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PRODUCT FOCUS:
PUMPS, LIFT STATIONS AND CONVEYANCE



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Raffi Moughamian, an associate civil engineer at the East Bay Municipal Utility District, worked on the utility's highly complex water transmission line replacement running 155 feet below the floor of San Francisco Bay from Oakland to Alameda.

(Photography by David Elkins)



COMING IN JUNE 2024

ACE Show Issue, Manhole Equipment and Rehabilitation

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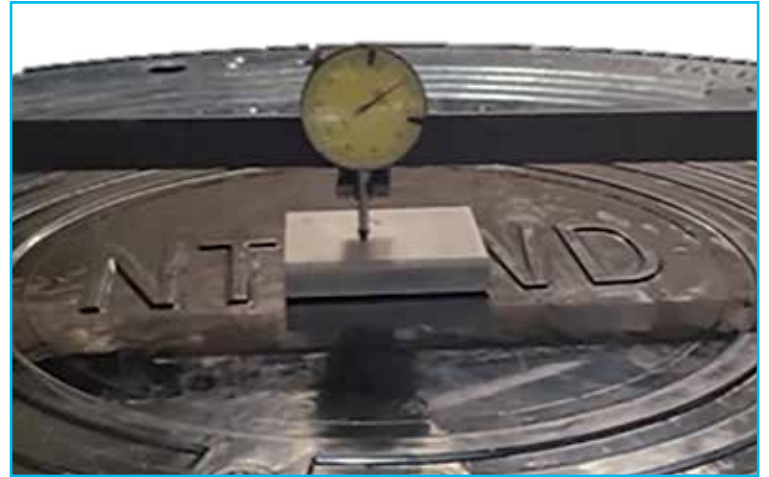
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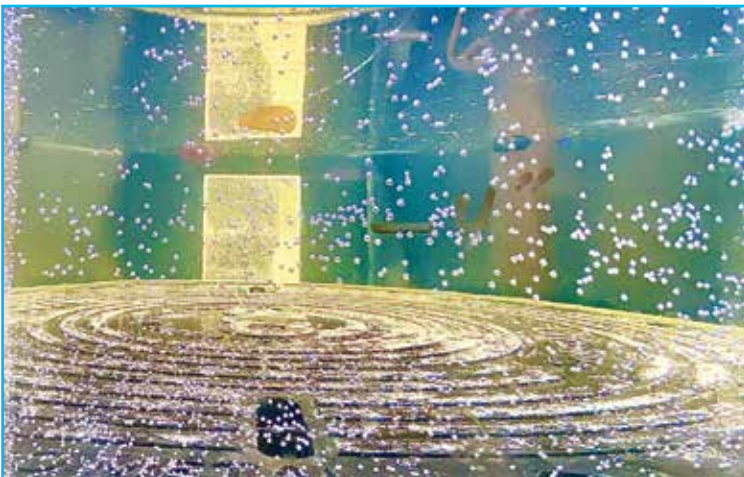


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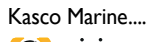
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EDITORIAL CORRESPONDENCE:

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

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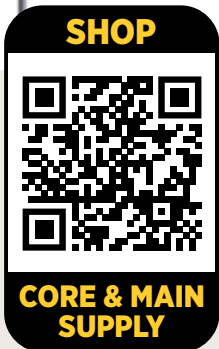
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Luke Laggis

STAYING IN FRONT

A proactive mentality can keep your utility ahead of problems

At first glance, Green Bay, Wisconsin, and the East Bay area of northern California don't share a ton in common. From weather to population size, they're very different places. Yet with their locations on Lake Michigan and the Pacific Ocean, both communities are defined in many ways by their connection to the water.

The East Bay Municipal Utility District and Green Bay Water, both profiled in this issue of *Municipal Sewer & Water*, provide clean water to their residents. Their approach to that mission highlights their similarities and the value of a proactive operational mindset.

In the East Bay area, where earthquakes can pose significant problems for underground infrastructure, maintaining a resilient transmission system brings extra challenges. And for residents of Alameda, an island city in San Francisco Bay, the reliability of that system takes on added significance.

Alameda is served by four pipelines carrying water under the harbor from Oakland. The pipelines are the island's only source of water, and three of the lines

are made of aging cast iron that's more susceptible to potential earthquake damage. On top of that, the city has no reservoirs or storage tanks to hold emergency water supplies, so the utility is working toward replacing these critical pipelines with new earthquake-resistant lines.

The first of these new lines is Alameda's primary water feeder, a 3,300-foot-long run of high-density polyethylene pipe carrying approximately 25 million gallons of water per day.

The line, which runs 155 feet below the harbor floor, was completed in January at a cost of \$26 million after about a decade of planning and also included the open-trench installation of 11,000 feet of pipe to connect the new pipeline to the existing transmission system.

Back in Green Bay, the projects look different but the approach is much the same.

Last summer the utility took on the cured-in-place rehabilitation of 1,400 feet of 8-inch cast iron water line. The line had a history of leaks that caused ground disturbance. At the same time, the street above was in good condition and the line was still adequately sized, so the utility decided the time was right to take on its first water-main lining project.

And when the 36-inch main transmission line running 25 miles from the utility's filtering plant needed a full assessment, they brought in new technology to get a clearer picture of what was happening. The result of that effort, and subsequent inspection work, has allowed the utility to make the line more resilient without unnecessary rehab or replacement of pipe that was in good shape.

It's all part of Green Bay's approach to proactively seeking out new technologies and processes that make their operations more efficient and effective.

Both of these utilities demonstrate the value of this approach. Gaining efficiency and effectiveness should be part of the operational mindset for every utility. I hope it's part of yours.

Enjoy this month's issue. ♦

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

Their approach to that mission highlights their similarities and the value of a proactive operational mindset.

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NEW REPORT

Stormwater Capture

A new study reveals urban areas in the U.S. have the potential to capture massive amounts of stormwater runoff, exceeding previous estimates. Greater uptake of the strategy outlined in this online article could bolster resilience against floods, droughts and water shortages.

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EDUCATION PROGRAM

Virginia Utility Makes a Splash

Prince William County (Virginia) Service Authority's award-winning H2Go Kids! uses cartoon mascots to teach K-6 students about water conservation and the water cycle. This engaging online program helps educators keep kids interested in science, even during virtual learning.

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OVERHEARD ONLINE

"We're at an inflection point for water with intensifying challenges, but also enormous opportunity to solve these issues through innovation."

— **Global Student Innovation Challenge Calls on Next-Generation Leaders to Tackle Water Security**

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INFRASTRUCTURE ASSISTANCE

University Pilots Water Initiative

Cornell University's College of Engineering is tackling a nationwide challenge with a new project in Puerto Rico that aims to help small communities in the territory finance, build and operate drinking water systems. Read more about the WaterSAVerS project in this online exclusive article.

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CROSSING THE BAY

Oakland utility tackles a water main project of seismic proportions

By *Ken Wysocky*

To protect the city of Alameda’s water supply from potentially crippling damage during an earthquake, the East Bay Municipal Utility District recently completed a highly complex project: replacing a vulnerable underwater, cast-iron water main with a 3,300-foot-long, high-density polyethylene pipe.

The project, which cost \$26 million, was completed in January after about a decade of planning. It dramatically improves the resiliency and reliability of the transmission system, which carries water under the harbor from Oakland to Alameda, a city on an island in San Francisco Bay, via four pipelines — the new earthquake-resistant line and three older lines, says Raffi Moughamian, an associate civil engineer in the utility’s pipeline-infrastructure division.

The engineering feat was achieved by using horizontal directional drilling technology. A 44-inch-diameter bore hole was drilled about 155 feet below the harbor floor. This particular pipeline, which can carry approximately 25 million gallons of water per day, was installed first because it is Alameda’s primary water feeder.

“The city has no reservoirs or water-storage tanks to hold emergency water supplies, so they’re completely dependent on the water lines,” he says, underscoring the project’s importance.

The project also included the open-trench installation of 11,000 feet of 24-inch steel pipe in both Oakland and Alameda to connect the new pipeline to the existing transmission system.

During the next decade or so, two more of the aging, cast iron water mains will be replaced with earthquake resistant HDPE pipes to further protect the city’s roughly 80,000 residents from potential

“Laying out more than 3,000 feet of pipe in a highly urban, densely populated area was a challenge.”

Raffi Moughamian

water-service interruptions stemming from seismic activity. The fourth main will not be replaced, Moughamian notes.

“We looked at all the data and determined that three new pipelines, which will be as large or slightly larger in diameter than the existing lines, would be sufficient to meet Alameda’s future water needs,” he says.

EBMUD supplies water to approximately 1.4 million people in a 332-square-mile area across the bay from San Francisco; the service area covers 20 incorporated communities — including Oakland and Berkeley — and 15 unincorporated communities.

The utility gets its water from 90% from snowmelt in the western Sierra Nevada mountains. The water is stored in two up-country reservoirs. EBMUD also owns and operates five water reservoirs, six water treatment plants and about 4,200 miles of pipelines. In addition, the utility operates wastewater collection and treatment infrastructure.

Unstable soil

The new underwater pipelines are needed because the original lines, some of which date back to the 1940s, weren’t laid deep enough. For example, the recently replaced pipeline was buried only 50 feet below the inner harbor floor.

Furthermore, the soil surrounding them was too liquefiable, or unstable, which raised the risk of pipe failures due to inadequate support for the brittle cast iron pipeline, Moughamian explains.

“It was a huge problem ... that required a proactive approach,”





PROFILE:

East Bay Municipal Utility District, Oakland, California

WATER CUSTOMERS SERVED:

About 1.4 million people

WATER SERVICE AREA:

About 332 square miles

WATER INFRASTRUCTURE:

6 treatment plants, about 4,200 miles of water mains, two up-country reservoirs, five local reservoirs, 135 pumping stations, more than 31,000 fire hydrants

WATER TREATMENT PLANT CAPACITY:

Up to 430 mgd

AVERAGE DAILY USE:

Approximately 160 mgd

WASTEWATER INFRASTRUCTURE:

1 treatment plant, 37 miles of sewer mains, 29 miles of sewer interceptors, 15 lift stations

WASTEWATER CUSTOMERS SERVED:

About 740,000 people

WASTEWATER SERVICE AREA:

Around 88 square miles

WASTEWATER TREATMENT CAPACITY:

Roughly 415 mgd

AVERAGE DAILY TREATMENT:

About 63 mgd

EMPLOYEES:

About 2,000

WEBSITE:

ebmud.com

The 3,300-foot-long pipe, resting on more than 100 pipe rollers, was pulled from Alameda to Oakland at a rate of between 3 to 4 feet per minute. The pipe weighed about 228,500 tons.

PHOTOGRAPHY BY DAVID ELKINS



The new pipeline was created by fusing together 63 sections of HDPE pipe, a process that took about three months to complete.



