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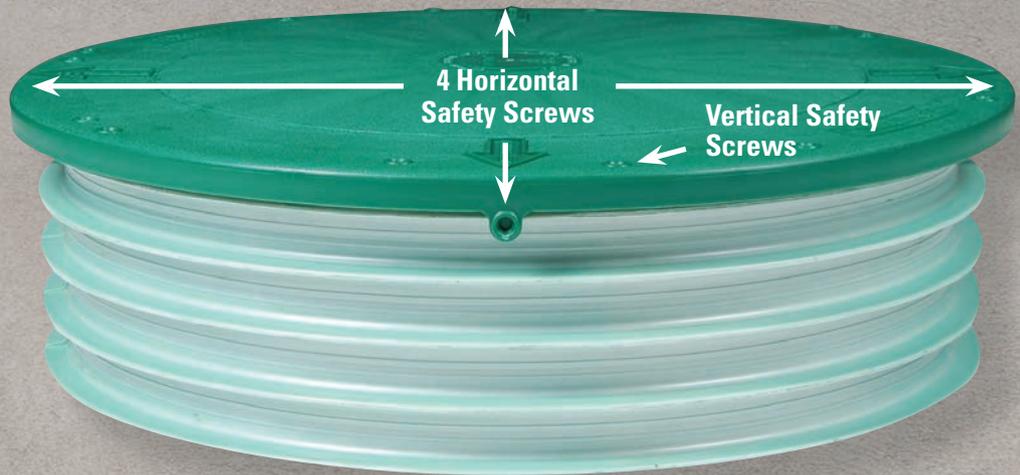
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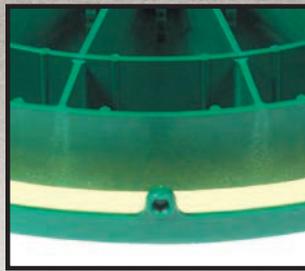
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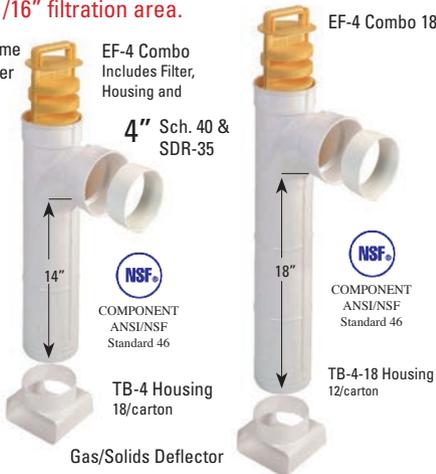


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INSTALLER PROFILE:

He's an O&M Man
By David Steinkraus

ON THE COVER:

BAT Onsite in Mount Airy, Maryland, specializes in the installation and maintenance of advanced septic systems. Owner Eddie Harrison is shown in the company yard flanked by technician Maria Haines (left) and office administrator Jeannettea Williams (right). (Photos by David Sinclair)

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Coming in May 2020

ISSUE FOCUS: Annual Buyer's Guide

States Snapshot: Kansas Small Flows update

System Profile: New Urbanism in Georgia

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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.

Jim Kneiszel

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

We Need Your 'Tough Job' Stories

Onsite is here to stay, and it's incumbent on you to build on the success we've had in this industry. Helping out with a System Profile story is one way to do that.

Springtime for readers of *Onsite Installer* means lining up excavation and construction work for the busy summer season ahead. This is the important time when you balance your crew's ability to handle the workload with the calls coming in from homeowners anxious to get their projects going. They want a new septic system and they want it now!

As the editor of the trade publication for installers, it's also a busy time of planning for me as well. We need to identify challenging projects on the docket for contractors heading into the busy 2020 summer season. You're doing the heavy lifting ... and we want to tell the world about it with our pen and notebook, laptop computer, and camera gear.

And nailing down our monthly System Profile features for the coming issues of the magazine can be a challenge. Certainly not the problem-solving challenge our professional installers face every day, but a challenge nonetheless. We are tasked with convincing our wonderful installing community to carve a little time out of their busy schedules to share their unique stories.

You don't always want to hear from us, I'll admit. Sometimes when I call you, I know you are back at the office after a long day in the field, boots off, feet up on the desk and perhaps even an adult beverage in hand as you think about the status of your current projects. Are the guys going to meet the deadline at that lake home project? Is there a piece of equipment broken down in the shop that needs some attention? Did you return all the messages left on your cellphone today?

YOUR NEXT BIG PROJECT

Well, I'd like to take a moment to make a pitch for you to spend a little time talking to one of our writers about your latest big project. If you're a regular reader of *Onsite Installer* — and I am thankful that so many of you let me know you turn these pages every month — you'll know we relish covering the most unusual installs our contractors face. These might be traditional septic systems custom-fit to the most extreme topography. They might be projects using new-to-you technology on postage stamp-sized lakefront lots. They might be projects requiring you to jump through more hoops than a circus dog performer.

Whatever the case, someday we'll be calling and asking you to tell the story of that head-scratcher of a job. Or maybe you'll identify one of these

Someday we'll be calling and asking you to tell the story of that head-scratcher of a job. ...

I can give you several reasons to answer "yes" to working with us.

projects on your own and will reach out to tell us about it. In either case, I can give you several reasons to answer "yes" to working with us on a System Profile story. Consider this:

You want to be known as the "tough-job installer."

Is yours the company in your area that folks call when they've stumped other installers? I hear this frequently from contractors we feature in System Profile. They take pride in being the contractor who isn't just building simple tank-and-drainfield systems in perfect soil conditions. They are excited by the challenge of overcoming site limitations to deliver the perfect flow for the home being planned. They embrace the idea of adding a whole new treatment product to their repertoire. They run toward, not away from, a job that requires a set of approvals and regulations hurdles. If you're one of those installers, we want to hear from you.

You want to promote the use of new technologies in your state and county.

When you hear of a new type of system approved for use elsewhere, do you watch for a project where you can work with regulators to promote that technology in your county or state? When you go to the WWETT Show, do you seek out manufacturers offering new solutions that you've never seen go in the ground before? Our System Profile contractors say they are curious to learn something new with each difficult project. They are intrigued by a learning opportunity and feel it's an asset to offer customers the widest possible variety of systems to meet a need. They also believe it benefits them and the industry when new treatment products find regional or national acceptance.

You want to help other installing professionals.

Some contractors like to keep what they've learned about installing close to the vest and don't like to share with others for fear of losing a competitive advantage. I would argue that positive networking promotes professionalism in the industry. If installers talk with each other about what is working, what isn't working and the questions they face in the field, it benefits everyone, including the customers. And isn't that what this is all about — helping customers? If you have read our System Profile stories over the years, you have benefitted from the experience of others in the industry. Turnabout is fair play, as they say. Isn't it time for you to return the favor and talk about your biggest challenges?

You want to support decentralized wastewater treatment.

The U.S. Environmental Protection Agency Memorandum of Understanding many years ago determined that decentralized wastewater treatment is a viable and important permanent part of the sewage treatment equation. No longer is a septic system assumed to be a temporary solution while homeowners wait for municipal sewer system expansion. Onsite systems are expected to grow to represent one-third of all permanent treatment solutions in the future. This is great news for installers and maintainers. Onsite is here to stay, and it's incumbent on

you to build on the success we've had in this industry. Helping out with a System Profile story is one way to do that.

LET'S GET AFTER IT

The spring thaw is here in Wisconsin, and most installers across the country and in Canada are scheduling jobs covering the next six months. It's time for me to reach out to installers again to nail down some exciting projects to share with *Installer* readers in the coming year. If you have an upcoming job that seems like a great fit for the System Profile feature, let me know about it by email at editor@onsiteinstaller.com. I'd enjoy talking to you about it. And if I ring your phone number, please consider picking up and talking to me. I'm not a telemarketer. The only thing I'm trying to sell you is the opportunity for us to build on the success of the onsite industry together. □

Drop Us a Line

Have a comment about an article you've seen in *Onsite Installer*? An experience from a job that you'd like to share? *Onsite Installer* would love to hear from you. Email comments and photos to editor@onsiteinstaller.com

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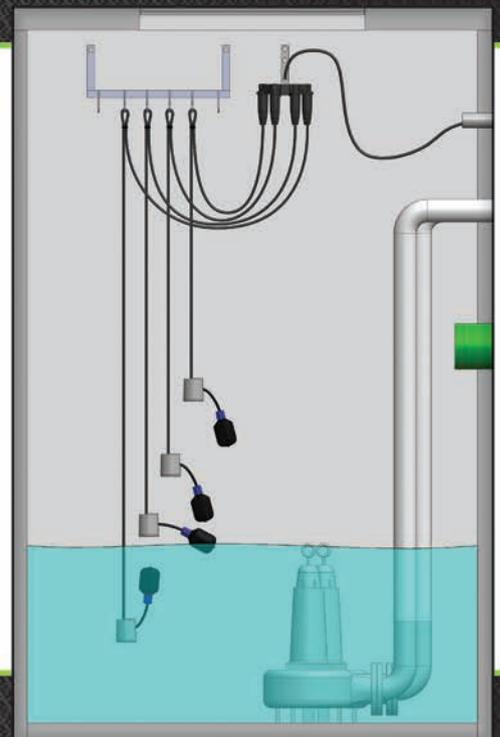
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Installers: Carry On With Your Important Work

The federal government counts your mission as essential to the public during the pandemic response. We knew this all along.

