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Supplement to:
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&
WATER**

In Good Repair

I&I remediation plan sees success in Indianola, Iowa

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UTILITY SPOTLIGHT:
A supportive regional authority battles I&I for its member municipalities

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Submarine Hatches Don't Leak ... Why Should Manhole Covers!



City I&I Test on CAP Cover



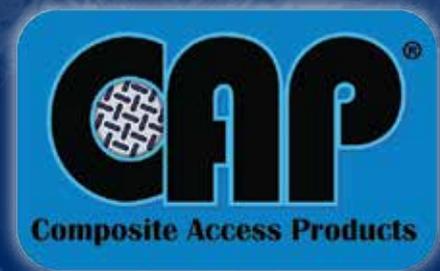
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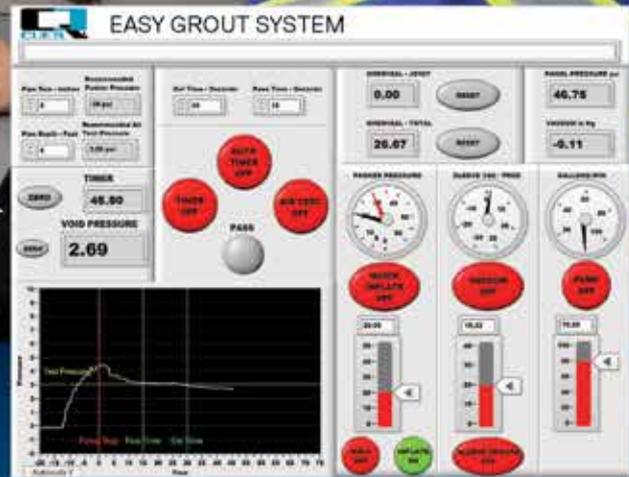


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*Data provided by the ASCE Manuals and Reports on Engineering Practice No. 92, "Manhole Inspection and Rehabilitation", 2008 Update.



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I&I

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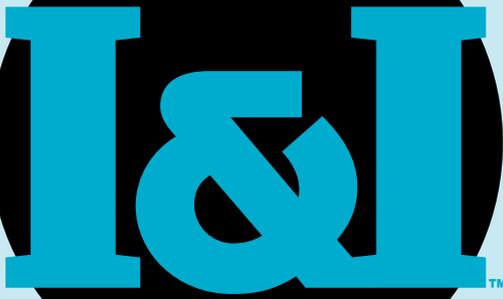
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INFLOW & INFILTRATION
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COVER PHOTO: Wastewater operator Norman Hart stands at the rear of a CCTV truck as he inspects a blocked sewer line with Envirosight's ROVVER X. (Photography by Scott Morgan)



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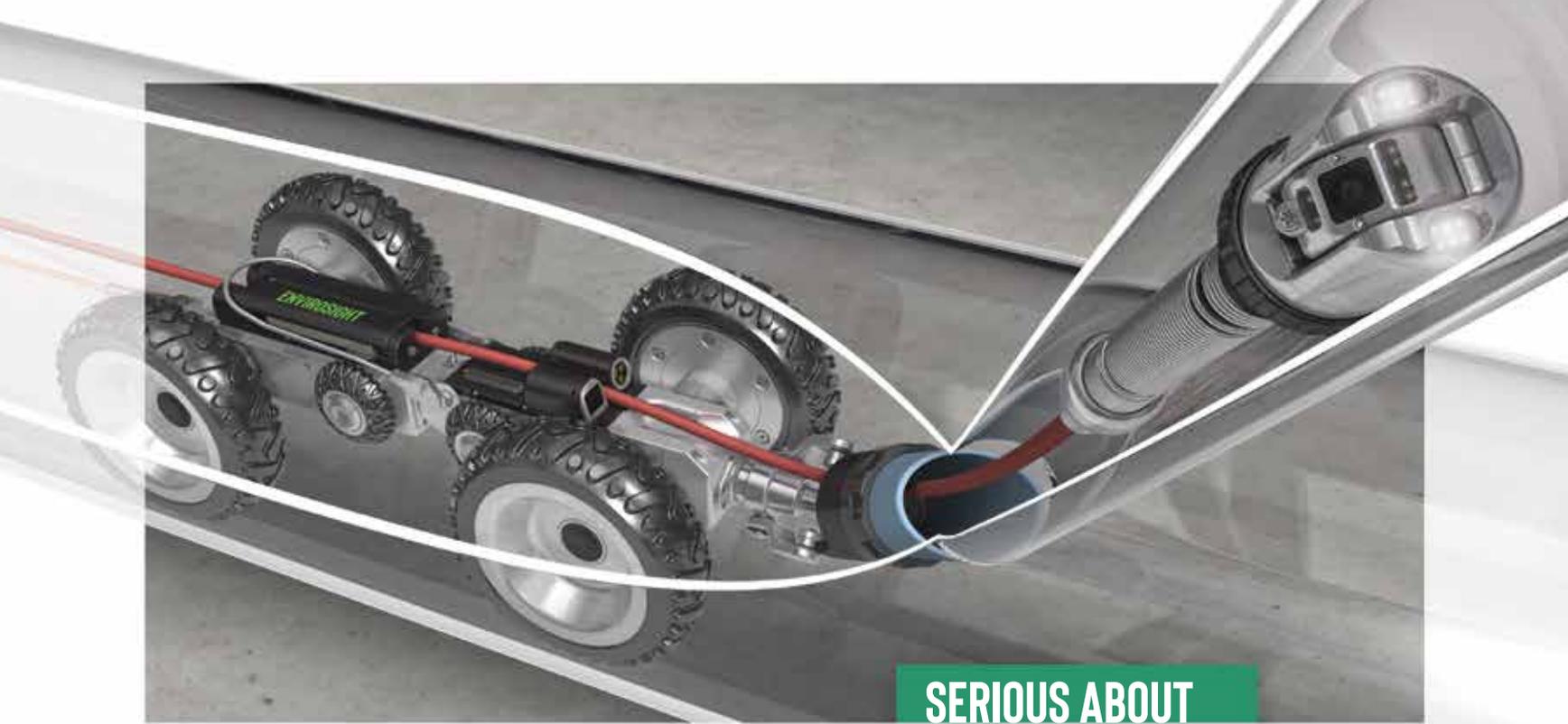
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ENVIROSIGHT

In Good Repair

I&I work is never done, but the plan is coming together for Indianola, Iowa STORY Giles Lambertson | PHOTOS Scott Morgan

Water leaking out of a water pipe is bad enough. Rainwater leaking into a sewer collections system is a headache of another sort because it strains wastewater treatment facilities. Then there's the matter of wastewater leaking out into neighboring soils, introducing pollutants into groundwater. Indianola, Iowa, has experienced all of the above but is well on its way to restoring the integrity of its sewer lines.

The Warren County seat in south-central Iowa had an awakening in 2009 when the state's Department of Natural Resources issued a mandate to the city of 16,000 people to remove all groundwater from its sewer collections system. Total elimination of inflow and infiltration is pretty much an impossible task given the ability of water to get around gaskets, seals and other sealants, but the DNR wasn't looking for perfection.

It ultimately settled for less, lifting the mandate in 2014 on the strength of progress made and the community's pledge to keep reducing I&I. City Manager Ryan Waller and wastewater department Superintendent Rick Graves have been overseeing the effort to live up to the terms of the consent order since their arrival in 2016 and 2015, respectively.

"My understanding is that the data point for I&I was fairly high in 2009, leading the DNR to issue its order," Graves says. The city's Water Pollution Control employees subsequently worked their way through the system, first inspecting and sealing manholes against water infiltration. Then they methodically inspected the network of pipes — one quadrant of the city at a time — searching out leak-points in pipe that averages 35 to 40 years old.

