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WHERE WATER AND SOIL MEET

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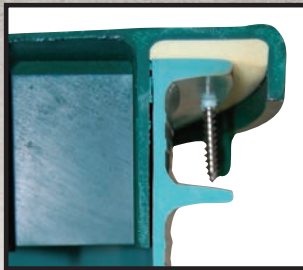
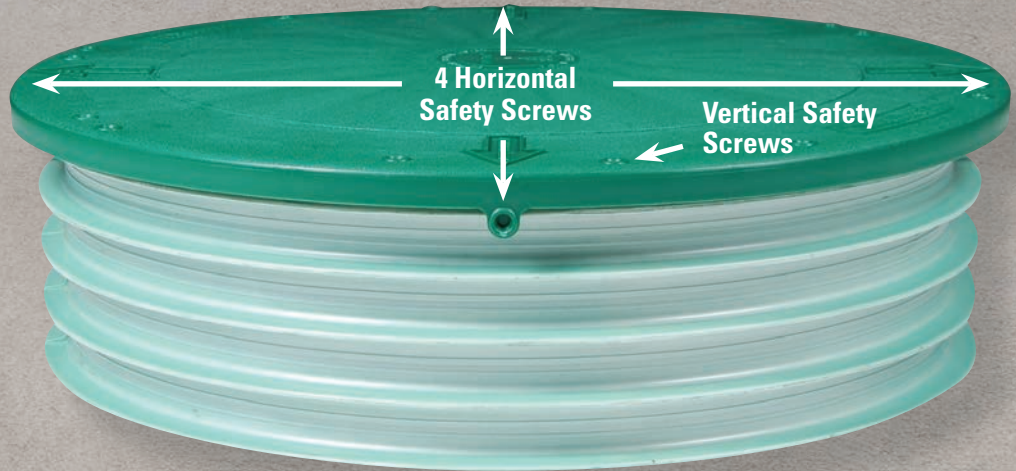
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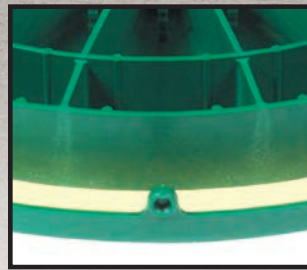
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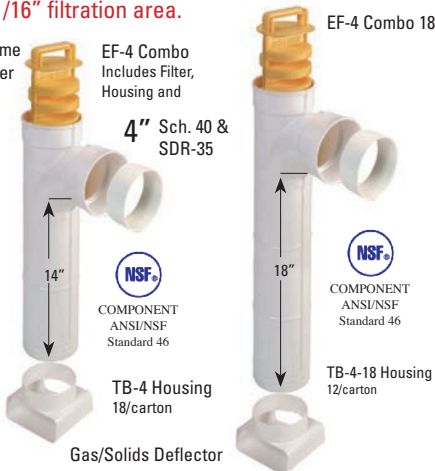


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INSTALLER PROFILE:

Where Water and Soil Meet

By David Steinkraus

ON THE COVER:

Brian Rabe and the team at Cascade Earth Sciences have provided professional evaluations for the onsite community in the Pacific Northwest for decades. Rabe, the managing soil scientist for Cascade, is shown in the field with a CST Berger laser level. (Photo by Ethan Rocke)

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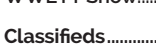
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Enjoy this issue!

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





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

Report: Installers, Onsite Users Need a Boost to Improve Sanitation Outlook

Health and humanitarian organizations recognize a need for public subsidies, approval of treatment technologies and a fresh installer workforce to modernize wastewater treatment

A report released recently by the World Health Organization and UNICEF concludes what we in the onsite installing industry have known, and shouted from the rooftops, for years: that oversight and investment in decentralized wastewater infrastructure is woefully inadequate.

Despite some improvements in regulation and funding for wastewater treatment upgrades, countries across the globe need to do better to promote human health and a cleaner environment, according to the *State of the World's Sanitation*.

The report indeed finds the problems are significant in crowded third-world countries and those with emerging economies. But it also recognizes the U.S. needs to make major strides in adapting to new technologies and that federal, state and local governments should invest in improvements to private onsite systems.

As we've been stressing for years, the report states that too many U.S. states have inadequate rules requiring things like system inspections and periodic maintenance and pumping. It's an affirmation that we all need to roll up our sleeves and get to work with health department officials and legislators to promote industry advances.

HAPHAZARD INSPECTIONS

"Upgrades are only required if inspections are conducted and systems prove to be in failure, and inspections only happen in a haphazard way, at time of sale or when a neighbor complains, typically," the report states. "It is a question as to whether there should be a universal federal approach to rules and regulations, setting minimum guidelines, and allowing states to adapt to those minimums as it regards what system are approved for use, how often maintenance is performed, and when systems are inspected at interval."

And quite significantly, the report says municipal sewers and decentralized systems should be put on equal footing, and that governments need to realize much future growth in sanitation will be in onsite systems. This means backing our industry's network of service providers and equipment manufacturers to ensure success.

"Strategies and plans should explicitly recognize the utility of both sewered and nonsewered sanitation (including decentralized systems) and

"Government seeking to support private sector investment in sanitation must develop a robust regulatory environment, **enabling private sector to generate reliable and sufficient revenue streams to cover their investments and operations.**"

World Health Organization and UNICEF

appreciate the importance of building and supporting the entire sanitation chains of both," the report states. "The role of informal sanitation service providers should be acknowledged, recognizing that their experience is a valuable resource ... Government policy must enable and encourage more private sector producers, suppliers and services to increase competition, lower costs, increase innovation and allow the availability of a diverse range of products in the marketplace."

BLEAK WORLD VIEW

Let's step back for a moment and take a global look at the sanitation picture. We are lucky to live and work in North America, where sanitation conditions are advanced compared to much of the world. The report says 2 billion people in the world lack a basic level of sanitation. Among other advances, the WHO would like to eliminate open defecation and see all people receive basic sanitation by 2030.

That's a tall order. According to the report, 19% of schools worldwide were estimated to have no sanitation service in 2019. Some 367 million children use pits, bucket latrines or have no sanitation facilities at all. In 28 countries, 10% of healthcare facilities in 2019 had no sanitation service.

These figures and the images conjured by them put our problems in the U.S. and Canada into perspective. We have a great advantage over much of the world, but that is not universal across our land, either. In poorer areas across America, people are still utilizing inadequate treatment

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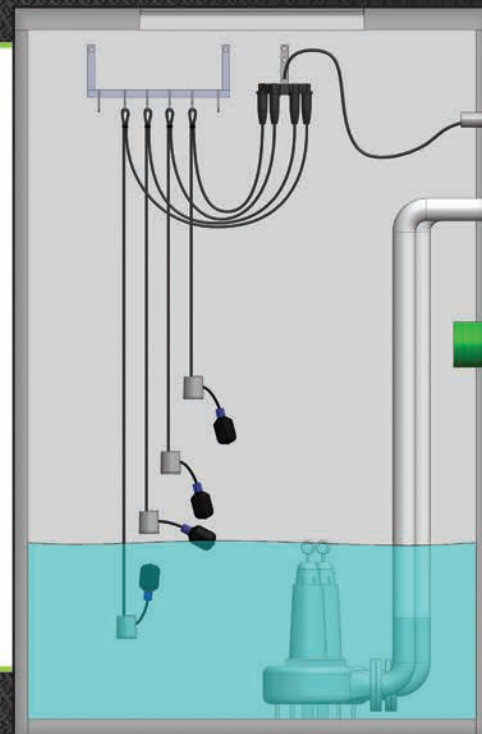
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systems that include direct effluent discharge into streams, ditches and backyards. In every region a good percentage of septic systems are failing and need replacement.

It's true that our regulations have not kept pace with an aging infrastructure and constant development. Millions of onsite systems are certainly contaminating groundwater at this very moment. At the same time, owners of these systems balk at the concept of replacing them or plain don't have the money to do so. The WHO and UNICEF report recognizes the issues and says government needs to make adjustments or the problem will get worse.

"Government seeking to support private sector investment in sanitation must develop a robust regulatory environment, enabling private sector to generate reliable and sufficient revenue streams to cover their investments and operations," the report state.

So governments must play a more aggressive role in encouraging inspections and upgrading systems. But at the same time, these bodies must seek creative ways to use grants, loans and other financial vehicles to support users who face large bills for upgrades.

HELP WANTED

The report also recognizes another major hurdle if we are to improve the sanitation infrastructure: how to put enough people to work in the wastewater industry. As we know in the installing community, the industry is aging. Many of our best frontline workers are nearing retirement, and installers are constantly telling me they can't find good workers to fill the ranks. Without well-trained and reliable crews, this important work will come to a standstill.

Worker conditions are more dangerous in other countries, we know.

