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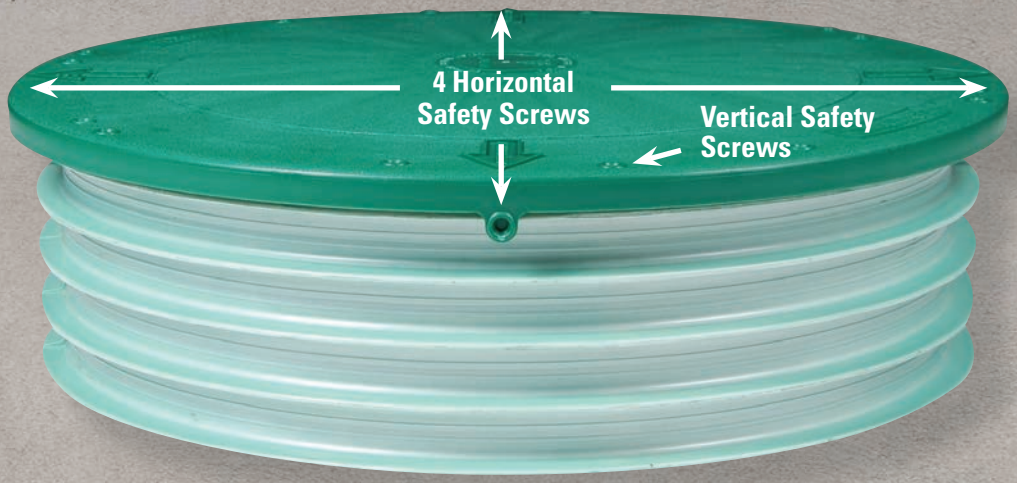


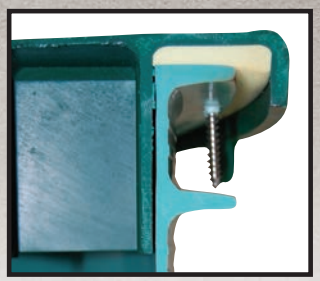

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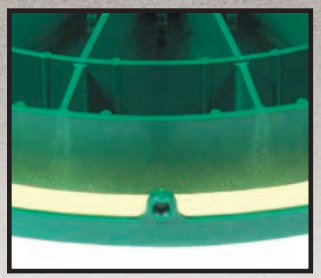

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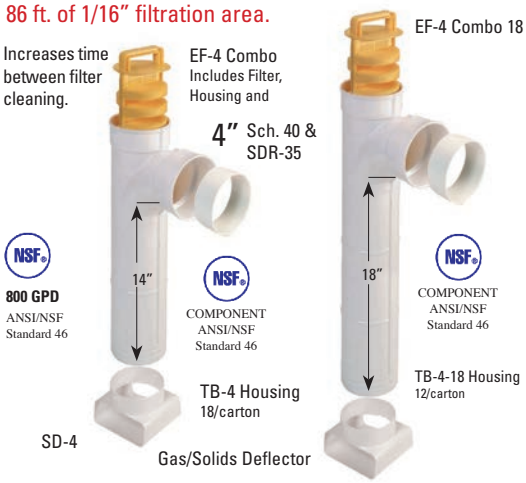


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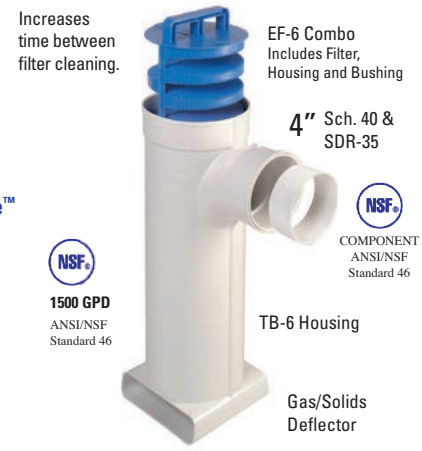


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**ON THE COVER:**
The team at Lentz Wastewater Management shows pride in installing workmanship around Statesville, North Carolina. Owners Jarrid and Jeanie Lentz are shown in the field with a Kubota excavator. (Photo by Wendy Yang)



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# ADVERTISER INDEX

December 2019



## 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

# You Know Onsite Installing Is a Great Career. Get the Word Out!

Your local high school technical education teacher may hold the key to replenishing the onsite industry with a young, enthusiastic workforce

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

I took notice when two skilled trades teachers in my home state of Wisconsin recently qualified as semifinalists for the 2019 Harbor Freight Tools for Schools Prize for Teaching Excellence. The teachers and their programs to prepare students for a career in the trades stood to collect some of the $1 million in annual awards given by the hardware retailer.

The potential winnings could help Anthony Christian, a manufacturing teacher at Arrowhead Union High School, and David Kontz, an HVAC and welding teacher at Barack Obama School of Career and Technical Education, promote the skills necessary to strengthen the country's infrastructure and provide good jobs for many graduates.

Christian says his goal is to introduce students to potential workplaces, taking them on tours of local manufacturing plants, for example. The students then design and fabricate metal products — such as fire pits, rocket stoves and signs. He's having success, with 90% of his students landing summer jobs in manufacturing.

A teacher for 42 years, Kontz has coordinated many mentorship programs with local trade unions and industries. Among other things, his HVAC class focuses on energy conservation using a "whole building" concept. Kontz also organizes student clubs and competitions related to the skills he teaches.

## LET'S JOIN FORCES

We are in dire need of replenishing the workforce in areas such as manufacturing, plumbing and welding. The Harbor Freight program and others, such as the work that *Dirty Jobs* host Mike Rowe does to promote the trades, are shedding light on the deep shortage of skilled workers in so many specialties that flourished just a generation or two ago.

Not so long ago, working with your hands was considered an honorable way to make a living and support a family. Now, in some circles (not among the *Onsite Installer* fraternity, of course) working as a welder or machine operator is seen as a letdown for a young person, and certainly not a career path to be proud of.

I recently read a poignant and sad story that illustrates the lack of respect given, specifically, to the men and women who work as onsite installers. In *The Columbian* newspaper of Vancouver, Washington, Pete Roberts, recounted this story from a job site:

It's shameful that anyone in the installing field should be looked down upon or made to feel bad for the work they do. … **A qualified and hardworking installer — especially one who puts his or her name on the equipment — is likely going to out-earn many college graduates.**

"I was doing a septic tank inspection; there was this little boy, he was probably 5 or 6 years old. His mom says, 'That's why you want to go to school, to college, so you don't have to do that.' I chuckle because you know, it might be kind of a lowly job. But when you find jobs people don't like, they happen to pay a little bit better."

It's shameful that anyone in the installing field should be looked down upon or made to feel bad for the work they do. That mom's response to her child in earshot of the worker was irresponsible, condescending and downright nasty. What's more, it's ignorant. What installer Roberts knew, and what you realize also, is that a qualified and hardworking installer — especially one who puts his or her name on the equipment — is likely going to out-earn many college graduates.

## MEET THE TEACHER

Like Harbor Freight on a broader level, we need to do things to counteract that mom's wrong-headed message about working in the onsite installing trade. Could we band together as an industry and provide a similar monetary kick in the pants as a major retail store company? Maybe. Instilling an interest in young people to join this fantastic industry is certainly worthy of the investment.

We could have a long-term discussion among our trade associations, successful installing company owners and our product manufacturers about this type of lofty goal. But in the meantime, I have a few suggestions of how each of us can act locally to promote training programs in the skilled trades and bolster the image of onsite installing as a career to be proud of. And a lot of it can start with developing a relationship with your area high school skilled trades teachers.

### Partner with educators

Reach out to your town's tech ed teachers — we called them shop teachers in my day — and offer them a hand. Your real-world experience could be invaluable to their programs. Taking students from the classroom into the field can provide an enlightened viewpoint, showing them the joy and fulfillment you receive from working in the wastewater industry.

### Bring your kid to work day

Offer to host a class on one of your job sites. Demonstrate the equipment you and your crew use. Show them the growing role technology is playing in septic system design. Introduce them to your team, and encourage them to have one-on-one conversations about a career in onsite installing. Share with them the story of how you became involved in the trades, and answer all of their questions.

### Offer scholarships

Meet with your high school teachers and nearest technical school administrators and propose starting a scholarship program in your family or your company's name. It might be for $250, $500 or $1,000 a year; any amount can help a cash-strapped student down the path of learning a trade. See if you can structure the scholarship to go toward an area of study directly relating to the work you do — perhaps plumbing, machine operation, diesel mechanics. By organizing check presentations or meetings with recipients, you can develop rewarding relationships with the students. You may find rewarding mentorships or even find excellent future workers for your company through the scholarships.

### On-the-job training

Coordinating with a trades class, bring top students into the field to build an onsite system from start to finish. While they may not be able to operate your excavators, they can work alongside your operators to learn the capabilities of the latest machines. The students can review site plans with you, lay pipe and work with other materials, and, of course, grab a shovel and a wheelbarrow and get a little dirty. Building enthusiasm for the work depends on them seeing the fruits of their labor and the satisfaction of the customer.

### Hire the best as summer interns

Work with the teachers to get the word out that you need summer helpers to round out your crew. Offer to speak to classes about what a helper's job entails and the valuable experience student workers will receive working in the field. Pay these kids commensurate with the physical labor and skills they will develop on the job. Show them that even though the work is hard, it will be more helpful to them in the future that flipping burgers at a fast-food restaurant.

## FILL THE PIPELINE

These days it seems like we're losing quality installers to retirement every week. And the challenge I hear from the *Onsite Installer* community is not finding more work to keep the crew busy, but finding new crew members to keep up with an avalanche of work. Let's do something about that. Start today by looking for ways to fill the pipeline with enthusiastic young people to take over and keep the decentralized wastewater industry moving forward.

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LOW FLOW

## Water Use Changes Effluent

Remodels, new-home construction and concern for the environment mean water usage on average will continue to decrease. So as homes are using less water, what is occurring in the septic tank? Find out more in this exclusive online story from Sara Heger.
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**Overheard Online**

"Give yourself a break and sufficient space to focus on doing each task well, without stressing out. Put an end to your multitasking ways."

