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Steve Bigley and Dan Charlton
Coachella Valley Water District
Coachella Valley, California

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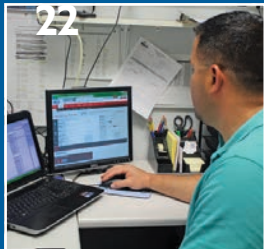
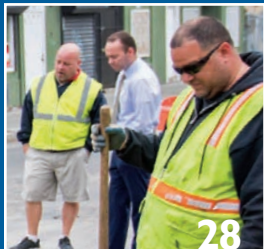
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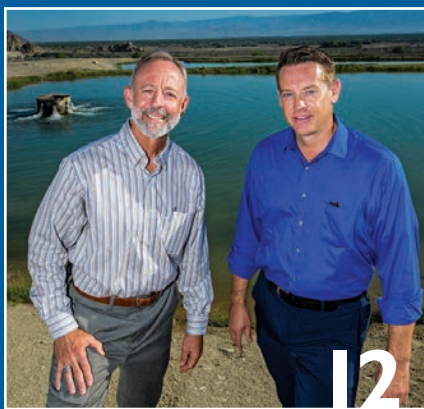
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ON THE COVER: Coachella Valley Water District Director of Environmental Services Steve Bigley (left) and Director of Facilities and Maintenance Dan Charlton at the Thomas E. Levy Groundwater Replenishment Facility in La Quinta, California. The facility is designed to perk 40,000 acre-feet of water per year. (Photography by Robert A. Keeran)



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FOR SANITARY, STORM AND WATER SYSTEM MAINTENANCE PROFESSIONALS

Published monthly by:



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



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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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


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EDITORIAL CORRESPONDENCE: Send to Editor, *Municipal Sewer & Water*, PO. 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: 2017 average circulation was 37,681 copies per month (U.S. and international distribution).

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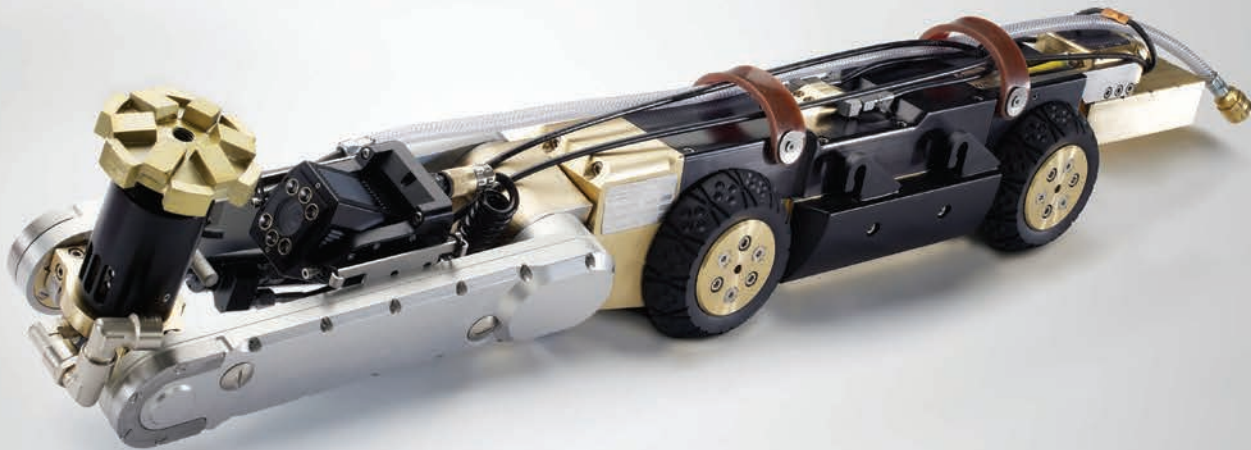
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FROM THE EDITOR

Luke Laggis

The water and wastewater industry is a constant challenge, whether it's securing water supplies, rehabilitating aging collections systems or securing the funding for your most critical projects.

I talked to quite a few utility operators at the American Water Works Association ACE18 in Las Vegas in June. One of the things I always ask people about is the condition of their systems and the biggest challenges they face. It gives me a good, quick snapshot of what they're dealing with, and the more people I talk with, the more my understanding of the water and wastewater industry as a whole grows.

The people I had the opportunity to meet included:

- Dan Drifill of the Monroe County Water Authority. The authority, which serves five counties in upstate New York, has a 100-year replacement program and is spending \$20 million per year on replacing and upgrading its distribution system.

- Jon Conover, meter shop supervisor for the city of Sacramento, California. He told me about a networking group he established that now spans well over 100 utilities. The group discusses metering issues, and every month Conover emails a question to all the members and then compiles all the responses and sends them out to the same recipients. It's a cool initiative, and he's done it all on his own.
- Greg Clark, wastewater rehabilitation manager for Cleveland Utilities. To combat significant sanitary sewer overflow and inflow and infiltration problems, Cleveland divided its collections system into sections and started doing evaluation studies. The studies have been used to guide several million dollars worth of rehabilitation work annually, primarily CIPP and manhole work.

I also talked to Gene Camp of the Bartow County (Georgia) Water Department, Kenneth Holcomb of the city of Compton (California) Water Department, and other operators, educators, and contractors. It was a good experience and a great opportunity to continue learning more about the work you're doing.

It also brings to mind the two municipal utilities profiled in this issue of *Municipal Sewer & Water*, which provide great examples of the varied but constant challenges you face.

The city of Lawrence is Massachusetts' poorest community. A long-running lack of investment in infrastructure left the city's wastewater collections system in bad condition. Brian Pena, water and sewer commissioner, stepped into his position in 2014, two days before the city was issued a Department of Justice consent decree. Since then, the city has sent cameras through 300,000 linear feet of pipe, conducted 3,500 certified manhole inspections, and extensively smoke-tested the system. The city has committed to clean water and strengthened infrastructure that will enhance economic development and the community's quality of life.

On the other side of the country, the Coachella Valley Water District's challenge has been to safeguard its water supply for its 450,000 residents, along with 120-plus golf courses and 65,000 acres of farmland. Summer temperatures in the valley average over 100 degrees F, and the area receives only 3 to 4 inches of rain a year. An extensive water recycling program has helped with irrigation needs, and aggressive promotion of water conservation has helped reduce domestic water demand by about 20 percent since 2013. But that's only a small part of the story.

Both of these utilities offer some important lessons for your own utilities and show the value of a proactive approach to maintenance and operations. I hope you find their stories helpful.

Enjoy this month's issue. ♦

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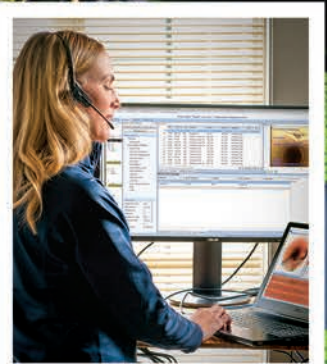
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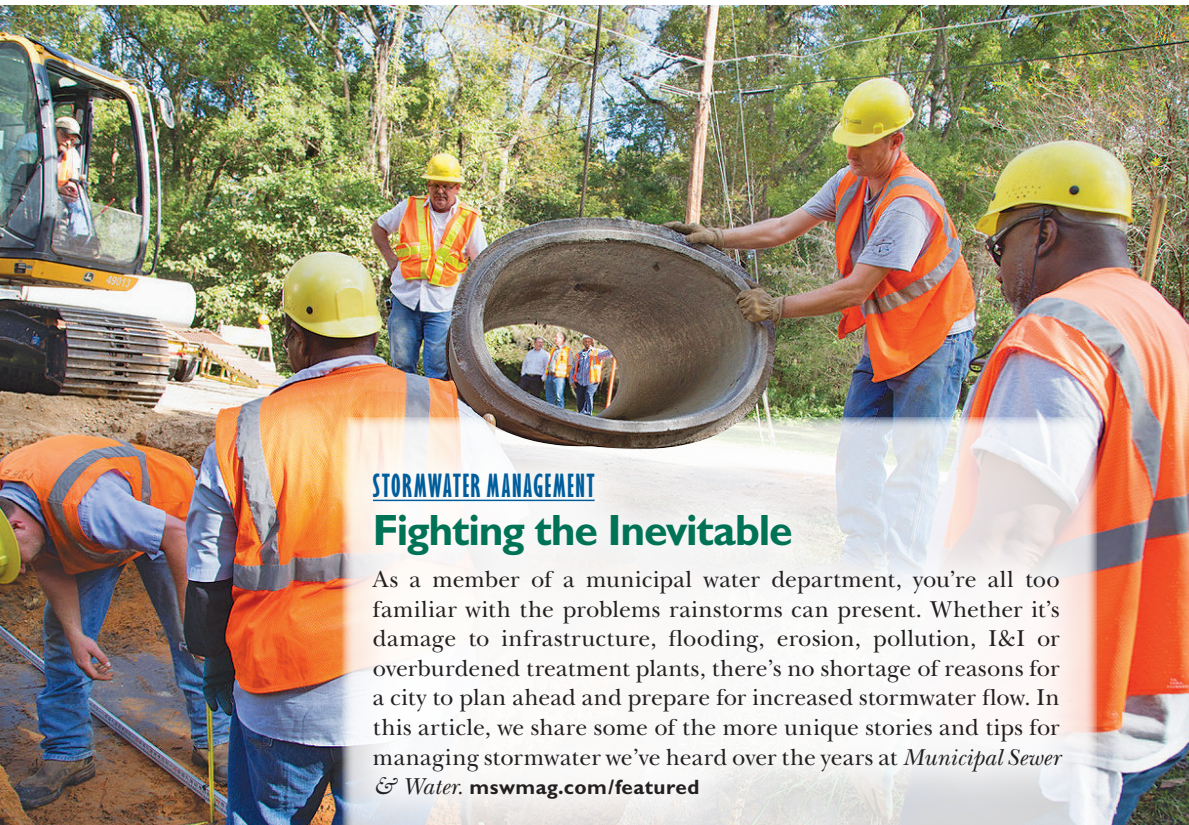
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STORMWATER MANAGEMENT

Fighting the Inevitable

As a member of a municipal water department, you're all too familiar with the problems rainstorms can present. Whether it's damage to infrastructure, flooding, erosion, pollution, I&I or overburdened treatment plants, there's no shortage of reasons for a city to plan ahead and prepare for increased stormwater flow. In this article, we share some of the more unique stories and tips for managing stormwater we've heard over the years at *Municipal Sewer & Water*. mswmag.com/featured



FIGHTING CITY BLIGHT

Building Green Infrastructure

A pilot program over the last three years in Buffalo, New York, has successfully combined local job creation and better stormwater management. The unique program between a utility and a nonprofit group has completed 20 acres of green infrastructure projects in the city that can keep 300,000 gallons of stormwater out of the collections system every rain event. In the process, more than 50 jobs were created — most filled by local, low-income residents in need of work. mswmag.com/featured



SCIENCE MEETS SCIENCE FICTION

Bringing Sewer Work to Life

Most of the public remains woefully unaware of the issues facing water and sewer utility workers. That's part of the inspiration behind a new comic book series called MeSseD that marries the science of municipal sewer and water work with science fiction. Written by a Cincinnati-based artist, the series aims to educate our 'flush and forget it' society about the weird, wet, wild world beneath our feet. Check out this online exclusive for the story and photos of a life-sized underground tour of the comic book's pages. mswmag.com/featured

OVERHEARD ONLINE

“While the mandated water quality reports produced by regional water authorities do a great job of measuring specific water quality issues, they are not telling the whole story.”

— *Survey Shows a Third of Consumers Have Water-Quality Issues*
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ELEVATING THE DISTRICT

Coachella Valley takes comprehensive approach to conservation, recharging its main aquifer and ensuring a sustainable water supply

By Jim Force

Coachella Valley Water District domestic crew chief Joseph Bloch flushes a waterline after the 8-inch main began leaking in front of a home. The Domestic Leak Repair crew was on site all night to make the repairs and get service restored as quickly as possible. (Photography by Robert A. Keeran)

For more than 100 years, communities in the arid, sun-drenched Coachella Valley east of Los Angeles have drawn their drinking water from the 45-mile-long Coachella Valley aquifer that stretches from the Whitewater River canyon just west of Palm Springs to the Salton Sea.

