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BUILT FROM THE UNDERGROUND UP

Sewer and water upgrades form the foundation of Northern Wisconsin community's downtown streetscape project

PAGE 22

Mark Barden
Project Engineer
Town & Country Engineering

Tim Kingman
Director of Public Works
Rhinelander, Wisconsin

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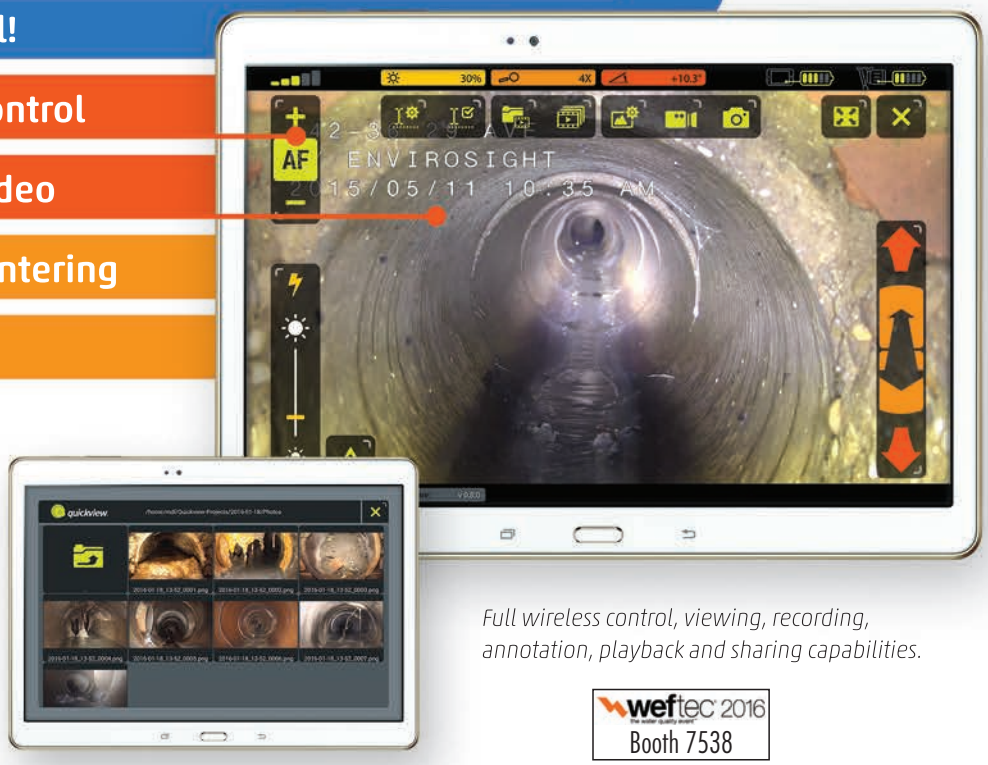

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INSIDE:

PIPELINE INSPECTION, SURVEYING AND MAPPING

ON THE COVER:
Project engineer Mark Barden of Town & Country Engineering (left) and Tim Kingman, director of Public Works in Rhinelander, Wisconsin, on Brown Street in the middle of Rhinelander's downtown sewer and water replacement project. (Photography by Cory Dellenbach)

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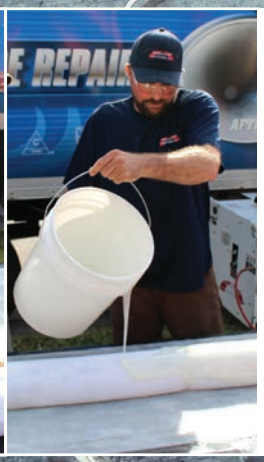

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Published monthly by:

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1720 Maple Lake Dam Rd., PO Box 220,
Three Lakes WI 54562

www.mswmag.com

In U.S. or Canada call toll free 800-257-7222
Elsewhere call 715-546-3346
Email: info@mswmag.com / Fax: 715-546-3786

Office hours Mon.-Fri., 7:30 a.m.-5 p.m. CST

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EDITORIAL CORRESPONDENCE: Send to Editor, *Municipal Sewer & Water*, P.O. Box 220, Three Lakes, WI, 54562 or email editor@mswmag.com.

REPRINTS AND BACK ISSUES: Visit www.mswmag.com for options and pricing. To order back issues, call Nicole at 800-257-7222 (715-546-3346) or email nicole.labeau@colepublishing.com. To order reprints, call Jeff Lane at 800-257-7222 (715-546-3346) or email jeff.lane@colepublishing.com.

CIRCULATION: 2015 average circulation was 37,623 copies per month (U.S. and international distribution).

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DIGGING DEEPER INTO THE STORY

A closer look at a hometown public works project reveals a story that can't be told in just a few pages

FROM THE EDITOR

Luke Laggis

You'll find something a little different in this month's issue of *MSW*. We're taking an in-depth look at a downtown reconstruction project in my hometown — Rhinelander, Wisconsin.

Rhinelander is about six hours north of Chicago, surrounded by big forests and one of the densest concentrations of freshwater lakes in the world. Long ago, the Windy City's Prohibition-era gangsters regularly fled here to escape the law. Al Capone was no stranger to the area, and John Dillinger's famous shootout with the FBI happened about 40 miles away at the Little Bohemia resort.

It's a tourist area, but Rhinelander is more of a commercial and industrial city. Its population is approximately 7,500, but it supports a much broader base of people who live outside the city limits. For the better part of the 20th century, the town's paper mill was the largest employer. It still plays a major role in the local economy, but it's not quite as significant as it once was.

A stroll through downtown Rhinelander exposes a city that has eroded since the mill was at its peak, in some cases significantly. Some buildings show neglect, empty storefronts aren't uncommon, and potholes are ubiquitous on downtown streets. The underground infrastructure was also in decline.

The local government has not invested significantly in its infrastructure, until recently. In 2010, the city's new $25 million wastewater treatment plant went online. The downtown project, which has been in the planning process for years, will cost the city approximately $9 million. In addition to separating the city's remaining combined sewers, and replacing and upsizing water and sewer lines, the project includes a new streetscape that will go a long way in breathing life back into a downtown that has for years suffered from shifting traffic patterns and the proliferation of big-box stores on the city's outskirts.

We've highlighted plenty of projects in these pages over the years, but this is a slightly different approach, and since it's right in our backyard, we're continuing to cover the story in greater depth online. You'll get a good overview of the project in this issue, and then you can immediately head over to MSWmag.com for an update on everything that's happened since we went to press.

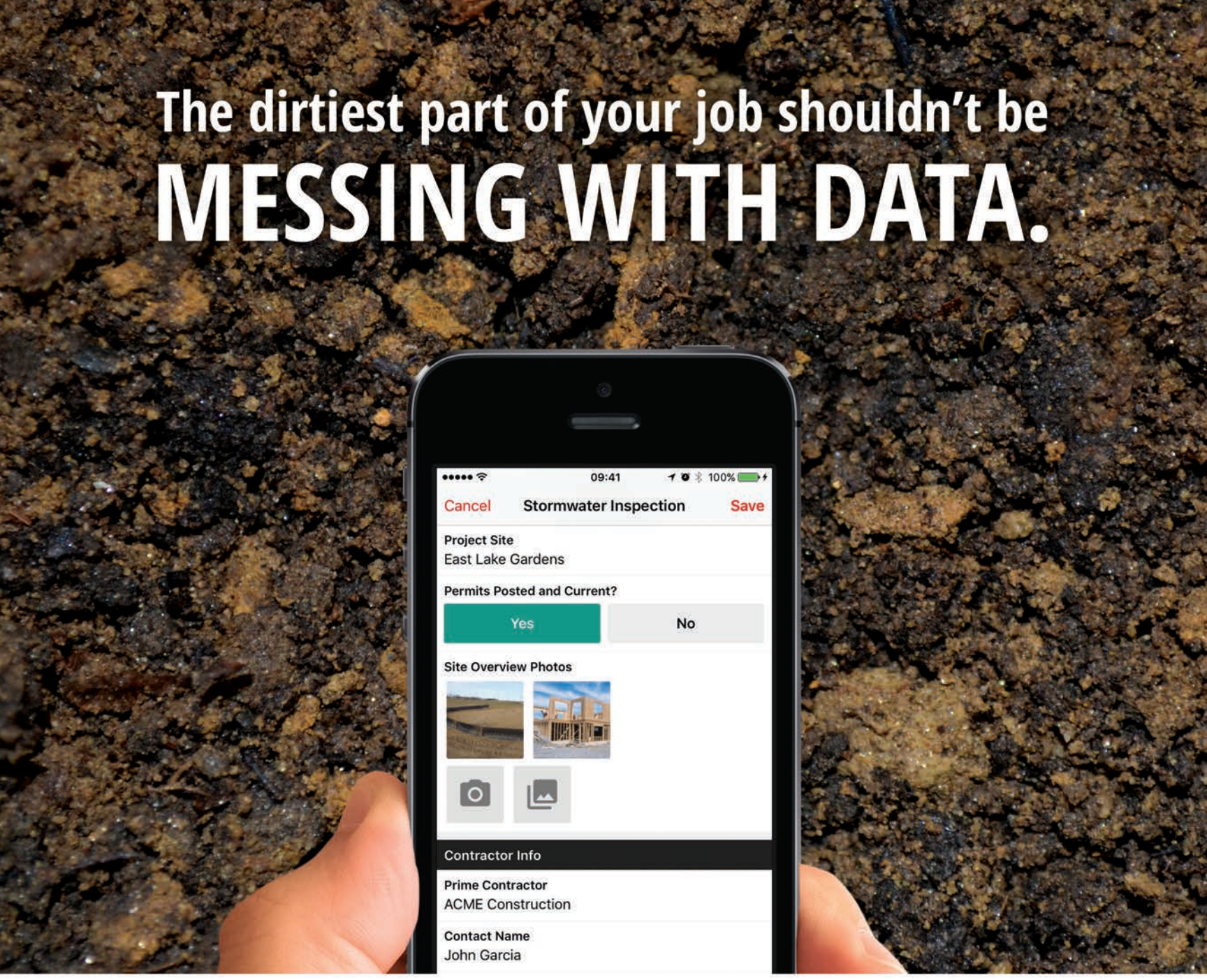
So many of these projects, in towns across the country, are about so much more than just putting new pipes in the ground, and we're going to bring you that perspective. You'll find a large photo gallery documenting the progress, along with additional stories providing different views of the project — everything from a more in-depth community profile to engineering challenges and securing project funding. We'll be covering it right up to completion.

We'll be compiling all this additional content at www.MSWmag.com/Rhinelander.

Enjoy this month's issue, and the extra content. ✦

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

The dirtiest part of your job shouldn't be MESSING WITH DATA.



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SAVING THE BAY

Murals Raise Awareness of Stormwater Pollution

Stop and think. That's the message the San Francisco Public Utilities Commission is hoping to spread with the unveiling of six colorful murals placed at storm drains in the Mission Bay neighborhood. Learn how the agency partnered with the local arts commission to pull off the project, how they hope it will impact the local environment, and how you can raise greater public awareness without words. **mswmag.com/featured**

OVERHEARD ONLINE

"In 40 years, I've never seen anything like this."

— ***Flash Flooding Washes Away Sewer Pipes***
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TO QUENCH A THIRST

Documentary Highlights Region's Water Supply

The San Diego County Water Authority released an engaging three-part documentary that explores the region's ongoing quest for safe and reliable water supplies. See how the agency, over generations, has built and diversified its robust infrastructure that today sustains 3.2 million people and a $218 billion economy. **mswmag.com/featured**

H2O ON WHEELS

Tap Water Express Delivers Important Message

Santa Clara's Tap Water Express delivers ice-cold water to thirsty patrons at special events throughout the city. But that's not all. "It's also a fantastic outreach tool," says Director of Water and Sewer Utilities Chris de Groot. By debunking the myth that bottled water is better, the vibrant vehicle demonstrates the safety and quality of the city's public water supply. **mswmag.com/featured**

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CALM, COLLECTED AND I&I COMPLIANT

Wastewater district embraces digital technology as a means of making infrastructure and operational improvements

By Mary Shafer

Taylors Fire and Sewer District in Taylors, South Carolina, is party to an intergovernmental agreement with Renewable Water Resources, which owns and operates several wastewater treatment facilities in their five-county service area. About 10 years ago, Taylors learned this agreement required them to eliminate inflow and infiltration into their wastewater collections system within 15 years, giving them a completion deadline of 2021.

This district serves about 10,000 customers in central Greenville County. It is responsible only for the wastewater collections system, including nearly 130 miles of gravity line and 3,602 manholes. It connects to treatment lines and a treatment plant owned by Renewable Water Resources, and Taylors can access flow data from ReWa's inline monitors.

Bad, but how bad?

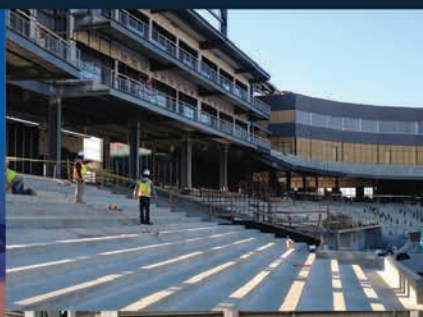
Taylors' service territory is divided into 10 mini-districts, bordered by the Metropolitan Sewer Subdistrict to the northwest and southeast, and the Wade Hampton Fire and Sewer District to the southwest. Nine of the mini-districts contain sewer collections systems, while the 10th comprises a small area of mostly septic systems.

One of those mini-districts, called Mill Hill, was the main problem area, says Samantha Bartow, director of sewer services. Her department was aware that the Mill Hill infrastructure dated from the 1920s, and was seriously past its design life — a likely culprit in the tremendous flow rise during heavy rain.

"Everything at that point was just guessing," she recalls. Taylors has nine required flow monitors at various points in their lines, and some spotty legacy inspection records still on VHS tape and in hard copy reports. Apart from this, Bartow's staff realized they had no substantial empirical data about specific problem locations in their

(continued)

Taylors Fire and Sewer District technicians Chris Stamey and Tevin Henry lift a manhole cover and set up to clean a sewer line with a Vac-Con combo unit in Taylors, South Carolina. (Photography by Ken Osburn)



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Administrative assistant Alicia Jenkins, Director of Sewer Services Samantha Bartow, construction crew leader Chris Powell, and GIS analyst Kristien King discuss the day's schedule at Taylors Fire and Sewer District.

system. "Until we do post-work monitoring, we won't know the percentage of I&I Mill Hill was responsible for, but we know from the instant jumps on the flow monitors during rain events that it's substantial."

