

ClearWaters

NYWEA'S MAGAZINE

Fall 2024



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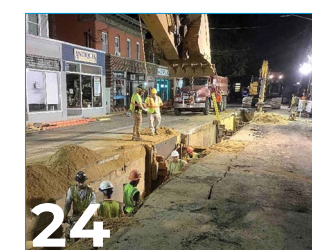
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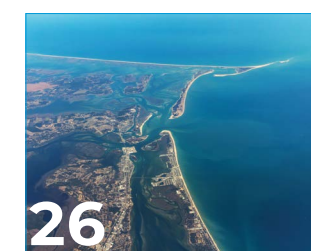
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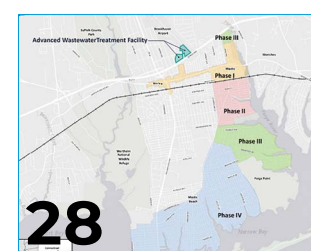
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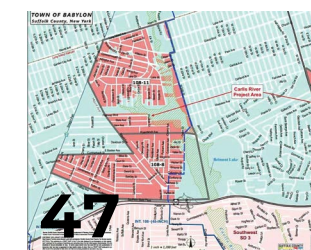
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PRESIDENT'S MESSAGE

It's hard to believe fall is upon us already. I must admit, this is my favorite season—the vibrant fall colors, the smell of hot apple cider and all things pumpkin, and the cool, crisp weather. It truly is an amazing time of year, and I hope you are enjoying fall in your area of this beautiful state.

NYWEA Road Trip

I was fortunate to have spent September traveling across the state on NYWEA road trips to attend several events. First, I was honored to attend the New York City Watershed Science & Technical Conference. This was my first time attending the conference and I was impressed with the vast technical program on watershed protection and management that Lisa Melville and her colleagues assembled. The historic Bear Mountain Inn did not disappoint with beautiful weather and scenic views (see page 51 for recap).

A few days later, I traveled to the Capital Chapter's Fall Technical event at beautiful Saratoga Spa State Park (see page 52). The technical presentations had something for everyone—from operators to engineers. I had the pleasure of presenting several 5S shovels and a Golden Manhole to some well-deserving Capital Chapter members. A bonus was winning one of the raffle items!

Lastly, I attended the Genesee Valley Chapter Steak Roast at the Dansville Fish & Game Club. The morning was filled with technical presentations and plenty of food including breakfast chili (who knew there was such a thing!), followed by the steak roast lunch on a sunny and unusually warm day in late September. I once again was fortunate to present several deserving members with 5S shovels and Golden Manholes. Presenting awards might be one of my favorite roles as president.

I truly enjoy being able to visit the different Chapters, meet new friends, and reconnect with friends who I may not have seen in quite some time.

WEFTEC

In early October I attended WEFTEC, which was my first time visiting New Orleans. It was wonderful connecting with the other Member Association leaders Sunday morning and learning more about WEF's initiatives (Workforce Development and Circular Water Economy). The exhibit hall was full of new technologies and equipment and literally was 1 mile long!

The Operations Challenge was a highlight of the conference, and I was proud to support our NYWEA teams—all six of them! The teams work extremely hard all year long to prepare for this event and I'm in awe of their work ethic and comradery; somehow, they manage to remain uber competitive, yet supportive of their fellow NYWEA teams. I'm thrilled to announce that NYWEA's teams were the winningest WEA at WEFTEC. Please check out the Operations Challenge recap on page 35 for more details on the teams and their accomplishments. Congratulations to all the teams!

Women of Water

On October 24, NYWEA hosted its second Women of Water (WoW) Leadership Exchange event in Albany. We had 40+ attendees eager to learn about essential skills to help elevate ourselves and one another as leaders in the water industry. We talked about overcoming imposter syndrome—if you don't know what imposter syndrome is, please "Google" it as I suspect most of you have experienced this at some point in your life. We discussed strategies to combat imposter syndrome and ways to "flip the script" and find strengths



Lisa Derrigan
NYWEA President

within imposter syndrome such as driving self-improvement and enhancing our resiliency. Highlighting my presidential theme, Water Ambassador Lauren Livermore led a panel discussion on meaningful mentorship featuring operators, consultants, and regulators with varying levels of experience. Jean Malafronte taught us strategies to help manage crucial communications and understand the "ABC" model (affect, behavior, and cognition) for managing conversations, which are useful for both work and life in general. Jean also presented on ways to elevate yourself and others through abstracts, awards and accolades. My key takeaway on this subject is to collaborate with the person you would like to nominate for an award to ensure the best possible outcome.

Many thanks to Jean Malafronte and Lauren Livermore for their efforts in organizing and speaking at this event, our mentorship panels for sharing their experiences, and our sponsors for making this event a success. You can check out our group photo and attendee testimonials on page 50!

In This Issue

This fall issue of Clear Waters highlights clean water efforts on Long Island including the Water Views feature on "Initiatives to Protect Long Island's Waters" by Carol Lamb-LaFay. You will learn about the water reuse roadmap and action plan for Long Island from Stephen Hadjiyane, and Jenna Greenberg writes about the new advanced water treatment facility and low-pressure sewer system for Mastic and Shirley. With its many beaches and extended ocean coastline, coastal systems resiliency is a high priority for Long Island and is the focus of Thomas Immerso's article. You'll also learn about the Long Island Chapter's annual kayak trips on local waterways.

