CENTRAL STATES WATER

The Official Magazine of the Central States Water Environment Association, Inc.

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Fond Du Lac WRRTF

PLUS:

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(WEF Water Environment Category):
Illinois Institute of Technology

2024-2025 Buyers' Guide

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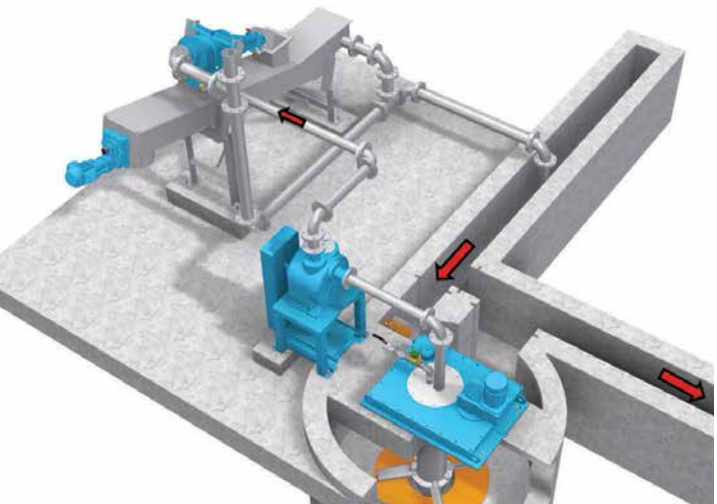

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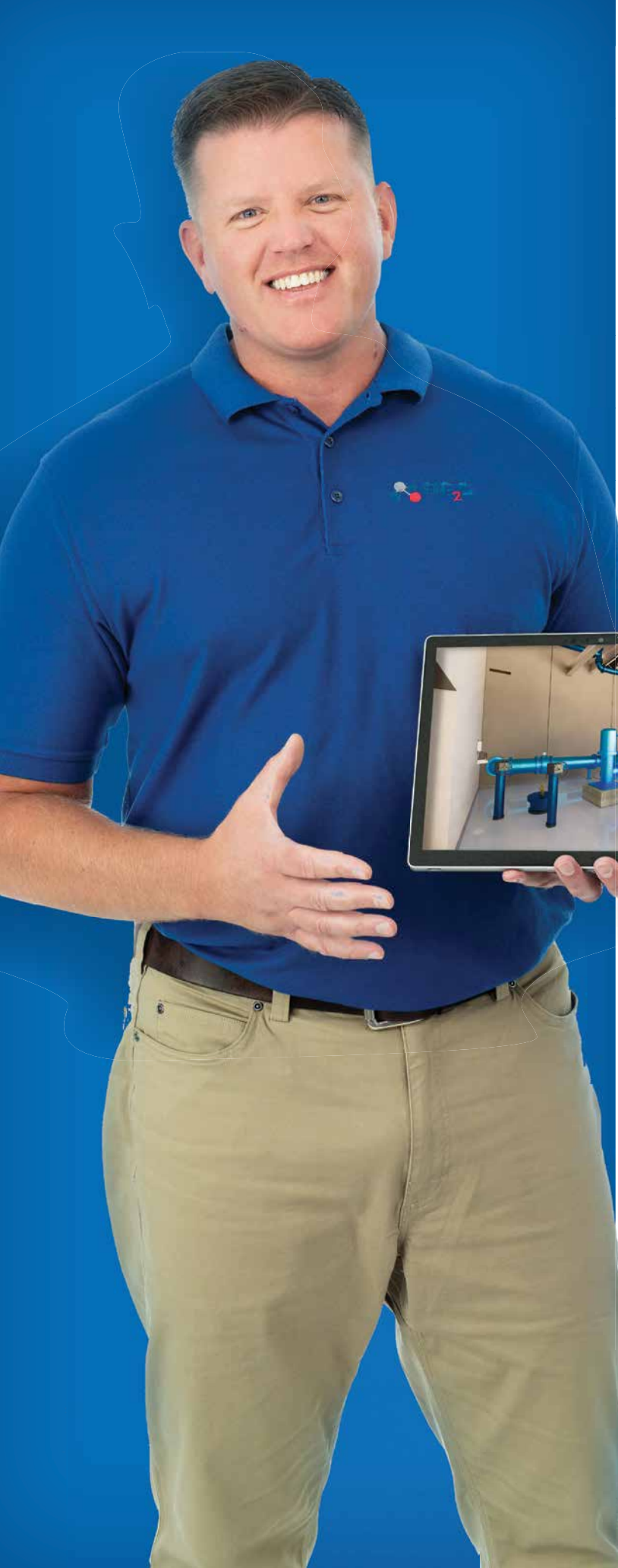

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Think it, Do it, Fix it

By Troy Larson

Strategic planning continues to be an underlying theme for the Executive Committee this year. After doing some workshopping – first with WEF, then with small groups, and again with larger groups at CSX – we have put together some initiatives that are getting attention from the board, the committees, and hopefully the entire membership. In reality, the strategy is taking that which we are good at and attempting to further institutionalize those strong attributes.

There are three focal points of the plan: Technical Excellence, Connection, and Water Workforce. Technical Excellence efforts involve better collaboration between committees and state sections and documentation of productive activities associated with the technical committee. Connection efforts involve improving opportunities for networking, with an emphasis on welcoming new members. Water workforce efforts involve improving access to information and opportunities for more vocational backgrounds, again with emphasis on helping people new to the Association and/or industry.

One outcome of the Strategic Plan is a revised Mission Statement for CSWEA, which now reads: *The Central States Water Environment Association facilitates connection, training, and technical excellence for current and future water professionals.* I believe that this mission statement gets right to the essence of the Association.

I would like to take this opportunity to thank the many people who have contributed to the plan, as the efforts have already provided reassurance that we are working to achieve common goals. I also believe that we are making progress towards documenting activities that can be handed from volunteer to volunteer as we complete our various duties and make way for others who will bring their time, talent, and energy to their new roles. From my vantage point, the exercises we completed are part of a healthy think-it, do-it, fix-it cycle of activity that continually maintains what brings value and eliminates what does not.

The Strategic Plan had the largest time slot at CSX but it was the discussion around welcoming young professionals into the organization that brought the most energy from the group. If you are a young professional and you are reading this article, please let me know what your experience has been. I can tell you with sincere confidence that you are welcome within CSWEA and that the membership looks forward to helping you grow as a water workforce professional. CS

> "There are three focal points of the plan: Technical Excellence, Connection, and Water Workforce."

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See You at WEFTEC

Written by Rich Hussey

Rich Hussey

Anna Munson

WEFTEC is around the Corner! October 5-9 in New Orleans, LA. We are hoping to see a large CSWEA contingency in attendance. Please make sure that if you are attending WEFTEC, you stop in at one of the best events. The CSWEA/IWEA WEFTEC Reception will be hosted on Sunday evening at The Chicory. We will have access to the beautiful roof garden at our reception this year. The reception provides so many great networking opportunities including the chance to socialize with our very own Mike Holland.

As we approach WEFTEC, it is an important time to reach out to Anna or I as your CSWEA-WEF delegate any concerns relative to WEF. The House of Delegates (HOD) meeting that occurs all day on the Saturday before WEFTEC is officially open to the WEFTEC attendees, and allows us as members to express any concerns within our Member Association (CSWEA).

Your collaboration and support are what contributes to both CSWEA and WEF serving as one of the leading organizations for the water and wastewater industry. Within this industry, we understand the importance of what we do each and every day. However, I am not sure the general public fully appreciates the collective effort we all contribute to general health and safety. Organizations like CSWEA and WEF allow their membership to take an active role in directing the initiatives of the federation. With that being said, we highly encourage you to provide any feedback or concerns you may have ahead of WEFTEC. This is the time that allows your voice to be actively heard as all Delegates from the MAs, Delegates-at-Large, and WEF leadership will be attending the HOD meeting.

WEF's HOD has a number of subcommittees that are regularly meeting to develop a more active HOD delegation. This includes evaluating the process of becoming a Delegate at Large and how to develop more emerging leaders through the HOD of the Future. These subcommittees are trying to help

facilitate and address questions such as: What are barriers of entry to the HOD for emerging leaders? What can the HOD do to support emerging leaders? How can the HOD help the MAs better utilize their emerging leaders? Do any MAs have programs or initiatives specific to their emerging leaders? We can put anyone interested in becoming a Delegate-at-Large or an Emerging Leader into contact with members who serve or have served in these roles.

Some additional news from WEF that we would like to highlight involves WEF AI. WEF is the first water sector organization to release this type of AI-powered technology and we get to be at the forefront of how we deliver content. AI is an on-call, super-brained librarian that has all kinds of WEF and technical information at its fingertips. Users get real-time answers to their specific questions and link to resources used to create the answers. What's more, WEF AI can speak Chinese, Dutch, English, French, German, Italian, Japanese, Korean, Portuguese, Russian and Spanish. So far, AI resource includes details on books, factsheets, conference papers, and more that are stored in Access Water, full text of *Water Environment & Technology* magazine back to 2017, full text of the *Stormwater Report*, information about WEF leadership, membership benefits, communities, events, and information about WEFTEC 2024.

We would also like to highlight that WEF is holding a summer sale on various publications. WEF members can save on WEF Standards, MOPs, Training Manuals and more. You can locate this on the website and utilize the code SUMMER to receive the discount. I know past president Tim Tack will be ordering a variety of publications as he stresses the importance of continuing education.

Additional news is that WEF is planning a revision of the sixth edition of *Design of Water Resource Recovery Facilities (MOP 8)*. The sixth edition, published in 2018, offers comprehensive coverage of water resource recovery facility design. The book fully explains all water treatment systems and processes and looks at environmental issues and procedures for energy generation. The upcoming (7th) edition will update the manual to reflect current practice and understanding of the topic. WEF is welcoming recommendations for updates, changes, additions, or cuts to the published (6th) edition in order to guide the revision effort. If you are interested in participating as a reviewer for this project, please contact WEF Staff Lara Hahn at *lhahn@wef.org* for the full text of the book and the review template. Review comments are due by August 26. Please note that WEF will not accept any comments that are submitted after the August 26th deadline.