Bartow's team knew that to comply with the agreement, "just guessing" wouldn't cut it. They would need to inspect their entire system and identify problem areas, then plan, schedule and budget for specific repairs and rehabilitation. So they began monitoring the system with flowmeters in 2006 when the I&I reduction order came down. They quickly estimated how long initial CCTV inspections would take, and started those immediately.

Going digital

While Taylors can pull flow data to determine what percentage of I&I originates in bordering districts — Wade Hampton Fire and Sewer District, Metropolitan Sewer and the city of Greer — Mill Hill is all theirs, so ReWa wouldn't pay for the repairs.

Taylors is funded through millage or tax notices and user fees, and this was an extensive project. They were able to get a $2 million loan from the state revolving fund to subcontract actual CIPP repairs and new pipes for the Mill Hill mini-system, but all the in-house cleaning, inspection and preparatory work was going to be labor-intensive and costly.

They had to keep costs as low as possible, and realized one way would be to switch over to all-digital CCTV inspection systems. Up until this point, issues were written on random sheets of paper, and finding any asset information required hunting through folders by line and segment numbers for notes and still photos. Naturally, accuracy suffered.

Construction crew leader Chris Powell (front) and sewer technician Jesse Evett prepare to seal a manhole ring.

Upgrades and outcomes

In 2008, they made their first move toward digital, replacing an old inspection truck with a Ford F-450 Gas Cab 4x4, outfitted with a CUES K2 Base Station saved from the old truck. The existing TV reels were also moved into the new unit, along with all software: PipeLogix Inc.'s Flexidata and its Digital Video Survey module, their GIS package and the Windows 7 OS. In 2010, Flexidata was rebranded as PipeLogix, and Taylors bought their Esri GIS software module.

Onboard inspection software now includes PipeLogix with the lateral module. They also switched from MS Access database-generated paperwork orders to Cityworks/ArcGIS CMMS integrated digital utilities management software in July 2014.

"Our crew uses Cityworks to locate assets, manage their workflow and prioritize repairs," Bartow says. "The bulk of the work is done on desktop computers, but out in the field they use tablets for quick reference."

Following an introductory period to familiarize themselves with Cityworks, the Taylors crew realized it would be beneficial to port the PipeLogix information to Cityworks, for users like the

(continued)

PROFILE:
Taylors Fire and Sewer District, Greenville County, South Carolina

FOUNDED:
1958

POPULATION SERVED:
10,000 customers

AREA SERVED:
16 square miles of the city of Taylors in central Greenville County

STAFF:
16; 11 in operations and 5 in administration

INFRASTRUCTURE:
About 130 miles of 6- to 15-inch sewer main; 3,602 manholes; one pump station; and one pump station operated and maintained by Renewable Water Resources

ANNUAL EXPENSE BUDGET:
$2.36 million

WEBSITE:
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Technician Mike Jones (left) and TV crew leader Gary Cantrell run a sewer line inspection from the control room of the CCTV van.

Mike Jones (left) and Gary Cantrell lower a CUES camera through a Light Ring into a manhole for a sewer line inspection.

district's director — who doesn't have hands-on daily experience with PipeLogix — to review work orders and work to-date, and to analyze completed work.

"Being able to see that data in one software program is very beneficial for upper-level management, to be able to make decisions on priorities," Bartow says. "It also allows us to have all the information about our CCTV inspections in one place." She cites, for example, the ability to see the work order requests and any related comments, and compare them to the actual TV inspection details collected from the field with PipeLogix.

Playing nice and unexpected benefits

Technicians are now inputting data from the field via iPhone and iPad. Reports can be generated anywhere via screen or print.

"We installed a CCTV interface module and are now working with PipeLogix to get their software and Cityworks to work together, importing videos and linking to work orders," Bartow says.

"We use Cityworks every day for the SC811 program, which is handled by our TV crew. PipeLogix and Cityworks combined have helped us locate areas of inflow and infiltration, where we would need to place a flow monitor, or have our construction crew make a repair. This has been a tremendous help, especially when the wastewater treatment facility our collections system dumps into required us to submit an inflow and infiltration reduction plan for a new subdivision flow request."

Cityworks has also helped Taylors' customer service staff keep better records of recurring incidents and complaint calls. It has helped improve their response time, since customer service staff can now answer questions that, in the past, had to be handled by field personnel. This has also freed up the field crews to be more productive.

The Taylors team is finding that the PipeLogix software also helps enable compliance with their new 811 safety hotline program, which requires people to call in before they dig on their property to be sure they won't strike underground utilities. The district processes more than 200 of these work tickets per month.

Now, technicians can just get a number off a PipeLogix report, go out into the field, measure off footage between two manhole points and mark where the service lateral taps into the mainline. Then the crew paints a line on the ground and/or places flags to indicate to the property owner where they should avoid digging.

That saves significant time and labor, says Bartow. "Without the PipeLogix reports, we'd have to do everything from the surface. That would mean we'd have to have a crew dedicated just to that work, which would be tremendously expensive. One district quoted a minimum of $100,000 to do this."

Related equipment changes

Along with the software upgrades, they've since added an Insight Vision push camera on a fiberglass rod, a CUES K2 portable system, a self-propelled lateral inspection system with color pan-and-rotate camera for 6- to 30-inch mains and

3- to 8-inch laterals, and a mini pan-and-tilt lateral launch system. In 2012, they brought on a CUES locator sonde to find their existing OZIII camera in the line, should it get hung up. They also purchased a CUES WTR crawler with 6-inch rubber wheels, plus an auxiliary set of 8-inch steel wheels.

This modern technology allows Taylors to focus CCTV inspection and reporting efforts where most effective for I&I reduction. The efficiency has paid off. "We've exceeded our goal of inspecting at least 8 miles of line annually since 2005," Bartow says.

Lean and effective

By 2012, Taylors had made enough progress that the project moved to a fiscal year basis. They now have just two mini-districts left to complete for inspection. Bartow credits the software upgrades with a significant part of the speed of the process on the administrative end, as well.

The intensive inspection program has also provided an unexpected bonus: It's helping identify illicit storm drain connections, creating opportunities for more I&I removal without generating extra costs to the district, since property owners are responsible for those remedies. While on site, technicians perform smoke tests to find unauthorized connections from basement sump pumps, truck washes, dog kennels and veterinarian washdown areas, whose clean-outs dump directly into the sewer instead of to authorized storm drains.

Taylors is shooting to start actual pipe rehabilitation by year's end, Bartow says, "but there are lots of variables. It should take about a year to complete, barring any issues with weather or hitting rock." They're televising old clay pipes that run underneath residences, with the goal to relocate all lines from beneath houses into the public right-of-way. Old lines will be abandoned and filled with flowable fill, so nothing can be run through them again. More than 5,900 linear feet of new mainline will be installed.

Now in its 10th year, the project is ahead of schedule. It's on track to for completion by 2020, a year earlier than anticipated. That happy outcome didn't originally look like a possibility, but the investment in digital, integrated technology has proven itself a greater boon than expected.

"This is a huge project, but even when it's done, inspection and rehabilitation will always be an ongoing effort," Bartow says. She acknowledges that they won't know just how effective the I&I reduction campaign is until they're all finished and do another round of flow monitoring. The agreement specifically states that compliance is based on the collections system maintaining an acceptable level of I&I measured after three consecutive rain events of 1 inch or more.

"Once in a while, you'll hit a home run … but until we have all the figures, we won't know. We also won't know what new requirements will be thrown our way," she says.

Regardless, it's clear that Taylors is rapidly developing into a lean, cost-effective wastewater collections system that now has the tools it needs to set higher goals, with every confidence of being able to reach them. ✦

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Editor's Note: This is part three of a three-part series on pump station design.

MAXIMIZE PUMP STATION EFFICIENCY

Smaller design considerations can have a huge impact on performance

By Thomas E. Jenkins, P.E.

Pump selection and physical design (parts 1 and 2 of this series) represent the greatest portion of the pump station design task. However, proper function requires a variety of ancillary systems. These may not be the most expensive parts of the project, but they are often critical for efficiency and operator satisfaction.

Variable or fixed speed

In many installations, process considerations influence the operating mode of the pumps. For example, variable-speed pumping at the headworks of a treatment plant can minimize slug loading to the process. However, the most common justification for variable-speed pumping is energy cost reduction.

Variable-speed pump performance is based on the affinity laws:

$$\frac{q_1}{q_2} = \frac{n_1}{n_2} \qquad \frac{h_1}{h_2} = \left(\frac{n_1}{n_2}\right)^2 \qquad \frac{P_1}{P_2} = \left(\frac{n_1}{n_2}\right)^3$$

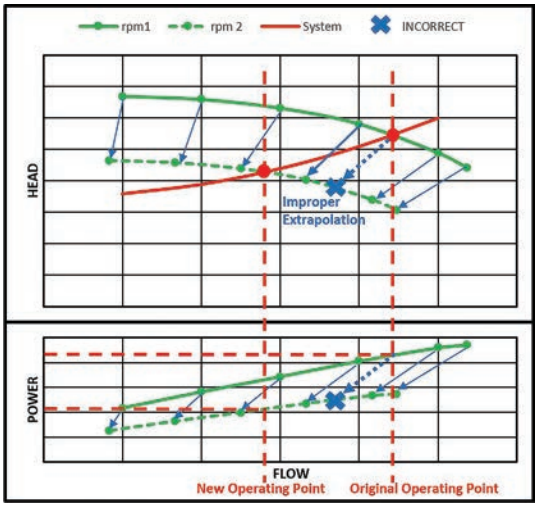
q1, q2 = initial and new flow rate, gpm
n1, n2 = initial and new speed, rpm
h1, h2 = initial and new head, feet or psi
P1, P2 = initial and new power, hp or kW

The affinity laws should be applied to the pump characteristic curves and used to create curves at the new speed. Superimposing the system curve will allow the new operating point to be determined. A common error is applying the affinity laws directly to a known operating point without consideration of the system curve. This can result in very inaccurate values. The amount of error depends on the nature of the two curves (Figure 1).

Small stations may be billed on energy consumption alone. Larger stations may be billed at different rates for energy based on the time of day. Even larger stations will also be billed for peak demand — the highest power consumption during a month.

If the system curve is flat — primarily static head with little friction — and the station is billed for energy consumption only, then using variable-speed pumping results in little cost reduction. On the other hand, systems with high-friction head that are billed for demand charges will save money with variable-speed pumping because of two phenomena. First, a lower flow rate will reduce friction, which will in turn reduce pump head and power, and total pumping energy. Second, the reduction in pump power from both lower flow rate and lower head will decrease peak demand.

Figure 1



The affinity laws should be applied to the pump characteristic curves and used to create curves at the new speed. Superimposing the system curve will allow the new operating point to be determined.

Control considerations

Control for many pump stations consists of float switches and across-the-line motor starters. The lead pump is started when the high-level switch trips and continues pumping until the low-level switch trips. When multiple pumps are to be operated simultaneously, additional float switches are used to start them when the wet well level rises.

For wastewater pump stations, the pumps are usually operated based on maintaining a constant wet well level. This matches pump flow rate to influent flow rate. As the level of the wet well increases, the pump speed rises to maintain the level at the setpoint.

A variety of devices can measure level. Submersible pressure transducers, designed to prevent fouling, are inexpensive and reliable. Some owners prefer non-contact devices such as ultrasonic level transmitters. Still others rely on bubbler tubes, with a continuous flow of air minimizing fouling.

Motor controls

Motor control is common to all pump stations. All but the smallest pump motors utilize three-phase power. Three-phase motors are more efficient, more reliable and lower in cost. Voltages range from 208 volts to 4,160 volts, but 480 volts is the most common. The means used for starting and protecting motors varies with the pump control method and power.

Small stations use across-the-line starters with built-in overload protection. At higher horsepower (typically dictated by the electric utility), reduced-voltage starters are used to limit motor inrush current. State-of-the-art reduced-voltage soft starters use solid-state devices instead of mechanical contacts. In addition to overcurrent protection, most soft starters include low-voltage and phase imbalance protection. RVSS life is extended if contactors are used to bypass the solid-state components once full speed is achieved.

Variable-frequency drives are usually the method of choice for variable-speed pump control, although magnetic couplings of various designs are also available for special applications.

(continued)

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VFDs include motor protection and eliminate the need for starters. Bypass contactors may be justified in remote locations to allow operation if the VFDs fail.

Enclosure selection for motor controls and instrumentation can have a significant impact on cost and reliability. Small starters and VFDs are usually wall-mounted. Large stations generally install motor control centers to simplify wiring and reduce space requirements.

Moisture and corrosive or explosive gases are produced by wet wells, and appropriate precautions must be taken against them. Locating enclosures in ventilated locations is good practice. Small stations commonly mount NEMA 3R weatherproof enclosures outdoors. Larger stations should install the controls in a ventilated space separated from the wet well and directly accessible from outside.

There is a temptation to specify washdown-rated NEMA 4X stainless steel or explosion-proof enclosures for everything electrical in a pump station. These enclosures have advantages in some applications, but they should only be used when needed. This is particularly true for VFD enclosures, where heat dissipation issues are a problem for sealed enclosures.

Because of methane occurrence, intrinsically safe instrumentation should be installed in wet wells or intrinsic safety barriers should be used in dry well mounted panels. The importance of entry permits and proper safety precautions for wet wells and confined spaces cannot be overemphasized. When in doubt, a qualified expert should be consulted to identify proper procedures.

Generators

Because pump stations need to operate regardless of weather, standby power is a necessity. In some cases it is sufficient to have power fed from two independent sources. The designer must ensure that there is not a single point of failure, such as a common utility pole, that could interrupt both sources.

For many pump stations, standby generators are used for emergency power. These may be portable units towed to the station for quick connection or permanently installed.

The need for electrical safety cannot be stressed enough. Proper interlocks must be installed to prevent "back feeding" power from the generator into the grid. Installations should be reviewed with the electric utility. Proper maintenance and periodic testing is mandatory.

Generator sizing, measured in kVA, involves more than adding motor nameplate power. Inrush current when starting motors usually dictates the generator size, especially when pumps are started across the line. VFDs also influence generator selection by causing harmonics and voltage distortion that increase the required generator rating. Altitude, ambient temperature and miscellaneous loads such as lighting also need to be addressed.

