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Andrea Long  
Principal Engineer  
Aurora (Colorado) Water

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Andrea Long is the principal engineer for Aurora Colorado's Wastewater and Stormwater Capital Projects Division. The utility is wrapping up construction of its new 30,400-foot sewer interceptor ahead of schedule.

PHOTOGRAPHY BY REBECCA SLEZAK



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Luke Laggis

# GETTING CONNECTED

Take advantage of opportunities to become a bigger part of the water and wastewater industry

How often do you talk to your peers? I don't mean the people you go to work with every day, but the people like you from other utilities serving other communities, tackling similar issues.

I've been working from home since the spring of 2020. It provides convenience and an extremely short commute, but it doesn't necessarily foster communication and understanding. I email and chat with colleagues, and occasionally pick up the phone, but none of that can really replace face-to-face interaction.

So, it was really enjoyable when I had the opportunity to fly south this fall for a big industry event. I talked to so many people whose names fill my inbox but whom I almost never see in person. I stumbled across new companies and innovations that will almost certainly be featured in *MSW* over the coming months. More important, I experienced something no Wi-Fi connection will ever provide: feeling connected.

It continued at the airport while I was waiting to fly home. A guy who had obviously been at the same event walked over to the same gate and sat down a

couple seats away. We started chatting and I found out he grew up not too far from where I live. When our connecting flight in Dallas got delayed, we got a beer together, talked about the industry and our jobs, even a possible story down the road.

Once I got home, connections from the event continued. I started getting follow-up emails and LinkedIn invitations from people I'd met. A phone call or two to discuss story opportunities.

I'm going over my notes now, looking over background information and plotting out stories that have sprung from conversations at the event. Connections made at the show will continue to expand my knowledge of the industry. They'll find their way into my inbox, daily work and ultimately the pages of this magazine.

Maybe a big trip across the country to go to one of the major trade shows isn't in the cards for you, but the smaller state and regional shows offer plenty too. They can connect, inform and inspire you, and that's good for you, your utilities and your communities.

And those opportunities aren't limited to a trade show or some other industry event. Maybe it's casual conversations with your colleagues at neighboring utilities. Maybe it's talking to your peers within other municipal departments. Or sitting in on webinars, welcoming product demonstrations or training opportunities. Maybe a little of it is reading this magazine and hearing stories from utility operators across the country.

It's easy to be insulated, to confine ourselves to offices or job sites where we only see the same few people each day. But if you really want to keep growing, improving and finding ways to make your communities stronger, you need to get connected.

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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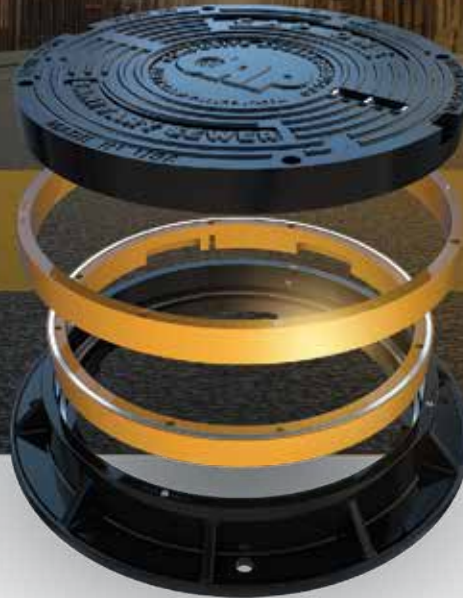


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# PRIORITIZING INFRASTRUCTURE RESILIENCE

Coastal utility tackling major sewer-related capital improvement projects outlined in 20-year master plan

By Ken Wysocky

The city of Fort Lauderdale is in the midst of a nearly \$28 million sewer replacement project that will remove from service an aging cast iron sewer main deemed extremely vulnerable to failure.

The project involves replacing a 7,900-foot-long, 42-inch-diameter sanitary force main with 42-inch, high-density polyethylene pipe. It also includes installing an additional 3,750 feet of 24-inch sewer line, also using HDPE pipe, says Alan Dodd, the city’s director of public works.

The little more than 2 miles of new force main will connect lift stations in several neighborhoods in the northeast quadrant of the city to a repump station that sends sewage to the George T. Lohmeyer Regional Wastewater Treatment Plant, located near the Atlantic Ocean, just southeast of the city’s downtown district.

“This force main is critical to our operations,” Dodd says.

The project began in April 2024. As of early August, it was about half finished. Completion is expected in mid-fall 2025.

But the project is just the tip of the iceberg for the city’s public works officials. During the last several years, they’ve been busy quarterbacking the installation of roughly \$100 million worth of sewer force mains. The 13 projects totaled 17.25 miles in length — nearly 5% of the city’s sanitary mains.

Those projects included installing nearly 9 miles of 30-, 42-, 48- and 54-inch-diameter force mains that transmit sewage from a repump station in the northeast part

of the city to Lohmeyer plant, at a cost of about \$63 million; and the installation of about 3.5 miles of 30-inch force main that transmits sewage from a repump station in the western part of the city to the Lohmeyer treatment plant, at a cost of roughly \$13.1 million, Dodd says.

“In the last year alone, we awarded more than \$157 million worth of projects [including the aforementioned force main replacement],” he says. “We find there’s value in doing larger segments instead of breaking the projects into smaller pieces. It creates a more coherent project and allows us to better manage the impacts on neighborhoods.”

Another significant project currently underway is the replacement of 4,200 feet of 54-inch effluent force main that connects the Lohmeyer treatment plant to a deep-injection wellfield. There the city disposes the fully treated effluent by pumping it approximately 3,500 feet below ground via five 24-inch-diameter deep-injection wells, Dodd says.

The effluent flows into a mineral rock formation known as the boulder zone, well below the region’s water aquifers. The project cost is about \$53.3 million and the project is slated for completion in September 2026.

## Massive rehab effort

The projects are among many prioritized in a 20-year master plan of sewer-related capital improvement projects approved in 2017 by the city’s board of commissioners. The plan also determined high-growth areas that need additional sewage-line capacity.



Principle pipe layer Robert Lawson (left) and foreman Tommy Woolley of the Fort Lauderdale Department of Public Works on the job site of the city’s \$28 million sewer replacement project.



“We’ve made a decision to invest heavily and get our infrastructure up to A-plus status.”

Alan Dodd



**PROFILE:**

Department of Public Works, Fort Lauderdale, FL

**SERVICE AREA:**

About 38 square miles

**POPULATION SERVED:**

About 250,000 people

**SEWER CUSTOMER BASE:**

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**SEWER INFRASTRUCTURE:**

One regional sewage-treatment plant, approximately 368 miles of sewer mains, 187 pump stations

**AVERAGE TREATMENT FLOW:**

41 mgd

**TREATMENT CAPACITY:**

Roughly 60 mgd

**EMPLOYEES:**

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**WEBSITE:**

fortlauderdale.gov



Crew member Gregory Staple breaks off a piece of old clay pipe.



