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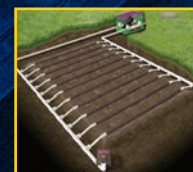
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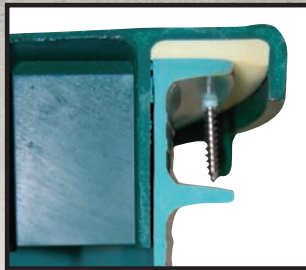
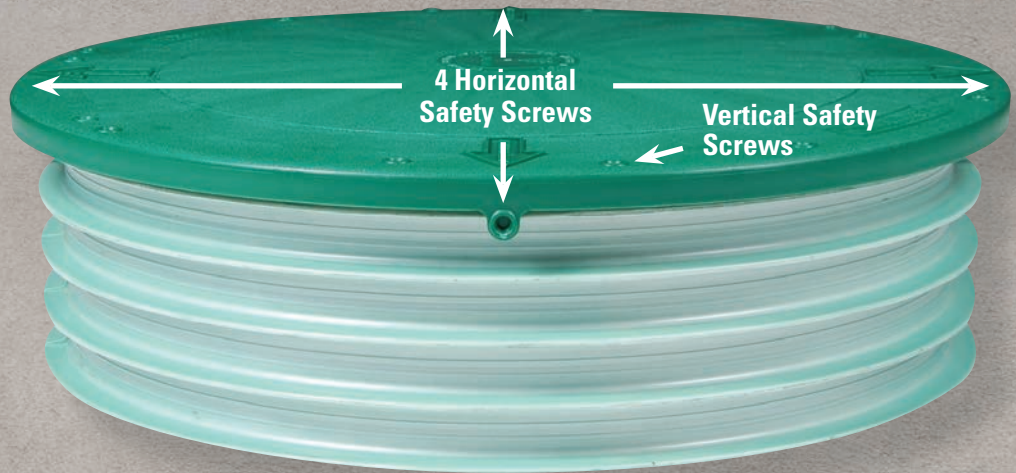
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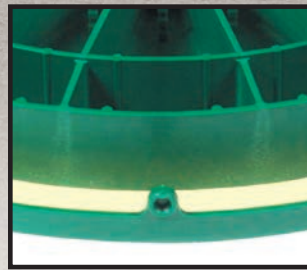
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INSTALLER PROFILE:

Rough and Ready By Scottie Dayton

ON THE COVER:

Challenging topography and rocky soils are the rule and not the exception when Arizona's Black Mountain Excavating goes to work on a new onsite system. Co-owner Willie Brown is shown in a trench filled with Eljen GSF, or Geotextile Sand Filter, drainfield media. (Photo by Mark Hentle)

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By Jim Kneiszel

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Coming in April 2019

ISSUE FOCUS: Large-Scale and Commercial Treatment Systems

Contractor Profile: Working in the Chesapeake Bay watershed

Basic Training: Review onsite sizing standards

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Enjoy this issue!

Established in 2004, *Onsite Installer*™ fosters higher professionalism and profitability for those who design and install septic systems and other onsite wastewater treatment systems.





The Ohio Onsite Wastewater Association Helps With Sober House for Women

Installers and manufacturers jumped at the chance to contribute an onsite system for a facility on the front lines of fighting opioid abuse

When Ron Laurent heard about the Red Tulip Project and its need for an onsite system, he wanted to get involved. A group of volunteers in Geauga County in northwest Ohio were working hard to build the first area sober house for women fighting opioid addiction, and Laurent felt the onsite industry could pitch in and help make the facility a reality.

“I thought it was a worthy cause because of the opioid epidemic across the country,” Laurent recalls. “I set up a meeting about the project with the Red Tulip board. We got into this conversation, and one thing led to another.”

At the time, Laurent served on the board of directors for the Ohio Onsite Wastewater Association and was about to be named president-elect of the organization. He was also an installing technician for DeBord/Benjamin Franklin Plumbing in Chardon. He felt compelled to rally the forces of the onsite industry to give the project a boost.

So Laurent coordinated donations of 100 percent of the equipment and labor needed to design and install a septic tank effluent pump system with a low-profile pressurized mound for the facility that is bigger than a typical residential dwelling.

The system was built on heavy clay soils with a shallow seasonal high water table, and the designers sized it a little larger than for the typical home (800 gpd) because there may at times be more occupants per bedroom, Laurent explains. It is expected that the average stay for residents will be 60 to 90 days, but they could stay up to two years through the treatment program.

GIVING BACK

All told, the value of materials and labor was about \$26,000 to \$28,000, and Laurent thinks the project reflects well on the giving nature of people working in the onsite industry.

“I had no trouble when I called around and asked people to donate. These were all members of the Ohio onsite industry, and it was heartwarming to have people I’ve known for years — good people — actually put their money where their mouth is,” he says.

Laurent’s then-employer led the way, with DeBord/Benjamin Franklin owners Dennis and Leona Kratochivil supplying four technicians and machinery to install the system. Laurent’s new employer, Jet Inc., supplied a J-800 aeration system, lift station and pump. Infiltrator Water Systems supplied an IM-1080 tank, risers, Quick4 low-profile chambers and components. Cleveland Plumbing supplied D-boxes, plumbing pipe and a control box. Klarich Septics offered a lift pump and panel. And Fincham Soil Investigations performed soil testing and provided the design.

Installation of the system in Chardon last summer provided the basis for an educational demonstration for the onsite industry, with 60-70 members of the Ohio Onsite Wastewater Association — installers, service providers, pumpers and regulators — attending a day of seminars featuring the donors



▲ Zak Sherman speaks to members of the Ohio Onsite Wastewater Association.



◀ Benjamin Franklin Plumbing employees install an Infiltrator Water Technologies IM-1060 tank behind a Jet Inc. treatment tank.

▼ Zak Sherman, of Infiltrator Water Technologies, demonstrates installation of Quick4 low-profile chambers. Also pictured are workers from the DeBord/Benjamin Franklin Plumbing installation team.



talking about their part of the project, followed by observation of the work being done. Participants received six hours of continuing education credits.

“We’re always looking for hands-on training education. Our members crave that rather than sitting in a classroom,” says Neil McConoughy, Ohio Onsite Wastewater Association president and a regulator for the Cuyahoga County Board of Health. The Ohio Onsite Wastewater Association, with 186 members, wants to get more involved with opportunities to provide community service coupled with field training opportunities.

“The manufacturers and installers stepped up to the plate, and it was a worthy cause. We would definitely try to do more if possible. This was our first project of this type, and it was a learning experience,” McConoughy says.

POSITIVE FEEDBACK

Weather was a challenge with the timing of the demonstration day, Laurent explains. It rained a few days before, slowing the prep work, then clear weather came the day before and a few days after, allowing for successful completion of the system. Laurent had hoped to finish the project while all the visitors were on site, but they didn’t get far enough along for that. They laid down plywood around the working areas to protect against soil compaction as the participants got close to the work being done.

Feedback was positive from the attendees as well as the project donors. The installers and company representatives were guests at a Pasta With a Purpose thank-you event celebrating construction of the sober house.

Laurent believes Ohio onsite professionals will carry the donations forward if more requests come for their help.

“We were never approached by any organization that needed that kind of help,” Laurent says. “I was hoping it would encourage other people to join our campaign to help with other problems. There are veterans in need, a whole community in need that could use help from time to time.”

Laurent won’t be involved in any more projects in Ohio, as he recently moved to Mississippi for his new job. He’s just starting to look around the Gulf Coast — he’s living in Bay St. Louis — and wondering how he can continue giving back through his onsite expertise.

“I’ve been in the industry for 35 years, and it was a glorious way to end my association with Ohio,” he says.

continued >>

“I had no trouble when I called around and asked people to donate. These were all members of the Ohio onsite industry, and it was heartwarming to have people I’ve known for years — good people — actually put their money where their mouth is.”

Ron Laurent



◀ Ron Laurent speaks at the Ohio Onsite Wastewater Association seminar that was part of the Red Tulip Project.



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SHARE YOUR STORY

The Ohio Onsite Wastewater Association partnership with the Red Tulip Project exemplifies the positive impact onsite professionals and industry manufacturers can have on their communities. In this case, they are making a difference in a tremendous battle being waged across the country to halt opioid abuse. But there are many opportunities to put your expertise to work for good — to help the poor through Habitat For Humanity or rebuild infrastructure in fire, flood, hurricane or other disaster relief, for example.