Screening and scum handling

Wastewater and stormwater pumping stations must cope with solids entering the conveyance system. These range from large objects like logs, to grit and similar non-putrescible materials. Solids can accumulate in the wet wells, cause odors and damage pumps.

Some utilities prefer to remove as many solids as possible at the pump station and use fine screens before the wet well. Others use trash racks to only remove debris that would damage the pumps, but allow smaller objects to pass through to the treatment plant.

Some stations try to minimize scum accumulations by adding chemicals or special bacterial cultures. Others periodically pump down and clean the wet well to remove accumulated scum deposits.

Regardless of philosophy, periodic cleaning of wet wells is necessary. Access for maintenance and cleaning must be provided, with provisions for continuing operation during service.

Ventilation and odor control

Proper ventilation is necessary to prevent deterioration of equipment and allow safe access by staff. In most jurisdictions, codes establish minimum ventilation requirements.

Dry wells may be continuously ventilated to minimize moisture and gas buildup. Wet wells are commonly ventilated intermittently (only when occupied), but may also be ventilated continuously. Ventilation is typically expressed as air changes per hour, and fan flow may be calculated based on the volume of the space ventilated:

$$Q = \frac{ACH \bullet V}{60}$$

Q = fan airflow rate, cfm (cubic feet per minute)
ACH = air changes per hour:
Wet wells = 12 continuous, 60 intermittent typical
Dry wells = 6 continuous, 30 intermittent typical
V = volume of space ventilated, cubic feet

Because pump stations include confined spaces, all necessary safety precautions should be rigorously observed. Monitors for hazardous gases, either portable or fixed, should be provided.

Odors in wastewater applications are inevitable. Some odor control measures are simple and inexpensive. Designing the wet well to reduce turbulence minimizes odor release. A tall exhaust stack can reduce the effect of odors by releasing them above the level of nearby structures.

More elaborate methods are often employed to reduce odors. Chemicals may be fed into sewers or wet wells to minimize formation of noxious gases. Scrubbers on exhaust ducts may utilize chemical sprays to neutralize odors. Filter beds to remove odors may use activated carbon, chemical pellets, sludge or various natural media. All of these methods may be effective, but proper maintenance is essential for long-term performance.

Pump station design can be a complex topic, and volumes have been written on the topic. This series of articles is far from exhaustive. The principal design considerations identified should enable the owner to work with design professionals and suppliers to develop systems that meet their needs and provide long-term value. ✦

About the Author

Thomas Jenkins is a professional engineer and the owner of JenTech Inc. in Milwaukee, Wisconsin.

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BUILT FROM THE UNDERGROUND UP

Sewer and water upgrades form the foundation of Northern Wisconsin community's downtown streetscape project

By Cory Dellenbach

An equipment operator with Kruczek Construction excavates old water and sewer lines in downtown Rhinelander, Wisconsin. The city is in the middle of a major downtown infrastructure project that involves separating its combined sewers and installing new waterlines. (Photography by Cory Dellenbach)

PROFILE:
Rhinelander (Wisconsin) Streetscape Project

START:
March 2016

EXPECTED COMPLETION:
June 2017

PRIMARY CONTRACTOR:
Kruczek Construction, Green Bay, Wis.

PROJECT ENGINEER:
Mark Barden, Town & Country Engineering, Madison, Wis.

PROJECT COST:
$9 million

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When you're digging up streets that haven't been dug up for decades, surprises are sure to emerge. The Northern Wisconsin city of Rhinelander is finding that out as it moves through a large sewer, water and streetscape project.

"We come across surprises every day in this construction," says Tim Kingman, director of Public Works. "We've encountered some interesting foundation walls that are frightening, but we have to deal with them. We've encountered piping and abandoned materials that we didn't know were there, and some active materials we didn't even know were there. It's been revealing."

The city, located about 2 1/2 hours northwest of Green Bay, has also had to deal with the challenges of keeping its downtown businesses operating as usual during the project. Keeping the sidewalks open for pedestrian traffic and keeping one of the two main streets open at all times are just some of the challenges the general contractor faces.

"The project has to be managed in a fashion where we keep our businesses open," Kingman says. "There's only two major thoroughfares north and south that we can work with, and having coordination of when one is open and the other is closed is really important."

Separation anxiety

The project has been a long time coming for the community of 7,500, after smoke testing revealed some issues back in 2003.

"We knew there was an issue with the combined sewer years ago," says Mark Barden, project engineer for Town & Country Engineering, which is overseeing the project. "We started smoke testing the downtown area to identify some of those issues. Then a couple years ago we got in and did some physical inspections of all the basements."

Crews spent time mapping out the known infrastructure, the location of suspected roof drain connections, identifying any galvanized pipes and anything else that could be upgraded or improved. One of the main focuses of the project was taking care of the roof drains and storm sewer system.

About 30 of the 128 buildings downtown had roof drains that were connected to the sanitary sewer, creating issues at the wastewater treatment plant during rain events. "The main objective here was to separate the sanitary sewer and the storm sewer systems," Barden says.

When a rain event would happen, the treatment plant would go from its average of 1 mgd to 3 or 4 mgd. "Whatever came off those roofs would be carried over to the treatment

"We've been very public about our approach and it's paid tenfold. Without the cooperation of the property owners we would be dead in our tracks."

– Tim Kingman

plant," Kingman says. "After this project, we're going to see a substantial difference on a rainy day."

Increased capacity

The new infrastructure is being built to handle a 10-year storm event, Kingman says. The $9 million project broke ground in late March with the general contractor, Kruczek Construction of Green Bay, installing two new outfalls for the stormwater that will flow into the nearby Wisconsin River.

Prior to the project, there was just one 24-inch outfall that handled stormwater from the street surface. "That outfall covered the entire downtown area, which we knew wouldn't be enough when we separated the combined sewer," Barden says. "The 24-inch outfall is remaining, but we have now added a 36-inch outfall and a 42-inch outfall along the river."

The first section of the project — a one-block stretch leading from the Wisconsin River to the first intersection — was the most difficult. "We have storm sewer on both sides of the road, just off the curb in that area," Barden says. "There's a couple reasons for that, such as taking advantage of the additional outfall and the other utilities in that area such as electric, gas and phone."

The new storm sewer is being installed deeper than what it normally would be due to the harsh winter conditions at the top of Wisconsin. Businesses were connected to the stormwater system as crews worked their way through the middle of the city. "We're actually coring into the foundation walls of all these businesses and we're supplying the property owners with the connection to the storm sewer," Barden says.

The city is paying to core through the walls, but once the pipes are inside the buildings, it becomes the property owner's responsibility to get a private plumber to make those connections.

"When the project is done, we're going to have everything separated," Barden says. "The private plumber has been working pretty hard and they're keeping up. They're making those connections as we stub out those storm laterals and the water connections, so things are going pretty smooth so far."

Barden says crews have upsized a lot of the water mains and a few of the sanitary sewer lines. "We've ran into some 4- and 6-inch water mains that we're upsizing to 8-inch," he says. "We've also bumped up some 8-inch sanitary lines to 10-inch lines."

Following the completion of the underground work in October, the city will move into its streetscape phase, where they will realign parking in the main business corridor and widen the sidewalks.

Kruczek Construction employee Tommy Hawk carries a section of new pipe through the construction site.

Planning the project

While the general contractor worked on the water and sewer infrastructure, other utilities took the opportunity to upgrade their own systems with the road torn up.

"The local gas utility is moving its lines and upgrading some of the older lines, while Frontier Communications is moving its ductwork for phone and internet," Barden says. "You really have the benefit of working on all of it at the same time, and that's the way we planned it."

A project of this scope required years of planning and continued communication after the start of construction. The city held several planning meetings with residents to get input on the project and thoughts on a final design. "We've been very public about our approach and it's paid tenfold,"

(continued)

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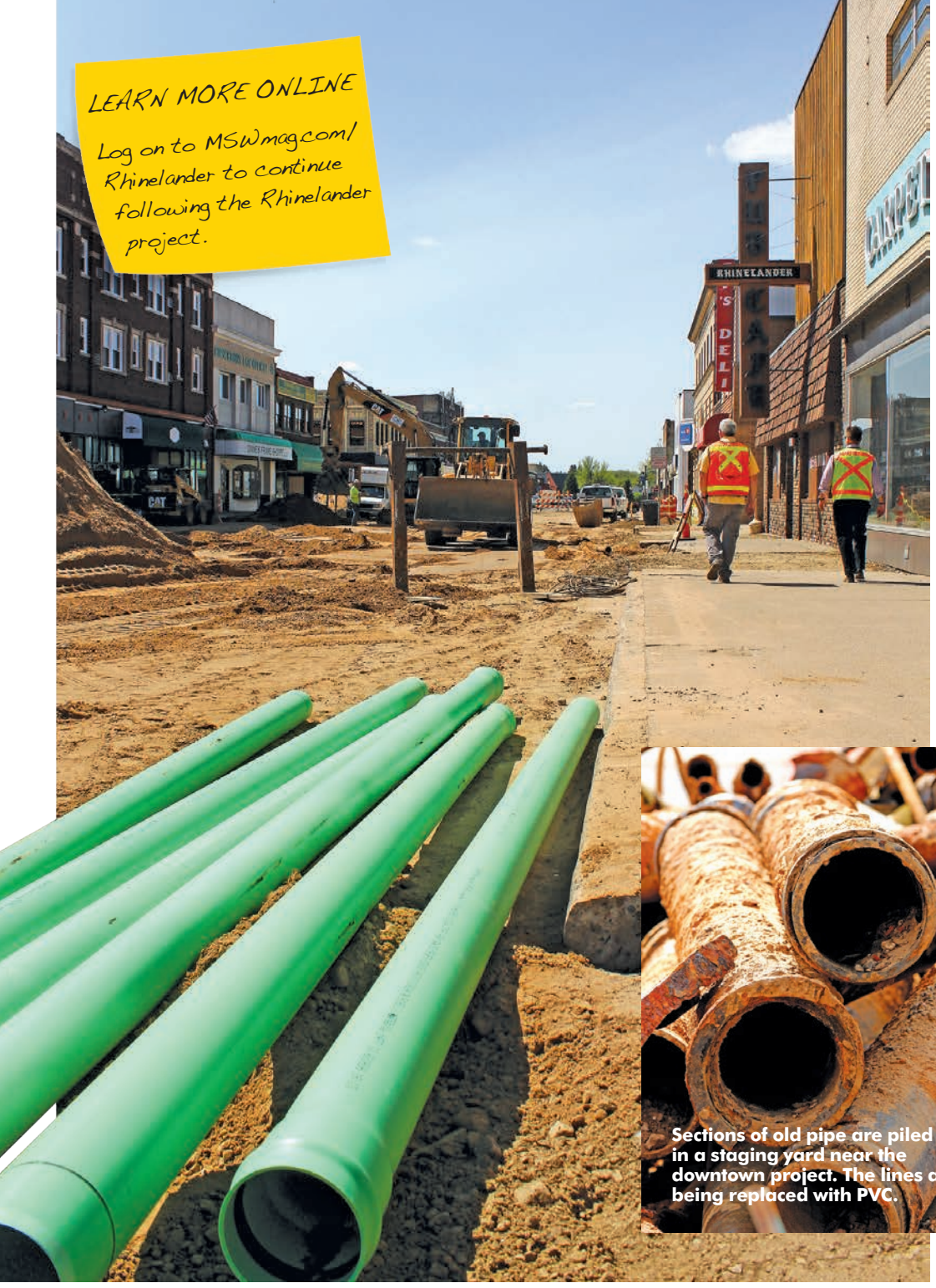
Log on to MSWmag.com/Rhinelander to continue following the Rhinelander project.



Rhinelander Public Works Director Tim Kingman (left) and project engineer Mark Barden of Town & Country Engineering walk along Brown Street in downtown Rhinelander while sewer and water work continues. The project will also include new streetscapes.

Sections of old pipe are piled up in a staging yard near the downtown project. The lines are being replaced with PVC.

This 36-inch stormwater outfall along the Wisconsin River on the edge of downtown Rhinelander is the smaller of two new outfalls that replace a lone 24-inch outfall.

"Business owners see the value moving forward and I think a lot of these owners are looking forward to the future. We've been very active in keeping people up to date on the city's website, we're keeping the parking lots open for the customers. We're trying to keep everything we can open for the businesses."

– Mark Barden

Kingman says. "Without the cooperation of the property owners we would be dead in our tracks.

"The early public meetings were about how we would take care of the utilities and how we finish out the streets. This is a utilities-based project, but we also got into streetscape and we wanted to rejuvenate the area the best we could."

Because of the location of the project and the importance of keeping businesses open, Kruczek Construction has had to make adjustments during the project — such as keeping sidewalks open and setting up temporary sidewalks, making sure at least one of the two main thoroughfares through downtown is open at all times and helping pedestrians navigate the streets. Sewer bypass lines were installed right at the start, and the water system has been updated and reconnected one building at a time as the project progresses.

"The downtown has been in such disrepair," Barden says. "Business owners see the value moving forward and I think a lot of these owners are looking forward to the future. We've been very active in keeping people up to date on the city's website. We're keeping the parking lots open for the customers. We're trying to keep everything we can open for the businesses."

Finding surprises

Kingman says the pavement on Brown Street, the downtown's main street, hasn't been torn up since the early 1980s. It's unknown when the water and sewer and other utilities were last worked on.

Early on in the project, Kruczek Construction and engineers began finding known and unknown mysteries — wood ductwork for electrical utilities, and basements under sidewalks, as examples.

"What is interesting is a lot of these buildings have basements that extend out into the

PART OF A BIGGER PICTURE

The water and sewer utility work taking place in Rhinelander, Wisconsin, is possible because of system updates the city has done over the past 10 years.

"In the last 10 years, the city probably has done more work than it has in the last 50 years," says Director of Public Works Tim Kingman. "We're at that vintage of system where we have a lot of clay tile pipe. We have a lot of 4-inch cast mains that need to be replaced."

The water utility owns and operates five drilled wells, three above-ground storage tanks, a 1.25-million-gallon underground treatment reservoir, and more than 66 miles of distribution water mains ranging from 4- to 16-inch diameter in size. The utility supplies approximately 1.5 million gallons of potable drinking water to its customers on an average day.

Most of the projects in the last 10 years have been wastewater focused.

The city built a new wastewater treatment plant that went online in 2010, along with a new pipeline along the Wisconsin River to carry wastewater to the new plant.

"All of this came in the beginning from identifying excessive I&I occurring in the city," Kingman says.

