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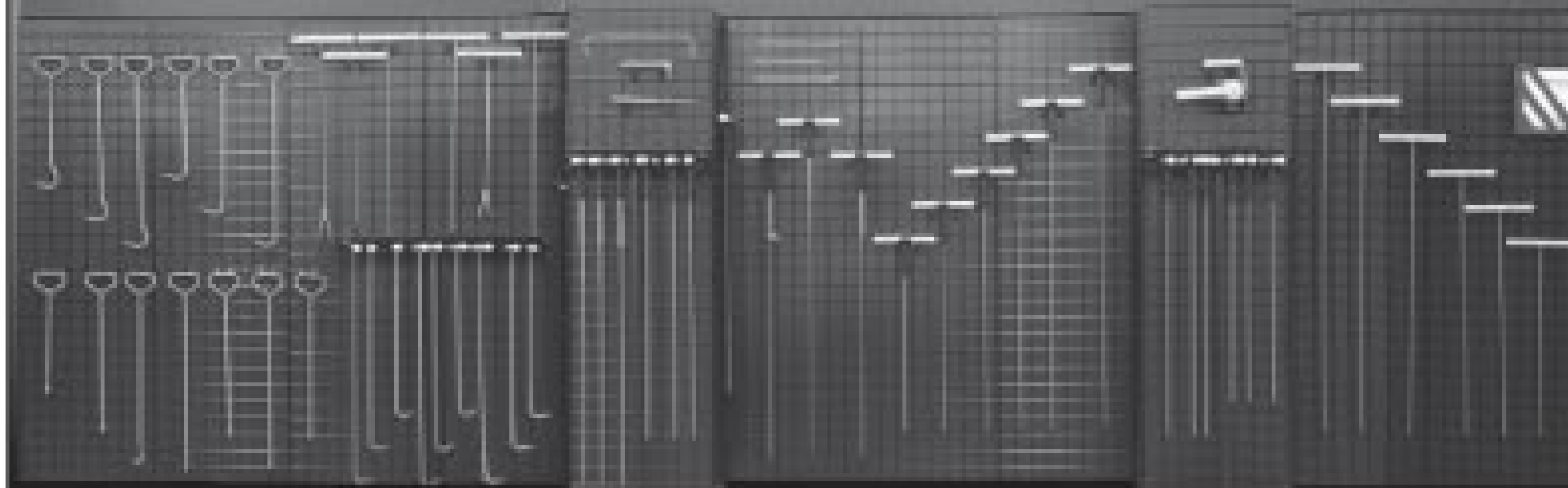


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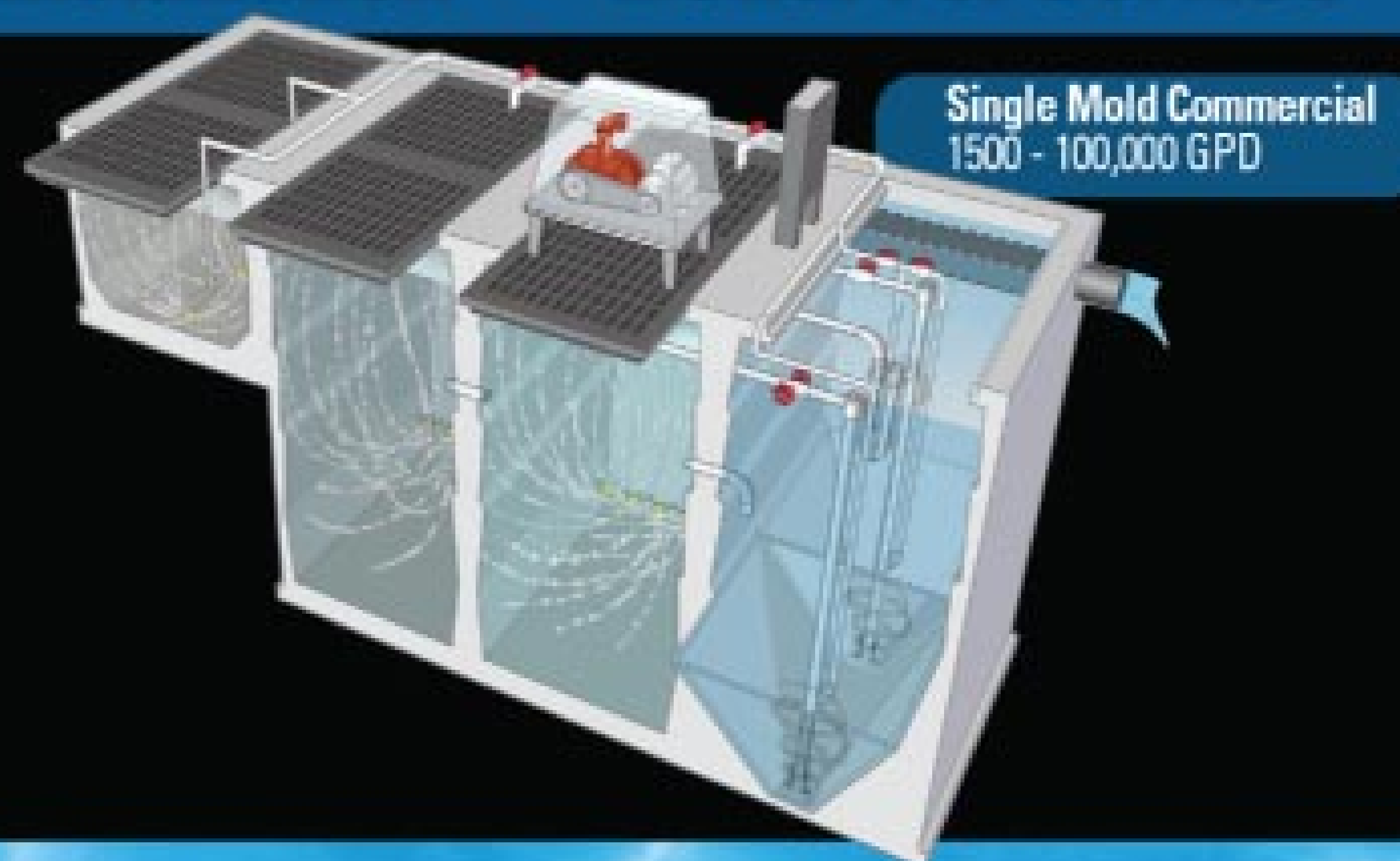




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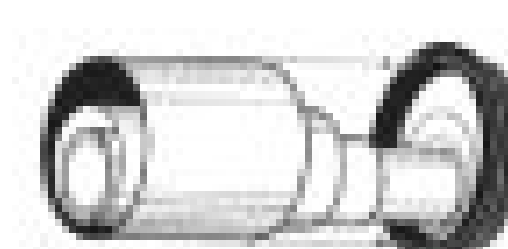
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# Job Well Done

**NOWRA guidelines for using water softeners with onsite systems marks another step in a well-conceived process of study and recommendation**

By Ted J. Rulseh

A few years ago, a controversy erupted in this industry on whether water softener discharges hurt the performance of onsite treatment systems.

The Water Quality Association (WQA), which represents makers of residential water treatment systems, insisted that the discharges were not harmful. Some members of the onsite industry took quite a different position.

NOWRA responded by convening panel discussions and forming a study group with WQA to address the issue. The result, released late last year, is a guidance document for using onsite systems and water softeners on the same site. The advice has value for homeowners, installers, and maintenance professionals alike.

This guidance is an interim step in addressing an issue that's still a long way from being resolved. Nevertheless, it's a good example of two industries coming together in a productive manner to address an issue of mutual concern. Instead of forming battle lines and shouting back and forth at each other, the groups have discussed the issue openly, done the research, and established a process for working toward real answers.

## Sometimes a necessity

The document acknowledges that water conditioning is a necessity in many homes, as untreated well water is often too hard and may have unpleasant tastes or odors. It notes that while water softeners and onsite treatment systems are often used together and in most

cases with no problems, there have been sporadic issues.

Therefore, while research continues, experts in both fields collaborated to offer a series of practical guidelines to follow in cases where a problem between an onsite system and a water softener is suspected. For example:

- Make sure the onsite system is being properly maintained and that the water softener is adjusted and operating properly.
- Inspect the home for sources of excess water usage, such as leaking toilet flappers and valves, as excess flow is a major cause of onsite system failures.
- If there is a problem with an onsite system that is taking a softener discharge, have the site evaluated by experts from both specialties. Those experts should use a screening tool developed by NOWRA and WQA and return the information to either organization for tracking and evaluation.

This guidance is highly practical. It all seems to make perfect sense.

## How it came to pass

Development of the water conditioning system guidance fits the mission of the Technical Practices Committee, which is to create technical materials on proven and successful technologies, soil science, transmission, installation, and recycling and reuse practices that enable effective and safe onsite systems and protect water quality.

Matt Byers, onsite program manager with Zoeller Pump Co., was chair of the committee when dis-

cussions about water-conditioning systems came to the forefront in 2005. He co-authored the guidance document with WQA technical director Joe Harrison and current Technical Practices Committee chair Allison Blodig.

The two associations have been working together since 2005, when NOWRA hosted a symposium on the issue at its annual conference. After that, the groups set up a task force that has continued to work toward answers.

**"WQA needs to understand how onsite systems work and are regulated, and onsite professionals need to understand their waste streams and how to accommodate diverse waste streams for the benefit of the consumer"**

Matt Byers

Meanwhile, WQA held a similar symposium at one of its meetings, with participation from the onsite industry.

Late last year, representatives from both groups took part in a workshop sponsored by the Water Environment Research Foundation and the U.S. EPA that led to identification of five research priorities for the water softener and onsite industries.

## The positive path

Byers and Harrison see cooperation as the best route forward. "It's been gratifying to see the good response from everybody — from our own members and from the onsite wastewater side," Harrison says. "When I say we want to get at the truth behind this issue, people

are very positive toward that.

"Having WERF take an interest was really a very positive thing. Their getting the EPA involved and bringing together various experts and viewpoints in the workshop last year was very fruitful. It has organized and crystallized what the important questions are that need to be researched."

Byers observes, "The question is huge. We're talking about onsite systems and inputs — chemistry, biology and physics — that many

in the field have experience with. But, even with those experiences, we have yet to solve this question.

"WQA needs to understand how onsite systems work and are regulated, and onsite professionals need to understand their waste streams and how to accommodate diverse waste streams for the benefit of the consumer. The guidelines we've created are a starting point really. The next phase will reveal many facts the industries can use.

"NOWRA has done the right thing in pursuing this issue. The association's job is to serve the onsite community, and if there's a nagging question hanging out there, it's NOWRA's responsibility to try and resolve it. Working this issue is something NOWRA has done that I think has value." ■



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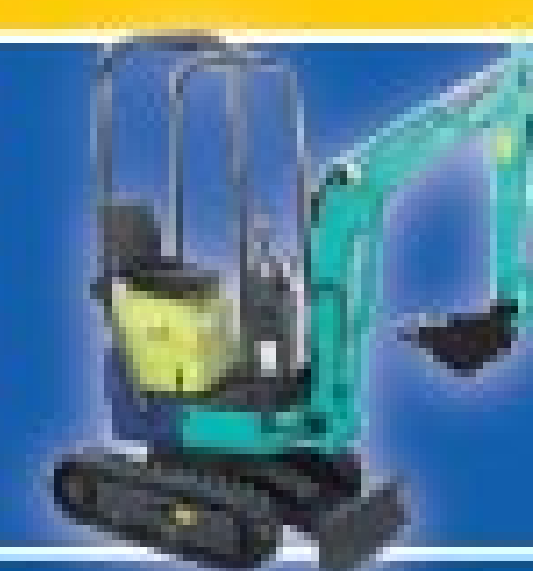




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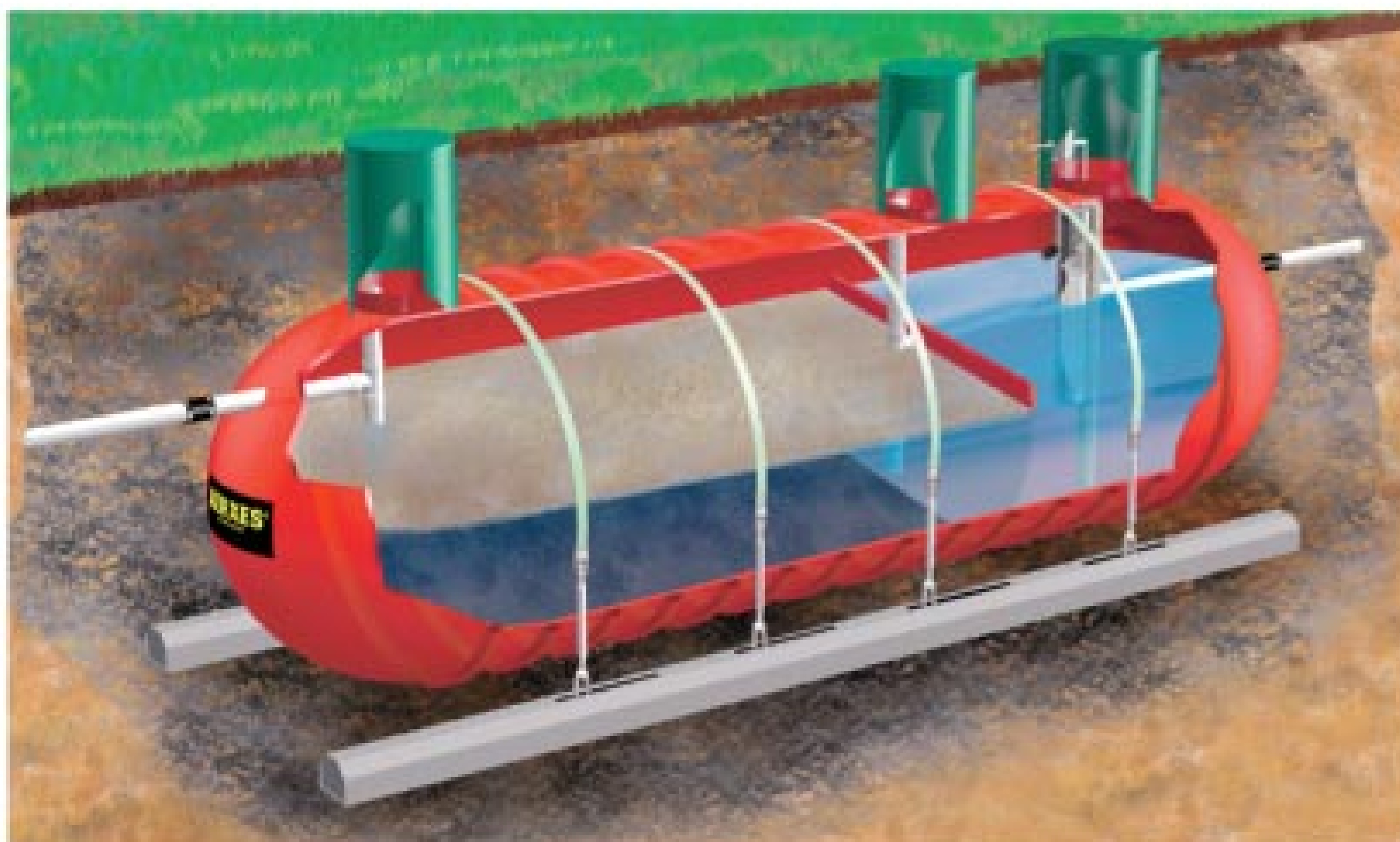
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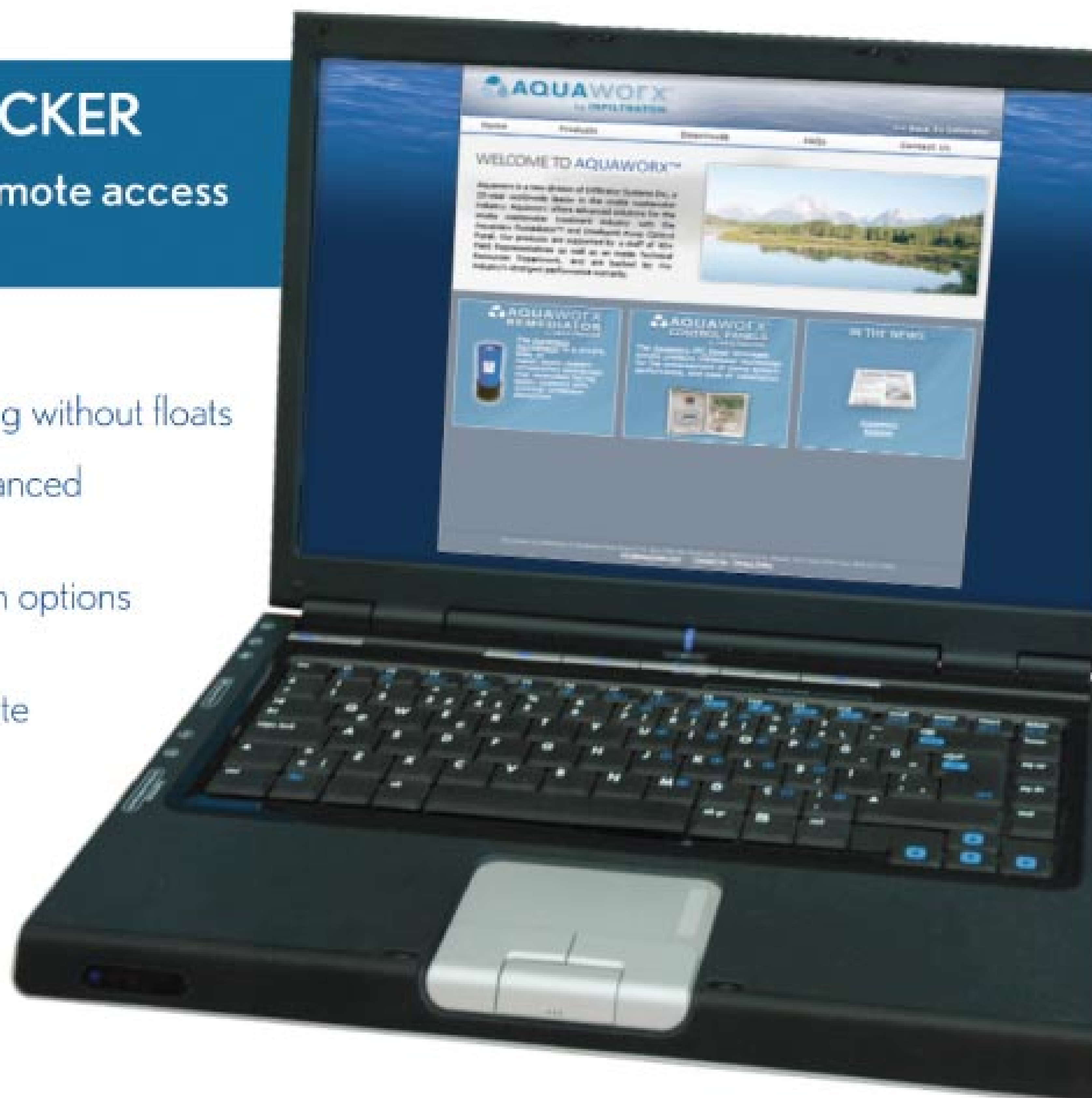
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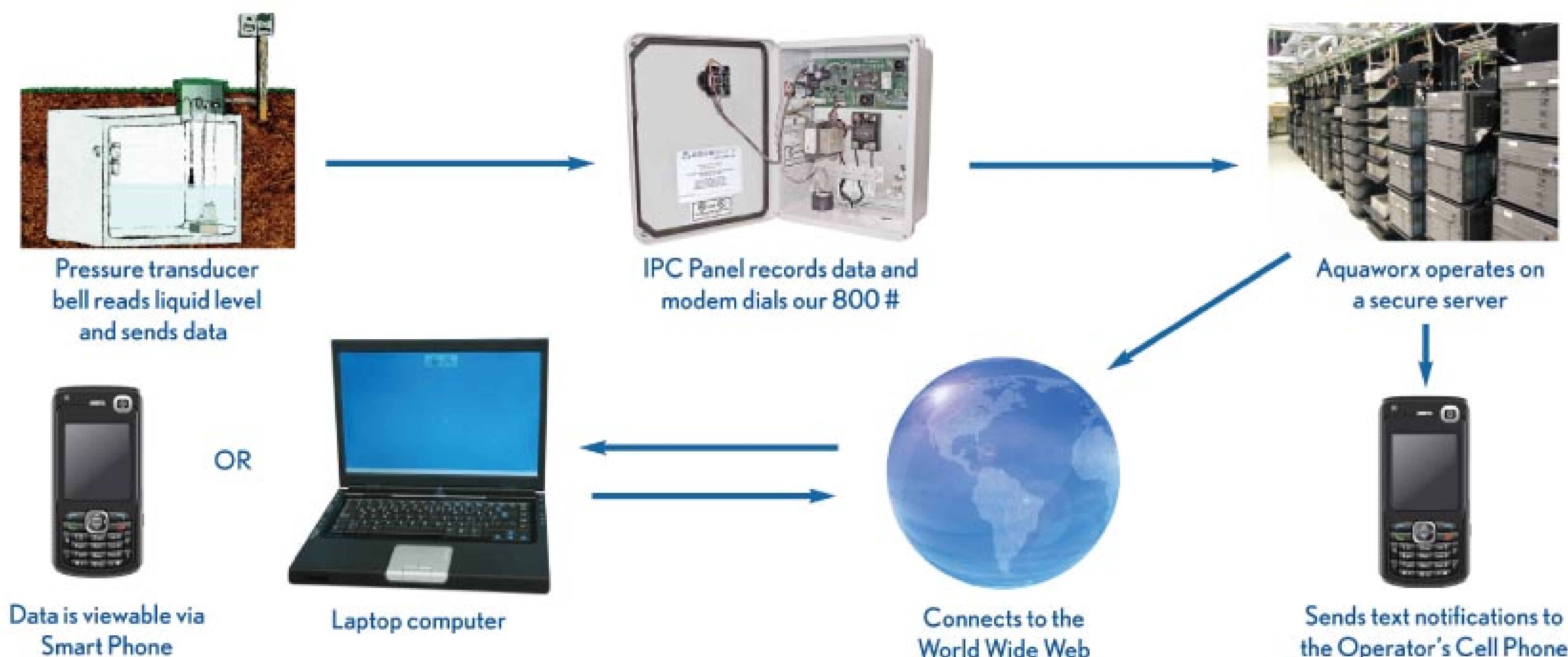
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### How It Works:



Sloan Swendsen, owner of Juneau Septic Services Inc., moves a 300-gallon Premier Plastics lift station downhill as he builds a treatment system. The company operates in diverse terrain on the coast along Alaska's panhandle. (Photography by Michael Penn)



# Self-taught Success

**Sloan Swendsen learned valuable lessons about the onsite business from his very first job — repairing a failed system on his own property**

*By Gil Longwell*

## **Juneau Septic Services Inc., Juneau, Alaska**

**OWNERS:** Sloan Swendsen and Jason Tarver

**YEARS IN BUSINESS:** 3

**MARKET AREA:** 60 square miles along Alaska's southwest coast

**SPECIALTY:** Fixing failing and underperforming systems

**BUSINESS MIX:** 60% installation, 15% repairs, 25% maintenance

**ANNUAL REVENUE:** \$300,000



**W**hen the onsite system serving Sloan Swendsen's home failed and he could not even get an installer to look at his problem, he decided to solve it himself.

Already familiar with equipment and construction, he learned how systems work and why his failed, studied Alaska's onsite regulations, and found and installed a long-term solution. He also changed career paths.

Today, from an office in Juneau, his business, Juneau Septic Services Inc., serves a 60-mile-long, 1-mile-wide strip along Alaska's southwest coast. Here, the climate is temperate rain forest with weather similar to that in Seattle, Wash. That changes about a mile inland, limiting his service area.

Although diversified within the onsite industry, Juneau Septic is intensely focused on onsite projects — both installation and pumping. "Other excavators treat onsite sys-

tems as a sideline; they are not focused on this business niche," Swendsen says. "We do it all, and both sides generate business for the other. For me, this dual path has been the right way to go."

### **Diverse requirements**

Self taught, Swendsen is always learning. "If I find a site that needs a specific technology with which I am unfamiliar, I study the technology, get the necessary training, and become qualified to do the installation," he says. "I am fully aware and conscious of each site's unique needs. There is no margin for error."

Alaska's diverse climate and geology have caused the state Department of Environmental Conservation to establish several subsets of regulations to meet varied site conditions. In Swendsen's area, all absorption areas must be of a type classified as engineered. While an engineer may be involved in the design, the engineer seldom visits

**"If I find a site that needs a specific technology with which I am unfamiliar, I study the technology, get the necessary training, and become qualified to do the installation."**

**Sloan Swendsen**

the site: Distance and cost work against that.

The regulations in the Juneau area specify a minimum 300-square-foot absorption area for a two-bedroom house. Each additional bedroom requires another 150 square feet. The typical absorption area size is 25 by 35 feet. Onsite systems in the area must include an advanced treatment unit.

With a shortage of habitable land, most lots are small, many only about 10,000 square feet. Annual rainfall in the range of 150 inches



**"Uncovering buried surprises is an everyday occurrence. Documenting what you uncover is an everyday necessity."**

**Sloan Swendsen**

results in water tables between 36 and 48 inches below grade. "These conditions converge and create significant challenges to proper system performance," Swendsen says.

#### **Learning from experience**

He often encounters old absorption areas that are inundated, and often there is little available space for a replacement. "Inadequate absorption area square footage is not the only cause of failure, but it is clearly a leading factor," he says. In many cases, a repair strategy must deal with space limitations and water table issues.