"Many more sanitation workers are needed," the report stated in a worldview that is mimicked here. "Yet sanitation workers, who are often poorly paid


and stigmatized, are repeatedly exposed to health risks. Working conditions need to be progressively formalized to safeguard health and safety."

We are better off in the U.S. and Canada, where worksite safety is mandated and wages and benefits for our crews are clearly better than in other parts of the world. But there is still much room for improvement. And one way to achieve those advances is through consumer education about the importance of properly functioning wastewater systems and placing a higher value on safe water supplies and a cleaner environment.

HELPING AT HOME

The report states that the "sanitation economy" represents a \$62 billion market opportunity in one country alone, India, in 2021. "The sanitation economy can only thrive with development of a supportive regulatory environment that encourages initiative," the report concludes.

As to the report, I recall the old mantra of political activists: "Think globally, act locally."

We can do our part to improve the global outlook by working to fix problems right here at home. That means lobbying with our local, state and federal legislators for commonsense regulations that would lead to infrastructure improvements. It means encouraging health departments to approve new technologies to offer to your customers. And, most importantly, it means educating the public at every turn about the importance of septic system maintenance and upgrades. 

Drop Us a Line

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

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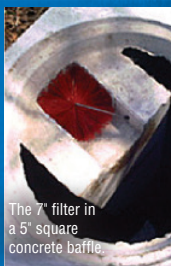
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GETTING STABLE **How to Remedy** **Over-Excavation**

Unless the site conditions require over-excavation, it should be avoided as natural soil typically provides the most stable base for system components. In some cases, over-excavation may be necessary or unavoidable. This article outlines what you need to know to finish preparing the site.

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Overheard Online

"Simply put, employees are never going to be inspired to work hard, try new things or set lofty goals if they have a leader who is fearful, anxious or paranoid."

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SOUND AND DURABLE **Using Rock in a Drainfield**

Washed rock used as distribution media needs to be the right size, durable and clean, and some types are more suitable than others. This exclusive online article discusses how to determine the durability and suitability of rock media and tips for installation.

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FEELING THE HEAT

High-Efficiency Furnaces Impact Onsite Systems

Because they reduce energy use, high-efficiency furnaces are getting more common every year, but the acidic condensate they produce poses two potential problems for septic systems: freezing and bacteria. This article outlines these two issues and provides solutions. onsiteinstaller.com/featured

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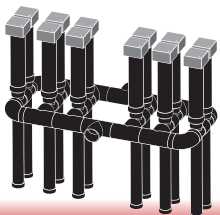
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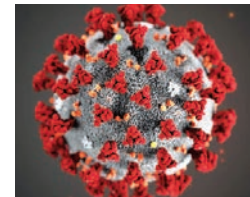
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WHERE WATER AND SOIL MEET

Cascade Earth Sciences and onsite expert Brian Rabe take on tough decentralized challenges in the Pacific Northwest

By David Steinkraus

▼ Brian Rabe takes photos during an inspection of a recirculation tank for a recirculating textile filter system from AdvanTex by Orenco. The system is in Oregon City, Oregon. (Photos by Ethan Rocke)



When it began, Cascade Earth Sciences had two purposes: onsite work and soil mapping. Over the past 44 years, there have been changes.

In 1998, Cascade was acquired by Valmont Industries. Founder Terry Rahe retired in 2006. Depending on customer demand and the experience of employees, the company branched out into other services such as land application, municipal biosolids, residuals management work for the pulp and paper industry, and bioremediation for mines, says Brian Rabe, the company's managing soil scientist.

Through all these changes, Cascade remained true to its original purposes with new services never far from the core of the company, because everything Cascade does is about what happens at the intersection of water and soil.

FAR-REACHING SERVICES

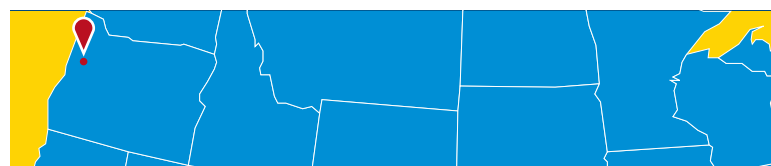
Cascade is decentralized. Rabe works at the main office in Albany, Oregon. Other offices focus on jobs specific to their locations. One office, for example, is in Spokane, Washington, and works consistently with food processors, especially potato processors. Another staffer was on special assignment in China for a few years, working primarily on large-scale land application of process water, Rabe says.

Early in his career, Rabe designed systems for single-family homes. "I still, in select and unique circumstances, do things at the single-family-residence level. It's not very often," he says.

There was one client he helped in northeastern Oregon, a job notable because it was done remotely.

"I told him, when I first called him back, I don't mean to sound judgmental, but I don't think you can afford me because it would take me eight hours to drive there, and that cost alone would be prohibitive for a residential system," Rabe says.

The customer still wanted Cascade, so they worked out an agreement.



Cascade Earth Sciences Albany, Oregon

Owner: Valmont Industries Inc.
Founded: 1976
Employees: 33
Service area: primarily northwestern United States
Services: onsite wastewater system design and project management, soil analysis and mapping
Associations: Oregon Onsite Wastewater Association
Website: www.cascade-earth.com



The customer collected information. Rabe made comments on it and worked on the design. This helped the customer and the regulator because the client intended to do his own installation. “And the regulator was concerned because there aren’t a lot of resources in that remote, rural part of the state, and it’s not the regulator’s job to consult,” Rabe says.

Work on community systems is uncommon in Oregon because of the state’s land-use and planning rules. Those push most development to urban and suburban areas where homes are often within reach of municipal sewer. Portland, Oregon’s largest city, has metropolitan planning, which adds another layer of review above the municipal governments.

“I’ve known installers who have told me if it’s work in Multnomah County (Portland), they’re going to add a 10% premium because they just know it’s going to be more time and hassle to get it done,” Rabe says.

He’s been working with a church there. After three years of review, the architect believes there is hope the project may soon go into final design.

LOOKING FOR A CHALLENGE

The projects Rabe likes best are those where the site has some

limitation, typically soil depth or a high-water table. The advantage of being a soil scientist, he says, is being trained to think about how limited soil can be built up so it performs as it would on a good site. And Oregon has plenty of limitations, many of which involve a lack of water.

“Most people, when they think of Oregon, they think of the western side of the state as being wet and green,” he says. “When you get to the eastern two-thirds of the state, we’ve got parts of eastern Oregon that are true desert at about 6 inches of rain per year.”

Interesting projects can come about when other designers miss something. About five years ago, there was a job at a residential drug and alcohol treatment facility with a commercial kitchen and more cleaning and disinfection than is common in a typical home, he says.



"There's folks out there who barely have a clue about what they're doing, and then there's folks who pay attention, go to school and listen ... and strive to get better."

Brian Rabe

"The system was struggling to perform as intended, and I think there may have been an underappreciation for the strength of the waste stream," Rabe says.

BOD was more than 300 mg/L, which is Oregon's upper limit for residential-strength waste, he says. Looking only at the hydraulic load, he says, a designer could have thought the installed units were properly sized, but calculating the mass load told a different story, because the manufacturer recommended a lower BOD for best performance. Rabe's solution was to intercept water between the septic tank and the treatment unit and send it through a BioMicrobics HighStrengthFAST unit.

"We took the discharge from the FAST unit and ran it right back into the septic tank so that 24 hours a day we always had flow to our little side loop," Rabe says.

What the modified system produces are small, continuous doses of wastewater moving through treatment. "We were designing to hit the maximum hydraulic limit of that treatment device spread out over 24 hours with little, tiny doses; I think it was on the order of 12.5 gallons every six minutes," Rabe says.

MINDING MICROBES

What Rabe did there illustrates a core idea: Microbes do best when fed in small amounts around the clock.

"When I'm trying to explain it to people, I use the Thanksgiving meal as a comparison," he says. "When you think about what most of us do at Thanksgiving, at 2 o'clock you fill your plate, and you can't help but go back for seconds, and then dessert rolls around, and by the time you're done you're moaning and groaning, lying on the floor, trying to stay awake and watch a football game or visit. And you're miserable because you've eaten so much at one time.

"If you were to take that same amount of food and start at 6 a.m. when you get up, and take a bite, walk around, come back in a few minutes and take another bite, and do that all through the day, you could actually eat more food and never be uncomfortable because your body can process little bits at a time. Microbes are the same way."

Most of his designs try to achieve this steady state of little bites around the clock, he says. And there are many new components that enable this and weren't available 30 years ago, he adds.

What Rabe does was inspired by Bill Stuth, inventor of the Nibbler, who introduced Rabe to the concept about 30 years ago. Stuth was big on putting in a surge tank and feeding wastewater through a system in small doses, Rabe says.

◀ Rabe, left, and staff engineer Chris Cotton set up a CST Berger laser level to shoot elevations at an onsite system location.

