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Susan Negrelli
MDC Director of Engineering
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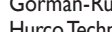


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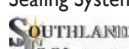
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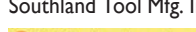


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Luke Laggis

KEEP THE PACE

New challenges present themselves every day, but you have to keep pushing forward

I'm a mountain biker. I like technical trails and jumps, good flow and I don't mind climbing. Most days I feel pretty good on a bike, no matter what I'm doing.

And then there was this past Saturday. There was a series race at one of my local trails. I do the occasional race, but it's not really my thing. Still, I thought I might as well do it because it was on my home track. I didn't do any special training, but I ride a lot and figured it wouldn't be too big a deal.

The race was two 12.4-mile laps on mostly technical, hilly single-track. It's a lap I've done many times. I figured two would be tough, but I wasn't too worried. I had a good dinner the night before, got a good night of sleep, good breakfast and a good warmup before the race. I did it all right, but then the wheels came off.

Hopefully you won't find any porcupines in your lines, but there will be other challenges.

The lead pack faded out of view pretty quick, but that was fine. I didn't want to go out too fast. It was a long race and it wasn't going to be won on the first lap. More troubling was the fact my legs felt dead right from the start. Usually I can ride through that and get my wind, but it never got better. It only got worse.

About a half hour in my right calf cramped like it had just been hit with a lightning bolt. That never happens to me, at least not that fast. Before the end of the first lap, both calves were cramping and I could feel it starting in my quads too.

That first lap took longer than it normally would on a casual weeknight ride. The second lap wasn't even a race anymore. It was just a battle to finish — more cramping, mechanical issues and a standoff with a fairly large porcupine. But I eventually crossed the line. It was a terrible race, but a hell of a test, and sometimes it's good to be tested.

I'm sure the past year has tested all of you in one way or another. As we reach the end of the year, it's good to evaluate the battles won and lost, take stock of where you've succeeded and where you need to focus efforts to improve.

Your water and wastewater systems are tested every day, and not every day can be a resounding victory. Hopefully you won't find any porcupines in your lines, but there will be other challenges. How you respond will tell the tale of your utilities.

And while my race tested me physically and mentally, it was all over in a few hours. In contrast, you have to manage the problems of the day while planning to address the challenges of the future. It's a tall order, and there's no one cheering for you at the finish line. In fact, there isn't even a finish line. It's just a race to stay ahead of the next challenge.

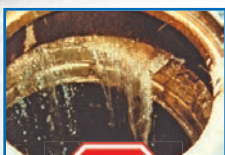
Here's hoping you keep the pace.

Enjoy this month's issue. ♦

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

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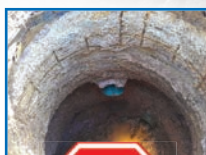
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SAFETY TRAINING

Keeping Employees Engaged

At 20 years old, Regina McMichael's husband died after falling off a roof at a job site where he was working. That was the day her safety career started. Three decades later she is still laser-focused on making the construction industries safer. She recently shared five key ways to improve your safety training efforts.

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OVERHEARD ONLINE

“Recently systems have incurred issues such as delayed or limited access to necessary treatment chemicals such as chlorine and sodium permanganate, and also products such as pipes and fittings.”

— **NRWA Urges Utilities to be Prepared for Ongoing Supply Chain Issues**
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DILIGENCE WITH DATA

Overcoming I&I

Fighting inflow and infiltration is a never-ending challenge, but that doesn't mean it's a hopeless endeavor. Taylors (South Carolina) Fire and Sewer District officials pin their hopes on data. And this data-driven approach is identifying problem areas, saving money and improving the integrity of the sewer system.

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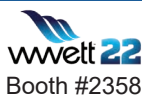
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FIGHTING I&I AND OVERFLOWS

Connecticut utility lays out plan to eliminate overflows in its aging combined system

By Traci Browne

Sewer overflow issues finally came to a head for the Metropolitan District (Hartford, Connecticut) in the early 2000s.

The Metropolitan District, a nonprofit municipal corporation that supplies water and sewer services to eight member communities, has been saddled with Hartford's 150-year-old combined sewer system since it was established in 1929. The 100-year-old sanitary systems of the surrounding towns they inherited weren't in great shape either.

In the early 2000s, approximately 1 billion gallons of untreated wastewater overflowed annually into area streams and waterways, which caught the attention of the EPA and the Connecticut Department of Energy and Environmental Protection. The result was a 2006

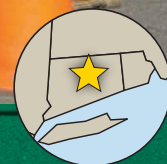
federal consent decree and a state consent order calling for the complete elimination of overflows in the towns of Wethersfield, Rocky Hill, Windsor, West Hartford and Newington.

The MDC immediately launched a sewer separation project but it didn't take long to realize that sewer separation, in addition to being costly and disruptive, wouldn't get them to their agreed goal in time. They needed a different approach.

To meet the consent decree and consent order requirements, MDC put together a comprehensive plan they call the Clean Water Project. The CWP includes a program for I&I remediation, construction of storage tunnels and an interceptor, upgrades to the treatment plant, and the now-infamous sewer separation.

Above: Metropolitan District (Hartford) crew member Corey Patterson removes a manhole cover while he and Greg Spillman set up to clean a sewer line. (Photography by John Marinelli)

(continued)



PROFILE:
The Metropolitan
District (MDC)
Hartford, Connecticut

YEAR ESTABLISHED:
1929

EMPLOYEES:
450

ANNUAL BUDGET:
\$196.9 million total /
\$94.8 million sewer

CLEAN WATER PROJECT:
\$2.5 Billion

INFRASTRUCTURE:
MDC treats approximately
30 billion gallons of waste-
water per year at four waste-
water treatment plants
(Hartford Treatment Plant is
the largest in Connecticut) and
has 1,300 miles of sewer main
in the collection system

ANNUAL BUDGET:
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POPULATION SERVED:
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“We were ripping up half of Hartford — 700 acres at this point — and we were not going to make our deadlines.”

Susan Negrelli

Sewer separation

While the MDC serves eight different municipalities, only Hartford has a combined system with brick sewers dating back to the 1800s. In addition to the typical connected roof drains, floor drains and the like, the sanitary flow from West Hartford, Newington, Weathersfield and Bloomfield all connects to and travels through Hartford on its way to the treatment plant. Condition issues in the sewer systems, and there are many in the connected communities, are exacerbating the problems in Hartford.

Susan Negrelli, director of engineering at the Metropolitan District, says they planned to go in and separate much of Hartford’s combined system, starting with the large drainage areas and targeting certain overflows. The original CWP gave them 15 years to make the improvements necessary to achieve the level of control the EPA and DEEP were looking for.

“We were ripping up half of Hartford — 700 acres at this point — and we were not going to make our deadlines. We got an extension but still, [separation] was slow, it was disruptive, it was costly and we were running out of time.

Disruptive is an understatement. Some of the separation projects ran as high as \$40 million and took years to complete. The business district was where the MDC met the most difficulties because crews could be blocking business entrances for weeks at a time. Despite the accommodations made for access, Negrelli says the work had a negative financial impact.

“And frankly, it was getting expensive for us with replacing this one’s driveway, and this one had a fence in the way, and that one had a big tree,” she says. “When you deal with private property, it gets very costly.”

Different solutions

Because of those issues, the MDC found it could not use a one-size-fits-all approach when undertaking a sewer separation of this scale. Every neighborhood is different, every section of pipe is different and every surprise discovered during excavation is different.

Negrelli also believes it’s important to phase projects to avoid working in one particular area for too long and burdening the local customers. Work a little here, then move there, and come back for the next phase after a while.

“You really have to look at the area where you are working to determine if it’s going to be a wise decision, or if there is something better you can do in that area,” she says. “Every situation has a different solution. You must evaluate all of the ramifications that come along with it. For example, maybe putting in a larger interceptor pipe in a business district is easier than doing a separation.”

Regardless, she says upfront communication with the community is critical.

“You’re going to have to go into their houses and onto their lawns. You’re going to be cutting down their prized tree. You can never have too much communication.”

Much of that outreach was done by local community organizations the MDC hired to go out into the neighborhoods to help with distributing flyers and holding public meetings.

“You find a lot of the residents are more comfortable dealing with the people they know, and taking their issue to their community organization. Then the community leaders deal with us directly,” says Nick Salemi, communications administrator for the Metropolitan District.

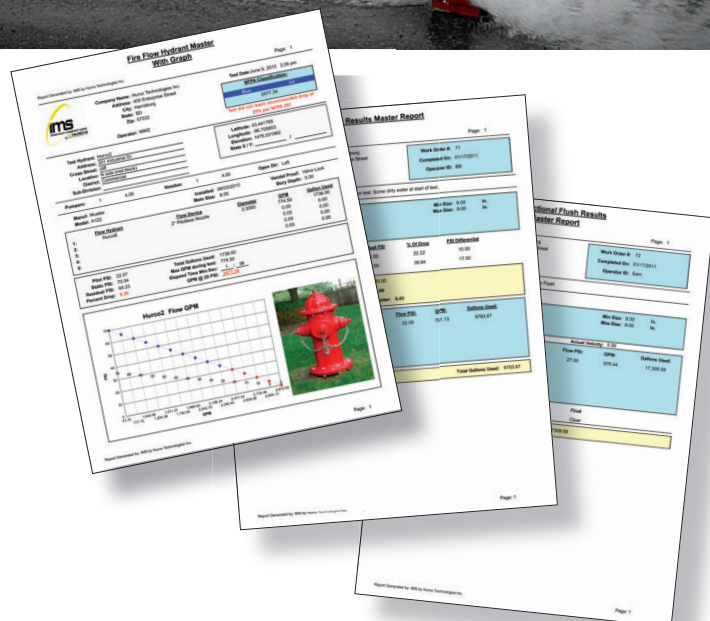
The MDC had a few other tricks up its sleeve to help residents as much as possible. They created traffic alert maps showing closures in real-time and made them accessible on its website. They also established regular “office hours” in neighborhoods where the work was taking place. The maps were so helpful that they remain front and center on the MDC website to let neighbors know how any MDC work will impact their commute.

(continued)



Above: Susan Negrelli, MDC director of engineering, has helped lead the district’s \$2 billion combined sewer overflow mitigation program.

Left: Metropolitan District crew member Greg Spillman lowers the jetter hose from a Vector 2100 down a manhole to clean a sewer line.



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“Every situation has a different solution. You must evaluate all of the ramifications that come along with it.”

Susan Negrelli

Today the field offices are mostly closed, but the Franklin area office is still open and doing community outreach for another big project. Since the MDC was running out of time on the consent order, they halted the separation project, at least temporarily, and started building a storage tunnel. Negrelli says the tunnel project was a once-in-a-career project, but it has been costly.