Sharing your time and talents can help the less fortunate, but it will also build the reputation of the onsite industry. The public more and more realizes the important role installers play in promoting a clean environment and protecting health. But when you give back, the public also realizes the industry is populated with great people who are looking out for their neighbors.

I realize the folks in Ohio aren't the only ones making great contributions. If your state association or your installing company is leading an effort to help others, let me know about it. I'd like to share your story with readers. □

Send your comments, questions or opinions to Jim Kneiszel at editor@onsiteinstaller.com.



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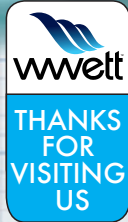
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EQUALIZING FLOW

Time Dosing Tips

Utilizing timed dosing instead of demand dosing mitigates variations or peaks in wastewater flow. Peak flows from the dwelling are stored and then dosed to subsequent components evenly throughout the day. In this exclusive online story, expert Sara Heger breaks down the benefits of time dosing. onsiteinstaller.com/featured



**EQUIPMENT
MAINTENANCE**

8 Tips for Excavator Care

Tracked excavators are a familiar sight out in the field. But operating expertise doesn't mean that maintenance is any less important. From adjusting track tension to problem warning signs, here's what you need to know to keep your machine in good shape. onsiteinstaller.com/featured

**TREATMENT
CONSIDERATIONS**

Impacts of a Spa

If you have a customer who would like to open up a spa or is already offering spa services and is served by a septic system, there are numerous concerns to be addressed in the design and management of the system. Read up on these recommendations. onsiteinstaller.com/featured



Overheard Online

“Certainly the emphasis from the industry is that in five or eight years, it'll be a supply and demand issue, and if you're in the right spot at the right time, you'll have access to a good living if you do the right thing.”

- In Your Words: Industry Insight From Onsite Installers
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INSTALLER PROFILE

▼ Willie Brown uses a Caterpillar backhoe to backfill over a drainfield trench with suitable material for his area in Arizona. (Photos by Mark Henle)



ROUGH AND READY

Black Mountain Excavating tames unruly home sites to provide quality onsite wastewater treatment in a remote and inhospitable region of central Arizona

By Scottie Dayton

Installing septic systems in a remote and rugged region of central Arizona presents many challenges for Willie Brown, who works mostly by himself, with a summer assist from his younger brother, Daylen. There's the challenging topography and rocky soils, long hauls with heavy equipment to reach many job sites, even trying to avoid venomous snakes and spiders in residential crawl spaces.

And that doesn't even get into the challenge of a painfully slow economic recovery after the real-estate collapse a decade ago. While other parts of the country have enjoyed a steady climb out of the doldrums, that's not the case in the lightly populated Gila County, located in the Tonto National Forest. It's been a slog, but things are starting to look up.

After working 17 years in the family's Black Mountain Excavating business in Payson, Brown suddenly became the sole operator in 2016. "Dad told me he needed to get out," he says. Bill and Lori Brown still co-own the business with their son, but no longer participate in it.

Willie Brown, 37, installed a total of 10 standard and alternative systems in 2017, the busiest the company has been in years. "We're just beginning to see what looks like an economic recovery," he says.



To supplement onsite work, Brown works as a subcontractor on gated-community developments laying municipal sewer and water pipes and conduits for Arizona Public Service. He also completes the site work for these homes in the Payson area.

OVER THE MOUNTAINS

Gila County covers 4,796 square miles and is home to 53,500 residents. Brown lives in Tonto Basin, a small community with two full-time excavating companies that receive the majority of work. “We do better in the Payson-Pine-Strawberry area in the northern half of the county,” he says.

The 31-mile trip over the Mazatzal Mountains takes 30 minutes and places Brown at a disadvantage. “To remain competitive, I absorb the expense of transporting equipment from Tonto Basin to Payson by piggybacking trips,” he says. “I’ll haul soil to Payson for different jobs and bring brush or spoils home to sell.”

Besides the Mack RD688CH 10-wheel dump truck Brown drives, the company owns two Kenworth T800 10-wheelers (one is for off-road work only). All three have 10-cubic-yard boxes by K and H Mfg. Machinery is transported on a low-boy trailer pulled by a Peterbilt 567 with an oversize load permit. “The trucks are the most expensive things we own,” Brown says.

Mechanical maintenance and welding happen in a 40-by-60-foot one-room shop on the 80-acre homestead. It has no office. Brown runs the company with a cellphone and in-home office. “My wife, Megan, works in Payson three days a week as a dental office manager and cares for our 1-, 4-, and 7-year-old boys,” Brown says. “My only office help is QuickBooks, and I’m still learning to deal with the unending paperwork.”

FAMILY TIES

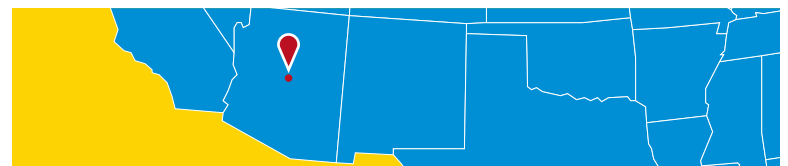
Because Gila County is a tightknit community, referrals generate most of the company’s work, eliminating the need for advertising and a website. Furthermore, the Brown family has been in the area for decades. Grandfather Jim Brown owned an excavating business, but his twin sons, Bill and Joe Brown, wanted to see the country by working for larger companies.

“Dad was with F&F Construction for almost 30 years,” Willie Brown says. “By then, he was ready to stay closer to home, and that’s why he opened Black Mountain Excavating in July 1999. Uncle Joe returned home, too, and he opened Quality Pumping in Payson.” Like the close family they are, the twins share heavy machinery (mostly Caterpillar).

Lori Brown, who worked in the office and answered phones, saw an opportunity to increase business by becoming a soil tester. Being the first onsite professional to work with homeowners often opened the door for Bill Brown to be the installer. Empowered by the trust customers had in them, Lori Brown certified as a designer of standard systems. With Bill Brown as installer, Black Mountain became a turnkey business. (Today, Lori Brown continues to do soil tests for other contractors.)



▲ Willie Brown shovels dirt in a drainfield trench while installing a system in Star Valley, Arizona.



Black Mountain Excavating, Payson, Arizona

Owners: Bill Brown, Lori Brown and Willie Brown

Founded: 1999

Employees: 1

Service area: Northern Gila County

Specialties: Onsite installations, inspections, repairs, maintenance

Affiliations: Arizona Onsite Wastewater Recycling Association, Arizona Registrar of Contractors

» Brown uses a digital grade stick from Spectra Precision/Trimble while constructing a drainfield.



Willie Brown joined the company full time after graduating from high school in 1999. "Dad and I were installing 20 to 25 new systems annually, and 75 percent were advanced treatment units," he says. "As subcontractors, we also did residential site work for new home developments in the Payson area."

COUNTY WORK

Much of their onsite work was for Gila County, which still had grandfathered cesspools in the pine forest subdivisions of Young, Tonto Basin and the northern half of the county. Most cesspools had failed and also were near waterways. "Homeowners couldn't afford the expensive replacement systems, so beginning in 2006, the county received grants to fix a few a year," Brown says. The easy installs each took 10 days for the following reasons.

The 45-home Kohl's Ranch subdivision north of Payson was the most difficult project. Year-round Tonto Creek flows past eight to 10 lots per acre with homes built within feet of the hillside. Properties received a 1,000-gallon precast septic tank and AX20 AdvanTex aerobic treatment unit (Orenco Systems) pumping to a 60-by-50-foot-wide pressurized dripfield (Geoflow). "Sometimes even our compact machines wouldn't fit on the lots," Brown says. "We did a tremendous amount of hand work." The company owns a Bobcat S55 skid-steer, two Bobcat 322 mini-excavators, a Bobcat 425 mini-excavator and a Caterpillar 416 C backhoe.

"Parents should loosen the reins here and there. Let their kids take over something, and leave a little room for failure once in a while. They are valuable learning experiences."

Willie Brown

PRESERVING A RURAL HERITAGE

Farming with draft horses relieved stress for Bill Brown. When he wasn't running Black Mountain Excavating with his wife, Lori Brown, he used 10 Belgians and two Percherons in wide-abreast hitches to plow, disk and mow 40 acres of animal-feed crops on their H-4 Ranch in Tonto Basin, Arizona.

