

August 2019

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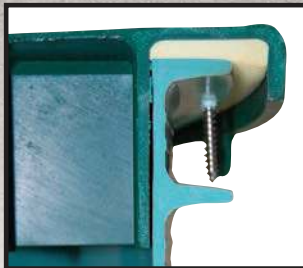
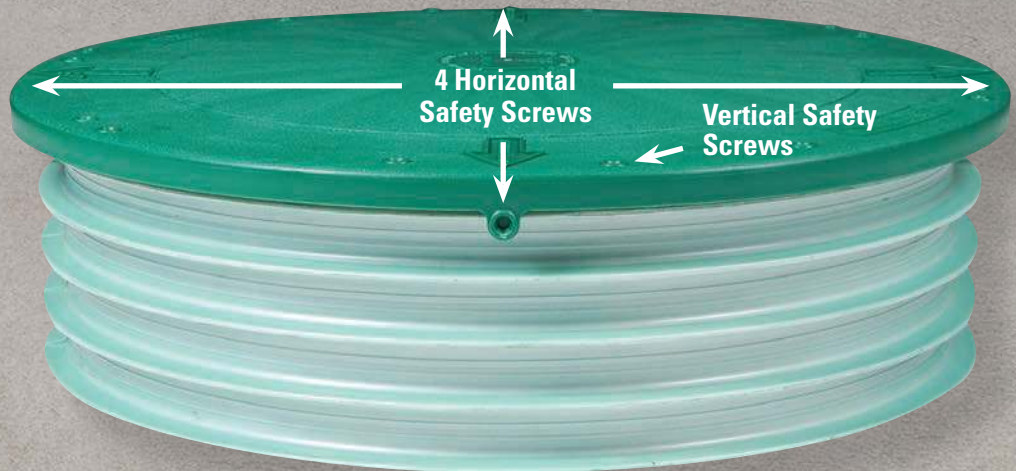
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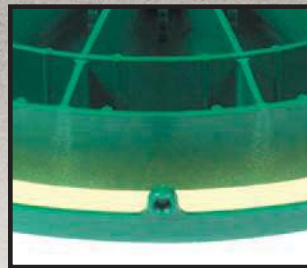
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INSTALLER PROFILE:

Sharpen the Focus By Betty Dageforde

ON THE COVER:

Kendall (left) and Brandon Unruh own Western Septic & Excavation in Buhl, Idaho, with their father, Maynard Unruh (not shown). Their business covers many facets of wastewater service, including installing, pumping and drain cleaning. (Photo by Lisa Kidd)

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Your input is critical for this magazine to remain a business-building tool for onsite professionals.
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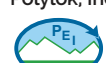







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Enjoy this issue!

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.

How Can We Help You?

Your input is critical for this magazine to remain a business-building tool for onsite professionals

Where would *Onsite Installer* be without the hardworking contractors who provide a critical service to one-quarter to one-third of all people across North America who utilize decentralized wastewater systems? Relegated to a heap of irrelevant junk mail that piles up on your desk, I presume.

This magazine is dedicated to the equipment operators and helpers who get their hands dirty building onsite systems that allow homeowners to live wherever they choose. It is for the system designers and public health professionals who create and oversee evermore-sophisticated onsite plans that protect the environment and open up new land for development. It is for the innovators who produce the components used to make wastewater treatment work better and be more cost effective.

And just like how you always strive to make your product better for the customer, we always want to improve this printed product to better serve our readers. As we reach the apex of the busy summer season, I want to pause to remind you that this is your magazine. We want it to reflect the important work you do. It is a place where installers can network and learn from each other, a forum to share ideas and the important challenges you face.

LET'S TALK

For that, we ask for your contribution to the discussion. I know this is a time when you're putting in long hours. For fieldworkers, it's sunup to sundown and coming home to toss sweat-soaked and mud-covered work clothes into the washing machine to be ready for another day on the job. I know that if you find time to page through this magazine this time of year, it's either on a hurried lunch break back at the office or in the wee hours of the morning.

But when you do find a minute or three to read this, I'd like to ask you to ponder how others in the Installer community might benefit from your experience. Or how you might learn from the experience of a colleague in the industry. What challenge have you overcome that others might face? Has a question about an install been dogging you and you're desperate for an answer?

When you think of that creative solution or face that burning question, take a moment to let me know. We'd like to share your story or ask your question of the greater community of installers. Let's start a conversation that might lead to new content in the magazine.

We value your input in many areas, but here are a few places to start:

Contractor profiles

It's not like folks in the wastewater industry to want to brag about their accomplishments. I get that and I respect the preference to keep your head

For every successful installer, there's at least one industry mentor in the past who's been a supporter and a guiding light.

By talking about your journey in this industry, you can pay it forward for all the help you received starting out.

down and your shovel moving. But let me put a pitch in for putting yourself out there by appearing on the cover of *Installer* and sharing your story. For every successful installer, there's at least one industry mentor in the past who's been a supporter and a guiding light. By talking about your journey in this industry, you can pay it forward for all the help you received starting out. Any tips you have about running a small business, training your crew, utilizing new technologies and solving problems can help others. And the more we all learn and share, the more professional this industry will become. Don't be afraid to nominate your company or another worthy company for one of our profile stories.

Safety issues

The main objective of installers is to build effective wastewater treatment systems. But underlying that goal is the need to work safely so you can return home to your families in one piece at the end of the day. And this is not something to be taken for granted. On a daily basis you work with heavy machinery and excavate and work in trenches on a variety of terrain. Accidents happen. We want to redouble our efforts to address safety topics to help protect you and your crews.

Unfortunately, too often photos cross my desktop showing questionable working conditions. Occasionally we have to reject images sent for publication because they show apparent violations of Occupational Safety and Health Administration (OSHA) rules, particularly for inadequate use of personal protective equipment (PPE) and lack of shoring in deep trenches. I take it as my responsibility to make sure we discourage unsafe practices. Let me know about safety topics we could address in the magazine. Maybe you could share the stories with your crew during morning tailgate safety talks.

Second round of Snapshots

I'm happy to report that over the past few years, we've visited with a member of every state or provincial onsite trade association through our States Snapshot feature. It's been great to hear — in their own words —

what dedicated installers are accomplishing as volunteers in the many groups that work to advance the onsite industry. We're about to embark on another round of these interviews, so don't be surprised when we call on your association again.

It's been fun to ask onsite professionals to talk about the biggest issue they're dealing with, share their typical day on the job, talk about their most challenging job and talk about the craziest customer question they've heard. We may change up the format of this popular feature in the future, but the main goals will stay the same: to get to know what makes an installer tick and to shed light on the work of our professional groups. We'd like to see your photo running alongside the Snapshot feature.

System Profiles

I'll bet you either just completed or are in the planning stages for a real doozy of an install project. It may include a complex treatment system you've never implemented before. Or the topography or soil conditions are more extreme than you're used to. Or you have to come up with an incredible workaround to fit the drainfield on the lot. Whatever the case, we'd love to share your story in our System Profile feature. We're also starting to return to the scene of earlier install stories after a decade to see if they are still performing up to expectations. Let us know if you are proud of a past project we can spotlight in our System Profile: Looking Back feature.

Equipment Corner


The skills of your crew are your main asset, but quality equipment maintained properly is a huge contributor to profitability for an installing company. When you're in the market for a new machine, you learn about the latest features and benefits. After you've had an excavator in the field for a while, you want to know how to keep it in tiptop shape. What would you like to know about the latest and greatest equipment offered to the onsite industry? What aspect of equipment maintenance would you like to know more about? We'll get in touch with an equipment expert to answer those questions.

Industry and Product News

Are you aware that *Installer* is a place to share your news with the onsite industry? Has your company just celebrated a 25th anniversary? Did you win a small-business honor from the local chamber of commerce? Have you recently promoted a key employee to a new position? Write a few paragraphs about these company milestones and send me an email. Similarly, if you are an advertiser in the magazine, you can share news about moving to a new location, a promotion on the executive team or a new

product introduction. Our Product and Industry News features reflect our commitment to being a networking tool for onsite professionals.

MAKING CONTACT

Please feel free to contact me anytime about these features in the magazine or any issues of importance to you as installers. My email is editor@onsiteinstaller.com. I promise to respond to any suggestions or questions. 

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RENT VS. OWN

Equipment Options

Contractors are increasingly taking the rental route for equipment they need at the job site rather than purchasing it. Like anything, there are pros and cons. Read up on which option is right for your company in this exclusive online article. onsiteinstaller.com/featured

Overheard Online

“Talk about what annoys, bothers, harms or otherwise inconveniences the customer — like the sewage backups they will inevitably experience if they don't get their tank inspected and pumped regularly.”

— 5 Marketing Mistakes to Avoid
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SITING AND DESIGN

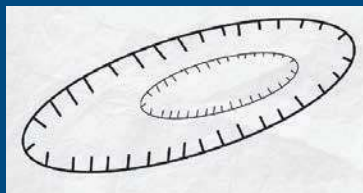
Reading a Contour Map

If you're a site evaluator or system designer (or both), knowing how to read a topographic map of the site of a proposed onsite treatment system is a good skill to have. This series from expert Jim Anderson breaks down what you need to know about topography and site mapping. onsiteinstaller.com/featured



**TANK REPLACEMENT
Abandoned Systems**

In the event that a septic tank is no longer used, the tank must be properly abandoned. Precautions should be taken to render the area of the old tank safe and free of environmental or public health impacts. There are three common practices for dealing with the empty tank. Read more about them online. onsiteinstaller.com/featured



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INSTALLER PROFILE



« Technicians Chad Goossen, left, and Carlo Schmidt prepare risers made from culvert material and concrete lids during a system install. (Photos by Lisa Kidd)

SHARPEN THE FOCUS

When the Unruh family construction pros settled on wastewater-related services, consistent revenue started rolling in

By Betty Dageforde



When the economic recession rolled across the country a decade ago, Kendall Unruh, his brother Brandon Unruh and their father, Maynard Unruh, were engaged in custom homebuilding in Buhl, Idaho. The town got hit hard and construction and remodeling work dried up, putting the Unruhs' 20-year-old business in jeopardy. The family knew they had to do something different. Fortunately, they had equipment and expertise that offered a solution.

"We had a backhoe and a mini-excavator," Kendall Unruh says. "I was doing the excavating side of construction, and through that, I had gotten my septic installer's license so I could install systems



on the houses we were building.” They formed a new company named Western Septic & Excavation and began installing septic systems. Over the next few years, they added related services — pumping, drain cleaning, camera inspection, hydrojetting, trenchless repair — to become a full-service provider and avoid facing another potential crisis should one aspect of the industry slow down.

They originally operated out of Unruh’s home and a nearby shop on his 40-acre farm, but in 2018 they remodeled an old house on the property near the shop, turning it into an office and break room. He mostly works in the office doing bidding, estimating and general management. Brandon Unruh heads field operations, and Maynard Unruh drives a vacuum truck and performs maintenance around the shop. The rest of the team includes Kendall Unruh’s wife, Michele Unruh, who handles bookkeeping and office work, and technicians Chad Goossen, Carlo Schmidt, Ryan Wiebe and Rustin Koehn. The company works within a 60-mile radius.

MINDING YOUR OWN BUSINESS

In the early days, as they were building the septic specialty, the company took on unrelated excavation jobs, most involving digging basements and foundations for a local builder. As that builder’s business grew, so did the company’s involvement with them but at the expense of their own business. Finally, by 2017 they realized they had gotten off track and decided to give that work up completely.

Unruh says despite losing nearly half their business overnight, they never noticed it.

“That made us realize how much work we had been letting fall through the cracks,” he says. “Since that time, we’ve been focused 100% on septic, sewer and water.”

Today septic installations and sewer and waterline repairs account for about 60% of their work. Excavating equipment includes a 2005 Case 580 Super M Series 2 backhoe, a 2006 Kubota KX121-3 mini-excavator, a 2017 Kubota KX040-4 mini-excavator, a 1985 Ford LTL-9000 company-built dump truck with a Heil 12-yard dump body, and a 1996 Volvo Autocar 12-yard dump truck with a Williamsen-Godwin dump body.

Unruh says the challenge in their area is shallow soils. “There are a lot of places here where you can’t dig more than 2 feet,” he says. “It’s just solid rock. That can be real challenging for us to come up with a decent solution.” They typically do mound and capping fill systems. They’re currently looking at the Oscar-II system from Lowridge Onsite Technologies, which has a low profile requiring a shorter mound. Unruh says there hasn’t been a lot of call yet for advanced treatment systems in their area: “We do a lot of just the old-style perforated pipe and rock.”



