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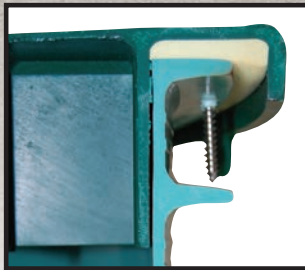
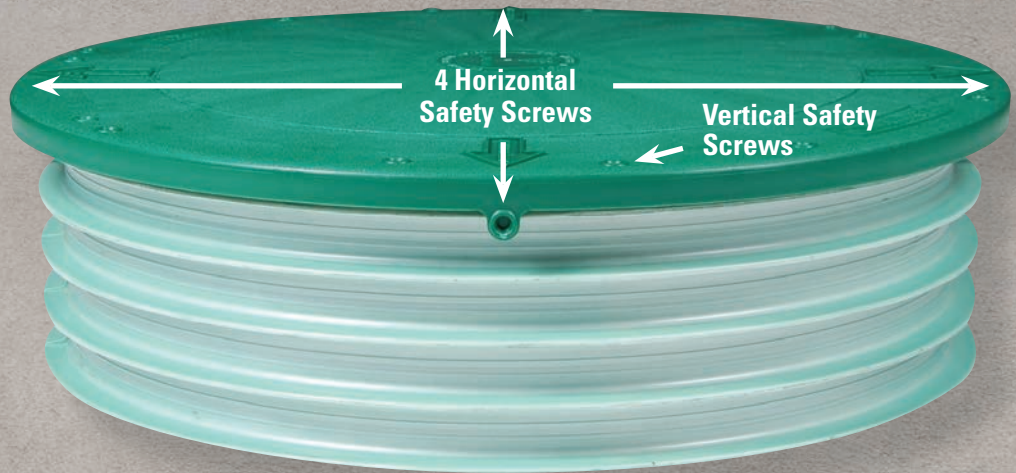
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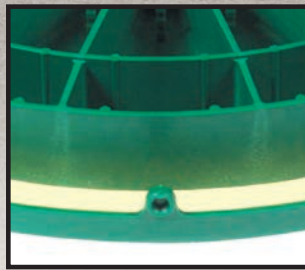
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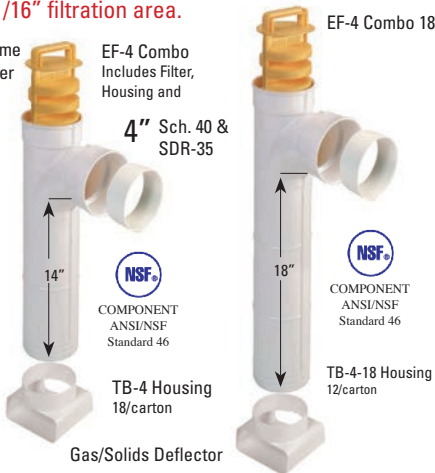


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Established in 2004, Onsite Installer™ fosters higher professionalism and profitability for those who design and install septic systems and other onsite wastewater treatment systems.

What's the Onsite Outlook in Your Region?

A nationwide homebuilders survey shows where decentralized wastewater systems are most prevalent in new construction

By Jim Kneiszel



Housing starts that utilize decentralized wastewater systems are one indicator of where and when installers would be wise to consider ramping up their services and putting more crews on the job. A recent economic analysis from the National Association of Home Builders gives a regional breakdown of the use of onsite systems in new residential construction. The statistics may be enlightening — and perhaps surprising to some of you.

Overall, the Survey of Construction data showed that nationally, 16 percent of new single-family residential construction in 2015 incorporated septic systems to treat waste rather than hooking into public treatment infrastructure. Across the broad spectrum of the United States, including major metropolitan suburbs and infill of vacant lots in cities, 84 percent of new homes connected to a public sewer.

On its face, the onsite usage statistic may seem low when compared to the government and wastewater industry conclusions that 25 to 30 percent of all Americans are served by decentralized wastewater systems. But we must remember the NAHB survey accounts for only new home construction and not the existing private wastewater infrastructure, which is substantial, well established and far-flung.

REGIONAL PERSPECTIVE

The regional picture is where the builders survey gets interesting — and could shed some light on where the onsite industry will grow more quickly in the coming years.

If you're working in New England, listen up; it might be time to think about adding another crew. Almost half — 47 percent — of new construction in the northeast (Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut) required septic systems. According to the report, new homes in this region are generally custom-built on larger lots.

Robust onsite system construction occurred in the East South Central region — Kentucky, Tennessee, Mississippi and Alabama — where 42 percent of new homes were off the public wastewater grid. That's followed

by the East North Central states — Wisconsin, Michigan, Illinois, Indiana and Ohio — where 26 percent of new homes includes septic systems.

The Middle Atlantic region — New York, Pennsylvania and New Jersey — fell below the national average, with only 14 percent of new homes requiring septic systems. The number dipped to 10 percent for the West South Central region, including Texas, Oklahoma, Arkansas and Louisiana.

The fewest new-construction onsite systems were built in the Mountain and Pacific regions, comprising the western third of the U.S. by area. In the states of Montana, Wyoming, Colorado, Idaho, Nevada, Utah, Arizona, New Mexico, Washington, Oregon, California, Alaska and Hawaii, only 8 percent of new houses utilized septic systems, according to the survey.

TAKEAWAYS

In some ways, the results are the opposite of what you might expect. In the densely populated Northeast, it's reasonable to expect a more developed public sewer system and less land to develop. However, when you take into account the rural expanses found in states like Vermont and a desire by people to move out of congested cities, the demand for onsite systems is understandable.

And what about the Rockies and westward? A crowded California and the growing populations in Seattle and Portland in the Northwest explain the high number of houses using public sewers. But then you look at Big Sky Country and wonder why onsite systems aren't being utilized more. Perhaps so-called “smart growth” zoning policies — an attempt to cluster development nearer to bigger cities to discourage sprawl — might restrict homes using their own wastewater systems.

Then there is the growing cost of Big Pipe expansion and what impact that will have on the future of onsite systems. Cities, counties and states are strapped for cash today. Look at where we're going with other infrastructure, such as roads, public buildings and parks and recreation facilities. The many potholes on your local roads should tell you there is little appetite for raising taxes to address even basic needs.



Follow this link to see the National Association of Home Builders U.S. map of septic system usage in new construction of single-family homes:

eyeonhousing.org/2016/09/the-geography-of-homes-built-on-private-wells-and-with-individual-septic-systems/



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If money isn't going toward road projects, it's not likely to go toward expansion of sewer pipes, either. At the same time, the dream of many Americans is still to build a new house on a larger piece of property outside town. These trends bode well for installers. Folks aren't going to give up on their dreams of home ownership, so they will turn to the onsite industry to provide for their wastewater needs. Installers are ready to answer the call, with new technologies that work in smaller spaces and produce cleaner effluent than ever before.

Folks aren't going to give up on their dreams of home ownership, so they will turn to the onsite industry to provide for their wastewater needs.

STILL A WAYS TO GO

Another article I saw recently was an indicator that the onsite industry, and wastewater treatment in general, still has much room for development. The *Weirton Daily Times* news story outlined the wastewater situation in rural West Virginia, where even today many thousands of homes still have no wastewater treatment, either a septic system or a public sewer.

"In a small coal camp community, the houses are too close together for traditional septic systems and the public utilities have not reached those areas. So sewage and wastewater collection has been in ditches that flow into streams. ... The sewage is flowing right past houses on its way down the hill," says Jenny Newland, who represents a nonprofit group dedicated to improving sanitation.

That account is not coming from a developing country where you'd expect substandard wastewater services. It's right here in the United States. It's sobering to realize there are parts of this country where sewage simply runs out of a pipe in the backyard and rolls downhill into a stream. We as a nation need to raise minimum standards of sanitation to protect our citizens. And the onsite industry is going to play a major role in the effort. □



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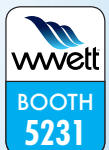


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this holiday season
and throughout
the new year.