*– How to Manage Anxiety as a Business Owner*
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SUCCESSFUL SYSTEMS

## 3 Steps for Services Visits

As a septic professional, it is your responsibility to ensure that homeowners clearly understand their responsibilities in maintaining their new system. This will increase the longevity of the system (thereby making it cost-effective), improve customer satisfaction and protect our water quality. This article outlines three steps for making subsequent service visits a success.
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DOUBLE STANDARD

## What to Expect

It may not be fair, but customers apply different expectations for the kind of service they'll receive from a business based solely on its size. No matter what size category you fall into, here's how you can use those expectations to your advantage. There's really nothing better than exceeding your customers' expectations.
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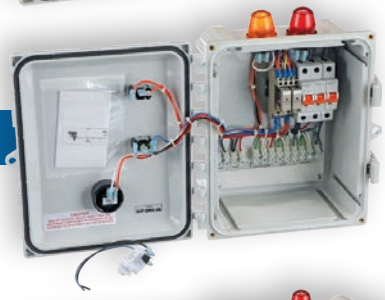

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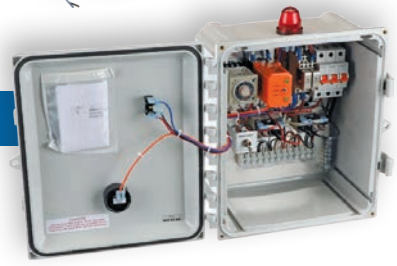

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# BACK TO THE ROOTS

Lentz Wastewater Management brings the family business full circle by adding system installation to a growing repair and drainfield restoration service

By Ted J. Rulseh

Jarrid Lentz started in business in 2000 doing drainfield restoration and septic system repairs. Five years ago, he added onsite system installation. In doing so, he brought a third-generation family business back to its roots.

Lentz Wastewater Management, in Statesville, North Carolina, has a thriving business restoring drainfields with a Terralift machine and installing and fixing onsite systems in the fast-growing area north of Charlotte and around Lake Norman.

It's a natural complement to Lentz Septic Tank Service, a pumping business owned by Jarrid's father, Keith Lentz. The two companies, while separate, share referrals and projects freely. For example, the pumping company can transfer callers inquiring about installation directly to Lentz Wastewater Management.

It's an ideal arrangement, and the legacy of the family name has certainly helped Jarrid and his wife, Jeanie Lentz, grow their business to seven team members.

## FAMILY HISTORY

The Lentz family enterprise goes back more than 60 years. Roy Lentz Sr. founded a septic system installation company in 1958. His sons Keith and Roy Lentz Jr. launched the pumping business in the 1970s. The elder Lentz retired in the 1980s, ending the installation side.

Jarrid grew up in the pumping business, riding in the trucks to jobs with his dad and uncle. While in school, he worked part time for a plumbing contractor. Later, he enrolled in a plumbing program at the local technical college; he left school to help his father in the pumping business while his uncle spent more than a year recovering from an injury.

In 2000, at age 24, he started his own Terralift and system repair business. "My dad bought a Terralift machine in 1996, but he didn't push it because he was focused on was the pumping side," Jarrid recalls. "I was working for him doing Terralift jobs on weekends and when I wasn't in school.

"One day I went to him and said, 'Hey, do you want to sell this thing?' He said yes, and I took off and ran with it. I bought a mini-excavator and carried it around with the Terralift. I worked for 12 years by myself with no help. In 2015 I bought a bigger excavator and started installing septic systems. We now have a full-time installation crew going." In 2018 the company did 79

Jason Lentz (left), Jerry Wyatt (right), and Marcos Benitez (in the background) install a Goulds WE Series pump into a new Infiltrator Water Technologies tank with Infiltrator EZsnap risers during a system install. (Photos by Wendy Yang)

> "We're starting to use horizontal panels more, and that has opened up lots that had been shut down for septic systems."
>
> Jarrid Lentz

new installs, replacements, expansions or additions; and in the first three quarters of 2019, it did 77.

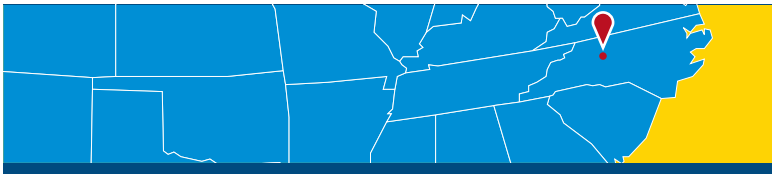
The field team includes Jason Lentz (Jarrid's brother), Aaron Stephens and Jerry Wyatt, septic install and repair technicians; Marcos Benitez, crew member; and Brixan Burgess, part-time summer helper. Wyatt also handles fleet and equipment maintenance.

Many repair jobs come through referrals from the pumping side of the business. "For example, we get a lot of tee replacement jobs from the pumpers," Jeanie says. "They'll hand the customer our card, and the customer will call us after the pumpers leave." In return, Lentz Wastewater Management calls Lentz Septic Tank Service when there's a need to pump a tank.

## FINDING A FIT

The installation business has taken flight in the past two years. The area's red clay soils can be challenging, but more often the critical issue is finding space for a drainfield on compact lots, especially around Lake Norman.

There, the company relies on what Jarrid calls "50% reduction systems" using materials and designs provided by T & J Panel, headquartered in Statesville. The state Department of Health has approved the technology for drainfields half the size of those required for conventional onsite systems.

## Lentz Wastewater Management

**Statesville, North Carolina**

| | |
|---|---|
| **Owners:** | Jarrid and Jeanie Lentz |
| **Years in business:** | 19 |
| **Employees:** | 7 |
| **Service area:** | 50- to 60-mile radius |
| **Specialty:** | Onsite system repair and installation, drainfield restoration |
| **Affiliations:** | National Onsite Wastewater Recycling Association, National Association of Wastewater Technicians, North Carolina Septic Tank Association, North Carolina Rural Water Association |
| **Website:** | www.lentzwastewater.com |

"T & J Panel introduced the product back in the 1970s," Jarrid observes. "The systems use concrete blocks, about 4 feet long and 20 inches tall. We dig a 2-foot-wide trench, install a bed of sand and set the panels vertically on top of the sand. Then we run pipe through the holes in each block, backfill with sand up to the top and plumb the connections all the way back to the septic tank."

Each line has a clean-out so required flushing can be performed twice a year. The systems can be either gravity flow or pressurized. For gravity systems, the drainfield lines have to be equal in length. For pressurized systems, line length is flexible, enabling systems to conform to odd-shaped lots.

Recently, T & J Panel introduced a horizontal panel that require less depth of suitable soil. "We're starting to use horizontal panels more, and that has opened up lots that had been shut down for septic systems," Jarrid says.

Aside from panels, the company installs mainly conventional systems with chamber drainfields (Infiltrator Water Technologies). Jarrid prefers concrete septic tanks (Shoaf Precast Septic Tank) but uses plastic tanks (Infiltrator) where sites are inaccessible to delivery trucks. Pump repair and replacement, installing risers and replacing tees are also part of the workload.

### MACHINERY CARE

Go-to machines for installation work are a 2019 Kubota KX057-4 excavator and 2016 Kubota SVL75-2 track loader. A 2016 Bobcat E26 rubber-tracked mini-excavator is used mostly on small repair jobs. Vehicles include a 2017 Ford F-550 and 2016 Ford F-450, both with 11-foot Reading service bodies; a 2011 Chevy 2500 HD; and a 2002 Chevy C7500 dump truck.

The team at Lentz Wastewater Management, shown with Kubota machines, includes (from left) Jason Lentz, Jarrid Lentz, Jeanie Lentz, Jerry Wyatt, Aaron Stephens and Marcos Benitez.

"I try to keep equipment that's in good shape so we're not having to work on it," Jarrid says. "If a machine starts breaking down and gets worn out, we get rid of it." The company does its own machine and truck maintenance, mainly because "We're working so many hours we can't get them to a place that's open during the day to get the work done. We do it after hours and on the weekends — whenever we can."

The Charlotte area is competitive: pumpers and installers are abundant. At least three other companies have Terralift machines. Lentz Wastewater Management stakes it future on quality.

"I've worked on repairs; that's where I started," Jarrid says. "I see the things you shouldn't do as an installer. Bedding pipe is one big issue. Installers don't always bed their pipe correctly, and that's when it settles and breaks. We fix a lot of those. Then it's a matter of people just not doing quality work, not gluing their fittings properly.

"On the repair side, we find that contractors have replaced pumps using the wrong size or wrong kinds of pumps, such as using a sump pump or grinder pump in place of an effluent pump. I learn from that. I do things my own way and try to make systems as trouble-free as possible. We use the best materials we can. We use Goulds WE Series effluent pumps. They haven't changed in 40 years, and they work. I've seen their pumps last over 30 years."

## PLEASING CUSTOMERS

Competing to win also means quality customer care. That starts with Jeanie's voice on the phone. "They call in and they have a problem," she says. "Everybody has an emergency. They want somebody who knows how to solve it. If I don't know the answer, I assure them I will find out."

Jason Lentz operates a Terralift machine. The company used the soil aerator to restore more than 100 drainfields in 2018.

# NEW LIFE FOR DRAINFIELDS

Lentz Wastewater Management has employed Terralift machines for many years to restore drainfields that become plugged and no longer function properly.

Drainfields can become clogged when the biomat that grows naturally in the trenches over time becomes too heavy so septic tank effluent can no longer seep into the soil and be treated. The Terralift machine inserts a probe 3 to 6 feet into the ground next to the drainfield lines.

A blast of high-pressure air then fractures the ground; at the same time, styrene plastic beads are forced into the resulting cracks and fissures. These beads keep the cracks open so the liquid can once again drain down into the earth.

Lentz Wastewater Management restored 122 drainfields with its Terralift machine in 2018. "Terralift works well in the soils here," says Jarrid Lentz, co-owner. "Development is dense around Lake Norman, and on many lots there isn't room for a replacement drainfield."

