

**Appendix H - Non-Gravity Sewer Connections Only**  
**Environment One Corporation - Extreme Series Grinder Pump**

**Prefabricated Low-Pressure Sewage Pump Systems**

- A. The Board of Water and Sewer Commissioners has standardized on the type of pumping system to be purchase, installed and operated and maintained by private property owners.
- B. Following a Request for Proposal process and associated Proposal evaluation, the Board of Water and Sewer Commissioners selected F. R. Mahoney & Associates using Environmental One Corp. as the manufacturer of the Low-Pressure Sewerage Pump Systems. F. R. Mahoney & Associates contact information is as follows:
- C. F. R. Mahoney & Associates (Exclusive New England Distributor for Environmental One Corp.)  
273 Weymouth Street  
Rockland, MA 02370  
T: 781-982-9300  
F: 781-982-1056  
<http://www.frmahony.com>
- D. The Design Engineer should coordinate with F.R. Mahoney & Associates for the appropriate Low-Pressure Sewage Pump System for the property. Such coordination shall occur prior to the submittal of the permit application.
- E. In general, the Prefabricated Low-Pressure Sewage Pump Systems is a complete factory-built and tested system of the wetwell/drywell type designed to take the flow from the property and boost into the Town’s wastewater infrastructure (gravity sewer or low-pressure sewer). The System includes, but not be limited to: (a) wetwell containing grinder pump(s) (semi-positive displacement type grinder unit) mounted in a high-density polyethylene (HDPE) basin and anti-siphon valve and check valve assembly; (b) drywell containing an electrical quick-disconnect; pump removal system and shut-off valve; and (c) electrical alarm/disconnect panel.
- F. As part of the Request for Proposal process, the proposal by F. R. Mahoney & Associates included a guaranteed, Lump Sum price for each component, identified in the table below, in May 2023 U.S. Dollars. The Lump Sum Prices will be adjusted for inflation by the percent increase in the ENR Construction Cost Index between May 2023 and the month in which each Purchase Order is issued.

Item	Description	May 2023 Price
A.1.	Cost for Each Low-Pressure Sewerage Pump System, including control systems and all other necessary appurtenances. The cost shall include delivery and all other construction related services for the Low-Pressure Sewerage Pump Systems.	
A.1.1.	Model DH071-93 (Type A) Exterior, Simplex, System Capacity at 700 GPD and Wetwell Capacity of 70 Gallons	\$5,620.00
A.1.2.	Model DH151-93 (Type B) Exterior, Simplex, System Capacity at 1,500 GPD and Wetwell Capacity of 150 Gallons	\$6,145.00
A.1.3.	Model DH152-93 Exterior, Duplex, System Capacity at 3,000 GPD and Wetwell Capacity of 150 Gallons	\$11,890.00

Item	Description	May 2023 Price
A.1.4.	Model IH-091 (Type D) Interior, Simplex, System Capacity at 700 GPD and Wetwell Capacity of 90 Gallons	\$4,812.00
A.1.5.	Model DH272-92 Exterior, Duplex, System Capacity at 5,000 GPD and Wetwell Capacity of 275 Gallons	\$25,460.00
A.1.6.	Model WH484-92 Exterior, Quadriplex, System Capacity at 7,000 GPD and Wetwell Capacity of 486 Gallons	\$29,150.00
A.2.	2 Year Warranty extended to 5 Years for Each Low-Pressure Sewerage Pump as part of base equipment package	\$1.00
A.3.	Cost for Each Engineered Stainless-Steel Service Lateral Component	\$270.88
A.4.	Cost for Each Pump Monitoring System	\$528.10
A.5.	Cost for Each Anti-Buoyancy Device Bal-Last for DH071	\$359.00
A.6.	Cost for Each Pump Core Replacement	\$2,490.00
A.7.	High Flood Configuration for Type A, Type B, and DH152	\$260.90
A.8.	Insulation Disc for Freeze Protection	\$75.00
A.9.	Remote Sentry – Alarm Unit in House Mounting	\$250.00

The Property Owner’s Grinder Pump Guidebook from F.R. Mahoney & Associates can be found on the Town website: <https://www.town.orleans.ma.us/DocumentCenter/View/3168/Orleans-MA-E-One-Operation--Maintenance-Guidebook-2021-09-02>

**About Environment One Corporation**

Environment One Corporation (E/One) is an operating company of Precision Castparts Corp. (NYSE: PCP), a worldwide manufacturer of complex metal parts and industrial products. With corporate headquarters in New York and regional offices and distribution throughout the industrialized world, E/One is a manufacturer and provider of products and services for the disposal of residential sanitary waste and utility systems for the protection and performance optimization of electric utility assets.

