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Jim Smyth
Sweetwater Authority general manager
Sweetwater, California

A SWEETER SYSTEM

Sweetwater Authority modernizes
a Southern California water system
through methodical maintenance
and repairs, and innovative
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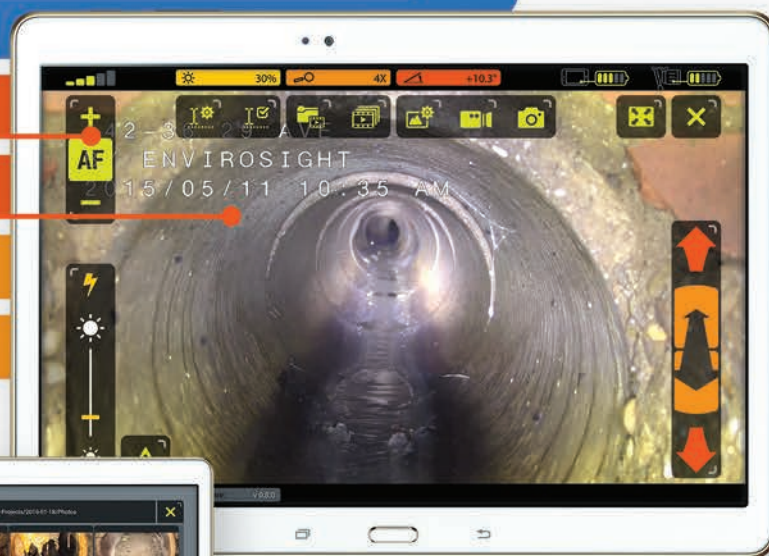
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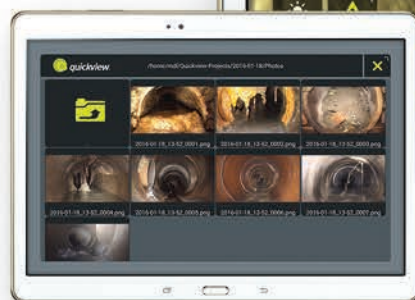
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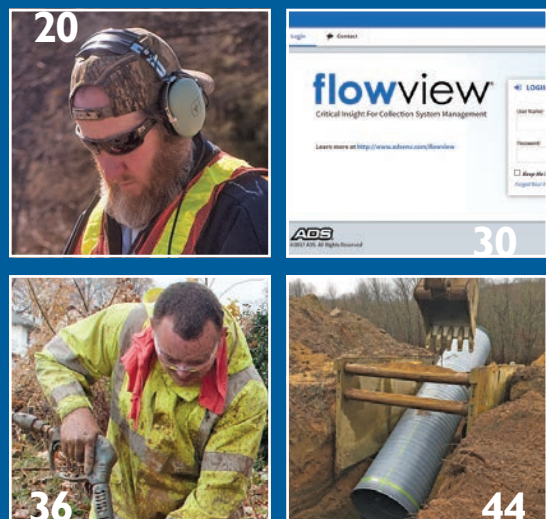
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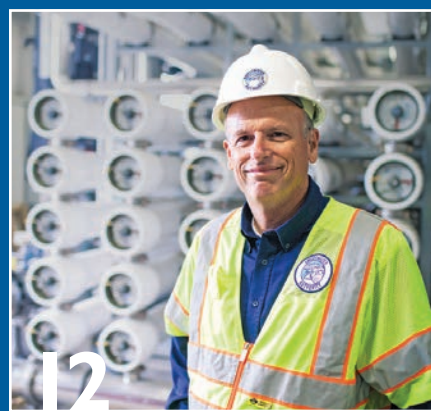
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ACE PRE-SHOW ISSUE

HYDROEXCAVATION AND INDUSTRIAL
JET/VAC SERVICES



ON THE COVER: Sweetwater Authority General Manager Jim Smyth in front of one of three new reverse osmosis trains. Each train uses a vertical turbine pump to provide the pressure to move water through the purifying membranes. (Photography by Collin Chappelle)



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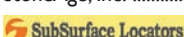
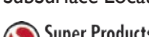








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FROM THE EDITOR

Luke Laggis

Good conversations lead to good content. I enjoy hearing your thoughts and ideas, and I always appreciate any feedback on the magazine — good or bad.

I got a call from Kent Carlson the other day. Carlson was part of the story we did on the Los Angeles Wastewater Collections Division in 2015. We've been in touch several times since, and he always provides some good perspective. This time he wanted to talk about the value hiring military veterans can bring to municipal utilities.

Carlson, himself a U.S. Navy veteran, has seven other veterans working

“Good conversations can lead to greater efficiency, improved operations and better systems. I enjoy getting you involved in those conversations and bringing you the perspective of your peers.”

in his current department. He said he was looking around the other day and noticing what a significant contribution they make to the department's success. He also talked about his own school experience, and the dwindling opportunities for technology education available to today's high school students,

which is taking depth from the pool of potential employees who have basic technical training.

But there is a large pool of military veterans with significant training, and water and wastewater utilities should be doing more to recruit from that talent pool. It was an interesting point, and I think it'll make a good story in a future issue.

I also heard recently from Greg Ferguson — and on a separate occasion from Tim Aubrey — at the city of Florence (Kentucky) Public Services Department. Florence is one of only two cities in northern Kentucky that still maintains its own water, sanitary sewer and storm sewer systems.

Ferguson's wastewater crew reads the magazine. He says they enjoy hearing about how their peers are doing their jobs, and they're doing some progressive things themselves. On the water side, Aubrey explained how their automated metering and leak detection system has improved efficiency and response time. You'll probably be hearing more about their operations in a future issue as well.

You'll also have the opportunity to read about a large sliplining project in Louisville, Kentucky. Kelley Dearing-Smith got in touch to let me know about the project, which covers 6.6 miles of a 48-inch transmission main installed in the 1930s. It's one of the oldest water mains in the system, and it runs through beautiful, established neighborhoods and a popular shopping district along historic Olmstead Parkway, so digging up the entire stretch wasn't an option. It's an interesting project, and with thousands of commuters using the parkway daily, Dearing-Smith says communication has been just as important as the engineering process.

On my end, good conversations lead to good content. I appreciate when you call or email to tell me about your utilities and the projects you're tackling.

On your end, good conversations can lead to greater efficiency, improved operations and better systems. I enjoy getting you involved in those conversations and bringing you the perspectives of your peers. I hope it helps.

Enjoy this month's issue. ♦

Comments on this column or about any article in this publication may be directed to editor Luke Laggis, 800/257-7222; editor@mswmag.com.

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LIGHTWEIGHT PACKAGE

More Hydrovac Makers Targeting the Urban Market

Today's hydroexcavators call the city home. They're not only roaming the oilfields as they did decades ago. But that versatility has also created problems, most notably the weight issue. Working in a municipal environment often means loads are being transported rather than dumped on site. Trucks are exceeding road weight limits when fully loaded, giving operators two choices: Risk a hefty fine, or greatly underutilize the debris tank's capacity. Many truck makers have already been offering lighter, more compact options to address the problem, and now even more are realizing the needs of the municipal market. Learn about some of the newest options.

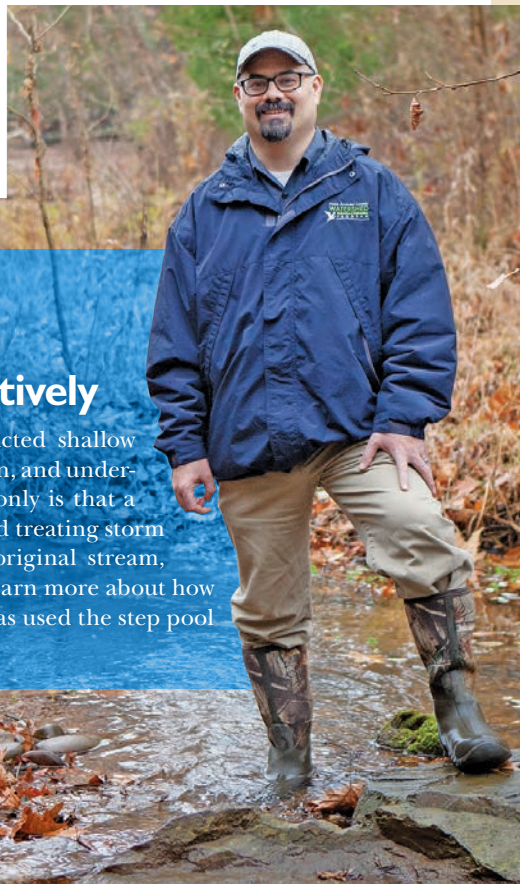
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OVERHEARD ONLINE

“When we started this project, we saw a large section lit up and we thought: ‘Wow, this is a perfect opportunity to take some nice photographs and video of the tunnel and show the community what happens beneath the ground.’”

— *Watershed District Turns Stormwater Repairs into Public Outreach Effort*
mswmag.com/featured



STORMWATER SOLUTIONS

Maryland Community Uses Step Pool Conveyance Effectively

Step pool systems consist of a series of constructed shallow aquatic pools, riffle grade control, native vegetation, and underlying sand/woodchip mix filter bed media. Not only is that a good recipe for safely conveying, slowing down and treating storm flow, it often ends up looking better than the original stream, according to Anne Arundel County, Maryland. Learn more about how that community, featured in the February issue, has used the step pool method to its benefit. mswmag.com/featured



PHOTO EVIDENCE

Photographer Captures Differences in Water Access

You turn on the tap, water comes out. That was the feeling of photographer Ashley Gilbertson before taking on a project for UNICEF, in which he visited households across six countries to document the variations in water access that exist around the world. After comparing his family's water use in New York City to that of families in undeveloped countries who must collect their water daily, he felt a greater appreciation for the resource and the utility workers who help get it straight to his tap.

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A SWEETER SYSTEM

Sweetwater Authority modernizes a Southern California water system through methodical maintenance and repairs, and innovative water sourcing

By Erik Gunn

Some water districts are blessed with an abundant supply of clean water. The Sweetwater Authority isn't one of them.

For four decades, Sweetwater Authority has been bringing a water system begun more than a century ago into modern, safe practices while upgrading its infrastructure. One of its greatest successes is drawing pure, clean drinking water

from a supply that's anything but.

Sweetwater Authority did that by thinking ahead and taking a well-timed chance on technology, says Jim Smyth, general manager. The result is enabling the authority to depend less on outside purchased water than it used to, at a savings to ratepayers and in a state that until recently labored under drought.

This summer, that supplemental source of water is set to double in size — further reducing the authority's dependence on outside suppliers.

Pioneer spirit

The Sweetwater Authority's origins reach back to the settling of the San Diego area. Today, the authority provides water to about 189,000 people
(continued)

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over a 32-square-mile service area that includes National City, Bonita, and western and central Chula Vista, California — three adjacent communities immediately south of San Diego.

It was established 40 years ago, but Smyth traces its history back more than a century earlier, when the area's water system was created by brothers Frank, Warren and Levi Kimball, who moved from out east to develop the area and established the Kimball Brothers Water Company.

"They knew they needed two things to get people to come here: the water and the railroad," Smyth says. To meet that first requirement they built the Sweetwater Dam in 1888 on the Sweetwater River. It was the largest masonry arch dam in the country at the time.

The water company's original infrastructure consisted of 57 miles of various steel pipelines ranging from 4 to 36 inches in diameter. That included 10 miles of 24-inch riveted steel pipe

extending into National City. In the decades that followed, the area grew, and when the U.S. Navy made San Diego the home port for the Pacific Fleet during World War II, population and development soared, along with the demand for water.

For 110 years, water for National City, Bonita and Chula Vista was provided by a patchwork of about a dozen private water companies. Originally established in 1972 to finance the public acquisition of the system, Sweetwater Authority took over the operations in 1977 under an amended joint powers agreement between National City and the South Bay Irrigation District.

Decades of rebuilding

Like a new college graduate facing a six-figure college debt, the authority was born with a huge financial burden. The previous private owners had no consistent maintenance practices and no plans for the future.

"In 1977 when we took over, the system was in very, very great disrepair," Smyth says. "There were nearly 200 leaks a year. We just inherited a system that had a very high maintenance need."

For 40 years, Sweetwater Authority has been making up for previous neglect. The new authority drew up a master plan for replacing its 90 miles of aging metallic and undesignated pipeline. It targeted 8 miles of the remaining 1888 riveted steel pipe that had once been the system's mainstay. The pipe was still in good shape, but the rivets wore out.

