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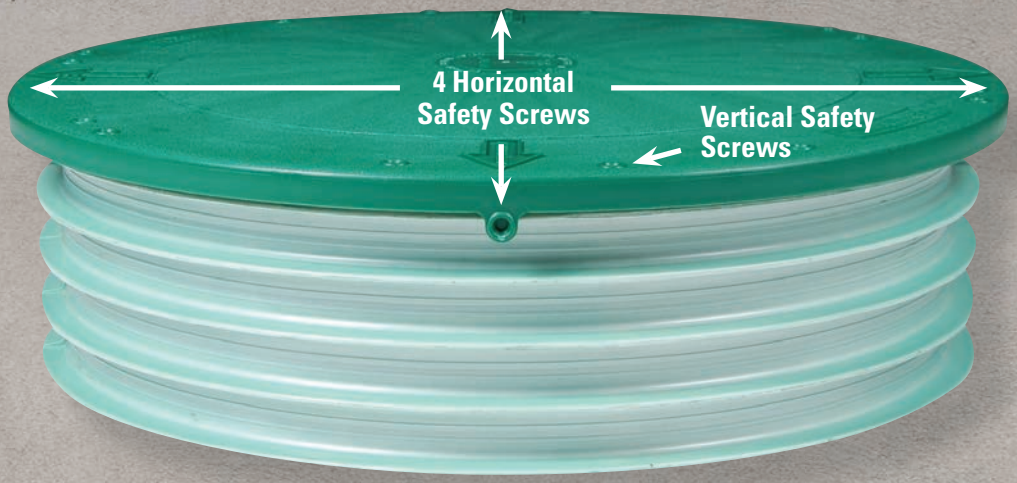

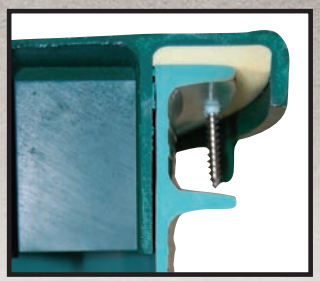

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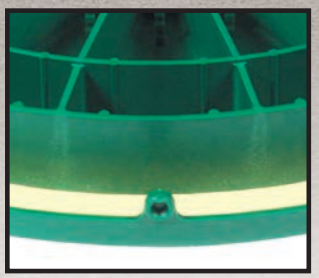

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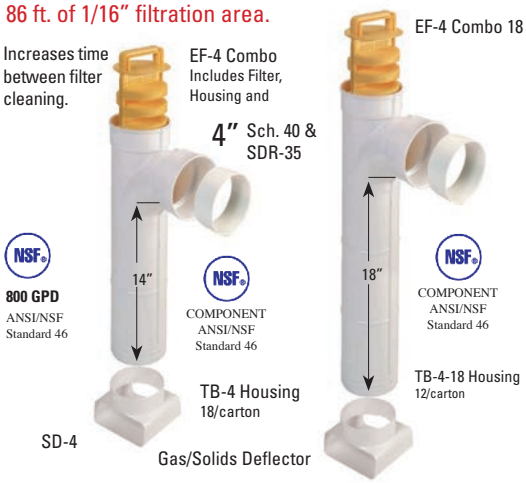

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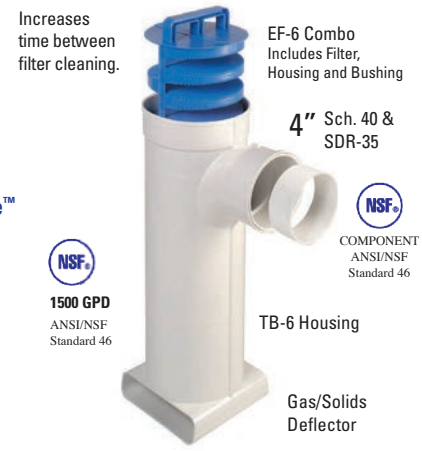

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Basic Training: Siting the soil treatment area
System Profile: Supersizing a school system in New York

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ADVERTISER INDEX

February 2021

Enjoy this issue!

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

Jim Kneiszel

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

Are You Prepared For the Rural Revolution?

A workforce free to move about will be singing "Take Me Home, Country Roads," and demanding more from onsite installers in the coming years

Triggered by the COVID-19 pandemic and 21st century technology advances, huge lifestyle changes will be coming fast and furiously in the coming years. The work-at-home revolution. A desire by folks to live wherever they choose. Spreading out. Downsizing. Saving money. Seeking peace and quiet. Returning to our agrarian roots.

Whatever the motivation, a movement is starting with city dwellers migrating to the country and building a future in new homes on larger plots of land or re-inhabiting farmhouses and long-forgotten rural homesteads. And these new-age country folks are bringing certain quality-of-life expectations along with them.

They want the level of infrastructure city services to continue out in the middle of nowhere. They also want to live a greener lifestyle, with a concern for clean water, renewable energy and construction best practices. And because they are relocating with the resources of the big-city jobs they have held for years, the telecommuters will have the funds to realize these objectives.

Many millions of people used to trudge to large office complexes every workday. This necessitated people living near to their jobs or making very long commutes to work. **Suddenly that's no longer the case.**

WHERE YOU COME IN

Enter the professional onsite installer. You can provide this new breed of customer with wastewater systems that will handle spiking flows, treat their waste effectively and efficiently, and provide systems that will satisfy stringent environmental expectations. Homeowners and the commercial businesses that follow them into rural towns will demand water reuse for irrigation purposes, recharging of the aquifer right at home, and capacity for potential wastewater service expansion in the future.

And you and your crews will give it all to them.

But let's backtrack a little bit. How do I know this rural renaissance is going to happen? That's a fair question. Especially since if what I say is true, many of you will have to reevaluate your business plans to meet this rising demand. Looking ahead, you may want to hire and train new crews, buy equipment that allows you to work faster and more efficiently, overall invest a lot more money in what has been a lean and successful installing business.

So consider a few of these trends I'm seeing, and experiencing, and maybe you'll agree with my premise:

The pandemic pushed many employers to a radical new human resources model.

Many millions of people used to trudge to large office complexes every workday. This necessitated people living near to their jobs or making very long commutes to work. Suddenly that's no longer the case. Many employees were asked to work from home when the pandemic hit last year, and when telecommuting worked out fine, their employers encouraged them to stay home.

This happened in my family. My wife's employer decided to allow anyone to work from home permanently, and a vast majority of the staff took them up on the offer. This meant the company could save money by consolidating its owned or rented office space and my wife and I could live anywhere we wanted to from now on. This outcome would have been unimaginable if not for something like the deadly coronavirus. And I doubt we will return to the centralized work model when the pandemic eases.

