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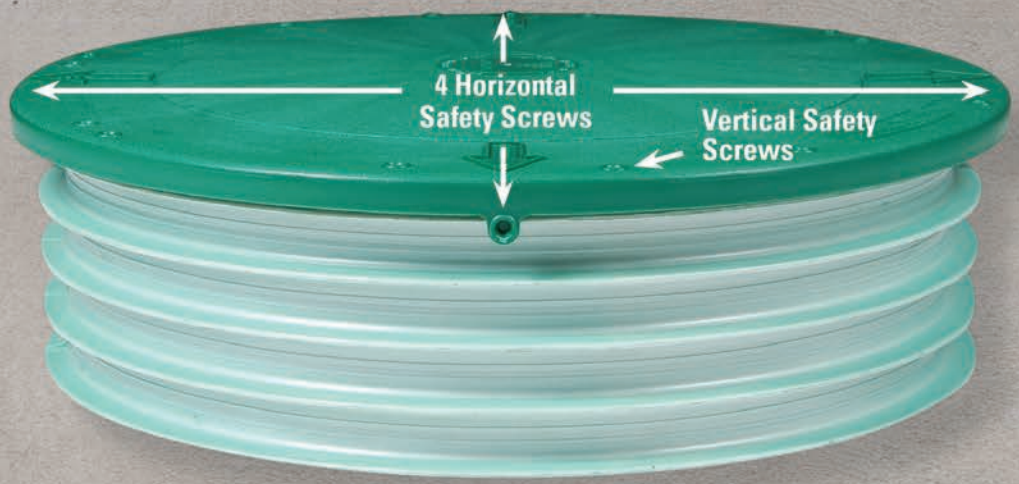

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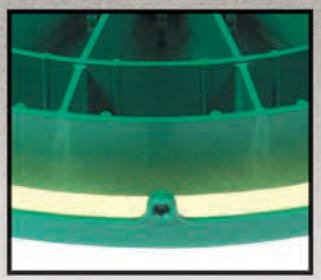

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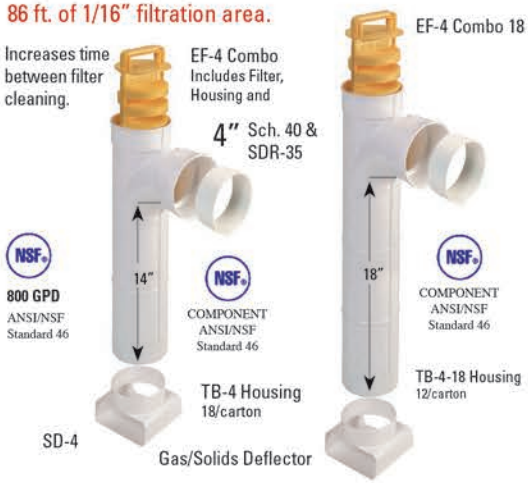

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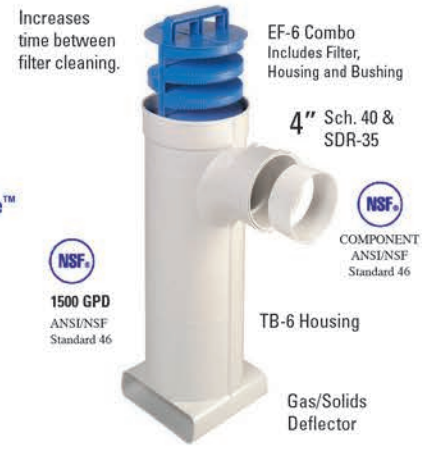

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Leap of Faith
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James Stiksma made a bold move from corporate sales and customer service positions into buying an existing onsite installing business in British Columbia. But the move into an unfamiliar industry has paid big dividends for Stiksma, of Canadian Septic Inc. (Photo by Taehoon Kim)

Coming Next Month

ISSUE FOCUS: Annual Buyer's Guide
Contractor Profile: Onsite expertise in Texas
System Profile: Visit the Grand Canyon

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April 2022

Enjoy this issue!

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

Jim Kneiszel

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

Here's Why You Will Be Driving an Electric Work Truck in 5 Years

Have you been skeptical about the trend toward electric vehicles? Through innovative designs, truck manufacturers are making a better case for contractors to go green very soon

I suspect a lot of contractors who install septic systems for a living have been skeptical about the idea of electric work trucks. It has been easy to remain a naysayer about all-electric vehicles as the automakers promise but fail to deliver a stout unit that would serve an onsite installer's needs for a job site truck.

Why mess with the internal combustion engine, which has provided reliable service for generations? Our gas and diesel pickups and cargo vans provide plenty of torque, the ultimate in fuel flexibility and range to get to and from remote locations. Sure, they require some maintenance and can break down on occasion, but for the most part you've happily racked up hundreds of thousands of miles on the job in Chevys, Fords and Ram trucks.

But something is changing. A corner is quickly being turned. And I now believe you'll soon be transitioning to EV for most of your fleet vehicles. And you'll love it!

Once only of domain of technology dreamer Elon Musk of Tesla and a few other small-scale tinkerers, EV is quickly heading into the mainstream and will benefit from swift development by the companies that have provided your work trucks forever. Most notably, Ford is releasing its Lightning version of the F-150 right now, and Chevrolet will start selling its Silverado EV next year. In total, a dozen manufacturers have electric trucks nearing production. Aside from Ford, Chevy and Tesla (The CyberTruck), there is the GMC Hummer, Rivian R1T, Lordstown Endurance, Atlis XT, Bollinger B2, Canoo Pickup and Alpha Wolf.

STEP UP FROM HYBRID

And for our small contracting companies, full-electric trucks seem like they will provide a more practical and permanent technology transition than the hybrid vehicles that have emerged over the past 20 years. The hybrids seem more like a compromise or in-between solution on the way to something better. With both battery-driven motors and gasoline engines, hybrid vehicles feel like they offer no advantage as far as maintenance goes, just a few more MPGs. And especially for work vehicles, important features like payload and towing capacity haven't proven out with hybrid technology.

I don't think that's going to be the case for EV work trucks and vans. They will have plenty of pulling power, ample torque and several other features contractors will find attractive when contemplating making the switch to electric.

Ford and Chevy promise bidirectional power capabilities that will allow you to keep the lights on at the shop during a power outage. Ford Intelligent Backup Power automatically reverses the power feed from the truck to the building.

Here are a few of the game changers that will move you away from the gas pump and over to the charging station:

Extending the Range

Electric vehicle technology has been criticized for not offering a practical range for working vehicles. But the numbers are going up steadily. Ford says its extended battery option has a 300-mile range between charges, and that figure is based on a 1,000-pound payload capacity. In everyday use, some observers say the number will be much higher. The Silverado EV promise a top range of 400 miles. Tesla says its CyberTruck will go 500 miles on a charge and Rivian's truck already on the road will go 314 miles.

At the same time, the automakers are quickly adding charging stations, which is also being supported by the federal government's infrastructure program, and fast charging is going to make it easier to quickly add miles needed to extend the range during the day. Ford, for example, says a 10-minute fast charge will add 54 miles and the F-150 will go from 15 to 80% in 41 minutes of charging. Chevy claims to add 100 miles to the range with a 10-minute charge.

Plenty of Power

EV beats internal combustion engines by offering full torque across the power band. That means you'll have the maximum power to pull heavy equipment from a dead stop. Chevy promises its work truck, the first EV Silverado release in 2023, will provide 510 hp and 615 ft-lbs of torque, while

the RST model will up that to 660 hp and 780 ft-lbs of torque. This will take the truck from 0-60 mph in 4.5 seconds and max towing capacity will reach 20,000 pounds in future work truck models. Ford says the F-150 Lightning will offer either 430 or 560 hp, both with 775 ft-lbs of torque, a 0-60 time of 4.5 seconds and up to 10,000 pounds of towing capacity in the early models. Tesla's six-seat CyberTruck with four-wheel drive is touted to go 0-60 in a blistering 2.9 seconds and have a 14,000-pound towing capacity.

Fewer repairs/Reduced Downtime

An EV by its nature has far fewer moving parts than an internal combustion vehicle. So breakdowns should be minimal by comparison, keeping your trucks and your crews on the road. And presumably as the battery technology evolves, concern over cost of replacing batteries should go away. Unlike many hybrid vehicles, the new electric trucks are being designed specifically for EV technology and manufacturers should be addressing ease of battery service. Just think about no more oil changes, coolant flushes, belts and hoses to change. Maintenance will not be nearly as routine.