In any design, Rabe works first to meet permit limits, and then he considers soil loading. As soon as effluent reaches the soil, bacteria begin to build a biomat that restricts flow and becomes a limiting factor in drainage. In rapidly draining soils, it's harder for a biomat to form, and that means less capture of pathogens and nutrients by the biomat, which means more nutrients and pathogens moving to groundwater, he says. That's when you need low-pressure distribution, Rabe says, so effluent is spread out and there is more opportunity to capture pathogens.

MENTORS MATTER

Rabe credits much of what he is to the people he's learned from. There's Bill Stuth, of course, and there's Dan Bush, who was once a regulator for Columbia and Clackamas counties and the state. Rabe recalls having lunch with him and Terry Rahe when Bush was thinking about starting his own business.

PASSING ALONG ONSITE KNOWLEDGE

Among all the day-to-day tasks, it's easy to lose sight of what will happen to a business after retirement. Brian Rabe was intentional about the future for Cascade Earth Sciences in Albany, Oregon.

When Terry Rahe founded Cascade in 1976, it was with an emphasis on onsite wastewater and soil mapping. "So I said, I've carried the torch for all these years, and I don't want that torch to go out when I leave," says Rabe, the company's managing soil scientist.

After 33 years at CES, he knows retirement is not that far in the future. So a few years ago, when he hired Chris Cotton coming out of Oregon State University with a master's degree in engineering, Rabe was clear about his goal.

"When we were doing the interviews, I said the goal of this hire is to hire my replacement," he explains. "I want the opportunity, with a few years of overlap, to download what's between my ears to the next generation to carry the torch."

In the beginning, he told Cotton as much as possible, using sketches, plans and worksheets from other projects to reinforce important details. As time went on, Rabe says, he talked less and released Cotton to do more work on his own, letting him ask questions when he needed help or wanted to learn more.

"I've seen too many people who either worked on their own or, when they retired, didn't have that opportunity. And I've known a couple, like Dan Bush, who did an exceptional job of passing on their knowledge to the next generation," Rabe says.

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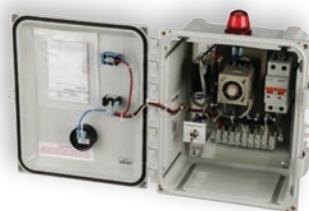
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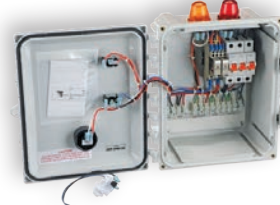
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"I've known installers who have told me if it's work in Multnomah County (Portland), they're going to add a 10% premium because they just know it's going to be more time and hassle to get it done."

Brian Rabe

➤ Brian Rabe uses an AMS Inc. (formerly Art's Machine Shop) reinforced mud auger to collect and inspect soil samples for an onsite wastewater project.

✔ Brian Rabe, left, confers with contractors on a jobsite.



As a regulator, Bush saw many systems that were not maintained well and thought he could do better. He did start his own company, and over the next 20 years became an expert in operations and maintenance, Rabe says. Because he had a degree in biology and environmental health, Bush had a better understanding of onsite system function than most people, Rabe says. And because Stuth was one of Bush's mentors, he was primed to think about dissolved oxygen, pH, and what kinds of microbes were present in a system at any given time.


"There's folks out there who barely have a clue about what they're doing, and then there's folks who pay attention, go to school, and listen to folks like Dan, and strive to get better," Rabe says.

A significant number of his designs, Rabe says, have been inspired by needs that Bush identified from his fieldwork.

Rabe grew up in a house with a septic system. As a child, he says, he was fascinated with biogas, built a digester in his bedroom using manure from the family's animals, and was thrilled when

he applied a match and saw the methane ignite. It fed the nerd in him, which is what work at Cascade does.

He learned what onsite systems are during a summer internship with the Oregon Department of Environmental Quality. Shortly after he graduated (and a couple of times after that) he was invited to join the state. But he took the job offer from Cascade, and he stayed.

"I have relationships with many of the regulators, and I'm sure I would do OK in that position, but I'm sure parts of their jobs would drive me nuts," Rabe says. "What I would miss, and the part I really appreciate, is that creative side: coming up with a different way to do something, a new way to do it." 

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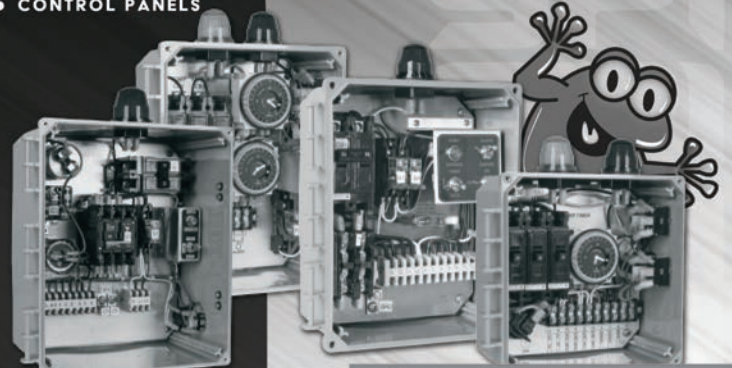
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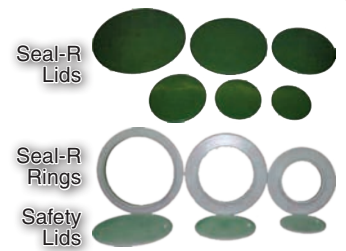
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New NOWRA Executive Director Pushes For a Higher Industry Profile

Thomas Groves replaces Eric Casey, who served decentralized wastewater professionals for a decade

By David Steinkraus

In January, the longest-serving executive director of the National Onsite Wastewater Recycling Association retired, and the next executive director started. Eric Casey's contract officially ended on Dec. 31, but he stayed on for a few weeks until Thomas Groves was finished with his previous job and was ready to take over.

Groves is an engineer who has been involved with NOWRA since the mid 1990s. Before becoming NOWRA's executive director, he was director of wastewater and onsite programs for the New England Interstate Water Pollution Control Commission. The commission is a quasi-governmental organization that provides training and technical assistance, organizes conferences and workshops, and conducts research on water topics for its seven member states. In other words, it's a kind of regulator, and when he was on the NOWRA board, Groves filled the seat designated for regulatory agencies.

Groves was president of the NOWRA board that hired Casey a decade ago as the organization's first (and only) full-time employee.

BUILDING OUT

"I'm going to build off a lot of the structure that Eric's put in place," Groves says.

For example, NOWRA was ahead of the curve in putting training programs online, he says, and he wants to expand that. "We were lucky to be where we were and have it so established when the pandemic hit. We see that trend not going away," Groves says.

Some in-person training may return, he says, but because online resources can flex to fit peoples' schedules, and because of the variety of programs that can be offered, virtual training will remain a major way to help people in the industry, he says.

It's also part of diversifying NOWRA's income, Groves says. Membership dues are still important, but by 2019, revenue from training had grown to comprise the largest share of NOWRA's revenue at about 31%.

Part of Groves' revenue diversification plan includes putting NOWRA in a position to apply for grants. As a 501(c)(6) it can't accept most grants now because it lobbies lawmakers on behalf of members. So there may have to be a sister organization eligible to accept grants for research or other purposes, he says.

Groves also wants to continue building connections between NOWRA and its state affiliates, and perhaps help create state affiliate organizations where none exist now.

"I think we'd like to change the idea of NOWRA as a parent that is off in D.C. and doesn't care about the state affiliates as much. We do care; we do deeply," he says.

CENSUS QUESTION

Some people who work only locally don't understand how a national organization can benefit their business, he says. For example, NOWRA has been encouraging the U.S. Census Bureau to ask people if their home uses an onsite system. Hard information like that can be used when lobbying Congress to appropriate money or when talking to state policymakers.

Casey notes that NOWRA has been working with other nonprofits to expand the amount of federal grant money available to repair or replace failing onsite systems. This would happen through the Rural Decentralized Water Systems Grant Program of the U.S. Agriculture Department. Along with the National Groundwater Association and the Rural Community Assistance Partnership, NOWRA has pushed to expand the amount appropriated for onsite system aid. Last year, Congress appropriated \$5 million although the grant program is authorized for as much as \$20 million. All of that money was used for rural wells, Casey says.

Another challenge facing the entire industry is the aging of the workforce, Groves says. That means not just people who understand pipes, pumps, and electronics and who make wastewater systems run. Many folks are closing in on retirement, he says. "There's a lot of knowledge that will be going out the door, and there isn't a proven mechanism for grooming the next wave (of workers)," he says.