My wife grew up on a farm and moved around to several cities to follow her career. Now her career path likely will no longer dictate where she lives. So will she move back to the country and the rural lifestyle she had before? We're not sure about that yet, but think of the millions like her who can now live in the country if they want to, and be nearer their extended families.

After living in the "rat race," people yearn for the peace and quiet of small towns.

Let's face it. Most folks associate big cities with noise, pollution, traffic and crime. If they don't prefer the big-city amenities, many people would be happy to walk out their back doors and see farmland, quiet woods, or a lake

or river. Seems like that is the retirement dream of many people already — why wouldn't they make that dream a reality before collecting the gold watch and signing up for Social Security benefits?

People seek a lower cost of living and less regulatory hassles in their day-to-day lives.

Over the past century, people have migrated into cities because that's where the work was and because fewer and fewer people could make a living off the land. That has caused the downfall of so many rural areas across the country. They have become ghost towns with empty houses and deserted Main Streets. Consequently, there is now a cost disparity between the crowded cities and suburbs and rural towns and villages.

Families can sell their homes in the city and buy houses with larger properties in the country for less money. Or they may buy vacant land and build a new house. There are fewer regulations over home construction and remodeling in rural towns and counties, so they are more often free to do as they please with a dwelling.

Neglected houses, new builds will require extensive wastewater infrastructure.

The repopulation of rural regions will bring along the need for untold numbers of septic system upgrades and new system installs. While municipal wastewater treatment systems, or the "big pipe," cover most of the urban wastewater users, a great majority of homes and businesses in rural areas and small towns will require decentralized wastewater service.

That means a huge demand is coming at the same time installing companies are already busy and concerned about the future workforce. Installers frequently report to me that they look around at their competitors and see an undeniable graying of the industry. More installers are contemplating retiring than hiring a new generation of workers. Installers face the same challenges to attract workers as all the other trades needed to rebuild this country. So those who can make the argument that this should be an attractive career path will benefit the most.

BE PREPARED

As winter melts into spring, I ask you to think about the massive work and lifestyle changes that will forever alter the path of onsite installers. Consider the evolving health concerns and technological revolution that will let people migrate to live wherever they choose.

In the past year, installers have let me know their phones are ringing more with customers wanting to repair or install onsite systems. I'm convinced this will only intensify in the years ahead, with the growth of the installing community limited only by the added labor and energy at the working end of the shovel and excavator.

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MAJOR KEYS

Media Filter Installation

Proper installation of the treatment train components is essential to media filters working effectively and efficiently over a long life span. There are many different options available for media filters these days, and even though they are all a little different, three key steps for media installation are common with all them. This exclusive online article spells them out. **onsiteinstaller.com/featured**

Overheard Online

"A little self-inventory can be critical for identifying vulnerabilities that need to be addressed, opportunities that need to be exploited, and strengths begging to be reinforced."

— 4 Tips for Conducting a SWOT Analysis for Your Onsite Business
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FROM THE CLASSROOM

Answers to Trainees' FAQs

This month's cover star, Chad Widmer, owner of Soilworx, is also a certified trainer in Alberta, Canada. In this online article, Widmer shares the answers to questions he's frequently asked by his installing students. **onsiteinstaller.com/featured**

TEACHING TIPS

Training That Sticks

You've probably been asked to take someone under your wing and teach him or her a skill, show how to perform a particular task or even how to use a new piece of equipment. It's in the best interests of everyone — you, the trainee and your employer — that you do it well. But doing a good job of instructing takes more than just saying, "Here, watch me." This online article details six things to keep in mind when you're passing along your hard-earned wisdom. **onsiteinstaller.com/featured**

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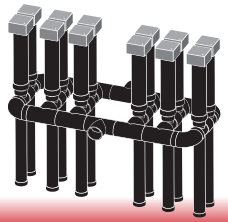

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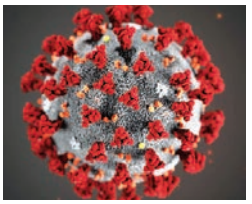

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CLASS IS IN SESSION

Onsite system designer Chad Widmer trains installers to take on work in the great white north of Alberta, Canada

By Ken Wysocky

Chad Widmer enjoys a good challenge. And as a designer of septic systems, the owner of Soilworx — based in Okotoks, Alberta — runs across his fair share. Like huge homes built on tiny lots, where space for a system is an afterthought. Or a system for a business with unusual waste products. Or developing a creative disposal solution for a local zoo.

Widmer also is one of only four certified design and installation trainers in the 250,000-square-mile western province. So when he isn't designing systems or doing the odd installation here and there, he's busy teaching would-be contractors so they can pass certification tests for system design and installation.

As if that's not enough, Widmer also runs a private mentorship program in which he works with newly licensed contractors, walking them through their first couple of installations.

"Some guys take the course and get certified, but then never put a system in the ground," Widmer explains. "The certification doesn't teach you how to dig a hole or lay pipe.

"So I work with guys that need a little extra help," he says "I help them dig their first test pits, do the soil work, critique their designs and so forth."

Does Widmer enjoy the variety of duties? "You bet, especially the projects that are a little outside the run-of-the-mill," he says.

"Sometimes I'm the second or third designer on a project because other designers said there's no solution except for holding tanks," he continues. "But in all those cases, I came up with solutions … you just have to be more creative.

"I tell clients that there's always a solution, but sometimes it requires a bit more money and some compromises. But it's always fun — I enjoy it."

Soilworx
Okotoks, Alberta, Canada

Owner:	Chad and Kathy Widmer
Founded:	2004
Employees:	4
Service area:	Central and southern Alberta
Specialties:	System design and design/installation training
Website:	www.soilworx.ca

HIGH-FLYING START

Established in 2004, Soilworx primarily designs systems for homes and small businesses. Widmer already was familiar with the industry, having worked for his father, a system installer, during summers while in high school.

From there, Widmer took a somewhat circuitous route to his current career. After earning a private pilot's license when he was in high school, he moved to Florida for training to become a commercial airline pilot.

Around 2000, Widmer was hired by Ameriflight, a commercial-cargo airline. He handled UPS deliveries to smaller towns and airports in western states. But then fate intervened in the form of the 9/11 terrorist attacks, which devastated the airline industry.

"That pretty much squashed any chances of a young pilot going anywhere anytime soon," Widmer says.

After bouncing around from job to job for a while, he heard that the Alberta Onsite Wastewater Management Association was looking for people interested in becoming certified designers and installers of septic systems.