Swendsen's experience living with a repaired system gives him several advantages. "I know how comforting it can be when the

installer or pumper shows up just a few hours after getting a panic call," he says. He does his best to respond to urgent calls on the same day, and he is always on site no later than the next day.

He also understands the essential role homeowner education plays in system life. He sees every customer contact as a potential teaching moment.

Swendsen has found success installing multi-component repair systems. In a 6-foot-deep excavation, he places 6 inches of coarse aggregate and then a 2-foot sand layer. On this porous yet stable foundation, he places drainfield chambers (Infiltrator Systems Inc.). Six inches of coarse aggregate follows. Two feet of frost-permeable topsoil provides the final cover. The effluent that reaches this absorption area has been processed through an advanced treatment system (Orenco Systems Inc.).

#### **Opportunities in pumping**

The majority of systems Swendsen pumps are not properly operated or

**Swendsen uses a tracked excavator to place a Bord na Mona peat filter (green) in line with other treatment system components, including a 1,200-gallon Premier Plastics septic tank (yellow) and 300-gallon Premier Plastics lift station (blue).**



## **By Land or By Sea**

Many properties in the Juneau Septic Services' market are accessible only by water, so owner Sloan Swendsen had to find a way to reach them to install or service their onsite systems.

"Mobilizing for a project site that is only water-accessible brings a unique set of challenges," he says. He uses a landing craft similar to a World War II LST for jobs. Customers pay for the mobilization in addition to the usual cost of his work.

Things needed first get loaded last. Heavy items must be loaded in a way that ensures a balanced craft. It's important not to forget anything: leaving a tool behind can cause the loss of a full day's work.

Factors such as wind, tide and current all affect these projects. High and low tides are roughly 12 hours apart. Sometimes a high tide, essential to get the vessel close to shore, occurs at an



**Sloan Swendsen**

inconvenient time, like 4 a.m. Some sites will see water levels change by 15 to 20 feet between high and low tides.

By finding a way to go beyond the road network, Juneau Septic Services has expanded its service area.

maintained, and some were not properly constructed in the first place. Before he can fix a system, he must understand the problem.

To find the problem at one

commercial facility, he added a CCTV inspection system to his toolbox. At the facility, he found sewer and drain line cross connections, an overloaded advanced treatment unit, and a marine discharge that was not meeting its permit requirements.

"We proposed adding a Bord na Mona peat filter followed by UV lamp disinfection," he says. Working with the Department of Environmental Conservation, Swendsen secured the necessary modification permits. This was the company's first Bord na Mona installation, and the first in Alaska.

Marine discharge systems release highly treated effluent to the Pacific Ocean, or to the many bays and inlets in the area. Swendsen finds that many of these systems are also operating well below regulators' expectations. Seeing that about 90 percent of marine discharge systems included an advanced treatment unit, he learned how to service them and so opened a new line of business.

#### **No quick fixes**

Swendsen does not try to com-

pete on low price. The company instead sells reliability, performance and system longevity. Swendsen did not want a quick fix with a limited service life in his backyard, and knows his customers don't either. "We put systems in properly so that they do last," he says.

Meeting the regulations does not ensure a quality installation. Working closely with the Department of Environmental Conservation Swendsen has built a trusting relationship. When unexpected issues arise, or when a by-the-book repair solution simply does not fit the regulations, he works with the regulators to solve the problem and eliminate a potential source of pollution.

"Uncovering buried surprises is an everyday occurrence," Swendsen says. "Documenting what you uncover is an everyday necessity." He takes pictures of everything, especially on challenging and constrained sites. He photographs key aspects of every system before they are covered, so that he has an

archive for each job (which ideally he will never need to reopen).

#### Focused resources

Swendsen's partner, Jason Tarver, handles the business paperwork. Tarver is a full-time firefighter whose work schedule — 24 hours on, 48 hours off — limits his availability in the field.

Juneau Septic's first acquisition

on a job site, but it also reduces the machine's lifting capacity," Swendsen says.

Other equipment includes a 1982 International single-axle dump truck rated at 26,000-lbs GVW, and a 2009 Yanmar backhoe. To move material on a job site, a Yanmar self-propelled tracked wheelbarrow is available. The next acquisition will be a six-wheel-drive vacuum truck

**"As long as you do everything in compliance with the regulations, are conscientious about the quality of materials and workmanship, and are honest with all parties, success will be part of every installation."**

Sloan Swendsen

was a 1982 International vacuum truck that Swendsen used to solve his own problem. A 2001 tracked excavator with an articulating knuckle soon followed. "The knuckle greatly reduces the number of times the machine must be repositioned

for reaching treatment tanks in difficult locations.

The company has grown by steadily responding to market opportunities. Keeping installation, maintenance, and repairs under one roof helps keep cash flowing year-round. "As long as you do everything in compliance with the regulations, are conscientious about the quality of materials and workmanship, and are honest with all parties, success will be part of every installation," Swendsen says. It's an approach he shares with his customers every day. ■

Challenging sites mean Sloan Swendsen often has to work with regulators to solve problems with solutions that may not be strictly "by the book."

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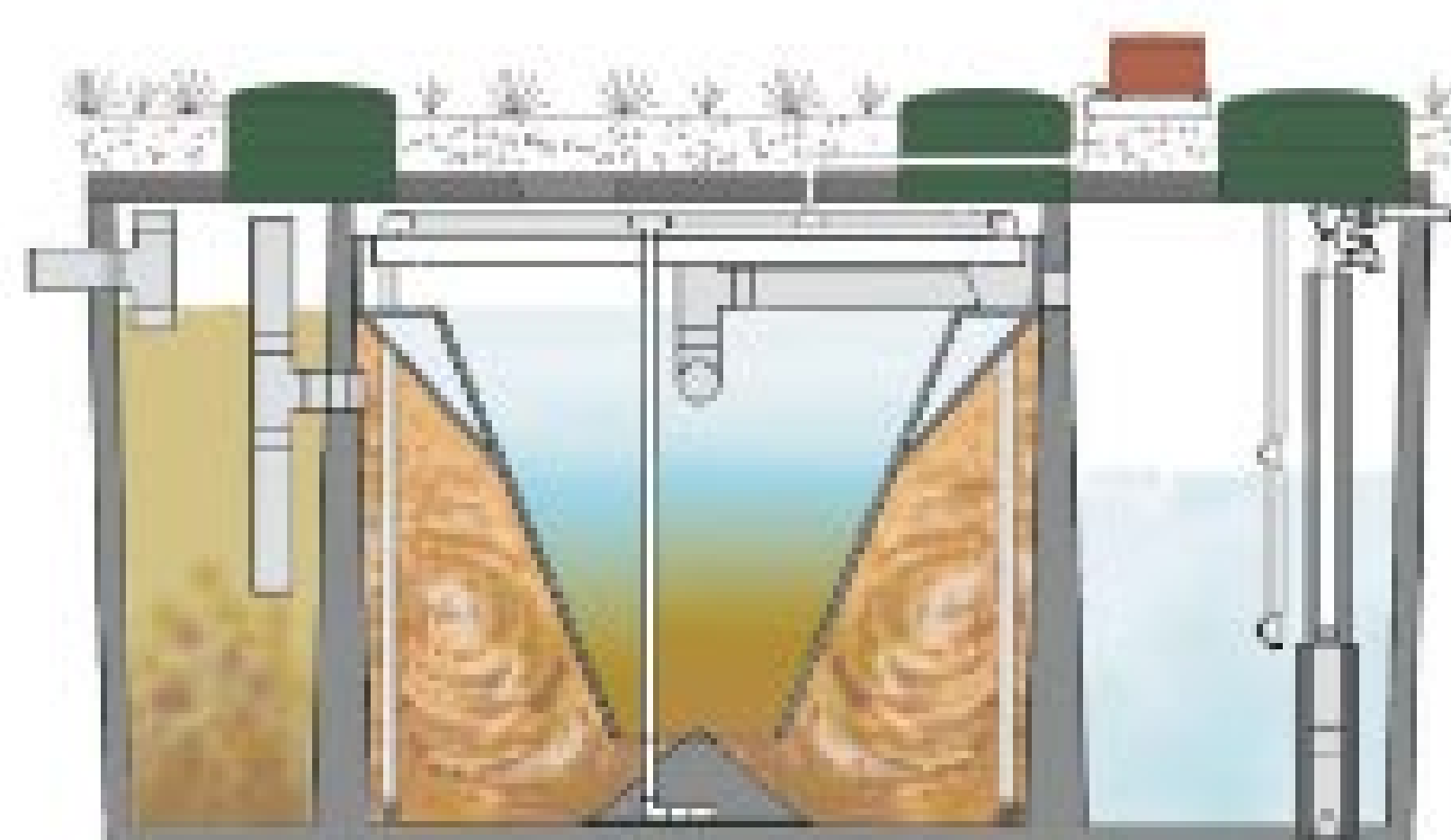


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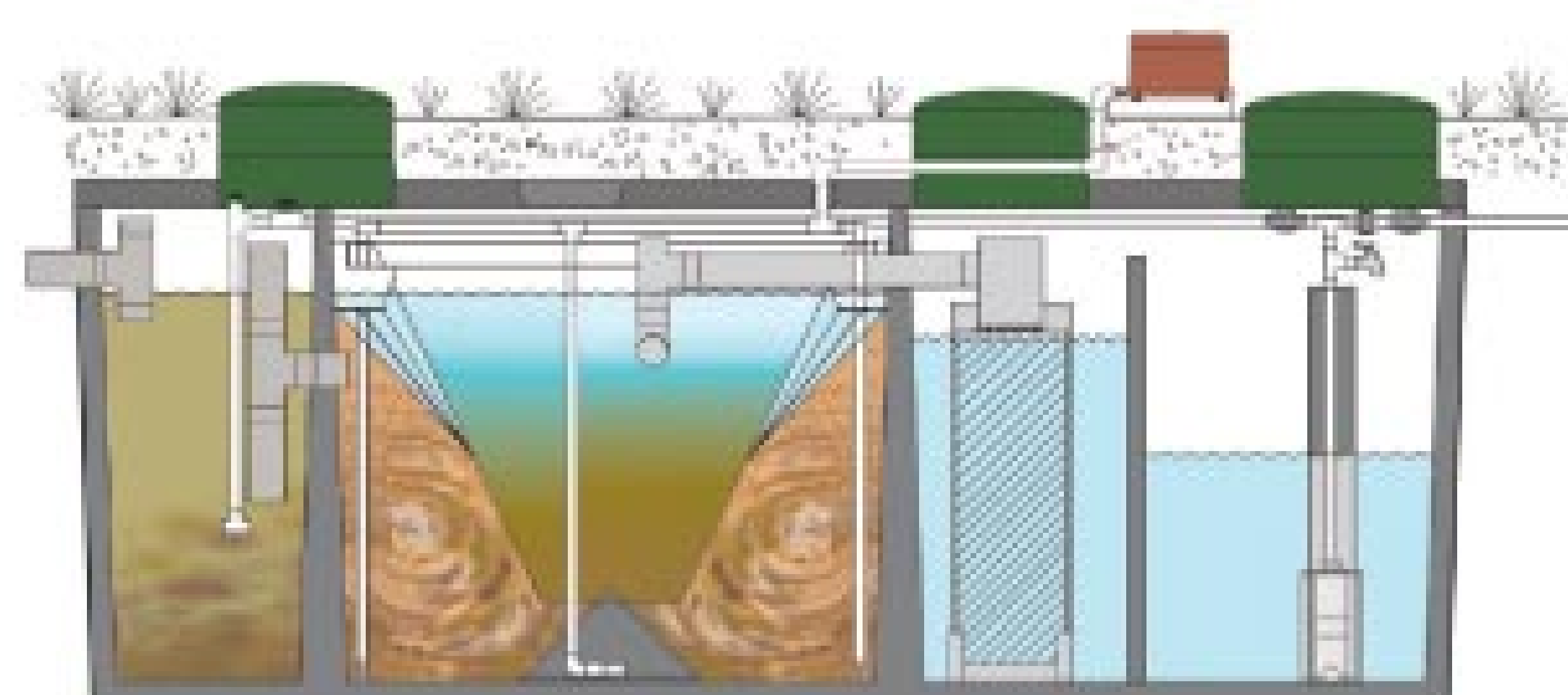
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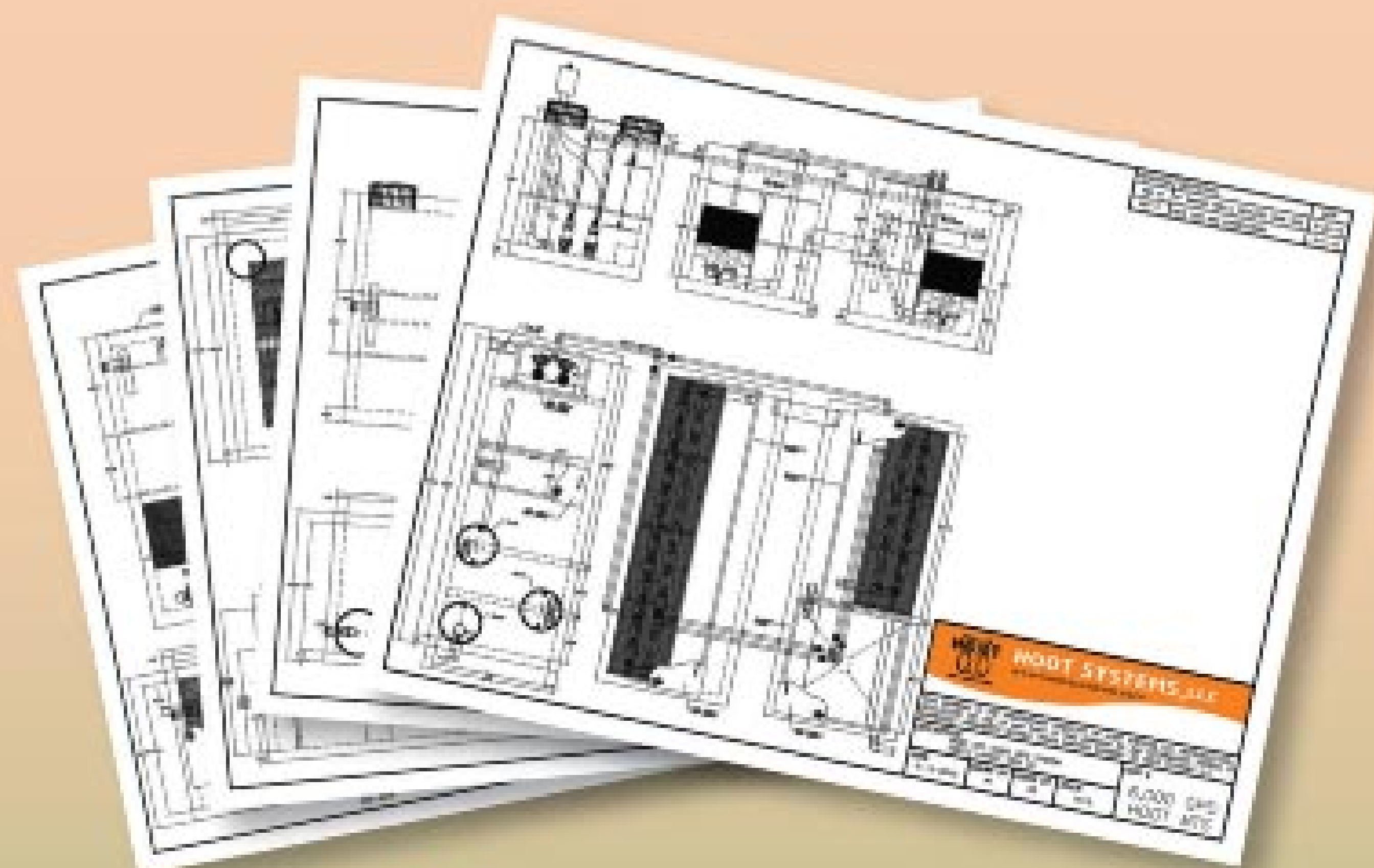
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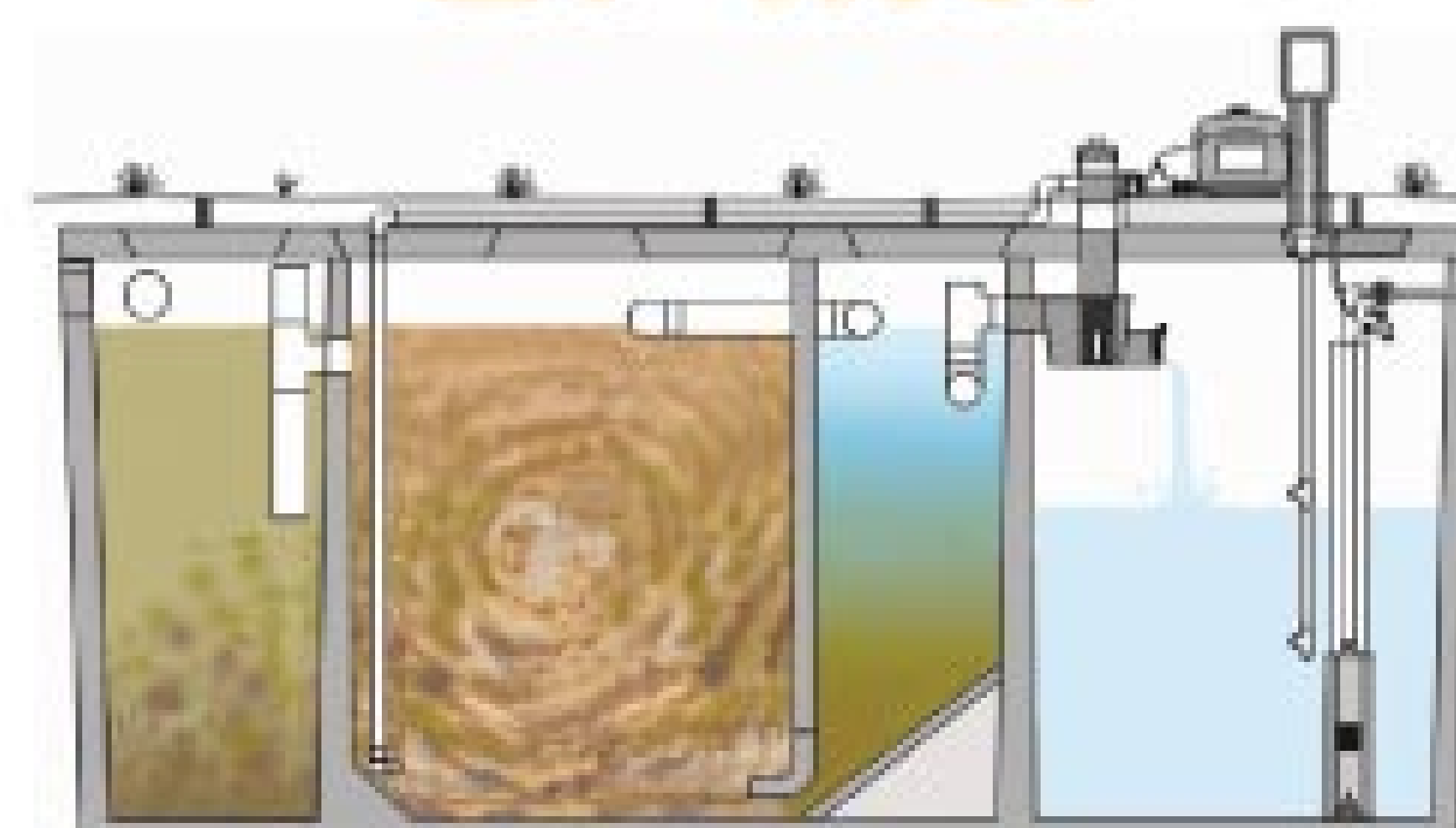


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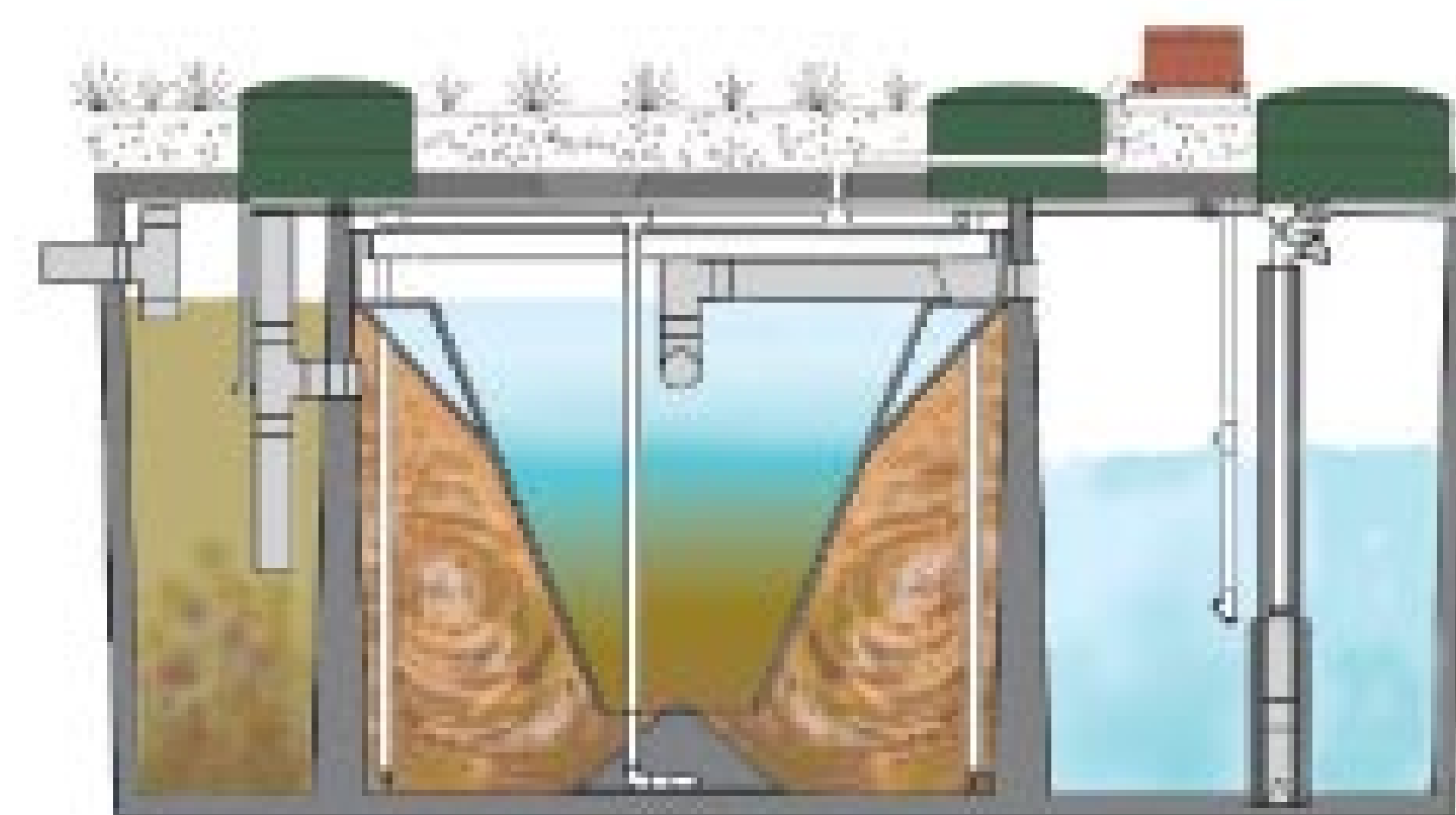


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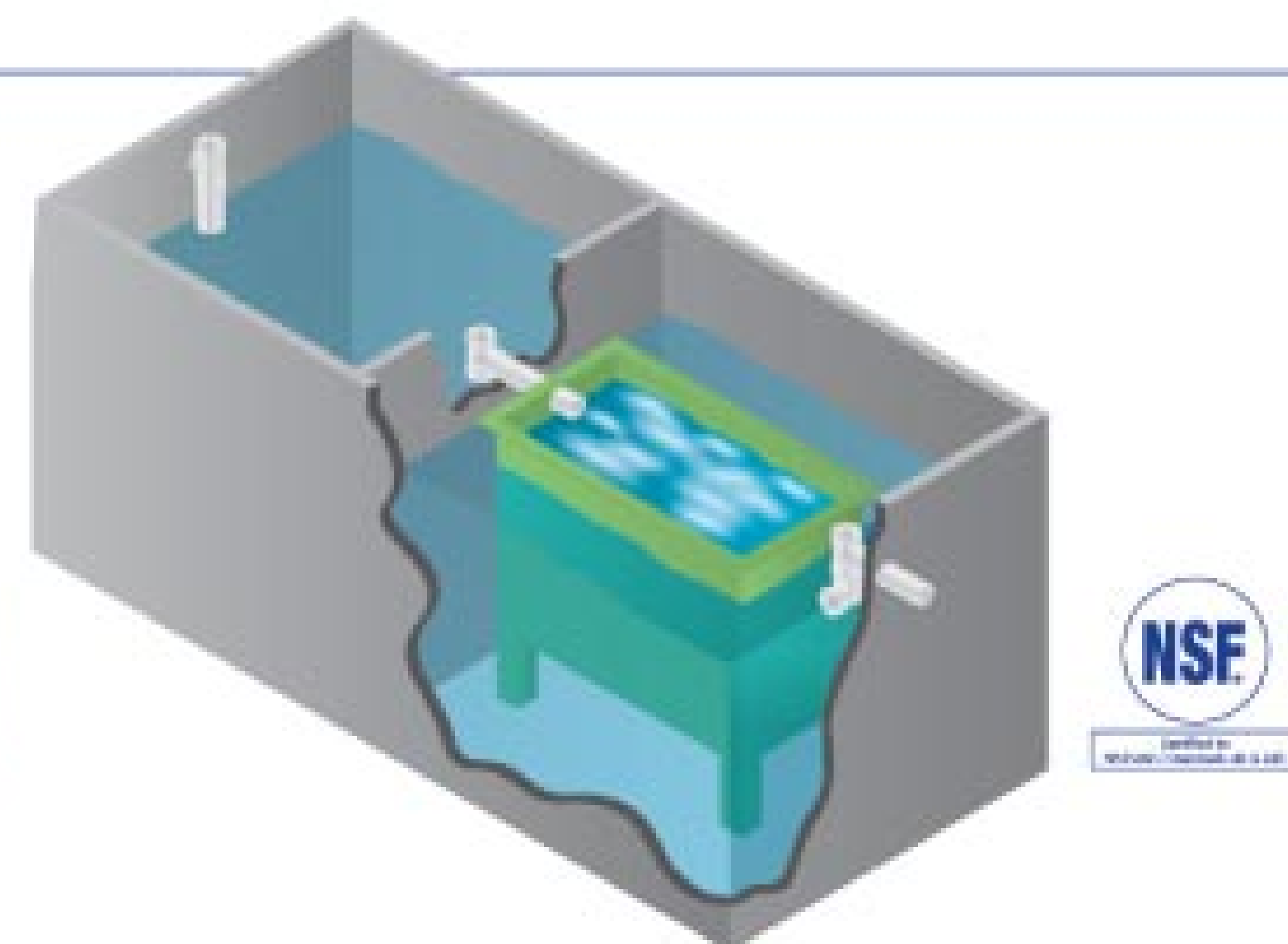