The replacement project included 45 miles of cast iron pipe put in between World Wars I and II. The highly corrosive local soil took its toll on the material.

"We've replaced all the cast iron over time, but it took about 30 years to do it because of the cost," Smyth says.

The remaining 265 miles of pipe in the original system is made from asbestos cement, most of it installed between 1950 and 1980. It was not included in the original replacement program given the material's track record for reliability and its 100-year rating. The authority is now developing a follow-up replacement priority program to identify asbestos cement pipe for replacement.

Today, the entire system has grown to 388 miles of pipeline, and leaks are down to fewer than 10 per year. The authority uses PVC for 16-inch or smaller replacement lines. New pipelines 24 inches or larger are steel, and pipe in the 16- to 24-inch range is a mix of PVC and steel.

Steel pipe is coated on the inside with a cement lining per AWWA waterline standards and wound around the outside with vinyl tape. Ductile iron is rejected because of its vulnerability to corrosion.

Economy and innovation

The Sweetwater Authority draws water from three homegrown freshwater sources: two deep freshwater wells in National City, the Sweetwater Reservoir, and an auxiliary reservoir further upstream.

(continued)



A contractor works outside Sweetwater Authority's recently installed Additional Iron and Manganese Removal System, which helps avoid damage to the distribution pipelines and customers' plumbing systems. A Sparling Instruments valve regulates the flow.

PROFILE:
Sweetwater Authority

POPULATION SERVED:
Approximately 189,000

SERVICE AREA:
National City, Bonita, and portions of Chula Vista

WATER VOLUME:
20.6 mgd (peak), 15.2 mgd (average)

NUMBER OF EMPLOYEES:
126

INFRASTRUCTURE:
388 miles of water mains

ANNUAL OPERATING BUDGET:
\$44.19 million

WEBSITE:
www.sweetwater.org

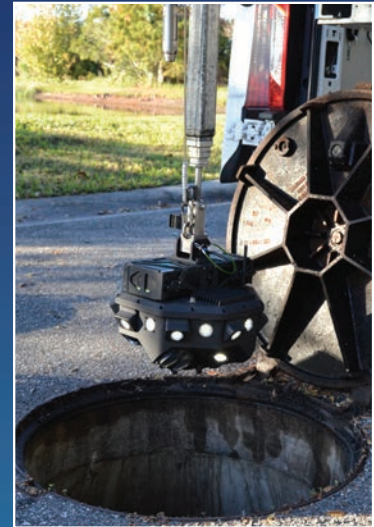


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Eric Rasmussen (left) and Julio Salazar reconnect water services after replacing an old 6-inch steel pipe with new 8-inch PVC as part of the Authority's pipeline replacement program.

AWARD-WINNING APPROACH

Recognition from its regional peers is evidence of the Sweetwater Authority's performance as a water utility.

In 2015, the California-Nevada section of the American Water Works Association gave the authority an award for Outstanding Service to the Industry. The award was in recognition of the support the authority gave to the work of its program director, Sue Mosburg, up to and during her time as chair of the California-Nevada section.

Recognition internally is a significant part of the authority's approach as well. And because safety is a keyword, the authority recognizes it through two separate in-house awards.

"We actually make a big deal here by celebrating once a year and giving a couple of safety awards," says Jim Smyth, the authority's general manager. The "Big Al" safety award, named for former Sweetwater Authority general manager Al Sorensen, and the "Rubey" award both recognize employees for recommendations that enhance worker safety on the job.

Sweetwater Authority's practice of promoting safety has brought the agency regional recognition as well. In 2016, the authority received the AWWA California-Nevada section's Larry C. Larson Safety Award for its commitment to employee health and safety.

The reservoirs store water from the Sweetwater River and help capture local runoff. Like many rivers and creeks in California, the river dries up when there's no precipitation, so the authority must purchase water from the San Diego County Water Authority, which gets its water mainly from the Colorado River and Northern California.

Long before California's five-year drought, which only ended in early 2017 with a series of significant storms, water officials throughout the state have been prospecting for new sources.

In the early 1990s, the Sweetwater Authority hired the U.S. Geological Service to drill a series of pilot holes in Chula Vista to a depth of 1,000 feet. They found groundwater 150 to 200 feet below the surface.

Carbon dating shows that water supply to be nearly 20,000 years old.

"It's brackish," Smyth says. "It's not drinking water, it's not seawater, but it's a little bit in between. You don't want to drink it — you just don't."

EPA standards require no more than 500 parts per million of impurities in drinking water. By comparison, water from the ocean typically contains about 33,000 ppm — mostly salt. This ancient underground cache of water has about 6,000 ppm — a chalky mix of salt and other minerals.

Reverse osmosis

The condition of that water didn't deter the authority's engineering director at the time, Richard Reynolds. Reynolds suggested a workaround: reverse osmosis — passing the water through a special membrane that removes ions, certain molecules and larger particles.

The authority's directors agreed to the plan and subsequently promoted Reynolds to general manager. Smyth succeeded him as engineering director, charged with carrying the idea forward. After nearly a decade of planning and subsequent

construction, the new facility for treating this underground water supply opened in 1999.

Reverse osmosis technology is some 50 years old, Smyth says, "but it's expensive."

When Reynolds first broached the idea of using it to treat the brackish groundwater, calculations showed it would cost more per acre-foot of liquid to extract and treat it than it would to buy the same amount from the San Diego Water Authority. But Sweetwater Authority projected that in time the price points would pass each other, making the underground supply cheaper in the long run.

"We took that risk and it paid off," Smyth says.

Growing source

The Richard A. Reynolds Groundwater Desalination Facility opened with a production capacity of 4 mgd. A new \$42 million expansion will bring the total reverse osmosis treatment capacity to 10 mgd once it comes online this year. The project is 75 percent funded through state and federal funds. The remaining \$10.7 million cost is being split 50-50 with the city of San Diego, which will get half of the new water production.

The expansion required additional treatment equipment as well as five additional wells and 19,700 feet of new pipelines, but the plant building was already large enough for the added capacity. The wells themselves cost about \$1.5 million each. "We have to use stainless steel well casings, because the brackish water is very corrosive," Smyth explains.

This alternative groundwater supply is expected to make a significant contribution to the authority's water inventory.

Demand on the Sweetwater Authority system ranges from 10 to 15 mgd in the winter to 30 to 35 mgd in the summer. In recent years, the authority has depended on water purchased from the

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San Diego Water Authority to meet that demand.

The two National City freshwater wells to which the authority has access produce only 2 mgd. Meanwhile the reservoir can't be counted on during extended dry spells: "The only way to get water in it is by rainfall," Smyth notes. "This groundwater was an added benefit — it's drought-proof."

The authority avoids over-pumping from the underground supply. California's drought-stricken agricultural Central Valley has seen firsthand the dangers, as natural underground water reservoirs run dry and give way, causing the landscape to sink in places. Authority engineers are watching their own system's use closely and consulting with the U.S. Geological Survey to calibrate how much water they should draw. "We don't want to pump more than what's being replenished," Smyth says.

Safety and maintenance

Smyth, who joined the Sweetwater Authority in 1980, just three years after its founding, says concern for safety has been built into the agency's culture from the start.

A safety committee made up of employees meets regularly to analyze accidents and other safety problems. It sets goals to reduce or eliminate chronic problems such as ergonomic strains as well as reduce hazards that could lead to acute injuries.

Changing practices enabled by new technology have helped improve safety — such as using



Utility workers **Julio Salazar (left)** and **Eric Rasmussen** dig around an existing service line after installing a new 8-inch PVC water main.

saws for cutting pavement to install new pipe instead of making workers operate body-pounding jackhammers. "It may cost you on the equipment, but it's going to save you on the workers' compensation side," Smyth says.

The authority has also been refining its maintenance practices, employing asset management strategies to schedule maintenance.

The recently concluded drought has added to the authority's challenges, reducing revenue from water sales and therefore cutting into resources available for initiatives. "It's getting harder for public agencies," Smyth says. "We've got to do more with less."

With attention to details ranging from safety to maintenance, to its developing of innovative sources for water, though, Sweetwater Authority appears to have found a way not just to do more with less — but make the most of it. ♦

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BUILDING A CULTURE OF CANDOR

Your organization may suffer from groupthink and yes-men, but you can change that mentality

By Ken Wysocky

Want a new job? Here's a quick way to get there: Express reservations about your manager's latest harebrained idea.

In fact, in too many organizations, even challenging a really bad idea can quickly get you an unsolicited seat in that course known as Resume Updating 101. Which truly is a shame, because organizations should strive for a culture of candor — a workplace where employees aren't afraid to play devil's advocate and thoroughly examine new ideas and proposals, says Dana Brownlee, a corporate training consultant.

"Almost everyone who reads this can relate to those situations where a manager — or even someone in senior management — announces their latest and greatest idea, and everyone in the room nods their heads while silently thinking, 'This is absolutely crazy,'" says Brownlee, who founded Professionalism Matters (www.professionalismmatters.com). "We all joke about it, but this phenomenon can lead to disastrous consequences — products that go to market and fail because they weren't properly vetted, or projects that consume tons of time and money, but never should've happened in the first place.

"It's very rare to have a workplace climate where people feel comfortable about raising their hand and expressing concerns," she continues. "It goes against every political instinct we have in our DNA."

How can you tell if an organization cultivates a culture of fear instead of candor? The tell-tale signs are obvious, Brownlee says. You know the drill: There's the "meeting after the meeting," where employees who smile and nod their approval as the boss announces another doozy of an idea then gather in a break room and whisper about the ridiculous proposal. She says she's even seen employees sitting in on conference calls use instant messaging to tell colleagues about a particularly wild idea being proposed.

"Or if you're attending a large, all-hands meeting and the president of the company asks if anyone has questions about a new proposal, and no one raises their hand," she adds. "If you have that many people in a room and you have zero questions, you're working in an organization with low trust." Worse yet, it convinces executives that bad ideas are viable. "They're thinking, 'Well, that went well, didn't it?'" she says.

The business world is rife with evidence of "great ideas" that became

epic fails. Does anyone remember New Coke? Betamax video format? (There's a good reason you may not.) The Apple Newton personal data assistant? The Microsoft Zune, which was supposed to compete with the iPod? (It didn't.) Or how about HD DVDs? (Blu-ray technology elbowed it aside.) The list goes on and on.

There are many reasons why employees won't tell the boss he or she has an ugly dog, so to speak. High on the list: Concern about retribution. Or they're afraid they'll be the only one to say something — even if they believe

others share their skepticism. Or perhaps they lack the confidence or conviction to express an opinion, fearing it's without merit.

On the flip side of the coin, organizational leaders often don't understand how the power of hierarchy dampens candor. They just can't fathom that people wouldn't be honest with them. Brownlee recalls one instance where she told a woman who was second-in-command at a major company that

employees feared being honest with her. "She looked at me like I had five heads. Sometimes senior executives live in a totally different reality."

Of course, everyone comes up with a loser of an idea every so often. But the problem is that senior executives have the power to make them a reality, as opposed to those at the lower end of the food chain. "So there's a responsibility at both ends," she notes. "Good leaders rely on staffs to be honest with them, so it's unfortunate when people don't speak up."

So how does one go about creating a culture of candor? On a personal level, Brownlee points out that it's not what you say when raising concerns, it's how you say it. In other words, when you're talking to your manager, don't say the idea is terrible and ask what he or she was smoking. "Instead, tell them it's a good idea, but the only concern I have is x, y and z," she suggests. "Or say, 'I know this is your baby, and I fully support it, but I've heard some rumblings that could raise red flags. Do you want me to bring those up to you or keep it to myself?' It's always good to ask for permission up front, and phrasing concerns as a question is much less threatening."

On a broader level, organizations need to let employees know that candor is a corporate value to be prized, not punished. They should encourage employees to play devil's advocate because it's better than having a

We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive team. Or ask a question about a specific issue on which you would like advice. Call editor Luke Laggis at 800/257-7222, or email editor@mswmag.com.

"It's very rare to have a workplace climate where people feel comfortable about raising their hand and expressing concerns. It goes against every political instinct we have in our DNA."

— Dana Brownlee

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customer discover a problem that should have been solved in-house. "I work with one major company where candor is not considered a negative, just something that's necessary to ensure efficient use of resources," she says.

