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December 2019 [www.mswmag.com](http://www.mswmag.com)

HUMAN SIDE: CROSS-TRAINING  
HELPS MEET CHALLENGES

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# BUILDING SELF-RELIANCE

Olathe is reaping the rewards of  
stretching its in-house maintenance  
and rehabilitation capabilities

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Ira Speer  
Field Operations Supervisor  
Olathe, Kansas

## PRODUCT FOCUS: STORMWATER MANAGEMENT





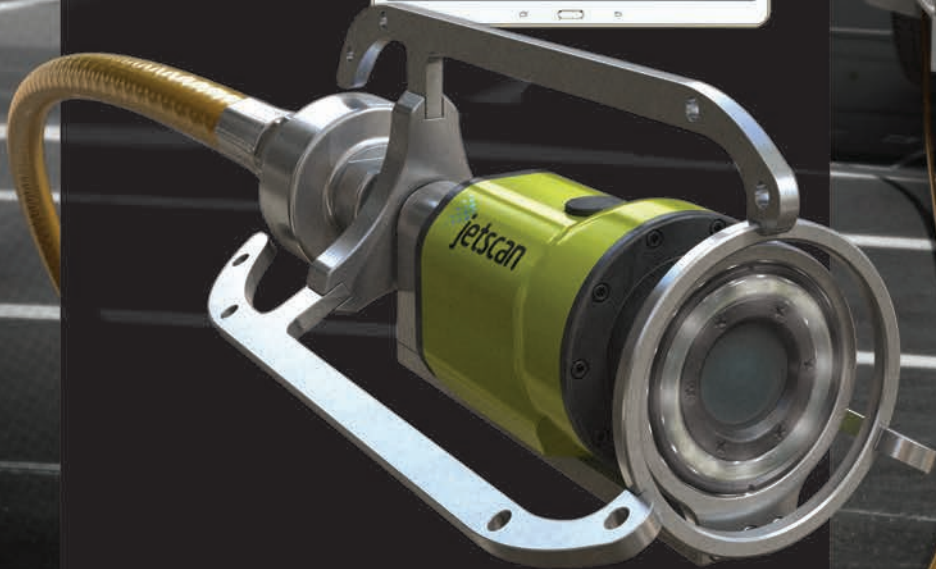


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# INSIDE:

STORMWATER MANAGEMENT



ON THE COVER: Olathe (Kansas) Sewer Department Field Operations Supervisor Ira Speer oversees the systematic revitalization of the city's manholes as part of his supervision of the wastewater and water systems in the state's fourth-largest city. (Photography by Denny Medley)



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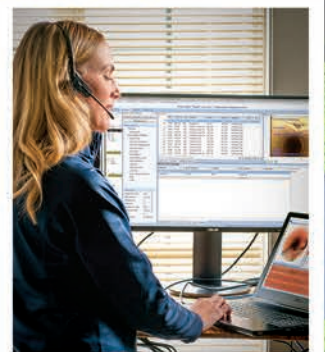




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# JOURNEY OF A LIFETIME

Grab a telescope — or an atlas — and follow a stream of water to the center of the universe

I have driven through the center of the universe. It isn't an unfathomably distant and nebulous point in space. It isn't a black hole or a star. It's in Idaho.

Wallace, Idaho, is a small community in the state's Panhandle region with a population under 1,000 people. The community was built on mining — first gold, then silver — in the 1880s. The area was no doubt the center of the universe for those early settlers looking to strike it rich. Little did they know its celestial significance.



## FROM THE EDITOR

Luke Laggis

Mining has largely faded from the area, but that doesn't mean the town has faded into obscurity. Quite to the contrary, it is has actually become the most significant place on earth, and beyond. In 2004, then-Mayor Ron Garitone officially proclaimed Wallace to be the center of the universe.

Probabilism, an ancient Greek doctrine, gave Wallace license to stake its claim as the center of the universe, essentially stating that if you can't prove something isn't true, it is true.

But it wasn't the study of philosophy or mythology that brought this notion to Wallace. It was the Environmental Protection Agency. In a story about this quaint little town where every downtown building is on the National Register of Historic Places, *Atlas Obscura* reports that the EPA paid a visit to the town and announced that due to more than a century of mining, the local water and soil were polluted. Wallace was declared a Superfund site, but the EPA also admitted it couldn't prove whether the lead problem was due to contamination from mining operations or was just naturally occurring. Neither could be disproved, so to accommodate both potential causes, the Superfund site was significantly expanded.

That's when Wallace was introduced to — and embraced — probabilism. In angry response, the story goes, the mayor stood in the middle of the street and declared himself to be at the center of the universe, and if he couldn't be proven wrong, he must be right.

My favorite part of the story is how the center of the universe is marked — with an ornate manhole cover at the intersection of Bank and Sixth streets. In an industry that gets little positive attention or thanks from the general population, it should be heartening to know that a small piece of your infrastructure is really at the heart of all life and existence.

And we'd never know any of this had water not brought the EPA to town.

Coincidentally, it was water that brought me through Wallace 20 years ago, albeit in frozen form, on a ski trip with my friend Scot. We skied our way from Montana to Idaho, up into British Columbia and back, unknowingly traversing the center of the universe in a beat-up Chevy truck. You can't get more well traveled than that.

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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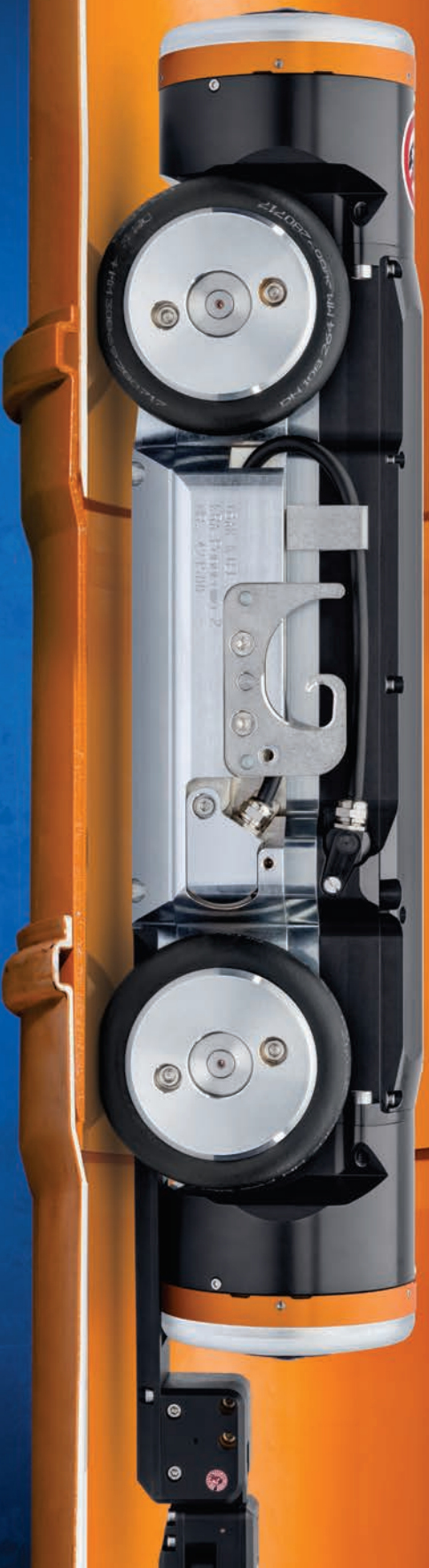


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### Keep Your Crew Safe

For many utilities, safety means throwing personal protective equipment at employees and setting them loose — but a little planning before the job is much more effective in ensuring employees' protection. For an explanation of why PPE shouldn't be a first line of defense for hazards, check out this online exclusive article.

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## THE RETIREMENT GAP

### An Industry Priority

The Environmental Protection Agency's assistant administrator for water recently called water workers “silent everyday unsung heroes,” pointing out that roughly one-third of water/wastewater operators in the nation will be eligible to retire in the next decade. Bringing this issue to the forefront is a crucial step in meeting the challenge of recruiting and retaining skilled workers in today's high-tech water sector.

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# SAFEST PIPE IN THE SYSTEM

Colorado sanitation district rehabilitates massive tunnel responsible for delivering all its wastewater to a neighboring treatment plant

By Steve Frank



## PROFILE:

Southgate Water  
and Sanitation Districts

**YEAR FOUNDED:**  
1961

**WATER DISTRICT SIZE:**  
14.9 square miles with  
50,000 population

**SANITATION DISTRICT SIZE:**  
16.2 square miles with  
65,000 population


**NUMBER OF EMPLOYEES:**  
14

**NUMBER OF CUSTOMERS:**  
80,000

**ANNUAL BUDGET:**  
\$3.7 million excluding capital  
(combined); \$11.2 million combined  
2019 with capital projects included

**WEBSITE:**  
[www.southgatedistricts.org](http://www.southgatedistricts.org)





“The collaboration and the team atmosphere that developed in this project was a big change from many projects.”

David Irish



The new HDPE pipe, with pulling head still attached, after completion of the 7,615-foot pull.

Most people — if they ever think of sewers — don’t think about sewage tunnels. They think about a pipe lying peacefully, horizontally in the ground. When sanitation districts and cities think about sewers, however, they see dollar signs — lots of them. And if sewage is conveyed through a tunnel, they see both dollar signs and risks associated with operating a tunnel, especially if it malfunctions.

The Southgate Water and Sanitation Districts operate and maintain the water distribution and sanitary sewer collections systems for almost 80,000 residents in the southern part of metropolitan Denver. Southgate contracts with Denver Water for potable water delivery and with South Platte Water Renewal Partners (formerly Littleton/Englewood Wastewater Treatment Plant) for sewage treatment service.

A major component of this largely unseen sewer service is the 1.5-mile Colsman Tunnel. The 50-year-old tunnel stretches west from Southgate’s headquarters to a tie-in with the Big Dry Creek Interceptor and eventually the city of Englewood’s sewer system for sewage delivery to the South Platte Water Renewal Partners plant. The tunnel’s total length is 7,615 feet.

#### Looking long term

Up to 90 feet deep in places and 70 inches tall by 60 inches wide at its largest cross section, the Colsman Tunnel runs mostly through claystone. It was hand-bored in the 1970s by men using mining equipment. The boring machine then available determined the size of the bore.