The U.S. Department of Homeland Security is calling on critical infrastructure industries — including onsite system installers and maintainers — to continue providing essential services during the spread of COVID-19. Through an announcement by President Donald Trump, the Cybersecurity and Infrastructure Security Agency shared this guidance:

“If you work in a critical infrastructure industry, as defined by the Department of Homeland Security, such as health care services and pharmaceutical and food supply, you have a special responsibility to maintain your normal work schedule.”

CISA distributed a list of “essential critical infrastructure workers” covered, clearly including private wastewater-related service companies and the manufacturers that provide necessary supplies. CISA released a document this week, “Guidance on the Essential Critical Infrastructure Workforce: Ensuring Community and National Resilience in COVID-19 Response.”

The Homeland Security memorandum recognizes the important role decentralized wastewater professionals play in promoting public health during a crisis.

This is something we at *Onsite Installer* and COLE Publishing have always known. Since 1979, COLE Publishing has highlighted the unsung and sometimes dangerous work of wastewater professionals. The country could not function without the dedication of our workforce to ensure the treatment and safe recycling of wastewater for nearly one-third of U.S. residents who rely on septic systems. And industry manufacturers are constantly introducing new technologies to better protect groundwater supplies and pristine waterways.

The CISA document spells out the importance of infrastructure workers continuing to provide their crucial services. As many states enforce shelter-in-place or other safety measures aimed at protecting the public, Homeland Security reminds infrastructure workers to coordinate with state and local officials to continue to deliver services.

“All decisions should appropriately balance public safety while ensuring the continued delivery of critical infrastructure services and functions,” CISA announces.

Congratulations on continuing to answer the call when members of the public have a wastewater emergency. You are on the front lines of the public health system, and we urge you to take all necessary precautions to work safely and efficiently during the pandemic response.

To view the complete memorandum and infrastructure guidance document released by the federal government:

www.cisa.gov/sites/default/files/publications/CISA_Guidance_on_the_Essential_Critical_Infrastructure_Workforce_508C_0.pdf



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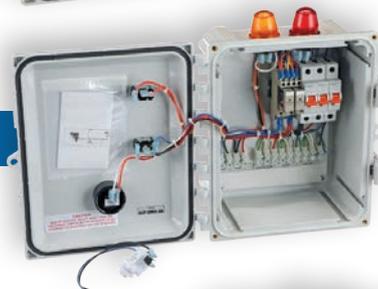
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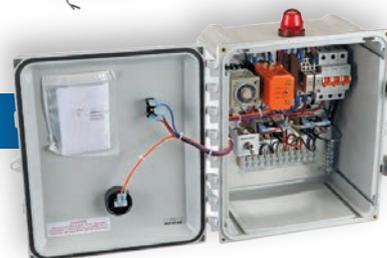
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EASILY ACCESSIBLE Keep Maintenance in Mind

Even if you won't be personally doing the maintenance on the systems you install, it's important to keep tank access in mind. Tanks must be reasonably accessible to facilitate inspection and maintenance activities after installation is complete. This exclusive online article gives a rundown of what to remember during installation. onsiteinstaller.com/featured



ALL ABOUT PREPARATION Evaluate the Tank Site

Potential tank movement after installation is measurable, predictable and preventable. Proper evaluation of the original soil, bedding materials, depth to groundwater, backfill materials and potential stress loads reduces the likelihood of later problems. Read up on these tips on properly preparing for excavation and setting the tank in place. onsiteinstaller.com/featured



TIME TO BUY?

Rent or Own

Renting excavating equipment has its upsides, especially when it comes to reducing risk. However, there can be advantages to equipment ownership if you are confident in the technology, confident in your work outlook and believe you will have good utilization of the machine. When is it a good time to get away from renting and move toward the ownership route? This online article outlines factors to help guide the decision. onsiteinstaller.com/featured

Overheard Online

“One of the biggest mistakes you can make is to wait until your company is declining before you sell it.”

– 6 Questions to Ask Yourself Before Selling Your Business
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HE'S AN O&M MAN

Tired of digging trenches, Eddie Harrison built a successful specialty by installing and servicing advanced treatment units

By David Steinkraus

◀ Eddie Harrison uses a core sampler to check the wastewater level in tanks at an assisted living facility. (Photos by David Sinclair)



In northern Maryland, BAT Onsite is fairly new on the scene. The same isn't true of its owner, who has been building things and installing onsite systems since he was a young man. BAT Onsite is only the latest venture for Eddie Harrison who is starting a new phase of his wastewater business.

"I saw a void in the market," he says. "And I was getting older and getting tired of shoveling gravel. I'm still young enough to shovel gravel, but I had to look to the future."

His future no longer includes gravel. He has left behind Harrison Contracting, which did excavating along with other jobs. Instead, he formed BAT Onsite. It's a business with a sharper focus on the market, but he can still put his deep mechanical knowledge to good use.

"I was raised in construction. My father was a bricklayer. I was on the wall at 17," he says.

With his own company, he built homes, garages and provided excavation services. "I installed systems the whole time," he says. He specialized in innovative onsite systems for challenging sites, and he did small municipal water and wastewater utility jobs that were too small for the big companies in his area.

With BAT Onsite, he focuses on installing and repairing advanced systems. And that means only the units themselves. He leaves the trenches and pipes to others.

Harrison, 60, started BAT Onsite in 2015 after operating the construction company since 1993. He began doing operations and maintenance in 2010 while still running the construction business, and in that year, he added 10 systems to his maintenance list. In his second year, he had about 40. By the middle of 2019, he had more than 400 systems to take care of. And he had mostly stopped installing because the service end of the business was prospering.



▲ Maria Haines gathers equipment needed for a system inspection as she and Harrison unload the Nissan NV2500 service vehicle.

"I'm getting a reputation. I get phone calls saying, 'I'm told you're the only guy who can fix this.'"

Eddie Harrison

Good reputation

About 20 of the systems he maintains are best-available-technology (BAT) units (state approved) that he installed. All of the other work came to him because the installers or vendors didn't want to do the maintenance. Probably 75% of his maintenance work comes from equipment vendors, he says. Other jobs have come from people who are not vendors, and some were generated by soliciting homeowners and word-of-mouth.

"And I'm getting a reputation. I get phone calls saying, 'I'm told you're the only guy who can fix this,'" Harrison says.

That's why he doesn't have a website yet, Harrison says; business appeared without an internet presence beyond a Facebook page.



BAT Onsite LLC

Mount Airy, Maryland

- Owner:** Eddie Harrison
- Founded:** 2015
- Employees:** 3
- Service area:** State of Maryland
- Services:** Service of advanced septic systems, onsite installation
- Affiliation:** Maryland Onsite Wastewater Professionals Association



HONING YOUR PEOPLE SKILLS

Your success in the wastewater industry can depend a great deal on how well you work with people, says Eddie Harrison, owner of BAT Onsite in Mount Airy, Maryland. “You need to have people skills,” he says. “You have to be able to recognize that glassy-eyed look that says (your customers) don’t care.”

And many property owners don’t care about onsite systems and how they work, he says. Some people want to learn, but others simply want to push a magic button and have their wastewater disappear. When you find someone with that glassy-eyed look, he says, you have to know how to wrap up the conversation without cutting them off or seeming rude. And you should try to leave them with a comment or bit of information that makes them think.

Harrison says he was lucky because he grew up in a family of storytellers. “My dad was good at telling stories, and I learned from him.” Everyone in the family could tell a story, and after you heard a tale, you would walk away wondering whether it was true. He learned to distinguish between fibs and truth and how to read people.

Your ability with people is more important in some areas of the wastewater business, he says. You don’t need it so much if you’re doing installations on new homes because you’re dealing with builders who you know and you’re dealing with fewer people.

“When you do service, you’re dealing with eight different people a day,” he says.

BAT Onsite is not restricted to newer technologies. There are advanced systems installed more than a decade ago and sold in such small numbers that no one supports them anymore. With a phone and the internet, Harrison can find the information he needs to perform service. His background helps, too. “I was born a mechanic so it’s not hard for me to figure things out,” he says.

His business advantage is that few people are interested in service work. There is less profit in it, which means you have to do more jobs in order to make a living, he says. He sees that lack of interest in the one-day service course he teaches every year. Typically 20 to 25 people attend. Most of them already work for an existing service business that is adding technicians, and other attendees are installing and think service is a good area to expand into.

Service work also entails dealing with people who don’t understand what they have. For example, Harrison was called in to do an inspection for a customer selling a house with a troubled system, a BioMicrobics pretreatment unit leading to a Geoflow absorption field. The customer thought he just needed a new blower. Harrison found the problems went deeper.

◀ SJE Rhombus and IFS Insight control panels are checked by Eddie Harrison as part of an inspection of an AdvanTex treatment system from Orenco Systems.

The owner had created paddocks on his land, and one was on top of the dripfield. The weight of the horses had damaged the headworks, but fortunately not the drip tubing. The man had also built a shed, complete with footings, to hide the blower and the access hatches to the treatment unit. Harrison put in a new blower and replaced vacuum relief valves on the ends of laterals, rebuilt the headworks and did other repairs. That \$6,000 worth of work was enough to get the system functioning, but six months later, the next owner had to repair some weak spots, Harrison says.

The people who sold this man the advanced system said it was high tech and worry-free, Harrison says. “Nobody told him he had to maintain it. And I deal with that on a regular basis.”

Seat at the table

Another part of Harrison’s life involves educating state legislators as legislative liaison for the Maryland Onsite Wastewater Professionals Association.

Because of water-quality issues in Chesapeake Bay, Maryland is one of the places debating the use of advanced treatment units. Tempers flared when former Gov. Martin O’Malley used an executive order in 2013 to

require that BAT be used for any new construction and any system expansions.