There are a variety of techniques to make employees feel more comfortable with candor. Brownlee says one manager she's worked with puts \$5 in a jar every time one of his reports pushes back on a new idea. He then uses the money to fund a once-a-month pizza party.

When Brownlee was a team leader and project manager for a major telecommunications company, she would put an index card on every chair in a room where she was announcing a new initiative. On the card was written, 'My biggest concern about this project's success is _____. ' When she'd finish the presentation, she'd ask employees to anonymously fill in the blank and drop the card in a bag as they left the room. "This technique gave me tons of candid feedback," she explains.

In the end, changing an organization's culture can be a lot like turning around an aircraft carrier: It takes time. And it's the little things that matter, Brownlee says. "There's no real formula for changing it," she notes. "It takes a lot of role modeling by managers. It's the small things you do at the granular level that change the paradigms."

For example, she suggests that during team meetings, managers pick a rotating devil's advocate that is responsible for raising tough questions. "It might sound silly, but when you do things like that, it starts to shift the culture," she explains. "You take away the fear factor and pressure for people who don't want to push back because for that one person, it's their assigned job."

There's no denying that change is uncomfortable. But many benefits result from creating a culture of candor where employees are free to challenge assumptions and candidly address tough issues. That includes better employee engagement and retention — and more empty seats in Resume Updating 101. ♦

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WATER AND WASTEWATER AUTHORITY of WILSON COUNTY

STRIVING FOR THE BARE MINIMUM



The Water and Wastewater Authority of Wilson County crew includes (front, from left) Annette Taylor and Sharie Murray; middle: Austin Davis, Marsha Green, Debbie Scott, Chris Leauber, Chris Baenziger and Andy Adsmund; back: B.J. Baugus, Matt Lacy, Robert Boyd, Josey Smith and Jasper Smith. (Photography by Martin Cherry)

Fighting water system leaks is an obsession for the efficiency-focused staff of Wilson County

By Peter Kenter

In Wilson County, Tennessee, achieving the least is top priority.

The Wilson County Water and Wastewater Authority supplies water service to 25,000 residents, purchasing all potable water from outside sources. Since purchased water represents its single biggest expense, the authority has ramped up efforts to reduce system losses to their statistical minimum, using only free software, district metering and step testing.

Wilson County is located just east of Nashville. The authority provides water service to the eastern half of the county, excluding the cities of Lebanon and Watertown. The authority purchases treated

water from different sources, including Lebanon.

Chris Leauber is executive director of the authority and chair of the American Water Works Association's Water Loss Control Committee.

"We're always looking to control costs," he says. "When the authority was formed, it wasn't economically feasible to build our own water treatment plant. As the system continues to grow, we'd consider the possibility of building a water treatment plant and associated infrastructure, but it continues to make more economic sense to purchase water and concentrate on leak detection to lower costs."

He describes Wilson County's underpinnings

as "one solid limestone rock."

"People joke that, if you hit it with a hammer in one county, you can hear it in the next," he says. "All water main installation is done by blasting and using rock trenchers. The major failures that occur on the mainline infrastructure are typically caused by poor installation years ago, where rock in the backfill has split the PVC pipe from underneath."

A new water system

Water is distributed through 340 miles of main, ranging in diameter from 2 to 10 inches, with the majority running at 6. It's a fairly new system, with the oldest section dating back to 1975.

(continued)

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Water and Wastewater Authority
Executive Director Chris Leauber
inspects a system input meter.



Chris Baenziger
checks the ultrasonic
flow meter at a
storage tank in Wilson
County, Tennessee.

Other than one short section of ductile iron, pipes are made of PVC.

The distribution system consists of nine pumping stations and five ground-level storage facilities ranging from 50,000 to 500,000 gallons in capacity.

The authority handles all operations and maintenance on the water distribution side. The in-house staff installs 2-inch water service lines using a Grundomat horizontal boring tool by TT Technologies. Larger construction projects are typically outsourced.

Initial surveys

The earliest leak surveys on the system were conducted in the early 1990s under the Tennessee Energy and Water Conservation Program. "I was the project manager as a member of the consulting firm that was awarded the contract to conduct water audits across the state, and Wilson County was the first system we inspected," Leauber says.

Sonic leak detection drove the program, and the utility quickly adopted the technology for

ongoing inspections. Leauber joined the authority in 2006.

"When they originally brought me on as assistant executive director, it was primarily because of my expertise in water loss control," he says. "Then as now, the overall condition of the infrastructure was in good shape. It's the cost of water supply that's driving further efficiency in leak detection and repair."

The best things in life are free

The authority uses the free Water Audit Software provided by the AWWA, a regulatory requirement in the state of Tennessee. This software calculates the utility's infrastructure leakage index (ILI) — total system losses divided by unavoidable system losses. It also uses the AWWA Water Audit Software Compiler, which provides year-to-year analysis and comparisons of water loss records.

"District metering was one of the first concepts we implemented to drive efficiency," Leauber says.

District metering requires the water system to be divided into discreet district metered areas

"Establishing DMAs can reduce the time required to isolate a leak to just a day instead of having to check the entire system over possibly months."

— Chris Leauber

(DMAs) that are relatively easy to isolate from the system using the fewest shut-offs.

"Establishing DMAs can reduce the time required to isolate a leak to just a day instead of having to check the entire system over possibly months," says Leauber.

The authority has already recorded benchmark minimum night flow data for each of the system's 21 DMAs, which typically occurs between 1:30 and 3:30 a.m. Legitimate nighttime consumption averages 1.5 gph, per connection. The SCADA system generates a call to on-duty personnel if it detects major system demand exceeding the minimum night flows in any DMA.

"You don't always assume it's a leak," says Leauber. "It could just be unusual consumer demand, such as filling a swimming pool. If the flows exceed the benchmark, and we feel it involves leakage, we'll go through a process called step testing. Our standard operating procedure includes the GIS data required to locate the mainline valves we need to shut in sequence to reduce flows by the exact amount required to match the volume of the leakage. We try to do this for no more than five minutes, because you don't want to depressurize the system."

(continued)



PROFILE:

**Water and Wastewater
Authority of Wilson County,
Tennessee**

YEAR ESTABLISHED:
1975

POPULATION SERVED:
25,000

AREA SERVED:
323 square miles

DEPARTMENT STAFF:
13

INFRASTRUCTURE:
Water — 340 miles, sewer — 14 miles

**ANNUAL DEPARTMENT OPERATING
BUDGET, SEWER AND WATER (2015):**
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“We have a goal that everybody who touches our water infrastructure is a certified operator. It elevates their capabilities and knowledge level.”

— Chris Leauber

For large leaks, step testing will be conducted during the day. For minor leaks, crews will hold off until the next night's minimum flow period. That's because it's easier to measure the smaller leakage during the minimum night flow period when the ratio of leakage to total flow is greater than during the day.

Knowledge is power

While the valves are identified through GIS, crews still need to apply their training to manipulate the valves to counterbalance the leakage. Leauber and the authority's project manager are state-certified distribution operators, as are four of the six members of the field crew — the other two are studying for their exams. “We have a goal that everybody who touches our water infrastructure is a certified operator,” he says. “It elevates their capabilities and knowledge level.”

Typically, the leak is isolated first to a DMA and then to a shorter length of pipe in a few hours. From there, crews look for an actual leak, starting with visual inspection. If no leaks are visible, the next step is to use direct contact sounding on system valves, hydrants and customer service lines. PVC is less conductive to leak sounds, so ground microphones can also be used to locate leaks within a radius of a few feet. Crews most commonly use the Heath Aqua-Scope, which can provide both ground and direct contact miking.

Crews also look at other evidence of leaks, including unusual flows to and from storage tanks or increased flows in pump stations via flowmeters.

“Even though we use telemetry, we keep flow-

meters installed outside in the open,” Leauber says. “We like the ability to drive up and read the meter manually. If someone is manually operating a valve, the SCADA system does not always reflect the changes instantaneously, but a crew member can monitor the meter in real time.”

One-man step test

The procedure has been refined to “one-man step testing.” The process requires an extremely accurate flowmeter — the authority has used the electromagnetic evoQ4 by Elster, which provides flow data to a local read-out and to the SCADA system via telemetry. Pressure data is also collected and transmitted.

“Most meters put out a pulse for every 100 gallons of flow,” says Leauber. “That's not fast enough to perform a step test in under five minutes. The evoQ4 puts out a pulse for every one gallon of flow. We worked with Verizon to find a black box that would allow crew members to communicate directly with the meter via smartphone text service to get instantaneous readings.”

By simultaneously adjusting valves and reading the meter via smartphone, step testing is reduced to a one-person operation.

Leauber notes that the authority squares the approximate \$5,000 cost of retrofitting real-time telemetry on an existing DMA meter against the cost of lost water from an unlocated leak. The payback period amounts to just a few months.

“Once we locate a leak, it's generally easy to excavate into the existing limestone trenches to make a repair,” Leauber says. “Only if the pipe is lying on the bottom of the trench do we have to hoe ram a little rock underneath the pipe to complete a clamp repair. In many cases, we get the leak repaired without any noticeable service interruption to the customer.”



B.J. Baugus uses an Aqua-Scope leak detector to help pinpoint a leak in the Wilson County water system.

FIVE SIMPLE STEPS TOWARD DEVELOPING A WATER LOSS CONTROL PROGRAM

Here are five steps designed to help any water utility to reduce avoidable water loss, courtesy of Chris Leauber, executive director of the Water and Wastewater Authority of Wilson County, Tennessee:

1. **Use** the free American Water Works Association water audit software to determine the utility's Infrastructure Leakage Index and other performance indicators.

2. **Consider** having a completed water audit validated by a knowledgeable third party who can check to see if the methodologies used to collect data are sound. For example, if you're not checking your

input meters for accuracy on a regular basis, all the data that follows may also be inaccurate. Don't make investments to correct water loss unless you're confident that the data is free of major errors.

3. **Analyze** the two categories of water loss identified by the Water Audit Software. “Apparent loss” is typically the result of inaccurate customer meters. That may require some field testing of sales meters. “Real loss” is a reflection of system leakage. Look at leak detection programs that can reduce water loss.

4. **Make sure** that the increase in water revenue gained by reducing apparent loss and the decrease in water costs from a leakage control program are cost-effective. The Water Research Foundation's free Leakage Component Analysis software will help identify a target ILI that's cost-effective.

5. **Monitor** system losses on an ongoing basis. The AWWA's free Water Audit Software Compiler provides year-to-year analysis and comparisons of water loss records.

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Down to the minimum

Using these simple tools and procedures, Wilson County often achieves an ILI of just 1.0 — the technically achievable minimum in any system.

However, Leauber cautions utilities that each situation is different. Utilities must set an ILI goal that includes an economic analysis to determine the cost of achieving that goal against the actual cost of lost water. Another free tool, the Water Research Foundation's Leakage Component Analysis software, will help identify a cost-effective ILI target against the cost of water loss control and pressure management programs.

"A leakage control program is an investment," he says. "That makes pursuing water loss a delicate fiscal balancing act. While nobody wants to waste water, the economic goal of a good leak detection program is to achieve an ILI that maximizes the amount of water we can provide while delivering water to customers for a reasonable price." ♦

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Left: B.J. Baugus does a remote check on a flow meter from his smartphone. Above: Andy Adsmond uses a backhoe to backfill around a pipe after repairing a leak.

