

# Putting Pipe to Work

## A high-quality onsite system installation includes proper pipe location, bedding and backfilling

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Last month we discussed selecting the proper kind or schedule of pipe based on the application. We also noted the importance of providing the proper pipe slope to prevent blockage. This month, we focus on proper pipe location, proper bedding and finishing materials, and the long term protection and care of pipes.

When we talk about proper pipe location, we refer to required separation distances based on safety or environmental concerns. The main safety issue is to separate pipes carrying wastewater from water-supply pipes. This reduces potential for drinking water contamination.

To help promote separation of the two, different-colored pipes are used: blue for drinking water, green for sewage. Purple pipe is used for treated wastewater that is to be reused for another application. In many states this treated effluent is used for irrigation water on landscapes.

### The right distance

Separation distances differ for each state, so you need to know your state requirements. In many states, the separation distance is between 50 and 100 feet. In some areas, the type of well construction and casing depth are factors in setting separation requirements. This can be critical, since the type of well construction can be difficult to determine on existing residences.

A safety issue aside from separation is to assure the sewage pipe does not leak. This requires a pressure test, which should be done after the pipe is installed but before the piping has been backfilled. This makes it simpler for any required repairs, but also means an installer needs to be careful backfilling the trench to avoid any breaks.

A pressure test is conducted by plugging the pipe at both ends and adding compressed air for a period of time. It is important to have a method to add air and measure the pressure in the pipe. Air pressure is raised to a set level, typically 3 to 5 pounds. The pipe then should hold this pressure for an extended period, typically 5 to 10 minutes. If the pipe and joints can hold this pressure, it is considered watertight.

### Maintenance issues

The other major concern is maintenance. As the pipe is installed close to structures or decks, it becomes more difficult to maintain the pipe at proper slopes and to make good connections.

The need to clean and replace pipe is the reason for specifying setback requirements from structures. Typically 10 to 12 feet will allow for the excavator to work on the piping around the structure. Decks become bigger problems because they are often built after the pipe is installed. The pipe can be crushed or broken during

installation of the footings. Installers must work with homeowners to understand the importance of avoiding the pipes and planning for access in case future repairs are needed.

### Digging and filling

The next items of concern are proper excavation and backfilling. These steps are related, since problems with the excavation will create problems in backfilling. By following three simple rules, you can avoid problems in the future.

**Rule 1: Avoid over-excavating the trenches when possible.** If wastewater is to flow properly, the pipe must be supported. Unsupported pipe can lead to clogging and freezing problems. By minimizing unexcavated soil under the pipe, you reduce potential for development of low spots where water can collect. In general, natural soil provides a solid base (unless you work in organic or peat soils). If the trench is over-excavated, you will need to compact the soil before you place the pipe.

When placing pipe in organic soils, remove that material and replace it with a solid material or aggregate. Organic soils – peat and muck – do not provide a solid base, and settling and heaving are likely to take place. This movement puts pressure and stress on the pipe and will cause leaks at the joints. More important, the pipe will not maintain the proper pipe slope.

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**Rule 2: Support the pipe over deep excavations.** If you removed material, like organic soil, or if you installed a sewage tank and the piping going in and out of the structure, the pipe will be at least partially on fill, and this can settle. To minimize problems, use a granular fill material and compact it as the material is installed.

Sand or rock are most typically used as fill. If rock is used, silting into the rock is a form of settling that can cause an aesthetic problem. Rock also can create a drain system that channels groundwater into sewage tanks.

Another part of support in these situations is the pipe material choice. Using a heavier pipe [Schedule 40] helps minimize bowing. In pressure supply pipes where 2-inch pipe is used, it can be placed inside a 4-inch pipe, adding strength and decreasing the potential for bowing. Be sure that the 4-inch pipe is sealed to avoid having a pipe full of soil or groundwater.

**Rule 3: Backfill with good material.** The backfill material has two jobs: Protecting the pipe system and maintaining the slope. Protection means the pipe is surrounded by and covered with the material, providing some protection from freezing.

For this to be true, the backfill must be all around the pipe. The strength of the pipe is related to its round shape. If the shape is deformed, the strength is reduced, and that can lead to failure. To

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minimize the weight of the cover and the potential for collapse, apply granular backfill at least to the midway point of the pipe.

Plastic pipe needs to be covered to protect it from UV rays and other surface activities that can cause failure. Lawn mowing and traffic over excavations can break and crack the pipe. You can minimize these problems by creating a backfill system that properly supports the pipe.

Avoid using large stones, as these also can damage the pipe during backfilling. Big rocks should not be returned to the trench in contact with the piping. In heavier clay soils, dry soil clods can act like rocks, so don't use them to backfill the excavation. Using a granular material in contact with the pipe will minimize the impact of soil clods.

### **Freeze protection**

In cold-weather areas, pipe also needs to be protected from freezing. In city sewer systems, this is often done by making sure the pipe is installed deep under-

ground (6 to 8 feet), but in onsite systems this depth is not always available.

If the bury depth is shallow, or if the pipe is under a driveway or sidewalk, it should be insulated. There are two methods to insulate. You can buy pipe with insulation attached, but it is more expensive than standard piping. The other option is to install foam sheets over the pipe. Make sure you choose insulation designed for use underground. Fiberglass batting is not designed for such applications.

The right material, proper location and three simple rules can help your system always move effluent the right way. Remember that our plumbing friends had it right: Water flows downhill, and hopefully someday is payday. ■

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