Terralift crew members Jason Lentz and Aaron Stephens travel with a Bobcat E26 rubber-tracked mini-excavator for making ancillary repairs, such as digging up and replacing distribution boxes and installing risers on septic tanks.

A typical Terralift job takes three to six hours, and Jarrid Lentz has seen some rejuvenations over the last 20 years or more. The company is now on its third Terralift machine (a 2015 model).


Jarrid Lentz uses a Kubota excavator to dig trenches for a new drainfield utilizing Infiltrator Water Technologies chambers.

> "I do things my own way and try to make systems as trouble-free as possible. We use the best materials we can."
>
> Jarrid Lentz

Team members in the field are trained to treat customers courteously. They also go the extra mile: If a customer needs a service beyond the onsite system repair, such as removing a tree stump or relocating a pile of soil, they'll do it for a reasonable extra charge.

Locating septic tanks is a common challenge; many homeowners have no idea where the tank is. Lentz Wastewater Management team members insert a cable into a clean-out at the house and then use a Subsite Electronics UtiliGuard locator to trace the line back to the tank. At that point, they typically install a riser and leave the customer with a diagram on graph paper, showing the property lines and locations of the house, other buildings and treatment system components.

All that helps create good word-of-mouth, which the company augments with increasingly sophisticated marketing. Joshua Mackens, a marketing specialist based in Tennessee, helps the company with its website and with search engine optimization.

Jeanie is active in marketing as well, on top of her duties in financial management, payroll and job scheduling. "Our local newspaper has a Best of Statesville competition every year in different categories," Jeanie says. "We won Best of Statesville for septic service in the last two years." She also handles occasional local media advertising, writes posts for the website and posts to social media.

She has come a long way from her profession as a speech pathologist, in which she still works part time: "I used to say there was no way I could work for the family business. It just happened. Two summers ago, Jarrid needed help so I stepped in and it just kind of stuck. I sure do stay busy."

## BIG PLANS AHEAD

Everyone at Lentz Wastewater Management is pretty well guaranteed to stay busy. Jarrid's next big goal is to build a shop and office to replace the rented headquarters. He also wants to hire a team member and launch a

Jarrid and Jeanie Lentz are shown at a work site where a Kubota excavator is digging trenches for a drainfield using Infiltrator Water Technologies chambers.

"Everybody has an emergency. They want somebody who knows how to solve it. If I don't know the answer, I assure them I will find out."
Jeanie Lentz

maintenance service for T & J Panel systems — there are thousands of them in the area.

Meanwhile, the company is working with the Piedmont Design Associates engineering firm in nearby Mooresville to prepare for installing advanced systems with aerobic treatment units, most notably on small lots with drainfields that can't be rejuvenated with the Terralift.

As for a fourth generation in the business, there's the Lentzes' 12-year-old son, Ashton. "He'll go to work with Jarrid some days," Jeanie says. "The guys will send him back and forth to the truck to get supplies."

Will he take over the business someday? Only time will tell.

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# New York Communities Step Up Effort to Upgrade Substandard Onsite Systems

By David Steinkraus

The Lake George Town Board in New York approved an agreement that will help residents replace failing septic systems. Under the agreement, the nonprofit FUND for Lake George will create a program supplying grants to cover 50% of the cost of a new onsite system. Each grant will be capped at $8,000.

Projects must be within 500 feet of Lake George or 100 feet of tributary streams for the lake, reports *The Post-Star* of Glens Falls. The fund allocated $30,000 for four projects in 2019. The fund is also working with Warren County to apply to the New York Septic System Replacement Program, which also provides grants.

Lake George is located in the southeastern corner of Adirondack Park, and local people have become concerned by an increase in the amount of algae appearing in the lake and by a general decline in water quality.

Also in New York, Suffolk County held two public meetings about its plan to upgrade onsite systems to reduce nitrogen pollution along the county's Atlantic Ocean shore. Suffolk County is on the eastern end of Long Island, and many properties use cesspools for onsite wastewater treatment. In recent years, the county and its municipalities have focused on how to eliminate the cesspools and shift onsite treatment to lower-nitrogen alternatives.

The county plan identifies 190 subwatershed areas in the county and proposes nitrogen-reduction goals for each. Onsite system upgrades would progress in four phases during the next 50 years, reports the *East End Beacon* of New Suffolk. But officials believe the plan could have an effect on water quality in as few as 10 years.

During the first phase, from now until 2023, there would be 10,000 upgrades or connections to municipal sewer systems. Total cost of the plan is estimated at $4 billion. First-phase projects would be paid for with $535 million in federal and state money.

The local wastewater industry can support about 1,000 installations per year now, but that will grow, Deputy County Executive Peter Scully tells the newspaper.

## Hawaii

In September, the Maui County Committee on Governance, Ethics and Transparency voted 5-3 to recommend settling the county's case with Hawaii Wildlife Fund and several other parties. The case was scheduled for oral arguments before the U.S. Supreme Court. If the parties agree to settle the case, it would be dropped from the court.

Under the settlement, the county would be expected to reduce its use of injection wells to dispose of treated wastewater, reimburse the litigation costs of the wildlife fund and the other parties who brought the lawsuit, and abide by a National Pollutant Discharge Elimination System permit.

For years the county has pumped treated municipal wastewater into injection wells that carry it deep underground. In 2011, the U.S. Environmental Protection Agency funded a tracer dye study that found wastewater from the wells flows into groundwater and back into the ocean near Kahekili Beach where it was linked to environmental damage such as algae blooms that smother coral reefs.

In 2018, the environmental law firm Earthjustice, which represents Hawaii Wildlife Fund, said the county's Lahaina Wastewater Reclamation Facility injected 3 million to 5 million gallons of wastewater daily. The wildlife fund filed suit, claiming the county's pumping should be subject to the Clean Water Act. A federal district court and the 9th Circuit Court of Appeals in San Francisco agreed, and then the county appealed the decision to the Supreme Court.

What is critical about the case is the potential change in how the Clean Water Act is applied. When it was written in the early 1970s, it specifically excluded some nonpoint sources such as agricultural and forestry practices, according to Erin Ryan, of the Florida State University College of Law. Congress focused the law on pollution sources easy to clean up, such as pipes coming out of factories. Where we are now, she says, is deciding how to deal with those remaining sources of pollution.

The difficulty is how to cope with pollution that is discharged from a point source but that contaminates regulated surface waters through a stretch of groundwater. "How should we think about the connections between surface water and hydrologically related groundwater, and what do we do about the sources of pollution that are really genuine threats to the nation's waters but are conveyed by something not as easily attached to a point source designation, such as a factory pipe?" Ryan asks.

## Virginia

Homeowners with failing septic systems or no system may be eligible for financial help if they live in Bland, Carroll, Grayson, Smyth, Washington or Wythe counties, or the cities of Bristol or Galax.

The Mount Rogers Planning District Commission, which serves these municipalities, is applying for a grant for 2020 from the Virginia Department of Housing & Community Development, reports the news website *SWVA Today*. Funds will help low- and moderate-income families who do not have safe drinking water supplies or who have failing septic systems or no septic system.

In 2019, 13 projects were completed, and planner Josh Smith expects

the district will receive grant money for another 13 projects in 2020. Applications for the 2020 program may be submitted beginning in mid-October.

## Michigan

Two counties on the northwestern side of the Lower Peninsula are trying to take different directions with requirements for onsite system inspections at the time a property is sold.

Kalkaska County commissioners are deciding whether to complete a proposal to withdraw from the inspection program operated through the area health department, reports the *Traverse City Record-Eagle*. In nearby Manistee County, commissioners are trying to remove exemptions in order to strengthen the program.

Because the same health department covers both counties, each county's commissioners must approve the actions of the other county. Both county boards have refused to consider the other's requested changes.

People in favor of the program say it protects homebuyers and helps keep drinking water safe, while opponents say the program has too many exemptions and creates a backlog of transactions on hold pending inspections. At a public hearing in Kalkaska County, several people told commissioners that the program could be amended to address criticisms while protecting the environment.

## Florida

A Charlotte County study concluded its future development would depend on onsite systems because sewer system expansion is not keeping up with growth. The study is part of a state-mandated review of water and sewer capacity that takes place every five years, reports the *Port Charlotte Sun*. The county is in the southwestern part of the state near Fort Myers.

Five years ago, a similar study concluded the number of new onsite systems was decreasing, but in the last few years, the number has ballooned as people built new dwellings, says Matt Trepal, the county's principal planner. To address the water-quality programs that come with old systems, the county is removing those in critical areas near open water.

## South Dakota

The Rapid City Regional Airport got in trouble for dumping thousands of gallons of wastewater on its property without talking to the state Department of Environment and Natural Resources. Last summer, the airport hired a contractor to pump 30,000 gallons of wastewater from its overfull lagoon onto another part of its property. In August, another 74,100 gallons were pumped to the same place.

"We were getting calls that the airport was land-applying the water, which was one of their options, but they had not gone through the necessary steps to get the Department of Environment and Natural Resources' approval," Brian Walsh, environmental scientist manager with the department, tells TV station KEVN. He says his agency told the airport to stop what it was doing and consider a permit for land application.

The airport's executive director says heavy rains brought about more use of car washes for rental vehicles, and that put an extra 100,000 gallons of water into the lagoon. ◻

"Rules and Regs" is a monthly feature in *Onsite Installer*™. We welcome information about state or local regulations of potential broad interest to onsite contractors. Send ideas to editor@onsiteinstaller.com.

SYSTEM PROFILE

# Pop Quiz: How Do You Handle Wastewater for 550 New Students?

Designer Mark Lancor and installer Mark Green do their homework to expand a complex onsite system for a Connecticut school

By Scottie Dayton

A private school in Greenwich, Connecticut, wanted to expand its nursery through ninth grade facilities by building a high school for 550 students. E.E. Cruz won the general contractor bid, and Mark Lancor, P.E., principal engineer at DYMAR in Southbury designed the 10,000-gpd onsite system.