Largely impervious, claystone isn’t a material that would cause most district managers to lose sleep at night. But thinking about the contents in the only means of conveying sewage to the treatment facility backing up onto his headquarters’ property still made David Irish, Southgate district manager, nervous. So, he commissioned a study in 2013 by HDR, the Omaha, Nebraska-based architectural, engineering and consulting firm.

The study said the tunnel was largely in good shape but there were areas of concern such as cracks and evidence of corrosion, and something needed to be done in the next 10 years. “It doesn’t take many of those contingency conversations to know we needed to do something, even though we didn’t have an emergency on our hands,” Irish says. “From there, it’s ‘How should we address this problem?’”

The analysis did not suggest what action should be taken, but it said a long-term solution should be sought. It also pushed a tunnel backup contingency to the top of the district’s emergency communications plan.

#### Seeking a solution

With the HDR study in hand, Irish and the Southgate board began to ask, “What would a solution look like?” Irish notes that Southgate is fortunate to have several engineers on its board of directors, which made the early “what-iffing” easier. He says two of these board members who are also engineers participated in the selection process, “so we didn’t have to come back and sell the board on who we selected.”

To help further manage the process, the

An American Augers pipe-pulling machine is positioned at the east portal, which was the end point of the 7,615-foot Colsman Tunnel Rehab Project. Pumps from Sunbelt Rental helped keep the lines dry. CONTRIBUTED PHOTOS





**Every joint in the new pipe was welded by a certified operator with a McElroy pipe fusion machine. The data on each weld was captured and preserved as part of the quality assurance program.**

players and helped the team build an atmosphere of trust that helped get the job done. The team established a working principle upfront that there would be no “bad ideas.”

### Transparent planning

In the ideation stage, close to a dozen rehabilitation ideas were developed and evaluated for how well they could assure Southgate that its sole means of conveying sewage to the treatment plant was sound and would remain so. Neither cost nor schedule was the sole driver.

Ten different technical memoranda were developed to guide the decision-making process. Before the construction even began, Lehrburger says about \$1 million was spent on preconstruction engineering studies and design. A guaranteed maximum price to the district was developed. The contract is “open book,” and incentives to the contractor through shared savings were also built into the contract. Everything is transparent.

“The collaboration and the team atmosphere that developed in this project was a big change from many projects,” Irish says. “It made a huge difference. There’s no pointing at one member or another and saying, ‘It’s their fault.’”

“Burns & McDonnell has acted as a true owner’s representative for us,” he adds. “It made the project a lot less scary. They’ve done numerous design-build projects, so they have that expertise. They brought in the right people with the right experience to see that we’re getting what we’re paying for, and no surprises.”

Weekly meetings kept the team on track. Decisions were discussed and made as a team, and a log was kept so the rationale behind all decisions could be referenced later in the project. Initial decision-making and planning took a year.

The design-build team of Garney Cos. (contractor), Dewberry Engineers (engineer) and Shannon & Wilson (geotechnical engineering) pulled a 1.5-mile, 48-inch HDPE pipe through the existing tunnel.

Because the tunnel had been basically hand-bored, it was highly irregular. The cross-section shape varied from mushroom to egg. Before deciding to slipline the tunnel with HDPE pipe, the tunnel was measured using cameras and then remeasured using a manned entry to make sure it was large enough for the anticipated pipe. The district’s future anticipated build-out flows were also checked to verify that the smaller pipe within the tunnel would still have enough capacity.

HDPE was selected as the pipe material because it is completely inert. “There’s no corrosion,” Lehrburger says. Other materials were considered and rejected. Pipe came to the job site in 50-foot sticks weighing 219 pounds per foot, or over 5 tons per pipe. The pipe walls are 3.56 inches thick.

*(continued)*



**A barometric loop was installed during construction to maintain proper flow.**

**“They brought in the right people with the right experience to see that we’re getting what we’re paying for, and no surprises.”**

**David Irish**

district brought in the Kansas City, Missouri-based engineering firm Burns & McDonnell as its owner’s representative. Starting early proved an advantage. It allowed Southgate the relative luxury of considering several options and project delivery approaches without feeling rushed or backed into a corner because of imminent danger or increased risk.

“In our early discussions with Burns & McDonnell, it wasn’t clear what the solution would look like or how to approach it,” Irish says. “Burns & McDonnell took the lead as owner’s representative because of the uncertainty as to whether it

should be a traditional design-bid-build project or something else. As things unfolded, the uncertainties led us to a design-build project.”

Burns & McDonnell’s project manager, Mike Lehrburger, P.E., says, “Design-build was a very big piece of the overall success of this program.” At the outset, he notes, it wasn’t clear what kind of project it should be. “It would have been hard to hire an engineer and start a design on something that could wind up being anything from a \$2 million spray-applied liner system to a \$30 million parallel tunnel — or something in between.

“How does one solicit reasonable numbers for a project like that? How do you solicit the technical expertise and the contractor commitment” in the face of that uncertainty?

The district also wanted to be a part of the decision-making process. So, a progressive design-build approach was adopted. That flexible approach created a partnership among the major



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**Southgate Sanitation District Manager David Irish at the east portal of the sanitation district's Colsman Tunnel Rehab Project. (Photography by Steve Frank)**



**Seated around the east portal manhole (from left) are Mike Lehrburger, Burns & McDonnell project manager; Joe Graham, Garney Construction project engineer; Kyle LeBrasse, Burns & McDonnell project engineer; and Mike Hale, Garney Construction project manager.**

## **"We were counting on the 'slime factor' in the sewage to help us out by reducing the friction."**

**David Irish**

### **Getting to work**

Construction began in October 2018. The construction team set up work sites at two locations to pull the pipe into place in the tunnel. The two locations were the east portal (at Southgate's offices) and the west portal, 1 1/2 miles to the west.

The pipe-pulling machine was installed in Southgate's parking lot. At the west portal, pipe "welding" took place 150 feet from the portal. The pipe was pulled into the tunnel with live flow in the tunnel. Pulling the pipe through the live flow kept the project team from having to bypass flow, which would have cost an additional \$2 million.

As the pipe was pulled through the tunnel, the next length of pipe was fused to the pipe ahead of it to become one continuous piece of

pipe. Per the quality assurance plan, a certified operator made every pipe fusion. After the operator completed each of the 110 fusions, the welds were inspected and the data on each one captured and recorded for future reference. After the weld cooled, the pipe string was pulled into the tunnel and the process was repeated. Each weld took over three hours to prepare, fuse and cool.

An early concern was that as additional sticks of pipe were added, the weight of the "pull" increased. The forces required to pull such a heavy pipe into place can be tremendous. "We were counting on the 'slime factor' in the sewage to help us out by reducing the friction. We underestimated how well it would work," Irish says.

The slime lubricant reduced friction as the pipe was pulled along the tunnel floor. The live flow likely provided some additional lift, too, even though the team was pulling the pipe "uphill" against the flow. "It turns out the pull-weight ended up being less than originally calculated, and we didn't have to change the drill rig like we

thought," Lehrburger says. "That saved both time and money."

In the end, the project wound up costing an estimated \$13.8 million and came to a smooth conclusion in the fall of 2019. Because of the slope, material and flow, the team expects the pipe to be self-cleaning. "This was the biggest job Southgate has ever done or might ever do," Irish says. "And it's the safest pipe I have now. There's no redundancy needed." ♦

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## **FLOWS LIKE SHAVING CREAM**

When the Colsman Tunnel Rehab Project was originally planned, the final step was to add a linear low-density cellular concrete (grout) material between the outer wall of the pulled-in pipe and the inner wall of the existing tunnel. No void was to be left in the tunnel.

But when the team began to add the grout after completion of pulling the pipe, a problem developed. The structural grout was too viscous. "It flows like shaving cream and sets up like pumice," says Mike Lehrburger, P.E., of Burns & McDonnell, the engineering firm that was the owner's representative on the job.

The original tunnel had four vent holes to the surface, some 80-90 feet above. The plan was to pour the grout into the vent holes (and from each end) and have it flow around the pipe and fill the void. But it just wouldn't flow.

At this point, it would have been likely under a traditional design-bid-build scenario for everyone to start pointing fingers at everybody else because money was at stake. Nobody had anticipated grout that wouldn't flow.

"Because we structured the job like we did, we were willing to use some risk management money to help solve the problem," Lehrburger says. The contractor drilled two test holes using some scrap HDPE to make sure that, after drilling down 80 feet, the HDPE pipe already in place in the tunnel wouldn't get punched through. Southgate compensated the contractor to provide proof of the solution.

After perfecting the methodology, the team drilled nine vertical shafts above the tunnel in one week. Workers stopped at the pipe, added the grout, it flowed and filled the voids, and the shafts were sealed. Job complete.

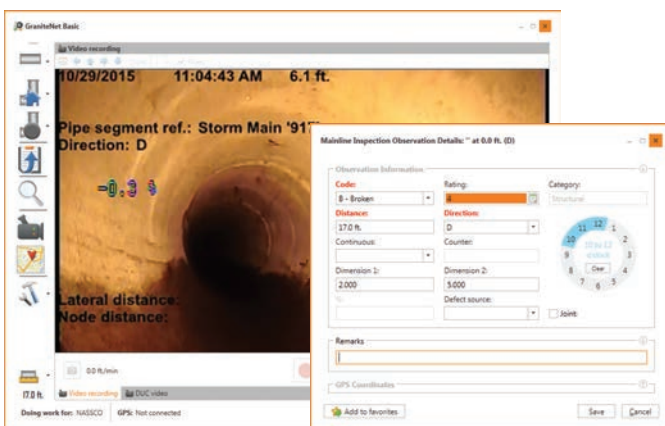


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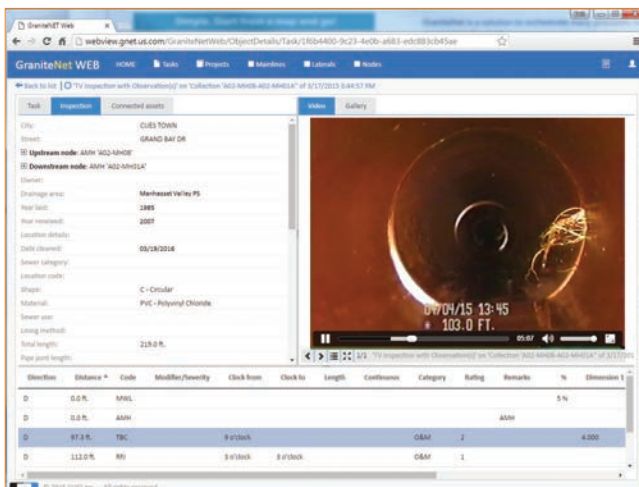
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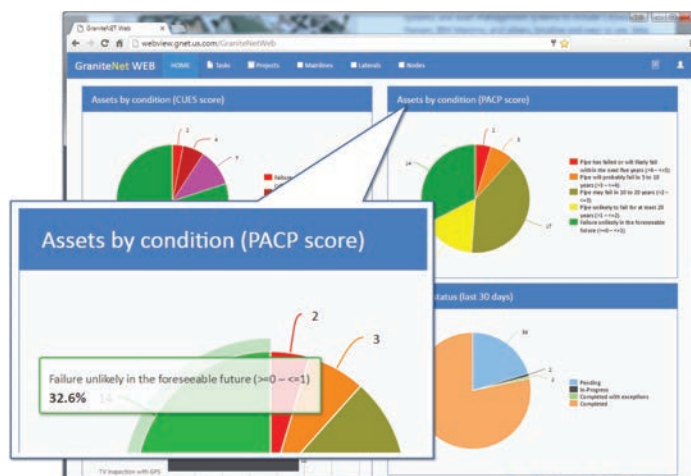