“It really angered a lot of people on the left and the right,” Harrison says.

The rule didn’t last. Gov. Larry Hogan repealed the rule when he took office, and at the moment, the Legislature seems to be letting the issue cool off, Harrison says. But that does not mean the idea is entirely a bad one, he says.

While the BAT rule covered the entire state, not all treated wastewater reaches Chesapeake Bay. “We’re contaminating wells. We’re repairing systems that are running out of room for repairs because we have houses built in the ’70s that are on their third repair,” he says.

This battle over onsite technology looks like the automobile emissions struggles of the 1970s, Harrison says. “It’s a train coming down the track. That train is coming, and you can’t stop it.” It may take 10 years, it may take 30, but eventually all people will be required to use advanced treatment, he says.

“To me, onsite is the most efficient and safest way to dispose of wastewater,” Harrison says. That is not the same as saying it’s best in every situation. When a large number of people live in a small area, sewer systems are necessary. “But to centralize all your wastewater into one dumping point, that’s one spot where you’re putting a lot of stress on the environment,” he says. And, he adds, centralized wastewater treatment fails to recharge aquifers, instead sending water off to the oceans.

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"I saw a void in the market. And I was getting older and getting tired of shoveling gravel. I'm still young enough to shovel gravel, but I had to look to the future."

Eddie Harrison

The way rules are applied can make a great difference in how they're received, Harrison says. The original BAT regulation also required a five-year maintenance contract. (Hogan reduced that to two years, following the NSF standard.) "Property owners treated me like I was from the government. If I told them after five years that their system needed a fix, they would say, 'Well the state put it in. They can fix it.'"

"I compare BATs to chocolate cake," Harrison says. "The previous administration took chocolate cake and shoved it down everybody's throat, and now everybody hates chocolate cake."

O'Malley's rule and the subsequent ruckus shows how important it is to be involved when laws and regulations are written. As legislative liaison for the association, that is exactly what Harrison is trying to do. He goes to meetings and attends fundraisers so local politicians will recognize his face and talk to him about wastewater issues. The Maryland Onsite Wastewater Professionals Association doesn't pay him, he says, so technically he's not a lobbyist.

He says the same people he now works with on legislative initiatives are the people who wrote the overaggressive BAT regulations. "They're very good people. They have a very admirable mission to accomplish," Harrison says. "I don't agree with them on all that they want to do. They have a lot of influence over environmental policies. I feel we need to be part of the conversation. I'm just there to help them see whose toes they'd be stepping on if they did this or did that."

Part of the struggle on water quality is also educating the public, he says. People who live next to Chesapeake Bay understand their wastewater affects the bay, but people who don't live on the waterfront don't necessarily understand that — or that their wastewater can contaminate a neighbor's well.

The right people

For most of his business time, Harrison has worked by himself with perhaps an assistant or two. Because his new company is small, he didn't have to go through an extensive recruiting process.



▲ Eddie Harrison, right, and Maria Haines, technician, inspect an Orenco Systems AdvanTex treatment system at an assisted living center.

He found his office assistant, Jeannette Williams, on Facebook and asked his friends about her experience. Hiring her was one of the best moves he has made, Harrison says; she has proved invaluable.

Technician Maria Haines, the wife of a friend, is smart and has a strong technical background as an airplane mechanic. She goes out on calls with him, but he's considering buying a second truck to put her out on a route. Harrison's daughter, Sarah Harrison, is a helper in the field.

Currently Harrison runs a 2019 Nissan NV2500 van, 2007 Bobcat T320 skid-steer and 2005 John Deere 410G backhoe/loader.

Harrison is looking at expanding the business by another person or two if he can find the right people. What he is not looking at is leaving the business. "I don't ever want to retire," he says.

Harrison has set himself up for a productive future because he can use his decades of experience to do what other people don't necessarily want to do. Like fine gravel, he will flow into the small gaps in the market — but he doesn't have to lift anything. □

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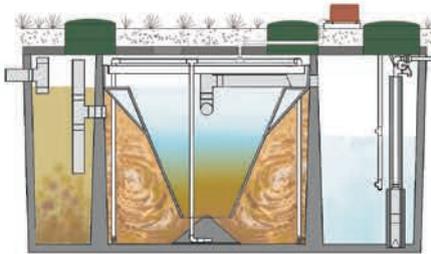
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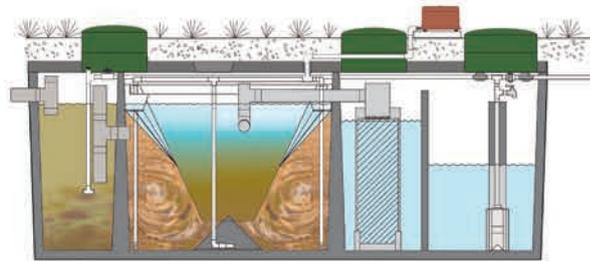
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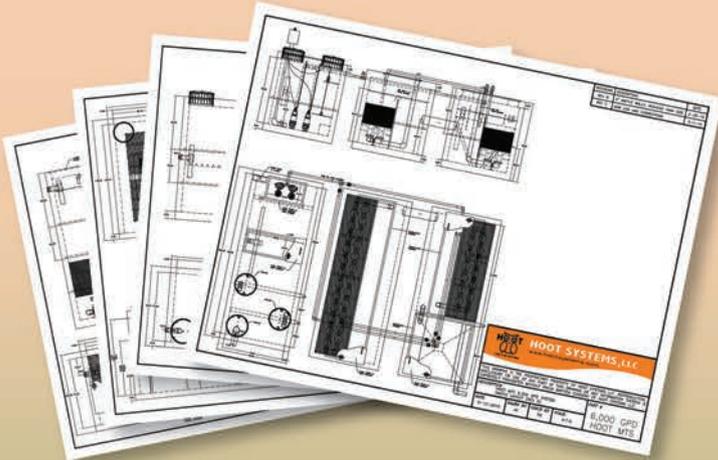


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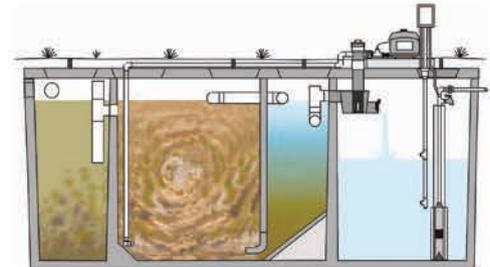
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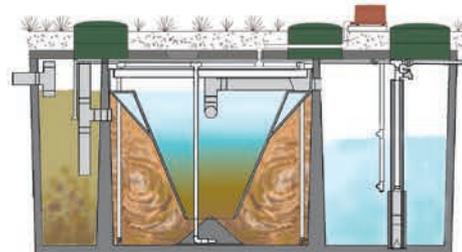


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Watch Out for Changing Drainage Patterns

Over time, new driveways, excavation and cosmetic grading changes can lead to overloaded drainfields

By Jim Anderson and David Gustafson

A few months ago, we wrote a column about the importance of paying attention to conditions outside the system installation and taking them into account during design and installation. At the end, we made a passing reference about paying attention to drainage conditions. Recently, we received the following from a reader:

"I have a property that has been in my family since the '60s. ... It has always been a rental. In 2007, a serial distribution system was installed, as the original system was plagued with tree roots. The new system has never operated properly during heavy rains. It works fine otherwise. This year has presented exceptional rainfall, requiring the system to be pumped out many times. We are trying to locate the problem and make a permanent repair. There is much more information that has been gathered in an effort to reach a conclusion."

This led to several exchanges back and forth. Gathering information involved digging up parts of the backyard to look at the septic tank outlet and the two seepage trenches. We asked why they did all that digging. In this particular area, we were told, it is not required to have inspection ports for the septic tank, dropboxes or seepage trenches. This is a situation where having access to parts of the system would have saved a lot of time and effort. We have always talked about this access as designing and installing for maintenance. It could also be called designing and installing for troubleshooting.

If the entire soil profile is saturated around the trenches, they simply cannot accept any more water, with backups and surfacing the result.

MYSTERY FLOWS

They discovered after excavating for tank access and at the outlet that tank water levels were elevated but no blockages were evident. It was also discovered that the trenches were filled with water. To us, it would appear that during heavy rain events the trenches are being filled with water and then backing up into the tank. What are some possible reasons for this?

In cases like this, we start by looking for the source of surface water

flowing into the system and trenches during heavy rainfall events. One possibility is the roofs of the house or other buildings and where the gutters empty water into the yard. If they empty in the vicinity of the system, this can be rectified or minimized by directing flow from the downspouts away from the system. In some cases, this may involve actually burying the outlet and carrying water downslope past the system.

Another potential area is the driveway or adjacent streets. We have seen examples where road improvements have diverted water off the street and toward the drainfield area. Fixing this involves working with local government to route the water flow away from the onsite system.

We visited one site where the neighbor had rebuilt the driveway, laying down asphalt instead of gravel. It made for a great driveway, but resulted in dumping a lot more water downslope into the neighbor's yard near their onsite system. The solution was to install a diversion to route runoff away from the system and into an area where it could infiltrate. Solutions like this are not always easy depending on neighborhood dynamics. It is also dependent on having someplace to put the water.

In the case of the rental property owners, building drains, driveway or road runoff did not appear to be the culprit. What other possible soil or site aspects could result in this situation? At another location we visited, we noted similar problems and were perplexed. We went back to the original design and the topographic survey of the lot and found something very interesting. On the initial topographic survey, there was a distinct drainageway that originated in an area upslope from the system.