If you missed the May issue of Treatment Plant Operator (TPO) magazine, we have a reprint of the article featuring Dale Grudier and how wastewater treatment is a family affair (including his lovely wife, Water Ambassador Donna Grudier). Our member spotlight focuses on our very own Vice President-Elect Dan O'Sullivan.

I encourage you to spend some time reading these and all the other fantastic articles and features in this fall issue of *Clear Waters*.
Happy Fall!

Lisa J. Derrigan, PE
NYWEA President

Khris Dodson
Executive Director



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FROM THE DESK OF THE EXECUTIVE DIRECTOR

Fall is upon us! And that means that our annual NYC Watershed conference and WEFTEC are behind us.

The NYC Watershed Conference was (again) a resounding success with more than 200 people in attendance, continuing on an upward trend for attendees. Just before the pandemic we averaged 150 to 175 attendees. We are pleased to continue to be able to offer affordable, quality programming in this part of the state.

WEFTEC was unprecedented with NYWEA sending six Operations Challenge teams this year! Check out page 35 to see the results. We had two teams ranked Overall in their divisions! We also sent two Student Design Competition teams: one from SUNY ESF and the other from University of Buffalo.

Looking forward, we're planning on some legislative meetings with our partners at NYSAWWA and New York Rural Water Association, as well as the Clean Water Coalition—which includes Citizens Campaign for the Environment, Nature Conservancy and others—to represent the needs of our members in Albany. I'll be looking for some of you to join us in Albany (and Washington, D.C.) to talk about the issues that are most important to our industry. And we always encourage volunteers who are interested in joining.

In other news, we received a record number of abstracts for our annual meeting this year! We've got nearly 40 sessions comprised of more than 130 papers! It's proving to be an exciting ramp up to our 2025 Annual Meeting!

At the same time, we've launched (finally) a new membership platform that members, committees and chapters can all utilize. We're using it this year for our annual meeting, instead of Whova, for all your registration, exhibitor, advertising and sponsorship needs! Similar to last year, we'll be tracking CEUs using QR codes in the sessions. By now you should've received a welcome email to NYWEA's MemberLeap (let me know if you haven't). As we move forward using this new platform, NYWEA staff are here to assist you. Once we're all up and running it should serve as a one-stop shop for most, if not all, of your NYWEA needs.

Finally, as the holiday season is upon us, I'd like to wish you and yours Happy Holidays and a Happy New Year! Hopefully, we'll be seeing each other in New York City in February for our 97th Annual Meeting.

Khris Dodson
khris@nywea.org

**VISIT
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OR PAGE 55
FOR
ANNUAL
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LINKS**



Below left: Dan O'Sullivan inspects a pipe during the 2024 NYWEA Operations Challenge in Buffalo.
Below right: Dan with colleagues Julie Barown and Rosaleen Nogle at 2024 Annual Meeting. Photos: Trent Wellott



Dan O'Sullivan: Member Spotlight

I have been employed with the Buffalo Sewer Authority since 2012 and currently hold the title Shift Superintendent of Sewage Treatment at our Bird Island Treatment Facility. I am also the vice president-elect for NYWEA and will be president as NYWEA celebrates its 100th annual meeting!

My start in NYWEA, interestingly enough, was a little like Angel French's start, as she described in the last Clear Waters member spotlight. I, too, was lucky enough to be awarded the Lucy Grassano Scholarship in 2019 and as a result was able to attend that year's annual meeting in New York City. A few weeks later, I was notified that I had been accepted into the Water Environment Federation Water Leadership Institute class of 2019. I guess it was a good year for me!

After being awarded these two opportunities, I truly got to understand the importance of being an active member of these associations and thought to myself, "What more can I do to help NYWEA?" I started to get involved in committees, in particular the Utility Operations and Maintenance Committee (UOMC). After a short time on the UOMC, I was thrust into committee leadership as well as elected to the Operators Governance Council. Both endeavors were truly time well spent. We accomplished so much, and I am confident that we will continue to make positive changes for the recognition of operators and maintenance staff across the state who do so much for this industry and organization.

I have also helped judge NYWEA's Operations Challenge. Everyone sees the great work the competitors do during this event, but the amount of work that goes into it behind the scenes by so many other folks is remarkable. It's an honor to just be a little part of that.

I have become more active on the chapter level as well, and presently serve on the Western Chapter board. Now I may be a little biased, but the NYWEA Western Chapter and the Buffalo Sewer Authority are full of so many great people who have always been willing to help me grow and develop. They are some of the most encouraging, supportive and motivating folks I have come across. One of the people who really helped bring me along was longtime Western Chapter chair and Buffalo Sewer Authority employee Robbie Gaiek. She was the person that first approached me and asked me to join in on a Greater Buffalo Environmental Conference planning committee meeting. She has often said, "you should try this, I think you'd be good at it" when trying to encourage me to do more. I was nervous beyond belief, but once again the entire group was welcoming. I can't wait to start planning this year's conference!

I could write dozens of pages about my experiences with this organization and why it's so important to me, as could probably so many of the other members who took the time to read this. That's why this organization is so incredible to me and why others should join. Everyone you meet and talk to is cheering for the other person's success. NYWEA is a place where people from different backgrounds, education, job titles and skill sets come together with one common goal of protecting public health and the environment.