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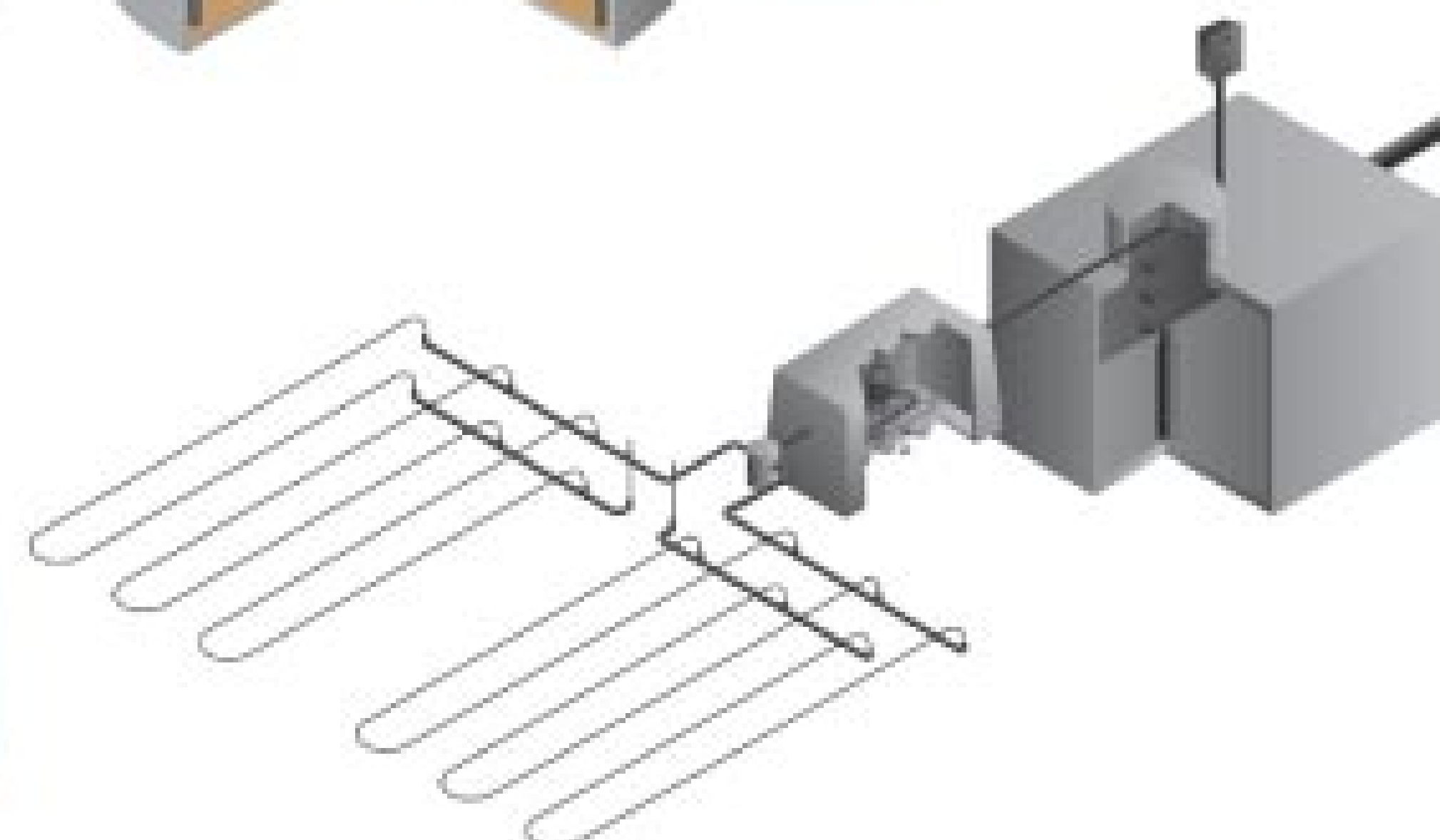
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# What's New in Treatment?

Advanced treatment units continue to break new ground in product and technology innovation and government certifications

By **Scottie Dayton**

**E**ach year brings innovations in advanced treatment units — not only brand-new systems but also line extensions, new components and capabilities, new test results verifying treatment performance, and approvals for specific systems' use in new states and provinces. Here is a look at the latest developments in advanced treatment units.

## New product lines

The redesigned **Remediator** and **Pro Line** kits from **Aero-Stream LLC** have greater reserve capacity and reduce sound output by 75 percent. The Pro Line Plus handles high flows and high-strength influent and is U.S. and Canada UL listed. The Aero-Alert battery-powered multifunction alarm system uses advanced LEDs and piezoelectronics. Contractors can



Remediator and Pro Line from Aero-Stream LLC

install the system without a licensed electrician or electrical permit. The unit alarm signals for more than 60 days. **877/254-7093; [www.aero-stream.com](http://www.aero-stream.com).**

## Approved in all states

### S-400 and S-600 SludgeHammer

aerobic bacterial generators are certified by the International Association of Plumbing and Mechanical Officials Research and Testing Inc. and to NSF/ANSI Standard 40 as advanced treatment systems for residential wastewater. The models are approved in all states. Most units are engineered for subsurface drip disposal. The generators use microbes to process waste in the septic tank. Then the organisms migrate to and remediate clogged leachfields. Digestion of effluent is so complete that nothing remains to create a biomat, the company states.

S-400 and S-600 from SludgeHammer

The units are designed as cost-effective options when repairing or replacing failed absorption beds. **800/426-3349; [www.sludgehammer.net](http://www.sludgehammer.net).**



## Installation ready

The **Model J-500CF** nutrient reduction system from **Jet Inc.** uses intermittent aeration and additional filtration to reduce total nitrogen. The prefabricated unit meets NSF Standard 40 and 245 for reduction of TSS, BOD, and total nitrogen. The system includes the 700LL aerator, attached pretreatment tank, and biologically accelerated treatment media process to transform wastewater into colorless, odorless effluent. **800/321-6960; [www.jetincorp.com](http://www.jetincorp.com).**

## High-strength MBR

The **BioBarrier** high-strength membrane bioreactor (HSMBR) from **Bio-Microbics Inc.**, is designed for residential or commercial applications with high-strength effluent in flows from 500 to 9,000 gpd. Acting as a physical barrier for nearly all common pollutants in wastewater and greywater, the system avoids fouling of the sheets by inorganic solids with ultrafiltration and microfiltration flat-sheet membranes with pore sizes down to 0.03 to 1.1 microns.

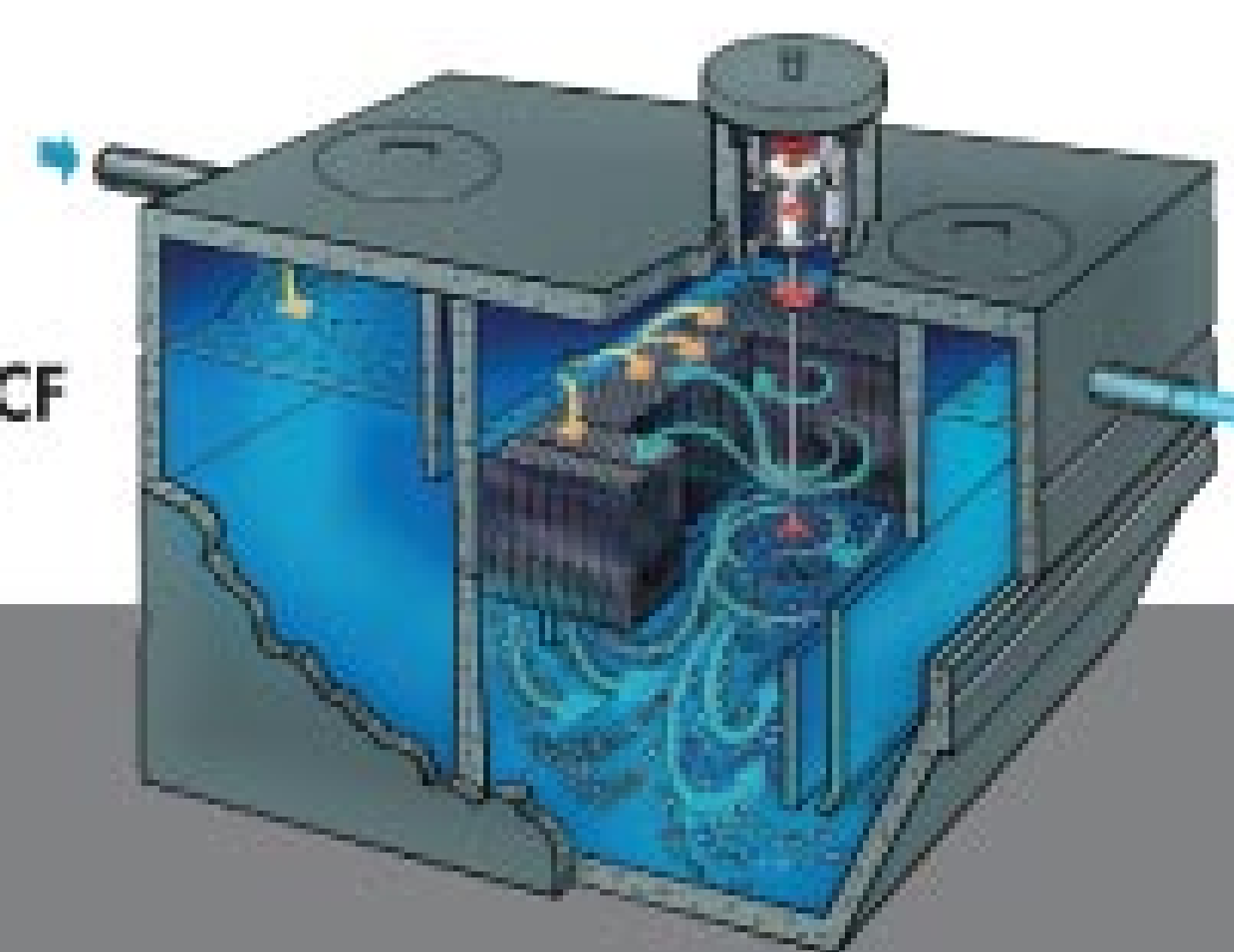
The operation sequence requires no complex backwashing and is completely automated. It is based on the same technology as the NSF-certified BioBarrier MBR and produces high-quality effluent that provides water reuse opportunities. The pre-engineered, modular unit ships installation-ready and fits into new and existing tank configurations. **800/753-3278; [www.biomicrobics.com](http://www.biomicrobics.com).**



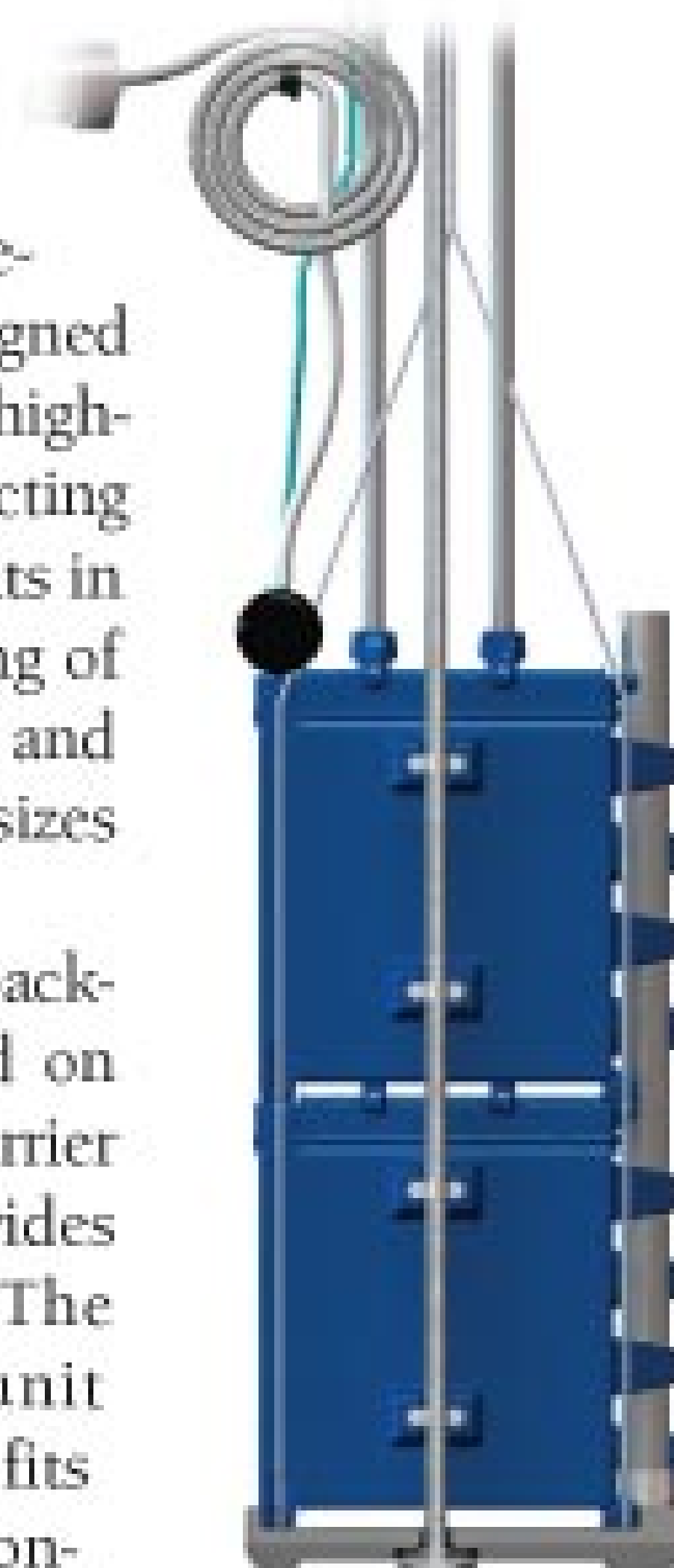
Aquaworx Remediator

## Aerobic bacterial generator

Failing wastewater drainfields can be rejuvenated in as little as two weeks with the **Aquaworx Remediator**. Installed with minimal landscape disruption, the system is inserted into the existing septic tank and reverses the biological clogging process that caused the failure. The unit is designed to be inexpensive to install, operate and maintain. **877/278-2979; [www.infiltratorsystems.com](http://www.infiltratorsystems.com).**



Model J-500CF from Jet Inc.

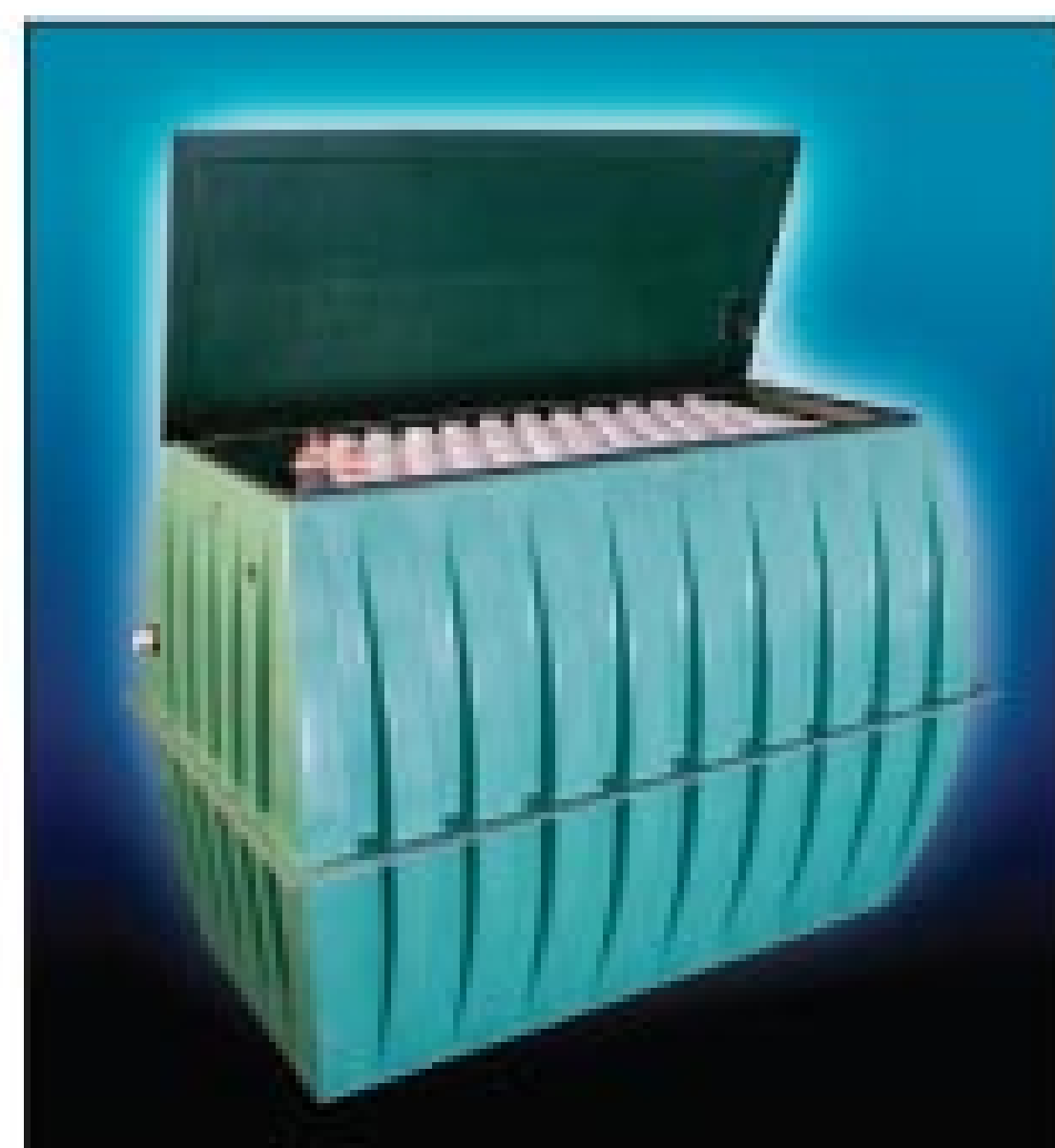


BioBarrier from Bio-Microbics Inc.



### New systems

The **AdvanTex AX20-RT** and **AX20-RTN** three-in-one treatment, recirculating and dosing systems from **Orenco Systems Inc.** come with factory settings and "plug-and-play" installation. The 5- by 8.5- by 6-foot-high watertight fiberglass basins install like a tank. Effluent recirculates without a splitter valve. Systems are NSF-approved to produce less than 10 mg/l BOD and TSS and reduce nitrogen by more than 60 percent. Rated at 500 gpd, the units have a VeriComm remote telemetry control panel or MVP digital programmable controller. 800/348-9843; [www.orencosystems.com](http://www.orencosystems.com).



AdvanTex AX20-RT and AX20-RTN from Orenco Systems Inc.

### Nutrient reduction

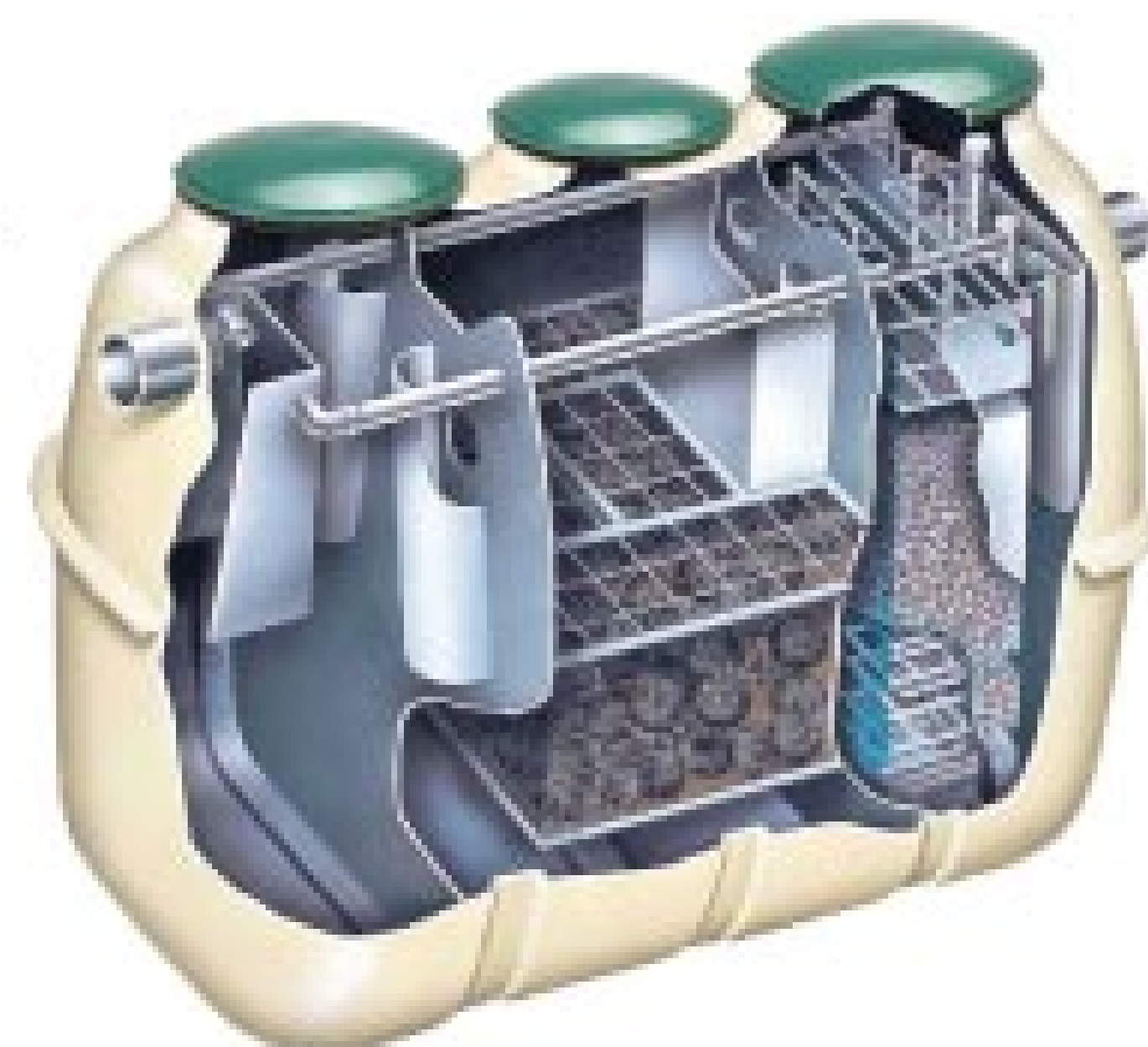
A **nutrient reduction system** from **Enviro-Flo Inc.** accomplishes nutrient reduction without added pumps or chemicals. The system, which has no moving parts, is simple to install with minimal plumbing. The company's NSF Standard 40 HDPE aerobic treatment tanks have a ribbed-arch shape for ease of back-filling. Access openings accommodate standard risers. Weighing less than 600 pounds, the systems include a pretreatment chamber, a pump chamber, or both, and can be set without machinery. 877/836-8476; [www.enviroflo.com](http://www.enviroflo.com).



Nutrient reduction system from Enviro-Flo Inc.

### More capacity

**Fusion series** wastewater treatment systems from **Clarus Environmental**, a division of **Zoeller Pump Co.**, are now approved in Georgia and Texas. Units treating 1,120 to 2,800 gpd are available for clustered and commercial applications. 877/244-9340; [www.zoeller.com](http://www.zoeller.com).



Fusion series from Clarus Environmental, a division of Zoeller Pump Co.