The lot as viewed now showed no signs of the drainageway; it had been graded and filled during installation of the soil treatment trenches. Just because it was filled on the lower end, that doesn't mean water will not move downslope, following the same path. This is exactly what was happening. During rains and spring runoff, water was flowing downslope in the soil into the trenches, causing them to fill and surface.

COMMON EVALUATION ERRORS

This led us to think about the soil condition in the area of the current drainfield. As we have stated many times, most system problems in drainfields can be traced to one of two things: a mistake in reading the soil condition in terms of seasonal or periodic saturation or permeability, or soil disturbance during installation (such as installing when the soil is too wet), resulting in reduced long-term acceptance rates.

Two common soil identification mistakes that can cause trenches to

flood out during wet periods are: trenches installed into dense soil layers where the trenches act as a drain during heavy rainfall events or not recognizing evidence of periodic saturation in the soil. During times of heavy precipitation or spring runoff events, if trenches are installed into the more slowly permeable dense layer with a permeable layer above, the rock or other media-filled trenches act just like drain tile in the soil, filling with water. In this case, it flooded out the trenches. If the entire soil profile is saturated around the trenches, they simply cannot accept any more water, with backups and surfacing the result.

At the property in question, there was the double whammy of having a very slowly permeable layer below that is at or near saturation, with the water flowing through the more permeable surface horizons into the trenches. Identifying this condition by soil investigation was made difficult by the soils being very red in color due to high amounts of iron in the profile. If they don't know the soils, this condition gives even very experienced site evaluators problems. □



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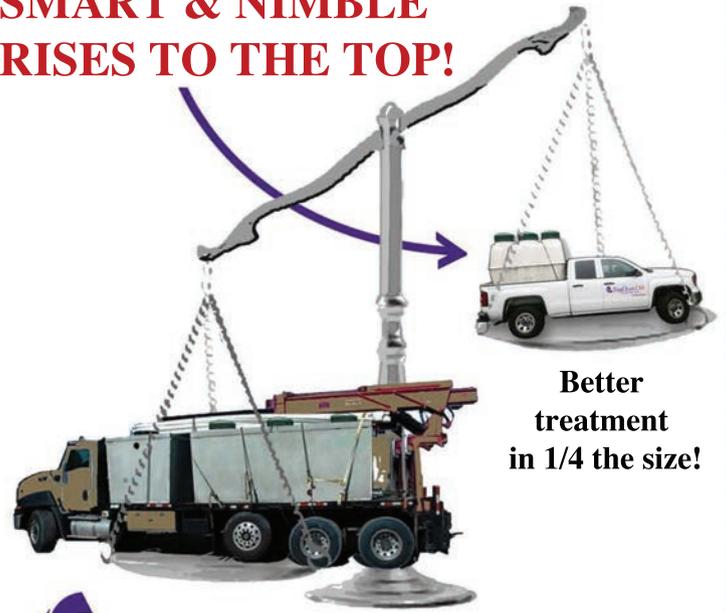
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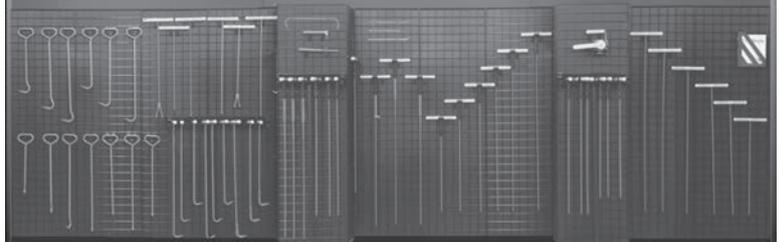


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Study Finding Fecal Contamination in Southwest Wisconsin Water Wells

By David Steinkraus

Southwestern Wisconsin residents are in the middle of a controversy about drinking water. There is contamination from animal and human waste, concern about protecting water supplies, questions about what regulations are needed, and even an attempt by local government to control what is said about the issue.

A recent poll of five southwestern Wisconsin counties found support for tougher rules to protect water quality. Safe, clean drinking water was ranked as very or fairly important by 89% of respondents.

When told their groundwater is vulnerable to pollution from manure and fertilizer, 80% said that is a good or excellent reason for stronger regulations. Yet 58% said they would prefer to invest in research and technology even if that delayed solving contamination problems, and 50% said they would not want rules that harm the agricultural industry. A majority said they would support political candidates who support more regulation to protect drinking water.

The poll of 601 people was conducted for the Environmental Law & Policy Center's Action Fund and has a four-point margin of error.

The second phase of a three-year study of wells in the area recently found human fecal bacteria in several samples. The Southwest Wisconsin Groundwater and Geology study began in 2018 with tests of 840 private wells in Grant, Iowa and Lafayette counties, which form the southwestern corner of the state. About 32% of those wells showed bacterial or nitrate contamination.

From the contaminated wells found in the first phase of the study, researchers randomly selected 34 for further work. Samples from 25 of those wells showed fecal contamination, and samples from 14 of the 25 wells had fecal microbes from humans, reports Wisconsin Public Radio. A research microbiologist from the U.S. Agriculture Department, and author of the study, says it's too early to say whether septic systems are the source of the human microbes.

The study is about half complete.

Results from the groundwater study have not appeared without their own controversy because local officials tried to control information. In early November, the Lafayette County Board considered a resolution saying results of the study would be given only to select local officials, and the resolution threatened to prosecute news reporters if they, "glean information and selectively report it in order to interpret the results for their own means." The idea for such a resolution apparently came in an email from the chairman of another county board.

After the public questioned why officials feared the study results and asked what they were trying to hide, the resolution was amended to omit

the threats against news media but also said any county supervisor or county employee who spoke about the water study without authorization would be subject to disciplinary action.

After further publicity, the board tabled the resolution without action, essentially killing the idea.

Michigan

WasteWater Education, a 501(c)(3) nonprofit based in Traverse City, applied for a grant to help build consensus for a statewide wastewater code. Michigan is the only state without such a code. The grant didn't come through, but Dendra Best, the organization's executive director, says her board decided to pursue the process anyway although the lack of grant money will affect the work.

The group intends to arrange online conferences to increase participation in consensus building. Distance poses an obstacle in Michigan, Best says. People in the state's Upper Peninsula face a 400- to 500-mile one-way drive to Lansing, the state capital, which makes it difficult to attend the regular meetings needed to formulate rules. Online conference technology would broaden the number of people involved, she says.

The last unsuccessful effort to create a statewide code — in 2018 — was sharply criticized by local health departments for not being transparent and not welcoming input from stakeholders.

WasteWater Education intends to follow the model used in Ohio, Best tells partners in an email. Ohio spent several years building a consensus on its rules.

"When proposed legislation is crafted, not by professional regulators, practitioners and those impacted, but by vested political interests, the purpose becomes muddled and the outcome uncertain," she writes. "If the proposal is unworkable, unfundable, unenforceable and widely unaccepted, even if passed it will inevitably be challenged in court."

She says her organization will continue to seek grants.

* * *

A small community in central Michigan is working hard to help homeowners keep their onsite systems in the face of state pressure to solve water contamination issues.

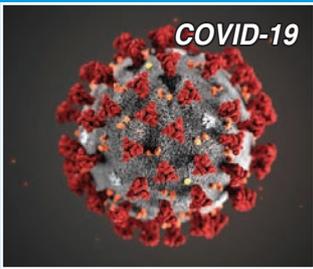
In 2018, the board of Seville Township received a letter from the state Department of Environment, Great Lakes and Energy saying that many failing systems in the small community of Riverdale were discharging waste into the Pine River. The department wanted a permanent solution.

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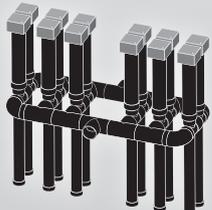
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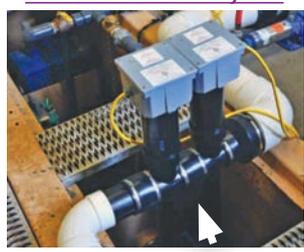
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Michigan continued

The township contracted with an engineering firm to look at options, a citizens committee began working with homeowners, and the state board of commissioners and the Mid-Michigan District Health Department approved resolutions asking the state “to allow residents in the village of Riverdale to keep their cost-effective and efficient private septic tanks and not waste taxpayer and property owners’ money on an unneeded \$5.5 million municipal sewer system.”

Already 12 illegal connections to storm drains have been corrected, and 11 new onsite systems have been installed or are in the permitting stage, reports the *Morning Sun* in Alma. Township officials also propose passing a septic system ordinance that would require mandatory pumping and inspections, as well as regular testing of storm drains.

It was unclear when the state would respond to the township’s position.

* * *

Lenawee County, southwest of Detroit, has filed lawsuits against 14 Amish families, alleging their properties do not meet codes because of insufficient wastewater systems.

Court documents say wastewater was being discharged onto the ground in violation of county health codes, reports *The Daily Telegram*. One Amish couple tells the newspaper they dispose of human waste by dumping it on their manure pile. The county argues these methods endanger neighbors and the general public.

Other violations alleged by the county involve the Amish use of hand pumps to draw water. A county official says wells must be installed according to state code and must send water to a household fixture.

The Amish say complying with these rules would violate their religious beliefs, and the Michigan American Civil Liberties Union has taken their case.

Florida

A proposed ordinance in Palm Bay, on the Indian River southeast of Orlando, would force everyone in the city to connect to municipal sewer service, and not everyone is happy about that.

The city’s utility wants the ordinance because it paid the cost to install the system and must maintain it regardless of how many people are connected, reports Spectrum News TV-13. The ordinance, if passed, would generate one-time revenues of about \$11.5 million in impact fees and about \$8 million in extension fees. Annual customer service charges would bring in about \$2 million.

