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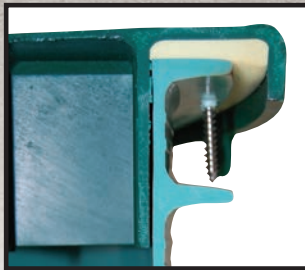
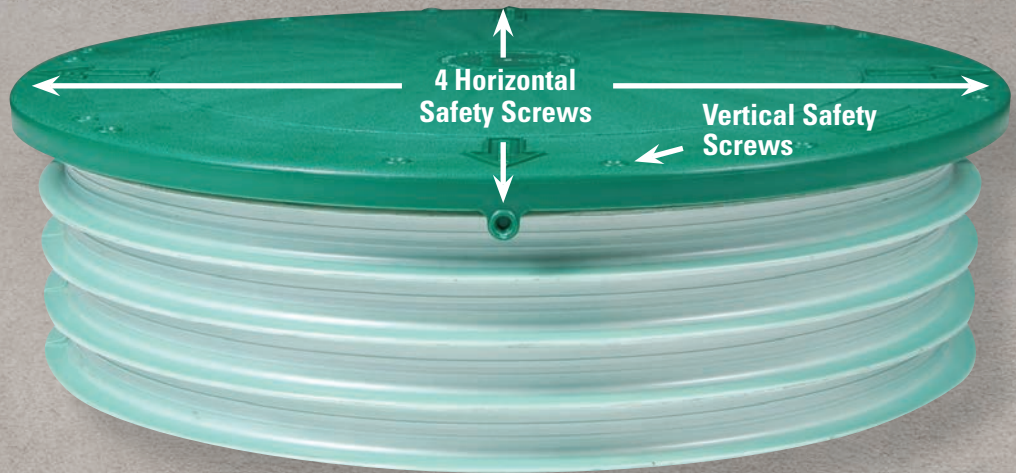
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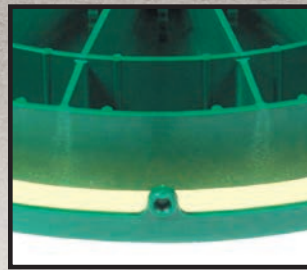
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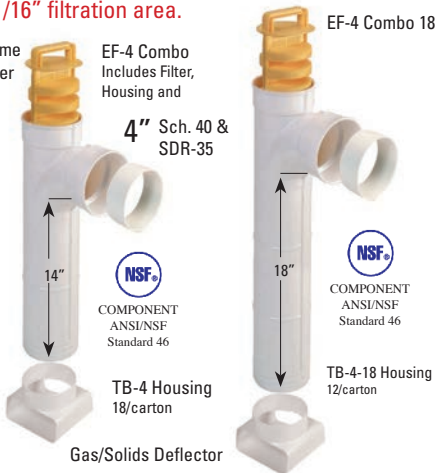


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Send to Editor, *Onsite Installer*, P.O. Box 220, Three Lakes, WI, 54562 or email [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).

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

# Is It Time to Hire a New Crew?

All signs point to blue skies for the onsite industry. Are you prepared to meet a growing demand for your services?

By Jim Kneiszel



I'm an unabashed optimist when it comes to the onsite wastewater industry. Looking at the world around me, I see nothing but an upside for the community of hardworking septic system installers. Allow me to explain why.

Between 25 and 30 percent of North Americans utilize onsite systems to treat their residential wastewater, and I believe that percentage will be on the rise as developers move further beyond the urban centers and existing municipal treatment plants that are aging and testing their capacities. The Big Pipe is expensive to maintain and expand its coverage, and building new large-scale public facilities will be a tough sell as governments rebuild other crumbling infrastructure.

Speaking of crumbling infrastructure, millions of septic systems across the U.S. and Canada are aging out. They've usually outlived their predicted life span — many still functioning after 30, 40 and 50 years. They've served their purpose well, but concerns over pollution and tainted ground and surface waters are forcing governments to monitor these systems more closely and mandate replacements.

## REGULATIONS HELP

And more and more public health officials are moving to meet the fiscal challenges associated with requiring onsite system upgrades. Many state and local governments are starting to offer grants and no- or low-interest loans for repairing or replacing failing systems. This is partly a result of lobbying by the National Onsite Wastewater Recycling Association to direct tax dollars to the millions of homeowners who rely on decentralized wastewater treatment. NOWRA and the National Association of Wastewater Technicians have argued that fairness requires a small percentage of public dollars spent on wastewater treatment go to private systems.

In response to a great need, our industry engineers and manufacturers are constantly launching systems that treat wastewater better, offer improved reliability and require a smaller footprint. These systems help meet the demand for more housing and commercial development on lots that were previously considered substandard, and to meet greater population densities favored by urban planners.

All of these factors — and an improving economy — are indicators that you are well positioned to grow your installing business. And the past few years have only hinted at the great things to come.

The 2016 construction season has tested the limits of installers, some of whom report being busier than ever. If the weather allowed, installers I've talked to fired up the excavators earlier than usual last spring and plan to work as late as possible before the ground freezes in the north. Summer days were long, crews were tired and meanwhile the phone has kept ringing. And with stricter regulations nationwide and that aging infrastructure, there's no reason to believe things will slow down in 2017.

## TIME TO STRATEGIZE

So with the busy season winding down for most, what should you be doing to better take part in this industry upturn? How about planning to add crew members to take on more installing jobs or to fill a need for maintenance or inspection work? And that leads to another challenge: finding quality workers and training them for rewarding careers.

Here are a few ways to start the search for good men and women:

Network, network, network

Networking can take on a myriad of forms, from the simple to the sophisticated. Start at home by asking your best employees if they have friends looking for a quality work opportunity. Offer your employees a bonus if someone they suggest for a job is hired and becomes a positive contributor to your company.

Approach the local high school or technical college and partner with instructors to offer paid work experiences to students who show an interest in the trades. Be patient and willing to nurture young people who may develop into the next generation of leaders in the onsite industry.

Use social media and other contacts — such as your local Chamber of Commerce — to promote a job fair day at your business this winter. Offer refreshments and a personal tour of your facility, providing a hands-on look at the equipment you use. Introduce your current staff to potential employees and let them sell newcomers on the great things the industry has to offer.

**The concept of "employee ownership" on any level might be a bit scary, but there are creative ways to reward workers for helping you build the business.**



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**Offer better incentives**

Perhaps it's time to review what you offer employees in wages and benefits to attract high-caliber applicants. And upping your game on the human resources front may provide another benefit: better employee retention, keeping your best employees around longer and developing them into management material.

Look at what you pay your crews on average. How does it stack up against what workers make doing similar jobs in your community? There's nothing wrong with overpaying a little as long as you can afford to do so. Better wages will bring better employees, and workers who perform at a higher level will translate to a better end result and happier customers.

Consider offering some sort of profit sharing or ownership for workers who've made great long-term contributions or who have special skills you need to grow the business. Talk to your accountant or financial adviser to get direction on possible ways to let employees share in the success of the company. The concept of "employee ownership" on any level might be a bit scary, but there are creative ways to reward workers for helping you build the business.

Younger workers, the millennials, have different priorities in a job than baby boomers or Generation X. While older workers are used to rising early and working until sundown and might want as much overtime pay as possible, younger workers can value things like flexible scheduling or a 40-hour workweek to accommodate their lifestyle. And as health insurance continues to rise in cost, workers may be impressed if you are willing to help them pay for it.

**MOVING FORWARD**

I'm convinced that blue skies are ahead for the onsite industry. And with the 2016 busy season behind you, the next few months will be a great time to contemplate how your company can take advantage of a sunny forecast. If you have business-building ideas to share with the rest of us, please feel free to let me know about them. Send me a note at editor@onsiteinstaller.com and I can include your tips in the magazine.



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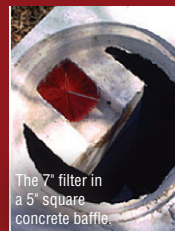


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## SYSTEM MAINTENANCE

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## GET PAID End Collection Woes

If you ever end up spending more time and effort trying to get paid than you did installing the septic system, you need to revamp your billing technique – starting with spelling out payment terms before you even begin the work. This article spells out a plan to make sure you always get what is owed to you. [onsiteinstaller.com/featured](http://onsiteinstaller.com/featured)



## FAILURE PREVENTION

### Assessing Solids Accumulation

Solids are the enemy of a septic tank, but unfortunately many tanks are not regularly assessed for accumulation. What do you do if you are monitoring a system and something makes you scratch your head? Our expert outlines steps to determine whether a system needs a shorter pumpout interval in order to deal with solids accumulation. [onsiteinstaller.com/featured](http://onsiteinstaller.com/featured)



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# BIG TICKETS

Topanga Underground tackles onsite systems in and around Malibu, California, that involve major site challenges — and carry price tags to match

By Ted J. Rulseh | Photos by Collin Chappelle

What Richard Sherman considers a routine onsite system project would be well outside the mainstream for most installers.

That's because Sherman and his company work in Malibu and other California communities west of Los Angeles, where cramped lots, hilly terrain, beachfront homes and strict regulations make almost every installation a challenge.

Onsite systems using aerobic treatment units, with seepage pits instead of traditional drainfields, are the norm. Replacement systems routinely cost \$100,000 and more. Sherman and his 15-member team tackle those challenges daily, while also inspecting onsite systems, installing water mains, setting fire hydrants, and handling multiple other tasks.


"I've been working around here since 1969, so I get calls for almost anything," says Sherman, still going strong at age 79. "I don't need to do any advertising. People know we're here six days a week. We look at 400 to 500 jobs a year. We do probably 75 percent of them." It adds up to a business that generates \$2 million to \$2.5 million in revenue per year.

## BORN OF NECESSITY

Sherman began his career working in the machine shop for Rocketdyne, a rocket engine design and production company based in California. He eventually became an expeditor on the factory manager's staff. "I got laid off in the late 1960s and went to work for a grading company in Topanga, where

### Topanga Underground

Canoga Park, California



<b>FOUNDED:</b>	1969
<b>OWNER:</b>	Richard "Dick" Sherman
<b>EMPLOYEES:</b>	15
<b>BUSINESS MIX:</b>	50 percent onsite systems, 50 percent water system installation and miscellaneous projects
<b>SERVICE AREA:</b>	Mainly Malibu, Calabasas and Topanga in the Santa Monica Mountains area
<b>SPECIALTY:</b>	Advanced onsite installations on challenging properties
<b>WEBSITE:</b>	<a href="http://www.topangaunderground.com">www.topangaunderground.com</a>

I lived," he says. "I've been there ever since."

The company was then called Topanga Unlimited. "In those days, my promise was that I'd do anything you wanted done," Sherman says. "If I didn't know how to do it, I'd go to the library and get a book and come back and do the job tomorrow."

In the early 1990s, a housing developer offered to hire Sherman to

<<**OPPOSITE PAGE:** The Topanga Underground team includes, from left, Manny Ibarra, Jose Merlos, Carol Montes, Richard Sherman, Jose Umaña, Hilario Saravia and Carlos Cardenas.