Another project that kicked off this summer in the city was connecting one of Rhinelander's biggest industrial businesses to the wastewater treatment plant.

"This is a unique project taking place," Kingman says of all the work. "A lot of communities might be able to learn or observe some patterns that we've done here."

right-of-way under the sidewalk. We've identified what we think is all of them and we're abandoning them as we go along," Barden says.

When digging near a bank building — about 100 years old — crews discovered windows under the sidewalk that allowed sunlight into the basement of the bank many years ago. Crews have had to fix those areas while continuing to work on the main project.

Crews are also removing the wood ductwork, which is located throughout the downtown area. The 4-by-4 posts were laid end to end horizontally with 3-inch channels bored through them for telephone and electrical lines. The posts are typically 8 to 10 feet long and connect together like Legos.

Set for the future

While most of the underground work is scheduled for completion by Oct. 31, Barden says the final layer of asphalt won't go down until summer 2017, to allow for any repairs or settling that might occur.

"When you start at the beginning again like we are doing, you can make it the way you want it," Kingman says. "We're getting this set up for the future right now." ✦

UNDERSTAND PEOPLE AND WHAT MOTIVATES THEM

Simple management principles will help you get the most out of your employees

By Ken Wysocky

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.

The Greek philosopher Heraclitus once observed that the only thing that is constant is change. That's particularly true in today's business world — and it'll become even more so in the years ahead as an estimated 85 million baby boomers begin to either retire or take on reduced job roles, paving the way for a seismic shift in managerial ranks.

During the next five years, studies show that 500 of the largest companies in the United States expect to lose half of their senior managers. Moreover, 70 percent of companies say they expect to experience moderate or severe leadership shortages. In other words, get ready for a lot of new managers in workplaces nationwide, says Kirk Lawrence, a program director of executive development at the University of North Carolina Kenan-Flagler Business School.

With those facts in mind, Lawrence — who has more than 35 years of experience in leading both large and small organizations — says that it's more important than ever to make sure managers know how to effectively lead and communicate. That's no small challenge, he says, noting that while many companies recognize there's a causal relationship between developing strong leaders and organizational success, most also concede they're not doing enough in terms of succession planning.

"The challenge is that it takes a heavy investment in time, people and money," he points out. "(Preparing managers) is a particularly timely topic for organizations interested in maintaining continuity — retaining the people that know your culture and strategies."

For new managers who may find themselves on their own, Lawrence has developed five solid tips to consider as they embrace their new leadership role. The tips focus less on technical proficiencies and more on the human and emotional "soft skills" that truly set good managers apart.

"You have to understand people and what motivates them — how to get the most out of them," he says. "Even in a small office with just 10 or 15 people, each individual responds differently to challenges, stress and incentives … and if you don't understand the human aspects of all that, you kind of miss the boat."

In a nutshell, here are Lawrence's tips and advice for Managing 101:

1. Be a good follower. Unless you're a workplace unicorn — that special, gifted person who's a born leader — most leadership skills stem from experience gleaned while working your way up through an organization. As such, learning how to follow is invaluable to eventually becoming a manager. "You've got to learn what it's like to be in the trenches … and get exposure to good and less-than-good leadership styles," Lawrence says. "If you learn what it's like to be a worker bee, you learn good managerial skills as a result."

And as counterintuitive as it may seem, experience with a bad leader can be just as valuable as the alternative. Why? "You're a far better leader from being exposed to bad management, because you learn a lot about how not to treat people," Lawrence explains.

In addition, Lawrence points out that people who are good followers (he calls it the practice of "followership") pick up five essential skills from doing so: awareness, diplomacy, courage, collaboration and critical thinking.

2. Listen and learn. Eager to make their mark, many new managers start out with the proverbial rush to judgment — a scorched-earth makeover of prior practices and processes. "They jump to conclusions and question everything done by the previous manager, as well as criticize that manager," Lawrence says. His advice? Slow down and listen — you just might learn something by not trying to move the needle too quickly. Ask people what worked well and what didn't. And never forget that 85 percent of learning is acquired by listening.

"If you take a step back and assess the playing field you're on, you may find that you have good ideas … but the timing may not be right to implement them," he notes. "Don't destroy the village while trying to save it by being too rash or questioning the competency of the person you replaced. You never know — that person might again be your boss, or could even be a potential client. Be judicious with your comments and assessments."

As you take in the lay of the land, it's also important to figure out which employees you can trust — find out who's credible and who's not. And that's something that can be gleaned from listening.

3. Practice the ethic of reciprocity. This bit of advice could easily fall under the "everything I needed to know in life I learned in kindergarten" category. It's also known as the Golden Rule: Treat others as you'd have them treat you. That's an essential policy for managers, who should understand that a promotion to a position of authority doesn't automatically guarantee the support of your employees.

"If you treat people with respect and dignity and give them a sense of validation, you can get them to do things that are difficult and distasteful," Lawrence says. "It doesn't work all the time, but as a rule, it's a pretty good principle."

4. Don't confuse likeability with respect. This is especially true for managers who are promoted from within and end up leading the same people with whom they were sharing jokes with at the water cooler before the promotion. "Too many new managers want to be the cool person," Lawrence explains. "They think that if their employees really like them, they'll really be able to make things happen. But it doesn't always work out that way.

"You can never forget you're in a supervisory position," he adds. "And if something goes south, they're going to be out to save their own skins. You gain respect for your ability to be a good leader. If they know you'll always be fair and that you'll listen to them, they'll have the confidence to trust you when things don't go well."

At times, every manager has to make unpopular decisions, and they're tougher to make if you're always out socializing with your direct reports and trying to be their best friend. But if you've built a culture of respect for your team, you can make those decisions and still maintain their trust. "It's okay to go and have a beer with your team," he notes. "But remember that you're the boss — you have to maintain a little separation."

5. You're defined by your integrity. Whatever you do, don't compromise your integrity. Organizations that honor ethics and integrity experience less employee turnover, more engaged workers and higher levels of customer satisfaction, Lawrence says.

"Compromising integrity is a slippery slope," Lawrence cautions. "Once you fudge a number or are dishonest with a client, it becomes easier to do it again. And at the end of the day, everyone wants to do business with someone who they know that their word is their bond." That means always doing the right thing — even when no one is looking. ✦

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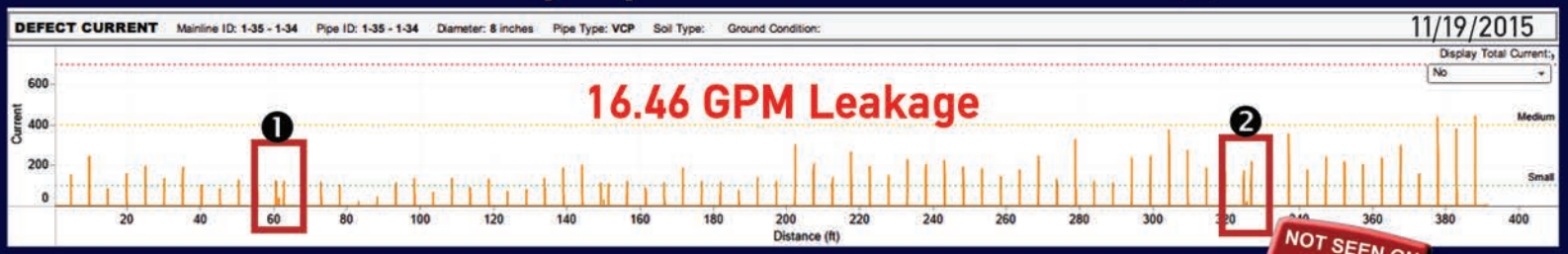

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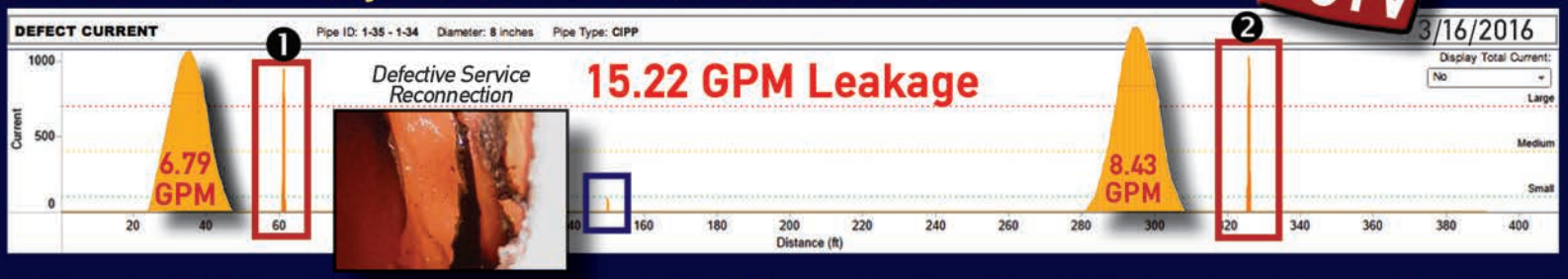

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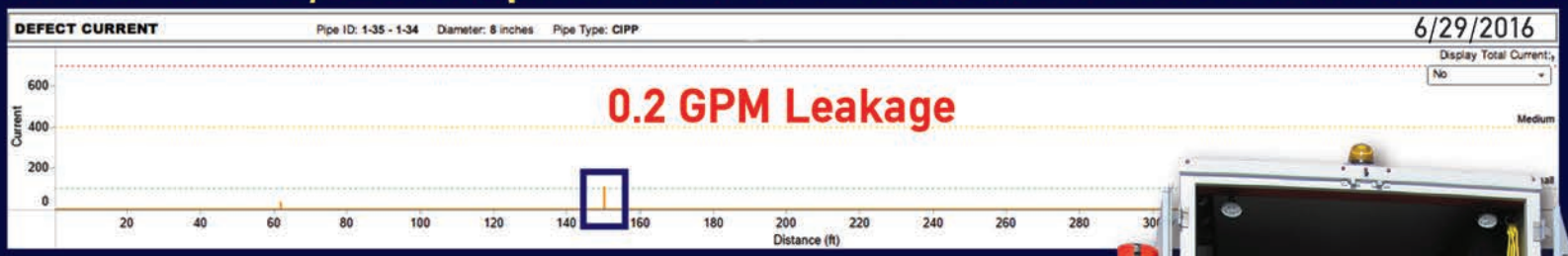

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SIMPLE AND EFFICIENT

Combination truck from Sewer Equipment eliminates auxiliary engine and complicated controls

By Craig Mandli

Sewer Equipment product development engineer Stan Stuart (left) discusses the features of the 900 ECO Combination Sewer Cleaner with several 2016 WWETT Show attendees following the unit's official unveiling ceremony. (Photo by Craig Mandli)

As the water and sewer industry has evolved, the equipment used to maintain those systems has grown increasingly more complex. Sometimes, however, a simple tool is the best thing to get the job done.

A new combination truck unveiled by Sewer Equipment at the 2016 Water & Wastewater Equipment, Treatment & Transport Show eschews potentially complex touch screens and digital displays in favor of manual controls designed to make the unit easy to operate and maintain. A simplified powertrain system makes the 900 ECO Combination Sewer Cleaner more efficient as well.

"The 900 ECO is the integration of the best features from our other Sewer Equipment units into one top-of-the-line unit," says Stan Stuart, product development engineer for Sewer Equipment. "More than 2 1/2 years of research and development has gone into the design of this unit."

The 900 ECO is powered by a Hydro Drive powertrain system, which takes all required power for the pump, blower and the auxiliary hydraulic systems directly from the chassis engine, eliminating the need for an auxiliary engine. When ready to work, the operator simply has to put the truck in neutral, apply the parking brake and exit the cab. The truck remains in neutral and power is taken directly from the chassis engine, ensuring operator safety, as there is no transfer case to slip into gear.

"That's a safety feature as well as an efficiency feature," explains Stuart. "Just think about the fuel you can save as an operator not having two engines running."

The unit operates at 35 percent lower rpm than a typical sewer cleaner, consuming considerably less fuel and emitting less noise than traditional designs.

The unit also features simple controls. Once the operator flips a switch to put the truck into Work Mode, water pump, blower and throttle switches can be engaged. The only interface between the module and chassis is via the throttle control port, an intentional lack of integration aimed at eliminating potential CANbus communication problems between the chassis and module. The easy-to-understand controls enhance safety while making the unit easier to operate.

"This is our response to operators who wish they could find the simplicity of their old sewer cleaner, without the electronic bells and whistles that can be sometimes tough to navigate," Stuart says. "It actually puts the control away from a computer and back into the hands of the operator."

The 900 ECO is available in 9-, 12- and 15-yard debris capacities, with respective water capacities of 1,400, 1,750 and 2,100 gallons. The water tank is made of Duraprolene, which offers immunity to corrosion and dents for long service life, and also eliminates the need for draining during storage. The fully baffled construction eliminates sloshing and allows for safe travel at highway speeds while full. The boom features a full 10-foot extension and 180-degree rotation, enabling a hydroexcavation option. According to Stuart, the unit is aimed at municipalities and contractors that specialize in municipal sewer work.

"We recently made a delivery of our first two 900 ECO units to Colorado Springs, and the feedback we've heard from them has been great," Stuart says. "They told us that the unit is exactly what they've been looking for."

A large crowd was on hand for the official unveiling of the 900 ECO on the WWETT Show floor. Stuart says the company typically tries to unveil a new product at every show, as the attendees are the company's target market.

"This is definitely the show to be at in our industry," he says. "We always have great traffic at our booth here, and that's why we always put a lot of effort into our footprint here. It's very important for the company." **877/735-4640; www.sewerequipment.com.** ✦

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DITCHING THE OLD WAYS

Florida district shifts its approach to stormwater management and water conservation

By Jim Force

Times have certainly changed when it comes to stormwater management in the Sunshine State.

"Back in the day," says Dr. Ann Shortelle, executive director of the St. Johns River Water Management District, "the idea was to get as much water as possible off the land and into the ocean. It was ditch and drain."

Now, however, with Florida the third most populous state in the country and facing a growing concern about water supply and water quality in the future, the emphasis is exactly the opposite.

"We've spent a couple of decades trying to reverse that trend," Shortelle says. "The old policies dried out our wetlands and took water away from the St. Johns River. Now we are bringing water back onto the land, rehydrating and restoring wetlands, and cleaning the water."

To that end, the St. Johns District implements its own water projects, while also sharing costs with municipal utilities in the district in support of local efforts to conserve water, capture stormwater, recharge the aquifer and protect water quality.

