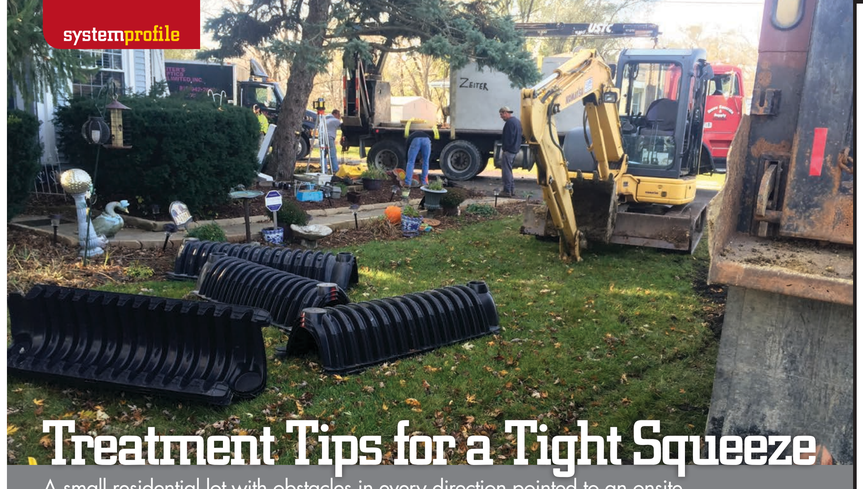


Treatment Tips for a Tight Squeeze

A small residential lot with obstacles in every direction pointed to an onsite solution utilizing a membrane bioreactor and a compact drainfield design

By David Steinkraus

How do you install a complex onsite system when you're working on a very small lot? You get creative — and you really pack in the equipment. Zeiter's Septics Unlimited did that in a subdivision in Shorewood, Illinois, a community about 40 miles southwest of Chicago.

"In the backyard there was no room, maybe a 20-by-20 area to work with. On one side of the house was a driveway. On the opposite side was a pool. The front yard had telephone, power, and other utilities running through it," says installer Dave Zeiter.

This was a system replacement. Local officials installed a new connector road to reach a nearby interstate highway, Zeiter says. "The owner's old system fed a tile that crossed the road and discharged somewhere, perhaps into another tile. The road construction damaged the tile system, and effluent from the owner's land began surfacing and flowing into the ditch beside the road." Local officials told the owner to repair the system.

SYSTEM PROFILE

Location:	Shorewood, Illinois
Facility served:	Private home, 5 bedrooms
Designer:	Zeiter's Septics Unlimited, Morris, Illinois
Installer:	Zeiter's Septics Unlimited, Morris, Illinois
Type of system:	Bio-Microbics BioBarrier
Site conditions:	22 to 24 inches of black, permeable loam
Hydraulic capacity:	1,000 gpd

TUNING THE FLOW

From the house, wastewater emerges through a 4-inch pipe and runs about 8 feet into a 2,100-gallon tank from Grove Concrete. The tank is partitioned into an 800-gallon settling tank and a 1,300-gallon tank that houses a pair of Bio-Microbics BioBarrier MBRs. A SaniTEE filter at the outlet of the 800-gallon tank bridges the two parts of the tank.

Zeiter set Tuf-Tite risers and lids: a 12-inch riser above the clean-out and a 24-inch riser above the SaniTEE for easy access. A pair of 30-inch Infiltrator Water Technologies TW risers were installed above the BioBarrier units for convenient servicing.

The BioBarrier installation was two 0.5 units combined to reach a 1,000 gpd flow for the new system. Two Goulds stainless steel pumps built into the MBRs pushed treated water out through 2-inch pipes about 25 feet to the front of the house where the drainfield was laid under the lawn.

A Bio-Microbics panel controls the system. Zeiter typically installs globe valves in the discharge tubing of MBRs. This allows fine-tuning the flow through the MBRs. Experience has taught him the slower the water is pulled through the reactor membranes — especially a flow of less than 3/4 gpm – the longer the required interval between membrane cleanings. The risk of this technique is a high-water alarm if the dwelling occupants suddenly increase their water usage.

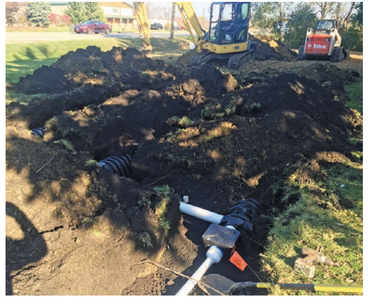
Before reaching the drainfield, the pipes first enter a Tuf-Tite distribution box where the pipe diameter increases to 4 inches. These feed three laterals, each inside 20-foot sections of Infiltrator chambers. A piece of paving tile inside serves as a splash pad to prevent erosion where the feed line enters the chamber, but otherwise the soil is bare. The flow rate is so small — at most 1.5 gpm when both pumps are running — that nothing more is necessary.