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# CROSSOVER APPEAL

Training employees in a variety of roles can help smaller water utilities build efficiency and meet compliance challenges

By Ken Wysocky

**W**hile several studies indicate that smaller rural water utilities have a harder time complying with safe drinking-water standards than larger urban utilities, an effective and relatively inexpensive solution might help those smaller utilities improve: cross-trained employees.

That's the implication of a study funded by the Technical and Educational Council of the American Water Works Association. Cross-training not only allows smaller utilities to maintain high levels of technical knowledge in a field where technology is advancing rapidly, but it also gives them greater flexibility and resiliency, especially in terms of providing the capacity to handle extreme events and crises, the report notes.

**“As with boxing, cross-training may help smaller utilities ‘punch above their weight.’”**

“As with boxing, cross-training may help smaller utilities ‘punch above their weight,’” it states.

The study took about two years to complete. While it's a few years old now, its findings remain valid, says David Switzer, a co-author and currently an assistant professor of public affairs at the University of Missouri. During the study, Switzer was working on his doctorate degree in political science with an emphasis on U.S. water policy at Texas A&M University.

“The challenges facing small rural utilities without access to a highly educated workforce and vibrant labor markets are much the same today as they were in 2016,” he says. “I don't think we've solved the problem yet in any meaningful way.”

To perform the study, Switzer teamed up with Manuel Teodoro, an associate political science professor at Texas A&M, and Stuart Karasik, a retired workforce development consultant who now does employee training on a freelance basis.

## Tale of two utilities

The two-part study first compiled statistical evidence that established a correlation between regulatory-compliance issues and smaller rural water utilities. Switzer says the team generally defined small utilities as those that serve fewer than 20,000 customers and employ roughly two dozen employees.

After that, the researchers found two very similar rural utilities with divergent compliance records, then took a closer look at possible reasons why one performed better than the other. That was accomplished by conducting numerous interviews with officials at both utilities.

“The utility with compliance issues was competently run, but it faced challenges almost any smaller rural utility faces,” Switzer says.

The two utilities were remarkably similar — an important factor in the study. They both are relatively small utilities in the same state; are located just 30 miles or so from each other; aren't unionized; serve similar-size populations (15,000 and 10,000 customers, respectively) with similar socioeconomic demographics; employ almost the same number of people; and draw from comparable labor markets in terms of education. Moreover, they draw water from the same river.

“When doing comparative case studies, it's important to find as many similarities as possible,” Switzer explains. “The main difference between these two utilities was that one was compliant with safe drinking-water standards and one had some compliance issues.”

## Different training strategies

But as interviews continued, another key difference emerged: divergent approaches to employee training. While the utility with no compliance problems emphasized a culture of cross-training, the other relied on a more rigid system in which employees were assigned to various operational areas like treatment, distribution and wastewater.

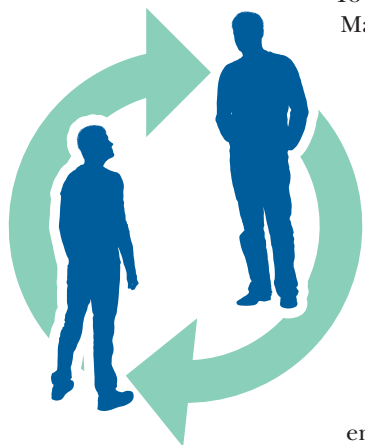
Employees typically moved from one area to another only upon request, even though there were no formal barriers — legally or structurally — to prevent cross-training, the report points out.

“We had no idea that cross-training would be identified as a strategy that could help to explain the difference in regulatory compliance,” Switzer says. “During our interviews with people from across the organization, cross-training consistently emerged unprompted as a key management strategy. It's part of the utility's organizational culture — an expectation that everyone will have competencies in all elements of the organization.”

“Even office staff have some training in water and wastewater management,” he adds. “In fact, the utility's manager actually came up through bookkeeping and accounting but holds licenses in water and wastewater treatment.”

The research also revealed that cross-training employees makes it easier to do even more cross-training, because when opportunities arise, the utility is equipped to cover the responsibilities of people who miss work to attend training sessions.

**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](mailto:editor@mswmag.com).







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One caveat emerged as well; low turnover is a key requirement for effective cross-training. In addition, it can take several years for employees to get fully licensed through cross-training, the report notes.

On the other hand, cross-training is relatively inexpensive and resources are readily available. Switzer says that most state departments of health or natural resources offer training resources, as do the state chapters of the AWWA. The biggest obstacles are time and management commitment, he says.

### No causality conclusions

The report declined to make any sweeping cause-and-effect relationship between cross-training and regulatory compliance. Furthermore, utility managers should check with their individual regulatory authorities before they deploy cross-training initiatives.

But there is no doubt that training all utility staff — from water and wastewater treatment operators to customer service representatives to front-office personnel — on all phases of utility operation provides smaller utilities in regions with limited human capital a degree of resilience and proficiency they otherwise couldn't achieve, Switzer says.

Moreover, cross-training might also help organizations weather the so-called silver tsunami — the massive storm of retirements now sweeping across water utilities.

"It would be premature to make broad, industrywide management recommendations on the basis of this limited study," the report states. "Nonetheless, the initial findings here suggest that cross-training might be a workforce and human-capital management strategy that is worth exploring."

Or as Switzer puts it: "The results of this study don't mean everyone should start cross-training. But it does merit further investigation to see if it can help smaller utilities overcome the workforce challenges they face." ♦

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# CUTTING THROUGH CORROSION

Polyurethane parts provide simple repair or replacement of curb boxes damaged by acidic soil

By Jeff Elliot

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The Speedy Sleeve is a noncorroding, quick-repair curb box product made of polyurethane. It enables repairs of the corroded or broken top portion of curb boxes in minutes to provide access to the water shut-off valve.

Curb boxes don't see daily use, but keeping them in good working order is critical for waterline repairs and shut-offs. Acidic soils can make that a challenge.

The challenge is that many areas across the U.S. — including the East Coast, South, Upper Midwest and Pacific Northwest — have acidic soil that rapidly corrodes cast iron infrastructure. Soil with a pH of 6 or less is considered acidic.

**“We have an electrolysis problem in the acidic soil here, and it eats up the pipe.”**

**Bob Krueger**

While soil can typically range in acidity from 2.5 to 10, pH levels of 5 or below can lead to extreme corrosion rates and premature pitting of buried cast iron infrastructure and curb boxes. Even coatings intended

to protect cast iron begin to dissolve when soil pH is around 4, which leaves curb boxes vulnerable to corrosion.

“We have an electrolysis problem in the acidic soil here, and it eats up the pipe. Even though we put a stainless steel rod on [the curb box], that stainless steel rod doesn't do any good when you have a pipe that's rotting out where we can't get to it,” says Bob Krueger, a systems operator at Waverly Sanitary District in Menasha, Wisconsin, which had hundreds of curb boxes in need of repair.

Fortunately for municipal waterworks departments, an easy repair that takes minutes can dramatically prolong curb box service life using polyurethane parts that won't corrode in acidic soil.

Because corrosion can also compromise the entire curb box/curb stop apparatus, a growing number of industry professionals are also turning to replacement kits that utilize polyurethane, which can make the whole system impervious to corrosion and premature replacement.

## Prolonging life

The more acidic the soil, the sooner cast iron curb box caps will corrode, making it difficult or even impossible to access the water shut-off valve. Typically, the curb box cap will “freeze up” due to corrosion. Then when a technician tries to remove the cap, the nut or cap will break.

The common curb box cap repair procedure is to dig a wide, deep hole around the broken equipment, cut the cast iron tube below the affected





**Acidic soil can rapidly corrode cast iron infrastructure and compromise the entire curb box/curb stop apparatus.**

plastic, cannot be damaged from impact with lawn mowers or plows and remains pliable even in extreme cold.

The sleeves are 6 to 18 inches in length with two small fins. The top opening is sealed with a cap that will never rust and seize.

Installation is simple: Just cut off the top of the old pipe, and

area, splice an extension by either manually threading the broken pipe and using a threaded coupler or by using a coupler with two setscrews, and then replace the cast iron top. However, this takes hours and still exposes the curb box to the possibility of corroding again in a few years.

If acidic soil corrosion has affected the curb stop (the lower portion of the curb box that houses the water shut-off valve), then a more extensive repair is required. This often requires a crew using heavy equipment to dig out and replace the entire curb box apparatus, adding hours of labor.

In response, Krueger and the Waverly Sanitary District turned to the Speedy Sleeve, a noncorroding, quick-repair curb box product made of polyurethane. It's made by Argonics, a Michigan-based design and manufacturing firm specializing in high-performance materials.

The product enables repairs of the corroded or broken top portion of curb boxes in minutes to provide access to the water shut-off valve, and it was specifically engineered for extended use, low maintenance and easy installation. It doesn't rust or corrode like cast iron, won't shatter or crack like

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**“We were looking for something with a much longer life span than 10 years.”**

**Bob Krueger**

then slip on the sleeve. To get a snug fit at an appropriate level — above or below ground — dig out around the pipe and then tap down with a hammer. The fins stabilize the device in the soil so it won’t twist or move due to frost heaving. They are always easy to locate because the cap is designed with an embedded magnet.

