

**DESIGN REQUIREMENTS**  
**LOW PRESSURE SEWER**

**1.01 General**

- A. Low pressure sewer systems may be installed in areas shown for low pressure sewer in the sewer master plan when such plan is developed, in projects where existing septic developments are converted to public sewer, in areas where septic tanks are not approved, in areas where conventional gravity sewer is not available, or in other areas if approved in writing by the City of Cordele Public Works director or authorized representative (PWD). The term PWD shall mean the Public Works Director of the City of Cordele or authorized representative. The developer shall furnish and install complete factory tested progressive cavity grinder pumps in stations approved by PWD, each consisting of grinder pump(s) suitability mounted in a basin constructed of high density polyethylene (HDPE) for simplex stations and HDPE, Fiberglass Reinforced Polyester Resin tanks for duplex stations; Pump removal system, shutoff valve, anti-siphon check valve, each assembled in the basin, electrical alarm panel, and all necessary internal wiring and controls. Component type grinder pump systems that require field assembly will not be acceptable, due to the potential problems that can occur during field assembly. Low pressure sewer systems may only be installed in areas served by water from the City of Cordele, Georgia.
- B. At the completion of the warranty period, the City of Cordele shall own, maintain and operate all system piping and valves within the right-of-way. The grinder pump station including all controls, valves and piping outside of the right of way shall be owned, maintained and operated by the Homeowner/Developer or Home Owner's Association (HOA).
- C. Low Pressure Sewer Design Submittal Shall Include:
1. Pump submittal with shop drawings and specifications
  2. Manufacturer approved system hydraulic analysis (including but not limited to pipe sizes, flows, velocities, retention times, etc.)
  3. Number and location of proposed valves and cleanouts
  4. Capacity calculations of receiving gravity system
  5. Plans stamped by a professional engineer registered in the State of Georgia
  6. Site development plan and profile, and construction details.

7. Items 5 and 6 of the design submittal requirements may be waived by the PWD in the case of submittals for individual lots, provided actual installation meets all other requirements of this section.

D. Because the City of Cordele will be maintaining and operating all system piping and valves within City right-of-way, only progressive cavity grinder pumps from approved manufacturers shall be acceptable for low pressure sewer systems. Acceptable low pressure sewer manufactures include the following:

1. Flygt
2. Environmental One Corporation
3. Other manufactures that can demonstrate they meet all requirements of this document, can demonstrate their product is equal to or superior to the above named manufactures, and which are approved by the PWD. The PWD shall have 60 days to review and approve or disapprove low pressure sewer grinder pumps requesting to be added to the list of approved low pressure sewer manufactures.

All of the equipment furnished herein shall be the product of a manufacturer experienced in the design and manufacture of submersible grinder pumps designed for use in low pressure sewer collection systems. The manufacturer shall experience producing grinder pumps for a minimum of 20 years. All parts shall be properly stamped for identification and location as shown in the Operation and Maintenance Manuals furnished. Clear identification giving the name of the manufacturer and all other pertinent data shall be attached to each packaged pump station.

### **1.02 Product Requirements**

- A. The pumps shall be capable of delivering a minimum of 14 GPM against a rated total dynamic head of 0 feet (0 PSIG), 9 GPM against a rated total dynamic head of 138 feet (60 PSIG) and 7.8 GPM at 185 feet (80 PSIG). The pump(s) must also be capable of operating at negative total dynamic head without overloading the motor(s). Under no conditions shall in-line piping or valving be allowed to create a false apparent head.
- B. The grinder pump manufacturer shall provide a written part(s) and labor warranty on the complete station and accessories, including, but not limited to, panel and redundant check valve, for a period of sixty (60) months after notice of final acceptance. Any manufacturing defects found during the warranty period will be reported to the manufacturer by the Owner and will be corrected by the manufacturer at no cost to the Owner.