>>**RIGHT:** Topanga Underground foreman Jose Umaña uses a Caterpillar backhoe to replace an existing trench on a 30-year-old septic system serving a home and guest house in Malibu, California.

install the water mains for housing projects if he would get his contractor license. So, Sherman studied for and acquired a Class A General Engineering license. Since then he has installed “a couple hundred” water mains, primarily in his home territory of Malibu, Topanga and Calabasas.

Before the 1990s, Sherman seldom built septic systems. That changed in 1991 when Malibu incorporated as a city, largely to avoid installing sanitary sewers. Los Angeles County wanted to force Malibu to sewer a 4-mile stretch of the Pacific Coast Highway from the Los Angeles city limits to Malibu’s civic center at a cost of about \$50 million. Malibu wanted to stay on septic systems mainly to avoid the explosive growth sewers would bring.

### ATUS INTRODUCED

“It would have turned downtown Malibu into Miami Beach,” says Sherman. “The political leaders in Malibu realized that with sewers there would be no way to restrict building in the civic center. The Pacific Coast Highway is the only road in and out, and it was already a nightmare in the summertime.”

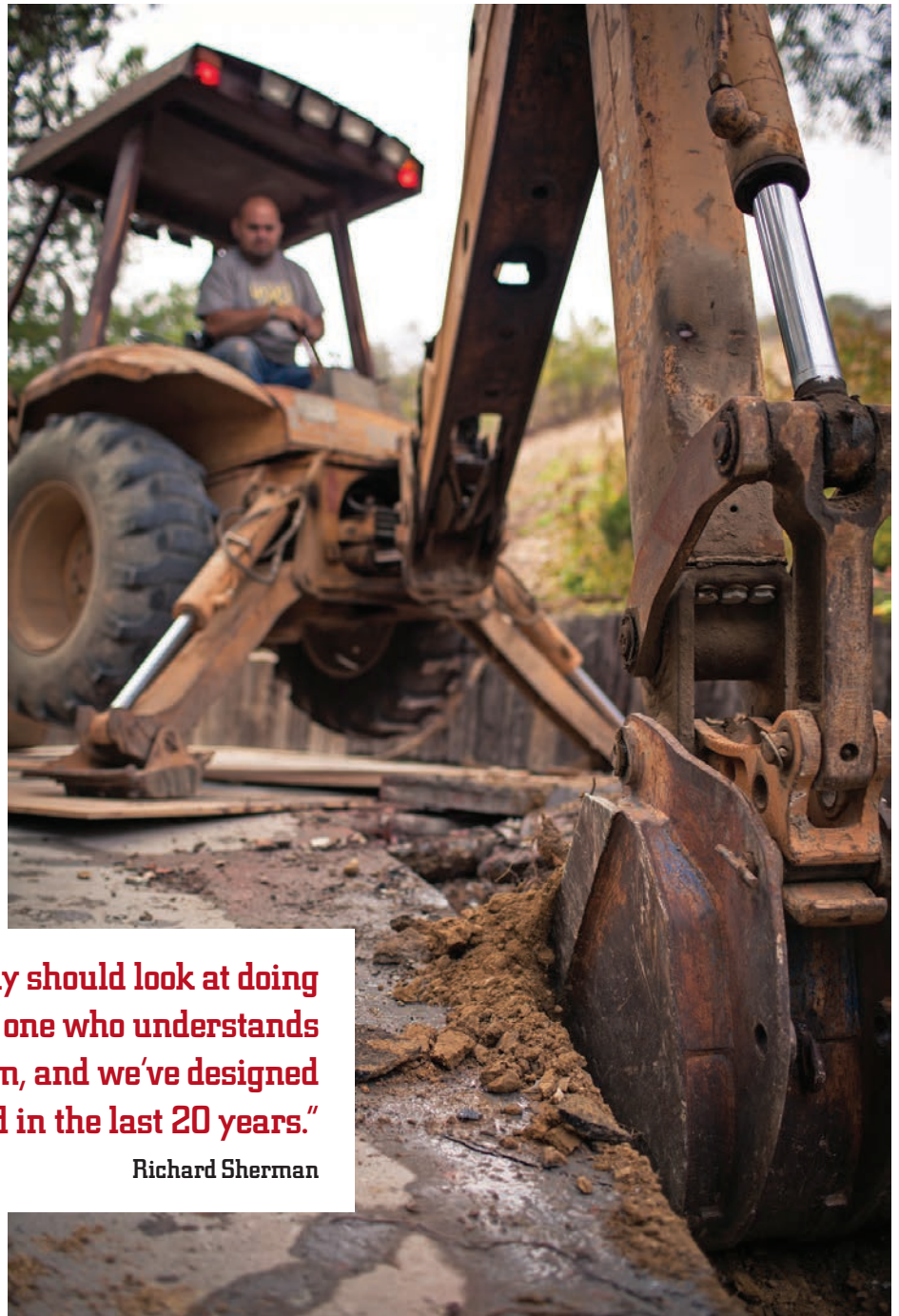
**“Malibu came to me and said, ‘You really should look at doing more septic systems, because you’re the one who understands this stuff.’ So we started designing them, and we’ve designed and built a couple hundred in the last 20 years.”**

**Richard Sherman**

The county allowed Malibu to become a city while reserving the right to install sewers if the city failed to clean up its septic systems after 10 years; those systems had been polluting the beach. Environmental groups including Heal the Bay and Santa Monica Baykeeper, along with the Los Angeles Regional Water Quality Control Board, also pressured Malibu into acting.

The city’s newly hired environmental health specialist began introducing ATUs in the city and asked Sherman to get involved with the onsite system improvements, based on his reputation and background. “ATUs have computers, gauges, floats, pumps and controls. Malibu came to me and said, ‘You really should look at doing more septic systems, because you’re the one who understands this stuff.’ So we started designing them, and we’ve designed and built a couple hundred in the last 20 years,” Sherman explains.

Over the years, Topanga Underground has installed ATUs from Jet, Presby Environmental (Advanced Enviro-Septic units), Scienco/FAST - a division of Bio-Microbics systems, and MicroSepTec. Today its treatment systems of choice are AdvanTex systems from Orenco and its local distributor, BioSolutions.



### PROTECTING THE OCEAN

Advanced treatment is essential in Topanga’s area mainly because of proximity to the ocean. “The bulk of Malibu is on the beach,” Sherman says. “The beach properties all had leachfields under the houses. In the 1970s and 1980s, if somebody on the beach called about a failed leachfield, we would pump the septic tank and let the field dry out, then send a crew under the house to shovel the old leachfield over the bulkhead and let the tide take it away. Then we would spread gravel under the house to build a new leachfield in the same spot.”

That, of course, is now unacceptable. Solutions for failed systems, and designs for new ones, are complex and costly. Reliance on soil treatment is locally allowed only where room exists for a drainfield. Otherwise, the septic tank effluent must be pretreated. “Most ATUs put out what looks like tap water,” says Sherman. “In Malibu you have to disinfect it if you’re going to discharge to a pit.”

# CADILLAC RANCH

You could say Richard Sherman has a soft spot for older cars — and trucks. His favorite ride is a 1970 white Cadillac Coupe DeVille, restored inside and out with a lot of help from a local body shop.

"I bought the car wrecked in 1978," says Sherman, owner of Topanga Underground. "It belonged to a friend of mine. A drunk hit it and tore up the rear fender on the driver's side. He parked it and didn't drive it.

"He passed away and his kids didn't want the car. They left it parked out in the backyard. I bought it one day for \$800. My pipeline welder and I went to the local junkyard, found another 1970 DeVille, and cut it in half with a torch. We picked up the back half with a forklift and put it on a flatbed.

"Then we took that and my car to a body shop and said, 'Here, fix this.' They chopped up the other car and spliced it into mine. You can't find where they put it together unless you look inside the trunk. About 10 years ago I redid the interior and had it painted. I just put in a new stock car motor that's about 500 hp." He drives the Caddy mainly for special occasions.

Sherman also has a penchant for old Ford trucks. The newest one in his fleet is a 1992 F-450 with a utility bed. "I'm up to Ford truck number 34," says Sherman. "All my trucks are lime green. Everybody in town knows us by those trucks."

His main ride? A restored 1987 Ford Bronco that he bought at a scrapyard for \$250.



Richard Sherman and his wife, Lyn Sherman, are shown in their Canoga Park, California, shop.

To illustrate the challenge of building systems, Sherman described a vacant lot where the owner planned to build a three-bedroom house. The site required a seepage pit because it sloped steeply and lacked horizontal space for a drainfield.

Topanga rented a LoDril excavator-mounted drill unit because there was no room to move an actual drill rig onto the site. That unit drilled a 2-foot-diameter test hole; a geologist lowered on a cable logged the soil conditions and determined the groundwater level. Then two more holes were drilled, which the geologist also logged.

"We covered the holes with plywood and soil," says Sherman. "After five days, we came back and took the dirt and plywood off. The geologist verified the groundwater level. We then sent a crew to backfill all the holes to 10 feet above where we found the groundwater. Then we put a 2-foot-thick bentonite cap on top of the backfill and ran a three-day perc test.

"We hired a water truck because there was no water on site. At that point the bill was nearly \$20,000, and we hadn't done anything yet except prove that the site would perc. Now we've got to draw a set of plans and install the system."

The design included a fiberglass septic tank (Xerxes) and a 600 gpd MicroSepTec ATU at the bottom of the lot. A duplex pump station lifted the effluent to the seepage pit, drilled out to 6 feet in diameter and lined with

5-foot-inside-diameter concrete piping. The total system cost was nearly \$60,000 — and that was a simple system by local standards.

## TOUGHEST CHALLENGE

On the other end of the scale was a system for the Inn of the Seventh Ray restaurant, less than 50 feet from Topanga Creek. Originally a church, the building was converted to a gas station and service garage. In the mid-1970s a couple bought it and made it into a 50-seat restaurant serving natural foods. Sherman and his team built the original 2,500 gpd onsite system for the restaurant with a drainfield on what had been the service station's tow yard.

Since then, the restaurant has grown to seat 120 and Topanga Underground has rebuilt the onsite system five times. The most recent rebuild, two years ago, includes a 15,000-gallon grease trap, a 25,000-gallon fiberglass septic tank (Xerxes), and an 8,000-gallon tank split in half as a recirculation tank and a storage tank for effluent to be pumped to the drainfield. The heart of the system consists of three AdvanTex AX-100 units.

"Because of proximity to the creek, we had to build concrete containment structures so that if the systems leaked, they would leak back to the tanks," says Sherman. "In case the water should rise, the systems are protected from the creek knocking them down. It's probably the most elaborate system we've ever done." At the cost of a mere \$550,000.