After successful use of the sleeves for quick repairs, the Waverly Sanitary District also utilized Speedy Sleeve poly curb box systems to replace a large number of systems that had corroded and were no longer viable. Corrosion was so significant that the district was replacing its curb boxes every five to 10 years.

When used with off-the-shelf PVC piping, the Speedy Sleeve curb box systems replace the entire curb box/curb stop apparatus.

“We were looking for something with a much longer life span than 10 years,” Krueger says. “We like the curb box because it’s a noncorrosive product and because of the ease of installation. These boxes installed easily, they’re easy to adjust and they don’t rely on metal threaded couplings.”

The simplicity of the design enables adjusting the height of the Speedy Sleeve repair kit and complete curb box system to the desired final grade in seconds. Both are engineered to be installed with ease in concrete drive-ways and sidewalks.

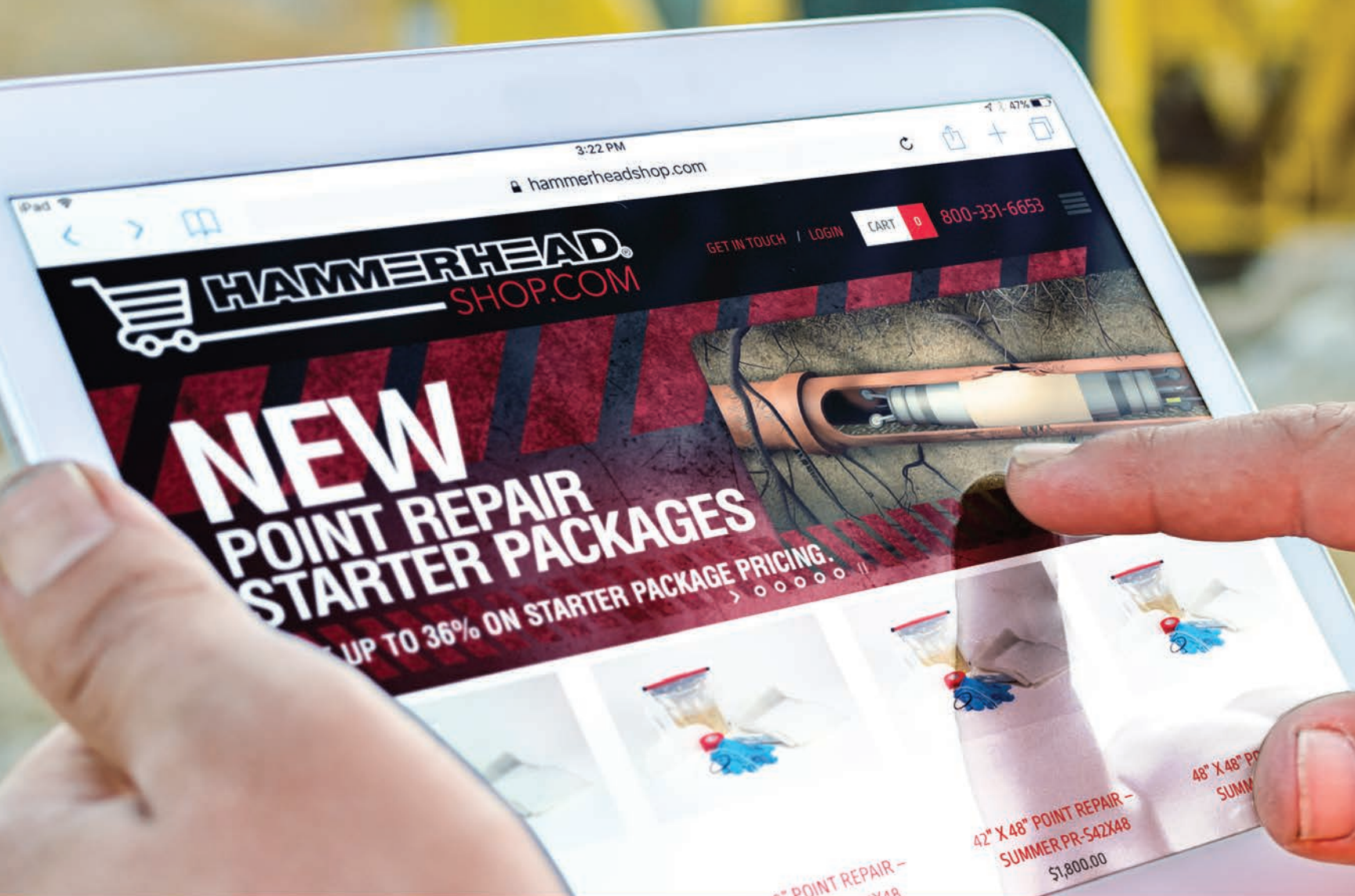
Unlike proprietary cast iron repair tops and bottoms, which often vary in thread pitch so they cannot be mixed and matched, the Speedy Sleeve

**Speedy Sleeve curb box systems are easy to install, and when used with off-the-shelf PVC piping, can replace the entire curb box/curb stop apparatus.**

units have a universal design that accommodates most industry variations and adjusts to height. This minimizes required inventory space.

With the life span of aging municipal waterworks infrastructure being shortened by acidic soil conditions in many parts of the country, proactive supervisors are increasingly extending service life and reducing maintenance by turning to polyurethane alternatives that will not corrode. ♦





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# TROUBLE UNDER FOOT

The rising toll of water main breaks, sinkholes and hidden leaks requires a new approach

By Suzan Chin-Taylor

Sinkholes and washed out infrastructure are a growing problem for municipal utilities as failing water mains erode surrounding soil.



Water main breaks are often associated with cold weather freeze-thaw cycle effects, but in recent years, the number of breaks, subsequent sinkholes and leaks have been on the rise regardless of season or climate.

Some municipalities with the means to take a proactive approach to the growing problem have been able to stay ahead of the wave and mitigate catastrophic impact, but for many municipalities it's tough to get out of the reactive mode.

"One of the challenges for an asset owner is having enough data to make a truly informed decision," explains Michael Twohig, project director for subsurface mapping at DGT Associates of Boston. "Unlike sanitary sewers, there aren't many easy and inexpensive options to test water pipelines from the inside. Ultrasonic testing can be used for larger lines to check the wall seam thickness or corrosion, but it is very difficult to perform this over the entire pipeline. Spot inspections are helpful, but again, it doesn't guarantee the integrity of the entire line, so even with rigorous testing, it may not preclude the system from

having failures in between the tested locations."

Trenchless technology has helped extend the life span of water delivery systems, but many sections have reached or gone well beyond their intended design life and the best resolution is replacement.

According to a recent study by The University of Utah, water main break rates have increased by 27% in the past six years. The major-

ity of those breaks are occurring in cast iron and asbestos cement, which make up almost half of the water mains in North America. Smaller municipalities experienced twice the number of breaks as larger metropolitan areas, and the overall rise in breaks is expected to grow exponentially over time. The study goes on to advise utilities across the country to "rapidly accelerate pipe replacement schedules to avoid



**“One of the challenges for an asset owner is having enough data to make a truly informed decision.”**

**Michael Twohig**

potentially serious economic and social impacts.

“An average of 0.8% of installed pipe is replaced each year across the country. This equates to a 125-year national pipe replacement schedule. Pipe replacement rates should be between 1% and 1.6%, equivalent to 100- and 60-year replacement schedules, respectively. In general, pipe replacement rates need to increase.”

### **Not so obvious effects**

“There are quite a few ramifications to having a water pipeline failure, with the most obvious being the inconvenience to the customers and residents,” Twohig says. “It’s the one we always think about, but there are many larger challenges that happen in the surrounding environment. For example, in the Boston area where we are located, there have been several breaks that have impacted hospitals and flooded basements and patient care facilities.”

Remediation and reconstruction costs can be high. In addition, erosion of material from a break makes an area highly susceptible to sinkholes. Even after a repair is made, leaks may have been in existence for extended periods, making it difficult to measure the extent of material loss. Sinkholes may not appear for weeks, months or even years after a repair has been made, creating a false sense of security for the community after the immediate crisis and repair work is done.

“Budgets will always be a challenge, and some things you will not be able to prevent. But there are some things that municipalities can do to help reduce the damage and make things more manageable and less stressful for their response teams,” Twohig says.

A robust and accurate mapping of assets, their age, composition, community information and demographics is critical to performing work efficiently. The added benefit of this is the ability to make well-informed decisions on whether to fast-track lines that may need replacement or identify those that are candidates for rehabilitation with less-invasive trenchless technology.

### **Be prepared**

Applying the Boy Scouts motto to water system data has even more value beyond the obvious maintenance and repair needs. In areas that have been identified as high risk, ensuring that all valves

are functioning properly is critical.

“Having a highly detailed inventory of where all of the assets are, in particular shut-off valves and facilities and also the proximity or spatial awareness to other critical facilities or utilities, can be of incredible value to first responder crews that need to be able to locate the valve quickly to reduce the impact of the incident,” Twohig says. “When you’re in a foot or two of water in the middle of the night during freezing conditions, it isn’t easy for crew members to figure this out quickly.”

Having asset data and maintenance records available on mobile devices is also proving helpful. Cloud-based systems can even query the names of other asset owners who need to respond to an emergency One Call ticket before repairs can begin.