Members that are looking to take a more active role within WEF and help work on the future vision of WEF can simply start by attending a future WEFMAX. We cannot stress enough the value one will receive by attending one of these events. The schedule for 2025 is out, and details will follow early in 2025, but we understand from planning and budgeting purposes, it is important to highlight the schedule now. The locations and dates are as follows:

- **April 2-4**, Oklahoma City, Oklahoma
- **April 30-May 2**, Salem, Massachusetts
- **June 4-6**, location TBA, California

We continue to appreciate your support and look forward to any comments or opportunities within either CSWEA or WEF you would care to discuss. CS

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Fun-Filled Fall

By Patrick McNamara

I hope everyone reading this had a fantastic summer – the kind where you saw some sunshine and got to do an outdoor hobby like swimming, fishing, golfing, or watching a kid's ballgame. Hopefully the summer was so fun and exhausting that at the end, you even thought: "I can't wait for the fall routine to start." For myself, there's always one day in August where I feel a little bummed that summer is winding down, but then I get that adrenaline of everything beautiful that fall has to offer. Fall is certainly a bright highlight in Wisconsin with colorful leaves, comfortable weather, exciting football, and everything pumpkin.

The summer-fall transition is also an exciting time for the WI section of CSWEA. Our YP Brewers outing was held at the end of August and offered a chance to *Grow Together* and invite new members into our group and experience the comradery first-hand. This article was due before the event, but I'm going to take a low-risk and say that it was another fantastic event with new faces and familiar ones. WEF is an organization made up of member organizations that are made up of smaller groups like our Wisconsin Section. These events with their strong turnouts and networking opportunities in a nutshell are why WEF is so spectacular. The summer-fall transition also takes us from the smaller local stage of a Brewer game to the larger national stage of WEFTEC in New Orleans. We have a fun-filled night planned for the CSWEA welcome on Sunday of WEFTEC. If not too late, bring a friend! What better way to introduce someone to our organization than mingling in New Orleans?

If you aren't able to make it to New Orleans or other destinations for one of our conferences or seminars, no sweat, we are also ramping back up our efforts on webinars. Dr. Linda Lee gave a fantastic webinar this past summer on PFAS and land application of biosolids. Over 100 people attended, including folks from outside of CSWEA to hear her speak. Sick of PFAS? Dr. Brooke Mayer will be presenting a webinar on September 24 on innovative treatment solutions for phosphorus removal. Join to hear an overview of the global phosphorus issue as well as nuts-and-bolts details. We welcome ideas you have on speakers or topics you would like included for a webinar.

Fall is also a great time to think about, and act on, nominating someone for a CSWEA award (*www.cswea.org/awards*). We all know lots of go-getters with high integrity who deserve to be nominated. We also all likely know someone who has worked hard behind the scenes and maybe has not gotten the recognition they deserve. These awards are a great way to get someone recognized for their outstanding contributions.

As I wrote in the last issue of this magazine, the mantra I'm following for this year is "*Let's Grow Together.*" If you have already brought in someone new, thank you! If not, see if you can pick out and mentor two people to join and become active in our group. The more the merrier. In addition to webinars and WEFTEC, the CSWEA Operator Training Webinar is October 23. Please let new members know about our annual meeting on May 27-29 so they can get it on their calendars and feel the excitement of our full section in person. For now, enjoy those hayrides in a sweater with a hot apple cider. CS

Perspective

By Mark Enochs

Clean water and good sanitation are common expectations here in Minnesota and across the US. You turn the faucet and clean drinkable water comes out. You flush the toilet and it goes to its proper place for treatment. And the cleaned water gets rerouted back to where it belongs in the environment.

It takes a lot of people doing the right things to bring the clean water and treat the wastewater. Last year I had the honor of traveling with a team on a mission trip to rebuild a church building deep in the Amazon jungle of Peru. In the town of approximately 300 people living along the Amazon River tributary, residents reside in barely standing shanties and thatched huts, with no electricity and no running water. Common-use outhouses have a toilet, a bucket of water for flushing, and a bucket for paper. Pipes for these toilets run down the hill straight into the river. This is the same river where people bathe, wash clothes, and drink. Many use rain barrels with water collected from rooftops and elaborate gutter systems. We brought large jugs of clean water for drinking.

> "Clean water and proper sanitation don't just happen. People have to know and then act."

During the week we worked hard in high heat and humidity. At the end of each day, we were sweaty and dirty and really wanted a shower – but there was none. There was the river. That's where we bathed and cooled off, standing on the mucky bottom in the chocolate milk colored river (with our eyes and mouths tightly closed). We didn't linger long there, especially after watching some boys nearby playing with a four-foot-long snake they had just pulled out of the river.

I noticed remnants of a village drinking water system – a water tower, treatment tanks, and distribution system. But the pipes were broken and disconnected, and the plant was not running nor had it been for years. Yet people living there were happy, seemingly accustomed to not having clean water and proper sanitation. I even saw a guy driving his thin shallow handmade boat up the river reach down, cup a handful of water, bring it to his mouth, and drink it. My view of the river was clearly different than his.

Seeing how water is managed (or not) outside of my daily world brought perspective. It also brought a fresh appreciation of why I'm in the water/wastewater business. Clean water and proper sanitation don't just happen. People have to know and then act. That's what we do – we're part of an organization that has a shared vision. Thank you all for your contribution to this shared mission.

Check out the MN Section committees on the CSWEA website and take a chance. You're valued and you're needed. CS

Water Challenges Centerfield at the Olympics

By Christopher Buckley

What an exciting summer it has been! Warm, sunny days, incredible wet weather, BBQs, vacations, road trips, CSWEA CSX, and the Illinois Section Collection System Seminar! The summer season has been lots of fun.

One of the signature events of the summer was the Summer Olympics in Paris, France. This incredible spectacle focused on the performance of athletes from around the world. What was particularly interesting was how France chose to utilize the Seine River as one of the focal points of the Olympics, especially the opening ceremonies. The river was the main stage, and it was spectacular. It shows how our waterways play an essential role in our lives and significant events.

Unfortunately, the issue of water pollution should have caught the eye of all water professionals. Water pollution has been a significant concern in several Summer Olympics. Despite extensive efforts to clean the Seine River, water quality remained inconsistent. This led to problems with the safety of the athletes competing in events like marathon swimming and triathlon, which marred those events.

While ensuring safe water conditions remains a challenge for many of our waterways, both locally and globally, significant progress is also being made. Several engaging presentations on sewer overflow disinfection technologies were presented at the CSWEA Annual Meeting in May. Organizations like Global Water Stewardship (GWS) work tirelessly to reduce water pollution and preserve pristine environments in less developed countries like Costa Rica. This progress is a testament to our collective efforts as water professionals, and while there's still a long way to go, it's important to acknowledge and celebrate these steps forward.

As we reflect on the Olympics, I am hopeful that the spectacle not only inspired a new generation of athletes but also sparked an interest in the next generation of water professionals. I hope those who watched the Olympics this year are inspired to be the scientists, engineers, operators, regulators, and politicians who will lead the charge in improving and protecting our waterways.

Speaking of highlighting new technology and as we look towards fall, WEFTEC, the premier water conference, is happening in New Orleans from October 5 to October 9. As in years past, there will be a CSWEA-IWEA Joint Reception on October 6. I hope everyone who wants to attend the conference can make it!

CSWEA continued its excellent monthly Operator Training events with Purposes & Fundamentals of WW Treatment on September 23. Additionally, CSWEA hosted a webinar on bioinspired phosphorus recovery on September 24. Be sure to take advantage of these educational opportunities when they are offered.

Let's make Fall 2024 as great as the Summer!

Keep Up the Pace!
Christopher Buckley PE, BCEE CS

City of Fond du Lac Wastewater Treatment and Resource Recovery Facility

By Alex Krause, Assistant Superintendent at City of Fond du Lac WTRRF

The City of Fond du Lac WTRRF began to treat wastewater in basic forms beginning in 1913 in central Wisconsin. While the location remains the same, every aspect of this facility has been improved, with major facility upgrades occurring in 1928, 1949, 1964, 1975, and 2008. The facility now receives domestic flow from approximately 65,000 residents including 18 communities surrounding the city, otherwise known as Outside Sewer Groups. Design annual average flows are 9.84 MGD, although flows can range as low as 4 MGD in winter months and upwards of 60 MGD in wet weather events.

Along with residential and clear water flows, Fond du Lac has several industries. Approved in 1984, an industrial pretreatment program was implemented to keep toxic and non-compatible pollutants out of the sewer system. As of 2024, there are 10 industries in the program categorized as significant industrial users.

Collection System

The City of Fond du Lac owns, maintains, and operates 17 sanitary stations and 19 storm stations. Due to an aging collection system and having predominately clay soils, inflow and infiltration (I/I) has been a large concern to the facility. To address these concerns, the city has spent a significant amount of time identifying and repairing I/I contributions, including sanitary main and lateral replacements, wet weather televising, dye testing, smoke testing, bagging and flooding, manhole repairs, modeling, public education, and private side inspections/enforcement of existing codes.

> "The facility now receives domestic flow from approximately 65,000 residents including 18 communities surrounding the city."

Treatment Facility

Preliminary treatment consists of influent pumping, pH monitoring, mechanical fine screens, grit removal, and grit washing. Following preliminary treatment, are two co-thickening primary clarifiers where primary solids and waste activated sludge (WAS) are thickened prior to anaerobic digestion. Secondary treatment consists of three series of aeration basins originally designed to run off dissolved oxygen (DO) control to treat ammonia and biochemical oxygen demand (BOD) biologically and phosphorus chemically.

Since the 2008 upgrade, Fond du Lac has faced changing phosphorus limits, creating a push towards enhanced biological phosphorus removal (EBPR). Process changes include extension of anoxic zones, strategic diffuser grids, supplemental carbon addition, utilizing machine learning with historical data, and implementing OSCAR aeration controls. By adding most-open-valve (MOV) and cascade logics to the control, this low DO system can fine-tune air supply based off oxidation-reduction potential (ORP), ammonia, and DO instrumentation to provide the aeration required at the lowest pressure loss and energy consumption. Currently, over 90% of influent phosphorus is removed biologically. Ortho phosphorus is continuously monitored in the MLSS and effluent. This will control chemical dosing on an as-needed basis. Following aeration includes secondary clarification and UV disinfection prior to the effluent discharging into Lake Winnebago. Around 2.5 billion gallons of water is treated and discharged annually.