Robert Lawson (left) and Gordan Antione dig out around the existing pipe.

“Like just about every other community in the country, we’re playing a little catch-up when it comes to improving sewer infrastructure,” Dodd notes. “Demand for sewer services keeps growing and our infrastructure is getting older, so we’ve made a decision to invest heavily and get our infrastructure up to A-plus status.

“Infrastructure resilience is our top priority.”

To underscore the situation, Dodd points out that out about 168 miles of the city’s approximately 368 miles of sewer lines are 60 years old or older.

To fund this large slate of projects outlined in the 20-year master plan, the city commission approved the issuance of two water and sewer revenue bonds worth \$200 million each, one in 2018 and the other in 2024.

### A confluence of threats

A perfect storm of factors is the city’s sewer line problems: Cast iron pipes that are subject to corrosion; a high water table with salty water; and sand that enters the sewer lines due to inflow and infiltration and scours the bottom of pipes.

“We’ve had a number of failures caused by the bottom walls of pipes getting eroded away,” Dodd says.

In some instances, sand had scoured portions of 1-1/2-inch-thick cast iron pipes’ walls down to a quarter of an inch thick, Dodd says.

“That’s why we’ve been on this very aggressive program to replace mains with pipes that are better suited for the ground conditions and that can handle the flows we have now versus what they were required to handle years ago,” he says.

In one particularly significant incident in 2017, breaks in a cast-iron main that handles about a third of the city’s sewage inundated some neighborhoods with sewage more than a foot deep. Faced with a public health emergency, the city hired Murphy Pipeline Contractors in Jacksonville to rehabilitate a little more than 4 miles of sewer force mains in just nine months.

### Speed drill

The company deployed two different technologies — horizontal directional drilling and compression-fit pipe lining, to complete the massive project. Speed was of the essence because sewer line breaks threaten local intracoastal waterways and other environmentally sensitive marine areas.

The nearly \$15 million project involved installing approximately 8,600 linear feet of new 30-inch force mains via horizontal directional drilling and rehabilitating another 11,500 linear feet of existing 30-inch force mains with compression-fit lining technology, which uses HDPE pipe.

In compression-fit lining, powerful winches pull long runs of HDPE pipe through custom-made steel dies that are slightly smaller than the host pipe. As the pipe passes through the dies under extremely high force — anywhere from 70 to nearly 100 tons of pressure, depending on the length of the pull — it gets compressed to a smaller diameter than the host pipe.

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**No easy job**

The force main project posed several challenges. Its route traveled through a densely populated area with a lot of underground utility lines, narrow roads and residential homes. As such, about 60% of the main was installed via horizontal directional drilling that passed under the lines, Dodd says.

“There’s also a cost savings [with HDD] compared to open-cut, plus you avoid a lot of impacts on traffic and residents,” he adds. “We try to use the best technology to minimize the impact while staying on schedule and improving the value of what we deliver with the project.”

Another challenge was the high groundwater table. As a coastal community, groundwater is as shallow as 5 feet below roadways in some areas, which made it necessary to continually dewater the pits dug for the HDD operations.

Furthermore, the force main’s path passed under the driving range of a private golf course. That required the city to work out a complex agreement with the golf course owner, even though the city owned an easement for the line, which generally follows the route of the existing force main, he says.

“It took a lot of coordination with the neighborhood and the golf course to align the project and minimize the impact on the residents and the golf course,” Dodd says.

The old line will be abandoned after the new line is installed.

**Following the plan**

There’s much more work ahead as the city follows the outlines of the master plan. In the next four years, the city will embark on eight more projects that will involve replacing/rehabbing about 11 more miles of force mains.

For example, the city recently awarded a \$53.4 million contract for the rehabilitation and replacement of 23,370 feet of 48- to 54-inch force main that connects the wastewater collection system in the central part of the city to the Lohmeyer treatment plant. Work on that project is expected to start in September 2024.

“We’re doing a lot of rehab on lift stations, too — replacing pumps and motors and elevating control panels to avoid damage from flooding,” Dodd explains. “We have extreme challenges in south Florida from heavy rainfalls and high-tide flooding.”

The work outlined in the master plan is being performed in five-year increments. By the end of the 20 years’ worth of work proposed by the plan, Dodd estimates the city will have replaced or rehabbed approximately 40 miles of sanitary sewer lines, mostly large-diameter force mains.

“We have plenty of work to keep going for many years,” he says. “Our main focus is prioritizing projects based on risk and vulnerability and to stay ahead of sewer line breaks.

“We have a very active program, but that’s what makes it fun.” ♦

**“In the last year alone, we awarded more than \$157 million worth of projects.”**  
**Alan Dodd**



Lawson and Antione remove an old fitting.

**PROGRAM AIMS TO REDUCE I&I**

As the city of Fort Lauderdale strives to replace or rehabilitate roughly 40 miles of vulnerable force main sanitary sewers by around 2037, it also has initiated a five-year-long program to reduce infiltration and inflow in gravity sewer mains, sewer laterals, pump stations and manholes.

The program, which kicked into gear around March 2024, has a proposed budget of \$100 million (pending approval by city commissioners). It aims to reduce I&I flow to the city’s only wastewater treatment plant — the George T. Lohmeyer Regional Wastewater Treatment Plant — by 6 to 9 million gallons per day by around early 2029, says Alan Dodd, the city’s director of public works.

“This reduction is critical in order to keep up with the city’s growth, while also avoiding the need for costly wastewater treatment plant upgrades,” he says. “Reducing the amount of stormwater and subsurface groundwater that enters the city’s sanitary sewer system is a top priority.”

Previous flow-monitoring and capacity studies completed as part of a 20-year master plan for sewer infrastructure improvements, which was approved by city commissioners in 2017, show that base I&I adds approximately 9 mgd to sewage flow into the Lohmeyer plant.

But during heavy rains, that I&I number swells to as much as 30 to 40 mgd of additional flow.

“This phenomenon is not unique to the city of Fort Lauderdale, as many municipalities across south Florida and throughout the nation are facing similar issues caused by aging sewer infrastructure,” Dodd notes.

Reduction of extraneous I&I flows also will ultimately reduce additional costs associated with wear and tear on pumping and treatment equipment, chemical consumption, additional maintenance and energy usage.

Public works officials currently are assessing the condition of infrastructure in 130 pump stations areas and trying to pinpoint I&I sources. The assessment includes roughly 300 miles of gravity mains and 7,000 manholes. When the assessments conclude, officials will prioritize repairs that yield the greatest I&I reductions and provide the best benefit for the cost.

“The guiding principle prior to performing I&I repairs is an analysis of whether it is more cost efficient to continue to pump the extraneous flows or mitigate the source of the I&I,” Dodd says.

Additionally, officials are revamping protocols to establish a long-term plan for continuous I&I maintenance efforts after this specific I&I-reduction program concludes.

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# REDUCING DEMAND

Twin Cities' Water Efficiency Grant Program incentivizes conservation to help protect the region's aquifers

By *Sandra Buettner*

Leaders at the Metropolitan Council in the Twin Cities knew that area aquifers were not infinite and needed to be conserved to meet the needs of future generations.