On a site visit, Widmer compares soil samples to the Munsell soil classification chart. (Photos by Tracy Singer)

Widmer is shown opening the access and performing an initial visual check of the Premier Tech Aqua Ecoflo Biofilter media.

"I always was interested in architecture, so when I heard the words 'engineered designs of septic systems,' it definitely got me interested," he says. "So I jumped in with both feet and the rest is history."

When Widmer founded Soilworx, about half the company's business came from installations or excavation jobs and the rest from system designs. But the company's focus slowly shifted away from installations because he felt less suited to managing employees and maintaining equipment.

At this point, Widmer does only one or two installations year. To that end, the company owns a Bobcat E45 mini-excavator and skid-steer and a Caterpillar skid-steer. Designing systems for customers in central and southern Alberta now accounts for about 75% of the company's revenue; training, which Widmer started doing in 2105 after receiving AOWMA certification, generates the balance, he says.

SPACE RESTRICTIONS

Widmer periodically has to contend with large homes built on relatively small, 1- to 1-1/2-acre lots in outlying communities around Calgary (about 25 miles north of Okotoks) and Edmonton (about 185 miles north of Calgary), Alberta's two biggest cities.

Those areas attract professional athletes, oil executives and other wealthy businessmen who want to live near, but not in, big cities. They also want large homes, even though the lots are small, Widmer says.

Chad Widmer reviews a system design at his Soilworx home office in Okotoks, Alberta.

"Sometimes you'll see a nine-bedroom home on a 1-1/2-acre lot with a detached garage that needs a private sewage system," he says. "Unfortunately, sometimes I'm the last guy that gets called … so I'm left with a 20- by 20-foot area for a septic system.

"I do a ton of work on challenging lots, where you have to get very creative with design work," he adds. "In theory, they should consult with someone about septic systems before any construction even starts."

Because homeowners aren't very happy when they learn their only option is a holding tank that might need pumping twice a month, Widmer says architects and home-builders for the last few years have been more conscious about holding a site meeting prior to breaking ground. The permitting process for builders is supposed to require plans for private sewage systems, but Widmer says that for whatever reason, it sometimes "slips through the cracks."

"It's a learning curve," he says. "But most builders that do it once don't do it again."

Changing the mindset of builders and architects requires educating them whenever possible about the need to leave a sufficient area of undisturbed soil for a septic system, as well as help them understand sizing requirements for systems, he adds.

REVERSE ENGINEERS

So how does Widmer design septic systems on lots with limited space? Reverse engineering seems to work best, he says.

For example, says there's a four-bedroom home that will generate 450 gallons of sewage per day at peak flow, but there's only space for a system that can handle 350 gallons a day. Widmer uses controls that limit septage discharge to 350 gallons in the main system, then adds a second tank to the system to handle the remaining 100 gallons of overflow septage.

"The system is programmed to pump out only 350 gallons each day until the tank is empty," he explains. "If the system is continually over-used, the extra flows are collected in the extra tank. And when that extra tank fills up, an alarm goes off. Then the homeowner must either call a pumper to clean the tank or drastically reduce the flows until the system can catch up."

If there's no room for an extra tank, Widmer says he tries to use deeper, taller tanks instead of shallow and more elongated tanks. In extreme cases, holding tanks are the only options, he says.

"Sometimes I'm the second or third designer on a project because other designers said there's no solution except for holding tanks. **But in all those cases, I came up with solutions … you just have to be more creative."**

Chad Widmer

Designing systems for businesses also can pose unusual challenges. In one case, Widmer was asked to create a system for a veterinarian clinic in a town south of Calgary.

"It was tricky because of the chemicals and the animal blood that goes down the drain at a business like that," he explains. "Blood is a nightmare to treat — it's so strong it's almost untreatable.

"But I made it not tricky by designing a separate pipe system for the drains in the surgical rooms, with those pipes draining into a separate holding tank," he continues. "The rest of the waste is treated by an advanced (aerobic) system coupled with a sand-treatment mound."

WHICH SYSTEMS ALLOWED?

Widmer primarily designs sand-treatment mound systems, which typically are the most economical solution for the kind of site and soil conditions common to the area. "We see a lot of shallow, restrictive layers within the first five feet of soil around here," Widmer says.

"In Alberta, we have to use a pump or a syphon dose to the field," he says.

"We are not allowed a trickle-type system and we are not allowed to have serial distribution."

The province's most recent code update (in 2015) also allows for at-grade systems that use effluent chambers combined with LFH layers. LFH stands for litter, or relatively fresh organic material; fermented, or moderately decomposed organic material; and humus, or well-decomposed organic material. These systems require an aerobic treatment plant and must be located in a forested area.

"Before 2015, LFH at-grade systems were only allowed if you received special permission from a permitting authority," he says.

In central and southern Alberta, only one county requires advanced systems. In Canada, the provincial governments develop their own guidelines and regulations for septic systems. But counties within the province are allowed to require more stringent standards as they see fit, Widmer says.

Advanced units commonly used in Alberta are from Ecoflo / Premier Tech Aqua, Orenco Systems, BioMicrobics, Pro Flo, Jet and Norweco.

"Homeowners are concerned about the price of systems, so advanced systems — which can cost about $10,000 more than a more conventional system — aren't as common unless required," he explains. "But it's always a conversation we have.

Widmer activates the pump using a test button on the SJE Rhombus control panel during a septic system inspection.

>> Widmer inspects the Sim/Tech filter in a Premier Tech Aqua Ecoflow Biofilter system.

"I explain that with an advanced system, they get a higher level of treatment ... Some homeowners like the environmental side of it, some like the bragging rights of having one and some simply think it's great, but they can't spend the extra money on one."

Chad Widmer

"I explain that with an advanced system, they get a higher level of treatment, along with the benefits of a smaller field system. Some homeowners like the environmental side of it, some like the bragging rights of having one and some simply think it's great, but they can't spend the extra money on one."

Widmer also sees a trend emerging toward pressurized systems instead of gravity systems because they're more efficient. They also help leachfields last longer because they distribute water farther into the drainfield instead of overloading the first 10 or 15 feet of a trench, he says.

"With gravity systems, effluent usually doesn't make it to the end of a trench, so you need to rely on a biomat forming to slow down infiltration," he says. "Also, when it comes to challenging lots, pressurized systems provide more design flexibility because they can use smaller leachfields.

continued >>

LOCAL ZOO POSED CHALLENGES

Chad Widmer was intrigued when he got a call from officials at a zoo in the Calgary area that needed multiple decentralized wastewater systems installed in a special section devoted to research and preparing animals for captivity.

