package, wiring, and control panel placement.

Equipment and materials required to perform additional testing shall be the responsibility of Contractor.

* + - * 1. Manufacturer will provide the services of a trained representative for a minimum of one (1) eight-hour day for the purpose of system commissioning.

Upon system commissioning, the Manufacturer's trained representative will provide Engineer a written report of findings.

Engineer will then perform or direct Contractor to perform any required adjustments to equipment and place it into operation.

* 1. TANK TESTING
     1. Tank Testing:
        1. Demonstrate Watertightness: Each tank must be field-tested for watertightness.
           1. During installation, backfill each tank to just below the mid-seam flange. Then fill tank with water to a level 2 inch (50 mm) into riser.

Inspect tank for leaks after two hours, or as required by local rules.

There is to be no drop in liquid level and no visual leakage from seams, pinholes, or other imperfections.

Tank will not be accepted if there is any leakage over the two-hour period.

Once tank has passed field test, drop water level in tank to a level below tank invert, but not below mid-seam.

* + - 1. Successfully withstand an above-ground static hydraulic test when individually tested to Manufacturer's specifications.
  1. FORCE MAIN COMPONENTS AND TESTING
     1. Combination Automatic Air/Vacuum Release Valve:
        1. Release Valve: A.R.I. Model D-021 or Engineer-approved equal. Valve shall be corrosion resistant and operable with a minimum line pressure of 3 psi (20 kPa).
           1. Valve Base: Reinforced nylon and O-ring seal constructed of Buna N rubber. Valve Body: Reinforced nylon housing a foamed polypropylene float, and stainless steel stem.
           2. Polypropylene Elbow: To expel air horizontally.
        2. Piping: Model ARA or Engineer-approved equal. Schedule 40 PVC.
           1. PVC Isolation Valve: 2 inch (50 mm) diameter.
           2. PVC Ball Valve for Bypass: 3/4 inch (19 mm) diameter.
           3. Pressure gauge connection.
           4. Rated Working Pressure: 150 psi (1034 kPa).
        3. Air-Release Assembly: Enclosed in 30 inch (750 mm) diameter access riser. Not intended for traffic areas.
           1. Material: FRP.
           2. Risers : Extend 3 inches (75 mm) above ground surface to allow for settlement and have a minimum nominal diameter of 30 inch (750 mm).
           3. Concrete Apron (LxWxH): 14 x 14 x 4 inch (1200 x 1200 x 100 mm) poured around FRP riser.
        4. Lids: Model FLD30G DuraFiber or Engineer-approved equal.
           1. Finish: Green non-skid finish.
           2. Stainless steel bolts and wrench.
           3. Riser and Lid Combination: Sealed for watertightness and able to support a 2500 lb (1136 kg) wheel load.
     2. Manual Valves: Model ARA or Engineer-approved equal.
        1. Piping: Schedule 40 PVC.
           1. Component Worker Pressure Rating: 150 psi (10,34 kPa). Allow installation of a combination air/vacuum release valve.
           2. Isolation Valve: 2 inch (50 mm) diameter PVC.
           3. Ball Valve: 3/4 inch (19 mm) diameter PVC for bypass, and a pressure gauge connection.
        2. Manual Valve Assembly: Enclosed in a 30 inch (750 mm) diameter access riser.
           1. Material: FRP.
           2. Risers : Extend 3 inch (75 mm) above ground surface to allow for settlement and have a minimum nominal diameter of 30 inches (750 mm).
           3. Concrete Apron (LxWxH): 14 x 14 x 4 inch (1200 x 1200 x 100 mm) poured around FRP riser.
        3. Lids: Model FLD30G DuraFiber or Engineer-approved equal.
           1. Finish: Green non-skid finish.
           2. Stainless steel bolts and wrench.
           3. Riser and Lid Combination: Sealed for watertightness and able to support a 2500 lb (1136 kg) wheel load.
     3. Force Main Testing: Adhere rigorously to hydrostatic testing procedures and requirements.
        1. Allowable AWWA leakages should be the maximum, not to be exceeded. Zero leakage is the goal.
        2. Hydrostatic Test Procedure:
           1. Fill line with water to expel air.
           2. Pressurize to desired pressure at lowest point.
           3. Hold for two hours to plus or minus plus or minus 5 psi (34 kPa) of test pressure.
           4. Accurately record time, pressure readings, and amount of leakage.
           5. For further details, refer to AWWA C600 Section 4.
           6. Allowable Leakage (L): For push-on or mechanical joints, in liters per hour.

L = (SD\*P^1/2)/133200

S = Length of pipe tested in feet

D = Nominal pipe diameter in inches.

P = Average test pressure, psi, at lowest location on test section.