"We plan to do even more," Shortelle says, referring to the district's water projects. "There are so many really important benefits."

The district

Headquartered in Palatka, the St. Johns River Water Management District is one of five water districts created by state legislation in 1972 to manage surface water and groundwater throughout the state. The district serves all or portions of 18 counties, stretching from the Jacksonville area in the north, down the coast to Vero Beach, and inland to Gainesville and Ocala. The area encompasses over 12,000 square miles.

(continued)

"Unlike many other states, Florida is heavily dependent on groundwater. We are very mindful of water recharge — either in underground reservoirs or on the surface."

– Ann Shortelle

Dr. Ann Shortelle, executive director of the St. Johns River Water Management District, outside the district's headquarters in Palatka, Florida. (Photography by Robert Herrera)

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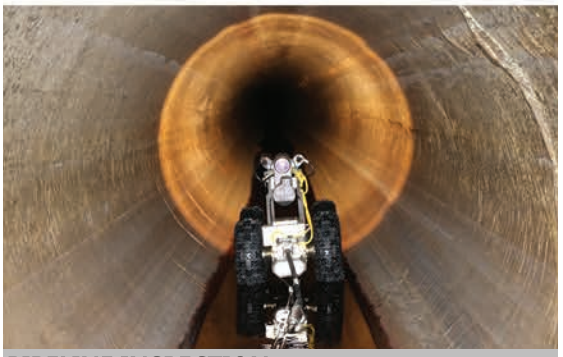
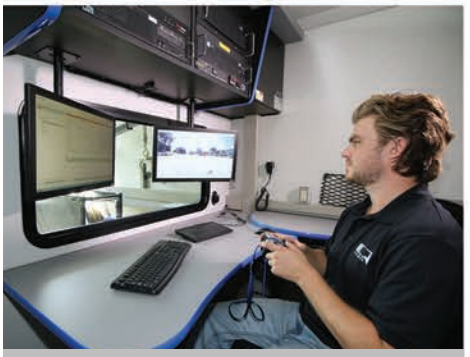


PIPELINE INSPECTION



CONDITION ASSESSMENT

www.cuesinc.com

Environmental scientists Shane Overstreet (left) and Paul Ek collect water samples from the Wekiva River for lab testing.

"The old policies dried out our wetlands and took water away from the St. Johns River. Now we are bringing water back onto the land, rehydrating and restoring wetlands, and cleaning the water."

– Ann Shortelle

All districts have a common four-part mission to protect water quality, manage water supply, control flooding and preserve natural systems. The districts are funded through an ad valorem tax, as well as numerous grants. The annual budget for SJRWMD is about $150 million, with a staff of 600.

In addition to water management projects, the district has a permitting role, and owns and manages hundreds of thousands of acres of land — some for natural flood control, others for recreation and public use.

"Unlike many other states," Shortelle says, "Florida is heavily dependent on groundwater. We are very mindful of water recharge — either in underground reservoirs or on the surface." There's also a big emphasis on water conservation (see sidebar), nutrient removal, and capturing stormwater runoff for blending and reuse.

Water supply planning

Despite the presence of the Floridan aquifer — one of the world's most productive aquifers — and annual rainfall amounts that put Florida among the nation's wettest states, it's imperative that Florida plans for adequate water supplies in

(continued)

PROFILE:
St. Johns River (Florida) Water Management District

FOUNDED:
1972

AREA SERVED:
All or portions of 18 counties in north-central and east-central Florida; 12,283 square miles

POPULATION SERVED:
4.73 million

AUTHORITY:
Water quality, water supply, flood control, natural systems

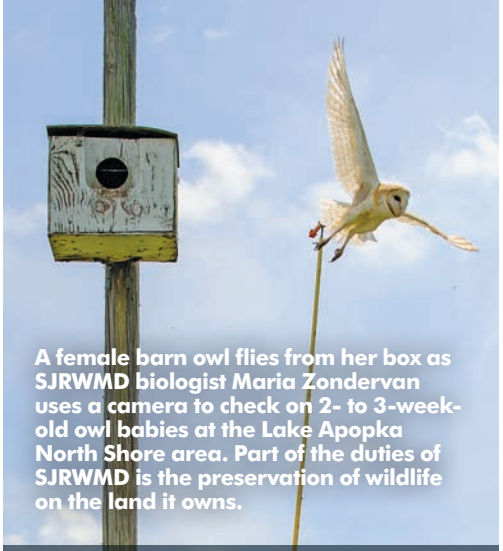
ANNUAL BUDGET:
$150 million

STAFF:
600 employees

EXECUTIVE DIRECTOR:
Dr. Ann Shortelle

WEBSITE:
www.sjrwmd.com

Paul Ek collects data from a Campbell Scientific continuous monitoring station while Shane Overstreet cleans a probe enclosure in the Wekiva River near Sanford, Florida.



A female barn owl flies from her box as SJRWMD biologist Maria Zondervan uses a camera to check on 2- to 3-week-old owl babies at the Lake Apopka North Shore area. Part of the duties of SJRWMD is the preservation of wildlife on the land it owns.

STORMWATER PARK IN SOUTH BREVARD COUNTY

The Wheeler Stormwater Park in south Brevard County will be yet another step toward protecting water quality in the St. Johns River Water Management District.

The new park, to be completed later this year, converts land formerly used for farming into a 300-acre site consisting of settling ponds, restored wetlands and newly planted trees. The park will reduce pollutants that formerly ran off agricultural lands and a mobile home park. The runoff entered the Sottile Canal, which flows into the St. Sebastian River and ultimately the Indian River Lagoon.

The project is a prime example of how the St. Johns River District partners with other agencies; funding participants include the Florida DOT, DEP and Brevard County.

"The western states might laugh at why we're concerned about water. But most of our rainwater has gone out to sea (in the past). Florida is unique in that it is primarily dependent on groundwater for potable water."

– Ann Shortelle

the next 25 to 50 years and beyond, especially as population and development continue to increase.

In the St. Johns District, the task of water supply planning falls to Mike Register and his staff. Register, division director for water supply planning, says his group's primary task is to look ahead 20 years and project both water supply and water needs.

"We evaluate the water demand in the area and then determine sources that are able to meet the demand," Register says.

Within the St. Johns District, water supply plans are drawn up and periodically updated for the northern portion, the central portion and area along the east coast. The projections are made based on prior water use, population projections, and estimates for water conservation and water reclamation and reuse. "We estimate the amount of groundwater that will be pumped from the aquifer, then identify alternative sources such as surface water, beneficial reuse and stormwater harvesting," he says.

Register says his group develops a suite of options that individual utilities can chose from, then monitors the progress toward the plan that utilities are making, updating the plan every five years. "Municipalities can pick from the options we've identified, and then make their capital projects and budget plans," Register explains. "They can meet their needs in the most cost-efficient way."

Conservation, Register says, is the most desirable alternative because it does not require large capital outlays. Desalination is another possibility, but is not really feasible and is expensive, Register says. Drilling deeper into the lower Floridan aquifer would produce water of lesser quality.

Harvesting stormwater is another major challenge, because — as Register explains — you often don't get the rainfall when you need it. "The question we ask is 'How can we build enough storage?' Do we treat and inject, build rapid infiltration basins, combine with reclaim, store in regional treatment facilities?"

Controlling floods

Floodwater not only damages property, it represents a lost opportunity as the water swirls away downstream.

Controlling floods and capturing floodwater is one of the St. Johns District's most important efforts to ensure adequate water supplies in the years ahead.

Woody Boynton is chief of the district's bureau of operations and maintenance, a team responsible for overall operation of the district's flood control and levee systems. He says the objective of the district's 50 to 75 gates, over 100 miles of levees and numerous pumping stations is to enhance water supply, water quality and natural systems whenever possible. An additional benefit is to direct stormwater back into the St. Johns River and prevent it from escaping to the ocean. Boynton's team concentrates on maintenance and monitoring.

Shane Overstreet takes water readings using a YSI Exo 1 Sonde and hand-held display.

"Most of our infrastructure is old — dating to the 1950s and 60s," he says. "Maintenance is an important aspect of what we do."

The district has embarked on a 10-year rehabilitation plan, rebuilding the entire system.

Another priority is regulating and monitoring. "We monitor 16 bodies of water and 12 major flood control systems," Boynton says. The district uses telemetry to monitor water levels and control the opening and closing of gates. "When we get 10 to 12 inches of rain, things can get pretty hectic."

Another district focus is returning former agricultural lands to natural areas that can absorb stormwater. Boynton says the district has spent close to $100 million in property acquisition in recent years, and points to the Fellsmere Water Management Area as an example. Fellsmere is an Upper Basin project consisting of 10,000 acres of restored wetlands at the headwaters of the St. Johns River. Formerly crop and pasture land, the area will now become the primary source for irrigation of the remaining farmland. The area will also reduce nutrients and freshwater input to the estuary by redirecting flows away from it and into the river.

In most of these areas, the district uses extended retention and natural treatment to take up pollutants through vegetation. In a few cases, chemical treatment removes pollutants before the water enters the receiving stream.

"The western states might laugh at why we're concerned about water," says executive director Shortelle. "But most of our rainwater has gone out to sea (in the past). Florida is unique in that it is primarily dependent on groundwater for potable water."

She is excited at the prospect of building water storage both "beneath our feet" and in surface reservoirs. "We have to remind our citizens that water is a state resource for the public good," she says. "We need to be careful and use only what we need. These are not the days of dig and drain. We need to get back to a better balance of water storage for people and for the environment." ✦

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KEEP YOUR CERTIFICATION CURRENT

Pipeline assessment program requires recertification every three years

By Ted DeBoda

As underground infrastructure assessment professionals, you must keep your knowledge fresh and stay current on all coding updates if you want to provide the best possible service.

Completing NASSCO's Pipeline Assessment Certification Program is an important part of your inspection training, but certification doesn't last forever. To maintain PACP certification status, individuals must become recertified every three years.

We do our best to keep certified individuals informed of these upcoming recertification deadlines by sending out email reminders in the months leading up to the expiration of your PACP certification. If your email or other contact information changes, however, there is no way for us to keep you informed. Therefore, it is important that you keep us updated with your current contact information so we can help you keep track of these important deadlines, as well as to keep your information accurate in the NASSCO database.

Getting recertified in PACP provides an opportunity to help you succeed and ensure we all work with the same information, which is of critical importance to NASSCO's mission to set standards for the assessment, maintenance and rehabilitation of underground infrastructure.

PACP recertification can be accomplished in one of three ways:

1. Participate in a one-day recertification course with a PACP trainer;
2. Attend the complete two-day PACP course for a comprehensive refresher; or
3. Complete the recertification course online (available late summer 2016).

To help PACP-certified professionals maintain their certification, NASSCO provides a one-year grace period after expiration to become recertified. While this may not be practical for operators who cannot afford a lapse in their certification, it does help engineers, reviewers and others who need to be recertified but would not be impacted by not being certified during this period.

If you don't get recertified within that one-year window, however, you will be required to complete the comprehensive, two-day PACP course as if you were a brand-new user. This means that the one-day course with a PACP trainer and online recertification courses will not be options after your certification has lapsed for a year or more.

The PACP recertification program is the best way to keep your knowledge and skills finely tuned and up to date, to support your career and help keep our underground infrastructure healthy.

For questions about PACP's recertification requirements or to sign up for an upcoming class, please visit nassco.org. ✦

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916/899-8961 or email mshepard1@hotmail.com

August 10-12
Santa Clara, CA
Includes Manholes and Laterals!
Recertifications Welcome
Trainer: Brandon Conley
Contact Ashley Groves for more information or to register:
248/349-0904 or email pacp@dohenycompanies.com

August 15
San Francisco, CA
One-Day Recertification Course
Trainer: Brandon Conley
Contact Ashley Groves for more information or to register:
248/349-0904 or email pacp@dohenycompanies.com

August 15-17
Ventura, CA
Includes Manholes and Laterals!
A limited number of PACP Recertification seats available.
Contact Marilyn Shepard for more information or to register:
916/899-8961 or email mshepard1@hotmail.com

August 16
Marriottsville, MD
PACP User Recertification
Trainer: Ted DeBoda
Contact Dawn Jaworski for more information or to register:
410/442-7473 or email dawn@nassco.org

August 16-17
Canyonville, OR
PACP Only
Recertifications Welcome
Trainer: William Strait
Contact William Strait for more information or to register:
541/504-5073 or email bill.strait@ci.redmond.or.us

August 16-18
San Francisco, CA
Includes Manholes and Laterals!
Recertifications Welcome
Trainer: Brandon Conley
Contact Ashley Groves for more information or to register:
248/349-0904 or email pacp@dohenycompanies.com

August 16-18
Conyers, GA
Includes Manhole and Laterals!
Recertifications Welcome
Contact John Jones for more information or to register:
404/431-5584 or email plumblineconsultant@gmail.com

August 17-19
Seattle, WA
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PACP Recertification seats available
Contact John Jurgens for more information, register or discuss in-house training:
425/487-3325 or email nodig@aol.com

August 23-25
Roseville, CA (Sacramento area)
Includes Manholes and Laterals!
A limited number of PACP Recertification seats available.
Contact Marilyn Shepard for more information or to register:
916/899-8961 or email mshepard1@hotmail.com

August 26
Seattle, WA
One-Day PACP User Recertification
Contact John Jurgens for more information, register or discuss in-house training:
425/487-3325 or email nodig@aol.com

August 30-September 1
Whitestown, IN
Includes Manholes and Laterals!
Recertifications Welcome
Trainer: Brandon Conley
Contact Ashley Groves for more information or to register:
248/349-0904 or email pacp@dohenycompanies.com

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Manhole Rehabilitation
8 a.m. – 5 p.m. Day 1
8 a.m. – 12 p.m. Day 2 Morning
Trainer: Tim Back
Contact Tim Back for more information:
513/253-8461 or email timbacktwo@gmail.com.