And despite periodic declines in the amount of available water, the Coachella Valley Water District's comprehensive management plan is helping ensure that water will be available years into the future. The plan includes entitlements to imported water from the Colorado River and the California State Water Project, drinking water wells and systems, aquifer recharge, recycle and reuse of treated wastewater, conservation, irrigation, irrigation drainage and stormwater management.

"We are unique in that we provide each type of water-related service while serving over 100,000 connections, yet depend entirely on the groundwater basin for our domestic water supply," says

Steve Bigley, director of environmental services. "There aren't many agencies in the U.S. — if any — that are like that.

"It's a testament to the wisdom of the people who formed the water district 100 years ago and managed it for decades," he says of the planning. "They had the foresight. They recognized the value of the groundwater basin the whole valley depends on."

Bigley says the amount of groundwater storage in the basin this year is higher than it's ever been, thanks to a snowy winter in 2016-17. "We stored over 380,000 acre-feet of water, which not only improves aquifer levels, but also helps prevent subsidence (in ground levels). We've actually seen uplift in some areas."

The district

The slogan "Valley of the Sun" belongs to Phoenix, but it could well be applied to the Coach-

ella Valley. Summer temperatures average over 100 degrees F during the day, and the area receives only 3 to 4 inches of rain a year. Still, its proximity to Los Angeles, lush golf courses, and historic architecture have drawn over 450,000 folks who live there, including many movie stars and headline entertainers. Another 200,000 to 300,000 tourists visit annually, escaping cold weather elsewhere.

The district encompasses 1,000 square miles and is one of two agencies importing water to help manage water resources in the region. Its customers use about 90 mgd of domestic water. The organization is governed by a publicly elected board of directors and funded through property taxes and user rates.

The district operates five wastewater treatment plants — two of which produce tertiary level reclaimed water for recycling — three drinking water treatment plants, two large aquifer replenishment facilities with a third one under construction,

“It’s a testament to the wisdom of the people who formed the water district 100 years ago and managed it for decades. They had the foresight.”

Steve Bigley

about one hundred drinking water wells, over 1,000 miles of drinking water pipelines and wastewater sewers, irrigation and irrigation drainage grids, and stormwater management. The district is also responsible for the 123-mile-long Coachella Canal, which brings water by gravity flow from the Colorado River, and maintains a critical arrangement with the Metropolitan Water District of Southern California, exchanging Colorado River water for water from the State Water Project, bucket for bucket. Coachella is one of only two agencies in the state having access to both imported water sources.

Domestic water

To provide clean water for domestic use, wells ranging in depth from 800 to 1,800 feet typically draw between 1,800 and 2,000 gpm from the aquifer.

In 1990, the district began adding chlorine at its wells to meet revised bacteria standards. “The water drawn from our wells meets bacteria standards without treatment but chlorine maintains this quality in the water system,” Bigley says. He adds that California’s hexavalent chromium (chromium 6) standard adopted in 2014 triggered extensive treatment technology research by the district due to naturally occurring chromium 6 found in many of its wells.

Plans to install conventional treatment facilities costing over \$250 million were put on hold late in 2016 when it discovered a more economical chemical reduction method. “We have recently demonstrated a cost-effective method to reduce chromium 6 in drinking water that is ready to go,” Bigley says, “but California had to withdraw the regulations and is beginning the process needed to adopt a replacement standard. It’s been a real roller-coaster ride for us.”

Five wells near the Salton Sea at the district’s far eastern edge use ion exchange to comply with the revised arsenic standard adopted in 2001.

The treated water is stored in more than 60 elevated reservoirs located in the foothills around the region. The largest has a capacity of 12 million gallons.

Farms and the 120-plus golf courses in the area are large water users, and the district fulfills much of their irrigation needs with raw Colorado River water and recycled wastewater. The district also maintains the area’s 480 miles of irrigation drainage pipes, which collect subsurface drainage largely from agricultural lands and direct it to the Salton Sea.



A short section of 33-inch clay pipe is lowered and fitted into the bell of another piece of pipe. The work is part of the Palm Desert Sewer Improvement Project.

“The Coachella Valley has the potential for some of the most severe alluvial fan flooding in the nation. The surrounding mountains are hardscapes, and the channels are our lifelines from a stormwater perspective. Our goal is to protect life and property.”

Dan Charlton

“There are 65,000 acres of farmland within our district boundaries,” says Dan Charlton, director of facilities and maintenance. The drainage system is designed to convey agricultural drain water, maintain groundwater levels beneath the farms, and prevent salt buildup in the soil. At some point in the future, this source may help meet future water demands.

Conserving water

As another means of protecting and preserving the aquifer, the district aggressively promotes

water conservation. Customers are encouraged to install low-flow toilets and smart sprinkler and irrigation systems. A turf buyback program has reduced the number of green-grass yards. As a result, domestic water demand has been reduced by about 20 percent since 2013.

Although the area receives little rain, storms in the mountains and across the district can create raging torrents of stormwater. To limit damage from such events, the district maintains a 600-foot-wide storm channel, which runs down the center of the region, fed by 16 tributary channels. “The Coachella Valley has the potential for some of the most severe alluvial fan flooding in the nation,” Charlton says. “The surrounding mountains are hardscapes, and the channels are our lifelines from a stormwater perspective. Our goal is to protect life and property.”

The district has been a pioneer in automated monitoring and operating its sprawling water system. “We started in the ’60s, using microwave towers to communicate with remote field systems, specifically the Coachella Canal, which begins

just west of Yuma, Arizona,” Bigley says. “Operators could control the gates along the canal from a control center — pretty advanced technology for that time.”

Today, the district is improving this SCADA system and plugging in new Wonderware software (Schneider Electric - Invensys) to sync with the microwave towers and field-based PLCs. “The systems have setpoints; setpoints trigger alarms; and alarms trigger action,” Charlton says. “It’s our eyes and ears in the field.”

Replenishment

If SCADA is the brain, the replenishment facilities are the heart of the system. They trace their beginning back 100 years — long before groundwater recharge became common. “In 1918, we hired an engineer to develop facilities to capture the stormwater coming down the Whitewater River channel,” Bigley explains. “We were doing it way back then.”

Near the site of that early installation, the Whitewater Groundwater Replenishment Facility *(continued)*

Crews install a 7,500-foot-long, 24-inch-diameter nonpotable water transmission main as part of the Mid-Valley pipeline Phase II expansion that will allow the district to expand its service area for delivering nonpotable water. The ductal iron pipe and was protected with a purple polyethylene encasement designating the line as nonpotable.

PROFILE: Coachella Valley Water District



FOUNDED:
1918

POPULATION SERVED:
290,000

AREA SERVED:
1,000 square miles of Coachella Valley

WATER SYSTEM:
Domestic water wells, aquifer replenishment, drinking water treatment and distribution, wastewater treatment and recycling, stormwater management, water conservation, irrigation and irrigation drainage.

EMPLOYEES:
555

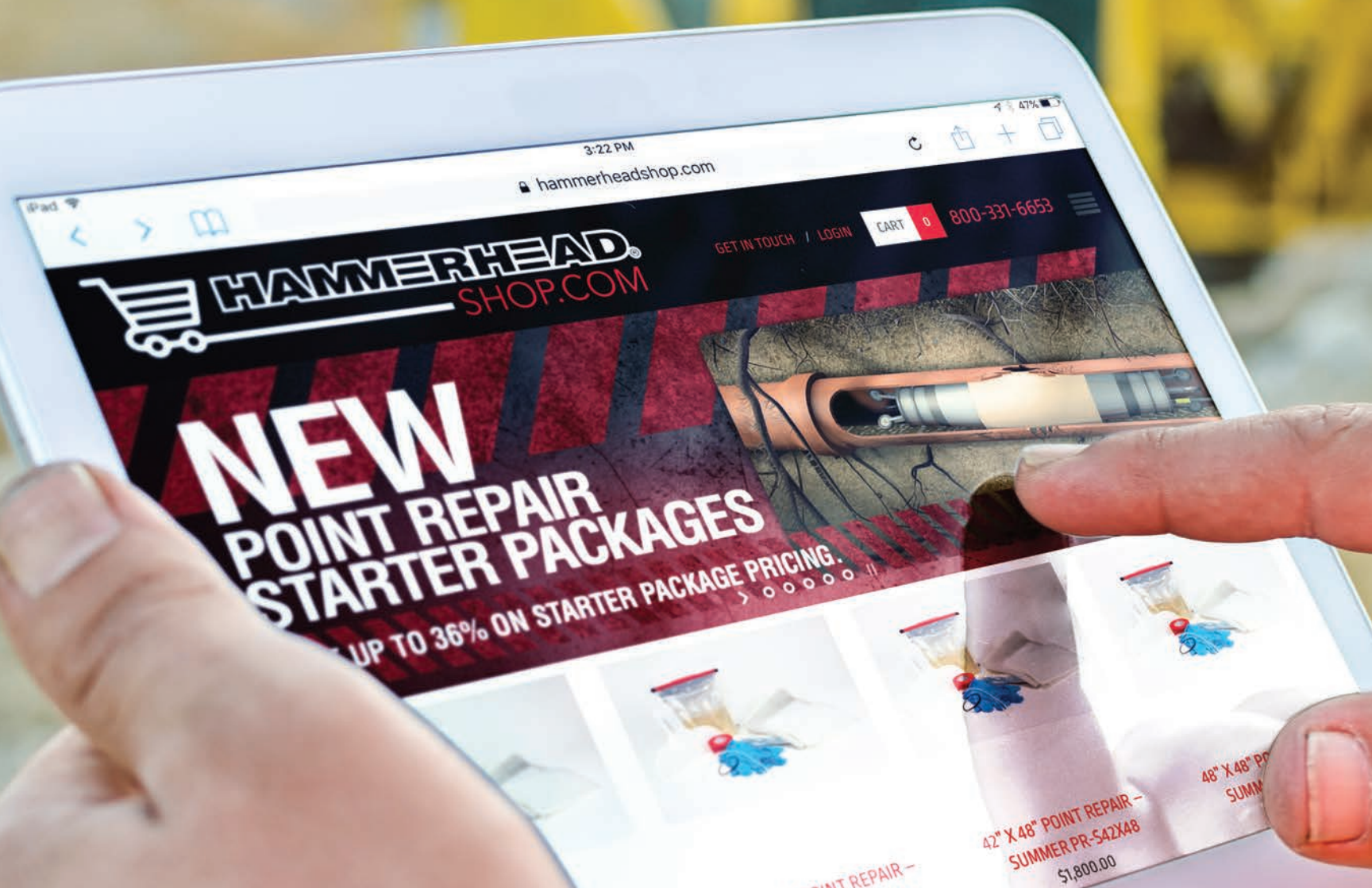
KEY STAFF:
Jim Barrett, general manager; Raul Aguirre, director of service; Steve Bigley, director of environmental services; Dan Charlton, director of facilities and maintenance; Katie Evans, director of communications and conservation; Dan Farris, director of operations; Heidi Keeran, director of human resources; Luis Maciel, director of information systems; Craig Parker, director of engineering

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Coachella Valley Water District's Mid-Valley Pipeline sends Colorado River water — via the Coachella Canal — to mid-valley golf courses to reduce the amount of groundwater they use. Crews using massive earth-moving equipment are burying the 54-inch-diameter pipe 20 feet below the surface.



has since been expanded to more than 700 acres and now includes diversion structures, which head a series of 19 percolation ponds. The ponds range in size from 13 to 58 acres and allow imported water, as well as snowmelt from the San Gorgonio Mountains to percolate into the sandy soil and replenish the aquifer.

At the eastern end of the district, the Thomas E. Levy Groundwater Replenishment Facility was commissioned in July 2009 to replenish up to 40,000 acre-feet of Colorado River water annually. It is 163 acres in size and contains 41 percolation ponds. The Palm Desert Groundwater Replenishment Facility will have a capacity of 25,000 acre-feet when finished in early 2019.

Based on the Engineer's Report for 2017, the replenishment facilities have received over 1.2 trillion gallons of imported water, and for the first time, each groundwater basin benefiting from the district's replenishment program showed a positive 10-year running annual average change in storage — indicating no overdrafts of the groundwater aquifer.