GIS is essential but has some limitations, as it is intended to be primarily informational. It

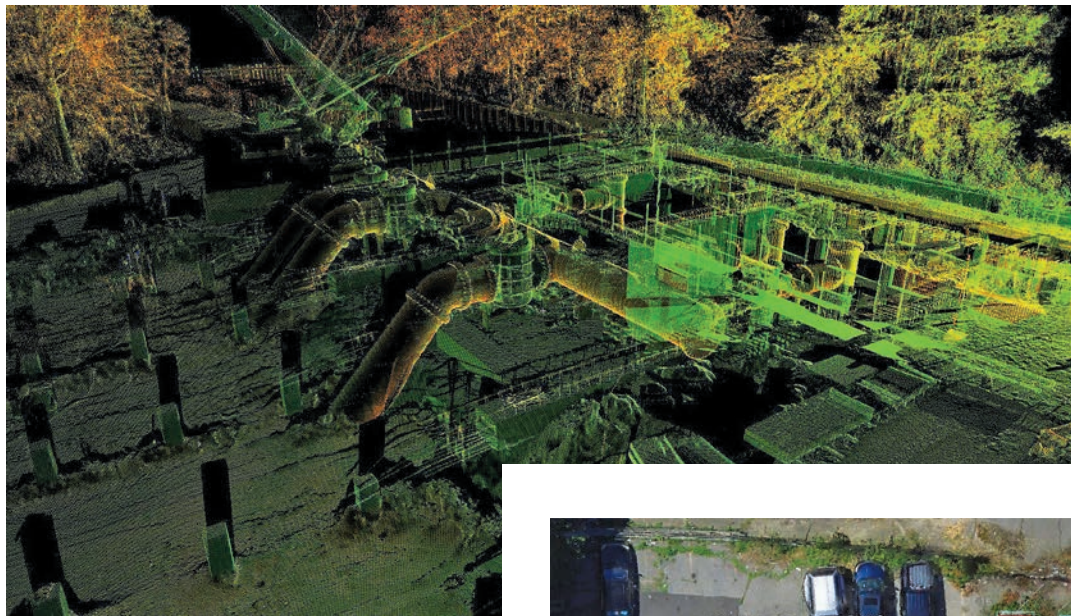
Water main breaks are hardly a new phenomena, but aging infrastructure is leading to growing problems. A recent University of Utah study shows water main breaks have increased 27% in the past six years.



was not designed to be exact, like a survey-grade drawing. In addition to helping crews quickly pinpoint exact locations of shut-off valves and the composition of infrastructure to prevent as much damage as possible, having survey drawings tied into GIS can offer valuable insight about the surrounding area and any other assets or infrastructure that could be impacted. All of this information can help other utilities and crews be as prepared as possible in the event of a catastrophe.

Take for instance a major water main break in Philadelphia’s downtown business district during a summer heat wave. When the main broke, spilling approximately 15 million gallons of water, the flood spread in multiple directions and closed surrounding streets. Over 1,000 customers were without power for an extended period in the extreme heat, and businesses were completely shut down. The break left mud and debris for





**“When you’re in a foot or two of water in the middle of the night during freezing conditions, it isn’t easy for crew members to figure this out quickly.”**

**Michael Twohig**

**Accurately mapping infrastructure is critical for effective response to main breaks and mitigating the peripheral damage they cause.**

## FIGHTING THE CURRENT

Certain areas are more prone to water leaks, breaks and sinkholes, including those exposed to a high influence or subjected to electrolysis.

For example, waterlines or other buried utilities situated close to subway or electrified rail systems would be subjected to electrolysis. In San Francisco, waterlines located close to a streetcar line experience accelerated water leaks and premature failures due to the influence of stray current.

“On one of the pipeline projects our firm worked on in metropolitan Boston, asset owners claimed that in the area of streetcar systems, there was one line that was losing over a hundred pounds of metal a day due to accelerated corrosion from stray current,” says Michael Twohig, project director for subsurface mapping at DGT Associates.

Cathodic protection can help prevent the acceleration of this pipeline corrosion from electrolysis and has been used successfully in the past. The “sacrificial anodes” are buried next to pipelines to rust away and stop or prevent the acceleration of the nearby pipeline’s corrosion.

“For municipalities that need to prioritize due to budget constraints, adding locations in these high-voltage areas to the priority list for more testing, rehabilitation or replacement is worth considering to avoid inevitable and more rapidly developing waterline failures,” Twohig says.



blocks around the site with one major street being closed indefinitely. It took months to fix the crater created by the break, and the financial impact to businesses and a major hospital in the affected area was estimated to be in the millions.

Communities rarely have the patience for long failures, so having the necessary information to reduce response and corrective time is a huge advantage.

### Drones and heat mapping

The use and application of drones is another proactive approach to assessing water system health. In addition to surveying and mapping, drones can be equipped with remote sensing technologies such as infrared that can utilize thermal deviations to help identify possible leaks and potential sinkholes earlier than visual inspections. They can be preprogrammed with specific flight paths to inspect and record a systems’ health status in high-risk areas and populate even more detail in an agency’s current GIS database.

Leak detection programs also help cities stay ahead of catastrophic breaks and leaks, but they often come with a hefty price tag. Designed to be deployed throughout a system to detect water loss that can be indicative of a pipeline that’s about to rupture, they can be tied to GIS and asset management systems to dispatch a crew

before the break happens.

This level of monitoring and maintenance can be very effective, but it requires a large investment that many cities simply haven’t found the budget to implement. For those cities looking to move to a more proactive mode within their budgets, Twohig suggests using “heat mapping” to help prioritize.

“The use of heat maps is becoming commonplace in many industries. Whether it’s in politics or other metrics that you’re trying to evaluate, it’s a very intuitive, visual-orientated approach.”

For municipalities, the map of their environment would be populated with the number of incidents. As the incident number grows, the color would change from green to yellow to orange to red. Once at the red level, managers can direct available budgets to be focused in those hot areas.

“When you have a large system with a limited budget, having a heat map helps you pinpoint readily where you need to dedicate resources to stay ahead of catastrophic failures,” Twohig says. “You may not prevent everything, but you will be able to shift more in the direction of maintaining your assets proactively and perhaps have fewer sleepless nights worrying about or dealing with breaks and the aftermath.” ♦



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Troy Wilson, Jimmy Wichmann and Chris Dankinbring (from left) seal the seams on the outside of a manhole with Gator Wrap (Sealing Systems) after installing Cretex Pro Rings. (Photography by Denny Medley)

# BUILDING SELF-RELIANCE

Olathe is reaping the rewards of stretching its in-house maintenance and rehabilitation capabilities

By Giles Lambertson

Olathe, Kansas, is a growing suburb of the Kansas City metropolitan area with 141,000 people and almost 11,000 manholes. Ira Speer oversees the systematic revitalization of the manholes as part of his supervision of the wastewater and water systems in the state's fourth largest city.

Manholes are not Speer's exclusive focus. As supervisor of field operations in the utilities

department, he oversees projects for the city's wastewater, water distribution and lift station systems. In addition, if the manager of the city's in-house utilities construction crew isn't available, Speer is the man they turn to.

A native of the area — his home is Wellsville, 21 miles southwest of Olathe — the 40-year-old Speer needed a job 16 years ago, signed up as an inexperienced worker in the Olathe utilities

(continued)



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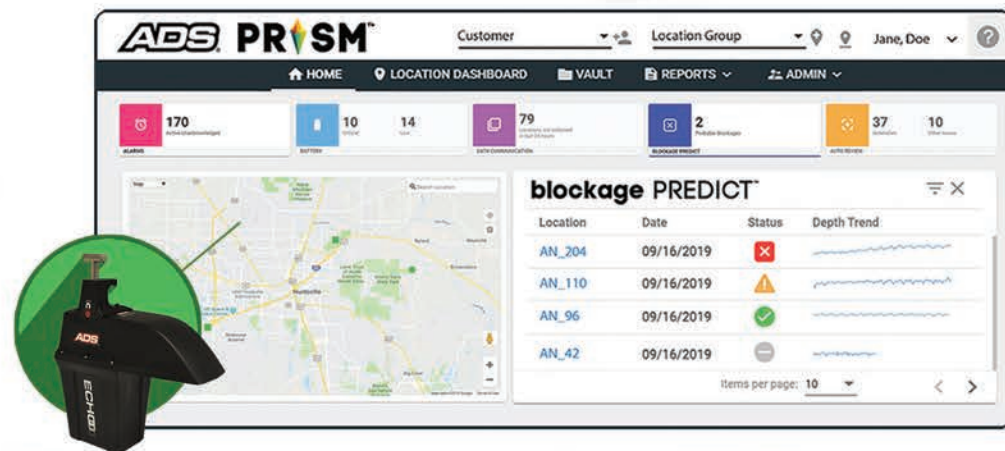
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department and rose to his current position.

Of the 46 employees in the utilities department, a crew of 15 is tasked with sewer system work. They are grouped into specialty crews — inflow and infiltration, manhole, lift station, etc. — Public Works employees generally are cross-trained to step in and complete necessary tasks outside their areas of expertise. This is true of both water and wastewater staff members.

“We do a lot of cross-training, even someone in daily operations. If someone goes on vacation, we’ll pull someone from a different crew,” Speer says. “We want an employee to have at least a general knowledge of other work. It gives them opportunities to grow. Some, like me, came to the work without knowing much about it. Some employees like the water system better than waste-

water, but cross-training gives all of them more options and gives supervisors options as well.”

Besides doing urgent tasks that periodically crop up and require shuffling of personnel, cross-trained workers are also able to cover for one another on weekends when emergency calls sometimes come in. A cross-trained wastewater crew member usually has enough general knowledge to take care of, say, a leaking water distribution line.

### Assessing the system

Olathe is methodically assessing and rehabilitating its manholes and mains, a project going well enough to have warranted a presentation by Speer earlier this year to other utility departments. In it, he walked through Olathe’s 10-step

**“We want an employee to have at least a general knowledge of other work. It gives them opportunities to grow.”**

Ira Speer

process of assessing, fixing and sustaining various components of the system.

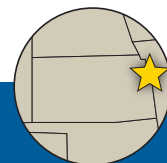
Assessments are chiefly based on CCTV inspections. The city has three trucks outfitted with cameras to do the work. First, though, the department’s cleaning crew methodically flushes a segment of pipe using one of the department’s two combination hydrovac trucks or a jetter unit. It is constant work. The crew is tasked to clean 750,000 feet of line annually — or about 140 miles of the 446-mile network of PVC and clay pipe.

Then the city’s camera crew moves in to produce a visual baseline of the condition of a line or manhole. The inspection crew scores each manhole or line segment, and all the scores are prioritized for scheduling of repair or replacement work. The department’s goal is to inspect and score 2,000 manholes and 385,000 feet of pipe each year.

Crews have begun using a new hand-held laser scanner to evaluate the infrastructure. The collected CCTV images and laser data are supposed to help the department manage the system — and it appears to be working: The 2019 goal was to have a dozen or fewer pipeline blockages; to date, the city has experienced none. “We’re staying ahead of it pretty well,” Speer says.