Fond du Lac has four anaerobic digesters running at mesophilic temperatures. Around 50 million gallons of co-thickened primary sludge and high strength waste are treated annually to a Class B biosolid prior to centrifuge dewatering. Fond du Lac produces roughly 11,000 wet tons of biosolids per year to be land applied following the standards put in place by the EPA and WI DNR. In 2018, a side stream deammonification process using Anammox bacteria to remove ammonia from the centrate was put in place. Prior to this addition, this side stream flow accounted for roughly 40% of total ammonia loadings to the facility. This granular biomass provides simultaneous anaerobic ammonium oxidation and denitrification allowing for 90% removal in a relatively small footprint. These efforts were implemented to reduce competition of denitrifying bacteria over phosphorus-accumulating organisms (PAOs) to improve biological phosphorus removal.

Fond du Lac produces roughly 85 million cubic feet of biogas annually through anaerobic digestion. The methane gas is treated for H_2S, siloxane, and moisture removal prior to fueling a boiler and 450 kW combined heat and power methane generator. Energy savings from this generator contribute to over 3 million kW of renewable energy produced, or around 40% of total annual power, lessening the need for utility power.

The Future of FDL WTRRF

To ensure phosphorus compliance in the next permit renewal, Fond du Lac is participating in water quality trading (WQT). This WQT plan identifies and quantifies phosphorus and TSS water quality trades on agricultural property

owned by the Fond du Lac County Airport. Through modeling and implementation of best management practices (BMPs), the facility will generate credits to offset the pounds of phosphorus discharged from the plant as needed. Work to be done includes permanent grass for conservation cover and grassed/rock-lined waterways to repair severe gully erosion. Construction of these BMPs will begin in late summer/fall of 2024 and is included in the WTRRF WPDES permit renewal in 2025.

With construction beginning in 2025, the WTRRF will be perusing renewable natural gas (RNG) production for pipeline injection. Through a membrane technology, biogas purification will occur removing H_2S, moisture, siloxane/VOC, and CO_2. The gas will then be pressurized, monitored for quality, and injected in the grid. Doing so allows the WTRRF to capture and utilize virtually 100% of methane gas produced while also bringing in revenue.

The WTRRF will also begin construction of a thermal sludge dryer, increasing the percent solids of biosolids from around 23% to over 90%. In this process, Fond du Lac will achieve Class A exceptional quality biosolids, lessening the restrictions of land application and significantly reducing hauling and disposal costs. The organic nitrogen and phosphorus found in the biosolids are used quite efficiently by crops as these plant nutrients are released slowly throughout the growing season.

Facility Mission

The City of Fond du Lac WTRRF has a mission to operate and maintain the regional facility in a cost-effective manner, producing effluent water that achieves and exceeds permit requirements and recovering valuable resources such as energy, biosolids, and nutrients to be used in an environmentally beneficial manner. Commitment to implementation of projects, programs, and processes that promote sustainability and meet the needs and challenges of wastewater treatment and resource recovery is key. The facility looks forward to continuous growth and meeting the needs of all municipal customers. CS

"Fond du Lac produces roughly 85 million cubic feet of biogas annually through anaerobic digestion."

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On April 8, 2024, a team from Illinois Institute of Technology (IIT) competed in CSWEA's Midwest Student Design Competition (MSDC) in Madison, WI. The team won the WEF Water Environment category with the *CASM Project: Chatham Area Stormwater Management.*

The IIT team comprised of Mathis Lucet (Urban Systems Engineering), Judith Rackow (Architecture), Ryan Gripentrog (Civil Engineering), Constantine Giattina (Architecture), and Francis Gilleece (Computer Science).

The team writes: We were happily surprised to see how well our interdisciplinary skill sets complemented one another. Starting from a genuine interest in the project concept, we used a one-to-one design attack approach to truly put forth the best of our creative and forward-thinking abilities and complete a project that we are proud of. Guidance was provided by our faculty advisor, Dr. David Lampert, and retired engineer from Metropolitan Water District Reclamation (MWRD) Jerome McGovern. Our self-propelled motivation with their guidance allowed us to design something that could be a feasible solution. The research required us to look deeper into what projects of this magnitude demand and how it affects us on a human scale. This understanding has brought us and our ideas to a more grounded and holistic viewpoint that will be beneficial for future water environment designs in our careers. We believe our project has immense potential both in the real world and in hypothesis and, if given the chance, would love to see how much farther we could take it.

(Left to Right): Judith Rackow, Francis Gileece, Mathis Lucet, Ryan Griepentrog, and Knowlen Giattina

THE CASM PROJECT: CHATHAM AREA STORMWATER MANAGEMENT

In the US, the majority of the population residing in urban areas has replace open land with impervious surfaces. This urbanization of the landscape profoundly affects the hydrological cycle and how water is moved through both the land and the ground.

Urbanization poses a challenging problem when trying to collect, move, and disperse water during and after storm events. Surface runoff in urban areas can no longer be absorbed into the ground as most of the area has been covered by concrete, asphalt, and buildings. This leaves stormwater runoff to be managed by a manmade system of sewers, gutters, and ditches, which often leads to complexity in constructing and maintaining

adequate infrastructure to divert large amounts of runoff in condensed urban areas. This is a problem that many Chicago neighborhoods are now facing as the current stormwater infrastructure is failing to keep up.

In 2013, when a thunderstorm dropped 5-7 inches of rain within hours in the Chatham neighborhood, it wasn't a surprise for residents to experience basement flooding. The mass flooding has continually led to extensive technical damage and huge repair costs for several houses. The record devastation led the State of Illinois to declare the Chatham neighborhood an official flooding disaster. In response to these events, the Center for Neighborhood Technology (CNT) conducted studies to show that the scope and severity of flood risk and flood-related damages in the Chatham community are *among* the worst in Cook County. Between 2007 and 2011, the two zip codes that Chatham occupies are responsible for 6.5% of the damage claims for damaged property in Cook County ($50 million out of $773 million). The main problem in Chatham, Chicago that the team has identified is the inability of the existing storm sewer system to manage stormwater that overwhelms the current management systems. The excessive stormwater runoff causes chronic backups and flooding for the residents who see statistically higher problems as result than in all other areas of Chicago. There are four factors contributing to flooding in Chatham: Low-lying typography, impervious surfaces, changing climate, and aging infrastructures.

When analyzing the Chatham neighborhood to further understand the issue at hand, it was noted that the area is served by the City of Chicago's combined sewer system. This combination of both sanitary sewage and rainwater from storm drains then outflows to the Metropolitan Water Reclamation District's (MWRD) Interceptor Sewer System. The Interceptor Sewer System was built alongside MWRD water reclamation plants to treat sewage water and return it back to Chicago waterways. Additionally, in the 1950s the city constructed a relief sewer under Indiana Avenue to connect to MWRD's South Side 2 Intercepting Sewer. This is important in the case of this project as the relief sewer under Indiana Avenue runs through the middle of the Chatham Neighborhood.

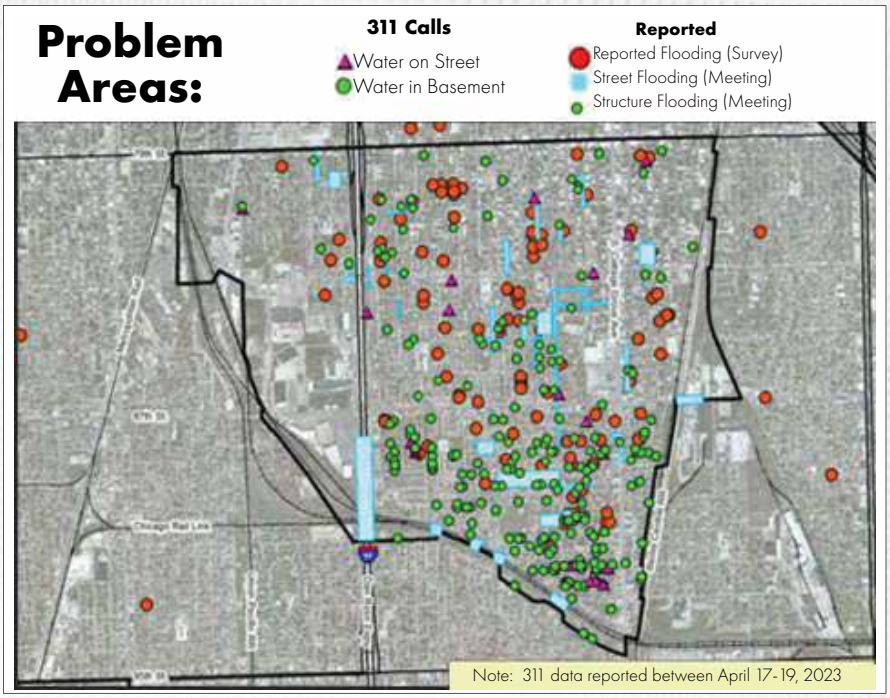

Figure 1: Reported Flooding in Chatham

We concluded that in the sewer system, with the increasing amount of rainfall due to climate change, the current infrastructure is unable to keep up with the amount of stormwater that flows through the Chatham streets today and into the future. This project aims to reduce basement flooding in Chatham by studying both green and grey infrastructure.

IDENTIFYING THE PROBLEM

To better understand the problem, a Stormwater Management Model (SWMM) of Chatham's sewers was developed. This tool enabled us to better understand how the sewer works, and to implement effective solutions.

SWMM is an open-source software used throughout the world for planning, analysis and design related to stormwater runoff. Knowing that, the purpose of the use was to design the existing sewer system of Chatham and implement different solutions to estimate the effectiveness of them. To do that, extracts concerning Chatham have been recovered in the Chicago Sewer Atlas.

To process a reproduction of the sewer network of a wide area, assumptions were made especially on the catchment areas. To ensure that these assumptions reasonable, we first studied the system to understand the general direction of the water and where are the main outlets. Thus, in this way, we acted on the smaller sewer pipes by grouping them together every two streets to form one larger pipe with the right dimensions to come up with a reasonable number of catchment areas. So, we have kept the main and secondary sewers, as well as the general direction of flow in the sewers to have an accurate model to process good simulations.