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FINDING A SOLUTION Design in Difficult Soils

Tim Haeg, this month's cover star, has faced a lot of difficult sites working in Minnesota: rocky soil, glacial outwash plains with zero treatment areas and floodplain issues. He left his job as a county inspector to start his own company, and new regulations in Minnesota meant studying for certifications and learning a lot about verifying soils during design. Read about Haeg's experience in an exclusive online story. onsiteinstaller.com/featured

RIGHT FOR YOUR SITE

Notes on Drip Distribution

If you are unfamiliar with drip distribution, pretreated effluent is applied to soil through a series of tubes equipped with emitters that allow a small amount of effluent into the soil at a time. It can be used in places where conventional trench systems aren't suitable or where site conditions make it difficult to install trenches, mounds or at-grade systems. Check out this overview of drip distribution systems.

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Overheard Online

"A paid-time-off policy can have a very real impact on employee morale, and a good policy can even be a powerful tool for staff recruitment and retention."

- Considerations for Writing Your Paid-Time-Off Policy

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TANK LID SAFETY

Everyone is Responsible

If you have been in this industry for some time you have certainly seen a lid on a cesspool, septic, aerobic or pump tank that was not on tightly, was deteriorating or maybe covered with plywood. And you've also probably seen news stories about children falling into a septic tank because of an unsafe lid. These stories too often end in tragedy. This article discusses the responsibility of everyone in the industry to do everything possible to prevent these horrible accidents.

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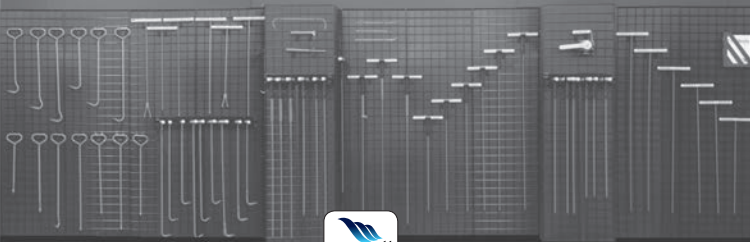


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BACK TO THE DRAWING BOARD

Tim Haeg adapts advanced onsite system designs to meet growing customer demands, challenging soil conditions and shifting regulations in the land of 10,000 lakes

By **Scottie Dayton** | Photos by **Brad Stauffer**

Inspecting onsite systems for Stearns County Environmental Services, the county's planning and zoning division, enabled Minnesota regulator Tim Haeg to see a broad spectrum of materials, equipment, practices and workmanship. In March 2000, he left the public sector to open Watab in St. Joseph, Minnesota. The company specializes in onsite system designs and inspections. Finding solutions to the common construction errors Haeg had seen enabled him to design better systems.

"From day one, I've never had a slow spell," says Haeg, 44. "I did 200 jobs that first year, two-thirds of them design and the remainder inspections. Every year has shown growth, despite the work becoming progressively more complicated."

By 2015, Haeg and his staff had doubled production, completing 424 projects. Referrals and repeat customers keep his service board full. Haeg's commonsense approach to projects includes treating each one with respect and persevering until he has a quality product. "Our business model has rewarded us with the best customers — people who are interested in seeing things done well," he says.

CLOSE TO HIS ROOTS

Haeg's desire to stay near his birthplace in Collegeville, Minnesota, has shaped his life. In 1994, he graduated from Saint John's University, with a major in biology specializing in plants and a minor in environmental

Watab Inc., St. Joseph, Minnesota



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EMPLOYEES:	6
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ASSOCIATIONS:	National Onsite Wastewater Recycling Association, Minnesota Onsite Wastewater Association, Central Minnesota Builders Association
WEBSITE:	www.watab.net

studies. He found employment that kept him close to home. "My biology degree made me the top candidate for the position of onsite regulator at the county, and I enjoyed working with the contractors on job sites," says Haeg. He was certified as an inspector through the University of Minnesota.

In 1996, the Minnesota Pollution Control Agency revised its septic code to require soil testing and an onsite design before issuing building permits. Designers also had to be certified. "At the time, plans were hand-drawn and

<<OPPOSITE PAGE: The Watab crew includes, from left, Megan McNair, Ben Pflueger, Tim Haeg, Fletcher McNair, Jen Burg and Don Fischer.

>>RIGHT: Ben Pflueger measures and stakes a future septic system drainfield. In the background Don Fischer and Tim Haeg gather data for the new system.

contractors had difficulties working with them,” says Haeg. “They’d ask me to interpret the designs, and I’d offer suggestions to help them make informed decisions.”

When Haeg left the county, the contractors still wanted his help. They also asked him to design systems. He opened Watab, an Ojibwa noun for “river with spruce roots.” The Watab River flows through the area and into Watab Lake, so the name is synonymous with clean water, Haeg explains. The contractors he helped at Stearns County formed the basis of his clientele.

Scheduling became Haeg’s biggest challenge, because nothing moves until counties have the required onsite design. “Whether clients need an inspection, maintenance or a design, it’s their most important project,” says Haeg. “Our philosophy is to treat every person’s project as if it is our most important job.”

RAMPING UP

In 2001, Haeg bought a Bobcat 331 mini-excavator to dig test pits. Two years later, he bought a Bobcat S205 skid loader and hired installer Don Fischer. (Fischer has since been certified as an onsite inspector, designer and service provider.) “My brother Greg also worked with me for a few years,” says Haeg.

Office manager Megan McNair followed in 2005. “Her degree in exercise physiology brings a different, beneficial perspective,” says Haeg. “Although we’re an eclectic crew, Megan nevertheless tries to influence us. She recognizes ways to improve our diets, to keep us hydrated, or to remind us about health and wellness.”

Ben Pflueger, who joined the team in 2012, is a certified inspector, designer and installer. “Jen Burg started here doing part-time office work when she was a high school senior,” says Haeg. “Then she worked for the county in a position similar to my old job before I hired her again in 2013 to help develop drawings.” Megan’s brother, Fletcher McNair, provides seasonal help while attending college.

Haeg’s design work has always been 90 percent residential and 10 percent commercial. Residential systems average 600 gpd with designs split 50/50

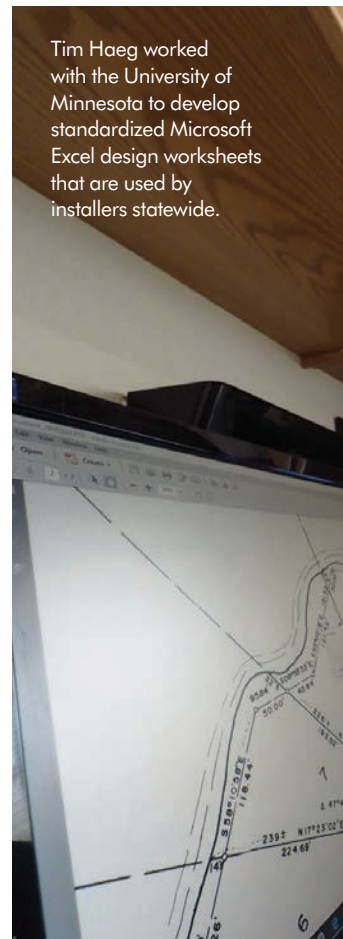


between replacement and new construction. Conventional rock-and-pipe drainfields or Quick4 chambers (Infiltrator Water Technologies) work best in the area’s glacial till, glacial outwash (sandy plain), and lacustrine (clay and silt) soils. “In-ground systems and Wisconsin-type mounds are typical, but we also design many box-type mounds and sand filters,” says Haeg.

Haeg frequently tackles challenging sites requiring creative solutions, but the technologies he chooses depend on available suppliers and support resources. “As service providers, we see MicroFast (Bio-Microbics) and Nibbler (Aqua Test) aerobic treatment units performing well,” he explains.



Don Fischer digs a test pit at an onsite customer's home in Avon, Minnesota. He's using a 2007 Bobcat 331 mini-excavator.