INSPECTION RESULTS

The inspection turned up lots of lateral line problems, but also significant infusions of groundwater in sewer mains. In 2017, Indianola's city council approved a regimen of pipe inspections on private properties with penalties for failure to correct discovered problems. Property transactions required inspection of sewer laterals and hookups.

Typical violations called out by inspectors included the connection of roof gutters and sump pumps to the sanitary sewer system, cracking of laterals by tree



“Anything related to municipal work and infrastructure – the work is never done ... We have more I&I work to do and the storm sewers need a little more TLC, but they’re not in bad shape. We’re sitting pretty nice.”

Ryan Waller



Hart operates the control panel on a Vactor 2100 Plus sewer cleaner during a job clearing out a blocked line.

Wastewater operators Tye Herrick (left) and Norman Hart work on clearing out a blocked line in Indianola, Iowa.



roots or aging, and uncapped cleanout pipes. The inspections on private properties became voluntary in 2018. In the interim, some of the oldest properties were inspected and corrected. The community's newer housing stock generally harbored fewer improper hookups and aging laterals.

"We still have some issues with laterals," says Graves. However, City Hall is counting on property buyers volunteering for inspections to protect their investment. "We're going to move ahead and get our sewer mains buttoned up and go from there."

"When Rick and I got here, not much was being done," Waller says. "So, we had conversations with our community partners at local real estate offices and they had a hand in crafting the inspection ordinance. That was a good thing. The question was how we could work with residents and Realtors in selling our community. The collaborative effort was in the best interests of the property owners and of the department."

Working with the various components of the community is a key guideline for Waller. He refers to the Four C's — communication, collaboration, community engagement and customer service — in talking about that work.

"The state's mandate was kind of a heavy hand, and the first smoke-testing to find leaks had a negative connotation in the community," he says, looking back. "We have a great team and hosted a community meeting to share with residents what we were doing, showing them that collapsed lines cost them money and that the inspections were doing them a service. We didn't want to come down heavy handed, too."



The interaction had the residual effect of building long-term public trust in the administration and the wastewater department. That makes sewer rate increases more palatable for residents. In fact, Indianola recently raised its rates for the first time in seven years, upping them to a base rate of \$18 for the first thousand gallons and \$9.85 per thousand gallons after that. Some of the money will help fund the city's new wastewater treatment plant.

INDIANOLA (IOWA) WATER POLLUTION CONTROL

SERVICE AREA: 11.5 square miles

DEPARTMENT EMPLOYEES: 6

SEWER CUSTOMERS/CONNECTIONS: 5,800

MILES OF SEWER MAIN: 93

COLLECTIONS SYSTEM: 7 lift stations and 23 pumps

MANHOLES: 2,085

DAILY FLOW TO TREATMENT PLANT: 1.5-2.5 mgd (dry/wet weather)

AVERAGE PEAK DEMAND: 4.32 mgd (maximum wet weather)

CAPACITY OF NEW TREATMENT PLANT: 6 mgd

WEBSITE: www.indianolaiowa.gov



Construction on the new wastewater treatment plant.

NEW TREATMENT PLANT UNDER CONSTRUCTION

Ten years ago, in conjunction with an inflow and infiltration dilemma, Indianola had an aging wastewater treatment plant problem. The challenges were interrelated, of course, with the extra water flowing into the lines additionally stressing a plant built in the 1970s. Today, both problems are much closer to resolution.

When the Iowa Department of Natural Resources came down on the city in 2009, planning by the city already had begun on a new treatment plant. Years of planning had convinced city officials that upgrading the old plant was not the best option. Six years of working with a consultant led to DNR approval of a state-of-the-art \$46.5 million facility that will meet Indianola's anticipated growth but also is easily expandable, satisfies Iowa's nutrient reduction strategy, and incorporates new technology that shaves \$12 million from the cost of a conventional treatment plant.

Furthermore, some of the cost is being deflected from taxpayers by drawing upon a new local sales tax, all the revenue from which will go to helping fund the plant. Indianola is home to several regional facilities, such as the Des Moines Metro Opera, and annually hosts the National Balloon Classic. All those visitors boost sales tax collection, and the plant will be a beneficiary.

The plant is being constructed on 20 acres of a 360-acre city-owned property, with the other 340 acres being kept agricultural. That's pertinent, because treated wastewater will be pumped through an "umbilical cord" system attached to a fertilizer rig on a tractor, which will knife the treated effluent directly into the soil.

"That reduces the hauling cost and lessens truck traffic in the neighborhood," City Manager Ryan Waller says. Operation of the new plant will be overseen by Rick Graves, department

superintendent. This is not a new assignment for him. He helped design and start up a new wastewater plant while working in another city.

"I like to think we are above average among Iowa wastewater systems," Waller says. "A lot of it has to do with the aggressive nature the community had in addressing the I&I situation, in deciding to build the state-of-the-art wastewater facility, and how we are leveraging sales tax to help fund the new plant. With our growth, the upgraded infrastructure, a new treatment plant and affordable sewer rates, we're in a really good place."

It is all coming together so well that the city decided to give the new facility and department a new name. When the plant is complete, gone will be "Water Pollution Control." In its stead will be "Water Resource Recovery Facility."



Ryan Waller, Indianola city manager



Rick Graves, water pollution control superintendent

“Nobody likes rate adjustments,” Waller says. “But we’ve not heard many complaints. We’ve had a lot of conversations the last several years. The community understands we can’t get out of meeting state regulations.”

I&I WORK ONGOING

The I&I issues remaining to be addressed are not negligible. Graves estimates that as much as a million gallons of rainwater still infiltrate the city’s sewer system on a rainy day. “Here’s an example of that. We had about an inch of rain on Nov. 10 of last year and our flows jumped up 700,000 gallons a day for two days and then went right back to normal. An extra 1.4 million gallons of flow. I call it a spike event.”

To reduce that big number to something more incidental, Indianola is budgeting \$250,000 a year for inflow and infiltration corrective work. In 2020, that funded lining of 2,300 feet of pipe in 10 sewer main sections and 50 laterals. In addition, 10 manholes were repaired. This fiscal year, an equivalent amount of sewer main was completed by December and the lateral work continues.

That level of investment in the system will continue for the foreseeable future along with \$30,000 a year for replacement of lift station pumps. The type of projects varies from year to year. For example, the current contract calls for additional manhole makeovers, less than a thousand feet of sanitary sewer lining and about 350 feet of storm sewer repair.

PRIVATE PARTNERS

The heaviest part of the city’s ongoing and planned infrastructure work will be bid out. Waller, who has worked in the industry for 20 years, says contracting out some services ensures that vital infrastructure is in the best shape possible.

“We do projects in-house when we have the equipment to do it. Our team does a great job televising and cleaning lines and replacing manholes. Sometimes, though, we bid out those jobs, too. Smoke services is one of the services we typically partner with the private sector to get done.”

The excess work is prioritized and competitively bid, even spot repairs. In the last round of bids, a trio of Iowa companies won contracts. Municipal Pipe and Tool lined the mains. Central Iowa Televising worked on laterals. Dependable Maintenance Systems overhauled manholes.

Sewer lines mostly are 8-inch clay, with some PVC mixed in, according to Graves, with larger sections of pipe ranging up to 30 inches. To keep an eye on the buried infrastructure, the department calls on its 3-year-old CUES push-camera system and an even newer Envirosight Rovver X sewer inspection crawler.

The department has budgeted the purchase of a Bobcat Toolcat in 2022. Among other uses, the compact loader will carry the Envirosight system to less accessible sewer mains along with a Honda generator to power the camera system. To clean the lines, the city has a Vactor 2100 jetter rig.