The city’s wastewater is routed to two treatment plants. The larger one, Cedar Creek, can handle 23.25 mgd. A smaller plant on Harold

(continued)



### PROFILE: Olathe (Kansas) Public Works

**SERVICE AREA:**  
60 square miles

**WASTEWATER CUSTOMERS:**  
30,600

**TREATMENT PLANT CAPACITY:**  
Cedar Creek plant, 23.25 mgd;  
Harold Street plant, 6.4 mgd

**WASTEWATER INFRASTRUCTURE:**  
446 miles of sewer mains,  
10,800 manholes

**PUBLIC WORKS EMPLOYEES:**  
46 (15 in sanitary sewer division)

**WEBSITE:**  
[www.olatheks.org/government/public-works](http://www.olatheks.org/government/public-works)



Troy Wilson applies sealant to a new Cretex Pro Ring to be installed on an existing manhole along a bike/pedestrian trail.





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**Olathe sewer department crew members Mike Fitzwatel (left) and Vince Wolfe clean a residential sewer line.**

**“Inflow has always been there. With the data collection and inspection going on now, it’s just more obvious.”**

**Ira Speer**

Street has a capacity of 6.4 mgd. In drier summer months, the flow to the plants is far less.

Most of Olathe’s manholes are brick, but

there are also some precast concrete access points in the system. Manhole upgrades include raising the structures to grade in cases where street paving work or landscaping have left the covers low. The city has opted to use a nonconcrete extender — PRO-RING from Cretex Specialty Products — which is fabricated of expanded polypropylene.

“They work great,” Speer says. “They’re lightweight and durable. Because of their

weight, working with them is a lot safer from an employee standpoint. The lightness was a big factor for us.” A PRO-RING weighs about 14 pounds and can be installed by one or two people without using brick and mortar.

I&I point repair on manholes includes sealing the structures’ lower levels with grout. Covers are replaced in the course of the repair, usually with an EJ composite hinged product. “Old covers don’t have a lockdown mechanism and are heavy to lift,” Speer says. “These new lids are harder to tamper with, are a little bit lighter and the hinge makes them more user friendly.”

#### **In-house or subbed out**

Speer has a four-person crew dedicated to manhole maintenance — one supervisor and three workers. They work on sewer mains and some auxiliary lines 90% of the time, with the other 10% filling in as needed elsewhere. A typical manhole project is completed in one or two days — flushed, inspected, grouted, raised (if needed) and newly lidded.

Major manhole rehabilitation includes lining the structures to eliminate I&I. Two years ago, the city awarded a local company a \$650,000 contract to perform such work on 370 manholes. “The size of the project was beyond our in-house resources,” Speer says. Each of the manholes had been laser-scanned by the city and determined to be in poor condition from hydrogen sulfide corrosion. A Zebtron polyurethane wrap was installed on each structure, effectively extending the life of the structure by 50 years — all at less cost than replacement of the entire manhole structure.

Other preventive programs in the Olathe wastewater department deal with the system’s 22 lift stations and 135 creek crossings. A weekly, biweekly, monthly and quarterly inspection schedule for the lift stations is being followed, and up to \$2 million will be invested annually for the next five years to replace or upgrade them as needed. Of the creek crossings, 20 are exposed; and after each significant rain event, the exposed pipe is inspected and photographed to document erosion and any other risks to the pipe.

The city’s aggressive attempt to minimize I&I will continue for the foreseeable future, Speer says. About half of the 180 identified infiltration hot spots have been addressed, most of them in aging 8-inch standard lines. The department is determined to curb the inflow by integrating each repair into an overall repair plan. Otherwise,

*(continued)*

## **CLEARING THE AIR**

Sometimes neglected in preventive maintenance routines is inspection of the air release valves in force mains near a pump station. The Olathe (Kansas) Public Works collections system has 22 lift stations, with 44 identified valves.

Ira Speer, field operations supervisor who oversees water and wastewater fieldwork, has assigned his manhole maintenance crew the job of keeping tabs on the valves. “A lot of times, the valves get forgotten about in a system,” Speer says.

If the valves aren’t maintained in working order, air at a high point in the line can become trapped. This reduces efficient flow of wastewater. In worst case scenarios, the air can become locked in place and block flow.

When near a lift station, the condition can also cause damage to pumps. So, venting the lines is important for proper function of the system and preservation of system components.

In Olathe, the air release valves themselves are inspected twice a year. During the second inspection, the lift stations are turned on to make sure no damage has occurred. This comprehensive inspection process is routine thanks to electronic service records accumulated year by year and accessed as needed by the inspection crew.

“They have looked at the service records before they even get on site and take a picture each time,” Speer says. “It all really gives the inspection employees a good handle on what they are seeing.”



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## ADDRESSING PROBLEMS IN-HOUSE

Olathe (Kansas) Public Works has a reputation for undertaking more in-house rehab and construction work than most utilities attempt. The city department didn't decide overnight to do more of the work itself and rely less upon contractors — the work pattern evolved.

"For a municipality like us, it is a little unusual," says Ira Speer, field operations supervisor. "It came out of management and just progressed. We did a little bit in-house and then began to do more. I think there is a lot of good that comes from it."

Not every project is undertaken by Olathe crews. A two-year manhole rehab job was contracted out to a local company because the overall project outstripped the capacity of Speer's team to do it. Yet there are times when doing the work themselves has real-time benefits.

"When one of our crews — say, the inflow and infiltration crew or manhole crew — is out in the field and sees something leaking, if you contract out the repair work, a contractor usually can't get there in time to stem the flow," Speer says. "What we can do is quickly address a problem — take care of it right away instead of waiting and putting a big list of repairs together. We all work together when we see one of these issues in our system. We make a work order and get on it."

Repairs are seasonal in eastern Kansas, a place where the average temperature is 30 degrees F in January and 80 degrees F in July and 36 inches of rain falls most years. "When the wet times come in April and May, we are focused on I&I work because we can find the leaks easier. When it turns hotter and drier, we shift gears and get caught up in doing point repairs on pipes. We prioritize work according to the weather."

Speer sees two benefits from the extra in-house rehab work. The first one is obvious: A damaged or broken system component is fixed right away instead of being put on a back burner. The other benefit is the impact on employee morale. "Employees can see their efforts to find problems are highly valued and the problems they identify are quickly acted upon. This helps build the team."

**Field Operations Supervisor Ira Speer with crew members Vince Wolfe, Mike Fitzwatel and Chris Dankinbring of the Olathe sewer department.**

a problem just migrates to another vulnerable area in the line.

"Inflow has always been there," Speer says. "With the data collection and inspection going on now, it's just more obvious. I know we can't fix it all." Still, he adds, being able to track and anticipate the underground issues enhances the department's ability to manage them and budget for them.

Speer cites the measurable benefits of one I&I project at a lift station: Inflow was reduced by 48%, the cost of electricity to operate the pump was reduced by \$88 per month and the whole intervention cost less than \$600. These are the kind of numbers that keep employees enthused about their rehab work.

Other in-house maintenance tasks by Olathe Public Works crews include pipe bursting, something the department has been doing for a decade. The utility's construction crew is currently replacing a water-line using the bursting method. It's all part of the evolution of the staff and the technology available to them.

"When I started, we had clipboards. Now we have iPads," Speer says. "Our employees have all the information they need right at their fingertips. Need a map? Pull it up. When they arrive at a job site, all the needed information is right there on their iPads." ♦

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# GRANTS FOR INFRASTRUCTURE

Government Relations Committee building traction in Washington, D.C.

By Sheila Joy

**N**ASSCO's mission to set standards for the assessment, maintenance and rehabilitation of underground infrastructure is a noble and long-standing goal. This all hinges, however, on sufficient government funding to do inspections, maintain our systems and repair aging infrastructure.

As a 501(c)(6) not-for-profit organization, one of NASSCO's primary responsibilities is to advocate for our industry by building awareness of the need to rehabilitate water and wastewater pipes and to make the condition of underground systems top of mind when infrastructure budgets are being created.

In 2018, NASSCO advocated before Congress for the establishment of a grant program to provide funding assistance to communities for combined sewer overflows, sanitary sewer overflows, and stormwater collections and conveyance infrastructure improvements. NASSCO, along with like-minded organizations such as Water Environment Federation and others, was successful in this endeavor: America's Water Infrastructure Act of 2018 (Public Law 115-270) was signed into law on Oct. 23, 2018, and section 4106 established this new grant program.

The work, however, has just begun. When infrastructure budgets are considered, water, sewer and stormwater systems are sometimes out of sight, out of mind. Attention often goes to the repair of roads, bridges and airports — all of which can be seen. This makes the work NASSCO does even more critical. Consider, for example:

- A vast majority of the nation's sewer pipes were installed in the years just following World War II, meaning they are at or beyond their design life (a typical design life is 50 years).
- Increased volume and changes in population are placing a greater demand on these systems, which have not proportionally benefited from the increased federal and state funding available for treatment works following passage of the Clean Water Act in 1972.
- The Environmental Protection Agency estimates that at least 23,000 and up to 75,000 SSO events occur in the U.S. each year.

Congress will be providing funding for America's Water Infrastructure Act of 2018 in the 2020 fiscal year budget, and the EPA will likely begin offering grants to communities in late winter or spring of 2020. The momentum is building, so make sure your voice is heard.

NASSCO has made it easy by creating a grassroots program, NASSCO's Sewer System Heroes. Available at [www.nassco.org/government-relations](http://www.nassco.org/government-relations), NASSCO members and nonmembers alike can make a difference by simply clicking "Take Action" and sending a prewritten communication to your local officials. ♦

**NASSCO (National Association of Sewer Service Companies)** is located at 2470 Longstone Lane, Suite M, Marriottsville, MD 21104; 410-442-7473; [www.nassco.org](http://www.nassco.org)

Sheila Joy is executive director of NASSCO. She can be reached at [director@nassco.org](mailto:director@nassco.org).