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	Rotodrill	Cleaning blocked pipes, frozen pipes, heavy debris	2" - 14"	13 to 80	2,000 - 4,000	0.25 lbs. to 1.5 lbs.	1	6	1/2" - 1"
	Grenade	Flushing heavy debris	6" - 12"	40 to 80	2,000 - 3,600	11 lbs.		10	1"
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	10.125TR Chain Scraper	Root removal, hard grease, hard deposits	5" - 12"	14 to 80	2,000 - 3,600	6 lbs.		6	1"
	10.200R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits	8" - 16"	50 to 80	2,000 - 3,600	78 lbs.		6	1"
	10.400R Rotating Chain Scraper	Removal of root masses, clogs, hard deposits	16" - 32"	80 to 120	2,000 - 3,600	105 lbs.		6	1"
General PIPE CLEANERS General Pipe Cleaners 1101 Thompson Ave., McKees Rocks, PA 15136 800-245-6200 412-771-6300 www.drainbrain.com info@drainbrain.com	14.200 Milling Cutter	Removal of concrete & mineral deposits, dropped liners	8"	80 to 120	2,000 - 2,200	70 lbs.		6	1" - 1 1/4"
	Bulldozer 50.100G	Flushing debris from large pipe	16" - 40"	40 to 80	2,000 - 3,600	57 lbs.	1	8	1"
	Chisel Point Nozzle	Penetrating, breaking up debris	4" - 10"	12	2,500	4 oz.	4	6	1/2"
	Traction Nozzle	Sand and mud removal	4" - 10"	12	2,500	8 oz.	1	6	1/2"
	Cleaning Nozzle	Maintenance Cleaning	4" - 10"	12	2,500	12 oz.		8	1/2"
	Spring Leader Nozzle	Guiding hose around tight bends	2" - 10"	1.5 to 8	1,500 - 3,000	4 oz.		3 to 4	1/8" - 1/4" - 3/8"
	Downhead Nozzle	Dropping down T's	2" - 4"	1.5 to 4	1,500 - 3,000	2 oz.		3	1/8"
	Chain Saw Nozzle	Cutting roots	4" - 10"	4 to 12	2,500 - 3,000	2 lbs.		2 to 4	3/8" - 1/2"
 NozzTeq Inc. 1949 Calumet St. Clearwater, FL 34698 866-620-5915 603-413-6583 (f) 603-413-6744 www.nozzteq.com info@nozzteq.com See ad page 46	Rotary Nozzle	Scour pipe walls clean	2" - 10"	1.5 to 12	1,500 - 3,000	2 oz. to 10 oz.		2 to 4	1/8" - 1/4" - 3/8" - 1/2"
	BL Swiper™ (Med)	Reduce blown toilets and safe in lined pipes	8" - 18"	15 to 250	400 - 4,000	3 lbs.		4	1/2" - 3/4" - 1" - 1 1/4"
	HAMMERHEAD™	High performance sewer cleaning or storm water cleaning	6" - 12"	5 to 80	400 - 4,000	4 lbs.		4	1/2" - 3/4" - 1"
	Multi-Global Nozzle™	Sewer and pipe cleaning for penetration	2" and Up	4 to 170	400 - 4,000	2 lbs.	4	6	1/2" - 3/4" - 1" - 1 1/4"
	JAWS®	High performance sewer and pipe cleaning heavy debris	6" - 30"	30 to 265	400 - 4,000	7 lbs.		5	1/2" - 3/4" - 1" - 1 1/4"
	IceBear Penetrating Nozzle™	Sewer and pipe cleaning penetrating nozzle	1" and Up	4 to 170	400 - 4,000	1 - 3 lbs.	3		1/4" - 1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
	C-RAY 200™	Bottom cleaning for sewer and pipe	12" - 36"	30 to 265	400 - 4,000	22 lbs.	1	6	1/2"
	C-RAY 400™	Bottom cleaning for sewer and pipe	15" and Up	40 to 350	400 - 4,000	42 lbs.	1	8	3/4" - 1" - 1 1/4" - 1 1/2"
	BL Swiper™ (large)	Ventura effect type nozzle to clean with water in the line and sucks the water down	15" and Up	40 to 265	400 - 4,000	13 lbs.		39	
	Spinner Nozzles (No rebuilds)	Grease and other obstructions	4" and Up	14 to 350	400 - 4,000	3 - 15 lbs.	2		1/2" - 3/4" - 1" - 1 1/4" - 1 1/2"
	Goblin Grease Eater™	Grease nozzle sewer lines or storm lines	6" and Up	40 to 350	400 - 4,000	12 lbs.	1	10	3/4" - 1" - 1 1/4" - 1 1/2"
	NATAB	Penetration with sewer and pipe cleaning	4" - 12"	5 to 50	400 - 4,000	3 lbs.	1	4	1/2" - 3/4"
	BL Swiper™ (Small)	Helps reduce blown toilets with 1/2" and 3/4" units	4" - 12"	10 to 80	400 - 4,000	2 lbs.		4	1/2" - 3/4"
	MONRO-JET®	Hydro-Excavation	2" - 8"	3 to 20	2,000 - 36,000	2 lbs.	1		1/2"
	ORCA™	Two truck operation at either end of the pipe	15" - 60"	40 to 350	400 - 4,000	15 lbs.		8	3/4" - 1" - 1 1/4" - 1 1/2"
	Missile Nozzle	Heavy duty cleaning with optional front jet	6" - 36"	40 to 265	400 - 4,000	10 lbs.	4	6	3/4" - 1" - 1 1/4" - 1 1/2"
	Golden Nozzle	Recycled water use with our same tube system technology	6" - 36"	40 to 265	400 - 4,000	6 lbs.	1	6	3/4" - 1" - 1 1/4" - 1 1/2"
	C-RAY 800™	Dual truck operation for double the flow for large pipes	36" - 96"	120 to 350	400 - 4,000	50 lbs.		8	3/4" - 1" - 1 1/4" - 1 1/2"

MANUFACTURER	NAME OF NOZZLE	APPLICATION	PIPE DIAMETER	FLOW RATE (GPM)	MAX OPERATING PRESSURE (PSI)	WEIGHT	NUMBER OF AVAILABLE FRONT JETS	NUMBER OF AVAILABLE REAR JETS	HOSE SIZE / CONNECTING THREAD
Sewer Equipment 1590 Dutch Rd. Dixon, IL 61021 888-477-7611 (f) 815-284-0453 www.sewerequipment.com sales@sewerequipment.com See ad page 37	Mini Missile	General Cleaning	3" - 12"	18 to 80	0 - 4,000	5 lbs.	1	3	1/2" - 3/4" - 1"
	Weisel	General Cleaning	3" - 15"	18 to 80	0 - 4,000	2 lbs.		8	1/2" - 3/4" - 1"
	Dual Degree	General Cleaning	4" - 18"	18 to 80	0 - 4,000	5		8	1/2" - 3/4" - 1"
	Tri-Star	Penetrating	3" - 24"	18 to 80	0 - 4,000	3	4	6	1/2" - 3/4" - 1"
	Avanti	Penetration - Rotational	3" - 24"	18 to 80	0 - 4,000	4		6	1/2" - 3/4" - 1"
	RDS	Heavy Cleaning	3" - 28"	18 to 150	0 - 4,000	4		6	1/2" - 3/4" - 1" - 1 1/4"
	Mega 5 & 6	Flushing	12" - 120"	18 to 80	0 - 4,000	35		11	1/2" - 3/4" - 1" - 1 1/4"
	HW	Flushing	4" - 18"	18 to 55	0 - 4,000	3		8	1/2" - 3/4" - 1"
	Combi	Cutting	4" - 24"	18 to 80	0 - 4,000	6	3	6	1/2" - 3/4" - 1"
	Patriot 1	Root & Grease Cutting	4" - 24"	40 to 80	0 - 3,000	25		5	3/4" - 1"
Sewer Pro Shop 1700 Enterprise Way, Ste. 116 Marietta, GA 30067 877-864-9394 470-592-1717 (f) 770-984-2802 www.sewerproshop.com info@sewerproshop.com See ad page 19	Stealth	General Sewer Cleaning	8" - 24"	60 to 80	2,000 - 2,000	17.7		8	1"
	Emperor	Cleaning & Traction in large Sewer/Storm lines	12" - 32"	60 to 80	2,000 - 2,000	19.9		12	1"
	Typhoon	Grease, light roots, light mineral deposits	4" - 12"	18 to 80	2,000 - 4,000	3, 11.4, 11.8		6	1/2" - 3/4" - 1"
	Raptor	Total blockages & obstructions caused by organic material	6" - 16"	18 to 80	2,000 - 4,000	2.5, 5.5, 6	3	3, 6	1/2" - 3/4" - 1"
	Penetrator	Pipes with small voids	6" - 16"	50 to 80	2,000 - 3,000	15.5, 16	1	8	3/4" - 1"
	Paver Pull	Hilly, difficult terrain		16 to 80	2,000 - 4,000	1.6, 8.8, 9.0		8	1/2" - 3/4" - 1"
	Antiblower	Shallow & sewer lines close to homes	6" - 16"	40 to 80	2,000 - 3,000	8.8, 9.0	1	8	3/4" - 1"
	General	Preventative maintenance, all-around cleaning	4" - 16"	16 to 80	2,000 - 4,000	1.6, 8.8, 9.0	1	8	1/2" - 3/4" - 1"
	Spear	Blockages, total obstruction	8" - 24"	50 to 120	2,000 - 3,000	6.2	4	6	3/4" - 1"
	Big Foot	Large debris, sand, silt, sludge	12" - 72"	60 to 80	2,000 - 2,000	33, 39, 53, 56		6, 8, 10, 14	1"
StoneAge, Inc. 466 Skylane Dr. Durango, CO 81303 866-795-1586 970-259-2869 www.sewnozzles.com bill.shires@stoneagetools.com See ad page 31	Warthog WGR Magnum	Sewer Jetting	8" - 36"	50 to 80	1,500 - 5,000	13	1	4	1"
	Warthog WG-1	Sewer Jetting	8" - 36"	50 to 80	1,500 - 5,000	10	1	4	1"
	Warthog WGP-1	Sewer Jetting	8" - 36"	50 to 80	1,500 - 5,000	10	1	4	1"
	Warthog WHP	Sewer Jetting	6" - 18"	15 to 50	1,500 - 4,000	4	1	2	1/2" - 3/4"
	Warthog WH	Sewer Jetting	6" - 18"	10 to 45	1,500 - 8,000	4	1	2	1/2" - 3/4"
	Warthog WS - 1/2	Sewer Jetting	4" - 8"	8 to 20	1,500 - 5,000	3	1	2	1/2"
	Warthog WT - 3/8	Sewer Jetting	3" - 6"	5 to 12	1,500 - 5,000	1	1	2	3/8"
	Warthog WV - 1/4	Sewer Jetting	2" - 4"	3 to 8	2,000 - 5,000	1	1	2	1/4"
	Warthog WD 1 - 1/4	Sewer Jetting	8" - 36"	80 to 120	1,500 - 5,000	11	1	6	1 - 1/4"
USB-Sewer Equipment Corporation 1700 Enterprise Way, Ste. 116 Marietta, GA 30067 866-408-2814 770-984-8880 (f) 770-984-2802 www.usbsec.com info@usbsec.com	Flying Nozzle - 3D	Hilly difficult terrain: Silt, Sand & Large Debris Removal	4" - 24"	13 to 120	2,000 - 4,000	1, 2, 5, 12 lbs.		6, 8	1/2" - 3/4" - 1" - 1 1/4"
	Cleaning Nozzle - 3D	General Cleaning of Sand, Silt, Mud & Grease	4" - 15"	13 to 80	2,000 - 4,000	1, 2, 5, 7.5 lbs.	1	8, 10	1/2" - 3/4" - 1"
	Pipe Wolf	Total obstructions & Blockages caused by Roots, Grease & Organic Solid Material	4" - 24"	15 to 120	2,000 - 4,000	2.2, 5.8, 12.8 lbs.	3	6	1/2" - 3/4" - 1" - 1 1/4"
	Primus Nozzle	Grease, Scale, Crusts & Roots	4" - 24"	15 to 120	2,000 - 4,000	4, 7, 7.5, 19 lbs.	5	3, 4, 5	1/2" - 3/4" - 1" - 1 1/4"
	Superior Penetrator Nozzle - 3D	Pipe lines w/off-sets, drop joints, voids, etc.	6" - 15"	30 to 120	2,000 - 3,000	9.8 lbs.	1	8	3/4" - 1" - 1 1/4"
	Dredger Nozzle	Removal of heavy solids, silt, sand & sludge at the bottom of pipe	12" - 96"	40 to 120	2,000 - 3,000	22, 40, 56, 59 lbs.		6, 8, 10, 14	3/4" - 1" - 1 1/4"
	Antiblaster Nozzle - 3D	Shallow sewer lines, Sewer lines close to homes	6" - 12"	30 to 80	2,000 - 3,000	4 lbs.	1	8	3/4" to 1"
	Ultimate Chisel Nozzle	Total obstructions, blockages & pipe deformations	6" - 24"	50 to 120	2,000 - 3,000	5.2 lbs.	4	6	1/2" - 3/4" - 1" - 1 1/4"
	Grand Slam - 3D	General Sewer Cleaning	6" - 15"	50 to 120	2,000 - 3,000	12 lbs.		8	3/4" - 1" - 1 1/4"
	Super Slam - 3D	General Cleaning in large sewer/storm lines	10" - 40"	60 to 120	2,000 - 3,000	15 lbs.		12	3/4" - 1" - 1 1/4"
Vactor Manufacturing 1621S Illinois St. Streator, IL 61364 800-627-3171 815-672-3171 (f) 815-672-2779 www.vactor.com sales@vactor.com See ad page 3	HXXpose	Hydroexcavation		3 to 12	1,000 - 3,000			1	1/2" NPT
Water Cannon Inc. 4300 W Lake Mary Blvd., Units 1010-424, Lake Mary, FL 32746 800-333-9274 (f) 888-928-9274 www.watercannon.com sales@watercannon.com See ads page 7, 49	AquaNoz	Sewer Jetting	1" - 8"	2 to 20	1,000 - 7,000		1-6	3-10	1/4", 1"

2017

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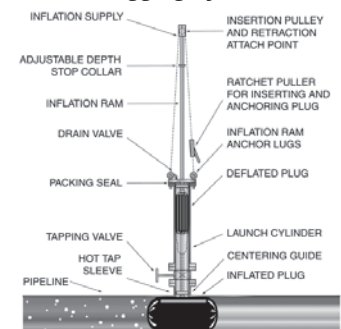
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THE COMPLETE PICTURE

FlowView pulls flow, level and rainfall data together in an intuitive system that makes managing your collections system much easier

By Luke Laggis

It's Saturday evening. You're out for dinner but there's a big storm rolling through. Do you know what's happening in your collections system, and will you be able to respond to changing conditions before they grow out of control?