**Low Pressure Sewer System**

A pressure sewer system is used in certain areas because of the unsuitability and/or cost of a conventional sewer system. The pressure sewer system consists of a pumping unit installed on your property which is connected to a network of pipes from other pumping units in your area or directly into a gravity sewer. These pipes transfer wastewater to the wastewater collection system.

The systems installed are E/One grinder pump stations and are very reliable and robust. There is not much you need to do and very little that can go wrong. In the event of a power outage, water usage should be limited as much as possible.



## E/One Extreme Series Grinder Pump

### A. Background

At the heart of the E/One Sewer System is the toughest, hardest working pump in the industry. The new standard in excellence, durability, and longevity, the E/One Extreme Series Grinder Pump. Its evolution reflects everything E/One has learned in 40 years as the originator and leader in the category of low-pressure sewer systems.

The pump stations incorporate the grinder pump, motor controls and level sensing device integrated into a compact unit, easily removable for servicing when necessary.

The geometry of the pump not only produces a near-vertical pump curve but, allows passage of ground solids without clogging. Because of the low revolutions per minute (rpm) and highest quality components, E/One experiences the lowest service call rate in the industry. An average mean time of 10 years between service calls is typical.

The progressing cavity pump itself is based on the Moineau principle. A rotor turns within a stator, creating a sequence of sealed chambers. The precision-cast and polished stainless-steel rotor moves wastewater through these chambers at a nearly constant flow, over a wide range of conditions – from negative to abnormally high heads. Turning at just 1,725 rpm, the one-horsepower motor can pump fluid through more than two miles of small-diameter piping or elevation changes of over 185 feet.



### B. Key Advantages

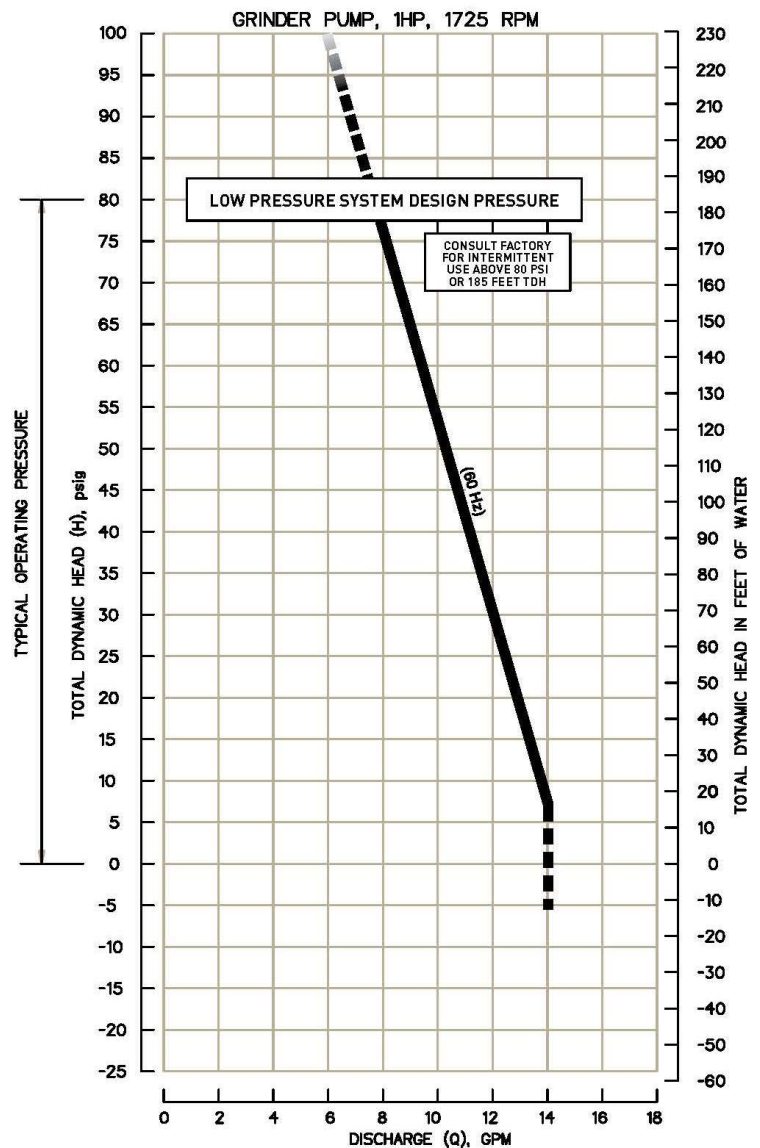
- **High Heads/Negative Heads** - Reliable operation from negative head to 185 feet of total head for continuous duty reduces the number of lift stations and pipe sizes. This cuts costs – both initially and in long-term operation and maintenance.
- **Constant Flow** - The system pressures to be overcome by any given grinder pump in a low-pressure system vary dramatically over the course of a day. E/One's progressing cavity pump readily accommodates these pressure variations while maintaining a nearly constant flow without ever operating at "near shut off" – thus avoiding the wear and motor burn-out suffered by other pump types.
- **High Grinding Torque** - This unique pump system, driven by a one-horsepower motor turning at 1725 rpm, produces grinding torque greater than a two-horsepower pump turning at twice the speed.
- **Energy Efficient** - The pump is activated automatically and runs for short periods. Typical annual energy consumption is comparable to a 40-watt light bulb.
- **Low Maintenance Submersible Motor** - Low maintenance and long life are the hallmarks of the air-filled motor. Permanently lubricated ball bearings and Class F insulation eliminate the need for periodic oil changes and oil disposal costs required by oil-filled submersible motors.
- **Large Diameter Grinder Assembly** - Almost twice the diameter of most other types of grinder pumps, contributing to a dramatic reduction of inflow velocity for less wear and no blinding, clogging or jamming.
- **No Preventive Maintenance** - Non-fouling static level sensors require no preventive maintenance. Because of the unique, near constant discharge rate, no main line flushing is required in a properly designed system.