I'm excited to continue on my track to become NYWEA president in a few years. I will be lucky enough to have an up-close view to see this organization continue to grow and evolve. I might even get a chance to play in more chapter golf tournaments across the state! I'm also looking forward to meeting more members and exchanging more stories and ideas, even though at heart I'm still just an extremely shy operator.



Dan O'Sullivan and Donna Grudier pose with his Service Award received at the 2024 Annual Meeting. Photo: Trent Wellott

What does the Utility Operations & Maintenance Committee do?

Sean Morrison, Chair

- Promotes the professional status of operating personnel, to maximize the efficiency and ensure the integrity of water resource recovery facilities.
- Provides opportunities to expand operator knowledge and circulates information regarding mechanical, operational and managerial skills.
- Organizes the annual NYWEA Operations Challenge competition.
- Provides support, including logistic support, for the NYWEA Ops Challenge winners and runners-up to compete at the Water Environment Federation's national conference.
- Reviews criteria and nominations for the Hatfield, Morgan, Mann and Hill awards.
- Recommends recipients to the Awards Committee for approval by the NYWEA Board.
- Provides input for the issues related to operator programs, training and professional development.
- Nominates one individual from the committee every three years to serve as a member of the Operators Governance Council.

What does the Operators Governance Council do?

Meredith Streeter, Chair

- Provides oversight with quality assurance/quality control for the Water Resource Recovery Operator Certification program in New York state.
- Reviews certification applications.
- Conducts renewal training.
- Assesses reciprocity issues.
- Administers exams.
- Evaluates monthly exam results.
- Performs other tasks associated with operator certification.

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Communicable Diseases and the Workplace



Nellie J. Brown
MS, CIH

Should we come to work when we are sick? Some people may be dedicated and feel obligated not to let their colleagues down in a crunch, especially if staffing is tight. There may have been a deadline looming, or people are fearful for their jobs or concerned about appearing “lazy.” Some people seem to think that having any kind of sickness is a sign of weakness. Some workplaces have a culture of long hours, where operational demands take precedence over employee well-being. When people work through illness, we call this “presenteeism,” as the opposite of “absenteeism.”

Just think about all the items that you have touched since you woke up this morning. We can clean the commonly touched environment: faucets, sinks, toilets, door handles, stair rails, buttons for the elevator and the ATM, shared phones, chairs, work surfaces, keyboards, etc. But some objects that we commonly handle, like paper, can't be disinfected. This gives perspective on why good handwashing can make such a difference in preventing disease transfer.

Handwashing is preferred as soap and water kill some organisms that sanitizers may not, such as polio. Of course, touch-free designs for toilets, faucets and soap/foam dispensers help reduce exposure. And remember to put the toilet lid down before you flush the toilet to reduce aerosol droplets.

Practice good respiratory etiquette: “do a Dracula”—cough or sneeze into the elbow, rather than the hand. It's OK to say to someone: “I'm dealing with a bad cold (or whatever), so I'm not shaking hands today.” What about using your cellphone when you are sick or your hands are contaminated? Have you ever noticed people using cell phones in the restroom? Consider using an antiseptic wipe to clean your phone.

The U.S. Centers for Disease Control (CDC) has general recommendations for vaccinations for the public and for those considered at high risk. Check the seasonal influenza vaccination recommendations, as well as those for the latest COVID booster. For the fecal-borne illness hepatitis A, a vaccine is available. For jobs with potential blood or body fluid exposures that fall under the Occupational Safety and Health Administration's Bloodborne Pathogens Standard, the employer must offer the hepatitis B vaccine, as well as put into place protections and preventions, including post-exposure prophylaxis. Definitely keep your tetanus vaccination up to date. The CDC recommends a tetanus vaccination every 10 years, and also after a deep cut or puncture wound, unless it has been fewer than five years since your last vaccination.

Do you grow diseases in the workplace kitchen? In our homes, we would never leave a plate with crusted food in our sinks for two weeks or use the same sponge for months to wash dishes, but this happens quite often in workplaces. Could you be running a mold growth experiment in your workplace's refrigerator?

WATER VIEWS

Initiatives to Protect Long Island's Waters

With a population of 2.9 million, over 1,600 miles of coastline, and a \$240 billion economy, Long Island depends on clean water to sustain a variety of industries, including tourism, aquaculture and maritime activities. Proper management of Long Island's water resources is critical to ensuring that water quantity and quality is sustained, and its iconic beaches protected.

Central to Long Island's water supply is a vast underground aquifer system that provides drinking water to nearly all its residents. This aquifer system faces significant challenges, including contamination and overuse. Also, its proximity to the Atlantic Ocean and surrounding saltwater bodies creates the potential for saltwater intrusion into the aquifer, especially as sea levels rise due to climate change. The island's extensive coastline and world-famous beaches, such as those along the Hamptons and Jones Beach, further highlight the importance of water quality management. These beaches, which draw millions of visitors each year, face challenges from pollution and coastal erosion.