Tim Haeg worked with the University of Minnesota to develop standardized Microsoft Excel design worksheets that are used by installers statewide.

"They dovetail with our precasters — Brown Precast (Brown-Wilbert), Amcon (Amcon Block and Precast), and Wieser Concrete Products — and suppliers Granite Water Works and Pipeline Supply."

"Our business model has rewarded us with the best customers — people who are interested in seeing things done well."

Tim Haeg

DESIGN CHALLENGES

Haeg's licensure as an advanced designer allows him to work on projects with flows up to 10,000 gpd. Flows greater than 10,000 gpd must be designed by a professional engineer.

Like most designers, Haeg's common challenges are lack of space, setbacks and disturbed or filled soils. Frequently, his soils also contain buried treasure. "People have lived here for generations," he says. "Don and Ben were dig-

ging test holes in a wooded site recently and encountered the foundation of an old farmhouse. Don kept moving the holes back until they found native soil suitable for a mound."

As design opportunities arose, Haeg rectified construction errors he had noticed as a county inspector. Sagged force mains from the pump tank to the drainfield topped his list. "Minnesota's frost depth is 42 inches, but pump lines are usually buried 24 inches deep," he says. "Because contractors were nervous about damaging the tanks, they often didn't compact the backfill around them properly." The settling ground pulled down the pipe, creating a belly in which the drain backwater froze. Haeg's designs specify sleeving the force main in 4-inch Schedule 40 pipe to help minimize settling.

A 1996 code requirement for inspection ports caused the next problem. When Haeg tried to remove inspection caps, the whole pipe often came out of the hole. "Glue isn't the answer because the ABS plastic in drop boxes won't bond with PVC pipe," he says.

Haeg encouraged installers to use mechanical fastenings, but they soon found some screws lasted longer than others. Haeg disseminated that information while visiting with contractors. "Our goal is to help everyone install the proper equipment, while making it long-lasting and serviceable," he says.

Before 2008, the biggest service obstacle was risers buried 2 to 3 feet below grade. Instead of excavating them, pumpers cleaned septic tanks via the 4- or 6-inch inspection port, an approach with dubious results. The 2008 code revision required risers at grade for new installations. Stearns County went further, requiring all risers be brought to the surface. When Haeg performs an inspection, he orders the tank pumped and makes sure access is to grade if it wasn't already. He uses 24-inch Ultra-Rib risers (Orenco Systems) ordered through Granite Water Works.

TECH TURNING POINT

A pivotal moment for Haeg came in 2003 when he invested in Vectorworks CAD software. The purchase was quite the plunge, but it paid huge dividends. Haeg designed a site plan template, and soon everyone involved in his projects knew exactly where to look for certain information.

Contractors forwarded the designs, saved in a PDF portfolio, along with background information and test results, to wholesalers for material takeoffs and orders. In return, Haeg tried to accommodate contractors who preferred certain suppliers by specifying the products they carried. Today, familiarity with Haeg's standardized plans helps contractors find the information they need for accurate bids and construction.



WHEN I'M NOT WORKING

Collapsing with pneumonia after his first year in business taught Tim Haeg, owner of Watab in St. Joseph, Minnesota, the importance of separating his professional and private lives. However, the confessed workaholic must physically remove himself from the work environment before he can relax.

His favorite retreat is pheasant hunting in South Dakota. "Last summer, my friend and I spent all our free time building a hunting lodge there," says Haeg. "The hunting is spectacular."

Early this year, Haeg's old yellow Labrador retriever died and he brought home a yellow lab puppy in March. He sent Murdo to a professional trainer, who taught him to be a disciplined hunting dog. "I'm counting on Murdo to help me become a better pheasant hunter," says Haeg.

Somewhere between Thanksgiving and Christmas, when the work slows down somewhat, ice fisherman Haeg enjoys catching a meal of panfish in the lake across the road or at a local secret spot. He has also flown to Alaska to angle for halibut in Cook Inlet and salmon in the Kenai River. His health remains excellent.



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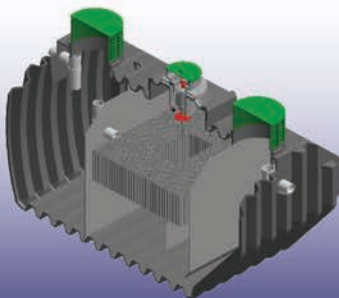


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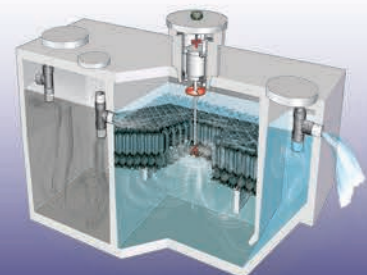


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<<LEFT: Tim Haeg performs a site evaluation comparing soil samples in a test pit with a Munsell color chart. A Watab Inc. Bobcat 331 mini-excavator is shown in the background.

BELOW: Jen Burg works with CAD drawing program Vectorworks and Stearns County GIS website maps to design a system.

“Whether clients need an inspection, maintenance or a design, it’s their most important project. Our philosophy is to treat every person’s project as if it is our most important job.”

Tim Haeg

“CAD software helps us interface with other professionals such as surveyors, engineers, and manufacturers’ support staff,” says Haeg. “For example, we import the surveyor’s AutoCAD file and develop the site plan on top of his survey. It adds another level of accuracy to our work.”

When Haeg occasionally has questions about which technology best suits a site, he looks to his peers for recommendations. “I work with local regulators and the University of Minnesota engineers, but most often our suppliers help determine the best available choices,” he says.

A recent example involved owner Matt Lee of Aqua Test helping Haeg develop estimates for an onsite system serving a new coffee shop/restaurant with a small kitchen and bakery. “Matt acted as a sounding board for my ideas,” says Haeg. “Rather than generalizing the entire wastewater flow, we looked at the nature of each waste stream separately. Together, we met the client’s needs without overkill.”

MINNESOTA STAYS AHEAD

Another of Haeg’s clients razed his convenience store/gas station in preparation of building a bigger version with an expanded kitchen on the



same lot. “Our challenge was fitting an 1,800 gpd onsite system into a small footprint,” says Haeg. “We worked with suppliers Andy Winkler of Wieser Concrete and Tony Birrittieri of Petersen Products Company.”

The treatment train has a 1,000-gallon grease interceptor, 4,800-gallon two-compartment septic tank, 5,000-gallon equalization tank, and a 6,000-gallon two-compartment pretreatment tank with a 3.0 HighStrength FAST and 3.0 MicroFAST in series. The 3,000-gallon dose tank pumps to two 9- by 84-foot drainfields with Quick4 chambers.

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Before long, what Haeg was doing caught the attention of educators. "Minnesota is progressive in its approach to wastewater, and our regulations are somewhat foreign to people outside the Midwest," he says. "For example, why worry if septic tanks are watertight? It's interesting that what we take for granted in our area strikes people as remarkable in other parts of the country."

Haeg has spoken at CONEXPO-CON/AGG and the National Onsite Wastewater Recycling Association Installer Academy, both in Las Vegas. Closer to home, he shares his experiences at Minnesota Onsite Wastewater Association conferences and with Realtor associations. Several times a year, Haeg partners with the University of Minnesota Onsite Sewage Treatment Program to find suitable sites for field classes. "We dig the test pits and take students to see working systems, design sites and soil conditions," says Haeg.

Looking ahead, Haeg envisions expanding the business by creating a service and maintenance branch. "I see the need for all systems to have regular scheduled service calls and routine repairs," he says. "Repairs are often as simple as replacing an alarm float or effluent pump, which we stock."