Job Site Power/Backup Power

This is possibly the biggest selling point for electric work trucks for construction-related contractors. These trucks all offer ample 120- and 240-volt outlets so you can run power-hungry tools like saws and air compressors from the truck. This will free you from finding household power or carrying and running a loud, smelly gas generator at a work site. The Rivian R1T takes it a step further, offering a built-in 150 psi air compressor and integrated Bluetooth speaker and high-power flashlight that can be moved around the job site and returned to charge at the end of the workday.

And the Ford and Chevy promise bidirectional power capabilities that will allow you to keep the lights on at the shop during a power outage. Ford Intelligent Backup Power automatically reverses the power feed from the truck to the building and can power a household for up to three days from the large truck batteries.

Frunk Flexibility

Securing tools on your pickup has always meant compromising bed space with a toolbox of some sort or having to add a service body to the truck, effectively eliminating the truck's bulk hauling capacity. Without an engine up front, EV trucks convert that space into a "frunk" or front trunk — secure, weather-tight spaces. In the case of the Ford, it's quite a big space. The frunk can transport tools and materials, and has a removable cover to a lower open area that can be configured several ways as a divider. The frunk also has lighting, several outlets, USB charging ports and a drain hole so you can hose out the area when it gets dirty.

Bonus Features

- The first EV trucks offer independent rear suspension and advanced suspension controls, such as self-leveling, onboard scales to adjust range to cargo weight, and the ability to raise the height of the truck for traveling over rough terrain.
- The Chevy offers flexibility to haul bulky loads with a multiflex midgate that opens the bed to the second row of seating and several tailgate positions. This extends the bed to allow 11 feet of cargo space.
- Use of electric motors makes it easier to run power to two wheels or four wheels without costly transmissions to fail. The Rivian truck, for example, can be ordered with motors to each wheel, totaling 800 hp output.
- Ford designed the interior of the Lightning to easily convert to a work office on the road. The shifter folds down and out of the way and the center armrest folds out to provide a large working surface. A wireless phone charger and 120 outlets power any office tools you need on the road.

Among many innovations, the Rivian R1T provides a secure storage space at the front of the bed with access from both sides of the truck.

Without an engine up front, EV trucks convert that space into a "frunk" or front trunk — secure, weather-tight spaces. In the Ford Lighting, the space is large and includes a variety of outlets to power tools in the field.

Tesla's futuristic six-seat CyberTruck with four-wheel drive is touted to go 0-60 in a blistering 2.9 seconds and have a 14,000-pound towing capacity.

The Silverado EV will be released next year. It will have a 0-60 mph time of 4.5 seconds and max towing capacity will reach 20,000 pounds in future work truck models.

Fuel Savings Price of Ownership

No matter how the price of gasoline or diesel changes, electricity is going to be a fraction of the cost, dramatically reducing your fuel budget. Add solar panels to the roof of your shop and you can run the EV at no cost for years to come.

And the stated price of the EV trucks may surprise you, especially considering how the cost of traditional pickups has risen in recent years. The baseline Ford F-150 will start at $39,900, with the extended battery version starting at $49,900. The Tesla CyberTruck is allegedly going to start at $39,900 for rear-wheel-drive model and $49,900 for all-wheel drive. Most Silverado models will come in at the $50,000 to $80,000 range.

LOOKS LIKE A TRUCK

Aside from the prototype Tesla CyberTruck, which looks like something out of a science fiction film, the Chevy and Ford EVs appear very similar to their gas-powered counterparts. And I think that's a good thing. Making a leap to electricity is already a big change; it's comforting that the American manufacturers have decided to keep a truck looking like a truck. If you buy an F-150, for example, most folks won't be able to tell it from the rest of your pickup fleet when you pass by.

You might want to go green and send a message that you want to reduce pollution and end your reliance on fossil fuels as much as possible. Or you may not care about that message at all. In the long run, I think any question or debate about going green will become irrelevant. You will choose electric vehicles only if they make good sense for your business.

As with many decisions made by small-business owners, practicality will win out over all other considerations. Very soon electric work trucks will offer many advantages, including lower operating and maintenance costs and practical on-the-job features for your crew. That's when you'll ditch the internal combustion engines we've been using for 100 years and embrace the future.

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UP THE OXYGEN

Adding an Aerator

Sometimes ATUs are installed without either a trash trap or a clarifier. The generic terminology for these types of systems is an adaptive mechanical aerator. An AMA is generally used for remediation of systems having issues with wastewater acceptance in the soil treatment area, but they can also be used to improve effluent quality for a new system. Learn more about AMAs in this online article from Sara Heger. **onsiteinstaller.com/featured**

Overheard Online

"Provide consistent communication and a culture that welcomes feedback, and employees won't feel like they're kept in the dark."

– Tips to Raise Morale and Keep Employees Happy
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DO NOT DISTURB

Protect Natural Soil Conditions

Maintaining natural soil structure is critical when installing a soil treatment area for an onsite system. All excavation to the infiltrative surface or surface preparation must be done so that the original soil structure is not smeared or compacted. Follow these tips to limit compaction and disruption of the soil treatment area. **onsiteinstaller.com/featured**

EFFECTIVE LEADERSHIP

Bring Out the Best in Your Team

It's critical that every crew leader take some time to invest in leadership skills. A good place to start is by looking into your past and asking: What did you like best about the crew leaders you worked for? The traits you'll want to emulate follow the golden rule: Treat others how you want to be treated. Combine this mindset with a few actionable steps and you can bring out the best in your team. **onsiteinstaller.com/featured**

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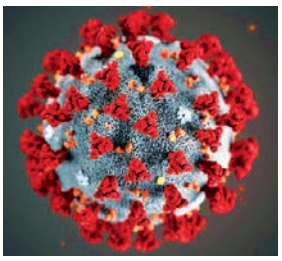

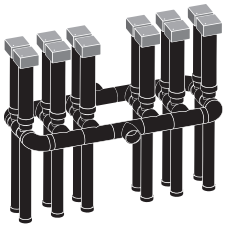

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As the clouds roll in over a mountain range, Stiksma, left, and Arien Brouwer, the operations manager, review plans during a septic system installation in British Columbia. (Photos by Taehoon Kim)

LEAP OF FAITH

James Stiksma learned on the run after buying and retooling the sales and marketing game of an established septic installation company

By Ken Wysocky

When James Stiksma left his corporate sales job in the cellphone industry in 2016 and bought Septic Expert, a septic system design and installation company, he knew absolutely zilch about the world of drainfields, distribution boxes and dosing tanks.

"There were times when I thought I was crazy for making such a big career change and entering a world I knew nothing about," admits Stiksma, 36, who rebranded the company as Canadian Septic and moved it to Langley, a city about 25 miles southeast of downtown Vancouver in southwestern British Columbia.

So far, Stiksma's lack of experience hasn't been a handicap. If anything, being a novice enabled him to take a more objective look at how to reshape the company, founded in 1999, and maximize its potential. After assessing the lay of the land for about a year while he learned the business, Stiksma leaned on his experience in the cellphone industry and adopted technologies to make processes and operations more efficient and marketing programs more effective.

"I like to look at the big picture and drill down into things," says Stiksma. "I'm always looking for ways to make things easier for everyone at the company — and for our customers.

"With just a three-man shop and two of us always on the road, time is always a challenge," he adds. "So I'm always looking for anything I can do to increase efficiency, give me more time to chase after sales instead of getting bogged down in paperwork."

While it took some time to gain traction, Stiksma's efforts are paying financial dividends. In 2021, the company's revenue was about 40% more than in 2017, its first full year of operation.

SALES AND SERVICE

Before his career U-turn, Stiksma held several different jobs. He worked for three years as a sales and service representative for Cintas, which supplies work uniforms for companies. He also served as a corporate account manager for a national wireless carrier dealership.

"I met a lot of people who worked in different industries," he says. "I learned about the hows and whys of their operations and helped them implement technology to streamline their operations."

But ultimately, Stiksma wanted a more sustainable and lucrative job to support his growing family. When he was unable to find a job he liked, he decided that buying a company would be a better alternative. "I wanted something I could call my own," he says.

Canadian Septic Inc.
Langley, British Columbia

Owner:	James Stiksma
Purchased:	2016
Employees:	3
Service area:	100-mile radius around Langley in southwest British Columbia
Specialties:	Septic system design, installation and repair
Website:	www.canadianseptic.com

A subcontractor moves dirt during the site prep phase of an onsite installation being completed by Canadian Septic in Langley, British Columbia.