**Thomas Groves,
Executive Director**

National Onsite Wastewater
Recycling Association
executivedirector@nowra.org
508-254-6078

The commission has been working with states to provide instruction teaching potential managers about budgets, labor relations and other management subjects, Groves says. He believes the onsite industry could draw on this idea to expand and professionalize its own workforce.

MONEY NEEDED

As he looks back at the industry he's served, Casey's key worry is about research in college and university programs.

"I personally think it's the most critical long-term problem that NOWRA can play a role in addressing," Casey says. "Since the early 2000s, the number of colleges and universities that offer programs in onsite wastewater of any type has dropped by almost two-thirds."

Only about four schools offer full programs to train professionals, he says. That means fewer people training the next generation of soil scientists and engineers, and it means fewer people researching topics related to onsite wastewater, and fewer people helping to develop new treatment technologies, he says. The last major influx of research money came about 20 years ago, and many ideas flowed from that, he says.

"The regulations 30 years ago on a septic system were way different than they are now, and now there are emerging contaminants; there are pharmaceuticals; there are any number of different things for which very little research has been done," Casey says. And there's climate change and how sea level rise will affect onsite systems in coastal areas, he adds.

Like everyone else, Casey says, scientists and universities have to follow the money, and young students can't build a career studying a topic if there is no money to support them and their work.

As part of this leadership change, NOWRA will no longer have an office in Washington, D.C. Instead, Groves will work from his home in Westford, Massachusetts, about 30 miles northwest of Boston near the New Hampshire border. He will commute to Washington as needed.

Casey, who is 62, will do some consulting if he has the opportunity, but he primarily wants to work on what interests him. Related to onsite treatment, he is particularly interested in working for groups trying to improve sanitation for lower-income people. Call it environmental justice if you wish, but it's important, Casey says. It's a view he developed from being NOWRA's executive director.

His training was not in a technical discipline but in government and business, and before joining NOWRA he worked at some of the many professional associations with offices in the nation's capital.

"Over the 10 1/2 years I've been here," he says, "I have come to not just love this industry but truly respect it for what it does, and the important role that it plays that is so greatly underappreciated by most people." □

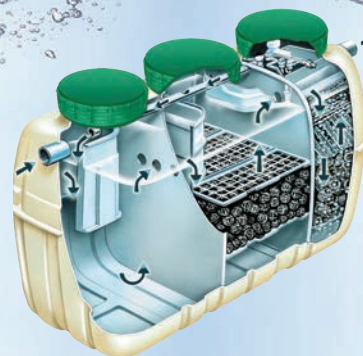
"The regulations 30 years ago on a septic system were way different than they are now, and now there are emerging contaminants; there are pharmaceuticals; there are any number of different things for which very little research has been done."

Eric Casey



Photos courtesy of NOWRA

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SYSTEM PROFILE

«Nick Waldow used a Case excavator and a Mustang skid-steer loader to remove the thick blanket of snow. It took about a day to clear the sloping, heavily wooded lot. While the snow initially was a hindrance, it also helped by insulating the ground, which prevented it from freezing. The lot contains heavy clay at a depth of 14 inches, which made it a good candidate for a GSF system. (Photos courtesy of Nick's Dirt Works)



Installing a septic system in the middle of winter with roughly 4 feet of snow on the ground may sound implausible to installers in warmer climates, but it was just another day at the office for Nick Waldow, the co-owner of Nick's Dirt Works, based in Fraser, Colorado.

Waldow installed an Eljen Geotextile Sand Filter system in March 2019 because the property owners didn't want to wait until early summer to move into a newly built, four-bedroom home, located outside of Granby, a small mountain town about 85 miles northwest of Denver.

"If the homeowners would've waited, the snow melt would've turned the site into a mud pit," says Waldow, who co-owns the company with his wife, Caroline. "Then they probably would've had to wait until June to move in."

The thick layer of snow actually worked in Waldow's favor because it insulated the ground and kept it from freezing. Nonetheless, it still required some skill and finesse to clear all that snow off portions of the 2-acre, heavily wooded and sloping lot, he says.

"We had to be very careful to not damage any trees or ruin any landscaping," says Waldow, who owns a Case CX160B excavator and a skid-steer loader manufactured by Mustang (a brand owned by the Manitou Group). "You just have to watch the bucket and take your time."

"We put the snow wherever there was room to pile it," he adds. "It took a day to remove the snow."

Rocky Mountain Report — Watch the Plow and Heavy Machinery During Tricky Springtime Installations

Working on mountain grades and surrounded by snowdrifts is nothing new for Colorado's Nick's Dirt Works

By Ken Wysocky



⚠️ Excavating the roughly 1,500 square-foot, boomerang-shaped drainfield, located at the bottom of a slope with about a 5% grade. The drainfield trench was 14 inches deep, about 12 feet wide and roughly 130 feet long. Machine operators had to be careful not to “smear” the damp clay with the bucket, which would reduce the soil-absorption rate.

⚠️ To install an Eljen geotextile sand-filter (GSF) system at this four-bedroom home outside of Granby, Colorado, Nick Waldow faced a natural obstacle: roughly 4 feet of snow. The owners wanted the system installed in March so they could move in around June. Waiting for warmer weather wasn’t an option because melting snow would’ve turned the 2-acre lot into a mud pit.



“We’re actually used to working in winter, so it wasn’t as bad as it sounds.”

Fortunately, temperatures during the roughly two-week-long project hovered in the mid-40s. The downside? The warmer temperatures made local roads softer, so deliveries of sand and other materials had to be scheduled during mornings to minimize road damage from dump trucks.

“We tried to get them in as early as possible while the roads were still cold,” Waldow explains.



⚠️ Kenny Westfall, an equipment operator and laborer, lays out sections of 4-1/2-inch-diameter perforated PVC drainpipe atop the two rows of GSF modules in preparation for gluing them together. U-shaped clips are used to attach the pipes to the units, which sit on a bed of washed concrete sand and filter effluent that drains from the pipes. The units measure about 4 feet long by 3 feet wide by 7 inches tall.

System Profile

Location:	Near Granby, Colorado
Facility served:	Single-family home
Designer:	Shannon Engineering and Diamondback Engineering & Surveying
Installer:	Nick’s Dirt Works, Fraser, Colorado
Type of system:	Eljen geotextile sand filter (GSF)
Site conditions:	Thick clay below 14-inch depth
Hydraulic capacity:	525 gpd

RESTRICTED ACCESS

Hundreds of small trees on the lot limited access to the drainfield, located on the south side of the lot at the bottom of a slope with about a 5-degree grade. The easiest path to the site happened to pass over the planned location of the septic tank.

So to avoid potentially damaging an installed septic tank with heavy excavation equipment, Waldow instead installed the nearly 1,500-square-foot drainfield first. That required digging a roughly 14-inch-deep trench about 12 feet wide and 130 feet long.

“We cleared off all the snow where needed, then shot the elevations to be sure the laterals would be at the correct grade,” he says.

Accurate grade measurement was critical so effluent would drain properly and not freeze inside the pipes during winter. Furthermore, piping from

SYSTEM PROFILE



◀ After covering the GSF modules with a geotextile to prevent sand infiltration, Waldow weighs down the fabric with shovel-fuls of sand. That kept the fabric from blowing away until the trench could be backfilled with more sand, then topped with soil and compacted.

▼ A delivery driver (left) and Waldow prepare to set the 1,250-gallon, three-chamber concrete septic tank. Waldow actually installed the drainfield first and the tank last because the easiest route to the drainfield site happened to pass over the planned location of the septic tank. As such, he didn't want to set the tank first, then potentially damage it by driving heavy excavating equipment over it.

"We had to be very careful to not damage any trees or ruin any landscaping. **You just have to watch the bucket and take your time.**

Nick Waldow

the 1,250-gallon, three-chamber concrete tank to the drainfield had to be covered by a minimum of 1 foot of soil.

Soil on the lot contains heavy clay at a depth of about 14 inches, which made a pretreatment system a good solution for the site.

While digging the drainfield trench, excavator operators had to be careful not to smear the damp clay with the bucket. That would reduce the absorption rate of the ground below the GSF units, Waldow says. "Instead of using the bottom of the bucket to smooth it up, you have to just scratch it with the bucket to loosen the clay," he explains.

INSTALL PROCEEDS QUICKLY

After that, the crew laid about a 12-inch layer of washed concrete sand, then installed the GSF units, which measure roughly 4 feet long by 3 feet wide by 7 inches tall.

"We used a walk-behind skid-steer loader (Bobcat) to run the sand to the drainfield so we wouldn't damage any trees," Waldow says.

The crew laid 62 units — 32 in two rows on one half of the curving, boomerang-shaped trench and 30 in two rows on the other half of the trench. They left approximately 3 feet of space between the two rows and about one foot between the trench walls and the GSF units, he says. "The GSF units are really light and easy to install," Waldow says. "You just snug them up against each other."