"Today, Dad hitches the teams mostly for weddings, funerals and parades," says son Willie Brown, who took over the company in 2016. "We also have 15 quarter horses for riding lessons and a government lease to run 300 head of Angus cattle in the Tonto National Forest."

Bill Brown bought his trained draft horses at an annual stock sale in Colorado, and always from Daniel Stutzman, an Amish farmer from Indiana. The men became friends, and in 2012 they created the annual Driving and Harnessing Clinic. "It also was a way for Daniel to bring his family to a warmer climate in winter," Willie Brown says. Proceeds from the clinic paid for their train tickets.

The three-day clinic in late January attracts 10 to 15 teamsters from Arizona, New Mexico and Colorado. The hands-on demonstrations in harnessing and hitching include the proper fit of the harness and collars as well as hitching from a single horse to three and four abreast, and four up (one pair in front of the other). "We use our own horses because we know which ones work together well and the position they prefer in the hitch," Brown says.

Farming demonstrations occur on the last day and illustrate various ways rope pulleys and jockey sticks connect teamsters' lines to each horse's bit in wide-abreast hitches. Then it's into the fields to work with farm implements such as a two-bottom plow pulled by a four-abreast or six-up hitch.

"Fortunately, we have draft horse enthusiasts and the Amish to preserve our early farming heritage," Brown says. "We're proud H-4 Ranch is a microcosm of that culture."

Working in the high country meant pounding through shelf rock with a hydraulic hammer, but the mini-excavators often lacked the power to break it. Forced to set tanks on the ledge, Bill and Willie Brown built numerous retaining walls into the hill, set the tanks against the wall and backfilled. Some sites even required raised dripfields inside retaining walls.

The houses, built on slabs, had crawl spaces under them, ideal homes for venomous reptiles, spiders and critters seeking shade. "I didn't like being down there to redirect toilet stub-outs to the new systems," Brown says. "All I had was a flashlight and my tools, and I couldn't move fast." After Joe Brown pumped the cesspools, Bill and Willie Brown filled them with concrete.



▲ Willie Brown usually works by himself on onsite wastewater jobs. That means hauling around his own supplies, in this case 3-by-4-foot Eljen GSF, or Geotextile Sand Filter, drainfield media. His Bobcat excavator is shown in the background.

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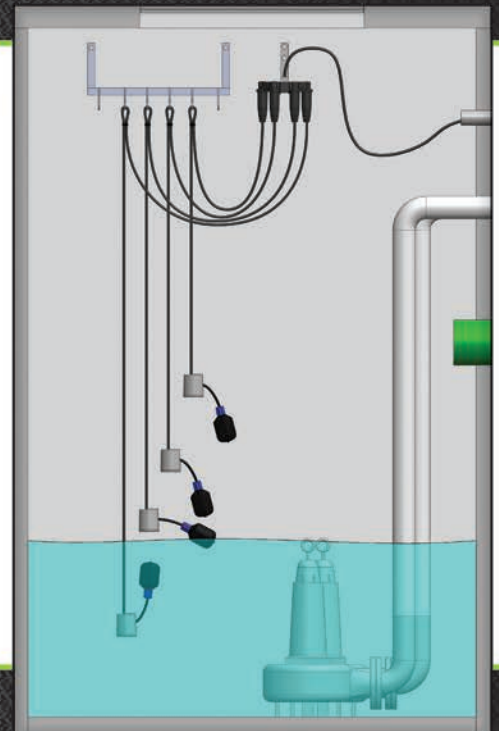


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"I don't play the negotiating game.
If customers argue price with me, I give
them another phone number and walk away."

Willie Brown

» Willie Brown constructs a drainfield into a slope using Eljen GSF or Geotextile Sand Filter, drainfield media covered by a geotextile fabric provided by Eljen. The laser level is from Spectra Precision/Trimble.

To help offset the cost of septic stone, the family purchased a diesel-powered two-deck quarry incline screen (Kolberg-Pioneer) in 2004. The rock in the bottom of Tonto Creek is exactly the right size for septic gravel, less than 2 inches in diameter. After Brown excavates material from the creek, he washes and screens it. Larger rocks come off the upper 40-foot-long screen box, leach rock comes out the second screen, and fines fall through to the bottom for bedding and backfill. "We get three to four loads of backfill per hour," Brown says. Nearby stone-crushing companies process the larger rocks.

NO NEGOTIATING PRICE

Brown says he was never deliberately groomed to take over the company, but he learned plenty from watching his dad. The biggest lesson was listening to Bill Brown cope with customers as they bullied him to lower prices or refused to pay the full amount after receiving a discount. Dealing with their attitudes while trying to build customer relations took a toll. Fed up, he left the company two years ago to run the family cattle ranches.

"I don't play the negotiating game," Willie Brown says. "If customers argue price with me, I give them another phone number and walk away. My quotes are competitive, so why should I lose money to these people? In the end, it means I'll be unable to pay a bill." The attitude adjustment works for most customers, who call Brown again.

When bidding jobs, Brown lists materials but not prices. "That opens the door to homeowners calling around to double-check my quotes, especially if I'm within dollars of other bids," he says. "I use high-end products and only Orenco parts on Orenco systems. I buy their kits to ensure I always have what I need on the job." The local Orenco distributor carries most parts and holds all the AdvanTex service contracts.

Brown bids municipal sewer installations differently. "If an ejector pump goes out, I want homeowners or repair technicians to buy a replacement at a do-it-yourself store that same day," he says. "Consequently, I install commercially available pump brands."

LEARNING FROM DAD

Brown also experienced how his dad's philosophy of not going into debt too deeply positioned the company to withstand the housing collapse. "We were subcontracting for high-end housing developments and weren't paid for quite a few jobs," Brown says. Bill Brown, however, always paid off the past purchase before buying something new. He never filed for bankruptcy or had to return a piece of equipment to the bank.

One thing Willie Brown wishes his parents had done was give him more responsibility sooner in the business relationship. "It's discouraging to work so long without climbing the corporate ladder," he says. "Parents should loosen the reins here and there. Let their kids take over something, and leave a little room for failure once in a while. They are valuable learning experiences." □

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Go With the Flow to Scope Out Potential Treatment Issues

Many of today's onsite systems are complex. Charting water moving through the system is critical to ensuring they continue to work properly over time.

By Jim Anderson and David Gustafson

We have spent a lot of time lately addressing questions about estimating or determining design flows. But recently these discussions and questions have been about the importance of measuring flow *after* a system is installed.

To consider decentralized wastewater treatment systems a viable alternative to the "big pipe" solution for small communities, we have also spent quite a bit of time and space on installing systems, to make management of the systems easier. This includes specific discussions on installing risers to the surface, making pumps in pump tanks more accessible, and installing inspection ports or access in all parts of the system. This allows the service provider the opportunity to access and observe all parts of the system to identify any potential problems early and solve them before they become real problems.

We thought it was time to explain in greater detail methods used to measure flows in the system. One obvious device to measure water flow or use is to install a water meter. A colleague of ours has long advocated installation of water meters whenever there is an onsite sewage treatment system.

Many proprietary systems have incorporated measuring and tracking flows to determine maintenance schedules and needs. In addition, we see more codes requiring some type of water measurement in conjunction with systems that require pumps.

We would agree this is a good idea, but the industry has been slow to embrace the concept. The good news is that many proprietary systems have incorporated measuring and tracking flows to determine maintenance schedules and needs. In addition, we see more codes requiring some type of water measurement in conjunction with systems that require pumps or are considered larger systems or systems serving other establishments.

There are several ways to measure flows in systems, including water meters, event counters, running time clocks and electronically controlled dosing. Today there are also a lot of options where the results can be accessed remotely, which means it does not take a system visit to look at the flow values and assess for potential problems. Water use data can be entered into a spreadsheet to provide a continuous picture of system operation. The service provider can easily determine whether a site visit is necessary to correct a problem.

We will discuss methods for determining flows.