## SKILLED HELP

Sherman does all the good work with team members who have been with him for years, more than 30 in some cases. Joseph Meisinger is project manager and an architect by education. David Rios is the AutoCAD designer of water mains, septic systems and other facilities. Bookkeeper Carol Montes is assisted by Sherman's wife, Lyn.

The field team includes Manny Ibarra, field superintendent; Jose Machuca, Jose Umaña, Julio Reyes and Carlos Cardenas, foremen; Jose Merlos, mechanic; and Luis Sura, Hilario Saravia, Oscar Castro, Jose Martinez and Juan Redondo, laborers.

Rather than keep a huge fleet, the company rents equipment regularly — skid-steers, excavators, even asphalt rollers where a job involves breaking and then patching pavement. The company's main fleet equipment includes:

- Case and Caterpillar backhoes
- Two Swinger skip loaders
- One Smith compressor
- Seven Ford pickups, utility and flatbed
- One bobtail Ford dump truck

When not dealing with difficult onsite systems, Sherman and his team can be found performing presale inspections of systems in Malibu or handling renewals for system operating permits. Sherman also does consulting on projects such as water system designs for commercial facilities. In addition, he consults with prospective lot buyers, spelling out  
*(continued)*

**"Most ATUs put out what looks like tap water. In Malibu you have to disinfect it if you're going to discharge to a pit."**

**Richard Sherman**

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Jose Umaña works the controls of a Caterpillar backhoe during a septic system updating project in Malibu, California.



**“People call and say, ‘The sewage is running down my driveway — what should I do?’ If need be, we’ll have a crew there in an hour.”**

**Richard Sherman**

the steps they must take to decide to what extent a property is buildable.

Topanga doesn’t maintain the systems it installs. “At my age, I don’t need a phone call at 10 o’clock at night telling me the septic system alarm just went off,” Sherman says. That’s not to say the company is allergic to emergencies.

“Basically, this is an emergency room half the time,” Sherman says. The company has earned a name for being responsive. Once, the city of Malibu called to report that Cal-Trans drilling

test holes on the Pacific Coast Highway had drilled through a 4-inch sewer force main.

“I called my superintendent on his cellphone. He found a crew working at a shopping center and yanked them off that job. They ran down to the site, dug the main up and patched it together. We do a lot of that kind of thing. People call and say, ‘The sewage is running down my driveway — what should I do?’ If need be, we’ll have a crew there in an hour.”

### WHAT RETIREMENT?

What keeps Sherman going after all these years? “I take after my father,” he says. Hoyt Leon Sherman was a renowned painter and fine arts professor at The Ohio State University. “He worked until one day he was waiting for mom to drive him to school and had a stroke at age 80,” his son says.

Out in California, Richard Sherman practices his own brand of artistry.



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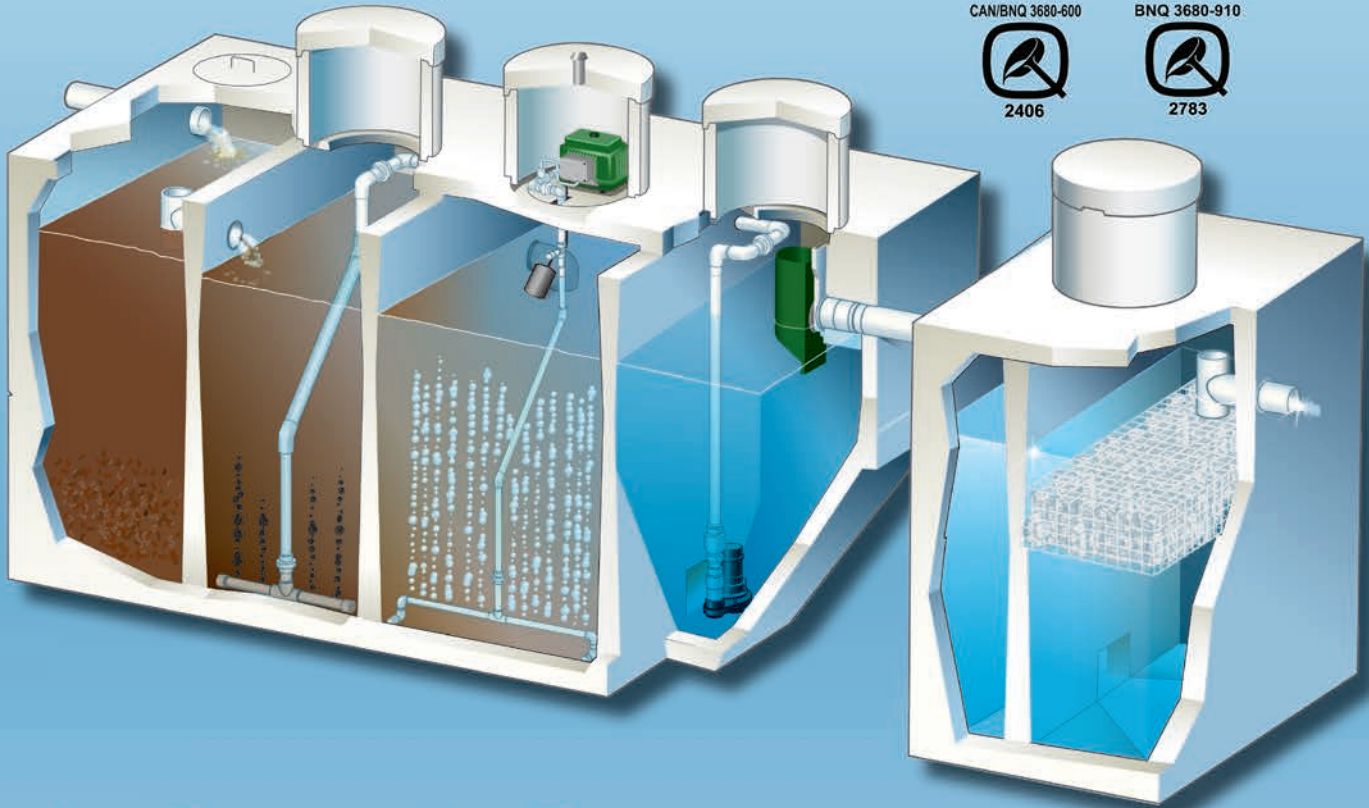
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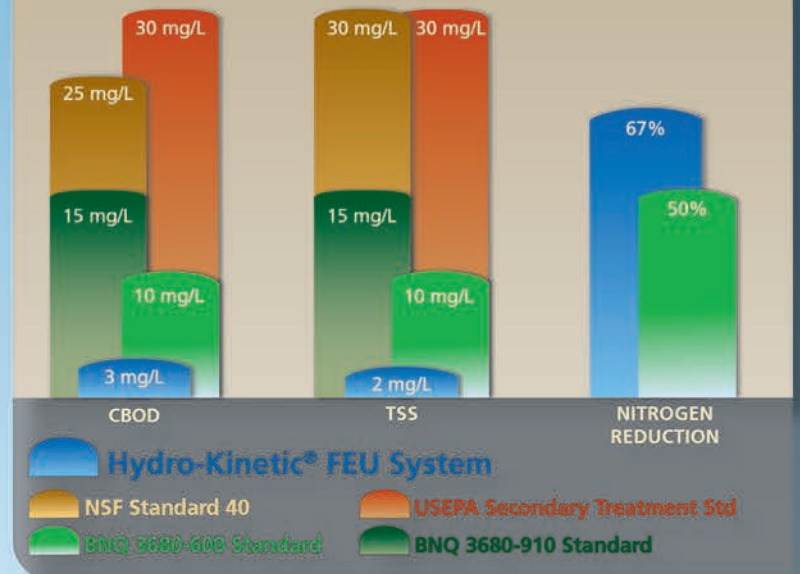
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# Avoid the Service Nightmare of Frozen Pipes

Try these pipe insulation tactics to make sure irate cold-climate customers aren't calling you to thaw out their onsite systems in the dead of winter

By Jim Anderson and David Gustafson

Last winter we were involved in online discussions about freezing pipes and insulation. We stressed that the best way to avoid freezing problems is to bed and slope piping to ensure that air is the only thing left in the pipes between water usage events. However, we recognize — and it was pointed out to us — that in some situations in our northern climate it's necessary to insulate the pipes to prevent freezing.

Some situations that call for insulation come to mind:

- A shallow house sewer line to a septic tank passing under a sidewalk or path that is kept open for the winter
- Sewer lines between multiple sewage tanks, such as septic tanks in series or septic tank to pump tank or media filter
- Where the supply line runs from a septic tank under a driveway or other areas where topography or soils limit the depth the pipe can be buried
- Sewer connections coming out of mobile homes (How often do you have to crawl under a mobile home to thaw the pipes?)

We regularly discuss three ways to insulate piping in these situations:

- Sleeve the pipe in a larger pipe to create insulating air space
- Use polystyrene sheets over the top of the pipe
- Use pre-insulated pipe with urethane foam surrounding the pipe and encased in a polyethylene sleeve

## EXPLORE YOUR OPTIONS

Our preferred method is using pre-insulated pipe, which may be a bit more expensive but is worth the investment. This is based not only on our experience in Minnesota, but also when we have troubleshoot systems in various areas. We have found the sleeve technique lacking in areas of extreme and prolonged cold like northern Minnesota. So while it may be effective in areas to the south or out west, not so much where we live. Also, when insulation sheets are used, we often see the mistake of choosing a material not rated for soil burial.

During the discussion, colleagues from Wisconsin, Colorado and other states provided very good information. While everyone agreed that pre-insulated pipe was probably the best choice, it's not always available when and where it's needed, so another method is used. Let's expand on the discussion of alternative solutions:

When using expanded polystyrene sheets over the top of the piping, 1 inch of high-density, closed-cell, extruded foam equals the insulation value of approximately a foot of soil cover. So check in your state plumbing codes to see the thickness of insulation needed based on frost or freeze protection zones. Also, the sheets should be laid 6 inches above the crown of the pipe. It is projected that the zone of protection extends down and inward from the edge of the insulation, toward the pipe, at approximately a 45-degree angle. This is important when considering the necessary coverage of insulation over the pipe. In Minnesota, where cold spells can be colder and last longer than in other regions, a common error is not insulating a wide enough area over the pipe.

A little different but similar approach is to create a box around the piping using the polystyrene sheets. There should be a minimum of 6 inches of backfill aggregate around the piping between the sheets and the pipe. Thickness of the insulation sheets will depend on the type of original soil, depth of bury and projected frost depth. Check the plumbing codes for water supply or sewer pipes for the ratings in your area.

## PLAN AHEAD FOR WINTER

Another suggestion is to use heating cables in troublesome areas such as crossing driveways. This involves using the pipe within a larger pipe, using Fernco or other quick-disconnect couplings so a new heating cable can be slid into the pipe when necessary. To the extent it's possible — depending on the depth of bury — also consider laying polystyrene sheets over the top. On a personal note, a neighbor of Jim's in northern Wisconsin successfully used this approach where his sewer pipe crossed from the septic tank next to the house under the driveway to a pump tank. Before this solution, the piping froze periodically.