Construction began in summer of 2022. About half of the bore was drilled from the Oakland side of the harbor and the other half from the Alameda side.

NEW LIFE FOR OLD INFRASTRUCTURE

Moughamian says. “We avoided that liquefiable layer of soil by installing the new line deeper than the original line.”

Pipeline construction began in summer of 2022. About half of the bore was drilled from the Oakland side of the harbor and the other half was drilled from the Alameda side.

The underwater portion of the project culminated in early April 2023 when the pipeline was pulled through the bore hole — an operation that took contractor Michaels Corp. about a day to complete, he says.

“The pull of the new pipe under the estuary was a remarkable feat of engineering and construction,” said Doug Linney, the director of the EBMUD board. “This work will benefit the residents of Alameda for decades to come with a more resilient and reliable water distribution pipeline.

“We are extremely grateful and proud of this effort, the crews who performed it and our customers for their patience and support.”

Complex process

The pipeline was created by fusing together 63 sections of HDPE pipe, a process that took about three months to complete. When completed, the pipeline was laid out along a little more than a half-mile stretch of Mitchell Avenue in Alameda.

Before it was pulled through the borehole, it was pressure tested to detect leaks, Moughamian says.

“Laying out more than 3,000 feet of pipe in a highly urban, densely populated area was a challenge,” he notes. “We had to do a lot of community outreach and develop plans to minimize the impact on residents and businesses, including traffic-control strategies.”

The pipe was pulled from Alameda to Oakland at a rate of between 3 to 4 feet per minute. The pipe rested on more than 100 pipe rollers. These small metal stands feature rollers that enable the pipe — which weighed a whopping 457,000 pounds (about 228,500 tons) — to move throughout the pull.

Even with years of planning, was it nerve-wracking to watch the process unfold?

“Yes — I’m not going to lie,” Moughamian says. “It definitely was a big day. But everything went very smoothly, with no major issues.”

The East Bay Municipal Utility District, which provides water and wastewater services to customers in and around Oakland, California, currently distributes about 9 million gallons of recycled wastewater per day, mostly for irrigation or industrial use.

But that number is expected to increase in the years ahead to 20 million mgd by 2040. And an old 24-inch-diameter, 1,500-foot-long cast iron underwater water main that rests about 50 feet below the Oakland inner harbor, across San Francisco Bay from San Francisco, will help the utility move toward that goal.

The 1940s-era cast iron pipe, which used to take water from Oakland to the island city of Alameda, was recently replaced by a new, 24-inch-diameter, 3,300-foot-long HDPE pipe that was installed 155 feet below the harbor floor via horizontal directional drilling. The old pipe was laid in unstable soil and was vulnerable to damage from earthquakes, which would be disastrous for Alameda since it has no reservoirs to hold emergency water supplies.

Old water lines like this typically are abandoned. But EBMUD officials decided to repurpose the pipeline and use it for transporting recycled wastewater to Alameda — a first for the city.

The line will be capable of transporting 500,000 mgd of recycled wastewater from the utility’s only wastewater treatment plant, located near the eastern foot of the Bay Bridge, says Nelsy Rodriguez, a utility spokesperson.

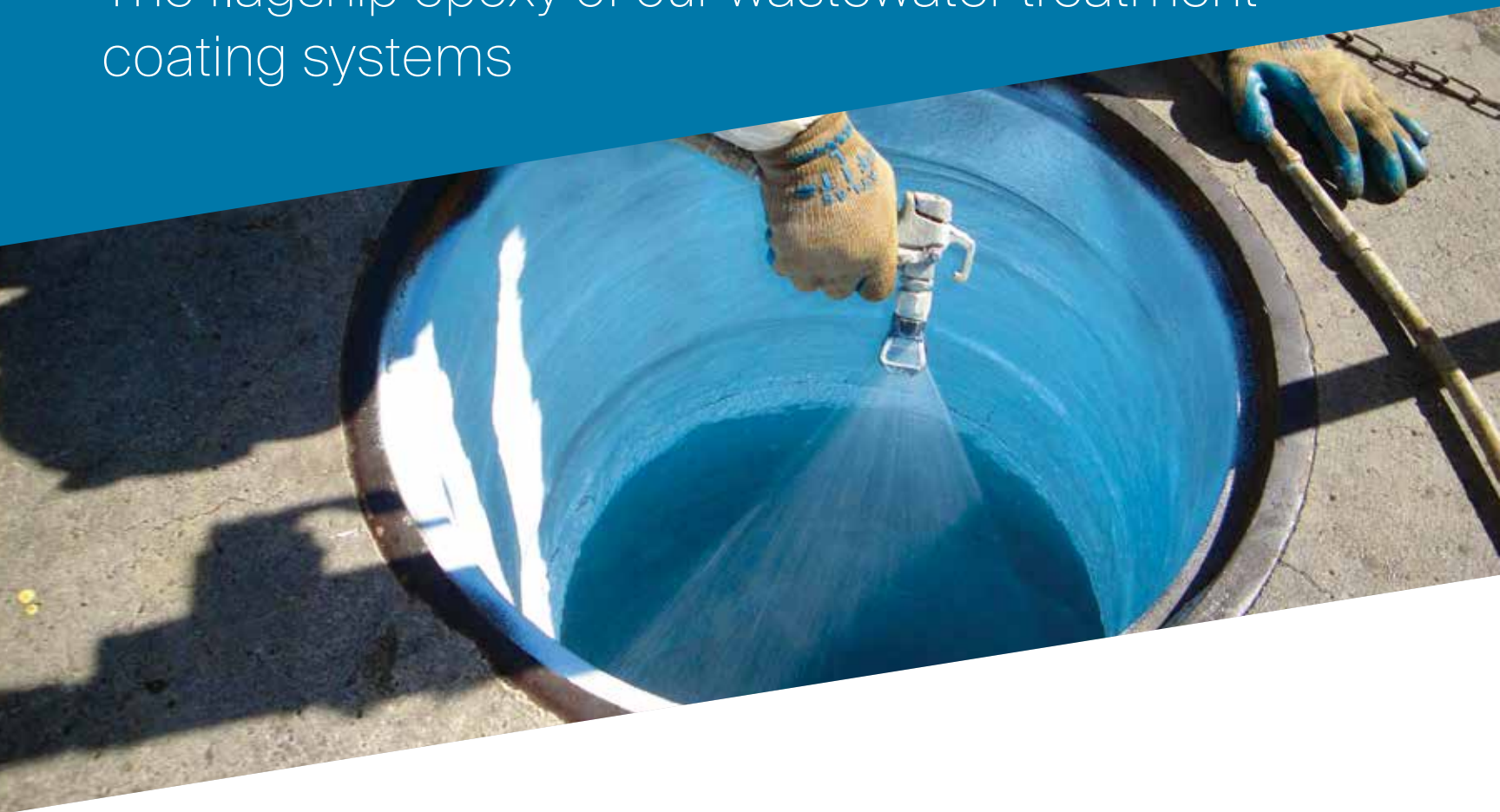
The project, which has no firm completion date, will cost about \$10.5 million. It received a financial boost in the form of \$3.2 million in federal funds appropriated through the U.S. Army Corps of Engineers’ Environmental Infrastructure Assistance Program.

“This project provides a phenomenal opportunity for local and federal government to provide a creative solution that supports sustainable water supplies in California,” says EBMUD Board President Lesa McIntosh. “As climate change disrupts historic weather patterns, we must use every drop of the natural water cycle.

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Major infrastructure upgrades

The underwater pipeline replacements are just a small part of a sprawling and ambitious \$2.8 billion, five-year infrastructure upgrade program underway at EBMUD, marking one of the utility's most capital-intensive periods since its establishment in 1923.

The program includes rehabilitation of water treatment plants, pumping plants, reservoirs, pipelines, wastewater facilities and sewer interceptors.

"Water infrastructure is the very lifeline of society," says Jimi Yoloye, the utility's engineering and construction director. "We cannot delay investing in this system. We must bring projects like the Oakland Inner Harbor Crossing to fruition. The coming years will be exciting and vital for our region's future."

During the last two fiscal years, the utility replaced about 45 miles of water mains.

"Our goal is to replace at least 20 miles of pipe a year, mostly aging cast iron mains, and we beat that goal by a few miles last year," says Nelsy Rodriguez, a media spokesperson for EBMUD.

In addition, the second underwater water main replacement is currently in

the design phase. The approximately 2,050-foot-long HDPE pipeline will be installed via horizontal directional drilling on the south end of Alameda's island. It will travel about 120 feet below the floor of San Leandro Bay.

After that project is completed, the third HDPE pipeline, which will be an estimated 1,300 feet long, also will be installed via horizontal directional drilling. It will be located about halfway between the first two pipelines and will pass about 100 feet below the bottom of a tidal canal.

Moughamian says that when the three projects are completed, Alameda will be better prepared for future population growth and economic

development.

"These pipelines will help ensure that Alameda continues to receive high-quality water without service disruptions," he says. "They will better position the city to meet its future water needs.

"As a utility, we're always trying to proactively plan for an uncertain future." ♦

"The pull of the new pipe under the estuary was a remarkable feat of engineering and construction."

Doug Linney



After the initial bore, crew members attach the pulling head to the lead end of the new HDPE pipe.

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GETTING KIDS TO THINK ABOUT WATER

A popular New Hampshire water festival and science fair presents students with a full day of thought-provoking activities

By **Sandra Buettner**

The New Hampshire Department of Environmental Services started its water festival 31 years ago to engage fourth graders in learning about the role of water in their lives and how our actions affect water resources.

“The festival has evolved over the years, but our mission has not,” says Lara Hooper, drinking water and groundwater education coordinator for the department. “In fact, we added another goal, and that is to empower students to help protect our waters.”

Forming the festival

New Hampshire is home to almost 1,000 lakes and ponds. Protecting watersheds from wastewater discharges and nonpoint pollution is critical.

Soon after creating the festival, the department partnered with Manchester

Water Works to start the New Hampshire Water Science Fair state finals at the festival. At the same time, NHDES built a coalition with federal, state, regional and municipal organizations to ensure robust and nuanced water education. Today, the festival events are organized by coalition partners Keene Public Works, Manchester Water Works, the New Hampshire Water Works Association, Plymouth Village Sewer and Water District, Concord General Services, RCAP Solutions and NHDES.

Then, in 2018, NHDES added a water poetry contest to engage the students more inclined to the arts. This enables third through fifth graders with varied interests to take part. “We want to engage all kids at those formative ages and impress upon them that the water cycle knows no borders,” Hooper says.

NHDES works directly with teachers and elementary school principals to

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.

Water poetry contest winners at the New Hampshire Water Science Fair display their certificates and ribbons.



promote the festival. The department also posts the information on its website (nhwaterfestival.org) and promotes the event through social media. The festival rotates around the state to four regions. The supporting utilities encourage educators to participate.