* + - 1. Portions of line that are critical or suspect should be left exposed throughout hydrostatic test to allow visual inspection.
         1. Leaks Detected Visually: Repair regardless of test results.
         2. The use of dye during initial filling and testing of a mainline section makes isolating leaks much easier, especially in areas with high ground water.
      2. Check-valve failure in service lines is difficult to diagnose and may misrepresent mainline integrity.
         1. Close service line connections until mainline testing is completed.
         2. Accurate records must be kept ensuring service line connections have been opened after mainline system has been approved.
      3. Avoid testing lengthy line segments.
         1. Lengthy line segments may pass leakage test, yet still have an excessive isolated leak which could be a problem.
         2. Testing shorter line segments reduces this possibility and more readily isolates any leaks.
         3. Best practice is to limit the test segment length to 12,000/D, where "D" is the diameter in inches and the length of segment is in feet.
      4. Air must be purged from line section prior to hydrostatic testing. Failure to do so may give misleading test results, possibly causing a section of line to appear to fail the test.
  1. PRELOS SEWER INSTALLATION CHECKLIST
     1. General Project Information:
        1. System Owner: \_\_\_\_\_\_\_\_.
        2. Site Address: \_\_\_\_\_\_\_\_.
        3. System Provider: \_\_\_\_\_\_\_\_.
        4. Contractor: \_\_\_\_\_\_\_\_.
        5. Inspector: \_\_\_\_\_\_\_\_.
     2. Pre-Installation:
        1. Tank Location Approved per Engineer:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        2. Panel Location Approved per Engineer:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        3. Electrical Supply, Circuits and Disconnect, Checked:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        4. Prelos Sewer Equipment Package Reviewed and Approved:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        5. Certificate of Origin Received:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        6. Service Connection Located:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        7. Riser-to-Tank Connection and Piping-to-Tank Method Reviewed:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        8. Tank Warranty Received:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        9. Date of Manufacture Specified:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        10. Factory Leak Test Documentation Received:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        11. Inlet Connection Approved:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        12. Inlet Tee Installed:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        13. Riser-to-Tank Connections Approved:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        14. Tank Level Checked and Tank Properly Bedded:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        15. Leak Test/Watertight Test: Passed. Tank filled 2 inches (50 mm) above tank/riser connection.
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
     3. Pumping System:
        1. ClickTight Location Acceptable:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        2. Pump Vault/Screen Easily Accessible for Maintenance:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        3. Discharge Assembly Installed Correctly:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        4. Service Lateral Properly Bedded with Sufficient Depth:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        5. Toning Wire Present:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        6. Check Valve Installed Correctly:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        7. Control Panel Location and Height Acceptable:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        8. Conduit Wiring Acceptable: Waterproof wire nuts used:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        9. Seal-Offs Acceptable: Panel and splice box:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        10. Service Connection Valve Box Accessible:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
     4. Start-Up:
        1. Risers Backfilled to Grade: Within 3 inches (75 mm) of lid.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        2. Appropriately Sized Pump Circuit Breaker:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        3. Circuit Breaker Marked Appropriately:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        4. Separate Alarm Circuit: Preferred, not required.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        5. Pump Operation Checked: Voltage and amperage.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        6. Float Operation: Alarm, on/off, and low-level checked/
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        7. Float Settings Accurate: Record dimensions from top of tank.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        8. Alarm: on/off, low-level checked.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        9. Controls: Audible alarm/visual alarm checked:
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        10. Emergency Call Sticker in Place:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        11. All Lids in Place and Locked:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        12. Homeowner's Manual Delivered to Homeowner:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
        13. Site Pictures Attached:
            1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
     5. Complete As-Built Site Diagram: Prepare an as-built sketch of site, including approximate location of buildings, property boundaries, trees, fences, existing septic systems, existing wells, new tank, recirculation tanks, pump basins, AdvanTex system, sewer piping, drain field, etc.
        1. Include dimensions.
        2. Attached to completed above checklist.
           1. \_\_\_\_Yes. \_\_\_\_No. \_\_\_\_\_\_Initial. \_\_\_\_\_\_\_\_\_\_Date.
     6. Inspector Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date: \_\_\_\_\_\_\_\_\_\_
  2. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturers recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.
  3. OPERATION AND MAINTENANCE
     1. Operation and Maintenance Manual: Quantity of Five. Four to be sent to Owner, and one to be sent to Engineer.
        1. Manuals must include a signed copy by Inspector of the "Prelos Sewer installation Checklist" Article for each sewer installation.
     2. Spare Parts: Manufacturer must provide spare parts in accordance with the following schedule:
        1. For every 50 Prelos Processors installed:
           1. Spare Pump: 1.
           2. Spare Floats: 4.
           3. Anti-Siphon Valves: 2.
           4. Circuit Breaker, 10-amp: 1.
           5. Circuit Breakers, 20-amp: 2.
           6. Motor-Start Contactor: 1.
           7. ETM-CT Kits: 3 for troubleshooting site-specific problems.
           8. ClickTight Wiring Connection System: 1.
        2. For every 100 Prelos Processors installed:
           1. Programmable Logic Unit: 1.
     3. Operation and Maintenance Tools: Provided by the Manufacturer.
        1. Scum Measuring Device: Model SMUG or Engineer-approved equal.
           1. A minimum of one scum measuring utility gauge.
           2. Size: 3/8 inch (10 mm) diameter with incremental scale for measuring scum levels.
           3. Rod: Bent at 90 degree angle at base to aid in identifying scum "by feeling."
        2. Sludge Measuring Device: Sludge Judge Ultra or Engineer-approved equal.
           1. A minimum of one Unit constructed of polycarbonate treated with ultraviolet stabilizer, durable in cold temperatures, and able to withstand heat up to 280 degrees F (138 degrees C).
           2. Size: 3/4 inch (19 mm) diameter marked with tape to designate 12 inch (300 mm) increments.
        3. Biotube Cartridge Cleaning Brush: Model OM-BIOTUBE BRUSH or Engineer-approved equal.
           1. A minimum of one brush for cleaning Biotube pump vault filter cartridges.
        4. Hanging Discharge Removal Hook: Model OM-HDA-TOOL or Engineer-approved equal.
           1. A minimum of one hanging discharge removal hook for removing hanging pump assemblies from vaults.

END OF SECTION