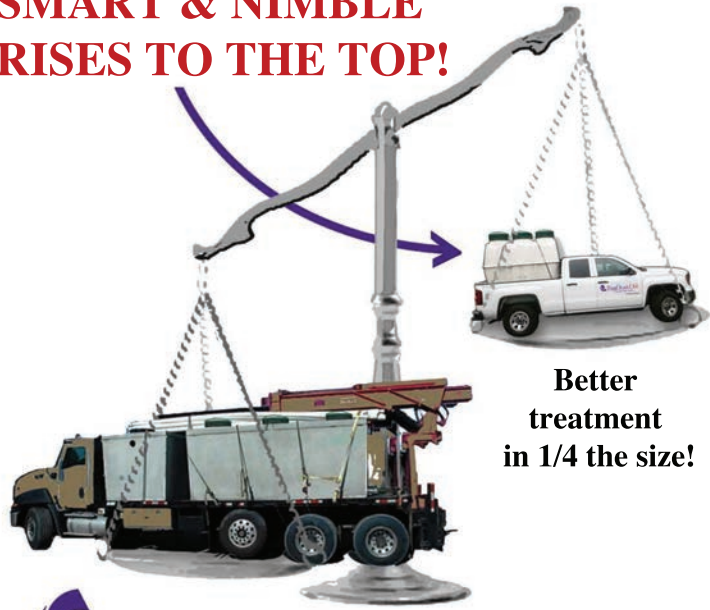
Water meters come in a variety of forms. Installation typically costs \$200 to \$400, so it's not an expensive item. Water meters are meant to measure clean water flows, so they need to be installed where water enters the house. Installation should include the cost of additional plumbing to place the water meter in a location where it does not measure water delivered to outside sillcocks so only in-house water use is measured. This is the water that will be delivered to the wastewater treatment system. When accessing data from a water meter, check if the flow is measured in gallons or cubic feet and make the proper conversions for the period of time flow is measured.

If pumps are used in the system, an event or cycle counter can be used to determine flow to the next system component. A cycle counter records when the pump starts up and runs. Count the number of times the pump turns on during the day and add how many gallons the pump moves each time it is activated to determine the wastewater flow. Cycle counters can be set up to operate through a panel to be read inside the house or from a remote location.

Counters are most appropriate for use in on-demand systems. Determining the volume delivered includes knowing how much water it takes to fill the pipe and how much will drain back to the system. The total amount delivered minus drainback will tell the volume of wastewater delivered. While this is a relatively cheap and easy method to monitor flow, it is not as accurate as either a water meter or an elapsed time meter. This is because floats are used to turn the pump on and off, and there is some variability in when the floats turn the pump on and off for each pump cycle.

Let's say in a typical pump tank there is a half-inch variation in the level when the pump turns on and there are 17-gallons/inch volume in the pump tank. The calculations could be off by 8.5 gallons every time the pump runs. If it runs four times a day, that would be a discrepancy of 34

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gallons per day. Over a week or month, the volumes begin to add up. Nevertheless, having a counter tells the service provider whether the pump is running and gives a relative value of the effluent delivered.

The other common measuring device is an elapsed-time meter. These days, this is the preferred method to measure flow into the system, and many proprietary products incorporate them into the system or require they be installed. Again, through use of a panel, data can be read remotely. Timers are used to ensure flow is more evenly spaced throughout the day. Times of peak flow are stored and delivered at regular intervals.

To use a timer, the pump must be calibrated to determine the flow rate and the amount of water delivered. An example uses the 17-gallon/inch tank. The pump is run for two minutes and the level in the tank drops 6 inches. This means 6 inches x 17 gallon/inch = 102 gallons delivered in two minutes or 51 gallons per minute, which is the pump rate. If the pump runs 10 minutes a day, it will pump 510 gallons.

Once the pump rate is determined, it is used to determine the volume of effluent delivered by accounting for any drainback from the piping. Service providers should check the pump periodically to make sure it continues to deliver at the same rate. Over time, pumps will begin to wear out, changing the rate.

Measuring flow by any of these means will help the service provider keep the system performing for a long period of time and provide a means of identifying problems before they cause system failure. □

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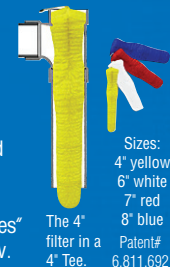
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SYSTEM PROFILE



Joe Jude (left) and Jamie Adams (right) compact soil around the Wieser Concrete treatment tanks at YMCA Camp Manitou near Monticello, Minnesota. (Photos courtesy Peter Schmitz)

A Busy Minnesota Summer Camp Demands a Creative Onsite Solution

Flow equalization and a series of big tanks is the key to handling occasional spikes in usage at YMCA Camp Manitou

By David Steinkraus

The YMCA Twin Cities planned to create not just a simple day camp, but a large complex on the shore of a Minnesota lake that would serve children from the Minneapolis and St. Paul metro areas and the city of Rochester.

In partnership with the city and county of Monticello, the YMCA created the Bertram Chain of Lakes Regional Park. It's 1,200 acres of protected land and lakes west of Monticello and about a 45-minute drive from downtown Minneapolis. All the land is protected and open to the public except for 12 acres on the shore of Long Lake. That's dedicated to the Camp Manitou day camp.

Of course, the camp has a beach and bathhouses that need wastewater treatment. There is also a swimming pool and splash pad, an office building and an art pavilion. The job of handling the wastewater came to Peter Schmitz, installer, and Bernie Miller, system designer.

System Profile

- Location:** Monticello, Minnesota
- Facility served:** Camp Manitou
- Designer:** Bernie Miller, Miller's Sewage Treatment Solutions, Kimball
- Installer:** Peter Schmitz, Schmitz Excavating, Monticello
- Type of system:** Septic with trenches
- Site conditions:** Sandy loam over sand
- Hydraulic capacity:** 9,875 gallons per week



◀ Joe Jude stands ready to put lines in the ground at YMCA Camp Manitou. Installer Peter Schmitz uses wooden stakes with saddles to keep pipes level as trenches are backfilled with 1 1/2-inch stone.

▼ The dosing tank chamber at Camp Manitou in Minnesota holds another Schmitz idea. He installs a vertical access pipe and two 45-degree elbows. If a supply line freezes in a harsh Minnesota winter, the elbows create a gentle curve for a technician to feed a jetter hose through.



“It was kind of a puzzle putting this together. The YMCA really didn’t want to have the drainfield in their ballfield, but they didn’t have any other suitable space.”

Bernie Miller

Although the construction was new, there were constraints on the site, Miller says. He owns Miller’s Sewage Treatment Solutions in Kimball and designed the YMCA system.

Because of the property’s sandy soils, the state determined the aquifer was sensitive. Systems in sensitive aquifers and with flows greater than 2,500 gpd require nitrogen reduction, but there was no room in the YMCA budget to add nitrogen pretreatment. Miller looked at similar YMCA camps where flows vary considerably depending on the schedule. He determined weekly flows at Camp Manitou would be 9,875 gallons. By including flow equalization in the system, Miller kept the design flow below the 2,500-gpd nitrogen treatment threshold.

“It was kind of a puzzle putting this together. The YMCA really didn’t want to have the drainfield in their ballfield, but they didn’t have any other suitable space,” Miller says.

The system

The system serves three buildings at the camp: the office building and shelter, the bathhouse and the art pavilion.

Wastewater leaves the office building and bathhouse in 4-inch

Schedule 40 PVC lines and empties into the first of two 5,000-gallon septic tanks connected in series. Wieser Concrete provided those and the other tanks for the project. These tanks provide initial treatment and settling.

Because of the layout and grades on the property, wastewater from the art pavilion takes a different route. A 4-inch Schedule 40 PVC line moves wastewater from the pavilion into a 1,000-gallon lift station. A Goulds Water Technology, a Xylem brand, PE31 pump sends wastewater 215 feet through a 2-inch Schedule 40 PVC line, and this empties into the 4-inch line just upstream of the first septic tank.

The two septic tanks are separated by 3 feet of Schedule 40 PVC, and wastewater flows by gravity from the first to the second. From the second tank, wastewater flows through a Polylok PL-525 effluent filter with an alarm, and then through 3 feet of Schedule 40 PVC pipe to the 6,000-gallon pump tank.

SYSTEM PROFILE

A pair of Goulds PE41 pumps sends wastewater through 205 feet of 2-inch Schedule 40 pipe that runs under the ballfield. The drainfield is just beyond the outer edge of the field and covers 108 feet by 71 feet.

An Alderon Industries panel runs the pumps. The advantage of this panel is its two settings for time dosing, Miller says. A second float tells the panel that the system is experiencing peak flow, and the panel decreases the time when pumps are off. "This has been something that saved a lot of headaches on the service side over the years," Miller says. "It can save you that phone call on Sunday from people having an alarm."