Western Septic & Excavation

Buhl, Idaho

Owners: Kendall, Brandon and Maynard Unruh

Founded: 2010

Employees: 8

Service area: 60-mile radius

Services: Septic installations and pumping, sewer and drain cleaning, sewer camera inspections, hydrojetting, trenchless sewer repairs

Website: www.westernseptic.com



▲ Maynard Unruh makes a call during a service stop to pump a septic tank. The truck in the background is a Peterbilt 357 built out by Advance Pump & Equipment with a Progress tank and National Vacuum Equipment blower.



▲ Chad Goossen operates a Kubota KX040-4 mini-excavator during an installation project.

OFFERING ONSITE FINANCING

Kendall Unruh says Western Septic & Excavation technicians occasionally find themselves in situations where they service someone's system, see that it actually needs a major repair and the homeowners can't afford to do it.

"So we're sitting there limping along and we're out there servicing, maybe pumping their tank every month or two," he says. "The homeowners can't save up for a new system because they're spending it all on pumping. And we don't want to just waste people's money." As a solution, the company thought about offering financing to its customers.

They decided to sign up with the Service Finance Co. The enrollment process involved filling out an application and providing financial statements. And the approval process for homeowners is done on the spot and couldn't be simpler.

"There's an app on my phone," Unruh explains. "You just go in there and fill out all their information and scan in their ID card. It goes to the Service Finance Co. and takes like two minutes for them to approve or disapprove it."

The company is just getting started with this idea, and so far, the first couple applications were declined. Unruh was not surprised because the homeowners were in bad shape financially. He is not discouraged and still believes he'll be able to help people out and at the same time possibly sell more work for the company. "I don't know if it will or not, but that's the idea."

The company does about 50 installations per year. Work is mainly residential, but they have a few commercial accounts, one of which is a fish processing plant where its most recent project was putting in a new drain system in the middle of winter when the plant's system failed. "That was an extra drain rock project, trenches with low-pressure distribution," Unruh says. "It was miserable, but we got it done."

BRANCHING OUT

Pumping: Within a year of getting started, the company added septic pumping, which now accounts for about 25% of its work. They have two vacuum trucks. The smaller one, a 1992 Ford F-800 built out by T-Line Equipment with a 2,300-gallon steel tank and Battioni MEC 6500 pump, was their first truck, purchased in 2010, and is now used as a backup and for tight spaces. After realizing they were spending more time traveling to and from dump sites 35 to 40 miles away than actually pumping, in 2017 they bought a larger truck — a 2001 Peterbilt 357 built out by Advance Pump & Equipment with a 4,400-gallon waste and 200-gallon freshwater aluminum tank (Progress Tank), National Vacuum Equipment 4310 blower and jetter from Advance Pump & Equipment. Disposal choices include a municipal landfill with drying cells, two treatment plants and two land application sites. They also use a Crust Busters tank agitator.

Drain cleaning: By 2011 the company added drain cleaning. A 12-foot Pace American enclosed trailer houses their equipment — a Jetters Northwest DrainJet 4000 jetter, a RIDGID K-60 drain cleaning machine, a Duracable DM30 cable machine, and several cameras (MyTana, RIDGID SeeSnake full-size reel and a RIDGID micro-reel). They also have two flex-shaft drain cleaners from Renssi Finland Oy, a fairly new tool for them but one that's had a big impact.

"You can send a camera down with it and actually watch what you're doing because the outside of the cable is not spinning," Unruh says. "And you can really descale pipes well with it. It's really simple to look at, but it's actually cutting edge."

➤ Rustin Koehn uses a Crust Busters tank agitator to create a slurry that can be pumped efficiently from a septic tank.

"There are a lot of places here where you can't dig more than 2 feet. It's just solid rock. That can be real challenging for us to come up with a decent solution."

Kendall Unruh

A lot of their drain work is for dairy farms. "The dairies spread straw in the corrals, and when the cows come in, they've got this straw in their feet and frozen manure and you name it. So they have a real problem with barn drains plugging up." Another focus is farmers' irrigation canals, which tend to clog with debris. "Our average annual rainfall is 7 to 9 inches and they're trying to raise a crop, so if they can't have their water, it gets serious fast," Unruh observes. For these larger drain and pipeline cleaning jobs, Western Septic & Excavation uses a Jetters Northwest Eagle 600 trailer jetter that produces 18 gpm at 4,000 psi with 600 gallons of water on board.

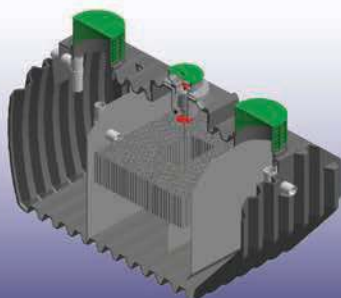


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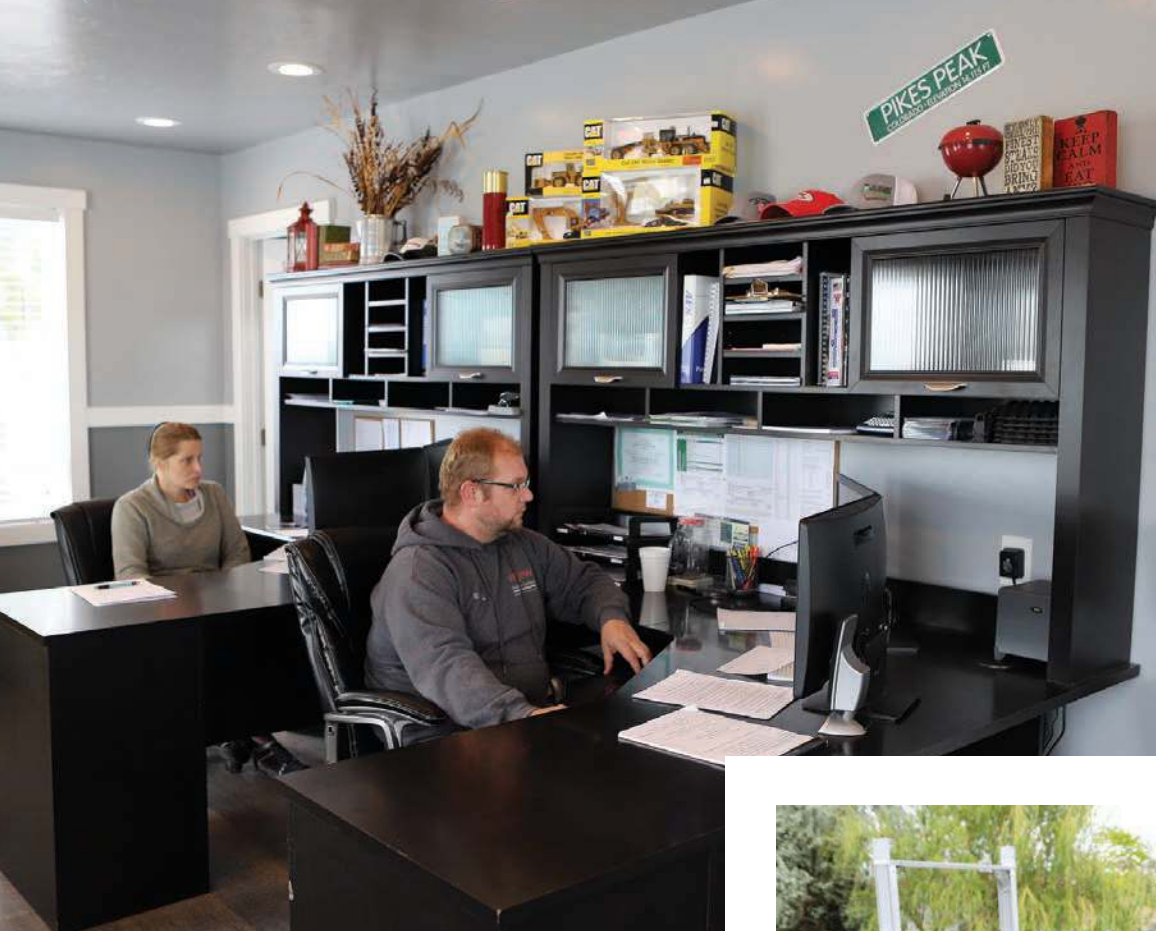
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◀ Kendall and Michele Unruh are working in the Western Septic & Excavation office.

▼ Brandon Unruh, left, and Ryan Wiebe use a RIDGID SeeSnake camera system to inspect an underground line.

"I like the fact that you can be diversified in the business and still be focused on the wastewater niche market. There are a lot of different things you can do and still be just septic and sewer guys."

Kendall Unruh

Trenchless repair: By 2012 the company was doing trenchless work, utilizing a 14-foot Wells Cargo enclosed trailer for its equipment — a TRIC Tools V24 pipe bursting setup, a GF Piping Systems pipe fusion machine, a Source One Environmental PipePatch system with different sizes and lengths of packers, as well as small water-powered and air-powered boring tools.

WORKING WITH TECHNOLOGY

Unruh is conscious of the importance of maintaining a professional online profile. In the beginning, the company hired a website designer but soon had some concerns. "I just had a bad experience," he explains. "That's my online reputation and I wasn't willing to turn it over to just anybody to make or break our reputation. So, I decided I'd just take it in-house and figure it out."

He used WordPress software and says it was a bit of a trial-and-error process, although he'd had a little experience building websites for some of his hobbies. He worked hard on the professionalism of it and says people often tell him it doesn't look like a do-it-yourself site.



He also maintains the company's Facebook page, which he thinks is a great way to reach people. "I spend quite a bit on advertising dollars there — more for branding than actual instant business."

In 2017 the company started using Smart Service software from My Service Depot for job scheduling. Technicians use the accompanying iFleet mobile app.

"When I schedule a job on their calendar, it syncs to their device," Unruh says. "They've got all the customer information, GPS navigation to the job and a time clock. They can clock in and out for the day on their iFleet but also clock in and out of each job. Any document I need them to have, like permits or drawings, I upload to the customer record at the office and then they'll have it on their device."

continued >>

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▲ Ryan Wiebe sprays off the trailer-mounted Jetters Northwest DrainJet 4000 jetter in the company yard.

The program also syncs with QuickBooks. When the technician closes out a job, it lights up on the scheduler back at the office to show it's complete and with a couple clicks it gets pushed over into QuickBooks as an invoice.

MANY AVENUES

The company continues to look at other opportunities for expanding its role in the industry. Along those lines, in early 2018, Unruh was appointed to a position on the Idaho Department of Environmental

Quality's Technical Guidance Committee, which handles the review process for approving products based on their conformance to the state rule book. They meet quarterly and pass along their recommendations to the department.

The variety of possibilities in the industry is what keeps it interesting and exciting, Unruh says. "I like the fact that you can be diversified in the business and still be focused on the wastewater niche market. There are a lot of different things you can do and still be just septic and sewer guys."



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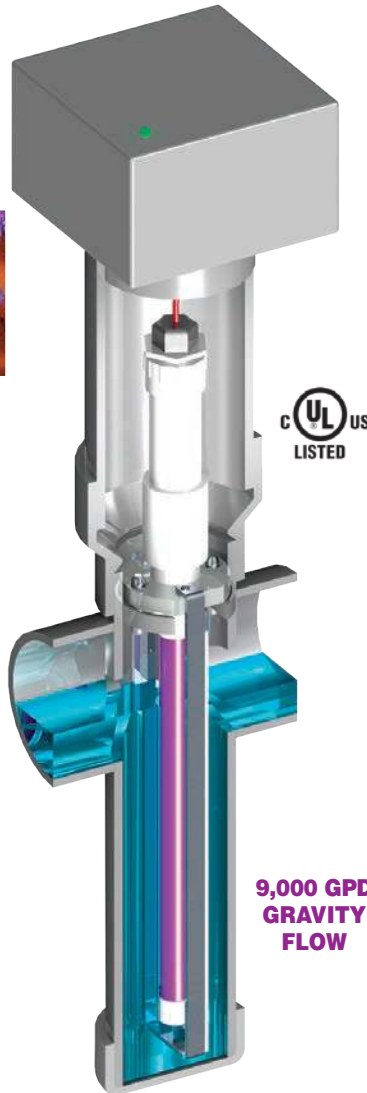
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SYSTEM PROFILE

Sittin' on the Dock of the Bay

A Advanced Septic Services watches the tide roll away as it installs a membrane bioreactor on an unusual Puget Sound property

By David Steinkraus

On the edge of Puget Sound in Washington are a handful of homes that wouldn't be possible today. When the tides are right, seawater comes within a few feet of the house walls.