The district, and the neighboring Desert Water Agency, began importing water from the State Water Project in 1973; and their combined amount represents the third largest among the 29 State

Water Project contractors. The district holds secure, senior rights to Colorado River water according to the Colorado River Compact signed in 1922 and has always received its full allotment.

In addition to replenishing the aquifer, district projects have helped minimize and — in much of the Coachella Valley — eliminate land subsidence, or settling of ground over the aquifer. “We saw limited subsidence from 1936 to 1996, about 2 feet in total,” Bigley says. “But now we’re getting uplift in some areas. Proper management of the groundwater basin has helped to stabilize the surface.”

“Without implementing the water management plan and imported water, we would be in continued overdraft,” Bigley says. “But that’s not the case.”

He says the Coachella Canal — which opened in 1949 — and the reduction of pumping groundwater through privately owned wells have saved the day. Efforts to increase the amount of imported water have helped as well. The district and Desert Water Agency have continued to enter agreements to receive additional supplies or increase the reliability of existing allotments.

Following California's multiyear drought, 2017 brought record precipitation in the Sierras, leading to more than 386,000 acre-feet of replenishment

at the Whitewater Groundwater Replenishment Facility — enough water to cover 1 acre with a hypothetical tower of water 73.1 miles high, points out Charlton. “It was a record year for replenishment.”

Critical maintenance

Proper maintenance is important. Charlton says during banner replenishment years, silt in the Colorado River water and sediment from the earthen conveyance channel can plug pores and interfere with percolation. His maintenance staff routinely removes sediment from the ponds and uses dozers to rip the hard surface that forms on the surface of the pond, allowing the water to soak through the sugar sand.

The crews have also developed new techniques for dealing with abrasion caused by rock and sediment entering the percolation ponds at high velocity. “We’re building bifurcated boxes for the inlet structures,” Charlton explains. The boxes provide an outlet to adjacent ponds and are equipped with gates that can be alternately opened or closed to provide flexibility of the delivery location.

“We have a great staff,” Bigley says. “They’ve developed the art and science of replenishment,

(continued)

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A HISTORY OF TWISTS AND TURNS

The history of water in the Coachella Valley (California) twists and turns like a willful river, rife with torrents and dry spells, often kept flowing by political foresight and creative agreements.

Today, the average citizen of Palm Springs, Indio or the other communities in the valley probably doesn't fully appreciate the efforts that have led to the flow of clean water from the taps or the irrigation water supplying the area's rich farmlands.

But Tom Levy does. Now retired from the Coachella Valley Water District, Levy knows the history of the district all the way back to its beginning in the early 1900s and reflects on its development through the rest of the 20th century and now, into the 21st.

"It was back in 1917 when the nearby Imperial Irrigation District had the idea to import water from the Whitewater River and use it for irrigating crops," he says.

"They were farming off wells, and water levels had already begun to drop. Their ambitions prompted the Coachella Valley Water District to form in 1918, as a way of protecting the water supply for the valley."

It wasn't long, however, before the district recognized the need for additional water sources, and thus began a long political process that resulted in the landmark Boulder Canyon Project Act in 1928 that built the Hoover Dam along with the All-American and Coachella canals.

"There were many multiday train trips to Washington by officials from the district," Levy says. "And though the Hoover Dam was completed in 1936, the construction of the canals bringing Colorado River water to the valley was interrupted by World War II and not completed until 1948."

The act also spelled out allocations of Colorado River water among seven states, including California. Levy chuckles and notes, "Through 'good engineering,' the agreement allocated 7.5 million acre-feet of river water a year, even though on average, the river doesn't produce that."

Ultimately, through a priority system agreed upon after considerable political haggling, California was allotted 4.4 million acre-feet per year.

That didn't solve the longer-term problem, however. Levy compares the Coachella Valley to a bathtub with water entering at the north end and exiting at the south, building up dense layers of silt as it moves through the valley. "The soil was salty, and it built up in the irrigation water," he explains. To address the problem, a drain system was constructed to take agricultural runoff water to the Salton Sea.

"Then in 1963 community leaders and board members recognized the residential and commercial potential of the entire valley and determined there was a need for even more imported water," he says, noting their amazing foresight.

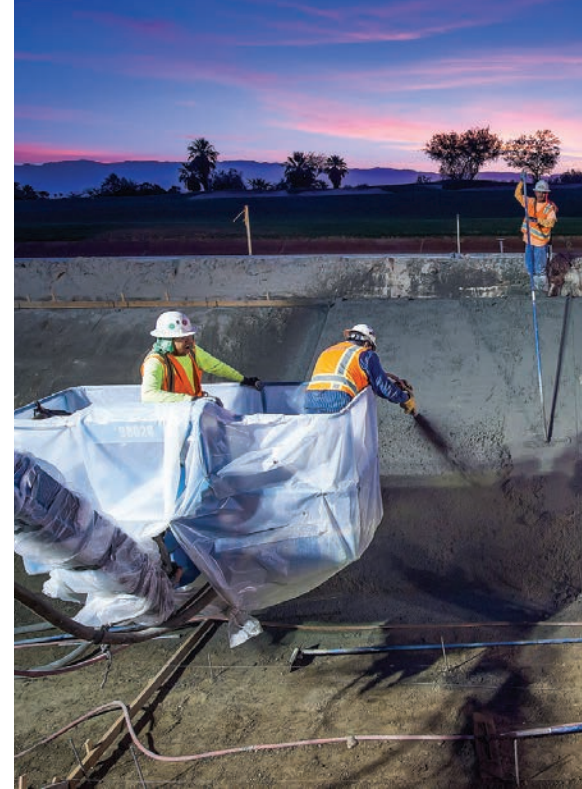
The answer was the California State Water Project, which piped water from the Delta area near Sacramento to Southern California.

But access was a problem. "It would have cost half a billion dollars or more to build an aqueduct through the mountains into the valley," Levy says. "The district scratched their heads and came up with an ingenious plan that would let the Metropolitan Water District of Southern California use Coachella Valley's share of the water from the State Water Project, while Coachella would take Metro's allotment of Colorado River water, in an even-up swap."

Despite the twists and turns, Levy remains confident the Coachella Valley will have enough water to meet demands long into the future.

The Quantitative Settlement Agreement of 2003 — finally adjudicated after decades of court opinions — clarified allotments of Colorado River water among the California agencies and assured a steady supply for the district. The agreement extends through 2078.

Meanwhile, the future of water from the State Water Project remains tangled in arguments over fish populations, threatened species and seawater contamination. "It's the quagmire of quagmires," Levy says. "But it will change because Southern California is where the voters are. Eventually we're going to get some rationale."



Workers replace a portion of the Coachella Canal at the SilverRock Golf Course. Because of summer's heat, the concrete pours for the newly realigned canal are done overnight. The SilverRock Project involved the relocation of approximately 4,700 lineal feet of the Coachella Canal.

getting maximum efficiency out of our percolation basins."

Charlton's crew also maintains the storm-water channel and the Coachella Canal, as well as the irrigation distribution and drainage systems. "Sediment is the usual issue," he says. "Whether it is dredging the canal or jetting the closed piping system, the conveyance of water needs to continue. Staff is very committed and does an excellent job."

Planning for the future

While Bigley, Charlton, and others express appreciation for the foresight of water planners 100 years ago, they are conscious of the need to keep their water management plan updated and forward looking. The current plan was developed in 2002 and modified in 2010, and it is designed to protect and preserve local water resources through 2035.

"The management plan is very important," Bigley says. It recognizes the need for Coachella Valley water to be sustainable and the valley's dependence upon imported water.

The future of the State Water Project may hinge on the outcome of discussions over environmental concerns and the needs of the public in the San Francisco Bay Area and Delta region near Sacramento. One proposed solution, known as California WaterFix, is subject to legislative action and possibly a public referendum. The plan would



specialists who want to live in the valley year-round when summer daytime temperatures exceed 100 degrees F.

Other features of the district plan include expanding the recycling program, continued conservation, and possible desalination of agricultural drainage water. The district's public outreach and educational programs are a critical component to the success of the district, Charlton says. "Emphasizing the need to communicate the water story both inside and outside the agency is paramount."

"We have a great staff. They've developed the art and science of replenishment, getting maximum efficiency out of our percolation basins."

Steve Bigley

"We need to promote a global understanding of the district priorities to ensure there is a sustainable water supply for future generations." ♦

construct massive tunnels to convey raw water from the Sacramento River to the downstream side of the environmentally sensitive Delta area. Concerns relate to endangered fish species and the intrusion of salt water from the Bay.

The district plan also addresses aging infrastructure. "Even though our systems are not as old as those in Eastern cities, some of our pipes date back to the '60s," Bigley explains. "Buried infrastructure represents a huge cost liability. We are preparing and planning and obtaining a bond rating for the first time in our history."

Asset management is also in the works. Charlton says the district is developing and implementing a forward-thinking asset management program to provide a comprehensive database to manage the district's \$1.3 billion in capital assets. "The team is currently performing an asset inventory and condition assessment of our assets, which will be followed by the completion of valuation and an accounting of the life cycle status of each asset."

Like most water agencies, Coachella faces retirements and the need to find qualified new people and retain institutional knowledge. Bigley says cross-training and leadership development are very important. He adds that despite the warm winter weather, it's often difficult to find technical



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CREATING A LOVE-TO-WORK CULTURE

Here are three strategies for making your organization a place where people want to come to work

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.

It used to be that prospective employees had to convince companies why they should be hired. But in today's job market, with low unemployment creating a shrinking labor pool, the tables have been turned: Organizations now have to convince job candidates why *they're* a great place to work.



As such, a key question emerges as organizations arm wrestle for quality employees: Do people come to work at your company because they have to, or because they want to? The difference is huge, and not only in terms of attracting great candidates; studies also show a clear correlation between high levels of employee engagement and superior financial performance, including higher stock prices.

So how do organizations help ensure their employees want to come to work, not have to, and thus attract the best candidates to their ranks? In a nutshell, companies must create workplaces that encourage collaboration, foster a culture where they feel valued and utilize technology that's familiar and user-friendly, says Jacob Morgan, author, speaker, and futurist.

"Employees these days have new and higher expectations," says the author of *The Employee Experience Advantage* and *The Future of Work: Attract New Talent, Build Better Leaders, and Create a Competitive Organization*. "They care about things other than just money. They want to contribute to an organization and feel a sense of purpose.

"They also focus more on health and well-being. They're blurring the lines between work life and personal life," he continues. "Plus,

there's a fierce war for talent amid a skills shortage. All these factors and more are forcing companies to figure out how to bring in the best and the brightest people."

Attracting these high-value employees is more difficult now because there's so much more transparency to the job-hunting process, thanks to company-review websites such as www.glassdoor.com and social media platforms. "We used to take jobs based on the stories we were told," he notes. "Now organizations can't tell stories anymore." Just like the *X-Files*, the truth is out there.

Spaces that engage

One of the three levers that employers can most easily pull in order to develop a want-to-come-to-work environment centers on physical workplaces that encourage collaboration.

"This one is the easiest one to see," Morgan says. "Employers need to create spaces that support collaboration. Create collaborative areas such as conference rooms — places where people can write on the walls, solve problems and have healthy debates and discussions. You need to give employees as many choices as possible as to how they get work done."

Workplaces with visibly collaborative spaces give off a positive vibe not only to employees, but prospective job candidates, too. "It's like when you walk into someone's house for the first time — you get a distinct vibe about that person," he notes. Moreover, a study performed by Steelcase, an office-furniture systems manufacturer — showed that the more options employees have about where they can work, including private spaces and collaborative areas as needed, the more engaged they feel.

If budgets are a concern (as they usually are), Morgan isn't saying that companies must take a sledgehammer to existing walls and spend hundreds of thousands of dollars on workplace makeovers. "None of these things need to cost a lot of money," he explains. "The simplest thing is to find out what employees care about and value and go from there. It doesn't have to be a crazy, over-the-top kind of thing."

Managers that care

Another lever organizations can pull revolves around making people feel valued. That, in turn, is strongly linked to developing a roster of managers with high levels of emotional intelligence.

"Organizations need to put people who care in positions of power,"

“Organizations need to put people who care in positions of power. We need more managers who genuinely care about employees — managers that believe every day that their job is to make people more successful.”

Jacob Morgan



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he emphasizes. "We need more managers who genuinely care about employees — managers that believe every day that their job is to make people more successful."