Graves came to Indianola after a dozen years of serving as superintendent for two other Iowa sewer systems and is licensed for a variety of wastewater treatment and distribution tasks. “He’s the expert,” Waller says. As such, Graves is well qualified to oversee cross-training of his crew.

Cleaning pipe. Repairing pumps. Running the cameras.

“We do 50,000 feet a year of camera work,” the superintendent says. “Everyone works at it in rotating shifts, with four operators working in the collections system and another person in the lab.”

The result is a sewer system that, despite ongoing I&I repair work, is in “a pretty good place,” he says. “The last three or four years have helped considerably.”

Waller concurs. “I was just talking to staff about that. Anything related to municipal work and infrastructure — the work is never done. You say, for

“We do 50,000 feet a year of camera work. Everyone works at it in rotating shifts, with four operators working in the collections system and another person in the lab.”

Rick Graves

example, we have all the streets paved, so the end is in sight, but that’s not possible. Yes, we have more I&I work to do and the storm sewers need a little more TLC, but they’re not in bad shape. We’re sitting pretty nice. We’re good.” **I&I**

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A SUPPLE SOLUTION

Irregular-shaped or badly damaged pipes are no problem for this pliable, steam-heated liner

By Ken Wysocky

A pipe lining system that conforms to any host pipe shape — square, round, ovate and anything in between — might sound highly implausible. But it's a reality at Clearwater Structures, a civil construction firm in Ontario that has embraced Thermoform pipe lining technology from Warrior Trenchless Solutions.

The company, based in Ajax, just east of Toronto, saw that Thermoform's shape-shifting capabilities would be an invaluable asset on projects where more conventional pipe rehab technologies can't be used. Furthermore, Thermoform is a chemically inert PVC product, which makes it more eco-friendly, says Mark Philpott, who co-owns Clearwater Structures with Mike Ciceri.

Founded in 2005, Clearwater Structures employs about 200 people and mainly serves customers throughout the province of Ontario. Its core markets are municipal sewer rehab, bridge construction and steel fabrication.

The company used to primarily rely on cured-in-place felt liners and HDPE lining, where a rigid pipe is pulled into a leaking host pipe. Any annular space between the replacement pipe and the host pipe is filled with grout. But sometimes these rigid pipes can't pass through a deformed culvert, for example, Philpott explains.

"Thermoform can be used even if a pipe has deformities and deflections. It conforms to the exact shape of the host pipe.

"We've used it in projects where pipes were bent or deformed, which would prevent a rigid round pipe from ever getting through. It's a very good product for damaged pipes located in places where you can't excavate to make repairs."

FLEXIBLE BUT STRONG

Thermoform pipe is made the same way as conventional PVC pipe, except that while it's still hot during the extrusion process, it's folded into a C or H shape and then coiled onto reels in whatever lengths are required. It's available in diameters ranging from 4 to 36 inches, and the wall thickness is variable, depending on the application.



"Thermoform can be used even if a pipe has deformities and deflections. It conforms to the exact shape of the host pipe."

Mark Philpott

A crew from Clearwater Structures uses a Thermoform pipe lining system to rehab a culvert that runs under a highway near Belleville, Ontario.

To install Thermoform pipe, it's first heated with steam to make it flexible and pliable. To do this, Clearwater Structures fabricated a system that's affixed to a 24-foot-long flatbed trailer; it includes a powerful hydraulic system to turn the large reels that hold the pipe and an enclosure into which the steam is pumped until it reaches about 200 degrees F, Philpott says.

After the pipe is pliable enough, it's hooked to a cable that's attached to a winch located downstream. Clearwater Structures uses a winch made by HammerHead Trenchless and boilers made by Sioux and Easy-Kleen Pressure Systems. The winch then pulls the pipe through the host pipe at a speed of about 100 feet per minute.

The pipe cools down in about five minutes, which reduces its pliability. So workers then install steel caps on each end of the liner and pump in steam

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High Density Polyethylene (HDPE) manhole grade rings have been proven to withstand the harsh roadway and significantly out-perform antiquated construction materials and techniques.

Grade rings are one of the main components of manhole chimney sections. For years, concrete grade rings were the only source available for leveling and raising manholes. Many grade rings are built with a piece meal approach to material acquisition, and no process or standard exists to guarantee a consistent quality product. Unfortunately, this also increases I & I issues and rehabilitation for the future.

Microbial Induced Corrosion (MIC) has been increasingly evident in concrete manholes and related sanitary sewer structures from the start. It is important to keep sewage from contaminating clean water sources.

MIC occurs when sulfuric acid, generated from raw sewage, reacts with the properties of cement to diminish the integrity on concrete manhole bases and related structures. Hydrogen sulfide (H₂S) has the capacity to severely damage concrete manhole structures. As a common occurrence, utility operators, civil engineers and the precast concrete industry have accepted this as fact and expect failure over time.

These conditions require revised designs for many components in the sewage transmission systems, including manholes. Ladtech, Inc. has designed the highest quality manhole chimney system that will eliminate the damage from sulfuric acid and continuous destructive attack on the manhole chimney by capitalizing on the inherent strength, durability, and corrosive resistance nature of HDPE.

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to make it pliable enough to inflate. Typically, the installation process requires three to four such heating-cooling cycles until the pipe inflates enough to fit tightly against the host pipe, creating a watertight seal; this process could take three to four hours, depending on the ambient temperature outside, Philpott notes.

"The pipe shrinks a bit as it changes shape, which is why you have to repeat those cycles," he says. "If you don't do enough cycles, the pipe could eventually crack and fail.

"We monitor the amount of shrinkage after each cycle. When the shrinkage is negligible between cycles, you know you can stop and run a camera through it." Clearwater Structures relies on an Aries Industries Pathfinder System for pipe inspection.

NOT PERFECT? NO PROBLEM

Thermoform offers another key benefit: If the installation isn't quite right, a crew can reheat the liner, then fix an error while the liner is pliable, Philpott says.

That capability came in handy during Clearwater Structures' first Thermoform installation, where the liner twisted a bit and left a wrinkle. Workers merely reheated the liner and rotated it slightly by hand, eliminating the wrinkle. "We've never had that particular problem again."

The largest and longest lining project Clearwater Structures has tackled so far involved a 450-foot-long, 24-inch-diameter storm sewer culvert. Buried in the middle of a freeway median, the culvert was accessible only via two manholes, which required the liner to make a sharp, 90-degree bend inside each manhole in order to enter the host pipe.

The company had just 10 hours to do the job before a closed lane of traffic was scheduled to reopen. When the crew couldn't get through the required heating cycles, Thermoform's flexibility came into play once again.

"After we ran out of time, we just let the liner collapse inside the host pipe," Philpott says. "Then we went back the following night and finished

the job. You can't do that with a felt liner. When you run out of time with a felt liner, you've got a problem."

SPEED VERSUS VALUE

Philpott says that sometimes Thermoform lining projects can take longer compared to using conventional liners. They also take more care and skill to install; as such, the company relies heavily on Ryan Hack, a lining superintendent who's "one of the best," Philpott says.

"It can be tricky to work with. But the true value of this particular technology is that you can use it in so many different pipe conditions. Plus, there's no release of any harmful chemicals during the installation process."

So far, Clearwater Structures has installed more than 8,000 feet of Thermoform — primarily inside culvert pipes that run under highways — since it first invested in the technology in 2018. But Philpott says the company is also trying to use it in municipal markets.

"We've already used Thermoform to line smaller, 10-inch-diameter sanitary sewer pipes for the city of Toronto. Because it's a relatively new product, a lot of municipalities haven't used it yet. It costs a little more than felt liners. But Thermoform also has a longer life span.