Risers are Orenco Systems Ultra-Rib, and lids are 24-inch insulated Polylok.

The field is split into two zones, with five laterals in each and one distribution box for each zone. Distribution boxes are placed side by side at a high point. Each lateral is set about 4 inches below the one upstream so the entire drainfield is gravity-fed, and one lateral fills completely before the next one.

Laterals are set 7 1/2 feet on center. Each one is made with a piece of 4-inch perforated pipe set on 12 inches of 1 1/2-inch rock. On top of the pipes are another 2 inches of rock, and that is covered with geotextile fabric. Cover soil was placed on top of the fabric.

Equipment Schmitz used for the project included a Cat 312C excavator, Cat D5G dozer, Cat 257D track loader, Cat 950 loader to move the excess dirt, low-boy by Fontaine Trailer to move the equipment and Mack 613 CH tractor to pull them, and a pair of Mack dump trucks to haul rock, a 1988 RD690S and a 1995 CH613.

Easy locating

The area designated for the wastewater system also includes an undeveloped expansion area to accommodate any future growth of the complex.

Children will be playing near the drainfield, so trip hazards were eliminated by burying almost all of the drainfield components. Schmitz put 6-inch sections of rebar in the ground next to the distribution boxes and the clean-outs and about 4 inches below grade. With a locator and the as-built plans, anyone needing to uncover these components should find the job easy, he says.

With Minnesota's frigid winters, Schmitz makes a special adaptation to lines running out of a pump tank. Instead of connecting the vertical pipe from the pump directly into the horizontal pipe running to the drainfield, he installs a T and adds a run of capped vertical pipe. This joins the T fitting through a pair of 45-degree elbows connected in series. This extra pipe allows a technician to run a jetter hose into the dosing line to



▲ Joe Jude (right front), Harry Zimmer (right rear) and Steve Rasset (left) backfill a trench at YMCA Camp Manitou. The conveyor directs stone precisely, and in residential jobs, it keeps rock off customers' lawns.

remove a clog or clear a frozen spot. The two 45-degree elbows create a gentle curve that's easier to push a hose through than a 90-degree bend, Schmitz says.

When Schmitz puts his drainfield pipes in the ground, he first installs wooden stakes with saddles that the pipes rest on. These keep the pipes level and removes the need to shovel stone under the pipes.

For spreading the stone he has another tool: a conveyor that attaches to his truck. On a new construction site like Camp Manitou the conveyor is useful. When he's working at someone's home, it's even more useful because stone isn't dumped on a customer's grass or driveway, it isn't scattered over the ground as the system is being installed and technicians aren't cleaning up dirty stone with a loader bucket.

Ongoing discussions continue about the future of the land. The hundreds of acres around Camp Manitou could be used for other types of activities. An RV park has been mentioned. But whatever comes about, the YMCA camp will be doing its share to protect the quality of the recreational land. □

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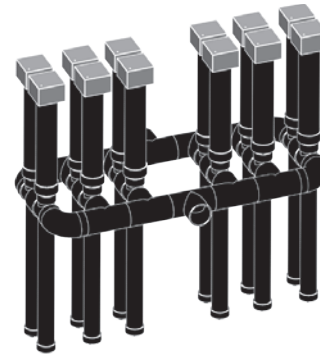
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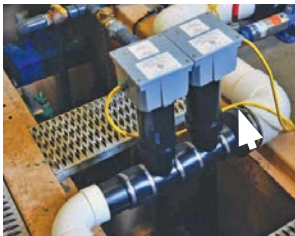
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‘Are There Leeches in the Leachfield?’

New Hampshire wastewater pros work with state officials to improve industry regulations and look for opportunities to educate the public

Compiled by Betty Dageforde

In States Snapshot, we visit with a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we learn about a member of the New Hampshire Association of Septage Haulers.



Darlene Johnson

(corporate secretary, treasurer and chief operating officer) with husband, Paul Johnson (president, chief executive officer, driver, maintenance coordinator)

Business: Best Septic Service, Loudon, New Hampshire

Age: 55

Years in the industry: 28

Association involvement:

I've been a member of the New Hampshire Association of Septage Haulers for 28 years. Our company's original owner was a founding father of the association so we had no choice but to slide right in. I've held the positions of secretary and president and am currently secretary and Department of Environmental Services of New Hampshire liaison.

Benefits of belonging to the association:

Staying connected and informed on regulatory changes at state and federal levels, idea flow between members, and camaraderie. We are not there to discuss or fix rates, which some folks think, but to share experiences, discuss new technologies or changes, assist colleagues on large jobs or when a truck is down, and find good referrals out of our service area. As one example of something we've done, there's a law on the books that says each town must provide access to septage disposal (either their own treatment plant or arrangements with a neighboring town), which the state wasn't enforcing. So we took them to task. We hired a lawyer, created a task force that rewrote the regulation and hired a septage coordinator at the Department of Environmental Services. Currently we are working on an outreach program to educate residents on the benefits of clean groundwater and their responsibility to keep up with maintenance. This will involve a media blitz, so it should be beneficial to all our pumpers and we hope increase membership. And we are awaiting our state's approval to allow us to buy into the health insurance arena as a group, which will hopefully give our business owners much-needed financial relief.

Biggest issue facing your association right now:

When our state was having disposal troubles and going through massive rule changes, our active membership was at its peak. But now that things are going along status quo, our membership is low. Although we represent roughly 26 percent of our state's licensed haulers — a good number by many standards — the core of active members is small. We try to bring things to the table for all the haulers, like Department of Transportation training, rule education, commercial driver's license drug regulations, insurance information, safety training, etc. So I hope these will get other folks to join.

Our crew includes:

Our son Eric Johnson is in charge of portable restrooms and the land-spreading operation, Greg Wells is our right-hand man and truck operator, our son Tim Johnson is a part-time truck operator, and Sandy Wesoja handles customer service, dispatch and receivables.

Typical day on the job:

I spend my time handling office operations, bookkeeping, billing, assisting with customer service and dispatch, rearranging schedules as

emergencies come in. I've got many irons in many fires and am constantly jumping around like a pingpong ball.

Helping hands - Indispensable crew member:

Eric Johnson is our go-to guy for everything. In the office he can do everything from making appointments to payroll. He can pump septic tanks and shuttle 40-plus restrooms out and about in a weekend. He seamlessly slides from one job to the other when needed and always goes above and beyond with his effort, including spending extra time to make sure things get done. He is the future of Best Septic Service and will do a great job when he has the reins.

The job I'll never forget:

The state's Fish and Game Department has an annual free event called Discover WILD New Hampshire Day to educate the public about wildlife, fishing, hunting, hiking, sustainability and preservation. The New Hampshire Association of Septage Haulers joins the Department of Environmental Services' tent to get the message out about clean water and how it's everyone's responsibility. We provide information about septic systems with the message to flush only toilet paper, and we literally hand out toilet paper with that message on it. You should see the faces of attendees when we hand them a roll. But they laugh and take it and then look forward to seeing us each year. Five or six of our members provide portable restrooms and hand-wash stations at a discounted price. It's pretty cool to see the rainbow of different units and logos standing side by side, representing companies from around the state. It's a fun event, and we've been glad to be part of it.

My favorite piece of equipment:

The one thing we all love — and we all hate — is the cellphone. It keeps us connected, emergencies can be dispatched with ease and efficiency, site photos can be taken and shared, it's easy to communicate with customers and the office, and it assists in locating unfamiliar addresses or checking on traffic conditions. In some cases, you can see what a house or driveway looks like before you get there. The "hate" part is that it can be invasive. When it rings, it's like, "Oh, no, here we go. Here comes the monkey wrench."

Most challenging site I've worked on:

We have a lot of old homemade systems around here and camps that have been retrofitted to permanent residences. We have one residence that has a floor trap in the dining room. And sometimes we have to climb under houses and decks to get to septic tanks. You might have 4 feet or you might have 2, so how do you get a stiff hose in and around? The guys usually use a sewer spoon or Crust Buster but you can't put any of that stuff down there when you don't have the space.

The craziest question I've been asked by a customer:

"I've lost my dentures down the toilet, can you come fish them out? I have to go to work this afternoon." Eric Johnson was asked if there were leeches in the leachfield.