The MDC also has 16 major interceptors in the combined sewer system receiving flow from trunk sewers, collector sewers and local sewers in Hartford and the surrounding communities. Some of these interceptors date back to the 1860s, with the newest built in 2013.

That interceptor, the Holmstead Avenue Interceptor East, was the most significant project the MDC tackled in Phase 1 of its CWP. It is a mile-long, 5-foot-diameter interceptor pipe, which won the National 2011 Public Works Project of the Year for the first-time use of curved micro-tunneling technology in the United States.

Eliminating inflow

The MDC's overflow problem is not because of enormous population growth. It's because of an I&I problem — a huge I&I problem. Despite the awards, Negrelli is not exactly a fan of interceptors or, for that matter, tunnels and sewer separation.

She explains that member towns don't have adequate storm systems, so while the MDC doesn't have overflow problems during dry weather, high volumes of stormwater enter surrounding sanitary systems during wet-weather events. The fluctuation in flow is drastic. On a dry day, West Hartford sends the MDC about 8 million gallons of wastewater. When the groundwater is high on a wet day, the district will see 69 mgd.

“We need to get the inflow out of the system, then fix our existing pipe networks. We don't want to be building these big pipes,” Negrelli says. “The environmentalists and regulators just want the problem solved the quickest way, and the quickest way is to build a tunnel. It's to build a bigger pipe and collect everything because that'll be easier and quicker.”

The MDC has a better idea.

MDC CLEAN WATER PROJECT

The Metropolitan District's Clean Water Project was created to address a federal consent decree and a Connecticut DEEP consent order to achieve Federal Clean Water Act goals. Designed to control and reduce the overflow of untreated sewage into local waterways, the CWP includes five major components:

The elimination of inflow from private property and infiltration via cracked or broken pipes and laterals, faulty connections and deteriorated manholes.

The separation of Hartford's combined sewer system.

Construction of two storage tunnels: the South Hartford Conveyance and Storage Tunnel (18 feet in diameter and 4 miles long) and the South Storage Tunnel (handling sewage from West Hartford, Newington, and Hartford).

Installation of a mile-long, 5-foot-diameter interceptor pipe.

Critical upgrades to the MDC's Hartford Treatment Plant.



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Funding the effort

With the Clean Water Project, the MDC committed to spending just over \$2 billion to control combined sewer overflows, and in some cases eliminate them. Currently they are only halfway to the goal but have spent approximately \$1.8 billion. Unfortunately, CSOs are not the only issue that MDC has to address under the consent decree.

To pay for all the repairs and renewals, the MDC gets its funding through State Clean Water Fund grants and loans, and from the issuance and sale of bonds.

Negrelli says that they have been lucky thus far as Connecticut has been very generous with its clean water funds.

Unfortunately for the ratepayers, they must help pay back the debt that the MDC incurs. The district collects its sewer fees through an ad valorem system and a Clean Water Project fee is added to customers' water bills based on water usage. That fee is now higher than property owners' water rate.

"It's getting pretty hard to keep raising that Clean Water Project charge every year. We can't maintain this pace of spending that we're doing right now," Negrelli says.

An integrated plan

For that reason, the MDC went back to DEEP and said they needed to create a 40-year integrated plan that would fix the myriad problems with more holistic solutions.

Corey Patterson carries a section of vacuum tube up to the front of the truck.

"It's getting pretty hard to keep raising that Clean Water Project charge every year."

Susan Negrelli

As part of the integrated plan, they want to fix the existing collections network, separate it in certain areas and limit the construction of large interceptors. The plan was submitted to DEEP in December 2018, and while the district is still awaiting final approval, support has been strong.

"We received eight letters of support, and some towns submitted a proclamation supporting our integrated plan," Negrelli says, noting that she hopes it means something to DEEP.

Negrelli is hoping they will get the green light soon and get to work on the new plan, part of which includes CIPP lining and some smaller, tightly focused sewer separation projects.

"We're asking for 40 years now, but we've given them a phased implementation plan showing what we plan to do for the next five to 10 years." ♦

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PAY ATTENTION TO RETENTION

Employees are jumping ship in droves. Here's how to keep them on board

By Ken Wysocky

“You have to make sure they care about the same things the company values.”

Beverly Flaxington

Nearly 3.98 million people quit their jobs in July, which almost topped the monthly record of roughly 3.99 million, set in April. At the same time, the number of job openings in July (the latest reporting period available), vaulted to a record-high 10.9 million, according to statistics from the United States Department of Labor.

Experts theorize that the pandemic-induced shutdowns and quarantines have prompted millions of employees to take stock of their jobs, thoughtfully consider what

work means to them, assess how much their employers value them and ponder their work-life balance.

Clearly, millions of people are finding their jobs and employers deficient in these areas. Luckily for them, there's never been a better time to seek new jobs or careers.

Consequently, it's also never been more important for companies to take steps to retain quality employees.

There are numerous ways to attack this challenge. Here are some thoughts from a variety of experts.

Interview for retention

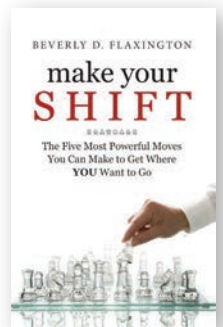
Employee retention should start at the beginning with how you interview job candidates. Beverly Flaxington, the founder and president of The Collaborative, a corporate consulting firm, says too many employers look only at whether job prospects' abilities match the position's requirements.

“But they don't look at who succeeds and who doesn't and figure out why they do or do not,” says Flaxington, the author of *Make Your SHIFT: The Five Most Powerful Moves You Can Make to Get Where YOU Want to Go*. They don't even define the attributes of what success looks like in their organizations.

“In fact, most hiring decisions are based on nothing more than whether or not the manager likes the job candidate,” she continues. “And ‘clicking’ with someone during an interview is usually the worst reason to hire someone.”

Instead, employers first should focus on the job itself: What problem is the position supposed to solve, what would define success in the position and what kind of people succeed and fail in your organization?

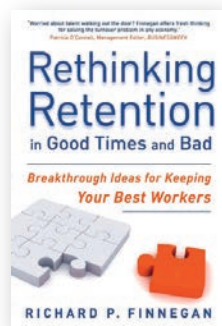
We invite readers to offer ideas for this regular column, designed to help municipal and utility managers deal with day-to-day people issues like motivation, team building, recognition and interpersonal relationships. Feel free to share your secrets for building and maintaining a cohesive, productive 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.



During the interview, interviewers then need to ask behavioral-oriented questions that will actually determine if the job candidate is a good fit for the organization's culture and values. That means asking questions that will reveal how the job candidate thinks — and to which the interviewee will have a hard time faking answers.

(What are your strengths? "I'm very organized and good at meeting deadlines." What are your weaknesses? "Well, my boss tells me I'm too detail-oriented and focus too much on quality.")

"If a candidate's values center around helping people and doing the right thing, and they're interviewing for a job at a company that's most concerned about profitability, the candidate might feel like a fish out of water," Flaxington explains. "You have to make sure they care about the same things the company values."



Stay interviews

Interview shouldn't end when the hiring process is finished. The use of "stay interviews" is a valuable retention tool, says Dick Finnegan, the CEO of C-Suite Analytics, a management consulting firm, and the author of *The Power of Stay Interviews for Engagement and Retention* and *Rethinking Retention in*

Good Times and Bad.

The premise behind stay interviews (not to be confused with performance reviews) is simple: It's better to obtain quality, insightful workplace intel from employees who believe they can benefit from changes, as opposed to exit interviews with disgruntled, soon-to-be ex-employees who no longer care about the organization.

The process is fairly simple, too; managers merely hold structured, one-on-one meetings with their direct reports and learn what they can further do to retain and better engage them.

"Stay interviews work because they're not all about company programs or human resources departments," Finnegan explains. "They put direct supervisors in the solution seat." Supervisors get to ask employees probing questions and then find answers to their problems, such as how to reduce overwhelming workloads, get them the skills they want to learn or allow a flexible work schedule for day care arrangements. They should be held at least once a year roughly six months after a performance review; new employees should receive two — one 30 days after they start work and another one 90 days later.

"It's funny that when managers find out why people quit jobs, they often say, 'If I'd have known that, I could've fixed it,'" he says. "With stay interviews, they get to the things that can be fixed before people quit."

Internal job-hopping

Building a culture of internal job mobility is another way to motivate employees to stay, says Jack Hill, a former vice president at PeopleFluent, a talent management consulting firm.

The concept is simple: Create an organizational mindset in which both employees and managers accept — better yet, even embrace internal job-hopping as a fact of life. And "both" is the operative word here, Hill points out.

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THE HUMAN SIDE

**‘It has to be accepted
by both managers
and employees —
that’s the big trick.’**

Jack Hill

“It has to be accepted by both managers and employees — that’s the big trick,” he says.

Managers in particular must walk the walk, not just talk the talk, to spur cultural change. For example, employees will be reluctant to express a desire for a new internal position if they fear retribution from an unsupportive manager. Moreover, managers also can thwart the change initiative by consistently refusing to let great employees move on to other positions.

Talent acquisition teams also must play a key role by quickly and competently backfilling positions as employees get promoted. Managers need to feel confident about the process — be certain that if they promote a rising star, the void will be filled.

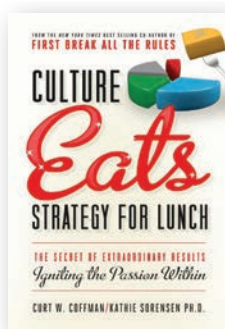
It’s also critical to establish what Hill calls a culture of internal mobility, which requires managers to keep it top-of-mind in the daily cadence of work.

“They have to think every day like they’re selling an idea,” Hill says. He also recommends that internal mobility become a part of the annual job review process; managers should talk about their career development within the organization.

Another critical component is a solid feedback loop in which employees who don’t get new jobs they apply for receive a thorough explanation and some coaching.

Recognize good work

Employee recognition programs also can bolster retention efforts. But to maximize their impact, rewards should be tailored to individual employees in order to



make them feel purposeful, important and significant, says Kathie Sorensen, co-owner of the Coffman Organization and co-author of *Culture Eats Strategy for Lunch: The Secret of Extraordinary Results*.

“I like recognition programs that are flexible enough and adaptable enough that the local manager can use them in a way that fits each person — gives them a lot of different ways to recognize people,” she says.

But managers also need to get to know their employees well enough to develop

insights into what they find valuable. For example, a good manager would never “reward” a harried, time-pressed worker with four children by taking them on a business trip, Sorensen notes.

As another example, she cites a well-known retailer that rewarded sales associates who logged the most customer applications for store credit cards. At the same time, it overlooked employees with great customer service skills, but who didn’t feel comfortable urging customers to sign up for credit cards.

“If you want to recognize employees in that environment, recognize that they earn great customer service scores,” Sorensen says. “But don’t rate them on how many credit cards they get people to sign up for. Again, you need to value those employees for the things they believe are worthwhile.