They also have faced droughts in the past few years. Minnesota may be the state of 10,000 lakes, but the council wants to protect those lakes and other water sources so that today's residents and future generations can use and enjoy them.

The Met Council, based in St. Paul, operates the region's wastewater treatment systems and is responsible for long-range planning in the seven-county Twin Cities metro area. The utility treats an average of 180 mgd of wastewater and has capacity to treat 251 mgd for the service area's nearly 2.7 million residents.

## Offering incentives

"Many regions across the country are facing the reality that groundwater is not an unlimited resource," says Henry McCarthy, grant program coordinator. "We are working to ensure that development in our region does not outpace the ability of our aquifers to retain adequate supplies."

To that end, the council created the Water Efficiency Grant Program to encourage customers to use water wisely and reduce demand on the groundwater. The council's 2015 Master Water Supply Plan identified where water use was the greatest and pinpointed supply issues.

The council proposed the grant program to the Minnesota legislature as a potential use of Clean Water Fund dollars. In 2015 the Legislature authorized the creation of a grant fund to help growing communities reduce water consumption and future infrastructure costs.

## Federal support

The council collaborated with the U.S. EPA WaterSense program to help facilitate the grants. The utility promoted the low-cost purchase and installation of EPA WaterSense products for communities,



reducing municipal water use. The partnership enables the Council to promote to its communities the benefits of using WaterSense label products.

The funds are available to cities that either operate a municipal water system of their own or are served by another municipal system. The program also requires them to replace specified water-using devices with approved devices that use less water. For existing homes, some eligible items are:

- Toilets, shower heads, irrigation controllers and irrigation spray sprinkler bodies with WaterSense-labeled models

- Irrigation system audit conducted by a WaterSense-approved professional
- Washing machine and dishwasher replacement with machines carrying the Energy Star label from the U.S. Department of Energy.

"Municipalities are allowed to design their own programs," says McCarthy. "Some may focus on a single device they are promoting, while others offer several device options for rebates."



**“We are working to ensure that development in our region does not outpace the ability of our aquifers to retain adequate supplies.”**

**Henry McCarthy**

**Traveling trailer**

Besides promoting the Water Efficiency Grant program and water-saving ideas, the Met Council paid for a traveling education trailer using money from Clean Water, Land and Legacy Amendment funds. The University of Minnesota’s Turfgrass Science Team, which built the trailer, takes it to community events in the Twin Cities region.

The trailer enables the turfgrass team to inform community residents about topics including lawn water conservation, seeding, smart irrigation, bee lawns and more.

“After a long winter, residents look forward to the warm summer months,” says McCarthy. “More water tends to be used on their lawns. That increases the stress on water resources and supply systems, driving up costs and putting engineered water systems at risk.”

The trailer can be reserved free of charge for community events such as farmer’s markets, home expos and county fairs. A science team representative is available to speak at events. In 2023 alone, the trailer team visited and spoke at 25 neighborhood events.

**Metrics and accolades**

The Water Efficiency Grant Program has gone through three funding cycles, and a fourth began in July 2024. The Met Council’s Water Efficiency Grant program is saving a total of 200 million gallons of water per year. The council also partnered with 45 municipalities.

For its efforts, the Met Council received a 2023 Excellence Award in Promoting WaterSense from the EPA. ♦

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# A NEW PHASE OF DEVELOPMENT

Aurora Water takes a different approach to planning system upgrades

By Jim Force



**PROFILE:**

**Aurora Water (Colorado)**

**FOUNDED:**

1949 as Aurora Water Department

**POPULATION SERVED:**

400,000

**AREA SERVED:**

City of Aurora

**MILES OF WATER PIPE:**

1,689

**MILES OF SEWER PIPE:**

1,198

**WATER TREATMENT PLANTS:**

3

**WATER RECYCLING PLANTS:**

2

**RESERVOIRS:**

11

**NUMBER OF EMPLOYEES:**

500

**WEBSITE:**

[auroragov.org](http://auroragov.org)

An old adage advises: “By taking one step at a time, you can achieve great things.” That may have been on the mind of Aurora Water when it broke a costly interceptor sewer project into several phases over three years, and included alternative bids, to achieve the overall objective while saving money.

Andrea Long, principal engineer for the city’s Wastewater and Stormwater Capital Projects Division, reported on the project at the 2024 No-Dig Show in Rhode Island last April.

“When first bid, our interceptor project came in significantly over budget,” she says. Known as Senac Creek Interceptor, the project involved constructing a gravity interceptor line to serve a rapidly developing area in the eastern part of the community. “We decided to bid the project in several phases and add alternatives to allow market conditions to determine most economical materials and installation methods.”

Aurora Water estimates total savings realized by phasing the project at about \$4.5 million.

A key to success was working with the developer to stay ahead of new construction. “In the first phase, we were able to prioritize the work and complete sections of the interceptor before buildings, streets and other utilities were in place,” Long explains.

Aurora evaluated PVC and fiberglass reinforced pipe, as well as tunneling and open trench construction for the project. Prime con-

tractors and tunneling subcontractors were prequalified prior to bidding, forming effective partnerships that added to the project’s success. Contractors and their subcontractors were evaluated as teams and ranked based on years of experience with similar kinds of work.

“We found fewer change orders and issues in the field when experienced teams are working together,” Long says.

Using this alternative approach, Aurora was able to complete Phase 1 and started Phase 2 by the end of 2023. The final phase is scheduled to be finished ahead of schedule in late 2024.

Funding was secured through the city’s Enterprise Fund, supported primarily through development fees.

**Aurora sewers**

The Aurora sewer system consists of sections installed in the 1940s as well as brand new networks being constructed as the city expands into new areas east of Denver. With 400,000 customers across portions of three different counties, Aurora is the third-largest and fastest growing city in Colorado.

Overall, the city’s sanitary sewer system measures over 1,200 miles, consisting of 6-to-48-inch pipe with over 31,000 manholes. Wastewater is conveyed to the Metro Water Recovery’s Robert W. Hite wastewater treatment facility and their Northern Treatment



**Sherri Ashcraft Lowers an Envirosight camera into a manhole for a warranty sewer line re-inspection in Aurora, Colorado. PHOTOGRAPHY BY REBECCA SLEZAK**

Plant. The Robert W. Hite facility can process about 130 mgd, and serves 61 different Denver-area communities including Aurora. The North Treatment Plant has a capacity of 28.8 mgd.

The new interceptor — 30,400 linear feet of 30-inch pipe — was designed to eliminate several older lines as well as two lift stations while delivering improved service to a number of new developments, both in the near and long term. In addition, seven separate tunnels were necessary to avoid interfering with existing infrastructure such as waterlines and roads. Tunnels ranged from 50 feet to 575 feet in length.

Aurora solicited bid alternatives for both PVC and fiber-reinforced concrete pipe.