Varied activities

The festival is held during the first full week of May as part of National Drinking Water Week. The children arrive at 8:30 a.m. and the festivities start at 9 a.m. About 400 students typically attend.

Students participating in the state Water Science Fair finals spend the morning presenting before panels of judges for the state title. Meanwhile, students at the festival are divided into groups and attend multiple 20-minute lessons. An exhibitor tent includes a variety of activities from which students can choose.

“We want students to get top-notch information and be exposed to professionals from a wide range of fields.”

Volunteer science fair judges and festival presenters come from various fields in the water industry, including water and wastewater operators, engineers, lab technicians, foresters, research scientists, geologists, land conservationists, wildlife specialists, university professors, environmental education center professionals and staff from NHDES and the state Department of Transportation.

“We want students to get top-notch information and be exposed to professionals from a wide range of fields, so they know that there are many, many ways to take care of water and our planet,” Hooper says. “Our volunteers are amazing.” The topics and current issues the various experts bring to the festival include everything from pipe tapping to water science to stormwater runoff.

About halfway through the day the kids take a lunch break and enjoy a concert. In the afternoon the science fair and poetry contest winners are announced and poetry winners share their entries. Cash prizes and gift cards are awarded for first, second and third place and honorable mention. The students’ choice for the Best Tasting Water is also announced.

Organizers work with presenters so that lessons create little to no waste. Instead of bottled water, a water fountain and refill stations are set up for attendees.

Festival feedback

Thank-you cards and feedback from the students and teachers are always incredibly positive and uplifting to the organizers. One student wrote that she wanted to repeat fourth grade so that she could come to the event again.

“Our presenters and volunteers also leave the event changed,” Hooper says. “They leave knowing they have made a difference. That makes them feel good and excited about coming back for next year’s event.” ♦

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TAKING THE STRESS OUT OF ASSESSMENT

Green Bay utility uses technology to better manage and replace aging infrastructure

By Giles Lambertson



PROFILE:
Green Bay Water

CUSTOMERS:
107,000 residents, 36,000 customer accounts

SERVICE AREA:
City of Green Bay, plus three adjacent villages and a town

WATER VOLUME:
21 mgd daily demand

INFRASTRUCTURE:
440-mile distribution system, filter plant capacity 42 mgd

EMPLOYEES:
67

WEBSITE:
gbwater.org

PHOTOGRAPHY COURTESY OF
GREEN BAY WATER

Some segments of Green Bay Water's infrastructure are old — we're talking 1882 old — but there is nothing yesteryear in the thinking of the utility's leadership.

"We like to think of ourselves as proactive," says Brian Powell, general manager of Green Bay Water. "We are sometimes the first to try new technologies in Wisconsin. We're open to new technology when it makes sense."

A recent example of that state of mind was the repair last summer of 1,400 feet of 8-inch cast iron waterline along a street called Hazelwood Lane. The repair method: cured-in-place-pipe lining. It was the first-ever CIPP project for the utility.

Inasmuch as the cured-in-place technology has been around for 50 years, one might ask how a 2023 project in Green Bay squares with the idea of the water utility being progressive. The answer is contained in Powell's statement about the utility employing such technologies "when it makes sense."

The general manager says it was a matter of "finding the right project." Factored into the search was the diameter of the pipe to be repaired, the condition of the street under which it runs, and the probable consequences of the pipe's failure. The Hazelwood line checked all the boxes.

"It is a cast iron water main from the 1960s and had a leak history," he says. "When it did leak, it would cause a lot of ground disturbance. So, it was problematic." Furthermore, the pipe's diameter was such that it didn't need upsizing. It just needed sealing and strengthening against further leakage.

As for the condition of the street above it, Powell described Hazelwood as being "in pretty good shape and not going to be replaced any time soon. There's a decent amount of life left in it." The utility was even more reluctant to rip up the street because it was built of concrete and served a busy neighborhood in the area of Lambeau Field, home of the Green Bay Packers.

So, the CIPP contract for Hazelwood Lane was let with FER-PAL Construction USA, which employed the ALTRA CIPP lining system. In due course, the liner was inserted in a Green Bay waterline for the first time. The project went well. "The contractor was easy to work with,"

"When it did leak, it would cause a lot of ground disturbance. So, it was problematic."

Brian Powell

says Kristin Romanowicz, the utility's engineering supervisor. "With our crew helping on four excavation pits, every part went as planned."

Looking back on the inaugural project, Powell deems it a success. "It definitely was cheaper than a traditional repair. It was a very noninvasive project, so traffic flowed along the street as normal. People had access to their properties as normal. And all of that's a savings, too."

The city is "brainstorming about where else we can use CIPP, but

we don't have anything set for the rest of this year," says Romanowicz. The trenchless technology might be employed in places where digging is not a good option — such as railroad or river crossings, according to Powell. Otherwise, the same criteria will inform any decision to line another pipe.

"We're tackling projects right now that need more immediate attention, but we're definitely looking to use this technology in the future. We will be doing more lining."

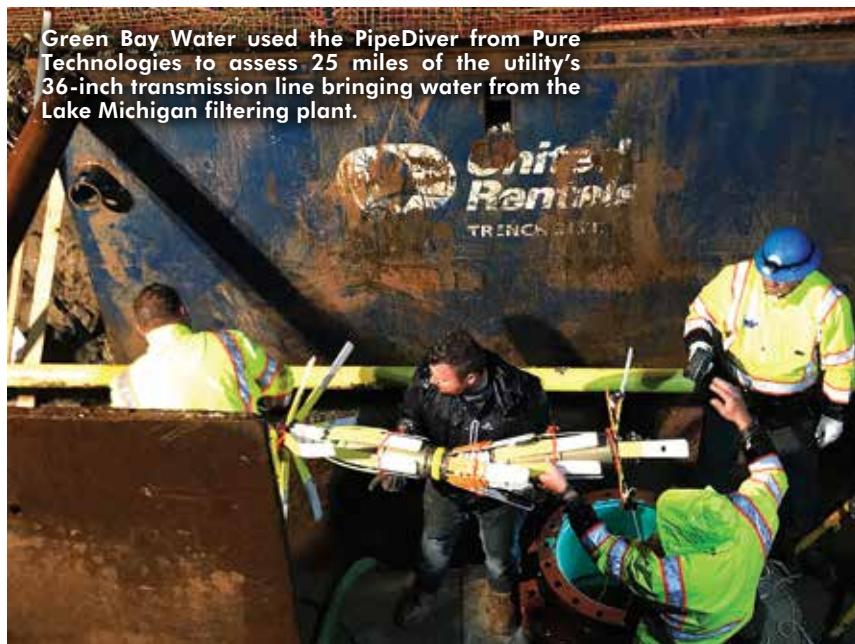
Diving in

Lining pipe wasn't Green Bay Water's first foray into 21st-century pipe inspection and repair. That happened in 2010 when the city contracted with Pure Technologies, a Xylem brand, to assess 25 miles of the utility's 36-inch main transmission line that runs from its filtering plant. Green Bay draws its water from Lake Michigan.

To accomplish the pipeline assessment, Pure Technologies utilized a proprietary robotic swimming device called PipeDiver. Because it's engineered to float through a waterline on the moving water, it doesn't interrupt the normal flow of water to customers.

The PipeDiver is sort of a prehistoric-looking, undulating three-segmented cylinder about eight feet long with a navigation head at the front and fins, or wands, projecting outward to keep it centered in a pipe. The device is available in three lengths to accommodate pipes of different diameters.

The PipeDiver swam easily through the utility's transmission line, which is a prestressed concrete cylinder pipe. Sensors particularly analyzed wire that keeps



Green Bay Water used the PipeDiver from Pure Technologies to assess 25 miles of the utility's 36-inch transmission line bringing water from the Lake Michigan filtering plant.

The utility tackled its first cured-in-place water main rehabilitation project last year, lining 1,400 feet of 8-inch cast iron waterline without blocking access to any properties on the residential street.



“We had so few pipes in poor condition that we elected to just go ahead and remove the nine bad ones.”

Brian Powell

ing the device’s wands, so that it floated closer to the top of flowing water in the pipe instead of in the center of it. The higher float allowed it to clear the butterfly valve disc.

“They did a project in New Jersey to prove to us that they had fixed the problem,” Powell says. In 2022, the contractor crew returned to Green Bay and successfully floated PipeDiver the length of the transmission lines. This time, the PipeDiver also carried a camera, another level of inspection accomplished.

Powell recently conferred remotely with water utility engineers in San Antonio, who had a similar valve situation in a mainline. They wanted some reassurances about letting the PipeDiver dive. Powell reported to them on how the issue was resolved in Green Bay.

So, what did the successful 2022 PipeDiver analysis reveal about Green Bay Water’s mainlines? In a long and detailed report, the engineers learned that out of 8,000 pipes in the inspected line, only nine had wire breaks.

“In other words, 0.12% of the pipes showed any stress,” Powell says. “I am told that, typically, 3 to 5% of pipes are revealed to be stressed, sometimes as high as 15%. We had so few pipes in poor condition that we elected to just go ahead and remove the nine bad ones.” Problems pinpointed and eliminated — thanks to the high-tech equipment.

Eyes open

The other tech marvel the utility has employed is called SmartBall, another Pure Technologies product. It is a round electronic package about the dimensions of a softball. Its electronics include a sensitive acoustic sensor that can pick up the sounds of leaks or of burbling gas pockets. Like the PipeDiver, it transmits its findings to system computers.

The device is housed in foam padding that resembles a Nerf Ball. Like the PipeDiver, it can be introduced to a water pipe with water running through it. The ball is pushed by the current, rolling along on the bottom of the pipe. “There is a range of velocities it can operate in. It was moving about 2 feet per second, which is within the range of the allowable velocity,” Powell says.

Most of the assessment work is done by the contractor, launching the ball via a long grapple and capturing and withdrawing the ball at the end of its run. The upshot of the SmartBall assessment? Three small leaks were discovered. It is success stories like these that keep Green Bay Water returning to new technology.

The utility was introduced to the technologies the same way as other water and wastewater agencies. First, word of mouth talked up the devices. Presentations at trade shows sparked serious interest. Peers recommended this company or that, this product or that. Eventually, Green Bay Water engineers investigated on their own, going to Louisville, Kentucky, when city engineers there were in the midst of a pipeline assessment, and then to Houston for another evaluation. Persuaded, they scheduled an assessment in Green Bay, and the rest is history.

“There always are other technologies,” says Powell, who has been general manager just a few months but was operations manager, too, during a 20-year stint at Green Bay Water. “For now, we feel pretty good about SmartBall and

the pipe from being blown outward by high water pressure and otherwise evaluated the integrity of the pipe. Data from the device was transmitted to a computer and a report prepared.

The 2010 analysis was a success, the PipeDiver functioned perfectly and the report reassured utility engineers about the soundness of the line. A decade later, in 2021, Green Bay Water called for another assessment by the device. The second time, things didn’t go as swimmingly.