SIMULATION

To see the effectiveness of the Chatham's Sewer System we ran a simulation of a 50-year return period two-hours duration storm. By looking at the precipitation Data of Chicago, this corresponds to a storm with an intensity of 2.15 inches of rainfall per hour.

By analyzing the results, we found that on one of the main sewer outlets (Indiana Avenue) the overall head in the sewer was too high, so when the level of the water reaches the maximum level, it starts flooding. And the

same observation was made on the other main sewer outlet (Dobson Avenue). So, we had to act on the main Sewer Outlet to really reduce the risk of flooding,

ALTERNATIVE ANALYSIS

We now know that the problem comes from the main sewer outlets, so we've developed two solutions to address the issue. The aim of this section is to see how effective they are in reducing the risk of flooding.

Alternative 1 is the addition of a stormwater storage tunnel underneath Chatham to capture and store overflow from the combined sewer system. This solution addresses the main concern with the outdated stormwater infrastructure, which is too often overwelled during storm events. This proposed storage tunnel will act as a relief system to the combined sewer system. The proposal to construct a relief tunnel beneath the existing sewer system under Indiana Avenue leverages historical infrastructure improvements while addressing current and future capacity challenges. The tunnel will run north to south, parallel to the combined sewer underneath Indiana Avenue spanning through the center of the Chatham neighborhood. This is an ideal location as the majority of the neighborhood's sewers are connected to this combined sewer. Once the storm event has passed, the tunnel will be pumped back up into the intercepting sewer.

Alternative 2 is based on the stormwater tunnel project done by the City of Chicago in Albany Park. The City of Chicago was experiencing overbank flooding during periods of high-water flow which led to extensive property damage to areas in and around Albany Park. The City's department of transportation and Stantec created an 18-foot diameter tunnel via an inlet structure near Springfield Avenue along the river's south bank within a small section of undeveloped Chicago Park District land. This tunnel will serve, during flood events, to divert the excess river water. Concerning our flooding problem in Chatham, the idea is to connect the two main sewer outlets of Chatham (Indiana Ave. and Dobson Ave.) to the Deep Tunnel of Chicago. This idea will implement windows at these two locations in the actual sewer to allow the excess water to be diverted into the new tunnel when the level raises too high in the conduct. The first section of this tunnel will go from 81st and Indiana to 81st and Dobson (around a mile) then the second one will go to 81st Dobson to 94th and South Chicago Ave. which is the nearest connection to the Deep Tunnel (around 3.2 miles).

Figure 2: Chatham's Sewer SWMM Model

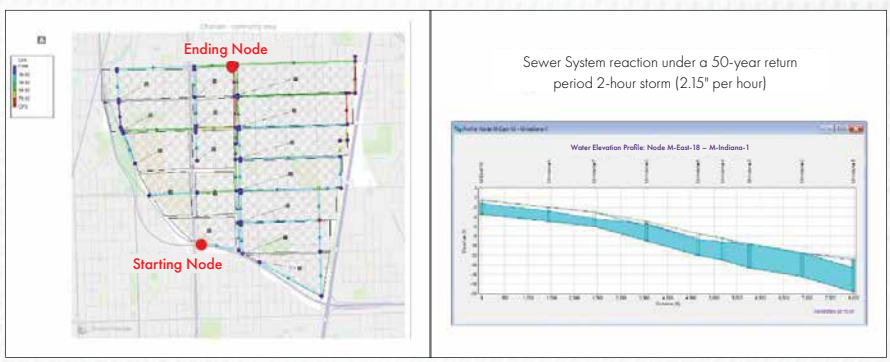

Figure 3: Effectiveness of the Chatham's Sewer System under a 50-year two-hour Storm

During this project, green infrastructure methods have been studied in the Chatham neighborhood. We developed the idea of opening areas to turn them into bioswales and permeable pavement to

allow for runoff to infiltrate into the ground. However, two major difficulties meant that the idea was abandoned. The first is the highly impermeable nature of Chatham's soil, and the second is the lack of resources to implement truly effective green solutions.

EFFECTIVENESS OF THE ALTERNATIVES

By using the features Diverted Node on SWMM, it was possible to reproduce the two alternatives. Figure 4 and Figure 5 show how the alternatives react under the same 50-year, two-hour storm.

After seeing the results, even if the two solutions seem close in terms of results the second one theoretically avoids the risk of flooding by being just under the limit whereas the first option still has a flooding problem at the outlet. Thus, the stormwater diversion tunnel is efficient for controlling the head in the sewers to avoid the risk of flooding.

DESCRIPTION OF RECOMMENDED DESIGN SOLUTION

We decided to go with the Stormwater Diversion Tunnel. It is initially more effective than the Stormwater Storage Tunnel but even if it is more complicated to install and more expensive, it appears to be a long term solution offering real protection against flooding. What's more, it's all gravity-driven, which can take away some of the maintenance problems associated with the other solution. Finally, as the Deep Tunnel is designed to receive huge quantities of combined sewage, its smooth operation will not be affected by this new connection.

With the construction of the Chatham Stormwater Diversion Tunnel the following design aspects will be considered to meet the goal of reducing peak flow rate, tunnel specifications, locations selection, cost estimation, and feasibility.

DESCRIPTION OF DIVERSION TUNNEL DESIGN

To reiterate, the Chatham Stormwater Diversion Tunnel design takes inspiration from the Albany Park Stormwater Diversion Tunnel. This tunnel was constructed due to similar conditions that is seen in Chatham. Like Albany Park, the Chatham neighborhood has seen major flooding causing flooding in homes, costing millions in damages. Chatham also sits at one of the lowest elevation areas in Chicago, making it extremely susceptible to flooding.

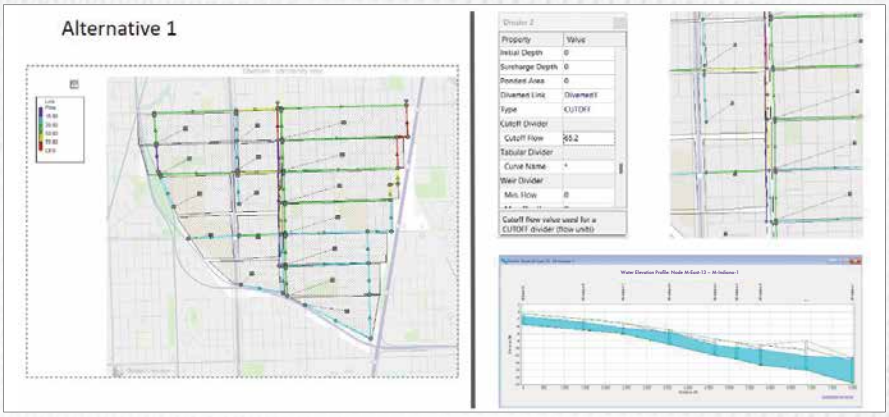

Figure 4: Effectiveness of the Stormwater Storage Tunnel

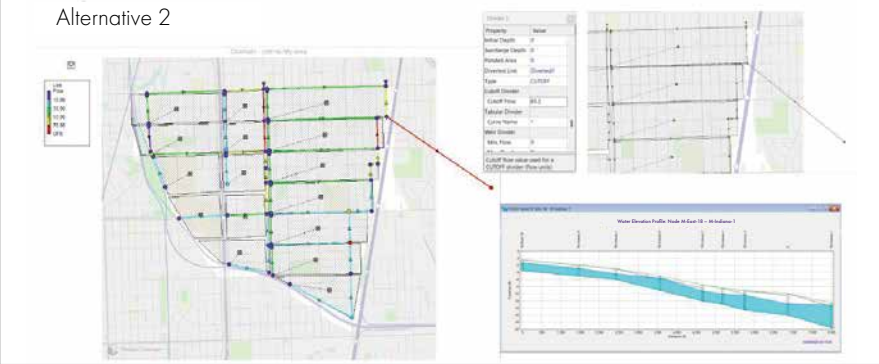

Figure 5: Effectiveness of the Stormwater Diversion Tunnel

DIVERSION TUNNEL CONSTRUCTION PLAN

Construction of this diversion tunnel is an ambitious project and will have an estimated construction period of three years (based off Albany Park Stormwater Diversion Tunnel). While laborious, tunnel construction of this size has been done before, evident by the Albany Park project, as well as the Tunnel and Reservoir Plan (TARP) by MWRD. This helps justify this design as the city of Chicago is known for building tunnels.

CONNECTION LOCATIONS AND DESIGN

The 81st and Indiana Ave. and 81st and Dobson Ave. have been chosen as drop shafts to build the tunnel because these are two locations at the main Sewer Outlets where flooding risks were the highest according to the SWMM Model. Plus, it is easier to create drop shafts at these locations instead of 79th Indiana Ave. and 79th Dobson Ave. because these locations are major traffic axis. Thus, even if they are nearer to the Outlets of Chatham, Large-scale diversion plans and an overhaul of access for emergency services/police should have been carried out. Plus, the potential fall in the incomes for the retailers.

To conclude, three drop shafts will be constructed. The two first at 79th Indiana Ave. and 79th Dobson Ave. and the last one at 94th South Chicago Ave. because this is the nearest point of the Deep Tunnel and an already drop shaft has been created here so it shouldn't be difficult to recreate one.

