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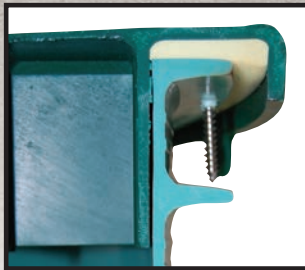
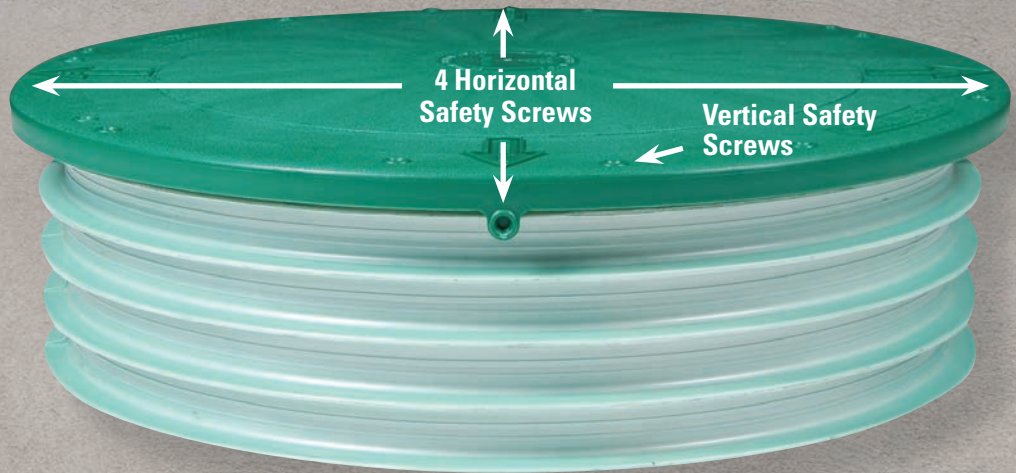
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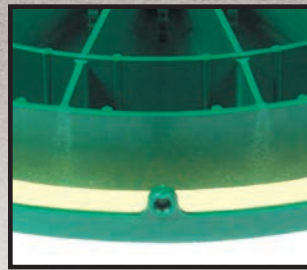
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Preserving a Legacy By Ted J. Rulseh

ON THE COVER:

Jereme Tuggle overcame the tragic deaths of both of his parents in 2017 and built a new installing company, Legacy Excavating & Underground, to honor the family's commitment to the wastewater industry. Tuggle is shown with an Infiltrator Water Technologies IM-1060 tank being installed in a new onsite system in Yuma, Arizona. (Photo by Mark Henle)

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Cedar River Volunteers Are Friends of the Onsite Industry

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Published monthly by



1720 Maple Lake Dam Rd. • PO Box 220
Three Lakes, WI 54562

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7:30 a.m.-5 p.m. Central time, Mon.-Fri.

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EDITORIAL CORRESPONDENCE

Send to Editor, *Onsite Installer*, P.O. Box 220, Three Lakes, WI 54562 or email editor@onsiteinstaller.com.

REPRINTS AND BACK ISSUES

Visit www.onsiteinstaller.com for options and pricing. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeff.lane@colepublishing.com. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicole.labeau@colepublishing.com.

CIRCULATION

Circulation averages 20,823 copies per month. This figure includes both U.S. and International distribution.

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Cedar River Volunteers Are Friends of the Onsite Industry

Citizen water-quality testing identifies *E. coli* from human sources, which may point to failing septic systems and a river system cleanup

Through regulation, your state or provincial governments hasten modernization of decentralized wastewater treatment and have a positive impact on water quality. In other cases, local governments and their environmental health departments can enact or enforce rules to bring about necessary change.

And sometimes concerned citizens, banding together as volunteers, bring awareness to wastewater issues and point the way to a cleaner environment. That seems to be the case in Mower County in Minnesota, where about 200 people organized for a long-term water-quality monitoring program on the Cedar River (near Austin in southeast Minnesota) ... and found evidence that failing septic systems are contributing to high levels of *E. coli* bacteria in the watershed.

While it appears the programs to clean up the waterways in agriculture-heavy southern Minnesota have been improving the situation, volunteers of the Cedar River Watershed Project are keeping a focus on the issue. Five teams of about 40 volunteers were trained to take water samples for bacteria, and a group of those samples has indicated high levels of *E. coli* from human waste, as well as swine and cattle. These bacteria make the river unsafe for recreational use.

SEWAGE REMOVAL

Over the years, local county governments have eliminated many of the household wastewater straight pipes that emptied directly into Cedar River tributaries, a practice that goes back 50 years or more, according to Bill Buckley, a river resident and retired environmental health director for Mower County. One of the water-sampling project volunteers, Buckley ran the county onsite program for many years as polluting systems were identified and replaced.

Who is Izaak Walton?

Many volunteers for the Cedar River Watershed Project are members of the local Izaak Walton League. Who is Izaak Walton, and how did this group get started? Walton was born in 16th century England and was an author famous for the book about fishing, *The Compleat Angler*. The Izaak Walton Fly Fishing Club was founded in Florida in 1908 in honor of the writer. The Izaak Walton League of America was formed in 1922 to preserve fishing streams and has many local chapters through the United States. For more information, go to www.iwla.org.

“We’ve removed sewage from a lot of small communities and subdivisions. You used to go along the river and smell sewage, and you don’t anymore,” he says. “I look at this as maybe the final step we need to take to eliminate these hidden sources (of bacteria), at least as far as septs are concerned.”

The water-quality monitoring first conducted in summer 2017 and continuing today was highlighted in a recent story in the Minneapolis *Star Tribune*. The story outlined how a \$100,000 grant from the McKnight Foundation was utilized to train for and conduct the water sampling and subsequent testing. Volunteers include members of local groups like the Izaak Walton League and 4-H, as well as concerned individuals living along the river and in many rural communities.

The volunteer teams took weekly samples throughout last summer in several locations along the Cedar River in addition to sampling following significant rain events. Buckley says about 75 percent of the samples contained *E. coli* levels above the acceptable standard. The group had seven samples sent for DNA analysis, testing for the origin of the bacteria from human, cattle, or swine sources. Human DNA was found in all samples.

SEPTIC MAINTENANCE

Attention will be turned to identifying sources of bacteria, both human and agriculture-related. “Finding the sources and correcting existing problems to begin with,” Buckley says. Ultimately the goal would be to seek stronger maintenance and inspection of septic systems through local enforcement of state guidelines.

“The state has established a three-year pumping standard and they have guidelines for compliance inspections, but the counties are not required to enforce any of that. That’s where the problem comes in,” he says.

A wide range of enforcement of onsite rules does exist, says Bill Thompson, the regional water quality project manager for the Minnesota Pollution Control Agency. For example, Mower County inspects septic systems at the time of property transfer or sale rather than using the three-year standard. Counties in more urban areas, by contrast, may more closely follow the state’s guidelines.

But Thompson points out the state has made great strides at overall improvement of decentralized wastewater treatment. Going back about 15 years, the state conducted a regional study of bacteria in waterways and many of the straight pipes were eliminated. He says an effort several years ago identified many polluting septic systems along Dobbins Creek leading into the Cedar River.

Thompson also points out that state and local programs to fund septic system updates are making a difference. Subsurface Sewage Treatment System grants offer mostly low-interest loans for system repairs and replacements that can be paid back over 10 years on homeowners' property tax bills. Additionally, in 2007 state voters authorized 3/8 of a percent sales tax going toward the Legacy Fund, part of which supports a clean water fund, and ultimately to local jurisdictions that give grants for onsite work.

MAKING A DIFFERENCE

On a personal level, Buckley says he has his septic system pumped every three years following the state guidelines and has had two required compliance inspections, once when he bought the house and once when he put on an addition. He also added a riser to his tank to make pumping more convenient.

Where waterways are impaired, the industry needs to promote the use of available advanced technologies to improve water quality and quality of life for folks who use septic systems.

With the popularity of more costly mound systems and the emergence of more advanced treatment units in some cases, he sees routine maintenance on the rise. "With the investment in those systems, people are pumping them more frequently," he says. "I also conducted education classes for new systems and anyone else who wanted to attend, and stressed the importance of regular pumping."