A key motivator that many managers miss out on is telling stories that connect the work employees do with the impact they have on customers and communities. When employees see that the work they do is part of a larger context — has a higher purpose with many ripple-effects on customers — they tend to take more pride in what they do and feel more engaged, he points out.

"Companies can use any number of mediums, such as videos, (news-letter) articles, posters, social media and intranets to tell these stories," he adds. "You just can't go wrong telling a story." As an example, he points to how a story-telling campaign engineered by KPMG, one of the Big Four accounting firms, significantly increased employee morale and reduced turnover.

Technological ease

The third lever to pull focuses on technology. In summary, technology should be, in a word, easy. Using software or computers at work should be just as easy as using the technology that employees enjoy using at home. If it isn't, frustration and reduced engagement tend to follow, Morgan says.

"Sharing something with a co-worker, for instance, should be just as easy as using Google Drive or email," he notes. "Employees should be able to view educational videos at work with the same ease with which they consume media online from Netflix. If all you're offering employees is clunky and cumbersome interfaces, it's just not a pleasant experience."

Of course, it's always a good idea to survey a workforce to find out what's important to them in terms of workspaces, managers and technology. Those surveys can help organizations mine for valuable data that will help avoid wasting money on engagement efforts that no one wanted in the first place. As Morgan puts it: "You can't make decisions until you know things, and you don't know things unless you get feedback from employees." ♦

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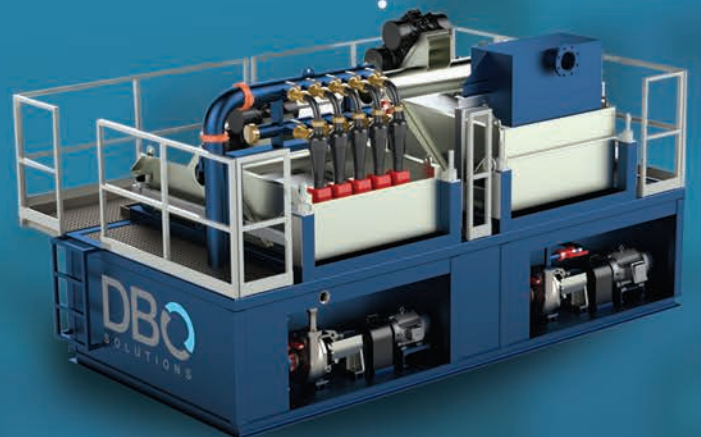
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CALL OUT CREWS WITH A SINGLE CLICK

Scheduling software provides utilities a simple solution for emergency callouts

By Jared Raney

Think about the time it takes to put together a crew for emergency work — supervisors poring through pages of employee lists, making call after call, sometimes over an hour or more.

For a long time, that was simply the cost of doing business for both Eugene (Oregon) Water and the Suffolk County (New York) Water Authority, but they found a way to expedite the procedure. In fact, with one piece of technology, it's now as simple as the press of a button.

ARCOS Callout and Scheduling Suite made that a reality for Eugene

and Suffolk by cataloging all work requirements, such as union worker lists and employee availability, and automated their callout procedure for instantaneous crew assignment.

A catalyst

Utilities need a system in place for emergency situations, and the manual processes still used by many municipalities are inefficient and time-consuming.

“Prior to ARCOS, any group that required after-hours callout would provide us a list on paper,” says Larry Longworth, transmission and distribution dispatch supervisor for Eugene Water. “We gathered about 20 different paper lists that would cycle in here either daily, weekly, monthly, or whatever the cycle was for that group.

“So everything was a manual process, everything was a piece of paper, and everything was somebody sitting somewhere manually punching buttons on a phone. And we'd literally take over an hour at times to get a crew complement,” Long-

(continued)

The Suffolk County (New York) Water Authority solved scheduling and callout issues for emergency work with ARCOS Callout and Scheduling Suite, which catalogs all work requirements, such as union worker lists and employee availability, and automates the callout procedure for instantaneous crew assignment.

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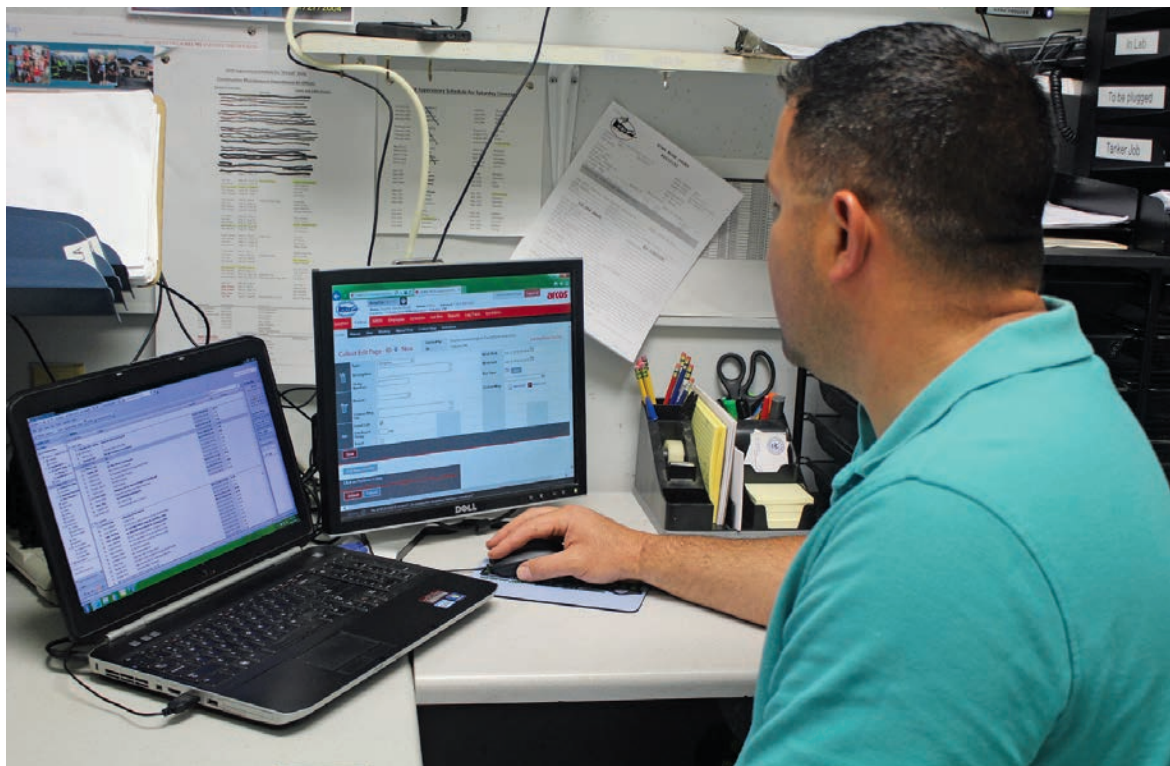
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ARCOS is a configurable database that programs lists and call rules for each department, shifting responsibility off the shoulders of dispatchers and supervisors.

worth says. “Nobody was ever happy, the people receiving the calls — there were constant issues with somebody saying ‘I didn’t get called,’ or ‘You didn’t call in the right order,’ or ‘You skipped my number’ — there were always issues with the call receivers who weren’t happy.”

One of the biggest problems is that union employees have certain rules when it comes to the order they are called, due to seniority or hours worked, and having a paper process made things difficult to track.

“Not only did we have a list of names, we had all these rules about how to call those names, and that’s quite often where some of the issues came about,” says Jeff Szabo, CEO of the Suffolk County Water Authority. “Unintentionally, with the old process, there would be errors. A supervisor would misdial, or call somebody on accident, and we would get union grievances from our employees.”

Beyond efficiencies of the system, the major catalyst for Eugene and Suffolk was actually an effort toward employee satisfaction and morale.

“The supervisors hated the old system because

“It was very quick for employees to see the value of it, and I would say at that level everybody loves it now, and it didn’t take very long because it really made their life easier.”

Larry Longworth

when they had to do it, they found out how disjointed the process was,” Longworth says. “It was just years of unhappiness that drove us to look for a solution.”

Many benefits

Failing to toe the line of union rules could result in grievances and subsequent arbitration; time and money lost for the utility.

ARCOS limits the possibility of those mistakes by programming in the lists and call rules for each department.

“It’s a configurable database basically, where you can have one or you can have a hundred different groups in it. You can divide your employees by job title, by any way you want to divide them up, and you can build rosters with callout rules very specific to each group,” Longworth says.

For example, some jobs require a certain ratio of journeymen to appren-

(continued)

The software suite allows more efficient time management for the troubleshooters and supervisors who are actually out assessing the emergencies, and simplifies the managerial aspects of emergency work.



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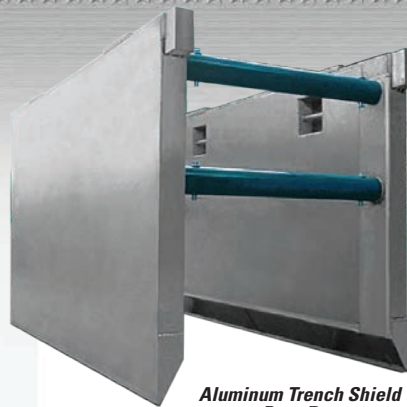


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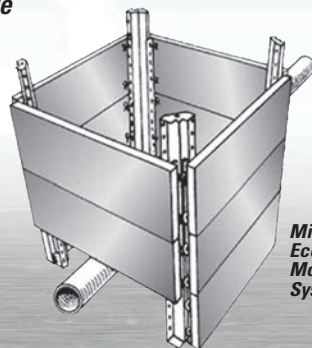
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tices. The ARCOS system keeps track of that and will pass over apprentices in the list until it gets the right percentage of journeymen, and then it will go back to calling apprentices.

There are many benefits, but both Longworth and Szabo say a big perk is shifting responsibility off the shoulders of dispatchers and supervisors. Because the rules are programmed into a concrete automated system, it's now up to the department head or whatever list-maker to ensure their call-out schedule is put into the system correctly.

"It is a bit time-consuming, and you do have to have buy-ins from your roster owners because it does require a different piece of work," Longworth says. "They've been used to sending you a piece of paper and being done with it, and now they have to take a little bit of responsibility and actually learn a piece of software. It was very simplistic to learn, but we did have a little adjustment period trying to get people on board."

The other major plus of the software is the pure functionality of it; customization is nearly unlimited.

"I would say that's the power of the tool, the callout functionality, and being able to adjust it and set it any way you want to. It can satisfy anybody's wishes," Longworth says.

All this combined allows more efficient time management for the troubleshooters and supervisors who are actually out assessing the emergencies, and simplifies the managerial aspects of emergency work.

"If my supervisors have expertise in managing a water main break or any emergency related to the proper distribution and flow of drinking water, that's what they should be doing. They should not be spending hours dialing employees' phone numbers, and we always strive here to provide the best possible customer service," Szabo says.

Never going back

Both utilities have had the software in place for about a year, and satisfaction is high.

"We don't worry about who's on call, who's the next guy up — we just push the button, and those crews are assembled automatically," Longworth says. "It was very quick for employees to see the value of it, and I would say at that level everybody loves it now, and it didn't take very long because it really made their life easier."

They also don't have to worry about mistakes and union blowback because they can prove their callout methods with data.

"For the first few months that we implemented, we still had some of the same old questions, about 'I didn't get called,' or 'I got called out of order,' but now I could actually do a print-off and show them that yes you did get called, here it is, we can actually hear your interface with the system," Longworth says. "So another savings is the ability to have that proof, the fact that we don't have people complain or challenge the callouts anymore, because we have data to support how the callout was done."

Because it was difficult to collect data with the manual paper system used before, neither utility can really say how much they've saved in adopting the program, but they also say that savings are really just icing on the cake.

"Even if we didn't save end dollars, off what we spent per year in subscription fees, those wouldn't have to match for the product to be worth it to me. It's allowing our people to do smarter work," Longworth says. "Not to say if we really penciled it out, that in the end it wouldn't justify itself."