When Haeg is ready to build his dedicated O & M crew, he will hire veterans. Three are already on his staff: Fletcher McNair, Fischer and Pflueger, all Marines. "They have a tremendous work ethic," he says. "I can't imagine a better group of qualified, motivated individuals." □



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Improper Use of 'Flushable Wipes' Costs Canadians \$250 Million Annually

By Doug Day

The Municipal Enforcement Sewer Use Group, composed of 29 communities in Ontario, estimates that flushable wipes cost Canadian utilities \$250 million per year in cleanup costs. It has been working with the International Standards Organization to develop standards for the word "flushable," and Canada's Competition Bureau is investigating companies for possible violations of consumer packaging laws and false and misleading labeling. While there are more than a dozen lawsuits in the U.S., Canadian utilities are so far depending on advertising in order to get consumers to stop flushing the wipes. According to *Alaska Highway News*, Metro Vancouver has a humorous \$200,000 "Adult Toilet Training" campaign telling its 2.5 million users that it's not OK to flush the wipes or anything besides "pee, poo and toilet paper." The Vancouver utility spent \$100,000 last year to unclog flushable wipes from pumps.

MINNESOTA

Nearly \$2 million is being used across three watersheds in Minnesota to upgrade onsite wastewater systems. The Clean Water Partnership loan program recently announced the \$1.9 million in low-interest loans and says it still has \$9 million in funds available for local units of government that want to "target the restoration and protection of a water resource such as a lake, stream or groundwater aquifer."

The Snake River Watershed Management Board received a \$400,000 loan to upgrade 27 to 33 systems that will prevent 136 pounds of phosphorus and 574 pounds of nitrogen from entering the groundwater. The Hawk Creek Watershed Project received \$1.05 million for 75 upgrades that will reduce 240 pounds of phosphorus, 5,300 pounds of total suspended solids, and 600 pounds of nitrogen a year. In the Heron Lake Watershed District \$450,000 in funding will be used to upgrade 30 systems, resulting in an estimated annual reduction of 304 pounds of phosphorus, 3.2 tons of sediment, and 807 pounds of nitrogen.

DELAWARE

A Delaware legislative task force is recommending a personal income tax increase and business license fee hike to fund restoration of polluted creeks, streams, rivers and bays. A similar plan proposed by Democrat Gov. Jack Markell in 2014 was defeated by lawmakers. The new proposal would charge individuals \$40 a year, up to \$80 per household on their income tax, and increase business license fees from \$75 a year to \$120. Reports indicate 94 percent of the state's rivers and streams have such poor water quality that fish can't thrive, and 85 percent are too polluted for swimming.

MASSACHUSETTS

The Tisbury Board of Health is dropping a plan to tax new homes for their contribution of nitrogen to area bodies of water based on water use and the type of onsite wastewater system. Instead, it is considering a requirement for denitrifying septic systems in all new construction or system replacements. Under the original proposal, newly built homes would be charged a semiannual fee based on the amount of wastewater produced and the type of treatment system. The annual cost for a three-bedroom home would have ranged from \$320 to \$3,200 depending on the wastewater system installed. The nitrogen tax plan was heavily criticized during a series of public hearings in June.

HAWAII

The U.S. Environmental Protection Agency has issued fines for illegal large-capacity cesspools in Hawaii, which recently became the last state to ban all new cesspools. Large-capacity cesspools, those that serve 20 or more people a day, have been banned since 2005 in the state. Hawaii County was fined \$105,000 for allowing illegal cesspools at a drag strip and a shooting range. Maui County was fined \$33,000 for those at a racetrack, and the state Department of Land and Natural Resources will pay \$50,000 for using them at a state park. Earlier this year, the EPA fined the U.S. Army \$100,000 for large-capacity cesspools at three military facilities in Hawaii.

KENTUCKY

The family of a 73-year-old woman who died when she fell into an abandoned septic system tank is suing the Metropolitan Sewer District of Louisville and a contractor, and is planning a class action lawsuit. The suit alleges that when the district connected all homes in an area to the sewer system in the 1990s, it was negligent in not backfilling tanks and in the oversight of its contractor, who has since gone out of business.

NEW YORK

Suffolk County has selected 20 winners in its lottery for new septic systems. It's the second year of the contest designed to help improve the area's water quality by reducing nitrogen from onsite systems. In the two years, 330 people have entered and 39 have won free systems, which includes installation along with monitoring and maintenance for five years. The systems, valued at up to \$20,000 each, were donated by six manufacturers in the U.S. and Canada. □

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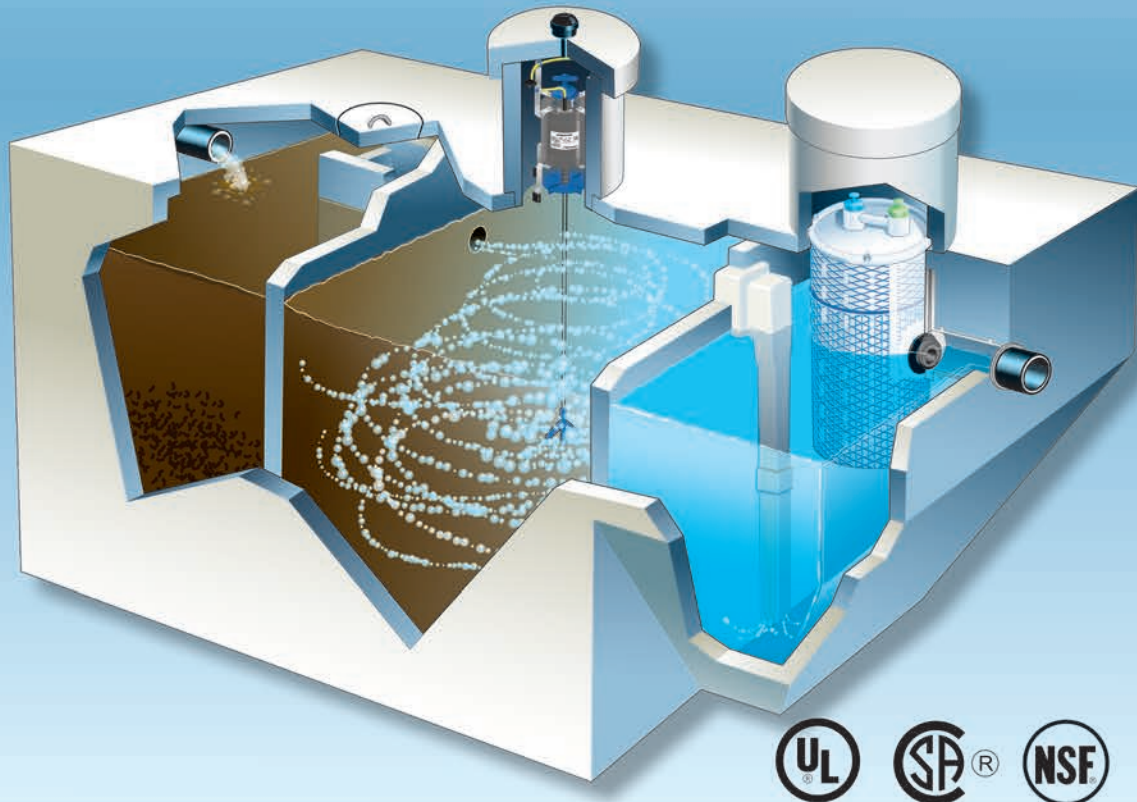
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Not All Onsite Inspections Are Created Equal

It's important for installers to know what type of septic system inspection is required based on customer needs

By Jim Anderson and David Gustafson

At the WWETT Show in February, someone told us we really need to have a session or workshop on inspection of new systems. The person had attended our workshops in the past on inspecting existing systems at the time of property transfer. In Minnesota, as a part of the onsite sewage treatment program, there is a specific inspection track and license that covers inspecting new systems.

If your state does not have such a program, it would be a very good idea to work with your state regulators and your state installer association to get one established. We go to a lot of places around the country where local regulators who inspect new systems have very little if any specific training about septic systems. In fact, we regularly hear the story, "I had the 'new' inspector on my site and I had to show them what a septic is!"

As professionals, we should find this unacceptable. It creates a lack of respect not only for the profession, but also for what are probably, on paper, very good regulations. The breakdown in communication and understanding usually happens in the field at the time of installation.