"The site has soils with low permeability, shallow depths to ledge and a seasonal high water table at 18 inches below grade, ruling out a conventional subsurface drainfield," Lancor says. Some of his design included a grease interceptor, five septic tanks, a membrane bioreactor with ZeeWeed 500Ds cassette module (SUEZ Water Technologies & Solutions), four pump stations with Barnes pumps (Crane Pumps & Systems), and a 180-by-137-foot-wide constructed-fill drainfield covered by a parking lot. All concrete tanks were H-20 traffic rated.

Green Construction Management in Waterbury had the expertise to install such a drainfield and a long list of large commercial systems that verified the company's reputation for trouble-free installations. On Lancor's recommendation, Mark Green, the company owner, met with the general contractor.

"I didn't leave with a signed contract, only the feeling that I'd get the job," Green says. He stuck out his neck and acted on the hunch.

## System operation

Permeate from the membranes is UV-disinfected, stored in a 5,400-gallon tank and used to flush the school's urinals and toilets. Overflow from the tank flows to a pump station dosing the 19,728-square-foot drainfield of CULTEC chambers. A rock revetment underdrain at the west end collects permeate and conveys it to a wet well pumping to a 6,000-gallon fiberglass storage tank near the school's main entrance. Duplex pumps distribute flow to an irrigation dripfield under a multipurpose athletic field. Quick4 high-capacity chambers (Infiltrator Water Technologies) protect the lines.

## Handshake deal

Lancor required the constructed fill, a custom mix of septic gravel and sand, to meet a permeability rate of 37 to 60 feet per day. "The only way I would be able to sleep at night was if I knew the mix came from Laurelbrook Natural Resources," Green says. He met with owner and friend Bob Jacquier to explain the predicament and deadline.

The high school was due to open in September 2019. When and if Green landed the job, he'd have to wait two months while Jacquier's team mixed the required 8,000 tons and tested it for permeability, compaction and particle size (sieve). "Just testing each 500-cubic-yard pile took two weeks," Green says. "We'd never have met the deadline had I waited for a contract."

Workers from New England Liner Systems thermal-fusion weld seams where the 40-mil liners overlap in the revetment. (Photos courtesy of Green Construction Management)

Mark Green, owner of Green Construction Management, and Tom Dauti, owner of Dauti Masonry, use low-ground-pressure Volvo MCT125C rubber-tracked skid-steer loaders to distribute a custom mix of septic gravel and sand.

## System Profile

| | |
|---|---|
| **Location:** | Greenwich, Connecticut |
| **Facility served:** | Private school |
| **Designer:** | Mark Lancor, DYMAR |
| **Installer:** | Mark Green, Green Construction Management |
| **Type of system:** | Constructed-fill drainfield with low-pressure dosing |
| **Hydraulic capacity:** | 10,000 gpd |

On a handshake, Jacquier began stockpiling the mix in early March. By the time Green signed the contract on Friday, May 3, the quarry had 4,000 tons ready for Green the following Monday. Meanwhile, E.E. Cruz had built the drainfield's 5- to 7-foot-deep subgrade with 4% rise in elevation from west to east.

"All my subcontractor friends were busy and had to drop what they were doing when this job took off," Green says. Monday morning, Dave Welch, owner of New England Liner Systems, and crew began installing the underlayment and the 40-mil high-density smooth HDPE liner (GSE Environmental) over it. The latter arrived on 870-by-22.5-foot-wide rolls, which were run out, overlapped, thermal-fused and tested for leaks at the welded seams.

### Keep 'em rolling

Meanwhile, 15 to 22 dump trucks per day made the 4.5-hour round trip from the quarry in Canaan to deliver the custom mix. Wayne Green, Mark Green's 72-year-old father, managed tickets and material inventories for all 355 loads.

By Wednesday, 2 tons of mix were on site and the liner had passed inspection. Green began stockpiling mix inside the pit at the center of the west face using a rented Volvo L110 wheel loader with 4-cubic-yard bucket.

"Just testing each 500-cubic-yard pile took two weeks. **We'd never have met the deadline had I waited for a contract.**"

**Mark Green**

Scott Lukowski, a project engineer from DYMAR, does a compaction test, overseen by a worker from Connecticut Materials Testing Laboratory.

Mark Lancor, principal engineer at DYMAR, looks downfield as Mark Green, owner of Green Construction Management, adjusts a valve during the squirt tests. Chambers are from CULTEC.

Heavy-construction family: Wayne Green, Joey Paparazzo and Mark Green.

"Liners are slippery as ice, and the sandbags holding down the edges didn't work as well as anchor trenches," Green says. "No matter how carefully I dumped the mix over the side, the liner slid into the hole with it and had to be pulled back."

Constructing the revetment required building a 10-foot-wide-by-12-inch-deep track-in road from the stockpile. Green drove one of two low-ground-pressure Volvo MCT125C rubber-tracked skid-steer loaders with 1-cubic-yard buckets. Tom Dauti, his friend and owner of Dauti Masonry, drove the second machine. They laid out and confirmed elevations using a Spectra Precision/Trimble LL500 laser level with Crain grade rod.

On Friday, Green and Dauti lined the revetment with filter fabric, brought in 2 feet of septic stone and laid the 6-inch perforated collection pipe, but there wasn't time to cover it. Torrential rain fell over the weekend, causing Green to worry that the sand would wash down and contaminate the stone. "By Monday morning, I was so nervous I didn't want to go to work for fear of what I would find," he says. "Somehow, we were OK."

## Bucket by bucket

Even with two machines, building 12-inch-deep lifts over the entire liner went slowly, as each layer required six samples to be tested for particle size, moisture density, density of soil in situ and permeability before the inspection. In addition, heavy rains fell daily, turning buckets of mix to slush. The wet well pumps weren't operational yet, so the crew dewatered the pit.

"It was a nightmare until the third lift was inspected, enabling us to bring in the rented Case 650M WT LGP crawler dozer with 8-foot-wide blade," Green says. His retired uncle, Joey Paparazzo, used it to fine-grade the lifts. It took a month to build the 5- and 7-foot lifts, followed by a 3-inch base of 1 1/4-inch stone (Haynes Materials) for the 108 Contactor 100HD low-profile H-10 wheel-loading chambers (CULTEC).

From the manifold, Green and Dauti set nine galleys per row, only the end unit was 36 inches long instead of 96 inches long. Meanwhile, Wayne Green drilled and deburred 1/4-inch orifices every 4 feet in the distribution pipes. Lancor measured and inspected every hole.

Although the ball valves were all 1 1/2 inches, they required concentric reducers to telescope the manifold, enabling optimization of flow. "The first three rows closest to the west have 3-inch pipe, the next two rows have 2-inch pipe, and the last row has 1 1/2-inch pipe," Mark Green says.

After Lancor conducted squirt tests to equalize the pressure in the pipes, Green and Dauti backfilled to the top of the galleys with 1 1/4-inch stone and covered them with filter fabric. Then they built thrust blocks with 8-inch manhole covers over the valves and clean-outs. Dauti Masonry poured the concrete.

Green handed the site to E.E. Cruz near the end of June.

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# 2019 Onsite Innovations

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See how these partnerships ensure success in this special **Onsite Innovations** section.

# The PL-625 Helps Reduce FOG Being Released Into a City Sewer

**Problem:** A fast-food restaurant located in Connecticut had a problem with fats, oils and grease being released from its grease trap into the city sewer system. The restaurant was facing heavy fines and a potential shutdown if the situation was not corrected.

**Solution:** The restaurant contacted Polylok's engineering team hoping to solve their problem. Polylok recommended they install a PL-625 effluent filter in the outlet of their 2,000-gallon grease trap. The PL-625 is ideal for grease trap applications. The 1/32-inch filtration has been shown to reduce FOG by as much as 60% to 98%.

**Results:** The FOG was reduced to acceptable levels and the restaurant was no longer facing heavy fines or a potential shutdown. The PL-625 was easy to install and saved this restaurant thousands of dollars in potential fines and interruption of business.

The PL-625 effluent filter is ideal for grease trap applications. The filter may also be used in onsite wastewater systems that require a finer level of TSS removal. Whatever the application, Polylok has the filter for you.

The PL-625 filter provides 625 linear feet of 1/32-inch filtration that is rated for up to 8,000 gpd. It accepts 4- and 6-inch Schedule 40 pipe. The filter also features a built-in gas deflector, an automatic shut-off ball when the filter is removed, alarm accessibility, and it accepts a PVC extension handle.

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# Tuf-Tite's New Look

Years ago Tuf-Tite invented the first "Riser Safety Pan" — allowing a concrete safety lid to be cast into a plastic riser system that could be placed anywhere in the column of risers. A design so innovative, it remains an industry standard.

Now the company is innovating once again. Tuf-Tite took the next step to make the first plastic internal safety lid for protection.

Tuf-Tite engineers knew that the original web design was extremely strong in the riser, but what about out of the riser? What if the internal safety lid was damaged in the field? Could it be reused? Others were using a similar web design, but Tuf-Tite moved in a new direction.

Tuf-Tite's new internal safety lids sit in the riser on four ledges. The solid safety lid features an inspection port, screw or bolt holes to fasten the lid to the riser and concrete keepers that can hold 40 pounds of concrete. This design has proved to be one of the strongest safety lids on the market, in the riser or out of the riser, according to a company spokesperson.

Tuf-Tite requires that the internal safety lid be screwed or bolted down to the ledges on the riser below. For added safety, the Tuf-Tite safety lid can be filled with concrete, adding an additional feature unique to Tuf-Tite.

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Tuf-Tite produced its first product in 1984. Years of polymer formulation experience and field testing have strengthened the full line of products the company produces today. Tuf-Tite is an American-owned and -operated company and all polymer products are manufactured in Lake Zurich, Illinois, where the modern and highly automated manufacturing, warehouse and shipping areas are all contained under one roof in a 165,000-square-foot facility. The company is fully capable of servicing any and all demand for Tuf-Tite products. Its automated supply chain capabilities provide customers with seamless on-time deliveries.