Palm Bay resident and onsite system owner Glenn Bennett is not pleased, and he says his neighbors feel the same way. If leaking septic systems are a problem, he says, there is a simpler solution: Fix the leak.

Minnesota

The Hubbard County Board doesn’t like one of the proposed amendments to the state onsite system rules, and it wrote a 5 1/2-page letter outlining its objections.

That proposed amendment from the Minnesota Pollution Control Agency would require septic tanks to be emptied of septage while they are

inspected for leaks, reports the *Park Rapids Enterprise*. The state says a lack of minimum standards has resulted in poor inspections.

The county’s letter noted the state provided no evidence of how many leaking tanks have been missed in inspections. It also pointed out the trouble with pumping out a tank just before or during winter.

“It is common knowledge that a septic tank should not be pumped during the winter or just before winter because doing so removes the biological activity that generates heat, which keeps a tank from freezing,” the letter says. “Conversely, an empty tank is susceptible to cracking as the surrounding soil freezes and expands. ... Thousands of seasonal lakeshore properties that are not occupied during the winter will be at risk.”

New Hampshire

A judge has forbidden a state representative from living at his property in the town of Belmont until he installs a proper wastewater system and complies with local and state building regulations.

The town took Rep. Michael Sylvia, R-Belmont, to court in 2018, alleging he had been living on the property for several years in violation of ordinances. Records showed the last working onsite system was damaged in a 2009 fire before Sylvia bought the property, the town says.

Sylvia is part of the Free State movement, reports *The Laconia Daily Sun*, whose members believe in maximum freedoms of life, liberty and property. On the day the judge ordered him not to live on the property, Sylvia wrote in his blog: “To be required to seek permission to use one’s own property, such as applying for a building permit, is contrary to our right of holding property.”

The judge withheld fines, but those could be imposed later.

Texas

The Texas Commission on Environmental Quality has changed the rules for land application of treated wastewater. Previously, municipalities or other entities disposing of treated wastewater by land application were required to set aside a certain area of land, even if some of the wastewater was diverted to other beneficial uses such as irrigation.

The new rules allow a reduction in the amount of reserved land if treated wastewater is consistently being used for a beneficial use, reports *Corridor News of San Marcos*. □

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SYSTEM PROFILE



Rain, Rain Go Away!

Record rainfall, a steep slope and a brook-side location created challenges at every turn for a cottage Mantis leaching system installation

By Scottie Dayton

◀◀ An exemption to the 25-foot setback enables Zone A's toe to be 10 feet from the front property line. Only Mantis Double-Wide 58 treatment modules (Eljen) fit the site. Also used is a laser is a SpectraPrecision LL500. (Photos courtesy of Green Construction Management)

A three-bedroom cottage sold after the owner agreed to replace the dry well before the closing date. Despite a catch basin, the bowl-shaped lot across the road from Lee Brook in Southbury, Connecticut, acted like a stormwater retention pond.

Mark Lancor, P.E., principal engineer at DYMAR in Southbury, designed the replacement system. "While all the topography slopes toward the proposed drain-field, the worst was the steep hill from the brook to the field," he says. "Controlling runoff was major."

The only cost-effective technology that fit the site was Mantis Double-Wide 58 treatment modules (Eljen). Even so, Lancor's design required exemptions to two 25-foot setbacks: a variance separation to the front property line of 10 feet and another separation of 6 feet from the curtain drain upgradient to the onsite system.

Lancor asked Mark Green, owner of Green Construction Management in Waterbury, if he could install the system in two weeks to meet the closing deadline. "I saw no way to get a big machine on site and no level place on which to set the Volvo EC35C rubber-tracked mini-excavator," Green says. "Of course I accepted the job." It became one of the company's most challenging installations.

Site conditions

Soils are boney fill, coarse sand and gravel with a percolation rate of 1 inch per 4 minutes. The water table slopes from 63 to 54 inches on the half-acre lot with 30% gradient.

System components

Lancor designed the system to handle 450 gpd. Major components are:

- Existing 1,000-gallon, dual-compartment septic tank (United Concrete Products) with Polylok effluent filter
- 12-inch round distribution box with Roto-Flow regulators (Polylok)
- Eight Mantis Double-Wide 58 treatment modules (Eljen)

System operation

Wastewater from the septic tank makes five 45-degree turns to circumvent walls and structures as it flows 77 feet through a 4-inch Schedule 40 pipe to the



▲ Bashlin Dauti of Dauti Masonry and Wayne Green of Green Construction Management mortar in the north manhole ring.

▶▶ Green used a Volvo EC35C mini-excavator to remove and pack soil into the trench for the 24-inch dual-wall N-12 corrugated pipe (Advanced Drainage Systems). The length above runs from the brook to the north manhole pad.



System Profile

Location: Southbury, Connecticut

Facility served: 3-bedroom lakefront home

Designer: Mark Lancor, DYMAR

Installer: Mark Green,
Green Construction Management

System: Mantis leaching system (Eljen)

Hydraulic capacity: 450 gpd

distribution box feeding the 800-square-foot drainfield. On either side of the box are two 20-by-7-foot-wide zones of four modules each.

The distribution box supplies the 4-inch HDPE pipe running through the center of the 18-gallon capacity modules. Effluent drains through 1-inch predrilled holes at the 4-, 8- and 12-o'clock positions. The pipe also secures the eight cusped plastic cores with Bio-Matt fabric (Eljen) separated by 3-inch-wide compartments (spacers) filled with ASTM C33 sand. Open-air channels within the filters promote fixed aerobic bacterial growth on the fabric. Final polish occurs in the sand bed beneath the modules.

Storm drain installation

The original 24-inch corrugated metal storm drain ran 30 feet from the brook to the north catch basin, then turned 45 degrees and ran 63 feet through the middle of the backyard to the catch basin in the street. To create the 10-foot separation between the drainfield and storm drain, Lancor rerouted the pipe from the basin to two new manholes 44 feet apart, then to the south catch basin 19 feet away.

“The plan was to remove the north catch

basin, then connect the storm drain to the north manhole using 14 feet of salvaged pipe,” Green says. “The manholes, which sit on earth pads, were custom-built because of the pitch of the pipe.”

The 30% slope made it necessary for Green to level a spot for his machine, excavate, pack soil into the trench for bedding, then reverse and repeat the process. Working alongside the owner’s chain-link fence, he struggled against gravity to pack the soil.

While removing the brick basin, Green exposed the storm drain. “Big pieces were missing from the eroded invert, and we knew the rest of the line would look the same,” he says.

Lancor had specified 24-inch dual-wall N-12 corrugated pipe (Advanced Drainage Systems) between manholes. Now he extended it to the brook. Once Green set the pipe, he placed rocks around the mouth to retain it and funnel the stormwater.

After building the first manhole pad, Green continued downhill, excavating and bedding the trench for the new storm drain. To ensure the excavation between manholes didn’t waver from the 10-foot separation,



▲ The pitch of the pipes requires custom-built manholes. Dauti of Dauti Masonry (left) lays up brick for the north manhole, assisted by Green of Green Construction Management.

SYSTEM PROFILE

➤ The slope in the front yard is raked, seeded and covered with an erosion blanket impregnated with grass seed.

✔ The 12-inch round distribution box with Roto-Flow regulators (Polylok).



✔ The eroded invert on a 24-inch corrugated metal storm drain.



“This was the first time we installed the double-wide modules, but installation was straightforward, just like with the standard units.”

Mark Green

Lancor and a surveyor had marked the route. Green constantly double-checked the distances and depth as he battled gravity and intermittent rain.

“I was trying to hold the material as close to the machine as possible, but it was big and boney,” Green says. “A lot of large rock and small ledge rolled down to the drainfield area. When the time came, I’d have to move the material back up the hill.”

Meanwhile, Bashlin Dauti of Dauti Masonry and Wayne Green, Mark’s 72-year-old father, built the first brick manhole. By close of day, they had laid the 44-foot drain and partially built the south structure, but had not connected it to the catch basin. Record rain overnight flooded the trench and ejected the pipe.

Green arrived the next morning with two 2-inch 1 hp Multiquip trash pumps to dewater the trench and replace the pipe.

That day, the team finished building the manhole and connected the drain to the catch basin using a 24-inch concrete pressure pipe.

Curtain drain installation

A surprise awaited Green as he excavated the metal storm drain running through the septic field. “There was either high groundwater or an underground spring because water gushed through holes in the invert and leached out the sides of the trench,” he says. “As I removed pipe, I packed the space with spoils to force water back into the ground, hoping hydraulic pressure would push it to the brook.”

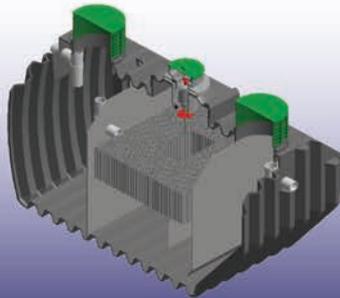
For two days, Green beat heavy compacted spoils and stones into the trench to stanch the water. When the site was dry enough to install the curtain drain, the crew removed the fence paralleling the

continued >>

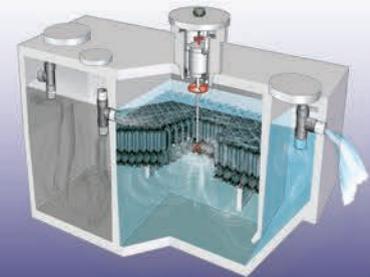


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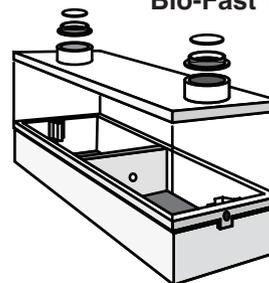
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brook, enabling Green to excavate through the rock to a minimum depth of 42 inches. He used the same excavation technique as with the storm drain.