The onsite industry should be supportive of volunteer-driven programs that search out antiquated wastewater treatment systems and potentially motivate government officials to increase enforcement of clean water rules. And where waterways are impaired, the industry needs to promote the use of available advanced technologies

to improve water quality and quality of life for folks who use septic systems. We've got a great environmental story to share and efforts like this one provide a platform to start those discussions. □

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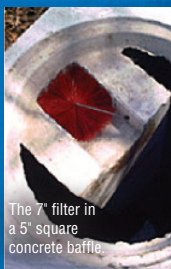
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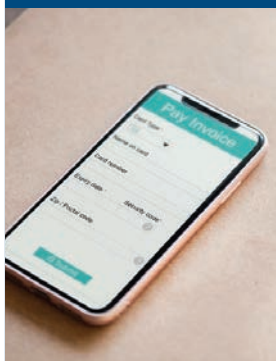
BLAST FROM THE PAST Still Going Strong

If you read last month's issue, you saw the first installment of a new feature called "System Profile: Looking Back." In that story we revisit a system that was installed 20 years ago — and is still operating well, maintained by the same company over the last couple decades. We dug the original System Profile out of the archives and you can read it online. onsiteinstaller.com/featured



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EVALUATING ISSUES Troublesome Tanks

Expert Jim Anderson continues his online troubleshooting series, this time covering additional items to check around the tank itself. Examining the tank for holes and cracks and looking for issues with its location are important steps when evaluating a faulty system. onsiteinstaller.com/featured

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INSTALLER PROFILE

◀◀ Jereme Tuggle overcame the tragic deaths of both his parents in 2017 and built a new installing company, Legacy Excavating & Underground, to honor the family's commitment to the wastewater industry. Tuggle is shown with an Infiltrator Water Technologies IM-1060 tank being installed in a new onsite system in Yuma, Arizona. (Photo by Mark Henle)

PRESERVING A LEGACY

After the death of both his parents, Jereme Tuggle persevered and launched a new onsite installation company in southwest Arizona

By Ted J. Rulseh

Jereme Tuggle began working summers for his father's onsite business when he was 14. His life plan was ultimately to own the company.

But no succession plan could have accounted for the tragedy that struck the family in 2017. His father, Robert Tuggle, age 58, died suddenly at home in March 2017. Not quite four months later, his mother, Monica, was killed in a vehicle accident.

At that very moment, the family's limited liability company was dissolved, according to law. Jereme Tuggle, then 41, was faced with starting all over. He inherited his father's equipment but had to earn his license as a qualifying party before the business could resume operation.

Encouraged by his wife, Cori Tuggle, and supported by his five siblings, he fought his way through the crisis. Today, his company, Legacy Excavating & Underground based in Yuma, Arizona, installs about 40 onsite treatment systems per year and does some smaller-scale sewer, water and fire protection line installations.

The company works in Yuma County, east of the Colorado River, which forms the border with California. The terrain includes the river valley, the plateau to the east, and the Gila Mountain foothills.

STARTING YOUNG

Jereme Tuggle had deep emotional ties to his father's business, Rob's Backhoe (dba Rock Solid Excavating & Underground). He recalls at age 5 sitting with his dad on a Cat D10 dozer. Rob's Backhoe at its peak had 12 employees and built 250 to 300 onsite systems per year, in addition to waterline and sewer line installations and other site work. Business slowed down significantly when the housing market collapsed in 2010-11.

Before his parents died, Tuggle was largely running the business but had no experience with ownership. While the transition was traumatic, family ties saw him through. "I have three sisters, two brothers, and a bunch of aunts, uncles, and cousins," he says. "My siblings and I bound together and helped each other. I don't think any of us would have been able to get through that situation as well as we did without the other five."

"I took my dad's death a little bit harder, just because we were so close from working together for so many years. When my mom died, of course I was sad, but at the same time, it was almost like a weight off my shoulders. I knew she was happy because she was with him."

BACK ON TRACK

Tuggle started working on his license soon after his father passed. Arizona requires a business test and a trade test. "I had taken my business test, and the week after my mom died, I was supposed to take my trade test."



David Tuggle fits pipes while Jereme Tuggle runs the New Holland backhoe during a system installation.



Legacy Excavating & Underground

Location: Yuma, Arizona

Owners: Jereme and Cori Tuggle

Founded: 2017

Employees: 4

Service area: Yuma County

Specialty: Onsite system installation



▲ Jereme Tuggle displays a "Just Like Dad Did It!" logo on the rear window of his pickup truck as a reminder about the importance of the family heritage of his business.

"My siblings and I bound together and helped each other. I don't think any of us would have been able to get through that situation as well as we did without the other five."

Jereme Tuggle



▲ Jereme Tuggle lowers an Infiltrator Water Technologies IM-1060 tank while David Tuggle maneuvers it into place.

"I reached out to some friends and business people in Yuma, and I could have had a different job, but Cori kept telling me, 'This is what you're made for; this is what you're meant to do.'

"It was always my plan to own the business. I just expected to inherit it while my dad was alive. I didn't expect to be in the position I was put in."

He pressed on and got his license. Meanwhile, the family received a life insurance settlement; instead of taking cash, Tuggle received his father's equipment, with his siblings' blessing. He created his own limited liability company in August and a month later had his license.

And so Legacy Excavating & Underground, named in honor of his father, was born. The team includes Jereme Tuggle and Cori Tuggle, their oldest son David Tuggle, and sister-in-law Jessica Tuggle in the office. The equipment inventory consists of two backhoes: a 2005 Case 580 Super M and a 2001 New Holland LB 110B. For challenging projects on tight residential sites, they rent a mini-excavator and a skid-steer.

Since Jereme Tuggle was at the forefront of his dad's company, he didn't need much promotion to get started. "I kept my dad's office phone numbers," he says. "All my business is word-of-mouth or residual business from my dad. Everybody still knows who I am. At times I'd answer the phone, 'Legacy Excavation & Underground,' and they'd say, 'Oh, I'm sorry, I thought I reached Rob's Backhoe.' I'd say, 'Hold on, this is Jereme. Same family, different name.'"

TACKLING TERRAIN

The terrain around Yuma calls for different approaches to system design. From the river about 30 miles east, the valley has rich clay soils that support a variety of agriculture. About 90 percent of sites there require advanced systems because of high groundwater.

"As you continue east, you get up on the mesa, and there it's all sand," Tuggle says. "When we dig, it's like digging in the sand dunes. Many times we have to set up some kind of irrigation system to soak the ground weeks before we start the project, just so the material will stand up as we're digging it. There it's usually just gravel and pipe systems." The same applies farther east in the foothills, except the soil is rocky and jobs are more difficult.

For perc tests and system designs, Tuggle relies on Kevin Dahl of Dahl Robins & Associates, the same engineer his father worked with: "I won't go to anybody else. He's a good man, and he does a good job."

For alternative systems in the valley, Tuggle chooses Enviro-Septic pipes from Presby Environmental Inc. (PEI) for their ease of installation and longevity. "I really like the fact that they can be rejuvenated," he says. "With a gravel and pipe system, I can tell the customer, 'If this fails, call me and I'll come in and charge you again to redo your leach lines.' But I can put in the Presby and say, 'Within 20 years, when this fails, it can be rejuvenated.'

"We just install a regular septic tank and use the Presby pipes on the outlet side. We don't have to install anything in the tank. There's no electrical and no alarms to hook up. We've got it down to an art. I can install a Presby almost as fast as a regular system. For rejuvenation, you're supposed to be able to pump the system, pull the caps off the ends of the pipes and let them dry out. Then you put the caps back on and start using the system again."

BUSINESS BY THE BOOK

Jereme Tuggle learned many lessons from his father. The one he best remembers? "He would always say, 'You've got to do business by the book,' and when he said by the book, he meant business by the Bible. That means 100 percent honesty at all times.

"I don't try to sugarcoat anything. I don't try to sneak something in. I'll never do a job without a permit. At the same time, if I can help somebody, if I can do a system for free, if I can donate something, that's what we're here to do. That's the biggest thing I learned from my dad."

He put that into practice when an older couple faced a failed system that they couldn't afford to have replaced. When Tuggle gave an estimate of the cost, the woman almost broke down in tears. She and her husband couldn't use their bathroom and had to take showers at their neighbors' home.