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# Decentralized Treatment Provides Sustainable Solutions for Communities Faced with Infrastructure Challenges

Finding cost-effective sustainable solutions for wastewater infrastructure challenges is a balancing act for rural and growing communities. When community leaders and residents define challenges and future needs, they make the best wastewater treatment choice for that situation. In most cases, the decentralized approach is cost-effective and offers exceptional performance and longevity. Communities that choose a sustainable development and wastewater treatment path base the choice on community planning, anticipated growth, economics and environmental sensitivity. While treatment needs, design challenges and local regulations vary greatly, what remains a constant is that decentralized systems provide long-term wastewater treatment performance at an affordable cost.

## Individual and cluster decentralized systems solve wastewater woes

Rowan, Iowa, was required by the state to upgrade all wastewater treatment systems in the city because the effluent was flowing into a field and emptying into a nearby creek. These included more than 150 residential, municipal and commercial systems.

Limited space and access required unique onsite wastewater treatment, and challenged project engineers at Veenstra & Kimm to design systems to serve daily flows and minimize future maintenance needs. Rethinking on-lot drainfield installation on the tight lots within city limits posed a challenge. The solution was wastewater treatment systems installed to serve groups of five to six lots. The process included relocating utilities, replumbing basements to accommodate shallow systems, plugging abandoned wells and installing an iron filter backwash system.

## System details

The project required 91 sewer hookups, 20,400 linear feet of Infiltrator Quick4 Plus Chambers, and boring 6,000 linear feet of 1 1/2-inch force main. The variety of lot sizes and absorption field areas resulted in a mix of solutions. These included 50 conventional gravity-fed septic tanks and individual Infiltrator chamber drainfields; 16 STEP tank systems feeding individual Infiltrator chamber drainfields; 18 STEP tanks feeding pressure mains leading to two Infiltrator chamber drainfields for a home cluster; and three advanced treatment units feeding individual Infiltrator chamber drainfields.

## Results

The installation contractor, Mort's Water Co., kept service disruption to the homes to a minimum. Each system was treated as an individual case. Maintaining gravity flows from the homes into the new wastewater treatment system often required changing the outflow of household discharges. The community was pleased with Mort's commitment to do the job right, the clear communication about the scope of the project, and the final site cleanup.

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Infiltrator Water Technologies is a leading manufacturer of products for the water and wastewater industries. For over 30 years, the company has manufactured a variety of innovative and environmentally friendly alternatives to traditional pipe-and-stone leachfields and concrete septic wastewater components. The company sells its products through wholesale distribution across the U.S. and Canada, for use on properties with onsite wastewater treatment systems. Infiltrator is a leader in the use of post-consumer and post-industrial recycled plastics in the manufacturing of its products.

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## Watertight

Whether midseam, top-seam or anywhere in between, precast concrete onsite wastewater tanks provide reliable watertight solutions. Precast tanks are tested and verified to be watertight. This ensures the tank's performance is not compromised by infiltration, and that soil and groundwater are protected. Joint sealants and resilient pipe connectors complying with applicable ASTM standards are designed specifically for this application and will contribute to a watertight structure.

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Precast tanks provide peace of mind as they resist buoyant forces with ease, even in the highest water tables.

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Precast tanks are engineered structures made with quality raw materials in precise proportions, in controlled manufacturing facilities. This combination of quality control and quality assurance enables precast concrete tanks to stand up to the most demanding conditions.

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## Easy to install

Precast tanks are easy to install regardless of soil type, water table height or other on-site conditions. Concrete's inherent strength also allows precast tanks to be installed at greater depths.

## Always advancing

The concrete industry has stood the test of time. It's been thriving for millennia and it's always advancing. New technologies are pervasive throughout the industry — from materials to equipment to designs — to adapt and meet your needs.

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National Precast Concrete Association is an international trade association representing the manufacturers of plant-produced concrete products and the suppliers to the industry. NPCA is dedicated to expanding the use of quality precast concrete.

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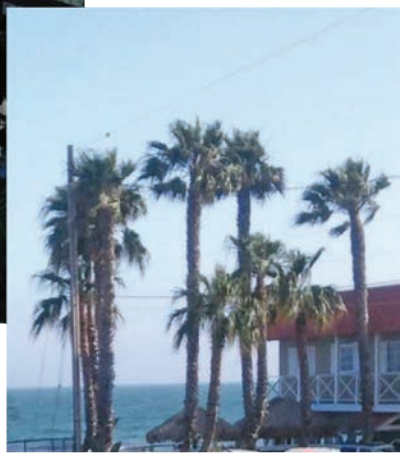
# Salcor 3G UV Disinfection Solves Duke's Oceanfront Restaurant Wastewater Problem, Enabling Direct Discharge Into Beach Sand

Duke's — a popular restaurant in Malibu, California — was named after Duke Kahanamoku, who is considered the "Father of Surfing." Wastewater from the restaurant averages 6,000 gpd and must be treated on site and directly discharged into a sensitive beach environment.

After numerous water quality and discharge violations, the facility began upgrading its treatment system in 2011, selecting an upflow sludge blanket filtration system and Salcor disinfection consisting of four 3G units in two parallel tracks. The design was approved by the California Regional Water Quality Board and City of Malibu, and construction was completed in April 2012.

4 SALCOR "3G" UV Units


DUKE'S RESTAURANT, Ocean Front, Malibu, CA Named for Duke Kahanamoku, the "Father of Surfing"



"3G" UV Disinfected Effluent Discharges into Beach Sand

## Outstanding results

The new treatment system for Duke's immediately produced high-quality effluent, which has met the stringent disinfection requirement of California Title 22. Results have been consistent over six years of operation, according to the plant operator.

Effluent total coliform count has been nondetectable, and DO concentration has averaged 6 mg/L. The high-quality discharge has reduced coliform levels in the groundwater lens under the site and adjacent beach from greater than 1,600 MPN to less than 2 MPN.

Because of the restaurant wastewater's fat, oil and grease content, the Salcor UV units were initially inspected weekly for possible fouling of the unique Teflon barrier. No fouling occurred, and operation has been trouble-free and efficient, according to the plant operator.

## About the unit

Salcor's unit is UL listed and meets the NEMA 6P successful 30-day underwater test. It survives most catastrophic weather disasters (hurricanes, floods and lightning). It has been tested extensively by several third-party testing sites, including 21 separate times by NSF. It has been used in residential, commercial and municipal projects, and can be clustered to treat up to 100,000-plus gpd.

Because its lamp has a Teflon cover, it resists fouling and reduces maintenance, which is limited to simply wiping it down every six months and replacing the lamp every two years. The unit can be installed in-ground or in a pump tank, so the footprint is minimal and includes an alarm circuit for reliable, continuous performance monitoring.

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760.731.0745 F: 760.731.2405

# Retrofit Your Current Station With a Barnes Upgrade Core Grinder Package

The heart of a pressure sewer system is the grinder pump and level control. The Barnes Upgrade Core package featuring the Barnes Omni Grind Plus centrifugal grinder pump is designed to allow operators and service providers to simply upgrade and retrofit into current stations without reconfiguration of the install site.

Some of the Barnes Upgrade Core features include good reliability; reduced operational and maintenance costs; hydraulic coverage to meet higher discharge head pressure and increased flows to provide proper line-scouring velocities; reduced odor problems; long pump life; few solids settling out in basin; and reduced level control issues.

## Core benefits

The main benefits of the Barnes Upgrade Control package include good hydraulic design coverage; multiple assemblies available for a variety of applications; individual plug-and-play cords allowing for modular component installation and upgrade needs; and rigid pipe or flex-hose connections.

A centrifugal pump, like a Barnes two-stage grinder pump, will provide a reliable performance without service for an average time of 10 years, according to the manufacturer.

Some other two-stage centrifugal pump benefits include continuous operation at heads over 180 feet and good performance capabilities; one pump can scour an HDPE 11, 1 1/4-inch pipe by itself to a head of 185 feet; dual-vortex impellers handle solids and provide continuous operation at any point on the curve without overloading the motor; no closed valve protection required for high-wear components.

## Three configurations

The Barnes Upgrade Core packages are available in three configurations: fixed discharge, universal and flanged horizontal discharge.

The Barnes 1.25-inch Fixed Discharge Core featuring the Barnes Omni Grind Plus pump provides a drop-in ready package that fits directly into your current station. The OGP pump combines the reliability of a centrifugal grinder with unmatched high-head capability.

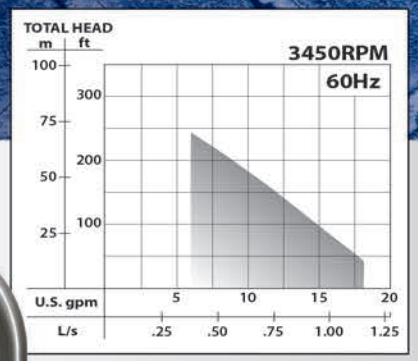
Features include stainless discharge pipe fits into existing receiver; easy-to-maintain flap-style check valve; corrosion-resistant pump and components; grinder pump that empties basin quickly; easy-to-remove level control; and quick-connect fittings to simplify electrical connection.

The Barnes Universal Upgrade Core is designed to retrofit into universal basin styles with a 1.25-inch NPT discharge connection. The Barnes Omni Grind Plus two-stage centrifugal pump provides maximum reliability and low life-cycle costs.

Features include 1.25-inch NPT for connection to existing flex hose or hard piped connection; combination flap-style check valve with anti-siphon port; cast iron pump stand and level control stand to provide proper clearance and support for the units, eliminating field adjustments; and independent level control and pump to allow for easy removal and inspection.

The Barnes OGV Omni Grind Pump with flanged discharge fits directly into existing systems with ANSI design requirements. The flanged volute features a 1.25-inch discharge with a standard ANSI pipe flange design, and the suction features a pipe flange design to fit 3-inch ANSI flanged pipe.