The next step: Use U-shaped clips to attach four roughly 60-foot-long sections of 4-inch-diameter, perforated PVC SDR 35 pipe atop the four rows of GSF units. After that, the crew placed anti-siltation geotextile filter fabric over the pipes and the GSF units to keep sand from clogging the units, then put sand on top to keep the fabric in place.

BRING IN THE TANK

With the drainfield installed, workers moved on to installing the septic tank, which was set with a crane owned by the company that delivered the tank. The tank includes a pump chamber to discharge effluent to the drainfield. The system, designed for 525 gpd, also features a two-way cleanout between the house and the tank.



▲ The slope of the lot, as well as the path Waldow followed to drive heavy equipment down to the drainfield, are clearly visible here. The lot was carefully graded to ensure water would properly drain away from the drainfield and not pond on top of it.

"We put the snow wherever there was room to pile it. It took a day to remove the snow. We're actually used to working in winter, so it wasn't as bad as it sounds."

Nick Waldow

"After that, we dug a trench from the house to the tank and hooked up the house to the tank," Waldow says. "Then we connected the tank to the D box, then the D-box to the perforated pipes on top of the GSF units."

Workers then filled the drainfield trench with enough sand to cover the GSF units and the filter fabric. In the final step, they back-filled the rest of the trench with the original soil and compacted it, he says.

Waldow had never installed this kind of Eljen system before.

"I'd say it's a pretty good application for this particular situation," he says, referring to the limited space for a drainfield, not to mention the high clay content, which makes pretreatment a preferred option. "It keeps the size of the drainfield down, which minimized disruption to the lot. Once you figure it out, it's pretty easy to install."



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Customer Friendships, Smarter Regulations Build a Wastewater Business

Nebraska needs to approve more alternative septic solutions to serve customers better

Compiled by Betty Dageforde

In States Snapshot, we talk to a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we visit a member of the Nebraska On-site Waste Water Association.



Kelly Tucker

Service tech, master onsite wastewater pumper and installer, master plumber, journeyman licensed electrician, HVAC tech

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Years in the industry: 38 — since 1983. It was hard to get work back in the 1980s and I was laid off a couple times, so I decided I was going to learn everything I could about the industry. Anderson threw me into electrical, plumbing and septic, which is how I got all my licenses.

Association involvement:

I've been a member of the Nebraska On-site Waste Water Association for 10 years. I've been a board member and Region 5 director.

Benefits of belonging to the association:

Keeping educated and current on regulations and products is one of the main benefits. It also puts us in contact with homeowners as we answer their questions and educate the public on what happens in a septic system and what are the do's and don'ts. We also work with legislators.

Biggest issue facing your association right now:

Public awareness is probably our biggest issue. Homeowners or contractors who don't get licensed still do things illegally or try to get in under the wire or they don't know what they're doing, and that can affect the groundwater.

Our crew includes:

We have about 65 people in the company but on the septic side, in addition to myself, we have Ben Vavra and Derek Vavra, both master installers.

Typical day on the job:

I work on all sides of the business, but as far as septic work, I help design systems and oversee the work. I resolve issues on failed systems and new installations.

The job I'll never forget:

Back in the late 1990s we installed a system for a four-bedroom, two-bathroom home with a whirlpool and a garbage disposal. We sized according to Nebraska's Department of Health and Human Services Title 179 regulations, which at the time figured off of number of bedrooms and bathrooms. We put in an Infiltrator system with a FRALO tank.

About six weeks later we got called because they had water flooding out of the ground. I wondered how that could be because we used the book and sized it accordingly. The customer was upset because they thought we didn't do the system right. Come to find out, there were actually 16 people living in that four-bedroom house. The homeowner was a minister and he fostered kids. His wife told me she was doing 16 loads of laundry a day.

It would have been nice to know all that information beforehand. By the time we got everything figured out and calculated, I had to add another 500-gallon tank and more leachfield. Their whole front yard and back yard was leachfield. And I had to put in a diverter valve so when one side of the house would fill up the flow could be diverted to the other side. They had to do that every six weeks. The key to a successful system is to ask the homeowner lots of questions and see what they really have and what their issues are.

continued >>



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My favorite piece of equipment:

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Most challenging site I've worked on:

I got a call on a system that had water leaching out of the ground. It was a six-bedroom, three-bathroom home and they had a 450-gallon whirlpool bath that had to drain into the tank. When I dug up the end pipe I found they didn't put in a drop box, they just put in a diverter box so all that pressure and volume was actually pushing all the way to the end of the leachfield and pushing it out on the ground.

We re-perc-tested the ground. It was perking less than three minutes an inch. That was like perking in sand. It was telling me I needed to put in a barrier to slow that water down. But it was clay soil, and I knew clay doesn't perc that fast. It's more like 20 to 30 minutes an inch. That's when I called up the city inspector and asked him what he thought. As it turned out, over the years topsoil had blown in and laid on the old grass. The roots on that old grass died and left little veins in the ground all the way down. So, as the clays would swell, it would perc slower.

The design was telling me to put in a liner. We chose not to do the liner; we chose to calculate it at 30 minutes an inch because we knew that once those clays would swell up that soil would perc slower. That meant the leachfield had to be bigger. I put in a water baffle so the water pressure couldn't push through the drop box to the end of the line and would actually fill up in the drop box and then it would divert as the leachfield would fill up. I also put in an effluent filter to slow flows coming out of the tank to go into the leachfield. That's a high-maintenance item — they have to clean that filter every six months. In the 15 years since, they haven't had a problem.

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

A customer asked why he kept smelling rotten cabbage in the house. I went and looked at it. Come to find out, the owner was a cancer doctor and was putting leftover medications down the sink. Those cancer chemicals will knock a system out. You've got to keep those bugs alive or they don't break down the solids.

I told the customer to call a pumper from a toxic waste center to have his tank pumped. They took the waste to Oklahoma to have it burned, which cost him a lot of money. It took almost nine months before that

tank really started to work right. He learned a lot about septic systems. But one way or another we do have to deal with chemicals that go into our water system. The more we can keep those hazards out of the system, the cleaner our water will be.

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

I would like regulators to make it easier for us to put in alternative systems, rather than just keeping us in a little box of "this is all we can do." There are issues we could address if we had more alternative solutions. It's just more difficult to put in the alternative systems. We have done them and the state approved it, but it's a permitted system so there are rules you've got to follow over a two- or four-year plan. We're doing better on the mound systems — they've opened that up a little bit more — which works really well. Alternatives are young in the system so we haven't had them out there long enough to see how they actually function and I think that has a lot to do with what holds it up. Once some time has lapsed and we see we can get 30 years out of a system, then I think we're going to see more approval.


Best piece of small business advice I've heard:

Customers don't always know what they're really asking for but if you can keep them happy you have a friendship for life. It's not so much a service-to-customer relationship, it's more of a friendship relationship. They get pretty partial to you and they brag you up to their friends. That friendship is very important and if you can see that, in the long run you'll have a successful business.

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

I always wanted to be an airline pilot. My dad used to fly and my middle son flies. He's a flight instructor so he could teach me but I've never cornered him to do it.

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

It's about taking care of the water. We're all in the same drinking glass and we all need to realize what we're doing after we get done with that glass of water. As long as we keep educating, I think taking care of the water will come. 



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.

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West Virginia Supreme Court Exempts Sales Tax for Some Industrial Portable Sanitation Services

By David Steinkraus

As part of a tax case, the state Supreme Court exempted portable restrooms from the consumer sales and service tax for their use by an oil drilling company.

Antero Resources, of Denver, appealed to the court because of a tax bill from the state for its remote horizontal drilling operations. The company asked for a tax exemption on its crew quarters, portable restrooms and other equipment. The court sided mostly with the company.

In its opinion, the court noted that the key question under state law was whether items were used or consumed in the production of natural resources and whether the items were an essential part of production. Drillers are on site for two weeks at a time and work shifts around the clock.

“These (portable restrooms) are located at remote well sites, and it would be impractical if not impossible for Antero to operate its well sites without making bathroom facilities available,” the court wrote. “Indeed, it is difficult to imagine how such operations could proceed without such facilities.”

The court did allow the state to tax the company for rentals of trash trailers and waste receptacles. As a result of the court’s opinion, the state will collect a fraction of what had been a seven-figure tax bill, reported WVNews.

Michigan

After a two-year struggle, residents of a Michigan township will be allowed to repair or replace failing onsite systems individually instead of being forced to pay for a central wastewater treatment plant.

In 2018, the state Environment, Great Lakes and Energy department found a number of failing septic systems in Seville Township were discharging into the nearby Pine River. The department sent a letter to the town board ordering construction of a wastewater treatment plant for homes in the community of Riverdale, reported the *Morning Sun* of Alma, Michigan. Riverdale’s 124 property owners were looking at \$6 million to \$8 million.