"There's a program in Yuma County (Arizona) that helps out with situations like that, but it had a two-year waiting list," Tuggle says. So he found a way to make the repair for free. "We used the existing septic tank, and it was just a rock and pipe system."

DPE Materials, a company in Yuma that does site and utility work, donated the rock. The Tuggle family's pipe supplier, Yuma Winnelson, provided the pipe. "We supplied the labor and equipment and got it done. I'm in contact with the couple to this day. They're in the foothills, and if I'm doing a job out there and don't want to come all the way back to town, I just go to their property and park my equipment there."

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» The Legacy Excavating & Underground team includes (from left) Jessica Tuggle, Jereme Tuggle, Cori Tuggle and David Tuggle.



He has installed one Norweco ATU; generally that level of advanced treatment isn't required except for lots directly on the river. He hasn't used alternative drainfield media except for EZflow by Infiltrator on one job where he helped a fellow installer who had an overflow of work. "There was barely any room to do a system. So my buddy decided to go with the EZflow by Infiltrator. For ease of installation, that's the way to go."

DOING IT RIGHT

Because the housing market remains slow, many of Legacy Excavating & Underground's projects are system replacements. No matter what system he installs, Tuggle takes pride in quality work: "When you go in and dig up somebody's yard and put 20 or 30 tons of gravel in the ground, it's not going to look the same as it did before you were there. But that's my goal: to make it as close to that as I can.

"It's got to be stressful to the homeowner.

First of all, you can't flush. Then you call somebody and they tell you it's going cost \$10,000 to fix it. You explain to them what you have to do and they're very fearful of how that property is going to look when you're done. Our goal is to put them at ease — give them a product that's going to work, and that's going to last, without disrupting their life."

The toughest job he can remember came soon after his father died. "It

was in the valley," he recalls. "The people had a very narrow area to work in. I was able to reuse the tank, but we had to put in 210 Presby tubes. It was a doctor's house in an affluent neighborhood. It took me about a week and a half to complete.

"I had to work in an area about 80 feet long and 12 feet wide. The trench was 8 feet wide, and I didn't even have enough room to pile up the spoil. So I'd reach out as far as I could with the backhoe and pull all the dirt up to it. Then I had to turn around, get that dirt and haul it

continued »

"I kept my dad's office phone numbers. All my business is word-of-mouth or residual business from my dad. **Everybody still knows who I am.**"

Jereme Tuggle

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▲ Jereme Tuggle, left, and David Tuggle, center, confer with George Amaya, the Yuma County (Arizona) senior registered sanitarian, on a job site.

out, and go back in and do the same thing. Then haul in some of the sand, put in some of the tubes, and then keep going, basically 10 feet at a time. We did about 20 feet in a day.

“We stockpiled the dirt in the street. I had to go door to door and tell everybody this is what we’re going to do. It’s going to be noisy. It’s going to be messy. Please bear with us. They were all very nice, and it worked out really well. I left a card with all the people I spoke to, and as we were cleaning up, I got a couple of compliments. Hopefully some potential new business will come out of it.”

MODEST PLANS

While building the business, Tuggle doesn’t aspire to making it as big as his father’s company: “I’m happy just to be a small-town septic system installer.” And although he has four sons, he doesn’t expect to see a third generation take over the company.

David Tuggle, his oldest, is attending technical college to become a mechanic and is already highly accomplished in that area. He recently helped Jereme Tuggle rebuild the rear end on the New Holland backhoe. “At 20 years old, he’s a better mechanic than I am,” Tuggle says. “His dream is to build and sell four-wheel-drive off-road trucks. He’s a Chevy fanatic. He’s just working for me to make money right now. The business will probably end with me.”

Still, for now, Tuggle carries on a legacy that would surely make his mom and dad proud. □

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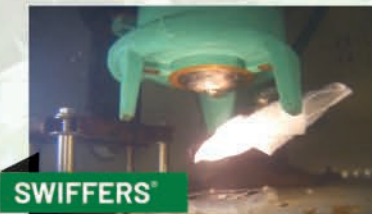
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New York Legislature Considers Ways to Cut Onsite System Costs

By David Steinkraus

Three bills before the New York Legislature could reduce the cost of onsite systems for state residents.

One would remove the requirement that a professional engineer or architect handle the design of an advanced onsite system to reduce nitrogen pollution, as long as the system meets certain guidelines and is on a health department list of approved technologies. This change could cut about \$3,000 of the cost of such installations.

A staff member of The Nature Conservancy on Long Island tells a news reporter that requiring engineer involvement for some onsite systems is like having an engineer certify the installation of a refrigerator. A professional engineer took issue with the idea, noting that advanced systems are essentially miniature wastewater treatment plants with components that need to be chosen by someone with expertise.

The bill was introduced by Rep. Fred Thiele, I-Sag Harbor, and Sen. Kenneth LaValle, R-Port Jefferson. The pair prepared two other bills that also address wastewater issues.

One would allow municipalities to establish septic system replacement loan programs. Property owners could borrow to help pay for the installation of a nitrogen-removing onsite system. The loan would be repaid through a charge on property tax bills.

The other bill would allow communities around the eastern end of Long Island to establish loan programs that draw on their Community Preservation Funds. Loans would be intended to bridge the gap between a septic system replacement rebate and the cost of advanced nitrogen-reducing systems. A 2 percent tax on real-estate transfers bankrolls the funds, which pay for water-protection programs and purchase land for preservation as open space.

"We're looking for ways to make septic system upgrades more affordable and give an incentive for people to participate in septic system upgrades," Thiele tells the *Newsday* newspaper.

Although they represent a very wealthy part of the country, communities on the eastern end of Long Island depend heavily on cesspools for wastewater treatment. Water-quality problems have led those communities to recognize the need for better treatment, especially nitrogen reduction. As a result, several communities passed laws requiring advanced onsite systems for new construction or significant remodeling.

Florida

The Brevard County Commission voted 3-2 in May to impose a five-month ban on the installation of conventional septic systems along the county's beachfront, on Merritt Island, and any inland location within 165 feet of the Indian River Lagoon and its tributaries.

Commissioner Jim Barfield proposed the moratorium in April as a first step. The county will next begin looking at permanent policies to reduce septic system pollution. Nitrogen from onsite systems is being blamed for algae blooms in the lagoon that runs for miles between the eastern shore of Florida and its barrier islands.

Although septic system installations would be on hold, developers and homeowners would still be able to install advanced onsite systems that remove at least 65 percent of the nitrogen in wastewater. Homeowners with an existing contract to install a traditional septic system would be exempt from the moratorium.

Among people testifying before the commission was Roxanne Groover, executive director of the Florida Onsite Wastewater Association. According to *Florida Today*, she asked commissioners to slow down the process to ensure that the policy coming out would be good law, and she asked them to consider alternative technologies for onsite systems.

In the meantime, reports the Brevard Indian River Lagoon Coalition, the Florida Health Department is approving septic permits for system removals and upgrades at double the rate specified in the lagoon cleanup plan.

Ohio

Portable restroom operators may have a new anti-icing fluid if a bill in the Legislature becomes law. HB 393 would allow the sale of used water from oil and gas drilling as a de-icer, for snow control, dust control, portable restrooms, or any other purpose approved by the chief of the state's Division of Oil and Gas Resources Management.

There are some conditions. Water could come only from vertical wells, and not horizontal wells, according to an analysis prepared by legislative staff. The water would also have to be processed to remove dissolved volatile organic compounds and other contaminants. Once a seller submits the appropriate documentation, the oil wastewater would be exempt from state regulations covering brine, although the division must collect no more than four samples of the oil wastewater per year to ensure the water meets regulations.

In testimony before the House Energy and Natural Resources Committee, Rep. Michael O'Brien, D-Warren, one of the bill's co-sponsors, said the wastewater is not like that from horizontal fracking wells. Wastewater from vertical wells contains salt and low levels of oil and natural gas, and the bill will encourage people to find ways to use brine rather than disposing of it in an injection well, he says. (The other co-sponsor is Rep. Anthony DeVitis, R-Green.)

The Sierra Club of Ohio disagrees with the assessment of oil wastewater.

"There's been some great research on this, showing it does not matter what kind of oil and gas well this fluid comes from, it has hazards in it," Cheryl Johncox, an organizer with the group, tells public radio station WOSU. "We're opposed to this bill opening up for additional broader use on roads in the state of Ohio."