# PROGRESSIVE CAVITY PERFORMANCE, MINUS THE SERVICE CALLS.




## Barnes® PGPT Upgrade Core 1HP Centrifugal Grinder Pump

- LOW AMP, HIGH TORQUE MOTOR
- EXCLUSIVE SLICERATOR™ CUTTING SYSTEM
- PLUG-N-PLAY CORD
- RIGID PIPED OR FLEX-HOSE CONNECTIONS
- HIGHER HEAD PRESSURE AND INCREASED FLOWS TO PROVIDE PROPER LINE SCOURING VELOCITIES
- REDUCES SOLIDS SETTLING IN BASIN
- ELIMINATES ODOR PROBLEMS
- REDUCES LEVEL CONTROL ISSUES

| | |
|---|---|
| **Model** | PGPT Upgrade Core |
| **Motor** | 1 HP |
| **RPM** | 3450 |
| **Construction** | Cast Iron |
| **Impeller** | Stainless Steel |
| **Discharge** | 1.25" NPT, Tubing, Vertical, Bolt-on Flange |
| **Seal Design** | Single Mechanical |
| **Weight** | 150 lbs. |
| **Liquid Temperature** | 104°F (40°C) Continuous |
| **Shredding Ring** | Hardened 440C Stainless Steel Rockwell® C-55 |
| **Cutter** | Hardened 440C Stainless Steel Rockwell® C-55 |

## VISIT BARNES AT BOOTH #N773
## NGWA LAS VEGAS DECEMBER 4th-5th, 2019

BARNES®

CRANE PUMPS & SYSTEMS

# Enviro-Septic System Enables Expansion of Community Treatment Plant to Accommodate Growth and Preserve Natural Beauty

As the population in the town of Newbury, New Hampshire, grew, facility operators began detecting elevated levels of nitrogen in the effluent and groundwater. This sparked the need for an update to the Blodgett Landing Community Treatment Plant. The Blodgett Landing plant is a 50,000-gpd facility that uses passive treatment, denitrification and dispersal to purify the town's wastewater. The facility's limited budget required that any treatment plant upgrade solution be effective and affordable both in upfront cost and ongoing operations and maintenance expenses. Additionally, Newbury's economic dependence on recreational tourism required a solution that would preserve the area's natural beauty.

## Solution

Several options were explored before town officials contacted Presby Environmental for help. Presby recommended replacing the existing sand filter configuration with a Presby Enviro-Septic system. The system's compact size and low maintenance requirements made it ideal for the Newbury system and the approach complements the existing Imhoff tank and recirculation.

## Result

The Enviro-Septic pipe utilizes passive filtration and naturally occurring soil microbiology, eliminating the use of harmful chemicals or an external power source. The water treatment process is 100% green, enabling Newbury to protect its natural resources. The system also performs well in varying climates — including freezing temperatures in colder months. The Enviro-Septic product is also a proven technology for removing up to 99% of contaminants, including fecal coliform, TKN, TN, TSS and BOD.

Presby Environmental, Inc.

Presby Environmental is a wholly owned subsidiary of Infiltrator Water Technologies, a leading manufacturer of products for the decentralized water and wastewater industries. Presby manufactures the Enviro-Septic, Advanced Enviro-Septic and other wastewater treatment technologies.

**800-473-5298**
**www.presbyenvironmental.com**


# Ashland Pump Offers Heavy Cast Iron Effluent Pumps

Heavy-duty effluent pumps from Ashland Pump are available in multiple horsepower sizes for various performance requirements and feature efficient, permanent split-capacitor motors. The oil-filled pumps have an upper and lower ball bearing design and handle solids up to 3/4 of an inch.

Made of heavy cast iron with cast iron impellers, the pumps are equipped with a piggyback switch (20-foot standard cord) or in manual configurations. They're offered in 3/10, 4/10, 1/2, 3/4, 1 and 1 1/2 hp models.

Ashland PUMP

Ashland Pump is located in Ashland, Ohio, and manufactures a complete line of pump products for the residential wholesale market. Ashland Pump is a family owned business with over 35 years' experience manufacturing pumps. The company stocks thousands of pumps in its 130,000-square-foot warehouse to ensure there's inventory on hand for customers.

**855-281-6830 | ashlandpump.com**

CONTRACTOR REWARDS

# Get Rewarded for Purchasing SJE Rhombus Products

SJE Rhombus and Contractor Rewards have partnered up to make sure you get the biggest bang for your buck. It is free to join and open to contractors, plumbers, septic system installers and trade contractors in the U.S.

How does it work? Simply register online, start submitting invoices and see the reward points build up. Spend them in the Contractor Rewards online shop on prizes that you actually want, like name-brand merchandise, vacations, events and charitable donations.

For a limited time, contractors can earn double points on eligible SJE Rhombus products when they submit their first invoice. This offer is valid even for existing Contractor Rewards members. For more information, visit www.sjerhombus.com/contractor-rewards/.

You can also earn points and receive prizes by visiting participating trade show booths and answering trivia questions on social media. Follow Contractor Rewards and SJE Rhombus on Facebook, Twitter or LinkedIn to see the latest contests.

Invoices must be submitted on www.contractorrewards.com or emailed to invoice@contractorrewards.com within 60 days to earn points. For questions, email contractorsupport@contractorrewards.com or call 877-286-7064 between 8 a.m. and 4:30 p.m. CST, Monday-Friday.

SJE RHOMBUS

SJE Rhombus is a leading brand of water and wastewater controls solutions with over 40 years of expertise. SJE Rhombus is marketed by SJE, a 100% employee-owned, privately held company. With corporate headquarters located in Detroit Lakes, Minnesota, SJE does business globally from multiple locations across the United States and Asia. To learn more, visit www.sjeinc.com.

**218-847-1317 | info@sjeinc.com | www.sjerhombus.com**

# Complete Treatment Solutions From Norweco

Norweco's onsite innovations provide a complete solution that engineers, designers, installers and regulatory officials trust to provide excellent treatment options to meet their application needs, now and in the future. Norweco has engineered advanced wastewater treatment technologies that have been patented and certified to provide a complete solution to environmental regulations.

The broad selection includes:

- Nitrogen treatment
- Phosphorus removal
- Water reuse
- UV disinfection
- Biological additives
- New technologies coming in 2020

The Singulair Model TNT (Total Nitrogen Treatment) system biologically oxidizes nitrogen compounds without requiring complicated and expensive equipment. The TNT system does not require the addition of chemicals or the recirculation of effluent.

The Phos-4-Fade phosphorus-removal filter is a simple gravity flow device that reduces effluent phosphorus to unheard of levels that are well below regulatory limits.

The Singulair R3 system features innovative water reuse treatment technology that reduces water consumption, reuses treatment effluent and recycles water for indoor and outdoor use to conserve and recharge our water resources.

The Model AT 1500 UV disinfection system is highly engineered and constructed to provide reliable disinfection and superior operational life.

Norweco manufactures a wide range of chemical products for the treatment of water and wastewater. From homeowners needing chlorine for a residential wastewater system, an engineer in need of dosage equipment for a municipal project, or a city struggling to lower phosphorus levels, we have the solutions.

Benefits include:

- Certified performance exceeding the effluent requirements of NSF/ANSI Standards 40, 245 and 350
- Ease of installation and maintenance
- Backed by a full warranty against defects in materials and workmanship.



# Eljen System Addresses Onsite Challenges at Assisted Living Center

A new assisted living center in Lawrence County, Indiana, had been using a pump-and-haul service for over a year while it tried to figure out a solution for its wastewater. The location originally reserved for an onsite system was unsuitable for an onsite wastewater system.

The center got an easement and purchased a nearby lot, however, a traditional system wouldn't fit. The site has a 3% slope and soils, and a daily design flow of 3,750 gallons per day.

Design considerations for this system were to make sure there was enough capacity to handle flows from the 35 apartments, laundry facility and dining hall, as well as to adequately treat the wastewater stream.

## The solution

Designer and engineer Ronald Burcham chose the Eljen GSF B43 for the project due to the sizing reduction in square footage. The system is comprised of a grease trap and a series of septic tanks, as well as two pump chambers and a sloped above-grade bed.

The effluent flows from the septic tanks to a pump chamber, which then pumps the effluent underground through the easements to another pump chamber where it's then distributed to the drainfield. The drainfield has five rows of 29 B43 modules each which are centrally fed by a distribution box.

## The results

The assisted living center is now able to stop costly pump-and-haul service. The new drainfield treats effluent to secondary treatment levels, and also allowed space to be reserved for a future system.

Eljen Corp., established in 1970, created the world's first prefabricated drainage system for foundation drainage and erosion control applications. In the mid-1980s, the company introduced its Geotextile Sand Filter products for the passive advanced treatment of onsite wastewater in both residential and commercial applications. Today, Eljen is a global leader in providing innovative products and solutions for protecting our environment and public health.

**800-444-1359 | www.eljen.com**

# Keep Customers' Septic Tanks Secure and Safe With Seal-R Septic Products

Seal-R products from BrenLin Co. are designed to be installed as part of the inspection/maintenance opening to sewer tanks. These products were developed by experienced onsite installers who strove for a product that was not only simple to install, but also provided flexibility and safety.

The products were designed using corrugated dual-wall pipe for the riser material due to the benefits of limited joints and the ability to cut to the exact length in the field. Made from HDPE, Seal-R products offer both durability and longevity. The Seal-R septic ring is designed to attach the riser to the septic tank while creating a watertight seal to prevent infiltration.

The Seal-R septic lid is designed to be mounted on top of the riser at ground surface to provide an access point to the septic tank. Lids are green in color and are provided with the stainless steel hardware needed to securely fasten to the riser pipe. Lids can be customized to include company information.

Seal-R products also come with a few add-on options, including a hinge system as well as lids that can be installed on the inside of the riser for additional safety.

BrenLin COMPANY, INC.

BrenLin Co. Inc. is a family owned and operated manufacturing business established in 1998. Specializing in heavy-duty plastic septic system products, the company designs all products in-house and manufactures them in the U.S.
**888-606-1998 | www.seal-r.com**

# Low-Profile Septic Tanks

Den Hartog Industries, manufacturer of Ace Roto-Mold polyethylene septic tanks, has introduced three new tanks designed to provide a safe and durable means for the storage of septic system byproducts. The entire line of septic tank products provides storage and is designed for belowground installation. These tanks are furnished with multiple fitting locations to accommodate a variety of plumbing configurations and two openings available for burial lids or access/inspection risers.