“It’s not rocket science,” she adds. “You only get a return on your [recognition program] investment if you pay attention to the things that help you leverage the energy of people.” ♦

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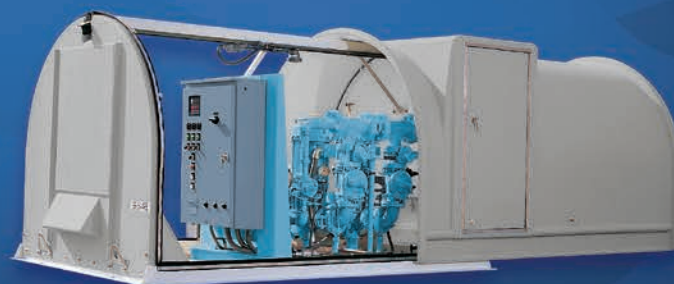
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IMPROVING HYDROEXCAVATION

Soil Surgeon was born from a need for a better tool and continues to serve that mission

By Kim Peterson

Like so many inventions, the Soil Surgeon was created out of the need to do a job more efficiently. In this case, the job was locating and exposing pipelines — but Belinda Bain wanted to do it more easily, quickly and safely.

Bain started her first company, California Hazardous Services, out of her garage when she was 23. Nicknamed CalHaz, the company started out cleaning fuel tanks. It grew into testing, repairing and cleaning all parts of fuel tanks and their systems, and further evolved into other work, like cleaning storm drains. Taking on more municipal cleaning and hydroexcavation work gave Bain the idea to create the Soil Surgeon, in order to streamline those jobs and make them more profitable.

Municipal Sewer & Water recently spoke with owner Belinda Bain about creating the Soil Surgeon, its versatility and how it speeds up hydroexcavation work.



“It knocks off so much time on any job — hours, and sometimes days on big projects.”

Belinda Bain

MSW: Tell us a little about the history of Soil Surgeon.

Bain: Soil Surgeon came about when CalHaz had gotten a project where we had to remove six city blocks of pipe. In those days, hydroexcavating was done the old way, with a water gun. You would pound the tube on the ground. Some people still cut or dig that way. I kept thinking, if there were jets boring inward on this tube and some jets boring outward on the bottom of this ring, then I could keep digging downward and suck up the dirt.

So we went back to my warehouse and built a water ring with jets boring inward to cut the soil and outward to bring the tube down. I was losing money on that job but then we brought out this new water ring and it sped up the job so much, we made a profit on it.

When it worked so well, I patented the Soil Surgeon and started marketing it to trucking distributors and companies that sell sewer combination trucks. I've been selling it now for 25 years.

MSW: What differentiates your excavating attachment from the competition?

Bain: There were other little water rings out there, where the tips bore straight down, that I found out about later. But none of them worked for

me. There was a water ring you put inside the tube and that doesn't work as well because that's how the suction sucks up the dirt — it would just get clogged. The one I designed is outside the tube, which allows it to bore inward and outward. That's the biggest thing.

The Soil Surgeon has handles — you grab hold of those handles and you just rock it back and forth after you have located your line, or in little circles in front of you, depending on how you're digging.

The water pipe is connected to the tube. We've got bumpers on the bottom of the tube to protect the lines and the tips. But you'll see a line 2 feet before you can get to it. It bores straight down. When you're line locating, looking at blueprints, it's not always completely accurate. So sometimes it takes a few bores to find it. But you can easily do that with this tool. And then the pipeline guys love it because when you locate a line, you can rock it back and forth and that clears out the soil underneath the pipe too, and then they can do the repair.

MSW: What sort of needs do they address? Break down the Soil Surgeon X1 and X2 and what applications they best serve.

Bain: It allows you to do so many things. It knocks off so much time on any job — hours, and sometimes days on big projects.

The X1 is designed for digging, boring straight down. All the tips go inward and outward to dig. So this is best for digging a hole, line locating, etc.

The X2 is designed more for basin cleaning or storm drains. Because of all the cigarette butts and other trash, they started putting filters on storm drains here in California. To clean out the filters and the storm drains, you had to have certification for confined-space entry. So what's nice about the X2 is you don't need to go into the storm drain anymore. The X2 water ring has tips boring downward, outward to clean the walls of the storm drain and upward so it cleans the sides and top and cleans the filters too. And then you just vacuum it out.

MSW: What are some recommendations for customers shopping for hydroexcavation equipment? What trucks are compatible with the Soil Surgeon?

Bain: When I designed the Soil Surgeon, hydroexcavation wasn't as well known. Now we have hydroexcavation trucks. But whether you have a hydroexcavation truck or you have a sewer combination truck, you can

THE SUPPLY SIDE

NAME:
Belinda Bain

JOB TITLE:
Owner

**YEARS IN THE
INDUSTRY:**
25

YEARS WITH COMPANY:
25



“As long as you have those three things, you can hydroexcavate. You don’t need a million-dollar truck.”

Belinda Bain



hydroexcavate or basin clean with any truck with the Soil Surgeon. It can open up so much more work for them, being able to dig like this. It’s so much safer and faster. Traditional excavating is so risky now, when lines aren’t always where they say they are.

The Soil Surgeon will fit on anything that has an 8-inch boom (I also have 6-inch tubes) and has a water tank, debris tank and a boom. As long as you have those three things, you can hydroexcavate. You don’t need a million-dollar truck.

MSW: Is there any special training needed, or tips for operating the Soil Surgeon?

Bain: If someone is trained to run these trucks, they can use the Soil Surgeon.

The tips are stainless steel, designed and fabricated specifically for the Soil Surgeon. We always warn customers when they’re buying it for the first time, because people want to pound the edge of it on the ground because that’s what they’re used to doing. We say, let the Soil Surgeon cut for you. Keep moving it in either a circle or back and forth and let the water cut for you.

If you use it every day, it’ll last you a good four to five years — if you use it correctly and don’t pound it on the ground. But if they do, we sell the tips. But we tell our guys, don’t be lazy. Pull the boom up to connect the tube so you’re not dragging it. Even though they’re stainless steel, if you drag the Soil Surgeon or pound it on the ground sooner or later you’ll have to replace those tips.

People will get the feel of it. The first thing we tell people to do if they haven’t had a Soil Surgeon before is get out and play with it. Get the guys out to play with it in the yard, pop a couple holes so you can get the feel for it.

Another beautiful thing about it is you control the power. You have complete control with your truck. So for us, when we’re locating a line, we’ll go soft into the soil so it’s not spitting up rocks and then when we’re down a couple inches we can bore down with the water, until at about 4 feet and then we back off on the water a bit until we find the line.

MSW: How do you see the sewer system maintenance evolving?

Bain: Storm drains are becoming more predominant around the country — California especially, being near the ocean. People are becoming more aware of keeping our environment clean, and the Soil Surgeon can play a role in that.

MSW: What can customers expect out of Soil Surgeon in the future?

Bain: I’ve had people say you should add gears, or this or that. But I don’t want any moving parts, because then you have oil. The Soil Surgeon has worked for 25 years, so I don’t see changing it. We did bring out the X2 a few years ago, so that market where you’d have to enter a confined space otherwise is definitely something I see growing. As we see more and more regulations, I think the X2 will become more popular.

MSW: What do you want your customers to think of when they hear the name Soil Surgeon?

Bain: The most powerful excavating tool. It’s safer and so fast — the best way to hydroexcavate. ♦

MANAGING THE FLOW

Lima's integrated planning approach helps reduce CSOs and protect the Ottawa River

By Asad Choudry

The city of Lima, Ohio, agreed to construct a 13 million-gallon CSO storage tank as part of a 2014 consent decree with the EPA. The project, which cost nearly \$40 million, was part of \$147 million in overall improvements required by the consent decree. (Images Courtesy of Xylem, Inc.)



The city of Lima, Ohio, struggled with combined sewer overflow issues for decades. Something had to change.

Of the city's 251 miles of sewer lines, roughly 130 miles are combined storm and sanitary sewers. Lima's 90-year-old wastewater treatment plant serves more than 40,000 people within city limits and surrounding communities, and treated wastewater is released into the Ottawa River. But during heavy rain events, the collection system also allows untreated overflows to discharge into the river.

Over the years, the city sought various solutions to the ongoing challenges with CSOs. In the mid-1970s, Lima made its first serious attempt at solving the CSO problem by installing a large sewer interceptor pipeline and five CSO control structures along the Ottawa River. The combined storm and sewer flow in the interceptor and the five CSO control structures are controlled by a sophisticated real-time flow control system.

Then, in 2002, the city installed raked bar screens on the five CSO control structures along the Ottawa River. Raked bar screens are designed to keep stormwater debris in the wastewater channel where it continues on to the treatment plant for removal and

During heavy rain events, wastewater and stormwater flowed untreated into the Ottawa River.

disposal. This created more capacity in control structures and helped prevent accidental discharge into the river.

Despite these improvements, the city continued to experience overflows. During heavy rain events, wastewater and stormwater flowed untreated into the Ottawa River. The CSOs threatened public health and caused damage to the aquatic environment.

Overcoming obstacles

As a result, in 2014, the City of Lima and the U.S. Environmental Protection Agency finalized negotiations for a consent decree to implement the improvements recommended under the city's integrated plan to control CSOs and sanitary sewer overflows.

The consent decree required the city to more than double wastewater treatment capacity — from 30 million gallons per day to 70 mgd. The EPA also mandated the city to get down to no more than five

The tank, located more than 45 feet underground, required digging through 17 feet of rock to reach the proper depth. It was designed to eliminate the need for confined-space entry during maintenance.



PROJECT:
Lima, Ohio.

FOUNDED:
1931

POPULATION SERVED:
40,000

AREA SERVED:
251 square miles

INFRASTRUCTURE:
130 miles of combined sewer and sanitary lines



The city engaged engineering consulting firm Stantec to design the solution for its CSO reduction goals. Peterson Construction served as the general contractor on the storage tank project, which includes a flushing gate and odor control system.

The tank, located more than 45 feet underground, required digging through 17 feet of rock to reach the proper depth.

overflows in a typical year of rainfall. The city has between 25 and 45 rains heavy enough to trigger overflows in a typical year.

Consequently, the city agreed to construct a 13-million-gallon CSO storage tank, separate sanitary sewer overflow abatement improvements and upgrades to the wastewater treatment plant. The CSO project, which cost nearly \$40 million, was part of \$147 million in overall improvements required by the consent decree — the largest in the utility department's history.

Integrated planning

Following the consent decree, Lima used integrated planning to determine a comprehensive approach to reduce the number of CSOs. They used this holistic approach to look at the entire collections system and the

wastewater treatment plant, determining what capital improvements could be implemented to achieve the EPA's established goals. Integrated planning also allowed Lima to consider financial feasibility to complete the upgrades and stretched the mandated projects out through 2038.