"It's hard to convince municipalities to spend more money upfront on capital costs in exchange for lower life-cycle costs. But it's emerging technology and a very good product. I believe it's the product of the future." **I&I**



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A HELPING HAND

PARSA provides support for member municipalities to make better I&I decisions

By Traci Browne

At a time when state and local government services are fighting tooth and nail for whatever money they can get, the Plainfield Area (New Jersey) Regional Sewerage Authority stands out as an example of a service that gives its members more than it takes.

PARSA has a small staff of just eight very dedicated employees. Yet, it tries its best to say yes to everyone if the request is good for the overall system and the environment, and it is working.

Except for extremely intense rain events, PARSA has not had an overflow for years, which is a significant accomplishment since most of its system runs along a creek.

TURNING THE SYSTEM AROUND

PARSA was formed in 1996 as part of the Settlement Agreement of a lawsuit against the former public operating agency, the Plainfield Joint Meeting. Today, PARSA serves eight municipalities, all with equal voting rights, across three counties covering a population of 135,000.

Back in the mid-1990s, when PARSA took over the regional interceptor system's operations, things were pretty dire. On top of operational, cash flow and administrative issues, the pipes' average age was 65-plus years. A third of the pipes were approaching 100 years in use.

Thanks to PARSA's dedication to its member communities and the environment, not only has it eliminated many of its problems, but it is now a well-respected, award-winning regional authority.

“We jump into action and do what’s necessary to protect the environment, as clichéd as that sounds. We’re not so worried about getting paid to do it.”

Robert Snyder

PARSA is responsible for the interceptor connecting eight municipalities to the area's wastewater treatment plant. But it does so much more for its member towns. PARSA provides services such as flow monitoring, sewer cleaning, CCTV inspection and I&I remediation at little or no additional cost, and it is always finding new ways to pitch in.

PARSA'S CLEANING PROGRAM

Why do they do it? PARSA Executive Director Robert Snyder puts it quite simply, “We’re a family.”



Workers from the Plainfield Area (New Jersey) Regional Sewerage Authority use a jetter to clean a sewer line as part of an ongoing program for member communities.

For example, three years ago, PARSA started a shared-service cleaning program to clean 20% of the members' collections systems annually over five years. Its members do pay extra for this service, and costs are calculated based on the overall footage that makes up the 20%. Snyder's eight employees clean, on average, about 350,000 linear feet of pipe each year.

Snyder came up with the cleaning program while looking to bring extra value to member towns. “Our staff is getting older. We could hire some new staff, train them and bring them up to speed, but we would have to increase our operations budget. I hate to say this, but what’s the benefit to our members by us doing that? There’s not a tremendous amount of value to them. So, I tried to come up with a creative way that allowed me to hire some new staff while giving the towns something more in return for their money.”

Snyder says that currently, seven of the eight member towns take advantage of the cleaning service and the only reason the eighth doesn't participate is that it has its own cleaning staff.

Once they get through year five of the cleaning program, Snyder says they will start phase two. He intends to scale back the cleaning (dropping to 10% annually), but they will be adding CCTV inspection (also 10% annually). Snyder says this change will help members identify trouble spots and strengthen the overall sewer system.

But that's not the only benefit to Snyder's creative hiring system. The majority of the PARSA staff are level three or level four licensed operators. One new staff member has obtained his level one license, and the other is prepared to sit for his license and would have it, had it not been for COVID-19 forcing him to wait. PARSA staff members serve as a licensed operator of record for member communities to meet DEP requirements.

INSPECTIONS AND MONITORING

PARSA also provides emergency CCTV inspections whenever possible at no charge for whoever needs it, member town or not.

“We jump into action and do what’s necessary to protect the environment, as clichéd as that sounds. We’re not so worried about getting paid to do it,” Snyder says.

Snyder says that when municipalities do flow monitoring, they can often only capture data for one month due to budgetary constraints. One of the member towns was interested in flow monitoring and received estimates for \$30,000 to \$40,000 for one month of monitoring.

“They would only be able to put the equipment in for a month because that’s all the funds they have. Unfortunately, if you install a flow meter in August, it’s going to show different results than if you monitored in September, October, April or May.”

So, PARSA stepped in and offered to help. PARSA installed flow-metering equipment (Hach and ISCO Laser) and let them in for about seven months.



PARSA employees gain access to a sewer via manhole to use CCTV equipment and inspect the system. The authority provides emergency CCTV inspections at no charge for area municipalities.

Using the Trimble Telog system, they were able to view the data as it came in from the meter every 15 minutes, and PARSA didn’t charge for the service. Snyder’s theory is that it’s more valuable to everyone involved to offer the service. The more data and information you have, the better the decisions everyone can make.

“I think that’s one of the key functions of a regional sewage authority or wastewater facility or whatever you want to call it — to bring all that to the table,” Snyder says.

PARSA takes a holistic approach to I&I, but some specific projects have included manhole grouting and wet weather inserts. PARSA also purchased a new CCTV truck by Envirosight two years ago that gives it the capability to do point repairs on the sewer lines.

Unfortunately, Snyder says they haven’t been able to take advantage of that new truck just yet. By the time they were trained on the truck’s basic functions and were ready to train on the point repair piece, COVID-19 hit. But once they get that training, it is a service they will provide at minimal cost to members. Snyder says they are just looking to cover materials.

BUDGETING FOR REPAIRS

PARSA has also done a few large pipe lining repair projects in-house and is preparing to repair a 400-foot section of pipe right next to a creek soon using either sliplining or CIPP.

Snyder says PARSA has done this type of work for its members throughout its existence, and he plans on continuing. But some work and some

requests are more difficult than others. Often it comes down to the money — who is paying for it, and how do you pay for it.

PARSA is not in the business to make money, and Snyder uses the term “revenue neutral.” Each municipality is billed based on three parameters — flow, biological oxygen demand and total suspended solids. This formula determines the municipalities’ portion of PARSA’s annual budget.

“There’s a balance that you have to keep with that. There are some projects that we can do, and it’s not a big deal.”

But other projects are a different story. Snyder has the same problem that many municipalities and authorities face. Sewers are often out of sight and out of mind, leading to reactive responses to I&I. Both Snyder and his predecessor, Rob Villee, have been trying to change that way of thinking.

“We need to give (our members) the tools to make those decisions. It’s not anything you can just flip a switch and get them to do. It’s a process, and you have to first inform them of the problem, bring them up to speed, and explain why it’s a good thing to do this. In their defense, if you’re not given the information, then you have no direction.”

“We need to give our members the tools to make those decisions. It’s not anything you can just flip a switch and get them to do. It’s a process, and you have to first inform them of the problem, bring them up to speed, and explain why it’s a good thing to do this.”

Robert Snyder

Snyder says they’ve been very fortunate in that all PARSA’s municipalities have embraced the proactive approach.

Snyder and all his PARSA employees take a lot of pride in what they do, and so they should. They provide all these services to their members because it’s the right thing to do. Even when they have to charge to cover costs, towns would never obtain similar services anywhere near the low fees PARSA charges.

How is all this possible on top of their day-to-day tasks during normal times, let alone during a pandemic? Snyder says they use technology as their ninth through 100th employee.

“It makes a big difference if a person can sit at their desk and look at 40 meters as opposed to having to run to 40 locations to check and make sure that the equipment is operating effectively,” Snyder says.

This year, PARSA will implement asset management software (Trimble Cityworks), which will tie all the pieces together. Their recordkeeping, TV truck data and files, flowmeter data, and alarms will all be going to a central hub that member towns will have access to.

PARSA and its members will be able to view how many times they’ve been to a specific line segment and any changes that come up during inspections. Information that will help towns form their capital improvement programs to remove more I&I from their systems.

Being able to access the data and track problem areas will help everyone make educated decisions. And hopefully, it will take some of the burden off PARSA’s staff.