### Membrane bioreactor

**Membrex** from **Premier Tech Aqua** combines biological activated sludge treatment with submerged membrane ultrafiltration to meet discharge requirements for nitrogen and phosphorus removal and disinfection. Designed for commercial and community applications, the system also meets California Title 22 requirements for effluent reuse. 800/632-6356; [www.premiertechaqua.com](http://www.premiertechaqua.com). ■

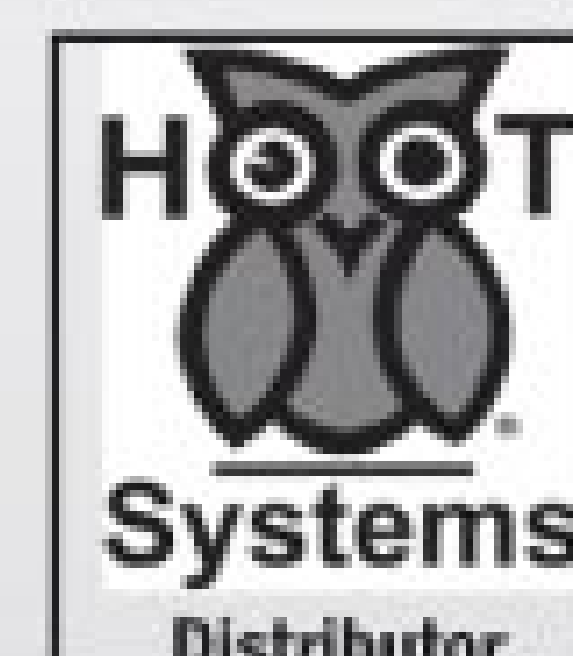


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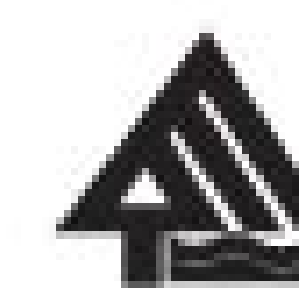
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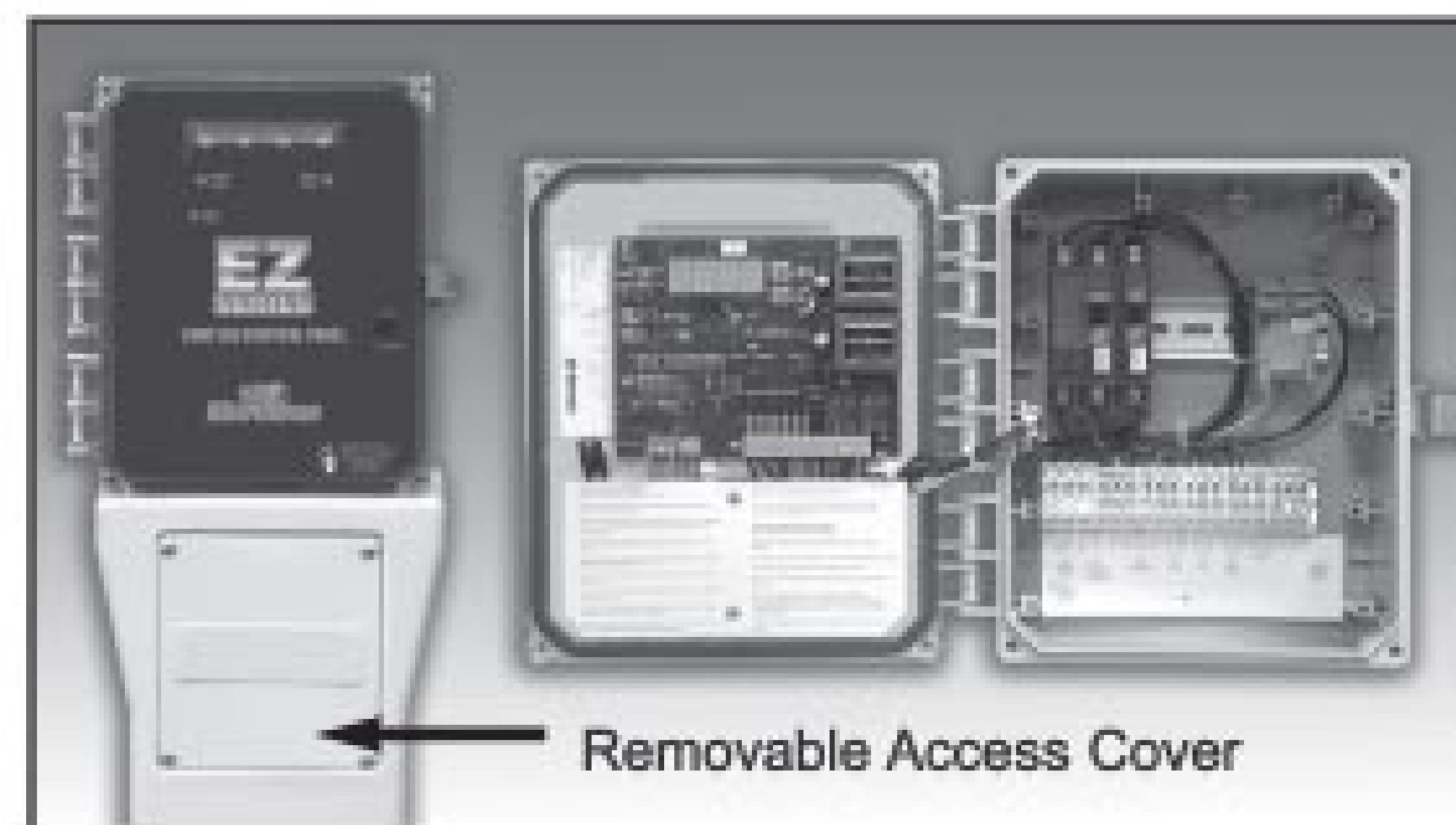
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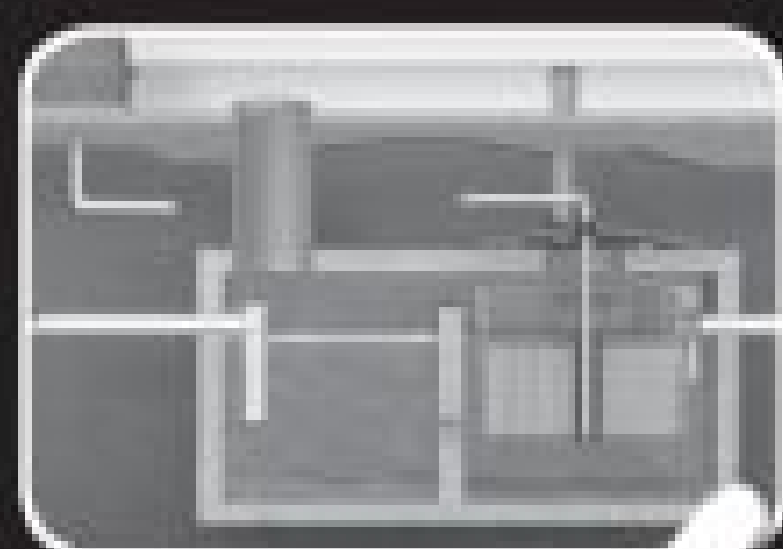
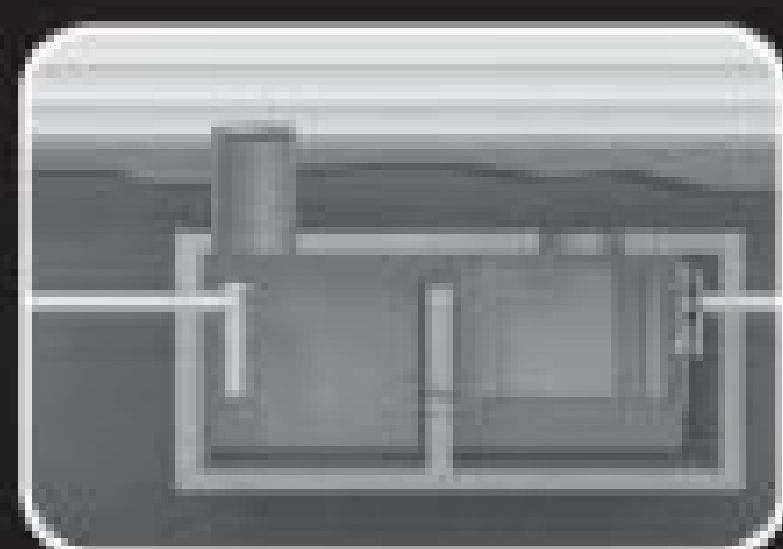
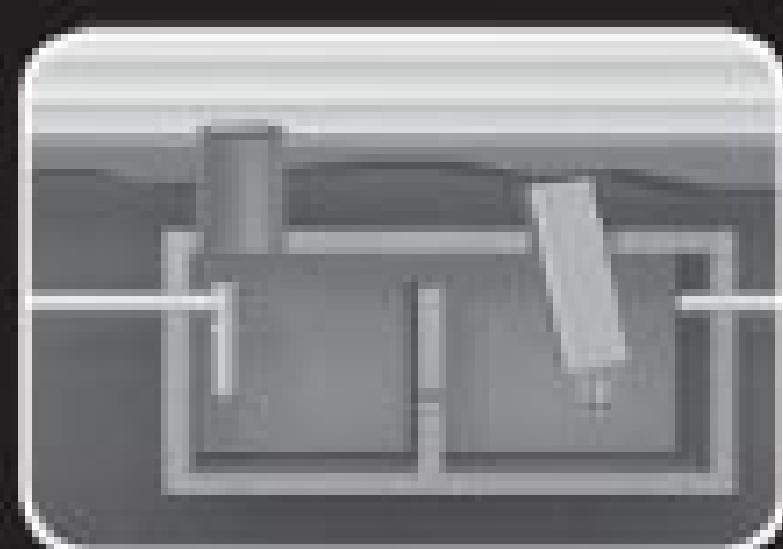
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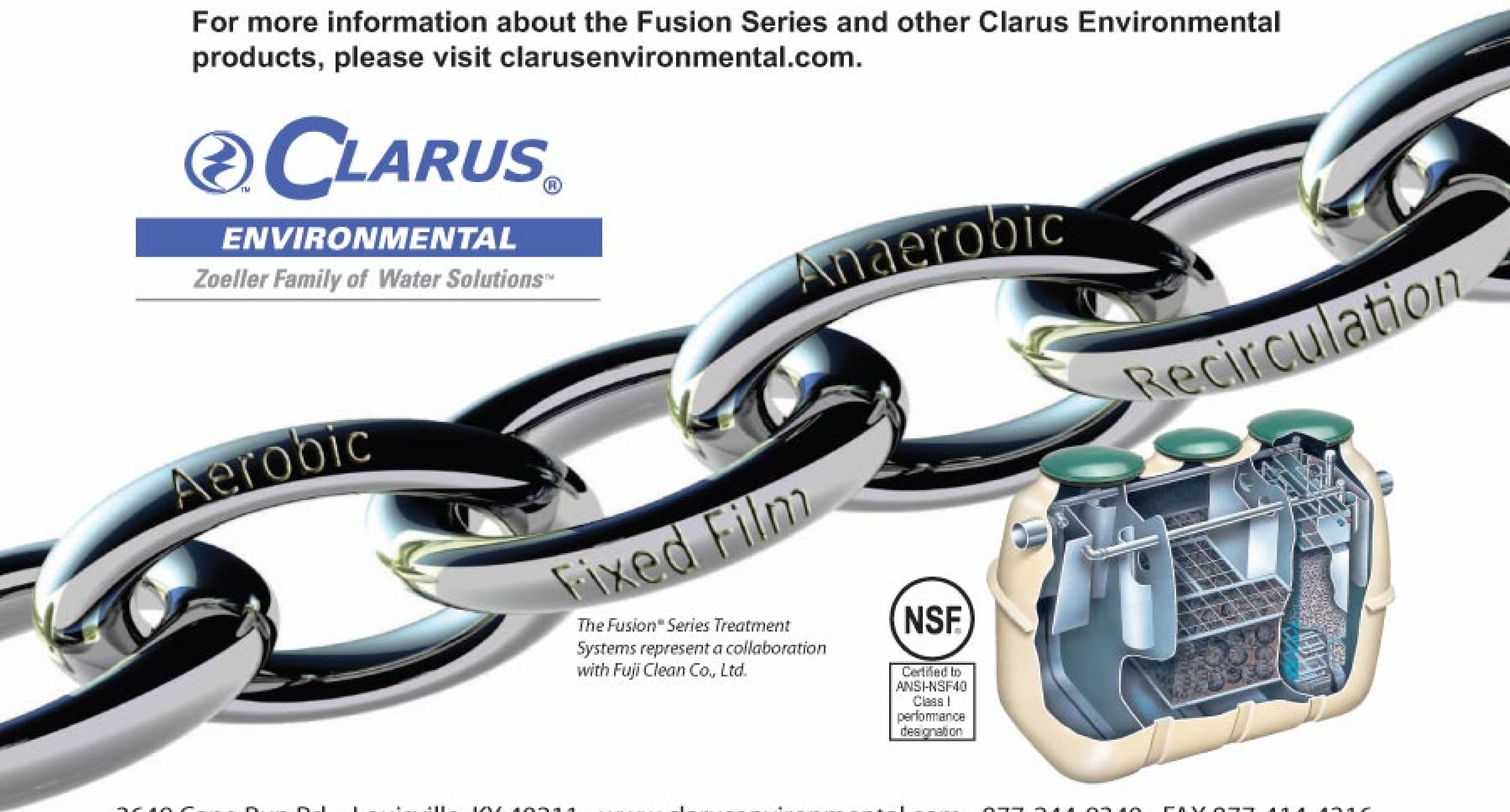
Designed for long term sustainability and with the maintenance provider in mind, the Fusion's anaerobic and aerobic media never need to be removed or replaced and carry a lifetime guarantee. All system components are easily accessible from the surface and no specialized tools are necessary.

For more information about the Fusion Series and other Clarus Environmental products, please visit [clarusenvironmental.com](http://clarusenvironmental.com).



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AS SEEN AT THE expo

# Show Stoppers

Installers get an up-close look at the latest innovations in onsite wastewater treatment during the 2010 Pumper & Cleaner Environmental Expo

By Ed Wodalski

Onsite installers looking to stay ahead of the competition saw the latest industry innovations at the 30th Annual Pumper & Cleaner Environmental Expo International, Feb. 24-27, in Louisville, Ky.

A total of 8,784 attendees from 3,921 companies viewed products from 493 vendors at the Kentucky Exposition Center. Among the offerings were the latest in advanced treatment systems, pump units, progressive filters, electronic monitoring devices, labor-saving equipment and innovative accessories. Here's a sampling of innovations found on the show floor:

## ADVANCED TREATMENT SYSTEM

The **Advanced Enviro-Septic** wastewater treatment system from **Presby Environmental** is NSF Standard 40 certified and designed to remove up to 99 percent of contaminants. The unit treats and disperses waste in the same footprint, requires no energy and needs no computer controls, media replacement or special maintenance.

Warm effluent enters the system and is cooled to ground temperature. As suspended solids separate, skimmer tabs capture grease and suspended solids. Pipe ridges enable the effluent to flow uninterrupted and aid in cooling. Bio-Accelerator fabric screens additional solids, developing a biomat that

Advanced Enviro-Septic



provides treatment and accelerates biomat development. A mat of coarse fibers separates more solids as effluent passes into the geotextile fabric and grows a protected bacterial surface. Sand wicks liquid from the fabric, enabling air to reach the bacterial surface to break down solids. **800/473-5298; [www.presbyenvironmental.com](http://www.presbyenvironmental.com).**

## GRINDER PUMP

The 2 hp **W202GDS** grinder pump from **Webtrol** features a hardened stainless steel shredding ring and grinding cutter. The recessed (vortex) impeller design reduces bearing load and prevents clogging. Internal capacitors eliminate the need for external controls. A silicon carbide mechanical seal with secondary lip seal helps prevent leakage, while the oil-filled motor dissipates heat. The pump has a 30-foot cord and 1.25-inch discharge and operates on 230 volts. With a cast-iron body with ductile iron base, the pump delivers 5 to 40 gpm with a total dynamic head of 103 to 45 feet. **800/769-7867; [www.webtrol.com](http://www.webtrol.com).**



Exhibit floor at the 2010 Pumper & Cleaner Environmental Expo International in Louisville.



## PROGRESSIVE EFFLUENT FILTER

The **ML3** effluent filter from **Bear Onsite** uses three progressive stages of filtration. Sidewall vents prevent gases from collecting and an open area (or quiet zone) works to slow the effluent movement and enhance settling of solids. Solids are exposed to 123.94 square inches of filter cartridge interface, of which 96.37 square inches are below the outlet invert.

The passive filtration system has three baffle walls. The first blocks particles greater than 3/16 inch. Smaller particles pass through to a second baffle wall that blocks particles greater than 1/8 inch. The final baffle wall blocks remaining particles greater than 1/16 inch. The filter system includes an alarm that alerts the homeowner to the need for service. The housing for the vertical reed switch is molded within the filter, protected from unfiltered effluent that could trigger false alarms. **877/653-4583; www.bearonsite.com.**

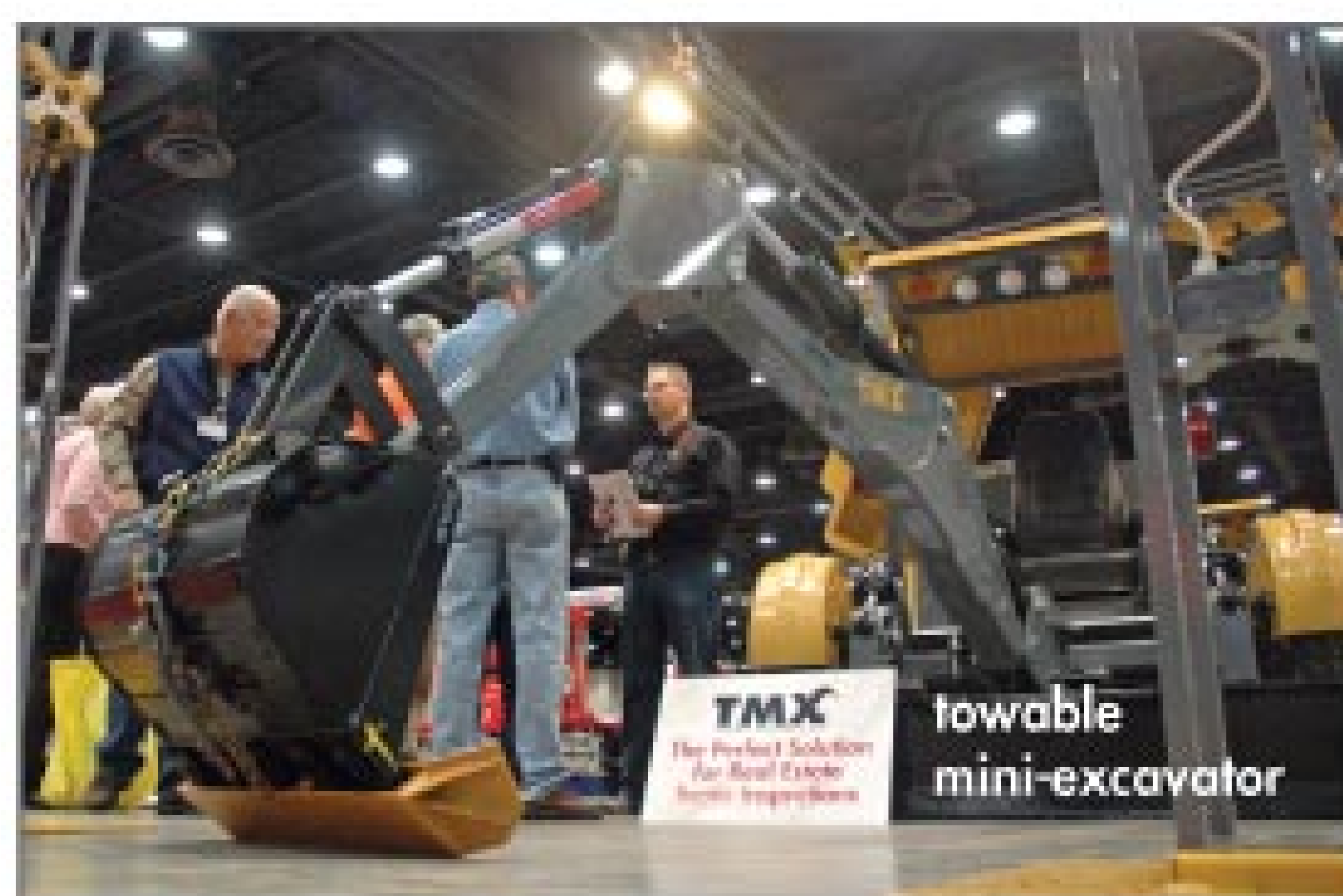


ML3

## TOWABLE MINI-EXCAVATOR

The **towable mini-excavator** from **TMX** has a built-in trailer and lock-out drive hubs that enable it to be towed at highway speeds with a pickup, van or other light-duty vehicle. The 20 hp, gasoline-powered excavator has a bucket digging force of 4,050 pounds, dipper force of 2,550 pounds, digging depth of 8 feet and loading height of 7 feet 2 inches. The unit has a 62-inch minimum swing radius and 140-degree boom swing.

The 72-inch back-fill blade has a 6-inch maximum machine lift and 21-degree tilt. The hydraulic system delivers 10 gpm/3,600 rpm and has a 3/8-inch flat-face quick disconnect. Measuring 151 inches long, 74.5 inches wide and 79 inches high, the unit weighs 2,941 pounds and has a tongue weight of 380 pounds. Armrest-mounted joystick controls are provided for both digging and grading. The seat is offset 4 inches for an unobstructed view of the bucket. **515/745-8352; www.tmx-excavator.com.**



towable mini-excavator



TeleSwivel

## MOVABLE HITCH ADAPTER

The **TeleSwivel** hitch adapter from **Williams Innovations** lets users connect a truck and trailer in a single pass virtually every time. The adapter has a target zone 25 times larger than a standard ball hitch. The coupler inserts into any 2-inch receiver. To

use, the operator backs into position, swivels the hitch into place, connects, and backs up to lock the hitch into place for travel. The adapter is Class IV rated for up to 10,000 pounds gross trailer weight and 1,000-pound tongue weight. It accepts any size ball. The BX model accepts a three-ball or pintel hitch, while the Pro adapter is rated at 14,000 pounds and comes with a 2 5/16 and 2-inch ball as well as pintel capability. It also has 7 inches of drop for easier hookup. **919/794-5484; www.teleswivel.com.**

## ONSITE TREATMENT SYSTEM

The **Singlair Green** onsite treatment system from **Norweco** is an advanced aerobic treatment system in a durable, watertight polyethylene tank that weighs less than 800 pounds. The system has a pretreatment chamber, an aeration chamber, and a clarification chamber that automatically equalizes influent and effluent flow through all stages of treatment.

Each chamber is manufactured separately and pinned together and welded for a watertight fit. The unit has Bio-Kinetic risers with sealed or vented lids. The Singlair aerator is powered by a 1,725-rpm, 115-volt, fractional horsepower motor. Molded internal walls allow the tank to be installed up to 3 feet below grade, while its ribbed-arch shape allows use of most soils for backfill and usually eliminates the need for water during installation. An anti-flotation option is available. **419/668-4471; www.norweco.com.**



Singlair Green

## PERCOLATION TESTING SYSTEM

The **E-Z Perk** automated percolation testing system from **Percolation Technologies Inc.** performs pretests and long and short tests. The pretest automatically determines whether a short or long test is required. Features include a user-friendly interface for quick and easy setup. It can print out perk test information and record the site location using an onboard GPS. The 24-pound main unit and 15-pound remote unit are powered by a 12-volt rechargeable battery. Designed for use in 40 to 120 degree F temperatures and hole depths from 5 to 39 inches, the units deliver 0.1-inch resolution and 0.02-inch accuracy. **320/258-2873; www.percolationtechnologies.com.**



E-Z Perk



C-Level

## FLOATLESS TECHNOLOGY

The **C-Level** wet well sensor from **SJE-Rhombus** is used with select Installer Friendly Series panels. The unit uses floatless technology to monitor tank pressure, sending a signal to the control panel, which displays the reading in inches or centimeters. Pump activation levels can be adjusted using the panel's touch pad.

One sensor replaces up to four floats and can be used with either timed-



dose or demand-dose applications. In timed dosing the sensor replaces the redundant off float, timer-enabled float, timer-override float and alarm float. In demand dosing, the sensor replaces the stop float, start float, alarm float and lag float. The IFS panel also can accommodate a redundant off float and alarm float when desired. 888/342-5753; [www.sjerhombus.com](http://www.sjerhombus.com).

### TANK INSPECTION CAMERA

The **Tank Inspection Camera** from Remote Vision System inspects septic tanks and other enclosures that are physically inaccessible or too hazardous to enter. The portable, pole-mounted video camera system is fully portable and includes camera, 4- or 5-inch TV monitor, 18-foot telescoping pole, 50 to 75 feet of cable, 12-volt battery, power cords and carrying case. The system can operate in an opening as small as 3.5 inches and is designed for overhead as well as underground viewing.

The Elite Remote Vision System includes a digital video recorder. Data can be downloaded and viewed on a computer or TV screen. The Premier model can be coupled with a DVR to record all video. 612/221-6690; [www.remotevisionsystem.com](http://www.remotevisionsystem.com).



Tank Inspection Camera

### DECORATIVE LANDSCAPE LIDS

Decorative fiberglass **Landscape Lids** by Orenco are watertight and durable and can support a 2,500-pound wheel load. Designed for secure covering of septic system risers and irrigation valve boxes, the lids come with stainless steel hex-drive screws and a hex key. Tamper-proof bolts are available. The lids come in grass, river rock and bark mulch patterns in 18-, 24- and 30-inch diameters to fit AX20 and AX100 pods. 800/348-9843; [www.orenco.com](http://www.orenco.com).



### LOW-PROFILE CHAMBER

The **Quick4 Plus** standard low-profile chamber from Infiltrator Systems Inc. stands 8 inches tall and is designed for shallow applications, such as high groundwater tables in as little as 6 inches of soil. Four center structural columns add strength. Available in 4-foot lengths, the 34-inch wide chamber can be installed in a 36-inch trench. A Contour Swivel Connection permits 10-degree turns right and left. The Quick4 Plus Equalizer 36 low-profile chamber, also 8 inches tall, is 22 inches wide and can be installed in a 24-inch wide trench. 800/221-4436; [www.infiltratorsystems.com](http://www.infiltratorsystems.com).