Long says the first bids were open in August 2021 and came in at one and one-half times the budget, forcing the district to go back to the drawing board.

“We couldn’t partially award the contracts,” Long explains. “Volatile market conditions were a challenge in that post-pandemic time. [PVC costs were sky-high and supply chain issues were plaguing all of the construction industry.] We simply couldn’t do this.”

### Phased approach

Instead, Aurora Water decided to rebid the project in separate phases, and use alternative bidding in an attempt to keep costs within budget, yet complete the project in a timely fashion.

In Phase 1, 5,700 linear feet of new sewer line was installed to serve Aurora Water’s new facility known as SEAM (Southeast Aurora Maintenance Site), a consolidated facility for Aurora Water staff and equipment, providing 300,000 square feet devoted to offices and maintenance space. The Phase 1 alignment, which is located in the middle of the overall planned pipe alignment, would ultimately require future phases to tie in the north and south ends of the sewer. The piping was installed under mostly open fields, before new asphalt, roads and landscaping had been placed, saving on costs.

The project also eliminated the need for two new lift stations as well as repairs that would have had to be made on the old system and was designed to provide long-term service to at least 11 new development sites.

Phase 1 was completed in November 2022.

**Phase 2**

Phase 2 was more complex and required more creative thinking on the part of the Aurora Water team.

With Phase 1 under construction, Aurora Water worked to secure additional funding for the project and evaluate ways to reduce the overall cost. Phase 2 included sections at both ends of the line as well as the longest tunnel — a 575-foot crossing of Coal Creek.

After discussion with the landowners and obtaining agreement to use either opencut or trenchless methods of tunneling under the creek, Aurora Water decided to break the Phase 2 project into even smaller portions to allow for identification of bid alternatives based on development needs. With funding in hand, the city solicited a base bid for the sewers, and invited alternatives that opened bids to either trenchless construction or opencut depending on what was most appropriate for individual segments.

Despite requiring a six-month delay for additional permits, the opencut method was selected for the Coal Creek crossing, at a considerable cost savings over microtunnelling. Additional money was saved through modifying the alignment and saved an average of 7 feet of depth along the majority of the alignment.

Another tunnel had to be added to the project because of a pair of high-pressure oil and gas lines discovered during discussions with landowners. Additional costs were incurred for geotechnical borings and reports needed to inform the tunnel design.

The last segment of Phase 2 of the Senac project is under construction now. It involves just over 4,000 linear feet of pipe and two trenchless installations completing the remainder of the interceptor at the far southern end of the alignment. The team has since been able to work with the contractor to engineer one of the tunnels out of the project, saving the city additional money.

The contractor is tracking ahead of schedule and under budget and is slated to be completed in 2024.

**Successful conclusion**

Utility owners are often faced with little choice but to cut scope in the face of volatile markets and escalating rising costs, Long concludes in her presentation. “However, with foresight and planning, utility owners can allow for alternative bidding of materials, alignment or installation methods — allowing the market to dictate what is most effective.”

Phasing a project — as was done in Aurora — can help utilities spread construction costs out over



Crew members at the City of Aurora's Southeast Area Maintenance Facility.

**“Ultimately, no approach is without risks.”**  
**Andrea Long**

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Andrea Long is the principal engineer for Aurora's Wastewater and Stormwater Capital Projects Division.

a period of time, reducing budget impact. In addition, phasing projects can allow for critical phases to be completed sooner or ahead of future projects which in turn provide cost savings.

Long adds that by prequalifying contractors and their subcontractors, utilities can be assured that bidders have the necessary experience to take on critical sewer line projects.

“Ultimately, no approach is without risks. It is important that utilities understand the levels of risk they are comfortable with and the various options available to them.” ♦

Shane Teal pulls in a guide rope after jetting a sewer line. Teal cleans hundreds of feet of pipe per day.



**“We found fewer change orders and issues in the field when experienced teams are working together.”**

Andrea Long

## PRECIOUS WATER

In Aurora, Colorado, nothing is as valuable as water. Aurora is the third largest city in Colorado, yet it's not located near a major water source. By sheer necessity, Aurora Water has become a state leader in water conservation, reuse and innovative water solutions. In addition to providing drinking water, the dedicated professionals at Aurora Water also oversee wastewater collocation and stormwater, employing over 500 staff members.

To ensure a reliable supply of high-quality water for its customers, Aurora Water has strategically developed a diverse water supply portfolio. The city's drinking water comes from a variety of sources, including the South Platte, Colorado and Arkansas river basins.

A series of 12 reservoirs provide storage to capture the water it owns the rights to, assuring adequate supplies even during drought periods that sometimes plague the Front Range of the Rocky Mountains. An elaborate system of tunnels and pipelines moves water to the desired locations.

Aurora Water operates three drinking water treatment facilities, with a combined total capacity of over 200 mgd. Purified water is distributed to approximately 400,000 customers through 1,689 miles of water pipes.

Prairie Waters, which became operational in 2010, is a key component of Aurora's system. A series of wells located along the South Platte River recaptures treated wastewater return flows through a process known as riverbank filtration. The water is then pumped 34 miles to the Peter Binney Purification Facility which utilizes a multibarrier purification approach to treat the water that is then blended with mountain water supplies. Prairie Waters's delivery capacity is up to 10 mgd, making it the largest water recycling facility in Colorado.

Aurora is also setting the bar high for water conservation in Colorado. Water consumption is 115 gallon per customer per day, well below the state's target of 129 gpcd (gallons per customer per day) by 2050.

Wastewater from Aurora customers travels through 1,198 miles of sewers to Metro Water Recovery — a regional wastewater treatment plant that works with 61 local governments.

Aurora Water uses four CTV units and six Vac-Con jet trucks to inspect and maintain its sewer system. The city aims to inspect and clean its entire system every three years as a part of its preventive and predictive maintenance program.



# USING SAFETY SENSE

Addressing issues is vital to providing a safe work atmosphere

*By Ronnie Freeman*







inconvenient. Using your safety sense means you are willing to speak up when you see hazards, have questions or see an unsafe act by a fellow employee. You are not born with common sense, but we do have the ability to develop it over time. It takes life experiences to develop and it's the same with safety sense. It will not come naturally, but with experience, training and making good decisions, you will develop a safety sense that will keep you free from injury. ♦

When it comes to workplace safety, are you using your “safety sense”? Are you making good decisions when it comes to working around hazards?

Safety sense is a combination of common sense and workplace safety. Common sense is defined as the ability to think and behave in a reasonable way and to make good decisions. Safety is then defined as the condition of being protected from or unlikely to cause danger, risk or injury. If you put those two definitions together you get the definition for “safety sense” which is using good judgment to work safely so that you prevent injury to yourself and others.

So, how do we apply this to our daily work life? First, safety must be a part of any job planning before work can begin. If you don't consider safety as a top priority, then you can be setting yourself up to be vulnerable to being exposed to hazards. Speaking of hazards, when there is a hazard present, then you will need to act immediately to eliminate the hazard if possible, and if not then make a plan to properly deal with the hazard. Some hazards can't be eliminated so there has to be a plan to mitigate exposure to the hazard.