James Stiksma supervisors a subcontractor operating a John Deere excavator on a residential system installation in Pemberton, British Columbia.

THE RIGHT INDUSTRY

Stiksma was intrigued when he ran across Septic Expert. He liked the fact that there was high demand for design, installation and repair/maintenance services; that the industry is regulated, so not just anyone can do it; and that it required education and certification.

"Nobody grows up thinking they're going to put 'poo' water into the ground," Stiksma says. "But this business kept on checking boxes, including high barriers to market entry.

"And as I looked over the financials, I was confident there was something worthwhile there," he continues. "I also compiled four or five pages of questions about the business and gave them to the owner — did a lot of digging. And the more I probed, the more I thought this was a really interesting industry."

Stiksma dug in even deeper by actually working for the company's owner, Martin Sparkes, for a week to get a real-life glimpse into the company's operations. And after he bought the business, Sparkes helped him with the first three or four installations and "basically held my hand for about the first three months," Stiksma says.

"For the first year, I also was able to bounce any questions I had off of him," he adds. "Overall, it still was a bit terrifying to make that leap. But based on what I learned about the business, I knew the calls were going to come. It was just a matter of ramping up my knowledge and experience so I could effectively communicate with customers."

TOOLS OF THE TRADE

Today Canadian Septic designs 20 to 30 septic systems a year and installs 30 to 36 a year.

"We work closely with a number of local engineers that do design work," says Stiksma, who sits on the board of directors for the Western Canada Onsite Wastewater Management Association-British Columbia.

To perform installations, the company owns a SK755 mini skid-steer made by Ditch Witch (a brand owned by The Toro Company); two pickup trucks — a 2020 Chevrolet Silverado 1500 and a 2021 Silverado

FLEXING THE MARKETING MUSCLES

James Stiksma takes a something-old-and-something-new approach to marketing Canadian Septic. The new tactics center on Instagram and Facebook, while the old focuses on distinctive-looking service vehicles that serve as rolling billboards.

Stiksma started posting on Instagram about three years ago, but made a New Year's resolution at the start of 2021 to be even more active. The effort has borne fruit; the company now has close to 1,000 followers on the social media platform.

"The original reason I started using Instagram was to get our name out in front of Realtors because they use social media a lot," he explains. "They hire us for pre-purchase home inspections or customers that need repairs done in order to sell their homes. And Instagram keeps us top-of-mind — keeps us visible."

Stiksma says he has sold several big design and installation projects to customers who learned about the company via Instagram.

"I like it because it can create a connection with customers before they even hire you," he says. "It warms them up because they've already seen our Instagram posts, watched our reels (videos) and heard our stories. They've seen our faces and the quality of our work," he continues. "It gives us an extra level of credibility — shows people we're not just some fly-by-night operation.

"Plus, no one in our industry out here posts as regularly as we do," he continues.

What does Stiksma post on the platform? Everything from photos and videos of projects to short educational snippets that teach customers about septic systems and provincial rules and regulations. He even includes family photos every so often to subtly show customers the business is family-oriented.

As for service vehicles, Stiksma goes big and bold, with all-black trucks emblazoned with large silver graphics. He says more than $250,000 in business during the last 12 months came from people who saw the company's phone number on its trucks and trailers and called for a quote.

In one case, a customer who'd been waiting months for a contractor to provide a project quote saw a Canadian Septic truck and called the company, Stiksma says. That turned into a $60,000 job — a complete system replacement for a 15-woman recovery center. Further work for the client turned it into a $140,000 payday.

"Visibility is something a lot of people take for granted, but it pays to be sure that people see your name out there, especially because we do a lot of driving around," he says.

Stiksma estimates he spent about $9,000 on graphics for the company's trucks and trailers. "They've provided an amazing return on investment," he says.

"**It's a very cool industry.** It may not have been something I ever thought about doing while I was growing up, but it's been great for my family and I think more people should consider it. It's definitely a great career option."

James Stiksma

3500; a 20-foot cargo trailer made by Continental Cargo (a division of Forest River Inc.); a dump trailer built by Big Tex Trailers; two pipeline-inspection cameras made by Hathorn Corp.; and a NaviTrack Scout and an RS-24 pipe locator, both built by RIDGID.

On the technology end, the company uses iPads to create service reports and invoices and make presentations to customers; FastField software that creates customized mobile forms; and Apple AirTag asset-tracking devices. To design septic systems, Stiksma uses a MacBook Pro and AutoCAD software.

In addition, Stiksma utilizes Google Drive, which allows him to store and easily access photos, documents and the like, as opposed to running back to the office to look things up — a real time-saver, he notes.

Brouwer carries PVC pipe fittings during an installation project for a new home.

> "We're not the cheapest company around and I'm not going to be that guy (who lowers prices to sell jobs). **We prefer to concentrate on quality instead of quantity.**"
>
> **James Stiksma**

James Stiksma, right, works with a subcontractor to hoist a septic tank into place during an installation.

Arien Brouwer adds ConSeal sealant to the lip of the lower section of a septic tank during installation.

CRITICAL DOCUMENTATION

To stay better organized and streamline the design process, Stiksma developed a spreadsheet program into which he inputs all the data gathered from customers to design systems — things such as how many people live in a home, the number of bedrooms, the total square footage of the building and so forth.

"Then I plunk the soil characteristics into the same spreadsheet to determine things like linear loading rate, vertical separations and the minimum drainfield area," he says. "It's invaluable to be able to access all this data quickly so that we can provide accurate answers to customers' questions. It allows us to deal with more customers in a shorter period of time."

When the company completes an installation, Stiksma and his team document all aspects of the project, from the size and brand of the pumps to exact measurements, photos and detailed notes, including any changes made after consulting with engineers.

"Then we give the commissioning report to the design engineers so they can update their as-built plans, which ensures accuracy," he explains. "Undocumented changes are fairly common in the industry, so we've found it's incredibly helpful to have everything documented in this digital form."

This summary report also serves as a marketing tool, he adds. "We just finished up our first install with an engineer and after we sent him the form, he asked if he could give our name to his customers," Stiksma says. "He said we saved him a ton of time and paperwork on the back end."

SMART USE OF ASSETS

Stiksma said the company also benefits from comprehensive communication with customers, with an emphasis on explaining why systems are designed a certain way.

"It's very important to us to take time to explain to customers why you're doing what you're doing," he says. "It also helps because we're not the cheapest company around and I'm not going to be that guy (who lowers prices to sell jobs). We prefer to concentrate on quality instead of quantity."

To keep costs down and minimize the need to hire more employees, which are hard to find, Stiksma typically hires an excavating company for installations. This helps him avoid tying up significant capital in equipment that might sit idle much of the time, like a variety of sizes of excavators needed for different jobs.

"My guys are on the ground, guiding the excavation subcontractors," he notes. "We also benefit from this because I use different contractors in different areas, so we don't have to pay subcontractors to travel all over the province. This helps us maintain competitive pricing on out-of-town projects."

Stiksma's righthand man is his brother-in-law, Arien Brouwer. "During my first year in business, I was doing everything," Stiksma says. "But now he's out in the field, which leaves me time to concentrate on sales and bids — focus on filling the back end, which is where I have the most experience."

SITE LIMITATIONS

The company primarily installs advanced aeration systems with sand mounds because the soil includes a lot of clay and water tables are high, due to the area's proximity to the British Columbia coast.

"We just put in a system where the water table was only six inches below grade," he says. "It was nasty. Tanks can be a real challenge here.

"The worst day of my professional career was when we showed up and found about a 2,425-pound concrete tank had floated on us overnight," he adds. "We didn't fill the tank up the day before and to make matters worse, we also hadn't put any backfill on top of the tank because we hadn't yet installed the risers.

"We ended up pulling out the tank with a crane truck, re-excavating, bedding the hole with more gravel and resetting the tank."

Stiksma uses a variety of treatment systems, including products made by BioMicrobics (MicroFAST), Fuji Clean USA (Ce and CEN Series), Infiltrator Water Technologies (Advanced Enviro-Septic), Eljen Corp. (A42 modules) and Canadian Wastewater Solutions (Moving Bed Bioreactor package treatment plants).