California

The owner of Diamond Environmental Services, a large portable restroom company in San Diego, will serve five months in federal prison for illegally disposing of wastewater in cities in Southern California.

Arie Eric De Jong III pleaded guilty last year to felony charges and was sentenced in May. In addition to the prison term, a judge ordered him to pay a \$15,000 fine and serve three years on probation.

Warren Van Dam, the company's chief operating officer, was given five years' probation and ordered to work 250 hours of community service.

Last year, the company's safety and compliance manager, Ronald Fabor, was convicted of two counts of perjury before a grand jury. He received five years' probation and a \$500 fine.

Assistant U.S. Attorney Melanie Pierson tells Judge Roger T. Benitez that De Jong was a thief.

"This is a scheme to dump portable waste down the sewer to save money. This is his idea. He planned it. He experimented with it. Then he implemented it across all of his facilities," she says, according to *The San Diego Union-Tribune*.

Prosecutors say the company saved millions of dollars in costs by illegally emptying pumping trucks into municipal sewer systems instead of paying fees to use a dumping station.

Indiana

Rush County now requires certifications for people who install, repair or replace onsite wastewater systems. Certifications can be obtained by showing proof of Indiana Onsite Wastewater Professionals Association certification or by taking a 60-question, open-book exam offered at the Health Department. Recertification will be required annually. Homeowners who want to work on their own onsite systems must also be certified.

Virginia

Cost-sharing reimbursements from the Culpeper Soil and Water Conservation District have increased for a variety of onsite work. Payments cover 50 percent of the cost of pumpouts, repairs, and new systems up to these limits: \$150 for a pumpout, or \$240 for lower-income families; \$1,000 for a pumpout and inspection, or \$1,600 for a low-income family; \$2,500 for repair of a conventional system, or \$4,000 for low-income families; \$4,000 for a conventional system, or \$6,400 for low-income households; \$5,000 for a conventional system with a pump, or \$8,000 for low-income households; and \$12,000 for an alternative system, or \$19,200 for a low-income family. The district covers Culpeper, Rappahannock, Madison, Orange and Greene counties.

California

Sonoma County officials asked for an extension of state deadlines for developing new rules for septic systems. Officials faced opposition from rural residents who feared they would be forced to undertake costly repairs and upgrades. The Board of Supervisors will ask for a six-month extension. It was not clear when the State Water Resources Control Board might make a decision on the county's request.

The rules are intended to reduce pollution in the Russian River. State estimates say about 10,000 onsite systems in the Russian River watershed will need upgrading, and about 5,000 will need to be replaced. There are about 53,000 onsite systems in the county. □

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University Sustainability Project Incorporates Futuristic Wastewater Reuse Technologies

New rural campus includes graywater reuse, constructed wetlands and advanced rainwater runoff strategies to return as much water as possible to the local aquifer

By David Steinkraus

When it received a grant of 388 acres of land about a decade ago, Chatham University already had a main campus near downtown Pittsburgh and another about a mile east of the main campus. The university's leaders decided to use a fraction of the newly acquired land for a third campus about 25 miles north of downtown. This campus would combine the best of sustainable technologies including an integrated system to handle the water falling on and flowing through the campus.

How well they succeeded is shown by the award the project won: a COTE Top 10 Award from the Committee on the Environment of the American Institute of Architects. Each year the American Institute of Architects gives these recognitions to projects that set high standards in design and sustainability. Chatham University says the Eden Hall Campus is the first fully sustainable campus in higher education in the world.

The property came with some buildings that were remodeled. Four new

◀◀ An outdoor amphitheater is formed by the natural contours of the ground, with rain gardens surrounding the circular stage area. (Photos courtesy of Chatham University)

environmentally advanced buildings were added to form the core of the campus. Those are: the Café, a former dairy barn; the Field Lab that houses the aquaculture program, a classroom laboratory, and the controls for the wastewater system; the Esther Barazzone Center that has the main campus kitchen, student activities center, and classrooms; and South Orchard Hall, a residence building for 66 people. The Café, Barazzone Center, and Orchard Hall also have solar photovoltaic arrays with a combined output of just over 200 kilowatts.

The campus is still under development, says John Cunningham, director of facilities and building systems. There is a 50-year master plan that foresees several more buildings, and the plan also dictates how water is handled. The campus has an integrated system that accounts for everything from rainwater to wastewater.

WATER STAYS ON CAMPUS

Rain flowing across the ground is collected in about 19 rain gardens and subsequently flows into local streams. Roof runoff is collected in a 50,000-gallon storage tank and can be used for irrigating landscaping and gardens. At the moment, most of the stored rainwater overflows the storage tank and returns to local streams, but this capacity will allow for more irrigation as the campus develops, Cunningham says.

“Our main parking spot is a graveled area,” Cunningham says. “There is an adhesive layer to keep the gravel in place, but it is a permeable surface. Very little of this campus is paved with anything.”

Almost all of the wastewater processed on campus stays on campus. The exception is Orchard Hall. Recycled water is used to flush toilets there, but that blackwater flows into a municipal sewer system. Yet that is

“We use attached growth because we knew we would have a variable food supply for the bacteria, but in the wetlands and trickling filter, we have a habitat that sustains the bacteria and enables them to grow rapidly when needed.”

Ryan Case

only about 10 percent of the wastewater produced on campus. The other 90 percent is handled by the recycling system.

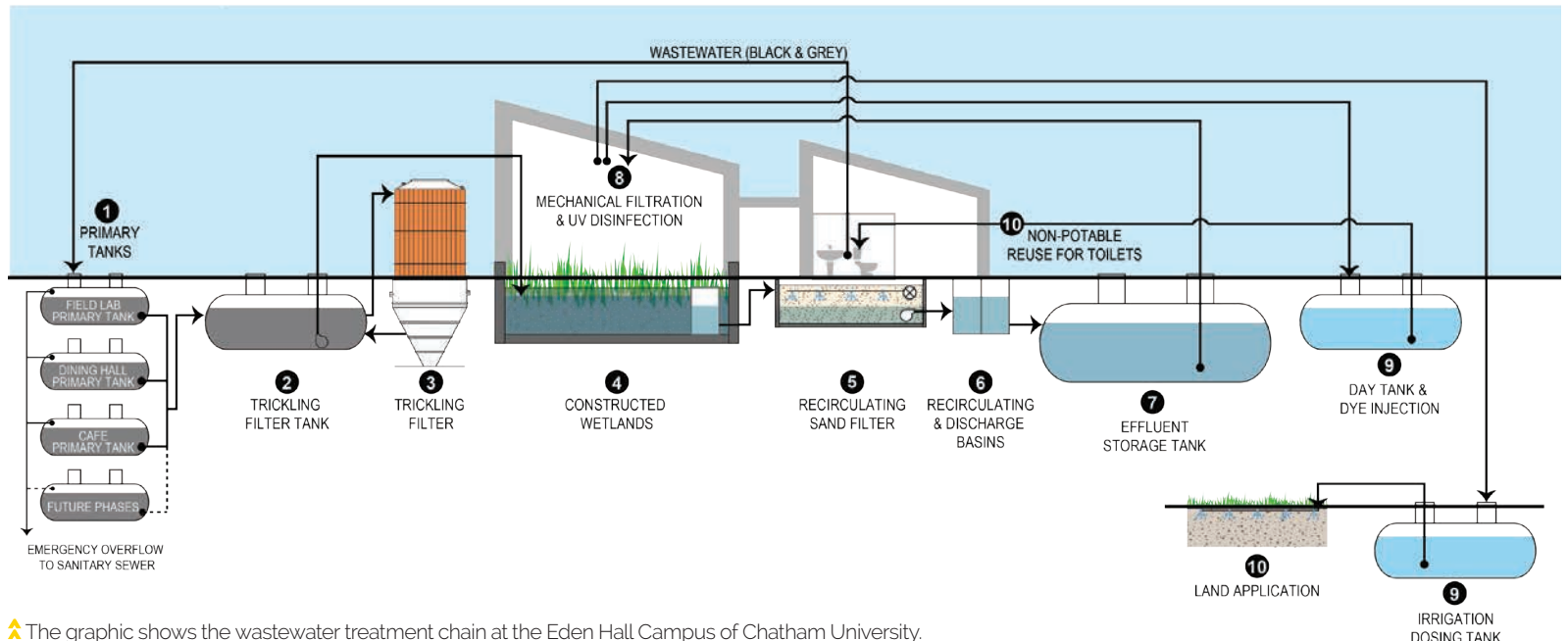
The Café and Field Lab each have a 1,500-gallon septic tank for initial treatment. The Barazzone Center has a 10,000-gallon tank to handle the greater flow from the kitchen and student center.