Qualified employees must meet all the education requirements to be licensed. The intent is to avoid a situation where the first real experience the inspector has with an onsite system is when he visits the site with the installer.

THE BASICS

We'll share our observations and thoughts about inspecting new systems. First, there are different levels and types of inspections:

- There is the kind of inspection mentioned above, the time-of-transfer inspection, what we call an "operation-level" inspection. The objective is to determine if all the necessary parts of the system are there, in good condition and working the way they are supposed to. This gives the buyer some level of assurance the system will work the way it should when they take possession of the property.
- There's an assessment of the system when you, as a service provider, are going to take over its care and management. In this case, it's not

enough that the parts are there and they operate. They also have to be in such condition that you can take over management without the potential to lose money by having to replace or repair parts considered part of your maintenance contract in the event of a breakdown. All parts of the system including the final soil dispersal area are evaluated.

- New system or compliance inspections are where all parts of the system are evaluated or assessed, but also compared to the most current rules or regulations. In the case of a new system, it obviously needs to meet those requirements to obtain an operating permit and the permit is not granted until they are met.

A compliance-level inspection may be required in some other situations and is often tied to property transfers or when the house is being remodeled with bedrooms or other rooms added. This would be done to make sure that the system would comply in terms of size and ability to treat any additional flows that may be generated due to the addition.

SETTING THE RULES

Local governments need to establish a comprehensive inspection program to enforce current code requirements. This should establish the frequency and times of inspection, the requirements of the inspection (what will be measured and when), a specific protocol for the inspections as they occur (what has to be left open, etc.), and allowable actions if the inspection cannot be performed within the time limits established. In addition, a certificate of compliance or noncompliance needs to be issued through the local unit of government with specific recommendations about what is needed to bring the system into compliance.

In Minnesota, the only people allowed to do these inspections are qualified employees of the local government or licensed inspectors. Qualified employees must meet all the education requirements to be licensed. The intent is to avoid a situation where the first real experience the inspector has with an onsite system is when he visits the site with the installer.

Specific items that should be addressed within the certificate of compliance (or noncompliance) include property and property owner identification, scale drawing of the system location with all setback distances indicated, such as property lines and easements, buildings and well setbacks.

To provide an idea of the scope of this requirement, the Arizona code lists 25 different setback requirements that must be addressed. This may



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sound on the surface like a minor detail, but it is in fact a significant activity. Finally, and probably most important, a field check of the soil conditions must be conducted. This includes evaluation of whether the system design incorporates the correct soil loading rate. The soil evaluation should also include an analysis for any limiting soil layers (water tables, dense impermeable horizons) and bedrock.

DECIDE FOR YOURSELF

The bottom line is a compliance inspection involves a lot more time and effort than an operation-level inspection. It's up to you to determine the details of an inspection for a system you plan to take on as a service provider. In future columns we will address some of the specific items in a compliance inspection and what it will take to implement them. □

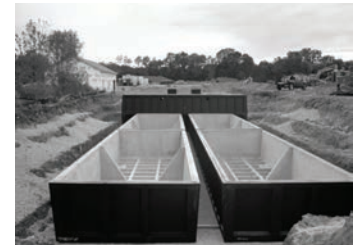
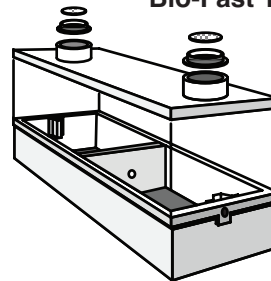
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One Lot. Two Systems. No Room to Spare.

Indiana's Blazer Farms meets the challenge of fitting commercial and residential onsite systems on a single lot and working around a filling station and parking lot

By David Steinkraus



When a business in Cassville, Indiana, changed hands, the local health department wanted changes. Wastewater from the gas station, as well as a nearby house, was emptying into a drain tile that discharged into a county-regulated ditch that in turn discharged into a creek. The health department required a modern onsite system for both business and home.

The county approved a permit for the house. The gas station was more complicated, and both buildings were on the very same small parcel of land. "We had about 4/10ths of an acre to work in, including land for the buildings, parking and driveways," says installer Dick Blazer, owner of Blazer Farms, Kokomo, Indiana.

That wasn't the end of complications. Underlying the soil, about 47 inches down, is glacial till. Blazer had to stay out of that. This part of Indiana also has a very high water table, typically 8 to 12 inches. And a couple 100-foot well setback zones from neighboring properties intruded into the space Blazer had to work in.

FINDING A SOLUTION

Because of the size of the lot and the service station owner's plan to eventually serve food, the county specified an Aero-Tech aerobic treatment

unit. Final treatment is done with an Advanced Enviro-Septic system from Presby Environmental.

From the rear of the gas station, effluent flows about 10 feet through 4-inch Schedule 40 PVC pipe into a 1,500-gallon, two-compartment concrete tank from McCreary Concrete Products in Rushville, Indiana. The tank is divided in half, and both sections settle solids. A filter at the outlet intercepts particles before water flows by gravity about 8 feet into a 2,000-gallon fiberglass trash tank from Aero-Tech. A Zoeller E-57 pump time-doses wastewater into the 2,000-gallon Aero-Tech fiberglass ATU tank.

An Aero-Tech pump next moves water into a 1,500-gallon concrete dosing tank from McCreary. Two Liberty 250 pumps, controlled by a panel from Aero-Tech, alternately send water out to the Presby sand beds.

Water is dosed through 1 1/2-inch Schedule 40 PVC to a spider valve. This was a change from the engineer's drawings because the distribution boxes originally specified would have required being set 3 feet above ground in order to get proper gravity filling of the lines. The spider valve can accommodate orifices of different sizes to allow precise dosing of each bed. There are three outflow lines, one for each absorption bed. Two lines use 3/8-inch holes, and one needed an 11/32-inch hole. The spider valve is covered by a Tuf-Tite riser and lid for servicing and adjustment. Tuf-Tite

<<OPPOSITE PAGE>> FAR LEFT: Lee Dickerson, left, and Mike Parrish, right, check measurements on one of the sand beds that treat wastewater using Presby AES pipe for the absorption bed. In the excavator cab is Dick Blazer.

RIGHT: Dick Blazer, in the cab of the Kubota excavator, backfills a trench at the Cassville project. The concrete settling tank at left receives wastewater first. Next come the two Aero-Tech tanks at right, one a trash tank and the other for aerobic digestion. Concrete tanks utilize Tuf-Tite risers and lids.

BELOW: Dick Blazer built this metal trough for sprinkling sand to create a sand bed. There is no compaction, and at about \$250 it was an inexpensive tool to build, although it has grown larger as Kubota excavators have grown larger. (Photos courtesy of Dick Blazer)

SYSTEM PROFILE

Location:	Cassville, Indiana
Facility:	Gas station and private residence
Designer:	Wyatt Johnson, 40th Parallel Surveying LLC, Tipton, Indiana
Installer:	Blazer Farms, Kokomo, Indiana
Type of system:	Aero-Tech ATU and Presby AES system
Soil:	Clay loam, compact glacial till at 47 inches
Hydraulic capacity:	1,350 gpd

products were used throughout the project except on the Aero-Tech tanks, which came with their own risers and lids.

The absorption beds are composed of three 60-foot runs of Presby AES pipe. Each bed is 62 feet long and 20 feet 6 inches wide, and has a 3-1 slope ratio. Below the Presby pipe is 12 inches of sand. Above is 6 inches of sand, capped with a foot of topsoil.

“We were right down to the absolute inch on installation. ... The owner didn’t want the tree taken down, and I don’t like to take them down, but we had to trim some roots in the way of the bed and the perimeter drain for the bed.”

Dick Blazer

Blazer graded the rest of the property to make swales directing surface water around the beds. He also installed a perimeter drain with a 6-inch tile running 10 feet outside each sand bed and 24 inches below it to intercept the high groundwater. Indiana code allows this to ensure absorption beds are not flooded.