Local codes forbid new construction in sensitive sites like these, but a new system can be installed for an existing home. That was the challenge for A Advanced Septic Services.

It was a job the company came across by accident when it was called in to inspect the system on a home at the base of a 100-foot bluff. What A Advanced found during the pumpout and inspection was an old homemade tank with missing baffles.

"The house was vacant when we came, unoccupied for some time. But with a new wastewater system, it was worth a tremendous amount," says Andrew Gunia, who owns A Advanced.

Several system designers passed on the project because they thought a solution was not possible. But for Keith Pelzel and his partner Brian Potucek at Westside Septic Design, talk of an impossible project is motivation to solve it, Gunia says. And they did.

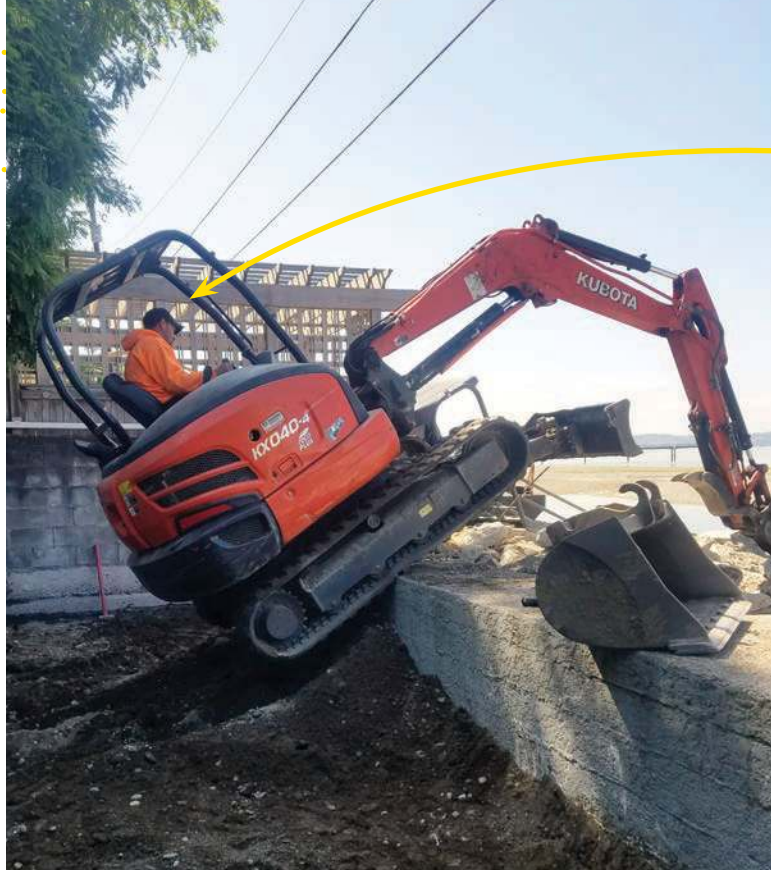
System Profile

Location: Des Moines, Washington
Facility served: Single-family house
Designer: Westside Septic Design, Tacoma
Installer: A Advanced Septic Services, Sumner
Type of system: Membrane bioreactor
Site conditions: Heavy clay topped with beach sand
Hydraulic capacity: 287 gpd

The system

Water leaves the house in a 3-inch Schedule 40 pipe and flows 5 feet to a 500-gallon concrete tank. That and the other tanks in the system came from Evergreen Pre-Cast of Sumner.

▲ Jerry Arthur, left rear, and Keith Pelzel, right rear, work on the treatment part of the system at the Puget Sound beach house. Part of the absorption field was installed between the house wall and sea wall in the foreground. At right rear is a tidal pool left when the ocean retreated at low tide. (Photos courtesy of A Advanced Septic Services)



◀◀ Going over the sea wall, as Tom Armijo is doing here, was the only way to get to the job site on the edge of Puget Sound. One night the crew from A Advanced Septic Services parked an excavator on top of the wall to ensure the high tide didn't touch it.

✔ These permeable plastic pavers cover the Netafim dripfield on one side of the Puget Sound beach house. The pavers were an idea of A Advanced Septic Services because they prevent a future owner from installing some other cover that may compromise the field beneath.

✔✔ As Doug Highland checks the compressor, work continues on the membrane bioreactor installation on the edge of Puget Sound. The Netafim absorption field was installed beneath the deck and between the sea wall and the house.



"This property has an incredible view of the Olympic Mountains. Whales swim in front of it. You cannot reproduce this under today's code requirements and restrictions, let alone even consider building at the bottom of a bluff like this."

Andrew Gunia

"We needed to use concrete because at certain times of the year the tidal waters are higher than the elevation of the finished grade. There's a bulkhead that keeps much of that out, but during what we call 'king tide,' the water will be on top of the tanks," Gunia says.

The first tank in the chain is intended only to settle solids, not for pretreatment, so wastewater moving into the bioreactor is ideally still aerobic.

A 3-foot run of 4-inch pipe takes water through a SaniTEE filter and into a 1,000-gallon tank holding a BioBarrier membrane bioreactor from BioMicrobics. From the bioreactor, water flows a few feet into a 1,000-gallon pump tank. An Orenco Systems PF2005 turbine pump pushes water through an HD Fowler continuous flush headworks and to the absorption field, comprised of 359 linear feet of Netafim split into two arrays.

The Netafim wraps around two sides of the three-bedroom home. Technicians dug out the existing soil and hauled in 20 yards of washed sand to cover the Netafim. Sand was settled with a plate compactor. His company learned years ago while building mound systems that this will not damage the lines and it prevents sagging as sand settles naturally, Gunia says.



On top, technicians put 2 inches of cover, filter fabric, and then 2 3/8-inch plastic pavers to bring the installation back up to grade. These are anti-flotation pavers that are permeable. That was something Gunia and his team insisted on having. Without those, there was always a chance that the next homeowner would choose some covering that compromised the dripfield.

A 6-inch concrete slab was poured on top of the tanks to prevent them from floating. This wasn't on the original design, but as the project progressed, everyone realized that the membrane and pump tanks might operate when nearly empty, especially if the next buyer used the home as a weekend or vacation residence. Although a bulkhead (or sea wall) keeps most of the salt water off the property, during the annual and very high king tides, water could flow past the bulkhead.

SYSTEM PROFILE



◀ The finished system at the Puget Sound beach house lies beneath a concrete slab to prevent tanks from floating at high tide. The absorption field is beneath the deck in the background and wraps around the far side of the house.

▼ Workers transported equipment and trucks to and from the work site along the beach at low tide.



For the project, A Advanced used a trio of Kubota mini-excavators and a 1999 Kenworth truck with a dump box.

Challenges

The King County Health Department wanted to guard against any possibility of a leaking tank, so Pelzel came up with the idea of wrapping the tanks in plastic. Liners common for sand filters are not rated for saltwater exposure, so the choice was a special 30 mL liner. The A Advanced crew wrapped the tanks at the shop. That way technicians were able to lower the tanks into the water table without the risks of the plastic being punctured or sagging, Gunia says.

Because installation space was so tight, the crew had to remove two sets of stairs, one to an upper balcony and another to a higher terrace. Concrete around the base of the house was also removed to allow installation of the tanks and dripline. A Advanced has an architectural division, and that group built new stairs when the system was in the ground.

Technicians reached the property by driving about a quarter mile across the beach from a city park. It's a common route for other service providers, but the scheduling for A Advanced had to be precise because tide times change every day. Every working day, the crew lost about half an hour as the time of low tide shifted on the clock.

On several days during the two-week construction, technicians had to pull all the equipment off the site and remobilize the next morning. "We left a compressor outside the bulkhead one night only to realize the tidal waters had come within a couple of feet of that," Gunia says.

Crews didn't have to wait for low tide to move gear, only water low enough to allow driving. "In fact, we wanted moisture on the beach to carry the weight of the truck," he says.

Yet the path was narrow. While trying to turn around one day, a vacuum truck driver backed too far at the wrong place, and his wheels dropped into a

hole while the tide was coming in. A dump truck headed that way to hook on and pull the pump truck out, but it provided some tense moments. "We suspect that at some point it would have floated," Gunia says with a laugh.

While technicians were breaking concrete at the start of the job, they left one of the mini-excavators parked on top of the bulkhead wall. It was the safest spot because there was no room behind the bulkhead and next to the house.

Approval of the work took about 18 months because this was a nonconforming use. The owners handling the estate were very supportive, Gunia says. They showed up at every meeting and did their best to apply pressure to King County to approve the work.

At approximately \$132,000, this was an expensive project. But it meant the house now has value as a residence instead of as only a demolition project.

"This property has an incredible view of the Olympic Mountains," Gunia says. "Whales swim in front of it. You cannot reproduce this under today's code requirements and restrictions, let alone even consider building at the bottom of a bluff like this."

"There will be no more homes like this," he says. "There will only end up being less."

Because of the team Gunia worked with, there won't be fewer homes just yet. ■

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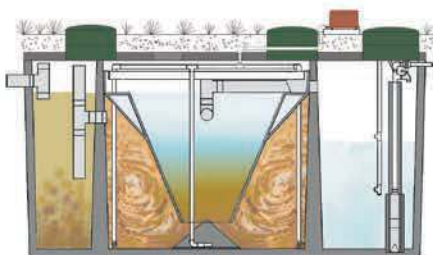


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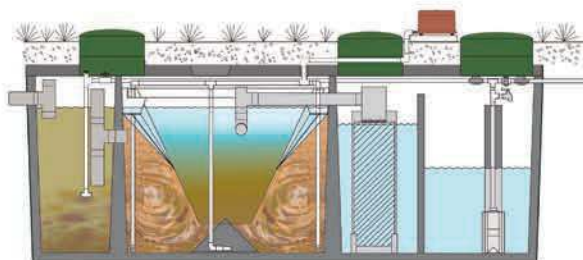
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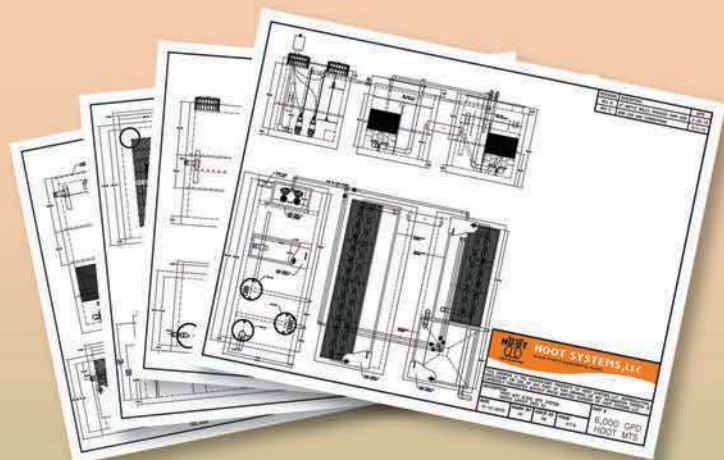
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Hoot - ANR

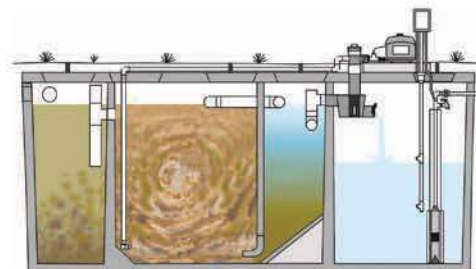


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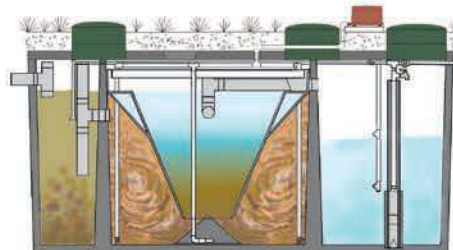


