

# BARNES®

*Pressure Sewer Systems*

*Why Use a Barnes  
Pressure Sewer System?*



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### Why Use a Pressure Sewer System?

Pressure sewer systems are an effective method to move residential wastewater through small diameter pipes to collection facilities where other methods are less economical or less feasible. The primary differences between conventional gravity sewer systems and pressure sewer systems are in the piping network and the reduction of solids size in the wastewater. Pressure sewer systems use specialized submersible grinder pumps, which are designed to reduce sewage particulate size to easily move the sewage through small diameter pipes.

The application of grinder pumps and pressure sewer systems is a cost-effective, long life answer to allow more home sites, both existing and new, access to a public sewer system or regional private waste water treatment system.

### Applications

Pressure sewers can be used where gravity systems just won't work because of uphill topography, surface rock, high water tables, waterfront locations, very flat land, extreme cold weather, stream crossings, restricted access and constraints on excavation.

Because the piping systems are sealed, pressure sewers offer freedom from infiltration and excess inflow. This provides a twofold benefit. The wastewater treatment plant can be built to handle smaller capacity since it is not necessary to allow for storm peaks, and the treatment process will not be upset by storm related flows that can easily overload the plant.

In general, these systems are installed outdoors, below grade, with a locked cover mounted just above grade. The burial depth or basin length is set by local codes and usually depends on maximum potential frost depth. A typical system includes a pump, basin, controls, piping and valves.

### Replace Failing Septic Tanks

Originally developed as a waste solution in rural areas, septic tanks were deployed in massive numbers beginning with the building boom after World War 2, often in high-density developments. The US EPA has estimated, however, that roughly ten percent of septic tank systems currently in use fail each year. In addition, the US Public Health Service has estimated that over 50% of available land in the US is unsuitable for septic tank systems. The risk to our nation's watersheds has become considerable. Pressure Sewers are an excellent alternative to replacing failed septic systems and can be used on just about any terrain.



## Frequently Asked Questions

### **Q. What is a pressure sewer?**

**A.** A sanitary sewer system that utilizes a pump at each sewer connection to transport wastewater to the collection and treatment system.

### **Q. What is a grinder pump?**

**A.** A submersible pump incorporating a grinding mechanism designed to reduce sewage particulate size. The pump then pumps the resulting slurry from a residential structure to a collection system.

### **Q. Is a grinder pump in a pressure sewer system the same as a septic tank?**

**A.** No. A grinder pump grinds waste from the home and pumps it to a public sewer system or waste treatment plant.

### **Q. Where is the grinder pump system located?**

**A.** These systems are normally installed outdoors, at or below grade.

### **Q. Will the system be noticeable from the street?**

**A.** Installations should be done in such a manner as to blend with the local landscape. Most installations will not be noticed unless you know it's there. The only two components that may be seen are the basin cover and an electrical panel.

### **Q. How long will the system last?**

**A.** Experience with pressure sewer systems installed since the 1960s suggest an installed life of 30-plus years.

### **Q. How do I know that the system is operating properly?**

**A.** Each system is provided with a high water alarm, both visual and audible. As long as the alarm is not sounding and your indoor appliances are draining normally, your system should be operating properly.

### **Q. How expensive are maintenance and operating costs?**

**A.** The electrical power needed to operate a grinder pump station generally amounts to less than a dollar or two per month. Maintenance costs are extremely low, especially if care is taken to minimize the amount of abrasive or corrosive items introduced into the waste stream.

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### ***New Developments, Slow Buildout***

The initial capital costs for a gravity sewer system are often prohibitive for developments with a slow buildout rate. If pressure sewers and grinder pumps are chosen, all of the small diameter shallow buried pressure piping system can be installed initially at a very low cost per foot. The grinder pump station, which comprises the majority of capital cost, needs to be purchased and installed only as each house is built. The pressure sewer system provides an affordable and effective sewer system, even for the first few houses.

### ***Large Lots***

The cost difference between gravity and pressure sanitary sewers is a function of the pipe size, depth, and the need to deeply bury gravity sewers to ensure downhill flow. Pressure sewer piping, smaller than gravity sewer pipe, can be installed to follow the contour of the land at a constant shallow depth, dictated by frost depth and the need for protection from mechanical surface damage. Costs to service properties are frequently based on a dollars per foot basis, so the cost savings advantage for pressure sewers increases rapidly as lots become larger.

### ***Difficult Terrain***

In steep terrain, especially on uphill runs, gravity sewers very quickly become too deep and costly to be feasible. Although gravity works well on downhill sections, at least one pumping station is required on each significant uphill reach, and the capacity of the pump stations become successively larger as the piping progresses toward the ultimate discharge point. Pressure sewers can be designed to work successfully and economically in either situation with air release valves located in appropriate locations. The ability to construct sewers that follow the contour of the land not only makes development affordable, but can also preserve natural rolling topography and trees.

### ***Rocky Soil***

Rock can be one of the most costly and difficult factors in construction. Gravity sewers require wide excavated trenches and go deeper with each foot of length. The price per foot, therefore, is significantly higher than installations in normal soil, making installation costs economically unfeasible. Contractors recommend alternatives such as pressure sewer systems in cases such as these that require dramatically narrower and shallower trenches. Pressure sewer systems are thus feasible in places like solid rock where gravity systems are literally impossible.



## ***Pressure Sewer System Features***

1. Level control
2. Guide rail for pumps and level control
3. High strength poly lid
4. Rigid fiberglass basin
5. Grinder pump
6. Removeable discharge/ check valve assembly



## ***High Groundwater Levels***

Locations with high groundwater, whether seasonal or year round, present other challenges in both construction and operation of gravity sewers. Construction is both difficult and costly with constant dewatering and the risks of unstable soils. Construction of pressure piping systems, with narrow and shallow trenches, is much less costly or dangerous. Operation of a gravity system is also difficult in that the sewer pipe is frequently submerged in groundwater, leading to potential infiltration or inflow that can overload waste treatment plants.

## ***Lakeside or Oceanfront Properties***

"A place by the water" is always one of the most desirable properties. The topographical features, which create these precious water bodies, are dominated by the fact that the land almost always slopes down toward the shore. With failing septic systems, the untreated wastewater can potentially pollute the body of water. The pressure sewer has proven to be an environmentally friendly, cost-effective solution in these waterfront locations.

## ***Lots on the "Wrong Side"***

Property is sometimes developed in a strip on one side of a highway or stream. Often there are highly desirable, perhaps isolated, building lots on the "Wrong side of the street." Pressure sewers bored under the stream or highway using a trench-less technology or carried overhead on a bridge crossing make such difficult sites easily accessible to whatever sewers already serve the strip community.

## ***Houses Not Easily Served by Existing Gravity Systems***

Public sewers are installed to be deep enough to serve fixtures at, or just under, the basement floor level. It often happens that when a gravity sewer is designed to serve a certain area, the basements of the houses at the ends of the served streets end up just level with the sewer. If such streets are later extended, the new houses will be too low to have basement sewer connections. The answer is to install a grinder pump station and create a pressure sewer line that can pump to the nearest gravity pipe or pumping station with available capacity.

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