The city engaged engineering consulting firm Stantec to design the solution for its CSO reduction goals. Peterson Construction served as the general contractor on the project, and Woolace Electric installed all of the electrical components.

By having a large basin to collect excess overflow, discharges in the river can be prevented, with collected overflow pumped to the wastewater treatment plant for treatment prior to release into the river. The tank, located more than 45 feet underground, required digging through 17 feet of rock to reach the proper depth.

The CSO tank stores flow from the collections system for treatment following wet weather events. Situated near an existing CSO outfall, the offline storage tank accepts flow by gravity.

Once water levels have reduced and capacity has returned within the collections system, the tank is dewatered via submersible pumps at a rate of up to 30 mgd. Flow is then pumped to the sewer system for treatment at the city's wastewater treatment center. The tank is constructed of 3- to 4-foot-thick concrete walls and includes a flushing gate and odor control system. The project also called for a diversion structure, utility pipe bridge crossing and underground gate structure improvements for improved flow management and control of CSOs.

Built adjacent to Simmons Field, where the collegiate summer league Lima Locos play, the massive 13-million-gallon tank measures 200 feet wide by 400 feet long and 45 feet deep. More

than 75,000 cubic yards of rock was excavated and hauled off site, according to Utilities Director Michael Caprella. More than 35,000 cubic yards of concrete was poured to construct the holding tank.

Flygt distributor Buckeye Pumps equipped the pump station with three Flygt NP3531 20-inch units, each with 130 hp closed-loop cooled motors. A connecting pipe that runs over the Ottawa River on a utility pipe bridge helps transfer water into the 54-inch sewer line that feeds into the WWTP when crews dewater the underground CSO basin.

Installed at a depth of 55 feet, the pumps provide several value-added features aside from the 30 mgd pumping capacity. Those include sustained efficiency, self-cleaning hydraulics and durability with the high



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chrome impellers. The Flygt deep lift mechanism does not require a permanently attached lifting chain or cable to the pump. This added feature helps simplify installation and maintenance when needed, eliminating any need for personnel to enter the wet well.

CSOs today

Completed in the fall of 2020, the project was nine months ahead of schedule and under budget. Upon completion of the overflow tank, the site reverted to a green space, which will be used for recreational purposes.

Since going online, the new pump station and CSO tank have helped protect the community and environment by significantly reducing combined sewer overflows to the Ottawa River.

Lima expects to see the number of CSOs continue to drop as engineers continue to optimize the set points for the CSO storage tank, along with the plant upgrades. The next step in moving forward with the consent decree requirements will be eliminating san-

itary sewer overflows during heavy rain events at seven different locations, all at pump stations.

The city is currently evaluating methods to reduce flows to these pump stations to reduce the scale of the pumping, and flow equalization improvements. ♦

The massive 13 million-gallon tank measures 200 feet wide by 400 feet long and 45 feet deep, with three Flygt NP3531 20-inch pumps installed at a depth of 55 feet.



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THREE FACTORS FOR NOZZLE SELECTION

Effective sewer cleaning begins with understanding how to choose the right nozzle for the job

By Kent Carlson

The nozzle you select makes a big impact during sewer cleaning. Specifically, the selection of cleaning nozzles is a critical element of hydro-flushing.

In the last two decades, advancements in nozzle jets have changed the performance criteria for sewer nozzles. Jets now are far more efficient in delivering more thrust when set at a higher angle to the axis of the pipe. The old-school requirement for lower jetting angles to speed progress has gone out with the debris.

With that said, nozzle selection with higher jet angles and larger orifice jets can be obtained with the ability to still clean efficiently at a rate of 10-20 feet per minute. This cleaning speed can be achieved while reaching the goal of restoring a line to 95% of operational capacity.

To reduce sanitary sewer overflows and the frequency of cleaning required, a sewer pipe should be cleaned to a minimum 95% of its operational capacity (measured at the pipe's internal diameter). To accomplish this, the selection of a sewer cleaning nozzle (rotational, static or specialized) must be based on three important factors:

1. Angle of the jet from the axis of the pipe.*

Jet Angle	Primary Use
6-15 degrees	Designed for thrust, propelling a nozzle up the line and moving debris. This is generally insufficient to achieve the operational capacity target.
16-20 degrees	Propels the nozzles and moves debris, but only delivers marginal cleaning effectiveness.
21-29 degrees	Balances thrust to impact force cleaning ratio.
30-45 degrees	Adequate for cleaning pipe walls; however, the thrust is marginal.
46-90 degrees	Excellent for removing calcium, roots, calcified grease and other obstructions, but minimal thrust is provided.

2. The quality of the jet and cohesive stream flow.*

High-quality jets or inserts have a cohesive jet stream. Cohesive jet streams travel farther through the air before breaking into droplets and their streams carry energy for a longer distance. A non-cohesive stream can be caused by drilled jets and low-quality inserts.

As maintenance and operations professionals consider nozzle options, they should also not be overly reliant on the tier rating system.

3. The ability of the nozzle to deliver the proper gpm and psi to the pipe.*

Larger jets hit harder and last longer. Whether it's a rotational or static jet nozzle, a low number of larger orifice jet inserts will ensure greater force and cleaning strength across the pipe circumference. A higher number of inserts with smaller orifices will enable more

spreading of the water while the impact force is weaker across the circumference of the pipe.

** Consult pipe manufacturers' specifications for cleaning methods including jetting angles, gpm, psi and stationary position limitations.*

Proper adherence to engineering, installation and maintenance standards is important to realize the best, long-term service from any pipe. As an example, the longest warranty in the sanitary sewer pipe industry is offered by vitrified clay pipe, which carries a 100-year warranty. Keeping the pipelines clean over the entire life cycle is critical to maintaining operational capacity, eliminating inflow and infiltration, and preventing SSOs.

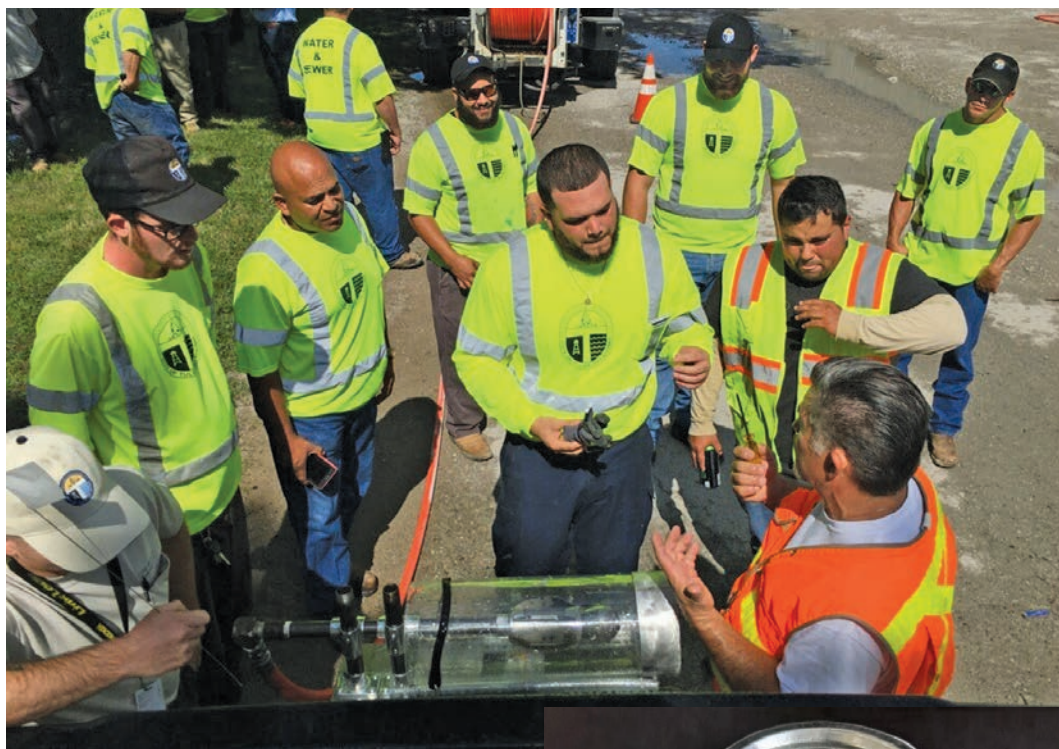
The maintenance of a sewer is not only an integral part of its operations, it is also the most impactful factor in the longevity of the sewer after it is properly installed. Many cities employing a robust cleaning program have operational vitrified clay pipe sewers that are well over 100 years old.

As maintenance and operations professionals consider nozzle options, they should also not be overly reliant on the tier rating system. This system rates a nozzle 1, 2 or 3 (with 3 being the top tier). A common misconception in the sewer world is that this system is based on the "cleaning effectiveness" of a nozzle.

Keep in mind that "cleaning effectiveness" is based on what the water streams do after they leave the nozzle. The meaning of "clean" in the sanitary sewer world is to remove something unwanted.

A recent industry poll asked the question: *What determines whether a sewer nozzle is considered a Tier 1, 2 or 3?* It was a multiple-choice survey with four possible answers. The survey respondents' answers had the following distribution:

- Cost of the nozzle: 2%
- The type of nozzle: 19%
- Nozzle's cleaning effectiveness: 31%
- None of the above: 48%



An NCPI field training session in Tulsa, Oklahoma, demonstrates aggressive cleaning techniques to reduce SSOs.

A surprising 31% of respondents believe that the tier rating system represents the “nozzle’s cleaning effectiveness” and 19% believe that it represents “the type of nozzle.” Less than half selected the appropriate answer: “None of the above.” This distribution is just one demonstration of how common misconceptions are regarding this rating system.

The system’s main rating criteria is based on the flow of water *through* the nozzle coupled with the internal and external design of the nozzle and not by the cleaning effectiveness of the nozzle at the pipe wall. The most efficient flow of water through the nozzle garners a higher rating. In this system, the flow of the water through the nozzle is important, but the jet and orifice designs deliver the water stream to the inside of the pipe wall.

Because of the internal and external design criteria of the tier rating system, rotating nozzles, sewer floor nozzles, stoppage nozzles and hydro-mechanical tools are not rated by this system.

The tier system also quantifies a nozzle’s cleaning based on footage cleaned (speed) but not the resulting cleanliness and restored operational capacity (effectiveness).

Most sewer cleaning crews utilize several types of nozzles to handle a range of issues found while cleaning. Selection of these nozzles requires researching different nozzle manufacturers and their designs while understanding the limitations dictated by the pipe material and condition. Refer to the information that should be provided by



Jet angles, orifice size and cohesive flow play an important role in nozzle efficiency. (Photos courtesy of NCPI)



The ultimate test is if it performs to the user’s standards.

the pipe manufacturers to ensure a clear understanding of these limitations.