What happened is that the utility, in the interim, had experienced a catastrophic break in the transmission line. To strengthen the system at that point, interconnections between parallel lines were constructed and butterfly valves added upstream and downstream from the interconnecting pipe. One of these valves became an obstacle for PipeDiver.

“We thought the face of the valve was facing one way and it wasn’t. When PipeDiver encountered it, it got caught,” Powell says, a snag that occurred just seven miles into its 25-mile swim through the pipe. The device eventually had to be cut out.

The manufacturer might not have welcomed the hang-up, but Pure Technologies took the opportunity to rework PipeDiver. Modifications included shorten-

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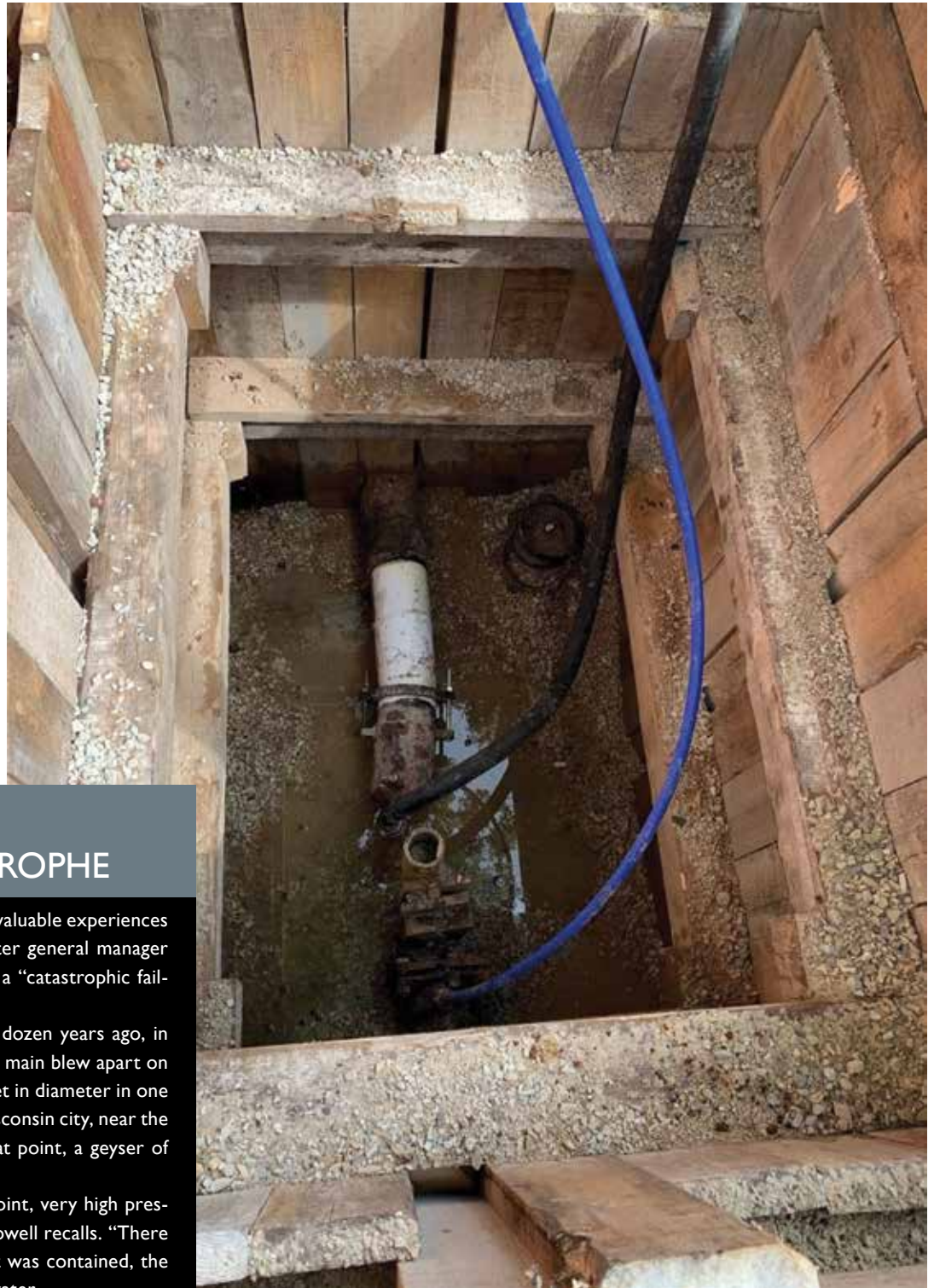
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Brian Powell, Green Bay Water General Manager



Kristin Romanowicz, Green Bay Water Engineering Supervisor



CONTAINING A CATASTROPHE

Successes build confidence, but failures are valuable experiences too. During conversation with Green Bay Water general manager Brian Powell, the GM alluded several times to a “catastrophic failure” the utility had once experienced.

It turns out the failure happened almost a dozen years ago, in 2012, on New Year’s weekend. A 36-inch water main blew apart on Dec. 29 of that year, blasting a hole almost 2 feet in diameter in one of the busiest streets on the east side of the Wisconsin city, near the intersection of Mason and Main streets. At that point, a geyser of water erupted.

“There’s about 130 psi in the line at that point, very high pressure, and it sent water shooting into the air,” Powell recalls. “There was a river flowing down the street.” Before it was contained, the mainline poured out some 8 million gallons of water.

Besides the mess, the interrupted and diverted flow threatened to severely interrupt normal water services to customers. Furthermore, restaurants in the city, which had planned on big New Year’s Eve crowds, began to fear that the eateries and party centers would be shuttered for lack of water.

Powell and his colleagues in the water department dove in, however, and finished the repair of the line by the afternoon of New Year’s Eve. Restaurant owners probably were the first to celebrate the fix. The cost of the blowout? Some \$200,000 in pavement repairs fixed the street. The utility paid for the various costs from a reserve fund rather than stick water customers with the tab.

PipeDiver, but we always keep our eyes and ears open.”

The contracted assessment tests are “not cheap,” he says, “but doing them and finding problem areas before they truly fail is money well spent.” ♦

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ONE TRUCK, MANY RISKS

Proper training and safety precautions are critical for vacuum truck operation

By Ronnie Freeman



In the water and sewer industry there are many hazards within the daily work that put employees at risk. Whether it's working in a trench, a confined space, handling chemicals or driving an excavator there are always dangers present.

Sewer and water technicians regularly encounter the potential dangers of driving and operating vacuum trucks. These powerful vehicles help us do many things and make our jobs easier, but they offer some serious hazards as well. Therefore, it is a must to prioritize safety when you are operating vacuum trucks.

A typical vacuum truck can weigh over 30,000 pounds, which presents obvious dangers. Imagine the kind of damage it would cause should it strike another vehicle or run off the road at full speed. The operators of these vehicles must be properly trained and authorized to operate them. But there are many other precautions and best practices to be aware of and followed.

At the top of the list of best practices is proper training for all operators in the equipment operation, all safety protocols, proper maintenance and emergency procedures. Next on the list is wearing the appropriate personal protective equipment, which can range from a hard hat, safety glasses, hearing protection, steel toe shoes and the right type of gloves to ensure operator protection.

It is the operator's responsibility to conduct pre-operation inspections to check the condition of the hoses, tanks, valves, alarms, lights and any other equipment the operator will be using. If there are any issues or damages, ensuring they are repaired properly before using the equipment is a must. Do not take the risk of using damaged equipment.

An area that can be easily forgotten or overlooked is overhead clearance with power lines. Be sure to maintain plenty of clearance with a minimum of 10 feet unless you've made proper arrangements with the local power company to have the line's power cut off.

Your work area will need to be clear and clean for good footing. You do not want to try to operate on an incline, slippery ground or any unstable surface. Working close to trenches can create an unsafe working surface so be aware of this hazard.

Also, working near and sometimes in the middle of the roadway creates an altogether different type of hazard. Unfortunately, today's drivers tend to be distracted so it is vital to make sure you are highly visi-



The importance of having a second operator present extends to all operations of the vacuum truck.

LATERAL INSPECTION SYSTEMS

ble. Always wear your high visibility apparel and have the proper cones set up to protect yourself and your crew from oncoming traffic.

Operators will need to be familiar with emergency shutdown procedures as well as knowing where the fire extinguisher and first-aid kits are located on the truck. If there is an emergency, stop working and follow the proper procedures for shutting down the vacuum truck.

Part of operating a vehicle of this magnitude involves driving the vehicle on all types of roadways. The operator needs to always have a second operator to help with backing up and parking due to the large scale of the vacuum truck. When backing up and parking in tight areas, always use a spotter to ensure you are safely getting where you want to go. The importance of having a second operator present extends to all operations of the vacuum truck.

Another reminder while operating your vacuum truck is to leave the cellphone out of the equation. Cellphones are a major distraction and the damage caused by a collision involving a vacuum truck can be enormous, costly and even deadly. No phone call or text is worth that risk so just don't do it.

Lastly, operating the pressure washer has its own set of dangers so the operators should also be properly trained in its use. The operator must be familiar with the safety precautions, which include making sure to never direct the spray towards yourself or anyone else. This may sound obvious, but too many operators have been seriously injured in pressure washer incidents. Always release any residual pressure in the system by turning off the water supply and operating the trigger before disconnecting any hose or accessory.

Operating a vacuum truck can be a safe experience if the operators are following safety procedures. It's a responsibility never to be taken lightly and must be shared by both operators and any employees that might be working in the area during operation. ♦



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Sheila Joy is executive director of NASSCO. She can be reached at director@nassco.org.

UNDERSTANDING THE CODES

Perforated pipe codes now part of updated PACP Version 8.0

By Sheila Joy

It seems the more we know, the more there is to learn, and I think that's why so many of us are drawn to the underground infrastructure industry. Not every person can know every trenchless technology or method, so the more we share information and knowledge, the more our industry will thrive.

This came to mind recently when, while attending an educational session at a large industry conference earlier this year, I was surprised to learn that some contractors identify the holes in perforated pipe as defects. This is not their fault — they just don't have the knowledge. That's why the inclusion of perforated pipe codes, among many other updates and improvements in the recently launched Pipeline Assessment Certification Program Version 8.0 is so important. While every version of NASSCO's PACP has delivered valuable instruction in the proper coding of pipeline conditions, each version becomes more robust based on what we learn from the industry.

NASSCO's Infrastructure Condition Assessment Committee set forward efforts to introduce perforated pipe to the standard. Perforated pipe can now be used for sanitary and nonsanitary use, for drainage of partially treated sewage, or for groundwater as part of an underground drainage system, thus removing the misalignment of grading when inspecting perforated pipe. The committee also sought to define perforated pipe where it is described as "a pipe that has a series of small holes, slots or intentionally installed small, separated joints, that allow water to enter or exit them easily."