Quick4 Plus

### UV DISINFECTION

The **PL-UV1** ultraviolet disinfection unit from Polylok Inc. is designed to meet stringent environmental permit requirements. The unit provides a UV dose greater than 40,000 microwatts per square centimeters at 254 nanometers and has a transmissivity quality of 65 percent. Flow rates range from 100 gpd to 8,640 gpd (gravity flow only). The system provides lamp operation temperature in the range of 104 to 120 degrees F and is designed to reduce fecal coliform by 99 percent.

A current sensing circuit automatically monitors performance of the UV bulb and assures proper operation. The system also can be monitored externally. Features include dual-pass design, waterproof electrical components, and long-life UV bulb encased in a transparent quartz sleeve. The unit consists of a NEMA 4X electrical enclosure with internal ballast, solid-state circuit board, 4-inch inlet and outlet hub, turbulence inducer, and ABS housing. 800/701-3942; [www.polylok.com](http://www.polylok.com).



PL-UV1

### DROP-IN TREATMENT UNIT

The **Fusion Series** treatment system from Zoeller Pump Co. is a four-stage unit that combines anaerobic, aerobic, recirculation, fixed-film and backwash processes. The pre-assembled drop-in unit can be adapted to existing systems and does not require a septic tank unless mandated by local regulations.



Fusion Series

The small footprint and advanced treatment capacity are designed for long-term sustainability. Its anaerobic and aerobic media never need to be removed or replaced. All system components are accessible from the surface without use of specialized tools. 800/928-7867; [www.zoeller.com](http://www.zoeller.com). ■

The Pumper & Cleaner Environmental Expo will celebrate its 31st year in 2011 at the Kentucky Exposition Center in Louisville, March 2-5.

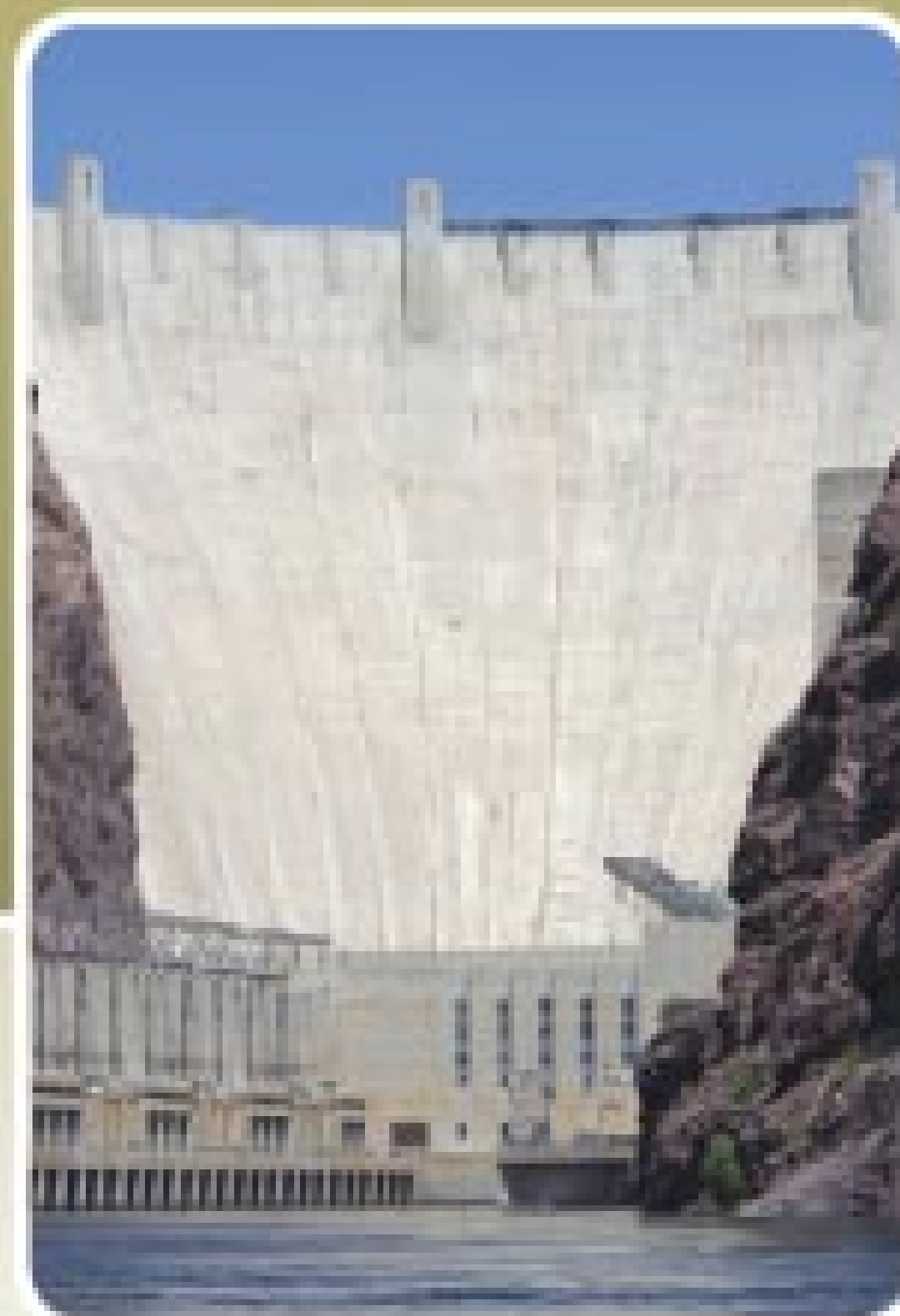


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Jim Anderson and David Gustafson are connected with the University of Minnesota onsite wastewater treatment education program. David is extension onsite sewage treatment educator. Jim is former director of the university's Water Resources Center and is now an emeritus professor, as well as education program coordinator for the National Association of Wastewater Transporters. Readers are welcome to submit questions or article suggestions to Jim and David. Write to [ander045@umn.edu](mailto:ander045@umn.edu).

# Piping It Right

Here are three important rules to follow when installing piping. Follow them and you will minimize problems in your onsite systems.

By Jim Anderson, Ph.D., and David Gustafson, P.E.

In the last two articles, we touched on the issue of how to install piping properly, in ways that avoid pipe damage and dips in the pipe. Installation should follow the ASTM-2321 Standard. But what exactly does that mean?

Let's look at the general piping installation process and three rules to follow during excavation and backfilling.

## Build a base

All plastic pipe material needs to be installed on a solid base. Ideally, the base should consist of the natural, unexcavated soil — except where organic or peat soils are present.

However, the reality is that installation usually requires placement of some type of granular base material. If the soil is excavated and then backfilled, the base should be compacted in 6- to 12-inch lifts. To enable proper backfilling around the pipe, the width of the trench bottom should be about three times the pipe diameter (12 inches wide for a 4-inch pipe).

The excavation should follow the designed pathway for the pipe. This is especially critical in pumping situations, such as the supply pipe to a manifold in a mound- or pressure-distribution system. If the trench is over-excavated, or if organic soil material is present, then use an inorganic base, such as sand or pea rock, to bring the base to the

required elevation before laying the piping. The key for any sub-base material is that there must not be any settling or bellies in the pipe.

## Rules to live by

Now for the three simple rules to follow during excavation and backfilling to ensure that piping is installed correctly and effluent will flow where you want it to.

**Rule 1. Avoid over-excavating the trench if possible.** If wastewater is to flow properly, the pipe must be supported. Unsupported pipe can clog and freeze. By having unexcavated soil under the piping, you reduce the risk of developing low spots or dips in the pipe where solids can settle or water can collect and freeze.

If the trench is over-excavated, you must bring in material and compact it to the elevation necessary. This means extra work, and it costs time and money. If the excavation is in organic soils, the pipe will be subject to settling and heaving during wetting/drying or freezing/thawing of the soil. This also puts pressure on pipe joints and connections, causing leaks. In addition, the pipe will not maintain its proper slope.

**Rule 2. Support the pipe over deep excavations.** This simply means that if you have over-excavated the trench, or if the pipe has to cross an excavated area to enter or leave a sewage tank or other pre-



Upper photo: Over-excavation for the septic tank can create problems for both the inlet and outlet caused by settling over time. Lower photo: Unsupported piping into a chamber can cause flow problems later. (Photos courtesy of Donald Moats, DJ Backhoe Services in Kirkland, N.M.)

treatment device, the pipe will be at least partially on fill that can settle. To minimize problems, use a granular fill and compact it to support the pipe. Sand or rock is typically used. The rock should not be too large. If it is, topsoil can filter down into the rock spaces, causing a depression at the surface that can collect surface water. This in turn can create a drain around the system components, potentially allowing water to enter the system.

Where the pipe crosses such a fill area, use at least Schedule 40 piping to minimize bowing and the need to provide support. Where 2-inch piping is used for pressure supply lines, the pipe can be placed



inside a 4-inch pipe. The 4-inch pipe should then be sealed to keep the pipe from becoming filled with groundwater or soil.

**Rule 3. Backfill with a good material.** The backfill material has two jobs: protecting the pipe system,



and maintaining the pipe slope. Protection means the pipe is surrounded by and covered with the material. This provides some insulation to prevent freezing in cold climates. Another way to avoid freezing is to use insulated pipe at points where freezing may be an issue.

Large stones should be avoided during the backfilling process. The strength of the pipe is related to its round shape. Objects such as large



A properly supported pipe into the septic tank helps ensure reliable flow of wastewater for the long term. (Photo by Dave Gustafson)

rocks or dry, heavy clay soil clods can deform the pipe and lead to failure. To minimize the weight of the cover, apply granular backfill to at least the midpoint of the pipe.

Plastic pipe needs to be protected from UV rays and other surface conditions that can cause failure. Lawn mowing and traffic over excavations can break and crack the pipe. You can prevent this by creating a backfill system with granular material to support the pipe.

Finishing should be done with a soil that will allow establishment of a good vegetative cover. Make sure there is a crown on the finishing material to allow for settling. Good topsoil should contain:

- Less than 5 percent particles larger than 2 mm (#10 sieve).
- No material larger than 2.5 cm (no large rocks).
- No highly organic soil (only 1 to 5 percent organic matter to promote healthy plant growth).

Install piping correctly and you have made an important contribution to a long-lasting and high-performing treatment system. ■



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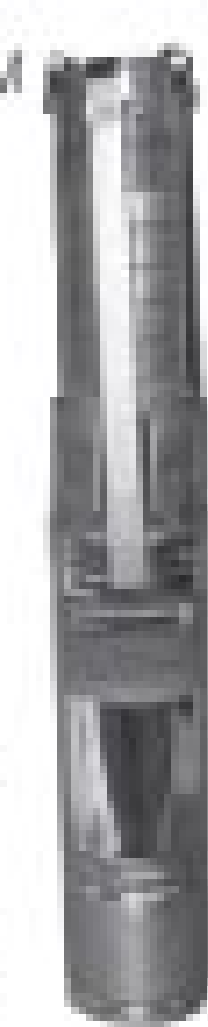
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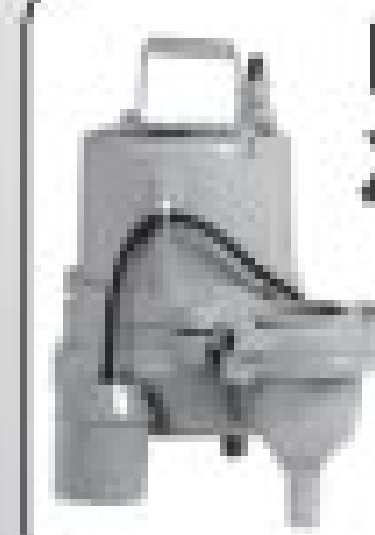
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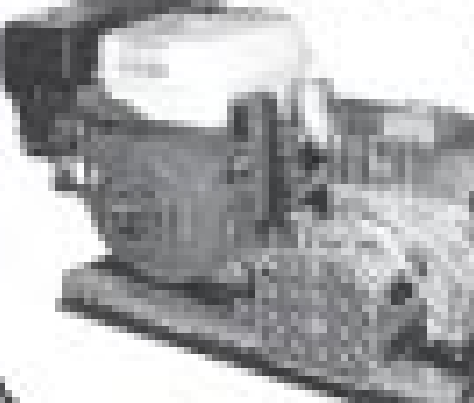


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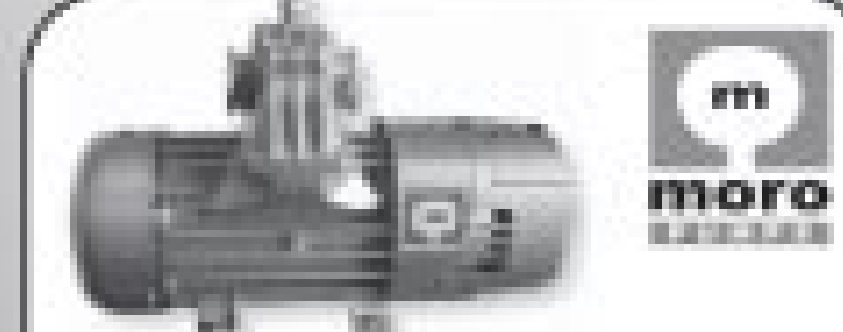


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# Multi-Tasking

Compact utility tractors are considered the Swiss Army knives of contractors involved in residential projects that involve earth-moving

By Greg Northcutt

**T**oday's compact utility tractors, typically 60 hp and smaller, offer impressive power and speed to out-work and out-maneuver larger, more expensive equipment in tight areas. Designed to operate a wide range of labor-saving attachments and implements, they are also economical on fuel and easy to transport.

Those with a loader on the front and a PTO and three-point hitch on the rear can easily handle just about any landscaping and grounds maintenance job, including some tasks related to onsite treatment system installations and repairs. You can use the loader to move soil, gravel, sand and other materials and the PTO and three-point hitch to operate tools that till, rake, seed, mow, spray, dig postholes, blow snow and more. Depending on make and model, tractors offer such features as hydrostatic transmissions, smooth and precise hydraulics, and suspension seats and cabs.

Many contractors find these machines ideal for projects from digging footings and installing and repairing utilities to general excavating and material-handling duties that once required the capabilities of full-size machines.

"Compact machinery is earning a great reputation in the market and is accepted better than in the past," says Keith Rohrbacker, construction equipment product manager with Kubota Tractor Corp. "Compact tractor-loader-backhoes (TLBs) are very popular with contractors just starting

out on their own. Often, they will minimize their startup costs or investment with a used compact TLB, because it is sized and priced right for their needs at that time.

"As their income and profits increase, they can step up to a newer or larger model, or perhaps hire another operator and move on to more specialized machines like skid-steer or compact track-loaders and compact excavators." Here's a look at several popular lines of TLBs.

## Cub Cadet Yanmar

Cub Cadet Yanmar offers the 28.7 hp model Ex2900 and the 32 hp Ex3200 compact tractors for startup contractors and the larger 45 hp Ex450 compact utility tractor for customers looking for more power and attachment versatility. Each comes standard with a direct-injection diesel engine, fully hydraulic power steering, dual gear-driven hydraulic pumps and foldable ROPS, along with optional rear-hydraulic remotes.

Features include a three-range hydrostatic transmission, an 8-foot, 2-inch turning radius, and a selectable control valve for simultaneous operation of loader arms and bucket. The Ex450's synchro shuttle transmission allows quick shifting between nine forward and nine reverse speeds. It also has dual turning brakes for tighter turning capabilities and a Category 1 three-point hitch with a 2,400-pound lift capacity. The curved design of the boom loader with optional

*Machine Matters is designed to help readers get the most from excavators, backhoes, skid-steers and other mechanical equipment through proper maintenance, operation and financial practices. Readers are welcome to submit ideas for this column and can send them to Ted J. Rulseh, editor, by calling 800/257-7222 or e-mailing [editor@onsiteinstaller.com](mailto:editor@onsiteinstaller.com).*



Cub Cadet  
Yanmar Ex450

QuickAttach for each tractor model improves operator sight lines, and the arched design of the QuickAttach backhoe increases digging depth and control. [www.cubcadetyanmar.com](http://www.cubcadetyanmar.com).

## Kioti

Kioti offers the CK series of 20 hp to 35 hp compact utility tractors. Models with either manual-synchro shuttle or hydrostatic transmissions are available with multiple forward and reverse speeds, rear differential locks, and wet disc brakes. The three-cylinder diesel engines are designed for simple maintenance and ultra-quiet, low-vibration operation.

The three three-point hitch machines come standard with front and rear PTOs and optional mid-PTO. A single-lever joystick controls all loader functions and automatically returns to neutral and stops the loader when released. A float position allows the bucket to float over the ground. Suspended clutch and brake pedals max-



Kioti CK Series



Bobcat CT335



Allmand TLB 225





John Deere 3320

imize foot room, and the ROPS folds for low clearances. Engine panels and the front hood remove for easy service and maintenance. Call 877/465-4684; [www.kioti.com](http://www.kioti.com).

### Bobcat

The Bobcat line of compact tractors includes nine models; from the 21 hp CT120 with a loader lift capacity of 830 pounds, to the 50 hp CT450 with 2,050-pound lift capacity. Standard features include four-wheel drive and hydrostatic transmission with two or three travel speed ranges, depending on model. Also standard is a Deluxe Category 1 three-point hitch with telescoping lower links and telescoping sway bars for easier implement hookup.

In addition to the standard rear PTO, an available mid-PTO can be added for operating a mid-mount mower. Some models are equipped with a PTO, which continues to operate at full speed if you stop or change directions using the hydrostatic controls, or an independent PTO. By flipping a switch, users can engage or disengage it, and it will stop without activating a clutch. An optional rear-remote hydraulic valve with float lets you use hydraulically powered implements, like a backhoe. Call 800/743-4340; [www.bobcat.com](http://www.bobcat.com).

### Allmand

Allmand offers six models of compact TLBs. The smallest, the two-wheel-drive TLB-220, offers a loader breakout force of 2,600 pounds, a loader lift capacity of 1,700 pounds, and a maximum lift height of 90 inches, while the backhoe digs to 7.5 feet (2-foot flat bottom) with a bucket digging force of 2,875 pounds.

The largest model, the TLB-6235, with full-time mechanical four-wheel drive, provides a 3,400-pound loader breakout force. It can lift 2,100 pounds as high as 110 inches. Producing a 6,000-pound digging force, the backhoe has a digging depth of 9.5 feet (2-foot flat bottom).

All models have the friction-reducing ESL (Extended Service Life) backhoe design and oversized pins that have composite bearings and urethane lip seals in all working joints. Other features include 180-degree hydraulic cushioned

**"Compact tractor-loader-backhoes are very popular with contractors just starting out on their own. Often they will minimize their startup costs or investment with a used compact TLB, because it is sized and priced right for their needs at that time. As their income and profits increase, they can step up to a newer or larger model."**

Keith Rohrbacker

swing for working precisely in tight areas, and load-sensing hydraulic steering, which consumes no horsepower unless the steering wheel is turned. Call 800/562-1373; [www.allmand.com](http://www.allmand.com).

### John Deere

John Deere compact utility tractors include the 3000 Twenty series models — the 32.8 hp 3320, the 37.1 hp 3520 and 43.2 hp 3720. These 2,900-pound four-wheel drive tractors have a maximum height loader lift capacity of 1,598 pounds and a Category 1 rear-hitch lifting capacity of 2,200 pounds. The LoadMatch electronic power management system maximizes torque, virtually eliminating stalling.

With the optional AutoHST transmission (3520 and 3720) you press a single pedal to go forward and use a hand lever to shift into reverse. With the optional eHydro two-pedal automatic transmission, you shift from forward to reverse at the touch of a pedal. The Performance Tracking System provides instant feedback on tractor functions and systems for quick diagnosis.

Both transmission choices include Automotive Cruise, SpeedMatch and MotionMatch to customize speed to any application. A coupling system lets you attach rear-mounted PTO-driven implements from your seat. Call 800/537-8233; [www.deere.com](http://www.deere.com).

### Kubota

Kubota's four compact TLB models include an integrated loader, a quick-attach backhoe, and a Category 1 three-point hitch. They range from the 23 hp B26 with a weight of 4,001 pounds, to the 57 hp 8,345-pound M59 with a 12-foot digging depth and the power to lift a pallet of pavers off the side of the delivery truck.

Each model offers standard loader quick couplers and optional auxiliary hydraulics for the loader and the backhoe. Self-leveling loader



Kubota M59

control valves improve pallet fork work, while the backhoe crawling mode allows safe use of the transmission to reposition along trenches.

Other features include an integral main frame to withstand heavy-duty or high-cycle applications; a curved backhoe boom design for easier reach at maxi-

mum dig depth with a minimum trench-cut and easier truck loading; slanted hood; and loader arms for improved visibility. Call 888/458-2682; [www.kubota.com](http://www.kubota.com).

### Mahindra

The 35 series is the latest in the line of Mahindra compact tractors. Powered by direct-injection, three-cylinder diesel engines, these four-wheel-drive machines include the 3535 (35 hp engine; 29 hp PTO) and the 4035 (40 hp engine; 33 hp PTO). Lift capacities range from 4,125 to 3,090 pounds.

The new ML 120 Loader offers a maximum lift height of 106 inches and a quick-attach adapter for use with attachments including bucket and pallet fork. In addition to the three-point hitch, the tractor can be used with the 485 backhoe attachment to dig as deep as 8 feet, 5 inches. Heavy-duty components include a cast-iron chassis for traction and stability, transmission with shuttle shift and 12 forward and reverse speeds, sturdy front axle, and reinforced fenders. The tractors have standard suspension seats and rear work lights. Call 800/887-2286; [www.mahindrausa.com](http://www.mahindrausa.com).

Next time you need new equipment for installation jobs, it may be worth your time to check out these versatile machines. ■



Mahindra 4035



April 2010

## Planet Care Acquires Eco-Pure

Planet Care Inc. has acquired the assets of Eco-Pure Inc., Fort Myers, Fla., and relocated all product manufacturing, including a 180-inch swing rotational molding machine, to Pulaski, Va. The company's initial product offering will consist of the Eco-Pure peat moss biofilter and Eco-Pure polyethylene septic and pump tanks.

## Containment Solutions Re-Designs Corporate Web Site

Containment Solutions' new corporate Web site, [www.containment-solutions.com](http://www.containment-solutions.com), features product information, installation instructions, and CAD drawings for engineers as well as a training section. ■

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# Minnesota May Locate All Septic Tanks

By Doug Day and Scottie Dayton

**B**y Sept. 15, Minnesota should know the location of all septic systems in the state. The audit was ordered by legislative action in 2009 and requires "directly or indirectly inspecting and providing an inventory for all subsurface sewage treatment systems." It calls for direct inspection of each system "on riparian land or lake or near wetlands or other sensitive waters" to see if they are failing or provide an imminent health threat.

Minnesota has seen an increase in funding for sewage programs through the Clean Water Legacy sales tax amendment passed by voters in 2008. It raised the sales tax from 6.5 percent to 6.875 percent from July 1, 2009 through June 30, 2034. A third of revenue, about \$80 million in fiscal 2010, is earmarked for clean-water projects.

## Connecticut

The state Department of Environmental Engineering is changing to an electronic distribution system for all notices, training announcements, and circular letters and will no longer use postal mail. To sign up for the e-mail distribution list, e-mail your electronic contact infor-

mation to [Kathy.graff@ct.gov](mailto:Kathy.graff@ct.gov). The change does not affect notifications from local health departments or sanitarians.

## Indiana

The state Court of Appeals has ordered the City of Indianapolis to refund nearly \$9,000 to each of 30 homes forced to abandon their septic tanks and hook up to the city's sewer system. A class action lawsuit sought reimbursement for those who paid the 2004 special assessments in full rather than on installment plans.

When the city later changed its policy to require a flat fee of \$2,500, those on payment plans were forgiven their outstanding balances, but those who had already paid received no relief. The city was also ordered to pay interest on the money along with the plaintiffs' attorney fees.

## Maryland

In response to President Barack Obama's executive order calling for an overhaul of the Chesapeake Bay environmental restoration, a 24-point strategy sent to the Administration is said to be more stringent than a

plan being developed by the U.S. EPA.

An official with the EPA says local and state cooperation will be necessary because the Clean Water Act does not have authority over septic systems and other matters. Officials promised a cleanup by 2010, but the effort has fallen about 40 percent short of goals. Maryland has funded upgrades to about 1,000 septic systems, according to the *Washington Post*, but many of the state's 420,000 systems need upgrades, as well.

## Minnesota

Polk and Roseau Counties decided not to adopt the revised Minnesota Pollution Control Agency (MPCA) rules governing onsite systems, and Beltrami County commissioners let the adoption date pass. The new rules would require pressurized systems in all sandy soils.

Polk and Roseau County Board resolutions, stating that the pressurized systems do not work at minus 39 degrees, demanded the University of Minnesota Extension Service do more research to demonstrate a need for the regulation. The resolutions also objected to the requirement that county regulators must visit sites to certify soils instead of accepting certifications from licensed firms.

## Virginia

A proposed bill addressing alternative treatment systems would require regular inspections, maintenance contracts, effluent sampling for systems larger than 1,000 gpd, and a survey plant as part of the application permit. Licensing of soil evaluators, installers, system operators, and owner-operators also would be required. Meanwhile, the Virginia Sewage Handling & Control Board

should complete its review of maintenance regulations for alternative systems by the end of the year.

## Missouri

Governor Jay Nixon has proposed changes to state law to help clean up the Lake of the Ozarks and other state waters. Among other things, the proposal would give the state power to inspect septic tanks, including 50,000 septic systems near the lake, a popular tourist destination.