"I would never want to go back to the way we used to do it. This is one of the best investments we've made as far as I'm concerned." ♦



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PROACTIVE MAKES PERFECT

Cash-strapped community cleans up its collections system with a new approach to upgrades and maintenance

By Giles Lambertson

All utilities face challenges. Some challenges are a lot bigger. Imagine for a moment being a 29-year-old professional engineer overseeing an ill-equipped and undermanned sewer department in the state's poorest community, with nearly century-old sewer and water pipes needing tens of millions of dollars of repair and the Environmental Protection Agency and Department of Justice tapping you on the shoulder about Clean Water Act violations.

Welcome to the world of Brian Pena, water and sewer commissioner for the city of Lawrence, Massachusetts, a Merrimack River Valley town 25 miles north of Boston. Pena started at City Hall on a Tuesday in May 2014 and two days later was welcomed to work by a Department of Justice consent decree. "I didn't see it coming," he acknowledges. But neither was he particularly surprised.

As a former engineering consultant to the city for the firm of Woodard & Curran, Pena was very familiar with Lawrence's sewer and water situation so he knew what he was getting into when he joined the city's executive team. "The EPA long knew there was an issue in the city — a lack of investment in infrastructure. The city was very reactive. When the EPA sent out a number of people to observe the work of the department, they got to witness how the city reacted to things. They were not impressed."

Now they might be. Pena, along with Carlos

City of Lawrence Sewer & Water Department worker Matt Halloran (left) talks with Commissioner Brian Pena, while worker William Rivera keeps an eye on the backhoe bucket on a job site in Lawrence, Massachusetts. (Photography by Scott Eisen)





“When the EPA sent out a number of people to observe the work of the department, they got to witness how the city reacted to things. They were not impressed.”

Brian Pena

Sewer & Water Department workers Eddie Santiago (left) and Frank Rapisardi move a length of polyvinyl chloride pipe into place to replace a crushed drainage pipe while Frank Condo readies himself in the pit.

Jaquez (director of Public Works) and the city administration of newly elected Mayor Daniel Rivera, have begun to turn things in another direction. Pena credits Rivera with being committed to clean water and strengthened infrastructure that will enhance economic development and the community’s quality of life. All three are proponents of proactive infrastructure supervision.

This change in mindset became immediately clear to Justice Department lawyers when they sat down to negotiate with the city. “When we had the first meeting with the EPA and Justice people, we were excited to show them all we had done,” Pena says. “We had to expand what we were doing quite a bit, but we had planned to do that anyway. We just relayed to city officials that we needed to do it quicker.”

Initial evaluation

Before 2014, the system’s problems were not unknown to community leaders. When water and

sewer pipes have been in the ground for 97 years and repairs are constantly being made across the system, the problem and solution are obvious: Old pipes need replacing. Yet for decades the city had banked on the pipes not failing until more city funds were available. In 2014 the need to repair and replace had become critical. Putting repairs off for another day was no longer a viable fiscal or maintenance approach.

“When I came aboard I pushed for proactive maintenance despite the evident cost of that approach,” Pena says. “Doing nothing until failure occurs is a double-edged sword. But securing \$20 million to address the issue was an obstacle. The city would save money in the long run, but the upfront money was still an obstacle.”

At the heart of the city’s new philosophy is a commitment to identify problematic situations before they become critical. In the fall of 2013, a cursory Woodard & Curran evaluation of the
(continued)



PROFILE:
Lawrence Water & Sewer Department

AREA SERVED:
City of Lawrence, Massachusetts

WATER SYSTEM:
154 miles of pipe in its distribution system; 4,400 water valves and 1,300 fire hydrants


WASTEWATER SYSTEM:
137 miles of sanitary and combined sewers, 41 miles of storm drains, 4 wastewater pumping stations; 4,000 catch basins; 3,500 manholes

STAFF:
Brian Pena, commissioner; Daniel Lahiff, supervisor; Ericka Ajanel, office/billing supervisor; William Hale, field/construction supervisor; Andrew Sullivan, water foreman; George Daley, water foreman; Matt Halloran, sewer foreman; Paul Gardner, chief cross connection inspector

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Members of the City of Lawrence Sewer & Water Department include (from left) Matt Halloran, Frank Condo, Kevin Silva, Commissioner Brian Pena, William Rivera, Leonel Urbaez, Frank Rapisardi and Eddie Santiago.

UNDERMANNED, UNDEREQUIPPED

When Brian Pena became water and sewer commissioner in Lawrence, Massachusetts, in 2014, he inherited a small sewer operations staff. The combined sewer and water division has 45 employees, but only four of those were assigned to sewer work when Pena took over — a foreman and three equipment operators. Four employees maintained a sewer system serving about 80,000 residents.

“Within the first couple of years, I was able to double staff to eight and secure budgeting for 12 people,” Pena recalls. “Now we’re down to six. We need more staff. I have lines out to hire more, but I can’t find people to take the bait.”

What that means operationally is that the department has to contract out some of its basic maintenance and operating responsibilities. Crews have been busy with day-to-day tasks that make it difficult to focus on longer-range projects that head off problems. For instance, if a catch basin needs cleaning out, Pena sometimes must outsource the work because his handful of employees are working on a backed-up line.

This understaffing goes hand in hand with the sewer department being underequipped. When Pena arrived, the department had an 11-year-old hydrovac unit, a couple of trucks and a trailered pressure pump — none of the units particularly well-maintained. “And there was no redundancy in any of it.” If the hydrovac unit wouldn’t start, there was no backup plan.

“But the most unacceptable situation was the sharing of equipment across the sewer and water division,” he says. “Sharing equipment is fine and cost-effective, but too often work was put off in one department because the other department was using the equipment. If the water department was using the backhoe, for example, the sewer department had to reschedule its work.”

The sewer department has since acquired a new backhoe, a new dump truck, and a new Vac-Con jet/vac unit. The problem now is that both of the department’s jet/vac truck operators left. “We are recruiting new operators,” the commissioner says. “But even with two vac operators and hydrovac trucks, we don’t have the manpower to get to all the catch basins.”

“When I came aboard I pushed for proactive maintenance despite the evident cost of that approach. Doing nothing until failure occurs is a double-edged sword. But securing \$20 million to address the issue was an obstacle.”

Brian Pena

city’s sanitary sewer administration concluded that Lawrence kept poor records of a derelict maintenance regime and had no long-term plan for fixing things. The firm was hired to scrutinize a cross section of the system and, from that, develop a systematic and systemwide fix.

The consulting firm’s engineers studied flow, inspected manholes, ran inspection cameras through lines, and performed other testing. This evaluation was well under way when the consent decree was served. Four years later, the city has sent cameras through 300,000 linear feet of pipe, conducted 3,500 certified manhole inspections, and extensively smoke-tested the system. Engineers are on track to inspect the remaining 430,000 linear feet of pipeline over the next five years.

But inspections and evaluations don’t patch leaks. With inspection data in hand, Lawrence officials secured funding from a Massachusetts low-interest revolving fund and bid out repair work. The money largely is being spent on CIP lining of pipes.

So far, \$9 million in repair work has been completed in two contracts. Approximately \$10 million more is being done this summer. In some places, spot repairs were necessary before pipes could be lined. In all cases, contractors were able to access the city’s pipe systems through manholes, eliminating excavations and the ensuing traffic congestion.

“CIP repairs have a smaller footprint, which helps keep roads open and traffic flowing. That’s huge for our community of 80,000 people and 50,000 vehicles,” Pena says.

Finding savings

Green Mountain Pipeline Services is a CIPP Corp. licensee and inserted liners constructed of Applied Felts material containing Interplastic resin. The steam generator used to push the liner into place was fabricated by Green Mountain itself and employs Clayton Industries boilers. Aries Industries cameras are utilized to inspect the work.

Woodard & Curran engineers have tracked the relative costs of this project over the last three years using Innovyze InfoMaster software. The figures are telling. When the city used the conventional emergency repair method — excavating dirt to lay bare a failed pipe, fixing it, and covering it up again — it spent an average of \$760 per linear foot of repaired pipe. When employing CIPP technology, the repair cost per linear foot of pipe was \$174.

The cost of contracting with Woodard &

Curran to manage the repair process and to inspect and smoke-test cost \$3 per linear foot, and the consultant's management of the work has cost the city 97 cents per foot. In other words, to date, Lawrence has saved itself almost \$600 for each foot of inspected and repaired pipe.

Rather than randomly patching pipes as leaks erupt, the money is being spent to rehabilitate entire sections of still-functioning pipe. This more substantial upgrade puts the city in a better position to manage its future economic development. "That has always been one of the selling points," Pena says.

Making progress

The city is located near two major highways and, with three rivers intersecting the city limits, has more than enough water for residential and commercial use. But the infrastructure was problematic. "We always have made the point that Lawrence has the infrastructure to support expansion, and now we are in an even better position to do that."

Not that the municipality's upgrade is anywhere near complete. The CIPP work is proving its value, but there still is a lot of work to be done. Fifty-one of 138 miles of sewer lines — two-thirds of which are sanitary/stormwater combinations — have been inspected. Cameras are being run through another 22 miles this year. That still leaves 65 miles of pipe waiting to be inspected. (Not to mention 154 miles of century-old water pipe, which the city also is carefully monitoring.)

Given all that, the sewer and water department cannot afford to proceed without a plan in place. So, it has prioritized repairs according to levels of urgency:

- Failed
- Likely to Fail
- Reported Overflows
- Paving/Infrastructure Street Work Already Scheduled.

In addition, engineers consider stormwater quality issues, the presence of critical facilities such as hospitals, and so on. This matrix of criteria is fed into a computer program to generate a priority list for the engineers.

Even if all goes as planned and the relative integrity of the entire system is mapped and

repaired according to these criteria, the work isn't done. A second round of inspections will be launched — this time with lower tolerances for what is acceptable. This will establish a pattern of regular inspection over two- or three-year intervals. In other words, the city has learned its lesson.

"I feel we have definitely learned that doing nothing is not, at the end of the day, a good approach," Pena says. "We have learned not to be reactive. You have to do something, something intelligent, and make the best use of available funds." Despite the evident improvement in the city's infrastructure, he says he is not yet comfortable sitting back and reflecting on what the

"We have learned not to be reactive. You have to do something, something intelligent, and make the best use of available funds."

Brian Pena

department has accomplished.

"There is always so much yet to do. Still, I encourage my sewer foreman and his staff to be positive. There are fewer emergency incidents, fewer collapsed pipes, fewer backups. We are making progress." ♦



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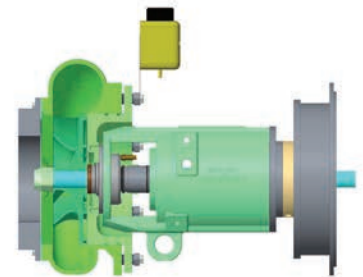
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PROTECT YOUR OPERATORS, AND THE PUBLIC

Safe hydroexcavation takes two sets of eyes and an understanding of all potential risks

By *Jared Raney*



Hydroexcavation safety takes planning and teamwork. Having a second person on site to watch the operator and keep an eye on everything is critical. (Photography by David Ryder)

Hydroexcavation is often promoted as a safer method of excavation — and in almost all ways, it is. But that doesn't mean it is without its own dangers, of which operators must be constantly aware.

As with any job site, working with hydrovac trucks has the potential for catastrophe if the proper precautions are ignored. The best way to keep operators and the public safe is to simply have a second pair of eyes on the job.

“That’s the biggest thing — just having that extra guy around to watch your back,” says Anthony Chavez, safety compliance officer for Davids Hydro Vac in White Bear Lake, Minnesota. “With hydroexcavation, 90 percent of the time while you’re digging, you’re staring at the ground. You try to keep your head on a swivel as much as you can, but there’s a lot of different dangers that go on around you.”

One of the biggest concerns is boom clearance. While operators are focused on the ground before them, booms are stretching far overhead and can come in contact with power lines or other obstacles if not closely monitored. And while it is less likely than with traditional digging equipment, damaging underground utilities is still possible, which brings gas lines and other utilities into play, in addition to electricity.

Bystanders present another potential safety issue. Unlike a typical construction or excavation site with backhoes and bulldozers, a job site with just a hydroexcavator doesn't always raise the same red flag in the minds of bystanders.

“If you’re in a residential area, there could be commuters,” Chavez says. “A lot of times you’ll get the wanderers that come up and they just want to know what you guys are doing. If you don’t have that extra guy, they may go into an area that you’ve already excavated — they may not pay attention to the caution tape or the cones that you have set up.”