From these tanks, water flows into a 4,000-gallon tank that has one compartment with a trickling filter and a second that equalizes flow from the filter compartment and doses 3,600 square feet of constructed wetlands. Water next flows into a recirculating sand filter and then into a storage tank.

VARIABLE FLOW CHALLENGES

Water from the storage tank can be reused for flushing toilets or land application through dripline in two forested areas and one grassland. (Rainwater is used to irrigate landscaping.) But first the water passes through a pair of filters, 100 micron (Orival Water Filters) and 5 micron

EDEN HALL CAMPUS, CHATHAM UNIVERSITY: NATURAL WASTEWATER TREATMENT AND REUSE



▲ The graphic shows the wastewater treatment chain at the Eden Hall Campus of Chatham University.

» TSE (treated sanitary effluent)
Treatment room includes Grundfos pumps (left) that convey treated water from a storage tank to toilets throughout the building for use in flushing.

(Pentair Industrial), and then past UV lamps (Atlantic Ultraviolet). A turbidimeter from HF scientific set to a limit of 10 NTU governs where the water flows. Water reading less than 10 is released for nonpotable use in buildings. Water reading greater than 10 is diverted to the irrigation dose tank. Any excess water from the reuse tank also flows to the irrigation dosing tank.

Panels controlling the system were all custom-made by Orenco Systems. They run on solar power and convert the DC current into low-voltage AC to run the electronics.

“One of the big challenges in doing this system was the soil. We had a lot of trouble finding soils suitable for land application,” says Ryan Case of Biohabitats in Santa Fe, New Mexico. His company was contracted to design the campus water management system.

How much water is reused in buildings varies with what is occurring on campus, Cunningham says. On a low-use day, the system processes about 1,000 gallons. On a really busy day when there are events on campus, the flow is a couple thousand gallons.

“That flow variability is one of the challenges we have now in operating the system. As the campus activity has picked up during the last couple of years, the flow has increased. My bigger problem is I’m always dealing with after-the-fact knowledge of what’s going on as opposed to being able to predict what will happen if there is an event with 500 people,” he says.

He and Nicole Weiers, the certified wastewater operator who runs the system, have been working on pump averages to try and get a handle on this.

“There is a lot of flow variability,” Weiers says, “but the system is designed with enough redundancy to handle not only the changing flows, but also changing strengths.”

Influent BOD can vary from 60 to almost 400 mg/L. If BOD is still high coming out of the primary treatment tanks, the trickling filter is there to reduce it, and the wetlands can do more, and the sand filter can do still more, she says.

SYSTEM EVOLUTION

Each stage also has some equalization capacity, Case says. Override timers control each stage of the system, and these can be adjusted to alter the flow on days when there may be a large event or during semester breaks when there is little water use on campus.



“The choice of treatment was also part of this,” Case explains. “We use attached growth because we knew we would have a variable food supply for the bacteria, but in the wetlands and trickling filter, we have a habitat that sustains the bacteria and enables them to grow rapidly when needed.”

In the buildings with new construction, where purple pipes handle the recycled water, there is also an educational feature, Case says. Plexiglass panels are installed in the walls so students or visitors can see the purple pipe and build an understanding of the water system.

That is not to say the system has been problem-free. Some of the pipes were improperly laid, Cunningham says. They don’t drain well, and a couple have large dips in them. He had some cracked pipes in the winter of 2016-17 and attributes this to how the pipes were laid.

You could call these growing pains for a new system. Like the system, the campus is at the beginning of its life. Yet plans are in place to handle future wastewater needs. Preliminary design work is already done for the next planned expansion, Case says. Because of site constraints, there will have to be a second onsite treatment system for additional buildings, but the supply system for recycled water will tie into the system for new buildings.

In other words, if Chatham University is already an example of wise water use, it is prepared to remain an example for decades. □

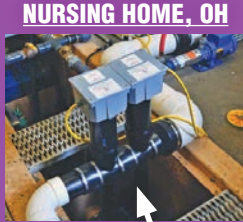
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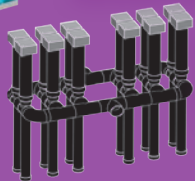


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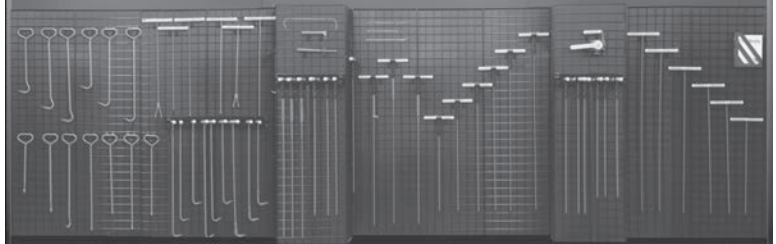


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SYSTEM PROFILE

▼ Jim Malm of Malm Plumbing seals a TUF-TITE riser to the dose tank from Georgetown Precast. (Photos Courtesy of NexGen Septics)



Adding Four Bedrooms, Doubling the Square Footage

An engineered supplemental treatment system enables major remodeling of home in northeastern California

By Scottie Dayton

A mandatory onsite system upgrade came with a homeowner's plans to add four bedrooms to his three-bedroom home in Granite Bay, California, and to expand the footprint from 3,640 to 8,500 square feet. The original 1979 trench-and-stone system also was in failure.

The homeowner hired his neighbor and general contractor, Gene Graves, for the remodel. Graves owns Excellent Construction and sister company, Sustainable Solutions, in Granite Bay. "I was in a quandary with this property," he says. "Meeting setbacks for a creek, a large pond, a meandering swale, public utilities, and multipurpose easements ruled out a conventional onsite system." The state also requires a reserve area.

Shell MacPherson, vice president of Sustainable Solutions, stated that septic plans for aerobic pretreatment with low-pressure drip and building plans had been submitted to the county. "It was a stopgap measure that enabled me to begin construction while researching alternative treatments that were more affordable and less maintenance-intensive," Graves says.

Bob Crandall, then assistant executive officer for the Central Valley Regional Water Quality Control Board, introduced Graves to Advanced Enviro-Septic treatment-dispersal pipes from Presby Environmental Inc. (PEI). He also educated Placer County health officials about the technology. They approved it almost a year later in June 2017. By September, Graves installed the first Advanced Enviro-Septic system in the county.

Site conditions

Soils are sandy loam with a percolation rate of 14 minutes per inch. The 2.3-acre lot has a 9 percent slope.

System components

MacPherson designed the system to handle 1,050 gpd. Major components are:

- 2,000-gallon two-compartment septic tank, no effluent filter (Georgetown Precast)
- 1,500-gallon dose tank with model PF100512 1/2 hp effluent pump in Biotube pump vault (Orenco Systems)
- Concrete distribution box with velocity reduction
- 360 feet of Advanced Enviro-Septic treatment-dispersal pipes, vented (PEI)
- 781 square feet of ASTM C33 washed concrete sand with no more than 2 percent fines passing a No. 200 sieve
- Simplex control panel with alarm (Orenco Systems).



▲ PEI technical representative Mark Vander-Heyden and Gene Graves from Sustainable Solutions watch Jim Malm of Malm Plumbing scarify the drainfield area with a Kubota L35 backhoe.

► Lance Bates (with back to the camera) from NexGen Septics talks to installers, engineers, contractors, officials from the Registered Environmental Health Specialist program, an architect, and community homeowners at the field day in Granite Bay, California.