Concerning the design of the structure:

- Concerning the actual sewer, a window will be built. The window will be 4' wide

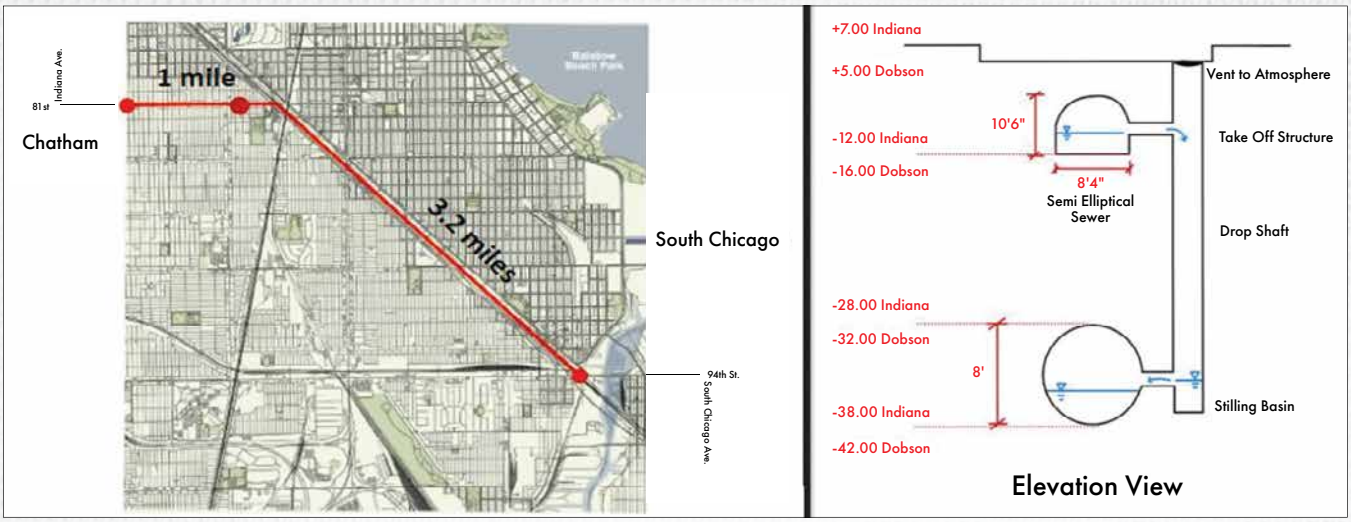

Figure 6: Design of the Stormwater Diversion Tunnel

and 3' high. It will be placed 4' high from the sewer invert. Indeed, this height will not allow discharge in the diversion tunnel during dry weather. During heavy rainy days, the excess water would then be directed to the drop shaft and then flow into the tunnel. It will relieve the sewer system and reduce the overall head to avoid basement back-ups.

- The diversion tunnel will have two connection points (First: Indiana Ave. -38 CCD; Second: Dobson Ave. -42 CCD) to the actual sewer system and then it joins the Deep Tunnel Drop shaft at 94th and South Chicago Avenue (elevation unknown). It will be around 4.2 miles long.

COST ESTIMATION

We contacted Stantec (the design company of the Albany Park Stormwater Tunnel) to advise us during the cost estimation of the project and even if the project is ambitious not many services have to be ordered to do the project. The figure below shows the cost estimation of the project.

FEASIBILITY AND BENEFITS

First, the cost seems high but by thinking that during a five-year period, $50 million of damage were claimed in Chatham and demonstrating that this is an efficient solution, the cost can be easily justified, and that price will not be an obstacle if this project should be realized.

SERVICE	COST ($)
EPBM	5,000,000
Construction of the Tunnel	110,000,000
Materials (Concrete)	3,200,000
Drop Shafts	2,000,000
Total	**120,200,000**

Figure 7: Cost Estimation of the Stormwater Diversion Tunnel

The main difficulty will be to obtain all the permits to build the tunnel. This 4.2-mile tunnel will go under many private properties including highway and main traffic axis. However, MWRD's support and ability to obtain this type of permit is the key to proceeding with this project. What's more, we'll surely be able to activate this lever, as this project is in line with a major project with which MWRD is very familiar.

Finally, on the subject of benefits, the ability of this project to solve Chatham's flooding problems has been demonstrated through SWMM modeling, but not only does it solve Chatham's flooding problems, given its size we can imagine in the future, but possible connections to other neighborhoods also suffering similar problems to this tunnel. This will increase the tunnel's effectiveness.

FUTURE PLANS

While the most effective implementation has been selected, there is still an alternative that could prove to be more effective as more information is gathered. With that in mind, cost estimation and comparison between the two alternatives would be appropriate considering the high weight of cost effectiveness towards the long-term success of the project. A visit to the site of the initial construction will be made as well to accurately gauge the social impact of the project at the community level.

Finally, collecting the latest information missing is crucial to start making real plans for the conception of the tunnel. The missing information is the elevation of the TARP and its precise location to know the final size and elevation of the tunnel and start calculation.

Ultimately, the future steps are:

1. Get the missing information to have the final dimension and elevation of the tunnel to make construction plans.
2. Finish the construction plans by considering every step from the beginning to the end of the construction.
3. Establish a strategy for financing the project.

Our team looks forward to continuing the development of this design and presenting the results to the Chatham community, MWRD, and to the other professionals at WEFTEC. CS

Washington University in St. Louis

MSDC COMPETITOR HIGHLIGHT:
Washington University

The 5th Annual Midwest Student Design Competition (MSDC) was held on April 8 in Madison, WI. This year the competition represented the work of 55 students from 13 competition teams and a total of five states. Thanks to all who competed, including the team from Washington University in St. Louis, whose project is featured below.

The project "Efficient Membrane-Assisted Biogas Upgrading for Wastewater Treatment," developed by a team from Washington University in St. Louis, introduces a novel approach to enhancing the sustainability and efficiency of biogas utilization in wastewater treatment plants. The design features a groundbreaking three-phase up-flow biogas upgrading reactor, which is particularly effective in increasing methane content and reducing carbon dioxide levels in biogas.

At the heart of this innovative system is a membrane-assisted biogas upgrading module integrated into the existing anaerobic digestion infrastructure. The process focuses on converting biogas into renewable natural gas (RNG) through biological methanation facilitated by hydrogenotrophic methanogenesis. The introduction of hydrogen, sourced from onsite water electrolysis, into the system plays a critical role in this process, significantly boosting the methane concentration in the biogas to levels exceeding 90%, while reducing carbon dioxide to below 10%. This results in a higher energy content for the biogas and aligns with stringent environmental regulations.

This membrane-assisted biogas upgrading system represents a scalable and sustainable solution for wastewater treatment facilities. By improving energy efficiency and reducing carbon footprints, this project aligns with the broader goals of environmental and economic sustainability, offering a model for similar facilities looking to optimize their biogas utilization.

The team from Washington University in St. Louis consisted of Sean Hwang, BA in Environmental Analysis 2027; Yue (April) Rao, PhD Candidate in Energy, Environment & Chemical Engineering 2025; Ariel Richards, BS in Chemical Engineering 2024 and MS in Energy, Environment & Chemical Engineering 2025; and Jiasi Sun, PhD Student in Energy, Environment & Chemical Engineering 2026. CS

Washington University Team (Left to Right): Jiasi Sun, Yue (April) Rao, and Sean Hwang. Missing: Ariel Richards.

Class A Biosolids

CORN AND SOYBEAN TEST PLOT 2023

Merrell Bros., Inc.

Corn and soybeans are synonymous with Indiana and the Midwest United States. We are fortunate to live in this part of the world that is fertile and productive. Each year, farmers are challenged with multiple decisions about how to grow the highest-yielding crop while being financially responsible. Fertilizer decisions start with the primary macronutrients: nitrogen, phosphorus, and potassium. Recently, sulfur has started to become a more discussed topic in its position in the secondary macronutrient role since it is less atmospherically available.

Biosolids and how to manage them are synonymous with most wastewater plants across the entire nation. We are familiar with many disposal and recycling practices, including landfilling, composting, incinerating, and land application. The land application process has a handful of challenges, but sustaining a program that fits a farmer's preferred methods is challenging. There are setbacks for Class B biosolids, delayed planting dates, storage hurdles, and simple handling headaches. What if there is a process to eliminate those hurdles, reduce volume, and offset costs by selling a marketable product?

Merrell Bros., Inc. has been blessed with tremendous customers spanning the municipal and industrial side, and we have been managing Class A and B biosolids land application programs for decades. For the last several years, the R&D arm of Merrell Bros. has kicked into high gear to try and solve some of the issues mentioned above to see if we can make corn, soybeans, and biosolids, as a marketable fertilizer, synonymous with each other.

In the spring of 2023, we set out to complete research on a Class A biosolids pellet product and the effect certain fertilizer blends have on our midwestern staples: corn and soybeans. Merrell Bros. has developed various processes to meet Class A biosolids criteria from Florida to Indiana. There have been many successful Class A biosolids developments over the years, and the ones that can reduce volume while allowing for various marketing channels seem to have risen to the top. As a land applier in the Midwest and transporter in the Southern US, we have been able to witness first-hand what type of products transport, store, and work well in beneficially reusable environments. The goal of our 2023 test plots was to determine if certain blends of Class A biosolids, in the pellet form, had the same outcome on yield as those farms with commercial or synthetic fertilizers.

This trial process had many facets, all starting with the beneficial reuse of biosolids. Achieving the Class A status will be covered in another article, so for the purpose of this study, we started this process with an already-made Class A biosolids product. We took Class A biosolids at 85% solids and utilized a mill to turn them into biosolid pellets. Some of the biosolids were pelletized alone with no additional material or blending. We also took some of the Class A unpelletized biosolids and combined various synthetic fertilizers together in a ribbon blender prior to pelletizing. Several lessons were learned, including that the inclusion rate of synthetic fertilizers to biosolids was critical. If the scales tipped too far to the synthetic side, the pelletizing process was sub-par. We varied rates of synthetics, but also types and amounts of synthetics blended with biosolids. This allowed us to create various mixtures/blends that were supportive of the upcoming corn and soybean crop.

We then selected the plot site and began gathering background data, including soil type, soil test data, and residual nutrients. Planter modifications were made in order to precisely place the pellets 2 inches beside and 2 inches below the seed (called 2x2 placement) for some of the trials, soil preparation, and field layout.

Biosolids have always been nutrient-laden but not necessarily nutrient-balanced. The nutrient ranges vary, but a 6-8-1 value is average. This 6-8-1 number signifies six pounds of nitrogen, eight pounds of phosphorus, and one pound of potassium per 100 pounds of applied fertilizer. If you went to your local store and looked for a bag of general fertilizer, you may look for a 12-12-12. This blend is commonplace but is traditionally 100% synthetic, and the cost has increased over the last four years.