Another pipe-within-a-pipe suggestion from an installer was to wrap the sewer pipe in bubble wrap and duct tape inside the larger pipe. The

**Always remember that the best time to insulate is during the initial installation rather than after the fact. So for problem areas, it's best to discuss pipe insulation with the homeowner during the project bid process.**



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issue with this approach is we're uncertain whether bubble wrap provides more insulation value than simply using a double pipe, and whether all bubble wrap products provide the same insulating value. It's better to use rated materials for your area that have proven results.

Always remember that the best time to insulate is during the initial installation rather than after the fact. So for problem areas, it's best to discuss pipe insulation with the homeowner during the project bid process.



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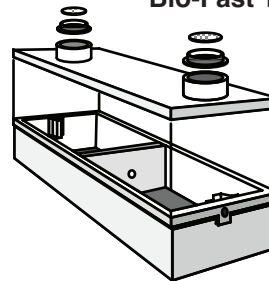
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# Michigan Proposal Would Create Statewide Septic Regulations

By Doug Day

A set of bills to set a statewide regulation for the estimated 1.3 million septic systems in Michigan has been introduced in the Legislature. House Bill 5732 would establish the regulations, including a time of transfer inspection. Under the proposal, local health departments could set standards stricter than state law. House Bill 5733 would appropriate \$3 million to pay for the program and the development of a database of septic systems. The program would be supported by user fees, which would also provide funding to support homeowners who can't afford to repair or replace systems. Supporters of the bills say there are about 130,000 failing systems in the state, but only 11 of the state's 83 counties have programs to detect failed or failing septic systems. The bills are the work of Democrats Gretchen Driskell and Julie Plawecki, the latter of whom died after they were introduced.

## MARYLAND

Calling it a "cost-prohibitive burden," Maryland's Republican Gov. Larry Hogan has announced a rollback of a 2012 law requiring the use of the best available denitrification technology for all new septic systems in the state. Instead, it will be up to the counties to decide if such technology will be required outside a designated Critical Area, land within 1,000 feet of the Chesapeake Bay and its tributaries, where it is still required. Many rural areas had opposed the regulation and a previous proposal by former Gov. Martin O'Malley to ban all new developments on septic systems in the state. The department also announced it would increase efforts to replace failed septic systems. It has offered grants for advanced systems and to add new technology to existing systems in Critical Areas. The change has been sent to the Legislature's Joint Committee on Administrative, Executive and Legislative Review for final approval.

## SASKATCHEWAN

An extensive survey by the Saskatchewan Onsite Wastewater Management Association has provided a long list of recommendations to the Ministry of Health on the province's onsite wastewater program as it considers changes to its regulations. Among the 27 recommendations, SOWMA calls for a training and certification program for installers, required soil sampling at the restricting and limiting layers rather than basic site and soil evaluation, monitoring ports at each end of the system, high-level alarms, and GPS locating information on the permit application. It also calls for increased setbacks, fines and penalties to serve as a deterrent, effluent filters on all systems, development of a best practices protocol for inspections, a central database, and training for local health officers.

## GEORGIA

According to *The Septic Times* newsletter of the Georgia Onsite Wastewater Association, 735 contractors have maintained their certification since the state first required it in 1999. In 17 years, 5,876 contractors allowed their

certifications to lapse and are no longer certified, and 3,658 companies have come and gone. In June, the newsletter reported there were 1,017 certified installers, 316 contractors certified for pumping, and 615 who are certified for both.

New interpretation of a longstanding septic system siting rule is causing concerns in the 13 Georgia counties that make up the Department of Health's District 2. Smaller lots established prior to 1984 have been grandfathered from minimum requirements on lot size and setbacks. Though there have been no law or regulation changes, the health district has "clarified" the minimum requirements. An installer said a 1-acre lot that could hold a three-bedroom home under the old interpretation would now be limited to two bedrooms. The local Habitat for Humanity program has also expressed concern because most of the properties it acquires for low-income housing are grandfathered lots and said meeting the increased standards would make the homes unaffordable.

## MINNESOTA

The Minnesota Pollution Control Agency has been monitoring lake transparency for about 40 years. In a report issued in June (using the latest data from 2014), of those lakes showing trends one way or the other, 25 percent had decreasing transparency while 75 percent were showing increasing clarity, an indicator of improved water quality. The agency found a link between phosphorus levels and transparency, and a link showing that those lakes with improved transparency also had ongoing watershed restoration and septic system upgrade programs.

## NOVA SCOTIA

A 12-year-old girl's water quality project for school has led to an agreement between Nova Scotia Department of Environment and the community of Lunenburg to replace 600 straight pipes that carry a daily flow of 158,500 gallons of raw sewage directly to the LaHave River. Local officials say they've been trying to get the province to address the problem for more than 20 years. An elementary school project by Stella Bowles renewed interest in the issue and resulted in a \$17 million project under Infrastructure Canada's Building Canada Fund. Lunenburg will oversee installation of septic systems for each home, and own and maintain each system for six years before turning it over to the homeowner. It's expected to cost each homeowner \$12,000 to cover unfunded costs, which will be repaid through property taxes over six years.

## OHIO

As Lucas County, Ohio, assesses the condition of septic systems in the county, it is also offering \$300,000 in grants to repair or replace them. With 13,000 septic systems in the county, 544 have been assessed through mid-July in the voluntary program, with 28 percent lacking risers that allow

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homeowners to pump and maintain their systems. For repairs and replacement, the grant will cover the full cost for those at or below 100 percent of the poverty level. Those at 200 percent of the poverty level are eligible for 85 percent reimbursement, and 50 percent is available for those at or below 300 percent of the poverty level.

### OREGON

The Oregon Department of Environmental Quality is offering assistance to those who need to repair or replace their septic systems. As of last May, DEQ had \$250,000 for low-cost loans to help prevent the estimated 6,000 failed septic systems identified annually. State officials say it is a start, but that they really need around \$6 million. □



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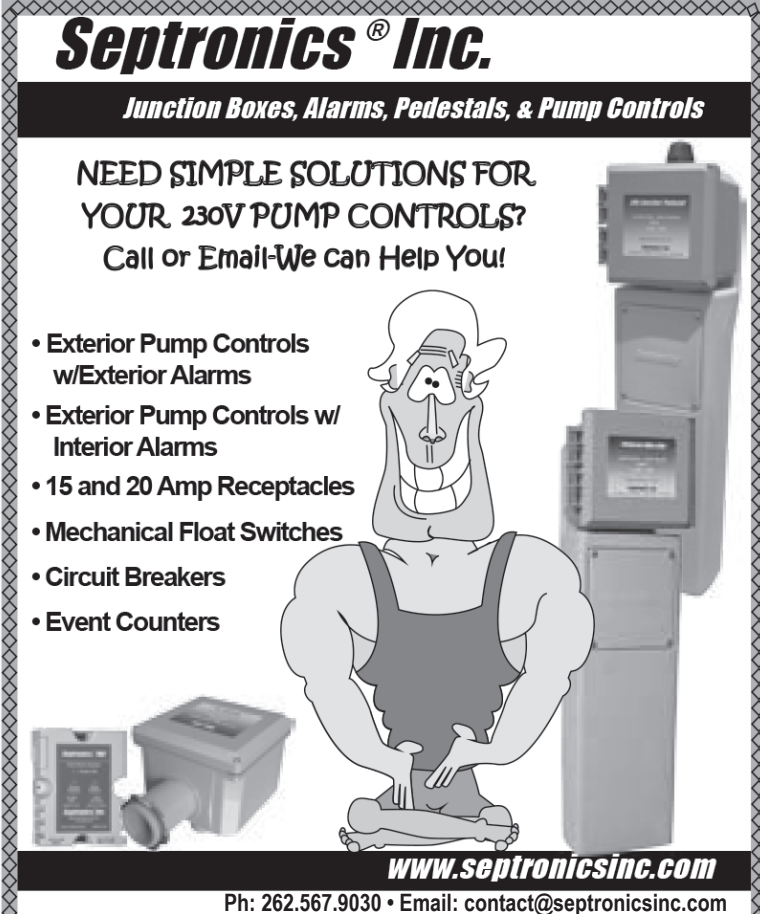
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Jim Mack (on tank), owner of Jim Mack Excavating, oversees the setting of the second 2,000-gallon single-compartment septic tank for the camp's dining hall. (Photos courtesy of Infiltrator Water Technologies)

# Let the Games Begin

Adding standard tanks and a pressurized inground absorption bed with chambers, a Pennsylvania youth camp preserves its athletic field

By **Scottie Dayton**

**T**he South Mountain YMCA Camp in Reinholds, Pennsylvania, wanted to double the size of its 200-seat dining hall and increase bathroom facilities from two to 18 toilets in the Wigwam Building. The latter has a recreation hall with lavatories on the ground floor and an auditorium on the upper level.

Dale Kuntzman, director of facilities, hired consulting sewage enforcement officer Roger Lehmann of All County & Associates to upgrade the onsite system. Before his involvement, however, the municipal SEO had chosen the new absorption area — the camp's multipurpose activities field.

"I was extremely concerned with soil compaction limiting the air exchange into the drainfield," says Lehmann. "In addition, the camp was essentially closed from October to March, so the system had to start up fast in spring." His design divided the drainfield into two zones, enabling one to be inactive during winter. For the drainfield, he chose Infiltrator Water Technologies chambers because they facilitate airflow.

"This system is no different from single-family home systems, just larger," says Lehmann. "There were no design challenges, only a cost versus benefit analysis of the various system types." Jim Mack of Jim Mack Excavating in Hereford, Pennsylvania, won the installation bid.

## SYSTEM PROFILE

<b>Location:</b>	Reinholds, Pennsylvania
<b>Facility served:</b>	YMCA camp
<b>Designer:</b>	Roger Lehmann, All County & Associates, Pottstown, Pennsylvania
<b>Installer:</b>	Jim Mack, Jim Mack Excavating, Hereford, Pennsylvania
<b>Site conditions:</b>	Loam to channery, percolation rate 12 minutes per inch, seasonal high water table 72 inches below grade
<b>Type of system:</b>	Passive treatment with pressure distribution
<b>Hydraulic capacity:</b>	8,500 gpd

## SITE CONDITIONS

Soils are loam to channery with a percolation rate of 12 minutes per inch. The seasonal high water table is 72 inches below grade.