Proper training and apprenticeship are also important. It doesn't matter how many guys are on scene if they don't know what they're doing.

“That second guy in the truck is going to know all the safety features on the truck. If anything happens to that operator, you always have that backup person who’s going to know how to operate that truck. So he can shut it down if need be, he can pull the operator out of it, so you always have that safety backup.”

Of course, OSHA training is required, but for Chavez, that's the bare minimum. He also has their spotters go through union training on flagging and hand signal procedure, and the operators spend at least six months to a year riding along with senior operators before going out on their own.



One of the biggest concerns in hydroexcavation is boom clearance. While operators are focused on the ground before them, booms are stretching far overhead and can come in contact with power lines or other obstacles if not closely monitored.

“We could do a crash course and have the guys out there operating a truck, just because they have a CDL, within a month. That’s just not the way we do it,” Chavez says. “The less high-profile customer may not require certain training. We just go ahead and do the training regardless, across the board, with all of our guys.”

Lastly, Davids Hydro Vac has a job site checklist, something that is typical on many construction and job sites across the industry, but may be overlooked when it comes to hydroexcavating.

“When you handle it this way, there’s no downtime. You don’t have to stop the whole construction site or excavation. They can keep working and keep doing what they need to do,” Chavez says. “The biggest thing is making sure that our guys and the guys they’re working for are making it home safely.”

If you don’t think there is any risk for operators or contractors, consider the Ontario hydrovac company that was fined \$285,000 in February after one of its workers was killed when he hit an overhead electrical line with his hydrovac truck’s boom. Reports say that there was no secondary monitoring of the boom’s movement, and operators were so focused that they didn’t realize the boom was too close to the lines.

“The fines, that’s money. Somebody getting injured, that’s somebody’s life, their livelihood, their career,” Chavez says. “It’s not the money standpoint; it’s that somebody’s life could get taken away for a simple bonehead mistake if somebody’s not paying attention or taking it for granted that they have the clearance.”

With very little downside and plenty of upside, all hydroexcavation work should be accompanied by a second pair of eyes. ♦

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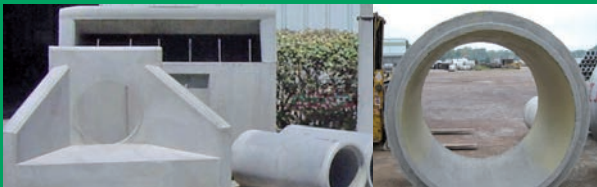


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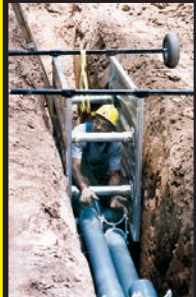
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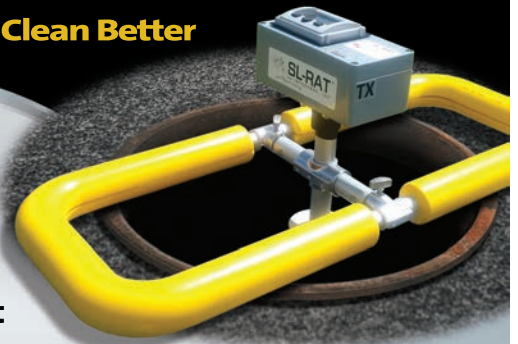
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By Sheila Joy

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a similar policy as PACP, ITCP-CIPP inspectors will soon be required to recertify every five years. With a projected release date of March 2019, the new ITCP-CIPP recertification course will also be available online to ensure the same accessibility and affordability as PACP.

Offering recertification training online is one way to make sure the programs are affordable and accessible to as many industry professionals as possible by eliminating the need to become recertified in a traditional classroom setting unless that method is preferred. This allows the student to take the recertification class at a time and place that works best for him or her.

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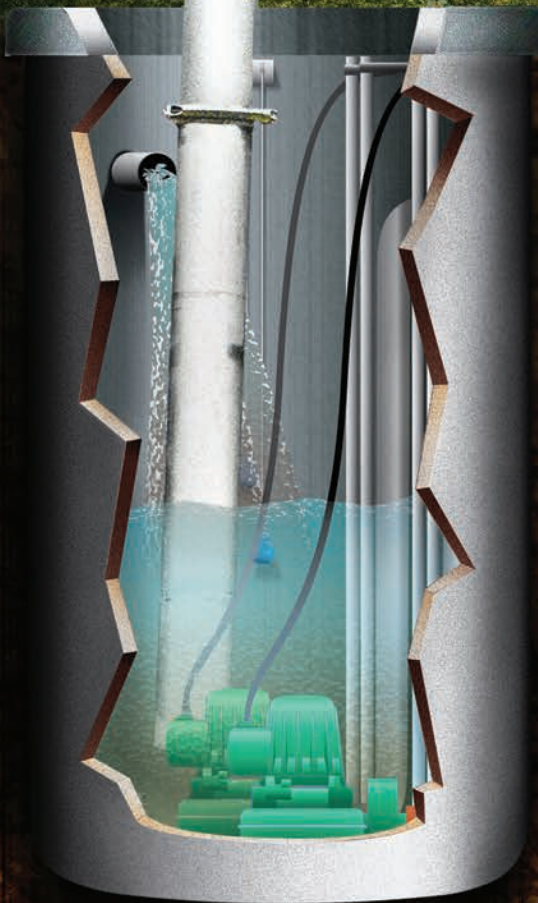


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PIPELINE INSPECTION, SURVEYING AND MAPPING

By Craig Mandli

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screen. The unit operates the reel, tractor, camera and LED light array. It includes a rechargeable, wireless keyboard and an integrated overlay for video titling and fault annotation. Pathfinder Model TR3310 provides increased power and pulling distance. A compact profile ensures great maneuverability in pipes from 6 to 36 inches and larger. The Pathfinder XL operates in 8-inch and larger pipe. A strong, lightweight reel, made of aircraft-grade aluminum alloy, gives the system its portability. Its 1,000-foot, low-friction, multiconductor cable facilitates long inspections. **800-234-7205; www.ariesindustries.com.**

Deep Trekker DT340 pipe crawler



The **DT340** pipe crawler from **Deep Trekker** is completely self-contained in two carrying cases, requiring no dedicated service truck to operate. It can be deployed from anywhere in under five minutes, and it comes with a lightweight, hand-held control console, a strong but thin tether, a pivoting tether connection,

wheel and track options, and plug-and-play integrations all designed to make pipe inspections easier. It is depth-rated to 164 feet. **855-949-3441; www.deeptrekker.com.**

Envirosight ROVER X

The **ROVER X** from **Envirosight** is a cloud-connected system that lets the user control inspections, view and record digital video, log observations, generate reports, and link directly to asset management software. Users can inspect pipes from 6 to 72 inches in diameter with a single, reconfigurable crawler. With 12 quick-change wheel options, a camera lift, carriage, and lamp accessories, it's ready to traverse even the most treacherous pipes. Its

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VC500 controller allows an operator to make a Pipeline Assessment and Certification Program-compliant inspection, then upload it wirelessly to the cloud for instant access anywhere, on any device with a browser. It also includes a suite of tools to measure pipe diameter and bend, crack size, obstructions, flow level, lateral diameter and angle, and inclination. It brings drag-and-drop simplicity

to the task of overlaying video with inspection data, system status and images. **866-936-8476; www.envirosight.com.**

Forbest Products FB215



The **FB215** crawler inspection camera from **Forbest Products** is suitable for 6- to 16-inch pipe and comes with a waterproof crawler, featuring three types of wheels on the six-wheel-drive system and double motors that can turn left or right with the creeping speed of 20 to 65 feet per minute. The waterproof, pan-and-tilt, high-resolution color camera

head's focus can be adjusted with the high-brightness LED lights. It carries 400 feet of 0.35-inch fiberglass cable and includes a meter counter and universal wheels with braking function. The heavy-duty, waterproof control box includes a 10-inch LCD color screen with USB and built-in SD card to record photos and videos. **877-369-1199; www.forbestusa.net.**

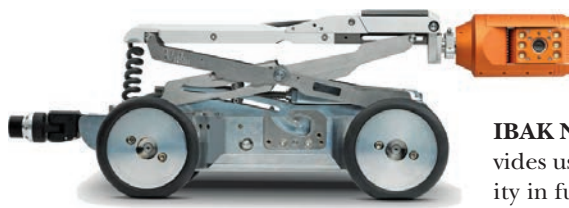
Pearpoint/SPX P356 Cradle



P356 Cradles from **Pearpoint/SPX** are designed to provide camera centering in pipes as large as 60 inches in diameter when used in conjunction with the powered elevator. The Compact Cradle is for deployment through 21-inch manholes and can lift a camera to the

center of a 53-inch pipe. Mounting is quick and easy, requiring no specialist tools. Once the wheels have been removed, the crawler is fixed in place with one simple hand-screw, making the addition of the cradles to a P350 flexitrac system straightforward. **800-688-8094; www.pearpoint.com.**

RapidView IBAK North America ORPHEUS 2.0



The 6-inch **ORPHEUS 2.0** HD camera system from **RapidView**

IBAK North America provides users with visual clarity in full 1920 x 1080 high definition. It has complete

pan, tilt and zoom capabilities and includes built-in laser measurement for measuring defects inside the pipe. With 120 times zoom and one-push, intelligent auto focus, it is ideal for providing crisp, clear images of larger-dimension pipes. **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 multiconductor camera transporter. The 12 super-bright LEDs with variable intensity light

the way through 5- to 30-inch-diameter pipes. Using the full 360-degree-rotation pan-and-tilt camera, users will be able to see defects and obstructions more closely and in more detail. This same camera head is interchangeable with the head on the company's pan-and-tilt push camera system. The power and controls to operate the crawler are in a handy remote control device. It comes with a manual lift and built-in 512 Hz sonde for locating purposes. **800-461-9200; www.ratech-electronics.com.**

GIS GPS

PipeLogix GIS



With the addition of the **PipeLogix GIS** module added to ArcMap, supervisors can view all surveys performed on an asset. The toolbar filters survey data in the master database to highlight pipes with selected conditions, grades, or score values, allowing the user to link to the movie or

survey. Survey conditions can be exported to a shape file or a geodatabase feature class. When opened in ArcMap, this layer displays the condition along the length of pipe. Selecting the condition will link to the movie and jump to the correct footage for viewing. Seeing the problem and where it exists on the pipe can make it easier to schedule repair and cleaning crews. The system is compatible with ArcGIS 10.0 through 10.5. **866-299-3150; www.pipelogix.com.**

Mainline TV Camera Systems

Electric Eel Ecam Pro 2



The **Ecam Pro 2** mainline pipeline inspection camera system from **Electric Eel** has a stainless steel-housed, 1.68-inch self-leveling color camera with sapphire lens; 20-LED light ring with an impact-resistant polycarbonate light ring cover; and high-resolution CCD element. The auto-iris adjusts light automatically. A flexible camera spring navigates 3-inch P-traps. The unit comes standard with 200 feet of braided fiberglass premium 1/2-inch-diameter push-rod (with a capacity of 400 feet available on the reel), 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, voice-over recording, an 8 times zoom function, audio/video out jacks, 8-inch wheels for easy maneuverability, a secure-locking reel brake, and rugged powder-coated steel tube and bar construction. **800-833-1212; www.electriceel.com.**

(continued)

Hathorn Magnum M7



The **Magnum M7** from **Hathorn** is packed with multiple features and is extremely lightweight at only 29 pounds. The unit can easily be carried down a flight of stairs or rolled on its 6-inch wheels. The 7.4-inch monitor delivers a clear, bright picture and is covered by an acrylic shield for durability. It offers USB recording, two-hour lithium battery, on-screen footage counter, 512 Hz sonde transmitter, adjustable lighting and text writer. A Wi-Fi transmitter can be added for recording to a mobile device. It comes with a variety of pushrod lengths and camera sizes to fit every job type. **905-604-7040; www.hathorncorp.com.**

Perma-Liner Industries Perma-CAM



The **Perma-CAM** from **Perma-Liner Industries** comes complete with a self-leveling color camera head with a sapphire lens and centering skid and a 200-foot heavy-duty push cable with a standard 512 MHz transmitter, all mounted on a heavy-duty, powder-coated aluminum frame. The 7-inch monitor comes with a weatherproof hand-held holder, complete with a custom sunshade. The HD monitor records to an SD media card and also has voice-over capability. The standard, Wi-Fi-compatible unit comes with a complimentary Samsung tablet. **866-336-2568; www.perma-liner.com.**