You can have monitors collecting data all over your system, but if you can't pull all that information together and view it in real time, you might just be watching a disaster happen instead of preventing it.

That's why ADS has developed FlowView, a web application built to support management, engineering and operational decisions. FlowView con-

nects clients to an ADS monitoring network, delivering near real-time operational intelligence on the status of the wastewater collections system.

We recently spoke with ADS product manager Kevin Enfinger about the new application and what it can do to improve operations for wastewater utilities.

MSW: What is the philosophy behind the development of FlowView?

Enfinger: The philosophy behind FlowView is simple: put flow monitor, level monitor and rainfall monitor data from wastewater collections systems at your fingertips in an accessible, easy-to-use manner so you can manage your collections system effectively.

MSW: Can you give me an overview of the system's capabilities?

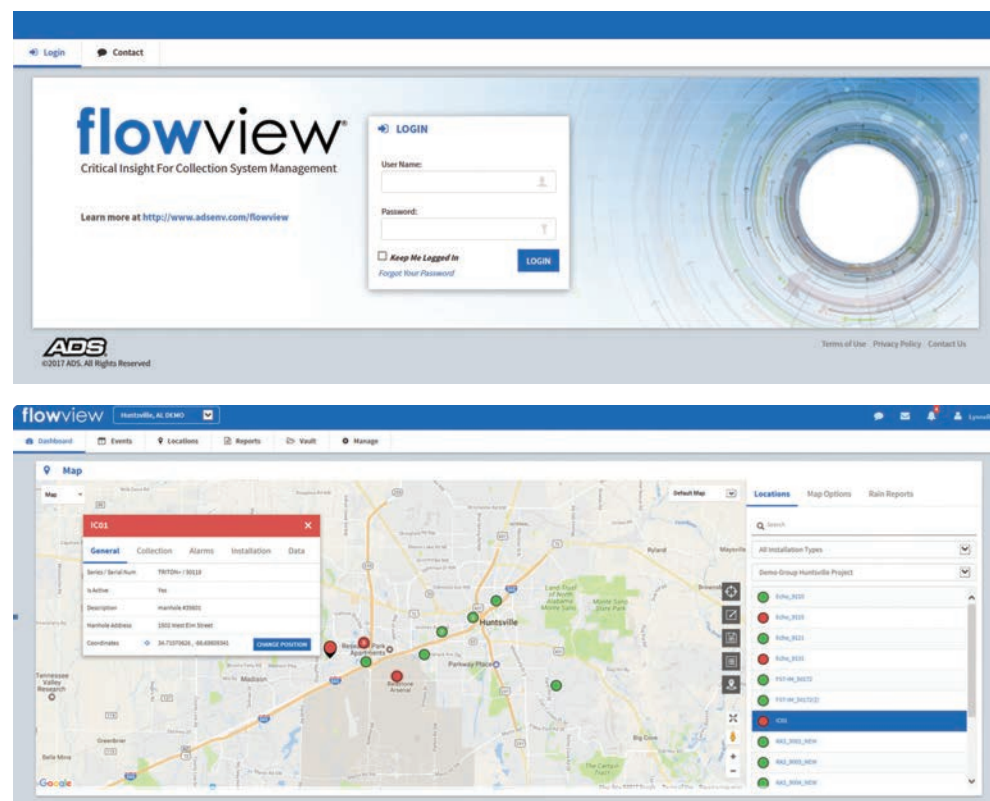
Enfinger: FlowView connects clients to an ADS monitoring network, delivering near real-time operational intelligence on the status of the wastewater collections system. This state-of-the-art system provides knowledge and early detection of potential problems. It offers dynamic analytical functions for fueling discoveries that will lead to enhanced management of the sewer collections system. FlowView performs data retrieval, storage, alarm management and information presentation functions.

MSW: What are the advantages of this software platform over other available options?

Enfinger: FlowView offers seamless integration with ADS monitors and is designed to provide near real-time delivery of a variety of alarms. Alarms can be configured for low level, full pipe, high level, high-high level, and overflow conditions, as well as flow loss alarms. In addition, device status alarms including low battery alarms and tilt alarms (for ADS ECHO-level alarms) can also be configured.

MSW: What types of system monitoring devices can be integrated with the platform?

Enfinger: FlowView integrates data from wireless ADS flow monitors, level monitors and rainfall monitors.



FlowView puts flow, level and rainfall monitor data from wastewater collections systems at your fingertips in an accessible, easy-to-use dashboard that makes system management more efficient.

TECH CLOSE UP

PRODUCT:
FlowView

MANUFACTURER:
ADS LLC
800/633-7246
www.adsenv.com

APPLICATION:
Web application built to support management, engineering and operational decisions

BENEFITS:
Delivering near real-time operational intelligence on the status of the wastewater collections system.

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MSW: Is this platform compatible with flow monitoring equipment from other manufacturers?

Enfinger: No. Although historical data from other flow monitoring equipment from other manufacturers can be imported into FlowView, the application is designed primarily to work with ADS monitors.

MSW: How is real-time information from system infrastructure relayed to the system?

Enfinger: Scheduled data transfers and asynchronous alarm events are relayed to FlowView via 3G/4G wireless communications.

MSW: Walk me through the setup for a typical utility.

Enfinger: FlowView setup is performed by ADS. The process is simple and painless.

MSW: How is information stored and shared between users?

Enfinger: Monitor data is archived in a web-accessible database, eliminating the need to store, back up or organize flow monitor data. Leverage the data within FlowView using existing reports and graphs, or export data as needed to other applications such as hydraulic models and spreadsheets.

MSW: What's the biggest advantage of pulling all of this information into a single dashboard view?

Enfinger: The centerpiece of the FlowView Dashboard is a feature-rich map interface. Of all of the displays we use in our daily lives, people can most readily relate to a map. At a glance, the map interface lets FlowView users see not only where their monitors are located, but also their alarm status. Supporting information is also close at hand, just a click or two away. The map-based dashboard interface is intuitive and easy to use. You can quickly assess system conditions and drill down to sites with alarm conditions.

FlowView helps operators understand capacity-related concerns with percentage-full reporting and graphics. It facilitates routine reporting for billing networks, regulatory reporting and more. It also gives your engineers and engineering consultants direct access to monitor data for engineering planning and design efforts.

MSW: Are all of the dashboard's capabilities available when users receive system alerts on mobile devices?

Enfinger: FlowView users can receive system alerts via text message, email, or directly through the FlowView web application. System alerts can be acknowledged or cleared via the FlowView web application viewed on any of the most commonly used modern web browsers, including those used on iOS and Android devices.

MSW: How is system monitoring improved with FlowView?

Enfinger: Flow, level and rainfall monitors generate a tremendous amount of data. FlowView improves system monitoring by managing this data and placing it at people's fingertips to keep a pulse on conditions within the system and react to developments as they occur. Insight is provided through the map interface, as well as a variety of easy-to-use reports and graphs.

MSW: Is the platform aimed at larger utilities, or can it still be cost-effective for small utilities?

Enfinger: The FlowView platform works for utilities of all sizes. It's a web application and is priced with a setup fee and a monthly fee thereafter, based on the number of monitors configured in FlowView.

MSW: What sort of support does ADS provide?

Enfinger: ADS provides support to its clients in a variety of ways. Technical support for FlowView is provided by our support center. ♦

TRACKING THE PULSE OF TRENCHLESS TRENDS

Sharing relevant industry information assists contractors and system owners with planning and identifying areas of opportunity

By *Ted DeBoda*

Every year we ask our members one very important question: "Why are you a member of NASSCO?" We ask this question because we know that we must stay relevant in order to achieve our mission to set standards for the assessment, maintenance and rehabilitation of underground infrastructure, and to ensure the continued acceptance and growth of trenchless technologies.

NASSCO members tell us they join the association for the educational opportunities, the ability to network with peers, and to have a voice in setting standards through our various committees. As a result, we continually seek opportunities to deliver on these expectations and uncover other value-drivers of NASSCO membership.

This year, we have introduced Pulse by NASSCO, a free new benefit that provides NASSCO members with an understanding of market potential for rehabilitation projects across the U.S. In partnership with Bid Ocean Inc., NASSCO now offers its members the ability to take a pulse on the market potential for rehabilitation technologies, including five key work types: CIPP, lateral rehabilitation, manhole rehabilitation, grouting and CCTV inspection. While the work types covered may increase in the future, we wanted to jump-start the program with a strong focus on these core technologies.

Members will have access to an accumulating database for all projects in all EPA regions beginning in 2013, including the total value of rehabilitation completed for the five key technologies and the total number of projects completed using those technologies. Periodic overviews of these five work groups, which make up a nearly \$10 billion industry segment, will also be provided to NASSCO members. Information will be broken down by individual trenchless technology for all EPA regions. Regional overviews, focused on one EPA region and drilled down to state revenue levels in the five work types, along with state-by-state project trends, will also be accessible by NASSCO members as part of their membership.

We believe this type of information is critical for our industry to grow. It provides contractors, engineers, manufacturers and municipalities access to vital information that affects us all. Understanding market trends by using technology assists contractors and system owners in projecting capital spending needs, planning crew utilization, budgeting appropriately and identifying areas of opportunity. Tracking this valuable data over time will also enable us to collect, evaluate and utilize baseline information to gain a better understanding of industry trends and growth opportunities for years to come. To learn more about Pulse and to become a NASSCO member, visit www.nassco.org. ♦

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PACP TRAINING

April 4-6

Northville, Michigan

Includes Manholes and Laterals!
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Trainer: Brandon Conley
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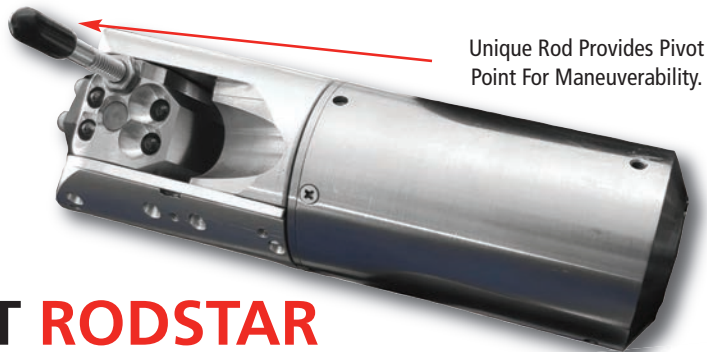
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Contact one of the trainers listed above if you are interested in having a class at your facility or in your area.