New York state is engaged in a comprehensive set of initiatives aimed at protecting the quality and quantity of ground, surface and coastal waters on Long Island. Key to these efforts is the Long Island Nitrogen Action Plan (LINAP) that targets the reduction of nitrogen pollution—a major threat to water quality—by identifying sources of contamination, implementing targeted mitigation strategies and fostering collaboration among local stakeholders. Over \$1.6 billion in federal, state and local funds have been expended on 327 nitrogen reduction projects in both Nassau and Suffolk counties, including the Bay Park Conveyance project. Out of the total, the New York State Department of Environmental Conservation (NYSDEC) awarded over \$170 million for 123 nitrogen reduction projects in both Nassau and Suffolk counties. These funds were used to upgrade wastewater infrastructure, expand sewer systems, and support the replacement of outdated septic systems, all of which are critical to reducing nitrogen levels. Additionally, the Long Island Groundwater Sustainability Model will play a pivotal role by providing a sophisticated tool to simulate groundwater dynamics, assess the impacts of various environmental and human factors, and guide sustainable water management practices.

New York state is protecting Long Island's coastlines through initiatives aimed at reducing flood risk, combating erosion, planning for sea-level rise and managing storm damage. Key efforts include the New York Rising program that funds flood resilience projects, the Living Shorelines and Breakwaters projects that use natural barriers to reduce erosion, and partnering with the Army Corps of Engineers to nourish beaches, restore dunes and restore natural coastal processes. Additionally, the Coastal Erosion Hazard Area program regulates development in erosion-prone areas to minimize damage to property and prevent the exacerbation of erosion hazards. Wetland restoration also plays a critical role as a natural buffer against storm surges.

Looking ahead, the Long Island Action Agenda being drafted now represents the continuing commitment by New York state to support and guide Long Island's water resource management. This strategic plan will outline targeted actions to protect and restore the island's vital water systems, including the aquifer, coastal waters and wetlands. By collaborating with local governments and stakeholders, NYSDEC and our state agency partners ensure ongoing involvement and resources to address the challenges posed by pollution, climate change and overdevelopment.

Through these coordinated efforts, NYSDEC is working to safeguard Long Island's water resources, promote sustainable water use, and protect the region's natural and recreational assets for future generations.



Carol Lamb-LaFay
Director, Division of
Water and Acting
Deputy Commissioner
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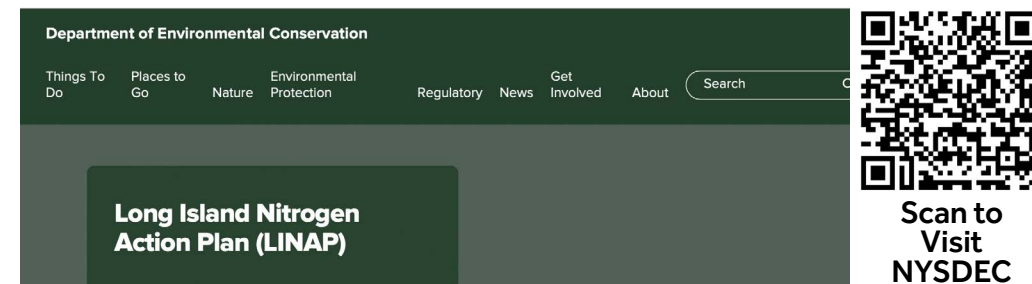
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Long Island Nitrogen Action Plan (LINAP)

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Groundwater Sustainability of the Long Island Aquifer System

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Members of the CCNY Student Chapter promoting NYWEA at the Campus Club Fair. Credit: JK Goongoon



JK Goongoon during a site visit to the Newton Creek WRRF. Credit: JK Goongoon

Student Spotlight: JK Goongoon

Despite living in a country intersected by hundreds of rivers, my exposure to water had been limited growing up. Recalling my childhood in Bangladesh, my mind flashes back to the small lakes in Dhanmondi, where my father would take my brother and me for morning walks. These lakes always appeared polluted, while still being home to intricate ecosystems we would spot while skipping stones across the lake. In our daily lives, I remember the pots of tap water we would boil for hours before being able to drink it, which over time built a feeling of uncertainty with water in me. My fondest memories with water back then are, therefore, marked by yearly trips to my grandparents' village, where I would get to ride aboard a boat down their local rivers. As we would row through vast amounts of water lilies and hyacinths, these boat rides gave me a glimpse of the beauty of the country's rivers, quite contrary to the sights I saw living in a densely populated city.

When I moved to the United States, specifically New York City, the waterfront was much closer to me than ever before. In high school, I worked firsthand with local oyster and mussel populations at Hudson River Park. There, I examined hard metal concentrations resulting from combined sewer overflows (CSOs) and learned more about water quality management—an experience that sparked my interest in environmental engineering.

When I began applying for colleges, I learned about NYWEA and applied for the organization's annual scholarship for high school students. I was thrilled and grateful to connect with the organization's mission, scholarship and network, and even more excited to learn that there was a student chapter at The City College of New York (CCNY), where I was going to attend starting the fall semester of 2021.

However, like many student organizations across college campuses, NYWEA at CCNY had ceased operations during COVID-19, shortly before I entered college. I was still able to explore my interests in water when I started working at CCNY's Environmental Engineering Laboratory at the end of my freshman year, helping extensively with water quality testing for the lab's ongoing projects.