- C. The tank shall be furnished with one Nitrile rubber or EPDM grommet fitting to accept 4.50" OD DWW(V) or schedule 40 pipe. Tank capacities shall be shown on the contract drawings.
- D. All discharge piping shall be constructed of 304 Series Stainless Steel or cast bronze and terminate outside the access way bulkhead with a stainless steel, 1 1/4 inch female NPT fitting. The discharge piping shall include a stainless steel or bronze ball valve rated for 200 psi Water, Oil, Gas (200 psi WOG); PVC ball valves will not be accepted. The bulkhead penetration shall be factory installed and warranted by the manufacturer to be watertight.
- E. The access way shall include a single NEMA 6P electrical quick disconnect (EQD) for all power and control functions, factory installed with accessway penetrations warranted by the manufacturer to be watertight. Plug-type connections of the power cable onto the pump housing will not be acceptable as a station disconnect due to the potential for leaks and electrical shorts. The access way shall also include a 2-inch PVC vent to prevent sewage gases from accumulating in the tank.
- F. The pump discharge shall be equipped with a factory installed, gravity operated, flapper-type integral check valve built into the stainless steel discharge piping or cast iron housing. The check valve will provide a full-ported passageway when open, and shall introduce a friction loss of less than 6 inches of water at maximum rated flow. Moving parts will be made of a 300 series stainless steel and flap rated for corrosion resistance, dimensional stability, and fatigue strength.
- G. Each grinder pump installation shall also include one separate check valve for installation in the 1 1/4" service lateral between the grinder pump station and the sewer main, preferably next to the curb stop.
- H. The pump discharge shall be equipped with a factory-installed, gravity operated, flapper-type integral anti-siphon valve built into the discharge piping prior to the check valve.
- I. All materials exposed to wastewater shall have inherent corrosion protection.
- J. The grinder pump station shall be free from electrical and fire hazards as required in a residential environment. As evidence of compliance with this requirement, the completely assembled, factory wired and tested grinder pump station shall be U.L. listed. Grinder pump stations without U.L. listing will not be acceptable.
- K. All electrical cables penetrating or passing through the silhouette of the pump station must be guaranteed to be water tight by the manufacturer and must be installed at the factory or by a factory authorized representative prior to shipment.

- L. The discharge piping shall include a stainless steel or bronze ball valve with a minimum rated pressure of 150 psi. All valves shall be operable from ground level.
- M. All necessary controls, including motor and level controls, may be located in the control panel or top housing of the core unit providing the core unit is sealed properly and will not leak causing damage to the controls while submerged.
- N. Level detection for controlling pump and alarm operation shall be accomplished by use of detection device specifically designed for use in sewage grinder stations. Level detection device shall not require any regular preventative maintenance.
- O. Each grinder pump station shall include a NEMA4X, UL listed alarm panel suitable for wall mounting. The NEMA 4X enclosure shall be manufactured of thermoplastic or fiberglass to assure corrosion resistance.
- P. The alarm panel shall include audio and visual alarm.
  - 1. The audio alarm may be silenced by means of the externally mounted push-to-silence button.
  - 2. Visual alarm remains illuminated until the sewage level in the wet well drops below the “off” setting of the level setting.
- Q. During a high level alarm condition on a duplex station, the audio alarm shall be capable of being deactivated by depressing a push-type switch mounted on the control panel enclosure.
- R. The grinder pump unit shall have a means of being removed with Nylon rope or chain to facilitate easy removal when necessary. All mechanical and electrical connections must be water tight and field replaceable. All motor control components shall be mounted for ease of field service.
- S. Pipe shall be high performance, high molecular weight, high density polyethylene pipe. The pipe material shall be a Type III, Class C, Category 5, P34 material as described in ASTM D 1248, or current ASTM specification Minimum cell classification values of the pipe material shall be 3 4 5 4 3 4 C as referenced in ASTM D 3350 - 84. The density shall be 0.941 - 0.957 gms/cm<sup>3</sup> when tested in accordance with ASTM D 1505. Hydrostatic Design Basis shall be 1,600 psi at 230C when tested in accordance with ASTM D 2837.
- T. All grinder pump units will be delivered to the job site 100 percent completely assembled, including testing, ready for installation.

### **1.03 Installation**

- A. Installation shall be accomplished so that 1" to 4" of access way, below the bottom of the lid, extends above the finished grade line. The finished grade shall slope away from the unit. The diameter of the excavated hole must be large enough to allow for the concrete anchor.
- B. A 6" inch (minimum) layer of naturally rounded aggregate, clean and free flowing, with particle size of not less, than 1/8" or more than 3/4" shall be used as bedding material under each unit.
- C. Installation must include anti-flotation design and must be addressed to the manufacturer's instructions. Ballast requirements shall be in accordance with pump station manufacture's guidelines.
- D. A four (4) foot piece of four inch SCH 40 PVC pipe with water tight cap shall be provided to stub-out the inlet for the property owners' installation contractor, or as depicted on the contract drawings.
- E. The contractor shall mount the alarm device in a conspicuous location, as per national and local codes. A disconnect switch shall be provided prior to the alarm panel.
- F. Backfill of clean native earth, free of rocks, roots, and foreign objects shall be thoroughly compacted to a final Standard Proctor Density of not less than 85 percent. The Grinder Pump Station shall be installed at a minimum depth of 24" inches to assure frost protection. The finish grade line shall be 1" to 4" below the bottom of the lid, and final grade shall slope away from the Grinder Pump Station.

### **1.04 Start-Up and Field Testing**

- A. Upon completion of the start-up and testing, the manufacturer shall submit to the City the start-up authorization form describing the results of the tests performed for each grinder pump station. Final acceptance of the system will not occur until authorization forms have been received for each pump station installed and any installation deficiencies corrected.
- B. The manufacturer/contractor shall supply four (4) copies of Operation and Maintenance Manuals to the City.