The house received a simpler system. A 4-inch line runs from the rear of the house into a 1,500-gallon partitioned tank from McCreary. The 1,000-gallon section provides septic treatment, and the other 500-gallon section is a pumping tank. A Liberty 250 pump controlled by a float sends water about 80 feet to the home’s front yard, where there is another Presby bed that is 62 feet long and 16 feet 2 inches wide. This also received a perimeter tile to intercept groundwater.



ABOVE: Dick Blazer returns to check the control panel, from Aero-Tech, which alternately sends effluent from two Liberty pumps to Presby sand beds.

BELOW: These are two of the four sand beds serving a gas station and store in Cassville, Indiana. The beds are tightly spaced because of well safety zones extending from neighboring properties.



NECESSARY PRECISION

"We were right down to the absolute inch on installation," Blazer says. The space was already tight, and he found reality did not match the plans. A restricted well zone from a neighboring property was marked at 12 feet from the gas station property line, but it actually intruded 32 feet onto the property. "We had to scoot everything over to make it fit, and we curved bed No. 2 slightly to fit the space."

Then there was the tree in front of the house. "The owner didn't want the tree taken down, and I don't like to take them down, but we had to trim some roots in the way of the bed and the perimeter drain for the bed."

With no room to store material on site, sand for the beds was piled next to the street and moved to the rear of the property as needed to build the Presby beds. "We don't drive tracked equipment on a bed because we've seen the damage it can do. You can pretty well pack all the sand down even under tracks," Blazer says.

Sand beds should properly be built from the uphill side, Blazer says. To do that he uses a tool he fashioned for himself years ago. It's a metal trough about 2 feet wide, 18 inches deep and 10 feet long, and it fits on his Kubota 80 GX excavator. It accepts a whole bucket of sand from his Bobcat skid-steer, and the Kubota operator uses the trough like a big scoop to sprinkle sand where it's needed to build a bed. As Kubotas grew larger over the years the trough was lengthened to match, but the original cost of the trough was about \$250, Blazer says.

Restoration was done with 27 loads of topsoil. Blazer's Land Pride seeder, attached to the Bobcat with a homemade hitch, spread a mix comprised of a large portion of rye with some fescue and bluegrass. The rye sprouts and grows quickly to hold soil in place. In subsequent years the

slower-spreading fescue and bluegrass take over and provide a lasting cover, Blazer says.

Even with the advanced system in place, the gas station is not yet meeting the owner's full business plan. Originally that plan called for a simple kitchen to heat or fry prepared food and serve it, but the state did not approve that part because the wastewater system installed had to be smaller than usual to fit the available land area. The state wants to ensure the system has sufficient capacity, Blazer says, so he is monitoring the effluent strength for a time.

"There is no other option for this property. Without this system the property would have to have been condemned and the business closed," Blazer says. □

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Top Truck-Accessory Picks for Holiday Gift Giving

Your presents will be requested under the Christmas tree when you offer up these sweet work truck additions — and a bonus scale model for display

By Ed Wodalski

It's the holiday season. And like most people you've probably been wondering what to buy for that special someone on your gift list. If they own, drive or just like trucks, we have a few ideas that might save the day.

A blast of air

If you're looking for something with flare as well as practicality, give Truck Lungs a look. Basically, they're powder-coated nerf bars filled with compressed air. Customizable step plates are available. Finished in a semi-gloss black (other colors available), the onboard air system mounts like any other running board. Primarily designed for pickup trucks, they can be built for any-size vehicle. Made to power air tools and pneumatic jacks, remove dust and inflate tires, air capacity ranges from about 8 to 14 gallons at 200 psi. Each kit comes with a fill adapter that works with any air compressor. A small 12-volt compressor, mounted under the truck, is available to automatically fill the lungs.

Tanks are 3.5 inches in diameter and have a wall thickness of 0.12 inches. Mounting brackets are made of 1/4-inch steel. Pricing begins at \$750. Delivery typically takes two to three weeks and gift certificates are available. www.trucklungs.com.



See and be seen

For those late nights and early mornings, Maxxima offers a 1.8-inch round LED auxiliary emergency warning light with amber clear lens. The light is brighter and uses about 10 percent less energy than a standard halogen.

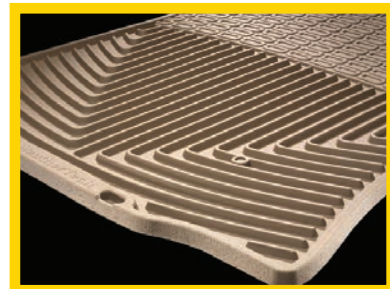
Distributed by Virgo Fleet Supplies, the light features 17 selectable flash patterns, synchronized/alternating flash, control module, chrome bezel,

flange and gasket. It sells for \$59.95.

To keep your truck showroom sharp, Virgo also offers Mojo paint protectant and Mojo metal polish. Both come in a 12-ounce bottle and sell for \$20. It is a polymer-based formula designed to clean, polish and protect. The metal polish is formulated for chrome, stainless steel, aluminum, copper and brass. www.virgofleet.com.

Keep it clean

Winter slop dragged into the cab can make it a challenge to keep a truck clean. All-weather floor mats from WeatherTech feature deeply sculpted channels designed to trap water, road salt, mud and sand. They're engineered to prevent curling and cracking in subzero weather. The mats also have anti-skid ridges to prevent shifting and come with a protective, nonstick finish for easy cleanup. Available in black, tan and gray for select-model trucks, the mats sell for \$54.95.



For even greater protection, WeatherTech offers laser-measured FloorLiners. Made of a high-density material, the liners feature a rigid core for extra strength and tactile feel. The grippy underside is designed to reduce movement. Channels carry fluid and debris away from shoes and clothing. Available for select vehicles, the laser liners sell for \$109.95, depending on vehicle configuration. www.weathertech.com.

Get organized

Nothing is more frustrating than trying to find something in a cluttered cab. It gets even worse when you set that cup of coffee on the dash and it spills on your work orders. Raney's Truck Parts offers the V-Truck custom dashboard system in a variety of colors for Freightliner, Kenworth, International, Volvo, Sterling, Western Star and Mack trucks.



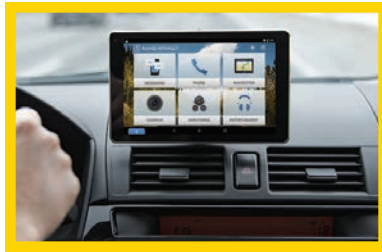
The removable shelving (\$139.95) mounts on your dashboard, providing added space for your phone, pens and laptop. It even serves as a portable travel table when you stop for lunch. The shelving comes with gray and black carpet and chrome finish or in all black. Mounting hardware is included. www.raneystruckparts.com/dashboard-shelves.

Give it a rest

Long days on the road can lead to sore elbows and shoulders — especially if your truck doesn't have an armrest. The RoadPro padded armrest from Pickup Specialties is a moveable pad that can be used with the window up or down. The armrest installs in seconds with no tools or glue and is completely adjustable — simply slide it forward or back. Available in dark gray, light gray, tan and black, the armrest sells for \$19.95 and fits most pickups, vans and semis. www.pickupspecialties.com/truck_and_car_padded_arm_rests.htm.

Stay connected

Making its debut at the 2016 Chicago Auto Show, Rand McNally's OverDryve dashboard tablet is a great technology update for older vehicles. The tablet provides hands-free calling and texting (phone required), and enables you to navigate to your next destination and receive collision warnings. Features include magnetic mount; 7-inch, high-definition screen; and Bluetooth wireless technology. Options include wireless backup camera, driving-habit analytics, vehicle diagnostics and tire pressure monitoring. Base price: \$399. www.myoverdryve.com.



Scale-model trucks

Let's start with a new vacuum truck. Not the full-size version, although that would be an awesome gift, but a 1/34th scale model — true in detail right down to the hoses, pumps and graphics.