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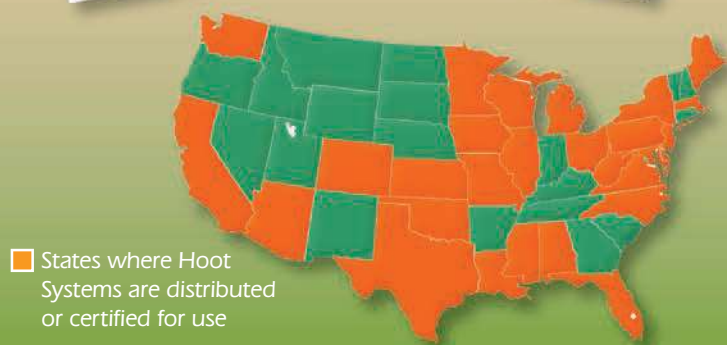


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	SeptiTech STAAR	100 to 150,000	1996	SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculation) Filter Systems are designed for both multi-family domestic and high-strength commercial wastewater from 100 gpd to 150,000+ gpd for residential and commercial wastewater treatment applications. Utilizing partially submerged media to treat high organic loads that integrate with other technologies and accessories, the simple, automatic and reliable equalization and clarification process treat high organic loads that integrate with other technologies and accessories. SeptiTech's "Smart" technology allows the system to go into a sleep mode that will dial down activity and eventually shut all power off until normal flow conditions are detected.	
	BioBarrier	100 to 150,000	2009	BioBarrier MBR is certified to NSF/ANSI 40 class 1, NSF/ANSI 245 (nitrogen reduction), and NSF/ANSI 350 standards, the BioBarrier Membrane BioReactors (MBRs) BioBarrier GWMBR (greywater-only), and BioBarrier HSMBR (High-Strength) are complete, optimized wastewater/greywater systems that provides high levels of treatment while dramatically simplifies the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process to remove 99.9% of the contaminants. This blackwater/greywater treatment system establishes the material, design, construction and performance requirements for onsite residential and commercial applications. Ideal for small lots, waterfront properties, AG/wineries, and water recycling applications; see our Winery Wastewater Treatment version.	
Clarus Environmental Products 3649 Cane Run Rd. Louisville, KY 40211 800-928-7867 • 502-778-2731 www.clarusenvironmental.com See ad page 33	Z-Cell High Performance Wetland	450 to 36,000+	2001	The Z-Cell technology can be used in residential, commercial, or small community applications for treating residential strength septic tank effluent. The Z-Cell is a timed dose system and the wastewater has a 36" vertical path to an outlet pipe below the wetland's surface. By moving water vertically, the fluid must pass through the horizontally oriented plant root zone. This eliminates short circuiting, an issue common in conventional constructed wetlands. During the growing season, evapotranspiration through plant leaves reduces the hydraulic load to downstream components. Produces better than secondary quality effluent.	Contact Manufacturer
	Recirculating Media Filters	450 to 36,000+	2001	Designed for use in residential, commercial, or small community applications for treating residential strength wastewater from a septic tank. Treatment occurs below grade as the fluid trickles down through the pore spaces of the media where aerobic organisms feed on the nutrients. Effluent leaves the system through an outlet pipe in the bottom of the filter. Multiple RMFs can be used together when greater capacities are needed. Effluent can be discharged above or below grade. Above grade disposal must meet local health codes or guidelines. Produces better than secondary quality effluent.	Contact Manufacturer
	Fusion	450 to 800	2006	Drop-in wastewater treatment units that use anaerobic and aerobic zones to produce secondary quality effluent. The "drop-in" system is easy to install and maintain. Filter media are never removed or replaced. Key operating features include the constant recirculation of treated wastewater and a twice-daily automatic backwash cycle that returns residual sludge to the head of the system. A quiet, programmable compressor delivers oxygen to aerobic zones, while consuming as little energy as a 65-watt light bulb. The Fusion's unique design enables it to be installed without a pretreatment tank, making it ideal for use on sites where space is limited.	AL, AR, MI, NY, OH, VA
Delta Treatment Systems 9125 Comar Dr. Walker, LA 70785 800-219-9183 • 225-665-6162 info@deltatreatment.com www.deltatreatment.com 	DF Series	500 to 1,500	1993	The process occurs entirely within the self-contained treatment unit which is comprised of outer mixing tank and a cone-shaped settling chamber. Raw, unsettled domestic wastewater enters directly into the mixing tank where mixing occurs through an air distribution system. The mixed liquid then enters the settling chamber from the bottom. The settling chamber maintains a quiet condition which allows solids to settle down and re-enter the mixing chamber for more processing. The liquid is hydraulically displaced upward and is discharged as a clear, odorless treated water which meets or exceeds state water quality standards.	AL, AK, AZ, BC, BWI, CA, CO, FL, GA, HI, ID, IL, IN, IA, KY, LA, ME, MI, MD, MN, MO, MS, MT, NC, NM, NV, NY, OH, OK, ON, OR, TN, TX, UT, VA, WA, WI, WV
	ECOPOD	500 to 100,000	2006	The ECOPOD Advanced Wastewater Treatment System is a FFBR (fixed film bioreactor) system that houses an engineered PVC media specifically designed to treat domestic wastewater. Five models accommodate daily flows ranging from 500 to 1,500 gpd, with customizable options available for commercial applications up to 100,000 gpd. The ECOPOD is ideal for individual residential installations, cluster designs, and small-to-medium commercial wastewater treatment applications. Self-contained, it can be inserted into a standard-sized septic tank or vault providing quiet, odorless operation. ECOPOD is certified to ANSI/NSF International Standards 40 and 245, FHA and VA acceptable, and suitable for intermittent usage.	
	Enviro-Aire Series	500 to 1,500	2005	The plant achieves treatment by a flow through process. Raw sewage enters a primary chamber, which has a hydraulic capacity of 346 gallons, providing a retention time of 16.6 hours. This chamber provides for separation of heavy, easily settled solids as well as floatable materials such as grease. Settling solids accumulate on the bottom and floatable solids accumulate on the surface. Effluent from the clear layer flows into an aeration/mixing chamber with a 28-hr retention time. An aeration system provides for oxygenation of the primary effluent with the wastewater in the aeration/mixing chamber. Air is introduced by passing from the air pump to the air drop-line located in the chamber. The mixed liquor enters the settling chamber at the bottom and travels upward toward the discharge pipe. The quiet condition allows solids to settle down and re-enter the mixing chamber.	IL, LA, MS, TX

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
Ecoflo by Premier Tech Aqua 200 Kelly Rd. Quakertown, PA 18951 800-632-6356 • 267-371-9527 pta@premiertech.com www.ecoflobiofilter.com See ad page 7 	Concrete Ecoflo	1 to Unlimited (cluster)	1995	Robust and durable, the concrete Ecoflo wastewater treatment system stands strong where other systems fail. The watertight design means you can install pumped models in areas with high water tables – areas where it once would have been impossible to build. Tanks are made by local precasters and systems come pre-assembled and ready to be installed. Built-in lifting anchors make loading and unloading a breeze. NSF/ANSI and CAN/BNQ certified. Sizes range from 420 to 750 US gal./day (1,600 to 2,800 L/day).	AZ, CA, IA, IL, MN, NJ, NY, PA, VA, VT Canada: AB, BC, NB, NL, NS, ON, QC
	Ecoflo PACK	1 to Unlimited (cluster)	2016	The Ecoflo PACK saves you time and money. This all-in-one wastewater treatment system includes a primary tank and biofilter, pre-assembled and ready to be installed with one excavation. Perfect for small lots, this system helps you lower your on-site costs without compromising quality. The Ecoflo PACK delivers superior performance and satisfies customers who want an eco-friendly solution. The filtering media is made of renewable and recyclable coconut husk fragments, and no energy is required for treatment. NSF/ANSI and CAN/BNQ certified. Three sizes available: 500, 600, and 750 US gal./day (1,900, 2,200, and 2,800 L/day).	
Eliminite, Inc. PO Box 359 Belgrade, MT 59714 888-406-2289 info@eliminite.com www.eliminite.com 	Eliminite Grizzly	Up to 50,000	1997	The Eliminite Grizzly system is designed for large-scale, high-volume, high-strength commercial applications where advanced nitrogen reduction is necessary. The system was originally developed to serve high-altitude commercial and resort developments in the Rocky Mountains where winter temperatures linger at or below 0 degrees F, and seasonal use patterns/dramatic fluctuations in flow and wastewater strength are the norm. It functions with little operator input and simple maintenance. C-Series systems serve high-altitude highway rest areas, resort communities, golf courses, ski areas, mixed-use residential communities, restaurants, RV parks, worker camps, corporate retreats, business parks and convenience stores. It is suited for use in multi-stage treatment trains and as a means of reducing waste strength prior to conveyance to municipal treatment facilities.	US
Eljen Corporation 90 Meadow Rd. Windsor, CT 06095 800-444-1359 info@eljen.com www.eljen.com See ad page 39 	Eljen GSF	Scaleable	1982	The Eljen GSF (Geotextile Sand Filter) is an alternative onsite septic drainfield system. Each GSF module is made up of geotextile fabric and a plastic core material that provide vertical surface area and oxygen transfer. The GSF system applies secondary treated effluent to the soil.	US, Canada, Australia
Fuji Clean USA 41-2 Greenwood Rd. Brunswick, ME 04011 207-406-2927 Fax: 207-406-2929 info@fujicleanusa.com www.fujicleanusa.com See ad page 29 	CE Series	450 to 1,000 single tank systems		Fuji Clean's CE model series averages 50,000 systems being installed annually worldwide. The popularity is driven by a small footprint (about 7' x 4'), low power draw (1.27kWh/day), easy plug & play installation and simple, efficient O&M and consistent treatment (90-95% BOD and TSS removal, NSF 40 certified, no preceding septic tank). There are no moving parts in the "contact filtration" treatment process. One 80 L/min external air blower (FujiiMAC) introduces oxygen aerobic chambers and powers internal air lift pumps, which manage sludge return and discharge of clean effluent.	Most States
	CEN Series	450 to 900 single tank systems		Fuji Clean's CEN technology provides enhanced denitrification into its standard contact filtration treatment process and produces a consistent high quality effluent (NSF 40/245 certified: 5 BOD, 6 TSS and 10 TN) from straight septic wastewater – no preceding septic tank necessary. There are no moving parts in the treatment process. The CEN5 is compact (about 8' x 4'), lightweight (about 475 lbs), highly maneuverable and features a low power draw (one 80 L/min blower drawing 1.27 kWh/day), plug & play installation and optional wireless telecommunication package that offers both dial and text capabilities. A proprietary electrolysis-based phosphorus reduction option (CRXII) is also available with this system.	
	Commercial Systems	1,000 to 6,000 single tank systems		Fuji Clean's largest CE commercial system, the CE6KG, is now available to supplement its existing CE21 (1,900 gpd), CE30 (2,700 gpd) models and CEN21 (1,900 gpd). The CE6KG, which can treat up to 6,000 gpd, uses the same treatment technology, process flow and one-tank structure as the smaller CE systems and can be squeezed into the tightest of sites. The footprint size is only 36' x 6.5' (including built-in septic tank).	
Hoot Systems, LLC 2885 Highway 14 E Lake Charles, LA 70607 888-878-4668 337-474-2804 questions@hootsystems.com www.hootsystems.com See ad page 21 	LA-Hoot	500 to 1,000	1986	LA-Hoot is an improved version from the original Hoot Treatment System introduced in 1984. Results are better than 10/10 mg/L on CBOD and TSS, with more than a 95% reduction of the wastewater influent. Two-year warranty/NSF Standard 40 certified.	Nationwide
	H-Series	500 to 1,200	1995	Five-stage, one piece system with a pretreatment tank, aeration chamber, final clarifier, optional disinfection device and a pump tank. Results are better than 5/5 mg/L on CBOD/TSS. A 99% reduction on CBOD and TSS. Marketed as BNR in MD and FL with Biological Nitrogen Reduction of >50%. Three-year warranty/NSF Standard 40 certified.	
	ANR	450 to 900	2007	Adds Advanced Nutrient Reduction to the Hoot System. Results of 5.8 mg/L on TN, better than 10/10/10 mg/L on CBOD/TSS and Total Nitrogen. Areas where 10 mg/L is the discharge limit for Total Nitrogen, the federal level for drinking water. Three-year warranty/NSF Standard 40 and 245 certified.	
	MTS	3,000 to 500,000	2011	The Hoot MTS, (Media Treatment System) is a series of larger treatment systems that were tested and verified under NSF Standard 40/245 protocol. The Hoot MTS is used for Residential, Commercial and High Strength wastewater applications and can also be set up to treat for Ammonia, Total Nitrogen, Phosphorus and other discharge parameters. Instead of selling a one size fits all box, or multiple boxes, Hoot can deploy our MTS technology into locally sourced concrete castings, retrofit into existing structures or fabricated for new, poured in place vessels. We have substantial experience with RV parks, camps, convenience stores, restaurants, shopping plazas, schools, churches, brewery/winery tasting rooms and other challenging applications.	