The National Clay Pipe Institute recommends benchmarking nozzles through actual cleaning processes to assess how the nozzle operates within a given system, under pressure. The ultimate test is if it performs to the user’s standards. NCPI offers a training workshop that includes a review of best practices for maintenance and proper VCP cleaning techniques. This particular workshop is built on my more than 30 years’ experience in the Wastewater Collection System for the City of Los Angeles and 40 years of designing and manufacturing nozzles. This maintenance workshop qualifies for professional development hours and can include an evaluation of a municipality’s cleaning program.

Always remember that a \$500,000 sewer truck is only as good as the cleaning effectiveness of the nozzle at the end of its hose and how that system, in combination, delivers to the inside of the pipe wall. ♦

About the Author

Kent Carlson is vice president of the National Clay Pipe Institute (www.ncpi.org). Before joining NCPI, he served as the operations manager for the City of Los Angeles Wastewater Collection Systems Division.

PUTTING FLIGHT IN THE FIGHT

NASSCO gears up to discuss funding needs for underground infrastructure

By Sheila Joy

NASSCO represents every segment of the underground infrastructure industry, from the system owners to the contractors who keep our communities safe and healthy through the proper assessment, maintenance and repair of water and wastewater systems.

Our responsibility is to speak on behalf of our industry to ensure communities — especially underserved communities — get the funding they need and manage assets properly to eliminate system failures.

NASSCO's Government Relations Committee is a dynamic group that is gaining traction in Washington D.C., to build awareness and ensure infrastructure funding includes what is unseen: our crumbling water and wastewater systems. NASSCO's D.C. Fly-In events are a pivotal way to make this happen. For the past three years, NASSCO members have come together either in person or virtually to share the need to fund underground infrastructure with government leaders in Washington, D.C. Paired with congressional representatives from their home states, NASSCO members are armed with everything they need to communicate NASSCO's key policy recommendations:

1. Increase funding for water and sewer pipeline infrastructure

- Expand funding available through federal programs to increase funding to assess, rehabilitate and replace wastewater and stormwater collections systems.
- The Government Accountability Office should complete a report to Congress analyzing the state of sewer collections infrastructure and the national need for its maintenance and repair.

2. Strengthen asset management requirements and funding

- Provide federal technical and grant assistance to communities that lack the financial and technical resources to develop comprehensive asset management plans.
- Require that asset management plans be in place for sanitary and/or storm sewer systems for all applications to federally subsidized grants and loans.
- Require that certified inspectors perform inspections of drinking water, wastewater and stormwater collection and conveyance systems, and that

a standardized identification and assessment method be used to assess pipe conditions.

3. Maintain regulatory compliance enforcement

- Full funding annually to federal programs and offices that directly and indirectly ensure that the Clean Water Act and National Pollution Discharge Elimination System permits remain in full regulatory compliance.

Why are NASSCO's policy recommendations important?

- There are an estimated 19,700 wastewater pipe systems, comprising approximately 800,000 miles of sewer pipe.
- Over 75% of all Americans rely upon well-built and maintained wastewater and stormwater collections and conveyance systems.
- A vast majority of the nation's sewer pipes were installed in the years just following World War II, which means they are at or beyond their design life. (A typical design life is approximately 50 years.)
- Increased volume and changes in population have placed a greater demand on these systems, which have not proportionally benefited from the increased federal and state funding available for treatment works following passage of the Clean Water Act in 1971.
- The Environmental Protection Agency estimates that at least 23,000 and up to 75,000 sanitary sewer overflow events occur in the United States each year due to structural failure, blockages and overflows.
- Diminishing of the wastewater collection and conveyance system impacts public health, the environment and the success of businesses large and small across America.

While the national needs for repairing and upgrading our wastewater and stormwater infrastructure are significant and will require broad and substantial policy and funding solutions, NASSCO's policy recommendations are making meaningful headway towards improving the nation's wastewater and stormwater collections and conveyance networks.

Please join us for the 2021 NASSCO D.C. Fly-In scheduled for the weeks of Dec. 6 and 13. If you're not yet a NASSCO member, please join us by visiting nassco.org/join and get involved. ♦



NASSCO

NASSCO is located at 5285 Westview Drive, Suite #202, Frederick, MD 21703; 410-442-7473; www.nassco.org

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

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OTHER CLASSES FORMING

Contact NASSCO if you are interested in having a class at your facility or in your area.

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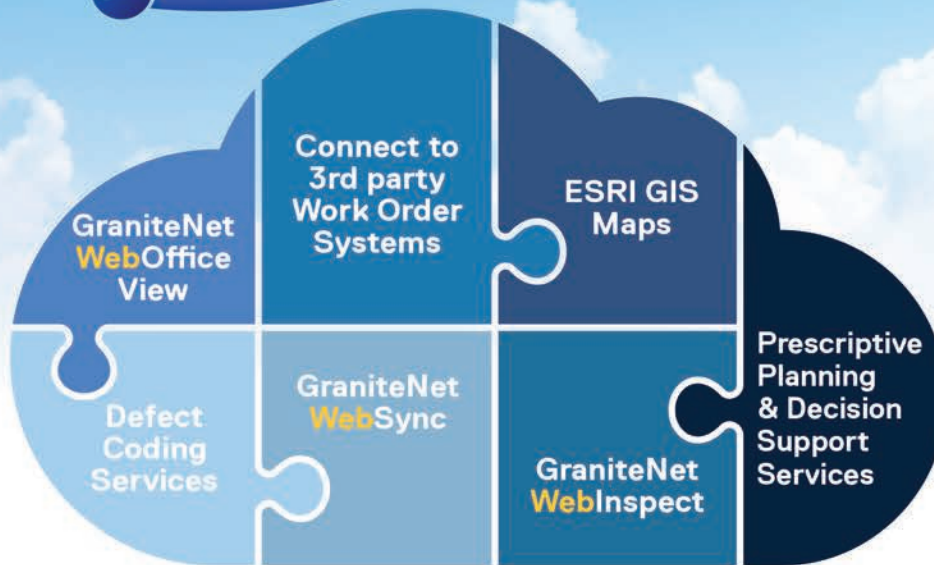
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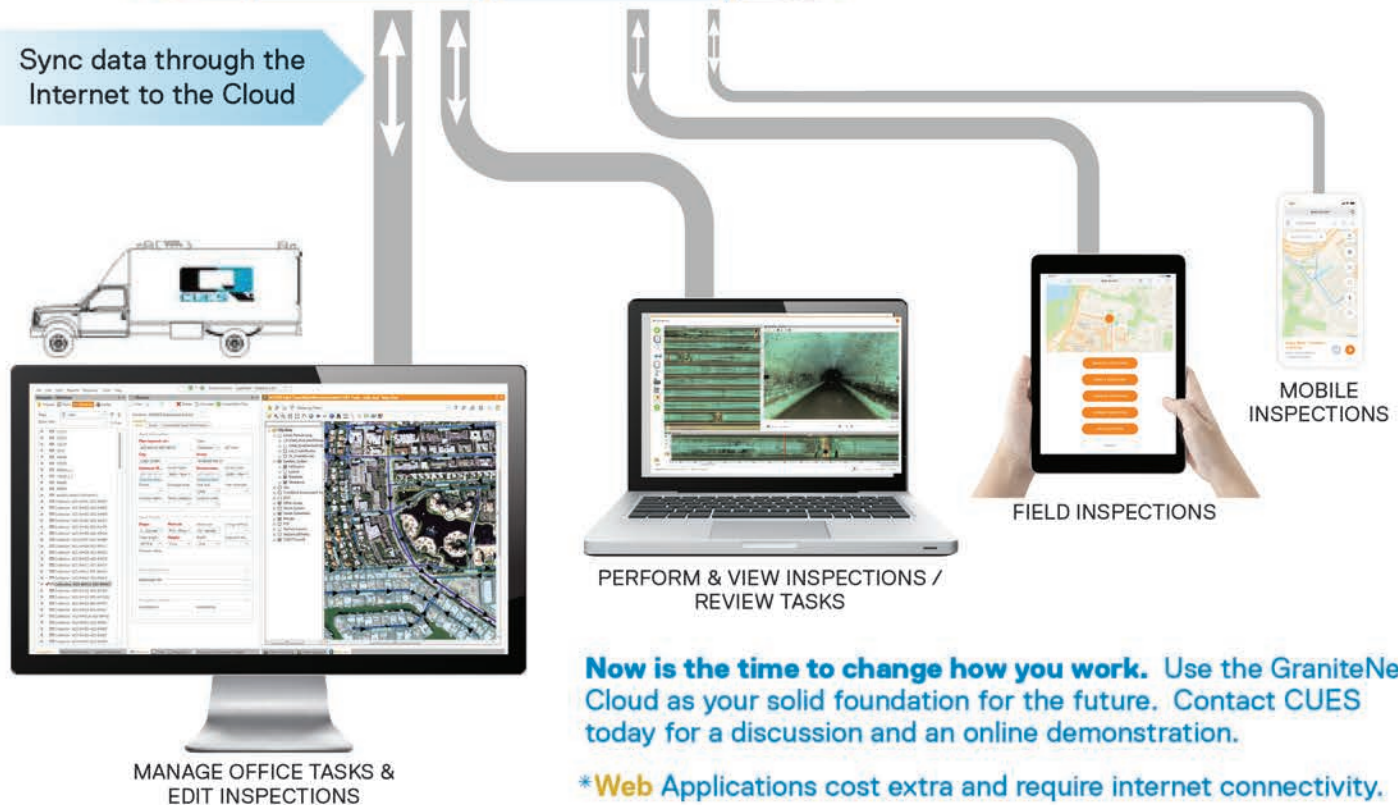
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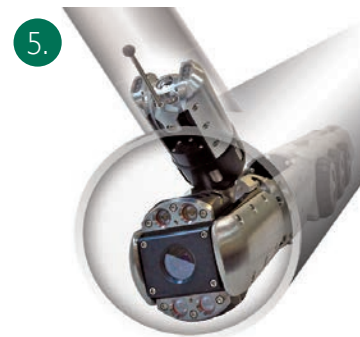
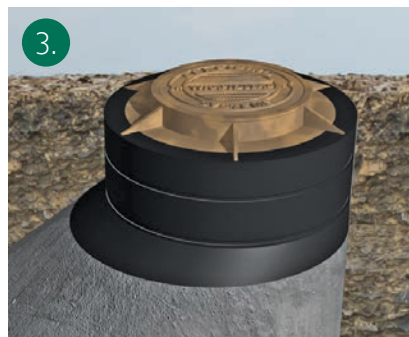
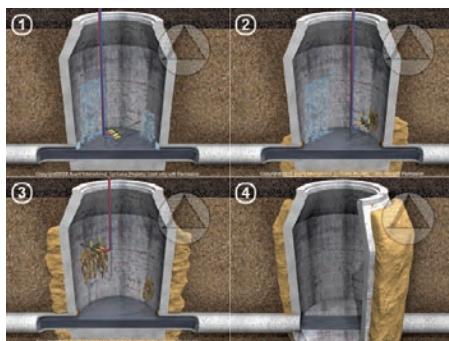
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STORMWATER MANAGEMENT

By Craig Mandli



2.