This is where following safety regulations can really make a difference. These regulations may seem like a time-consuming hassle, but they are there to protect you from the hazards that can cause injury. If you discover an unsafe condition or witness an unsafe act, have the courage to speak up. Addressing these issues is vital to having a workplace that provides you and your co-workers a safe atmosphere. By developing good safety practices, you build a great safety culture in your workplace. Going home to your loved ones is what all employees should want at the end of the day.

When you take responsibility for your own safety and the safety of others you will find that working safely isn't that difficult of a task. When all employees share the same level of commitment for workplace safety you will have better morale at work, and it will show in a reduction of injuries and incidents involving safety.

Using safety sense means making the right decision and sticking to it. It is following safety regulations and adhering to safety training even if it is difficult or

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## Catch Basin Cleaners

Enz USA Bulldog Manhole Nozzle

The **Bulldog Manhole Nozzle** from **Enz USA** was designed to clean lift stations and vertical pipes. It puts a new spin on cleaning lift stations, eliminating the disposal process by emulsifying the grease. This allows the 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](http://888-369-8721); [www.enz.com](http://www.enz.com)



## I&I Detection/Prevention

Avanti International AV-100

Injection grouts such as **AV-100** chemical grout (acrylamide) from **Avanti International** play a crucial role in municipal sewer systems by effectively sealing leaks and preventing I&I through pipe joints and defects. For over 45 years, it has



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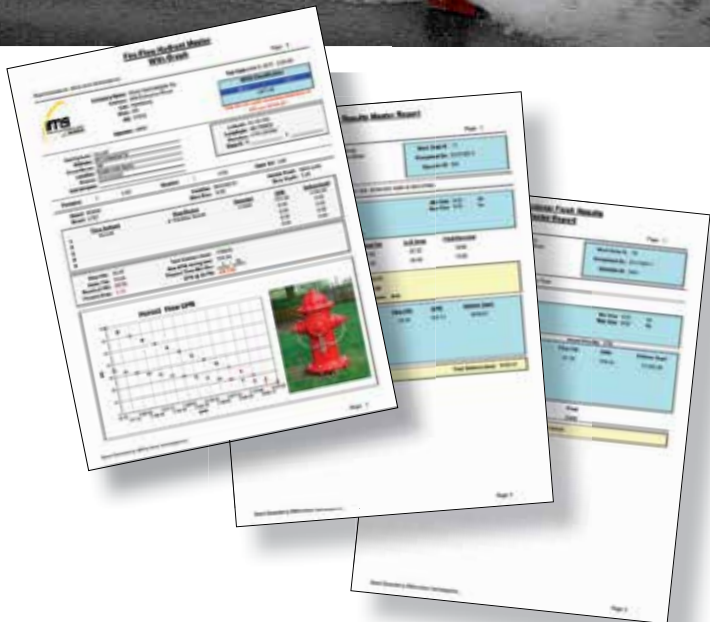


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# Product Spotlight



## New specifications available for HDPE pressure water piping systems

By Craig Mandli

The installation of HDPE pressurized water piping is precise work that requires guidelines to ensure the job is done correctly and to exact specifications. A document is now available for small- and large-diameter HDPE PE4710 pressure water piping systems using horizontal directional drilling.

“MAB Model Specification for the Installation of PE4710 Water Service, Distribution, and Transmission Pipes by Horizontal Directional Drilling (MAB-11-2024)” is available for free download at [plasticpipe.org/mabpubs](http://plasticpipe.org/mabpubs). It was developed by the municipal advisory board, and published with the help of the members of the Plastics Pipe Institute.

According to Camille George Rubeiz, P.E., F. ASCE, co-chair, MAB, and senior director of engineering for PPI’s Municipal & Industrial Division, Maxi-HDD and Mini-HDD operations are covered, with sections devoted to subsurface investigation, equipment and supporting systems, regulations, safety, environmental practices plus

other steps required for the successful HDD installation of HDPE PE4710 pipe. It also contains verbiage that can be directly used in bid documents and includes guidance on submittals and close-out/payments.

“This model specification is intended as a guide,” says Rubeiz. “It is ideal for engineers, users, contractors and other interested parties to use in the design, construction and installation of HDPE pressure water piping systems. The local utility or engineer may want to modify this model specification to adapt the document to local conditions, operations and practices.”

The municipal advisory board task group was led by industry consultant, Dr. Larry Slavin, president, Outside Plant Consulting Services. The model specification was prepared by MAB members and associates as a service to the water industry. The MAB serves as an independent, noncommercial adviser to the Municipal & Industrial Division of the PPI, which is the major North

American trade association representing the plastic pipe industry.

“We broke the document down into two parallel sections; one for large diameter and another for small diameter,” says Slavin. “Both Maxi-HDD and Mini-HDD columns address the same topics with information specific to each. This was for reading ease and quick reference. I was very pleased to see the immense number of contributions, along with the cooperation of our task group that included academics, contractors, installers and utility engineers. Only such a well-rounded group could have produced this very helpful document in fewer than seven months.”

Additional information including model specification (MAB-7) for midi-horizontal directional drilling can be found at the MAB publications website. **469-499-1044; [www.plasticpipe.org](http://www.plasticpipe.org)**

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# CASE STUDIES

## STORMWATER MANAGEMENT

By Craig Mandli

### Catch basin risers used on interstate highway

#### Problem:

In the section being resurfaced on Wisconsin's I-39 highway, about 100 catch basins laid atypically close to a concrete barrier wall. "In places, the barrier wall was actually over the basins," says Curt Neuhauser, project manager for the Wisconsin Department of Transportation. "This initially seemed like it might cause a lot of unexpected work and expense. Fortunately, the contractor floated an option that sounded like it would work."

#### Solution:

Catch basin risers from American Highway Products had been used to raise inlets without removing any surrounding asphalt. "I've used them before,



and have found them quick and easy to install," says Sam Bilhorn, project manager for Payne & Dolan. "I felt they could be used here, and we could avoid removing or undermining the wall. And it wasn't even a change order — the point was, we were able to avoid a change order. And WISDOT agreed they were worth a try." The risers are precisely sized as needed for given situations; width, depth and height are customized for particular jobs. The company can provide multiple sizes per order and keep them organized by size when shipping.

#### RESULT:

Approximately 100 catch basin risers were used on the I-39 project. For his part, Neuhauser is optimistic, and the risers will be used on upcoming projects. "All we had to do was remove the grate and install the risers," he says. "We didn't have to remove the barrier wall, and we didn't even have to dig out any roadway. The proof is in the pudding, of course, but we like how they worked on this project, and we'll be using them again."