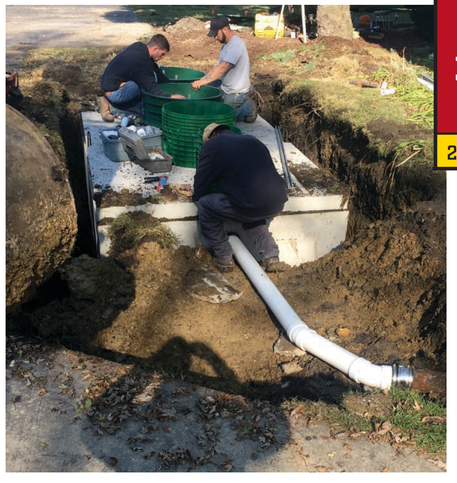
"Strictly speaking, we didn't really need that third run, but in some parts of life more is better, and this will ensure the hydraulic load doesn't exceed the capacity of the soil. Also, there is still a considerable savings compared to systems that require 500 or 600 linear feet for laterals," Zeiter says.

<<OPPOSITE PAGE: The crew from Zeiter's Septics Unlimited prepares to set a tank at a small field installation in Shorewood, Illinois. The front yard of the home was the only place for the drainfield, and the sections of Infiltrator Water Technologies chambers mark the spot.

BELOW: The BioBarrier allowed the use of a very small drainfield, essential in the restricted space at the Shorewood, Illinois, project. From a Tuf-Tite distribution box, pipes feed three sections of Infiltrator chambers. Treated water falls on bare soil except for cement pavers used as a splash pad to prevent soil erosion where water enters the chambers.

>>RIGHT: Technicians from Zeiter's Septics Unlimited fit a drainline and risers to the tank holding a Bio-Microbics BioBarrier. From back to front are: Matt Moser, Shaun Pratscher and Mike Gifford. The tank is fitted with four risers: a Tuf-Tite 12-inch over the clean-out, a Tuf-Tite 24-inch over the effluent filter separating the trash and MBR sections of the tank, and two Infiltrator 30-inch risers above each of the MBR units for easy service access. (Photos courtesy Dave Zeiter)





"In the backyard there was no room, maybe a 20-by-20 area to work with. On one side of the house was a driveway. On the opposite side was a pool. The front yard had telephone, power, and other utilities running through it."
Dave Zeiter

It was a relatively straightforward job, done in the course of a day with the help of Zeiter's Bobcat 273 skid-steer and Komatsu PC50 mini-excavator.

VARIANCE EASES THE SQUEEZE

Because of the tightness of the space to install the system, Zeiter received a variance from the county to drop the tank only 6 feet from the foundation wall of the house. Code requires 10 feet. He and his crew had to cut out about 50 square feet of asphalt from the driveway and a 3-foot section of sidewalk to install the discharge pipe feeding the drainfield. And they had to work around a 2-inch discharge line from a sump pump. Because it was already the end of November when this rush job was done, Zeiter only backfilled the excavations to grade with soil. The owner said she would handle restoration herself.

On many jobs, Zeiter will increase the capacity of the BioBarrier assembly. A single 0.5 unit may do the job even in a four-bedroom home, yet if someone is doing laundry while the kids are taking showers, the extra load may trigger a high-water alarm. "This is a water recycling system, not a wastewater system pumping out 20 gpm. It's a green technology with many pluses, but one of the negatives may be high-water alarms if not enough treated water is being pumped out," Zeiter says.

Because the home was occupied, Zeiter started the MBRs right away. Normally that isn't the case, because once wet, the components must remain wet in order to continue functioning, he says. So in most jobs he or a technician will come to a property about a week before occupancy, fill the tank and turn on the blower.

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QUICK INSTALLATION

"I think we put this project together in a week. We were also able to expedite the permit through the county," he says. And although the space was tight, the system went in easily, with only about 30 minutes when the homeowner couldn't send wastewater out of the house.

The existing septic tank was small and was abandoned in place. "We pumped it out, popped a hole in the bottom, and then we pulled the sides in. We don't like spanning a caved-in tank unless we can fill it with stone to support a pipe above. Sometimes we'll leave a corner of the wall up for support. In this case we could install a 22-degree bend plus a 45 and miss the old tank site entirely," Zeiter says.

The soil was 22 to 24 inches of black loam. "It was so good we had a hard time keeping the tubes full during the infiltrometer hydraulic load tests."

As a result, the homeowner went into winter with a fully functioning wastewater system that will last on the property for years and protect the local environment. □

MORE INFO:

Bio-Microbics, Inc.
800/753-3278
www.biomicrobics.com
(See ad on page 22)

Goulds Water Technology, a Xylem brand
866/325-4210
www.goulds.com

Infiltrator Water Technologies, LLC
800/221-4436
www.infiltratorwater.com
(See ad on page 3)

Tuf-Tite, Inc.
800/382-7009
www.tuf-tite.com
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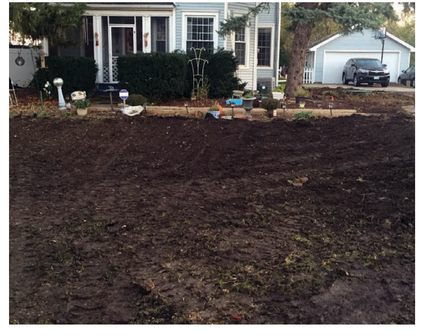

The completed MBR installation shows only a few riser lids peeping above grade. Notice the restricted space to the left and right of the home. The backyard was similarly small, necessitating placement of the drainfield in the front yard.