At the same time, I was able to learn more about NYWEA from the lab's principal investigator, Krish Ramalingam (University Committee chair for NYWEA's Metropolitan Chapter). Krish and David Cham (civil engineering Ph.D. candidate at CCNY), helped me learn about NYWEA's work and resources for undergraduates and young professionals interested in the water industry. It was through their guidance and encouragement that I was able to revive the NYWEA chapter at CCNY in the spring semester of 2023, at the end of my sophomore year in college.

The pandemic had left no transition in leadership. Thus, I began contacting past alumni for guidance and building a new e-board, while compiling club archives. I became the sole liaison between past and incoming e-board members as team coordinator. With the new e-board, we worked to re-register our student chapter within CCNY and reached out to our classmates to garner new student members. With our efforts, CCNY-NYWEA officially restarted for the 2023-2024 school year.

My personal initiatives in CCNY-NYWEA have been geared toward creating opportunities for our student members by allowing them to delve deeper into water quality management and environmental sustainability through site visits and facility tours. As an e-board member of the re-registered club, I led the drive to bring back events that had been done pre-COVID such as the site visit to Newtown Creek Wastewater Resource Recovery Facility. I was also able to incorporate newer events, such as a tour of the historical Ossining Weir with Friends of the Old Croton Aqueduct, as well as engaging activities like kayaking with the Downtown Boathouse. This was largely possible due to the support of Krish and Dr. John Fillos (civil engineering professor at CCNY and CCNY-NYWEA chapter adviser). The continued support of my fellow e-board members was also pivotal to bringing these events to fruition. Our collective efforts have hence been very successful in creating a



JK Goongoon
City College of New York

welcoming space for students from various disciplines to engage with water careers through experiential learning.

During this time, I have been able to navigate my own journey in water through the several experiences I have gained through NYWEA. Attending the 2024 Annual Meeting earlier this year helped me connect with students and professionals in New York dedicated to this field, exposing me to opportunities available within the water industry. In particular, events from the Metro Chapter's Young Professionals Committee (e.g., Annual Beer Garden Social, webinars on professional licensure) have helped me gain valuable insight and advice from early-stage professionals as I piece together my next step.

Most recently, I was very fortunate to attend WEFTEC 2024 in New Orleans through WEF's Introducing Future Leaders to Opportunities in Water (InFLOW) Program. Due to the tremendous efforts of WEF InFLOW's program directors Julianne Jones, PMP (WEF's senior manager for education and training) and Alma Rocha, Ph.D., I was introduced to a variety of journeys in water—water stories I will hold on to dearly as I carve out my own. It was an incredible opportunity to foster connections with professionals coming from several sectors in water, but also learn about the latest technology and innovation through WEFTEC's Exhibition and Technical Sessions. As the first WEF InFLOW Scholar from CCNY, this experience was particularly significant in connecting me to resources and opportunities I have since brought back with me for my student chapter.

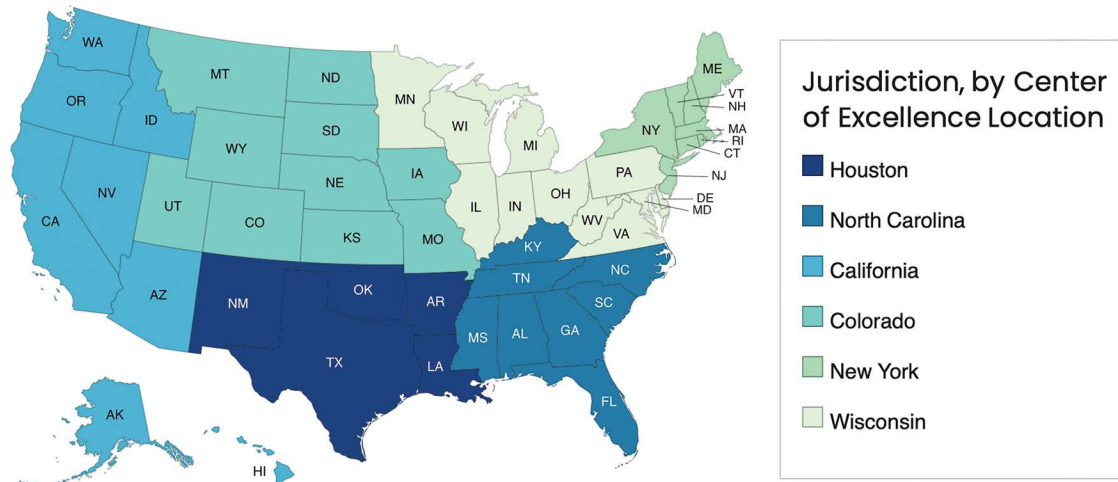
Whether it be through the vast and diverse network of water professionals, or the ways I have been supported through scholarships and mentorship opportunities, there is a lot I have NYWEA and WEF to thank for. My time with these organizations has been instrumental in helping me shape my career in water, an industry that supports my passion for intersectional climate solutions. I have come to learn that addressing water quality and infrastructure concerns can tackle both social issues (e.g., access to potable water sources that I had lacked in Bangladesh) and environmental issues (e.g., habitat restoration and resiliency) simultaneously. Learning about the various paths in water has helped me draw these connections.