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### Utility uses trenchless technology to rehabilitate deteriorated stormwater drainage culvert



#### Problem:

In July 2023, the Ontario Ministry of Transportation was faced with rehabilitating degraded 50-plus-year-old twin 42-inch CSP stormwater drainage culverts under Highway 402, west of London. Due to constant cross-border traffic between Michigan and

Ontario, the highway could not be closed for repairs. These culverts drained into the nearby creek, which required an environmentally friendly solution without use of chemicals. Lastly, these culverts were 400 feet in length, posing a challenge to install quickly and minimize traffic disruption.

#### Solution:

After evaluating bids and previous successful use of PVC fold and form up to 36 inches across Ontario, the MTO awarded the work to CMS, a licensed installer of the Thermoform PVC liner from Warrior Trenchless Solutions. Due to the unprecedented size, length and weight of this liner (42 inches by 410 feet and 13,000 pounds), equipment upgrades were performed over the course of the winter/spring. The liner was successfully installed in one of the culverts over two days in July 2024, allowing for cleaning and preparation Day 1 and lining the pipe Day 2.

#### RESULT:

The MTO has a fully rehabilitated culvert with a new structural liner, extending the life of the pipe by 50 years while also improving hydraulic capacity. This was accomplished with no road closures and minimal traffic disruption, with a technology that discharges only water in the process of installation. The MTO is now extending use of this technology up to 48-inch pipes and longer lengths, for applications that had been out of reach previously.

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# HIGH-VELOCITY PIPE CLEANING



Northern Divers' high-velocity cleaning system was set up along the shore of Lake Winnebago near the Oshkosh Water Filtration Plant.

An innovative system makes sure raw water keeps flowing to a water treatment plant on Wisconsin's Lake Winnebago

By *Scottie Dayton*

From 2019 to 2022, the average raw water turbidity at the Oshkosh Water Filtration Plant increased from 6 to 7.4 NTU while the maximum rose from 9.8 to 12.8 NTU.

In August 2022 Mike Harris, a diver with Northern Divers USA, visually inspected the 2,600-foot-long, 60-inch primary intake pipe in Wisconsin's Lake Winnebago and found it 50-75% occluded with sediment, dead fish and zebra mussels.

"The blockage didn't affect our normal demand of 6-10 mgd, but pushing operations near the plant maximum of 16 mgd would have triggered capacity concerns," says Public Works Director James Rabe, P.E.

The obstruction also increased the pipe's velocity, increasing the risk of pulling in frazil ice and clogging the intake. The city had suffered an ice blockage during the winters of 2015-16. At that time two 24-inch backup intake pipes supplied water to the plant, but ice shoves have since damaged one, restricting its capacity.

In light of the more recent blockage, City Manager Mark Rohloff declared an emergency to resolve the issue before winter, but city officials were unable to secure an intake flushing permit.

A second inspection by Northern Divers in May 2023 found the occlusion had progressed to 75% throughout much of the primary pipe. Approval to clean it arrived on Dec. 5, by which time turbidity averaged 7.3 NTU and peaked at 14.9 NTU.

Northern Divers went to work and, not counting the two weeks off for Christmas and New Year's Day, crews set up the piping and high-performance high-head pumps in 18 days, then cleaned the primary pipe with high-velocity water.



**“We used our 29-foot workboat with 500 hp Honda engine to break through the ice to the navigation channel.”**

**Frank Frosolone**

### Planning ahead

Built in 2005, the concrete intake pipe runs from a depth of 16 feet to a 30-foot-deep concrete diversion vault in Menominee Park. From there the 60-inch transmission main runs to a wet well tee outside the pump house. Both pipes, at 2,600 feet, are separated by the vault and considered individual lines.

The water plant’s dual treatment trains include rapid mix, flocculation, sedimentation, dual-media filtration, ozone and granular activated carbon contactors and chloramine disinfection.

While waiting for the flushing permit Frank Frosolone, Northern Divers president, spent three weeks in his workshop custom fabricating seven 72-by-36-inch sleds, 24 inches high with flanges to help anchor the HDPE supply pipes in the lake. A D-ring attached to the front of the sleds accepted a 10-foot steel pulling cable.

“We had only seven sleds and I needed 14,” says Frosolone. “The solid sled bottom eliminates drawing sediment into our suction pipes.”

Frosolone subcontracted Mersino Dewatering to set up a dozen 18-inch diesel Global Pumps and then fuse 2,400 feet of 24-inch HDPE suction pipe and a dozen 24-inch discharge pipes of various lengths.

The discharge pipes fed two 48-inch manifolds, designed to send high-velocity water through a 48-inch discharge pipe and into the occluded intake pipe. A 12-inch diesel pump and piping supplied emergency water to the wet well in case an increase in demand should overwhelm the plant’s 24-inch near-shore intake.

### Making preparations

Mersino’s bypass project manager Steve Rziemkowski and five workers arrived in the park on Dec. 11 along with truckloads of equipment. While they set the pumps and fused the pipe, divers Harris, Patrick Depass and Andrew Roades worked in the vault

in 20-foot-deep water at 34-38 degrees F.

“There was ice on the lake and the shallow boat launch in the park was always frozen,” says Frosolone. “We constantly needed deicers at the vault and boat launch. We used our 29-foot workboat with 500 hp Honda engine to break through the ice to the navigation channel.”

The divers, wearing hot-water suits, spent three days removing 4 feet of sediment from the vault floor using vacuum pumps. “The plant was constantly drawing in muck, which filled the transmission main and kept turbidity readings high,” says Frosolone, who acted as the certified diving support supervisor.

The intake pipe invert was 2 feet above the floor. When contractors installed the pipe, they welded a steel plate over the mouth to keep water out as they worked inside the vault. Afterward, they rough-cut the plate to remove it, leaving uneven edges that kinked a pair of 3-inch chemical lines running to the crib.

“City officials were unaware of the damage and gave us permission to fix it,” says Frosolone. The divers cut the plate flush, ground the lip smooth and replaced the compromised lines with 3-inch HDPE pipe.

### Tight fit

The next challenge was to lower a custom-built 48-inch-diameter pneumatic bypass plug through a 5-foot-square opening in the vault roof. Frosolone, controlling the Stellar 7630 crane on his truck, flew the suspended plug, guided by radio directions from the divers in the vault. “With only a foot of clearance around the hatch, there was no room for error,” he says. When the plug was in position, the crew inflated it to lock it against the pipe walls.

The 16-foot-long, 48-inch drop pipe had two 45-degree elbows on each end. Lowering it down the hatch was another nail-biter, performed with a telescoping forklift. The driver held the plug in position as the divers joined it to 44 threaded rods on the plug. When that was done, the mouth of the pipe protruded above the hatch to accept the 48-inch discharge pipe.

### Joint efforts

To move the suction pipes into the lake, Mersino workers slipped a strap with a loop over the middle of a pipe, secured a sled to the front of it and attached the pulling cable to the D-ring. The forklift driver slid the machine’s fork through the loop and waited.

Meanwhile, Frosolone piloted the boat within range for a diver to throw a 100-foot line onto shore. One end was hooked

to the cable and the other end to a heavy fitting on the boat. As it slowly pulled the sled forward, the forklift driver raised and extended the boom, pushing the pipe into the water.