The roughly 160-acre facility is divided into five sections, each devoted to specific animals and including some kind of building and enclosure. Designing individual systems to handle each section was fairly straight-forward; figuring out the flows and waste strengths was not, says Widmer, the owner of Soilworx, based in Okotoks, Alberta.

"It was one of the more unusual jobs I've ever encountered," Widmer says, "There were a lot of moving pieces. We have (flow and strength) standards established for residential and commercial applications, but there's nothing specifically available for zoos."

As such, Widmer worked with zoo officials to obtain flow estimates for each enclosure, which generates animal waste as well as wastewater from washing pens.

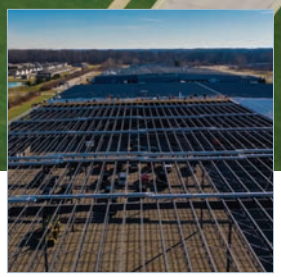
"We put a flow meter on the hoses they use to figure out a daily average flow for each area," Widmer explains. "Then we took grab samples from different areas to determine the BOD and TSS, which tells us the strength of the waste.

"After we had all that figured out, the actual design of the individual systems was fairly easy," he says.

In the end, one enclosure was outfitted with Ecoflo Premier Tech Aqua advanced-treatment units to help reduce the expected higher-strength septage. Three other enclosures were equipped with large settling tanks coupled with sand-mound treatment units. The fifth area relies on a holding tank, due to sporadic seasonal use, Widmer says.

All the systems utilized concrete tanks. Widmer typically likes to use concrete manufactured Alberta Wilbert Sales or Westcon Precast. "Alberta gets warm 'Chinook winds' throughout the winter that come over the mountains from the coast," he explains. "With a Chinook wind, we can get temperature swings of 40 to 50 degrees within a day or week.

"This can cause crazy freeze-thaw cycles that can really shift the ground around here," he continues. "Hence, to avoid damage to tanks, we like to bury them deep — sometimes 6 to 10 feet from the surface to the top of a tank. A high-quality concrete septic tank deals well with the freeze-thaw cycles, plus it's capable of deeper burial ratings."



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» Per a county requirement for subdivision approval, Widmer places and buries a pipe for a groundwater test well.

"The only gravity systems I design now have a lot of acreage with good soil," he points out. "But those kinds of sites are becoming more and more rare."

SHIFT TO TRAINING

Over the years, training for system design and installation has become a bigger part of the company's focus. Widmer says he typically trains about 50 to 60 people a year in classes held in Edmonton and Calgary.

Training takes two weeks and enrollment tends to be somewhat cyclical, oddly enough depending on the health of Alberta's oil industry.

"We're in kind of a weird bubble here," he explains. "Whenever there's a downturn in oil prices, our class sizes go up because a lot of people come in from the oil fields. The bad part is when oil prices pick up again, those guys disappear.

"As a result, there definitely are some issues in the private-sewage industry here with new installers putting in one or two systems, then they're nowhere to be found later that because they're back working on a rig somewhere. So there's a lot of volatility in this industry."

The COVID-19 pandemic has forced Widmer to teach training classes remotely via Zoom video-conferencing. Learning how to teach remotely was somewhat of a challenge because there wasn't much time to adapt, but Widmer says it's now working fine.

"I'm fairly techy, so it wasn't a huge deal for me," he says. And on the plus side, Widmer points out that remote instruction saves him the time and expenses associated with traveling to Edmonton and Calgary several times a year.

"It's also saving students a lot of money," he adds. "They come in from all over the province and normally would have to either fly in or perhaps drive eight hours or more, plus pay for hotel rooms."

ON THE HORIZON

Widmer enjoys his unique, bird's-eye view of the onsite wastewater industry in Alberta, as well as the unusual and challenging jobs that test his knowledge and skills. Looking ahead, he sees steady growth for Soilworx and the industry as a whole. There's also a good chance Soilworx will diversify a bit and start teaching courses in septic system maintenance and inspections.

"The AOWMA has asked me to spearhead a training course for maintenance," he says. "I've been talking to other professional associations, particularly in states in the northern United States, about how they've set up and run successful inspection and maintenance training programs."

Some of these states have decades-old programs that have been constantly evolving, and Widmer wants to learn from their successes and use that information to implement a training program that conforms with Alberta's own unique weather, systems and conditions.

"I'm thankful that both the AOWMA and the provincial government are backing this direction," he concludes. "It will provide our industry here with huge benefits and credibility."

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Aa

Jim Anderson, Ph.D, and Dave Gustafson, P.E., are connected with the University of Minnesota onsite wastewater treatment education program. Dave is Extension Onsite Sewage Treatment Educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor. Readers are welcome to submit questions or article suggestions to Jim and Dave. Write to ander045@umn.edu.

Use Many Investigative Tools When Working on Tricky Soil Profiles

The Munsell guide and field procedures can help system designers make the right call when locating soil treatment areas on properties with seasonal saturation issues

By Jim Anderson and Dave Gustafson

One key part of any site evaluation for location of a soil treatment area is the description of the soil profile. As we have stated many times, when we troubleshoot systems that are experiencing problems or have failed, the most frequent reason is a misinterpretation of the soil characteristics. There are two primary areas where mistakes occur: evaluation of structure and texture to estimate the long-term acceptance rate (LTAR) and not identifying features in the soil that indicate periodic soils saturation.

If you recall from past columns, soil characteristics used as evidence of periodic or seasonal saturation of soil layers are called redoximorphic features. These features are formed by processes of reduction, translocation and oxidation of iron and manganese oxides. When a soil horizon or layer is saturated there is a lack of oxygen and the iron and manganese compounds are reduced and will move into soil water solution, and move as the water moves in the soil.

As the soil dries and more oxygen moves into the soil, iron and manganese are oxidized. This results in unique patterns of color in the soil. Where iron and manganese have migrated away, the soils are gray in color (depletions), while the areas where they have reprecipitated are bright reddish or black in color (accumulations).

NATURALLY RED COLOR

Wetland soil scientists use these same features to identify the presence and extent of wetlands for preservation and protection. We use the features primarily to set the separation distance between the infiltrative surface of the soil treatment component and the seasonally saturated layer. For example, if redoximorphic features are identified at a depth of 5 feet in the profile; and the minimum separation distance to a limiting soil layer required is three feet; the system can be excavated no more than 2 feet.

As with any indicator, there are always some problematic conditions or characteristics making identification of these features difficult. One condition prevalent in areas where we work is soils that have developed from a parent material that is naturally red in color due to the high concentrations of iron naturally present. In these soils, it is often difficult to see the depletions and accumulations due to the lack of contrast. The natural redness overwhelms the changes that occur during saturation.