	PLOT 1	PLOT 2	PLOT 3	PLOT 4	PLOT 5	PLOT 6	PLOT 7	PLOT 8	PLOT 9	PLOT 10	PLOT 11	PLOT 12	PLOT 13	PLOT 14	PLOT 15	PLOT 16	PLOT 17	PLOT 18	PLOT 19
	Naked light rate	Potash + Sulfur + Array	Array Rev polymer mix 11	10% K+S	20% K+S	2.5% arc gel + K + S mix 9	25% AMS	10% Tiger Sul	33% AMS	20% AMS	Foster FC mix 13	30% AMS	Arc Gel Rev poly mix 10	6% TSP mix 12	10% TSP & AMS	Naked pellets 2x2	broadcast naked	broadcast naked	broadcast naked
	Analysis	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**	**Analysis**
Total N	6.2	5.54	6.06	5.79	5.72	5.9	11.8	5.3	10.17	8.61	5.56	5.34	6.53	5.8	6.85	6.2	6.2	6.2	6.2
P2O5	8.4	6.1	7	7.1	5.7	6.8	4.2	6.2	5.4	6	10.2	6	7.8	9	12.2	8.4	8.4	8.4	8.4
K2O	1.2	5.24	1.05	4.93	9.94	2.25	0.68	1.06	0.88	0.96	1.09	1.02	1.02	1.1	0.68	1.2	1.2	1.2	1.2
Sulfur	1.01	2.22	1.21	2.28	5.29	1.7	9.1	3.1	6.9	5.38	1.12	8.8	2.11	1.05	3.33	1.01	1.01	1.01	1.01
#'s of actual product	79	145	114	134	143	146	119	118	105	118	121	117	110	128	124	155	184	225	370
NITROGEN	**5**	**8**	**7**	**8**	**8**	**9**	**14**	**6**	**11**	**10**	**7**	**6**	**7**	**7**	**8**	**10**	**11**	**14**	**23**
PHOSPHORUS	7	9	8	10	8	**10**	**5**	**7**	**6**	**7**	**12**	**7**	**9**	**12**	**14**	**13**	**15**	**19**	**31**
POTASSIUM	**1**	**8**	**1**	**7**	**14**	**3**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**2**	**2**	**3**	**4**
SULFUR	1	3	1	3	8	**2**	**11**	**4**	**7**	**6**	**1**	**10**	**2**	**1**	**4**	**2**	**2**	**2**	**4**

	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu	Dry bu
North	63.1	62.4	63.5	64.0	67.7	62.9	66.6	65.1	65.9	66.9	62.5	62.8	62.1	60.4	62.3	61.9	63.8	65.8	69.6
Per ac equivalent	275.3	272.4	277.3	279.3	295.4	274.5	291.0	284.3	287.7	292.0	272.8	274.4	271.2	263.6	271.8	270.4	278.8	287.3	304.0
	Dry bu	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**	**Dry bu**
South	65.3	66.2	64.5	65.0	67.3	69.3	69.3	67.6	67.0	66.0	66.9	67.6	69.1	69.0	68.5	66.1	65.2	63.8	68.1

The trial consisted of various fertilizer application methods, including 2x2 placement, surface broadcast with incorporation, and top dressing (placed over the crop once the crop had emerged). To reduce variables, we used one seed variety, planted all plots at the same depth and population, and applied all pesticides evenly among both corn and soybean plots. We then duplicated each trial to improve the reliability of the results. During the trial, we conducted soil testing, in-season tissue testing, and yield analysis at the end of the season.

While 2023 had less precipitation than the Midwest average, the harvest season generated a higher-than-average yield for most grain farmers. Maximizing the profitability of every acre is the typical farmer's goal, which includes minimizing expenses and maximizing yields in its most basic form. We have the benefit of farming additional acres, which gave us the opportunity to compare our test plot yield data to commercial acres, in addition to comparing the side-by-side test plot trials.

The final yield data was encouraging. The test-plot corn yield came in at 281 BPA (bushels per acre), which was higher than our overall commercial farm average. We had a range of 266.1 BPA to 302.8 BPA on this test plot. The top yielders were blends consisting of water-absorbing polymer blends, blended sulfur, and added nitrogen in the form of ammonium sulfate (AMS). On the soybean plots, increased nitrogen applied in the pre-plant stage generated the top yields. The overall plot yield was 70.2 BPA, with the top end being 78.2 BPA and the low end coming in at 64.01 BPA, which happened to be the control section with zero biosolids applied. If we consider revenue generation alone, the top five corn yielders grossed $81.00/acre (at a $4.50/bushel price) more than the control strips. The soybean revenue-generation portion grossed $134.88/acre more (at a $12.00/bushel price) than the control strips with zero biosolids.

Mistakes were made along the way. I improperly set the planter on the first strip and applied half as many pounds of pellets as desired, rendering that test strip useless (see the pale-yellow rows above), verified by the drone aerial photos.

Our soybean test plot was planted last (May 30, 2023), which likely limited some top-end yield potential during the shortened season.

We will adjust, modify more equipment, learn from our mistakes, and press forward with more test plots in 2024. There are some positive lessons to take home, including some hurdles mentioned earlier:

- Delayed planting was not an issue as we applied biosolids and planted the same day, sometimes simultaneously.
- Application methods varied and simple, making all options available to farmers and end-users.
- Storage hurdles are greatly reduced as the pellets can be handled similarly to dry, synthetic fertilizers.
- Yield and profitability. The yields showed that the crop beneficially reused the organic-based biosolids with decreased input costs compared to commercial cropping.

As long as we are here, biosolids will be present and will be a valuable resource when handled properly. As we conduct additional trials and gather more data, we look forward to sharing that information as we tackle these challenges together.

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2024-2025

CSWEA BUYERS' GUIDE

Welcome to the annual *Central States Water* Buyers' Guide. When making purchasing decisions about products and services in the wastewater industry throughout the Central States region, please support the companies whose advertising makes *Central States Water* possible.

OUR CSWEA BUYERS' GUIDE CONSISTS OF TWO SECTIONS:

1. A categorical listing of products and services, including a list of companies which provide them.
2. An alphabetical listing of the companies appearing in the first section. This listing includes name, contact info, website, and more.

LISTINGS BY CATEGORY

ACOUSTIC INSPECTION
InfoSense, Inc.

ACTIVATED CARBON
Carbon Enterprises Inc.
Unison Solutions, Inc.
WaterSurplus

ASSET MANAGEMENT
AE2S
Bolton & Menk, Inc.
Brown and Caldwell
CDM Smith
Crawford, Murphy & Tilly
Donohue & Associates, Inc.
Ziegler CAT Power Systems

BIOGAS CONDITIONING EQUIPMENT
Unison Solutions, Inc.

BIOGAS FLARES
Energenecs

CHEMICAL PROCESSING AND FEED SYSTEMS
Boerger, LLC
Energenecs
LAI, Ltd.

CHEMICAL TANK SCALES
Force Flow/Halogen Valve Systems

COATINGS, LINING AND CORROSION CONTROL
Bolton & Menk, Inc.
Dixon Engineering, Inc.
RELINER/Duran Inc.
SEH

CONTRACTORS
InfoSense, Inc.

CSO/SSO CONTROLS, WATER RESOURCES, DISTRIBUTION, AND COLLECTION
InfoSense, Inc.
Metropolitan Industries, Inc.
Strand Associates, Inc.

CURED-IN-PLACE-PIPE (CIPP)
Foth

DIGESTER GAS SAFETY AND GAS STREAM EQUIPMENT
Energenecs
LAI, Ltd.

DESIGN-BUILD SERVICES
Baxter & Woodman, Inc.
CDM Smith
Crawford, Murphy & Tilly
Donohue & Associates, Inc.
Rice Lake Construction
Ziegler CAT Power Systems

DISINFECTION/EQUIPMENT
LAI, Ltd.

ELECTRICAL INSTRUMENTATION, CONTROLS, AND GENERATORS
AE2S
Baxter & Woodman, Inc.
Donohue & Associates, Inc.
Energenecs
Gasvoda & Associates, Inc.
Integrated Process Solutions, Inc.
KROHNE, Inc.
LW Allen/Altronex
Metropolitan Industries, Inc.
MSA Professional Services, Inc.
Starnet Technologies
USEMCO Inc.
Ziegler CAT Power Systems

ENGINEERS/CONSULTANTS
AE2S
Apex Engineering Group
Baxter & Woodman, Inc.
Bolton & Menk, Inc.
Brown and Caldwell
CDM Smith
Clark Dietz, Inc.
Crawford, Murphy & Tilly
Dixon Engineering, Inc.
Donohue & Associates, Inc.
Engineering Enterprises, Inc.
Foth
Hazen and Sawyer
HR Green, Inc.
Integrated Process Solutions, Inc.
MSA Professional Services, Inc.
SEH
Strand Associates, Inc.
Trotter and Associates, Inc.
Ziegler CAT Power Systems

ENVIRONMENTAL LABORATORY TESTING
YSI, a Xylem brand

FACILITY CONSTRUCTION, REHAB, AND REPAIRS
Rice Lake Construction

FILTER MEDIA
Carbon Enterprises Inc.
WaterSurplus

FILTRATION
Carbon Enterprises Inc.
WaterSurplus

FINE SCREENS/SLIDE GATES
Gasvoda & Associates, Inc.
JDV Equipment Corp.
LAI, Ltd.
LW Allen/Altronex

FLOW CONTROL
AMERICAN Flow Control
Electric Pump, Inc.
KROHNE, Inc.
Starnet Technologies

FRP BUILDINGS/ENCLOSURES
Mekco Manufacturing

GIS AND MS4
Baxter & Woodman, Inc.
Bolton & Menk, Inc.

GREENSAND PLUS
WaterSurplus

GRIT REMOVAL
JDV Equipment Corp.
Lakeside Equipment Corporation

GRIT REMOVAL SYSTEMS/SCREENS
Clark Dietz, Inc.
Electric Pump, Inc.
Energenecs
Gasvoda & Associates, Inc.
JDV Equipment Corp.
LAI, Ltd.

HEADWORKS SCREENING
Lakeside Equipment Corporation

INFRASTRUCTURE REHABILITATION
RELINER/Duran Inc.

INSTRUMENTATION SERVICE AND CALIBRATION
Electric Pump, Inc.
Integrated Process Solutions, Inc.
KROHNE, Inc.
LW Allen/Altronex

INTAKE SCREENS
Lakeside Equipment Corporation

LAND SURVEYING
SEH

LEAK DETECTION
KROHNE, Inc.
Starnet Technologies

MANAGEMENT CONSULTING
CDM Smith

MANHOLE REHABILITATION
RELINER/Duran Inc.