The owners of failed septic systems could be ordered to make repairs, connect to a sewer system, or stop using the system. Nixon announced his proposal in December, several months after a newspaper investigation found that the state Department of Natural Resources had withheld a report revealing dangerous levels of *E. coli* in Lake of the Ozarks. The Senate environmental committee is investigating the incident, which caused five DNR officials to leave the agency, and led to a two-week suspension for its director.

## New York

The Catskill Watershed Corporation is offering assistance to homeowners in the Catskill-Delaware watershed who paid for the repair or replacement of septic systems in 2009. The agency will reimburse the costs for work done outside the priority areas for its Septic Repair and Rehabilitation Program if they were approved by the Department of Environmental Protection. Full-time residents are eligible for 100 percent reimbursement. Part-time residents can get 60 percent of their costs covered. ■



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# ONSITE<sub>journal</sub>

Spring 2010

NEWS FOR THE ONSITE WASTEWATER RECYCLING INDUSTRY

**Successful Installer Academy and  
Roe-D-Hoe held at 2010 Pumper Show**

**Model Code Success Story  
in the Making in Colorado**

**Updated Homeowner  
Folder Now Available**



**NOWRA**  
National Onsite Wastewater  
Recycling Association

# ONSITE<sub>journal</sub>



NEWS FOR THE ONSITE WASTEWATER RECYCLING INDUSTRY

Spring 2010

## National Onsite Wastewater Recycling Association, Inc.

### EXECUTIVE COMMITTEE

**President** - Thomas Groves  
**Vice President** - Richard Otis  
**Past President** - Jerry Stonebridge  
**Secretary/Treasurer** - Greg Graves

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*(Terms Expire December 2010)*

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*(Terms Expire December 2011)*

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*(Terms Expire December 2012)*

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**OSJ Editorial Board** - Matt Byers  
**Installer Academy** - Tom Fritts

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[www.waterforalllife.org](http://www.waterforalllife.org)





**President**  
Thomas Groves

Welcome to the spring 2010 issue of the NOWRA Onsite Journal (OSJ). Well, it's finally official! Our long awaited partnership with the Water Environment Association (WEF) was formalized by both associations' boards in January. NOWRA and WEF subsequently entered into a three-year Group Membership and Shared Resources Agreement that began February 1, 2010. With that, the search for a new NOWRA Executive Director and the establishment of an office in Alexandria, Virginia has begun in earnest. By the time this Journal reaches you, we hope to have our new Executive Director on board.

As you can imagine, this partnership agreement has consumed a large portion of the NOWRA Executive Committee and Board of Director's time in 2009. We are relieved to have this behind us so we can concentrate on moving other initiatives forward, such as the NOWRA Model Code Framework. In addition, our relationship with WEF will allow NOWRA to enhance our membership benefits. We look forward to offering our members the kinds of benefits that can assist them and their small companies in this challenging economic environment.

The most recent NOWRA news comes from our successful Installer Academy and Backhoe Roe-D-Hoe held in February during the Pumper Show in Louisville, Kentucky. As many of you know, NOWRA's Installer Academy and Roe-D-Hoe was traditionally held in December in Las Vegas. This year the Pumper Show gave us an opportunity to see if this event could benefit and grow in a different venue and time of year. We were very pleased with the outcome and feedback that we received. Thanks to Sara Heger as Education Chair, and to Tom Fritts as Installer Academy/Roe-D-Hoe Chair for a job well done.

Inside this issue you will find an in-depth article on the educational sessions presented by NOWRA during the Academy and a description of the fun that was had by all during the Roe-D-Hoe competition. Many contestants vied for the \$1,000 cash prize as well as the championship belt buckle and bragging rights as the 2010 Roe-D-Hoe champion. Congratulations go out to Corey Hoover of Erie, PA for his performance and title as 2010 NOWRA Roe-D-Hoe champion. If you missed the action, make sure to mark your calendar for next year's Pumper Show as we hope to be back. A big thank you goes out to COLE Publishing for allowing us to become part of the Pumper Show and help to grow this weeklong event.

In addition, I would also like to thank COLE Publishing for once more assisting NOWRA with this publication and for their continued support of our organization and the onsite industry as a whole. This is our third issue of the Onsite Journal within the COLE Publishing Onsite Installer magazine. We are pleased with the results and we hope you that you enjoy it as well. We are very interested in your feedback on these combined publications so if you have any comments or suggestions, please send them along to the NOWRA office at [info@nowra.org](mailto:info@nowra.org). If you

are a NOWRA member don't forget, this is a great opportunity to be seen by the larger Onsite Installer audience; so, make sure all of your information is current in NOWRA's online directory - SepticLocator ([www.septiclocator.com](http://www.septiclocator.com)).

Lastly, the NOWRA Board would like to give recognition and thanks to our past Secretary/Treasurer Brian McQuestion who resigned from that post in early 2010. Brian was NOWRA's Secretary/Treasurer for the past 5 years and was instrumental in keeping NOWRA afloat through not only these current tough economic times, but also through changes in the association's management personal. We wish him well, he will be missed. Greg Graves has assumed the role of Secretary/Treasurer and was endorsed by the NOWRA Board at the February Directors meeting.

We hope you enjoy this April issue of the NOWRA Onsite Journal. Let us know how we can better serve you.

Sincerely,

Thomas W. Groves  
NOWRA President



## A Message from Water Environment Federation

By Executive Director Bill Bertera

This is an exciting partnership for WEF and we are looking forward to working closely with the NOWRA membership in the years to come. The communities we serve increasingly expect the water industry to present an integrated approach to water and wastewater management, and that means in small communities as well as in large. This partnership positions both NOWRA and WEF to provide that integrated service.

Most importantly, this partnership enhances the ability of both organizations to share the most up-to-date information and technology with our respective memberships through conferences, publications and the web. Of course this is not only a partnership of two national organizations...both have networks of state and regional organizations which are integral to our respective memberships and our work.

NOWRA and WEF already share a significant number of joint members and supporting organizations in both the public and private sectors. This partnership is a natural fit that will work for us and the public interests we serve. This is the way the not-for-profit community is supposed to work. ●

Bill Bertera, Executive Director  
Water Environment Federation

# Sustainable Water Infrastructure for Cities and Villages of the Future

By Jerry Stonebridge



An international conference on Sustainable Water Infrastructure for Cities and Villages of the Future (SWIF) was held in Beijing, China on November 6-9, 2009. This event was organized by the Beijing University of Civil Engineering and Architecture and Co-Sponsored by the National Onsite Wastewater Recycling Association (NOWRA) and the Water Environment Research Foundation (WERF). Sponsorship was in name and help with organization, which was very much appreciated by the Conference Executive Chair, Dr. Xiaodi Hao, Professor.

The Conference was the continuation of themes that were presented at the Wingspread Workshop "Cities of the Future – Bringing Blue Water to Green Cities", Racine, Wisconsin, July 2006 and "Water for all Life: A Decentralized Infrastructure for a Sustainable Future" Baltimore, Maryland, March 2007.

A multi-disciplinary group of Keynote Speakers discussed the integration of water management, resource recovery, nexus of water and energy, ecological sanitation, and the role of nature's natural cycles in the context of a sustainable future. The conference consisted of three days of high energy presentations and discussions, with eighty technical papers presented. The papers covered topics from: Policy/Management/Economics, Stormwater Management, Fresh/Drinking Water Supply, Energy, Resource Recovery and On-Site Systems, Nutrient Removal and Recovery, and On-site Systems and Sludge Management.

An exciting aspect of this conference was the presentations and the interaction with the students of the many Universities. At least half of the attendees were students from all levels of their educational programs. It was a delight to talk with them and listen to what their concerns were about decentralized systems and the future of sustainability.

One PhD candidate in particular, Xia Chen, had definite opinions regarding the importance of a sustainable environment and clean water and why it had not progressed as it should. She believes "that the water issue is more related to society rather than technology" and "that more social and economical issues should be discussed at such conferences." Not a bad idea.

Many of the papers presented at the Conference will be published by the International Water Association, so check their Web site for details.

To make a paradigm shift to a sustainable future, it will take all disciplines working together to make it happen. ●

*Jerry Stonebridge*  
SWIF Keynote Speaker  
Past President, NOWRA

## SUSTAINABLE WATER INFRASTRUCTURE FOR CITIES AND VILLAGES OF THE FUTURE (SWIF 2009) 2009第二届“生命之水”前沿技术国际会议





## LOCAL AFFILIATES' UPDATES

FOR A LISTING OF NOWRA'S CURRENT AFFILIATE GROUPS,  
VISIT OUR WEB SITE [WWW.NOWRA.ORG/STATEGROUPS.HTML](http://WWW.NOWRA.ORG/STATEGROUPS.HTML)



### Delaware On-site Wastewater Recycling Association (DOWRA)

DOWRA has elected Jim Williams as their new President. Hollis Warren will be DOWRA's Vice President, Ben Miller is the new Secretary and Lisa S. Wood will be the new Treasurer. Newly elected directors are Daniel R. String/Engineer, Bob King/Regulator and Ken Walsh/Installer. All other directors will remain the same.

DOWRA started their year out with a booth at the Delaware Rural Water Association Conference in February and will hold their Annual Clay Shoot in April. The quarterly BOD/Membership meeting was held March 9, 2010, at the Exhibit Hall, Delaware State Fair Grounds in Harrington. Please check DOWRA's Web site for their calendar of events. The Annual DOWRA Conference will be at Dover Downs October 19-20, 2010.

Any information needed, contact President Jim Williams @ (302) 492-3915 or (410)324-0738. The DOWRA Web site is [www.dowra.org](http://www.dowra.org).

### Minnesota Onsite Wastewater Association (MOWA)

#### Legislative/Regulatory

The MPCA (Minnesota Pollution Control Agency) has made significant changes to the SSTS (Subsurface Sewage Treatment System) Rules effecting on-site system design, installation, maintenance and inspection. These changes include: Advanced training and licensure requirements, increased septic tank requirements, and a new process for Product Registration for treatment and distribution products.

MOWA is scheduled to enter mediation this winter with MPCA over an issue related to design guidance and the newly revised Minnesota septic code. The Minnesota 2010 Legislative Session has recently commenced and MOWA scheduled a Day at the Capitol on February 9, 2010 to meet with state representatives and discuss critical issues for the wastewater industry. Unfortunately, this needed to be cancelled due to a snow storm. The MOWA Legislative Committee and lobbyist, Gary Botzek are monitoring legislative action and preparing to testify on behalf of our members if necessary.

#### Conventions/Seminars

MOWA held the Summer Seminar on August 27, 2009 at Camp Courage/Camp Friendship near Annandale, MN. Topics included:

- Describing and interpreting coarse sandy soils
- Requirements for land application or disposal of flammable waste traps, car wash waste, and sand traps.
- Discussion of the performance of the various distribution media products installed at this site.

- Tour of the Albertville Class A Wastewater Treatment Plant that uses reed plants for treatment and removal of phosphorus and UV disinfection.

The Annual MOWA Convention focusing on "Protecting our Most Precious Resource" was held February 1-3, 2010 at the Arrowwood Resort in Alexandria, MN. There were over 250 attendees and 35 exhibitors.

#### Educational sessions included:

- High Strength Waste
- New Nitrogen Reduction Requirements
- Ultraviolet and Chlorine Disinfection
- Motivational, business and legal presentations
- Open Forums to discuss new regulations, grease disposal, land application, and hazardous waste.

Approximately \$6,500 was raised in the Scholarship Auction at the Convention.

To learn more about the Minnesota Onsite Wastewater Association:

- Visit our Web site: [www.mowa-mn.com](http://www.mowa-mn.com)
- Contact Pat Martyn, Executive Director: (952) 345-1141 or (888) 810-4178

### Yankee Onsite Wastewater Association (YOWA) New England

YOWA has elected Russell Martin as their new President and Vic Giard as the Vice President for a two-year term that began on January 1, 2010. Dan Ottenheimer will serve another term as the Secretary/Treasurer of the association and Steve Corr will serve as past-President. Newly elected directors are Mary Clark, Joe Ducharme, Claire Golden, John Murphy, and Chuck Resevik – their three-year terms began on March 1, 2010. Directors appointed to a second term include Dave Clark, Douglas Coombs, Steve Dix, Michael Moreau, and Dave Potts.

YOWA's day to day activities are now being coordinated by the New England Water Environment Association (NEWEA) – the New England member association of WEF. NEWEA will assist YOWA with handling all membership renewals, membership questions, registrations for training programs, newsletter development, and support for the YOWA Board of Directors.

For 2010, the YOWA Education Committee plans to have multiple one-day workshops across New England. Scheduled at this point are a one-day Microbiology and Media Filter workshop in Vermont on April 6, and an Alternative and Innovative Technology workshop to be held in late May in southern Massachusetts. Look for more information on an additional Massachusetts workshop in June in Worcester.

For any additional information, contact YOWA's office at [yankeeonsite@gmail.com](mailto:yankeeonsite@gmail.com) or at (888) 969-2674. The YOWA Web site is [www.yankeeonsite.org](http://www.yankeeonsite.org).

# What Do You Think? DO PRESCRIBED DESIGN FLOWS COMPROMISE TREATMENT?

By Richard J. Otis NOWRA Vice President

Our country's rural landscape changed dramatically from the rapid economic growth that occurred in the late 1940's following WWII. With the baby boom in full swing and young and growing families looking for places to live, houses couldn't be built quickly enough. Subdivisions sprang up on the fringes of metropolitan areas faster than sewers could be extended. 'Septic systems' were used but their regulation was lax or nonexistent. It wasn't long before large numbers of onsite system failures were observed and reports of contamination of private household drinking water wells received. These direct threats to public health raised serious concerns over the effectiveness of rural sanitation methods. In response, the Public Health Service, in cooperation with the Joint Committee on Rural Sanitation, initiated a 5-year study in 1946 to develop a factual basis for the design, installation and maintenance of seepage pits and septic tank soil absorption systems. This study culminated in the publishing of the *Manual of Septic-Tank Practice in 1957*<sup>1</sup>, which provided design, installation and maintenance guidance for homeowners.

One of the recommendations made in the *Manual* was to use the number of bedrooms to determine the size of the subsurface infiltration system assuming two occupants per bedroom each of whom would generate 75 gallons per day (gpd) or 150 gpd/bedroom. The intent of the bedroom method was to provide an estimate of the maximum or peak day flow from homes to ensure the size of infiltration area would be sufficiently large so that the drainfield would seldom, if ever, operate at capacity. Since the systems were used as "disposal" systems, ensuring adequate hydraulic capacity in the drainfield was the primary concern. At the time this was a reasonable guideline because building materials were rationed, which kept houses small and usually necessitated sharing of bedrooms.

Today, this basis for estimating system design flows is prescribed by rule in most states and provinces though the required design flow varies generally from 120 to 200 gpd per bedroom. This practice remains despite dramatic changes in lifestyles and the increasing emphasis on targeted treatment to remove fecal coliforms, nitrogen, and in some cases phosphorus. The question is, is this method reasonable or even appropriate for sizing systems today?

## Household Characteristics

The fact is the number of bedrooms in a home is a poor predictor of wastewater flows from the home. The 2008 American Community Survey conducted by the U.S. Census<sup>2</sup> reports that the average U.S. national household size in 2008 was 2.6 persons. Further, over two-thirds of all homes are 2 and 3 bedroom homes and that the number of occupants per room is less than one person in nearly 97 percent in all homes (see tables). These data suggest that there is little correlation between house size and family size and home occupancy that reaches or exceeds two persons per bedroom, is quite unusual. A recently completed Water Environment Research Foundation (WERF) study monitored daily flows from residential households during each quarter of 2008 at 17 homes in three different states; Colorado, Florida and Minnesota<sup>4</sup>. The average per capita water use for all 17 homes was 54.6 gpd with a median of 45.2 gpd per capita. The average daily flow was 174 gpd/home or a flow of 54 gpd/bedroom. A similar water use monitoring study of 1,100 homes was conducted by the American Water Works Foundation in 1999<sup>5</sup>. The average daily flow of all homes in this study was 69.3 gallons per capita. Monitoring of average daily flows in effluent sewers (sewers receiving septic tank effluent) have been reported to be 170 to 200 gpd per residential connection<sup>6</sup>. Together, these studies provide strong evidence that the traditional approach of using numbers of bedrooms for estimating household water use result in design flows that are 150 to 200% greater than the actual flows.

Inflating system design flows this greatly, can have serious unintended consequences for onsite treatment systems. The most notable are costs to the consumers, ineffective flow equalization and pressure distribution, and inability to adequately remove targeted pollutants such as nitrogen.

## System Costs

An obvious consequence of inflated design flows is their impacts on system costs. Tony Smithson, Director of Environmental Health Services in Lake County Illinois and an active member of NOWRA, provided a good example of these impacts during a roundtable discussion held at

## 2006-2008 AMERICAN COMMUNITY SURVEY<sup>3</sup> Housing and Occupancy Characteristics

| Household Size      |             |                |                 | Bedrooms per House |                  | Occupants per Room  |                  |
|---------------------|-------------|----------------|-----------------|--------------------|------------------|---------------------|------------------|
| Occupied Households | Total       | Owner Occupied | Renter Occupied | Number of Bedrooms | Percent of Homes | Number of Occupants | Percent of Total |
|                     | 112,386,298 | 75,363,085     | 37,023,213      |                    |                  |                     |                  |
| <b>Size</b>         |             |                |                 |                    |                  |                     |                  |
| 1 person            | 27.5%       | 22.1%          | 38.4%           | 0                  | 5.2%             | ≤ 1.00              | 96.8%            |
| 2 person            | 33.2%       | 36.5%          | 26.6%           | 1                  | 10.6%            | 1.01-1.50           | 2.1%             |
| 3 person            | 15.9%       | 16.2%          | 15.2%           | 2                  | 26.1%            | ≥ 1.51              | 1.1%             |
| ≥ 4 person          | 23.4%       | 25.1%          | 19.8%           | 3                  | 38.5%            |                     |                  |
|                     |             |                |                 | 4                  | 15.5%            |                     |                  |
|                     |             |                |                 | ≥ 5                | 4.0%             |                     |                  |





the NOWRA Annual Technical Conference in Milwaukee, April 2009. This discussion explored the feasibility and practicality of regional rules. Smithson stated that in Illinois, design flows must be based on 200 gpd per bedroom or 100 gpd per person with two people per bedroom. The census data for Illinois shows that only 24% of all Illinois homes have 4 occupants or more. So, the probability of a 3 or 4 bedroom home occupied by 6 or 8 people who use water at the rate of 100 gpd per person (about twice the average national rate) is uncommon! Using reasonable assumptions for hydraulic loading rates on Illinois soils, Smithson calculated that if the state would use a design flow of 120 gpd/bedroom or 60 gpd per person instead of 200 gpd/bedroom, the cumulative savings from all new systems installed each year would be \$7,350,000! This savings was based on 4900 new system permits issued in the state per year and a cost \$2.50 per square foot of trench.<sup>7</sup>

## Wastewater Treatment

**Flow Equalization:** This is a beneficial operation that is used to reduce the variability of influent flows, which enhances treatment and allows the treatment system to be sized based on the average daily rather than the peak day influent flow (check with your local jurisdiction first!). This component is usually installed between the septic tank and any advanced treatment units downstream. The equalization tank stores the septic tank effluent, which is pumped out uniformly at regular intervals over the 24 hour day. Assuming a 3 bedroom home sized at 150 gpd/bedroom and the flow equalization component set to discharge every 2 hours, the discharge volume for each event would be 450 gpd/12 events/day or approximately 40 gal/event. But, if the average daily flow were really 200 gals, only 5 events would occur each day (200 gpd/40 gal/event) primarily during the daily peak flow periods thus negating much of the advantage from including flow equalization in the treatment train.

**Uniform Distribution:** Pressure distribution networks for applying pre-treated wastewater to the subsurface infiltration system provide the advantage of achieving uniform distribution over the soil's infiltrative surface both spatially and temporally. Whether a rigid pipe or drip tubing network is used, uniform distribution only occurs when the pipe or tubing is fully pressurized. Therefore, the network should not be so large that large dose volumes are required to pressurize the network.

Rigid pipe networks are affected more by over sizing than drip tubing because of the pipe diameter is much larger. Using the example of the 3-bedroom home with a design flow of 450 gpd but actual average daily flow of 200 gpd, the length of the distribution piping would be 2.25 times greater for a 450 gpd system than for a 200 gpd system. Assuming four 70ft trenches using 1½-inch diameter laterals, the total volume of the network would be approximately 26 gallons. The commonly used rule of thumb is that a dose must be at least 5 times the volume of the distribution network piping to ensure the time of pressurization is long enough that the non-uniform losses that occurs during filling and draining of each dose is a small fraction of the total dose. This requires the dose volume to be 130 gal/dose. At design flow, this would result in 3.5 doses per day. However, at the average daily flow of 200 gpd, the network would only receive 1.5 doses per day thereby losing nearly all the advantage of using pressure distribution. The size of the dose volume cannot be reduced to allow more doses per day because the dose volume would be too small to achieve adequate pressurization time and uniformity in distribution.

**BOD and Ammonia Removal:** Advanced treatment systems use aerobic processes that are used to remove organic carbon (typically measured as the 5-day biochemical oxygen demand or BOD5) and/or to nitrify organic and ammonium nitrogen (together referred to as Total Kjeldahl Nitrogen or TKN). The amount of oxygen that must be supplied to the treatment system to oxidize the organic carbon and TKN is determined by the mass of these pollutants discharged to the treatment system each day. To remove each pound of BOD5, one pound of dissolved oxygen is required. However, the oxygen demand to nitrify TKN is nearly 5 pounds of oxygen for one pound of TKN. Thus, ammonia removal or nitrification has a large oxygen demand that must be satisfied to achieve treatment.

From the many of studies of septic tanks, we know generally in what concentrations these materials occur in septic tanks. What we seldom know is the actual mass of the pollutants. This requires that we know the flows at the time the concentrations are measured ( $\text{Mass} = \text{Flow} \times \text{Concentration}$ ). This is where the designer needs to be careful because an error in estimating the mass of pollutants to be removed, particularly TKN, has a significant impact on the amount of oxygen required and thus the size of the blowers to use!

Because of dietary needs and habits, a family will generate a mass of organic carbon and TKN, which is not likely to vary much from day to day. However, the concentration of these pollutants in the septic tank will change with differences in water use in the home. We have seen this in the increase in TKN concentrations from septic tanks over the last 15 -20 years due to the increasing use of water conserving fixtures.

Using the prescribed design flow and text book values for concentrations will usually result in substantial over sizing of equipment. For example, if the designer were to expect a TKN concentration from the septic tank from a 3 bedroom home of 60 mg/L, at the design flow of 450 gpd, the estimated mass of TKN would be 0.23 lbs/day ( $450 \text{ gpd} \times 60 \text{ mg/L} \times 8.34 \times 10^{-6}$ ) but if the actual average daily flow is 200 gpd, the estimated mass of TKN would only be 0.10 lbs/day, more than a 55% reduction. These differences can be significant and will impact performance in larger systems. The designer must be aware of the consequences in estimating the average daily flow for the new system and the pollutant concentration that would be appropriate for the particular use of the building to be served. If not carefully considered, the result will either be excessive aeration and increased power costs or under performing treatment.

Avoiding over aeration is difficult for small individual home systems because most treatment equipment that is available is sized for a minimum treatment volume of 500 gpd, which results in increased wastewater residence times in the unit with a corresponding increase of time under aeration. However, this can be a critical issue when designing larger treatment facilities where cost concerns and targeted treatment for nitrogen reduction is likely (see below).

**Nitrogen Reduction:** Carbon management is critical for single stage total nitrogen reduction treatment processes because the organic carbon is needed for the final step of denitrification. If the treatment is to be effective, it is imperative for the designer and operator to have accurate estimates of the available organic carbon (cBOD) and total Kjeldahl nitrogen (TKN) in the system. Nitrification requires 4 to 5 times the amount of oxygen needed for BOD removal. Consequently, much of the carbon is removed due to oxidation during the nitrification step, particularly when design flows are inflated and treatment vessels over sized.

The most reliable carbon source in single stage denitrification systems is the raw wastewater. After nitrification in the aerobic unit, the nitrified effluent is recycled to the septic tank where the organic carbon is available under anoxic conditions. Using a recycle ratio of 3 or 4:1 is commonly used to achieve 50 to 65% reduction in total nitrogen<sup>89</sup>. To achieve a higher removal is difficult because fresh TKN that must be nitrified is added with each recycle. Also, the increase flow in the septic tank due to the recycle of the nitrified effluent requires that the septic tank be sized appropriately to accommodate the influent and recycle flows. It is also critical that the recycled flow does not return too much oxygen so that anoxic conditions are not maintained in the septic tank, which is needed to support denitrification. Using the prescribed design flow, which represents the estimated maximum daily flow will result in over aeration, loss of needed carbon, and the reduction of denitrification potential of recycling nitrified wastewater to the septic tank because of the addition of oxygen from the recycle flow.

## Summary

It is unlikely that our onsite prescriptions for estimating design flows will change soon so our designs must consider how a proposed system should be operated to avoid loss of treatment efficiency due to inflated design flows. Good estimates of expected flow and pollutant concentrations from an existing or proposed system are necessary to determine how to approach the design. In my opinion, it will be most appropriate in most instances to include flow equalization designed for peak flow with the subsequent downstream system components designed for the actual expected average daily flow. Whether the local jurisdiction will allow this solution is another issue.