To determine color differences and contrasts, the Munsell color book is used. Munsell color notation is used, which identifies an overall hue along with a value and chroma. Soil matrix, depletions and accumulations are described. Redoximorphic features present are described by their abundance in terms of percentage of exposed surface, size and the contrast.

Abundance is described as few, common or many. Few are features that occupy less than 2% exposed area, common occupy 2-20% and many occupy more than 20%. Size is defined by fine medium or coarse; where fine is less than 5 mm, medium 5-15 mm and coarse greater than 15 mm. Five millimeters is approximately 3/16 inch and 15 mm is approximately 5/8 inch.

Contrast is defined by faint, distinct and prominent based on the difference in color notation. Faint is when the redoximorphic features are closely related to the matrix color; distinct the features differ by one or two hues and several units in chroma; and prominent the features and matrix vary by several units of hue, value and chroma.

This is the Munsell color chart page with a hue of 10R; value along the left side and chroma along the bottom. 10R would be a hue of red parent materials.

FOR QUICK RESULTS

With this as background, we return to the difficulty in determining seasonal saturation in soils developed in red parent materials. The indicators for red soils (hue of 7.5 YR or redder) are as follows: the matrix has a value and chroma greater than two, and less than or equal to four. The layer must contain 10% or more depletions (common or many) and/or distinct or prominent accumulations. The depletions should differ in color by at least one value higher and one chroma lower than the matrix or a value of four or more and chroma of two or less.

Part of the guidance given to field soil scientists suggest that to be sure

A field procedure was described in a scientific journal where this analysis can be done in the field in an hour using two test tubes and a series of reagents. **The field method produced an accurate assessment 93% of the time.**

they are interpreting soil characteristics correctly, they determine the Color Change Propensity Index of a sample. Unfortunately, this index has required a soil sample be sent to a laboratory equipped to determine soil colors for analysis. This obviously takes time the site evaluator may not have to deliver their report to the client on a timely basis. As an aside, wetland soil scientists also run into the same issue relative to timing.

A few months ago, a field procedure was described in a scientific journal where this analysis can be done in the field in an hour using two test tubes and a series of reagents. The field method produced an accurate assessment 93% of the time. For soil scientists and others who describe soils for onsite sewage treatment system location in areas of predominantly red soils, this procedure can help cut down on the incidence of making the wrong soil call in terms of separation distance.

If you think this method would be helpful in your field evaluations, contact your University Extension or Natural Resources Conservation Service soil scientist to see if they are aware of the methodology and can help set up the procedure for your use.

Voters in one Alabama county reject future land application of septage

By David Steinkraus

Voters in Talladaga County, Alabama, decisively said septage may not be spread on land in the county. Although the county still had a few provisional ballots to count in the week after Election Day, the unofficial vote total was at 70% against land spreading with only 30% in favor.

Local Amendment 2 drew support from some members of the public and Coosa Riverkeeper. The Coosa River winds along the county's western border, and septage was spread on land outside of nearby Lincoln. People may be recreating in the river and not know they are exposed to human waste, said Justin Overton, executive director of the Coosa Riverkeeper.

Resident Larry Phillips told CBS 42 News that he worried about his cows because runoff from the septage spreading property comes onto his land.

But fewer municipal wastewater plants are accepting septage. A limited number of people are doing land application, and because the area is growing, eventually there won't be any sites for land spreading, Charles Hall, executive director of the Alabama Onsite Wastewater Association, told CBS 42.

"At some point there is very few places to put sewage that is pumped from a septic tank, so people with a septic tank are going to have a much higher fee to have to pay to get their septic tanks pumped," said Hall.

The amendment will not affect biosolids, and farmer Phillips noted someone raising chickens may still spread that manure.

Virginia

People who live in the Upper Hazel River Watershed are eligible for aid to help with the cost of pumping, maintaining, repairing or replacing their septic systems. The watershed covers portions of Rappahannock, Culpeper and Madison counties near the state's western border.

Grants through the Culpeper Soil and Water Conservation District are intended to reduce bacterial contamination in local streams. In some streams, *E. coli* bacteria levels are higher than allowed by state water quality standards, reported the *Rappahannock* News of Washington, Virginia.

Reimbursements to property owners vary from 50% to 80% depending on income. For a 50% reimbursement level, a property owner may receive a maximum of $175 for a pumpout, $2,500 for a repair, $6,000 for a conventional system requiring a pump to move effluent to a drainfield, or $12,000 for an alternative system.

Minnesota

Hubbard County is considering the removal of some code provisions that trigger septic system inspections. The change would leave only inspections required by the state and are a reaction to the state's change of its onsite inspection rules.

The Minnesota Pollution Control Agency will begin requiring onsite professionals to drain a tank when inspecting it. Eric Buitenwerf, environmental service officer for Hubbard County, told county commissioners there is already a shortage of people who can do inspections. That shortage will only be made worse by the new rule, he said, according to the *Park Rapids Enterprise* of Park Rapids, Minnesota.

Some southern and metro counties agreed with the state rules change, he said. And he said there are other tools to deal with systems that are failing badly.

New York

A signature made it official: All new construction in Suffolk County must use advanced treatment systems to remove nitrogen.

"Protecting water quality is a top priority for both our region's environment and our economy," said County Executive Steve Bellone when he signed the new law on Oct. 15.

In addition to new homes and commercial buildings, advanced systems will be required for home renovations that increase the number of bedrooms to more than five and increase the building's footprint. In order to aid businesses, the law allows more flexibility in the use of smaller wastewater treatment plants.

The law takes effect in July. For several years, the county, which occupies the eastern end of Long Island, has focused on reducing water pollution by upgrading wastewater treatment. An estimated 380,000 residences in the county use cesspools to treat wastewater.

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

SYSTEM PROFILE

When an Animal Shelter System Goes to the Dogs, Onsite Professionals Come to the Rescue

Many wastewater industry companies contributed to a major treatment update at a Wisconsin facility serving man's best furry friends

By David Steinkraus

Brady Rubenzer, left, and Mark Yohnk, second from left, both of Stolt Excavating, CeCe Rudnicki of the Wisconsin Department of Safety and Professional Services, second from right, and Lindsey O'Rourke and Haillie Passow of Chippewa County Planning & Zoning, right, install the 100 feet of force main taking wastewater from the treatment chain to the Eljen GSF drainfield at the Chippewa Humane Association. (Photos courtesy of Joe Rubenzer)

The call came late in fall 2019 from the Chippewa County Humane Association in northern Wisconsin. The onsite system at the animal shelter was failing, and they asked Joe Rubenzer at Stolt Excavating & Trucking in Chippewa Falls, if his company could install a new drainfield.