STRIVING FOR A BALANCE

Stiksma says his biggest business challenge is figuring out how much more he wants the company to grow and if it does so, how to grow without running the risk of employee layoffs. While he wants to provide employees with family-sustaining wages, plus a career track, he also knows that winter rains make year-long installations impossible.

"I do struggle with committing to employing someone full-time, but knowing I might have to put them on unemployment for a while during the winter," he says. "It's a bit of a mental hurdle because I feel a great responsibility for everyone on our team and their families.

"At the same time, we turn away repair, maintenance and inspection work on a daily basis," Stiksma says. "Those services are incredibly underserved in our area, but they also require certification and years of hands-on experience."

But no matter what direction the company takes going forward, business opportunities abound. And with a solid business model and systems in place, the company is well-positioned to capitalize on them, he says.

As Stiksma looks back on the last five years, he has no regrets about making the dramatic career switch.

"I've enjoyed creating relationships with customers and seeing some very spectacular homes along the way," Stiksma says. "It's a very cool industry. It may not have been something I ever thought about doing while I was growing up, but it's been great for my family and I think more people should consider it. It's definitely a great career option."

"Based on what I learned about the business, I knew the calls were going to come. **It was just a matter of ramping up my knowledge and experience so I could effectively communicate with customers."**

James Stiksma

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Site conditions are sloppy for Arien Brouwer as he gets equipment out of a Canadian Septic trailer at an install location.

Jim Anderson, Ph.D., and Dave Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. Dave 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 Dave. Write to ander045@umn.edu.

Don't Turn Bedrock Into a Money Pit

Careful planning with architects, engineers and designers is critical to making sure tricky systems in rocky soil remain profitable for the installer

By Jim Anderson and Dave Gustafson

We've heard from readers recently who live in areas with shallow solids over bedrock. As you can imagine, they report that these conditions present many challenges for installing onsite systems. We have observed homesite preparation in areas where rock creates problems simply for creating an area to set the house.

Techniques to prepare these areas include one or some combination, depending on the type of rock involved, of blasting with dynamite, using large jackhammer-type equipment on the end of an excavator arm to pulverize the rock into submission, and large bulldozers and earth movers to create an area to place the footings for the house.

All of this makes the job of evaluating the site and designing a sewage treatment system more difficult. It is important that handling sewage is part of initial planning for the house and not simply an architect's simple drawing of line from the house to a septic tank and a few lines to represent the sewage treatment trenches.

The current version of onsite sewage treatment mounds came about due to problems in areas of creviced limestone bedrock in Wisconsin. **Installers have more options these days, including an at-grade system or drip distribution if the soil over the bedrock is deep enough.**

PLANNING TEAMWORK

If there are locations on the lot where soils are suitable for installation of the soil treatment unit, these need to be identified and protected through the lot preparation process. How sewage is going to get to these areas needs to be factored into the house layout and plumbing plans. A note here on site evaluation in these areas: Solid bedrock is identified in the field by whether a shovel or knife can penetrate the rock.

In one instance, we observed that the only area available for soil treatment was all the way on the opposite side of the house and about 200 feet away. This creates a challenge just to run the supply piping. All members of the house design, construction and installation team need to have continuous communication to make it all work.

Without proper planning, activities that are normally easy for installers become much more difficult. In soils with minimal rock, digging holes for the sewage tanks and trenches to run the supply piping between components can be done in a few hours at most. Depending on the bedrock outcrops, there might be need to route piping to avoid those areas or do some blasting or jackhammering to provide an area for the tanks and run supply pipes.

Proper bedding material to set the tanks and piping will need to come from offsite. When these systems in rocky conditions are in a cold climate, tanks and piping will need to be near the surface and will require insulation. Tanks may need insulation on the top and maybe the sides as well, depending on the exposure. Insulated piping is available, usually consisting of a smaller pipe inside a larger pipe and with foam insulation in between.

Design problems and solutions differ in different types of bedrock and other rock problems. Of course, our goals are always the same — to have the amount of effluent generated from the house be accepted and treated before it is released to the environment.

CREVICED LIMESTONE

From a bedrock perspective, a primary concern is treatment if the bedrock is creviced limestone. If the bedrock is solid, impermeable granite, we worry about treatment and where the effluent goes after it leaves the system. For soils where rocks are more than 35% by volume, we worry about rapid movement of water through the soils resulting in a lack of treatment.

In areas of creviced limestone bedrock, the shallow soils over the top and the soil material filling the crevices is usually permeable and can be a good treatment media. However, if the sewage is applied directly to just one or a few crevices, the effluent can quickly move through the crevices to contaminate groundwater and water wells located far from the sewage source.

The solution is to utilize whatever thickness of natural soil is over the bedrock and applying effluent in a matter that does not concentrate in one or a few parts of the soil treatment area.

Pressure distribution is a must, and the more uniform distribution is over both time and space the better. This means controlling doses by

using a timer. In an interesting piece of onsite history, the current version of onsite sewage treatment mounds came about due to problems in areas of creviced limestone bedrock in Wisconsin. Installers have more options these days, including an at-grade system or drip distribution if the soil over the bedrock is deep enough.

Similarly, where the soils contain a large percentage of rock, spreading out flow over time and space allows effluent to infiltrate over the entire area providing treatment. Solutions would be like the limestone situation — with mounds, at-grades or drip systems.

In addition to acceptance and treatment, we worry about where the effluent may go in the solid or "impermeable situations." Part of the design needs to factor in whether the effluent will move along the top of the bedrock and then outlet somewhere nearby as it passes through the treatment media and hits the bedrock surface. If so, it needs to be treated before it outlets in the drainageway. Some additional water management is required where the water comes in to the drainageway. Additional pretreatment components may be required to ensure treatment.

ESTIMATE CAREFULLY

Bedrock problems are some of the most challenging conditions an installer will face. In addition to the problems discussed above, these areas also often have significant land slope. This makes moving equipment in and out and getting the components into place very difficult. As an aside, it also makes estimating the job difficult and any mistakes very costly.

SYSTEM PROFILE

Better Treatment on a Barrier Island

Orenco AdvanTex is chosen for a commercial system replacement on environmentally sensitive Atlantic Beach in North Carolina

By David Steinkraus

There was nothing really wrong with the onsite system serving the Coral Bay Club in Atlantic Beach, North Carolina. It had grown as the club had grown, but wastewater disposal wasn't working as well as it should, says Steve Barry, president of AQWA Inc., in Wilson, North Carolina. His company was a product vendor for the project and operates the system.

At times the wastewater flow in the old system exceeded permit limits, and there was a high nutrient load on the soil. Like other places, North Carolina has had a nitrogen standard in place for some time, Barry explains, and most systems with similar loading have nitrogen-reduction equipment.

Atlantic Beach is on a barrier island, so there is little municipal sewer coupled with a high development density and a sensitive environment. Coral Bay needed a system capable of quickly transforming high wastewater flows into water safe for the ocean in the club's backyard.

System details

The Coral Bay system is divided into three sections on two sides of the road in front of the club. This is done because of space constraints. There wasn't enough space on either side of the road to hold all of the components. Next to the club building are a set of tanks that collect water and provide primary septic treatment. On the opposite side of the road are components for secondary aerobic treatment. Then water is moved back across the road for dispersal in a dripfield.

Wastewater leaves the main building through a 6-inch pipe with two branches, one for the kitchen and the other for the rest of the facility.

Kitchen wastewater flows into a 4,000-gallon two-chamber concrete grease trap, then joins the main collection pipe. The combined flow enters a 10,000-gallon two-chamber tank that is followed by an 8,000-gallon

One of the AdvanTex AX-Max pods is set at Coral Bay Club in Atlantic Beach, North Carolina. Because of space limitations, the treatment system is located across the street from the club with pipes carrying wastewater under the street. A second pod was set where the excavator sits. The 1,000-gallon tank in foreground settles any debris that might get into the pipes running between the pods and the septic tanks next to the club building. Pictured are Jon Meade, Green Engineering, left; Zach Conrad, Quality Septic, right rear; Matt Aaron, Quality Septic, right front; and Edward Faison, the owner of Quality Septic, in the Cat excavator. (Photos courtesy of AQWA Inc.)

Controls and the supply and return lines for the Coral Bay Club wastewater system are collected in a small control building near the AdvanTex AX-Max pods. Also in the building are two small chemical feed systems (sodium bicarb) to assist with nitrogen removal.

Michael Clayton, left, and Kevin Johnson from AQWA, install a bed of chipped tires inside one of the AdvanTex AX-Max pods at Coral Bay. The chips, made from old automobile tires, serve as a growth substrate for bacteria.