“We were told the soil wasn’t adequate for septic systems, but that wasn’t true,” Tish Mallory, a town supervisor, told the newspaper.

Citizens formed a committee and the township began working with the Michigan Rural Water Association to address the problem. In a four-page letter, the department agreed to alternative proposals made by the town. Among those are conducting semi-annual water tests, establishing a septic district for the community, mandating pumping of all systems every seven to 10 years, and enacting point-of-sale rules requiring system inspections.

Three homes and two businesses are using their onsite tanks as holding tanks until the local health department issues permits for new systems.

“We have been told by other (government) entities that we’ve been an example for other (EGLE) cases because no one has ever done this,” Mallory said.

The township is in central Michigan, about 44 miles west of Saginaw.

Iowa

Story County commissioners voted 2-1 to require all septic systems be pumped every five years. The county is in the central part of the state, about 45 miles north of Des Moines and includes the city of Ames.

There are 3,120 active permitted systems in the county, but 900 rural properties have no permit, reported the *Ames Tribune* of Ames, Iowa. A small study of systems without permits found that none had drainfields for secondary treatment. Systems instead discharged into field tiles, ditches or creeks.

Penalties for violating the new law begin with a \$65 fine, but the county’s Environmental Health Department won’t begin looking for non-complying residences until later this year. Residents who have never pumped their tanks, or who haven’t done so since 2016, will have the rest of the year to comply with the law.

Massachusetts

A seepage hauler will pay \$500,000 in penalties and fees for illegally disposing of wastewater. In addition, Midstate Sewerage, of Millbury, Massachusetts, will not seek state or municipal contracts for two years as part of a settlement with the state, announced the office of Massachusetts Attorney General Maura Healy. The settlement ends a lawsuit filed in 2018.

Midstate was accused of dumping seepage into a Millbury municipal pump station instead of hauling it to the Upper Blackstone Water Pollution Abatement District, news reports said. By doing so, the company avoided paying thousands of dollars in disposal fees.

At the same time, the company had a contract with the state Transportation Department to dispose of wastewater, and the state says the company lied about disposal so it could receive payment under the contract.

Midstate — along with related entity LDI LLC — was also accused of installing unauthorized seepage storage tanks at its property and of illegally handling and disposing of waste oil.

Virginia

The Accomack-Northampton Regional Housing Authority has grant money available for low- and moderate-income families who need to have their septic tanks pumped or who need help repairing or replacing a failing system.

Depending on whether a property is in the water quality project area, and depending on income and other factors, property owners may receive up to 100% of the cost of pumping, repairing or replacing a septic system, said a press release from the authority.

Pumpout grants are available for the Chesapeake Bay watershed, and people are eligible if their household income is less than about \$40,000.

The repair or replacement program is available only to people in parts of Northampton County. Income limits apply to this also, but even people with incomes greater than about \$70,000 are eligible for a 50% cost share, the press release said.

Oregon

Money is available from through the Federal Emergency Management Agency for people who lost their well water supply or onsite systems in the Echo Mountain Complex wildfire last fall. Residents in Lincoln, Clackamas, Douglas Jackson, Klamath, Lane, Linn and Marion counties designated for federal disaster aid may be eligible for money to cover repairs not covered by home insurance.

"FEMA assistance cannot duplicate insurance coverage," the agency said in a press release. "However, households that don't have insurance or have received an insurance settlement less than the cost to repair serious damage may apply to FEMA for help with costs that are necessary to have a functioning home, including for repair or replacement of private wells and/or septic systems."

Washington

Jefferson County's Board of Health declined to change the county's ban on outhouses at a December meeting. The board has been reviewing a number of regulations, such as sanitation requirements for people who live in RVs, tents and other nonpermitted residences.

One commissioner, Greg Brotherton, asked for repeal of the law. Other counties allow them, he said, according to *The Leader* of Port Townsend, Washington. And not everyone can afford to install a septic system, he said.

Other members of the board refuted his idea, saying there was too much risk to groundwater and that it would be impossible to enforce state outhouse rules, which requires outhouses to be clean, free of flies, and not drain into state waters.

Brotherton made a motion to repeal the law, but it failed for lack of a second.

Jefferson County covers roughly the center of the Olympic Peninsula about 25 miles northwest of Seattle. ■

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Careful Siting of the Soil Treatment Area Protects the Environment

Our reader asked: "Where does the sewage go?" This question reminds us of the important role installers and designers play in protection of groundwater.

By Jim Anderson and Dave Gustafson

We had an interesting conversation with one of our local service providers and he made a comment we didn't not think much about at first. He said: "We do not always think about where our sewage ends up." The more we thought about this, the more important the comment became. It fits with our overall goals to have our systems not only accept the amount of wastewater the building generates but also provide treatment to protect the environment and human health.

We spend a lot of time focusing on the infiltrative surface of the soil treatment and dispersal area, and sometimes the area right beneath the system. However, more than the infiltrative surface and development of the biomat, limiting infiltration needs to be considered when siting and installing an on-site system.

As we have stated numerous times, soil is an effective media to treat and disperse septic tank effluent. In general, if three feet of unsaturated soil is available beneath the infiltrative surface, BOD and pathogens will be removed and many of the nutrients tied up. We always characterize these treatment activities as happening before effluent is released elsewhere into the environment, such as ground water or surface waters. One major nutrient exception is nitrogen.

Soil treatment and dispersal area should be located away from areas where surface water flows converge ... **The most suitable locations are on ridgelines or high on the landscape in areas with convex slopes that naturally shed surface water.**

In the case of nitrogen, we rely at least somewhat on dilution as well as treatment mechanisms in the soil to reduce levels below 10 mg/L (human health standard) before reaching a groundwater source. We are particularly concerned, where space is limited, and there are large numbers of systems in a small area, or where soils are uniform coarse sandy over shallow water tables or bedrock. In these situations, additional pretreatment is required before discharge into the soil treatment area.

THE SITING PROCESS

As effluent travels downward and laterally through the soil, it is important to consider in the design and siting process where the water ultimately discharges. If the discharge is into a water table, the treatment processes must be complete enough so there is no concentration of constituents in excess of water quality standards. It is also important to understand the location of the system on the landscape to avoid interference with water moving away from the system.

To begin, the soil treatment and dispersal area should be located away from areas where surface water flows converge. Any additions of water over the surface or subsurface provide the potential to hydraulically overload the treatment area, causing failure. The most suitable locations are on ridgelines or high on the landscape in areas with convex slopes that naturally shed surface water so it does not collect over the treatment area.

Often, soil permeability is lower deeper in the profile. This is one reason it's important to keep systems shallow. It takes advantage of higher rates of water and oxygen infiltration as well as increased biological activity to assist in treatment. This change in permeability is factored into the distance required between treatment trenches. We usually express this in terms of distance from the center of one trench to the center of the next trench.

On center, distance needs to be evaluated to make sure effluent delivered to one trench in the sequence does not interfere any of the others. On sloping sites this is termed the contour loading rate. This assumes that the soil is deep enough, there is not another type of limiting condition near the surface, and water will move vertically to a regional water table.

THE DOUBLE WHAMMY

What if there is a more restrictive layer closer to the infiltrative surface? Examples of these would be either a regional or perched watertable, dense more slowly permeable soil layer or bedrock. In these cases, there is the potential to mound water above these layers. This is termed groundwater mounding.

When water is mounded into the unsaturated zone beneath a trench infiltrative surface, the treatment capacity of the soil is reduced. There is less ability of oxygen to enter around the system and the biomat will develop more extensively. This creates a double whammy for the system of reducing infiltration rates less than design numbers and reducing the ability for aerobic soil organisms to survive and assist in the treatment process.

Water Tight Structures



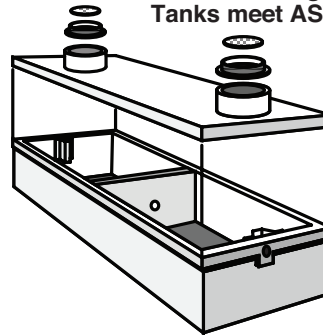
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In addition, water can move laterally away from the mounded area on top of the limiting layer — pushing the water out to the surface — if the restrictive layer meets the ground surface lower in the landscape. Partially treated effluent at the surface creates a nuisance and a threat to public health. Proper trench spacing and attention to the contour loading rate on sloping sites will help prevent or mitigate this condition; but it must be factored into the design from the start.