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
Jet Inc. 750 Alpha Dr. Cleveland, OH 44143 800-321-6960 • 440-461-2000 Fax: 440-442-9008 email@jetincorp.com www.jetincorp.com See ad page 13 	J-Series	500 to 1,500	1993	NSF Standard 40 and 245. Fixed Film BAT media and Jet Aerator.	US and International
	R-Series	450 to 1,400	1993	NSF Standard 40 and 350. Fixed film BAT media and Jet Aerator.	
	JCP	1,500 to 300,000	1993	Jet Commercial Package Plants. Extended aeration. MBBR.	
Knight Treatment Systems 281 Cty. Rd. 51A Oswego, NY 13126 800-560-2454 Fax: 315-343-2941 mark@knighttreatment.com www.knighttreatment.com See ad page 41	White Knight	Scaleable	2010	The White Knight Microbial Inoculator Generator from Knight Treatment Systems offers an enhanced form of aerobic treatment technology 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 ATUs and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septage processing facilities.	US, PEI, Eastern Caribbean
MST Manufacturing, LLC 23362 Medero, Ste. C Mission Viejo, CA 92691 877-473-7842 • 949-297-4590 Fax: 949-916-2093 microseptec@microseptec.com www.microseptec.com 	EnviroServer	600, 1,200 and 2,500	1998	The EnviroServer ES is a combination of primary treatment, flow equalization, and secondary treatment by both fixed-growth and suspended-growth aerobic processes. The system consists of five chambers in one compact pre-engineered unit. The first chamber is a primary clarifier, the second chamber is the first aeration zone, the third chamber is the second aeration zone, the fourth chamber is the final clarifier, and the fifth chamber is the effluent chamber where an optional pump(s) and disinfection device may be installed.	AZ, CA, DC, DE, MD, NJ, NV, PA, VA
NextGen Septic, LLC 1776 Mentor Ave. Cincinnati, OH 45212 513-262-9506 sales@nextgenseptic.com www.nextgenseptic.com 	NextGen Advanced	1,200		NextGen Advanced with Septigen technology is a three-stage, compact, wastewater treatment solution that saves water, saves money and saves the environment. In stage one, simultaneous biological aerobic and anoxic treatment of the organic material breaks down solids and treats nitrogen and phosphorous through a combination of proprietary biomedica and high-capacity aeration technology. Then, membrane separation phase treats water for nitrogen and phosphorous in addition to filtrating and treating any remaining suspended solids. Ozone disinfection technology is used as a final stage to ensure treated water meets surface discharge and reuse standards.	Nationwide
	NextGen Retrofit	1,200		NextGen Retrofit with Septigen technology can be installed into any approved, existing septic tank and works to repair a clogged soil drain field in as little as 8-12 weeks. By eliminating the cost of excavation and tank removal as well as the cost of replacing or extending the drain field area, NextGen saves the homeowner tens of thousands of dollars on installation alone. And, the low-maintenance design gives them peace of mind that the field will remain clear in the future. NextGen technology features a compact, stand-alone, automated, two-stage treatment system for domestic sewage that removes nitrogen phosphorous.	
	NextGen Community	1,500 to Unlimited		NextGen Community Septic Systems are advanced multi-home sewage treatment systems that are hybrids between a packaged treatment plant and an advanced septic system. The system design eliminates the need for large septic tanks in each yard, creates a stand-alone treatment system that removes traditional contaminants plus nitrates and phosphorous, and provides graywater irrigation usable for community greenspace. The NextGen system uses Septigen™ technology, a patent-pending, multi-stage treatment process that includes simultaneous aerobic and anoxic treatment, high-capacity aeration, membrane separation and disinfection.	
Norweco, Inc. 220 Republic St. Norwalk, OH 44857 800-667-9326 • 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com See ad page 43 	Singulair Model 960 and Model TNT (Total Nitrogen Reduction)	500 to 1,500	1996	The Singulair system is the state-of-the-art alternative to a troublesome septic tank for domestic wastewater treatment. Employing the extended aeration process, the Singulair plant provides flow equalization, pretreatment, aeration, clarification, tertiary filtration and optional chemical addition within a single precast concrete tank. Designed for domestic wastewater flows ranging from 500 to 1,500 gpd, performance of the Singulair system is certified by NSF International (Standards 40 and 245) and the Canadian Standards Association.	North America, Central America, South America, Europe, Africa and Middle East
	Singulair Green Model 960 and Model TNT (Total Nitrogen Treatment)	600	2009	The Singulair Green aerobic treatment system incorporates Norweco's advanced aerobic treatment process into a durable, watertight polyethylene tank. It is ideal for new or retrofit applications and can be installed easily in the most difficult jobsite with just a backhoe. Incorporating support ribs and inherently strong arch shape, the durable Singulair Green tank will provide decades of reliable performance. Designed for domestic wastewater flows up to 600 gpd, with treatment performance meeting or exceeding the strictest state and county requirements, Singulair Green is certified by NSF International (Standards 40 and 245).	
	Hydro-Kinetic	500 to 1,500	2013	The Hydro-Kinetic wastewater treatment system employs innovative Hydro-Kinetic filtration technology to produce the cleanest, most consistent effluent quality available. They Hydro-Kinetic system uses the extended aeration and attached growth processes to treat wastewater, and features innovative nitrification-denitrification technology. The Hydro-Kinetic FEU system is the only NSF/ANSI Standard 40 and 245 certified residential wastewater treatment system to pass two consecutive back-to-back tests without performing routine maintenance for a full 12 months. It quietly, efficiently and automatically pretreats, aerates, flow equalizes and filters all wastewater returning only the purest effluent back to the environment.	

Norweco continued

MANUFACTURER	BRAND	GPD	RELEASED	DESCRIPTION	DISTRIBUTORS
Norweco, Inc., continued 220 Republic St. Norwalk, OH 44857 800-667-9326 419-668-4471 Fax: 419-663-5440 email@norweco.com www.norweco.com See ad page 43	Singulair R3 and Singulair R3 Green	500 to 1,500	2018	The Singulair R3 REDUCES water consumption, REUSES treated effluent and RECYCLES water to conserve and recharge our groundwater. It provides the cutting-edge solution to chronic water shortages and reduces energy costs of water and wastewater treatment. The system efficiently treats incoming wastewater to the highest level for restricted indoor and unrestricted outdoor use. Unrivalled performance that exceeds the effluent requirements of NSF/ANSI Standards 40, 245 and 350.	North America, Central America, South America, Europe, Africa and Middle East
Presby Environmental 143 Airport Rd. Whitefield, NH 03598 800-473-5298 • 603-837-3826 Fax: 603-837-9864 info@presbyeco.com www.presbyenvironmental.com See ad page 5  Presby Environmental, Inc.	Advanced Enviro-Septic	Varies	2005	Advanced Enviro-Septic (AES) is a passive treatment and dispersal system. This effective and non-mechanical onsite system is designed for residential, commercial, and community use. AES has been proven to remove up to 99% of wastewater contaminants without the use of electricity or replacement media. AES does this quickly and naturally establishing multiple bacterial treatment environments throughout the system that break down and digest wastewater contaminants leaving the septic tank. This passive process allows the system to discharge highly purified wastewater, preventing soil clogging and groundwater contamination. AES has third party certifications from NSF, Cebedean, BNQ, and SAI Global.	30 States and 14 Countries
	EnviroFin	Residential/Commercial	2016	The Enviro-Fin passive onsite wastewater treatment and dispersal system is designed to have a small footprint and ship easily, while maintaining and exceeding NSF/ANSI Standard 40 treatment. Effluent leaves the septic tank and enters the fin distribution unit, where it settles and breaks down suspended solids. Effluent is distributed to the eight treatment fins, which are filled with coarse green plastic fibers, filtering and digesting more suspended solids.	NH, ME, AL
Waterloo Biofilter Systems Inc. 143 Dennis St./PO Box 400 Rockwood, ON N0B 2K0 866-366-4329 • 519-856-0757 Fax: 519-856-0759 info@waterloo-bio-filter.com www.waterloo-bio-filter.com 	Waterloo Biofilter Systems	Up to 50,000	1994	The Waterloo Biofilter is an efficient, low maintenance biological trickling filter for treating residential and commercial wastewaters. Fully scaleable and developed for cold climates, the system has small space and low energy and maintenance requirements. The patented filtration media carries a 20-year warranty. A variety of small to large plug & play configurations for ease of installation are available. This includes attractive self-contained modules in 5,000 and 50,000 gpd ISO shipping container units, and remote camp units transportable by helicopter. Versatile and robust systems include options for re-use, nitrogen and phosphorus removal, and remote monitoring.	US and Canada

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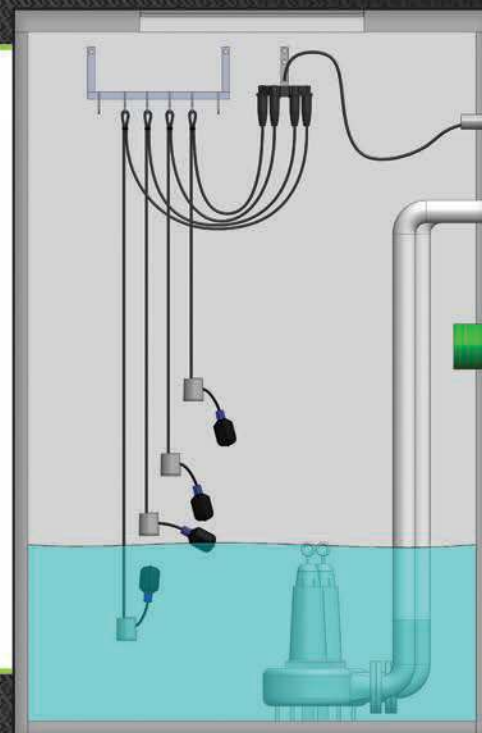


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Jim Anderson, Ph.D., and David Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor. Readers are welcome to submit questions or article suggestions to Jim and David. Write to ander045@umn.edu.

You Installed a Quality Wastewater System. Now It Must Be Protected.

You want homeowners to take an active role in onsite system care?
Share these tips to reduce water use and abuse.

By Jim Anderson and David Gustafson

Last month we discussed the responsibilities of the installer to ensure long-term operation of wastewater treatment systems. A good deal of the discussion centered on supplying information to homeowners so they have knowledge to make good decisions about the use of their systems. We thought it would be a good idea to suggest specific actions homeowners can take to use and maintain their systems properly.

If an onsite system is properly located and installed, the three most common causes of premature failure are within the homeowner's control. They are overuse of water consistently exceeding the finite capacity of the system, using and flushing products that are harmful to the biology or operation of the system, and lack of maintenance.

Over the years, we have worked with numerous homeowners whose problems were solved simply by implementing water-saving techniques. The bottom line is the system was designed and installed to handle a specific amount of water. If that amount is exceeded on a regular basis, everyone in the industry would say that system is destined for failure, and the solution is to either increase system size or cut back on water use.

Anti-bacterial soap use should be limited, along with any other strong cleaners and bleach that would impact bacteria in the septic tank. **The key here is not total elimination but to use the products only when needed.**

In the past, we have discussed not using the toilet as a disposal receptacle. Every additional flush that does not need to be made adds additional water to the system. Whenever water is used, a similar amount flows out of the septic tank and to the soil treatment area. Our tongue-in-cheek way to express this has been, "Do not put anything down the toilet unless you have drunk or eaten it first." Our one exception is toilet paper; even here, use should be limited to only what is necessary. Low-flush toilets are getting better every day, so another way to reduce toilet water inputs is to replace the toilets.

While we are talking about toilets, they are not garbage disposals, so things like cigarette butts, baby or cleaning wipes, and unused medications should not be flushed. Solids such as wipes, sanitary products and condoms do not settle in the tank; so they can plug the effluent screen causing backups that can flood the lower level of the house if there is not a high tank alarm to alert the homeowner.

REDUCE CHEMICALS

We all like to take long, hot showers. From a water-use perspective, installing low-flow showerheads, limiting shower times and shutting off the water while soaping up are all ways to reduce water use to help keep the system within capacity. We've worked with homeowners who put timers in the shower to enforce family rules requiring shorter showers. Homeowners should resist the temptation of turning their bathrooms into a warm sauna by running hot water. If they want a sauna, they should build one in the backyard.