A crew sets an 8,000-gallon septic tank next to the Coral Bay Club building. With the 10,000-gallon tank already set, this group of tanks handle settle and initial treatment. A 4,000-gallon grease trap is visible at left. Risers and lids are from Orenco. Pictured are clockwise standing, Edward Faison (yellow helmet), Michael Clayton, Jesus Lemon, Carlos Pena and Phillip Shoaf. On top of the tank is Eric "Moose" Byerly, Shoaf Precast.

two-chamber tank. These handle settling and pretreatment.

"It's a little bit oversized, but that's because of the strength of the waste," Barry says.

Next in series is a 10,000-gallon pump tank with dual Orenco PF200512 20 gpm, 1/2 hp pumps. Water is pushed out through a 2-inch line and travels about 300 feet across Highway 58 to the secondary treatment components. Lines to move water back and forth across the road were directionally bored.

Pretreatment tanks came from Shoaf Precast of Lexington, North Carolina. All were buried under a parking lot and are rated for traffic. Traditional traffic-strength risers give access to tanks. Other risers and lids came from Orenco.

First is a 1,000-gallon trash tank. If there is a break in the wastewater line, any grit or debris will settle here before reaching the AdvanTex pods, Barry says.

Two 42-foot long Orenco AdvanTex AX-Max pods were set about 5 1/2 feet in the ground, leaving about 2 1/2 feet above grade so operators can easily reach inside the tank. "The whole idea there is to make it as operator-friendly as possible," Barry says.

The first pod is filled with a lightweight, highly absorbent engineered textile media. The second pod has two chambers. First is an upflow filter made with used, chipped auto tires, rubber with metal removed, as a growth

System Profile

Location:	Atlantic Beach, North Carolina
Facility served:	Coral Bay Club
Designer:	Green Engineering, Wilson, North Carolina; soil work by Chris McGee LSS, Agri-Waste Technologies, Apex, North Carolina
Installer:	Quality Septic, Swansboro, North Carolina; AQWA Inc. (operator/vendor), Wilson, North Carolina
Type of system:	Orenco AdvanTex
Site conditions:	Fine sand, barrier island
Hydraulic capacity:	14,050 gpd

The main participants in the Coral Bay Club wastewater project are (from left): Leo Green III P.E. of Green Engineering; Eddie Cameron, Eddie Cameron Construction; Steve Barry; Jon Meade P.E., Green Engineering; Steven Berkowitz P.E., North Carolina Department of Health and Human Services; Edward Faison, Quality Septic; Julie Harris, Carteret County Health Department; Zach Conrad and Matt Aaron, Quality Septic.

medium. Between 25% and 50% of water is returned from here to the head of the plant. MicroC is added for nitrogen reduction. The second chamber is all textile with recirculation for a final polish. Effluent flows by gravity through Orenco UV units before entering a 4,500-gallon pump tank with duplex 1.5 horsepower Orenco pumps. This sends water back across the road for dispersal.

Beside the AdvanTex pods is a propane-powered emergency generator. It's a regulatory requirement in North Carolina because of the frequency of hurricanes, Barry explains.

Oversizing the dripfield

The supply line runs into a head works with an Orenco UV unit and Netafim filter, and then is dispersed in 14,000 square feet of Geoflow divided into five zones and buried under the large lawn in front of the main club building. Two zones operate at any one time, and one zone is flushed. Ball valves allow the zones to be isolated in case of a problem, and there are air release valves inside a hatch so operators can check line pressures.

Although state rules would have allowed less drip tubing, Barry says his experience with sandy soils shows that sometimes dripfields can be undersized, which won't allow the treated water to be moved to the soil fast enough. Installing extra drip tubing isn't that expensive, he says.

At the west end of the club building is a snack bar for the pool. A grease trap and septic tank handle preliminary treatment of wastewater from the snack bar, and wastewater then flows to the main treatment system through about 350 feet of 6-inch pipe. Original piping for this small system was 4-inch, but it was expanded to 6-inch so the run would be flatter, Barry says.

"It had to be done well and a little delicately because it was next to an existing structure in sand," he adds.

An Orenco panel controls the system and includes a panel with a cellular phone link that Barry can use to log in and check the system.

Installation was done by Quality Septic, Swansboro, North Carolina. Barry says he has worked with owner Edward Faison for almost 20 years, and adds that the installer does outstanding work.

"It had to be done well and a little delicately because it was next to an existing structure in sand."

Steve Barry

Challenges

Construction was planned for the off season. On the North Carolina shore, Barry says, January and February can be miserable with temperatures of 40 degrees and winds of 20 mph. Tourist season ends about mid-October.

After the Coral Bay Club system was installed, it was used as part of a training day for engineers and wastewater treatment plant operators from nearby counties. Because of its effectiveness, AQWA Inc. has used the same basic system for other projects.

Dispersal of treated wastewater is in a dripfield in front of the main Coral Bay Club building, visible at left. The field was covered and seeded and became a large lawn.

The 2019 preconstruction meeting was on Jan. 7, and work began on Jan. 15. Inspection of the finished system came on March 11.

During the project, technicians had to remove most of the old drainfield, Barry says. "We tried to argue with the state to put drip tubing over the old drainfield." But the state allowed overlay only in places where the old drainfield was set deep, he says.

"This layout of using the AX-Max and then upflow and tertiary Max unit is something we've reproduced at a few sites," Barry says. The reason, he says, is consistently good performance: nitrogen less than 10 mg/L, ammonia less than 1 mg/L, and BOD and TSS typically below reportable values.

During the summer, BOD runs 400 to 500 mg/L because the club hosts weddings and has a full kitchen. "So the strength of the waste is quite high." Numbers are good enough for water reuse although the system isn't permitted that way, he says.

The system has been humming along for three years, Barry says. Typically these systems require site visits twice a week throughout the year, but because of telemetry, the state allows his technicians to visit only weekly during the season and monthly during the off season.

During the winter, daily flows of 500 to 1,000 gpd are enough to keep microbes alive with the help of the carbon feed and recirculation.

Putting the AdvanTex pods partly above ground and purchasing long-warranty pumps show that this system is intended to keep going, Barry says. "It's really built with operation and long-term operation in mind."

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SNAPSHOT

An Aging Wastewater Workforce Points to Future Troubles

The industry needs to find a way to attract a younger generation of workers willing to perform a tough but necessary job

Compiled by Betty Dageforde

Darius Melton

president

Business: **2M Pumping Service,** Hot Springs, Arkansas

Age: 52

Services we offer: Primarily septic pumping. We do some inspections but it's limited. We don't have the equipment to chase the lines or that sort of thing. But we're seeing a lot more interest in that, especially with Realtors. With so many houses being bought and sold, that seems to be a big thing right now, at least checking the tanks for dirt, roots, cracks.

Years in the industry: 10-plus. I got into this on a fluke. I was in the excavating business with my father and brother. There was a power plant job down in Texarkana and I went down there to look for a dirt job. They very politely told me they weren't going to hire me but the guy said, why don't you get your pumping license and I'll let you bid on [a contract to service restroom trailers]. I maneuvered my way through the system, got my license, bid the job, got the job — and then I had 30 days to find a pump truck. The stars all lined up and we've done this ever since, along with the excavating business.

Association involvement:

I've been a member of the Arkansas Onsite Wastewater Association (ARKOWA) for over five years. They have different segments on the board — installers, pumpers, designers — and I represent the pumpers.

Benefits of belonging to the association:

It helps us stay on top of the laws that could be changing. A lot of lobbying goes on. It's a big help. Not that you can get a jump on anything but a lot of times you can lobby against some things. In Hot Springs, they were going to raise our dump rates to a nickel a gallon. I was going to turn it over to the board and let them negotiate with the city about that, but then the regulators worked with me one-on-one and we got a deal where they raised it two-and-a-half cents the first year and two-and-a-half cents the second year. The city actually didn't want to deal with the board. But it was definitely a benefit being on the board and being able to mention the board.

Biggest issue facing your association right now:

There are several. One is the rate hikes on dumping sewage. Another is laws changing faster than we can comprehend. And another thing I think the association is going to see is possibly a downturn in the number of people getting into this business because pumping, installation or any of this is not seen as a desirable business. You can make a good living at it but it's just not one of those glamorous occupations.

Our crew includes:

My wife Tonya, who dispatches and talks to clients, my mother Eunice Melton, driver David Cannon and part-time driver Nick Dison.