System Profile

- Location:** Granite Bay, California
- Facility served:** Seven-bedroom remodeled home
- Designer:** Shell MacPherson, Sustainable Solutions, Granite Bay
- Installer:** Gene Graves, Sustainable Solutions
- Type of system:** Passive combination treatment and dispersal system
- Site conditions:** Sandy loam, percolation rate 14 minutes per inch
- Hydraulic capacity:** 1,050 gpd

System operation

Wastewater flows by gravity 46 feet through a 4-inch ABS house lateral to the septic tank, then to the dose tank. (Graves will adjust the pump cycles and volume once the homeowners take occupancy.) Doses travel 55.5 feet through a 1.25-inch PVC pipe that rises 15 feet and ends in a 90-degree velocity reduction tee in the distribution box. Flow equalizers in the box distribute effluent equally to two serial 180-foot-long sections in an elevated bed. The first section has six 30-foot laterals, and the second has two rows of 30-foot laterals and three rows of 40-foot laterals. Spacing is 1.5 feet on center.

Each 12-inch Advanced Enviro-Septic tube has a corrugated, perforated plastic pipe where treatment begins. Ridges on the pipes increase surface area and circulate effluent uninterrupted, cooling it to ground temperature. Skimmers at each perforation help retain grease and suspended solids, protecting the three outer textile layers from clogging.

The inner first layer of white Bio-Accelerator develops the biomat, screens more solids, and evenly distributes effluent along the length of the laterals.



The supply and distribution pipes are mounted in the distribution box. Jim Malm backfills around a plumbed pair of pipes while a helper prepares to glue more PVC connections.

SYSTEM PROFILE



“This event was more about giving people a chance to see the system in cross section and understanding how it works rather than installing pipes.”

Gene Graves

The second layer, a mat of coarse green plastic fibers, traps more solids and creates a massive suspended growth area for aerobic bacteria. The third and outer layer of black geotextile fabric protects the inner layers and provides more surface area for nutrient uptake. As the sand bed wicks liquid from the fabric, it transfers air to the microorganisms. Third-party testing showed the system treats effluent to less than 2 mg/L TSS and CBOD and to 218 CFU/100 mL fecal coliform.

» Form boards delineate the 40-by-18-foot-wide drainfield filled with 6 inches of concrete sand. Workers will drag the screed board (foreground) over the material to scrape off the top layer and create a smooth, level profile.

Preparation

Graves, MacPherson, and chief executive officers Lance Bates and Jim Rentschler from NexGen Septics, organized the installation into a Field Day. Graves purchased all the onsite components, including the Advanced Enviro-Septic system from PEI distributor NexGen Septics.

In preparation for the event, Jim Malm of Malm Plumbing used a Kubota L35 backhoe to excavate the 15- by 20- by 10-foot-deep hole for the two tanks. The driver from Georgetown Precast set them on a 6-inch bed of decomposed granite. “This native material resembles coarse sand and is beautiful to work with,” Graves says.

His crew then plumbed the tanks, decommissioned the original septic tank, and prepared to install 80 percent of the drainfield between clusters of mature oaks and the home, side property access drive, and swale.

Drivers stockpiled 24 tons of concrete sand on an area Graves had graded below the drainfield. “It’s important to keep the sand clean,” he says. “I didn’t want it too near the dusty drive.”

The location for the 40-by-18-foot-wide drainfield had a 7.5 percent slope. Malm scarified the area, then workers staked it out with 2-by-6-inch form boards. After the crew brought in 6 inches of concrete sand, they dragged a screed board over the material to scrape and smooth the top layer, leaving a level profile.

“We set it up so people could see the concrete sand below and above the pipes, and we exposed some end caps,” Graves says. “This event was more about giving people a chance to see the system in cross section and understanding how it works rather than installing pipes.”

To that end, Graves also exposed connections to the septic tank, pump tank, and bypass vent line. “The system depends on passive air transport to support aerobic bacteria,” Graves says. “Convection draws air from the 4-inch screened low-vent PVC pipe in the drainfield, through the system, and out the roof vent on the house. However, the pump acts like a gate valve and interrupts the flow.”

To restore the flow, the system requires a 4-inch ABS bypass vent from the dose tank to the distribution box. The bypass also mitigates hydrogen sulfide corrosion by allowing heavy gases to escape.

Field Day

The event attracted 25 attendees including installers, engineers, contractors, officials from the Registered Environmental Health Specialist program, an architect, and community homeowners. PEI technical representative Mark Vander-Heyden from New Hampshire explained the details of the system. Graves, Bates, and Rentschler assisted during the Q&A session.

For the hands-on portion, Vander-Heyden encouraged participants to snap fittings and couplers together and lay geotextile fabric. Assembling the 10-foot-long pipes went quickly. Corrugations on them matched those on 8-inch-wide couplings that locked around the pipes like zip ties.

Graves made some plywood fixtures with a 4-inch spine to space the pipes on center and hold them in position during backfilling. “The spine enables us to screed off an even layer of concrete sand over the pipes before adding 6 to 9 inches of topsoil,” he says.

One neighbor hired Graves to replace his failing trench-and-pipe drainfield with the Advanced Enviro-Septic system.

Maintenance

No maintenance contract is required. Sustainable Solutions will respond to alarms and recommend when to pump the septic tank. ■

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Time to Review Basics of Soil Sizing Factors and Organic Loading

Designing an effective residential septic system still comes down to the delicate balance of estimated daily sewage flows and long-term acceptance rates

By Jim Anderson and David Gustafson

During basic septic system classes, we stress trying to meet two goals that often work against each other during the designing and installing process: We (more particularly the homeowner) want the final soil dispersal and treatment area to accept all the water that exits the house, while at the same time treating effluent before it is released to the environment. Meeting these goals protects human health and the environment.

Our basic classes concentrate on single household (domestic) waste, although we briefly discuss some other business or commercial systems. In this context we discuss (and have reported in this column previously) household water use habits and how they affect determination of estimated daily sewage flows for residences and long-term acceptance rates, or LTARs, for soils that lead to establishing the size of the final soil dispersal and treatment area.

Designers and regulators must recognize the importance of organic loading to the design numbers and criteria they are using.

Cleaner effluent does not always mean the loading rate can be increased.

SOIL TYPES MATTER

LTARs were determined in two ways and reflect the two goals discussed above. For sandy soils, the primary concern was how rapidly virus and bacteria could move through sand under saturated flow conditions. Research showed if a sandy soil was loaded at no more than 1.2 gallons per day per square foot, virus and bacteria would not move farther than 2 feet in the soil. As we look around the country at various state codes, we see most specified loading rates are either 1.0 or 1.2 gpd per square foot, consistent with the treatment concern for sands.

On the other end of the spectrum, when the soils have increasing amounts of clay, the numbers were determined by how much water could move through the soil after establishment of the biomat. It was determined that the saturated flow rate in clays was 1.0 centimeters/day, which is equivalent to a loading rate of 0.24 gpd per square foot. Most often, the

number 0.2 gpd per square foot is used in state codes. As a side note, in older research articles, you will find the biomat referred to as a crust or clogging layer. The LTARs reflect a combination of the biomat and the soil texture and structure. In soils with high clay contents, how fast water moves through the soil is more determined by the soil itself, rather than the biomat.

Further, LTARs are based on a biomat that develops when typical residential septic tank effluent is applied to soil. Effluent with a biological oxygen demand of 150-170 milligrams per liter is considered typical. Effluent that consistently exceeds this level of what we call “organic loading” will result in a more resistant biomat and a lower LTAR. Maintaining the septic tank becomes very important to keep organic loading values within the accepted range.

As we have discussed in previous columns. Providing a “cleaner” effluent through additional pretreatment is desirable and can extend the life of systems and to a certain extent allow somewhat higher loading levels that would decrease the size of systems. Our concern about this approach is that what we have seen in codes is that decreasing the size of systems is applied across the board. So on the sandy end of the soil spectrum, you may not get the treatment of bacteria or viruses desired and on the clay end — since the soil becomes the controlling factor — the systems can end up undersized, resulting in premature hydraulic failure.

CRITICAL ISSUES

One of our previous articles on this topic led to this comment and observation by a reader:

“I assume your article is in the context of a single-family residential home; however, I would caution that the organic loading/sizing is becoming more and more of a critical factor in systems, especially commercial and community systems. We are finding through our management and sampling of clusters of homes on a community system that we are not getting the effluent quality we would expect from single-family homes even with adequate septic tank capacity. Commercial systems are a ‘whole different animal’ altogether with regard to what the organic content of the effluent may be. So, a word of caution to be sure to include organic loading as a factor in sizing, in addition to the hydraulic loading and soil type/texture criteria.”