What do you think? (Please respond to [think@nowra.org](mailto:think@nowra.org)) ●

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## ACCOMPLISHING THE WORK OF Reports from Our Committees



**D**espite the downturn in our economy that created hardship for most of us in our industry, dedicated members of NOWRA's committees continue to give of their time to support our association and advance our industry. Many of our members volunteer their time and expertise to work on a broad range of issues that affect our industry, our affiliates, our businesses, our practices, our regulations, and the public we serve. Look below to see what they are doing. If you see an activity in which you have interest and feel you can help, please contact the committee chair for more details. Also, watch for "help needed" announcements from our committees in the On Site Journal, e-News or on our Web site asking for assistance with special needs and projects. Become involved not only for NOWRA's benefit, but your own!

### Education (Chair, Sara Heger, University of Minnesota-Twin Cities)

The Education Committee's mission is to provide member education on current and emerging issues through the Annual Conference, Installer Academy, specialty workshops, and roundtable discussions, which offer CEU's for attendees. The Committee also is available to

support Affiliate Conferences with educational programs.

In addition, the Education Committee works with the Installer Academy and Annual Conference Committees to organize and coordinate these two annual activities (see below).

### Installer Academy (Chair, Tom Fritts, Residential Sewage Treatment Co.)

The Installer Academy was held in conjunction with the Pumper Show in Louisville, Kentucky in February. This partnership with COLE Publishing, the sponsor of the Pumper Show, was very successful and we hope to continue this partnership in 2011!

In addition to two days of a variety of educational programs, six manufacturers offered over 15 hours of training in the proper application, installation and operation of their equipment. The Consortium of Institutes for Decentralized Wastewater Treatment (CIDWT) provided two days of training for system installation, which included their comprehensive "Installation of Wastewater Treatment Systems" manual. This committee also provided a NOWRA program for the Pumper Show's Educational Day. But it wasn't all just training or walking the Pumper



Show exhibition floor. The Backhoe Roe-D-Hoe Champion's Belt was up for the taking with the defending champion and state champions competing all week on the floor of the show. Check NOWRA's Web site to see who won!

## Conference 2010

**(Chair, Randy Miles, University of Missouri)**

Though it is not yet confirmed whether we will hold the Annual Conference in 2010 because of the economic downturn, NOWRA is proceeding with plans to hold it in St. Louis, Missouri in October. The theme is to be "Surface Discharging Systems and General Permits." Watch for an announcement soon for whether the Annual Conference will proceed.

## 2011 Super Conference

**(Chair, Craig Gilbertson, Ayres Associates)**

The planning continues for the "Super Conference" to be held as partnership between National Environmental Health Association (NEHA) and the State Onsite Regulators Alliance (SORA) in Columbus, Ohio in June. The joint conference is expected to create significant synergy between the members of three sponsors, which will help to coordinate our individual efforts toward common goals. We expect that this joint conference will be a beginning of other similar partnerships of mutual benefit.

## Marketing & Communications

**(Chair, pending)**

The Marketing & Communications Committee continues to work hard to maintain communication with our membership and other interested parties regarding NOWRA's current activities, accomplishments and other information relevant to our industry. These activities include:

- Publishing the monthly "e-News" to provide a timely summary of events and information of interest to our industry
- Working with the Web & Technology Committee on NOWRA's web site page to post a help wanted/jobs available page
- Assisting other committees in editing and publishing technical documents for our membership.

Recent documents completed for the Technical Practices Committee that may be found on NOWRA's Web site include:

- *"Decentralized Wastewater Infrastructure: Protecting Our Water Resources into the Future"*
- *"Onsite System for Homeowners Guide"*

The Marketing & Communications Committee is seeking a chairperson as well as volunteers to join the committee. If you have expertise in marketing, graphics, desktop publishing, web design and are interested in helping out, contact the NOWRA office at (800) 966-2942 or by email at [info@nowra.org](mailto:info@nowra.org).

## Technical Practices

**(Chair, Allison Blodig, BioMicrobics)**

The Technical Practices Committee's responsibility in NOWRA is to develop technical materials on proven and successful technologies, soil science, transmission, installation, and recycle/reuse practices that ensure the effective implementation of safe onsite systems and water quality protection.

The Committee completed a white paper, *"Decentralized Wastewater Infrastructure: Protecting Our Water Resources into the Future"* as part of *"The NOWRA Perspective"* series. This 5-page document promotes decentralized options to decision makers of small communities faced with upgrading their wastewater treatment services. This is also available on NOWRA's Web site.

With help from the Education Committee, *"Onsite System for Homeowners Guide"* has been upgraded. It is available on NOWRA's Web site and it is also printed in folder form for members to purchase for distribution to their clients. Space is provided on the folder for you to insert your business logo and address. Details can be found on the Web site.

The committee's has begun a new initiative to update fact sheets for the range of treatment processes and generic technologies available for onsite and cluster systems. These fact sheets will all follow a standard format and give basic introductory information for use by our installer members and their prospective clients and/or regulators unfamiliar with technology. Also to be included, is a guide for how to select appropriate treatment processes for given wastewater types and soil characteristics.

## Model Code

**(Chair, Tony Smithson, Retired Director of Lake County Environmental Health Department, Illinois)**

The intent of NOWRA's Model Code Framework was to promote state and national policy and rule reform by providing a model code to be used by states for revising their rules and to adopt performance provisions. However, interest in the Model Code Framework has languished since it was approved by NOWRA's Board of Directors in 2007. After conducting a series of workshops across the country in 2007-2008, it became obvious that moving to performance-based codes is too great a leap without tools and other resources to help. (Colorado was one state that has used the Model Code Framework to help the state develop performance state rules, which is highlighted elsewhere in this issue of OSJ). A strategic multi-year plan has been developed to address some of these short comings. For 2010, the committee intends to complete the soil treatment document, which was meant to be part of the model code. Also, an effort is being initiated to develop code language for product approvals, which will be accepted as a regional rule. Target dates for completion of both are by the end of this year. Other initiatives outlined by the strategic plan will follow in future in OSJ.

## Quality Installation Using Best Practices Task Force (Chair, Ralph Benson, Clermont County General Health District, Ohio)

This is a new initiative that will get underway during the second quarter of this year. Its objective is to develop an easy to use checklist for installers and regulators to ensure a quality installation is achieved. The checklist will be supported with best practices for completing the variety of tasks typically associated with an installation. Look for an announcement in March for volunteers to help with this important guide!

## Resource Library Task Force

**(Chair, Judy Sims, Utah State University)**

The Resource Library was established last year to provide various resources for use by NOWRA's members. The committee is just beginning to post resources, which are expected to be available by the end of March. Links to each state's rules are currently being formatted. Searches for literature related to decentralized treatment, which was published in 2008 and 2009 have been completed and ready for posting on the site. Each of the two years searched found over 150 documents for which the citations and abstracts will be available in the Library. The committee will continue to identify other resources of interest and work to have them posted. ●

## Colorado - Upgrading Onsite Regulations with Help from NOWRA's Model Code Framework for Decentralized Wastewater Infrastructure

By Ed Church CHURCH Onsite Wastewater Consultants



Colorado is in the process of reviewing the Statute and Regulations with respect to Onsite Wastewater, currently called Individual Sewage Disposal Systems ISDS. The existing Statute (Article 10, Individual Sewage Disposal Systems Act) and Regulations (Guidelines on Individual Sewage Disposal Systems) were passed in 1973-74 with minor revisions since then.

The need for changes has long been recognized. In 2002 a Steering Committee appointed by the Colorado Department of Health and Environment CDPHE recommended 13 revisions. Recommendations included changing ISDS to "Onsite Wastewater Systems" (OWS), developing a performance-based approach to OWS, authorizing renewable permits, developing strategies and programs for training/certification, and reviewing funding options. One of the recommendations, – review of what had been done in the first year following the issuance of the report, recognized that nothing had been accomplished. Several members of the Steering Committee organized a Colorado affiliate group of the National Onsite Wastewater Recycling Association (NOWRA), the Colorado Professionals in Onsite Wastewater (CPOW), in 2004.

In 2007 CPOW members testified before the Colorado Joint Budget Committee to support a CDPHE funding bill, which included funding for the one full-time employee (FTE) assigned to Onsite Wastewater at the State level, in lieu of the then existing 0.1 FTE. Passed in 2007, a fee of \$23.00 was added to each ISDS permit issued in the state with counties keeping \$3.00 and \$20.00 sending to CDPHE. The FTE was hired in spring of 2009.



The organization of CPOW involved state wide seminars, working with the state and counties and the Colorado Environmental Health Association (CEHA). By 2007 CPOW was ready to make an effort to upgrade the Statute and ISDS Guidelines. Mike Corry was sponsored by NOWRA to assist CPOW in organizing and developing a strategy for proceeding with performance-based regulations using the NOWRA Model Code Framework as a resource. In the

Fall of 2007, Richard Otis and Mark Hooks, sponsored by NOWRA came to Colorado and presented a workshop on to use the NOWRA Model Code.

CPOW worked through 2008 and early 2009 on developing a draft Model Code for Colorado. Discussions were held with legislators and lobbyists on how to proceed. In evaluating what was missing, the group decided it needed to talk to the Water Quality Control Commission (WQCC), which had been delegated responsibility for ISDS by the Legislature. After discussions with Dave Akers of the Water Quality Control Division (WQCD) and a presentation to the Water Quality Control Commission, it was determined that a stakeholders process organized through the WQCD, would be undertaken to review the Statute and Guidelines. At the same time Barbara Dallemand P.E. was hired to be the OWS Coordinator at CDPHE. Barbara Dallemand has been a NOWRA member for many years.

NOWRA's Model Code provided the basis for CPOW's work to consider Education & Certification; Performance based regulations and the risk involved with performance levels; and related maintenance levels. Drafts of what CPOW proposed for consideration to move ahead were prepared to provide members with an understanding of what new regulations might look like.

Based on discussion between CDPHE, WQCD and CPOW, a stakeholder's process was established with 7 sub-committees and a goal of bringing revisions to the Statute to the 2011 Legislature. The 7 sub-committees include: 1) Training and Certification, 2) Performance and Risk-Based Code, 3) Septage Management, 4) Graywater, 5) 2000 GPD - the current county permitting limit, 6) Funding and 7) Title Transfer Inspections, Use Permits and Maintenance. At this time each sub-committee has considered alternatives with pros and cons for their area and has made a presentation to the larger stakeholders group. The committees include state and county officials and the sectors of service providers, regulators, engineers, manufacturers and distributors, and pumpers/cleaners. CPOW members who have been instrumental in the process are Brian Scheffe, 2009 CPOW President, of Front Range Precast; Bob Wright and Kate Carney of CHURCH Onsite Wastewater, LLC; Lane Drager of Boulder County and 2010 CPOW President; Warren Brown of Tri-County Health Department; Kim Seipp of High Plains Sanitation Service; and Becky Roland, the CPOW administrator. Over 200 stakeholders are participating and input from many more will be required before finalizing changes. As the process goes forward, more involvement from the public and other stakeholders will be encouraged.

What is left? Mountains of work! The final documents for the proposed Statute revision must be prepared for submittal for review first by CDPHE and then consideration and hopefully inclusion of the proposed changes in the Call for the Legislative Session by the Governor in proposed 2011 legislation. Hopefully the Stakeholder process will provide wide support for performance-based Statute and Regulations. ●

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## CALL FOR PAPERS

### October 25-27, 2010

**T**

The National Onsite Wastewater Recycling Association (NOWRA) welcomes abstracts for papers to be presented at the NOWRA 19th Annual Conference in St. Louis, Missouri on October 25-27, 2010. St.

Louis will serve as a great location in the heart of the US on the Mississippi River, and we are pleased to have the Missouri Smallflows Organization as the Local Host for this conference. This conference will highlight issues related to surface discharges: what

can be done, what are some appropriate technologies, and what are some successes as documented with case studies.

The NOWRA annual conference serves as the premier conference for the conveyance of new research, regulations and policy, and experience and practices in the decentralized wastewater industry. The traditional trade show will be taking a one-year hiatus, but will return in 2011 when NOWRA partners with NEHA and SORA for the "Super Conference."

NOWRA's 19th annual conference will be focusing on surface discharging issues, but abstracts covering the broad range of topics relating to onsite/decentralized wastewater treatment are encouraged. The deadline for submission of abstracts is April 15, 2010. For more information on the Call for Papers, see the NOWRA Web site at [www.nowra.org/annual\\_conference.html](http://www.nowra.org/annual_conference.html) or contact Sara Heger at [heger001@umn.edu](mailto:heger001@umn.edu). ●



## Membrane Bioreactor (MBR) Technology

By **Reza Shams-Khorzani, Ph.D., BioMicrobics**

This article is a summary of a short course given at the Installer Academy, 2010

**T**

The term membrane bioreactor (MBR) defines a combination of a biological process and membrane separation. The MBR forms an important advancement in the treatment of wastewaters. In comparison with conventional treatment techniques the MBR technology displays several advantages such as very high effluent quality, limited space requirements and possibilities for a flexible and phased extension of the treatment plant.

Generally, treatment of the residential wastewater by the MBR system would produce effluent with non-detectable TSS, BOD concentration of less than 2 mg/L, ammo-

nia-nitrogen concentration of less than 0.5 mg/L, fecal coliform count of less than 20 per 100 mL, and with proper design, total nitrogen concentration of less than 5 mg/L. The MBR effluent can easily be considered for reuse in various applications. The MBR system is also ideal for treating challenging wastewaters such as low temperature conditions and compounds that are difficult to treat.

In the last 15 years, the MBR technology has extensively been applied to treat both municipal and industrial wastewaters. Currently, there are more than 2,000 small and large (56 MGD) MBR treatment plants in operation in the world. ●

**ORDER YOUR**  
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Recycling Association

## HOMEOWNER'S FOLDERS TODAY!

The NOWRA Technical Practices Committee, Educational Committee, and the Marketing Committee have joined forces to revise the HOMEOWNER'S SYSTEM GUIDE AND RECORD KEEPING FOLDER. This folder is the perfect place to keep all of a homeowner's paperwork and documents in reference to their onsite system. It also provides a basic septic system education as well as a comprehensive inventory of what is included at a site. The folder provides a space to personalize it with your company's contact information and is ideal for file cabinet storage.

Download an order form for packages of 25 folders to give to all your clients on the NOWRA Web site at [http://www.nowra.org/onsite\\_guide.html](http://www.nowra.org/onsite_guide.html). A PDF version of the folder can also be downloaded from this same Web site.

# My Latest Visit to the Shrink

By Bob White



Being a long time installer can sometimes push you to the edge. I will admit that I have sought out professional help in the past from the famous wastewater psychologist and therapist, Dr. Brian Anthony Pumper. On my most recent visit Dr. B. A. Pumper urged me to share my thoughts with others. Something about "controlled venting."

I was so upset I really unloaded on Dr. Pumper. Do you know how many jobs I am losing?... Have the Regulators lost their minds?... How many more times am I expected to let Billy Bob Backhoe undercut me selling products he bought from Onsite-R-Us?... And have you even taken a look at these new systems they are promoting?... Come on Doc, how is a mentally unstable installer expected to keep up with all these things?

"Slow down Bob. Remember, trying to deal with more than one issue at a time will drive anybody crazy," exclaimed Dr. B. A. Pumper early in our session. "First of all there are a lot of people losing jobs to low bidders right now. Don't think you are alone. And Bob you have come to me with this issue before. Remember? Take the high road. Maintain your quality. And remember what you told me you learned in one of your classes you took at your last state convention? All the jobs in the state are not enough if you are not making money."

You're right Dr. Pumper, but those regulators... sometimes I feel like telling them to..."Calm down Bob. You don't understand," Dr. B. A. Pumper said while scooting to the edge of his chair. "Aren't they making the regulations stricter?" Yes. "And doesn't that mean the homeowner will have to do more, not less with their system?" Yes... Oh I get it. The tighter the regulations the more they will have to hire the educated installer to install or repair their system. "Well Bob that's true," Dr. B. A. Pumper said calmly puffing on his pipe, "but only if you are qualified. Only if you have kept up on those continuing education classes offered by the state and national associations." I suppose you are right Doc.

"Bob I'm going to let you in on something. I'm sure you know how important the doctor / client privilege is." Sure Doc. "Well since we go way back I will tell you that you are not the only onsite installer who has sought out my help. In fact that company on the South side of town, you know the

one who has all the same color shirts with their names on them?" Yea I know the ones.

"Well he tells me he and his crew are extremely busy right now. He says that it is getting to the point where the only jobs he gets calls on are the most difficult ones. The ones where the homeowner doesn't ask many questions about price just about whether you are qualified to do the work." I wish we were that busy Doc. "Well it sounds to me like taking the classes to learn about these new systems would be a good idea. He also said he is actually making more money now with fewer jobs and less time. You know he won that fishing tournament last week." I know Doc. I was too busy to go. But I could have beat him. "Sure Bob. I think you are too out of practice right now to challenge anyone to anything but a tail chasing contest." That hurts Doc. "That's what they say about the truth Bob. Remember the high road Bob? Well you have slipped off into the weeds. You have started lowering your prices to get work. That means lower profits. That means more work for less money. That means you are becoming that contractor you despise. I would suggest you make the time to learn more about the installation of the more advanced systems. Get out of the weeds and back on track. In this economy working smarter for your money is a lot better than working harder."

You know Doc you may have a point. I guess I should take the time and money to learn how to install those advanced systems. Like you said, work smarter, make more money and have more free time.

"And Bob don't forget that it will also make you a better contractor overall. The customer sees that, believes and trusts you and starts putting the cost of the system at the bottom of the list and hiring a reliable contractor at the top."

I know you're right Doc. How do you do this in 45 minutes?

"Well Bob I am going to have to charge you double for this session since I worked as both your analyst and your business consultant. See Bob, education doesn't cost, it pays." ●

*This article is fictitious and intended to be humorous and hopefully thought provoking.*

## Changes continue to happen at NOWRA headquarters in between issues of the Onsite Journal.

Communicated through our "E-News" publication, updates are relayed to the NOWRA members on a monthly basis. For those of you who do not receive our electronic newsletter, please sign up. Just drop us a note at [info@nowra.org](mailto:info@nowra.org) and we will add you to the monthly electronic newsletter mailing list. You do not need to be a member to receive this vital piece of communication on industry topics and Association updates. All past issues of the E-news are posted on the NOWRA Web site at [www.nowra.org/e-news.html](http://www.nowra.org/e-news.html).



# Evaluation of Disinfection Units for Onsite Wastewater Treatment Systems: Summary of Report No. 2006-1

By Harold Leverenz, Jeannie Darby, and George Tchobanoglous, University of California, Davis

Disinfection systems for onsite wastewater systems are required by regulatory agencies for some applications, however, there is insufficient operation and maintenance data available to ensure reliable performance. A commercially available calcium hypochlorite tablet chlorination unit and ultraviolet (UV) disinfection unit were evaluated, under conditions within the operational range specified by the manufacturer, for suitability in onsite and small wastewater systems. The disinfection units were assessed based on overall performance, reliability and constraints, maintenance requirements, and estimated cost of installation and operation. Performance was evaluated by measurement of MS2 coliphage, total coliform, and fecal coliform inactivation. The disinfection systems were operated for nine months using biologically treated septic tank effluent. Both systems provided comparable results, frequently achieving 5 log removals. However, both systems were also subject to intermittent breakthrough events. Breakthrough in the chlorination system resulted from differential erosion of the calcium hypochlorite tablets. It was found that there was little control over the applied chlorine dose, with chlorine concentrations ranging from less than 1 mg/L to more than 500 mg/L. The UV system was subject to mineral precipitation on the lamp sleeve (note that the area where the test was conducted has hard ground-

water). The precipitate reduced the effectiveness of the UV system but could be removed with regular maintenance. However, the maintenance interval could not be predicted in advance without testing under the actual conditions. Water with less hardness in the groundwater are not expected to have the same degree of fouling as in this study. Other factors that were identified as important for effective performance included reliable pretreatment, flow equalization, and maintenance frequency. Based on these experiments, it is recommended that any disinfection system should be monitored closely after installation to determine the required maintenance frequency that will ensure performance. ●

*Report 2006-1 is an independent assessment of disinfection processes used in onsite applications conducted by the University of California at Davis, and funded by the State of California Water Resources Control Board.*

*Contact Harold Leverenz for more information at [hleverenz@ucdavis.edu](mailto:hleverenz@ucdavis.edu)*

## Why Belong to NOWRA

National Onsite Wastewater Recycling Association

BY JOINING THE NATIONAL ONSITE WASTEWATER ASSOCIATION (NOWRA), YOU ARE ENTITLED TO IMPORTANT BENEFITS AND OPPORTUNITIES THAT CAN HELP MAKE YOU MORE SUCCESSFUL.

### As a NOWRA member, you can:

- Have your business, products and services listed and promoted nationally through the NOWRA Septic Locator
- Become directly linked with building and development interests for business opportunities
- Have access to national and international educators and other top industry professionals
- Stay up-to-date with on-site industry regulations, technology, products and services
- Earn valuable education credits for technical training leading to professional certification
- Have your business and professional interests represented by the only national organization with direct access to state and federal policy officials
- Participate in medical, life and health insurance program for small businesses
- Receive discounts and other promotional savings from national office supply chains
- Network with your peers from other parts of the U.S. and Canada to learn what is happening in other parts of the country and around the world
- Learn about the industry and regulatory trends that could impact your business
- Attend educational sessions (and earn CEUs) taught by leaders in the onsite industry

### Other benefits include:

- Onsite Journal Subscription - Provides a valuable forum for what is happening around the country
- National Conferences & Training - In-depth information in a national & international forum for new information and research
- NOWRA - The only national organization that exclusively supports the on-site industry

For membership information, please call the NOWRA office at (800) 966-2942 or download a membership application and visit our list of local affiliate groups at [www.nowra.org/join.html](http://www.nowra.org/join.html).

# NOWRA National Backhoe Roe-D-Hoe

By Tom Fritts



It was a "Big Time in Derby Town" when the annual NOWRA National Backhoe Roe-D-Hoe was contested at the 30th Annual Pumper Show February 25th, 26th and 27th in Louisville, Kentucky. Hootin' and hollarin' was heard throughout the hall when 76 contestants on Thursday and 85 on Friday competed to be one of the top 5 to return on Saturday morning for the finals. Competition was brisk both days with sharp operators demonstrating several creative approaches at the 3 different events. The events included basketball, bowling and golf. The course was set up by

"Mr. Backhoe Roe-D-Hoe" Mick Heibert of IHI Compact Excavator Sales LLC. Mick has experience in both North and South America setting up challenging tasks for operators who brag about being the best at their trade. Thanks to Mick and IHI the technical aspects of the event went off without a hitch.

The Roe-D-Hoe kicked off Thursday morning with operators looking over the equipment and sizing up their chances to take home the grand prize of \$1,000. They soon found out that maintaining grade in an excavation might be a little different from shooting hoops, picking up a spare and chipping one in the cup with a backhoe. We had a collection of professional backhoe operators from Canada to Barbados watching, talking and privately figuring out "Do I try and scoop all three basketballs at once or just go for 2 and then sweep the last one for a respectable time? Or would it be better to try and pick up 2 bowling pins with that short dowel on the end of the bucket or just quickly swing and stab them one at a time? And what about keeping that golf ball from looking like a moth orbiting a porch light?" There were several techniques used to stay on the "Top 10" board which was displayed during the contest. It was not uncommon to see a top 10 contestant drop by to check the board only to find they had slipped off...Requiring another trip through the events with a possible change in technique, or maybe just more concentration, or both.

Saturday morning the "Top 10" board had been reduced to five, Kent House from Indiana, Chris Hartman from the home state of Kentucky, Vincent Sullivan of Austin Texas, Mike Smallwood from Ohio and Cory Hoover from Erie Pennsylvania. All had their eyes on the cash. You could tell there had been



Presentation of the First Place check for \$1000 and belt buckle for NOWRA's 2010 Backhoe Roe-D-Hoe. From left to right – NOWRA's President, Tom Groves; Grand Prize winner, Corey Hoover of Erie, PA; and prize sponsor JET, Inc. represented by Chris Madich. (Photography by Ed Wodalski)



The top 5 finalists from NOWRA's 2010 Backhoe Roe-D-Hoe are (from left to right) Kent House (Indiana), Runner-up Mike Smallwood (Ohio), Chris Hartman (Kentucky), Grand Prize winner Corey Hoover (Pennsylvania), and third place winner Vincent Sullivan (Texas). (Photography by Ed Wodalski)





some late night planning and strategizing. The five finalists were allowed one trip through the events for practice and then the real thing. The crowd was treated to a superb exhibit of skill. In the end it was Cory Hoover from Erie Pennsylvania taking home the grand prize of \$1,000.00 with a record time of 1 minute 50 seconds. What a great time Cory! Second place went to Mike Smallwood of Ohio and third to Vincent Sullivan from Austin, Texas. Along with the first place cash the top 3 finishers took home a belt buckle to show the folks back home that they really are the cream of the crop.



A special thanks to Jet Inc for their generous donation of \$1,000.00 for the grand prize, IHI Compact Excavator Sales for the machines, Mick Heibert of IHI for setting up the events, Ed Wodalski of COLE Publishing for some fine pictures, all the volunteers who took time from the show to work the event and the National Onsite Wastewater Recycling Association (NOWRA) for developing the National Backhoe Roe-D-Hoe.

We look forward to seeing everyone again next year at the NOWRA National Backhoe Roe-D-Hoe. ●

## A Successful Fifth Annual NOWRA Installer Academy

Count on the Installer Academy every year!

By Sara Heger, NOWRA Education Committee Chair

The fifth annual National Onsite Wastewater Recycling Association (NOWRA) Installer Academy was held February 22-23, 2010 in Louisville, home of the Kentucky Derby, prior to the Pumper show. The Academy can best be described in the words of one attendee: "Energetic, current, positive, and well-illustrated."