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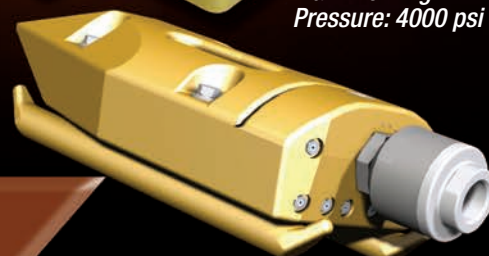
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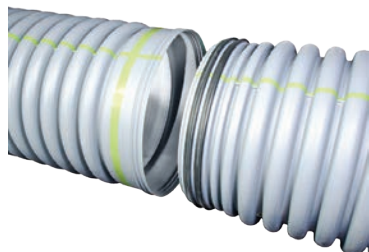
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By Craig Mandli



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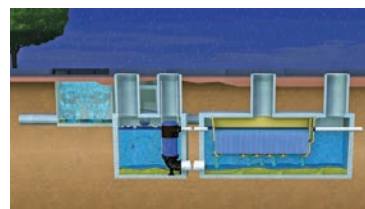
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**Flex-Seal Utility Sealant** from **Sealing Systems** is a plural-component aromatic urethane with 800% elongation and a tensile strength of 3,200 psi. It is designed to prevent inflow and infiltration and to provide corrosion protection at the grade adjustment ring section or joint section. It provides an ideal seal and will pass a vacuum test according to ASTM standards. The internal seal is manually applied using a paintbrush, and the kit is designed to cover 12 vertical inches on a 27-inch-diameter manhole. **800-478-2054; www.ssisealingsystems.com.**

### Teledyne ISCO LaserFlow Ex

The **LaserFlow Ex** noncontact velocity sensor from **Teledyne ISCO** is designed for intrinsically safe locations. The subsurface flow measurement sensor is certified for hazardous areas classified as Class 1, Div. 1, Zone 0 and ATEX category 1G. The LaserFlow Ex can remotely measure flow in open channels with noncontact Laser Doppler Velocity technology and noncontact Ultrasonic Level technology. The sensor measures velocity with a laser beam pointed below the surface of the water or wastewater stream. It offers built-in diagnostic tools, simple installation and minimal maintenance, which reduces the number of site visits. With a variety of communication options, programming and data retrieval can be performed from a remote location. **800-228-4383; www.teledyneisco.com.** ♦



**Sealing Systems Flex-Seal Utility Sealant**




**Teledyne ISCO LaserFlow EX**

## ADVANCED WATER LEAK DETECTOR

The LD-18 Digital Water Leak Detector uses patented technology to significantly reduce ambient noises from dogs barking, footsteps, people talking, etc. The digital amplifier samples the sounds every few tenths of a second, rejecting intermittent sounds instantly.

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A worker in a blue hard hat, orange safety vest, and blue jeans is using the LD-18 Digital Water Leak Detector. He is holding a handheld device connected by a cable to a probe on the ground.

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## Cloth media filters treat combined sewer overflow

### Problem:

The city of Rushville, Indiana, had to comply with a 2007 consent order for combined sewer overflows polluting the Flatrock River. The city planned to install a 1 million-gallon stormwater storage tank.



### Solution:

The city was approached by **Aqua-Aerobic Systems** with a pilot test proposal using the **AquaStorm** cloth media filter. The pilot study captured events from May to July 2015. The results prompted the city to request a design for an AquaStorm filtration system that could treat both dry- and wet-weather flows. An alum coagulant was to be injected upstream of the filters to meet future effluent phosphorus limits and eliminate fine CSO particles.

### RESULT:

Two 14-disk AquaStorm systems started up in July 2017 with a design average flow of 1 mgd (dry) and 12.6 mgd (peak wet weather). The filters were retrofitted to abandoned sand media filter structures, saving capital costs. The system cost \$1 million less than the storage tank proposal. This was the nation's first AquaStorm filter installation for dual tertiary/wet-weather treatment, and it will keep some 50 million gallons of raw sewage per year from entering the Flatrock River. "With the addition of the AquaStorm filter system and new UV disinfection system, Rushville is discharging the best quality of water to our receiving stream, Flatrock River, than in years past," says Les Day, utilities director. 815-654-2501; [www.aqua-aerobic.com](http://www.aqua-aerobic.com).

## Liner used to end I&I issues in precast manholes

### Problem:

Along one length of the Carroll County (Maryland) Bureau of Utilities' sanitary sewer force mains, there are nine precast manholes. As with most aging municipal infrastructure, they required regular attention and rehabilitation in order to eliminate inflow and infiltration through their leaking joints.

### Solution:

Pleasants Construction recommended **Epoxytec's CPP Sprayliner**. This 100% solids, high-build epoxy paste is blended with fiber-reinforced polymers,

providing high strength with flexural properties. The product was applied using an Epoxytec CPP Sprayliner rig. Materials flow through separate (part A and part B), continuously heated hoses. The system has a fixed ratio of 1-to-1 by volume. This structural product was sprayed to achieve a thickness of 100 mils.

### RESULT:

Applied by a four-man crew, the entire application to all nine manholes took five days. "When searching for manhole solutions, it's important to find a product with hydrogen sulfide resistance and sealed I&I barrier protection," says Ron Callahan, director of construction for Pleasants Construction. "CPP Sprayliner offers that protection in an easy-to-apply method." The successful application and completion of this project will eliminate I&I from these manholes, thus eliminating the costly routine maintenance that was previously required. 877-463-7699; [www.epoxytec.com](http://www.epoxytec.com).



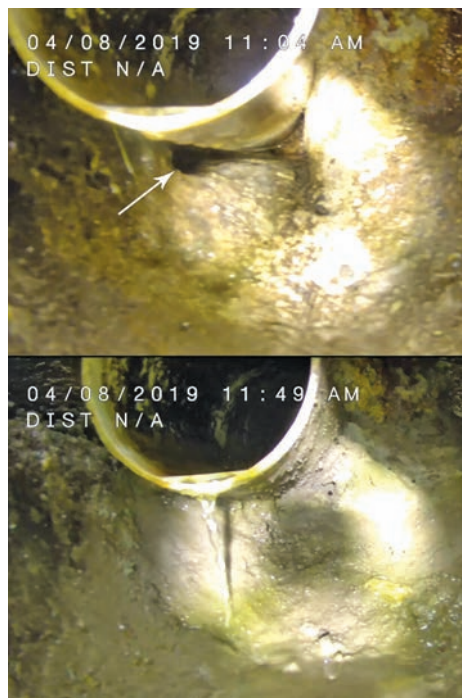
## Sealing products stop manhole leaks in minutes

### Problem:

During a newly developed inspections program in the town of Ithaca, New York, infiltration was found throughout the system's manholes. Joseph Slater, Water & Sewer maintenance supervisor for the town's Public Works Department, needed to find an economical solution for active leaks that could be handled entirely with in-house personnel.

### Solution:

**PARSON SEAL-TITE** and **PARSON QUICK PLUG**, both part of the manhole rehabilitation product line from **Parson Environmental Products**, were chosen because of their ability to stop active leaks in minutes. PARSON SEAL-TITE is a moisture-





insensitive, two-component, fast-reacting hydrophobic polyurethane grout designed to stop high-volume active leaks up to 50 gpm. It is injected at or near the source of the leak, using a manual dual-component caulk gun. The product cures to a dense, rigid mass in approximately 30 seconds and contains no solvents, CFCs or HFCs. PARSON QUICK PLUG is a hydraulic cement material that is mixed with clean, potable water to produce an extremely rapid setting plug. It is inserted into prepared areas to stop active leaks under low to moderate pressure and is suitable for sealing around pipes and conduits.

#### RESULT:

The products were able to quickly and effectively stop the active leaks, even in the most difficult areas on the bottom side of the pipe at the invert. 800-356-9023; [www.parsonenvironmental.com](http://www.parsonenvironmental.com).

## Monitoring system enables utility to optimize sewer cleaning

#### Problem:

San Antonio Water System was struggling to sustain the demands of monthly cleaning for nearly 200 sites to prevent sanitary sewer overflows in response to an Environmental Protection Agency consent decree. The collections system has about 110,000 manholes and pipeline segments.

#### Solution:

SAWS deployed **Smart-Cover Systems** at high-frequency cleaning sites over 70 miles of sewer line and performed cleaning only as needed. Smart-Cover Systems combines real-time monitoring, data transmission via satellite communications, software and analytics to guide sewer operators to exactly where and when to clean.



#### RESULT:

SAWS now monitors level trend changes, and SmartCover Systems provides automated messages for anomalies, allowing the utility to clean only when necessary instead of just in case. The combination of real-time monitoring and trend analysis provides powerful, predictive insights into the behavior of the collections system, enabling visibility of potential problems days or weeks ahead and concurrently providing continuous overflow protection while dispatching cleaning crews only as needed. 760-291-1980; [www.smartcoversystems.com](http://www.smartcoversystems.com). ♦

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Contact [jbird@slrwd.org](mailto:jbird@slrwd.org) with any questions

#### DESCRIPTION:

Steuben Lakes Regional Waste District (SLRWD) is a utility based in Indiana, US that has been in operation since 1975 and responsible for protecting the local river watersheds including Steuben County's tourist-attracting natural lakes and streams. The District's service area includes several townships within Indiana and extends to some townships within the bordering state of Michigan. Within the District's service area is a diverse set of industries including a significant manufacturing population, a university and tourism. In addition, population growth is anticipated as IT and renewable energy sectors are emerging in the area.

Factoring in the operating costs for field maintenance resource deployment to constantly address prohibitive discharge that results in clogging, the problem was clear. The District needed a more effective way to address sewer collection system clogs that was both sustainable and could enable more cost efficiencies. Join SLRWD for an informative webinar where they will detail their technology solution journey for eliminating clogs within their lift stations.