RIDGID SeeSnake MAX rM200 Series



The **RIDGID SeeSnake MAX rM200 Series** camera system combines portability with the versatility of the D2 drum series, offering different combinations of push cable stiffness and spring flexibility. It is capable of inspecting lines up to 200 feet in length and 1 1/2 to 8 inches in diameter, depending on drum selection. It comes with a choice of two drums with different push cable lengths, diameters, stiffness and springs for on-the-job flexibility. The drums can also be purchased separately and easily interchanged for maximum job site use. The unit has an integrated transport system for easy portability and pairs with the CS65x or CS6x digital monitors. The monitors are Wi-Fi enabled and can be docked to the MAX rM200 for convenient transport, operation and storage. **800-769-7743; www.ridgid.com.**

Spartan Tool Explorer



The **Explorer** modular camera system from **Spartan Tool** has a control box that is compatible with five different pushrods up to 400 feet in length, letting the user quickly adapt to any environment. Included WinCan software allows the user to map full plumbing systems for future reference, and files can be saved to a WinCan account, the cloud, external USB drives, and the system's internal storage. The stainless steel camera

head provides a crisp color picture to the super-bright, sunlight-readable LCD display. Change out reels to create a system that provides the ability to tackle any size job. **800-435-3866; www.spartantool.com.**

Vivax-Metrotech Type-CP



The **Type-CP** inspection system from **Vivax-Metrotech** has 200-, 300- or 400-foot reels with stiff pushrod that's flexible enough for easy entry and turns. The 1.6-inch D34-CP self-leveling camera provides 700 pixels of resolution to inspect up to 6-inch pipes. It includes the vCam-5 control module with an 8-inch color LCD; trans-

mitting sonde; full-function keyboard; internal microphone; AC/DC power; rechargeable batteries; distance counter; camera LED brightness control; and digital recording to the USB thumb drives, SD cards, or internal hard drive. The control module ships ready to use with LACP software such as POSM, WinCan or MuniXS. **800-446-3392; www.vivax-metrotech.com.**

Wohler USA VIS 700



The **VIS 700** high-definition inspection system from **Wohler USA** provides flexible features needed for a variety of applications. It offers razor-sharp high-definition images, zoom, a focus function via joystick for precise inspection, and the ability to stream live images and video to phones, laptops, and tablets via wireless LAN. It comes with a removable touch-screen monitor with adjustable handgrip, automatic screen rotation, an on-screen keyboard

for notes, a voice-over recording option, a removable pushrod for quick and easy cleaning, and variable pan-and-tilt speed via joystick. **978-750-9876; www.wohlerusa.com.**

Mapping

RauschUSA LATRAS



The **LATRAS** lateral tracking system from **RauschUSA** is a modular upgrade to the Rausch M-Series product line for the automatic measuring and graphic documentation of pipe laterals. The system's control electronics capture the direction of motion of

the sensor head behind the KS 60 DB digital lateral camera. These coordinates are registered constantly in parallel with the inspection and allow the documentation of the laterals at the same time without any significant additional work for the operator. **877-728-7241; www.rauschusa.com.**

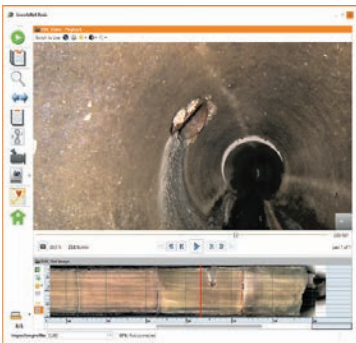
Software

CTSpec sewer overlay edition module



The **CTSpec** sewer overlay edition module lets the user edit pipe reference numbers, street names, the entry manhole, or the exit manhole in an automated way directly in the inspection record. This module allows the user to change the text of existing information; add missing information to the inspection record; change the position, color, and size of the information; and add or remove an observation. **888-965-8987; www.ctspec.com.**

CUES GraniteNet



GraniteNet from **CUES** is a next-generation condition assessment software for the public works industry. It 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 to include Cityworks, Infor, IBM Maximo and others. Intuitive and easy to use, data and video can be accessed via a web portal. **800-327-7791; www.gnet.us.com.**

Trio Vision AssetDMS



Utilizing an operator-friendly and intuitive touch-screen interface, **AssetDMS** from **Trio-Vision** makes collecting and analyzing pipe survey data second nature. The data collection process is simple and highly streamlined, with built-in user prompts that ensure critical information is captured accurately. Compatible with a

wide range of manufacturers' CCTV systems, it allows for import/export from any certified PACP/LACP/MACP database, and PACP reference photos are included to eliminate the need to memorize all the codes and rules. A comprehensive and extensive reporting suite provides easy-to-understand analysis reports to help you make well-informed and accurate decisions regarding the health and rehabilitation requirements of your underground infrastructure systems. **800-443-3761; www.assetdms.com.**

WinCan Web

WinCan Web is a cloud-based sewer assessment portal that allows users to share data, maps and videos instantly online while maintaining complete control over who has access to inspection data and protecting it with built-in redundancy. Because all entries are stored in the cloud, the most up-to-date reports are always accessible. When integrated with a GIS platform, it can navigate and analyze inspection data using a rich GIS interface.



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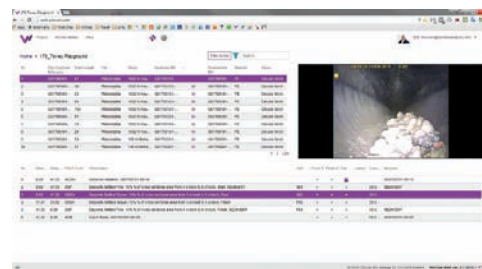
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• 689 CC Honda • 300' x 3/8" Hose



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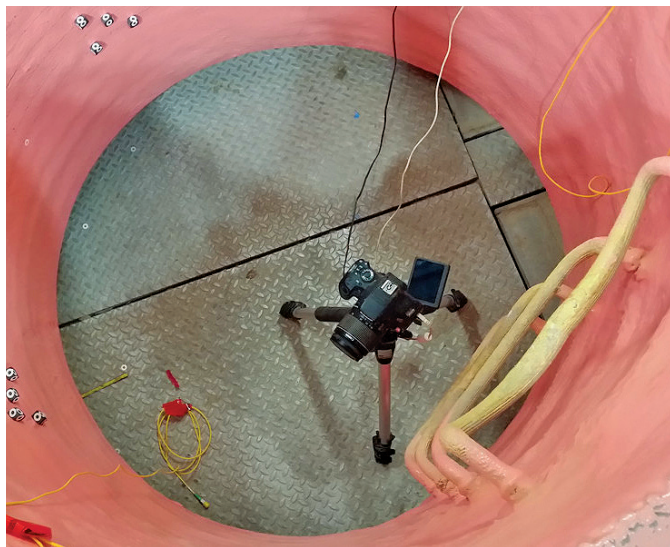
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Users can click map features to link directly to section and defect information or jump from a record to its mapped location. This bidirectional link eliminates manual data entry by prepopulating inspections with data in GIS, and GIS data can be updated with results as soon as an inspection is complete. Annotate and edit maps using common tools, easily show/hide map layers, and export map data to a variety of formats. **877-626-8386; www.wincan.com. ♦**

FEATURED CASE STUDY

Proving the effectiveness
in resisting infiltration and corrosion



Municipal governments and other infrastructure owners are increasingly taking an interest in understanding rehabilitation methods to prevent groundwater infiltration and corrosion in wastewater structures. **SpectraShield** has participated in three independent studies for the evaluation of effectiveness in resisting infiltration and corrosion.

In 1996 SpectraShield participated in the CIGMAT program at the University of Houston. The objective of the study was to evaluate SpectraShield for adhesion, resistance to external hydrostatic pressure, and chemical resistance. SpectraShield passed in all three categories.

In 2013 SpectraShield was evaluated by the U.S. Army Corps of Engineers at Fort Bragg, North Carolina. The Corps released their report and findings in April 2016 and rated SpectraShield with a return on investment of 5.5.

In 2017 SpectraShield was evaluated by The Geo Engineering Centre at Queen's University, Kingston, Ontario, Canada for resistance to external water pressure. The test was conducted to over 120 feet of hydrostatic pressure and the SpectraShield Liner remained intact.

800-284-2030; www.spectrashield.com.

Tools help develop a proactive
maintenance program



Problem:

The city of Cocoa in central Florida has a wastewater collections system that includes approximately 200 miles of sewers. Recognizing the importance of proactive collections systems maintenance, the city developed a six-year capital plan to reline or replace problematic pipes based on CCTV footage gathered by RedZone Robotics. In search of an effective proactive assessment platform for the city's ongoing collections system maintenance operations, Chris Collier, field operations manager, researched emergent technologies that could enable their team to be more efficient while maximizing the effectiveness of their cleaning and CCTV assets.

Solution:

In February 2017, Cocoa integrated the SL-RAT from InfoSense. The acoustic inspection tool is the first step in their collections system maintenance program. Collier describes it as a "game-changer in terms of operations," since the acoustic assessment is so fast, "in approximately 3 minutes, you can obtain the degree of blockage in gravity sewer segments." It helps drive the decision on where more expensive CCTV or cleaning resources should be deployed. And, its integration with their GIS system allows the city to quickly identify problem areas for further analysis.

RESULT:

By proactively assessing their system, Cocoa is able to focus more time and resources on the pipes that need attention. They utilize the SL-RAT on a weekly basis and "it has already paid for itself," Collier says. 877-747-3245; www.infosense.com. ♦



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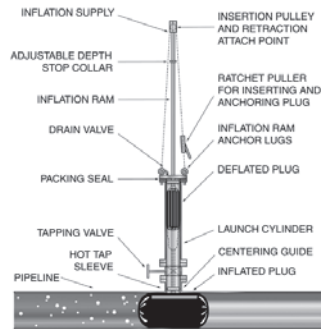
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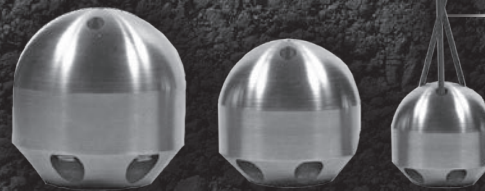
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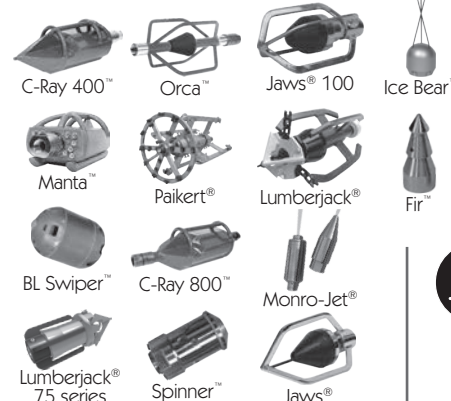
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Product Spotlight

Mechanical system rehabs all pipe types without chemicals

By Cory Dellenbach

If a contractor is looking for a simple and easy way to reline a manhole without the cure times required by CIPP, Sekisui SPR Americas has the solution: going spiral wound.

This year the company introduced its SPR TF product. The SPR TF spiral wound process is a trenchless solution for restoring the hydraulic efficiency, reliability, and integrity of aging sewers, storm drains, and culverts.

“SPR TF can rehabilitate all types of pipe from corrugated metal, brick, concrete, clay, and so on,” says Joseph Dominguez, senior technical services engineer with Sekisui SPR Americas.

The system consists of a single strip of polyvinyl chloride profile, which is progressively wound into the existing pipeline by the SPR TF machine. The winding machine rotates and traverses within the pipe, interlocking PVC profile together against the host pipe wall. This process allows for the liner to be installed without additional steps to fill annular spaces.

“Some of the major differences between this and other lining methods out there is that the liner is PVC and installed via a mechanical process,” Dominguez says. “There are no chemicals involved.”

SPR TF requires only a manhole or existing access chambers for entry and can be installed in up to 30 percent live flow.