If I could change one industry regulation, it would be:

Right now there's nothing. We've worked so closely with the state over the years. They've listened and been open-minded enough to understand that



▲ From left to right: Eric Johnson, vice president; Greg Wells, pumper; Paul Johnson, president and CEO; and Jake (dog), mascot. Fleet, from left: 2016 Chevy 1-ton with Best Enterprises tank and pump system; 2000 International F4900 with an Amthor International tank and Battioni pump; 2005 International F7600 with Tri State Tank (Progress Tank) and Battioni pump; 2007 International F7600 with Com Vac Systems tank and Battioni pump; and 2017 Dodge Ram 5500 with a KeeVac Industries tank and pump system. (Photos courtesy of Darlene Johnson)

they can't put in a rule that just prohibits business because they know they want the septic tanks to be maintained. They realize it's a give-and-take. They have to regulate, but they also have to let us run our business and do what we need to do.

Best piece of small-business advice I've heard:

Do the job well and as promised, have open communication with customers and set a fair price. But my favorite is "Being in business is a huge responsibility, it commands lots of time and devotion, but remember to step away and make time for yourself and family." This was dispensed by our company's founder, Harold Colby. He worked two or three jobs when starting his business and spent so much time away from his family that it became the one thing he regretted in his later years.

If I wasn't working in the wastewater industry, I would:

Be doing something creative. I've started to paint, do crafts, build things, make cards. The only class I ever failed in high school was typing. I took small engine repair and drafting and was not going to be the person sitting behind the desk — but here we are.

Crystal ball time - This is my outlook for the wastewater industry:

The industry has come a long way from the grungy pumper days. I hope to see it continue on the path of professionalism and promoting education. As stewards of the environment, we can help maintain clean and safe water for all as long as we share what we know with those who don't, leading to maintenance of onsite wastewater systems that keep our groundwater safe and plentiful. My hope is to see more free-standing septage-only wastewater treatment plants that will replenish local aquifers rather than dumping at municipal plants that shed water into the rivers. □

Federal Farm Bill Includes Funding for Rural Onsite System Upgrades

By David Steinkraus

When President Donald Trump signed the 2018 Farm Bill in late December, it included a present for onsite installers. A few paragraphs in the bill allow low-income, rural homeowners to access a pool of money for upgrading or replacing their onsite wastewater systems. The law allows grants of up to \$20,000.

Because this is a piece of federal legislation, that doesn't mean the cash drawer is open. The way Congress works, a bill creating a program is separate from the appropriations bill that allocates money for a purpose.

Passing appropriations bills is the next step when the new Congress convenes in January and begins work on the next federal budget, says Eric Casey, executive director of the NOWRA - National Onsite Wastewater Recycling Association. On this issue, NOWRA partnered with the Rural Community Assistance Partnership, which led the push for the onsite program.

The need for an appropriation means supporters of the program still have work to do, Casey says. "Most of the time, congressmen are more disposed to support something if they think their constituents support it," he says.

But getting an appropriation will also require time because new committee members must be appointed. Also, members of the Senate and House will have their own agendas to push. Agriculture Committee members in both houses would be receptive to messages supporting the onsite program, Casey says.

"Overall this is an excellent bill. It's a really good opportunity to clean up some of the worst individual onsite problems that are out there among the low-income population," he says.

The onsite program was added to a long-standing federal law that provides money to fix problems with rural drinking water wells. That program was small with only about \$5 million appropriated, Casey says. Sen. Cory Booker, D-N.J., tried to push that up to \$100 million, and a committee settled on \$20 million. It is this pool of money that the onsite program will now also be able to tap — if the appropriation goes through.

Farm bills are approved every five years by Congress to set policy and programs for the agriculture industry.

Michigan

A bill to create a statewide septic code went nowhere in the final days of the 2018 legislative session and died when the Legislature adjourned.

The bill, HB 5752, had been stalled in committee since the spring. In the last few weeks of the session, it was moved to the Local Government Committee chaired by Rep. James Lower, R-Cedar Lake, who sponsored the bill. Lower's committee sent his bill to the full House of Representatives, but the House did not take it up as legislators went through the final few days

of rapid votes, group pictures and farewell speeches.

The bill drew opposition from Michigan health departments. They say the legislation was drafted behind closed doors and without their input. Departments worry about increased costs should the state take over code administration, and they worry about the erosion of local control and losing the ability to adjust their rules to closely fit local environmental conditions.

As a result of the November elections, a new Legislature took office in January. Should Lower wish to pursue the issue, he must start from scratch by introducing another bill and seeing it through the committee process.

A health department official tells *Onsite Installer* the idea of a statewide code has been talked of for about 15 years but has never come this close to passing the Legislature.

Montana

As part of a penalty for spilling millions of gallons of water into the Gallatin River, a resort will fund three environmental projects for businesses near Bozeman. The 2016 spill at the Yellowstone Club happened when a pipe failure at a holding pond dumped about 30 million gallons of treated water into the river. The water was not a health hazard, but the spill violated pollution rules, officials say.

In 2017 the club was fined \$256,700 for the spill. One quarter of that was paid in cash, and the rest, about \$192,000, is being used for the environmental projects. The club will pay about \$174,000 to upgrade the septic systems at three area businesses. The difference between the amount paid for the work and the penalty assessed will be used for a trout habitat project on another fork of the river.

New York

With one ordinance passed, the nonprofit Lake George Association is encouraging other local governments to require onsite system inspections when a property is sold. Last fall, the town of Queensbury approved such a rule after three years of discussion. If a property-zoned waterfront residential is sold, the town will inspect the onsite system. Only if the system has passed an inspection in the previous three years will it be exempt. While untreated stormwater is the greatest threat to water quality in the lake, failing onsite systems can also pose health and water-quality problems, says a letter from the association.

Also in New York, the Cayuga County Board of Health voted to fine a farmer \$1,000 for a septic violation in worker housing. The board says farmer Joseph Tidd did not have an adequate septic system for the building. Human waste was discharged into a manure lagoon on the property. Last

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February, Tidd was given a month to correct the problem, but that order was moot when the town of Owasco cited him for not having a building permit or an occupancy permit for the structure, reports *The Citizen* of Auburn. Last fall, officials found Tidd had been housing workers in the building after he had received the citations. Tidd may receive half of the fine back if he complies with the order to fix the septic issue.

Washington

The city of Bainbridge Island won a round in its effort to establish new development regulations for environmentally sensitive lands. The City Council adopted new rules in 2018. Those rules included restrictions in areas considered critical to recharging aquifers. Almost all of the island, across from Seattle on the Puget Sound, falls into a critical area. The Kitsap County Association of Realtors challenged the rules. It says the regulations would significantly limit what a property owner can do, and it alleges the regulations had no scientific basis. The Central Puget Sound Growth Management Hearings Board disagrees and ruled in favor of the city.

Ontario

In the first year of a four-year inspection program in Algonquin Highlands, a contractor looked at 1,095 onsite systems and found 426 of them, or 39 percent, required some kind of remedial action. Typically that action was a simple pumpout, according to *The Times* of Minden. Inspectors found 24 metal tanks, and nine of those systems were more than 50 years old. Additional investigations were required at 39 properties, and homeowners were advised to call in a qualified professional for an in-depth examination. Some of the systems were affected by tree roots, and in other cases, driveways had been poured over drainfields. The community is about 168 miles northeast of Toronto. □

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Distribution Equipment and Systems

By Craig Mandli

DISTRIBUTION BOXES

Advanced Drainage Systems distribution box

The Advanced Drainage Systems distribution box is a high-density polyethylene box designed to evenly distribute effluent by gravity flow. The heavily ribbed box has an inspection port. It offers many tubing configuration options for single absorption field designs. The drain tube distribution box measures 9 1/2 inches high, 24 inches wide and 25 7/8 inches long. 800-821-6710; www.ads-pipe.com.



TUF-TITE Distribution Box with Speed Leveler

The noncorrosive TUF-TITE Distribution Box with a Speed Leveler in each outlet provides a simple, stable, reliable and permanent means for dividing septic tank effluent flow, according to the maker. Distribution boxes come in four sizes: four-, six-, seven- and nine-hole. Risers are available on the four-, seven- and nine-hole boxes. All boxes come with a one-piece watertight seal that accepts 1.5-, 2-, 3- and 4-inch SDR 35 or Schedule 40 pipe, including corrugated, for ease of installation. 800-382-7009; www.tuf-tite.com.