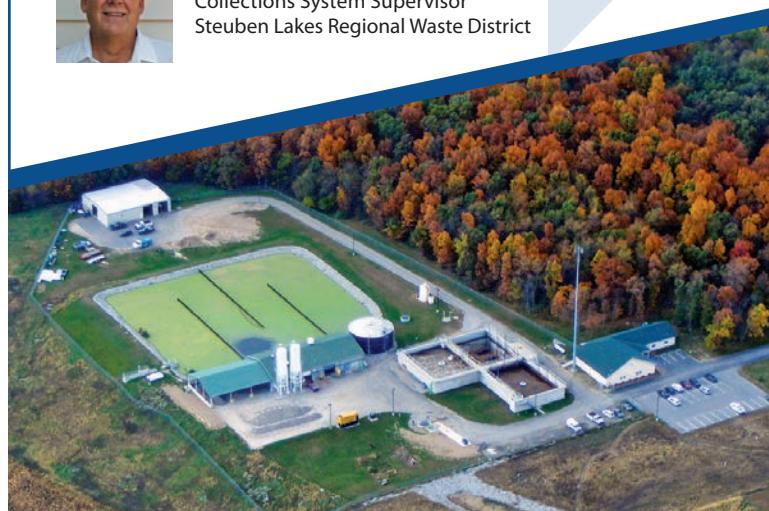
#### SPEAKERS:



**Bryan Klein**  
Superintendent  
Steuben Lakes Regional Waste District



**Bruce Deters**  
Collections System Supervisor  
Steuben Lakes Regional Waste District





# Product Spotlight

Smart tool helps predict blockages before they happen

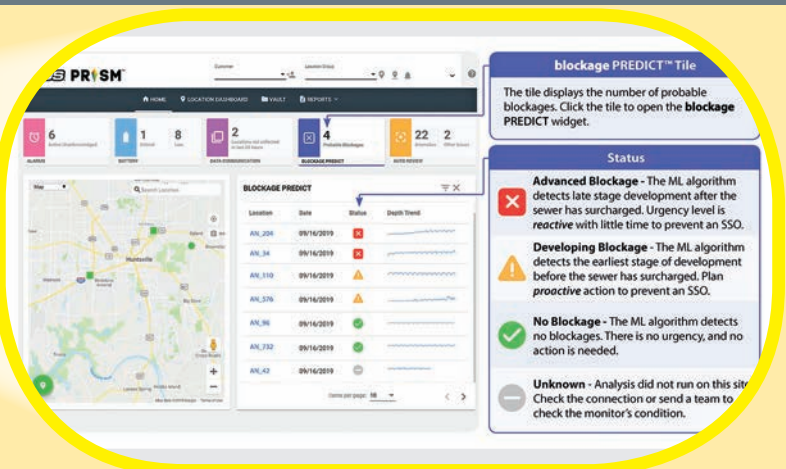
By Craig Mandli

**S**ewer blockages are the main cause of sanitary sewer overflows and often result from grease, roots and debris. Historically, preventive sewer cleaning has been the preferred approach to prevent SSOs caused by blockages, where all sewers are cleaned periodically in a preventive manner to mitigate emerging blockages, while sewers with recurring problems are cleaned on a more frequent basis.

While this approach is effective, it is not always efficient. Therefore, ADS Environmental Services has developed blockage PREDICT to detect the earliest signs of blockages, allowing sewer cleaning resources to be deployed at the right place at the right time in a proactive manner well before an overflow occurs.

Blockage PREDICT works with an ADS ECHO level monitor installed upstream from a location of interest, measuring sewer flow depth at regular time intervals. This data is transmitted periodically to the cloud where a machine-learning algorithm evaluates the data, looking for telltale signs of developing blockages.

"Blockage PREDICT is an advanced app within our PRISM software platform that predicts developing blockages with sufficient advance notice to plan a proactive response with the right resources at the right time to prevent an



overflow well before it occurs," says Eric Lott, senior marketing manager for ADS Environmental. "Using blockage PREDICT in conjunction with level monitoring allows municipal managers to optimize sewer cleaning and prevent SSOs."

The PRISM app itself provides critical data to support management, engineering and operational decisions within a wastewater collections system, connecting clients to any monitoring network, delivering near real-time operational intelligence on the status of the system. It serves as a fast and easy way to visualize the condition of a collections system, offering dynamic analytical functions to fuel discoveries that will lead to enhanced management of the system.

"Our machine-learning application blockage PREDICT, as a component of PRISM, provides a new early warning system for potential overflow-causing blockages in the collections system, with up to a two-week advanced warning before serious problems arise," Lott says. "It provides unique solutions across multiple applications in our industry, enabling sewer cleaning optimization, preventing SSOs and building efficiency in daily operations and maintenance for collections systems managers." **800-633-7246; [www.adsenv.com](http://www.adsenv.com).**

## General Pipe Cleaners stainless steel braid hose

The new high-performance stainless steel braid jet hose from General Pipe Cleaners/General Wire Spring enhances the performance and cleaning power of the portable JM-1000 Mini-Jet and JM-1450 water jet drain cleaners. The durable stainless steel braid makes it easier to slide the jet hose down 1.5- to 3-inch drainlines and more easily navigate tight bends. The 3/16-inch Teflon core reduces flow resistance and improves small-line cleaning power. It is available in 30-, 50- and 75-foot lengths. **800-245-6200; [www.drainbrain.com](http://www.drainbrain.com).**



## SmartCover Systems SubSonic dual sensor

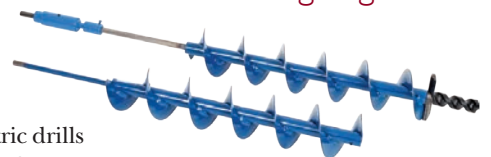
SmartCover Systems' SubSonic dual sensor extends visibility throughout the entire manhole, from the bottom of the channel to the cover. It combines the accuracy of ultrasonic with the wide range of a pressure sensor. The SubSonic embeds a pressure sensor to



monitor costly inflow and infiltration during water surges, such as heavy rainfall events when groundwater and stormwater flows into a wastewater collections system. The sensor detects water level changes from the outset and provides data beyond the point when the ultrasonic sensor becomes submerged. It issues alarms when a manhole is reaching overflow levels and allows wastewater operators to triage manholes to prevent sanitary sewer overflows. **760-291-1980; [www.smartcoversystems.com](http://www.smartcoversystems.com).**

## Custom Auger Systems horizontal boring auger kit

The hand-held horizontal boring kit from Custom Auger Systems combines horizontal auger boring with the power of heavy-duty electric drills to bore distances of 5 to 30 feet or more underground. It's designed in sections so it can be used in tight spaces. An insulating drill chuck adapter helps protect the user from electric shock. The kit can be used for installation of PVC pipe under existing foundations or driveways, running gutter systems or irrigation lines under sidewalks, or shooting pipe under landscaping or other permanent installations. It requires only one person for operation and is less damaging to landscaping than sawing and trenching. **865-585-7861; [www.customaugers.com](http://www.customaugers.com).** ♦







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## NLB announces staffing changes

NLB announced that Bryce Mulligan has been promoted from the vice president of branch operations to the vice president of operations at the company's Wixom, Michigan, location. The company also announced that Renee Walsh has been promoted from the director of customer solutions to the vice president of branch operations for all U.S. branch operations.



Bryce Mulligan



Renee Walsh

## TGI-Connect and PressurePro unveil integration plans

TGI-Connect and PressurePro announced their intent to integrate technology. Announced in conjunction with the opening of Trimble's insight user conference, the completion of this integration would feature wireless connectivity between the solutions, allowing fleets immediate access to real-time tire condition reports for each of their trailers, powered or not. ♦

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## JET VACS



This **2016 Vac-Con** sewer vacuum truck was on a three-year, full maintenance lease with a San Francisco Bay Area Municipality. The lease has expired and this truck is ready for sale. Model: VPD3612LXHAEN-0, price \$294,000. Original price was close to \$500,000. Need more than one? We can help.

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## PEOPLE/AWARDS

**Samantha Harper** was hired as the water superintendent for the Jefferson County (Washington) Public Utility District.

**Christie Baumel** was hired as a deputy mayor for the city of Madison (Wisconsin). Stormwater management will be among her responsibilities.

**Daniel Bobadilla** was hired as Public Works director and city engineer for the city of Chino Hills (California).

**Andrew Flynn** was hired as a technical professional 1-civil by Wood Environment & Infrastructure. Stormwater modeling is among his specialties.

**Jeff Arthur** was hired as director of Public Works by the city of Lafayette (Colorado).

The **city of West Plains** (Missouri) received a \$1.8 million grant from U.S. Department of Commerce's Economic Development Administration. The funds will go toward infrastructure improvements needed to establish stormwater detention basins.

The **Anne Arundel County (Maryland) Department of Public Works' Watershed Protection and Restoration Program** received a Municipal Stormwater and Green Infrastructure Award from the Water Environment Federation.

**Christopher B. Burke** received the 2019 Ray K. Linsley Award for surface water hydrology from the American Institute of Hydrology.

**Water Environment Services** received the 2019 Outstanding Member Agency Award from the Oregon Association of Clean Water Agencies. Water Environment Services earned the award for its leadership in pollution prevention and innovation in environmental management relating to the Carli Creek Water Quality Project.

## LEARNING OPPORTUNITIES

### Webinars

The American Public Works Association is offering a Talking Top Tech webinar on Dec. 5. Visit [www.apwa.net](http://www.apwa.net). ♦

## CALENDAR

### Jan. 14-16

South Dakota Association of Rural Water Systems Conference, Ramkota Hotel, Pierre, South Dakota. Visit [www.sdarws.com](http://www.sdarws.com).

### Feb. 18-20

Illinois Rural Water Association Conference, Holiday Inn, Effingham, Illinois. Visit [www.ilrwa.org](http://www.ilrwa.org).

### March 23-26

American Water Resources Association Geospatial Water Technology Conference, DoubleTree by Hilton, Austin, Texas. Visit [www.awra.org](http://www.awra.org).

### April 14-17

Center for Watershed Protection National Watershed and Stormwater Conference, Renaissance Austin Hotel, Austin, Texas. Visit [www.cwp.org](http://www.cwp.org).

### May 17-21

World Environmental & Water Resources Congress, presented by the Environmental & Water Resources Institute of the American Society of Civil Engineers, Green Valley Ranch Resort, Spa and Casino hotel, Henderson, Nevada. Visit [www.ewricongress.org](http://www.ewricongress.org).

### May 19-22

American Public Works Association North American Snow Conference, Salt Palace Convention Center, Salt Lake City. Visit [www.apwa.net](http://www.apwa.net).

### July 12-15

American Society of Agricultural and Biological Engineers Annual International Meeting, CHI Health Center, Omaha, Nebraska. Visit [www.asabe.org](http://www.asabe.org).

### Aug. 9-12

American Society of Civil Engineers Pipelines Conference 2020, San Antonio (site TBA). Visit [www.asce.org](http://www.asce.org).

### Aug. 18-22

StormCon, Hyatt Regency, Atlanta. Visit [www.stormcon.com](http://www.stormcon.com).

### Sept. 14-16

National Rural Water Association WaterPro Conference, Phoenix (site TBA). Visit [www.nrwa.org](http://www.nrwa.org).

### Nov. 9-12

American Water Resources Association Annual Conference, Embassy Suites by Hilton Orlando Lake Buena Vista South, Kissimmee, Florida. Visit [www.awra.org](http://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](mailto:editor@mswmag.com).



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