Rubenzer agreed to look at the situation, but first he pulled the county's sanitary records. They said two drainfields had been installed on the property in the previous 15 years.

"I said, 'You guys have something else going on here. I think we need to look into this deeper,'" Rubenzer recalls.

He contacted Mark Prevost at First Supply in nearby Eau Claire, Wisconsin, for a second opinion. Together they met with people from the animal welfare organization to talk about how much water they were using. The answer was quite a bit.

"They're doing laundry daily, multiple loads, washing bedding for the animals," Rubenzer says. They were deep-cleaning kennels and generally using more water than the 450-gpd system was designed to process.

As part of their investigation, Rubenzer and Prevost had a meter installed on the system and watched it for a couple of months. On days when the shelter was open, use averaged 754 to 1,015 gpd.

To begin finish work on the Eljen drainfield, Dan Stolt, of Stolt Excavating, lays sand to hold geotextile fabric in place.

The crew from Stolt Excavating prepares the sand bed for the Eljen GSF modules at the Chippewa Valley Humane Association. A large fraction of the equipment and labor for the system were donated by wastewater professionals and companies.

On days when the shelter was closed, when the staff is cleaning, average water use varied from 1,208 to 1,432 gpd.

At that point, Rubenzer told the humane association they would be better off upgrading the system. Fortunately for the nonprofit group, Prevost is passionate about animals, and Rubenzer said he went to work on the phone seeking equipment donations. The result was a system that meets the association's needs with newer technology and extra filtration.

LOTS OF FILTERS

From the humane association's building, effluent leaves in two ways and in two amounts and is treated in a five-tank system.

On the north side of the building, the lesser amount of wastewater from the indoor kennels moves through a 4-inch Schedule 40 pipe to a 2,000-gallon, two-chamber tank from Crest Precast of La Crescent, Minnesota. This tank replaces a holding tank in the same area.

Water settles in the 1,250-gallon first chamber and flows through a Polylok 525 filter into the 750-gallon second chamber. A SJE Rhombus reed switch trips an alarm if the Polylok filter is clogged and water is backing up. In the second chamber, a Goulds PE51 pump controlled by an SJE Rhombus data logging panel sends wastewater through a Sim/Tech STF-100 filter and into 200 feet of 2-inch force main that circles the building and joins a 4-inch Schedule 40 pipe receiving the larger amount of wastewater on the south side. Pumping was the only solution, Rubenzer says. The grade wasn't right for a gravity feed, and the wastewater flow couldn't be rerouted.

The 4-inch pipe enters the first tank in a four-tank treatment chain. Tank one is a 1,000-gallon concrete model from Huffcutt Concrete in Chippewa Falls. It was already in place, and Rubenzer repurposed it. It also has a Polylok 525 filter and SJE Rhombus reed on the outlet.

System Profile

Location:	Anson, Wisconsin
Facility served:	Chippewa Humane Association, town of Anson
Designer:	Joe Rubenzer
Installer:	Stolt Excavating
Type of system:	Eljen GSF with tanks
Site conditions:	Sand and sandy loam
Hydraulic capacity:	2,000 gpd

Tanks two through five are new concrete models from Crest Precast.

Tank two is a 2,000-gallon two-chamber model. Combined with tank one, this tank provides flow equalization, and the two chambers allow for more settling and provide the opportunity to install more filters to deal with animal hair, Rubenzer says. At the inlet of the 1,250-gallon first chamber in tank two, Rubenzer and his technicians installed a piece of perforated rigid pipe that can be filled with crushed limestone to adjust pH. A Polylok 625 filter separates the first chamber from the second 750-gallon chamber. On the outlet of the second chamber is a manifold with four Sim/Tech STF-110 bristle filters.

All the filters are not overkill. When Rubenzer and Prevost met with the humane association representatives, they also took a look at the drainfield. "It was full of hair," Rubenzer says. "You could tell some cat litter had gone through."

SYSTEM PROFILE

One tank of the four-tank main treatment chain is set at the Chippewa Humane Association in Wisconsin by CeCe Rudnicki, left, Joe Rubenzer, center, and Mark Yohnk, right while two employees of Crest Precast run the crane.

An SJE Rhombus data logging panel controls the main four-tank treatment chain at the Chippewa Humane Association, and another SJE Rhombus data logging panel handles the single tank on another side of the building. Alarms for the first filters in the system are inside the building where staff will immediately know about clogs.

Mark Noga from Knight Treatment Systems trains a group on components of the White Knight MIG WK150 Microbial Inoculator Generator system. Listening are Mark Yohnk of Stolt Excavating, left, Scott Moore of Eljen Corp., right, and Briar Golden of Buffalo County, rear. Not visible are CeCe Rudnicki of the Wisconsin Department of Safety and Professional Services, and Joe Rubenzer of Stolt Excavating.

In tank three (3,000 gallons) is a White Knight MIG WK150 from Knight Treatment Systems. Its blower is located in a storage section of the building's garage, and most of the system alarms are also located there.

A standard baffle separates tank three from tank four (2,000 gallons), which doses the absorption field. Dual Goulds WE0721H pumps push water through two Sim/Tech STF 100A2 pressure filters and then through about 100 feet of 2-inch force main to the field. Another SJE Rhombus data logging panel controls this part of the system.

The field is built from 300 feet of Eljen GSF modules split into three rows. The entire drainfield cell is 9 feet wide by 109 feet long. Wastewater is distributed through 2-inch PVC pipe inside 4-inch perforated pipe. Modules were laid on 12 inches of sand and topped with about another foot of sand and topsoil.

TEACHING TOOL

Installation went smoothly, Rubenzer says. Stolt workers, and a couple of volunteers, used Cat 313 and 312 excavators, a John Deere 35C mini-excavator, and a Bobcat T595 skid-steer to put the system in the ground.

There was a small hill the crew cut into to build the drainfield, and the rest was on level ground.

"I know if we would have come to them with the original price, **there's no way they could have afforded it.**"

Joe Rubenzer

Because so much equipment was donated, Rubenzer says, the association could have a system with more filters than would be typical and the Eljen GSF system allowed a smaller drainfield footprint.

Rubenzer had never worked with Eljen or Knight Treatment Systems equipment, so he spent the winter before the project doing a lot of research and visiting an area restaurant with a White Knight system in place.