## SYSTEM COMPONENTS

Anticipating possible additions to the dining hall, Lehmann designed the system to treat 8,500 gpd. Major components are:

### Wigwam

- Three 2,000-gallon septic tanks in series (Single-compartment tanks by Monarch Precast Concrete Corp.)
- 2,000-gallon lift station with Model 3885 1/2 hp pump (Goulds Water Technology, a Xylem brand)

### Dining hall

- 1,000-gallon 72-inch-diameter grease interceptor, traffic rated
- Two 3,000-gallon septic tanks in series
- Two 2,000-gallon septic tanks in series
- 6,000-gallon dose tank (three 2,000-gallon tanks connected in parallel) with duplex alternating 3887BHF 2 hp Goulds pumps
- 560 Quick4 standard chambers (Infiltrator Water Technologies)
- 2,408 feet of 1.5-inch Schedule 40 PVC laterals
- 20 4-inch Schedule 40 PVC vented inspection ports
- Two control panels (Aquaworx by Infiltrator)

**“If you can assemble Legos, you can install these chambers. We completed both zones, pressurized them to test for leaks, and backfilled all in one day.”**

Jim Mack

## SYSTEM OPERATION

Effluent from the Wigwam septic tanks flows through a 4-inch pipe to the lift station, then the on-demand pump sends 200 gallons at 20 gpm 190 feet through 2-inch PVC pipe to the dose tank below the dining hall.

A 4-inch pipe connects the dining hall kitchen to the grease interceptor. Lavatory wastewater flows through a 4-inch pipe to the four septic tanks connected in series, then effluent enters the dose tank. Dedicated on-demand pumps discharge 982 gallons at 182 gpm 216 feet through the 3-inch delivery line to the 2-inch manifold.



**TOP PHOTO:** Leil Ehst from Jim Mack Excavating uses a John Deere 135G excavator to remove 12 inches of native soil from the drainfield area.

**ABOVE:** Loren Mack from Jim Mack Excavating drills 1/4-inch orifices in the laterals. The first hole is 5 feet off the manifold; the remaining are 8 feet apart.

**BELOW:** Jim Mack and Leil Ehst from Jim Mack Excavating finish laying 28 laterals in the first of two drainfield zones.



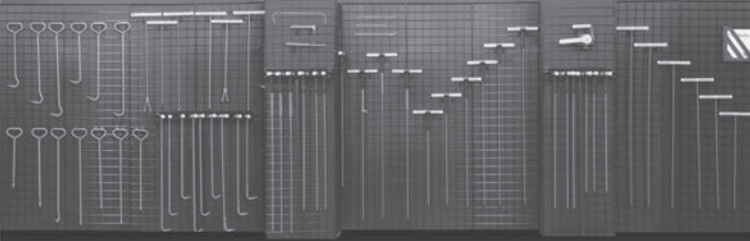


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The 6,888-square-foot drainfield has two 42- by 82-foot zones, each with 28 laterals, 14 laterals per side for a total of 560 Quick4 standard chambers from Infiltrator Water Technologies.

The manifold doses two 42- by 82-foot zones in the 6,888-square-foot drainfield. Each zone has 28 42-foot laterals hung in chambers, with 14 laterals per side. Effluent discharges through five 1/4-inch orifices per 1 1/5-inch pipe, while inspection ports ensure continuous air exchange.

**INSTALLATION**

Site preparation involved cutting down 15 mature trees growing in tank locations. Mack, his son, Loren, and son-in-law, Leil Ehst, pulled and disposed of the stumps, then crushed and filled the existing septic tank after it was pumped.

The driver from Monarch Precast delivered the tanks over four days. "I had specified multiple 2,000-gallon single-compartment tanks set in series because they were cheaper than 4,000- or 6,000-gallon tanks," says Lehmann. "The grease interceptor is circular because grease can sometimes collect in the corners of rectangular tanks."

The crew set the pump tanks first because the delivery truck had to park in those locations to lower the septic tanks. Ehst used a John Deere 135G excavator to dig most of the holes, and a Caterpillar 305 mini-excavator for tighter areas. The 3,000-gallon tanks came in two pieces. "We glued them together, but weren't required to test for watertightness," says Mack.

After installing the Wigwam tanks, Ehst trenched the 2-inch discharge pipe from the Wigwam pump tank across two asphalt driveways to the dining room pump tank. To protect the pressurized line at these locations, Loren Mack sleeved it inside 3-inch PVC pipe extending 5 feet beyond each side of the drives.

Ehst removed 12 inches of soil for the drainfield. "There was enough soil mixed with the rocks to make leveling the bed very simple," says Jim Mack.

Laying the pipe and chambers was straightforward and uncomplicated. "If you can assemble Legos, you can install these chambers," says Mack. "We completed both zones, pressurized them to test for leaks, and back-filled all in one day." Once the area grew grass, children returned to play soccer, football and baseball on the athletic field.

**MAINTENANCE**

The camp's maintenance crew will follow Lehmann's recommendation to inspect the tanks, pumps and electrical connections and hire a service provider to clean the tanks every two to three years. □

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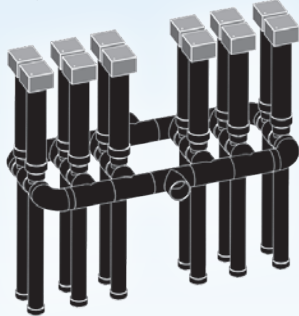
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# Would Snowplowing Bring in a Blizzard of Winter Revenue?

Carefully match your trucks to the right blade attachments to ensure success in a side business that can keep your crew happy during the offseason

By Peter Kenter

**W**inter can put a damper on construction. Onsite installers who have a suitable vehicle and time on their hands during the slow season might want to consider adding a snowplow to their toolkit. But contractors need to decide the depth of commitment they want to make to the snow removal business — there's a big difference between plowing driveways and commercial parking lots.

Eddie Quast and his father, Garry, are co-owners of GE Quast Excavating in Manotick, Ontario, Canada. The company specializes in septic tank installation and repair, excavation, and snow removal in a region known for heavy snowfalls. They've fitted quick-connect plow mounts to six trucks ranging from a 3/4-ton pickup to loaders and dump trucks.

"Snow removal is not for the faint of heart," says Eddie Quast. "The hours can be endless and you sometimes work so hard you think you can't work another hour — but you have to."

The company works commercial contracts, including large parking lots and private condominium roads. These jobs require the company to sign performance contracts, which include possible penalties. The company must carry liability insurance for snow removal, with an additional rider to perform salting, sanding and ice management.

"You have to schedule your work to maximize the value of every moment or you can bankrupt yourself," says Quast. "If you're installing a septic tank and a piece of equipment breaks down, a delay might be acceptable. If a plow breaks down at 3 a.m., you have to repair it or call someone to help you immediately. You can't tell a customer that the mall won't be opening on time."

## MATCH TRUCK AND PLOW

Contractors looking to get into snow removal should match the vehicle to the right plow for their purposes, says Mark Klossner, vice president of marketing at Boss Snowplow. The company specializes in plow blades 10 feet wide and under for medium-duty trucks.

"The first thing I recommend is to check the front gross axle weight rating of your vehicle," he says. "You can't exceed this rating when adding a plow to your truck."

He says a 1/2-ton pickup, utility task vehicle or all-terrain vehicle outfitted with a blade 7 feet 6 inches wide and smaller will do the trick for yard service or to clear a few driveways.

"If you're going to do this to earn money on 20 or more driveways or commercial contracts, you'll need at least a 3/4-ton truck with a FGAWR that can handle the larger plows," says Klossner. "Some people make the mistake of going out to buy a 3/4-ton dually diesel and want to put the biggest plow ever made on it. The truck may have options — extended cab and a big diesel engine that weighs hundreds of pounds more than a comparable gas engine — so you reduce the

Your skid-steer can be an effective snow removal machine combined with a compact straight blade plow attachment. (Photos courtesy of Boss Snowplow)





ability of that truck to carry additional weight. It's counterintuitive, but you might only be able to carry a smaller plow on that truck than a comparable gasoline-engine truck."

## MOUNTING KITS

One of the challenges of manufacturing plows is ensuring that engineers keep on top of truck designs to ensure that undercarriage mounting kits will work with any vehicle. Even a hydrovac can be outfitted to support a plow. While the kits are generally bolted on, mounting a plow for the first time requires knowledge of the vehicle's headlight and electrical system to attach controllers, wiring harnesses and power grounds. Klossner says that even a dealer will require up to five hours to install a connect system.

"Once this is in place, it will only take a minute or so to attach a plow when you need it," he says.

Manufacturers offer a multitude of blade configurations, including V-plows, straight-blade plows, box plows, UTV plows, ATV plows and skid-steer plows. Klossner offers some general tips for blade selection.

"For commercial and institutional work, you likely won't satisfy those contracts with one truck and one blade," he says. "You'll probably need two or three working simultaneously to keep them happy."

Klossner notes that plows with expandable straight blades are becoming popular in the mid-sized truck market.

**"For commercial and institutional work, you likely won't satisfy those contracts with one truck and one blade. You'll probably need two or three working simultaneously to keep them happy."**

Mark Klossner

"Our expandable model is the EXT plow," he says. "When you're driving down the road it's 8 feet wide, but you can hit the controllers to expand the wings to 10 feet when you get to the job site to improve productivity."

Rectangular-design box plows can be outfitted on loaders, backhoes and skid-steers. "They offer blunt force to move massive amounts of snow in a straight line for large jobs such as mall parking lots," he says.

## VERSATILE V-PLOWS

The configurations of V-plows can be adjusted, making them a versatile choice for contractors who use their equipment for other purposes in the summer. With the open part of the V forward, the blade becomes a snow scooper, allowing the operator to stack the snow at the end of the run. Heavy, wet fresh snow can best be attacked with the V in an arrow shape.

"That presents less surface area and allows the plow to break up snow on the first pass," says Klossner. "Then you can put the plow in straight configuration and angle it, making passes back and forth until you get all the snow off the parking lot. V blades are also good for breaking up old crusty snow, which is more difficult for straight blades."

Commercial snowplow contractors will almost always require a sander or salt spreader to keep the pavement black and wet to the client's specifications.



**ABOVE:** A box plow attached to heavy equipment will clear parking lots quickly.

**BELOW:** A power V-blade plow can be adjusted many ways to offer snow-handling versatility when attached to your pickup truck.



Safety is paramount for snowplow operators, because visibility is reduced due to snow heaps, plows, hoppers and spreaders. Buyers can look for heated LED lighting on plow attachments to increase visibility.

## CONSIDER THE SKID-STEER

"When operating a plow truck, you rely on mirrors and you always have to assume there's somebody right behind you," Klossner says. "You're off-road, but obey the rules of the road — no speeding, texting or cellphone use."

While many snow removal contractors choose trucks, Klossner says they shouldn't underestimate the power of a skid-steer.

"It offers a lot of visibility, is very maneuverable in tight spaces and has a lot of power," he says. "If you gave me a choice on a parking lot, I would rather clear with a skid-steer than a truck." □

# Enhanced PS Patrol System Designed to be Installed Quickly and Easily

By Craig Mandli

**E**lectronics utilized to operate onsite systems must stand up to harsh outdoor environments. Typically control panels and alarms need to be placed in a watertight outdoor receptacle to accomplish that. SJE-Rhombus has eliminated that need with the enhanced PS Patrol pedestal-style high-water alarm system, featured at the 2016 Water & Wastewater Equipment, Treatment & Transport Show.