Typical day on the job:

I see after the day-to-day routines of the business, checking on work, answering phones, bidding work, dealing with clients if there are issues or problems. I still drive occasionally when we're behind or just need to fill in. I do whatever I need to do to make the day more productive for us.

The job I'll never forget:

When we started, we had a contract with the city of Hot Springs to pump their sludge. One day my wife was riding with me and the valve stuck on the truck. I didn't know any better and I took a hammer to open the valve and let's just say we got sprayed horrifically with the product. She decided she needed to go home and get a shower.

My favorite piece of equipment:

I like my secondary truck, the backup truck, because if you have an issue with the primary truck you can always go back to the shop and grab the other one and keep the clients happy. We bought our primary truck — the tank new, the truck used — a 2001 Mack with a 3,400-gallon steel tank and Masport pump. Our backup is a 1998 International with a 2,500-gallon steel tank and Jurop pump.

Most challenging site I've worked on:

There was a government-funded building where they had taken an old hotel and converted it to apartments for people needing rent support. It had been around since the late 1930s or early 1940s. We got a call one afternoon

>> From left are Nick Dison, David Cannon, Tonya Philips Melton, Eunice Melton and Darius Melton. Melton's 2001 Mack carries a 3,400-gallon steel tank and Masport pump.

that it had flooded. They had turned the water and sewer off but couldn't work in the basement to do the plumbing patches or whatever needed because the basement had flooded. We didn't know what we were up against. We called the city and got approval to dump at night. Then we got in there and got to pumping. We figured out, by watching the water level, that the floor was poured on a percentage of fall. We saw where the fall was going and that's where we set up our hoses. We worked all night. We got 90% of that water out of there. They did have a sewage line break so there was sewage in it. It was nasty. We had our rubber clothes on, boots, everything duct taped. When it happened again about three months later we were more prepared.

Oops, I wish I could take this one back:

We did a big commercial job and the customer wouldn't pay us. We're still battling with him in court. He felt like it was too much. I said, "You should have been there, is all I can tell you."

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

"How did that get in my septic tank?" One of the most unusual things — and we still don't know how it got in there — was a baseball. It was at a little residential store. The truck just quit pumping so we took the hose out and there it was.

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

Right now they don't require a monitoring meter on the trucks — how much product is put on and how much is taken off at the dump facilities. They just go by an estimated amount of what your tank is. I really think — to be on the beneficial side of everybody — there should be flow meters and you should pay off that and be able to charge from that.

Best piece of small business advice I've heard:

Treat your customers how you would want to be treated. And: When you're on the job, go that extra mile. Believe me, they'll tell their friends, their neighbors. We don't advertise and we stay extremely busy.

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

The only other thing I've had an interest in is farming. We have a big farm that's been in our family since 1904. It was homesteaded by my great uncle. We don't run cattle any longer, we just grow hay on it. But if there was a way to make a living with cattle, that would be great. It's just not feasible but that would be my dream job.

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

My outlook is kind of grim. This is not a glamorous business and it's one that you have to work hard and I'm afraid young people are not going to be interested. But there is money to be made at this. The thing I figured out very quickly is you can't rely solely on residential, you've also got to do commercial. And if you do commercial you've got to understand there are certain things you can and can't do. The inspectors and treatment plant guys here have been more than willing to help us with that. A lot of this is self-taught. You've just got to use common sense and move forward.

Ohio septic inspection program reaching more counties seven years into new rules

By David Steinkraus

Three counties on Ohio's eastern border are beginning to implement a state requirement that all onsite systems be pumped and inspected and have an operation and maintenance plan.

Mahoning County has until 2025 to bring properties into compliance with the law, reported WKBN of Youngstown, Ohio. Neighboring Trumbull and Columbiana counties are also working on their plans to comply with the state requirement, the station reported.

"It's not that we wanted to wait until the last minute, but we did want to hold back and let other counties take the lead on this. We wanted to see what worked well," said Colton Masters of Mahoning County Public Health, according to WKBN.

Mahoning County knows of about 17,000 onsite systems in the county, and most people with systems will be receiving letters telling them of the new requirement to pump and inspect systems within three years.

According to the Lake County Health Department, the 2015 state rules updated regulations that had been in place since 1977. Property owners must regularly renew their permits to operate onsite systems.

Michigan

A group of residents in Girard Township have an idea about how to spend money from the American Rescue Plan: help build them a community wastewater systems.

Like many governments in Branch County, Girard Township has not has not yet decided how to spend its ARP money, reported *The Daily Reporter* of Coldwater.

That's where the people at Neible's Landing come in. There are 34 homes on the north end of Craig Lake, and about half of the owners want to replace their individual onsite systems with a community system located in a cornfield. Terry Reen told the newspaper that farmers have agreed to sell land for the project, and putting the treatment system in the field, and away from the lakeshore, would help reduce water pollution.

"The farther we get away from the lake, the better off we're all going to be. Every house will have its own grinder pump," Reen told the newspaper.

Not all of the system would be paid for with ARP money.

Montana

Montana State University Extension has produced two new printed guides for well and onsite system owners. Adam Sigler, water quality associate specialist for the extension service, said many onsite system problems can be avoided with proper maintenance, according to the university news service.

The guide describes how systems operate and what records people should keep. Included in the onsite guide is also information about how often to have systems pumped and how to extend the life of a system.

To order copies of the guides, visit the extension service online at store.msuextension.org or call the MSU Extension Distribution Center at 406-994-3273.

Washington

Ten years of work after a major lawsuit have led to a cleaner Columbia River and improved onsite systems, said a report from the Public News Service in Boulder, Colorado.

The lawsuit against Clark County, which touches the river across from Portland, Oregon, resulted in a penalty of $3 million, one of the largest citizen-enforcement judgements in state history. The settlement followed a federal court ruling that the county had violated the law for three years. At issue was the county's weaker pollution rules for big box stores and subdivisions. And instead of going to Washington, D.C., penalty money was put in a fund for local salmon habitat restoration, said Jan Hasselman, a Seattle attorney for Earthjustice who worked on the case.

The Clark County Clean Water Restoration Fund paid for 25 projects, including one to repair and replace failing onsite systems.

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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.georgiaonsitewastewater.com;
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; 317-965-1859

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

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 ENGLAND
Yankee Onsite Wastewater Association;
(Massachusetts, Connecticut, Maine, New
Hampshire, Rhode Island and Vermont)
www.yankeeonsite.org; 781-939-5710

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

Granite State Onsite Wastewater 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

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

OKLAHOMA
Oklahoma Onsite Wastewater Association,
918-727-7113

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-SiteSewage 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; 978-496-1800

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

If you would like your wastewater trade association added to this list, send contact information to editor@onsiteinstaller.com

INDUSTRY NEWS

SJE's Julian Atchia joins Hydraulic Institute board


Julian Atchia

Julian Atchia, vice president of research and development for SJE was selected to serve as a Hydraulic Institute board member. He and two other new members began three-year terms at the Hydraulic Institute Annual Conference in Orlando, Florida, in March. Board members are responsible for maintaining the missions, goals and key strategies of the institute; ensuring adequate financial, staff and volunteer resources; and providing leadership support to key committees to accomplish Institute goals.

Infiltrator using DeltaMax technology for septic chambers

Infiltrator Water Technologies has adopted DeltaMax technology from Milliken & Company's chemical business. According to Miliken, Infiltrator is using DeltaMax Performance Modifier to optimize the quality and performance of recycled polypropylene used to injection-mold its Quick4 Series of septic chambers.