After much collaboration, the committee identified the need to introduce new grades for the small joint defect for angular, offset and separated where its grade would be low to represent its existence but not identify it as a fault. Joints that would exhibit medium to large openings would still be classed as a defect and graded as such given the risk of potential soil migration. Further, infiltration stains, weepers, drippers and runners were seen as normal functioning inflow to the perforated pipe and was provided a low grade, again to represent its existence but not identify a fault. Infiltration gusher would be seen as inflow under pressure and would have a detriment to the surrounding pipe with likely soil migration and loss of ground, as such receiving a high grade.

These changes are designed to realign and standardize the scoring of perforated pipe segments, and this is just one of many improvements to NASSCO's PACP Version 8.0. To learn more, upgrade to PACP Version 8.0 certification, and sign up for a class, please visit nassco.org. ♦

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CASE STUDIES

PUMPS, LIFT STATIONS AND CONVEYANCE

By *Craig Mandli*

City deploys remote ultrasonic monitoring to reduce costs and avoid spills

Problem:

As part of their ongoing SSO management program, the city of Oakland Public Works department needed to measure full depth in a manhole. They had been using monitors with float alarms at fixed heights but found these required a significant amount of time for maintenance.

Solution:

Five years ago, Oakland began a pilot project using ECHO ultrasonic depth monitors from ADS Environmental Services that use “narrow-beam” technology. Unlike conventional ultrasonic sensors, which must be suspended on a flexible cable to within a few feet of the invert flows, the ultrasonic units can be installed at the top of the manhole. The narrow-beam technology provides a full 20 feet of dynamic measurement range and the stabilized mounting assures there is no sensor movement as occurs with cable-type ultrasonic sensors, which are prone to move and cause false alarms. The monitors also feature both low and high flow alarms that are configurable to the exact requirements for a given manhole.

RESULT:

Thus far, Oakland has expanded the ultrasonic monitor deployment to include 45 sites, relieving the city staff of any maintenance requirements. By using a proven turnkey service for monitoring and managing their sewer system, the city has been able to both improve their ability to avoid SSOs and reduce their overall costs. The turnkey approach relieves internal staff from the hassles of hardware installation, maintenance and monitoring, while assuring they have a continuous 24/7 stream of comprehensive data for alerts, alarms and long-term analysis. **877-237-9585; www.adsenv.com**

Duplex lift station employed in large healthcare location

Problem:

The Healthcare HealthTrust location in Florida functioned as one large warehouse before the decision was made to section off an end of the building to accommodate offices and restrooms for the staff. The project scope required tying these new restrooms into the existing sanitary sewer, with the furthest restroom roughly 850 feet away from existing sewer access. “The original spec included grinder pumps to be excavated 6 feet deep and 4 feet wide down in the ground,” says Nate Hefner, project manager from Feddon Mechanical. “But before we pulled the trigger on that, we decided to reach out to Saniflo to see what they had to offer.”



Solution:

After confirming that they could accommodate the electrical components to operate the Saniflo systems, the Sanicubic 2VX duplex lift station came out on top as the unit that could adequately handle the flow and distance of the plumbing system. This powerful 1.5 hp pump system provides above-floor drainage for multiple plumbing fixtures for an entire commercial structure, eliminating the need for costlier and less convenient pit installations. The Sanicubic 2VX runs roughly 32 feet vertically and approximately 760 feet horizontally before entering the top of the second Sanicubic. The second pump runs approximately 26 feet vertically and approximately 80 feet horizontally into the conventional plumbing system.

RESULT:

According to Hefner, both Sanicubics have operated without a hitch at HealthTrust Lakeland. “Using Saniflo products that were readily available and didn’t require long lead time was cost-effective, compared with the equipment initially specified.” **800-571-8191; www.saniflo.com** ♦

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PUMPS, LIFT STATIONS AND CONVEYANCE

Control Panels

Gorman-Rupp Integrinex

Gorman-Rupp's Integrinex line of lift station controls is designed to ensure system performance through precise matching of controls to pumps and motors. The liquid level controls are available in four styles when combined with Gorman-Rupp ReliaSource solids-handling pump packages: Basic offers simple, reliable plug-and-play performance, and is designed for accurate start/stop operation in a duplex alternation pump system; Standard includes duplex and triplex alternation, level sensors, pump delay and alarms; Advanced includes soft starters and VFDs to manage electric inrush, hydraulic shock and matching starting and stopping torque-based management and monitoring; and Remote View offers all the functionality of the advanced system with the added convenience of remote-based management and monitoring.



419-755-1011; www.grpumps.com

Orenco Controls OLS Control Panels

OLS Control Panels from **Orenco Controls** come with the choice of either integrated starters or variable-frequency drives that optimize system operation. These panels are suitable for a variety of pumping applications such as lift stations, stormwater pump stations, water boosting, dewatering or sludge pumping. They can also be used as a SCADA patch, connecting peripheral equipment to future or existing SCADA systems. Parameters can be configured via a human-machine interface and include a user-friendly startup wizard. Engineers can preprogram user interfaces to the site-specific needs of an installation, making the panel virtually plug-and-play. Maintenance staff can easily adjust settings and monitor the system remotely. These weatherproof control panels are UL 508A listed and include service-rated circuit protection, phase and voltage protection and level controls.



877-257-8712; www.orenco.com

Lift Stations/Components

Epoxytec CPP Sprayliner MH

Designed with high moisture tolerance and sealed inflow and infiltration barrier protection, **Epoxytec's CPP Sprayliner MH** is an ideal product for lift station rehabilitation. This structural epoxy coating can be sprayed ultra-high build, up to 3/8 inch and is designed for spray applicators seeking to utilize a plural component heated spray application. It is a 100% solids, structural-grade epoxy coating and lining system that creates a thick, microfiber-reinforced polymer film with high mechanical strength. 877-463-7699; www.epoxytec.com



Legacy Building Solutions Tension Fabric Buildings

Combining rigid-frame engineering with the proven benefits of tension fabric membranes, **Legacy Building Solutions** offers fabric structures that are fully customizable. They utilize a durable rigid frame in place of the hollow-tube, open web truss "hoop" framing traditionally used for fabric structures. The strength of the structural steel frame provides several engineering advantages, most notably the ability to easily customize buildings to the exact width, length and height required. In addition to long clear spans, the buildings have straight sidewalls that maximize the usable square footage inside the structure. The design allows for much more structural flexibility than traditional fabric structures, including the ability to add lean-tos, mezzanines, sidewall doors and more. The structures are also engineered to provide desired overhangs or handle additional loads for items such as sprinklers and conveyors.



877-259-1528; www.legacybuildingsolutions.com

RELINER/Duran conveyance products

Eliminate troublesome outside drops and clean up failed inside drops. **RELINER/Duran Inside Drop Bowls** and **Stainless Steel Pipe Support Brackets** simply bolt to the manhole wall and can be cleaned and inspected from above. The compact, low-profile bowls are available in dozens of sizes to fit any application. They can be used for service laterals, mainline sewers and wet well drops. The stainless brackets are easily installed, adjustable clamping pipe brackets available in non-corrosive 11-gauge 304 or 316 stainless steel and they are AIS certifiable. They securely attach pipes to structure walls with no protruding hardware and are fully adjustable to fit irregular surfaces. Clamps are stocked for 1.5- to 30-inch SDR35, Sch 40, HDPE, C900 and DN pipe. Modular Manhole Invert Channels improve manhole hydraulics, reducing maintenance, turbulence and odor. 800-508-6001; www.reliner.com



Smith & Loveless EVERLAST Pump Station

Smith & Loveless EVERLAST Pump Stations offer a high ease of operation and maintenance, high level of operator safety, long-lasting service life, pump technology that eliminates clogging from flushables and low life cycle costs. All pumping, mechanical and electrical components are above the wet well with immediate access at ground level. This means that the STAR ONE non-clog pumps reside at ground level out of the sewage and are always dry. Likewise, all the valves, piping and controls reside above the wet well, meaning that inspection of the entire pump station can be accomplished in seconds by simply opening the hooded enclosure.



800-898-9122; www.smithandloveless.com

Pumps

A.Y. McDonald E-Series DuraMAC

The **A.Y. McDonald E-Series DuraMAC** water pressure booster system helps in obtaining proper water pressure. While ideal for residential applications, this pump comes complete with easy setup instructions, all metal connections, a half-gallon pressure tank and check valve. In addition, experience a quiet operation due to the TEFC single phase motor. Designed to shut off when no flow is detected, this solution gives an extra boost to water pressure.

800-292-2737; www.aymdonald.com



Boerger Multicrusher Lift Station Grinder

The twin-shaft **Multicrusher Lift Station Grinder** from **Boerger** is suitable for lift stations and can be customized with channel frames for varying heights. It offers capacities ranging from 50 to 2,000 gpm and can effectively process materials such as rags, rocks, wood and wipes.

612-435-7300; www.boerger.com



Duperon Dual Auger System

Serving as an alternative to grinders and chopper pumps in the collections system and plant headworks, the **Duperon Dual Auger System** is comprised of two vertical, electrically driven, counter-rotating augers that catch, dewater, compact and remove rags, wipes and other debris from the waste stream. Each unit offers a brushless 0.71-inch bar screen that passes organics and conveys compacted non-dissolvable debris to a discharge extension chute for disposal as well as a built-in bypass to avoid the risk of sewer backups during power outages. Utilities save time and money by eliminating the manual cleaning of clogged pumps and the use of maintenance-intensive grinders that send debris downstream only to re-weave and become problematic again. The compact, fully submersible unit can be installed in a wet well or manhole as small as 17 inches.

800-383-8479; www.duperon.com



Franklin Electric Little Giant Pit+Plus

The **Little Giant Pit+Plus** package from **Franklin Electric** is designed to provide an all-in-one solution for light duty wastewater management. Each package includes a roto-molded polyethylene basin — the pit — combined with the user's choice of Little Giant pump. The addition of the 1 hp grinder pump option joins the already available 4/10 and 1/2 hp sewage pump choices. The basin is available in two sizes: the 24x24 JR or 20x30 SR. The Little Giant 16G Series 1 hp grinder pump has a cutting mechanism modeled after the unique design used in larger Franklin Electric models. The heavy-duty 1 hp class F motor provides power to prevent flushables and other debris from clogging and causing downtime.

844-250-4982; www.littlegiant.com



Industrial Flow Solutions BJM Pumps

BJM Pumps from **Industrial Flow Solutions** offers submersible pump product lines including the Alpha V Series, BIC Series and GRIX Series. These products are available in three-phase, 60Hz, 230/460V options. The Alpha



V series is a compact pump with a vortex impeller, ideal for residential sewage applications. With a twin-channel impeller design, the BIC series is suitable for pumping effluent, rainwater, surface water and groundwater. The GRIX series are solids-handling grinder pumps designed with a built-in macerator to handle domestic sewage applications, liquids with suspended solids, or when high pressure is needed. **860-631-3618; www.flowsolutions.com**

Trillium Flow Technologies WEMCO Hydrogritter

The **WEMCO Hydrogritter** from **Trillium Flow Technologies** is a grit cyclone and classifier with an enduring operational life of over 25 years. Its components are designed as a system so that each piece of equipment is optimized to consistently produce long-term, high-performance grit removal with unmatched reliability and low operation and maintenance costs. Its use can help protect downstream equipment from grit damage, and minimize downtime and grit removal expenses. It is proven to remove fine (150+ mesh) grit.