The PS Patrol is a high-water alarm that also provides a convenient location to connect all wiring required for a pumping station application. It has a receptacle to accept a 120-volt pump and piggyback pump switch, and the sleek, angled design of the clear Type 3R enclosure includes a removable cover for easy access for field wiring.

“It basically eliminates the need to install a separate outdoor receptacle,” says Joe Zimmerman, sales manager for SJE-Rhombus. “It’s a junction box and post all in one.”

All of the unit’s internal components are sealed within the cover for protection from rain, condensation and other elements. Red LEDs illuminate the top of the cover in an alarm condition for easy 360-degree visual identification. The unit is available with or without a 32-inch mounting post, and can be installed on new systems or retrofitted to most existing risers.


“We’ve found that a lot of the guys in the onsite installation business are excavators and plumbers as well,” Zimmerman observes. “They want an alarm system that is all-in-one and not overly complicated.”

The system has an automatic alarm reset, green power-on indicator, and a flush-mount horn silence/alarm test switch. The electrical potting cavity provides an easy, reliable method to seal power cables, and a cord seal is included for sealing switch and pump cables. A large incoming power terminal block allows for simple wiring, while auxiliary contacts are included for attachment of remote devices.

“It was designed to be installed quickly, typically from 45 minutes to an hour,” says Zimmerman. “For these guys, time is money, and this helps.”

PS Patrol options include variable switch cord lengths, riser assembly adapter, DUO alarm and elapsed-time meter. “The PS Patrol has quickly become one of our most popular products,” Zimmerman says. “A lot of our customers appreciate the improvements we’ve made. Needing to install a separate receptacle was a big problem across the industry.”

The 2016 WWETT Show was a busy one for SJE-Rhombus staff, as the company promoted 12 new or enhanced products in their booth. Zimmerman says his company aims to introduce new product lines at WWETT.

“We really base our whole year around the WWETT Show,” he says. “A lot of our planning goes into rolling out several new products at this show. It’s always the kickoff of our year.” 888/342-5753; [www.sjerrhombus.com](http://www.sjerrhombus.com). 



Tim Callander, left, SJE-Rhombus’s Central Region Sales Manager, talks about the PS Patrol high-water alarm system with an attendee at the 2016 WWETT Show. (Photo by Craig Mandli)

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# Onsite Oversight is OK in Oklahoma

The Sooner State addresses the need for improved communication and updated regulations, looks ahead to tackling issues including graywater reuse

By Doug Day

**C**onventional systems are preferred when planning onsite wastewater treatment in Oklahoma. The design and inspection of septic systems falls under the auspices of the Environmental Complaints and Local Services Division of the Department of Environmental Quality, which has offices spread across the state.

Environmental programs manager Matt Pace says the agency works closely with the Oklahoma Certified Installers Association (OCIA), founded in 2000 when its executive director, Bill Warden, retired from his job as DEQ's onsite coordinator. Warden says its 100 members are mostly installers, many of whom also provide pumping services to their customers.

## What is DEQ's role in the oversight of onsite wastewater in Oklahoma?

**Pace:** We cover all 77 counties from cradle to grave: everything from design and soil profiles through inspections, enforcement and licensing of onsite professionals.

You'd be amazed at how much the soil changes throughout the state. Oklahoma is very diverse. We have the desert-like area in the panhandle to coastal plains in the southeast, mountains in the east. Our system of choice is conventional pipe and gravel. We think that's the best system and when we do a soil profile our thought is where we can place a conventional system. If the soil isn't conducive, then we look at the alternatives.

With about 6,000 systems going in every year, it's hard for our staff to do every design and inspection. We have 22 field offices across the state with a staff of 100, including 60 environmental specialists. So we license onsite professionals to do design and inspections to cut down the amount of time we have to spend.

## How does licensing work in the state?

**Pace:** We have three licensing programs, including septage haulers and five categories of installer licenses: conventional pipe and gravel, aerobic systems with spray, aerobic systems with drip irrigation, lagoons, and low-pressure dosing systems. And we license soil profilers, who need a bachelor's degree.

The license involves going through our class and passing an exam and posting a bond. To maintain the license, they are required to have continuing education each year. Soil profilers (25 individuals plus 60 licensed staff members) must take an annual approved continuing education course and pass an annual soil texturing exam. Installers (325

people) need at least four hours of approved continuing education per year. Haulers (300 people) require two hours of continuing education every other year.

We can communicate with them during continuing education and pass along rule changes. We also communicate with installers at the annual OCIA conference and we meet with their board periodically. Unfortunately, we don't have any organizations for soil profilers or septage haulers.

**Warden:** I saw a need for an onsite association (in 2000) because the training installers got after their initial certification just wasn't cutting it. We need quality education and training and it seems to work pretty well now. We have a pretty high quality of instructors to do hands-on training for all the modern technologies used today.

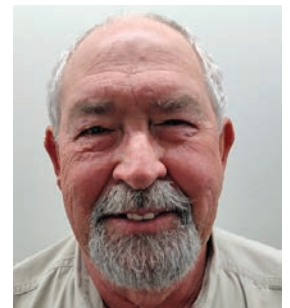
The biggest advantage is that either DEQ or OCIA can come up with an idea and bounce it off each other. Coming from opposite sides of the industry, we can generally come up with some pretty workable solutions to any issue. The more people you have working on the same issue, the better off you are.

## Which issues top the list in Oklahoma?

**Pace:** Using the soils properly. Trying to communicate that has been a big issue recently. Most homeowners don't know anything about septic systems, so they rely on us and the licensed individuals to supply information they need. In 2004, we started doing soil profiles as opposed to perc tests. We feel that's a much more reliable test, but the law still allows perc tests and there's still a good-sized group of people who use perc tests. We're still trying to convince them that soil profiles are a better way to go.



**Matt Pace**  
405/702-6209 or  
matt.pace@deq.ok.gov  
**OCIA**



**Bill Warden**  
918/798-4407 or  
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A big issue is the health of some of our streams and rivers that don't meet certain standards. In 2012, we started a new rule that requires nitrogen reduction technology within a certain distance of listed waters. It hasn't always been met with a lot of enthusiasm and there's been some controversy around it, but we're just trying to do what we can to further protect those waters.

**Warden:** DEQ and OCIA worked hand in hand on denitrification because areas that may be classified as sensitive really aren't. We helped set the boundary lines. Our members have been there and installed in those areas. They know what will and will not work and what is and is not possible.

It (denitrification) is a good thing, but the percentage of pollution that enters our ecosystem from onsite sewage is probably less than 2 percent. We have not addressed the real issue, which is runoff, particularly nitrogen. The majority of that is from agriculture. What we have stopped from onsite wastewater makes up a very low percentage.

OCIA is dedicated to raising the bar to become and maintain certified installer status, which is likely one of the key issues within the onsite profession. This includes hands-on contact with standard and new technologies, resolution of problem systems, troubleshooting malfunctions, and quality presentations from professionals in the onsite industry

**Pace:** We recently started a partnership with Oklahoma State University to help with some of our issues. The assistant professor of soil science, Sergio Abit, recently came here after doing a lot of work in the onsite program at North Carolina State University. He held his first onsite conference this fall with about 200 people. He's also working on a training center, which will have some mock-up systems. That will really be beneficial in educating people. We're trying to help provide some funding for him to hire a grad student to do studies on onsite systems, how they are working, and whether or not our sizing requirements are applicable.

OSU got us started with soil profiles several years ago when we worked with Dr. Brian Carter. He came up with the whole process for how we perform those profiles. Our work with the university has helped with our nitrogen issues.

### Do you see new issues on the horizon?

**Pace:** I'm a member of the State Onsite Regulators Alliance (SORA). The trend is to go green and people want to do things on their own. We've been getting a lot of questions and curiosity from citizens about graywater and water reuse. We don't allow graywater systems in Oklahoma, so I'm sure that's something we'll have to look at in the near future. We haven't done any work on that, but when we do we can use our partnership with Oklahoma State.

**Warden:** Reuse of water isn't popular right now, but they've done it quite successfully in California with very little opposition. It's a real issue and it's going to have to happen. □



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# New Technology/Installation Tools

By Craig Mandli

## EXCAVATION EQUIPMENT

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The CX350D excavator from Case Construction Equipment weighs 82,400 pounds with 268 hp. It has a combination of cooled exhaust gas recirculation, selective catalytic reduction and diesel oxidation catalyst technologies designed to maximize uptime and performance and improve fuel efficiency up to 8 percent. The excavator has an electrically controlled hydraulic pump that controls flow based on working conditions and boosts cycle times up to 12 percent. The cab provides ample legroom, a climate control system that responds to sunlight, Bluetooth radio and a fully adjustable operator's station with a heated air-ride seat. 866/542-2736; [www.casece.com](http://www.casece.com).



### EarthBuster

The EarthBuster is designed to return soil conditions to preconstruction status. Smearing and compaction from construction equipment can leave drainfield soil with less-than-ideal absorption properties. The unit can be mounted on skid-steers, mini-excavators and loader tractors. The process uses compressed air, and when used properly, is environmentally safe, according to the maker. 406/670-8318; [www.earthbuster.com](http://www.earthbuster.com).



### Hyundai Construction Equipment Americas HX220L

The 51,500-pound HX220L hydraulic excavator from Hyundai Construction Equipment Americas delivers 173 net hp through a Tier 4 Final-compliant Cummins engine. It achieves up to 13 percent faster cycle speeds than the previous 9A Series model. An all-around view monitoring system for 360-degree virtual operating view is available on all HX Series models. It displays on an 8-inch cluster monitor in the operator's cab. Included in the virtual operating view is the Intelligent Moving Object Detection system that senses and warns the operator when objects come within 16.5 feet of the machine. Options include a boom float mode for improved grading control, fine swing mode for improved load control when swinging, intelligent power control for computer-aided power optimization based on load demand, and eco breaker mode for selectable pump flow and improved fuel consumption when working with hydraulic attachments. 877/509-2254; [www.hceamericas.com](http://www.hceamericas.com).

### JCB North America 100C-1

The 100C-1 compact excavator from JCB North America has an H-design undercarriage, steel body panels, a spacious operator environment and a 74 hp Tier 4 Final engine. With an operating weight of 21,458 pounds, it has a maximum bucket tear-out force of 16,231 ft-lbs and a dipper arm tear-out force of 9,510 ft-lbs. It has a maximum dig depth of 15 feet, a dump height of 18 feet 6 inches, and a reach at ground level of 24 feet 4 inches. A reduced-loss hydraulic system operates with reduced back pressure, eliminating parasitic losses, and the hydraulic system puts less demand on the engine, reducing fuel consumption. A graphite-based pin-and-bush design delivers 500-hour greasing intervals for reduced daily maintenance and lower operating costs. Two digging modes, including an Eco mode for maximum efficiency and a Heavy mode for increased productivity, make it possible to tailor performance to the application. 912/447-2000; [www.jcbna.com](http://www.jcbna.com).