There are sites where the limiting layer occurs below our typical site evaluation 5- to 8-foot depths in borings or pits. It is important that treatment has occurred because often these layers do intercept the ground surface at some point or a drainageway or stream. Having a knowledge of the geology in the area will help the site evaluator/designer make proper system choices. In some areas, we see additional site evaluation requirements in state or local codes to address these possibilities. It is due to a recognition that where the sewage goes after it infiltrates is, in fact, important. □



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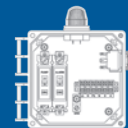
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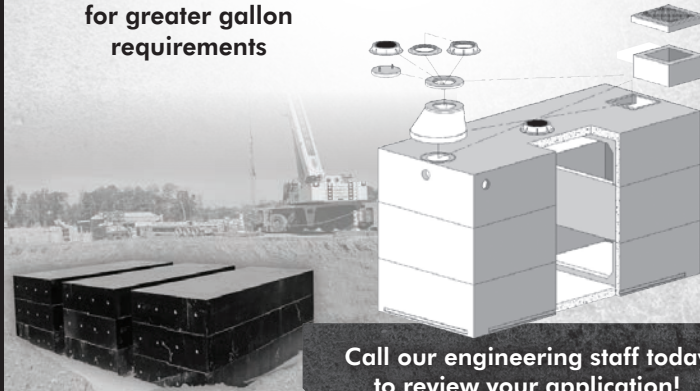
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PRODUCT SPOTLIGHT

Tank is key to sewer collection system

By Tim Dobbins

High-quality tanks are an important component of sewer collections systems. When releasing the Prelos sewer solution in 2019, Orenco Systems focused on quality tanks while creating a design to improve overall efficiency in function and maintenance.


Prelos systems are cylindrical and utilize a meander design for solids removal. Flow enters one end of the tank, where travel is then directed horizontally to the far end before returning back to the outlet port, which can be gravity or pump driven. The idea behind directing flow in such a way is to increase flow length, and Orenco reports seeing roughly a 90% longer flow path compared to traditional systems, leading to great efficiency in solids removal.

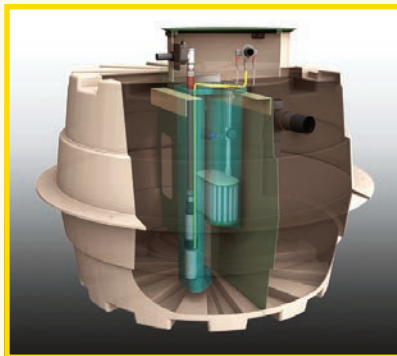
"Based on what we're seeing, we expect about a 20% improvement in between pump-out cycles with this new design," says Mike Saunders, Orenco's market segment leader for effluent sewers. "When you start thinking over the life cycle of the tank, that can be pretty significant."

Prelos stands for "pressurized liquid-only sewer" and was engineered using technology that is based on Orenco's nearly four decades of sewer solutions. This system is made to be a solution for community sewers as an all-in-one complete unit that is easy to install and will remove solids at the source. After installation, small-diameter, liquid-only sewer lines carry primary-treated effluent to a treatment facility.

Housing the meander design is a tank made from DCPD plastic, which Orenco says is probably the strongest part of the system. "What it brings to the table is a very high strength-to-weight ratio," Saunders says. "It is a resin product and really high impact resistant so it doesn't get damaged like fiberglass and it doesn't flex like a polyethylene tank would." This material makes the system lightweight and ideal for a buried tank, he says.

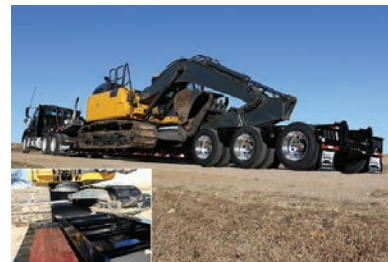
ClickTight electrical connections eliminate the need for splice boxes. "I think that's one of the most welcomed improvements because people who maintain these systems no longer see splice boxes getting compromised by moisture and now replacing pumps is much simpler," Saunders says. ClickTight connections are complete plug-in packages for wiring pumps, control panels or flow switches that make interchanging as easy as unplugging and plugging back in.

"People are finding it very easy to install and operators are loving the ClickTight and hanging pump assembly," Saunders says. "Everything we have heard back so far has been extremely positive." 800-348-9843; www.orenco.com 



Landoll construction series detachable trailers

Landoll's Models 855 and 860 construction series detachable trailers have a drop-side trailer option that features a 5-inch lowered track area and a raised center. This specialty option helps when hauling tall excavators, cranes or vehicles that must obtain the very lowest deck height possible. The outer track area is 14.37 inches from the ground with a 6-inch ground clearance when fully loaded. The track area is raised, wood-covered with 2-inch Apitong and is 24 inches wide into the main frame. The outside measurement of the main frame is 54 inches wide. 800-428-5655; www.landoll.com




Boss Vac vacuum excavation trailer

Boss Vac's vacuum excavation trailer is ideal for removing wet or dry materials, cleaning emergency road spills or hazardous waste, keyholing, trenching, cleaning irrigation canals, drilling oilfields and completion sites, removing debris from catch basins, locating underground utilities without impact damage and more. The tandem axle trailer is 9.5 feet wide and 21.5 feet long with the highest point reaching 7.5 feet tall with options for a goose-neck, skid or truck mount. Included on the trailer is everything needed to tackle the job from the moment it's received, including hoses, fittings and couplings, to engines. On the water side, a 9 hp engine pushes 4 gpm at 4,000 psi while a separate 24 hp engine powers a vacuum generating up to 300 cfm in either gasoline or diesel options. For debris storage, customers can choose between a 3.96-cubic-yard (800-gallon) or a 2.47-cubic-yard (500-gallon) storage tank. 405-885-1234; www.bossvac.com



Franklin Electric VR SpecPAK Pressure Boosting System

Franklin Electric's VR SpecPAK Pressure Boosting System is a pump and drive package that combines the benefits of its high-performance VR Series Vertical Multi-Stage Pump with an efficient TEFC motor and variable frequency drive specifically designed for pump applications. It is ASHRAE 90.1-2010 compliant and is designed with NSF/ANSI 61 and 273 certified isolation valves. Users can easily configure it to comply with pressure-boosting needs in most commercial, industrial, or multi-residential applications for constant-pressure operation with several available options according to flow needs, control enclosures, interfaces (Touchscreen HMI/PLC) and additional communication ports. 260-824-2900; www.franklinengineered.com 





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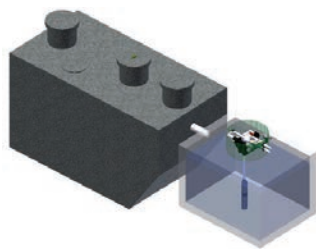
Distribution Equipment and Systems

By Craig Mandli

DRIP SYSTEMS

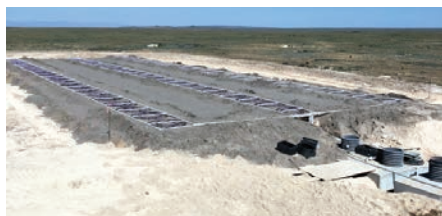
Jet Inc. Drip Irrigation Headworks

The Drip Irrigation Headworks package from Jet Inc. is designed as a direct-mount device for an effluent pump tank to filter effluent, while controlling pressure to the dripfield. It is available for automatic or manual/continuous flush. These packages contain a 1/2 hp high-head effluent pump, float tree, 1.5-inch vortex screen filter and pre-installed pressure gauges to monitor pressure drop across the filter component and regulate pressure to the dripfield. The package mounts onto an existing 24-inch riser or is pre-installed in a 24-inch riser for easy access to the pump, float tree, integrated vortex filter and controls. The package is available as part of the complete Drip Disposal Field Package that includes integrated controls for the Jet J-1500 or J-1500CF Series Bat Media treatment system. An optional flowmeter package, disc filter and pressure relief valve are also available to meet site-specific and regulatory criteria. 800-321-6960; www.jetincorp.com



Lowridge Onsite Technologies OSCAR-II

The OSCAR-II from Lowridge Onsite Technologies is a system combining a traditional mound and subsurface drip dispersal. The ground surface is prepared with a 6-inch layer of C-33 sand. Coils are placed on the sand and covered with another 6-inch layer of sand. Effluent (STE, secondary or tertiary) is micro dosed every 4 minutes. STE will be reduced to 2/2 CBOD5/TSS and 700 fecal coliform/100 ml, MPN. The system has a small footprint and shallow soil depth requirements. Other treatment technologies can be used in conjunction to meet additional treatment requirements. 877-476-8823; www.oscaronsite.com



EFFLUENT/SEWAGE/SUMP PUMPS

Ashland Pump effluent pumps

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



Franklin Electric NC Series

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



Liberty Pumps ProVore

The ProVore grinder from Liberty Pumps is designed for use in applications where the addition of a bathroom or other fixtures below sewer lines requires pumping. It has the same V-Slice cutter technology used in the Omnivore series, brought down to a more cost-effective level. Powered by a 1 hp motor, this smaller grinder is designed to operate on a standard 115- or 230-volt circuit, requiring only a 20-amp breaker. No special wiring is needed. The pump comes with a 2-inch vertical-style discharge and a standard leg pattern matching the LE Series. This allows for an easy retrofit into existing systems. Compact factory-assembled systems are available in both simplex and duplex versions: the ProVore 380 and ProVore 680. 800-543-2550; www.libertypumps.com