832-200-6220; www.trilliumflow.com



Vaughan Chopper Pump

Self-priming **Chopper Pumps** from **Vaughan** are designed to be easily accessed outside of the wet well while pumping waste solids at heavy consistencies, without plugging or dewatering of the solids. They eliminate the loss in production and mess, along with making it easy to service the pump to get it back in operation. **888-249-2467; www.chopperpumps.com**



Zoeller Pump 72 HD Series

Zoeller Pump's 10 and 15 hp **72 HD Series** is an expansion to its existing grinder product offering, now ranging from 1 to 15 hp. The units include a dual-carbon ceramic shaft seal, moisture and thermal sensor, a buna-N gasket to protect the 3,450 rpm motor, and class F windings. Pumps are available in 208, 230, 460 or 575 volts using a three-phase connection. The 3- or 4-inch ANSI flanged horizontal discharge allows for easy adaption to a variety of grinder or solids-handling rail systems. Pumping performance ranges from 250 feet at shutoff and a maximum flow at 150 gpm at 50 feet TDH. Removable legs clear the bottom of the pump to allow debris to flow easier into the cutter assembly when used with a guide rail assembly. This assembly uses a 440 stainless steel with a Rockwell C hardness of 55-60 cutter and cutter plate in a scissor-like cutting motion that reduces solids down to 1/8 inch. **800-928-7867; www.zoellerengineered.com**



Valve

Asahi/America wafer check valves

Asahi/America offers a PVC wafer check valve that is available in 3- to 12-inch sizes in ANSI, DIN and JIS standards. The valve body, disc and stopper are machined from solid PVC stock, which conforms to ASTM D1784 CC 12454. They also feature ISO 5752 face-to-face dimensions and chemical-resistant properties, making them a quick and easy replacement of corroded metal valves. They have no external shaft, no required spacer, and have a low back pressure requirement. They are rated to 150 psi (3 to 8 inch) and 85 psi (10 and 12



PRODUCT FOCUS

inch) at 70 degrees F. Ideal applications include tank inlets/outlets, preventing backflow into a pump, one-way mixing, water hammer mitigation, pressure balancing, and process intakes. **800-343-3618; www.asahi-america.com**

SCADA Systems

PRIMEX icontrol

PRIMEX's icontrol is a solution for operators seeking all the benefits of a full automation and control system without the expense and hassle of owning and maintaining these technologies. The cloud-based solution provides full SCADA functionality with secure remote access to an existing control infrastructure through a managed data center. There is no SCADA-related hardware, software or licensing to buy, manage or maintain. It interfaces to an existing local PLC control and telemetry network to offer accessibility, full SCADA/HMI, process control, monitoring and alarming, data and reporting and asset management. Process information is transferred via secure data connection to the data center. Each client then has secure access to its individual system from nearly any internet-enabled device. **844-477-4639; www.primexcontrols.com**



SmartSights Bundle

A **SmartSights Bundle** subscription leverages the combined capabilities of WIN-911 alarm notification software and XLReporter into one robust package. While this bundle still allows you to access critical data from anywhere at any time with the mobile app, there is now the added benefit of leveraging XLReporter data so you can address issues before they become problems. Additionally, the WIN-911 Mobile app can dynamically refresh reports for a single site or a connected enterprise. To further reduce unplanned downtime, the Failover Utility Feature monitors the health of your WIN-911 Status module and automatically switches to the backup configuration should the primary system experience a failure. **512-326-1011; www.smartsights.com** ♦



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PROTECTING WATER SUPPLIES AND THE ENVIRONMENT

Utilities turn to concrete admixtures to better contain water and keep contaminants out

By Jim Preskenis

Every drop of water stored in reservoirs, water treatment plants and behind dams is vital to the well-being of the population they serve and the local economy. This mission is even more crucial given that increasingly severe drought conditions have led to significant water loss.

As for our country's wastewater treatment systems, communities need to be secure, knowing that none of the sewage sludge held in these facilities makes it into local groundwater or nearby waterways. Likewise, we must be confident that

contaminants do not enter the clean water stored in our water treatment facilities.

Water containment structures all have one thing in common — they rely on concrete to keep water in its place, whether fresh or fetid. However, concrete shrinkage can lead to cracks, creating an opportunity for water to escape or contaminants to enter.

PROBLEM:

Concrete cracking in storage facilities allowing water to escape and contaminants to enter.

SOLUTION:

Using a magnesium-based admixture developed by Premier Magnesia in new concrete to reduce shrinkage and make regulatory compliance more manageable.

RESULT:

Significant minimization of early-stage concrete cracking for more resilient infrastructure.



Bill leads to expansion

The longtime recognition of the improvements needed in this country's water storage systems led in part to the passage of the 2022 bipartisan infrastructure bill, which will help municipal utilities deliver clean, reliable drinking water and help build secure operations.

The challenges for utilities are that new water and wastewater structures with shrinkage cracking can face difficulties passing the required leak test and may require other expensive remedial work. These additional operations increase the cost of construction and can also extend project timelines, leading to delays and reduced owner/taxpayer satisfaction. In addition, decades of crack repair and maintenance represent a significant cost burden to the owner and headaches from taking a structure out of service while being repaired.

Ultimately, concrete cracking compromises the life cycle of the structure. For example, concrete that should have lasted 50 to 100 years forces the utility to perform replacement after only two to three decades.

The costly cycle of shrinkage cracks, repair, maintenance and deterioration can be significantly improved using a magnesia-based admixture, which is an effective means of mitigating shrinkage cracks and curling. Reducing or eliminating shrinkage cracks means contractors complete projects on time while reducing repairs and extending the project lifecycle.

Projects can incorporate magnesium-based admixtures into the concrete for all water and wastewater structures, including reservoirs, primary and secondary treatment, clarifiers, aeration tanks and digesters. PREVENT-C, an admixture developed by Premier Magnesia, is one of the only shrinkage reducers that's NSF-61 certified for use in potable water applications to make regulatory compliance more manageable.

Built to last

In South Dakota, a major containment project controlled the problem of concrete cracking by adding magnesium oxide to the concrete as a shrinkage compensating admixture.

Around a quarter million households depend on electric power generated by the earthen Fort Randall Dam in South Dakota's southeast corner. The dam spans the Missouri River and encloses Lake Francis Case — the 11th largest reservoir in the U.S. Historic flooding caused it to overflow.

Army Corps of Engineers inspections found that necessary repairs to the dam would include partial replacement of large portions of the spillway slab. They were already concerned about concrete shrinkage and subsequent cracks in the spillway.

In addition, the Corps found that in most areas of the dam, they would need to install reinforced steel to handle temperature and shrinkage. This approach would require them to drill 130,000 dowels into surrounding concrete laboriously.

For a more straightforward and effective solution, the Corps opted to use PREVENT-C admixture at a 5% dosage rate and a macro polypropylene fiber at 5 pounds per yard in addition to other adjustments to their specialty concrete mix design. This approach significantly minimized early-stage concrete cracking for



They were already concerned about concrete shrinkage and subsequent cracks in the spillway.

a more substantial spillway slab.

Controlling overflows

In another instance, a Pennsylvania utility used a shrinkage compensating admixture in an expansion project aimed at reducing overflows.

Expanding the wet weather treatment capacity by enlarging existing plant facilities has been a cornerstone in the Allegheny County Sanitary Authority's strategy for reducing sewer overflows over the past 25 years. This stormwater runoff has been one of metro Pittsburgh's most intractable problems.

ALCOSAN's \$2 billion Clean Water Plan includes building the new East Headworks facility as part of the current ALCOSAN Plant Expansion Program. The expanded plant will increase the facility's wastewater treatment capacity from 250 mgd to 600 mgd. The contractor drilled over 1,900 auger cast piles into the bedrock to serve as the foundation for the East Headworks facility.

The engineer for the project was looking for a way to enhance the performance of the concrete in service and reduce potential cracking due to shrinkage or restraint on the project during the design stage.

As many of the structures contain wastewater and thus need to be watertight, the engineer specified Sika Control NS as a basis of design for the shrinkage-reducing compensating admixture for the concrete. Premier Magnesia produces Sika Control NS under a private label agreement for Sika.

Using a magnesium-based admixture will enable these utilities to minimize cracks in the surface of concrete structures to maximize public investment and ensure the facilities meet the needs of their residents for centuries to come. ♦

Jim Preskenis is the specialty concrete admixture manager for Sika Corporation.

Product Spotlight

Shoring system helps make small underground repairs safe and easy

By Craig Mandli

Large excavations are sometimes required for fixing small underground utility repairs. Those excavations can be messy, though, not to mention dangerous to work crews.

A solution is the EasyDig Trench Cage from EasyTech Infrastructure Group. These small, circular shoring systems are designed to have a low impact and provide a safe work area. The modular shoring system comes in lightweight 2-by-4-foot half-circle pieces that are easy to transport and carry by hand. They come with a built-in ladder and are engineered to conform with national regulations. They also include a locking lid as an accessory to secure the excavation. According to Carmelle Isaac, CEO of EasyTech Infrastructure Group, EasyDig not only helps provide a safe work environment, its use can save time and money.

“EasyDig is small and hand moveable, so it can be carried in the back of a pickup truck,” Isaac says. “That means minimal ground disturbance, and a neat and clean excavation area, for example on a front lawn waterline repair. There is really no other circular, modular shoring on the market designed to work with hydrovacs.”

The latest design of the EasyDig is engineered to a 28-foot depth, pending soil conditions. Created specifically for utility repairs such as sewer and water



repairs, it also fits across multiple other applications, including utility pole installation, curb-stop repairs, sewer/water repairs, directional drill bore pits, cable splicing/repair and wellhead repair. According to Isaac, the research and development of the product spanned roughly 10 years.

“The developer team included longtime hydrovac operators with a history in product manufacturing. It was used by the inventors out in the field for about 5 years and rented to various local contractors,” Isaac says. “Feedback was used to create a new prototype and brought to engineers for the required pressure testing. This evolved into the lightweight product we have today.”

Basically, what previously involved a backhoe and a large messy excavation can be completed in the same amount of time or less with the EasyDig Trench Cage and a hydrovac, Isaac says.

“Plumbers love it because they can work in a clean space instead of a mucky hole, and hydrovac companies receive more work, especially from municipalities,” he says. “Honestly, we have had no negative feedback to date, and EasyDig has been utilized from northern Alberta to southern Mississippi.”