We would agree with this comment; other establishments are a different animal and will require additional treatment. BOD levels from restaurants, bars, and any facility with kitchens and food preparation can be many times

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higher than 170 mg/L. Even multiple septic tanks in series as the only pretreatment usually will not bring the numbers down sufficiently. If the effluent has higher values, you will not get the same performance.

At the clay end of things, though, the soil is still the controlling factor; but more organic material can make it worse. Designers and regulators must recognize the importance of organic loading to the design numbers and criteria they are using. Cleaner effluent does not always mean the loading rate can be increased. And if they do not provide designs with adequate pretreatment of organic loading, the systems will be subject to premature failure.

The comment on sampling community systems is interesting. If they are not getting the necessary pretreatment using septic tanks, the tanks may in fact be too small or additional pretreatment may need to be added to bring the numbers down. We assume adequately sized tanks mean they meet the state code. To us, this means perhaps the code should be revisited based on their information and larger tanks or additional pretreatment required for community systems. □

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Better Grease and Septage Disposal Infrastructure Needed in Mississippi

Grassroots pumping and installing association is working closely with state officials to build smart regulations and identify local wastewater treatment options

Compiled by Betty Dageforde

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

➤ Chase Reynolds (left) and Steven Melton are shown with a 2017 Ram 5500 with a 1,250-gallon steel tank and Masport pump. The truck was designed by Melton and built by a local welder.



Steven Melton

owner

Business: Melton's Pumping Service, Summit, Mississippi

Age: 38

Years in the industry: 20

Association involvement:

I've been president of the Mississippi Pumpers Association since 2010. That's when the association was formed. I had been appointed by the chairman of the Board of Health of Mississippi to the Wastewater Advisory Board and worked with different groups and associations, and in 2010 we decided to come together and get organized. Today we've got about 40 members, both pumpers and installers.

Benefits of belonging to the association:

The biggest benefit is that we've got a voice. If one person goes to the Board of Health or the Legislature with a problem, they're less likely to get

anything done. But when one person is speaking for a group, there's a much better chance. We go to four to six Wastewater Board meetings a year; we work with state legislators on laws; and we work with the Board of Health on regulations.

Biggest issue facing your association right now:

The biggest thing we face right now in the state is having a local place to dispose of grease. Many pumpers have nowhere reasonably close by, and they can't pump it if they can't dispose of it. Septage disposal is also a problem in some areas. My county has a state-of-the-art wastewater facility pumpers can use but other counties don't, and if you have to drive 1 1/2 hours down the road, that's a problem. It increases your costs dramatically. I've had meetings with different county supervisors and they say there's not enough money to build lagoons or wastewater facilities.

Our crew includes:

Myself and Chase Reynolds.

Typical day on the job:

Typically we go from phone call to phone call with our pumping work. We schedule them out throughout the week. Then when we don't have anything on the schedule, grease traps are what keep us going. Some we do every month, others every two or three months, six months, depending on what kind of grease these restaurants have.

Helping hands - Indispensable crew member:

Chase Reynolds is as good as I can ask for. He's been with me about 3 1/2 years. I'm usually in the office handling the calls and taking care of the bookwork. Reynolds is the one running the truck. He's a very important part of the business.

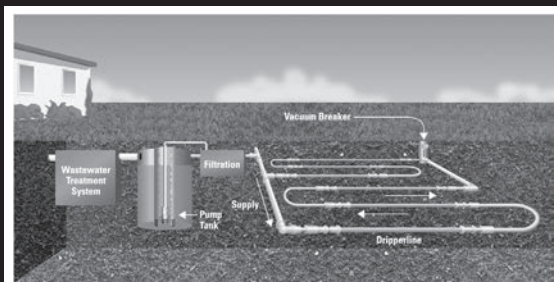
The job I'll never forget:

When I was brand new at this and just learning the business, I had to pump a grease trap I didn't know anything about. It was above ground. I didn't have the right equipment and it created a leak. To keep it from spilling all over the ground, I tried to stop the leak and that's when it all broke loose. I had it all over me from head to toe. Grease is much worse than sewer — it's really nasty. I swore that night I was getting out of the



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business. I hadn't even been doing it a year. But then I did some research and rethought my process and got some better hoses on my truck to keep that from happening again.

My favorite piece of equipment:

Without a doubt it's the Crust Buster (Crust Busters/Schmitz Brothers). We've got two of them and we use them daily. I got one a number of years ago after trying to pump a grease trap at a restaurant that had not been pumped in over a year. It was a solid pool of grease and I spent three hours mixing it with water and a hoe and trying to get it to where I could pump it out. I had seen the Crust Buster advertised and decided to get one. It's one of the best tools I've ever bought. It takes a three-hour job down to 20 minutes. We use it mostly for grease work but also on septic tanks.

Most challenging site I've worked on:

We don't normally do this, but because we have a pump truck, we've been called a few times to handle spillages at the local chicken processing plant — when the guts and stuff from chickens spill and dump all over. It's nasty; it stinks; you smell to high heaven; and it sticks with you for a long time. That's what makes it challenging — when it's really nasty and you've got to do it anyway.

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

"Does the state pay for this to be done?" I showed up to a home to service their tank and when I was just getting ready to pump, I found out they thought the state was going to be paying for it.

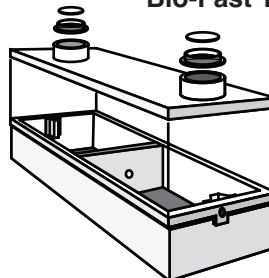
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If I could change one industry regulation, it would be:

Right now Mississippi has a good state law that the pumpers have worked really close with the legislators on so I'd say we're currently satisfied with the way the law is.

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

It's an old saying, but "Treat the customer like you'd want to be treated." It's just like if you walk into a restaurant and they welcome you and treat you right, you're more apt to go back than if they don't.

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

Be working with my wife, Robin, at our lumberyard. Her father started the business in 1986, and I started helping out there in 1997. A few years later, one of the customers who was a pumper and installer wanted to sell his equipment and we saw it as an opportunity. That's what got us going.

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

I see this industry growing and the pumpers and installers becoming more professional, which I think may be a result of the regulations, standards, and licensing requirements we now have. □

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.

Distribution Equipment and Systems

By Craig Mandli

DISTRIBUTION BOXES

Clarus Environmental Tru-Flow Splitter

The Tru-Flow Splitter from Clarus Environmental is a distribution box that can accurately split wastewater effluent flows up to 30 gpm into two to five distribution lines. It is constructed of lightweight, noncorrodible materials, making it easy to install and long-lasting. It consists of a diverter basin and cover and the diverter. The bubble level design allows for simple post-construction adjustments, solving the problems associated with distribution box settling. The unit may settle as much as 15 degrees to the front or to the back and/or 12 degrees to one side or the other and, when adjusted, will still evenly split effluent. With a 4- or 6-inch riser to the surface, it is easy to inspect, adjust and maintain. 800-928-7867; www.clarusenvironmental.com.



Polylok 24-inch (10-hole) Rhino Box

The Polylok 24-inch (10-hole) Rhino Box can be used for larger commercial drainage applications, but it is also a suitable size for all onsite wastewater applications. It has 10 potential openings and accepts the Polylok 4-inch seal with nut. It accepts 2-, 3- and 4-inch pipe, as well as 6-inch pipe with use of 6-inch grommets. It will also accept Polylok 24-inch risers to bring it to grade. The kit includes the box, a choice of a cover or gate, four 4-inch seals with nuts, and eight stainless steel screws. An optional 5 1/8 Rhino Horn bimetal hole-saw allows technician to make the perfect-size hole for the seals. 877-765-9565; www.polylok.com.