PVC profile is fed through a manhole or existing chamber using an aboveground spool. The SPR TF machine rotates and traverses inside the deteriorated pipe, lining the walls with PVC profile, which creates a tight fit. No grouting is required after winding is complete. As the winding machine travels the pipeline, the continuous PVC profile strip is locked in place. Profile lengths can be joined for the capability to rehabilitate larger runs.



The SPR TF is capable of lining pipes 40 to 60 inches in diameter. SPR TF profile material is made from a similar grade of PVC as new sewer and drainage pipe.

“A contractor only needs five to seven crew members to operate this equipment, depending on length of rehabilitation,” Dominguez says. “The smaller the length, the less crew members will be needed.”

The company also has an SPR EX model that will reline 8- to 42-inch diameter pipes. **866-627-7772; www.sekisui-spr.com.**



EJ STORMSURGE



Weil Booster System



Hannay HDD 6300



Mueller reclaimed water wrench nut

EJ STORMSURGE Access Assembly

The STORMSURGE Access Assembly from EJ is an innovative manhole cover assembly that allows water to flow during major rain and flooding, but the cover remains attached so it seals itself after the event. During a storm surge or backflow event, it can lift up to 16 degrees, enabling water to flow out and relieve pressure. The locking arm and hinge restrain the cover and allow it to return to the seated position once the surcharge subsides. The assembly is heavy-duty traffic rated, made of ductile iron and has a cover that is permanently attached to the frame. There is a safety catch at 90 degrees to prevent unintended closure and a security bolt allows for controlled access and acts as a theft deterrent. **800-874-4100; www.ejco.com.**

Weil Pump vertical multistage booster pumps and systems

The new booster systems from Weil Pump combine its programmable logic controller panels with Wilo-Helix V pumps and are available in two-, three- or four-pump configurations. The multipump systems offer real-time diagnostics and remote monitoring with variable-speed control and balanced run time for each pump. The booster packages are suitable for many applications, including water supply, pressure boosting, agriculture, washing/sprinkling systems, cooling circuits, and condensate return. The systems have a maximum head of 780 feet, maximum flow of 550 gpm, rated pressure of 232 psi and a liquid temperature range of 4 degrees below zero to 248 degrees F. The systems are NSF 61 and NSF 372 certified, have full 304 stainless steel construction, and feature 300 class ANSI flange connections. **262-377-1399; www.weilpump.com.**

Hannay Reels HDD 6300 Series

The HDD 6300 Series of reels from Hannay Reels is for high-pressure water spray operations. It is constructed with a heavy-duty spool and frame, along with a direct-drive hydraulic motor that utilizes a planetary gearbox for increased power. It holds up to 1,000 feet of 1-inch-I.D. jetter hose and can withstand outdoor elements for reliable year-round use on the road. The line of reels also has 1/4-inch-thick discs with rolled outer edges for strength and rigidity and a 3-inch square tubing frame construction for over-road durability. The 6300 Series can handle pressures up to 3,000 psi. **877-467-3357; www.hannay.com.**

Mueller Water Products reclaimed water wrench nut

Resilient wedge gate valves from Mueller Water Products have an option for a purple pentagon-shaped wrench nut, intended for reclaimed water service installations. This wrench nut introduces two distinguishing features: a unique shape requiring a special key for improved security and a purple finish to quickly identify reclaimed water. Purple is recognized by the American Public Works Association to identify reclaimed waterline components. **800-523-8618; www.muellerwaterproducts.com. ♦**



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StoneAge welcomes new vice president of finance and information technology

StoneAge welcomed Peter Brooks as vice president of finance and information technology. He will be based out of the Durango, Colorado, home office and provide oversight of accounting, financial and information strategies.



Peter Brooks

Redesigned HammerHead Trenchless website launches

The newly redesigned www.hammerheadtrenchless.com website provides customers in a wide range of industries faster, easier access to in-depth information and resources regarding trenchless methods and products. In addition to improved navigation and design, other new features include a dealer locator tool; enhanced product pages; links to purchase products on the e-commerce site; industry-specific content to help users find trenchless solutions to match their needs; and access to the HammerHead Trenchless resource library, with user manuals, product literature, and other documents.

Felling Trailers named 2018 Green Manufacturing Award recipient

Felling Trailers was presented with the 2018 Green Manufacturing Award at the National Association of Trailer Manufacturers Conference in Fort Worth, Texas. This award was established to recognize manufacturers that have made significant contributions toward improving their environmental impact within their manufacturing processes and facilities. Over the course of several years, Felling Trailers has made the reduction of their environmental footprint a



From left, Jim Berry of Dexter, John Kerr of Marsh & McLennan Agency, Marcus Hester of Optronics International, Patrick Jennissen of Felling Trailers, Ron Yarnell of PPG, Rick Coffey of The Carlstar Group, and Jerry Sampson of Kenda/Americana Tire & Wheel.

prime focus in the operation of their company. The most recent initiative achieved was obtaining ISO 9001:2015 Certification for their quality management system.

LaValley Industries adds new distributor

LaValley Industries announced it has entered into an alliance with American Augers to distribute the TONGHAND exit side wrench and DECKHAND pipe-handling system specifically configured for loading and unloading drill pipe in horizontal directional drilling applications.

"We're excited to make DECKHAND and TONGHAND available to American Auger's loyal customers," says Jason LaValley, CEO and founder. "American Augers has a rich history of providing innovative solutions to its customers, and we believe that our products combined with their global network is a win-win for our industry." ♦

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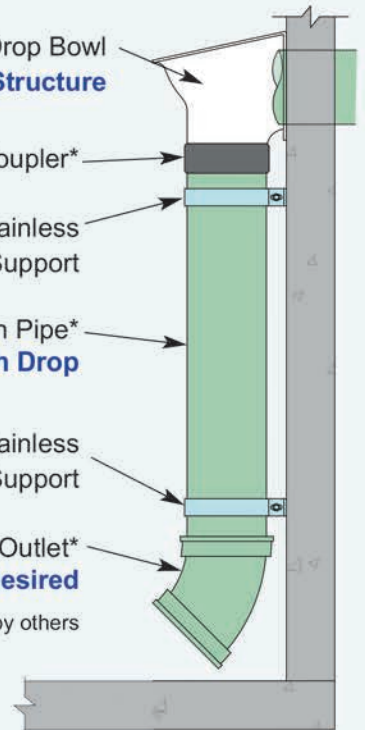
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PUMPS

Honda model WP40X, 8 hp, 4" with hoses. Honda 4 hp, 2" pump with hoses. The Cable Center: 800-257-7209. (CBM)

RENTAL EQUIPMENT

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

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T&T Tools: Probes, hooks. Probes feature steel shafts with threaded and hardened tips. The insulated **Mighty Probe™** tested to 50,000 volts. **Top Poppers™** open manhole covers easily. Free catalog. www.TandTtools.com. Phone 800-521-6893. (CBM)

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USED Envirosight ROVER Sewer Inspection Crawler: Overhauled with new parts and ready to run. Includes automatic cable reel, pan/tilt/zoom camera, steerable 6-wheel-drive tractor with various wheel sets, controls, and accessories. \$20,000. Call 973-252-6700. (MBM)

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PEOPLE/AWARDS

Maryland Gov. Larry Hogan announced that **Maryland, in collaboration with Howard County**, was awarded \$1,044,224 by the Federal Emergency Management Agency to fund a project that will reduce the flood risk of areas surrounding Main Street in Ellicott City. On July 30, 2016, a massive flooding event affected low-lying areas of the Jones Falls and Patapsco valleys. The storm caused significant damage to the downtown area of Ellicott City, as well as other businesses and homes.

Vital Farms was honored by the city of Springfield, Missouri, at the 17th annual Choose Environmental Excellence Awards. The city's Water Quality Division works to improve and protect water quality through projects and programs addressing stormwater pollution, as well as aquatic and riparian health. Vital Farms was honored for its best practices of stormwater green infrastructure, tree preservation, bioretention features, and erosion and sediment control both during construction and ongoing operations at its egg-processing facility.

A team of students at the **University of California-Berkeley** won first place in the Master Plan category of the Environmental Protection Agency's Campus RainWorks Challenge for developing a plan that could restore the Strawberry Creek watershed's water quality. The national collegiate competition tasks students to design innovative solutions for stormwater pollution. The team's project, titled (Re)Generations, includes a timeline spanning until the year 2100, by the end of which it aims to capture 100 percent of the university's stormwater runoff.

A team of students at the **University of Illinois** won first place in the Demonstration Project category of the EPA's Campus RainWorks Challenge. The national collegiate competition tasks students to design innovative solutions for stormwater pollution. The team's project, Campus Hydro Redesigned, incorporated green infrastructure practices into a parking lot with the goal of reducing flood-prone areas and mitigating stormwater runoff.

The **city of Dubuque, Iowa, Bee Branch Creek Restoration Project** received a 2018 Eddy Award (for design) from River Action, which launched the awards in 2000 to recognize work that celebrates the industry, history or art of the Mississippi River. The Iowa project converted 4,500 feet of buried storm sewer into an open channel, allowing the area's capacity for stormwater to grow. The project also created an outdoor amphitheater, an urban orchard, a play area and a trail system for people in the community. While creating the project, native plants, bioswales, and permeable pavement were used along the creek to help the filtration of the stormwater.

George Allen was hired as the streets and traffic control director for Fort Smith, Arkansas.

The **Edinboro Lake Watershed Association** received a 2018 Western Pennsylvania Environmental Award from the Pittsburgh Environmental Council. A management plan completed by the Edinboro Lake Watershed Association determined that 81 percent of the phosphorus entering the lake is from nonpoint sources, with more than 27 percent of the total being derived from stormwater runoff from land development.

Camden SMART Initiative and **New Jersey Tree Foundation** each received \$10,000 and 2018 Environmental Grant Program Awards from New Jersey American Water. Camden SMART Initiative's Business Engagement for Green Infrastructure Systems Maintenance project will assist with the management and diversion of stormwater runoff from the city of Camden's combined

sewer system into constructed green infrastructure projects to ensure that raw sewage is not ejected from the city's combined sewer systems into parks, streets, homes and surrounding waterways. New Jersey Tree Foundation's Trees for Irvington project is a watershed protection project in which the foundation's Renaissance Tree Program works cooperatively alongside the Irvington Department of Public Works in order to plant at least 30 new 2- to 2.5-inch caliper trees in the town. Each tree and corresponding tree pit is anticipated to intercept about 13,650 gallons of stormwater within the first year of planting in efforts to further improve the Elizabeth Watershed.

LEARNING OPPORTUNITIES

Kentucky

The American Water Works Association is offering an Effective Utility Management seminar on Sept. 19-20 in Louisville, Kentucky. Visit www.awwa.org.

Virginia

The American Society of Civil Engineers is offering the Young Member Leadership Symposium on Aug. 3-5 in Reston, Virginia. Visit www.asce.org.

Wisconsin

The University of Wisconsin is offering an Essentials of Hydraulics for Civil and Environmental Professionals workshop on Sept. 25-27 in Madison, Wisconsin. Visit www.epd.wisc.edu.

Online

The American Water Resources Association is offering a Forecast Informed Reservoir Operations Improve Water Management webinar on Oct. 10. Visit www.awra.org.

The American Public Works Association is offering a Talking Top Tech: Geographic Information System (GIS)/Mapping webinar on Sept. 13. Visit www.apwa.net.

The AWWA is offering a Latest Developments in Water Infrastructure Funding webinar on Aug. 29. Visit www.awwa.org. ♦

CALENDAR

July 29-Aug. 1

American Society of Agricultural and Biological Engineers Annual International Meeting, Cobo Center, Detroit. Visit www.asabe.org.

Aug. 12-16

StormCon, Hyatt Regency Denver at Colorado Convention Center, Denver. Visit www.stormcon.com.

Aug. 26-29

American Public Works Association Public Works Expo: PWX, Kansas City Convention Center, Kansas City, Missouri. Visit www.apwa.net.

Sept. 17-19

National Rural Water Association WaterPro Conference, Fort Worth, Texas. Visit www.nrwa.org.

Sept. 29-Oct. 3

Water Environment Federation Technical Exhibition and Conference, Morial Convention Center, New Orleans. Visit www.weftec.org.

Oct. 12-15

American Society of Civil Engineers 2018 Convention, Hyatt Regency Denver at Colorado Convention Center. Visit www.asce.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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