“A lot of times, it is difficult with eight, but then, you know, we just kick it into the next gear.” **I&I**

By Craig Mandli



SANITARY DISTRICT FINDS CAUSE OF 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 1970s 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 home 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 it receives. "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**

MECHANICAL POINT REPAIR SLEEVE USED IN SEWER PREVENTIVE MAINTENANCE PROGRAM

PROBLEM:

The Franklin Township Sewer Authority in New Jersey has a preventive maintenance program that had prioritized identifying and addressing defects to reduce I&I. But the repair process had become a bottleneck: Staff engineers spent too much time planning how to tackle each defect, and the contractor bidding process was slow. In the meantime, groundwater infiltration would continue to fill the pipe. They needed an option that was easier and more efficient.

SOLUTION:

Quick-Lock point repair sleeves from **Pipeline Renewal Technologies** provide infiltration abatement and structural repair, and they can be installed by just two people in under 30 minutes. Made of a heavy-gauge 316L stainless steel cuff and an EPDM rubber gasket, a sleeve can restore strength and stop infiltration immediately. Users position and prepare the sleeve with a standard inspection crawler, and the device is then expanded pneumatically to seal out infiltration. With no contaminating resins or prolonged cure time, this mechanical solution requires neither wet-outs nor bypass pumping. And it can be installed directly over gushers to eliminate high-volume sources of I&I.

Result: With the addition of Quick-Lock to its repair options, the authority is now able to identify a defect, determine if it is a candidate and make the repair immediately. After just two months of utilizing Quick-Lock on an as-needed basis, they had installed seven sleeves and were saving over \$6,500 per month.

866-936-8476; www.pipelinert.com



SEWER MANHOLE LEAK FIXED BY GROUT INJECTION

PROBLEM:

Colchester, Vermont's wastewater system processes more than 100 million gallons of wastewater per year. When a significant groundwater leak was discovered at the joint between manhole pipe sections, IP&C Industrial Services was invited to evaluate the situation.



SOLUTION:

IP&C Industrial Services determined that the most cost-effective solution would be to apply a **chemical grout-injection system** from **AmTech Tank Lining & Repair**. The crew drilled an injection path into the center of the crack. Flexible packing was wedged into the joint to slow the inflow. Fast-setting grout was pressure injected throughout the crack and voids created by groundwater outside the manhole pipe.

Result: Once the grout set, the leak and outside voids were completely sealed off. The town of Colchester realized significant savings compared with curtain grouting or replacement of the manhole pipes. **888-839-0373; www.amtechtanklining.com**

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CIPP POINT REPAIRS PROVIDE NO-DIG SOLUTION FOR LOCALIZED DAMAGE

PROBLEM:

An 8-inch PVC sewer main located beneath newly laid asphalt in an upscale residential neighborhood in Utah was damaged when an HDD contractor accidentally bored through it. Fortunately, the contractor realized their mistake before pullback, but the cross bore left large holes in the PVC sewer main.

SOLUTION:

While opencut replacement was an option, it was not ideal, as it would require cutting into the new asphalt and cause a significant inconvenience to area residents, so the city opted for a trenchless alternative. **Cured-in-place sectional point repairs** from **HammerHead Trenchless** provide a permanent, structural solution to repair localized damage. Point repairs can be installed in a wide range of host

pipe materials, 3 to 60 inches in diameter. A point repair utilizes a fiberglass-reinforced mat saturated with resin in 2- or 4-foot lengths installed using an inflatable packer.

Result: The experienced underground contractor first had to prepare the pipe and deal with debris entering the pipe from the large holes from the cross bore, which they removed with a reverse jet nozzle. The fiberglass mat and resin come pre-measured and packaged so the crew had everything necessary to prepare the mat and packer on site and install the 2-foot point repair, entering the pipe through a manhole. Once the repair was in place, it took around 2.5 hours to fully cure and the pipe was successfully repaired without any excavation. **800-331-6653; www.hammerheadtrenchless.com**



(continued)



DISMANTLING JOINT HELPS CREATE CUSTOMIZED PIPING SOLUTION

PROBLEM:

The water utility in Queen Creek, Arizona, had a range of solid steel piping that was connected on one side of a booster pump for water suction and on the other side for water discharge. After 20 years of use, the piping needed to be replaced, as it was rusting. The problem was that each of these connecting pipes was custom-made and varied in length. To replace each pipe, a new customized pipe would need to be constructed on site, with high associated costs in terms of money, time and effort. The utility was looking for a more cost-effective solution to replace the rusted sections without using tailored pipes for each repair.

SOLUTION:

HYMAX, a Mueller brand, developed an eccentric **dismantling joint** with flange connectors on either end that could be telescoped to be anywhere between 10 to 14 inches in length. Instead of fabricating each connection on site, a costly and work intensive process, the product could be adjusted exactly to match the length between the booster pumps and the discharge piping and installed by just one person in about 30 minutes.

Result: Without each pipe needing to be customized on site, repair cost, time and effort were greatly minimized. The new dismantling joint also helped increase water flow by approximately 40 to 60 gpm. The design enabled better hydraulic flow, as the old pipe was rough on the inside due to rusting.

855-457-2879; www.krauszusa.com

UTILITY UPGRADES OUTDATED LIFT STATION

PROBLEM:

The Terrace Street Lift Station is the main lift station for the village of Millersport, Ohio. Two surface pumps handled daily operation. During rainstorms, two 30 hp submersible pumps took over. By 2017, the surface pumps had reached their end-of-life. Flow went through the surface pump wet well first and overflowed into the submersible pump wet well. But debris settled in the wet well and plugged the surface pumps during rain events. Frequent unclogging decreased pump efficiency and increased maintenance costs. Additionally, the village didn't grow as expected, and the 30 hp submersible pumps were oversized, causing inflow to the facility. That resulted in increased treatment costs and added capacity to the collections system.

SOLUTION:

The village engaged **Xylem** to engineer a complete design/build solution. Working with Stutske Construction, they designed a turn-key solution for the lift station upgrade. Stutske found flow issues on Terrace Street and the nearby canal. Because all sewage flows toward the Terrace Street Lift Station, the infiltration caused backflow issues during heavy rains. The upgrade included installing two 10 hp **Flygt N-Technology submersible pumps** in the existing wet well. The pumps are controlled by two **Aquavar IPC variable-frequency drives**, **water level control float sensors** and a **MultiSmart controller**.

Result: Since completion, pump clogging has ceased, and energy consumption has dropped. In addition, with the installation of Flygt Cloud SCADA, they can remotely control the pumps to eliminate wastewater spills.

855-995-4261; www.xylem.com/pumping





HIGH-BUILD EPOXY COATING A SOLUTION FOR LIFT STATION

PROBLEM:

A Florida utility needed to coat a concrete lift station/wet well. The structure measured 21 by 21 feet and contained two tanks. The city was searching for a solution to line and protect the structures effectively before the typical 30-day concrete cure time.

SOLUTION:

Universal Painting was able to deliver the desired solution using **Epoxytec** products. **Mortartec Ceramico** was applied at 1/4-inch-minimum thickness. The product was kept under humid conditions while curing and away from direct sunlight to avoid dry-out conditions. CPP Sprayliner was applied as a protective topcoat.

Result: The application qualities of Epoxytec allowed the project to be completed on time. “It has been the easiest plural application we have ever had,” says John Aldrich, president/CEO of Universal Painting. “We absolutely love the surfacer. We are planning on submitting the product for some thin-film systems whose manufacturer doesn’t have an equal.”

877-463-7699; www.epoxytec.com

MANHOLE INSERTS ASSIST IN CONTROLLING SEWER ODOR EMISSIONS

PROBLEM:

For more than a year, New York’s Saratoga County Sewer District was faced with complaints from residents regarding odors being emitted from manholes. Historically, the sewer district would handle these complaints by chemically treating the pump stations closest to the odor problem. However, this only proved to be partially effective, as some of the communities within the treatment plant’s jurisdiction were simply too far away for the treatment to reach.