There is a growing understanding that anti-bacterial cleaning products can affect the biology of septic tanks and ATUs. These cleaners include automatic toilet bowl cleaners that dispense product every time the toilet is flushed. Shower cleaner and other anti-bacterial soap use should be limited, along with any other strong cleaners and bleach that would impact bacteria in the septic tank. The key here is not total elimination but to use the products only when needed.

Water can also be conserved in the laundry room. Homeowners should only wash full loads or make sure their washers have the function to change water levels for different loads and adjust accordingly. Wash for a typical home generally gets done in one day, start to finish, due to work schedules. This puts a strain on the system for that day; a better approach is to spread use out over the week, a load or two a day.

Water conservation should be practiced in the kitchen, too. Dishwashers should only be run with full loads. The good news about dishwashers now is they generally use less water and do a better cleaning job than in the past. However, some can act like a garbage disposal in the delivery of solids to the septic tank. And homeowners who rinse dishes clean before putting them in the dishwasher can greatly increase water usage.

DISCOURAGE DISPOSALS

If dishes are washed in the sink, fill the basin versus washing them under running water. Similarly, do not leave the water running while

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washing vegetables. Use only the amount of soap necessary for the job, whether washing in the sink or in the dishwasher. As in the bathroom and laundry room, limit the use of anti-bacterial soaps and cleaning products. Obviously for food safety reasons, some use of these products is necessary.

The final product we'll discuss is one that has been discouraged a lot over the years: the garbage disposal. This product has a tendency to add more water to the system. Most disposal manufacturers recommend running water with them for one to five minutes after the material has been ground. This is to make sure pipes do not get clogged. But at the same time, gallons of water are being used.

Also, disposals increase the volume of solids delivered to the tank. These solids are usually harder to break down and less likely to settle. This increases the need for maintenance of effluent screens and solids removal.

This is only a partial list and discussion of homeowner responsibilities. It should be obvious there is a lot of room for users to make poor decisions about their systems, so we as an industry must put an emphasis on homeowner education and promotion of regular maintenance visits. □



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Florida Wastewater Professionals Remain Optimistic About Potential Water-Quality Laws

By David Steinkraus

Florida's coast has been blanketed with algae blooms in the last couple of years. It was the talk at the state capitol in Tallahassee, and early in the year there was hope that bills addressing these water problems would become law. That didn't happen when the legislative session ended in May.

Only one bill, HB 973, made it to the floor of the House, and that bill incorporated ideas from several others. Yet there is still reason for hope, says Roxanne Groover, executive director of the Florida Onsite Wastewater Association.

"What we saw was a tremendous amount of discussion with new House members and a freshman senator," she says.

Even though it was not perfect, HB 973 incorporates concerns of the wastewater industry. "And we already know these bills are being discussed for next session and will be discussed over the summer," Groover says.

One part of the bill would have transferred oversight of onsite systems from the state Health Department to the Department of Environmental Protection. The Florida Onsite Wastewater Association was concerned this would have made work more difficult for installers because Health Department rules are overseen by county offices, whereas the Department of Environmental Protection has regional offices, so the shift could have slowed access to information.

The bill also would have required advanced onsite systems for properties along the Indian River Lagoon, notable in recent years for being regularly choked with algae. (The lagoon is formed by a barrier island along Florida's east coast and stretches about a hundred miles from roughly Orlando to near Palm Beach.) There were also provisions about the application of biosolids and grants for clean-water projects.

Groover says she thinks the bill dealt with so many critical issues that legislators wanted more time to think about them.

"These issues they're talking about for water quality are tremendously important to everyone in the state of Florida. It doesn't matter where you come from or what you do," she says.

What helped the Florida Onsite Wastewater Association get its views across was the dedicated involvement of several members, she says. The organization has held legislative days before, when members go to the state capitol for a day of meetings with legislators, but it has never had a group that kept returning to the capitol again and again.

In addition to its two lobbyists (Manny Reyes of Pereira Reyes Consulting and Bill Helmich of Helmich Consulting), the Florida Onsite Wastewater Association had Darla Eberst, board member and a co-owner of Beltz Septic & Portable Toilets; Jerry and Lisa Prescott, owners of

Liberty Plumbing & Septic; Michael Messina, owner of Messina & Associates and a manufacturer's representative for Fuji Clean USA; and Mark Repasky, P.E., president of Wastewater Technologies Inc.

This group could answer any question a legislator or staff person posed, Groover says. And because there were so many of them, they could speak at committee hearings, which are often scheduled simultaneously.

One revelation was how surprised legislators and staff people were about industry technology, she says. The Florida Onsite Wastewater Association group provided a list of about 45 technologies — whether approved by the state or not — available to solve wastewater problems.

"I think a lot of people were unaware that we have technology that is available to meet the need," Groover says. "Most people think all we have available is a septic tank and a drainfield. In most cases, I think the information was well received. In fact, I'm still receiving emails from folks I spoke to."

The next legislative period begins in January 2020 and ends 60 days later.

Minnesota

Because of the need to protect human health and the environment, a group of Amish people cannot be exempt from state wastewater regulations, a Minnesota judge has ruled. Four men, all part of the Swartzentruer Amish community in Fillmore County, sued to prevent the state from requiring installation of a septic system for graywater disposal. (Amish use outhouses for human waste, and that is permitted under state law.) They say their objection is based on a religious belief.

The county and state say that religious belief is not shared by all members of the Swartzentruer community, and they say the Amish already use similar components — such as gravity tanks and pipes — to move water into their homes.

In his ruling, Judge Joseph Chase writes that the Amish desire interferes with the rights of others. "This is a situation in which the Amish cannot, despite their most sincere efforts, be separate from the world. All water is connected, and all of us, Amish and English alike, drink from the same aquifers."

Michigan

Public irritation over a proposed onsite system rule has led the Mid-Michigan District Health Department to rethink that idea. Under the proposed rule, people with onsite systems would have been required to pay the Health Department a discharge permit fee every 10 years as well as pay for private inspections.

Health Officer Marcus Cheatham says the department believes the public criticism was correct, according to *The Daily News* of Greenville. He found three reasons for the public opposition. First, about 90% of systems work, and homeowners don't want to pay a fee in addition to system maintenance costs. Second, households with malfunctioning systems are low-income and don't have the money for repairs. Third, there are other sources of pollution in local rivers such as manure from animal feeding operations.

The department is now working on a new program for its territory of Clinton, Gratiot and Montcalm counties in the center of the state's Lower Peninsula. This new water-quality program would focus inspections on systems likely to be out of compliance with rules, would help people find financial assistance for repairs, and would make sure land application of waste, which the department already regulates, is done properly.

Delaware

A septic service owner was charged with illegal dumping and trespassing in what his wife says was a misunderstanding. According to a news story from the *Cape Gazette* in Lewes, Victor Daniels III was hauling pool water when he noticed water leaking from his truck. Daniels owns Dukes Septic Service, which he took over two years ago from his grandfather.

Daniels pulled onto a property he thought was owned by a business associate, says his wife, Lillian, who co-owns the company. After repairing the leak, a woman drove up and said the land was hers. Police and the state Department of Natural Resources and Environmental Control were called in. Lillian Daniels tells the newspaper that fewer than 500 gallons of water were spilled.

The state says Daniels violated his hauling permit, and the police cited him for trespassing.

California

A pumper accused of illegally dumping septage from his truck into a municipal sewer line completed his jail sentence last spring and was released. At a hearing in February, he was ordered to pay \$18,630 in restitution to the city of Santa Rosa. Police spent a year tracking Carlos Velarde Chavez. He owned Carlos' Petaluma Septic Services and was originally charged with two felonies and 22 misdemeanors.

According to the criminal complaint, he dug an access hole in the yard of his home and connected his truck to a municipal sewer line. The police observed him from October to December 2017. A local pumper tells investigators he had never seen Chavez or anyone else from his company discharge septage at a legal dumping station. Had Chavez used a legal dumping facility, he would have paid about \$119,000 to dispose of the septage he piped into the sewer line, says a search warrant filed in the case.

South Dakota

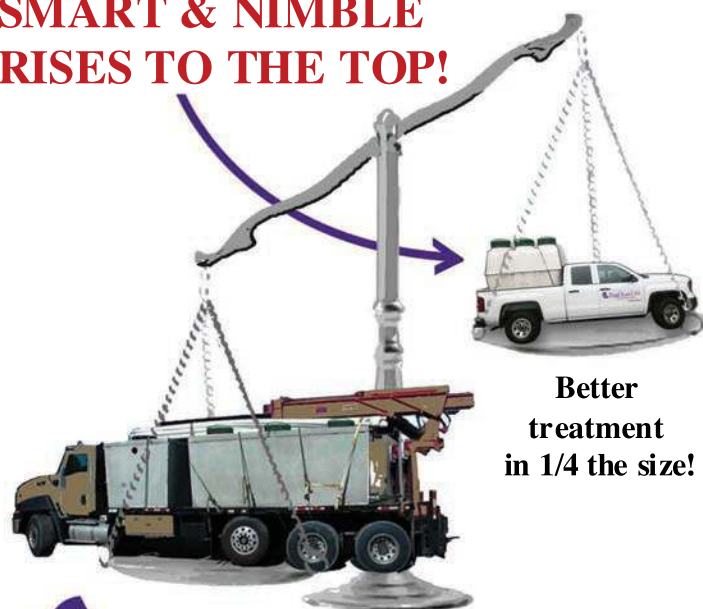
A judge upheld the conviction of a former Pennington County official accused of violating county septic system laws.

George Ferebee was convicted in 2017 for refusing to have his onsite system pumped, inspected and permitted as required by county ordinance. He appealed that conviction and was granted a second trial. Several months of settlement talks followed, but there was no resolution. Recently, Circuit Court Judge John Bastian affirmed the conviction and sentence of a \$200 fine plus \$60 in court costs.

Ferebee objects to the county's 2010 septic laws as a form of government overreach. His fight against those laws spilled into western South Dakota (Pennington County includes Rapid City) when he tried to shift his fight to the South Dakota Water Management Board and have it invalidate rules of the county and Rapid City. The board rejected his petition. Ferebee may still appeal his conviction to the state Supreme Court. ❑

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How Do You Convert 88,000 Cesspools to Modern Onsite Systems?

A massive wastewater upgrade plan in Hawaii requires new technology and a long time-horizon for cash-strapped homeowners

By David Steinkraus

In 2017, the Hawaii Legislature passed a bill requiring the replacement of all cesspools by 2050. Gov. David Ige signed that bill, and now a state working group is digging into how the state can make that law work.

Hawaii is a state of about 1.4 million people and has approximately 88,000 cesspools. The number of cesspools isn't certain. What is certain is that those cesspools are contributing pollution to the ocean surrounding the Hawaiian Islands. From 2006 to 2016, fecal bacteria counts along the islands' beaches increased fivefold.

State Rep. Nicole Lowen, D-Kailua-Kona, represents a district on the western shore of the Big Island, and for her constituents, the issue is critical in more ways than one.

"We rely on healthy reefs for tourism. It's a big draw, and it's the bulk of our economy," she says. But all drinking water comes from the island's aquifers as well. "As an island, we can't get water easily from elsewhere."

As a member of the Cesspool Conversion Working Group, Lowen will have a direct hand in helping to change Hawaii's dependence on cesspools as a means of wastewater treatment. On the working group are other legislators, a banker, a Realtor, people from government water and wastewater agencies, scientists and representatives from environmental advocacy organizations.

The group began meeting in 2018 and has a list of 14 tasks laid out by the Legislature. Among those are developing a long-range plan for the replacement of all cesspools, prioritizing the order of replacements, examining how this will be paid for and how much landowners can afford to pay, considering what technologies are best suited for the job and determining whether some areas should be exempt.

FINDING THE WORST

Although the 2017 law calls for replacement of all cesspools, in reality that may not be necessary, or it may

not be necessary immediately. A major challenge will be finding the information needed to make that decision, says Sina Pruder, wastewater branch chief of the Hawaii Department of Health. "Because one of the things that group will do is actually divide cesspools into those that are impacting state waters as well as groundwater," she says. The hope is to identify, and perhaps exempt, cesspools that aren't doing either.