As the student chapter president for CCNY during the 2024-2025 academic year, I look forward to building a lasting legacy of NYWEA within the CCNY community. I hope to extend the network of support I have received to my chapter members as well. Therefore, I am beyond excited to see the work my e-board and I accomplish this year, and cannot wait to see how my journey in the water sector unfolds.

JK Goongoon is pursuing a Bachelor of Engineering in environmental engineering, with a second major in sociology, and plans to graduate in the Class of 2025 from The City College of New York.

CDC ESTABLISHES NEW YORK STATE AS A CENTER OF EXCELLENCE IN WASTEWATER SURVEILLANCE

By David A. Larsen



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The six Centers of Excellence are led by public health departments and are located in California, Colorado, Houston, New York, North Carolina, and Wisconsin. The Centers of Excellence advance their mission through a collaborative partnership with academic and utility partners. *Credit: cdc.gov*

The United States Centers for Disease Control and Prevention (CDC) have recognized New York state as a Center of Excellence in wastewater surveillance. This recognition brings both opportunities and responsibilities.

As a Center of Excellence, we will receive additional funding to support scientific advancement in establishing wastewater surveillance as a key public health tool. We will also support the northeast region of the United States, Puerto Rico, and the U.S. Virgin Islands in their wastewater surveillance efforts. Much of the work we will be doing as a Center of Excellence involves interpreting wastewater surveillance data for public health benefit. For example, we will develop and test influenza and RSV hospitalization forecasting models that use wastewater surveillance. Our COVID-19 hospitalization forecasting (95% accuracy statewide) is just one of the tools that we provide to local health departments so they can manage their public health operations.

The Center of Excellence distinction would not be possible without our wastewater treatment plant partners. We are grateful for the continued collaboration and all the efforts you make to participate in wastewater surveillance. Thank you for all you do.

With Center of Excellence funding, we are pursuing two research projects with direct relevance to our wastewater treatment plant partners. First, we are scoping out the wastewater sampling data that you collect—data elements such as flow, total suspended solids, temperature, and pH. We think these might be informative data points for understanding pathogen testing results, but we have not wanted to burden wastewater treatment plants with collecting these data. Over the coming year we will reach out to see how you collect and store these data, and then determine if there are any simple and automatic data flows that we could implement. Please let me know if you would like to take part in those explorations.

Second, we will be distributing a survey to wastewater treatment plant operators regarding their knowledge, attitudes and practices related to wastewater surveillance for public health benefit. We hope to develop best practices for working with our wastewater treatment plant operators.

Thank you again for your collaboration. We could not have become a Center of Excellence without you.

David A. Larsen, Ph.D., MPH, is a professor and chair of the Department of Public Health with Syracuse University who may be reached at dalarsen@syr.edu.



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Ready to paddle the Nissequogue River.
Credit: Tom Immerso

FOUR RIVERS RUN THROUGH IT... LONG ISLAND!

By Thomas Immerso

Peace and tranquility... Those are the words that come to mind in assessing the natural wonders of living near the water—be it fresh or salt—on Long Island. Residents here are blessed with not only beautiful beaches to the south and picturesque waterfronts to the north, but with four river systems traversing Nassau and Suffolk counties. To that end, nothing conveys the serenity of these delicate ecosystems better than navigating them via canoe or kayak.

Over the past three decades, NYWEA's Long Island Environmental Sciences Committee (ESC) has annually organized summer outings on one of the four rivers, namely (from west to east), the Connetquot, the Nissequogue, the Carmans and the Peconic rivers. These rivers—ranging from 6 to 15 miles in length—have all been recognized by New York state as Wild, Scenic and Recreational rivers.

Flowing primarily in a north-south direction, these rivers are derived from groundwater (not from lakes) and freshwater until about their mid-points, where they become brackish. With increased salinity, the rivers become estuaries. This gradual transition is ideal habitat for brook, brown and rainbow trout, among many other aquatic species.

Each river has its own unique characteristics, typically offering varied types of organisms depending upon salinity and tidal (Nissequogue only) or non-tidal influences. Additionally, the rivers are slow-moving, making them ideal for canoeing and kayaking.

Over the years, the ESC outing has become increasingly popular, as it

is one of the few events that gives attendees a chance to not only enjoy the beauty and fresh air of the pristine outdoors, but also the opportunity to partake in a family-friendly event. Children love to attend and often get the opportunity to enjoy a dunk or two (usually intentional!) in the river at some point along the way. The trips are broken up by a midpoint lunch location, where boxed lunches are delivered in a park setting. This also gives everyone a chance to stretch their legs, use the restrooms and unwind a bit, while allowing the kids to run around for a little while.

Lest it be thought that these outings are all fun and games (they mostly are!), these trips are accompanied by New York State Department of Environmental Conservation personnel who provide narrative on the history and ecology of the river systems. In addition, they also identify indigenous species of aquatic birds, fish, reptiles and plants, along with taking questions by the covey of canoers and kayakers electing to remain in close proximity.

Should you find yourself down this way in mid-August (same time each year), please consider joining us by contacting NYWEA's Long Island Chapter. ESC Chair Dan McGreevy may be reached at dmcgreevy@gafleet.com for information.

Thomas Immerso is a Department of Public Works project engineer with the Town of Oyster Bay in Nassau County, New York, who may be reached at timmerso@oysterbay-ny.gov.