SOLUTION:

Dan Rourke, executive director of Saratoga County Sewer District, took his research online and found the **Parson Environmental Products Odoreater Manhole Insert**. This specially designed manhole insert, with the addition of a canister containing 20 pounds of activated carbon or non-impregnated activated catalytic carbon, works to trap and store unpleasant hydrogen sulfide and methyl mercaptan odors. The filtered and odor-free air is then ventilated into the atmosphere through the canister lid.

Result: The inserts were installed in manholes throughout the county. “The simplicity is the best feature,” Rourke says. “They work really well in remote areas, but are still heavily used by the public, such as walking and biking trails, public parks or utility easements in rural neighborhoods.” The insert requires minimal maintenance and is as easy as replacing the carbon materials (also available from Parson) when necessary.

800-356-9023; www.parsonenvironmental.com



LINING SYSTEM USED TO FIX ROOT-INFESTED SEWER PIPE

PROBLEM:

Mr. Rooter of Western Washington was called to help fix a root-infested sewer pipe on a nearly 100-year-old, two-family home in Seattle. The root infestation caused breaks in the lateral pipe and sewer backups in the basement. The multidiameter lateral, consisting of 4-inch cast iron for the first one-third of the pipe and 6-inch clay for the remainder, was approximately 85 feet from the basement clean-out to the city sewer main.

SOLUTION:

A tailored, 4- to 6-inch polyester **Transition Scrim Liner** from **Paramount Pipe Lining Products** was used because it creates a smooth, seamless transition in pipes with multiple diameters. The five-step process involved removing

roots from the pipe, mixing the epoxy, wetting out the liner, using air pressure to insert the liner into the pipe, and using a hot-water curing process. The liner was cured in less than two hours using the Hornet hot-water curing system.

Result: The entire sewer line from the basement out to the city sewer was effectively relined, forming a watertight barrier impenetrable by root intrusions. In less than two hours, the cracked and defective pipes were like new and 100% flow capacity was restored. “It’s important for homeowners to understand they have options to tearing up their landscape when it comes to fixing their deteriorated pipes,” says Vinnie Sposari, owner of Mr. Rooter of Western Washington.

833-663-2477; www.paramountcipp.com



(continued)



SENSOR PROVIDES RELIABLE OPEN-CHANNEL FLOW MEASUREMENT

PROBLEM:

A major Midwestern wastewater treatment plant was using a traditional open-channel system which consisted of a stilling well and pressure level measurement to measure the liquid level in the structure. The problem is that over time sedimentation and buildup would cover the sensing part of the measurement system, leading to inaccurate readings or completely failed measurement.

SOLUTION:

Hawk Measurement provided the **Sultan Flow Acoustic Sensor**. The noncontact acoustic wave sensor has a built-in self-cleaning method to provide maintenance-free, reliable and continuous measurement of the liquid level. It uses sophisticated software to locate and track the correct echo without being affected by echoes from fixed objects or changes in the liquid surface. When the liquid level or surface conditions change, the system follows preselected signal

tracking parameters. In the event of a total loss of signal, the system adopts signal recovery routines to relocate the correct liquid level. Powerful measurement pulses keep sensor facings clean of moisture and condensation, ensuring maximum performance in all conditions. Hawk's ability to remotely calibrate, test or check-in on the performance of the product sealed the deal for this wastewater treatment plant. Remote technical support and complete commissioning of equipment allows monitoring and adjustments of settings no matter what corner of the world.

Result: After the plant implemented the Sultan Flow, there was no need to continually clean or maintain the level sensor, which saved time, money and resources. They increased efficiency, productivity, profitability and do not have to worry about EPA compliance.

888-429-5538; www.hawkmeasurement.com

LINING SYSTEM USED TO ELIMINATE ROOT AND INFILTRATION ISSUES

PROBLEM:

The 1930s era Santa Barbara County Engineering Building and Administration Building in California were having troubles with their sewer system. When crews inspected the pipe with a camera, they saw lots of roots and water infiltration. The 4- and 6-inch clay pipe was cracked and full of scale. The county had previously hired a company to pipe burst, but the ground was too hard and was like concrete, and they had to look for a different solution.

SOLUTION:

The county called 101 Plumbing and decided CIPP would be the best solution for fixing the roots, cracking and water infiltration. They accessed the pipes through a brick manhole. They used the **Quik-Shot** from **Pipe Lining**

Supply to lateral line 112 feet of 6-inch pipe. Then they did a second line that was 75 feet of 4-inch pipe. They used the Quik-Roller to make sure the calibration of the resin was perfect. They also used a vacuum to follow the standards and completely saturate the material to stop root intrusions. Following the two shot lines, they used the Quik-Heater to heat cure the line.

Result: The county plus three city inspectors were pleased with the results. The lines were perfect, no more water, no more roots and a like-new pipe inside the old pipe. The job started at 8 a.m. and curing was started by 1 p.m., so the job was completely done in less than one day. The customer, city and contractor were satisfied with the end result.

888-354-6464; www.pipeliningupply.com I&I



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FIND THE RIGHT DEWATERING STRATEGY

As technology expands options, now is a good time to consider dewatering tactics

By Association of Equipment Manufacturers

Dewatering is a necessary evil in construction. “Keeping a dry hole is definitely required and necessary to maintain a smooth construction schedule,” says Ken Albaugh, who leads the dewatering commercial team in North America for Xylem, a global water technology player.

Dewatering lowers groundwater levels within the vicinity of the excavation. But a one-size-fits-all approach to dewatering a construction job site simply won’t work. “Each site is truly a unique environment,” Albaugh says.

Paul Schmall, vice president of Keller Specialty Services with Keller North America concurs. “A site-specific evaluation, including historical records if available, and a local understanding of the groundwater behavior is vital to determine the optimum solution,” he says. “If groundwater control is a critical path activity, this is not a good setting for do-it-yourselfers and certainly not for first-timers. Experience is paramount.”

SUMP PUMPS

Sump pumps are a common dewatering solution for construction sites. Groundwater enters the site and is collected in a sump or pit and removed using powerful pumps that can handle not only water, but soil and other solids.

“The contractor has to know how much water is coming into the hole, and how fast,” says Tony Chirico, national sales manager for Gorman-Rupp. “That will help narrow down the size of the pump required for the application along with calculating the total dynamic head.”

The type of material you are pumping will influence the type of pump used as well as the pumping distance. “For example, when pumping water mixed with sand or silt you might want to choose a pump with hardened components or coatings,” Chirico says.

According to Chirico, there are three primary types of pumps used in the construction market: self-priming pumps (wet prime), prime-assisted pumps (dry prime) and submersible pumps. Self-priming pumps require water to prime and reprime, while prime-assisted use an external priming device (compressor/venture, diaphragm and vacuum style) to prime and reprime. “Prime-assisted (dry prime) is typically a product of



Crews from a project in Michigan excavated swampland, replaced it with compacted sand and set up a wellpoint system before excavation for the project could begin.

choice for most rental companies and contractors alike because of its ease of priming and run-dry capability,” Chirico says.

WELLPOINT SYSTEMS

Some sites may require 24/7 pumping if the water table is higher than the excavation subgrade. On these sites, the water level can be lowered to create a safe, dry environment for excavation using wellpoint pumps and piping. A wellpoint system features wells which are spaced around an excavation and connected to a common header, which is attached to many more wellpoints. According to Schmall, they are best suited to relatively shallow excavations (less than 15 feet) and can be installed in a wide range of soils including sands, gravels, silts, soft clays and stratified soils.