Cured-In-Place Pipe
1 p.m. – 5 p.m. Day 2 Afternoon
8 a.m. – 5 p.m. Day 3
Trainer: Gerry Muenchmeyer
Contact Gerry Muenchmeyer for more information:
252/626-9930 or email gerry@muenchmeyerassoc.com.
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- Super Products, LLC
- Transwest
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PIPELINE INSPECTION, SURVEYING AND MAPPING

By Craig Mandli

Asset Management

Aquarius Spectrum iQuarius

The **iQuarius** mobile system for water pipe leak detection from **Aquarius Spectrum** combines an Android app with an acoustic widget and a sensor, which creates a system that allows listening and recording via very low-frequency sound vibrations. It also provides a graphical presentation of these frequencies. It performs GIS-based acoustic logging that measures the vibration intensity in water pipes. The noise is recorded and automatically sent to the server for further analysis. It can perform correlation between two mobile sensors, allowing the user to pinpoint the exact location of a leak. It is ideal for leak detection service teams that can use it for both leak surveys and pinpointing. Results can be analyzed on the iQuarius web application. The app is available on Google Play. **www.aquarius-spectrum.com.**

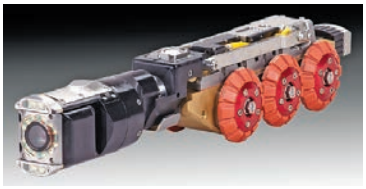
Syrinix PipeMinder

PipeMinder from **Syrinix** is a flexible network monitoring solution essential to network calming and leak and break reduction. It combines a five-year battery life, automated alerts for transients and bursts, and high-resolution data capture. It allows utilities to see, at a new level of detail and accuracy, where they are stressing networks and so contributing to leakage, and increasing the risk of bursts. Supporting a range of pipeline monitoring activities, it provides a high level of intelligent data and analytics, all captured via the RADAR customer portal and/or SCADA integration from a cloud-based interface. It detects in real time with always-on high-resolution data, with immediate alerts for events as they occur. With its long-term data reported daily, consisting of high-resolution minimum and maximum pressure and flow for each 15-minute window, it delivers reassurance in decision-making, supporting reduced leakage and bursts, and extending asset lifetimes. **www.syrinix.com.**

Crawler Cameras

Aries Industries Pathfinder Model TR3310

The **Pathfinder Model TR3310** mainline inspection system from **Aries Industries** operates with longer life in harsh pipe conditions. It is a powerful, steerable tractor with a pan-and-tilt camera and self-cleaning lens. Forward weight distribution results in better traction for longer pulls and faster inspections. Continuous-duty-rated motors, all gear-driven drivetrain and improved pressure testing ensures reliable operation. With various wheel sizes, it sets up quickly to match pipe contours. A standard configuration tractor operates in 6- to 24-inch-diameter relined pipe. A Large Line Kit



provides navigation in pipes up to 36-inch diameter. An adjustable electric camera lift with a 7.1-inch extension keeps the camera centered in a wide range of pipe sizes for full visibility. It operates with the Aries Master Controller, enabling wireless remote operation using a dual-joystick Xbox controller for ease of use. **800/234-7205; www.ariesindustries.com.**

Deep Trekker DT340

The **DT340** pipe crawler from **Deep Trekker** comes with everything needed to perform a quick and efficient pipeline inspection without requiring a dedicated service truck or additional generators. It includes internal batteries that last between six and eight hours, a lightweight handheld controller with a built-in screen for viewing, wheel track options, and plug-and-play integrations, all packed up into two carrying cases. It allows users to access hard-to-reach sites to begin easy pipeline inspections in just minutes. It is fully submersible up to 164 feet. **519/342-3177; www.deeptrekker.com.**

Envirosight ROVVER X

The **ROVVER X** inspection crawler from **Envirosight** lets the operator control inspections, view and record digital video, log observations, generate reports and link directly to asset management software. All this capability is packed into a simple three-piece layout, with no CCU or other components to clutter the workspace. Twelve wheel options — plus camera lift, carriage and illumination accessories — mean it transforms in seconds to inspect any size line. Its six-wheel drive with proportional steering navigates past obstacles, and overlapping wheel climb offsets better than tracks. Powerful motors and a geared six-wheel drivetrain maximize travel range. It is built on an expandable digital backbone, allowing the user to add side scanning, laser profiling, viewing of data from onboard sensors, automating tasks with macros and measuring defects on screen. Its firmware updates automatically to the latest features. **866/936-8476; www.envirosight.com.**

Insight Vision Cameras IRIS Pan & Tilt

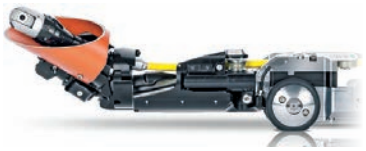
The **IRIS Pan & Tilt** mainline crawler from **Insight Vision Cameras** incorporates a motorized crawler and a power rewind-/feed-assist cable drum. The level rewind reel allows the video cable to be rewound at the same speed as the crawler moves to avoid running over the cable. The unit allows full 360-degree rotation and 180-degree pan for lateral sewer pipe inspection. It can be used for inspection of pipe from 6 to 12 inches in diameter and up to 18 inches with an optional pneumatic wheelset. The motorized drum

holds 600 feet of flexible and rugged video cable that will withstand the harsh environment found in sewer pipes. It is built with a telescopic handle and self-contained wheels for easy movement and portability. The system operates on Windows 7 64-bit software with 500GB of solid-state drive. The unit incorporates an integrated accessory power outlet, multiple recording ports, HDMI external port, 10-inch LCD touch screen, Windows apps, snapshots, on-screen footage, text writer and internet remote desktop support. **800/488-8177; www.insightvisioncameras.com.**

Pearpoint P350 flexitrax

The **Pearpoint P350 flexitrax** portable crawler system has the simplicity and transportability of a pushrod system while delivering the functionality and performance associated with more complex crawler systems. It is a modular system, designed to meet the tough requirements of most inspection environments. The command module is fully compatible with the Pearpoint P340 flexiprobe, allowing the user to switch from crawler to pushrod inspection without carrying a second system. It has an intuitive user interface and simple, one-touch control over video and photo capturing. Its ergonomic design and portability means companies can lower the cost per job as less training is required, and the P350 flexitrax allows for one-person operation. **800/688-8094; www.pearpoint.com.**

RapidView IBAK North America LISY 3.2



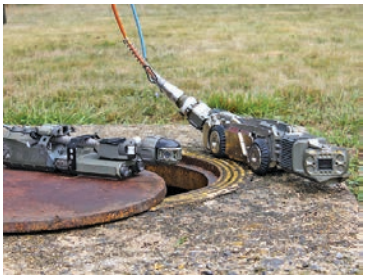
The **LISY 3.2** lateral launching system from **RapidView IBAK North America** has a front articulation arm that has been redesigned for greater strength and lower weight. The geometry of the front end has been altered to avoid debris and water retention during operations, and cable routing has been improved to protect critical cables. The drive system was revamped with a larger drive motor and more efficient pressure wheels to increase launch speed. It can be used to inspect mainlines from 6 to 48 inches in diameter, and laterals that are 2 inches and larger. **800/656-4225; www.rapidview.com.**

Ratech Electronics Mini Crawler PNT

The **Mini Crawler PNT** from **Ratech Electronics** is a self-propelled, four-wheel-drive, multi-conductor camera transporter. Its 12 super-bright LEDs with variable light intensity control have no problem lighting the way through pipe from 5 up to 30 inches. The stainless steel tractor provides pipe inspection for manhole-to-manhole inspections or small lateral pipes, navigating through difficult obstacles. Using the full 360-degree rotation pan-and-tilt camera, the user will be able to see defects and obstructions closely and in more detail. This same camera head is interchangeable with the head on the push camera system. The power and controls to operate the crawler are in a handy remote-control device. The unit comes with a manual lift and built-in 512 Hz sonde for locating purposes. **800/461-9200; www.ratech-electronics.com.**

RauschUSA M-Series

The **RauschUSA M-Series** pipe inspection system is highly modular, as each inspection module is interchangeable and upgradeable. The modules connect to the four-wheel-drive L 135 steerable crawler. For mainline inspection, mount the KS 135 pan-and-tilt camera to the remote-controlled electric lift. To upgrade the system to perform lateral launch inspections, remove the camera and attach the lateral launch system with the KS 60 pan-and-tilt lateral camera. Systems can push the lateral camera up to 150 feet into the lateral from mainline 8- to 48-inch pipe. With the steering pin attachment, the KS 60 can negotiate branched laterals. It takes less than two minutes to switch the modules from mainline to lateral inspection, or reverse. The system can be used in pipes 5.5 to 60 inches in diameter. **717/709-1005; www.rauschusa.com.**



GIS GPS

Benjamin A. Hill DiamondMaps.com

DiamondMaps.com from **Benjamin A. Hill** is a cloud-based GIS for water and wastewater utilities. It is designed for smaller departments that are looking for a simpler solution to keep track of their assets in the field. It allows them to import shapefiles or start drawing features from scratch; take pictures in the field, mark them up and attach them to the map feature for everyone else to view; log maintenance notes for each asset; track the GPS location; email maps to contractors; do editing in the field; measure distances and areas; browse, sort, and search data in rows and columns; and customize layers with special fields like pick lists and formulas. It includes background layers of aerial photography, roads, street view and more provided by Google Maps. There is no software to install or maintain, as all that's required is a PC, tablet or phone and an internet connection. **317/797-6824; www.diamondmaps.com.**

DPL Telematics Trackall OBDII

The **Trackall OBDII** from **DPL Telematics** is an advanced solution for wireless monitoring and remote tracking of vehicles to increase driver safety and productivity while reducing fleet costs. The GPS unit has no external wiring or antenna and plugs into the existing OBDII port of most vehicles, installing in seconds. Anti-tamper features include a backup battery, which delivers immediate disconnection notifications with location, as well as GPS jamming detection. It allows managers to wirelessly monitor all their vehicles continually and accurately from an internet-based software package and mobile app. It offers automatic location updates, engine data, utilization data, safety alerts, security alerts, VIN decoding and emission test readiness. **800/897-8093; www.dpltel.com.**

Matchpoint Water Asset Management Enigma3m

The **Enigma3m** from **Matchpoint Water Asset Management** combines leak localization and accurate correlation technology into one efficient and comprehensive leak detection system. Loggers are deployed across the water network, allowing for the continual monitoring of the integrity of the distribution

(continued)

system. This fixed-based acoustic noise logging system requires no above-ground assets and detects leaks remotely using GPRS/3G communication, sending data directly from the field to the web-based software, PrimeWeb. PrimeWeb processes the data daily, visually highlighting and prioritizing areas of leakage, and notes all healthy areas of the network. If there is evidence of leakage, the loggers will automatically perform time-synced correlations of each leak with the exact location of the leak(s) identified. The system eliminates the process of physically moving loggers across the network, retrieving the data and manually programming the correlation. **910/509-7225; www.matchpointinc.us.**

Inspection Vehicles

R.S. Technical Services Ford Transit CCTV pipeline inspection vehicle

The **R.S. Technical Services** inspection system has single conductor technology, including cameras, transporters, lateral inspection systems, and sonar and laser profilers that can be easily and precisely operated with one single conductor cable. The Ford Transit is available with either a diesel or gas engine and offers a compact footprint for ease of driving and maneuverability in tight-access areas or on narrow roadways. The wagon area has full-height rear doors and room for a spacious, ergonomically planned workspace. It can accommodate custom options such as extra storage, countertops, power sources, safety lighting, air conditioning, heaters and floor coverings. The interior installation configuration is customizable to each individual customer's needs. Other vehicle models and configurations are available. **800/767-1974; www.rstechserv.com.**

RICO GmbH CROSS|PORTER

The **CROSS|PORTER** TV inspection vehicle from **RICO GmbH** has a functional and cost-optimized development concept with light and high-quality materials. The camera unit can be separated from the vehicle in just a few simple steps for use directly at a manhole in rough terrain. Depending on the requirements, various carriages and cameras can be used. It has an emission-free energy supply via a lithium-ion battery system. It includes individually selectable sewer TV inspection software, and has storage space for accessories and safety equipment throughout the whole vehicle. **www.rico-gmbh.de.**

Mainline TV Camera Systems

Amazing Machinery Viztrac Max

The **Viztrac Max** camera from **Amazing Machinery** has the same durability and super-slick push cable as previous Viztrac cameras, with a 22 percent larger 9-inch LCD color display and a rechargeable lithium-ion battery pack capable of up to eight hours of field use before recharge. The unit includes an AC/DC adapter for direct power supply, a 512 Hz sonde transmitter and a DVR that records to a standard SD card. A 4GB card is included. **800/504-7435; www.amazingmachinery.com.**

Electric Eel Ecam PRO 2

The **Ecam PRO 2** from **Electric Eel** allows technicians to quickly inspect 3- to 10-inch pipelines. It includes a stainless-steel-housed, 1.68-inch-diameter self-leveling color camera with sapphire lens, 20-LED light ring and high-resolution CCD element. A flexible camera spring navigates 3-inch P-traps. The auto iris adjusts lighting automatically. The unit comes standard with 200 feet of Kevlar-braided 1/2-inch-diameter pushrod, industry-standard 512 Hz sonde, 10.4-inch daylight-readable monitor with click-touch controls and one-touch recording directly to a USB flash drive. It has an on-screen footage counter, a two-hour battery with built-in charger, adjustable light controls, 16 pages of text writing with memory saves, voiceover recording, an 8x zoom function, audio/video out jacks, 8-inch wheels for easy maneuverability, a secure-locking reel brake and powder-coated steel tube and bar construction. **800/833-1212; www.electriceel.com.**

Forbest manhole inspection camera

The manhole inspection camera from **Forbest Products** allows users to inspect manholes with high-resolution pictures or videos. It comes with a waterproof IP68 camera head of 13,000 candle power output with 6- and 13-degree beam, and focusing and zooming functions. The waterproof and dustproof control station has a 5.6-inch LCD color screen that is visible under strong sunlight with a plug-and-play laser distance module and wireless video transmission function. Users can record pictures and videos with a 64GB SD card or portable HD disk (MPEG4 video format). The telescoping pole is a 20-foot-maximum extendable fiber pole. The durable battery pack can last six hours. **877/369-1199; www.forbestusa.net.**

General Pipe Cleaners Gen-Eye Prism

The **Gen-Eye Prism** video inspection system from **General Pipe Cleaners** lets the user use a tablet or smartphone to monitor and record inspection work. A Wi-Fi transmitter inside the unit sends video to a designated device — up to 500 feet away. The command module weighs just 3 pounds and can be mounted securely on any GL or POD reel. An expandable cradle on top of the unit safely supports a standard-size tablet and easily adjusts for optimal viewing. Optional brackets for mini-tablets and smartphones are available. It offers an on-screen distance counter to track how much pushrod remains in the line, a nine-page titler with full keyboard to add company and job information to videos, a power port to keep the tablet or smartphone charged during inspections, date and time stamps for records, an LED dimmer control, and 2-, 3- and 6-inch trap skids. Its self-leveling color camera automatically keeps the picture right side up. **800/245-6200; www.drainbrain.com.**