- **Corrosion Resistance** - E/One's stainless-steel ball-type discharge valve and piping won't corrode like copper or galvanized and hold up years longer. No corrosion, no maintenance.
- **Dependability** - E/One pumps typically run ten years between service calls with 40 years of in-ground experience.
- **Provide for Environmentally Sound Wastewater Management** - The E/One Extreme Series grinds waste material into small particles. This enables the use of inexpensive, small-diameter pressure pipes, buried at shallow depths, to transport wastewater to a suitable processing site. Result: Ground water contamination from failing septic tanks can be eliminated.
- **Serviceability** - The unique core design eliminates the need for in-field troubleshooting and pump servicing. This means lower maintenance costs and minimum homeowner inconvenience.

**C. Performance Curve**

- In a low-pressure system, constant, predictable pump output is the foundation for proper hydraulic design. It enables the engineer to minimize retention time, pump wear, and keep scouring action at effective levels.
- E/One's semi-positive displacement, progressing cavity pump has a nearly vertical H-Q curve. It provides a predictable flow over the full range of typical system pressures; strengths critical in a large-scale, low pressure sewer.
- E/One's high head capability allows a system with few, if any, lift stations. It easily accommodates additional future connections without compromising system performance.

**E/ONE SPD PUMP PERFORMANCE CURVE**



**D. The Inside Story on the E/One Grinder Pump Station**

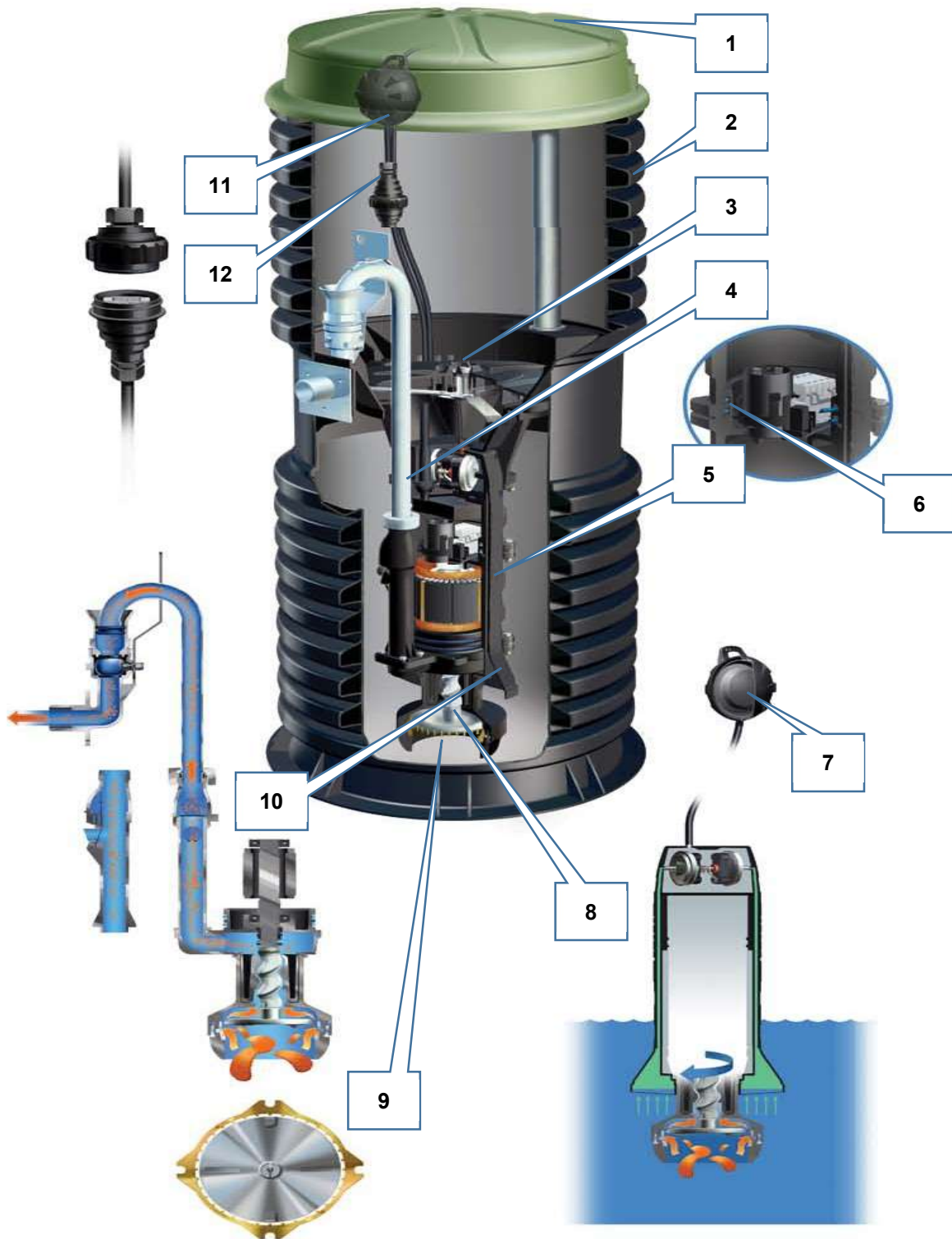
- 1 **Low-Profile Cover** - Provides easy access for service while blending with surroundings.
- 2 **High-density Polyethylene Tank** - Double-wall construction of high-density thermoplastic for rugged reliability. Factory pressure tested for infiltration and exfiltration free installation.