DEEP WELLS

Deep well dewatering is typically utilized with deep excavations, where the height of static water above subgrade is greater than the typical 17-foot suction lift limitation for a wellpoint system. Tunnels and dams are good examples of deep dewatering work.

Wells can vary in size from 3 to 24 inches in diameter and range in depth from 20 feet to several hundred feet. Each deep well holds a submersible pump. By operating deep wells around the vicinity of the excavation site, the groundwater can be lowered without equipment in the hole, a major advantage for the general contractor.

CUT-OFF

Another dewatering method that can sometimes meet requirements is installation of a cut-off where a barrier excludes water from the excavation area.

“An experienced groundwater control engineer can also weigh the options of dewatering versus groundwater cut-off such as steel sheet piling or a soil mix barrier wall.”

Paul Schmall

“Cut-offs can take several forms such as barrier walls made from steel sheeting, chainsaw trencher soil mix walls, conventional slurry trenching, or diaphragm walls for deep excavations,” Schmall says. “Jet grouting and permeation grouting are also options.”

DEWATERING EXPERTISE

According to Schmall, any project where there is no tolerance for a hiccup, or when multiple options are available to achieve the desired result, should involve a ground engineering specialist.

“An experienced groundwater control engineer can also weigh the options of dewatering versus groundwater cut-off such as steel sheet piling or a soil mix barrier wall.”

Xylem’s services cover a wide spectrum, and depending on client needs, it will provide anything from rental equipment to complete turnkey services. “I’m seeing growing demand for turnkey solutions,” Albaugh says. “Anybody can rent a pump. We try to be that partner that will give them a solution on how to dewater at an efficient cost.”

No matter what dewatering system is utilized, contractors need to be mindful of local discharge requirements and regulations. Water quality can be changeable too depending on site activities.

Technology is allowing contractors greater control over releases of dirty water. “We can now put sensors into the pipelines to check for pH and turbidity,” Albaugh says. “We can change the turbidity to make sure we are not releasing dirty water.”

CONNECTED TECHNOLOGY

Smart technology now allows contractors to monitor pumps remotely. “We can see when we have a dry or wet hole from our smartphone,” Albaugh



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says. Weather monitoring systems can trigger the pump to speed up or slow down to meet the conditions.

“Contractors want a reliable pump without too much maintenance, and they want to get it started without any additional resource,” Chirico says. Remote access through telematics allows them to easily check to see that pumps are properly maintained and fueled. Rental companies can see where their assets are located and how many hours they are being run.

According to Schmall other advances that the ground engineering community has seen in recent years include the effective combined use of partial cut-off and pumping as well as innovation in drilling techniques. It is now possible to install angled wells, horizontal wells, wells from inside tunnels, from basement interiors, and to drill wells into rock and difficult conditions.

With technology expanding your options, this may be the year to look at strategies to dewater your job sites with an eye toward improving efficiency, reducing pump maintenance costs and keeping projects on track.

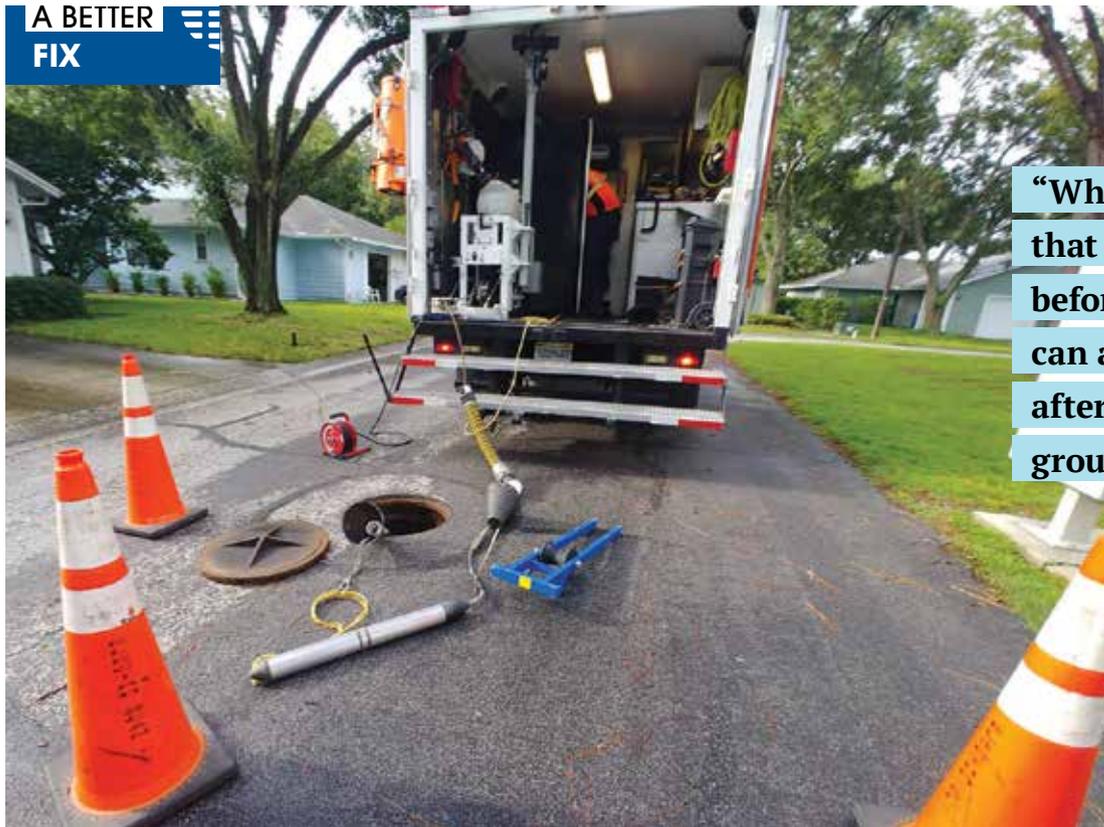
ABOUT THE AUTHOR

AEM is the North American-based international trade group representing off-road equipment manufacturers and suppliers, with more than 950 companies and 200-plus product lines in the agriculture and construction-related sectors worldwide. AEM has an ownership stake in and manages several world-class exhibitions, including CONEXPO-CON/AGG. I&I



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“What we’re finding out now is that if you use FELL technology before, and then you slipline, you can also use FELL technology afterward to make sure that they grouted the laterals correctly.”

Richard Cummings

After a recent trial run, Hillsborough County, Florida, is now committed to using newer technologies like focused electrode leak location by Electro Scan (pictured) and the SL-RAT by InfoSense as part of its I&I program.

FINDING THE FAULTS

Leak detection advancements can help you quantify I&I

By Anthony Drew

As the leader of a large and rapidly growing water/wastewater utility, Richard Cummings needs to make sure I&I issues are identified accurately and efficiently, and he needs to make sure those issues are unquestionably solved the first time he has a crew on site.

In this endeavor, he largely credits embracing emerging technologies that can give him quantifiable data about leaks and help take human error out of the equation wherever possible.

Cummings is the director of Hillsborough County, Florida’s Field Maintenance Services Division, which offers sewer/water services to about 200,000 customers. When he first started working at the utility in 2001, it was a little more than half the size it is now. Since 2013, he says the rate of growth has been “off the chain.”

“Hillsborough County is like many in the state of Florida. It started out as an entity and over the years it acquired a lot of different franchises,” he says. “A lot of the people in the franchises weren’t taking care of their systems the way they needed to. They were run down. Some of them hadn’t even had basic maintenance to sewers and waterlines.”