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NEW PIPELINE INSPECTION INNOVATIONS FROM RST



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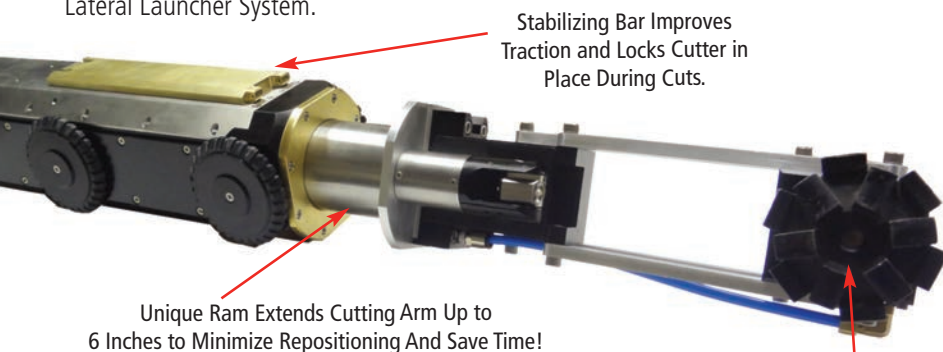
This state-of-the-art camera offers pan-and-tilt capabilities and is designed with a unique rod that provides an important maneuvering advantage when accessing different pipe sizes and negotiating T and Y junctions. The rod is used to pivot the camera head to help the probe change directions and angles within the lateral to overcome common obstacles that stop ordinary cameras in their tracks. The camera is deployed from RST's popular Mainline and Lateral Launcher System.



Inspect Laterals Up To 150 Feet From RST's Mainline and Lateral Launcher System

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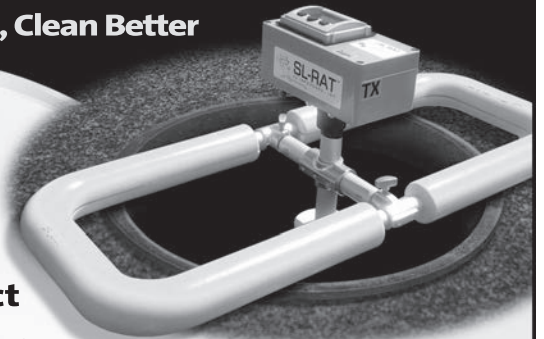
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VACUUM EXCAVATION — A HISTORY LESSON

Technology has advanced from the gold rush to underground utility work

By Jason Proctor



Reduced noise and a smaller footprint make hydroexcavation a more manageable approach for projects in residential areas.

Vacuum excavation has long been an essential practice on job sites across the globe. Every underground construction operator, large or small, seeks to keep crews safe and projects profitable. In a modern, competitive industry, finding the right machine to balance these needs can be difficult.

From damage prevention to fluid cleanup on horizontal directional drilling projects, vacuum excavation saves operators time and helps improve safety. Understanding the transformative history of these machines will arm today's contractors with an appreciation for the technology and provide insight into how they're transforming today's underground construction industry.

Underground origins

The history of vacuum excavation stems from the use of hydroexcavation as far back as the late 1800s, when pressurized water was used for mining purposes in the U.S. Breaking up soil using pressurized water created a cleaner and safer way to dig. From there, hydroexcavation expanded as a method used on underground construction sites throughout most of Canada and the U.S.

Beyond hydroexcavation, the modern "vac" machine can be traced back to cleanup duties and sewer applications beginning in the 1950s. As technology progressed and new innovations took hold, vacuum trucks became a fixture on HDD sites, where they proved effective in cleaning up drilling slurry and fluids exposed at the entry and exit pits on these HDD projects. This method aided operators by improving their visibility of buried utilities and providing an efficient method of fluid disposal.

After their introduction, vacuum excavators found continued heavy usage in Canada through the 1990s and into the present. The industry began to grow significantly in the late 1990s as several equipment manufacturers began entering the market with both truck- and trailer-mounted models to fit a growing demand for hydroexcavation in a variety of locations across North America.

Innovative applications

At the turn of the 21st century, the demand for vacuum excavation led to new designs focused on improving performance on a variety of job sites. Reduced noise, for example, supported the excavators' growing use in residential neighborhood projects. Innovations within nozzle technology focus on increasing digging capability while reducing damage to underground utilities. Larger tank capacities kept machines on job sites longer and provided greater hauling capacity, improving contractor profitability. For example, some municipal operators improved time savings by nearly 50 percent with larger tank sizes.

(continued)



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Due to the increased time and costs savings from not having to dispose of spoils, the productivity and efficiency of air excavation has proved significant for many operators.



Hydroexcavation is a fail-safe method for pinpointing buried utilities without the risk of damage.

Additionally, the machines evolved to fit smaller job site needs as well. Compact units featuring smaller tanks improved ease of use and maneuverability in tight work areas while other, larger models kept operators productive on bigger, more time-intensive projects.

Beyond mechanical updates, today air excavation has found a new prominence. For years, many contractors dismissed the effectiveness of air excavation. Due to the increased time and cost savings from not having to dispose of spoils, the productivity and efficiency of air excavation has proved significant for many operators. Unlike hydroexcavation, which requires access to water, air excavation keeps machines running and operators profitable without costly trips to acquire water or dispose of spoils.

And, just as the applications for vacuum excavation have evolved, so have the safety regulations. While there is not a consistent set of regulations for all states or countries today, several regulations are focused on responsible digging practices. In the U.S., mechanical excavation is prohibited within a "safe zone" on an underground construction job site, creating an opportunity for the use of vacuum excavation for damage prevention.

Vacuum excavators have been used for damage prevention since the 1980s, however, this role for today's vacuum excavator took off around 2010 as efforts were being made to avoid damaging existing underground utilities. This concentrated effort is spearheaded by the Common Ground Alliance, which reported 363,176 underground events in the U.S. and Canada in 2015. New innovations and machine designs continue to aid vacuum excavation contractors in revealing hidden utilities and preventing damage to utilities on the job.

Trends and predictions

The market for vacuum excavation is expanding in all directions. Every customer has a unique need thanks to the versatility of these machines and advancements in newer technology. As more vacuum excavators are used for damage prevention and utility location around the U.S., market demand is accelerating the need for these machines. The Pipeline and Hazardous Materials Safety Administration found that since 2005, excavation damage is the leading cause of pipeline accidents. This has created additional incentives to use vacuum excavators for utility locating of all sizes.

Today, manufacturers are focused on enhancing operator safety in their machine designs. Operating a vacuum excavator has long required physical demands, including a need to connect and hold various hoses throughout a job. Recent developments are focused on improved ergonomic designs to help keep operators safe and comfortable on the job site.

In addition to operator safety improvements, damage prevention is increasingly critical in areas around the country. Underground construction operators will continue to rely on vacuum excavators to pothole and safely locate hidden utilities, and to help minimize cross bores. And as fiber build-out and utility expansion continues, vacuum excavators will play an integral role in uncovering, digging and cleaning up these jobs. ♦

About the Author

Jason Proctor is the vacuum excavation product manager for Ditch Witch.

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HYDROEXCAVATION AND INDUSTRIAL JET/VAC SERVICES

By Craig Mandli

HYDROEXCAVATORS/AIR EXCAVATORS

1. Ditch Witch FX65

The **Ditch Witch FX65** vacuum excavator has advanced airflow at 1,215 cfm — 20 percent more than the FX60 Model. Powered by a 74 hp turbo-charged Deutz diesel engine, it is designed for super-sized cleanup jobs. It offers 500-, 800- or 1,200-gallon vacuum tanks and 200-, 300- or 500-gallon water tanks. Additionally, the machine has an advanced three-stage filtration system with a cyclonic filter, which cleans the air prior to reaching the filter. **800/654-6481; www.ditchwitch.com.**

2. Foremost 1600 Hydrovac

The **Foremost 1600 Hydrovac** has a heated 42-inch van body and is recommended for both urban and industrial applications. It allows for water capacities of 1,600 gallons and a 13-yard debris body. The Robuschi RBDV125 blower provides vacuum power. The Cat 3560 wash pump and 740,000 Btu boiler are also used on this model. The boom is rear-mounted, 8 inches in diameter, fully rotational and controlled by an OMNEX wireless controller, which also controls the vehicle rpm, wash and vacuum functions. All off-loading functions can be performed via the remote, and are performed via a sloped debris floor design and washout system. The dump door is 48 by 58 inches, providing a large area to allow for tank cleaning. Optional 4-inch Hydra-Tech off-loading pump systems are available, which allow for pumping off in a contained manner when discharging liquid loads. Complete winterization is standard. **403/295-5800; www.foremost.ca.**

3. OX Equipment MTS GmbH Dino 3

The **MTS GmbH Dino 3** suction excavator, distributed by **OX Equipment**, uses dry suction technology to excavate without the use of water, eliminating

issues related to wet slurry disposal as well as overweight loads. Its twin fan system generates over 24,000 cfm. The large 10-inch-diameter suction hose, which extends up to 30 feet off the back of the truck, is precisely manipulated via a mechanical power arm. The functional side-tipping feature allows for fast, efficient and easy dumping from the 10-cubic-yard spoils container, either directly on site or into roll-off bins, allowing the unit to stay on site all day to increase productivity. **888/290-4044; ox-equipment.com.**

4. Presvac Hydrovac

The **Presvac Hydrovac** is a versatile hydroexcavator designed for cold weather operation with optional full compliance with DOT specifications for collection of transportation of hazardous materials. The high-vacuum blower allows extraction of all types of soils, gravel, rock, clay, water and silt material, with knockout features in the debris tank minimizing carryover. Modular filtration configured to blower size provides blower protection and minimal maintenance. It comes with a heavy-duty 8-inch boom that extends up to 25 feet, with six-way hydraulic power and wireless controls for all boom functions, soft-start water pump, vacuum breaker and truck engine speed. **800/387-7763; www.presvac.com.**

5. Tornado Global Hydrovacs F3 ECO

The **F3 ECO** from **Tornado Global Hydrovacs** holds 12 cubic yards of mud and more than 1,700 gallons of freshwater. This unit is over 2,000 pounds lighter than the company's older models, meaning the operator can carry extra payload in the debris tank. The boom has a 342-degree rotation and a 26-foot reach. All critical components are housed in an insulated and heated aluminum van body. Operators do not need to hoist the tank to empty it, eliminating the dangers of dumping on uneven ground and near overhead power lines. **877/340-8141; www.tghl.ca.**



6. Transway Systems Terra-Vex

The **Terra-Vex** all-season hydroexcavator from **Transway Systems** has a Robuschi RB-DV145 6,400 cfm blower with OMSI transfer case and insulated acoustical enclosure with walk-in storage. Water pressure is achieved with a hydraulically driven Pratisoli KT20 water pump, delivering 10 gpm at 6,000 psi. The 3,000-gallon debris tank has a hydraulically operated hoist, and door locks with full-open door. The 1,200-gallon HDPE water tank supplies a 420,000 Btu diesel-fired burner, permitting operation in subzero temperatures. The water pump and water tank compartments are heated by a diesel-fired heater and 12-volt engine coolant heater. The 26-foot hydraulically operated 8-inch suction boom is equipped with joystick control and wireless remote control. All parts are painted/powder-coated off the unit, and it includes marine-grade plywood floor enclosure, three-camera back-up system and digital water level display. 800/263-4508; www.transwaysystems.com.

7. Vac-Con X-Cavator

The **X-Cavator** from **Vac-Con** is powerful, durable and easy to operate. It comes fully loaded and features a hydrostatic drive that uses the chassis engine for the vacuum, creating a more efficient system that eliminates the need for PTO, clutch and gearbox operation. It is available with water systems up to 4,000 psi, and a mobile wireless remote control system that enables the operator to work the chassis engine rpm, boom, automatic vacuum breaker, dump controls and hydraulic door locks from remote areas up to a 1/2 mile. The boom rotates up to 270 degrees. 904/284-4200; www.vac-con.com.

8. Vac-Tron Equipment CV Series

The **CV (Competitive Vac) Series** from **Vac-Tron Equipment** comes in two model lines, the CV GT and the CV SGT High-CFM. CV GT models are powered by a 27 hp Kohler engine and offer 580 cfm at 15 inches Hg. CV SGT High-CFM models are powered by a 37 hp Kohler engine and offer 1,000 cfm at 15 inches Hg. Both have wet/dry filtration with cyclonic separation, a 500- or 800-gallon debris tank, 200- to 300-gallon water capacities, and provide 3,500 psi at 4 gpm. Optional reverse pressure is also available. 888/822-8755; www.vactron.com.