As part of the project, Rubenzer donated a part of Stolt's fees. CeCe Rudnicki, of the Wisconsin Department of Safety and Professional Services, used the project as a teaching tool for county workers and sanitarians, and people showed up throughout the five-day project to observe, Rubenzer says.

Other donors were: Cresline Pipe, Eljen, Goulds Water Technology, Knight Treatment Systems, Polylok, Premier Plumbing, SJE Rhombus, Sim/Tech Filter and Stelter. And other people stopped in to donate time.

All the donations resulted in a system that cost the humane association about half of what a commercial customer would pay, Rubenzer says. "I know if we would have come to them with the original price, there's no way they could have afforded it." ◻

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SNAPSHOT

Skip Norsic Finds a Diamond in the Rough

Searching for heirloom jewelry in the septic tank is one of the things that made the wastewater industry memorable for the past 50 years for this New York pumper

Compiled by Betty Dageforde

In Snapshot, we talk to a member of a state, provincial or national trade association in the decentralized wastewater industry. This time we visit a member of the Long Island Liquid Waste Association.

Emil "Skip" Norsic Jr.
CEO

Business: **Emil Norsic & Son Inc.,** Southampton, New York

Age: 72

Services we offer: Septic tank pumping, cleaning and maintenance; temporary restroom and trailer facilities; waste line cleaning and inspection; residential and commercial trash pick-up; roll-off service.

Years in the industry: 51

Association involvement:

I have been a member of the Long Island Liquid Waste Association since 1995 and am currently a member of the board of directors.

Benefits of belonging to the association:

The main benefits of membership in LILWA are being able to share ideas and experiences with fellow members. And it gives us a voice with local officials on rules and regulations that affect our industry.

Biggest issue facing your association right now:

The population on Long Island has been steadily increasing, especially since the outbreak of COVID-19. People are leaving New York City and moving to the suburbs. I feel we need to carefully consider how to treat the increased wastewater that is being generated.

Our crew includes:

Stu Fuhlbrugge is our general manager and oversees all divisions. Brian Gilbride handles local, town and county government rules and regulations. In the septic division we have team leader Trevor Poach and dispatcher Peter Lelakowski. In the portable restroom and roll-off division, our team leader Chris Zorko works with Cheryl Hack who handles dispatch for construction units and Dan Palumbo who does the booking for special event units and restroom trailers. Edgar Garcia is the special events team leader. I must include Peter Blank who I worked with for over 35 years through thick and thin. All our employees have helped us carry on a business that my grandfather founded in 1932.

Typical day on the job:

I generally spend my time meeting with Stu, discussing and resolving problems and issues as they come up for each division.

The job I'll never forget:

About 25 years ago, when I was still driving a septic truck, we received a call from a customer who operated a beauty salon. Before she had her first client she removed an engagement ring her husband had given her. The ring had diamonds, rubies and sapphires. She placed it on a sink and somehow it had fallen down the drain. Panicking, she called a plumber to disconnect the U-trap. However, the ring was not there. She called our office to ask us to pump out the cesspool to try to locate the ring. I told her the odds were a million to one that we would recover it, but nevertheless, she wanted us to try. I pumped out the water down to the sludge. Then with hip boots on went down the cesspool with a swimming pool net and garden hose to sift through the sludge. I spent an hour or so doing this but with no luck. When I was climbing back up the ladder I noticed the main sewer line coming into the cesspool was Orangeburg. This material tends to have a sag or "belly" in it. I reached my hand in the line and sure enough I found the ring. When I was back on firm ground covered with you-know-what, the woman gave me hugs and kisses and said I was her hero!

My favorite piece of equipment:

The RIDGID SeeSnake video camera and locator are great because they take the guesswork out of where a septic tank is or where a line is broken.

Most challenging site I've worked on:

When Hurricane Sandy hit in 2012 we worked around the clock for three weeks to help provide liquid waste hauling, temporary restroom facilities and (containers) for clean up.

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

One customer asked our dispatcher if her boiler was connected to the septic system. She was relived when he said no.

Best piece of small business advice I've heard:

My grandfather told me to treat every fellow worker and customer with dignity.

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

I would love to be a pro golfer — but that's not going to happen. I love what I do. Every day has new challenges.

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

The Long Island Liquid Waste Association, along with the Suffolk County Department of Health, have adopted license requirements for septic companies that they must have in order to obtain certification. I feel this is a great step to further protect public health and water quality for future generations.

Here's How You Keep Making Tracks On the Job

Follow these 8 steps to keep your tracked excavator away from profit-killing downtime with the mechanic

By Kyle Rogers

Many installers rely on their tracked excavators every day to reliably dig trenches and drainfields, as well as move dirt to drop new tanks in the ground. What happens when contractors neglect critical upkeep on these hardworking earthmovers?

Your crew sits on the sidelines as your machine is hauled away for an emergency repair. Consequently you miss important customer deadlines. And a big fat bill from the mechanic shows up in the mail. Strike three and you're out!

Keeping up on maintenance for especially hard-wear items on these complex machines will keep your workload on track, your crews on the clock and your customers happy. Consider these eight important areas of tracked excavator maintenance:

Keeping the bucket teeth of an excavator sharp will help keep the equipment productive for a contractor. (Photo courtesy of John Deere)

1. Bucket teeth, pins and bushings among the high-wear items to watch

"Bucket teeth are an important item to keep an eye on because worn teeth make it hard to fill the bucket, which affects productivity," says Michael Boyle, product consultant manager for John Deere.

He says when bucket teeth come off or become worn through to the tooth adapter, they should be replaced by cutting off the adapter and welding a new one back onto the bucket.

Pins and bushings also experience high wear.

"Pins and bushings get a workout because excavators constantly move," says Adam Kolacki, senior service engineer for Caterpillar. "If you don't grease, you get an unpleasant noise. More importantly, you will get pin galling, which can lead to expensive repairs."

> "Bucket teeth are an important item to **keep an eye on because worn teeth make it hard to fill the bucket, which affects productivity."**
>
> Michael Boyle

2. Make sure you have the proper track sag/tension

"Increased wear occurs to the undercarriage if the tension is too loose or too tight," says Boyle.

To adjust track sag, lift the tracks off the ground about 3 or 4 inches with the hydraulics of the boom and arm, Boyle explains. Then rotate the tracks while the machine is off the ground — three times forward and three times in reverse to get the material out of the track rails. Go to the center of the undercarriage and measure the distance between the bottom of the roller mainframe and the top of the grouser.

"The specification is different for each excavator, so you have to check the operator's manual for the correct distance," Boyle says.