One of the many groups to have enjoyed the day on the Peconic River. Many thanks to Tom Immerso (fourth from the right) for his more than 20 years of organizing these trips for the Long Island Chapter.
Credit: Chris Korzenko



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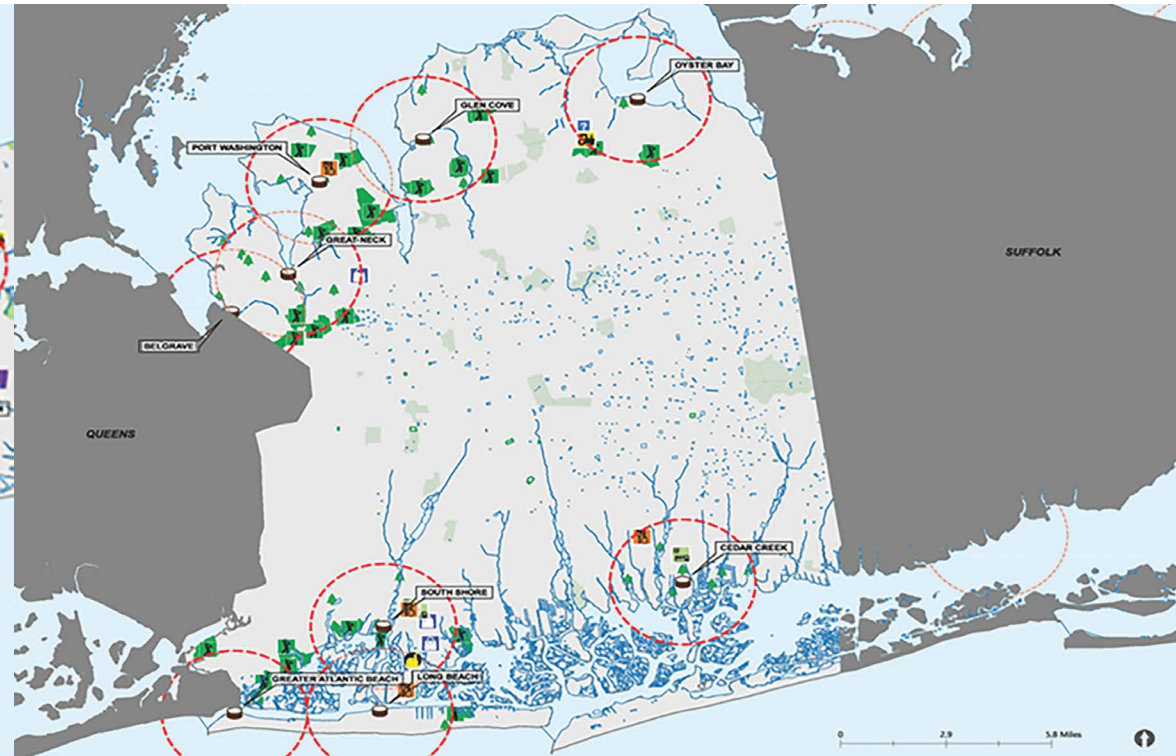
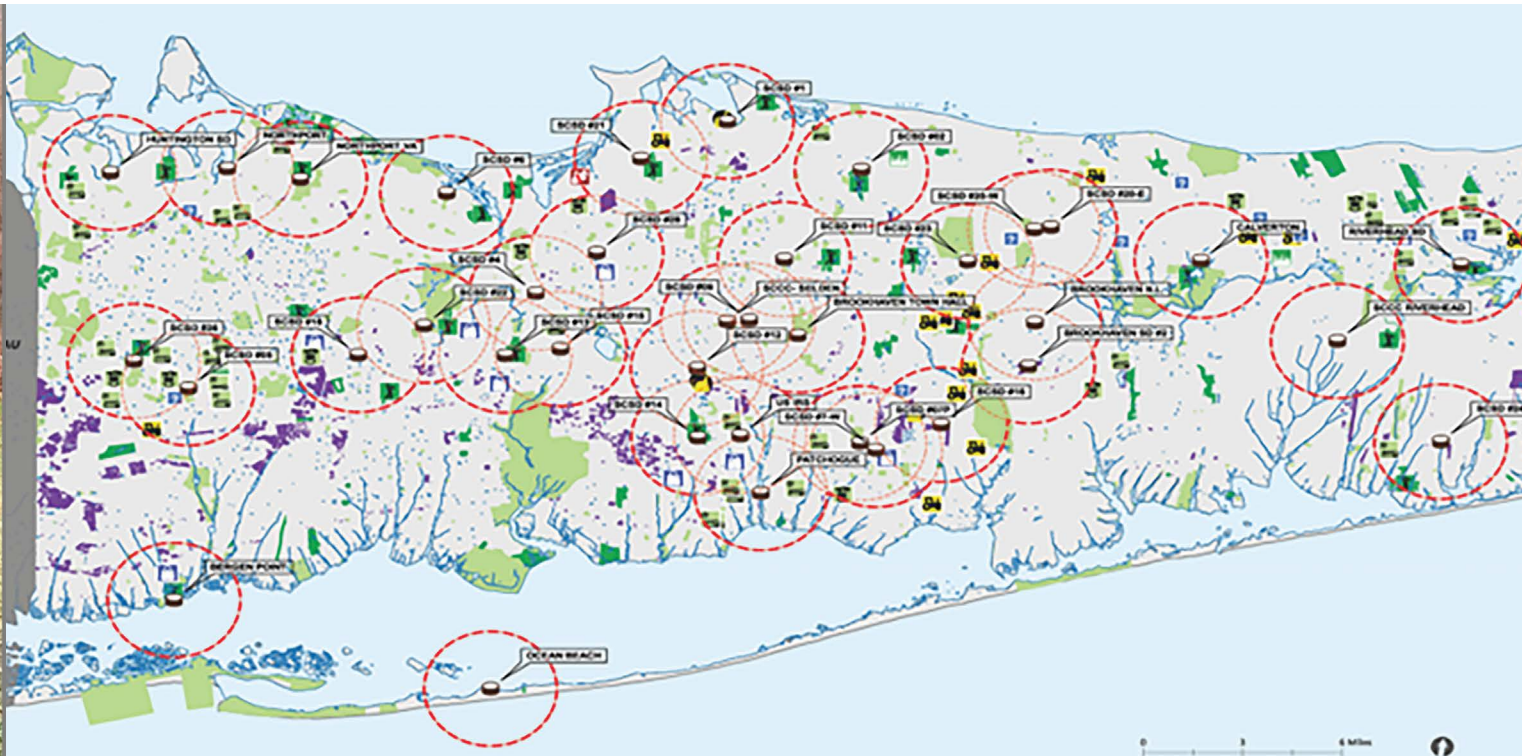