Bob Scribner of Granite State Collectibles in Rindge, New Hampshire, has built model trucks since 1989. He got the idea by paging through a friend's copy of *Pumper* magazine. With over 50 different cabs available, he requires a series of close-up photos of your rig, showing every possible angle. Delivery takes four to five weeks, so you might have to leave a card under the tree saying it's on the way.

Portable restroom trucks are \$175 and up; vacuum trucks are \$229 and up. Graphics average about \$35.

Scribner airbrushes each vehicle, using authentic automotive paint. Vacuum trucks are about 12 inches long and portable restroom trucks are about 8 inches long. All have real rubber wheels. He also has "toy" septic pump trucks with Kenworth, Navistar, Freightliner or Peterbilt cabs for \$28 each. www.granitestatecollectibles.com.

STUFF THE SACK

Hopefully, you've found an item or two that will bring a smile to the trucker on your gift list this holiday season. □

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Aero-Stream Risers Promote Safety and Easy Installation

By Craig Mandli

Every septic system technician has dealt with the challenge of locating a buried tank cover. Not only are they required to locate the cover underground, but cold climates create the additional challenge of frozen ground, making inspection and service all the more difficult.

The Septic Tank Riser Kit, showcased by Aero-Stream at the 2016 Water & Wastewater Equipment, Treatment & Transport Show, is designed to conveniently bring tank access to the surface or allow for easy tank access in new system construction.

“Our risers are available in any length you could need to bring the cover up to just above grade,” says Aero-Stream President Karl Holt. “The kit includes the installation guide, butyl sealant rope, four Tapcon anchor screws to attach the adapter flange to the tank, and six stainless steel screws to attach the adapter flange to the riser ring.”

Aero-Stream risers are available in heights from 7 to 50 inches in 3-inch increments, with custom heights available up to 96 inches. The riser rings typically weigh less than 30 pounds, while the durable cover weighs less than 10 pounds, making transporting and shipping easy and affordable. Covers are tested to a weight limit of 2,200 pounds, but Holt suggests only normal foot traffic on them.

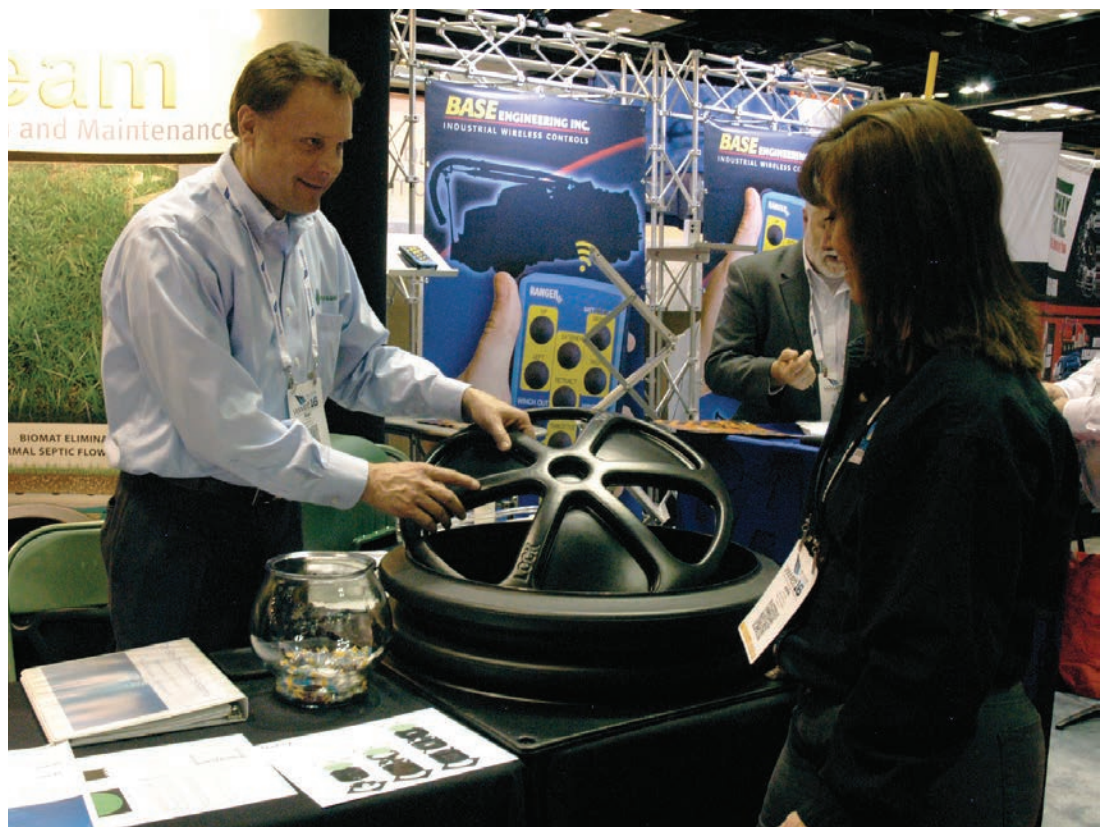
“All our kits ship via UPS Ground, and shipping costs are inexpensive,” says Holt.

Risers also come with Aero-Stream’s Integral Safety Barrier that provides added protection if the septic tank cover is removed inappropriately. The tank can be pumped without removal, but the barrier can be removed for servicing baffles. It fits 24-inch-I.D., double-wall corrugated, ribbed and smooth-wall pipe.

“The Integral Safety Barrier doesn’t require tools to install in our risers, and pops in in just a few minutes following installation of the riser,” says Holt. “That added security is a must. And while they are easy to remove, they can stay right in place for typical system pumping and maintenance.”

Holt says the product has been on the market for roughly 18 months and he’s encouraged by feedback so far.

“We have quite a few of these systems in the field right now, and installers



Aero-Stream President Karl Holt, left, discusses the Integral Safety Barrier that fits inside the company’s riser system. The barrier comes as part of the full riser kit. (Photo by Craig Mandli)

not only really like the safety barrier, but also that everything comes in an all-inclusive kit,” he says. “It really was designed to make the installer’s life easier.”

Holt was happy with the flow of installers past the Aero-Stream booth at the WWETT Show, as it gave him the opportunity to get the word out about his product to a wide audience.

“We’re using this show to create product awareness and get the word out about it to resellers,” he says. “We’ve gotten a lot of great leads and interest out of it, which is great for a relatively new product. The installers I’ve talked with are excited by products that can make their jobs easier, and this one can.” 262/538-4000; www.aero-stream.com. □

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Land Application Misunderstood in Big Sky Country

A state official overseeing decentralized wastewater would like to see an onsite and pumping trade association start up to improve consumer education

By Doug Day

It's a common problem in the onsite industry. As more people seek the peaceful rural lifestyle, conflicts arise with the way things are done outside the big city. That's true in Montana, as its natural beauty attracts more people to Big Sky Country, and where land application of septage is a common waste management strategy.

Land spreading is regulated by the Solid Waste and Septic Tank Pumper program at Montana's Department of Environmental Quality (DEQ). Septic tank installation is guided by DEQ's Water Quality Circular, but enforced by the state's 56 counties, which may have rules more stringent than the state.

Mary Hendrickson acts as the technical lead for the department, working with onsite and pumping professionals.



Mary Hendrickson
406/444-1808 or
MHendrickson@mt.gov.
DEQ

What is the relationship among states, counties and the onsite industry?

Hendrickson: Pumpers are regulated by DEQ Solid Waste and Septic Tank Pumper program according to the Septage Disposal and Licensure Law. All disposal sites must be approved, first at the county level, and then by DEQ. Counties have the opportunity to establish additional restrictions or requirements for septage land application sites under their jurisdiction. Both state and county officials have the authority to inspect sites and pumper disposal records.

Pumpers must be licensed by the state, but it's really very simple. They complete a license application and confirm that they

have the equipment necessary to do what they are proposing to do, a very easy process. There is no exam. That would require a change in state law and a board to oversee it.