As with any other type of wastewater technology, geology will play a part in the decision. You can't find a piece of land more than about 30 miles from the shore, but you can find parcels at high altitudes and maybe with a substrate where water doesn't move quickly and is not near groundwater, Darren Lerner says. He holds a Ph.D. in biological sciences, directs the University of Hawaii Sea Grant College Program and is interim director of the university's Water Resources Research Center. "Some of those places can be a lower priority in terms of conversion and may be suited for septic," he says.

He also emphasized the island's dependence on groundwater. "We have surface freshwater, but we do not have these perennial streams you would be familiar with on the continent. Many of those streams are flash. They exist when we have periodic rain," he says. And because of the steep inclines on the islands, most water moves to the ocean very quickly.

There is a good deal of information telling scientists where pollution is happening, especially in terms of nitrogen and phosphorus, he says. But that's different from knowing whether pollution from one particular cesspool is having an impact. It's also possible there are acceptable cesspools if some are found to have no effect or minimal effect on the environment, he says.

Lerner sits on the working group's subcommittees for technology and for data collection and prioritization. The other subcommittee will look at how to pay for the conversion. "You can't go out and convert all 88,000 tomorrow. We're talking in the billions of dollars," he says.



Nicole Lowen



Darren Lerner



Sina Pruder

TECHNOLOGY WANTED

Given the island's topography and geology, finding a suitable technology to replace cesspools will be a challenge. Connecting to municipal sewer won't solve the problem in every location, Lerner says. About 1 million of the state's 1.4 million people live on Oahu, and while sewer service is available there, it is not fully established even in the populous area around Honolulu. The cost of extending it to the rest of the island would be significant, he says.

Yet because of geology and proximity to the ocean or groundwater, in some locations septic tanks and drainfields aren't a much better solution than cesspools, he says.

"The technology we're using for treatment is from, like, the Industrial Revolution," Lowen says. She introduced a bill to start a pilot project with new technologies, in particular the Bill & Melinda Gates Foundation waterless toilet that turns feces into ash. Her bill passed the House but died in the Senate.

Ideally there will be a solution that has low installation and maintenance costs, Pruder says. Membranes or aeration blowers would preferably not be included because of the complexity they add. "We've found that a lot of homeowners don't maintain their systems," Pruder says. "I think one thing our state is looking at is some kind of breakthrough with passive systems."

Especially interesting, she says, is some of the research happening on the U.S. East Coast, which has been grappling with water-quality problems from nitrogen pollution. Notable is Suffolk County, New York, on the eastern tip of Long Island, where the county and several municipalities now mandate advanced nitrogen-reducing systems as the solution for about 360,000 cesspools.

Better technologies would also bring better opportunities for water reuse, Lerner says. Nitrogen and phosphorus could be extracted and water could be recycled for purposes that can, but don't have to, include potable use.

The Big Island will be especially affected by the replacement law, Pruder says. In 1991, the islands of Maui, Kauai and Oahu passed laws to prohibit new cesspools. The Big Island did not limit cesspools and people kept installing; and as a result, the island now has about 50,000, many next to the ocean shore.

LONGER DEADLINE

When the law mandating conversion was newly passed, there was a sense of fear among the public, Lowen says. "I think people didn't understand what the requirement would be or when it would come into play." Once they understood there was a span of about 30 years before conversion would be required, that fear subsided.

Yet motivating people to pay the cost of conversions will be a difficult issue as well because in most places the cost of a cesspool is cheap, Lowen says. By contrast, the islands have many solar power installations because the high price of electricity gave homeowners an incentive to make upfront investments in solar that paid off with long-term savings. Converting a cesspool makes good sense for public health and the environment, but there is no financial incentive for homeowners, she says.

It's a big task that Hawaii has set itself. Not only the Cesspool Conversion Working Group will be involved. In April the state Health Department posted two requests for proposal. One of those contractors will help the

"We've found that a lot of homeowners don't maintain their systems.

I think one thing our state is looking at is some kind of breakthrough with passive systems."

Sina Pruder

state evaluate technologies suitable for replacing cesspools, and the other will help determine what funding is available to help pay for all those conversions. Even converting a cesspool to a septic system can run \$20,000 to \$30,000 per household, and many homeowners cannot afford that, Lerner says. Parts of the islands are composed of "blue rock," a basalt that is notably hard and very difficult to excavate, Pruder says.

"I think the positive is that the state is really committed to moving forward," Lerner says. There is no need to convince the state of the existence of a problem. Everyone recognizes it and recognizes the need to work together.

None of this will happen immediately. In recognition of the size of the task, the Legislature passed a bill in the spring to extend the deadline for the group's final report by two years, from 2021 to 2023. ▣



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'You're Only as Good as Your Worst Guy or Gal'

Arkansas pumper and installer Justin Haynes shares small-business words of wisdom, the toughest work site he's faced and his wish for young professionals to populate the wastewater industry

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 Arkansas Onsite Wastewater Association.



Justin Haynes
president and owner

Business: Southland Septic Service,
Hot Springs, Arkansas

Age: 43

Years in the industry: 22

Association involvement:

I've been a member of the Arkansas Onsite Wastewater Association for eight years.

Benefits of belonging to the association:

I get to work with Don and Peggy Daley, directors, who stay on top of the regulations and changes with the state and the health department. They let us know before things are implemented so we know what changes are coming. It's also helpful knowing what issues are associated with the changes, good and bad.

Biggest issue facing your association right now:

There's a lack of support by the membership. Installers and designated representatives don't want to get involved in an organization. And if they do get involved, they don't want to show up at meetings or write letters or talk to the higher-ups at the state to voice their opinion.

Our crew includes:

We do residential pumping, inspections, repairs and installations, as well as maintenance and installations for commercial and municipal accounts including grease traps. Our team includes Tim Vanmeter, disposal facility manager; Brandy Adams, field technician who helps with installs, service calls and repairs; and Jacob Hansen, equipment transporter and helper.

Typical day on the job:

A typical day is very busy with many moving parts. Fielding incoming calls is a large part of my day. I try to keep a pulse on what's happening with the disposal facility, and I manage active projects. Running the truck, doing repairs and maintenance, cleaning and organizing tools are key to operations. Most days require bouncing back and forth between jobs, helping the crew. When there are complicated factors to a job, I generally stay on site for the duration of the project. Syncing the installations with the regular maintenance accounts requires some flexibility, especially when the outdoor elements are a factor.

Helping hands - Indispensable crew member:

Vanmeter is available and right there where you need him at any time, day or night, week in and week out. If there's a need, he fills the spot. He's very loyal. He's been with me six years.

The job I'll never forget:

We were servicing a septic tank and found a lot of debris floating on the surface. The homeowner came out and was looking over my shoulder and asked, "What are those?" They were condoms. There was a blank look on his face and he said, "I don't use condoms." That was awkward. He seemed agitated and upset after that. It turned out that was how he found out his wife had been cheating on him. A couple years later, we came out to pump the tank again and learned he had since gotten a divorce.

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My favorite piece of equipment:

Our latest vacuum truck. It is very powerful and set up just right — simple, but very effective. It's a 2006 Peterbilt with a 5,000-gallon steel tank and Jurop/Chandler pump with all sorts of bells and whistles — jake brakes, tag axle, full-locking rear-end differentials, LED lights all the way around, flotation fronts, 4-inch intake valve on the front of the tank so I can pump from the front of the truck (super handy), and heated valves.

Most challenging site I've worked on:

An installation where I bid the job without looking closely at the numbers on elevation. It was a 25-degree slope, which was extremely difficult. We handled that situation very carefully. I was the only one who ran the machine. I wouldn't let anybody else on it. We had to find flatter areas on the hillside and traverse back and forth to navigate — and use extra care not to flip the machine. We didn't flip it, we got it installed and everybody was happy, but it just goes to emphasize — always look at the permit. When it says tank elevation zero and line one is 20 feet away and elevation is 18 feet, you know it's steep.

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

We've had some doozies: Can you pump out our pool? Can you pump out an elevator shaft? Can you pump out our chicken house (in a flooded commercial building)?

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

The regulations are OK, but there's not enough enforcement. One local pumper, for example, hasn't had a permit (to operate) in 18 years. He

supposedly wanted to buy a local company when the (owner) died, but he never gave the widow the money and talked her out of the customer list and kept the name.


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

There are two. One: You're only as good as your worst guy or gal. All your employees represent your company. If you have one employee who's not doing well, either correct it or make staffing changes because he or she is going to bring your business down. Two: Feedback from customers and business associates can provide a lot of insight if you can take it in with an objective point of view.

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

Probably be on a beach in Mexico. But if I had to work, I've always been interested in building homes.

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

I think we're going to have a real serious problem — and we are already seeing it — because there's a big shortage of people who want to work in this industry. It's a problem not just in our industry, but all over; and I think it's just going to continue to become more and more of an issue. 

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.

Serving the Industry

Visit your state and provincial trade associations

ALABAMA

Alabama Onsite
Wastewater Association;
www.aowainfo.org;
334-396-3434

ARIZONA

Arizona Onsite Wastewater
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www.azowra.org; 928-443-0333

ARKANSAS

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CALIFORNIA

California Onsite
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in Onsite Wastewater;
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Recycling Association;
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Delaware On-Site Wastewater
Recycling Association;
www.dowra.org

FLORIDA

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Wastewater Association;
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GEORGIA

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Wastewater Association;
www.onsitewastewater.org;
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Georgia F.O.G. Alliance;
www.georgiafog.com

IDAHO

Onsite Wastewater
Association of Idaho;
www.owaidaho.org;
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ILLINOIS

Onsite Wastewater
Professionals of Illinois;
www.owpi.org

INDIANA

Indiana Onsite Waste Water
Professionals Association;
www.iowpa.org; 317-889-2382

IOWA

Iowa Onsite Waste
Water Association;
www.iowwa.com; 515-225-1051

KANSAS

Kansas Small Flows
Association;
www.ksfa.org; 913-594-1472

KENTUCKY

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Wastewater Association;
www.kentuckyonsite.org;
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MAINE

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of Site Evaluators;
www.maineese.com

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

MARYLAND

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Professionals Association;
www.mowpa.org; 443-570-2029

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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

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Wastewater Association;
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Organization;
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NEBRASKA

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Waste Water Association;
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NEW MEXICO

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Reuse Association of
New Mexico;
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NEW YORK

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NORTH CAROLINA

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Tank Association;
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Pennsylvania Association of
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Management Association;
www.psmma.net; 717-763-7762

TENNESSEE

Tennessee Onsite
Wastewater Association;
www.tnonsite.org

TEXAS

Texas On-Site
Wastewater Association;
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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;
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WCOWMA Onsite Wastewater
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MANITOBA

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Management Association;
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Onsite Wastewater Systems
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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
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CANADIAN REGIONAL

Western Canada Onsite
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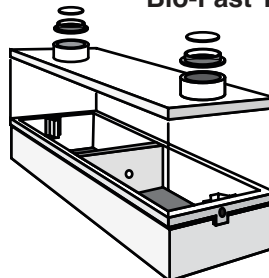
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Advanced Treatment Units

By Craig Mandli

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MicroFAST wastewater treatment systems or MicroFITT-ee (energy-efficient version) systems from BioMicrobics are integrated into a standard septic tank. With the SFR feature, alternate modes include intermittent operation of the blower to reduce electricity usage up to 45% and recirculation of nitrified wastewater to the primary settling chamber for added denitrification. Biosolids treatment and sludge digestion are designed to reduce treatment cost and maintenance. Available in 500- to more than 9,000-gpd configurations, technology scales up for larger residential and commercial flows. A stable treatment process with fully submerged, fixed-film media and the effectiveness of activated sludge treatment help in certain difficult applications and where infrastructure may not be available, according to the maker. The effluent meets secondary quality requirements and can be distributed to a soil treatment system or water reuse applications. Larger MyFAST and MacroFITT configurations offer up to 2 million-gpd flow. 913-422-0707; www.biomicrobics.com.



Clarus Environmental Fusion

Clarus Environmental's Fusion treatment systems are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450- to 4,000-gpd

treatment capacities. All models up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L CBOD₅ and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. 800-928-7867; www.clarusenvironmental.com.

NextGen Septic GenX Retrofit

GenX Retrofit septic technology from NextGen Septic can be installed into any approved septic tank and works to repair a clogged soil drain-field. 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 are broken down under anoxic conditions, while the wastewater is aerated with biomedica and submersible pumps in the secondary compartment. The second stage, which occurs in a separate treatment unit, treats nitrogen and phosphorus through a no-maintenance-required membrane and ozone disinfection system that lets water and salt pass through, while rejecting the solids and dissolved organic contaminants to create a clean-water output suitable for surface discharge. The clogged field begins to percolate water in as little as eight to 12 weeks, once the biomat thickness becomes small enough to allow water to get through at a reasonable rate, according to the maker. 513-673-3583; www.nextgenseptic.com.