9. Vacall AllExcavate

Vacall AllExcavate hydroexcavators include AllSmartFlow smart controls that help to conserve water during high-performance jet/vac digging around utilities and waterlines or cleaning frac tanks and vessels. Single-

engine efficiency helps conserve fuel and reduce emissions. It has a high-pressure water system with rheostat control to vary water volume and capacity output. A heated compartment enclosing the water system protects components against freezing. Its water tanks are made of high-quality aluminum for extra strength. Large, galvanized steel debris tanks are also available. A single control is used to open, close and lock the tailgate. It has double-cyclone filtration with a simplified design to reduce maintenance, extend performance and increase working life. Its rear-mounted boom front-loads debris. It is available with a cold weather package. 800/382-8302; www.vacall.com.

10. VACMASTERS System 4000

The **VACMASTERS System 4000** air excavator has the brute force to dig deep down with air, exposing utilities in even the hardest soils without harming them. It allows technicians to dig faster and safer in soil that is hard, wet, sunbaked or compact, including ground frost. This unit provides operators with seven to eight minutes average potholing time and efficiency in backfilling with no mud hauling or disposal costs. It offers remote operation, a low-maintenance design, hydraulic-powered dumping, a supervisory control panel, self-purging filtration system and a fast-acting interceptor canister. 800/466-7825; www.vacmasters.com.

11. Vactor HXX HydroExcavator

The **Vactor HXX HydroExcavator** provides up to seven hours of continuous operation with onboard water. The standard variable-flow water system allows lower water flow, resulting in less operator fatigue and a cleaner, more precise digging process. The system allows up to 25 gpm for projects requiring higher water flow capabilities. Using the DigRight Technology, operators select the maximum desired working water pressure for their application based on vacuum excavation best practices. This selection will limit the water pump from exceeding site, industry or customer maximum pressures to ensure a safe and nondestructive method of excavation. DigRight Technology also reduces wear and tear on the water system, extending product life. Its boom turret provides increased vertical range of motion for improved operator performance and productivity, enabling the operator to complete most applications with only one dig tube. 800/627-3171; www.vactor.com.

12. Westech Vac Systems Hydrovac Code TC407

The **Hydrovac Code TC407** excavation truck from **Westech Vac Systems** is specified with a TC407 rating (hazardous goods transport capable). The

(continued)



truck allows quick access to buried water mains and natural gas and petroleum pipelines, cutting through hardened scale and frozen ground with reduced risk of damage. It is designed to handle unpredictable off-road applications and unknown hazardous materials, in every type of weather, from -40 to 95 degrees F. It is quick and easy to set up so work can begin immediately, maximizing efficiency and productivity. Debris body capacities range from 11.8 to 13 cubic yards. It has heated rear door valves, a heated hose reel cabinet, and glycol and air purge winterization systems. 780/955-3030; www.westechvac.com.

HYDROEXCAVATION EQUIPMENT AND SUPPLIES

13. Hydra-Flex Switchblade

The **Switchblade** static, 0-degree nozzle from **Hydra-Flex** has the impingement and stream quality to allow operators to dig fast and use less water, providing greater efficiency on the job site. Designed for durability, this heavy-duty, high-impact nozzle operates at up to 3,200 psi and is constructed with stainless steel housings and tungsten carbide wear surfaces. The nonconductive urethane coating on the nozzle body works to extend the life of the nozzle while protecting the safety of the user and sensitive underground assets. A range of flow rates and spray patterns are available for different applications such as potholing and trenching. 952/808-3640; www.hydrflexinc.com.

14. NozzTeq MONRO-JET

The **MONRO-JET** hydroexcavation nozzle from **NozzTeq** combines the power of a solid-stream pencil jet with the large coverage of a fan jet. Its circular water jet motion generates tremendous power at modest gpm rates, allowing the operator to move faster whether hydroexcavating, surface cleaning or cleaning sewer lines. It can be used for other types of surface cleaning such as concrete, steel, castings and large surface areas including line removal from runways. It can be modified for internal pipe cleaning of sewers and pipes of all types. An orbital design increases performance at a lower gpm rate and pressures as high as 36,250 psi. 866/620-5915; www.nozzteq.com.

15. Soil Surgeon

The **Soil Surgeon** hydroexcavating tool fits any sewer combination truck equipped with a telescoping 6- or 8-inch boom. The tool has a 1-inch water connection. The operator controls water pressure and power through truck controls. It has a 6-foot Tuff Tube with handles to guide the unit down for potholing

or side to side for trenching. Six jets boring inward cut the soil, while six boring outward bring the tube down. 949/363-1401; www.soilurgeoninc.com.

16. USB - Sewer Equipment Corporation Hydro-Excavation Nozzle

The oscillating **Hydro-Excavation Nozzle** from **USB - Sewer Equipment Corporation** uses pressurized water to excavate soil. The oscillation is the result of high-performance ceramic balls and the internal parts are protected by a high-density plastic cover. 866/408-2814; www.usbsec.com.

INDUSTRIAL VACUUM TRUCK

17. Vector Technologies VecLoader Hepa Vacs

VecLoader Hepa Vacs from **Vector Technologies** are powerful, self-contained, critical filtered vacuum systems capable of conveying regulated materials including asbestos and nuclear-contaminated solids, slurries, powders and liquids. High power allows maximum vacuum performance for long-run vacuuming within high-rise buildings, tunnels, confined areas and crawl spaces with single or multiple smaller-diameter hoses. All processed air within the fully enclosed negative-pressure system is thoroughly scrubbed by a four-stage filtration process. All collected materials are easily bagged through a discharge valve at the operator's workstation. Many models can be towed with hose and accessories by a 1-ton truck. 800/832-4010; www.vector-vacuums.com.

JET/VAC COMBINATION TRUCKS/TRAILERS

18. GapVax MC Series

The **MC Series** combination jet/vac from **GapVax** is a wet-only vacuum truck. The debris body ranges from 5 to 12 cubic yards, with a stainless steel version available. The stainless steel water tank can hold up to 2,000 gallons. Vacuum pump options range from 3,500 to 5,000 cfm with up to 27 inches Hg. The unit comes with an 8-foot front-mounted telescopic boom, reaching 26 feet with a 180-degree rotation. The standard water pump is rated at 80 gpm at 2,000 psi. 888/442-7829; www.gapvax.com.

19. Hi-Vac Corporation Combo Hydro

The **Combo Hydro** from **Hi-Vac Corporation** is a hybrid of Aquatech sewer cleaners and X-Vac hydroexcavators, and comes with a powerful 27-inch



Hg blower. It has a large-capacity water pump for sewer cleaning that runs 80 gpm at 2,500 psi and hydroexcavation water flow of 20 gpm at 2,500 psi. Equipped with a 400,000 Btu boiler, the heated enclosure for the water pump and all water components enables it to work in cold conditions. 800/752-2400; www.hi-vac.com.

20. Sewer Equipment Model 900 ECO

The **Model 900 ECO** from **Sewer Equipment** is available in 9-, 12- or 15-yard debris capacities, equipped with Duraprolene water tanks carrying 900 to 2,000 gallons of onboard water. Its Hydro Drive powertrain system eliminates the need for a transfer case. Both single-piston and triplex pump options are available at 55 to 80 gpm at 2,000 to 3,000 psi with a 4,400 cfm blower and 18 inches Hg, built on an eco-friendly platform that provides greater fuel efficiency and offers noise reduction. 888/477-7611; www.sewerequisite.com.

21. Super Products Camel 1200

The **Camel 1200** 12-yard combination truck from **Super Products** is available with an optional hydroexcavation package that includes cartridge filters, dig tubes and specially designed water lances. Coupled with powerful waterjetting and vacuum capability, utilizing these tools allows operators to safely and effectively expose utility lines, remove debris and clean out a variety of structures, dig in congested spaces and perform many other hydro-excavating applications. A 9-yard version is also available. 800/837-9711; www.superproductsllc.com.

PUMP

22. Cat Pumps Model 56

The **Cat Pumps Model 56** is ideal for portable trailer-mount and smaller hydroexcavating equipment. At 1,760 rpm, this industrial-grade pump delivers 8 gpm at up to 2,500 psi. It can be hydraulically driven in a direct-drive configuration, and is built around a mechanical drive end to provide reliable long-life service. The discharge manifold is constructed from high-tensile forged brass for high strength and durability. Preset low-pressure seals provide secondary protection against external leaks. Durable dual V-packings are lubricated and cooled by the pumped liquid for long seal life. Concentric, high-density, polished, solid ceramic plungers provide a true wear surface and extended seal life. 763/780-5440; www.catpumps.com. ♦



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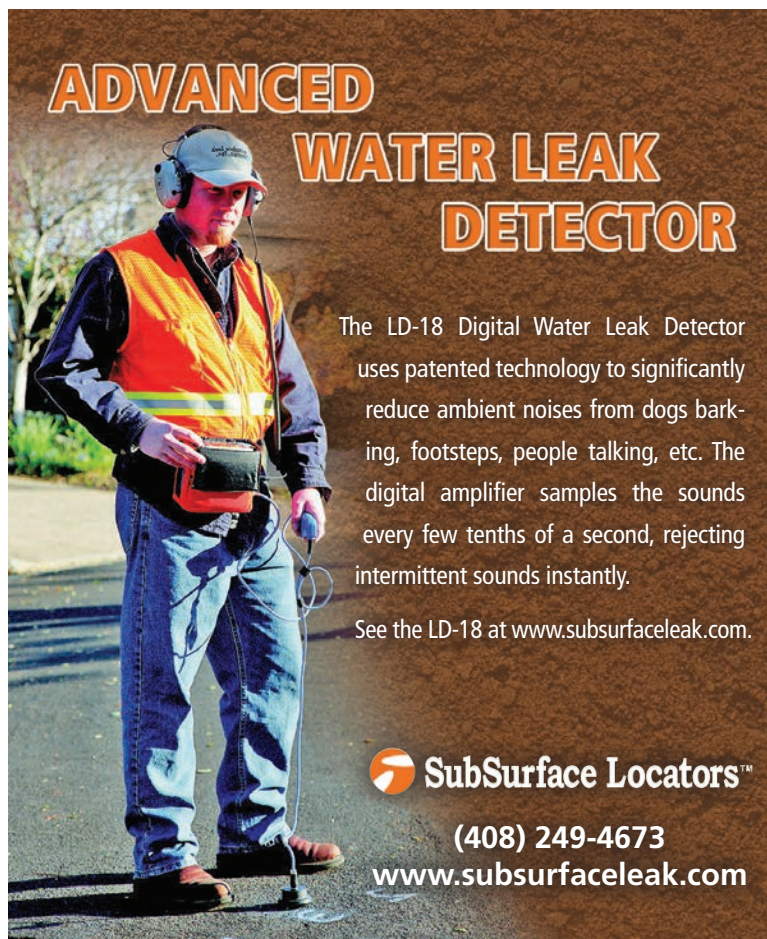
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Product Spotlight

Reinforced with fiberglass,
new pipe strengthens stormwater systems

By *Jared Raney*

Stormwater system improvements have become a focal point for public utilities in recent years, and to that end, Advanced Drainage Systems has released a new stormwater pipe designed with superior strength and resistance in mind.

HPXR 75 is a large-diameter polypropylene pipe using fiberglass reinforcement for enhanced rigidity.

"The construction industry is seeking product options with improved service characteristics, installation durability and increased joint performance," says Joe Chlapaty, chairman and CEO of Advanced Drainage Systems. "The HPXR 75 product line will directly address those needs."

The new pipe is available in diameters ranging from 30 to 60 inches and in 13- and 20-foot lengths. It's made of corrugated polypropylene with a smooth interior and fiber-impregnated outer wrap, providing approximately 75 pii stiffness for all diameters.

"HPXR 75 allows for a broad range of backfill materials and installation conditions, reducing costs while increasing installation speed with confidence of consistent line and grade," says Tori Durliat, director of marketing for Advanced Drainage Systems.



According to Advanced Drainage Systems, all pipe diameters in the HPXR 75 product line have a 100-year-design service life. The watertight bell and spigot exceed ASTM D3212 (specifications on joints for plastic piping systems) and comply with ASTM F477 (covering elastomeric seals).

"This exceptional pipe stiffness directly relates to superior results with less than ideal backfill, has exceptional joint performance, excellent man-hole connections and easily handles construction loads," Durliat says.