Orenco Systems Biotube ProPak

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



Pentair V2 Series

The V2 Series grinder from Pentair is designed with computational fluid dynamics software and has a volute and impeller design allowing shut-off heads up to 185 feet with a single-stage centrifugal pump. This design gives operators flexibility to change between the standard, high-head and high-flow design by swapping the impeller and cutter plate, simplifying maintenance and reducing service parts inventory for low-pressure sewage system projects. It is available with an optional quick-disconnect cord for easier servicing in the field, double-row bearings to absorb axial and radial loads,

and an oil-filled motor for cooler operating temperatures and longer life. 855-274-8948; www.pentair.com

Vertiflo Pump Series 900

The Series 900 industrial vertical immersion vortex sump pump from Vertiflo Pump provides an unrestricted flow, since the impeller is not normally in contact with the solids being pumped. Applications include chemical slurries, fragile food-processing solids, paper and pulpy solids, petroleum and oils, sewage, wastewater treatment and textiles. It handles solids up to 4 inches in diameter. It is designed for long life in severe services with heads to 170 feet, temperatures to 350 degrees F, and pit depths up to 26 feet with flows to 1,600 gpm. Construction options include cast iron, 316 stainless steel fitted, all 316 stainless steel, Alloy 20 and CD4MC. 513-530-0888; www.vertiflopump.com



Webtrol Pumps V Series

The V Series from Webtrol Pumps is comprised of VS sewage pumps and VE effluent pumps with cast iron impellers and volutes and a stainless steel motor housing. The VS5A24 pump is a sewage ejector, 1/2 hp, 2-inch discharge and passes 2-inch solids. This pump shut-off head is 24 feet. The larger sewage ejectors feature a 2- or 3-inch discharge. Three-phase models are available. Motors are continuous duty. A double mechanical seal is standard. The VE effluent series has the VS features as well. The VE5A46 is 1/2 hp with shut-off heads to 49 feet with a 2-inch discharge and a removable screen that

limits solids to 1/4 inch, or 5/8-inch solids without the screen. Models are available in single or three phases. The pumps can be guardrail mounted. 314-631-9200; www.webtrol.com



PUMP CONTROL PANELS

Alderon Industries Power Post control panel

The Power Post control panel pump connection and monitoring system from Alderon Industries can be used for a variety of applications, including mound systems, pressurized drainfields or any system requiring timed- or demand-dose pumping and monitoring. They allow the installer to make a professional and safe connection for power and float switch wiring connections, with available models that include a 120- or 240-volt AC pump power receptacle. Systems include an integrated outdoor alarm with LED indicators (various colors), buzzer and test/silence push button. The top of the enclosure changes color along with system function displayed text on the OLED screen. Menu keys are provided to program settings and view data such as pump run, pump cycle counts, pump amps, elapsed time, peak/extended pump run, total gallons pumped, pump dosing events, pump fail and alarm conditions. 218-483-3034; www.alderonind.com



Septic Products 50B019-120-240DD

The 50B019-120-240DD control panel from Septic Products is a duplex time-dosing panel for use in residential or commercial applications. It can be used with 120- or 240-volt power, and it accommodates two dosing pumps controlled by a repeat cycle timer. It has a durable, weather-resistant, NEMA 4X polycarbonate enclosure with SST latches; large, easy-to-access terminal block; circuit breakers for the pumps and control circuits; a rugged, externally mounted, UV-resistant alarm light; audible alarm and run-mute-test switch



PRODUCT FOCUS

with UV-resistant sealing boot; definite purpose motor contactors; alternating relay; and pump hand-off-auto switches. Compressor hookups are available. Wiring schematic and detailed connection diagrams are provided, as well as mounting feet for the enclosure. It is UL listed. 419-282-5933; www.septicproducts.com

SJE Rhombus Model 32S

The Model 32S control panel from SJE Rhombus is designed to alternately control two three-phase pumps in industrial and commercial water and sewage systems using the DPC-4F Pump Control Four Float Controller for pump sequence, alternation, selection, lag pump delay time and alarm. If a high-water alarm condition occurs, the high-water alarm float activates the audible/visual alarm system along with auxiliary contacts for remote alarm. Common applications include lift stations and pump chambers. Models are available with an intrinsically safe relay for circuit extension into hazardous locations. It is UL/cUL listed. 888-342-5753; www.sjrhombus.com



SUBMERSIBLE PUMPS

Gorman-Rupp SF Series

SF Series submersible solids-handling pumps from Gorman-Rupp are now available in five new models: SFEV4C, SFEV4D, SFDEV4D, SFEV4E and SFS4C with flows to 940 gpm and heads to 108 feet with horsepower ranges from 15 to 30 hp. They utilize extreme-duty vortex and semi-open, two vane impeller designs to combat stringy and solids-laden pumping media. The line now has 37 models in 3-, 4-, 6- and 8-inch flanged discharge sizes and horsepower ranges from 3 to 75 hp. These combinations with multiple impeller trims will provide flows up to 3,400 gpm and heads to 170 feet. They are available in multiple configurations, and nearly all are available with CSA C-US approval for standard locations and FM and CSA C-US approval for hazardous locations. 419-755-1011; www.grpumps.com



Goulds Water Technology, a Xylem brand, AGS Series

The Goulds Water Technology, a Xylem brand, AGS Series submersible axial grinder provides suitable performance against the challenging solids, flushables and trash present in modern residential wastewater applications. With a semiopen impeller design, including an eight-hole cutter plate and three-blade axial cutter, the grinder reduces waste to a fine slurry. The lobe-lifting technology lifts material away from the low-pressure center and redirects it for cutting. Built with a stainless steel volute, cast iron impeller and

hard-faced silicon carbide on silicon carbide mechanical seal, it is versatile for residential and tough wastewater environments. Heavy-duty, balanced handles simplify installation, and the 2-inch discharge allows for easy sewage pump replacement, minimizing downtime and service issues. The series is available in single-phase 1/2 hp (115- or 230-volt) and 1 hp (115- or 230-volt) options to fit a variety of residential sewage applications. 866-325-4210; www.goulds.com

Polylok PL-CPE4A

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



SEPTIC TANKS/GREASE INTERCEPTORS

Infiltrator Water Technologies IM-Series Tanks

Injection-molded IM-Series Tanks from Infiltrator Water Technologies are available in multiple sizes including the IM-540 pump tank, IM-1060 and large-capacity IM-1530 septic tank. Lightweight, strong and watertight, the tanks enable shallow, multiple and serial tank installation options in septic and pump applications. All have integral heavy-duty lids that interconnect with the watertight click-and-lock EZsnap riser. The tanks also have structurally reinforced access ports, reinforced structural ribbing and fiberglass support posts to provide additional strength. The two-piece tank design nests for efficient shipping, and inboard lifting lugs make delivery and handling easier. The tanks frequently house advanced wastewater treatment systems such as the ECOPOD fixed-film bioreactor system or the ECOFILTER pump vault tank filtration system. 800-221-4436; www.infiltratorwater.com



INDUSTRY NEWS


Grand opening of Renegade Equipment, Sales and Consulting

Mike Grieco opened Renegade Equipment, Sales and Consulting in Longmont, Colorado. The company specializes in construction equipment sales and rental.



Mike Grieco

Ashland Pump announces name change, acquisition

Ashland Pump acquired Water Source, a supplier of accessories and pumps for the sump, sewage and water systems markets. The Water Source team, currently located in Norwalk, Ohio, will be relocating to Ashland, Ohio, facilities. Their key staff will remain with the company. In addition to the acquisition, Ashland Pump changed its corporate name to Ashland Water Group, effective Jan. 1. 

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be installed and put into service immediately. They meet AASHTO HS-20 traffic loading standards. They are durable, non-buoyant, fully customizable, fit in a small footprint, and meet all state and federal requirements for ASTM- C1227 and C1613. 877-687-9255; www.kistner.com

Wieser Concrete precast concrete grease interceptors

Precast concrete grease interceptors from Wieser Concrete remove grease from the waste stream to bring the water to acceptable standards before discharge to a sanitary sewer system. The grease interceptors are easy to maintain and large enough to hold considerable amounts of grease to allow for sufficient retention time. The outdoor-type grease interceptors provide acceptable effluent quality. They are produced to provide a healthy restaurant environment and to be watertight, durable during storage and transportation, and easy to install. 800-325-8456; www.wieserconcrete.com 




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