Hathorn Corporation Wi-Fi camera system

The Wi-Fi camera system from **Hathorn Corporation** delivers 200 feet of pushrod attached to a slim, 1.4-inch self-leveling camera head. It includes

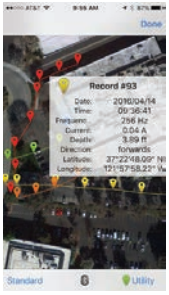
a 512 Hz sonde transmitter and a rechargeable lithium-ion battery pack, on-screen footage counter and adjustable lighting controls. The user can record video and take snapshots on any type of tablet or mobile device up to 200 feet away with a custom mobile app. Recorded files can be emailed or downloaded straight to a computer. The system allows users to recharge their mobile devices directly from the control unit. **905/604-7040; www.hathorncorp.com.**

MyTana Mfg. Company MS11-NG

The **MS11-NG** midsized video inspection system from **MyTana Mfg. Company** can be used to inspect 3- to 4-inch lines with up to 150 feet of range. It has a 1 1/2-inch color self-leveling camera head, built-in 512 Hz transmitter allowing a technician to locate during the inspection, and a daylight-readable 6.4-inch monitor. Record or upload an inspection using the MyTana viewer app, available for iPhone, iPad and Android. Built-in Wi-Fi allows multiple viewers on relining/rehabilitation projects. Inspection records can be uploaded to YouTube or still photos emailed to customers. Media connects through RCA jacks on the front of the unit. **800/328-8170; www.mytana.com.**

Mapping

Vivax-Metrotech VM-MAP



The **VM-MAP** application from **Vivax-Metrotech** allows for the real-time mapping of buried utilities. Mobile devices can pair with utility locators via Bluetooth with no trailing cables, allowing them to store depth of cover, GPS coordinates and the distance between locates. This data can then be downloaded or emailed to a PC for analysis. It is compatible with Google Maps, asset management and GIS software. Real-time generated maps ensure that the data is accurate. The location data is obtained from either the mobile phone's internal GPS, the utility locator's integrated GPS or an external GPS device of choice. Additional site data such as notes and photographs can be manually inputted as the log is created. The application is compatible with iOS and Android devices and available at the Apple Store or Google Play. **800/446-3392; www.vivax-metrotech.com.**

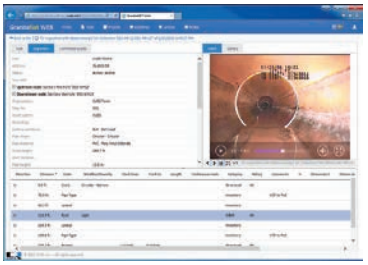
Recording/Archiving/Data Devices

Sensoray Model 2253P Codec

The **Model 2253P Codec** from **Sensoray** can collect and archive all video capture and corresponding data in tandem with other GIS mapping systems. It combines audio/video codec with a GPS receiver and multifunction port functionality. It can simultaneously encode, decode and preview A/V content and is housed in a rugged, compact exterior. All operating power is supplied by a single USB port. Each of the two multifunction ports included can operate as an incremental quadrature encoder interface or as dual general-purpose digital inputs (GPIO). Encoder counts, GPS data and GPIO states can be monitored, and real-time encoder counts and GPS data can be overlaid onto any video stream. **503/684-8005; www.sensoray.com.**

Software

CUES GraniteNet



GraniteNet condition assessment software from **CUES** is asset-based, which enables the software to easily interface with other asset-based software products such as Esri ArcGIS mapping systems, and asset management systems that include Cityworks, Hansen, IBM Maximo and others. Intuitive and easy to use, data and video can now be accessed via a web portal. **800/327-7791; www.cuesinc.com.**

Fulcrum

The **Fulcrum** mobile forms platform enables managers to easily build custom apps for capturing information in the field. Users can design forms using a drag-and-drop designer and quickly deploy them to a mobile workforce for collecting data. Users can use text entry and picklists, take photos and videos, collect signatures, scan barcodes and record GPS locations. It can be used as a standalone data collection platform or integrated with existing services such as ArcGIS and other asset management systems. Users can access a live data feed from anywhere for real-time mapping and analysis, or export data in a variety of standard formats like Excel, CSV, shapefile or geodatabase. **727/538-0545; www.fulcrumapp.com.**

Pipeline Analytics WinCan VX

WinCan VX from **Pipeline Analytics** emphasizes a productivity-oriented, fully customizable user interface with cloud-based data access and substantially enhanced reporting and analytical capabilities. It offers new support for value-added processes like pipe cleaning, rehabilitation and leak detection. It can help augment existing functional areas like GIS, laser/sonar scanning, side scanning, image measurement and municipal database integration. To accommodate large municipalities, it has been performance benchmarked on databases exceeding 5 million records. **877/626-8386; www.pipelineanalytics.com.** ✦

City adds scanning system to combat rain-dependent infiltration

Problem:

Oregon receives 2.8 inches more rainfall than the national average. As a result, rain-dependent infiltration (RDI) is an issue for cities such as Coos Bay, which receives between 60 and 80 inches of rain per year. RDI can be difficult to locate using visual methods, since in dry weather a defect may not be actively leaking, so it may not be seen. Meanwhile, in wet weather, there may be too much water in the pipe to locate the defects visually. Coos Bay has an area zoned for industrial, commercial, single-family and multifamily development, which will add a large volume of sewage to the system. The city has analyzed the existing sanitary sewer system that serves this area and has determined that it is over capacity.

Solution:

The city turned to **Electro Scan** technology for a way to locate and quantify its RDI. By locating and eliminating the RDI, the city hoped to be able to make room in the system for additional sewage.

RESULT:

Electro Scan testing was completed on four pipes. Sources of infiltration were identified, and results showed that the PVC pipe was in ideal shape and no defects were detected. However, the three concrete pipes were in varying conditions of disrepair; a total of 112 defects were located, representing an overall potential leakage rate of approximately 44 gpm, or 63,461 gpd. The data resulted in the city council's decision to purchase an **ES-620 for Sewer Mains** system, which was installed in December 2015. **800/975-6149; www.electroscan.com.**

Acoustic inspection reduces precleaning in CCTV inspection program

Problem:

Hillsborough County, Florida, serves a population of over 500,000 in the area surrounding Tampa. They have set an internal goal of CCTV inspection of approximately 1,700 miles of gravity sewer over the next five years. Management wanted to maximize the efficiency of the process and target its precleaning efforts on the pipes that needed it.

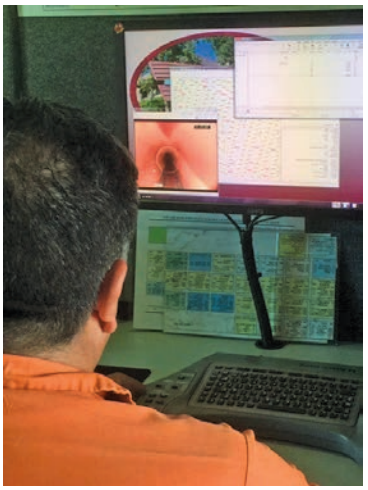
Solution:

The **Sewer Line Rapid Assessment Tool (SL-RAT)** from **InfoSense** was developed for rapidly identifying sewer line blockage conditions. It is based on measuring an acoustic signal transmitted between manholes in an active sewer line segment. Commonly encountered sanitary sewer defects, such as roots, grease and breakages, naturally obstruct acoustic energy; this changes the pipeline's acoustic properties and produces a measurable impact on the acoustic profile. An algorithm is used to exploit these variations and provide a real-time evaluation of the segment's blockage condition. A two-person crew can typically screen 2 to 3 miles of sewer per day. The units are GPS-enabled. Downloaded data can be visualized in Google Earth or integrated with a GIS system using SHP file exports.

RESULT:

Hillsborough County purchased two SL-RAT units in mid-2015. In the first eight months of operation, the technology had screened over 170 miles of the system and reduced unnecessary precleaning activity by over 80 percent, saving the county over $500,000 so far. **877/747-3245; www.infosenseinc.com.**

Software helps city manage sanitary collections system



Problem:

Chula Vista, California, maintains a digital asset management program to help provide the foundation for sustainable best practices. Collections system manager Dave McRoberts collects infrastructure data, running two CCTV inspection trucks with two tractors each, and a shared large storm drain tractor. He works closely with Public Works specialist Yuen Cheng and engineering technician Tim Weinman to share comprehensive, current information between departments. Together, they manage and maintain a sanitary collections system serving 265,000 customers with 515 miles of sanitary line — 98 percent gravity feed and 2 percent force main — 14 pump stations and 10,800 manholes. The city needed a software program capable of organizing collected data into an easy-to-use form.

Solution:

The city has been using **PipeLogix** pipeline assessment software since 1998 to work with its CCTV inspection cameras. Cheng collects CCTV survey data for the GIS department and imports it into an ESRI ArcGIS mapping program. "Citywide, users can click on any given pipe and bring up its video survey footage," she explains. She uses PipeLogix to help plan upcoming inspections, and pulls data into the city's core software, Lucity, which handles asset inventory, maintenance management and GIS compatibility. McRoberts uses PipeLogix's PACP-rated asset data to determine which lines get rehabilitated or replaced, and in planning new development.

RESULT:

Having all of the data in a digital format allows it to be available to all departments, on demand, eliminating any waiting for hard copy data, or having to manually match up printed reports with video. By all measures, the software-aided asset management campaign is a success. **866/299-3150; www.pipelogix.com.** ✦

GapVax names sales rep


Terry Brown

GapVax named Terry Brown sales representative for the Southeast territory. He has 25 years of experience in operations, construction and business development in the utility and gas markets.

Sioux electric pressure washers receive hazardous-use certification

Sioux Corporation all-electric pressure washers and steam cleaners received approval for Class I, Division 1, Group C and D; and Class II, Division 1, Group F and G hazardous environments.

GPS Insight partners with Fleetio

GPS Insight formed an integration partnership with Fleetio, a fleet maintenance software company. The data integration will allow customers who use both systems to receive automated odometer readings and DTC alerts from GPS Insight inside the Fleetio software application.

HammerHead adds coating system, cleaning tool

HammerHead Trenchless Equipment, a Charles Machine Works company, added the Picote Pipe Coating System and the Picote Smart Spider pipe cleaning tool to its Picote product line.

Aegion appoints president of Infrastructure Solutions platform


Frank Firsching

Aegion Corporation named Frank Firsching president of its Infrastructure Solutions platform. Firsching will have responsibility for the overall growth and profitability of the North American and European Insituform business, Underground Solutions, and Fyfe/Fibrwrap North and South America. He has been part of Underground Solutions' executive leadership team since 2006.

RauschUSA adds MME to distributor network

RauschUSA added Municipal Maintenance Equipment of Sacramento, California, to its family of authorized distributors. With four locations, MME serves contractors and municipalities in California and Nevada.

JWC Environmental names sales director


Troy Heimerl

JWC Environmental promoted Troy Heimerl to director of North American municipal sales. Heimerl has over 20 years of experience in the wastewater industry.

Jack Doheny Companies to become exclusive dealer for RapidView IBAK

Jack Doheny Companies will become the exclusive dealer of RapidView IBAK pipeline inspection and rehabilitation equipment in Florida. Jack Doheny Companies maintains facilities in Orlando and Miami and will provide sales, support, service and training throughout the state.

NexTraq partners with Fleetio

NexTraq and Fleetio have partnered to streamline fleet management processes for its customers and reduce operational costs. Through the partnership, NexTraq will automatically update the current odometer reading once per day for each Fleetio-mapped vehicle.

VE Group to coordinate sales for TRIC Tools

VE Group will coordinate sales for TRIC Tools in the Southeast region of the United States. VE Group currently represents TRIC in Mexico, Latin America and South America.

Sauereisen launches website

Sauereisen, a producer of protective linings, coatings and ceramics for industrial users, launched a new website, www.sauereisen.com. The site is available in 12 languages and offers easy viewing and navigation from mobile devices.

Nu Flow moves to larger office in Maryland

Nu Flow relocated its Maryland office to a 3,000-square-foot building in Frederick, Maryland. The increased space will allow the branch to operate more efficiently and meet the demands of customers throughout the Mid-Atlantic.

Trelleborg Pipe Seals signs agreement with Statoil

Trelleborg Pipe Seals' offshore operation in Norway signed a framework agreement with Statoil for the supply of Elastopipe, Passive Fire Protection and Thermal Insulation (Vikotherm R2, S1 and P7). ✦

Product Spotlight

Vacuworx PS 1 vacuum system eliminates heavy manual lifting

By Luke LeNoble

The PS 1 portable vacuum lifting system from Vacuworx International provides a safe alternative to heavy manual lifting on the job site.

The cordless unit is designed to work with skid-steers, mini-excavators, forklifts, cranes and other compact equipment. It can lift and move manhole covers or other heavy objects, including concrete, marble, granite, steel or iron.

Three interchangeable pad options range from 8 by 8 inches (693-pound lifting capacity) to 16 by 16 inches (1,654-pound lifting capacity). Additional pad configurations (up to 2,200-pound lift capacity) are available.

"One person can be working this unit on a job that may normally require four or five people," says Randy Hayes, corporate sales director at Vacuworx International.

"In markets where they are typically breaking up concrete and going through the messy removal process, this system will allow them to saw-cut the sections for easy removal with no hydraulic hammers, no heavy lifting for your personnel and less equipment required for cleanup and disposal," he says. "Or if they have to go in and pick up a steel plate and move it from one location to another, you can use this small piece of equipment to do that."

Approved for indoor and outdoor use, the unit is made for applications where no power source is available or where no emissions are permitted. The portable system weighs 25 pounds and is powered by a 12-volt, rechargeable battery with an eight-hour runtime.

"It's a very small, lightweight system — easy to use and easy for one person to carry," Hayes says. "The advantage of it being portable is that it allows for usage on a variety of equipment.