Frosolone communicated via radio with Rziemkowski on how fast to pull until the forklift driver aligned the rear pipe flange with the pump flange. After the driver raised the pipe, the crew joined the flanges with washers and nuts. They repeated the process 11 more times.

Next, the crews hooked the discharge pipes to the manifold supply lines through which the pumps would flush the pipe at 130,000 gpm/17 feet per second.

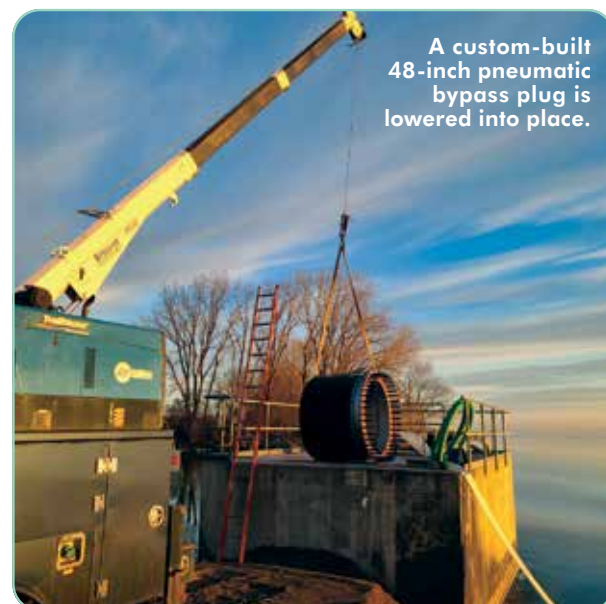
### Turbulent waters

On Jan. 2 in below-freezing temperatures, Frosolone started a pump every 15 minutes. “Start too many too soon and the velocity could cause a blockage,” he says. “Likewise, once the first pump started, we couldn’t stop or material would fall out of suspension and plug the pipe.”

At the crib, water and material blasted up like a volcanic eruption. From a safe distance, Frosolone’s crew tested water samples for turbidity. “We knew the pipe was clean when our testing equipment gave a reading of 0.04 NTU,” he says. “That’s because the suction pipes were collecting water inshore where turbidity was zero.” The pumps ran nonstop for three days.

Next came flushing the 60-inch transmission main from the vault to a tee outside the wet well. Prep work involved removing the cap on the tee and attaching the 48-inch discharge pipe. Frosolone started the pumps on Jan. 8 and ran them for another 72 hours. The team completed work on Jan. 11.

The 60-inch lines are on a three- to five-year maintenance schedule. ♦



**A custom-built 48-inch pneumatic bypass plug is lowered into place.**

# NASSCO HOSTING EDUCATION SESSIONS AT WWETT

Learn how to set up building sewer and drain inspection programs for system owners

By Sheila Joy

NASSCO returns to Indianapolis for the Water & Wastewater Equipment, Treatment & Transport Show this February where its members will present on a variety of topics related to building sewers and drains.

The session will kick off on Feb. 17 with the introduction of NASSCO's new Building Sewer and Drain Inspection certification program, presented by Carl Marc Aurel of Formadrain and James Kicklighter of MaxLiner. Attendees will learn how BSDI assists plumbers, sewer and drain contractors, and inspectors in the proper inspection and assessment of private property sewer and drains for the benefit of real estate transactions and general best practices. Attendees will review specific details to be recorded during an inspection including property location, inspector information, point of access/pipe characteristics, general inspection details and inflow characteristics including downspouts, floor drains, sump pumps, etc.

With BSDI as a baseline, NASSCO member Ed Ho from the San Francisco Public Utilities Commission will share how to set up a building sewer and drain section program for system owners. Municipal employees will learn the basics of proper building sewer and drain inspections and will understand the importance of the role these drain inspections play as a holistic part of an entire system. They will also be introduced to ways to develop programs for their jurisdiction.

David Hamberlin of Hydromax USA and Jerry Weimer of Jerry Weimer Consulting will then present on the topic of drain cleaning. Attendees will learn the best practices, including unique considerations and challenges, in the proper cleaning of drains. Presenters will deliver a preview of NASSCO's new drain cleaning certification program (to be launched in the spring of 2025), including proper steps and expected outcomes.

NASSCO Technical Advisory Council Member Chris Macey, P.E., will bring his expertise to present on the topic of trenchless and other rehabilitation methods for building sewers and drains. Specifically, Chris will share how progressively, once a building sewer or drain has been inspected and cleaned, rehabilitation may be the logical next step. Attendees will learn about various trenchless technologies and other methods to renew building sewers and drains and extend the life of pipes.

NASSCO's Education Day at WWETT will close out with a special session on building sewer and drain safety considerations. Co-presented by NASSCO member Travis Savy of Savy & Sons and Dennis Pivin, CSP, NASSCO's director of health, safety and environmental, they will share safety best practices with a special focus on the inspection, cleaning, maintenance and rehabilitation of building sewers and drains. The presentation will include a safety precautions review and discussion about hazard assessment of the process and ways to protect workers using PPE.

To learn more about NASSCO, please visit [nassco.org](http://nassco.org). To register for NASSCO's Education Day at WWETT, please visit [wwettshow.com](http://wwettshow.com). ♦



NASSCO is located at 5285 Westview Drive, Suite #202, Frederick, MD 21703; 410-442-7473; [www.nassco.org](http://www.nassco.org)

Sheila Joy is executive director of NASSCO. She can be reached at [director@nassco.org](mailto:director@nassco.org).