As Hillborough took over these franchises, it found a lot of the pump stations were overrun, and there were some significant I&I problems. As a result, the division typically spends \$2 million to \$3 million on a sliplining contract every couple years, and it has ramped up its CCTV and pipe cleaning efforts as well. “Even right now, to comply with Environmental Protection Agency requirements and the Department of Environmental Protection, they really would like for us to go through all of our collections system at least once every five years.”

ADOPTING NEW TECHNOLOGIES

The true game changer for Hillsborough County, according to Cummings, has been the adoption of technologies like Electro Scan’s focused electrode leak location (FELL) and the SL-RAT by InfoSense.

He says the utility first started using the SL-RAT, an acoustic inspection tool used to screen for blockages in small-diameter gravity sewers. Cummings praised its cost-effectiveness and efficiency in sewer assessments. It allows the utility to dispatch its CCTV and cleaning trucks more purposefully. “It’s very useful and we can get a lot of territory covered. The guys can go through literally like 7,000 feet per week.”

Later, after using CCTV to tackle a lengthy project at one of its worst basins — the River Oaks basin in the western portion of the county — Cummings decided to give FELL technology a test run for possible use in the future.

“With FELL technology, we did a small segment of a couple of runs two or three years ago,” he says. “It really opened our eyes up as far as what was happening.”

Since that initial test, the county has continued to use FELL to inspect its sewer system, and it has found a lot of leaks. “The main benefit I see is quantifying the leak — that’s the deal.”

Instead of relying on human operators to use cameras and MACP/PACP coding to identify and report leaks, the utility started getting its data via Bluetooth using Electro Scan’s included software, which offers detailed reports about individual leak intensities, even estimating their contribution to I&I in gallons per minute.



Hillsborough crews prepare to run an Electro Scan electrode through a pipe in a residential neighborhood to inspect the system for leaks.



As the electrode runs through the pipe on a jet hose, it sends electrical current that finds its way through leaks to a conductor rod at the ground level.

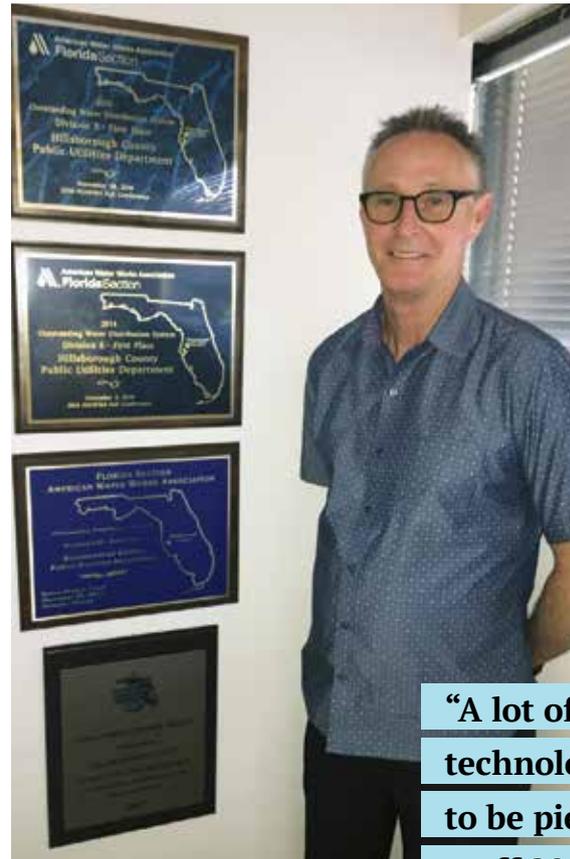
“Before, it was up to the human being to decide whether it’s this much of a leak, or this much, or this much. We like FELL technology because it puts a quantitative number on that. It tells the intensity of the leak and puts a number against it using a mathematical formula.”

And it finds a lot of defects, according to Cummings, the most significant of which almost always end up being at the lateral connections in his experience. “You can go manhole by manhole run, and you can see exactly by looking at it, it quantifies it. FELL is looking for leaks that make a difference — it shows an intensity. When you’re looking through these charts, you can see how many feet they are apart, and typically what you see is that these leaks are at a lateral almost all the time.”

A MULTIPLE-USE CASE

Identifying sources of I&I is only half the battle, though. Cummings says he wants to start using Electro Scan’s FELL technology to verify the integrity of those lateral connection repairs.

“We’ll decide we have a leaky pipe, and we’ll go in and slipline that and we’ll grout around where the laterals connect,” he says. “That’s fine, except for, that grout is clear, so it looks like clear jelly. So when you grout it, I can’t tell how much you put in there and I can’t tell if you stopped the leak or not. What we’re finding out now is that if you use FELL technology before, and then you slipline, you can also use FELL technology afterward to make sure that they grouted the laterals correctly.”



“A lot of this technology used to be pie-in-the-sky stuff 20 or 30 years ago.”

Richard Cummings

Richard Cummings, director of Hillsborough County’s Field Maintenance Services Division, stands near a collection of awards from the American Water Works Association Florida Section.

Cummings says he likes the added assurance a program like that could provide. “Because many times I think I’ve fixed the problem and I turn around and it’s leaking again. I sliplined it — so what? Did I stop the leakage rate? I have to be in there at the same time of year to test it when I’m talking about groundwater levels. With FELL, it doesn’t matter.”

HOW IT WORKS

To use FELL technology, Hillsborough’s crews first pound a conductor rod into the ground. Then, they use an electrode attached to a jet hose that pulls along a column of water. “Every joint it passes over is covered by water, and if water can get in, then the electricity can get out the same way,” Cummings says. “So if there’s a leaky joint and water could get into that joint, using this water, the electrical current squeezes through that crack and travels through the ground and the circuit is connected when it goes to that ground rod. The FELL technology can see the strength of that signal and the duration and tell you how much of a leak rate it is.”

It’s a technology that complements more traditional CCTV work. If there’s an obvious leak, Cummings says he wants to get a look at it with a camera. But for the less obvious leaks, which often accompany I&I programs, he says FELL is a solid technology. “Electro Scan tells you where the leak is,” he says. “And that’s worth a lot of money, because if you take care of that leak once, you’re saving money every month from now on. You’re not pouring water in the system.”

Keeping up on technological advancements and showing a willingness to give emerging technology a chance has proven beneficial for many utilities, including Hillsborough County’s Field Maintenance Services Division.

“A lot of this technology used to be pie-in-the-sky stuff 20 or 30 years ago,” Cummings says. “Things are going to change so much in the next 15 or 20 years, it’s going to be unrecognizable.” **I&I**

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What is your primary service?

- Cleaning - Industrial/Waterblasting
- Consulting/Engineering
- Location/Leak Detection
- Sewer System Installation/Repair
- Other _____
- Hydroexcavation
- Dealer/Distributor/Manufacturer
- Rehabilitation/Relining/Bursting
- TV/Video Inspection
- Industrial/Commercial/Municipal Services
- Government/Municipal
- Sewer/Drain Cleaning

Which types of sewer, storm & water repair, maintenance & inspection do you perform monthly?

- Jetting
- TV Inspection
- Repair/Replace Excavating
- Vacuum Truck Service
- Manhole Rehabilitation
- Treatment
- Pipeline Rehabilitation & Relining

What is the approximate population of the area in which you provide service?

- 0-10,000
- 10,001-50,000
- 50,001-100,000
- 100,001-200,000
- 200,001-500,000
- 500,001+

How many vehicles do you currently have in service?

- 1-5
- 6-10
- 11-15
- 16-20
- 21+

What is your annual equipment budget?

- \$0-\$50K
- \$50K-\$100K
- \$100K-\$200K
- \$200K-\$300K
- \$300K-\$400K
- \$400K-\$500K
- \$500K +

If municipal, what percentage of your sewer and/or water work is done by private contractor?

- None
- 1-20%
- 21-40%
- 41-60%
- 61-80%
- 80%+

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