If the tracks are too loose, the operator will likely complain about the machine rocking and you'll be able to see extra wear as the pin moves in the sprocket. When turning, the tracks may crack and pop or come off if

continued >>

A contractor performs engine maintenance on a Caterpillar excavator. The oil and grease checks should be completed on a regular routine. (Photo courtesy of Caterpillar)

> **"I can't stress enough how important it is to keep the machine greased daily** and even hourly in certain applications."
> Adam Kolacki

the machine is on a slope. If the tracks are too tight, the excavator loses track power and extra wear occurs.

"It is better to have tracks too loose than too tight," Boyle says.

3. When tackling scheduled maintenance, figure in the job's time constraints

"If the job is on a time schedule, it would be best to check if the engine oil and filter are due for a change or the hydraulic oil and filter," Boyle says. "It might be better to complete a required service prior to starting the project versus causing downtime during it to complete the service."

He also recommends regularly checking for leaks, frayed hoses, broken parts or cracks in components and replacing or repairing as needed.

4. Take into account job site conditions

Maintenance practices will have to be changed depending on the conditions of the job site. For example, says Boyle, in a sandy environment, a contractor might want to keep the tracks looser than usual to prevent sand buildup in the rails. In a high-debris environment, extra cleaning will be required to keep the cooling cores debris-free. John Deere offers reversing fans on most of its excavators to help with this.

"The operator can set the reversing fan on automatic, where it will reverse once an hour for 25 seconds or the operator can manually reverse the fan by pushing a button or switch," Boyle says. "This feature keeps debris and dust off the radiator/coolers, reducing the need to shut the machine down and clean cooling cores."

5. Before making repairs, consider the environment

"Leaks or simple component changes can be done in the field," says Kolacki. "Anything that requires extreme cleanliness for disassembly — such as pumps, valves, engines or fuel systems — ought to be done in the shop."

6. Don't be stingy with the grease

Among items that often get overlooked by operators is applying an adequate amount of grease to the linkage, Kolacki says.

"It's typically missed, particularly in more extreme applications," he says. "I can't stress enough how important it is to keep the machine greased daily and even hourly in certain applications."

7. Problem warning signs

A few top indicators of a problem include abnormal noises, bad oil samples and overheated components.

"For the do-it-yourselfer, refer to the owner's manual for guidance," Kolacki says. "If you like to have it done by a professional, contact your local dealer. Their service techs are trained to do the work right."

8. Operating tips

Damage or premature wear can also be avoided by regularly practicing certain operating procedures. For example, the machine's arm and boom joints can potentially be damaged by sweeping large piles of material too quickly with the bucket.

"Many times an operator will swing into large piles at full swing speed and cause extra stress on the joints," Boyle says.

He also recommends using a pivot turn when moving the machine to reduce track wear. "To make a pivot turn, the operator lifts the front of the tracks off the ground about 3 to 4 inches and uses swing torque to turn," Boyle says.

Kolacki adds that operators should be sure to use the appropriate tool attachment for the application.

"Don't use a bucket as a hammer. Pick the correct tool for the application and the machine," he says. "At Caterpillar, we have matching guides to help operators do just that and maximize the machine's performance."

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

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

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

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Pennsylvania Association of Sewage Enforcement Officers;
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NATIONAL

Water Environment Federation;
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Ontario Onsite Wastewater Association;
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PRODUCT NEWS

PRODUCT SPOTLIGHT

Polylok effluent filter designed for error-free install

By Tim Dobbins

As septic systems have progressed over time, filters have become a standard component to assist in the removal of fine solids. Effluent filters are an easy way to keep drainfields free of small particles and maintain capacity. Though to remove particles efficiently, filters must be maintained and installed properly.

To take the potential for error out of installation, Polylok designed an effluent filter to ensure proper function no matter what. "The PL-250 is a relatively new addition to our vast line of filtration products," says Peter Gavin, president of Polylok. "The cartridge is unique in that it cannot be installed incorrectly, and it can be installed in any 360-degree configuration without any chance of direct bypass."

The PL-250's design of 250 feet of 1/16-inch filtration will handle flows up to 3,000 gpd, making it a choice for both small-to-moderate commercial use, and large residential applications with higher flow, according to Gavin.

"The cartridge is built in a distinctive 'W' design that will not only fit our dedicated PL-250, 6-inch tee, but also any standard 6-inch tee," Gavin says. "This allows the filter to be used universally with existing system filters." The PL-250 filter fits on a 4-inch outlet pipe and accepts 1-inch PVC pipe of any length that can be used with or without a 1-inch filter handle from Polylok to accommodate tanks buried at various depths.

The built-in gas deflector in the PL-250 is manufactured and fitted to deflect suspended solids and prevent particles from leaving the septic tank. It does this by preventing gas bubbles from rising and carrying tiny solid particles out of the exit port into the leachfield. This deflector reduces clogging at the soil/stone interface and helps extend the life of the filter. Installation on the gas deflector simply involves snapping the tee into place and no tools are required.

The PL-250 effluent filter is certified to NSF/ANSI Standard 46 and, according to Polylok, will operate efficiently for several years under normal conditions before requiring cleaning. The company recommends cleaning the filter each time the tank is pumped, or at least every three years. **888-765-9565; www.polylok.com**

Mecalac AS900tele telehandler

Mecalac's AS900tele telehandler combines the compactness and mobility of Mecalac's AS Swing Loader Series with telescopic technology to provide versatility on the job site. The 22.2 gpm auxiliary hydraulics increase flexibility, allowing use with a range of attachments, including mowers, road sweepers and earth augers. Functioning as a loader, telehandler or landscaping tool, the eight-ton machine has an innovative swing design, where operators can swivel the fully loaded bucket 90 degrees on either side. Additionally, the AS900tele features three steering options: two-wheel, four-wheel and crab. **508-921-3076; www.mecalac.com**

Multi-Tank Precast System Overcomes On-Site Challenges

Challenge

A new temple and cultural center development in the Midwest needed an onsite treatment system, but the site posed challenges including limited access, confined drain field space and sensitive surrounding habitats.

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To meet the area's treatment needs and protect the adjacent wetlands, designers chose durable precast concrete tanks for the three-step advanced treatment system. The precaster designed the tanks to fit the site's small footprint and maximize the limited drain field space. The precaster also installed piping at the precast plant to save installers time on the jobsite.

Workers install 12,000-gallon precast concrete tanks for a development in the Midwest.

By installing air piping and discharge piping at the plant, installation time was greatly reduced.

Photos courtesy of Wieser Concrete Products Inc.

Locally Available: Precast concrete tanks are manufactured throughout all 50 states and Canada. No matter where you are or what you need, you can rely on these producers for quality products while supporting your local economy.

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