855-485-3279; www.easydig.ca

SPECIAL REPORT

Sanicubic heavy-duty wastewater solution from Saniflo



The Sanicubic lift station series from Saniflo, versatile for any wastewater scenario, offers both simplex and duplex models with grinder or vortex options. Compact yet powerful, these systems can discharge up to 250 gallons per minute, reaching heights of 36 feet and distances up to 1,640 feet. Designed for convenient above or below-floor installation, they provide easy access for maintenance and feature an external control panel and a

reliable triple redundancy air pressure switch. The duplex versions, equipped with smart pump technology, alternate pump use for durability and can simultaneously operate if necessary. Certified by CSA and IAPMO (UPC) for nationwide compliance, Sanicubic lift stations stand out for their quality, innovation and longevity in wastewater management.

800-571-8191; www.saniflo.com

SPECIAL REPORT



OZ Lifting Products stainless series

OZ Lifting Products’ stainless steel range includes chain hoists, lever hoists, trolleys and beam clamps all designed for use in corrosive environments. The centerpiece of the line is the stainless steel chain hoist, which is lightweight — meaning minimal effort is required to lift loads — yet durable enough

for industry’s most demanding applications. The hoists feature fully enclosed gearing; a fully machined lift wheel; a weather-proof holding brake; roller bearings on all gears and shafts; and forged stainless steel hooks with safety latches. Chain hoists, like the trolleys, are available in 1/2-, 1- and 2-ton capacities. The stainless push beam trolley fits most I, S and W beams and has precision ball-bearing trolley wheels. The beam clamps are available in 1- and 2-ton capacities. All products in the line are made from 304 stainless steel and come with individual test certificates and serial numbers.

800-749-1064; www.ozliftingproducts.com

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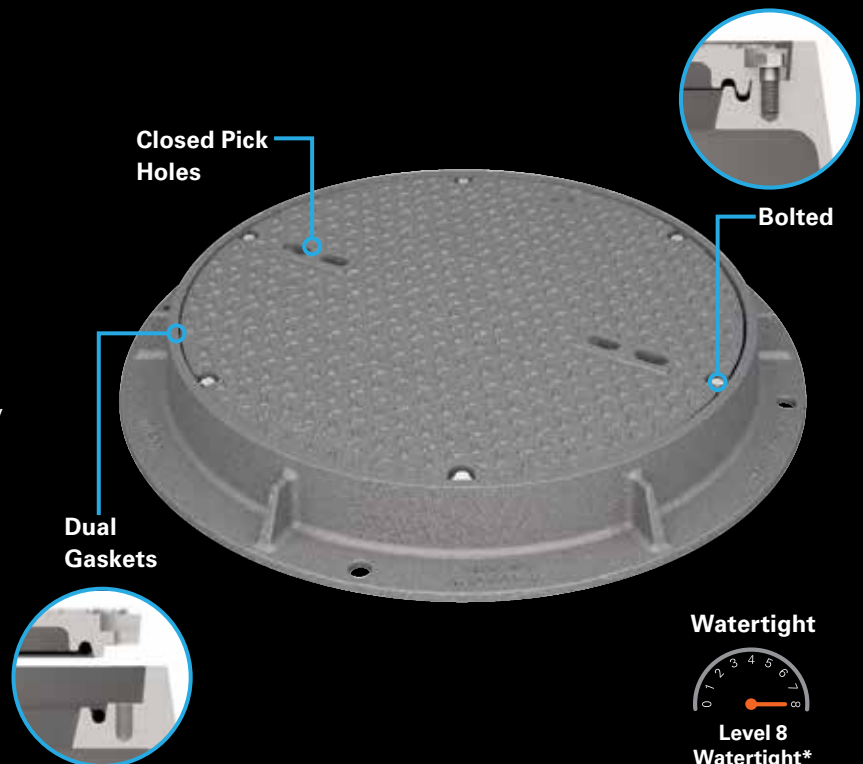
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SPECIAL REPORT

Superior Signal smoke testing systems reduce wet-weather peak flows

Superior Signal's smoke testing systems help reduce wet-weather SSOs and surface inflow. Superior's smoke candles, fluid and smoke blowers are designed to test sanitary sewers quickly, efficiently and economically. The smoke blowers can be used with smoke

candles or fluid to detect common sources of surface inflow and other faults. Classic smoke candles provide highly visible smoke to find more faults at a longer distance. The Superior 3C Classic smoke candle produces a volume of 40,000 cubic feet of smoke in just three minutes. Join multiple W3C smoke candles to create larger volumes of smoke visible for a longer time. Superior's smoke fluid systems offer a liquid-based alternative for mainline sewer inspection and feature an insulated heating chamber with a stainless steel injector to maximize dry smoke output. Since 1961, Super Signal's cost-effective methods have found sources of leaks and odors. Superior's smoke products are made in the U.S., meet WEF and NASSCO standards and are widely used in tests to meet EPA, ASHRAE, OSHA and NFPA standards. www.superiorsignal.com/cls; 732-251-0800



Aries Industries Voyager mainline inspection system



Aries Industries has added flexibility and efficiency to its Voyager mainline inspection system with the introduction of a completely mobile version. The unit easily navigates pipe conditions to capture detailed, high-definition video of relined mainlines 6 to 48 inches and up. The compact, portable system, equipped with an 800-foot cable, can easily be carried

in a pickup truck (fits under a tonneau cover) or mounted in a truck, van, trailer or Aries TrailBlazer. The Mobile Voyager HD System is digital CANbus enabled for instantaneous camera and tractor response. Inspections are viewed on a 15-inch daylight-readable touchscreen with thumbstick controls. An in-the-pipe WiperCam lens cleaning system maximizes inspection time versus downtime. A compact, full-HD 1080p pan and tilt video camera, with 120x zoom, captures every pipe detail around the crawler. Optional dual camera lasers are available to precisely measure cracks.

800-234-7205; www.ariesindustries.com

BAM! Bad Ass Mats safety mats



Avoid costly damage to your job sites with BAM! Bad Ass Mats. The mats are made from four-season, durable high-vis green HMWPE material with a built-in UV protector to guard against fading and cracking. 3/8-inch thick and rated at 160,000 pounds with pressure ratings of 373 pounds per square inch, and 53,700 pounds per square foot, they have a temperature rating of minus -103 degrees F to 258 degrees F. The 4-foot-by-8-foot sheets weigh 56 pounds and come with eight large hand holes for easy handling, even with gloves. A dual-side tread pattern provides safe traction for both equipment and pedestrians. Mats don't absorb moisture and chemicals, and can be simply hosed off. 262-877-4700; www.bamgroundpro.com

Finish Thompson DB10 sealless plastic centrifugal pumps



Finish Thompson's DB10 sealless plastic centrifugal pumps are ideal for transferring corrosive chemicals in water and wastewater treatment. The DB10 transfers chemicals from bulk storage to day tanks, unloads chemicals from tank trucks to bulk storage, provides flow of regeneration chemicals for ion exchange tanks, and empties batch treatment tanks. The

pump has a close-coupled design, corrosion-resistant polypropylene or polyvinylidene fluoride construction, and powerful neodymium magnets mounted to the motor shaft on every model. Featuring a sealless mag drive and a replaceable shaft and bushing, the pump mounts to NEMA and IEC motor frames, as well as motors without disassembly. The design eliminates the need for maintenance, flushing, or periodic seal replacement. The DB10 pump is equipped with 1 1/2-inch suction and discharge ports. It offers a maximum working pressure of 80 psi, and a high maximum specific gravity of more than 1.8. Connection types, O-ring, and bushing materials can be ordered to meet application-specific requirements.

814-455-4478; www.finishthompson.com

Kaman Air Gap Tool



The Measuring Division of Kaman Precision Products released its new Air Gap Tool. Offering simple, accurate measuring and data storage for hydroelectric turbines and more, the Air Gap Tool is designed specifically for static alignment of rotor and stator in large scale hydro generators. The tool can measure and store data with the tap of a finger; no power cords, pens or paper are needed. The tool can be easily positioned at predetermined locations between the stator core

and rotor poles. Air gap distance is accurately measured and transmitted wirelessly to hand-held Android or iPhone devices using the included app and stored on command. The Air Gap Tool is fully configurable and is available in optimized depths for a variety of specific applications.

860-687-5158; www.kaman.com ♦

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EVOLVING YOUR APPROACH TO STORMWATER MANAGEMENT

Recommendations to help more effectively and efficiently manage stormwater runoff

By *Brian King*



In 1970, rock band Creedence Clearwater Revival asked the seminal question, “Who will stop the rain?” Well, when it comes to rain and stormwater runoff, no one can. In fact, over the last 20 years, we have seen an increase in the frequency and magnitude of large-scale stormwater events.

In 2022, there were 17 stormwater-related natural disasters in the United States that each cost over \$1 billion. These large-scale disasters, which include severe storms, tropical cyclones, flooding, droughts and winter storms, collectively cost a staggering \$174 billion. By comparison, if we look back 20 years, there were just five of these types of events in 2002.

This higher volume of stormwater is putting a strain on natural waterways and municipal infrastructures, which is causing an increase in flooding, hazards to life and property and allowing pollutants to make their way into streams, rivers and lakes. This is significantly impacting communities, causing economic disruptions and contributing to environmental

damage.

This also comes at a time when many municipalities are dealing with aging stormwater infrastructures in need of repair or upgrades to adequately handle the increase in stormwater volume and keep residents and businesses safe from flooding.

To overcome these challenges, municipalities need to evolve how they approach the management of stormwater runoff. The following are three recommendations to help more effectively and efficiently manage stormwater runoff in today’s challenging environment.

Manage the entire lifecycle of a raindrop

The natural growth of cities, including construction of buildings, homes and roads, disrupts the natural ability of stormwater to infiltrate the ground. To effectively safeguard water and protect your community, you need a stormwater management approach that considers the entire lifecycle of a raindrop. This means managing the stormwater from the moment a raindrop hits the ground until it is returned to the environment.

This approach includes four key steps:

Capture: Collect and direct runoff to an underground conveyance system.

Conveyance: To prevent flooding, safely move water away from developed sites to be reintroduced to the water cycle.

Storage: To mitigate erosion and flooding, use retention and detention systems to manage infiltration and recharge stormwater prior to the treatment process.

Treatment: Remove trash, debris and pollutants from runoff collected in previous steps, ensuring only clean water is discharged back into the community.

Think big, site-specific and outside the box

Stormwater knows no political boundaries, flowing across all jurisdictions and borders. To ensure long-term effective solutions that manage the lifecycle of a raindrop, you need to work with agencies at all levels (e.g., federal, state, county and township).