TUF-TITE Distribution Box with Speed Leveler

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



DRAINFIELD MEDIA

BioMicrobics BioBarrier membrane bioreactor

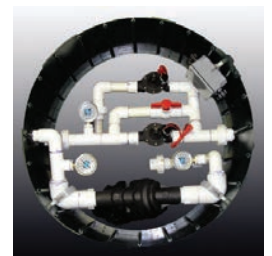
The BioBarrier membrane bioreactor system from BioMicrobics is designed to simplify the settling, screening, direct aeration and ultrafiltration of the wastewater treatment process to remove 99.9 percent of contaminants. Certified to NSF/ANSI 40 Class I, NSF/ANSI 245 (nitrogen reduction), and NSF/ANSI 350 standards, the blackwater/graywater treatment system establishes the material, design, construction, and performance requirements for onsite residential and commercial applications. Installed below or above grade, it offers flows from 500 to more than 27,000 gpd and meets water-quality requirements for the reduction of chemical and microbiological contaminants for nonpotable water use. Treated wastewater can be used for restricted indoor water use and/or unrestricted outdoor water use. 800-753-3278; www.biomicrobics.com.



DRIP TUBING

Jet Inc. Drip Irrigation Headworks

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



FILTERS/FILTER MEDIA



Advanced Drainage Systems Septic Stack

The Septic Stack system from Advanced Drainage Systems is available in configurations of 9, 11 and 13 pipes. The units allow for exceptional soil contact without the use of gravel, functioning as a trickle filter to disperse effluent into the voids in and around specially banded ADS pipe, according to the maker. The pipe is engineered with holes and slots,

allowing it to collect and disperse effluent as it passes over the corrugations in the pipe. Systems are available for use in both residential and commercial applications in trench, bed and mound configurations, as well as pressure dosing. 800-821-6710; www.ads-pipe.com.

Eljen GSF

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



Premier Tech Aqua Ecoflo Biofilter

The Ecoflo Biofilter from Premier Tech Aqua is offered as a nitrogen-removal unit using a new add-on kit. Integrating a pressurized flow divider to recirculate a fraction of the water back to the primary tank, all records and management of the dosing pump's cycles are monitored by a simplex

control panel. It is available in ready-to-use rotomolded units or concrete units integrated into existing tanks made by local precasters. The 40 percent increased hydraulic load of the coco media has also allowed the development of the Ecoflo PACK, an all-in-one treatment system integrating the biofilter and primary tank delivered to sites in a single monobloc configuration, reducing wait and installation time. 604-346-8199; www.premiertechaqua.com.

Presby Environmental Inc. (PEI) EnviroFin

EnviroFin from Presby Environmental Inc. (PEI) is a passive onsite wastewater treatment and dispersal system designed with a small footprint to ship easily and to exceed NSF/ANSI Standard 40 treatment. The effluent enters a fin distribution unit, or FDU, where it settles and breaks down suspended solids. Skimmer tabs located at the FDU's perforations prevent grease and suspended solids from leaving the FDU. The FDU distributes the effluent into the treatment fins, which are filled with coarse green plastic fibers, creating a massive bacteria treatment area. Perforated air duct pipes run across the top of each treatment fin, providing oxygen to promote bacterial growth. 800-473-5298; www.presbyeco.com.



Sim/Tech Filter No-Vault

The No-Vault pump filter from Sim/Tech Filter is designed to help protect turbine pump intake screens. Filtration is achieved through a choice of a 6-inch diameter PVC or 316L stainless steel screen with 1/16-inch diameter perforations. The shorter model has 139 square inches of open area, while the tallest model has 325 square inches of open area. With 35 to 80 times the open area of the intake screen, it helps reduce the frequency of screen and pump cleaning. The interior sealing sleeve allows it to adjust to different pipe heights. The smallest unit handles pumps up to 26 inches tall, while the largest unit handles pumps up to 50 inches tall. The simple unit is easily installed in new systems or retrofitted onto existing systems. 888-999-3290; www.simtechfilter.com.



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CASE STUDY

Distribution Equipment and Systems

By Craig Mandli



Decentralized system installed at county park

Problem: Live Oak Landing, a rural, riverfront Baldwin County-owned park in Stockton, Alabama, is popular with boaters and fishermen and hosts numerous fishing tournaments annually. A 2,500-gpd wastewater treatment system design was needed to service the proposed new facilities including a 24-site RV park, public restrooms, an expanded boat ramp and fish-cleaning stations, a pavilion, restaurant, and cottages. The large daily flow coupled with site challenges including a high water table, poor soils, and the Tensaw River Watershed location impacted the ultimate system design.

Solution: Due to environmental sensitivity of the area, pretreatment was required. The system includes a lift station at the RV park to pump the effluent from the RV site to the disposal area, three 4,600-gallon concrete tanks, an Orenco Systems Advantex AX100, and 1,000 feet of Infiltrator Water Technologies Quick4 Plus Low Profile chambers with low-pressure piping.

Result: The Alabama Onsite Wastewater Association utilized the installation as a CEU-credit education opportunity for area installers, many of whom had never seen a large system installation or one incorporating low pressure pipe in chambers or chambers after advanced treatment. North Baldwin Utilities participated in the system design and will manage the system moving forward. 800-221-4436; www.infiltratorwater.com. □



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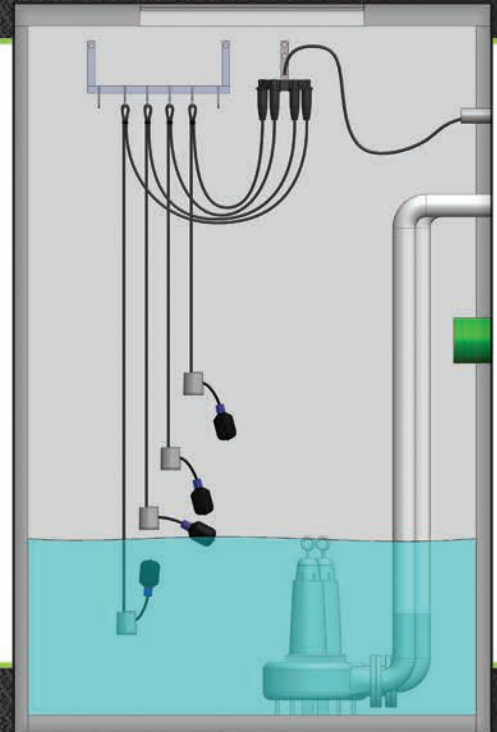
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INDUSTRY NEWS

AEM elects Caterpillar executives to board of directors, CE Sector Board

The Association of Equipment Manufacturers elected Philip Kelliher, vice president, Americas & Europe Distribution Services Division of Caterpillar, to the AEM board of directors



Philip Kelliher



Anthony Fassino

and Anthony Fassino, vice president, Building Construction Products Division of Caterpillar, to the CE Sector Board to fill unexpired terms. Kelliher joined Caterpillar in 1994 and has held numerous marketing and managerial positions with multiple international assignments. Fassino joined the company in 1996 and has held a variety of positions around the world, including several sales and technical field assignments in the U.S. and Canada.

Felling Trailers selects Trailer for a Cause beneficiary

Felling Trailers selected Minnesota Ovarian Cancer Alliance as the 2018 Trailer for a Cause auction beneficiary. The company hosts its annual Trailer for a Cause online auction of an FT-3 Utility trailer to benefit a nonprofit organization. Felling Trailers donates 100 percent of the winning bid to a different nonprofit each year. The auction tentatively begins Sept. 15.

"In past years, we would meet as a family and select the benefiting organization. This year, we put that decision in the hands of our employees. A list of organizations was given to employees to select from, and once the votes were tallied, MOCA had received the most votes," says Brenda Jennissen, president/CEO of Felling Trailers.

Kubota Tractor completes land purchase for future campus and office

Kubota Tractor purchased 200 acres in Phase II of Logistics Park Kansas City in Edgerton, Kansas, making the company the first major tenant for the industrial park. The company will construct two 1-million-square-foot, state-of-the-art logistics facilities for its new North American distribution center.

J&J Truck Bodies & Trailers names new manager

J&J Truck Bodies & Trailers named Nathan Weaver distribution sales manager. He will be responsible for supporting and developing municipal customers and brand awareness, increasing sales and developing new accounts. He will also work with the marketing department to develop and implement regional marketing plans, including attending regional and national trade shows. □



Nathan Weaver



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

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www.owpi.org

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Iowa Onsite Waste Water Association;
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Kansas Small Flows Association;
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Kentucky Onsite Wastewater Association;
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Maine Association of Site Evaluators;
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Maine Association of Professional Soil Scientists;
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Maryland Onsite Wastewater Professionals Association;
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Michigan Septic Tank Association;
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NATIONAL

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

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

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