MANHOLE INSPECTION/ LOCATING/MAPPING
Foth

MANUFACTURER
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OPERATION SERVICES
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Lakeside Equipment Corporation

PFAS TREATMENT
WaterSurplus

PROCESS MECHANICAL
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CDM Smith
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Rice Lake Construction

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PUBLIC INFORMATION/ COMMUNICATION
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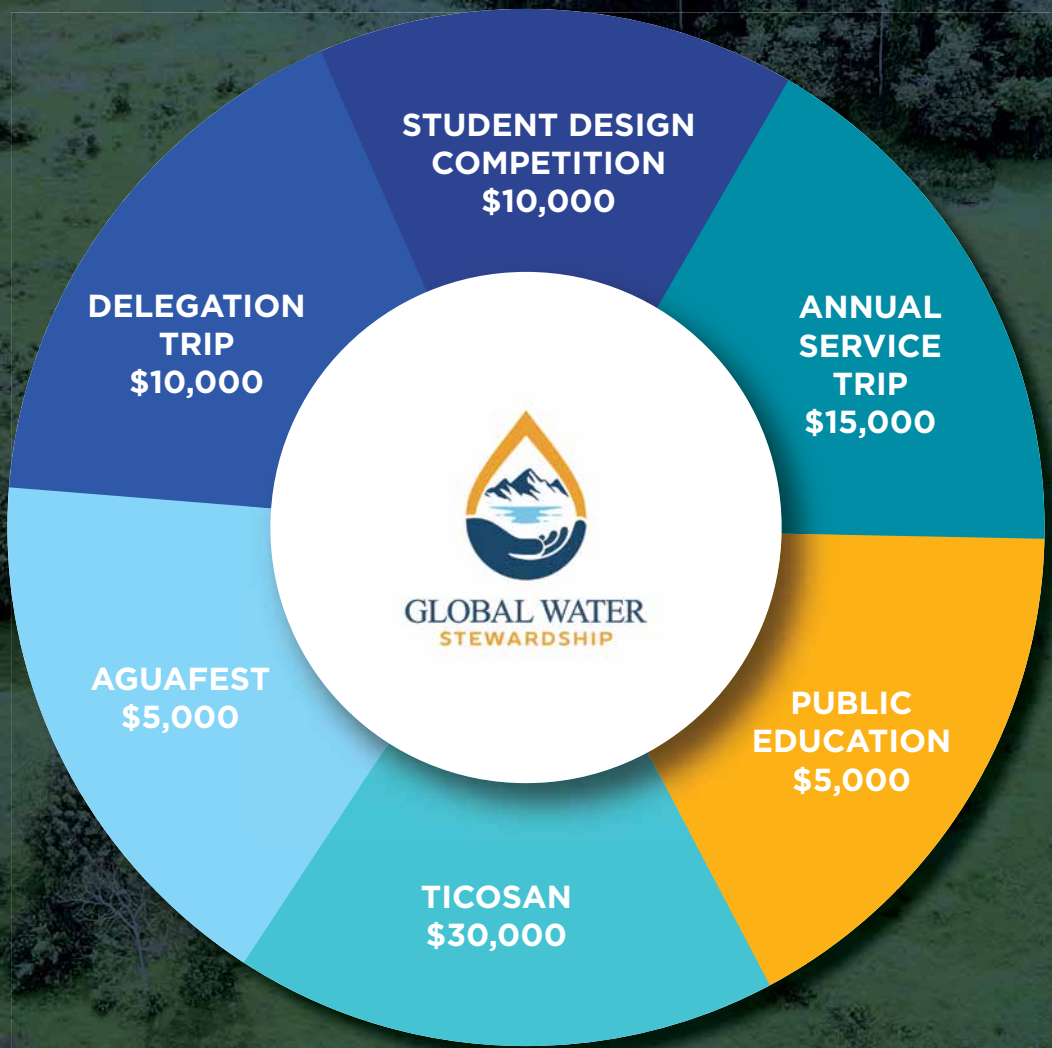
PROJECTS OVERVIEW



OUR MISSION

Global Water Stewardship resolves sanitation issues in developing countries. Our focus is on educating the public and engineering sustainable centralized solutions to keep waterways clean and communities healthy.

COMPLETED PROJECTS

COMMUNITY DESIGNS

- Sámara
- Monteverde
- La Fortuna
- Dominical
- Bahía Ballena
- Palmar Sur
- Piedras Blancas
- Montezuma
- Bijagua de Upala
- Horquetas

BIOGARDENS

- Cloud Forest School (Monteverde)
- Escuela Zeta Trece (La Fortuna)
- Escuela Verde (Bahía Ballena)
- Escuela de Montezuma
- Escuela San Fernando
- Escala de El Jardin

TECHNICAL SUPPORT

- Ptar Los Tajos (San José)
- Parque Manuel Antonio (Quepos)
- Ptar San Isidro (Pérez Zeledón)

WASH EDUCATION PROGRAM

- Cloud Forest School (Monteverde)
- Escuela Zeta Trece (La Fortuna)
- Escuela Verde PK (Bahía Ballena)
- Escuela Flor de Bahía (Bahía Ballena)
- Colegio Humbolt (San José)
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CALL FOR ABSTRACTS

98TH ANNUAL MEETING

One Water for All

MAY 28-30, 2025

The Central States Water Environment Association (CSWEA) Technical Program Committee has the responsibility for technical sessions at the Annual Meeting. Participants in any sector of the water environment field are cordially invited to submit abstracts for evaluation. Abstract submissions that will be given highest credit include:

- Submissions with a focus on day-to-day treatment, by people with hands-on experience at facilities.
- Topics of emerging concern or current industry focus, such as climate driven impacts on POTWs or a One Water planning approach.
- Case studies presented from diverse perspectives, such as operators, young professionals, middle management, and utility leaders.
- Research topics and case studies related to new and innovative technologies.
- Submissions focusing on local projects or issues.

Abstracts will be scored by the Technical Program Committee based upon the following criteria:

1. **Originality and status of subject –** The abstract should present new concepts or new and novel applications of established concepts. It also may describe substantial improvements of existing theories or present significant data in support or in furtherance of those theories. Studies with incomplete results or ill-defined problem statements should be avoided.
2. **Content –** Abstracts can either be technical or non- technical in nature. In either case, it should be evident that the abstract clearly describes the entirety of the content that would be presented in a technical session. The abstract content should be objective and non-biased toward specific products, approaches, or otherwise. Each abstract should contain clear purpose and impact for conference attendees.
3. **Water environment significance –** the author should clearly describe the pertinence of the abstract content to a practical area of concern or interest within the water quality and wastewater management industry.
4. **Adequacy of abstract preparation –** The adequacy of an abstract is often indicative of the quality of the final presentation. The abstract summarizes the presentation; therefore, it should provide a concise summary of objectives, scope, general procedures, results, and conclusions. To receive full credit for abstract format, submitters are encouraged to use the downloadable Abstract Template available on the CSWEA website. Submittal of presentation slides or a generic product brochure in place of an abstract will not be considered.

Once you start the abstract submission process using the online form, you cannot come back to it later. Have all materials ready to submit before starting the submission process. Presenting authors will be notified in January 2025 of the acceptance or rejection of the abstract. On behalf of the Technical Program Committee, thank you for your interest in – and contributions to – this year's technical program!

Steve Graziano
2025 Chair, Technical Program Committee
Jacobs Engineering
steven.graziano@jacobs.com

Submit abstracts by 11:59 pm CST on December 8, 2024 at *https://cswea.wufoo.com/forms/98th-annual-meeting-call-for-abstracts*

Determine Abstract Type

For Technical Abstracts
- Highlight desktop, benchtop, pilot study, full-scale projects, etc.
- Includes data, figures, and methodology.

For Non-Technical Abstracts
- Highlight soft skills, utility management and leadership.
- Does not require data but should allow for clear interpretation of the author's intent.

Abstracts Must Contain

Necessary Elements of Abstract
- Use the downloadable Abstract Template available on the CSWEA website that includes:
  - Title
  - Author(s)
  - Introduction/Background
  - Main Content
  - Broader Impacts
- Include all tables, figures, and references.
- Full abstract shall be 3-6 pages in length.

Submit Abstract Online

Online Submission
- Enter the Abstract Title.
- Enter an Abstract Summary (120 words max)
- Select your presentation format (oral or poster)
- Import Presenter and Co-Author affiliations and contact information.
- Choose your applicable topic area(s)
- Upload your abstract document (PDF with filename format: *Last Name–Abstract Title*).

Looking for abstract topic ideas? Consider these!

IMPLEMENTATION to OPERATIONS and MAINTENANCE:
- Time management or new process startup
- Efficiency (pumps, motors, lights, UV disinfection, HVAC, etc.)
- Technology/SCADA/Web-based maintenance programs/GIS applications
- Troubleshooting – Traditional facilities (activated sludge, BNR), new processes (nutrient recovery) etc.
- Case studies of facilities
- Startup case studies
- Optimization

ADVANCEMENTS in LIQUIDS TREATMENT
- Enhanced primary treatment
- Secondary treatment advancements and intensification
- Nutrient removal
- Tertiary treatment
- Alternative disinfectants

WATERSHEDS and STORMWATER MANAGEMENT:
- Climate change-driven impacts on treatment plants
- Green infrastructure solutions and best management practices
- Implementing new MS4 permit requirements
- Anti-degradation and other regulatory issues
- Using grants and other funding sources to implement stormwater management as part of CIP projects
- Habitat or groundwater protection or restoration
- Non-point pollution source modeling
- Water quality trading and watershed management issues and initiatives, including adaptive management
- Total maximum daily loads involving point and non-point sources
- Public education and outreach

UTILITY MANAGEMENT:
- Communications
- Employee retention and development
- Succession planning
- Project funding
- Utility rate development and reviews

GENERAL:
- Laboratory issues and bench-scale studies
- Pretreatment, industrial treatment, and pollution prevention
- Pollutants of emerging concern – PFAS, chlorides etc.
- Public education to address emerging concerns – chlorides, water softener use, leachate, flushable wipes, etc.
- Regulatory issues
- Security issues
- Engineering ethics training
- Collection system/treatment plant odor control
- *The Infrastructure Investment and Jobs Act*
- Significant industrial users and industrial pretreatment
- Emergency response/repairs