Norweco Singulair R3

The Singulair R3 water reuse system from Norweco is designed to reduce water consumption, reuse treated effluent, and recycle water to conserve and recharge water resources. It provides a solution to chronic water shortages and reduces energy costs associated with water and wastewater treatment. According to the manufacturer, the system quietly, efficiently and automatically treats all incoming wastewater to a high level for restricted indoor and unrestricted outdoor use. The system exceeds effluent requirements of NSF/ANSI Standards 40, 245 and 350 and qualifies for Green Building credits under both the LEED rating system and the National Association of Home Builders ICC 700 National Green Building Standard. 800-667-9326; www.norweco.com.



AERATION SYSTEM

Geomatrix Systems SoilAir

SoilAir from Geomatrix Systems intermittently aerates the drain/leachfield and the surrounding soils rather than constantly aerating the wastewater in a tank. This process allows rapid rejuvenation of failed septic systems, extends the life span of new leachfields and enhances treatment, according to the maker. Systems can serve single and multifamily homes, as well as challenging and high-strength waste streams, such as restaurants, hotels, marinas, laundromats, health care facilities, grocery stores, food processing facilities and convenience stores. 888-764-5247; www.soilair.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 technology 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 ATUs and package treatment plants and enhance the performance of community and high-strength wastewater treatment systems in addition to septic processing facilities. 800-560-2454; www.knighttreatment.com.



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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 worker 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. J-1500CF Series

The J-1500CF Series nutrient-reducing BAT media plant from Jet Inc. offers variable capacity in a NSF 245 tested treatment system. It provides complete effluent treatment from 500 to 1,500 gpd. The 500- and 800-gpd PLT Series tanks are the lightweight, rotational molded alternative to the concrete J-1500CF Series. The seamless polyethylene tanks are easy to transport and install in the most difficult site conditions. The system uses a 700++ aerator, effluent filter and the Jet 197 control panel, which cycles the aerator to reduce the nitrogen by over 60%. 800-321-6960; www.jetincorp.com.



Orenco Systems AdvanTex AX20-RTUV

The AdvanTex AX20-RTUV treatment system from Orenco Systems is a self-contained module that treats typical septic tank effluent to better than secondary standards, with nitrogen reduction and UV disinfection. It is designed for homes with up to four bedrooms and is suited for small sites with poor soils or that require shallow burial. It helps protect surface waters and aquifers and can be an effective solution for areas that have strict discharge limits, according to the maker. It is installed following a septic tank equipped with Biotube effluent filters. The unit eliminates the need for separate recirculation, treatment, discharge and disinfection tanks and basins, and it reduces the number of risers and lids needed in the treatment train. 800-348-9843; www.orenco.com.



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% 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. 604-346-8199; www.premiertechaqua.com.



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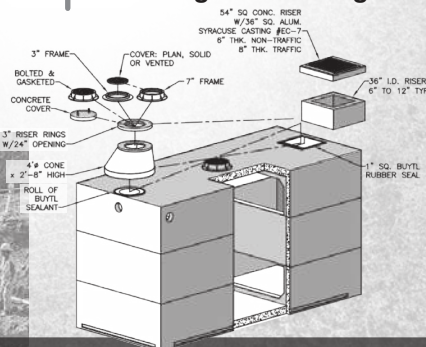
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PRODUCT FOCUS

PEAT SYSTEM

Anua Puraflo Dn

The Puraflo Dn peat fiber biofilter system from Anua provides enhanced denitrification below 20 mg/L through recirculating 50% of the treated effluent back to the front end of the septic tank, according to the maker. Flow proportioning is accomplished through simple adaptations to external plumbing, allowing for a single-pump system with no aerators. In recirculation mode, each module is rated for domestic strength at 240-gpd total hydraulic loading equivalent and 120-gpd forward flow. It can be designed and installed as a combined treatment and effluent dispersal system. Treated effluent exits the modules via weep holes around the perimeter at the module base and flows into the dispersal system situated beneath the modules. Available dispersal system options are an in-ground pad or mounded pad. 336-547-9338; www.anuainternational.com.



UV DISINFECTION

Polylok PL-UV1 UV Disinfection Unit

The PL-UV1 UV Disinfection Unit from Polylok reduces bacteria levels from secondary effluent to achieve strict water-quality standards. Every component of the compact unit is engineered and constructed to provide reliable disinfection and long operational life, according to the manufacturer. It has a dual-pass design, a long-life UV bulb, weatherproof electrical components and no chemical residual or harmful byproducts. It is easy and inexpensive to install and operate, and it has low electrical usage. Flow rates for gravity flow only are 100 through 8,640 gpd, with 100 through 4,320 gpd with 30 mg/L BOD and 30 mg/L SS, and 4,321 to 8,640 gpd with 10 mg/L BOD and 10 mg/L SS. It offers a UV dose greater than 40,000 microwatt-seconds per square cm at 254 nanometers, with transmissivity of 65%. 888-765-9565; www.polylok.com.



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 flood-proof and NSF/Washington State Protocol six-month tested (with 21 upstream treatment systems). It inactivates bacteria/virus pathogens, including superbugs. Rated at 9,000-gpd gravity flow, it is meant as a reliable building block for large water recovery/reuse systems, according to the maker. 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. Third party testing has confirmed that the 3G UV unit delivers a 254 nm UV dose of 55,000 microwatt-seconds per square cm on onsite effluent with UV transmittance of 31.5 percent at 8.45 gpm (12,168 gpd). 760-731-0745; www.salcor.world. ■

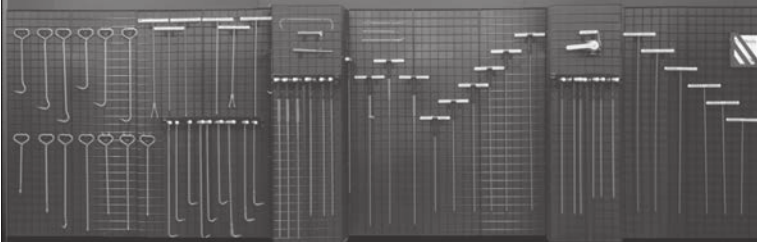


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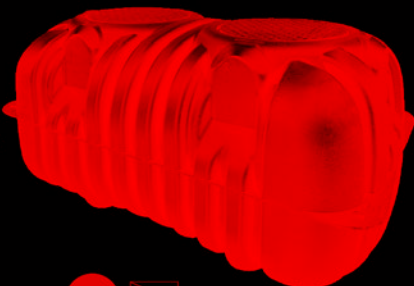
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Advanced Treatment Units

By Craig Mandli

Passive Presby Environmental Inc. (PEI) system chosen for Peru nonprofit facility



Problem: Asociación Hogar CIMA is a nonprofit organization in Peru that helps children and adolescents who live on the street or who are in high-risk situations and require rehabilitation. The organization was in need of a new septic system.

Solution: The organization chose a septic tank for pretreatment of raw domestic wastewater. The reinforced concrete septic tank was designed with a capacity of 4,755 gallons. They chose the **Advanced Enviro-Septic (AES) System**, a passive combined treatment and dispersal system from by **Presby Environmental Inc. (PEI)** to treat and disperse 3,170 gpd of wastewater. The design includes 100 AES pipes distributed through a bed of 20 rows of five pipes per row. This water is recovered entirely through a network of drains and a waterproof membrane under the pipes. The treated water is returned to a water tank for irrigation. The system design consisted of a uniform distribution of the wastewater effluent between the pipe rows using a distribution chamber equipped with equalizers. The equalizer, with its ratchet wheel, is the only mechanical part of the system design. The system does not require electricity for treatment or dispersal when it receives wastewater by gravity.

Result: All wastewater at the site is treated passively. No maintenance is required, and no energy is spent on wastewater treatment. 800-473-5298; www.presbyeco.com. ■

Splitter system helps maintain even distribution




Problem: A mid-Atlantic convenience store chain had drainfield failure at close to all of its stores being served by onsite systems. Since initial permitting, they went from a traditional grab-and-go that offered hand-made sandwiches to a full food service menu, introduced a line of 12 coffee decanters (that must be dumped every 4 hours), baking in-store bread, making smoothies, soft serve ice cream, milkshakes, all while disposing of substantially more disposable wipes, installing low-flow fixtures and moving from chlorine to quaternary ammonium for disinfection. The client was unwilling to change standard operating practices for stores with onsite systems, so the client needed systems to meet the needs.

Solution: **Hoot Systems** collaborated with the maintenance providers and engineers on developing modifications to dosing times of the equalization tank, automating the aeration system to vary carbon dioxide delivery based on wastewater strength and calibrating cycle times to ensure proper retention intervals in each stage of the treatment process. In addition, they stabilized alkalinity using pH boosters, added specific chemicals to the neutralize disinfectants and used carbon for the completion of the nitrogen-reduction cycle.

Result: With the redesign and operational modifications, Hoot Systems and the collaboration team brought these decentralized wastewater systems into compliance without changing the owner's day-to-day standard operating procedures. 888-878-4668; www.hootsystems.com. ■

INDUSTRY NEWS

**Felling Trailers announces
2019 Trailer for a Cause beneficiary**

Felling Trailers has selected Children's Cancer Research Fund as its 2019 Trailer for a Cause auction beneficiary. Felling Trailers will be hosting its seventh annual Trailer for a Cause online auction of an FT-3 utility trailer to benefit the nonprofit organization. Felling Trailers' goal is to bring awareness to various nonprofits that are making a difference by donating 100% of the winning bid from the auction to a different organization each year. 



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PRODUCT NEWS

SJE-Rhombus Xpert Alert Wi-Fi

The Xpert Alert Wi-Fi indoor alarm system from SJE-Rhombus helps protect a home from costly damage due to flooding, pump failure or freezing pipes. The system monitors and reports any residential alarm condition by notifying locally (audible and visual alarms) and remotely via SMS text messages and/or emails. It uses an existing Wi-Fi or Ethernet network to send messages, meaning there are no monthly fees or contracts. The sleek design incorporates an LED alarm light ring that illuminates red for alarm 1 and amber for alarm 2. The red low-temperature indicator activates at 40 degrees F to alert about potential freezing conditions, but it can be deactivated for cold climates. It is CSA certified. 888-342-5753; www.sjerrhombus.com. 

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PRODUCT SPOTLIGHT

Eljen GSF offers passive treatment for difficult sites

By Craig Mandli



The GSF, or Geotextile Sand Filter, advanced wastewater treatment and dispersal system from Eljen is designed for sites requiring high performance in a tight space. Using a two-stage Bio-Matt pretreatment process, the GSF applies a better-than-secondary treated effluent to the soil, increasing the soil's acceptance rate. The result is suitable effluent treatment in the smallest area possible.


"It actually provides a biomat management dimension that allows for the growth and maintenance of the biomat itself," says Jim King, president of Eljen. "By maintaining the biomat away from the soil and maintaining it on the units, the long-term acceptance rates of the soil are preserved."

GSF modules are made of geotextile fabric and a plastic core material that provide vertical surface area and oxygen transfer. Open-air channels within the module support aerobic bacterial growth, surpassing the surface area required for traditional absorption systems. A specified sand layer provides additional filtration and prevents saturated conditions.

"The geotextile fabric in the GSF unit is actually oriented vertically," King explains. "During dosing events, effluent must pass through the geotextile fabric and any biomat that has been established. By maintaining the biomat vertically, we are able to introduce aerobic bacteria after doses to the septic field to break down and maintain the minimal biomat on the unit."

To install, modules are placed along their 4-foot lengths on a base of stabilized specified sand. Then a 4-inch perforated pipe is centered on top of the modules and is secured with supplied metal clamps. Specified sand is placed along both sides of the module and at the beginning and end of each row once the cover fabric is in place. According to King, the system is a fit in several septic applications.

"Residentially, GSF systems are found on tight lots, lots with high water tables and sites with poor soils," he says. "Commercially, the system allows for the owner to expand operations more than a simple conventional system would provide."

GSF systems have also proven successful around the country, according to King. "We've had a 0.06% failure rate," he says. "Customers also appreciate how easy it is to put the system in." 800-444-1359; www.eljen.com. 

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