COLLECTION SYSTEM

1. RELINER/Duran Modular Manhole Invert Channel System

RELINER/Duran Modular Manhole Invert Channel Systems use molded fiberglass flumes with smooth sewer pipe interfaces to rehabilitate inverts without flow interruption. The field-installed modular components bolt together inside the manhole and serve as the form for a new concrete bench. They eliminate the inconsistencies associated with field-formed concrete channels. The full-depth lined channels are high-flow and easy to clean and maintain. Standard 8- and 12-inch-depth channel sections fit through a 24-inch manhole frame and will accommodate 6- through 12-inch pipes. Larger sizes are available. Parts are selected based on the unique configuration of each manhole. **800-508-6001; www.reliner.com**

I&I DETECTION/PREVENTION

2. Avanti International injection grouts

Infiltration enters underground systems every day through defects or faulty joints in manholes, causing system capacity issues, overload at treatment plants and possible injury to the community. **Avanti International** injection grouts have historically proven to be an economic and long-term solution to combatting infiltration entering all areas of a collections system, including manholes. Injection grouts are engineered to stop leaks, stabilize soil and control groundwater, and can be used in pre-cast barrel joints, brick and concrete masonry units, pipe penetrations, vertical or horizontal cracks, void fill and pinholes. Each technique enables the technician to stop several leaks at once and helps to extend the life of the structure. **800-877-2570; www.avantigrout.com**

3. CCI Piping Systems WrapidSeal Manhole Encapsulation System

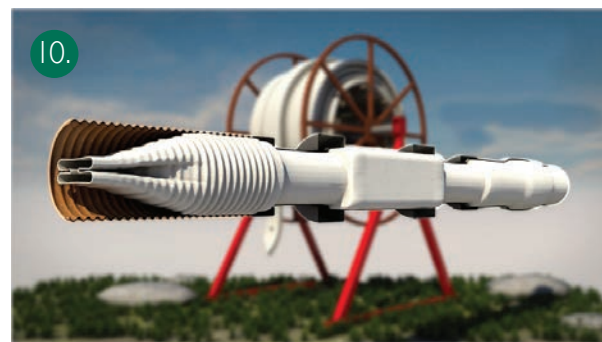
The **WrapidSeal Manhole Encapsulation System** from **CCI Piping Systems** consists of an engineered primer and a wraparound, heat-shrinkable sleeve designed to seal joints and prevent groundwater from entering a collections system. This material has a high-shrink membrane (70% stretch and 40% recovery) designed to shrink around any manhole profile. In addition, the high-tensile strength accommodates structural movement, while the tough backing resists soil stress and provides suitable abrasion resistance. It can be used for new construction or for the rehabilitation of existing manholes to control infiltration through joints and prevent deterioration, thus eliminating costly maintenance repairs and the added expense of treating groundwater. **800-867-2772; www.wrapidseal.com**

4. Cretex Specialty Products Internal Chimney Seal

Cretex Specialty Products Internal Chimney Seals are mechanical, so there is no need to worry about surface adhesion or stopping active leaks prior to installation. The seals eliminate and prevent manhole chimney inflow. During wet weather, clear water enters the manhole through deteriorated and broken chimney joints, which may burden the collections system. The chimney seal has a 50-year design life and is available in four widths, allowing complete chimney coverage up to 24 vertical inches with a single seal. **800-345-3764; www.cretexseals.com**

5. CUES LAMP II

The **CUES LAMP II** (Lateral and Mainline Probe II) can assist in locating buried assets and helping prevent potential crossbore risks. It is an inspection tool for identifying infiltration and inflow, potential crossbores,



pipe defects, and structural conditions in lateral services and mainlines. When used with the optional Mini or Micro Pan & Tilt Cameras, it can inspect lateral services and traverse multiple bends and wyes when deployed with or against the flow. Mainline inspection is accomplished with a pan, tilt and 40-1 zoom camera. It can pull 1,000 feet of video cable, reducing traffic control expenses while increasing production, and launch 150 feet or more into the lateral. The Mini Pan & Tilt Camera includes a detachable steering wand, self-leveling camera head, built-in lens wiper, 360-degrees pan and tilt, four banks of LEDs with variable light intensity, and a built-in sonde with switchable frequencies. **800-327-7791; www.cuesinc.com**

6. EnviroSight ROVER X

The **ROVER X** from **EnviroSight** lets an operator control inspections, view and record digital video, identify sources of I&I, log observations, generate reports and link directly to asset management software. All these capabilities are packed into a simple three-piece layout, with no CCU or other components to clutter the workspace. Twelve wheel options — plus camera lift, carriage and illumination accessories — mean it transforms in seconds to inspect lines from 4 to 96 inches. It can identify illicit connections, roots, cracks and corrosion with 145-degree tilt, 12X digital zoom and add-on side-scanning, laser profiling and lateral launch. Its six-wheel drive with proportional steering navigates past obstacles, and overlapping wheels climb offsets with ease. Powerful motors and a geared drivetrain maximize travel range. It is built on an expandable digital backbone, and future capabilities are limitless, as its firmware updates automatically to the latest features. **866-838-3763; www.envirosight.com**

7. Sauereisen Manhole ChimneySeal No. F-88

Manhole ChimneySeal No. F-88 from **Sauereisen** is an elastomeric lining composed of fiber-reinforced, asphalt-modified urethane. It is self-priming with water absorption of 0.05%. Applied by gloved hand at 1/8-inch minimum thickness, it provides a flexible barrier or gasket seal for the prevention of water infiltration. It resists the stresses and movement associated with freeze/thaw environments while maintaining ideal elasticity/adhesion over temperature ranges from negative 30 to 250 degrees F. **412-963-0303; www.sauereisen.com**

8. Sealing Systems Flex-Seal 2.0

Flex-Seal 2.0 all-purpose sealant from **Sealing Systems** adheres to many surfaces and has over 800% elongation. It is designed to prevent inflow/infiltration and to provide corrosion protection at the grade adjustment ring section or joint section of manholes and catch basins. It is 100% safe and Prop 65 compliant. The internal seal is manually applied using a paint brush and the kit is designed to cover 12 vertical inches on a 27-inch manhole. **800-478-2054; www.ssisealingsystems.com**

9. Superior Signal smoke generator

Smoke generators from **Superior Signal** locate sources of surface inflow resulting in wet-weather sanitary sewer overflows. A fast, inexpensive and easy way to find leaks and faults in collections systems, smoke candles provide visible smoke to detect more faults at longer distances and come in sizes to meet any need. Smoke candles, blowers and fluid systems for smoke testing are available. **800-945-8378; www.superiorsignal.com**

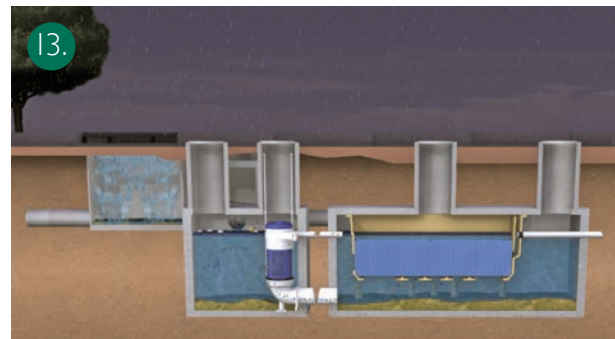
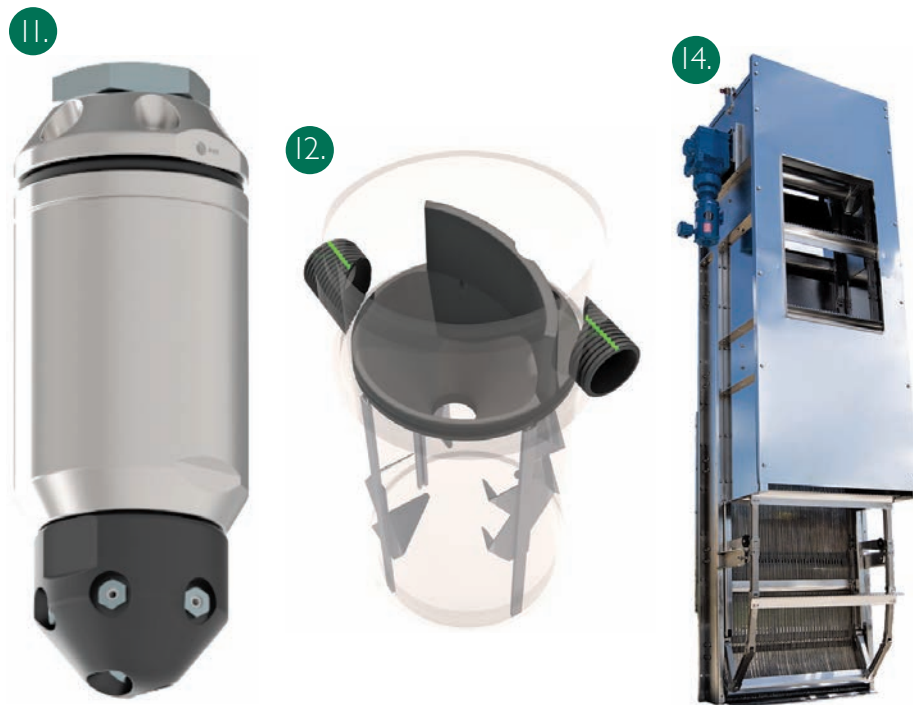
10. Warrior Trenchless Solutions Thermoform

Thermoform from **Warrior Trenchless Solutions** is a PVC-alloy structural pipe lining system designed for the trenchless rehabilitation of failing sewer and culvert pipes. It is an environmentally friendly, styrene-free thermoplastic. There are no harmful emissions, and it does not rely on any chemical reaction during installation. Factory-controlled production with rigorous material testing ensures a consistent quality product that conforms to and exceeds the expected standards. The material is highly flexible, allowing it to expand and fit tightly to the host pipe, including changes in shape and dimensions. It is produced in sizes ranging from 4 to 36 inches in diameter, and the wall thickness can be varied according to the application. All

(continued)