RESOURCE RECOVERY and ENERGY OPTIMIZATION
- Resource recovery – sourcing raw materials, nutrient recovery
- High strength waste and pretreatment programs
- Digester gas production and treatment technologies
- Lessons learnt from co-digestion
- Heat recovery case studies
- Alternative energy use
- Energy management and savings to utility management

COLLECTION SYSTEMS:
- Collection system rehabilitation technologies/methods
- Collection system rehabilitation case studies
- Educating the public on how to protect the system
- CMOM program development and implementation
- Collection system design and operation
- Green infrastructure case studies
- Infiltration/inflow management case studies
- Stormwater and combined sewer overflow management
- Stormwater conveyance

RESEARCH and DESIGN:
- New/innovative technology research and application
- Nutrient removal technologies
- Sustainability in design and construction
- Toxics/emerging pollutants monitoring and control
- Treatment design
- Wastewater reuse, applications, technology and regulatory issues
- Wastewater surveillance

RESIDUALS, SOLIDS AND BIOSOLIDS:
- Pollutants of Emerging Concern – PFAS
- Standard or advanced treatment and stabilization
- Environmental management systems – National Biosolids Partnership
- Public education and awareness, case studies
- Fertilizer production – Class A case studies

SOFT SKILLS/LEADERSHIP:
- Leadership skills
- Managing the ill or injured employee
- Generational integration
- Anti-harassment and discrimination training for managers
- Getting the most out of employee performance evaluations
- Union negotiations
- Handling the grievance and arbitration process
- Managing in a union environment
- Labor Law
- Management rights for managers
- Social media and the workplace

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CALL FOR AWARDS

98TH ANNUAL MEETING

One Water for All

MAY 28-30, 2025

Our role in protecting the public and the environment are often undervalued and invisible to the very public that we protect. Whether in design, academia, equipment manufacture and supply, management, or operations, we all know individuals who have successfully addressed unique and challenging issues. Our awards program offers the opportunity to receive recognition for these deserving professionals.

Each year, one of CSWEA's top priorities is to recognize the efforts of our members and water and wastewater professionals at all levels. We also seek to provide top-quality nominees to the Water Environment Federation (WEF) each year for national level recognition. Don't miss this opportunity to provide recognition to deserving water quality professionals.

It's time to brag a little about the accomplishments of our members. To nominate someone is straightforward: fill out the nomination form *at https://bit.ly/39KRsaE* with as much information as possible and submit it to CSWEA.

In order for you or a deserving colleague to be recognized, please submit a nomination to the Central States Water Environment Association and/or WEF for one of the many awards available.

Below is a listing of the award opportunities. Please carefully review the various awards available and nominate one of our many deserving members. Please note that award submittals need to be made by December 1, 2024 for awards presented by CSWEA to allow distribution to the respective CSWEA or WEF Awards Committees for consideration. CSWEA will present the winners with their awards at the 98th Annual Meeting Awards Banquet.

2025 CSWEA & WEF Award nominations now being accepted

Nominations are now being accepted for the following CSWEA and WEF awards and should you be aware of a worthy nominee we ask that you please nominate them. Note that it is OK to self-nominate. Each award is briefly described below and complete information may be found on *www.cswea.org*.

WEF AWARDS presented at CSWEA Awards Banquet

Arthur Sidney Bedell Award:

The Bedell is a federation award that is given annually to one recipient in recognition of outstanding achievement in the sewerage and wastewater treatment works field, as related particularly to the problems and activities of the member association. The Bedell Award Subcommittee selects the nominations, and the award is presented at the CSWEA Annual Meeting.

William D. Hatfield Award:

The Hatfield Award is a federation award given annually to one recipient in recognition of outstanding operation of a wastewater treatment plant. Each State Section may nominate one person per year and submit it to the Hatfield subcommittee. This award is presented at the CSWEA Annual Meeting.

George W. Burke Safety Award:

The Burke Award is made annually by WEF to a municipal or industrial wastewater facility for promoting an active and effective safety program. Each State Section Committee can nominate a facility and the nominations are then sent to the general awards committee. The winner will be presented with the Burke Safety Award at the CSWEA Annual Meeting.

Lab Analyst Excellence Award:

This is a WEF award that is given annually to one recipient in recognition of outstanding achievement in the area of water quality analysis. Each State Section Laboratory Committee may nominate one person. This award is presented at the CSWEA Annual Meeting.

CSWEA AWARDS presented at CSWEA Awards Banquet

Radebaugh Award:

The Radebaugh Award is given to the author of a deserving paper presented at the previous year's annual meeting. The Radebaugh Award Subcommittee selects the winner and the award is presented at the CSWEA Annual Meeting.

Operations Award:

The Operations Award is a Central States award that is given annually to one recipient in each state. The purpose of this award is to recognize operators of wastewater treatment facilities who are performing their duties in an outstanding manner and are demonstrating distinguished professionalism. The States Sections'

Operations Committee makes the selection and each State Section winner will receive the award at the CSWEA Annual Meeting.

Industrial Water Quality Achievement Award:
The award is given at the CSWEA Annual Meeting to one industry per year in recognition of outstanding contributions in waste minimization, pollution prevention, environmental compliance, and environmental stewardship. Each State Section Industrial Committee may nominate one facility per year.

Bill Boyle Educator of the Year Award:
This award is given to one teacher per year in recognition of outstanding education assistance to students of any level in the study of the water environment. The award is presented at the CSWEA Annual Meeting.

Collection System Award:
This award is given annually to one member from each section in recognition of outstanding contributions in advancing collection system knowledge and direct or indirect improvement in water quality. Each State Section Collection System Committee can nominate one individual per year with the selected candidate receiving the award at the CSWEA Annual Meeting. The recipient of the Association Award shall be nominated annually for the WEF Collection System Award.

Ryan Giefer Outstanding Young Professional Award:
This award is given annually to one member from each state section in recognition of the contributions of young water environment professionals to CSWEA and to the wastewater collection and treatment industry. This award is presented at the CSWEA Annual Meeting.

Academic Excellence Award:
The Academic Excellence Award is given to one student per year from each eligible institution in the state section hosting the Annual Conference. (Wisconsin is hosting the next conference.) An eligible institution shall be a college or university having a recognized graduate or under-graduate program in engineering or biological sciences at an eligible institution. The candidate shall be selected by the department chair or other designated person at the eligible institution. Selected candidates are able to attend the CSWEA Annual Meeting with expenses paid, to receive their award and scholarship.

Central State Section Safety Award:
The CSWEA Facility Safety Award is made annually by CSWEA to a municipal or industrial wastewater facility within each State Section in recognition of active and effective safety programs from Burke Award submissions and the awards are presented at the CSWEA Annual Meeting.

Water Stewardship Award: This award recognizes and honors the contributions of an individual for outstanding humanitarian service to improving and sustaining our global water environment.

Sustainability & Green Infrastructure Award:
Established in 2017, this award recognizes and honors the contributions of an individual or organization for projects at their organization that support sustainability in the water environment or make use of green infrastructure in the design of water reclamation facilities, or stormwater/wastewater conveyance or treatment processes.

Water Technology Innovator Award:
Established in 2019, this award recognizes individuals or groups that look beyond the traditional water and wastewater operational models and incorporate or advance sustainable principles and cutting-edge practices, with a focus on resource recovery, efficiency, and sustainability.

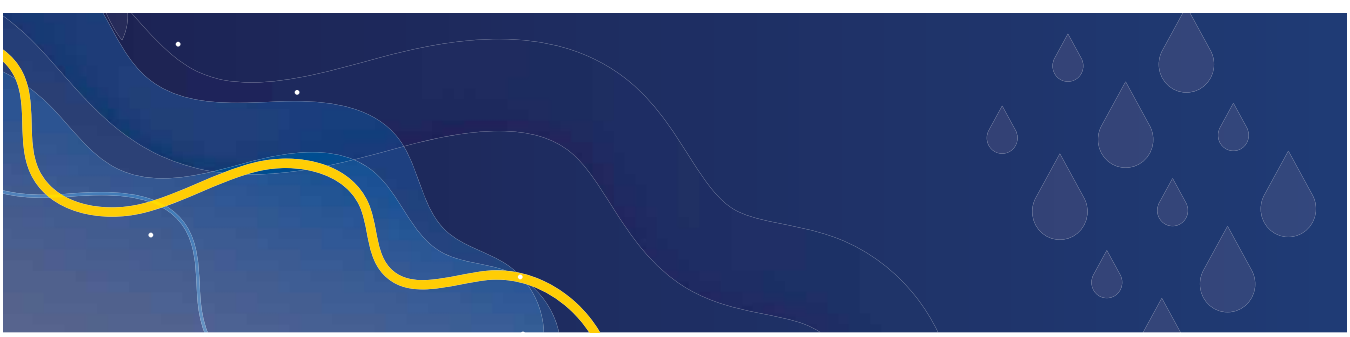
WEF AWARDS presented at WEFTEC

Charles Alvin Emerson Medal:
This award is presented by WEF to an individual whose contributions to the wastewater collection and treatment industry most deserve recognition. Areas of involvement include membership growth, water resource protection, improved techniques of wastewater treatment and fundamental research.

Harry E. Schlenz Medal:
This award is presented by WEF and recognizes the achievements of an individual outside of the water environment profession, who takes up the banner of environmental public education. This person is typically in the journalism, film or video production field.

Richard S. Englebrecht International Activities Service Award:
This award is presented by WEF and recognizes sustained and significant contributions to the furtherance and improvement of the activities of the Water Environment Federation in the international field.

Submit your nomination at *https://cswea.wufoo.com/forms/cswea-awards-nomination*



October 5-9

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the water quality people

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October 6

ILLINOIS Water Environment Association

CSWEA/IWEA WEFTEC RECEPTION
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Downers Grove, IL

October 23

CSWEA OPERATOR TRAINING WEBINAR:
PURPOSE & FUNDAMENTALS OF WASTEWATER TREATMENT
Virtual Event

November 7

Conference on the Environment

MN CONFERENCE ON THE ENVIRONMENT
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November 20

WI SECTION NOVEMBER MEETING
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