Large Scale and Commercial Treatment Systems

By Craig Mandli

ATUS

Clarus Environmental Fusion

Clarus Environmental's Fusion systems are drop-in wastewater treatment units designed for decentralized applications where effluent quality must meet or exceed secondary treatment standards. They are designed for residential, commercial and small community applications and are available in 450- to 4,000-gpd treatment capacities. All models up to 800 gpd are NSF/ANSI Standard 40 certified to produce effluent quality of 9 mg/L $CBOD_5$ and 9 mg/L TSS. The design enables installation without a pretreatment tank, making it suitable for sites with limited space. Effluent disposal options include conventional trenches, dosed systems, drip irrigation or disinfection with direct discharge. **800-928-7867; www.clarusenvironmental.com**

Eljen Geotextile Sand Filter

The GSF, or **Geotextile Sand Filter**, advanced wastewater treatment and dispersal system from Eljen is designed to provide treatment and dispersal in the same footprint, easy installations and minimal maintenance. This product is used for both commercial and residential applications. Utilizing a two-stage pretreatment process, the geotextile modules apply filtered septic tank effluent to the soil and increase the long-term acceptance rate. Open-air channels within the module support aerobic bacterial growth on the module's geotextile fabric, 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**

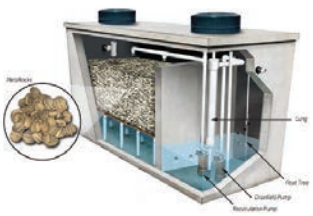
NextGen Septic technology

Treated water exiting **NextGen Septic** technology meets higher water quality standards than treated water leaving a typical centralized wastewater treatment plant. The system is suitable for sites traditionally requiring costly drainfield construction due to size restrictions and/or hilly, rocky, clay or sandy soil conditions. It is approved for surface discharge in Kentucky, and it uses a combination of anoxic treatment of the raw wastewater followed by aerobic degradation of the contaminants. An ultra-filtration membrane further treats the water before being disinfected using ozone. Treated water has less than 15 mg/L of BOD_5, less than 2 mg/L ammonia, less than 1 mg/L phosphorus and no TSS. Ozone decomposes to oxygen, which increases the dissolved oxygen level in the discharged water. This treated water can be used for irrigation or to resurrect a clogged leachfield. **513-673-3583; www.nextgenseptic.com**

COMMERCIAL TREATMENT SYSTEMS

Anua PuraACE

The **PuraACE** from **Anua** is a drop-in-tank reactor pod for treating high-strength waste from restaurants, convenience stores or other facilities. The pods can be added to residential or commercial treatment systems that are overloaded. Treatment occurs by a submerged aerated filter process to reduce BOD, COD and ammonia. Built-in passive alkalinity control regulates pH without chemical addition. The pod housing isolates aeration to keep the heavy solids from mixing. The open channel media prevents clogging while the airlift recirculation enhances retention time. Multiple pods can be utilized for larger flows and loads. **336-547-9338; www.anuainternational.com**



Eliminite Commercial C-Series

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

Jet Inc. Commercial Systems

Commercial Wastewater Treatment Extended Air plants and newer MBBR Plants from **Jet Inc**. are modular in design, can treat varying strengths and flows from 1,500 to 300,000 gpd, and allow for phase build-out. This makes it possible for convenience stores, motels, shopping centers and service stations to be constructed along interstate highways far from any town. Decentralized systems and subdivisions can be developed miles beyond sewer lines. Factories can be erected in rural areas. These systems can also be used for pretreatment before discharging into central systems to reduce overall system load. The plants, utilizing a variety of controls, treat wastewater through the aerobic digestion process that enables microscopic living organisms to transform wastewater into a clear, odorless liquid. Assistance with design, engineering and construction, as well as onsite 24/7 tech support, plant startup commissioning and operator training are available. **800-321-6960; www.jetincorp.com**

Orenco Systems AdvanTex AX-Max

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

SeptiTech STAAR filter systems

SeptiTech STAAR (Smart Trickling Anaerobic/Aerobic Recirculating) filter systems are designed for residential and commercial properties with minimal operator oversight, while delivering consistent treatment during peak, low or intermittent flows. Using an unsaturated, engineered textile media to treat wastewater that meets strict permit limits, the commercial filter system provides a simple, automatic equalization and clarification process for 500 to more than 150,000 gpd flows, according to the maker. The biological trickling filter technology also maintains low levels of Nitrate-N, with all below-grade components that fit in watertight concrete, plastic or fiberglass tanks. Smart technology allows the system to go into sleep mode to achieve lower operating costs and power requirements. Systems are ETV-EPA verified and NSF/ANSI Standard 40/245 certified. **800-753-3278; www.septitech.com**

CONTROL PANELS

SJE Rhombus Installer Friendly Series (IFS)

Installer Friendly Series (IFS) single phase panels from **SJE Rhombus** have been redesigned to feature an easy-to-use color LCD on the inner door for programming and system monitoring. Use the menu navigation to select Pump Hand/Off/Auto mode, convert between demand or timed dose operation, adjust pump activation levels, and switch between traditional floats or the C-Level sensor for continuous level monitoring, all while in the field. Users can also check the Tank Level Indication and setpoint monitoring at-a-glance. The simplex panel controls one 120/208/240V single phase and the duplex controls two 120/208/240V single phase pumps. Both models are housed in lockable 12-by-10-by-6-inch NEMA 4X enclosures, made with ultraviolet-stabilized thermoplastic. This product is UL/cUL listed. **888-342-5753; www.sjerhombus.com**

SPI 50B019-120-240DD

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

NITROGEN-REDUCTION SYSTEM

BioMicrobics HighStrengthFAST

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

PUMPS

Crane Pumps & Systems Barnes Razor

The **Barnes Razor** grinder pump from **Crane Pumps & Systems** is a suitable 2 hp pump for light commercial and residential solids-handling applications. It is designed with axial cutting technology to efficiently reduce solids like flushable wipes, diapers and other nonbiodegradable items. Maintenance is easy and convenient with only a single tool needed for disassembly. The plug-and-play cord also provides easy servicing without requiring removal of epoxy in the conduit. Unlike non-clog pumps with large discharge sizes, its 1.25-inch discharge is suitable for preconfigured packaged systems and turnkey solutions. It is available in the Barnes EcoTRAN Pressure Sewer System, allowing superior waste grinding in tough terrain. It provides a practical and environmentally safe alternative to traditional gravity systems, according to the maker. Numerous configuration options are available. **937-778-8947; www.cranepumps.com**

Franklin Electric FPS NCX Series

The **NCX Series** of explosion-proof submersible nonclog pumps from **FPS, a brand of Franklin Electric**, are certified for use in Class 1, Division 1 and Group C and D hazardous location requirements for municipal markets as well as any commercial or industrial application that requires an explosion-proof rating. The pumps are available in single- and three-phase power options to accommodate flows up to 625 gpm. Each unit is designed for serviceability and reliability with features including a field-adjustable wear plate, factory-standard dual-silicon carbide mechanical seals and chemical-resistant components. **866-271-2859; www.franklinengineered.com**

Hiblow USA HP-80

Hiblow USA is bringing back the safety screw to all HP Series air pumps, including the HP-80. In 2016, the safety switch mechanism — which cuts power to the pump when the diaphragms eventually rupture — was changed from a screw type to a slide switch type. The goal was to make rebuilds more efficient for service providers in the field. Over the past couple of years, the company received negative feedback from some and, after careful consideration and weighing the benefits of each option, Hiblow decided to revert to the screw type safety switch for all HP Series pumps. **734-944-5032; www.hiblow-usa.com**

Liberty Pumps ProVore

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

Polylok PL-CPE4A

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

Vertiflo Pump Company Series 1600

Vertiflo Pump Company's Series 1600 horizontal close-coupled, vortex end-suction pumps have a wide range of applications including food processing solids, wastewater treatment, pollution control, slurries and solids. They have capacities to 1,600 gpm, heads to 170 feet TDH, and operate at temperatures up to 250 degrees F. These pumps are designed with a variety of constructions such as cast iron, 316 stainless steel fitted, all 316 stainless steel, alloy 20 or CD4MCu. They are designed with a convenient back pull-out cost-saving feature to allow for easy inspection or maintenance without disturbing the piping to the pump. The impeller has a fully recessed design, which accommodates passage of solids. All impellers have wiping vanes, which reduce axial loading and prevent dirt from entering the sealing area. The impeller is keyed to the shaft and an impeller locking screw assures positive attachment. **513-530-0888; www.vertiflopump.com**

WASTEWATER REUSE SYSTEM

Norweco Singulair Green R3

The **Singulair Green R3** water reuse system from **Norweco** reduces water consumption, reuses treated effluent and recycles water to conserve and recharge water resources. It provides a solution to chronic water shortages and reduces energy costs associated with water and wastewater treatment. The system quietly, efficiently and automatically treats all incoming wastewater to the highest level for restricted indoor and unrestricted outdoor use, according to the maker. The system exceeds the effluent requirements of NSF/ANSI Standards 40, 245 and 350. It qualifies for green building credits under both the LEED rating system and the NAHB ICC 700 National Green Building Standard. **800-667-9326; www.norweco.com**

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Large Scale and Commercial Treatment Systems

By Craig Mandli

ATU solves challenges for small southern town

Problem: Septic systems in Section, Alabama, did not meet current requirements. The town needed a wastewater treatment system to process the domestic waste produced by 700 residents and its commercial entities.