### John Deere 135G

The 135G reduced-tail-swing excavator from John Deere is equipped with a durable 101 hp Final Tier 4 (FT4)/EU Stage IV diesel engine, meeting rigid emission regulations and providing power, reliability and ease of operation. A TRIAS III hydraulic system balances engine performance with hydraulic flow for predictable operation. Three productivity modes let operators choose the digging style that fits the job. It includes grouped service points and at-a-glance gauges, along with an easily accessible battery disconnect switch that extends battery life. The engine requires no diesel particulate filter, and extended service intervals help maximize uptime. D-channel side frames house and protect the highly efficient coolers and engine, along with a sealed and lubricated undercarriage with large idlers, rollers and strutted track links. 800/503-3373; [www.johndeere.com](http://www.johndeere.com).



### Kobelco Construction Machinery USA SK210

The 49,400-pound SK210 excavator from Kobelco Construction Machinery USA is powered by a 160 hp Tier 4 Final Hino engine for fuel efficiency during heavy-duty operation. It delivers a digging force of 29,330 ft-lbs. In H mode, it has a 7 percent increase in work volume. In S mode, it provides up to a 10 percent increase in fuel economy. Eco mode adds another 6 percent increase in fuel economy. Efficiency comes from a new hydraulic regeneration system, which aids the arm by reusing force generated by the boom.



A higher boom-foot cross section, thicker arm-foot base plate and stronger foot bases provide power to lift heavy loads and work safely. 281/888-8430; [www.kobelco-usa.com](http://www.kobelco-usa.com).



### Komatsu America Corp. PC210LC-11

The PC210LC-11 hydraulic excavator from Komatsu America Corp. is powered by a 165 hp Tier 4 Final SAA6D107E-3 engine. It comes with a viscous fan clutch for improved cooling, three travel speeds, and heavy standard counterweight (9,634 pounds) for improved over-the-front and over-the-side lift capacity. 847/437-5800; [www.komatsuamerica.com](http://www.komatsuamerica.com).



### Manitou Gehl Z55

The Gehl Z55 5 1/2-metric-ton compact excavator from Manitou comes with a 47.6 hp Yanmar Tier 4 turbocharged diesel engine with electronic throttle. Eco mode and auto-deceleration reduces engine speed by 10 percent without sacrificing power and decreases the engine speed to idle after four seconds without hydraulic movement. Controls include a proportional auxiliary hydraulic rocker switch, enhancing attachment options by enabling the operator to adjust the hydraulic flow. The operator can select standard ISO or an optional backhoe control pattern with a turn of a mechanical lever. A boom offset swing of 68 degrees in both directions allows for digging a square hole without repositioning the machine. 262/334-9333; [www.manitou.com](http://www.manitou.com).



### Mustang-Gehl Company 550Z

The 550Z from Mustang-Gehl Company comes with a 47.6 hp Yanmar Tier 4-certified, turbocharged diesel engine with an electronic throttle for precise control. Operating cost savings are possible with Eco mode and auto-deceleration features. Eco mode will reduce the engine speed by 10 percent without sacrificing power, while auto-deceleration decreases the engine speed to idle after four seconds without hydraulic movement. The features provide a 20 percent reduction in fuel consumption. An angle blade with float and bolt-on cutting edge is a factory-installed option. Using the rocker switch on the blade lever, the hydraulic angle blade can be angled 25 degrees to push material aside as the machine moves forward, eliminating the need for repetitive repositioning. The blade can be simultaneously angled and raised or lowered to reduce backfilling time. 262/334-9461; [www.mustangmfg.com](http://www.mustangmfg.com).

### Volvo Construction Equipment ECR40D

The ECR40D short-swing-radius compact excavator from Volvo Construction Equipment has updated controls and 10 percent more space, a Tier 4 Final Volvo D1.8A engine that is 5 percent more fuel efficient than previous models, and improvements to break-out and tear-out force. In-cab features include four attachment-specific buttons allowing for precise adjustment of hydraulic flow, an Eco mode reducing fuel consumption, two user-adjustable engine speeds for tasks such as grading or lifting, and an auto engine shut-down function that can be set to preferred intervals in order to reduce engine hours, maintenance costs and machine depreciation. The short swing tail radius and positioning of the offset boom allow it to work in particularly tight spaces. The swing post and offset cylinder stay within the tracks when



in an offset position, and the slew and offset movements are controlled simultaneously. 828/650-2000; [www.volvo.com/constructionequipment](http://www.volvo.com/constructionequipment).

## HAND/POWER TOOLS

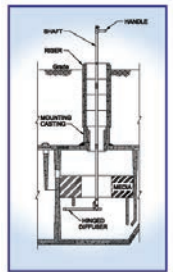


### BASE Engineering ASKR System

The ASKR System from BASE Engineering gives vacuum truck operators the ability to control the boom, pump, PTO, valves and other industrial equipment from outside of the cab and eliminates the need for most two-man teams. The operator has the freedom to move around the work site, controlling equipment with precision and accuracy from a safe distance, while getting the best vantage point. The system has up to 12 custom functions (including emergency stop capability), various modes of operation to suit specific needs, a range of up to 2,000 feet, and a 300-hour continuous-use rechargeable battery. 800/924-1010; [www.baseng.com](http://www.baseng.com).

### Jet Inc. BAT Media Cleaning Tool

The BAT Media Cleaning Tool from Jet Inc. allows efficient compressed air delivery below the effluent surface, while service technicians remain above grade. The original swivel design can be used with readily available, off-the-shelf air pumps, vacuum trucks or the Jet Catalog compressor. Proper service removes accumulated solids with coarse bubbles, without a washing wand or harsh chemicals. The biologically treated solids then settle in the aeration chamber to reveal more BAT Media surface area for a new biological colony to form. 800/321-6960; [www.jetincorp.com](http://www.jetincorp.com).



### LockNLube G.Gun Grease Gun

The G.Gun Grease Gun, distributed by LockNLube, is a 10,000 psi foot-operated grease gun. With no batteries to recharge or replace, it is always ready. It has a two-stage pump that creates a wave action in the grease, eliminating air locks and the need for a follower plate. The canister holds 2 gallons of grease, so the user spends less time refilling. Its pressure return valve eliminates pressure locks and returns excess grease to the canister, instead of spilling onto the machine. It comes with a LockNLube Grease Coupler that uses a sliding sleeve activated by a thumb lever. The coupler's four spring steel jaws lock onto the Zerk fitting, resulting in leak-free greasing. It is rated at 10,000 psi and is designed to work with both metric and SAE fittings. It comes with a 6.5-foot hose, with longer hoses available. 603/795-2298; [www.locknlube.com](http://www.locknlube.com).



### Milwaukee Tool Magnetic Tape Measure with Finger Stop

The Magnetic Tape Measure with Finger Stop from Milwaukee Tool is more compact, providing a better fit in the user's hand. An improved finger stop mechanism protects the users' fingers during retraction, while maximizing stability during layout applications. A more compact magnetic hook will allow users to get into smaller spaces while taking measurements. It has Nylon Bond Blade Protection, and a five-point reinforced frame for drop protection. 800/729-3878; [www.milwaukeetool.com](http://www.milwaukeetool.com).

product focus continued >>>

## PUMPS

### Aero-Stream Aerobic Remediator

The retrofit Aerobic Remediator (ARU) from Aero-Stream is designed to help restore failed systems and provide simultaneous nitrification/denitrification. The diffuser is designed to lower TSS and BOD and can be installed through a 3-inch opening. The UL-listed device induces oxygen directly into septic tanks, turning passive anaerobic environments into active aerobic environments. After conversion, the microorganisms reduce the organic matter in the tank by 80 percent and suspended solids by 60 percent. The cleaner effluent reverses the aging process and eliminates the clogging biomat; within weeks systems are restored to full functionality, according to the manufacturer. 877/254-7093; [www.aero-stream.com](http://www.aero-stream.com).



### Ashland Pump AGP-HC200

The AGP-HC200 grinder pump from Ashland Pump has a cutting-edge radial portion that grinds waste into fine slurry, while the axial portion cuts and chops stringy solids and other forms of nonhuman waste into pieces small enough to pass through the small-diameter discharge pipe. 855/281-6830; [www.ashlandpump.com](http://www.ashlandpump.com).



### Environment One Corporation Upgrade

The Upgrade replacement grinder pump from Environment One Corporation has a universal design for drop-in conversion and connection in most grinder pump wet wells. All solids including plastic, rubber, fiber and wood are ground into fine particles, allowing them to pass easily through the pump, check valve and small-diameter pipelines. The grinder is designed not to jam and for minimum wear to the mechanism. It comes with a self-contained level control system, eliminating float switches. 518/346-6161; [www.eone.com](http://www.eone.com).



### Flygt - a Xylem Brand Concertor

The Concertor smart, interconnected wastewater pumping system from Flygt - a Xylem Brand senses the operating conditions of its environment, adapts its performance in real time and provides feedback to pumping station operators. It can offer energy savings of up to 70 percent, reduced inventory due to flexible performance, clog-free pumping operation and clean wet wells. It offers a wide performance field from which to choose the right operating point, making selection simple, facilitating performance fine-tuning and reducing inventory. 855/995-4261; [www.xylem.com](http://www.xylem.com).



### Franklin Electric IGP Series

IGP Series grinder pumps from Franklin Electric can operate on nominal voltages ranging from 208 to 230 volts in one model. Their motor and construction are designed to handle low-pressure sewage applications, using the same cutter system at 414,000 cuts per minute. They incorporate a non-clogging impeller staged for efficient pumping of sewage slurries with a shut-off head of 130 feet. Available in an automatic version for single-phase power sources and a manual version for both single-phase and three-phase power sources, they



employ a 2 hp single-phase, 3,450 rpm (with capacitor) start/run motor with built-in overload protection to prevent overcurrent and overheating damage. They have corrosion-resistant brass impellers to minimize downtime and maintenance and an epoxy-coated cast iron finish for corrosion resistance and durability. 260/824-2900; [www.franklinengineered.com](http://www.franklinengineered.com).

### Gorman-Rupp Pumps Eradicator Solids Management System



The Eradicator Solids Management System for the Super T Series line of self-priming centrifugal trash pumps from Gorman-Rupp Pumps is designed to help improve system uptime, decreasing service calls and overall maintenance costs. The system consists of a lightweight inspection cover, a back cover plate incorporating an obstruction-free flow path, and a self-cleaning wear plate including laser-cut notches and grooves, along with a tooth designed to clear material from the eye of the impeller. It is equipped to handle sanitary wipes, plastic bags, feathers, hair, sludge and other clog-prone material. For Super T Series pump applications, complete pump units are available in Gorman-Rupp Hard Iron and cast iron materials. Eradicator upgrade kits are available for existing Super T Series installations and will include all components needed to make an easy conversion in the field. 419/755-1011; [www.grpump.com](http://www.grpump.com).