The 18-inch-wide trench ran 54 feet from above the septic tank to the storm drain just after it left the north manhole. As Green completed a section, the crew lined the trench with filter fabric, topped it with 6 inches of 1.25-inch stone and laid the 4-inch perforated PVC pipe. They covered the pipe with 32 inches of stone, overlapped the fabric on top of it, then added 6 inches of topsoil. When the team reached the storm drain, they bored a hole through it to insert the curtain drain, then capped off the open end.

The work took a day in intermittent rain. "The ground was mushy, but the water was under control," Green says. "We even compacted the topsoil a little."

Drainfield installation

Jay Bennett of H.L. Bennett Jr. Septic Systems pumped the inspected tank.

As Green prepared the drainfield site, he hit another surprise. The excavator bucket exposed the undocumented cinder block and stone dry well. "It was full of water and right where the distribution box went," he says. After Bennett returned to pump the well, Green decommissioned it.

It rained or drizzled daily. "We muscled even through downpours to meet the closing deadline," Green says. Zone A paralleled the house and installed

quickly, but there was no room to stockpile the 100 tons of septic gravel from Laurelbrook Natural Resources 90 miles away.

"The trucks arrived two at a time and dumped just off the road," Green says. "Bob Jacquier, the quarry owner, understood the situation and scheduled deliveries when I called. He never held us up."

Zone B angled 45 degrees from Zone A, and the toe of the field encroached into the hill. As Green excavated 4 to 5 feet down and into the bank, he worried about water leaching out. It didn't. The only place for spoils was on top of the storm drain, which required building a level area to prevent material from falling into the 84-inch-wide trench below.

"This was the first time we installed the double-wide modules, but installation was straightforward, just like with the standard units," Green says.

Finishing touches

The downspout on the northeast corner of the house discharged to the drainfield. Green called a friend who relocated it to the southeast corner. He was done and gone in 20 minutes.

The crew replaced the owner's fence, raked and seeded the slope in the front yard and covered it with an erosion blanket impregnated with grass seed. (A week later, there was a fully established lawn.) Work finished two days ahead of the closing date. □

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The Missouri Smallflows Organization Promotes Onsite Regulation Updates

While the industry advances, inspector Rick Wilcockson says the state is playing catch-up with wastewater rules that haven't changed since 1996

Compiled by Betty Dageforde

In States Snapshot, we talk to a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we visit a member of the Missouri Smallflows Organization.



Rick Wilcockson
owner/inspector

Business: Accurate Septic & Well Inspections and Eastern Missouri Water Lab, Troy, Missouri

Age: 60

Services we offer: I'm a licensed third-party inspector. We provide onsite septic system inspections, well assessments and water samples for existing home sales. We also offer water lab services so we can take water samples for the onsite inspections and do those in an 18- to 24-hour turnaround. Any time you do a septic inspection where there's also a water well, you do a well inspection and take a water sample to make sure the drinking water doesn't have coliform bacteria or *E. coli*.

Years in the industry: 24

Association involvement:

I've been a member of the Missouri Smallflows Organization on and off for 20 years and currently serve as chairman of the education committee. I'm also on the stakeholders committee of the Missouri Department of Health's onsite program.

Benefits of belonging to the association:

Continuing education and keeping up with legislative requirements are two benefits. We also get to see new products from vendors and how they're used to improve the onsite industry during our annual conference.

Biggest issue facing your association right now:

We're looking for legislative changes in the law. The current requirements have been in place since January 1996. We would like to see them updated. The Missouri Smallflows Organization is working with key personnel to help put needed changes in place.

Our crew includes:

Chris Mattingly, inspector; Amy Smith, office manager/lab technician; and Steve Corrier, technical adviser

Typical day on the job:

I'm up at 5 a.m. I read the news, review jobs and then head to the office where I check emails and voicemails before I hit the road. My inspections are usually at 9 a.m., noon and 3 p.m. As part of my duties for the stakeholders committee, sometimes I take new inspectors with me to do ride-alongs for education. One of the most rewarding things about the job is educating new people. We also pride ourselves on educating buyers, sellers and agents.

The job I'll never forget:

At one site, I fell through a metal tank and was chest-deep in sewage. We were digging the tank up and when I stood on top of it, it caved in. That's why it's important to have your hepatitis shot. We've also had jobs where people ran us off the job site and told us we were going to burn in hell. I've had my tires slashed four times; I've been held at gunpoint four times; I've been attacked by dogs. When you tell people their system is failing and in order for it to meet the inspection criteria they're going to need a new drainfield, which can be \$10,000, they get very angry and upset.

» Office — Accurate Septic & Well Inspections and Eastern Missouri Water Lab.

» From left, Tom Shaw of Tom Shaw Realtors, Rick Wilcockson, and Chris Orf of ORF Home Inspections meet monthly to discuss septic laws and ordinances.



My favorite piece of equipment:

Five years ago, my daughter had to drag me into the modern world kicking and screaming, but we started using Microsoft Surface Pro tablets with Inspection Support Network software and doing our reports electronically. It's wonderful. It makes writing reports very easy and you've got everything right there. It's \$4 for an inspection and everything's saved on the cloud. You don't have all those paper files anymore.

Most challenging site I've worked on:

Systems that are 60-plus years old are always challenging. Everything is like finding the lost Ark. Sometimes it's impossible to find any kind of drainfield. The tanks do not have risers. You have to probe and look and check old records and archives if they're available. Sometimes you run across them by accident.

Oops, I wish I could take this one back:

In the early days, you could do an evaluation without looking inside the tank. In one case, the people had put concrete blocks over a 300-gallon steel tank so when we measured it with our probing rod, it appeared to be a 1,000-gallon tank. They also had a fake pumping receipt.

Another example — again, in the early days when I was an environmental public health specialist — there was a new lagoon that was put in and graded. It was getting dark, but the people said they were closing on it the next day and couldn't wait. So I went out there and had a big lighting unit put on it. I walked around the lagoon and inspected it. About two weeks after they moved in, the lagoon was leaking through the bank. I pay for my mistakes so I paid for a new drainfield. I also learned you can't be a pleaser all the time. You have to follow the guidelines and use good judgement. Sometimes it's wiser to turn a job down.



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

I was once asked why I didn't have the tank pumped out and then get inside it to examine it.

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

All systems would require site-specific engineering by an experienced professional engineer and a follow-up signoff by the engineer. In the early days I didn't believe in that, but over the years I've seen things go wrong and I strongly believe in it now.

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

My good friend Will, an attorney, gave me some advice that has saved many business relationships and actually increased my client list. *Be proactive* — "Do not wait to go to the site and walk it over if there is a complaint." *Listen* — "Be a good listener, and try to understand the customer's needs." *Make it right if you made a mistake* — "Get out your checkbook or repair it yourself."

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

Be teaching. In the Marine Corps, I was an instructor in the Naval Aviation Maintenance School. Currently I teach a lot of classes for septic and wells. I'm an authorized trainer for the state of Missouri.

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

We need legislative updates and closing of loopholes in our regulations. Science and technology are always changing, and we need to tailor our standards accordingly. A lot of people do this to make money, and it's a good living. But I do it because I believe in having safe drinking water and not having sewage discharging. I'm getting more near the end of my career than the beginning and you look at it from a different perspective. □

Would you like to see someone in your state or provincial wastewater trade association profiled in Snapshot?

Send your suggestions to Jim Kneiszel at editor@onsiteinstaller.com.

Large-Scale and Commercial Treatment Systems

By Craig Mandli

AEROBIC TREATMENT

Anua AeroCell

The AeroCell recirculating media filter from Anua utilizes synthetic media housed in an engineered pod. The open-cell foam cubes have high surface area and porosity, which balance water movement and oxygen availability. The media will not degrade over time. Pretreated effluent is sprayed over the media using special helical spray nozzles, which provide uniform distribution over the entire surface area within the pod. The treated effluent is recirculated through the media multiple times, ensuring optimum treatment. The media properties and timed dosing allow for large loading rates, ensuring a small footprint. It provides significant nitrogen reduction and is certified to NSF/ANSI 40 Class 1. Multiple pod sizes are available for commercial facilities. 336-547-9338; www.anuainternational.com.



Knight Treatment Systems White Knight Microbial Inoculator Generator

The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment that introduces, cultivates and releases selected microorganisms. It is designed to be simple to install in most septic tanks. It can be used to retrofit outdated aerobic treatment units and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems and septage processing facilities. 800-560-2454; www.knighttreatment.com.



SeptiTech STAAR filter systems

SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculating) filter systems are designed for residential and commercial properties with minimal operator oversight while delivering consistent treatment even during peak, low or intermittent flows. Using an unsaturated, engineered textile



media to treat wastewater that meets strict permit limits, the commercial filter system provides a simple, automatic equalization and clarification process for 500- to more than 150,000-gpd flows. The biological trickling filter technology also maintains low levels of Nitrate-N, with all below-grade components that fit in watertight concrete, plastic or fiberglass tanks. Smart technology allows the system to go into a sleep mode to achieve lower operating costs and power requirements. Systems are ETV-EPA verified and NSF/ANSI Standard 40/245 certified. 800-753-3278; www.septitech.com.