Solution: System designers recommended a 30,000 gpd **ECOPOD** system from **Delta Treatment Systems** that treats domestic waste at a strength of 300 mg/L for both BOD and TSS. The system disposes of wastewater quietly, efficiently, with no odor, and has no inner tank filters, screens or diffusers to service. The sectioned system design handles an average daily flow fluctuation of 50 to 100%. The units were completed and shipped directly to the site ready for installation, including all required component equipment. A 14,200-gallon flow equalization tank was installed prior to the treatment reactor tanks to store the wastewater and evenly dose it to the treatment system throughout a 24-hour period. The flow equalization tank includes duplex pumps to ensure flow surges don't reduce the efficiency of the treatment system. A 19,190-gallon primary tank is before the flow equalization tank. The effluent also passes through a UV system for disinfection of fecal coliform to concentrations below permit levels. A drip disposal system includes an effluent pump chamber, headworks, tubing, controls, and all necessary valves and fittings. A concrete building houses electrical controls and equipment.

Result: The system is operating as designed and requires minimal operation and periodic professional maintenance. **800-219-9183; www.deltatreatment.com**

Treatment units help historic lodge meet nitrogen limits

Problem: The iconic Surf Lodge, located at the easternmost tip of Long Island in the heart of Montauk, New York, needed a new onsite wastewater system. Situated directly on Fort Pond, the town and the county had enough of the antiquated system leaking sewage directly into the waterway. Not only did the sanitary system need to be upgraded, it needed to meet Suffolk County program requirements of 19 mg/L of TN for the wastewater effluent.

Solution: Advanced Wastewater Solutions Long Island supplied the split system utilizing **Fuji Clean USA CEN21** treatment units, designed to satisfy the TN reduction program. The first system consists of three CEN21 units being fed by a new precast distribution manhole concentrating solely on the hotel side of the property and its residential waste stream. The second system consists of four CEN21 units preceded by a new grease interceptor and primary treatment tanks, to treat the higher strength flows discharged from the restaurant, bar and outdoor venue.

Result: The units are producing results consistently within the county's program limits of 19 mg/L of TN. With more consistent flows and loading last summer, results have been steadily closer to 10 mg/L of TN and are holding there. **207-406-2927; www.fujicleanusa.com**

Disinfection needs solved at oceanfront restaurant

Problem: The Duke's Malibu restaurant is located on the oceanfront in Malibu, California. Wastewater from the restaurant averages 6,000 gpd and must be treated on site and directly discharged to the sensitive, sandy beach environment. An existing system was outdated and caused numerous water-quality and discharge violations.

Solution: Carlile Macy was selected to provide an upgraded treatment system in 2011. It chose an upflow sludge blanket filtration system, or USBF, and **SALCOR** UV disinfection, consisting of four **3G** units in two parallel tracks. The design was approved by the California Regional Water Quality Control Board and city of Malibu, and construction of the new plant was completed in April 2012.

Result: The system immediately produced high-quality effluent, which met the stringent disinfection requirement of California Title 22. Results have been consistent since operation began. Effluent total coliform count has been nondetectable, and the dissolved oxygen concentration has averaged 6 mg/L. The discharge has reduced coliform levels in the groundwater lens under the site and adjacent beach from more than 1,600 MPN to less than 2 MPN. The UV units were initially inspected weekly for possible fouling of the Teflon barrier. Since no fouling has occurred, the inspections have been eliminated. **760-731-0745; www.salcor.world**

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PRODUCT SPOTLIGHT

EZflow system aims at improving drainfield infiltration performance

By Tim Dobbins

Infiltrator Water Technologies set a goal to make septic installations fast and easy by providing a lightweight alternative to stone and pipe drainfields.

The result of their effort is the EZflow septic system, which uses a geosynthetic aggregate modular design to provide an environmentally friendly option for septic drainfields. The aggregate is manufactured to provide void space and structure, maintaining a subsurface opening for proper drainage and dispersal of wastewater.

"EZflow systems are designed to improve infiltration performance by eliminating the fines and reducing compaction and embedment," says Jim Bransfield, marketing director for Infiltrator Water Technologies. "The lightweight expanded polystyrene construction offers structural integrity and resists compaction."

EZflow system are constructed from recycled materials, eliminating the need for natural stone. According to the manufacturer, this makes tidying up job sites and overall project completion quicker. The system is well-suited for many septic and drainage applications, and according to Bransfield it excels in shallow applications, septic system repairs, tight or confined lots, sloping sites and areas with unique local codes and regulations.

"The modular design makes it highly adaptable, and the product's flexibility allows the installer to follow difficult contours and navigate around structure and limiting factors," he says. "Designers often look to EZflow to solve issues with difficult sites."

The manufacturer also says these systems are requested for commercial and community or cluster systems. They can also be used with aerobic treatment units and in serial distribution, at-grade and pressure distribution systems. EZflow systems come in multiple bundle configurations including single, horizontal, vertical and triangle bundles.

Installers can choose from preassembled units that include a 3- or 4-inch perforated pipe surrounded by aggregate and held in place with a durable high-strength netting. A geotextile mesh inside the netting keeps soils from entering the bundles. They come in 5- or 10-foot lengths, and in diameters of 7, 8, 9, 10, 12, 13 or 14 inches with an 18-inch option available in select market areas. According to the manufacturer, all sizes are easy to contour and shape for any install.

"Installers report that EZflow is easy to install, saving time and money," Bransfield says. "The similarity to stone and pipe means there is little to no learning curve." **800-221-4436; www.infiltratorwater.com**

ASV Holdings ASV-branded attachments

ASV Holdings introduces a line of branded attachments for ASV machines. They include a full range of buckets, pallet forks, grapples and brush mowers, with each attachment type available for every machine in ASV's lineup. Contractors work with an ASV dealer as a single point of contact for a comprehensive package of ASV equipment and attachments. **800-205-9913; www.asvllc.com**

Yanmar Compact Equipment wheel loaders

Yanmar Compact Equipment's compact wheel loaders include comfort features across the line, including a spacious cab and dual doors for easy entry from each side. The machines provide a combination of power, comfort and compactness for applications that require fast travel speeds, high lift capacity and a small turning radius. The lineup includes the V4-7, V8, V10 and V12. Operating weights for the line range from 8,422 to 15,432 pounds. The loaders feature bucket capacities of .65 cubic yards to 2.35 cubic yards and lift capacities of 7,451 to 15,962 pound-force. Fast travel speeds improve job site productivity, ranging from 11.8 to 22 mph. Hydraulic quick couplers allow for fast and easy changing of attachments. **800-205-9913; www.yanmar.com/us**

Komatsu Machine Control 2.0 technology

As part of Komatsu's suite of Smart Construction products, services and digital solutions, the company's intelligent Machine Control 2.0 (iMC 2.0) gives contractors productivity-enhancing automation. Built on Komatsu's intelligent machine control platform, iMC 2.0 offers additional new features on the company's mid-to-large-size construction excavators: the PC290LCi-11, PC360LCi-11 and the PC390LCi-11. With integrated machine control, auto tilt bucket control aligns the bucket parallel with the slope so finish grading can be accomplished without needing to align the machine with the target surface. The new bucket angle hold control automatically holds the bucket angle to the design surface during arm operation, enabling operators to perform finish grading using only arm input. **847-437-5800; www.komatsuamerica.com**

Tight Timeline and Job Site No Match for Precast Concrete

Photos courtesy of Jensen Precast

Challenge: An event venue near Lake Tahoe needed to upgrade its gravity grease interceptor system to meet increasing demands. The project team was up against a condensed timeline and several site restrictions due to the location of the previous system.

Solution: The new system featured a durable precast concrete tank and was designed to accommodate existing on-site fixtures. The entire project was completed in just three weeks thanks to precast's local availability and quick, no-hassle installation.

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Polylok 24” Rhino (10 Hole) Distribution Box

The Polylok 24" Rhino Box makes even the toughest applications a breeze with its strength and versatility. The Rhino Box has ten potential openings making it great for any drain field application. Polylok’s 24” stackable riser system can be used to easily bring the Rhino Box to grade. The Rhino Box will accept 2”, 3”, 4” & 6” pipe.

40+ YEARS OF INNOVATION & DEPENDABILITY

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