DRAINFIELD COMPONENTS

Clarus Environmental WW4

The WW4 effluent filter from Clarus Environmental is mounted in the outflow of the septic tank to provide protection from solids moving out of the tank into the dispersal area. A secondary screen provides continued protection during servicing. When the primary cartridge is removed to be cleaned, the secondary screen blocks solids from sloughing off and traveling to the dispersal area. After the primary cartridge is cleaned, the secondary screen can be removed and cleaned. It can handle up to 4,000 gpd and can be assembled on site in a multifilter configuration for larger flows. 800-928-7867; www.clarusenvironmental.com.



Eljen GSF

The GSF, or Geotextile Sand Filter, advanced wastewater treatment and dispersal system from Eljen is designed to provide treatment and dispersal in the same footprint while keeping installations easy and maintenance minimal. Utilizing a two-stage pretreatment process, the geotextile modules apply filtered septic tank effluent to the soil, increasing the soil's ability to accept the effluent and increase the long-term acceptance rate. Its design provides increased surface area for biological treatment that greatly exceeds the module's absorption area. Open-air channels within the module support aerobic bacterial growth on the module's geotextile fabric interface, surpassing the surface area required for traditional absorption systems. The result is simple installations in a smaller soil absorption area, according to the maker. The system is tested and certified by NSF to NSF/ANSI Standard 40. 800-444-1359; www.eljen.com.



Geomatrix Systems GST Leaching System

The GST Leaching System from Geomatrix Systems is an adaptation of the stone leaching trench. This traditional leaching system has been improved with the use of a removable form to accurately shape and construct leaching fingers along the sides of a central distribution channel. The system is constructed with 3/4-inch washed stone and is surrounded with ASTM C-33 sand. The fingers increase the sidewall surface area by more than six times that of a traditional stone trench. The narrow profile of the leaching fingers and central distribution channel, combined with the uniform profile of the sand treatment media, enhance oxygen transfer efficiencies, which can result in better wastewater treatment and a longer leachfield life span, according to the maker. It has direct stone-to-soil contact for enhanced long-term performance and can be configured with standard gravity, pressure and/or time-dosed distribution. 888-764-5247; www.geomatrixsystems.com.



Jim Murray Mini Power Post

The Mini Power Post from Jim Murray can be used to make a professional and safe connection for power and float-switch wiring connections to an onsite septic system. It comes with a 30-inch post to install in the ground with the vented post cap, cable grips and junction box pre-installed to the post, which eliminates a 4-by-4-inch wood post and the exposed wires. This alarm can be used for a variety of applications, including septic tanks, holding tanks, pump chambers and water tanks. It is available in 120-volt AC or 230-volt AC models, and serves as a junction box for easy wire access connections of pump power, pump float switch and high-level alarm float switch, which is connected to the remote alarm panel. There are several float switch and accessory options. 800-234-5490; www.jimmurrayinc.com.



Sim/Tech Filter orifice shields

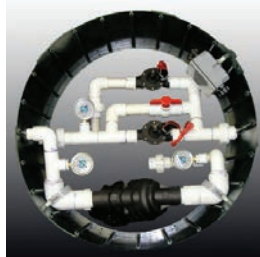
Orifice shields from Sim/Tech Filter are designed to prevent drain media, such as drain stone, from blocking discharge holes, helping to keep pressurized systems distributing effluent evenly. The shields have a sturdy design that keeps them firmly in place after snapping them on the laterals, according to the maker. The large amount of open area between the pipe and shield allows for easy placement over the holes and reduces media clogging by debris. The enclosed design has a large amount of open area, but all openings are small enough to prevent media from entering the shield. Two styles are available: one for top-discharge distribution holes and one for bottom-discharge holes. Shields are available to fit 3/4-, 1-, 1 1/4-, 1 1/2-, 2- or 3-inch pipe. 888-999-3290; www.simtechfilter.com.



DRIP SYSTEMS

Jet Inc. Drip Irrigation Headworks

The Drip Irrigation Headworks package from Jet Inc. is designed as a direct-mount device on an effluent pump tank to filter effluent while controlling pressure to the dripfield. It is available for auto or manual flush. The package contains a 1.5-inch vortex screen filter and pre-installed pressure gauges to monitor pressure drop across the filter component and regulate pressure to the dripfield. It mounts onto an existing 24-inch riser for easy access to the pump, float tree, integrated vortex filter and controls. The package is available as part of the Drip Disposal Field Package that complements the J-1500 Series BAT Media treatment system. An optional flowmeter package and pressure relief valve is available to meet site-specific and regulatory criteria. 800-321-6960; www.jetincorp.com.



Norweco Subsurface Drip Disposal System

The Subsurface Drip Disposal System from Norweco is engineered to uniformly apply treated effluent below the ground's surface. This method of pressure distribution is suited for all conditions, as effluent is delivered directly to the infiltrative surface of the soil using specially manufactured polyethylene tubing with built-in turbulent flow emitters. Properties with marginal soils can be economically developed using wastewater treatment systems and drip disposal technology. The system can increase the options available for onsite treatment system design. U.S. Environmental Protection Agency and environmental protection agencies worldwide have determined subsurface drip disposal is a reliable and efficient method of effluent distribution. Even the most difficult sites can be utilized through gradual soil absorption, nutrient uptake by vegetation and evapotranspiration. 800-667-9326; www.norweco.com.



FILTER MEDIA



Premier Tech Aqua Ecoflo Biofilter

The Ecoflo Biofilter from Premier Tech Aqua is offered as a nitrogen-removal unit using a new add-on kit. Integrating a pressurized flow divider to recirculate a fraction of the water back to the primary tank, all records and management of the dosing pump's cycles are monitored by a simplex control panel. It is available in ready-to-use rotomolded units or concrete units integrated into existing tanks made by local precasters. The 40 percent increased hydraulic load of the coco media has also allowed the development of the Ecoflo PACK, an all-in-one treatment system integrating the biofilter and primary tank delivered to sites in a single monobloc configuration, reducing wait and installation time. 800-632-6356; www.premiertechaqua.com.

PUMPS

Ashland Pump effluent pumps

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements, with efficient permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle solids up to 3/4-inch. They are made of cast iron, with cast iron impellers and equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They are offered in 3/10, 2/5, 1/2, 3/4, 1 and 1 1/2 hp models. 855-281-6830; www.ashlandpump.com.



Flygt - a Xylem Brand Concertor

The Concertor smart, interconnected wastewater-pumping system from Flygt - a Xylem Brand senses the operating conditions of its environment, adapts its performance in real time and provides feedback to pumping station operators. It offers energy savings of up to 70 percent compared to a conventional pumping system; it also reduces inventory by up to 80 percent due to flexible performance. Clog-free pumping operation and clean wet wells can save up to 80 percent in vacuum cleaning costs, according to the maker. Its compact design reduces cabinet size by up to 50 percent. It offers a wide performance field to choose the right operating point, making fine-tuning simple. 855-995-4261; www.xylem.com.



Gorman-Rupp ReliaPrime

Designed to deliver the benefits of sound-attenuated silent pumps, the ReliaPrime emergency bypass station from Gorman-Rupp operates on natural gas. The engine-driven pump comes with autostart and level controls that allow it to start and stop in response to the liquid level. The unit includes a 3-inch Ultra V Series pump capable of passing a 3-inch spherical solid, and it offers a soundproof, lightweight aluminum enclosure with lockable door panels that can be removed for maintenance of the pump or engine. The unit is a complete backup package ready for hookup for emergencies and power outages, primary pump repair and additional pumping capacity. 419-755-1011; www.grpumps.com.



Orenco Systems Biotube ProPak Pump Package

Biotube ProPak Pump Packages from Orenco Systems are complete, ready-to-install pump packages in a box. They are used for filtering and pumping effluent from single- or dual-compartment septic tanks to gravity or pressurized discharge points. Pump vault technology eliminates the need for a separate dosing tank. Packages include a Biotube filter cartridge, which filters up to two-thirds of solids, so only liquid from the tank's clear zone is pumped. Filters are easy to remove and clean without pulling the pump vault. All components are designed to be quickly installed and easily maintained. The PF Series high-head effluent pump is field-serviceable and field-repairable, and pump controls are designed for specific packages. Multiple models are available. ProPak Select software is designed to provide fast, error-free hydraulic calculations and generate system curves, according to the maker. 800-348-9843; www.orenco.com.