ADVANCED TREATMENT UNITS

Ecoflo / Premier Tech Aqua Biofilter

The Ecoflo / Premier Tech Aqua Biofilter is an energy-free treatment that uses a renewable, compostable coconut husk filter, giving it a low carbon footprint. Most models come preassembled and ready to use. 800-632-6356; www.ecoflobiofilter.com.



NextGen Septic GenX Retrofit

GenX Retrofit septic technology from NextGen Septic can be installed in any approved septic tank and is designed to repair a clogged soil drainfield. It includes a compact, stand-alone, automated, two-stage treatment system for domestic sewage that produces a clean-water output. The sewage is collected in a tank, where solids break down under anoxic conditions, while the wastewater is aerated with biomedica and low-noise submersible pumps in the secondary compartment. The second stage occurs in a separate treatment unit, treating nitrogen and phosphorus through a no-maintenance membrane and ozone disinfection system. The process lets water and salt pass through, while rejecting the solids and dissolved organic contaminants to create an output suitable for surface discharge. According to the maker, the clogged field begins to percolate water in as little as eight to 12 weeks when the bio-mat is thin enough to allow water to get through at a reasonable rate. 513-673-3583; www.nextgenseptic.com.



COMMERCIAL TREATMENT SYSTEMS

Eliminite Commercial C-Series

The Commercial C-Series system from Eliminite is designed to provide reliable treatment with emphasis on total nitrogen reduction for high-strength waste applications such as work camps, RV parks, restaurants, ski and golf resorts, breweries, mines and agricultural operations. It is designed to work with locally sourced tanks and components when possible. MetaRocks treatment media is designed to withstand a variety of high-strength waste-loading scenarios, particularly where clogging and odor control are major considerations. The system is scalable and may be adapted to suit specific phasing requirements, site constraints and unique demands. 888-406-2289; www.eliminite.com.



Jet Inc. commercial wastewater treatment plant

Commercial wastewater treatment plants from Jet Inc. are modular in design, can treat wastewater flows up to 300,000 gpd and allow for phase build-out. This makes it possible for motels, shopping centers and service stations to be constructed along interstate highways far from any town. Subdivisions can be developed miles beyond sewer lines. Factories can be erected in rural areas. The plants treat wastewater through the aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. The company offers assistance with design, engineering and construction, as well as onsite 24/7 tech support, plant startup commissioning and operator training. 800-321-6960; www.jetincorp.com.



Orenco Systems AdvanTex AX-Max

AdvanTex AX-Max wastewater treatment systems from Orenco Systems are containerized, fully plumbed plug-and-play units sized for larger commercial and municipal applications. Units come in a variety of configurations, measuring up to 42 feet long by 8.5 feet wide. They can be installed as a single unit or in multiunit arrays, either above ground or buried to grade. Systems use an attached-growth treatment method to produce clear, odorless effluent with significant nutrient reduction, suitable for subsurface irrigation or surface discharge after disinfection. One unit can process up to 5,000 gpd of raw sewage or 15,000 gpd of primary-treated effluent. Units reduce nitrogen up to 90%, depending on configuration, and can be operated with a part-time operator. They are easy to ship and set and can be installed in a variety of soils and climates. 800-348-9843; www.orencocom.



CONTROL PANELS

Septic Products 50B019-120-240DD

The 50B019-120-240DD control panel from Septic Products is a duplex time-dosing panel for use in residential or commercial applications. It can be used with 120- or 240-volt power, and it accommodates two dosing pumps controlled by a repeat cycle timer. It has a durable, weather-resistant, NEMA 4X polycarbonate enclosure with SST latches; large, easy-to-access terminal block; circuit breakers for the pumps and control circuits; a rugged, externally mounted, UV-resistant alarm light; audible alarm and run-mute-test switch with UV-resistant sealing boot; definite purpose motor contactors; alternating relay; and pump hand-off-auto switches. Compressor hookups are available. Wiring schematic and detailed connection diagrams are provided, as well as mounting feet for the enclosure. It is UL listed. 419-282-5933; www.septicproducts.com.



SJE Rhombus ACCEL Panel Program

The SJE Rhombus ACCEL Panel Program is designed to quickly deliver control solutions for simplex, duplex and triplex water/wastewater applications. It includes preengineered base models with select options. Base model features include three-phase 208 volt, 230 volt, 460 volt and 575 volt; NEMA 4 painted steel, with a single door wall mount; inner door with 22 mm Pump Hand-Off-Auto switches and Pump Run indicators; multitap transformer for 208/240/480 volts; IEC motor starting devices up to 32 full load amps; pump elapsed time meters; and an alarm package (includes flashing beacon, audible horn, silence/test switches and Form C auxiliary contacts). Panels are cUL 508 listed. 888-342-5753; www.sjerrhombus.com.



DISINFECTION EQUIPMENT

SALCOR 3G UV Wastewater Disinfection Unit

The 3G UV Wastewater Disinfection Unit from SALCOR is used for residential, commercial and municipal applications, and it is UL-certified NEMA 6P floodproof and NSF/Washington State Protocol six-month tested (with 21 upstream treatment systems). It inactivates bacteria/virus pathogens, including superbugs, according to the maker. Rated at 9,000-gpd gravity flow, it is meant as a



reliable building block for large water recovery/reuse systems. When installed in 12-unit parallel/series arrays with ABS pipe fittings, systems can disinfect more than 100,000 gpd. Gravity flow equalizes without distribution boxes. Each unit has a foul-resistant Teflon lamp covering, two-year long-life lamp with efficient installation, minimal annual maintenance and energy use of less than 40 watts. 760-731-0745; www.salcor.world.

Scienco/FAST - a division of BioMicrobics - SciCHLOR

SciCHLOR from Scienco/FAST - a division of BioMicrobics is a sodium hypochlorite generator designed to give a large span of markets a safe and effective way to disinfect. With salt, water and electricity, the system with multipass SciCELL electrochemical activation, or ECA, technology will produce an available supply of 10 to 60 pounds chlorine-equivalent/day sizes. Connected to an incoming water source and with multiple operating modes, the brine solution makes multiple passes through the low-voltage DC electrolytic cell to provide a reliable method for the needs of medium to large onsite disinfection applications. Its recirculation method keeps control of desired chlorine concentration while the assembly minimizes maintenance downtime. 866-652-4539; www.sciencofast.com.



NITROGEN-REDUCTION SYSTEMS

BioMicrobics HighStrengthFAST

HighStrengthFAST wastewater treatment systems from BioMicrobics are scalable wastewater solutions for commercial properties of all sizes. They are engineered to treat wastewater containing high BOD concentrations and often having higher FOG levels than standard sanitary-strength sewage. Models are available to treat 900 to 9,000 gpd and are designed for extreme environments such as specialty food/beverage/agriculture applications. 800-753-3278; www.biomicrobics.com.



Delta Treatment Systems ECOPOD-N

The ECOPOD-N fixed-film bioreactor (FFBR) system from Delta Treatment Systems is a self-contained device that houses engineered PVC media designed to treat domestic wastewater. Five models accommodate daily flows of 500 to 1,500 gpd, with customizable options for commercial applications up to 100,000 gpd. It is suitable for individual residential installations, cluster designs and commercial wastewater treatment applications. It is certified to ANSI/NSF International



Standards 40 and 245 and is Federal Housing Administration and Veterans Affairs acceptable. It can be inserted into a standard-size septic tank or vault to provide quiet, odorless operation, and it is suitable for intermittent usage with an average nitrogen reduction greater than 50%. It is designed to minimize sludge production and reduce pumpout frequency. 800-219-9183; www.deltatreatment.com.

Norweco Singulair TNT

The Singulair TNT (Total Nitrogen Treatment) system from Norweco is an advanced wastewater treatment system designed to reduce total nitrogen by more than 68%. Certified performance data from NSF Standard 245 verifies that average effluent contains 7 mg/L nitrate, 12 mg/L total nitrogen, 4 mg/L CBOD₅ and 9 mg/L TSS. The system offers flow equalization, effluent filtration and low electrical usage. It is designed for easy installation, operation and maintenance to minimize effluent nitrogen concentrations, according to the maker. Nitrogen reduction is achieved without requiring effluent recirculation or the addition of chemicals. All treatment is accomplished in the tank. 800-667-9326; www.norweco.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 up to 3/4-inch solids. 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.



Franklin Electric FPS NC Series nonclog pumps

FPS NC Series nonclog pumps from Franklin Electric are available in single- and three-phase power options to provide a rugged, maintenance-friendly wastewater transfer solution with flows up to 610 gpm. A field-adjustable wear plate minimizes downtime without needing a replaceable wear ring. Factory-standard dual silicon carbide mechanical seals have low thermal expansion and high abrasion resistance. 866-271-2859; www.franklinengineered.com.



Gorman-Rupp SF Series

SF Series submersible solids-handling pumps from Gorman-Rupp use single-vane impeller designs requiring lower horsepower with increased flow and head. The line of pumps is available on more than 24 models in 3-, 4-, 6- and 8-inch flanged discharge sizes and power ranging from 3 to 75 hp. These combinations will provide flows up to 3,400 gpm and heads to 170 feet. 419-755-1011; www.grpumps.com.



Polylok PL-CPE4A

The Polylok PL-CPE4A is a submersible, 4/10 hp, 115-volt, single-phase effluent pump with a 2-inch NPT vertical discharge. It has a maximum head of 38 feet and a maximum flow of 56 gpm. The pump is designed with a 3,450 rpm oil-filled permanent split-capacitor motor and has an amp rating of 6.6 for 115 volts, a rugged cast iron housing and volute equipped with a cast iron vortex impeller capable of passing 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. It has a 20-foot UL/CSA-listed power cable suitable for submersible service and fitted with a three-prong plug. The unit is supplied with an integrated clip for the included piggyback mechanical float switch and used for automatic operation. 888-765-9565; www.polylok.com.