This conference provides great networking opportunities for contractors. For many conference attendees the education sessions were the highlight of the conference. As one installer from Pennsylvania stated: "I have attended many onsite training seminars over the years. I learned more here in two days than in years of others. Keep up the good work!" The conference began with a keynote talk by former NOWRA and NAWT President Tim Frank on "Professionalism Through Education." Following the opening session, there were three concurrent tracks held over the two day period with class sizes kept small to maximize interaction between speakers and attendees.

There were four types of education sessions provided:

General Installer technical training provided by CIDWT members: Nancy Deal, NC State University, Tom Fritts of Residential Sewage Treatment Company, Sara Heger from the University of Minnesota, and Randy Miles with the University of Missouri. Topics included business practices, soils and site evaluation, installation techniques and safety along with piping, tanks, soil treatment systems, pumps and controls, ATUs, media filters, disinfection systems and much, much more.

A full technical day on Onsite Drip Dispersal including design, installation and operation was provided by representatives from Geoflow and Netafim.

Special exhibitor training was provided by BioMicrobics, Norweco, Polylok, Bord na Mona, and Infiltrator.

A Zoeller Plant Tour highlighted the various pumps, effluent screens, and decentralized technologies being manufactured at the nearby Zoeller plant.

NOWRA would like to thank COLE Publishing for offering us the opportunity to provide this training at the Pumper Show, and to Zoeller Company for their lunch sponsorship. Also, thanks to our conference sponsors – NOWRA's Business Benefit Program members as listed on the back page of this Onsite Journal.

In addition to the Installer Academy, Sara Heger and Tom Fritts also represented NOWRA during the Pumper Show Education Day by providing a condensed version of NOWRA's A to Z course to a packed room.

### Planning Already for Next Year!

The fifth year of the Installer Academy was such a success that 2011 planning is already underway. Please see [www.nowra.org/academy.html](http://www.nowra.org/academy.html) or contact us at 800-966-2942 or at [info@nowra.org](mailto:info@nowra.org) for more information.



Count on the Installer Academy every year!

## BUSINESS BENEFIT PROGRAM MEMBERS FOR 2010

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www.sjrhombus.com

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For information on the benefits, or how to become a 2010 NOWRA Business Benefit Program member, check out our Web page at [www.nowra.org/bbp.html](http://www.nowra.org/bbp.html) or call the NOWRA offices at 800-966-2942. Many new benefits were added to the program for 2010, so act now and don't miss out!

## SEPTIC LOCATOR - Your 24/7 Internet Sales Tool

With over 60 percent of people using the internet to find a service or product provider, it is more important than ever to have a Web presence for your business. And that is why NOWRA developed "Septic Locator."

Septic Locator steers customers to NOWRA business members, and it is the premier resource for placing their company's onsite wastewater products and services in front of homeowners, builders, realtors, regulators, and policy officials. No other Web site offers this kind of direct access to on-site wastewater professionals and products like Septic Locator.

As a free service to all NOWRA members, Septic Locator is easy to use and offers the flexibility of being upgradeable if the member wants to have a stronger presence on the Web.

If you are a NOWRA member, just go to [www.septiclocator.com](http://www.septiclocator.com) and click on "Add My Company." Fill out the simple form, hit "submit," and you are well on your way to having your information available to anyone in your area needing assistance. There is no easier way to make your NOWRA membership work for you 24/7 than on the world's most popular site for onsite services!

If you are not a member of NOWRA, isn't this a great reason to join? Visit us at [www.NOWRA.org](http://www.NOWRA.org).





# The Big Back Yard

Philadelphia's Greenworks Philadelphia is working to transform its city's discarded yardwaste into a resource for urban farming and landscaping.

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Philadelphia's Greenworks Philadelphia is working to transform its city's discarded yardwaste into a resource for urban farming and landscaping. The city has established a program to collect yardwaste from residents and businesses, which is then processed into mulch and compost. This material is then distributed to community gardens and urban farms, providing a sustainable source of soil for growing food and plants. The program has been successful in reducing the amount of yardwaste sent to landfills and in creating a valuable resource for the community.



### The Public Sector

As public sector organizations face budget cuts and increased competition for funding, they must find ways to improve efficiency and effectiveness. This article discusses strategies for public sector organizations to succeed in a challenging environment.



### That Something Ex

There is a lot of talk about the importance of customer experience, but many organizations struggle to implement it effectively. This article explores the challenges of creating a great customer experience and offers practical advice for success.

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# Rehab for the Rehabilitators

**A site-specific alternate replacement system enables a rehabilitation center in Pennsylvania to continue operations**

By **Scottie Dayton**

**T**he undersized, two-part onsite system at White Deer Run at Blue Mountain, a 20-bed rehabilitation center in Kempton, Pa., had effluent ponding in the conventional drainfield and leaking out the berm surrounding the sand mound.

Christman's Septic Service in Fogelsville, Pa., went from pumping the three septic tanks every six months to twice a month. When the business expanded into onsite installations, operations manager Dave Hummel contacted the center's regional director with replacement solutions.

To calculate the flow, the company installed a water meter at the facility and a cycle counter on the lift station to the sand mound. "State code specifies that sites must

have room for a secondary system, but there was barely room for the primary," says designer Joshua Hummel. "Using chambers instead of crushed stone reduced the size of the sand mounds, and biofiltration reduced the amount of sand, enabling everything to fit in the area we had."

The replacement system uses peat moss biofilters and alternate modified at-grade sand mounds. Because of the mountainous terrain and the lack of space for a secondary system, the state Department of Environmental Protection classified it as a site-specific alternate system.

## Site conditions

Soils are silt loam/silty clay loam with subangular blocking structure and stones up to 10 inches in diam-



**Mark Schoemaker and Luke Hummel check for proper placement of the six biofilter tanks.** (Photos courtesy of Christman's Septic Service)

eter. Absorption rates are 104 to 140 minutes per inch with soil mottling at 23 to 28 inches. The 7-acre property in mountainous terrain has slopes of 2 to 12 percent slopes and a potable water well.

## System components

Hummel designed the system to handle 3,000 gpd. Its major components are:

- 28-gallon Schier PEC-35 interior grease trap.
- Two 3,000-gallon single-compartment septic tanks in series. Second tank has an A300 Zabel effluent filter (Polylok Inc.). All precast concrete tanks made by Monarch Precast Corp., Allentown, Pa.
- Two 1,500-gallon lift stations



**Josh Hummel checks the grade from the flow equalizer supply line to the biofilter tank.**

with duplex alternating Model WE20H 2 hp pumps from Goulds Pumps-ITT.

- Six Ecoflo STB-650 textile-peat biofilters with six-way flow equalizer from Premier Tech Aqua, supplied by Ecoflo and Fallen Spring Technologies, Newburg, Pa.
- 56 laterals of 1.5-inch Schedule 40 PVC pipe.
- 524 Quick4 chambers from Infiltrator Systems Inc.
- 594 tons of recycled glass

## System Profile

|                            |   |
|----------------------------|---|
| <b>Location:</b>           | Kempton, Pa.  |
| <b>Facility served:</b>    | 20-bed rehabilitation center  |
| <b>Designer/Installer:</b> | Joshua Hummel, Christman's Septic Service, Fogelsville, Pa.   |
| <b>Subcontractor:</b>      | Mark Schoemaker, Mars Excavating, Schnecksville, Pa.  |
| <b>Site conditions:</b>    | Silt loam/silty clay loam with absorption rates of 104 to 140 minutes per inch and soil mottling at 23 to 28 inches |
| <b>Type of system:</b>     | Ecoflo peat biofilters, Premier Tech Aqua   |
| <b>Hydraulic capacity:</b> | 3,000 gpd   |



An overview of the top two absorption areas shows the piping in place and ready for the installation of chambers.



Mark Schoemaker places soil around the chambers.

from Cogle's Recycling Inc., Hamburg, Pa.

- Custom control panels from Boulay Fabrication Inc., LaFayette, N.Y.

### System operation

Three 3-inch lines leave the center and connect to a 4-inch PVC pipe. Wastewater gravity flows to the septic tanks and into the first lift station. On demand, a 60- to 90-gallon dose is pumped in one to two minutes through a 2-inch PVC line to the flow equalizer. At the end of a cycle, water drains back to the lift station to prevent freezing.

The flow equalizer divides the dose among the biofilters, arranged three per row. Effluent enters the tops of the units and runs into a bucket that tips back and forth, evenly dispersing the liquid onto distribution plates. After passing through 3/4-inch holes in the plates, the liquid percolates down through 32 inches of peat moss in about 24 hours. Each unit's capacity is 500 gpd.

**"Using chambers instead of crushed stone reduced the size of the sand mounds, and biofiltration reduced the amount of sand, enabling everything to fit in the area we had."**

Joshua Hummel

The water continues through 3/4-inch washed stone, then enters the drainage pipe in the center of the biofilter. The pipe connects to a 4-inch PVC gravity line running to the second lift station. Each time the "on" float rises, a different pump operates in sequence, sending 600 gallons to its dedicated mound. At the end of the cycle, water drains back to the lift station.

### Installation

The original building on the site was a four-bedroom home on a septic system with a 900-gallon septic tank. When the owner enlarged the residence to a 20-room rehabilitation center, the contractor added two 1,000-gallon septic tanks and a sand mound. The onsite system was not expanded after White Deer Run at Blue Mountain purchased the facility.

Since the facility prepares meals, the DEP asked Hummel to upgrade the kitchen. "It didn't have a grease trap, and that contributed to the system's demise, as did the overuse of water," he says. "We moved the dishwasher and sinks, then hooked them to the grease trap."

To avoid interrupting service, Hummel and his three men installed the mounds, biofilters, and the second lift station first. These components, built on a terrace in the side of the mountain, are at a higher

elevation than the tanks, which are below the facility.

Workers installed one mound at a time. Absorption area A is 3,989 square feet, area B is 3,807 square feet, and area C is 3,249 square feet. The men scarified the soil using a chisel plow on a mini track-loader, then leveled the area with 12 inches of DEP-approved recycled glass on the high side and up to 5 feet on the low end.

The pressurized drip lines, supplied by 3-inch PVC pipe and covered by chambers, have 1/4-inch holes 6 feet apart on center with the orifices up. Each lateral has an observation port. The entire job required 1 mile of piping.

Ecoflo representative Don Jones helped assemble the fiberglass biofilter shells, which arrived in halves. The units have 70 square feet of peat filtration area, covered by 12 inches of 3/4-inch washed aggregate.

"Subcontractor Mark Schoemaker of Mars Excavating hit huge rocks while digging the hole for the biofilters," says Hummel. "We set the rocks around the perimeter of the berms to help tie in the soil and make the area resemble the rest of the mountain." The hole was back-filled with washed 3/4-inch gravel and topped with river stone, which also created the lower berm surrounding the filters. Finally, the men ran the 2-inch flow equalizer

supply line down the mountain to the bottom terrace.

During the four days it took to set the septic tanks and first lift station and run new sewer lines, the crew pumped the three existing tanks morning and evening, as the flows had nowhere to go. A 3,500-gallon vacuum truck remained on-site and off-loaded into a 5,000-gallon tanker that hauled the waste away.

To reconnect the system, workers saw-cut the macadam driveway and parking lot, trenched, and laid 4-inch Schedule 80 PVC pipe. They broke out the inlets and outlets in the existing tanks to create a level passage for the lines, cracked the tank floors, then backfilled with 3/4-inch washed stone. The existing sand mound now maintains the caretaker's residence. The replacement system works as designed.

### Maintenance

Christman's Septic has the one-year maintenance contract. Every three months, a technician checks and tests the control panels, float controls, pumps, and levels in absorption beds and tanks. He cleans the effluent filter and pumps the grease trap as needed. Annual maintenance includes pumping of the septic tanks and lift stations and flushing of the laterals.

At the yearly biofilter inspection, the technician fluffs and levels the peat moss and adds more as needed. Under normal conditions, the filter bed lasts 10 years. When the media is due for replacement, a vacuum truck removes it, and fresh peat moss is added. ■

### MORE INFO:

**Goulds Pumps-ITT**  
315/568-2811  
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## Working on a Mystery

In response to "Mystery in Oregon" in November's Association News, installers e-mailed Kim Aldrich, a Yamhill County regulator, about their experiences with decaying concrete components in onsite systems. She published correspondence from Wisconsin, Indiana and Washington in the fall newsletter.

Two of the three e-mails reported water softeners plumbed to the septic tank. Last November, presenters at a water softener task force meeting in Virginia revealed that the sodium in water softening salt can increase the production of sulfides and hydrogen sulfide. The compounds and gas react with oxygen to form sulphuric acid, which erodes concrete in the upper reaches of tanks and d-boxes. (No definitive conclusion can be drawn in these cases that water-softening systems were the cause of deterioration.)

## Questionable Change

The Connecticut Onsite Wastewater Recycling Association (COWRA) opposed an attempt by the state Department of Public Health to consolidate many small, full-time health departments into five or six mega-health districts and fund only departments in cities with populations larger than 50,000 and districts with three or more towns.

In a letter to the governor, COWRA president Frank Talarico stated that eliminating local health offices increased contractors' travel time to satellite district offices, and for department staff to do inspections. Consolidation also would require additional supervisory positions, increasing costs to taxpayers.

Talarico said COWRA would support programs to improve the qualifications of local health directors and sanitarians, and asked for support to identify qualified local regulators to help maintain their positions.

In a second letter to the governor, the organization objected to the state requiring individuals maintaining small advanced treatment systems to be certified Class 1

Wastewater Treatment Operators. It argued that operating smaller systems requires different skills and experience than operating municipal treatment plants.

The letter suggested following the training and licensure program developed by the University of Rhode Island for smaller advanced treatment systems, and requested a meeting to discuss more suggestions and share insight about smaller systems.

## Human Waste Goes Green

Anne Naeth, a land reclamation expert at the University of Alberta, has studied combining biosolids with limekiln dust, a byproduct of lime manufacturing. Tests show the mix kills pathogens such as *E. coli*, binds up water-soluble metals, and produces a beneficial organic soil.

The most promising use for the material is for filling in quarries and old oil and gas wells. She hopes the product might eventually be used as a farm fertilizer.

## CALENDAR OF EVENTS

### April 9-10

Oregon Onsite Wastewater Association Conference and Equipment Rodeo, Red Lion Hotel Jantzen Beach, Portland. Call 541/389-6692 or visit [www.o2wa.org](http://www.o2wa.org).

### April 11-14

Ontario Onsite Wastewater Association Conference and Exhibition, London Convention Centre/Hilton Hotel, London. Call Denis Orendt at 905/372-2722 or visit [www.oowa.org](http://www.oowa.org).

### April 12-15

BioCycle West Coast Conference, Town and Country Resort, San Diego, Calif. Call 610/967-4135 or visit [www.biocycle.net](http://www.biocycle.net).

### June 6-9

National Onsite Wastewater Association Educational Conference and Exhibition, Albuquerque, N.M. Call 866/956-2258 or visit [www.neha.org](http://www.neha.org).

### Aug. 5-7

Florida Onsite Wastewater Association Conference and Trade Show, Daytona Beach Convention Center, Daytona Beach. Call 407/937-2228 or visit [www.fowaonsite.com](http://www.fowaonsite.com).

### Aug. 27-28

Georgia Onsite Wastewater Association Conference, Callaway Gardens, Pine Mountain. Call 678/646-0379 or visit [www.onsitewastewater.org](http://www.onsitewastewater.org).

## TRAINING & EDUCATION

### Alabama

Licensing classes are the joint effort of the Alabama Onsite Wastewater Association (AOWA) and University of West Alabama (UWA). Courses are at UWA Livingston campus unless stated otherwise:

- May 5-7 – Basic Installer
- May 19-21 – Advanced Installer Level II
- June 24-25 – Continuing Education, Dothan
- July 8-9 – Pumper
- July 28-30 – Basic Installer

The first day of Continuing Education classes is for installers and the second day for pumpers and portable restroom operators. Call 334/396-3434 or visit [www.aowa.org](http://www.aowa.org).

### California

The California Onsite Wastewater Association is offering a Science of Soils class on May 21 at Yuba City. Call 530/321-2207 or visit [www.cowa.org](http://www.cowa.org).

### Iowa

The Iowa Onsite Wastewater Association is offering Pumping and Maintenance of Conventional Systems on May 17 at a location to be determined. E-mail Alice Vinsand at [execdir@iowwa.com](mailto:execdir@iowwa.com) or visit [www.iowwa.com](http://www.iowwa.com).

### Kentucky

The Kentucky Onsite Wastewater Association has a Certified Installers of Onsite Wastewater Disposal Systems class for six

CEUs on May 20 at the Bluegrass Community Technical College in Lawrenceburg. Call 270/314-7110 or visit [www.kentuckyonsite.org](http://www.kentuckyonsite.org).

### Minnesota

The University of Minnesota Extension has these classes:

- May 3-4 – Maintaining Onsite Systems, Mankato
- May 4-7 – Service Provider, Mankato
- May 18-21 – Advanced Design and Inspection of Onsite Systems, Part 2, Mankato
- May 24-26 – Basic Design of Onsite Systems, White Bear Lake
- May 27-28 – Soils, Austin
- June 7-8 – Inspecting Onsite Systems, Waseca
- June 9-10 – Soils, Brainerd
- June 11 – Soils Continuing Education, Brainerd
- June 18 – Soils Continuing Education, Rochester
- June 24 – Soils Continuing Education, Willmar

Call Nick Haig at 800/322-8642 (612/625-9797) or visit <http://septic.umn.edu>.

### Missouri

The Missouri Smallflows Organization is offering these CEU courses:

- May 11 – Drip Irrigation: Design and Installation, Chillicothe
- May 12 – Pumps, Panels, and Electrical, Chillicothe
- May 25-26 – High-Strength Waste and Aerated Treatment Units, Liberty
- June 15-16 – Operation and Maintenance, Jefferson City

Call Tammy Yelden at 417/739-4100 or visit [www.mosmallflows.org](http://www.mosmallflows.org).

### New England

The New England Onsite Wastewater Training Center at the University of Rhode Island in Kingston has these workshops:

- May 5 – Functional Inspections
- May 11 – Innovative and Alternative Technology Overview



- May 20 – All About Series: Sand Media
  - May 27 – Innovative and Alternative Technology Field Overview, URI Peckham Farm
  - June 1-2 – National Operation and Maintenance Service Provider Program
  - June 15 – INSP200 Examination
  - June 16 – Soil Basics for the Onsite Wastewater Contractor
  - June 17 – Hands-On Component Installation
  - June 24 – Bottomless Sand Filter Design and Installation
- Call 401/874-5950 or visit [www.uri.edu/ce/wq](http://www.uri.edu/ce/wq). For soil course information, call Mark Stolt at 401/874-2915 or e-mail [mstolt@uri.edu](mailto:mstolt@uri.edu).

#### North Carolina

The North Carolina Portable Toilet Group is offering a Septage Operator Training seminar on June 19 in New Bern. Call 252/249-1097 or visit [www.ncpumpergroup.org](http://www.ncpumpergroup.org).

#### Washington

The Washington On-Site Sewage Association and Washington State

Department of Health in cooperation with Washington State University are offering these certification courses.

- May 5 – Electrical Control Panels, Puyallup
- May 6 – Installing Mounds and Sand Filters, Puyallup
- May 13 – Design Siting, Centralia, Puyallup
- May 19 – Evaluating and Repairing Onsite Systems, Bremerton

Call WOSSA at 253/770-6594 or visit [www.wossa.org](http://www.wossa.org).

#### Wisconsin

The Wisconsin Onsite Wastewater Recycling Association is holding a Private Onsite Wastewater Treatment System Evaluator Course on May 3-4 in Waukesha. Call 608/256-7757 or visit [www.wowra.com](http://www.wowra.com). ■

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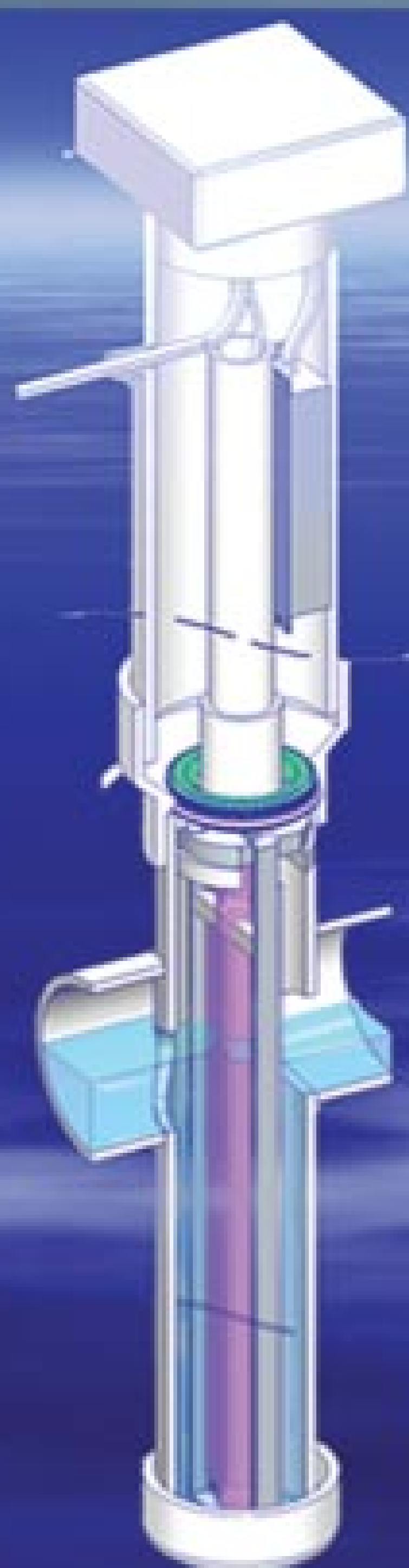
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- |  |   |
|--|---|
| <input type="checkbox"/> Aerators                    | <input type="checkbox"/> Positions Available      |
| <input type="checkbox"/> Blowers                     | <input type="checkbox"/> Positions Wanted         |
| <input type="checkbox"/> Bucket Machines             | <input type="checkbox"/> Pressure Washers         |
| <input type="checkbox"/> Businesses for Sale         | <input type="checkbox"/> Pumps-Dredge             |
| <input type="checkbox"/> Business Opportunities      | <input type="checkbox"/> Pumps-High Pressure      |
| <input type="checkbox"/> Cable Machines              | <input type="checkbox"/> Pumps-Submersible        |
| <input type="checkbox"/> Computer Software           | <input type="checkbox"/> Pumps-Vacuum             |
| <input type="checkbox"/> Dewatering                  | <input type="checkbox"/> Pumps - Washdown         |
| <input type="checkbox"/> Drainfield Restoration      | <input type="checkbox"/> Pumps-Water              |
| <input type="checkbox"/> Drain/Sewer Cleaning Equip. | <input type="checkbox"/> Ridding Machines         |
| <input type="checkbox"/> Dredges                     | <input type="checkbox"/> Roll-Off Containers      |
| <input type="checkbox"/> Excavating Attachments      | <input type="checkbox"/> Root Control             |
| <input type="checkbox"/> Excavating Equipment        | <input type="checkbox"/> Safety Equipment         |
| <input type="checkbox"/> Hand Tools                  | <input type="checkbox"/> Septic System Components |
| <input type="checkbox"/> Hazardous Waste Units       | <input type="checkbox"/> Septic Tanks             |
| <input type="checkbox"/> Hydroexcavation             | <input type="checkbox"/> Septic Trucks            |
| <input type="checkbox"/> Jetters-Trailer             | <input type="checkbox"/> Service/Repair           |
| <input type="checkbox"/> Jetters-Truck               | <input type="checkbox"/> Slide-In Units           |
| <input type="checkbox"/> Jet Vacs                    | <input type="checkbox"/> Sledge Applicators       |
| <input type="checkbox"/> Lease Financing             | <input type="checkbox"/> Tanks                    |
| <input type="checkbox"/> Levels & Transits           | <input type="checkbox"/> Tools                    |
| <input type="checkbox"/> Locations                   | <input type="checkbox"/> Trailers                 |
| <input type="checkbox"/> Miscellaneous               | <input type="checkbox"/> Vacuum/Tanker            |
| <input type="checkbox"/> Parts & Components          | <input type="checkbox"/> Trucks (dump/misc.)      |
| <input type="checkbox"/> Pipeline Rehabilitation     | <input type="checkbox"/> TV Inspection            |
| <input type="checkbox"/> Portable Toilets            | <input type="checkbox"/> Vacuum Loaders           |
| <input type="checkbox"/> Portable Toilet Tanks       | <input type="checkbox"/> Vases                    |
| <input type="checkbox"/> Portable Toilet Trailers    | <input type="checkbox"/> Vehicle Tracking         |
| <input type="checkbox"/> Portable Toilet Trucks      | <input type="checkbox"/> Wanted                   |
|  | <input type="checkbox"/> Wastewater Transfer      |
|  | <input type="checkbox"/> Waterblasting            |

Please print ad legibly below with correct punctuation and phone number. Circle each word to be bolded, if any. (\$1.00 extra per word)

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- |   |  |   |
|---|--|---|
| <input type="checkbox"/> <b>CLEANER</b><br>Deadline: 1st of the Month | <input type="checkbox"/> <b>MSW</b><br>Deadline: 1st of the Month                | <input type="checkbox"/> <b>PUMPER</b><br>Deadline: 10th of the Month |
| <input type="checkbox"/> <b>PRO</b><br>Deadline: 17th of the Month    | <input type="checkbox"/> <b>ON SITE INSTALLER</b><br>Deadline: 17th of the Month |   |

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(Example: 25-wd. ad X \$1.00 per word = \$25.00;  
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• [www.onsiteinstaller.com](http://www.onsiteinstaller.com)  
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PLEASE FILL OUT CREDIT CARD INFORMATION COMPLETELY INCLUDING V-CODE (3-DIGIT NUMBER FOUND BY YOUR SIGNATURE)

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