Polylok PL-CPE5A

The PL-CPE5A from Polylok is a submersible 1/2 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 48 feet and a maximum flow of 64 gpm. It is designed with a 3,450 rpm, oil-filled permanent split-capacitor motor and has an amp rating of 8.5 for 115 volts, cast iron housing, and volute equipped with a cast iron vortex impeller that passes 3/4-inch-diameter solids. The stainless steel shaft is supported by two single-row, oil-lubricated ball bearings. The shaft seal is an inboard design with a secondary exclusion V seal. Construction materials are carbon for the rotating face and ceramic for the stationary face. All elastomers are Buna-N, and the hardware is 300 Series stainless steel. It has a 20-foot UL/CSA-listed power cable suitable for submersible service and fitted with a three-prong plug. It is supplied with an integrated clip on its piggyback mechanical float switch for automatic operation. 877-765-9565; www.polylok.com.



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Distribution Equipment and Systems

By Craig Mandli

Membrane bioreactor system a fit for small drainfield

Problem: A three-bedroom home in Illinois was in need of a septic system repair. It had a 50-square-foot drainfield with a 50-minute-per-inch perc rate. This equates to a septic loading rate of 0.4 gallons per square foot per day, based on 200 gallons per bedroom, which is Illinois code. So, that would be 600 gallons per day.



Solution: A BioBarrier membrane bioreactor system with BihlerTech from BioMicrobics was installed by NET Excavation. The system's capacity is 3.75 times larger than it technically needs to be. According to the maker, if this was septic effluent instead of MBR Filtrate from a BioBarrier, the code would have required 1,500 square feet of septic field area instead of 50.

Result: The MBR system has served as a permanent fix, requiring minimal maintenance. 800-753-3278; www.biomicrobics.com.

Leachfield system replaces failing residential septic system

Problem: A Pittsford, New York, three-bedroom home septic system installed in the 1970s was failing. The owners needed a replacement but wanted to preserve their extensive investment in landscaping. The available footprint for a new system was limited and included steep slopes, high groundwater and nonpercolating soils. The failing septic system utilized two concrete single-compartment septic tanks: one for blackwater and one for graywater, and both septic tanks discharged to the same leachfield. The naturally sloping site resulted in stormwater flowing toward the existing system and the proposed footprint.



Solution: A 540-square-foot ATL passive advanced treatment leachfield system from Infiltrator Water Technologies was selected for the 330-gpd replacement system. Installation began by abandoning the blackwater tank and then installing two Infiltrator IM-540 tanks. To meet regulations, one IM-540 was installed downstream of the graywater tank to provide a second compartment, and the second tank

conveys settled effluent to the ATL system. The leachfield design has three 4-foot-wide-25-foot-long trenches. Due to the tight footprint and extensive landscaping, the installation of the shallow trenches proceeded as the crew worked themselves out of the area. Top-soiling and seeding of the system was completed, and a curtain drain was installed to convey stormwater away from the system. The system was engineered by Rosiek Engineering and components were provided by Kistner Concrete.

Result: The homeowner was happy with the minimal impact to the landscaping. The system is operating well. 800-221-4436; www.infiltratorwater.com.

Passive system a fit for odd-shaped bed

Problem: An older three-bedroom-sized conventional septic system failed on a property in Cullman, Alabama. The space was limited on the small property due to setbacks including a well and retaining wall, allowing only for a triangular-shaped bed and a shallow restriction of 6-inch excavation. The site had a slight slope with a soils perc rate at 60 minutes per inch. There were very few approved products that would be able to fit the site.



Solution: The EnviroFin passive combined treatment and dispersal system from Presby Environmental Inc. (PEI) was chosen. The three-bedroom 450-gpd system included two EnviroFin units pumped to elevation. The system fit the triangular-shaped bed.

Result: The homeowner was pleased to have a system that both treated the effluent and dispersed within the space restrictions of the site. 800-473-5298; www.presbyeco.com. □

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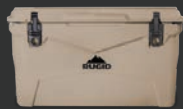
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www.cowra-online.org; 860-267-1057

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Delaware On-Site Wastewater Recycling Association;
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Florida Onsite Wastewater Association;
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Georgia Onsite Wastewater Association;
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KENTUCKY

Kentucky Onsite Wastewater Association;
www.kentuckyonsite.org; 855-818-5692

MAINE

Maine Association of Site Evaluators;
www.mainese.com

Maine Association of Professional Soil Scientists;
www.mapss.org

MARYLAND

Maryland Onsite Wastewater Professionals Association;
www.mowpa.org; 443-570-2029

MASSACHUSETTS

Yankee Onsite Wastewater Association;
www.maowp.org; 781-939-5710

MICHIGAN

Michigan Onsite Wastewater Recycling Association;
www.mowra.org

Michigan Septic Tank Association;
www.msta.biz; 989-808-8648

MINNESOTA

Minnesota Onsite Wastewater Association;
www.mowa-mn.com; 888-810-4178

MISSISSIPPI

Mississippi Pumpers Association;
www.mspumpersassociation.com; 601-249-2066

MISSOURI

Missouri Smallflows Organization;
www.mosmallflows.org; 417-631-4027

NEBRASKA

Nebraska On-site Waste Water Association;
www.nowwa.org; 402-476-0162

NEW HAMPSHIRE

New Hampshire Association of Septage Haulers;
www.nhash.com; 603-831-8670

Granite State Designers and Installers Association;
www.gsdia.org; 603-228-1231

NEW MEXICO

Professional Onsite Wastewater Reuse Association of New Mexico;
www.powranm.org; 505-989-7676

NEW YORK

Long Island Liquid Waste Association, Inc.;
www.lilwa.org; 631-585-0448

NORTH CAROLINA

North Carolina Septic Tank Association;
www.ncsta.net; 336-416-3564

North Carolina Portable Toilet Group;
www.ncportabletoiletgroup.org; 252-249-1097

North Carolina Pumper Group;
www.ncpumpergroup.org; 252-249-1097

OHIO

Ohio Onsite Wastewater Association;
www.ohioonsite.org; 888-294-0084

OREGON

Oregon Onsite Wastewater Association;
www.o2wa.org; 541-389-6692

PENNSYLVANIA

Pennsylvania Association of Sewage Enforcement Officers; www.pa-seo.org; 717-761-8648

Pennsylvania Onsite Wastewater Recycling Association; www.powra.org

Pennsylvania Septage Management Association; www.psmna.net; 717-763-7762

TENNESSEE

Tennessee Onsite Wastewater Association; www.tnonsite.org

TEXAS

Texas On-Site Wastewater Association; www.txowa.org; 409-718-0645

Education 4 Onsite Wastewater Management; www.e4owm.com; 713-774-6694

VIRGINIA

Virginia Onsite Wastewater Recycling Association; www.vowra.org; 540-377-9830

WASHINGTON

Washington On-Site Sewage Association; www.wossa.org; 253-770-6594

WISCONSIN

Wisconsin Onsite Water Recycling Association; www.wowra.com; 888-782-6815

Wisconsin Liquid Waste Carriers Association; www.wlwca.com; 888-782-6815

NATIONAL

Water Environment Federation; www.wef.org; 800-666-0206

National Onsite Wastewater Recycling Association; www.nowra.org; 800-966-2942

National Association of Wastewater Technicians; www.nawt.org; 800-236-6298

CANADA ALBERTA

Alberta Onsite Wastewater Management Association; www.aowma.com; 877-489-7471

BRITISH COLUMBIA

British Columbia Onsite Wastewater Association; www.bcossa.org; 778-432-2120

WCOWMA Onsite Wastewater Management of B.C.; www.wcowma-bc.com; 877-489-7471

MANITOBA

Manitoba Onsite Wastewater Management Association; www.mowma.org; 877-489-7471

Onsite Wastewater Systems Installers of Manitoba, Inc.; www.owsim.com; 204-771-0455

NEW BRUNSWICK

New Brunswick Association of Onsite Wastewater Professionals; www.nbaowp.ca; 506-455-5477

NOVA SCOTIA

Waste Water Nova Scotia; www.wwns.ca; 902-246-2131

ONTARIO

Ontario Onsite Wastewater Association; www.oowa.org; 855-905-6692

Ontario Association of Sewage Industry Services; www.oasisontario.on.ca; 877-202-0082

SASKATCHEWAN

Saskatchewan Onsite Wastewater Management Association; www.sowma.ca; 877-489-7471

CANADIAN REGIONAL

Western Canada Onsite Wastewater Management Association; www.wcowma.com; 877-489-7471



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