This new product was developed to improve upon previous product lines including N-12, HP, Nyloplast and StormTech. Advanced Drainage Systems says the pipe's superior strength offers resistance to effects of hot soils, effluent and accumulated hydrogen sulfide gas typically found in sanitary sewer systems. **800/821-6710; www.ads-pipe.com**



Rock Creek Grabbit



Hi-Vac F Series

Rock Creek Grabbit OMO debris removal system

The Grabbit OMO from Rock Creek Manufacturing is designed to remove debris from sewer and storm sewer manholes, wet wells and clearwells. Its multi-scissor mechanism allows it to lower easily in the open position and to lift and close with a maximum amount of pressure in the closed position. A two-rope system is used to lower and retrieve the unit. **918/385-1530; www.rockcreekmfgllc.weebly.com**

Hi-Vac F Series combination jet/vac unit

The new F Series front-mounted reel design from Hi-Vac Corp. includes an improved 360-degree articulating vacuum boom to help facilitate loading operations. It is designed with a 27-inch Hg blower and also includes poly-graphite water tanks. The F Series has a triplex reciprocating water pump that provides up to 150 gpm at 2,500 psi and a 10- to 15-cubic-yard debris tank. **800/752-2400; www.aquatechinc.com**

Vector emergency-stop wrist strap for excavators

The wireless emergency shut-off wrist strap from Vector Manufacturing is a new safety feature for all new Vector HXX vacuum excavators manufactured after January 2017, including the mid- and full-sized HXX Hydroexcavator, HXX Prodigy and HXX Paradigm trucks. The device communicates with the wireless remote control on the truck via Bluetooth technology. A locking ring on the strap connects to the digging lance, and also features a magnetic connection tethered to the ring. When the digging lance is dropped, the magnetic connection is broken. **800/627-3171; www.vector.com.**



Vector Wrist Strap

McElroy TracStar Series 2 machines

The McElroy TracStar Series 2 machines can fuse long polyethylene pipelines installed with sliplining, pipe bursting and directional drilling technologies. They are easy to maneuver on the job site, and have a generator on board to provide electricity and hydraulic power. The machines are self-propelled on a dual-track system, which offers freedom of movement across rugged terrain. They are offered in a wide range of pipe sizes from 2-inch IPS to 48-inch O.D. pipe. **918/836-8611; www.mcelroy.com.** ♦



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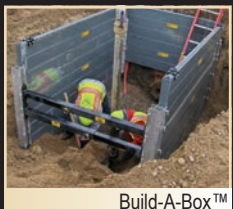
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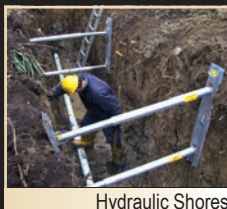
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FS Solutions enters distribution partnership

FS Solutions announced a distribution partnership with Gerotto Federico S.r.l. of Italy. Under terms of the agreement, the Gerotto Lombro remote-controlled mini-excavator will be sold and supported by FS Solutions in the U.S., and by Joe Johnson Equipment in Canada.

JLG plans operational changes, facility closures

JLG Industries announced it has submitted plans for closure to the works council in Belgium for its manufacturing and predelivery inspection facilities and to employee representatives in the U.K. for its engineering center there. Manufacturing lines at the company's Orrville, Ohio, plant will also be shut down. The proposed changes may affect up to 525 employees.

Water-Right hires Erik Koglin as field manager

Water-Right announced that Erik Koglin has been hired as field manager of Clear Choice Water Group, the company's professional-level dealer group. Koglin has spent his career with the water industry, working for Pentair in product management and as a territory sales manager for the Midwest, where he serviced water treatment OEMS, distributors, and helped dealers grow their businesses.



Erik Koglin

Prime Resins acquired by RPM International

RPM International has acquired Prime Resins to be part of its USL Group. Prime Resins will continue to be led by its founder and president, David Barton.

Endress+Hauser installs high-pressure test rig

Endress+Hauser installed a high-pressure test rig at its U.S. headquarters in Greenwood, Indiana. The rig allows for testing complete instrument assemblies to customer specifications, and provides a 100 percent test indicating a specific instrument can withstand the design process pressure up to 15,000 psi.

Hydra-Flex welcomes new director of sales

Jonathan Kingsbury has joined Hydra-Flex as its new director of sales. Kingsbury has over 16 years' experience in the commercial cleaning industry.

MARS Company launches software solution for water meter testing

MARS Co. announced that it has launched a new version of its M3 Enterprise Software Suite, designed for the waterworks industry. It provides the ability to capture meter-testing data based on individual meter-testing programs.

Komatsu CEO Rod Schrader named to AEM board of directors

Komatsu America announced that CEO Rod Schrader has been elected to the board of directors of the Association of Equipment Manufacturers, the North American-based international trade group for the off-road equipment manufacturing industry.



Rod Schrader

HD Supply Waterworks relocates Brookfield branch

HD Supply Waterworks has relocated one of its branches in Connecticut. The Brookfield branch is now located in New Milford and is one of three branches in the state.

John Deere employees increase volunteer hours

In 2016, Deere & Co. employees increased by more than 50 percent the number of volunteer hours they recorded in service to community organizations worldwide, totaling nearly 158,000 hours in the year. During the year, Deere launched its Serving Our Communities initiative, where employees organized volunteer projects to benefit local cities and towns.

McElroy partners with Netafim on HDPE

McElroy and Netafim have joined forces to meet the demand for HDPE pipeline solutions in the irrigation, potable water and natural gas industries. ♦

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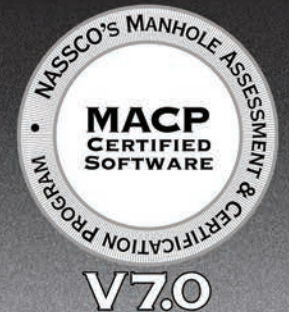
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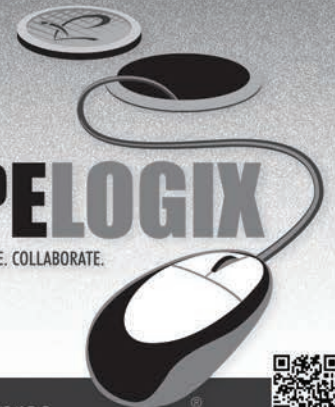
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The Town of Wartrace, Tennessee is seeking a Water & Utilities Manager to supervise the overall operations of Wartrace Waterworks and Sewer Systems and the Public Works Department. Responsible for proper operation, maintenance, reporting, collection, treatment, distribution and/or disposal of water and wastewater. Four years of experience and Tennessee Grade 1 Water Distribution, Grade 1 Wastewater Treatment and Grade 1 Wastewater Collection Certifications. Valid Tennessee driver's license. Finalist must pass a background check and drug test prior to employment. NOTE: Wartrace is also hiring a water/wastewater operator. Prefer wastewater certifications and must have valid driver's license. Applications for both positions are available online at www.townofwartrace.com or mail resume to Town of Wartrace, P.O. Box 158, Wartrace, TN 37183. (M05)

Moeller Marine Products is seeking a motivated North American Industrial Sales Manager, who is a self-starter, is energized by results, and knows how to grow a product market and "own the business." This individual will be responsible for the Moeller Industrial and Waste Vegetable Oil (WVO) \$3.5 million budget. ISM will work with the Moeller RSM's as well as Engineering and Marketing to seek out new opportunities with a specific focus on finding new customers. Responsibilities Include: • Prospect new accounts through cold calling activity • Building the relationships with customers and third-party representative group where applicable • Responsible for current accounts • Involvement in setting budgets • Organize trade show activity • Look at programs that could provide off-the-shelf industrial plastic products. Education Requirements: • Bachelor's degree preferred, business, sales management or marketing a plus. Qualifications: • Minimum of 5 years in the industrial plastics market • Candidate will be located in the Midwest or Central part of the U.S. • Willingness to travel up to 70%. All travel expenses paid by Moeller Industrial Products within the Corporate Travel Policy. If you are a team player with a positive "can-do" attitude, we want to hear from you! In return, we offer our employees a competitive salary; family-friendly work environment, and excellent benefits. We are committed to career growth. Moeller Industrial Products is supportive of the community and recently was recognized for 25 years of operation! Apply today by sending your resume to HR@themooreco.com. www.moellerindustrial.com ISO 9001:2008 certified EEO Employer/VET/Disabled. Moeller Industrial Products is a division of The Moore Company. (P05)

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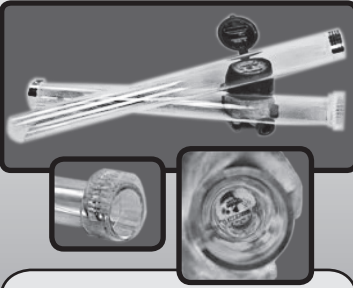
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PEOPLE/AWARDS

Storm Lake received a Best Development Award for 2016 from the group 1000 Friends of Iowa, which honors projects that implement the efficient use of resources to develop sustainable communities that provide a high quality of life. Storm Lake was selected by a panel of independent jurors in the “civic category” for its work on the North Central Stormwater Project.

A \$48 million expansion to **Staten Island’s Bluebelt** that exists to help reduce flooding has won a sustainability award. The Woodrow Bluebelt expansion, which will create a new wetland at Sheldon Avenue, was given an Institute for Sustainable Infrastructure Envision Silver Award recognizing projects that improve sustainability and resiliency.

Howard County (Maryland) announced that the **Restoring the Environment and Developing Youth (READY) Program** was awarded the Melanie Teems Award by the Chesapeake Bay Trust for its outstanding coordination of community members and resources to support the health of the Chesapeake Bay. READY works with Howard County government to fund employment of young adults, ages 16-25, in “green” jobs building and maintaining stormwater projects throughout the county to help alleviate the flow of stormwater runoff and improve local watershed health.

The **Colorado Springs (Colorado) Stormwater Division** has changed its name to Water Resources Engineering.

LEARNING OPPORTUNITIES

Canada

The Water Environment Federation is offering Stormwater Seminar 2017 on June 15-17 at the Quebec City Congress Center in Quebec City. Visit www.wef.org. ♦

CALENDAR

May 21-25

American Society of Civil Engineers’ World Environmental & Water Resources Congress, Sacramento Convention Center, Sacramento, California. Visit www.ewrcongress.org.

June 4-7

American Society of Civil Engineers’ Geo-Risk 2017, Grand Hyatt Denver, Denver. Visit www.asce.org.

June 11-14

American Water Works Association Annual Conference & Exposition, Pennsylvania Convention Center, Philadelphia. Visit www.awwa.org.

June 14-16

Florida Stormwater Association Annual Conference, Sanibel Harbour Marriott Resort and Spa, Ft. Myers, Florida. Call 888/221-3124 or visit www.florida-stormwater.org.

June 25-28

American Water Resources Association 2017 Summer Conference: Climate Change Solutions, Sheraton Tysons Hotel, Tysons, Virginia. Visit www.awra.org.

June 26-29

National Association of Flood and Stormwater Agencies Annual Meeting, Belmond Charleston Place, Charleston, South Carolina. Visit www.nafsma.org.

July 16-19

American Society of Agricultural and Biological Engineers 2017 Annual International Meeting, Spokane, Washington. Visit www.asabe.org.

Aug. 4-6

American Society of Civil Engineers’ Younger Member Leadership Symposium, ASCE Headquarters, Reston, Virginia. Visit www.asce.org.

Aug. 27-30

American Public Works Association PWX (Public Works Expo), Orange County Convention Center, Orlando, Florida. Visit www.apwa.net.

Aug. 27-31

StormCon: North American Surface Water Quality Conference & Exposition, Meydenbauer Center, Seattle. Visit www.stormcon.com.

Sept. 18-20

National Rural Water Association WaterPro Conference, Reno, Nevada. Visit www.nrwa.org.

Oct. 8-11

American Society of Civil Engineers 2017 Convention, New Orleans Marriott, New Orleans. Call 800/548-2723 or visit www.asce.org.

Nov. 5-9

American Water Resources Association Annual Conference, Red Lion on the River-Jantzen Beach Hotel, Portland, Oregon. Visit www.awra.org.

Municipal Sewer & Water invites your national, state or local association to post notices and news items in this column. Send contributions to editor@mswmag.com.



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