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LIFT STATION/WET WELL

11. Enz USA Bulldog Manhole Nozzle

The **Bulldog Manhole Nozzle** from **Enz USA** was designed to clean lift stations and vertical pipes. Using a high-pressure surface cleaning gun to remove hardened grease and debris that accumulates on lift station walls is a messy job. Removing the debris and disposing of it adds additional time and effort. This nozzle eliminates the disposal process by emulsifying the grease, allowing operators to pump the resulting wastewater to a sewage treatment plant. A job that could take hours to do can now be done in 20 or 30 minutes. Additional advantages of this nozzle include no water loss from leaks, and no required maintenance. **888-369-8721; www.enz.com**

PRETREATMENT

12. Advanced Drainage Systems BaySaver Technologies Barracuda S4

The **Baysaver Technologies Barracuda S4**, a high-performance hydrodynamic separator from **Advanced Drainage Systems**, removes sediment and other debris from stormwater runoff, further protecting water resources. It is designed with internal teeth that mitigate turbulence in the storage chamber to prevent re-suspension of captured contaminants. It is designed to be used in a single manhole configuration and offers multiple pipe configurations, flexible inlet/outlet positioning, quick installation, easy inspection and maintenance. **800-821-6710; www.adspipe.com**

13. BioMicrobics BioSTORM

The pre-engineered **BioSTORM** stormwater treatment system from **BioMicrobics** effectively filters and captures more than 90% of the common pollutants, such as trash, oils, sediment and other suspended solids that would otherwise end up in the combined sewer overflows, waterways or receiving environment in flows from 0.5 to 10 ft³/s. Used for primary and secondary applications, the versatility of the off-line, two-phase design consists of a StormTEE deflector screen to physically separate trash (cigarette

butts, etc.) and large debris, and a fixed-film media that acts to separate liquids from solids, and oil from water. They can be used together to form a complete system or separately for different sustainable site applications. The system allows for design flexibility and mounts easily in local precast tanks with minimal maintenance. **800-753-3278; www.biomicrobics.com**

14. Duperon FlexRake IQ

The **Duperon FlexRake IQ** platform provides real-time smart screening for maximum resilience at the headworks. It tackles high peaking factors due to extreme weather and difficult debris like flushable wipes, first flushes and settled solids. This is accomplished by system improvements and a sequence of operations that automatically responds in real time to optimize the screen field. The reimagined design focuses on smart enhancements to the raking device to manage heavy solids loading events with four times increased debris removal capacity, improved grit and rock handling and greater solids capture. During peak flow conditions, it adjusts the bar screen opening itself to provide additional hydraulic capacity and safety factor, matching the best capture rate to the flow volume in real time. **800-383-8479; www.duperon.com**

15. Smith & Loveless PISTA Stainless Steel Grit Chamber

The **PISTA Stainless Steel Grit Chamber** from **Smith & Loveless** is designed to offer reliable and long-lasting grit removal performance that is easy to install and can be inserted into existing tankage without the need for new concrete work, including for retrofitting aerated grit chambers. It is constructed of 316 stainless steel that is corrosion-resistant and designed to provide 50 years of paint, rust and maintenance-free service. Installation contracting costs are reduced or eliminated altogether, while system downtime and bypass pumping or dewatering needs are reduced. Because it is built exactly to specification, each system performs exactly as designed and contractor issues are eliminated. Chamber internals are similarly constructed of 316 stainless steel, including a flow control baffle that provides 95% grit removal down to 100 microns. **800-898-9122; www.smithandloveless.com**



STORMWATER MANAGEMENT

16. FPS, a brand of Franklin Electric NCX Series

The **NCX Series** of explosion-proof submersible non-clog pumps from **FPS, a brand of Franklin Electric**, are certified for use in Class 1, Division 1 and Group C & D hazardous location requirements, making them suitable for a variety of applications such as lift stations; sewage systems; stormwater, flood and pollution control; industrial waste and dewatering; wastewater treatment plants; and general fluid transfer. They are available in single- and three-phase power options to accommodate flows up to 625 gpm. Each unit is designed for overall serviceability and reliability with durability-conscious features like a field-adjustable wear plate, factory-standard dual silicon carbide mechanical seals, and chemical-resistant components. Intrinsically safe non-clog control panels designed exclusively for the pumps are also available. **866-271-2859; www.franklinengineered.com**

17. PRIMEX Arc Armor

Multiple-compartment **Arc Armor** enclosures from **PRIMEX** reduce the risk of injury resulting from arc flash and electric shock by limiting access to electrical equipment capable of producing arc flash incidents. The control and power circuitry are isolated in separate compartments, where only control voltage is present (120-volt max), thus preventing unnecessary operator exposure to arc flash. The enclosures are designed to reduce exposure to arc flash and arc blast with a multiple-compartment design and single-wall construction. There is a single-sheet drip cap with rolled edge drip loops on free-standing models. They have 304L stainless steel construction, electrostatically precipitated white polyester powder coating that reduces heat buildup, and three-point padlockable operating handles. Free-standing, wall-mount and pole-mount versions are available. **844-477-4639; www.primexcontrols.com**

18. Pulsar Measurement OCF 6.1

The **OCF 6.1** open-channel flow and tank level meter from **Pulsar Measurement** allows the user to continuously monitor, display, totalize and data log flow through any flume or weir, or measure the level or range of fluids

in tanks or vessels. Use the isolated 4-20mA to transmit flow to remote chart recorders or displays, and the control relays are programmable for level/flow alarm and flow proportionate pulse for samplers, chlorinators or remote totalizers. New features include a built-in 26 million-point data logger with software for easy reporting, expanded flume and weir selections, CE approvals and optional Modbus RTU communications. **888-473-9546; www.pulsarmeasurement.com**

19. Vactor 2100i Water Recycler

The **Vactor 2100i Water Recycler** provides productivity gains over a traditional combination sewer cleaner. The ability to collect the jetted water and reuse over and over allows for high flow/high pressure cleaning in pipes without the need to be connected to a nearby fill or have a chase vehicle to provide water support. This allows large-diameter lines to be cleaned quickly and efficiently, even if they have large deposits in the pipe. The flexibility of the machine also allows for use as a traditional combination machine on jobs that don't require the use of the water recycling system. **815-672-3171; www.vactor.com** ♦

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Failing culvert saved with trenchless point repair

Problem:

An Atlanta suburb was experiencing severe infiltration from a failing corrugated culvert, installed years before as a stream crossing. The exposed 8-inch culvert was used as a sewer line between two manholes and a retaining wall was built directly on top of it. Rusting over the years caused a couple dime-sized holes, allowing stream water to pour directly in. Traditional dig and replace methods required bypassing both the sewer and the stream to prevent sedimentation, in addition to demolishing and relocating the retaining wall. Contractor quotes were \$90,000 and up, and would have required occupying adjacent homeowners' yards for days with equipment and debris.



Solution:

EnviroWaste Services Group's Atlanta branch installed an 8-inch-by-8-foot trenchless point repair, manufactured by **Infrastructure Repair Systems**. The repair was accomplished in a single, partial day from above the manholes with only foot traffic through homeowners' properties. No bypassing of the sewer line or stream was required. EnviroWaste's installation of the repair kit not only sealed the pipe from infiltration, but also created new structural capacity for the existing pipe.

RESULT:

By utilizing the kit, EnviroWaste Services Group was able to repair the culvert for less than a one-tenth of the cost of dig-and-replace methods. The infiltration was eliminated and the county avoided potential sanitary sewer overflows with virtually no stress for surrounding homeowners. **727-327-4216; www.irsnet**

Repairing a broken sewer line in northern New Jersey

Problem:

Service Professionals Inc. needed to provide a permanent solution to a broken sewer line in Teaneck, New Jersey, using relining technology. The area of Teaneck is in the northern part of the state at a higher elevation, and the soil is very rocky.

Solution:

The technicians — Rich Cooper, Bill Cobb and Thomas Irving — excavated the floor to expose the



cast iron piping. They cut and removed a section of pipe to gain access to the line, which suffered from I&I. The first step was water jetting to flush out the line and remove the large amount of debris and roots. A camera inspection was performed to ensure everything was ready for the installation of the liner from **Perma-Liner Industries**. The technicians installed the new liner from the basement up to the main in the road. After the liner was inserted, a two-part resin was mixed and pushed into the felt liner. The liner was cured with steam and hardened as it cooled. This process results in a liner that is even stronger than PVC. After it cured, the technicians ran another camera inspection of the new line to make sure it was perfect. They then connected the new line to the existing back section while making an underground connection to install the new clean-out.

RESULT:

All this work was completed in just five hours, and has performed as advertised. **866-336-2568; www.waterliner renewal.com/brand/pli**

Sanitary district finds solution for I&I issues

Problem:

The Klamath Falls South Suburban Sanitary District in Oregon includes roughly 10 square miles and serves a population of approximately 25,000 people. It owns and maintains more than 100 miles of sewer pipe and more than 1,000 manholes. Most of the sewer mains were installed in the 1960s and '70s and consist of asbestos cement pipe. Excessive I&I was causing overflows and unnecessarily increasing the treatment plant processing costs. They had been using flowmeters, but these were hard to install, hard to move around and were expensive.



Solution:

The district turned to the use of **SmartCover** sewer monitoring because the deployment was less invasive, as there is no confined-space entry for installation. Also, based on calibration against other flow systems, it delivered accuracy, trend analysis and modeling to hone-in on specific I&I issues, especially for a sub-basin.

RESULT:

For the relatively small staff, the SmartCover units helped with better targeting of available resources on addressing real issues of concern regarding I&I. By leveraging them, the district has been able to expand monitoring and enhance the granularity and detail of flow information that they receive. "Monitoring remote locations with SmartCover is key in our efforts to identify and combat I&I," says Mike Fritschi, manager of the Klamath Falls South Suburban Sanitary District. **760-291-1980; www.smartcoversystems.com** ♦

Construction starts on Stantec-designed project in Los Angeles

As part of a comprehensive effort to improve the water quality in the Los Angeles River and Arroyo Seco, the City of Los Angeles Department of Public Works will break ground on the \$13 million Low Flow Diversion Project. The project, led by global design firm Stantec's Pasadena office, in collaboration with Los Angeles Department of Public Works Bureau of Engineering and Los Angeles Sanitation and Environment, will provide new infrastructure to remove dry-weather flows from five subwatersheds to the LA River and Arroyo Seco.

Grundfos to acquire Mechanical Equipment Co.

Grundfos entered into an agreement to acquire Mechanical Equipment Co. The U.S.-based MECO has manufacturing and sales offices in the U.S. as well as international offices in Singapore and Ireland. When completed, the transaction will represent the second since November 2020, when Grundfos acquired EUROWATER, a supplier of decentralized water treatment equipment and solutions in Europe.

Stan Brown assumes APWA presidency

The American Public Works Association announced that Stan Brown, member services consultant with the Georgia Municipal Association, was sworn in as president of APWA effective Sept 1. He succeeds APWA President Mary Joyce Ivers.