Ace Roto-Mold low-profile septic tanks are stronger, easier to install and less costly than old-fashioned concrete septic tanks — yet they still offer the quality construction and safety you expect. The low-profile septic tanks are available in one or two compartment models with 1,000, 1,200 and 1,500 gallons of storage and are specifically designed to be backfilled empty. The low-profile septic tanks feature sectional ribbing designed to sustain vertical soil pressures of up to 500 psf at a maximum soil depth of 36 inches.

Low-profile septic tanks are another way Den Hartog Industries lives up to its mission of being "Always at Your Service."

Den Hartog INDUSTRIES, INC.

Den Hartog Industries offers services from conception and design through production, customer service, quality assurance, and delivery for the agricultural, industrial, OEM and marine industries. Known for its spirit of innovation, focus on the customer, and product quality that exceeds industry standards and expectations, Den Hartog Industries can provide products for all your plastic and metal manufacturing needs.

**800-342-3408 | www.denhartogindustries.com | sales@denhartogindustries.com**

# MicroFAST Residential Wastewater Treatment Systems

BioMicrobics is a leading manufacturer of decentralized wastewater treatment systems. The company was founded in 1996 with a vision to manufacture simple, low-cost and robust products for the onsite water industry. Its advanced treatment units are preengineered for residential, commercial and high-strength applications. These systems are scalable and extremely efficient, providing a cost-effective solution to managing waste and improving onsite sanitation.

The MicroFAST system is a powerful aerobic wastewater treatment system using a submerged fixed-film process. For 23 years, MicroFAST has been serving residences and developments with reliable advanced wastewater treatment. As a versatile component for advanced septic systems, MicroFAST has been used to achieve secondary and tertiary effluent standards and nutrient reduction worldwide, with over 60,000 systems serving facilities in more than 70 countries.

Homeowners, installers and engineers can be comfortably assured that a MicroFAST system will serve their needs by providing reliable performance with minimal complexity.

In a MicroFAST system, the blower is the only moving part required for the treatment process, requiring no replacement parts over the life of its operation. The control panel powers the blower with SFR (Sequencing Fixed Reactor), UV disinfection compatibility and external alarm features. The MicroFAST treatment module contains attached-growth media optimized for biological wastewater treatment and a patented air-lift device for mixing and oxygen transfer. Installation options include "feet" or "lid" mounting for fastening the treatment module to a tank floor or tank lid.

BIO MICROBICS®

BioMicrobics manufactures innovative, advanced wastewater treatment systems, graywater, water reuse and recycling systems, and stormwater treatment that provide unique solutions for decentralized homes, clustered subdivisions, small communities, commercial properties and marine vessels around the world.

**913-422-0707 | sales@biomicrobics.com | www.biomicrobics.com**

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.

# How Can You Jump on the Graywater Reuse Trend?

The idea of diverting some household flows away from the septic tank for irrigation is appealing to homeowners and environmentalists. What do you need to know?

By Jim Anderson and David Gustafson

We have conducted numerous basic workshops on soil treatment systems for industry professionals and homeowners. Near the beginning of each workshop, we try to make the point that graywater needs to be treated just like combined household sewage flows before it is released to the environment.

Early on, our rationale was based on observations by other professionals that one of the easy "fixes" for septic system problems and failures would be the homeowner running washing machine water out into the yard, bypassing the septic tank. This immediately removed pressure to the drainfield, oftentimes — at least from a homeowner perspective — "solving the problem." When asked why they used this approach, homeowners say they heard from a septic professional that graywater was really pretty clean water and there was no danger to public health by discharging the water to the surface.

In recent years, this topic has taken on some different meaning with the move to segregate household waste streams to use water more efficiently and ensure water is recycled to replenish groundwater supplies. Questions at workshops have evolved to focus on the reuse of water for irrigation or somehow recycle it back through the residence or facility.

The concept of recycling and reusing wastewater is very good and deserves our attention. As the availability of good, clean water is reduced, pressure will mount on our industry to use different strategies in wastewater treatment and use. Reuse, along with reducing water use, will become a larger part of what we do.

## HUMAN HEALTH CONCERNS

We agree with some of the strategies employed for graywater management (not running it out to the surface direct from the washing machine, though). Graywater needs to be treated to avoid risks to human health. Along these lines, graywater may also need additional treatment before it is suitable for use in irrigation of ornamental plants due to the presence of nutrients and salts. Although this is important for irrigation purposes, the primary concern is the potential for pathogenic organisms to be present in graywater. As we like to say, this is the stuff that can make you sick.

Quite a bit of research has been conducted on this subject over the past 40 years. Graywater has been evaluated for the presence of total and fecal coliform, as well as *E. coli* and *Streptococcus*. The thinking on the part of professionals is that the majority of any pathogens present in the wastewater stream would be from the toilet waste and that graywater from bathing, laundry and even the kitchen sink would be much cleaner.

Graywater has fewer bacteria indicator organisms than toilet waste by itself or typical combined household sewage flows. In all cases, research has indicated the presence of fecal contamination, and when evaluated for common pathogens, they are also present.

The U.S. Environmental Protection Agency guideline for fecal coliform in reclaimed water for irrigation is set at 200 cu/100 mL. Published data shows suggested appropriate values for domestic wastewater recycling of <10,000 and <2,000 cu/100 mL for total and fecal coliform, respectively. While there has been a wide range of values, over time and by location, measured from research studies, these values are often exceeded. Bathing and clothes washing represent the two major activities to introduce pathogenic contamination to residential graywater.

## CHECK LOCAL RULES

Results of the microbiological studies have demonstrated that in both bath and laundry waste there is the potential to contain enteric (intestinal) and non-enteric organisms. While the levels measured are much less than toilet or combined household waste, direct human contact with graywater should be avoided unless the wastewater is disinfected.

A lot of the research on graywater has focused on the impact reduced levels of biological contamination have on treatment in soils. If the toilet waste is taken out of the waste stream, the size of the soil treatment part of the system can be reduced and potentially have less of a separation distance requirement. This is dependent on your state and local regulatory authorities, but we see more opportunities here than in the past. This is particularly true in areas where there is the desire to return as much water as possible through the soil to recharge groundwater aquifers.

While, it is clear that direct contact with graywater should be avoided for health reasons, there is not a consistent regulatory approach across the country concerning the type (chlorine, ultraviolet) of treatment or what level needs to be achieved before effluent is discharged directly to soil or water. If segregation and treatment of graywater is part of your approach or you think it will work for your clients, check your local regulatory requirements before proceeding.

## ONSITE INNOVATIONS

### Avoiding the Jolt

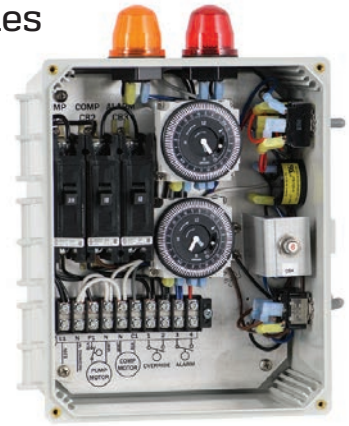

The Mighty Probe from T&T Tools is an insulated probe that provides protection against electrical shocks. A steel shaft and hardened replaceable tip make these probes safer, more rigid and easier to use. Adding a Slide Adapter creates an integrated minislide hammer probe. This allows you to pound your way through those extremely difficult spots. Hex rods are available in either a 3/8- or 7/16-inch profile to increase the probe stiffness. Probes are available in lengths from 3 to 6 feet in 6-inch increments.

T&T Tools Inc. is a small family owned business based out of Holland, Michigan, specializing in the design, manufacture and sale of subsurface hand tools. T&T Tools was started in 1989 by two friends who had experience in the pumper/cleaner market and with manufacturing. They made the first tools for their own personal use, but more and more people kept "borrowing" their tools. They realized they had a tool that filled a market need and the Smart Stick probe was born.
**800-521-6893 | www.mightyprobe.com**



## ONSITE INNOVATIONS

### Hard-Wired Control Panels Make it Easier to Troubleshoot Field Issues



In this digital age of "throwaway" products, SPI believes in putting the power to operate in the hands of the installer and service provider. SPI control panels are hard-wired with replaceable components, making them serviceable — unlike panels that use circuit boards. SPI has a full staff of service technicians ready to assist with troubleshooting needs.

Septic Products Inc. has been serving the wastewater industry for over 15 years with the most complete line of control panels, system alarms, float switches and onsite accessories at the best market price. SPI prides itself on providing quality products and learning firsthand the needs of its customers. Staff will help guide customers to choose the correct products for their application. SPI has expanded its facilities in Ashland, Ohio, to provide greater service and quick turnaround to those seeking volume orders and custom control panels.
**419-282-5933 | sales@septicproducts.com**

# Customers Come First for Florida Wastewater Professionals

'I think the industry will step into the future and onsite wastewater treatment will continue to be an economical and environmentally responsible technology when properly installed and maintained'

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 Florida Onsite Wastewater Association.*

**Gary Pinkas**
owner

**Business:** **Bradford Septic Tank Co.,** West Palm Beach, Florida

**Services offered:** We do septic installations for new construction and replacement systems including aerobic treatment units, grease trap installations, septic and grease trap pumping, repairs and inspections.

**Age:** 61

**Years in the industry:** 43 years

## Association involvement:

My father, Pete Pinkas, was one of the founding fathers of the Florida Septic Tank Association, which is now the Florida Onsite Wastewater Association. I have been a member since those early years. I served one term as president in 2000, and I've been on the board.

## Benefits of belonging to the association:

The association keeps us involved and informed on state legislation. We have a lobbyist. Years ago, when the State 64E Code regarding onsite sewage and treatment and disposal systems was written, the association worked with the Florida Department of Health, so we felt we had some input into the development of the code. Without the association, we would likely have rules that would be impractical. Being in the association also allows us to meet other people in the industry at association events and gives us credibility with homeowners and inspectors. It's nice to say to a homeowner that we're members of the association, and I think the health department has more respect for you, also.