DEQ doesn't regulate installers; there is no state testing or certification program. Most counties require installers to be licensed or certified locally. County requirements vary, with some providing classroom time to go over current regulations before taking an exam. Some require installers be certified annually and complete a set amount of continuing education. County

sanitarians provide training to installers in their counties, publish newsletters, and provide updates to regulations as necessary. We don't know how many installers there are; some are certified or licensed to operate in several counties. A standardized program would provide consistency among installers.

Onsite wastewater systems must be installed according to the current Montana Standards for On-Site Subsurface Sewage Treatment Systems that dictate the size and depth of the tank and drainfield. The type of system required depends on site-specific conditions. The standards do allow for flexibility in system design. However, installers must go through the design deviation and waiver process before installation.

There are no statewide requirements for pumping or maintenance of septic systems, but some more populated counties with a high concentration of onsite systems require pumping and maintenance every two or three years to minimize groundwater impacts.

Does the state offer annual training for pumpers?

Hendrickson: There are currently 155 licensed pumpers and the state provides classroom training to them annually, but it's not required. It could be a day or two depending on the content. We cover things from land application and how wastewater treatment facilities work to how a septic tank works, and we give them information they can take back to educate their customers, such as using certain products in their homes.

Several years ago we increased fees for pumper licenses. It was \$125 and we raised it to \$300. When we did that, we wanted the buy-in of our regulated community, so we formed a pumper advisory committee to help us. That provided support for our fee increase, but also ensured that part

"About 60 to 75 percent of pumped septage is land-applied. When we get complaints, I try to educate them on why it's beneficial and that it's a great way to use that resource. Most of the time that will alleviate their concerns as long as the pumper is operating within the regulations."

Mary Hendrickson

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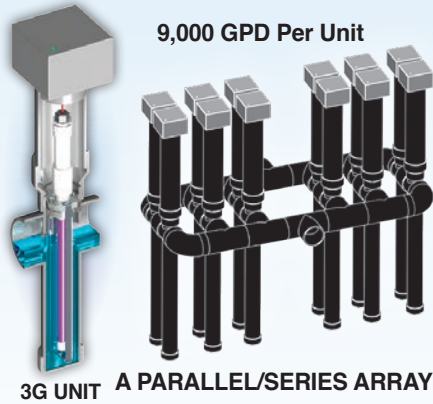
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of the money would go back to counties for their administration and another portion into our training account.

Typically, we've done the training in or near Helena (the state capital), but the last couple of years we just haven't had a lot of attendance because Montana is such a big state. So this year, we've decided to take our show on the road. I've set aside five communities where we're going to meet with pumpers and provide education on regulations and processes. We hope that the road show will encourage pumpers to attend, ask questions, and become more involved in the industry.

What current issues does the onsite industry face in your state?

Hendrickson: Pumpers are facing much more public opposition to the land application of septage. As developments emerge in rural locations, homeowners find the concept of land application distasteful and hazardous. Montana is a beautiful state and more and more people are moving here. There may be a land application site next door they didn't know about and they see a truck out there disposing of septage.

In the bigger cities, pumpers are able to take it to wastewater treatment plants. But I'd say about 60 to 75 percent of pumped septage is land-applied. When we get complaints, I try to educate them on why it's beneficial and that it's a great way to use that resource. Most of the time that will alleviate their concerns as long as the pumper is operating within the regulations. Our pumpers who do land application are doing a really good job. Both installers and pumpers can help overcome this by taking the time to educate homeowners about septic tanks.

This can be done by pointing out that they have an onsite system because they don't have access to a public or privately owned treatment system. Most wastewater treatment facilities in rural areas do not accept septage for disposal because of the impact they have on the balance of their

facility, so land application is often the only option for disposal.

County sanitarians are a huge help to us and play a pretty big role helping provide educational information to the public. DEQ has developed a comic book for the sanitarians that they can pass out to homeowners showing how a septic tank is installed and maintained. We also have a homeowners guide on our website (deq.mt.gov/Land/solidwaste/pumpers).

Would you like to have an onsite association in Montana?

Hendrickson: Yes, definitely. No. 1, they could help us identify training topics. That's one of the biggest challenges I've faced in the last several years. We always ask them and I frequently make phone calls to find out what interests them so that training could be tailored to their specific needs. I appreciate what they do very much, but I'm not out there doing what they do.

An association would also help by providing consistency. They all do things a little differently. If there were an organization, they would probably feel freer to share information about issues, problems they've had and how they resolved them, and be willing to reach out to people about their problems. An association would also have a stronger voice in helping to refine the regulations.

Have there been any discussions of forming a group?

Hendrickson: There has been. They've discussed it for years, but no one has stepped forward to lead the effort. Getting people involved is difficult because Montana is such a huge state. □



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GPS Insight was ranked No. 3,668 on *Inc. Magazine's* 500/5000 list. The *Inc. 5000* list recognizes the 5,000 fastest-growing companies in the U.S. GPS Insight has ranked on the *Inc. 5000* for the last seven years.

SkyBitz names VP of sales

Carolyn Rehling was named vice president of sales for SkyBitz Local Fleets division. Rehling has 20 years of executive sales experience. □



Carolyn Rehling

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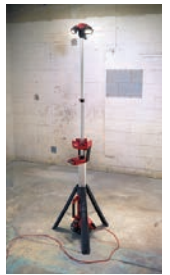
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Milwaukee Tool M12 and M18 LED lighting

Milwaukee Tool introduces several new lighting solutions. The M18 LED tower light/charger delivers 3,000 lumens and features a trifold head design for multidirectional lighting and built-in charger. The unit can be set up in five minutes and has a runtime of 17 hours. The M18 Radius LED site light is IP54 rated, produces 4,400 lumens of overhead light and can be controlled remotely using Milwaukee's One-Key app system. Users can adjust brightness, set lighting schedules and adjust 180 degrees either direction from the mobile phone app. The M12 Rover LED floodlight is designed to provide ample light in a more versatile package than the standard halogen flood lamp. It is capable of 1,000 lumens for up to 15 hours, has a magnetic base and is IP54 rated. The M18 four-mode LED searchlight features a beam distance of 700 yards and 1,250 lumens, and is ideal for providing overhead, long-distance and task lighting. The unit is IP54 rated and has 198-degree head rotation. 800/729-3878; www.milwaukeetool.com.



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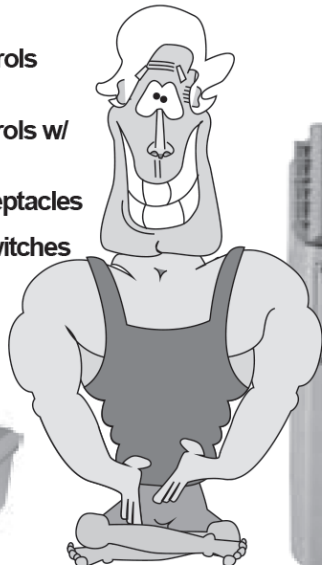
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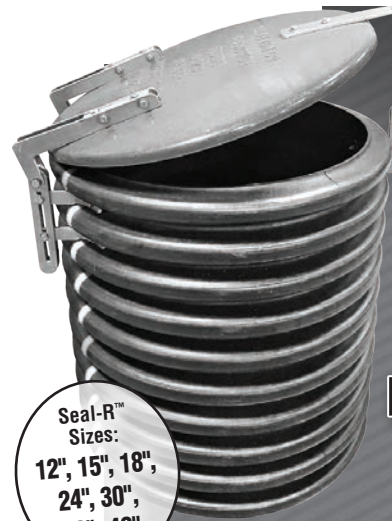
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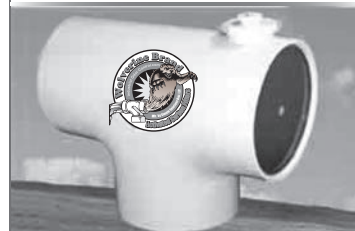
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