- 3 **Quick-Release Core Latch** - All stainless mechanism secures core in place and can be easily released from ground level.
- 4 **Stainless Steel Piping and Hardware** - E/One's stainless-steel discharge piping and ball valve won't corrode. No corrosion, no maintenance, no tools required.
- 5 **Unique Core Design** - Eliminates the need for in-field troubleshooting and service. Modular controls simplify service.
- 6 **Double O-ring Seals** - Make assemblies waterproof and novel joint geometry minimizes the effects of crevice corrosion.
- 7 **E/One Equalizer** - Compensates for fluctuations in atmospheric pressure to enable accurate level sensing while assuring the level sensing system is watertight.
- 8 **Progressing Cavity Pump** - A deceptively simple design produces a nearly constant flow under a wide range of continuously varying conditions.
- 9 **Grinder Wheel and Shredder Ring** - Hardened corrosion-resistant cutter bars and teeth process sewage, grinding wastewater solids, as well as wood, plastic and cloth.
- 10 **Pressure Switch Level Control** - Self-cleaning level sensors require no preventive maintenance.
- 11 **Direct-bury Cable** - For simple and inexpensive installation.
- 12 **Electrical Quick Disconnect** - For safe and easy service. UL-listed, compatible with OSHA regulations for confined space entry.

**General Information**

In order to provide you with suitable wastewater disposal, your home is serviced by a low-pressure sewer system.

The key element in this system is an E/One Grinder Pump. The tank collects all effluent from the house. The solid materials are then ground to a small size suitable for pumping as a slurry with the effluent water.

The Grinder Pump generates sufficient pressure to pump this slurry from your home to the wastewater treatment receiving line and/or disposal plant.



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