## Get the EDge

### Training and Continuing Education Courses

#### PACP Training

**Dec. 3, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Michael Lukas

**Dec. 3, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Laurie Perkins

**Dec. 4, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: John E. Jones

**Dec. 4, 8 a.m. CST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Jerry Weimer

**Dec. 4, 8 a.m. MST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Brandon Conley

**Dec. 9, 8 a.m. CST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Michael Lukas

**Dec. 10, 8 a.m. CST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Paul Booth

**Dec. 11, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Rizwan Siddiqi

**Dec. 11, 8 a.m. PST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Brandon Conley

**Dec. 16, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Paul Booth

**Dec. 16, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Jim Harris

**Dec. 17, 8 a.m. EST**  
Virtual

Includes PACP, LACP, MACP  
Trainer: Jerry Weimer

#### ITCP Training

**Dec. 2, 8 a.m. CST**  
Virtual

Includes ITCP-CIPP  
Trainer: John Williamson

**Dec. 9, 8 a.m. PST**  
Spokane, Washington

Includes ITCP-MR  
Trainer: Rocky Capehart

**Dec. 11, 8 a.m. PST**  
Spokane, Washington

Includes ITCP-CIPP  
Trainer: Rocky Capehart

**Dec. 12, 8 a.m. EST**  
Virtual

Includes ITCP-CIPP  
Trainer: Lou Krch

**Dec. 16, 8 a.m. EST**  
Spokane, Washington

Includes ITCP-MR  
Trainer: Tim Back

**Dec. 18, 8 a.m. EST**  
Virtual

Includes ITCP-CIPP  
Trainer: Jason Mathey



**CONFERENCE:** February 17-20  
**EXPO HALL:** February 18-20  
Indiana Convention Center

# WHAT'S NEW FOR 2025?

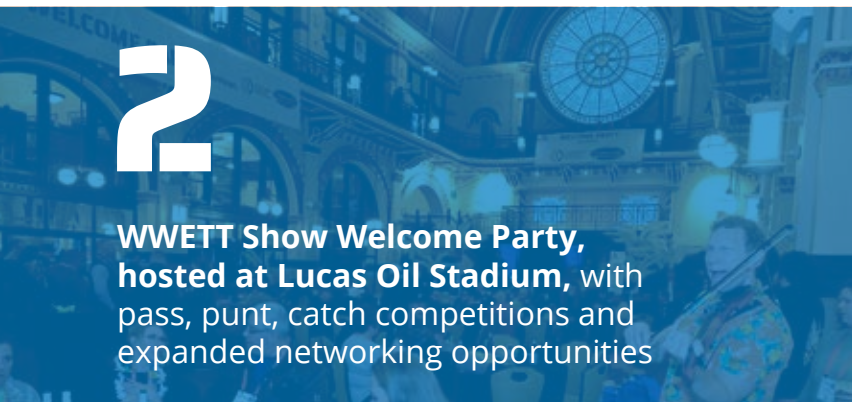
# 1

**Keynote Presentation** by American humanitarian and professional mixed martial artist Justin Wren



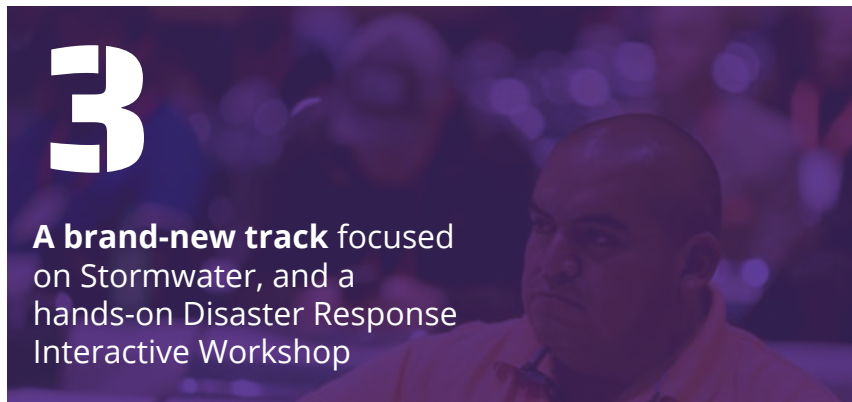
# 2

**WWETT Show Welcome Party**, hosted at Lucas Oil Stadium, with pass, punt, catch competitions and expanded networking opportunities



# 3

**A brand-new track** focused on Stormwater, and a hands-on Disaster Response Interactive Workshop



# 4

Get up close with **behind-the-scenes tours** of the Carmel Wastewater Treatment Plant and Lucas Oil Stadium's Wastewater Management System



# 5



**Inaugural Young Professionals Awards** to honor and celebrate rising stars making a big impact during a special ceremony at The WWETT Show 2025



Register today for **THE event** for wastewater and environmental services professionals  
[wwettshow.com](http://wwettshow.com)

Learn more:



**City of Lindsay wins \$9.5 million settlement to help clean up drinking water**

The city of Lindsay, California, announced a \$9.5 million settlement with SQM North America Corp., a subsidiary of Chilean mining company Sociedad Química y Minera de Chile, in a lawsuit seeking the costs of removing the toxic chemical perchlorate from the city’s drinking water supply. After finding perchlorate in one of its drinking water supply wells, the city deactivated that well, and filed a lawsuit against SQM, claiming that the contamination resulted from applications of defective fertilizer SQM had imported in the first half of the 20th century. The city was represented by SL Environmental Law Group, an environmental law firm that has spent the past 20 years helping municipalities and utilities recover water contamination costs.

**ADS partners with Geoplast on distribution deal**

Advanced Drainage Systems announced a partnership with Geoplast to distribute the company’s Aquabox stormwater detention/retention system in the U.S. The Aquabox system offers several solutions suitable for varying stormwater management requirements using both detention and retention techniques. It is designed for use under parking lots, playgrounds and green areas, maximizing land usage for commercial and public applications.

**Scott Lang named VP of Market Development at Simpson Strong-Tie**



**Scott Lang**

Pleasanton, California-based Simpson Strong-Tie has promoted Scott Lang to the newly created role of vice president, market development for residential digital solutions. In his new position, Lang will refine customer segmentation and develop market strategies for expanding the company’s residential digital solutions, including spearheading new initiatives and creating innovative strategies that cater to customer needs and broaden market reach. Lang has worked with

Simpson Strong-Tie for seven years, most recently serving as technology sales manager for National Builder / Pro Supply.

**Covenant Technical Solutions welcomes Blake DePaola**



**Blake DePaola**

Danville, California-based Covenant Technical Solutions has added Blake DePaola to its leadership team as the Southern California vice president of operations. DePaola brings more than 12 years of industry experience in supervisory and project management roles, where he led successful multimillion dollar alternative delivery projects that resulted in improved water quality and sustainability in the company’s home state.

**502 Equipment opens new location in LaGrange, Kentucky**

After three years of growth, 502 Equipment has officially opened the doors to its new 10,000-square-foot sales and service center in LaGrange, Kentucky, just outside Louisville. 502 Equipment specializes in selling, servicing, and renting out heavy equipment like hydroexcavators, pipeline inspection cameras and high-powered jetter trucks. With the new facility, the company’s mechanics and technicians can hit the road and be on site for service calls or training within 3-5 hours for much of the region.

**Stantec designs new facility in Portland, Oregon**

Construction has begun on the Bull Run Filtration Facility in Portland, Oregon, and Stantec is providing engineering services during construction of the facility. The filtration facility and related pipelines will allow the city to meet regulatory requirements to remove *Cryptosporidium* from the Bull Run drinking water. The project will also help improve the water system’s resilience by reducing the impacts

from fires, landslides and other extreme events that have become more frequent with climate stress. The 135 million gpd facility will be online in 2027.

**Lane Enterprises announces new SVP of marketing and communications**



**Tony Radoszewski**

Tony Radoszewski has joined Lane Enterprises in the new position of senior vice president, marketing and communications. Radoszewski will lead Lane’s efforts to broaden market opportunities in numerous civil infrastructure applications. A veteran of the pipe industry, he brings more than 40 years’ experience in sales, marketing, business development and executive management to the company. In 2019, Radoszewski was named president and CEO of the Plastics Industry Association, PLASTICS, the Washington, D.C., trade group that supports the plastics supply chain in the United States. During his tenure, the association implemented its first-ever, three-year strategic plan which led to identifying, developing and executing strategic initiatives focusing on advocacy, communications, member engagement, education and sustainability. ♦

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