## Biggest issue facing your association right now:

There's been a lot of talk regarding moving the regulation of the septic industry away from the Department of Health and placing it under the Florida Department of Environmental Protection. Supposedly it will be a straight-across change and the rules and regulations will stay the same. But, as with anything else, when a new department takes over, there's always some changes. No one knows how the details will work out. Some feel it could be a change for the better, and some feel it could be disastrous. But most are confident we will see this transition in our future.

## Our crew includes:

My wife, Janet, is the office manager, running the side of the business that takes the most time and patience. Gerrit Alvarez, full-time dispatcher, manages phones and schedules service calls for our three vacuum trucks. Our three pumpout drivers are Thomas Maxey, Kevin Smith and J.T. Torres. Equipment operators are Johnnie Jackson, Jose Gomes, Martel Perdue and David Willis. Brian Tankersley, full-time mechanic, does a great job maintaining all our equipment and helps on job sites with mechanical and electrical issues such as lift stations. Rico Ortiz does our repair permit submittals and maintains the ATUs under contract.

## Typical day on the job:

I start my day by walking the yard before anyone else arrives, looking at equipment and supplies for anything that needs attention. Then I'll come into the office, go over all the schedules for the crews, get the paperwork together they'll need for the day and hand out work assignments. At 8 a.m., our office staff starts the day and our phones start ringing, so I usually spend some time

Foreman Jose Gomes (far left), mechanic and tech support Brian Tankersley (far right) and three day laborers oversee placement of an EcoPure tank.

A Netafim dripline is laid out with a BioMicrobics treatment system. Lots in Florida can be tight and systems complex.

talking to customers and answering email. When I leave the office, I do site visits for proposals, check on crews and meet with inspectors when needed. If we have a large or tight job, I will be there for the tank installation. I end the day back in the office wrapping things up and getting ready for the next day.

## Helping hands – Indispensable crew member:

My most unique and indispensable crew member — Maxey — has been talking about retirement for so long that customers are surprised to hear he still comes to work every day. He's been here as long as I have and runs a pump truck, now with an assistant. He has a remarkable memory and knowledge of septic system construction in Palm Beach County, which is an asset every day. He also has a personality that makes him a joy to work with and popular with customers, who often ask for him by name.

## The job I'll never forget:

Recently we had to demuck for a tank set. Due to the depth, pilings were not a cost-effective option. We wound up digging a hole over 20 feet deep, which is an impressive hole in South Florida on a beach lot. We used a trackhoe with a 40-foot boom and hydraulic pump with an 8-inch discharge to keep the site dewatered. For a 20-by-20-foot excavation, we used about 120 cubic yards of rock. With the slopes and doing it by (U.S. Occupational Safety and Health Administration) standards, it was quite a large area we were utilizing for this tank set. With so many years of experience in this county, it's nice to have the confidence and knowledge to do big installation jobs — and it's fun, too! We have our own dig boxes to hold back all the sand and then rent different trackhoes and cranes depending on the size of the job.

## My favorite piece of equipment:

My overall favorite is the Terralift ground-fracturing machine. I call it my chitty-chitty bang bang. I bought it when I first heard about it about 30 years ago. It can save a customer thousands of dollars by rescuing a drainfield when an impervious biomat layer develops when a drainfield is fairly young. Now that the code requires multichambered tanks and outlet filters, I don't see much of that kind of failure, which is a good thing. But in years past, the Terralift gave homeowners who had unknowingly abused their septic system a second chance.

## Most challenging site I've worked on:

Years ago we installed the treatment systems for a state park in Palm Beach County. All the systems were rockless, which was innovative back then, before ATUs. The main systems for the auditorium and picnic pavilions were on the mainland, but the beach at this park is on a barrier island with access being a boardwalk over a quarter mile long. All materials, tools and personnel had to be transported by golf carts (provided by the state). It was tedious and time consuming, and we had to consider each trip carefully so as not to forget something.

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

A customer once asked me what all those colorful things floating in the tank were. Lucky for me, as I was considering how to word my answer, she realized what they were, turned red and walked away. In our office, we are

still amazed by customers who call up with a septic backup but consider themselves to be excellent at managing their septic system because they have not had the tank pumped in 15, 20, 30 years.

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

There's two things. First, I think all tanks should have (access) to grade. This is an issue the association brought up about 20 years ago, and I think it would be a long-term benefit for homeowners. It would allow them to know the location of their septic system so they could avoid landscaping in the area and it would prevent damage to the tank lid by an inexperienced (or lazy) pumping technician. Second — and I know I'm preaching to the choir — is mandatory inspections. Everyone in our industry often sees systems that are compromising to the environment, but if the homeowner doesn't have the interest in repairing the system, nothing is done and this gives our industry a black eye that is not deserved.

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

The advice that I've been able to put into practice and that's worked for me is to just show up every day and be honest. Sometimes showing up just means getting through a bad day and coming back tomorrow. And if you are honest in what you tell your customers, you don't have to remember any lies. … You just tell it the way it is and people will pay you for that. Honesty also includes saying you don't know sometimes.

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

Probably have gone into aviation, something I love. I am a pilot and own a plane, which is my biggest stress reducer. When I was young, I worked as a scuba dive master and a guy I worked for told me, "If you want it to be a hobby, keep it as a hobby. Don't turn it into a job because it will no longer be a hobby." I stayed in the septic business, and I have to say I have enjoyed this career and the people I have met in it.

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

With the increase in attention to environmental issues I see a future of increased scrutiny and innovation. I think there will be more installations of advanced treatment systems. There's a lot of talk in Florida about nitrogen reduction in effluent and the effect on surface water quality. With changes in state regulations and public interest, I think the industry will step into the future and onsite wastewater treatment will continue to be an economical and environmentally responsible technology when properly installed and maintained.

**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.

## INDUSTRY NEWS

### BioMicrobics names new president for SeptiTech

BioMicrobics named Tracey Rioux as president of SeptiTech. She started with SeptiTech in March 2007 and joined the BioMicrobics team when SeptiTech was acquired in July 2013. She managed the office and growing sales of SeptiTech in the New England area. She currently meets with engineers, government officials in Maine and the surrounding states, and is a Maine mechanical wastewater operator.

### East promotes Kenney to director position

East announced the promotion of Douglas Kenney to director of national fleet sales. Kenney will continue to be responsible for fleet sales in North America while strengthening the fleet sales department's national presence and enhancing East's position in the marketplace. He has 38 years in the trailer industry.



## PRODUCT NEWS

### Brokk 70 remote-controlled demolition machine

Utilizing SmartPower, an intelligent power management system, the Brokk 70 is the smallest electric robot in the company's lineup. It offers 100% more power than its predecessor, the Brokk 60II, yet retains the same compact dimensions with only a 133-pound weight increase. Measuring 35 inches tall and 23.5 inches wide, the machine fits through narrow doorways and into tight spaces to work in many interior demolition situations. With a base weight of 1,235 pounds, it can be transported on a passenger elevator, making it ideal for top-down demolition projects in urban areas. **800-621-7856; www.brokk.com.**

### Komatsu America D155AX-8 low-ground pressure dozer

The new 354 hp D155AX-8 low-ground pressure dozer from Komatsu America has two blade options and more track on the ground. The eight-roller undercarriage provides greater traction and optimum balance while significantly reducing ground pressure. The ground contact area is increased by 72% from the standard model for improved floatation in soft ground. Equipped with either a large-capacity semi-U blade or an angle blade, the D155AX-8 LGP can move large amounts of material while the wider cutting edge reduces the number of passes needed when grading. **847-437-5800; www.komatsuamerica.com.**


### Ditch Witch JT24 directional drill

The Ditch Witch JT24 directional drill is equipped with a 101 gross hp, Tier 4- and European Stage 5-compliant Cummins diesel engine. The unit provides 24,000 pounds of thrust and pullback while maintaining a small footprint convenient for a wide range of urban and residential gas, fiber and other utility installations. A new hydraulic platform maximizes drilling efficiency and conserves horsepower downhole. It carries up to 400 feet of drill pipe, allowing for longer bores. **800-654-6481; www.ditchwitch.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 Recycling Association; www.azowra.org; 928-443-0333

## ARKANSAS

Arkansas Onsite Wastewater Association; www.arkowa.com

## CALIFORNIA

California Onsite Wastewater Association; www.cowa.org; 530-513-6658

## COLORADO

Colorado Professionals in Onsite Wastewater; www.cpow.net; 720-626-8989

## CONNECTICUT

Connecticut Onsite Wastewater Recycling Association; www.cowra-online.org; 860-267-1057

## DELAWARE

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

## FLORIDA

Florida Onsite Wastewater Association; www.fowaonsite.com; 321-363-1590

## GEORGIA

Georgia Onsite Wastewater Association; www.onsitewastewater.org; 706-407-2552

Georgia F.O.G. Alliance; www.georgiafog.com

## IDAHO

Onsite Wastewater Association of Idaho; www.owaidaho.org; 208-664-2133

## 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

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

## MAINE

Maine Association of Site Evaluators; www.mainese.com

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

## MARYLAND

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

## MASSACHUSETTS

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

## MICHIGAN

Michigan Onsite Wastewater Recycling Association; www.mowra.org

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

## MINNESOTA

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

## MISSISSIPPI

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

## MISSOURI

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

## NEBRASKA

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

## NEW HAMPSHIRE

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

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

## NEW MEXICO

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

## NEW YORK

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

## NORTH CAROLINA

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

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

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

## OHIO

Ohio Onsite Wastewater Association; www.ohioonsite.org; 740-828-3000

## OREGON

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

## PENNSYLVANIA

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

Pennsylvania Onsite Wastewater Recycling Association; www.powra.org

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

## TENNESSEE

Tennessee Onsite Wastewater Association; www.tnonsite.org

## TEXAS

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

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

## VIRGINIA

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

## WASHINGTON

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

## WISCONSIN

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

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

## NATIONAL

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

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

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

## CANADA

## ALBERTA

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

## BRITISH COLUMBIA

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

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

## MANITOBA

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

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

## NEW BRUNSWICK

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

## NOVA SCOTIA

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

## ONTARIO

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

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

## SASKATCHEWAN

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

## CANADIAN REGIONAL

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