"We are in the business of taking care of people, keeping them out of harm's way, while increasing efficiencies and productivity," Hayes says. "All of our equipment is designed with those things in mind." **866/664-3450; www.vacuworx.com.**

General Pump HX

Cortec VpCI-371

Electric Eel Portable Battery Pack

General Pump hydroexcavation nozzle

HX hydroexcavation nozzles from General Pump are urethane-coated for durability and operator protection. Featuring a stainless steel body, the nozzles are rated for up to 30 gpm and 1,000 to 4,000 psi. **888/474-5487; www.generalpump.com.**

Electric Eel Mfg. portable battery pack

The portable battery pack from Electric Eel Mfg. is designed for use with the Ecam Ace, Ace Wi-Fi and Ace 2 pipeline inspection cameras. The lithium-ion battery pack will operate units for up to five hours and features a battery gauge and low-power alarm. Output voltages are 12 volts via DC jack and 5 volts via USB port. Units come with a wall adapter for charging. **800/833-1212; www.electriceel.com.**

Cortec high-temperature corrosion protection

VpCI-371 high-temperature aluminum solvent from Cortec Corporation is a silicone coating that provides corrosion resistance on metal substrates. The coating will dry tack-free to 5B hardness in about 20 minutes at room temperature and will achieve 9H hardness after heating. The coating is heat stable to 1,200 degree F and offers prolonged heat resistance from 400 to 1,200 degrees F. **800/426-7832; www.cortecvci.com.** ✦

classifieds

see photos in color at www.mswmag.com

COVERS

POND & TANK COVERS: Industrial & Environmental Concepts makes gas-collection covers, odor-control covers, heat-retention covers and wildlife-protection covers. Call 952-829-0731 www.ieccovers.com (MBM)

EDUCATION

RoyCEU.com: We provide continuing education courses for water, wastewater and water distribution system operators. Log onto www.royceu.com and see our approved states and courses. Call 386-574-4307 for details. (oBM)

MONITORING SYSTEMS

FOR SALE: Quantity 78 used Raco Verbatim VSS Series & 5 ANTX autodialers. 205-201-3582 watson.bo@gmail.com (M08)

POSITIONS AVAILABLE

Trio Vision (formerly Cobra) is looking to expand their sales team. We are seeking Regional Sales Manager, who will be responsible for sales and demonstrations in a particular territory. Currently we are seeking Sales Managers east of the Mississippi. Prior experience with CCTV inspection sales and software would be helpful. Please send your resume to: tomschmandt@cobratec.com 770-435-8991 (M08)

GapVax, Inc., a nationally recognized manufacturing business, is seeking a talented, highly motivated individual to fill a full-time Sales Position in the Midwest (Iowa based preferred) region. GapVax is the leading manufacturer of industrial and municipal vacuum units and hydroexcavation units in the United States. We provide the most reliable, comprehensive, and efficient mobile vacuum units in the industrial and municipal markets. Specifications of the position are listed on our website, www.gapvax.com, click on the Now Hiring link in the left hand column. Send resumes to KSalem@gapvax.com or 575 Central Avenue, Johnstown, PA 15902. (MBM)

PRESSURE WASHERS

Industrial Pressure Washer - New w/warranty $9,500. 2,000psi, 18gpm. 999cc Kohler & AR pump. Will deliver. 321-800-5763 (MBM)

Honda horizontal GX engines, new in-the-box w/warranty. GX200QX - $399; GX270QAG - $579; GX390QA - $599 delivered price. 800-363-9855 or GXParts.com (MBM)

RENTALS

Liquid vacs, wet/dry industrial vacs, combination jetter/vacs, vacuum street sweeper & catch basin cleaner, truck & trailer mounted jetters. All available for daily, weekly, monthly, and yearly rentals. **VSI Rentals, LLC, 888-822-8648; www.vsirentalsllc.com.** (CBM)

SERVICE/REPAIR

Dynamic Repairs - Inspection Camera Repairs: 48 hour turn-around time. General Wire, Ratech, RIDGID, Electric Eel Mfg., Gator Cams, Insight Vision, Vision Intruders. Quality service on all brands. **Rental equipment available.** For more info call Jack at 973-478-0893. Lodi, New Jersey. www.dynamicrepairs.biz (MBM)

TV INSPECTION

USED Envirosight ROVVER System: Brand new RC90 camera. Cable reel (SN 360570) has new power supply, motor, clutch, cable (656') and winding rollers. 125 crawler (SN 0260768) has new top plate, side plates, axles and seals, plus new control board compatible with rear-view camera accessory (not included). CCU (SN 0160981) with new power card, new 56V card, new +/-26 card, and new card. Control pendant (SN 0492645) is compatible with RC90 camera and R225 crawler. $27,500. Call 973-252-6700. (MBM)

NEED TRACTION? We make aftermarket more aggressive pads and chain assemblies for all chain-driven camera tractors. Custom, dependable, double-hole fabrication secured to high quality carbon steel chain, or just pads and rivets. Samples upon request. **Pipe Tool SpecialtiesLLC:** 888-390-6794; Fax 888-390-6670; www.yourtractionpads.com or email pts4422@yahoo.com (MBM)

WATERBLASTING

Gardner Denver T-375M: Bare Shaft pump. Gardner Denver T450M Bare Shaft pump. Gardner Denver TF-375M 21 gpm @ 10,000 psi. Gardner Denver TX-450HB 21gpm @ 20,000 PSI. Gardner Denver TF-450MB 52gpm @ 10,000 psi. NLB 10-200. 34 gpm @ 10,000 psi. HT-150S 25 gpm max 10,000 psi max, Shell Side Machine, Wheatley 165: 30 gpm @ 10,000 psi. Wheatley 125 with aluminum bronze fluid end. Boatman Ind. 713-641-6006. View @ www.boatmanind.com. (CBM)

WATER JETTING EQUIPMENT: We sell, repair and retrofit water blasters. Visit us at: www.waterjettingequipment.com or phone 714-259-7700. (CBM)

WORTH NOTING

PEOPLE/AWARDS

The town of Wrightsville Beach, North Carolina, hired **Bill Squires** as Public Works director and **Jonathan Babin** as assistant Public Works director.

Aaron Koch, a Chicago Water Department official who developed the Chicago Green Stormwater Strategy, has been named the city's chief resilience officer. He will address emergency preparedness, public safety and community development in collaboration with departments and agencies across the city. Koch will work to ensure the city can respond to and recover from shocks, such as flooding or blizzards.

The city of **Bellevue** received a $794,293 grant from the Washington State Department of Ecology to improve water quality at Bellevue Downtown Park. The grant funding will go specifically to retrofitting the park with water-quality treatment and flow control for stormwater runoff. The funding comes from Washington's Stormwater Financial Assistance Program, which funds stormwater facilities and "activities that have been proven effective at reducing environmental degradation from stormwater impacts resulting from existing infrastructure and development."

Marshall University in Huntington, West Virginia, received the 2016 Environmental Partnership Award from the West Virginia Department of Environmental Protection. Under the leadership of Marshall's environmental specialist Travis Bailey, the university has made serious strides to improve the region's water quality through its stormwater program, according to Matt Collier, environmental inspector for WVDEP.

The Delaware Water Infrastructure Advisory Council awarded a Surface Water Matching Planning Grant to **Dewey Beach** in the amount of $50,000. The proposal submitted by Dewey Beach to the council calls for innovative stormwater management practices and living shoreline techniques to help attenuate erosive wave energy and reduce sediment and nutrient loads into Rehoboth Bay.

A **University of Texas-Arlington** student team's design to reduce stormwater runoff that could result from future campus construction projects has won a national Environmental Protection Agency's Office of Water Award as part of the agency's 2015 Campus RainWorks Challenge. The College of Architecture, Planning and Public Affairs team included landscape architecture graduate students Baishaki Biswas, Sherry Fabricant, Jacob Schwarz and Ahoura Zandiatashbar. Their winning entry in the Master Plan category was called "Eco-Flow: A Water-Sensitive Placemaking Response to Climate Change" and centered on water runoff rates at sites of potential UTA student living, dining, recreation and parking facilities.

A regional coalition of 30 cities and towns in Massachusetts will receive $50,000 in state funding to help them comply with upcoming federal requirements for managing stormwater, the state Department of Environmental Protection announced. The **Central Massachusetts Regional Stormwater Coalition** will use the money to provide training and technical assistance to communities to meet the U.S. Environmental Protection Agency's MS4 (Municipal Separate Storm Sewer System) permit.

LEARNING OPPORTUNITIES

American Water Works Association

AWWA is offering a webinar titled "What You Need to Know About Climate Risks to Water Utility Infrastructure and Assets" on Nov. 30. Visit www.awwa.org.

Wisconsin

The University of Wisconsin Department of Engineering-Professional Development is offering "Using WinSLAMM v. 10.2: Meeting Urban Stormwater Management Goals R324" on Oct. 6-7 in Madison. Visit epdweb.engr.wisc.edu. ✦

CALENDAR

Aug. 14-18
Geo-Chicago 2016: Sustainability, Energy and the Geoenvironment, Sheraton Chicago Hotel & Towers, Chicago, Illinois. Visit www.asce.org.

Aug. 22-25
StormCon, Indiana Convention Center, Indianapolis, Indiana. Visit www.stormcon.com.

Aug. 22-25
National Association of Flood and Stormwater Management Agencies 2016 Annual Meeting, Portland, Oregon. Visit www.nafsma.org.

Aug. 28-31
American Public Works Association International Public Works Congress and Exposition, Minneapolis Convention Center, Minneapolis, Minnesota. Visit www.apwa.net.

Sept. 6-9
American Society of Agricultural and Biological Engineers International Drainage Symposium, The Commons Hotel, Minneapolis, Minnesota. Call 612/624-4230 or visit www.asabe.org.

Sept. 12-14
National Rural Water Association WaterPro Conference, Orlando, Florida. Visit www.nrwa.org.

Sept. 24-28
Water Environment Federation Technical Exhibition and Conference, New Orleans Morial Convention Center, New Orleans, Louisiana. Visit www.weftec.org.

Sept. 28-Oct. 1
American Society of Civil Engineers 2016 Convention, Oregon Convention Center, Portland, Oregon. Call 800/548-2723 or visit www.asce.org.

Nov. 13-17
American Water Resources Association 2016 Annual Conference, Florida Hotel and Conference Center, Orlando, Florida. Visit www.awra.org.

April 23-26 (2017)
American Public Works Association 2017 North American Snow Conference, Iowa Events Center, Des Moines, Iowa. Visit www.apwa.net.

April 30-May 3 (2017)
American Water Resources Association 2017 Spring Specialty Conference, Snowbird Ski and Summer Resort, Snowbird, Utah. 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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OKC Oilfield Expo - August 17-18 - Cox Convention Center
WEQFair - Sept. 12-13 - Wisconsin State Fair Park
PA Safety Days - Sept. 15 - Monroeville Convention Center
Tri-State Seminar on the River - Sept. 20-22 - South Point Hotel, Las Vegas

SHOWS NO MERCY EXCEPT TO BURIED

GAS lines

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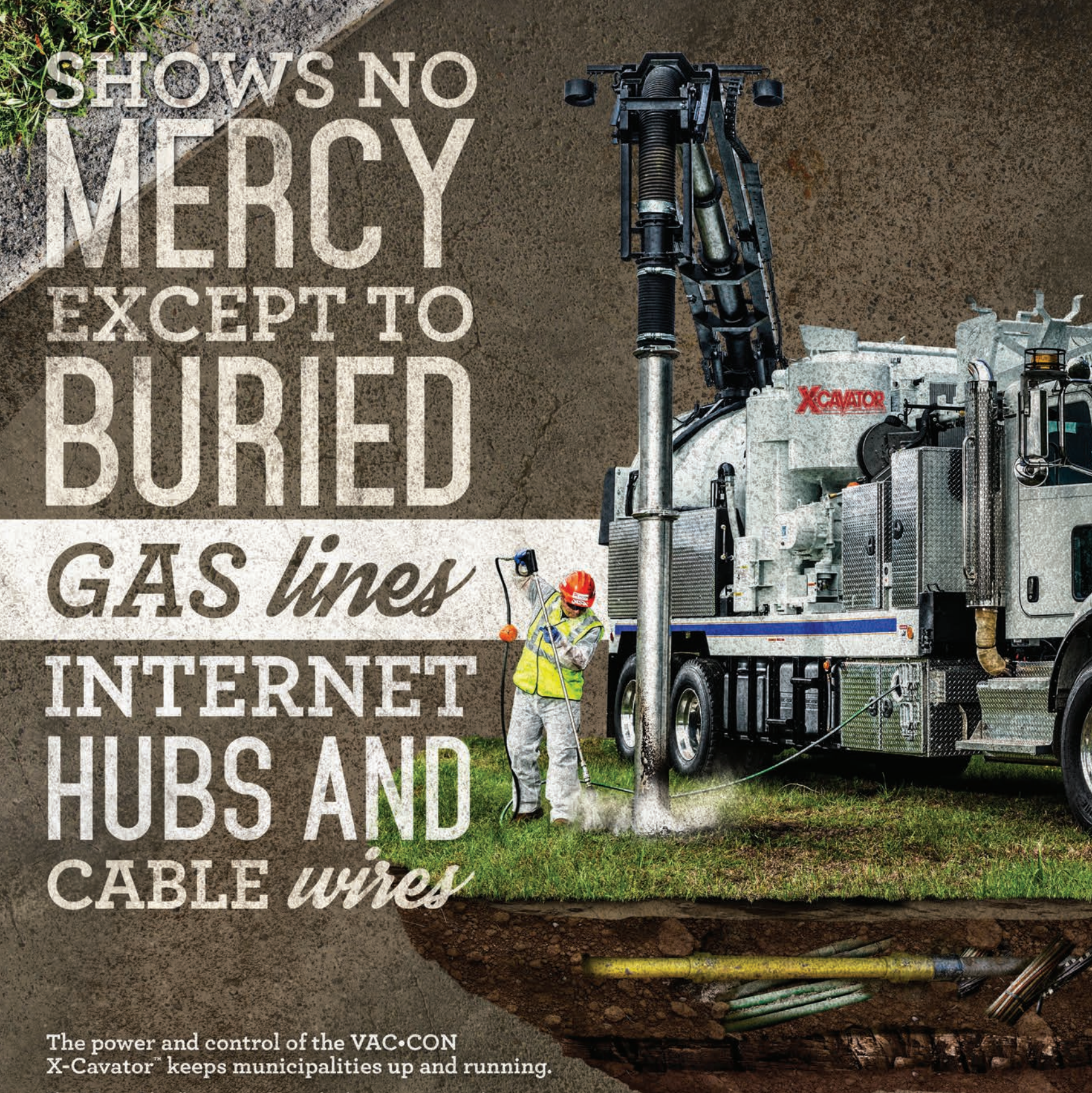

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