Orange County Water District receives AAEEES Award

The Orange County Water District was named an American Academy of Environmental Engineers and Scientists 2021 Award winner in its annual Excellence in Environmental Engineering and Science competition, for launching the nation's largest PFAS pilot testing program. OCWD received an Honors Award in the research category for advancing state of the art environmental engineering or science practices.

In December 2019, OCWD accelerated efforts to address PFAS, launching a pilot project to test 14 different types of treatment media, including granular activated carbon, ion exchange and novel alternative adsorbents, with the goal of identifying reliable and cost-effective solutions to remove PFAS from water. Now in its second phase, the project is testing additional adsorbents just emerging into the marketplace.



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HazTek welcomes Pete McEvoy to its team

HazTek announced that Pete McEvoy joined the HazTek consulting team as a solutions consultant. He will be working out of HazTek's corporate office in Medford, New Jersey, and will be servicing clients nationwide as part of HazTek's new safety solutions team. McEvoy has been involved with construction and facility maintenance for nearly 20 years as a business owner, safety professional and solutions consultant.



Pete McEvoy

Vermeer and Conneq announce distribution agreement

Vermeer entered into a distribution agreement with Conneq Construction Equipment and Machinery B.V., to supply Conneq-branded electric mini skid steer loaders to be sold, serviced and supported through Vermeer industrial dealers in Europe. Based in Budel, Netherlands, Conneq manufactures a fully electric, rubber-tired mini skid-steer model, the AS15, with a 1,102-pound lifting capacity.

Vortex hires Jaclyn Herrera as CMO

Vortex hired Jaclyn Herrera to fill the newly created position of chief marketing officer to drive the company's global marketing efforts. Herrera spent the first half of her 19-year career working at two Houston-based marketing agencies. In 2010, she was hired by The Weir Group's Oil and Gas Division to lead its global marketing and branding efforts. Over the course of 10 years, Herrera had multiple roles, including overseeing the company's marketing communications, branding, wellhead business development and sales programs. She also led the Artificial Lift product line and led operations for the North America Wellhead manufacturing plant.

Tnemec acquires Epoxytec

Kansas City, Missouri-based Tnemec announced it has acquired Epoxytec International, which was established in 1990 by Joe Caputi. Originally an independent distributor for a specialty coatings company, Caputi eventually parted ways to form Epoxytec. In 2001, his son Michael Caputi joined the business helping expand Epoxytec to offer services worldwide from its headquarters in Hollywood, Florida.

In a press release announcing the acquisition, Michael Caputi says, "I am proud of the business my father built that has led us to where we are today, and it's a model we intend to keep. We are excited to join another family-owned business where we can continue to put customer service and quality at the forefront of everything we do, as we have done for the last 30 years."

Perma-Liner named exclusive distributor of GP Sewer Cam

Waterline Renewal Technologies, a portfolio company of Behrman Capital, announced that Perma-Liner Industries is now an exclusive distributor of GP Sewer Cam, a tool for high-definition diagnosis, verification and documentation of pipeline rehabilitation projects. The GP Sewer Cam allows operators to turn a jetter into a sewer camera by attaching the proprietary adapter to a jetter hose. ♦

Product Spotlight

Check valve now offered in AIS-compliant model

By Craig Mandli

The pump discharge check valve is an essential element in the design of water and wastewater pumping systems. The valves work to protect valuable pump equipment, automatically opening to allow for forward flow and automatically returning to the closed position to prevent reverse flow when the pump is not in operation.

The Flo-Flex Model 745 rubber disc swing check valve from Flomatic Valves provides the water and wastewater industry one of the broadest lines of flexible rubber disc swing checks available on the market today.

Constructed for industrial and municipal applications, these check valves include a strong ductile iron body coated (internally and externally) with a fusion-bonded epoxy coating, a fast-paced 45-degree valve-seat angle for short disc travel distance, and non-slam high performance resulting in the reduction of water hammer. It is also available in an American Iron and Steel-compliant model.

"We felt it was extremely important to add an AIS-compliant check valve to our 745-swing check model line," says Jim Tucci, national sales manager at Flomatic Valves. "It includes all the same features as our traditional Model 745 with additional benefits such as a raised body boss, which is drilled,



tapped and plugged for easy installation of gauges or accessories."

Manufactured according to ANSI/AWWA C508-01 standards, the Model 745 provides the industry a broad line of flexible rubber disc swing checks featuring a maximum temperature of 140 degrees F, pressure max of 250 psi, vertical or horizontal installation, stainless steel hardware, a standard drain plug, a Buna-N coated disc rubber seal, low headloss for a smooth operation and ease of accessibility for installation and serviceability. It is available in a size range of 3 to 12 inches, providing the water and wastewater industry with one of the broadest lines of flexible rubber disc swing checks available on the market today, according to Tucci.

"The valve's short disc travel allows for faster closure. Its valve body flow area is equal to nominal pipe area," says Tucci. "It offers easy in-line serviceability, and it can be installed for vertical flow or in a horizontal direction. Its precision molded valve disc is a one-piece construction, with integral O-ring type sealing." 800-833-2040; www.flomatic.com

Aries Industries new dual reel

Moving from a stacked to a combined configuration, Aries Industries' new dual reel occupies a slim footprint within the company's inspection vehicles. Slip rings are now inside the shaft, eliminating the need for slip-ring boxes. The dual reel provides quick, easy setup and operation with single-button downrigger deployment, so there are no pins and knobs to adjust. Reel controls have been consolidated to a single accessible panel. The spring-loaded, retractable downrigger rollers allow easy cable removal. Field operation has been improved with enhanced level-wind timing for even level winding of the cable, and precise adjustable drum tension control with caliper and floating rotors on each drum. 800-234-7205; www.ariesindustries.com



General Pipe Cleaners Gen-Pack battery adapter

The new Gen-Pack battery adapter from General Pipe Cleaners allows for operation of sewer inspection camera systems in remote loca-



tions where access to power is limited. Depending on battery type and system settings, the Gen-Eye POD or Gen-Eye X-POD camera systems can run up to 12 hours with the Gen-Pack. The adapter is fuse protected for safety and easily mounts to both full-size and mini-reel versions of the Gen-Eye POD and X-POD. It features a powerful command module with USB port to record video inspections on flash drives. It also includes a 7-inch LCD color monitor, one-touch recording, digital zoom, voice-over recording and more. 800-245-6200; www.drainbrain.com

Perma-Liner Industries Extreme Cold 4:1 resin

Perma-Liner Industries is expanding its resin offerings to include a new Extreme Cold 4:1 resin. The epoxy resin comes in 40-pound buckets and is a complement for ambient curing in temperatures lower than 30 degrees F up to 50 degrees F. Perma-Liner offers 12 different resins for all types of rehabilitation projects that are eco-friendly, compatible with Perma-Liner products, meet and exceed ASTM 1216 and NSF Standards, and provide minimal shrinkage for maximum adherence to the host pipe. 866-336-2568; www.perma-liner.com



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Vermeer R500 electric-powered reclaimer

Vermeer expanded its HDD fluid management equipment line with its first electric-powered reclaimer, the R500. The reclaimer is available as a skid or trailer. The skid is prepared for fork-lift use, and the trailer comes equipped with a height-adjustable surge brake to adapt to a variety of towing vehicles. It has a rated processing capacity of 132 to 198 gpm and features a double-deck linear shaker to deliver stable performance under variable processing volume. A high-capacity, 11-kW pump is used for optimum circulation. The electric HDD technology offers an integrated electric power system. When connected to the electric grid, the system can operate fuel-free. **800-837-6337; www.vermeer.com**



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FOR SALE: 1995 P-30 step van Camera/Robotic cutter van, Equipment is a little outdated but all works. Cobra 8" crawler, bowman cutter, on board screw compressor with air dryer, pressurized water, onan diesel generator, bypass pump and hoses, signs, too many details to list. 20-ft enclosed wet out trailer for point repairs with 2 winch machines, several sleeve installers. This is a complete setup for 8" thru 12" dia x up to 10 ft length. Also have fiberglass matting, resin, ect. Priced for quick sale \$ 49,000 OBO Contact Steve 970-903-9104. (M01)

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WORTH NOTING

PEOPLE/AWARDS

David Mulvihill retired from the city of Erie (Pennsylvania) after working for the city for 28 years, including the past four years as public works director. Among his accomplishments, he helped transform the city's stormwater system. **Chuck Zysk** takes over as director after serving as the city's assistant director of public works. **A.J. Antolik** was hired to fill the assistant director position.

The Watershed Company (Washington) hired **Kim Frappier** as an environmental planner and **Heather Rogers** as a planner. The company provides a variety of services, including stormwater monitoring.

The borough of **Etna** was designated as a 2021 Great Place in Pennsylvania by the state's American Planning Association. Etna's stormwater projects were among the items that were cited for the recognition.

Watershed Wisdom, a lesson plan for schools on maintaining healthy water quality and watersheds, earned the Grand Award from the 2021 APEX Awards for Excellence in the Campaigns, Programs and Plans category. The lessons are a collaborative effort among North Carolina Watershed Stewardship Network, with key support from the North Carolina Water Resources Research Institute, North Carolina Sea Grant, Project WET, PBS North Carolina, City of Raleigh Stormwater, Town of Hillsborough Stormwater and Albemarle-Pamlico National Estuary Partnership.

The U.S. Water Alliance honored **Tucson Water** for the city's 20-year effort to move toward a more sustainable system for supplying water. Tucson used to be the largest American city entirely reliant on groundwater. That left the city vulnerable to overdrafting supplies, so it transitioned to almost entirely renewable water supplies. Tucson Water made that happen through multiple projects, including incorporating green stormwater infrastructure. ♦

CALENDAR

Dec. 1-2

American Rainwater Catchment Systems Association Annual Conference, events being held virtually. Visit www.arcsa.org.

Feb. 15-18

International Erosion Control Association Annual Conference, Minneapolis Convention Center, Minnesota. Visit www.ieca.org.

March 2-5

National Utility Contractors Association Annual Convention and Exhibit, Hyatt Regency Hill Country Resort and Spa, San Antonio, Texas. Visit www.nuca.com.

March 13-16

American Society of Civil Engineers Operation and Maintenance of Stormwater Control Measures Conference, Wilmington Convention Center, Wilmington, North Carolina. Visit www.asce.org.

April 24-27

American Water Resources Association Spring Conference, Bryant Conference Center, Tuscaloosa, Alabama. Visit www.awra.org.

May 2-4

Montana Stormwater Association Annual Conference, Holiday Inn Downtown, Missoula. Visit www.mtstormwaterconference.org.

June 27-29

Water Environment Federation Stormwater Summit, Hyatt Regency, Minneapolis, Minnesota. Visit www.wef.org.

Sept. 26-28

National Rural Water Association WaterPro Conference, (hotel/conference center TBA), National Harbor, Maryland. Visit www.nrw.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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