### Grundfos Pumps LCSE

LCSE split-coupled end suction pumps with integrated motor, drive and control from Grundfos Pumps come with MLE variable-speed motors in ranges from 3 to 30 hp at 3,500 rpm and 3 to 25 hp at 1,800 rpm. Available in 21 different models, the fully integrated, intelligent pumping system offers energy savings of up to 50 percent. The system consists of a controller, variable-frequency drive and standard asynchronous motor. Its footprint is 35 percent smaller than that of a frame-mounted design, and its plug-and-pump design results in quick and easy installation. GO technology allows building managers to remotely control and monitor the pump from a smartphone or tablet. 800/921-7867; [us.grundfos.com](http://us.grundfos.com).



### Septic Services Retro-Air Rejuvenator System

The Retro-Air Rejuvenator System from Septic Services provides a complete drainfield rejuvenation system designed to help return a failed septic system back to optimal flow and performance. It can be used in new or existing septic systems, and can be installed in single- or multiple-compartment septic tanks. It helps eliminate clogged drainfield biomat, as well as other secondary treatment systems, and is recommended in aeration systems that are prone to backup. It is quick and easy to install and requires minimal maintenance. It is available in several models to fit various applications. 800/536-5564; [www.retro-air.com](http://www.retro-air.com).



### Vertiflo Pump Company Series 900

The Series 900 industrial vertical immersion vortex sump pump from Vertiflo Pump Company provides an unrestricted flow since the impeller is not normally in contact with the solids being pumped. Applications include chemical slurries, fragile food-processing solids, paper and pulpy solids, petroleum and oils, sewage, wastewater treatment, and textiles. It





handles solids up to 4 inches in diameter. It is designed for long life in severe services with heads to 170 feet, temperatures to 350 degrees F, pit depths up to 26 feet with flows to 1,600 gpm. Construction options include cast iron, 316 stainless steel fitted, all 316 stainless steel, Alloy 20 and CD4MC. 513/530-0888; [www.vertiflopump.com](http://www.vertiflopump.com).



### Webtrol Pumps MVPS-RE1

The MVPS-RE1 drop-in package for existing progressive cavity systems from Webtrol Pumps has a progressive cavity pump at its center, providing reliable operation and nearly constant flow, and is easily able to adjust for pressure variations in any system setting, according to the maker. The package is powered by a 1 1/2 hp motor, spinning at 1,750 rpm to provide grinding torque. With all package parts readily available and easily replaceable, it can quickly and easily be serviced in the field. 800/769-7867; [www.webtrol.com](http://www.webtrol.com).

### Zoeller Company submersible solids-handling pumps

Submersible solids-handling pumps from Zoeller Company are designed to provide a long service life. Finned castings, oil-filled housings and non-overloading windings enable the motor to maintain a low operating temperature in harsh conditions. They are available in 1 to 60 hp, 3- or 4-inch solids-handling capacity, and two-vane or vortex impeller styles. They are available with either a standard or explosion-proof motor. 800/928-7867; [www.zoellerengprod.com](http://www.zoellerengprod.com).



### SLUDGE SAMPLING EQUIPMENT



### Sim/Tech Filter TruCore

The TruCore from Sim/Tech Filter is a large-diameter, accurate, user-friendly sludge sampler designed for use in the thicker sludge common to septic tanks. It allows samples to be taken quickly without creating excessive turbulence, as there are no restrictions caused by valves, stoppers or flaps. With a 1 3/8-inch inside diameter, the capacity per foot is almost 10 ounces. The straight-through design allows the sample to be quickly and effortlessly returned to the tank. The unit is made of a polycarbonate sampling tube (clearly marked every foot) and PVC fittings. It comes as a single-piece 8-foot unit or as two 4-foot units that slip together. Custom sizes and configurations are also available. A simple and customizable extension kit is available for deeply buried tanks. 888/999-3290; [www.simtechfilter.com](http://www.simtechfilter.com).

## Instrument helps calculate depth and grade for septic installations

**Problem:** Garth Tichy at HMA Capital Resources in New Hampshire sought an alternative to digging septic systems that allowed for a higher degree of precision, expedience and safety. Due to the complexity of septic installation, especially in terms of conflicting slopes and grading, Tichy reached out to New England Laser to improve his current digging technology.



**Solution:** When dealing with multiple grades during any stage of excavation or construction, the Geomax EzDig Touch allows the operator to remain in the cab while the instrument calculates depth and grade measurements. Attention to specific elevation and change in slope is made easy with the software in the EzDig.

**Result:** Use of the EzDig Touch has helped the business flourish, enabling Tichy to reduce the labor force while improving efficiency. 603/863-0833; [www.newenglandlaser.com](http://www.newenglandlaser.com). □

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## Liberty Pumps NightEye app

The NightEye wireless-enabled product app from Liberty Pumps links alarm and performance information to a mobile device via text, email and push notifications. Up to four phone numbers can be connected to the account and can be contacted worldwide. The app is free to use with compatible pumps and is available for iOS and Android. 800/543-2550; [www.libertypumps.com](http://www.libertypumps.com).



## RIDGID StrapLock pipe handle

The RIDGID StrapLock pipe handle is designed to simplify the installation, maintenance and handling of large-diameter plastic pipe. The handle grips plastic pipe from 3 to 8 inches in diameter with its rapid size adjustment. For use in tight quarters and wet conditions, the handle allows force to be applied in all directions. 800/769-7743; [www.ridgid.com](http://www.ridgid.com).



## Worksaver skid-steer loader attachments

Worksaver adapters connect skid-steer-type attachments to Kubota loaders with pin-style buckets. One adapter is designed for Kubota models LA504 and 534, while the other fits the LA524 and 525. Both adapters are built to the universal skid-steer standard. 217/324-5973; [www.worksaver.com](http://www.worksaver.com).



## The Dirty Bird septic vent concealer

The septic vent concealer from Dirty Bird is designed to meet U.S. Environmental Protection Agency ventilation regulations. Made from polyethylene, it measures 32 by 23 inches at the basin and can be topped with a birdbath, sundial or other accessory. 866/968-9668; [www.thedirtybird.com](http://www.thedirtybird.com).



## Water Cannon electric pressure washer package

The electric-powered Jetter Package pressure washer from Water Cannon delivers 2 gpm and 1,500 psi. The low profile and compact hand-carry version includes a 150-foot by 1/4-inch Piranha jetter hose, a 50-foot by 1/8-inch trap hose, ball valve, pulsation valve on demand, and four stainless steel jetter nozzles. The pressure regulator can be adjusted from 150 to 1,500 psi. 800/333-9274; [www.watercannon.com/catalogrequest.aspx](http://www.watercannon.com/catalogrequest.aspx).



## Ranger Design seat covers

Stain-, tear- and wear-resistant seat covers from Ranger Design are made to fit popular commercial vans. Constructed of heavy-duty Cordura fabric for puncture and tear resistance, the seat covers are urethane coated for additional protection against fluid spills and stains. The seat covers are machine-washable and can be installed in less than 30 minutes. 800/565-5321; [www.rangerdesign.com](http://www.rangerdesign.com).



## Milwaukee Electric Tool work gloves

Job site work gloves from Milwaukee Electric Tool Corp. feature touch-screen-compatible material on the fingertips, palms and knuckles. The gloves are available in Free-Flex and Performance models as well as Performance Fingerless gloves for added dexterity when handling small objects. The palms of the fingerless gloves are padded and reinforced. All three gloves have a reinforced thumb seam and hook-and-loop closures for a secure fit, breathable lining and mesh backing to wick away moisture. A terry cloth wipe on the backside provides a place to remove sweat. Sizes range from small to XXL. 800/729-3878; [www.milwaukeetool.com](http://www.milwaukeetool.com).



## Komatsu America Corp wheel loader

The WA320-8 wheel loader from Komatsu America Corp is designed for any application from pallet handling to hard digging. The wheel loader features an easy-to-control hydrostatic transmission and a 165 hp Tier 4 Final engine, which lowers fuel consumption by up to 3 percent in V-cycle loading and 2 percent in load-and-carry applications. 847/437-5800; [www.komatsuamerica.com](http://www.komatsuamerica.com).



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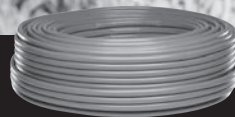
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**Continental ContiTech expands partnerships**

ContiTech will supply industrial hoses, hydraulics and power transmission belts to Applied Mexico and subsidiary RODENSA Mexico. Applied Mexico is one of the largest industrial distribution networks in Mexico with 22 facilities.



**John Deere awarded equipment contract**

John Deere was awarded a three-year construction equipment contract from the National Purchasing Partners Government Division. The NPPGov contract allows

public and nonprofit entities access to John Deere's products through simplified cooperative purchasing.

**JWC Environmental names senior vice president**

JWC Environmental promoted Greg Guard to senior vice president of global sales. He will direct global sales initiatives and strategies.



Greg Guard

**JCB North America recognizes dealer achievements**

JCB North America presented annual dealer awards to outstanding JCB dealerships in recognition of their efforts and achievements in 2015. The awards were presented at regional JCB dealer meetings held in Savannah, Georgia; Chicago; Las Vegas; and Toronto. In all, 18 dealers were recognized.

**Grundfos Pumps names GM**

Grundfos U.S.A. named Jonathan Hamp-Adams as general manager. He will lead all sales organizations in the U.S.

**Xylem adds rental operations managers**

John Bossong (Nashville, Tennessee), Bill Weymouth (Hubbard, Oregon) and Kelly Baker (Little Rock, Arkansas) were named rental operations managers for Xylem.



**Roth Industries breaks ground on \$6 million expansion**

Roth Industries broke ground in July on a \$6 million expansion of its Watertown, New York, facility. The project will cover 27,000 square feet, including installation of a new blow-molding machine, and will allow for the addition of at least 12 jobs. The new machine will add the capacity to produce product lines at the Watertown plant that are in prototype development. □



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California Onsite Wastewater Association;  
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## Maryland

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

## Massachusetts

Massachusetts Association of Onsite Wastewater Professionals;  
www.maowp.org; 781/939-5710

## Michigan

Michigan Onsite Wastewater Recycling Association;  
www.mowra.org

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

## Minnesota

Minnesota Onsite Wastewater Association;  
www.mowa-mn.com;  
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## Missouri

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

## Nebraska

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

## New Hampshire

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

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

## New Mexico

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

## New York

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

## North Carolina

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

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

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www.ncpumpergroup.org;  
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## Ohio

Ohio Onsite Wastewater Association;  
www.ohioonsite.org;  
866/843-4429

## 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

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www.powra.org

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www.psmna.net; 717/763-7762

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

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

**Wisconsin**  
Wisconsin Onsite Water Recycling Association;  
www.wowra.com; 608/441-1436

**Wisconsin Liquid Waste Carriers Association;**  
www.wlwca.com; 608/441-1436

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

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

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

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

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

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

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

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

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

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

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

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

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

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