Vertiflo Pump 1600 Series

The 1600 Series horizontal close-coupled, vortex end suction pump from Vertiflo Pump is suitable in a wide range of applications in areas like food processing solids, wastewater treatment, pollution control, slurries and solids. It offers capacities to 1,600 gpm and heads to 170 feet TDH, and it withstands temperature to 250 degrees F. Pumps are designed with back pullout construction that permits easy inspection and access for service or maintenance if needed without disturbing the piping to the pump. Standard construction is cast iron, 316 stainless steel fitted, all 316 stainless steel, alloy 20 or CD4MCu. The impeller has a fully recessed design, which accommodates the passage of solids. All impellers have wiping vanes, which reduce axial loading and prevent dirt from entering the sealing area. The impeller is keyed to the shaft, and an impeller locking screw ensures positive attachment. 513-530-0888; www.vertiflopump.com. □



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Large-Scale and Commercial Treatment Systems

By Craig Mandli

Housing complex meets effluent standards with hybrid system



Problem: The Massachusetts Department of Environmental Protection determined that the three conventional septic systems used by the Parker Terrace housing complex in Easton failed and were polluting the local groundwater. On top of needing to replace the existing wastewater infrastructure, the Easton Housing Authority also had new regulations to deal with, including reduction of total nitrogen and TOC. The system's proximity to a municipal water well posed an additional challenge.

Solution: When factoring in the primary drivers for this project — effluent standards, cost efficiency, a small footprint and sustainability — Graves Consulting Engineers decided to install an AquaPoint Bioclere-^{OH} wastewater treatment system. This multistage, hybrid system integrates AquaCELL aerobic and anoxic moving bed biofilm reactor chambers with two Bioclere trickling filters in between. Treated effluent flows through a tertiary-stage sand filter, activated carbon filters and UV disinfection prior to discharge.

Result: Testing has shown levels of BOD, TSS, TN and TOC well below standards. In addition, the system helps offset other costs, as the effluent is used for irrigation throughout the grounds of the housing complex. 508-985-9050; www.aquapoint.com.

MBBR system eliminates effluent concerns at RV resort



Problem: An RV resort on a lake in Alabama was having problems with its old 35,000-gpd aboveground steel extended air package treatment plant. The effluent was poor, causing the soil disposal field to fail, creating serious odors around the resort and upsetting neighbors.

Solution: An engineering firm selected the Earthtek Environmental Amber MBBR system to replace the steel package plant. They chose the MBBR process due to cost effectiveness, minimal operations and maintenance requirements, and underground installation that eliminates odors. The system is installed in buried fiberglass tanks, which are impervious to corrosion and leaks. The system contains thousands of small plastic media pieces floating in aeration tanks that provide a large surface area for attached growth treatment. The media is self-cleaning and requires no maintenance, and the biofilm thickness automatically adjusts to variable flows and loadings. Excess biomass that sloughs off the media is settled out and returned to the primary tank for digestion. The system includes a 30,000-gallon, fiberglass-reinforced plastic primary tank to settle solids, store scum and provide anaerobic digestion; two FRP aerobic MBBR tanks to reduce BOD and ammonia; one FRP settling tank; chlorine and dechlor tablet disinfection; and a pump station to transport the treated effluent out into the lake for disposal.

Result: The system has performed as expected, eliminating odors and dispersing clean effluent. 812-528-8784; www.packageplants.com.

Sand filtration utilized on wind farm maintenance facility



Problem: A maintenance facility for more than 270 wind farms in south-central Kansas needed a new septic system after the conventional field failed in a short time due to poor soils and excessive use. The maintenance vehicles used the yard for general maintenance, parking, turning and storing heavy equipment. These activities compacted most available soil on the property. Poor receiving soils and limited areas for a new system dictated the need for a treatment solution that would provide high-quality effluent in a small footprint. A replacement conventional stone-and-pipe system would not fit in the area.

Solution: The Eljen team, along with Kansas Environmental Health Association, used the site for training and an installation demonstration. Bob Blasi of Adams Electric & Plumbing did the design and installation of an above-grade 450-gpd system on heavy clay soils. The system contains 36 A42 GSF (Geotextile Sand Filter) units in two laterals and is center-fed. The pump-to-gravity system has a distribution box in the middle of the two rows.

Result: The versatility of the GSF units allowed the designer to choose an in-ground or above-grade system, as well as work the layout suitable for the limited site. The repair system was raised and protected from maintenance vehicle traffic and parking. The smaller-treatment raised system was able to fit in the available space. 800-444-1359; www.eljen.com.

Treatment system used to standard flow within limits



Problem: Registered sanitarian Jon Maass of JMI OSSF Consulting was contracted to help with a challenging mixed-use site of a 300-plus-people office complex, culinary training facility with corporate housing/condos for trainees in Dripping Springs, Texas. When all the uses of the property were added up, they were looking at 5,400 gpd flow on weekdays, with just the condos on the weekends at 2,700 gpd. In Texas, systems discharging more than 5,000 gpd aren't permitted at the local level under TAC 285. State permits can take in upward of a year to obtain and at much greater expense in both equipment and permit/design fees, and this site was well under construction and expected to be occupied within six months.

Solution: Working with the sanitarian, Hoot Systems was able to devise a plan to provide additional flow equalization and stack the excess waste generated Monday through Friday, adding this to the weekend flows to utilize the whole week's capacity limits. The flows from the condos were residential strength, however the office building and training kitchen generate higher strength waste. This combined flow required a 12,500 gpd MTS treatment system to properly treat the waste stream.

Result: Technicians from Hill Country Wastewater were able to get the system installed on budget and in time for the grand opening, and are the current operators. The daily flow to the drainfield has kept at or below 4,800 gpd, and is in compliance with the TAC 285. 888-878-4668; www.hootsystems.com.

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CASE STUDIES

System provides solution for Camp Fire emergency housing

Problem: The 2018 Camp Fire devastated the community of Paradise, California, killing 85 people, destroying 11,000 homes and displacing nearly 50,000 people. The Federal Emergency Management Agency needed to stabilize the situation and support rehabilitation of the community. This required a 1,500-worker camp, which included 400 temporary housing units, laundromat, and food preparation and dining facilities. Complications included accelerated deadlines and extreme site limitations, including shallow lava formations, which impeded construction and precluded subsurface dispersal.



Solution: A General Order Permit was acquired to speed development. A 100,000-gpd **Advanced Enviro-Septic** wastewater treatment system from **Presby Environmental** was selected, and specialized equipment was employed to excavate through solid lava-rock. The system receives gravity-flow influent to four 40,000-gallon septic tanks configured in series. The effluent is then segregated into four treatment paths to facilitate isolation during maintenance. The flow is split to four lined AES beds performing passive secondary treatment. Each 25,000-gpd bed contains 8,400 feet of AES pipe surrounded by specified sand for a total 33,600 feet of AES pipe. Treated effluent is collected and gravity-distributed to four UV disinfection units, each followed by a pump tank. These pumps distribute purified effluent to two evapotranspiration ponds, which allow for possible reuse.

Result: The low-maintenance, high-flow system, including disinfection, allows for full occupancy of the worker camp. This provides needed resources close to the devastated community. 603-837-3826; www.presbyeco.com. □

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PRODUCT NEWS

Franklin Electric NC Series nonclog pumps

The FPS NC Series nonclog pumps are available in single- and three-phase power options to provide a rugged, maintenance-friendly wastewater transfer solution with flows up to 610 gpm. A field-adjustable wear plate minimizes downtime while maximizing profit without the need and additional cost of a replaceable wear ring. Factory standard dual silicon carbide mechanical seals have low thermal expansion and higher abrasion resistance, providing up to six times greater wear life than commonly used carbon versus ceramic seals. 800-348-2420; www.franklinengineered.com.



Pettibone Traverse T1246X telehandler

The Traverse T1246X telehandler from Pettibone is the third Traverse model to join its next generation X-Series lineup. The telehandler has a traversing boom carriage with capability to move loads by traveling horizontally. This allows for the safe placement of loads at full lift height without having to coordinate multiple boom functions. The T1246X has a specified lift height of 46 feet, 6 inches, which matches its landing height. The traversing boom provides up to 70 inches of horizontal boom transfer, allowing for a maximum forward reach of 35 feet, 10 inches. The telehandler is powered by a 117 hp Cummins QSF 3.8 Tier 4 Final diesel engine that helps it achieve a maximum load capacity of 12,000 pounds. The engine is mounted on a side pod for easy service access while allowing excellent curbside visibility and ground clearance of 19 inches. 906-353-4800; www.gopettibone.com.



Doosan DX62R-3 mini excavator

Doosan's DX62R-3 mini excavator has a reduced-tail swing profile with 4.9 inches of side overhang, allowing for work in confined areas with more flexibility to maneuver. The design utilizes the basics of the existing Doosan mini excavator and builds on it by adjusting the positioning of the excavator upper structure to the undercarriage to reduce tail swing length. Moving the swing center forward extends the machine's digging reach by 11 inches while maintaining the desired machine balance. 770-831-2200; www.doosanequipment.com. □



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Professional Onsite Wastewater
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New Mexico;
www.powranm.org;
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NEW YORK

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

NORTH CAROLINA

North Carolina Septic
Tank Association;
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Portable Toilet Group;
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North Carolina Pumper Group;
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Wastewater Association;
www.ohioonsite.org;
740-828-3000

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

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

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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

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

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

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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

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

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

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

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