At the same time, you need to view each situation as site-specific. During the design phase of any municipal project, you should ask specific questions as it relates to stormwater runoff management. These include: What is our current problem? What are we trying to solve? Are there multiple benefits to multiple solutions? What is the expected service life of the solution? What are the performance criteria? What are the future maintenance needs? What types





ety of durable plastic pipes available on the market that can be quickly adopted into project specifications, offer a smaller carbon footprint and have a 100-year service life.

When enacted together, these three steps can help municipalities evolve their approach to stormwater management. Not only will it better position your city to properly address your current water management challenges, it will also enable you to plan for the future more effectively and successfully recover from major storm events. ♦

Brian King is the executive vice president of marketing, product management and sustainability at Advanced Drainage Systems, Inc.

To overcome these challenges, municipalities need to evolve how they approach the management of stormwater runoff.

of structural/hydraulic/contaminant loading will this site see in the future?

Additionally, don't feel constrained by traditional solutions, and instead be open to solutions that are outside the box. For instance, when capable, some municipalities are turning toward detention, infiltration and reuse solutions. Depending on the region and the runoff quality, multiple solutions may even be used.

Adopt a blend of resiliency and sustainability

View every project as an opportunity to build a resilient and sustainable infrastructure for your city's stormwater management. This means choosing stormwater management solutions designed to provide long-term value and rapid recovery when time is of the essence, as well as contribute to achieving your sustainability goals.

This could include replacing parts of your gray infrastructure (e.g., gutters, pipes and tunnels) with green infrastructure systems (e.g., bioswales, rain gardens and permeable pavements) that mimic natural hydrology, filter and absorb stormwater where it falls, and offer environmental, social and economic benefits.

It could also mean utilizing plastic drainage pipes made from recycled single-use plastics. There are a vari-



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SCAN WITH YOUR SMARTPHONE

Greg Golz joins DSI/Dynamatic as industrial sales specialist

DSI/Dynamatic welcomed Greg Golz as a new industrial sales specialist. Golz has more than 15 years' experience in outside and inside sales plus account management. He also has experience in technical support, purchasing and inventory management from several manufacturers and distributors in southeastern Wisconsin.



Greg Golz

Aries Industries adds new dealer in Arizona

Aries Industries has strengthened its Southwestern U.S. market reach by adding Phoenix-based Short Equipment to its dealer network. Short Equipment offers a broad range of top-brand municipal service vehicles. Its lineup includes sewer cleaners, hydroexcavators, truck jetties, street sweepers and refuse collection trucks. As a factory-authorized warranty and repair center, Short Equipment services vehicles from its many product lines, and provides preventive maintenance training. The Aries Industries dealer network has added over 15 dealers in North America since 2019.

Itron unveils new brand identity

Itron announced a new brand identity reflecting the company's commitment to creating new efficiencies, connecting communities, encouraging sustainability and increasing resourcefulness. As part of the refreshed brand identity, Itron is introducing a more modern logo that showcases a leaner font, a more upright design, more modern lines and richer, deeper colors.

PUCT names Connie Corona interim executive director

The Public Utility Commission of Texas appointed Connie Corona as the agency's interim executive director. She has worked at the PUCT for 12 years, most recently serving as deputy executive director since 2020. Corona first joined the PUCT in 1997 as a policy analyst focusing on the 1999 Texas Electric Choice Act, which introduced retail competition to the Texas electricity market. She rose to the role of director of electric policy analysis before joining NRG's regulatory affairs department in 2003, where she served as director of regulatory affairs. Corona returned to the Commission in 2017.

Scott Beightol of Michael Best to lead The Water Council board

The Water Council appointed Scott Beightol, partner at Milwaukee law firm Michael Best and Friedrich, as the new chairman of its board of directors. Beightol succeeds Jim Stern, executive vice president at A. O. Smith Corp. Stern was appointed chairman in January 2019. He will continue to serve on the board and lead its water stewardship committee. Ken Bockhorst, chairman, president and CEO of Badger Meter, will continue as vice chairman. Mark Mone, chancellor of the University of Wisconsin-Milwaukee, has been appointed board treasurer. The Water Council is celebrating its 15th anniversary in 2024. ♦

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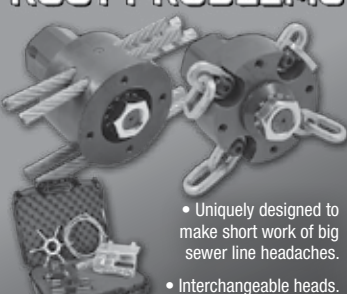
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WORTH NOTING

PEOPLE/AWARDS

AE2S announced the hiring of Josh Schoenberg as the civil and environmental consulting engineering firm's Instrumentation and Controls Group manager. Stormwater system consulting is among the firm's primary services.

The **North Carolina Office of Recovery and Resiliency** awarded \$17.7 million in federally funded grants to 17 cities, towns and counties. Counties whose funds will be directed to stormwater-related projects are:

- Bladen County (\$1.15 million), stormwater drainage study
- City of Lumberton (\$1.5 million), West Lumberton floodgate project
- Nash County (\$493,000), Town of Nashville Elm Street stormwater drainage
- Robeson County (\$174,000), Town of Pembroke stormwater drainage
- Robeson County (\$574,000), Town of Red Springs stormwater improvements
- Robeson County (\$452,000), Town of St. Pauls flood improvements
- Town of Princeville (\$851,000), Princeville Levee floodgate repairs

The city of **Philadelphia** received \$24.6 million for improvements to its water infrastructure. Limiting stormwater and flooding issues are among the goals. The funds come from the **American Rescue Plan**, the pandemic relief legislation signed by President Joe Biden.

The city of **Carbondale (Illinois)** secured a \$150,000 grant from the **Delta Regional Authority** to create its Comprehensive Stormwater Master Plan in partnership with the **Greater Egypt Regional Planning Commission**.

The municipality of **Norristown (Pennsylvania)** received a \$375,000 grant from the state's **Department of Community and Economic Development and Commonwealth Financing** to improve the area around **Sawmill Run Creek**. It's part of a larger flood mitigation effort.

CALENDAR

May 7-9

New York State Floodplain and Stormwater Managers Association, Queensbury Hotel, Glens Falls. Visit nyfloods.org.

May 15-17

International Erosion Control Association / U.S. Environmental Protection Agency Municipal Wet Weather Stormwater Conference, Auburn University, Alabama. Visit ieca.org.

May 8-10

Ohio Stormwater Conference, Kalahari Convention Center, Sandusky. Visit ohioswa.com.

June 23-27

Association of State Floodplain Managers Annual Conference, Salt Palace Convention Center, Salt Lake City. Visit floods.org.

August 27-29

StormCon 2024, Grand Sierra Resort and Casino, Reno, Nevada. Visit stormcon.com.

October 5-9

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

October 9-11

Southeast Stormwater Association Annual Conference, hotel TBA, Chattanooga, Tennessee. Visit seswa.org.

October 21-23

California Stormwater Quality Association Annual Conference, hotel TBA, Sacramento. Visit casqa.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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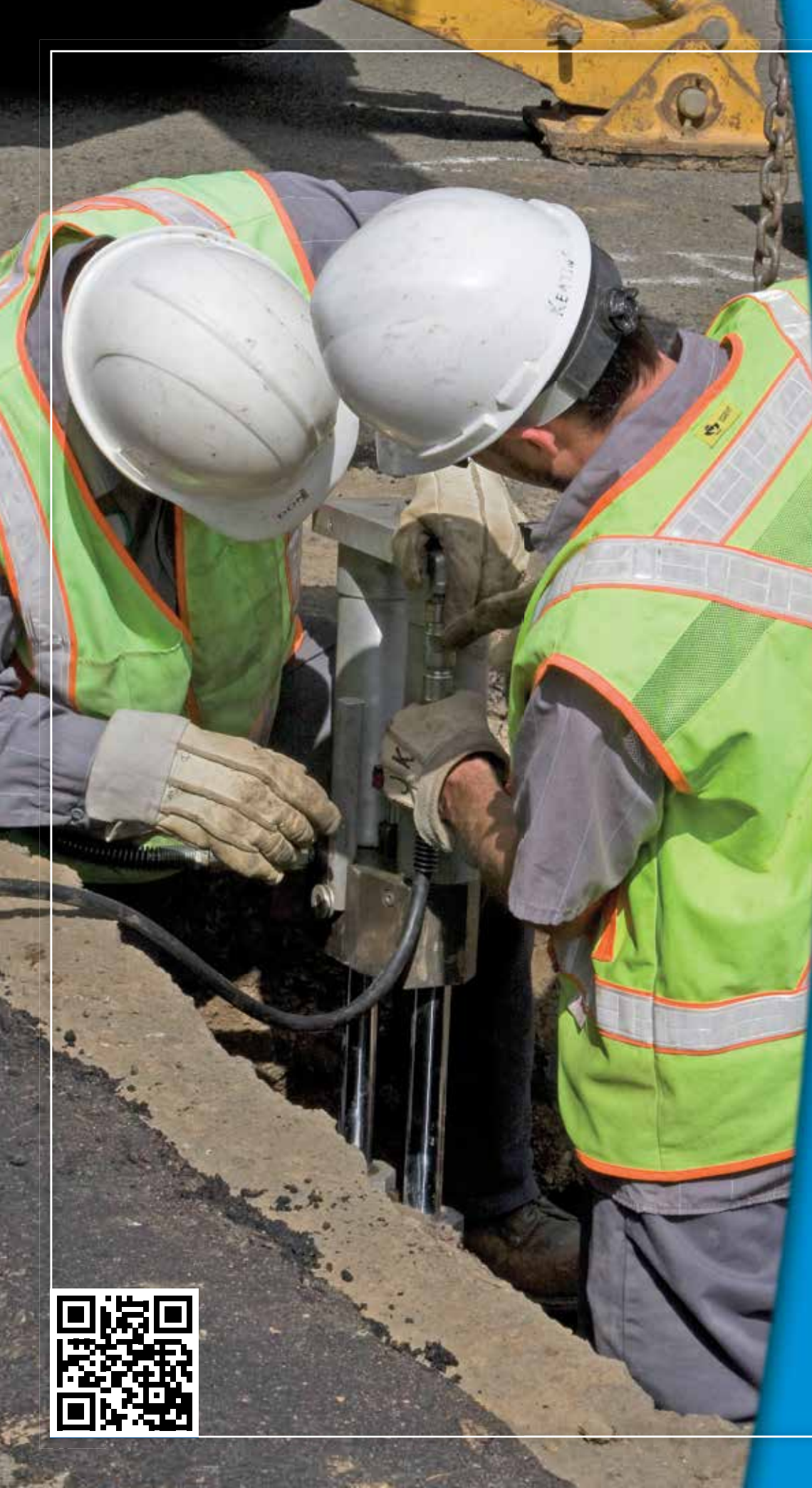
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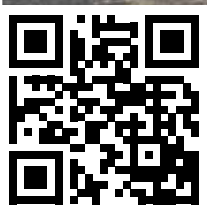
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