Moving Beyond Rock

Synthetic drainfield media can offer substantial benefits in ease of installation, reduced site disturbance, and system longevity

By Scottie Dayton

Trenches and rock are no longer the default design for onsite treatment system drainfields. In fact, some experts say rock is slipping to minority status as a drainfield medium as designers and installers learn the attributes of the alternatives.

Rock and pipe were used for years in drainfields and are still used widely, being readily available and generally inexpensive. Rock, however, has disadvantages. The main issues are fines sealing the trench-bottom infiltrative surface, and soils compacting from the weight of the rock and the force applied by machinery placing it in the trench.

In addition, high-quality, clean rock is not available everywhere. In areas without native supplies, shipping costs can make rock unattractive.

The most common alternatives to rock are plastic leaching chambers and synthetic aggregate. Another option gaining favor for challenging sites is narrow-trench systems using geotextile sand filters.

Narrow-trench systems

When contractors find a tight site with groundwater too close to the surface for conventional systems, a low-profile, narrow-trench drainfield is one alternative solution.

The technology, with its minimal footprint and two-thirds reduction in trench length, often rescues homeowners replacing lakeside cottages with larger year-round luxury homes that leave little space for the onsite system, says Stephen Dix, president of Septic Solutions LLC and consulting engineer for Eljen Corp.

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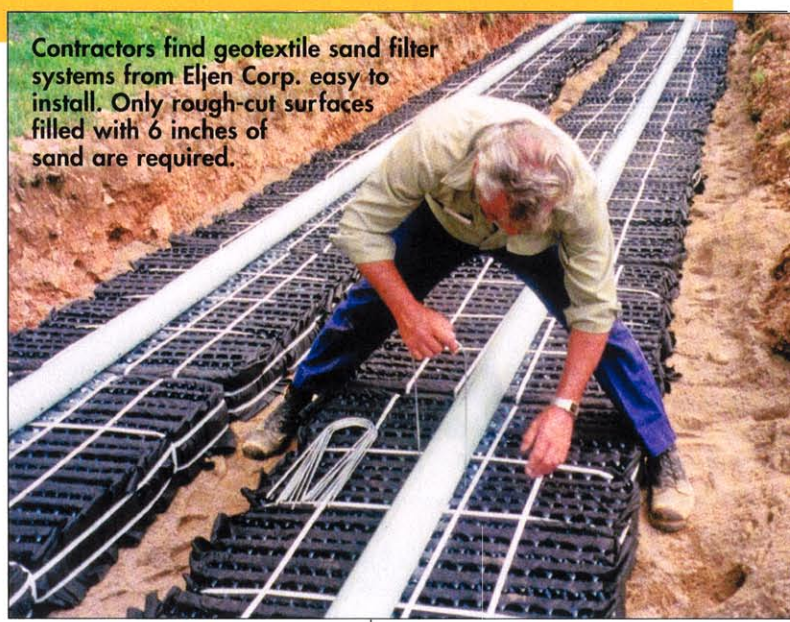
Stephen Dix
Eljen Corp.

Designers of new shoreline homes choose narrow-trench systems because they require little maintenance and have no moving parts. The media grants these systems a 4:1 loading rate. Dix notes that Massachusetts and Georgia grant groundwater separation credits for these systems, often making it unnecessary to mound the landscape.

"Since wastewater leaves the system as high-quality effluent, the soil in the trench or mound may be better able to accept it, and the system should last longer," Dix says. Cleaner wastewater qualifies the systems for use at sites that have been compacted, cut, or filled, and for environmentally sensitive areas near lakes, in shallow bedrock and aquifer recharge areas, and in wellhead protection areas. The systems also retrofit into drainfields that have failed because of excessive organic loading.

"Contractors find the systems easy to install," Dix says. "Only rough-cut surfaces filled with 6 inches of sand are required." The expanded soil interface gives a much larger soil contact area. The sand connects and holds open large pore spaces — critical for use in heavy clay soils. The sand is easy to level before placement of the lightweight media.



Contractors find geotextile sand filter systems from Eljen Corp. easy to install. Only rough-cut surfaces filled with 6 inches of sand are required.

Based on the site's percolation rate, one 3- by 4-foot or 2- by 4-foot module is installed per bedroom. "That's a large surface area and reservoir space per module," Dix says. "They can be configured for serial distribution, pump systems, level and slope sites — any new or replacement application."

The modules, installed shallower than conventional systems, minimize site impact and add flexibility when dealing with site constraints. Each module uses 100 square feet of filter fabric, representing 12 square feet of soil interface. Partially treated effluent then passes through the secondary treatment zone — 6 inches of washed sand under and around each unit. Dix states that the sand layer's long-term acceptance rate (LTAR) is two times that of conventional systems.

The modules, when laid in series and sized for the site's LTAR, prevent a clogging biomat from developing in the soils below. Pretreated effluent and enhanced surface area enable drainfields to be up to 50 percent smaller than traditional pipe and stone beds, reducing land requirements, reducing lumbering costs on wooded sites, and preserving the environment, according to Dix.

A distribution box disperses effluent to the modules. "Clean backfill and washed sand are critical parts of the installation," Dix says. Installation labor is reduced. When trucks cannot access the site, installers can carry a module in each hand as opposed to transporting gravel in wheelbarrows.

Site flexibility is probably the system's biggest advantage. Because the filter is watertight and uses media for treatment, the drainfield soil is not as important as the ability of the media in the filter to transfer oxygen. The system should be constructed to keep surface

water from entering the filter, Dix notes. Effluent is very clean, but still must discharge to the soil for final treatment.

Narrow trenches are not for everyone, Dix cautions. Contractors must use quality ASTM C-33 sand and should be trained, dedicated installers. Systems can be installed within a sand envelope, or the media can fit over pressure distribution laterals. The long, thin interface supports dispersion of lower-nutrient effluent after an ATU. The media can be trenched into denser soils to take advantage of more permeable shallow soil horizons.

The availability of advanced drainfield technologies may depend on state or local regulatory codes. Be sure to check with the proper officials before adding them to your arsenal of onsite solutions. ■

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