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Long Island Water Reuse Road Map and Action Plan

L-to-R Below: Dry streambed, Nassau County. Wastewater treatment plants and reuse opportunities—Western Suffolk County. Wastewater treatment plants and reuse opportunities—Nassau County.
Credit: Long Island Water Reuse Road Map & Action Plan



By Stephen Hadjiyane, Enrico G. Nardone and John Turner

The Long Island Water Reuse Road Map and Action Plan was issued by Seatuck Environmental Association and Greentree Foundation, in association with Cameron Engineering & Associates, LLC, in March 2023. This article is an excerpt from the Road Map and Action Plan that has been reprinted with permission.

Over the past half-century, water quality in Long Island’s groundwater aquifers—the sole source of drinking water for more than 2.5 million residents—and both freshwater and coastal surface waters have steadily declined. This water quality problem has detrimental impacts to human and ecosystem health associated with excess nitrogen. In drinking water aquifers, excess nitrogen can pose a public health risk to infants and small children; in surface waters it can trigger deleterious algal blooms and degrade salt marsh health.

During this same time period, Long Island’s water quantity problem has also come into focus. High rates of pumping have impacted Long Island’s vast aquifer resources, with water table levels significantly decreased in many places. While these reductions may not impact the overall availability of drinking water, they do result in lost streams and wetlands, which serve as vital wildlife habitat. High rates of groundwater withdrawal can also alter salinity regimes in coastal embayment’s and result in saltwater intrusion into aquifers used for drinking water.

An array of laws, policies, and strategies have been adopted over the years to address Long Island’s dual water problems. These

include the federal Clean Water Act and the New York State Pollution Discharge Elimination System, as well as local efforts to reduce the use of lawn fertilizers, encourage water conservation, require the enclosure of road salt piles, and a mandate that underground gasoline storage tanks be double walled.

More recently, Nassau and Suffolk counties have meaningfully responded to the threat from excess nitrogen by advancing ambitious programs to replace the nearly 400,000 existing private cesspools and septic tanks with Innovative/Alternative systems (I/A systems). These new systems significantly reduce the amount of nitrogen discharged into the groundwater and surrounding environment. While these efforts are having a positive impact, it is clear that much more must be done to ensure that both the quality and quantity of Long Island’s water resources remain high for generations to come.

What Is Water Reuse?

Water reuse (or water recycling, as it is also known) is a complementary strategy that can meaningfully help Long Island address its water issues. It involves “reusing” highly treated wastewater generated from sewage treatment plants for water-dependent purposes instead of discharging it into the ocean or local coastal waters.

Water reuse provides dual benefits related to both water quality and quantity. First, it impacts surface water quality by avoiding the dis-

charge of nitrogen-laden water into coastal waters by putting it to use in other applications. In many reuse applications (e.g., golf courses, sod farms, nurseries), the nitrogen in the reclaimed wastewater is used by plants, which can reduce the need to apply synthetic fertilizers. Second, water reuse addresses water quantity problems by eliminating the need to pump “new water” from the aquifer and, in some applications, allowing reclaimed water to infiltrate back into the ground.

The dual benefits of water reuse have long been recognized and embraced in other parts of the world, such as the Middle East, and across the country, especially in places such as California, Arizona and Florida where supplies of freshwater are limited. These states have incorporated extensive strategies to recapture and reuse valuable water resources. Some, such as California, are even moving aggressively toward the direct use of highly treated wastewater for potable purposes.

According to the U.S. Environmental Protection Agency, approximately 2.6 billion gallons of water are reused daily in the United States. New York and other states in the Northeast have been slower to adopt these strategies, largely because they have more abundant supplies of freshwater. But water reuse is getting more attention as a tool for addressing both water quality and quantity problems in areas facing water management challenges.

On Long Island, the Riverhead Sewage Treatment Plant Water Reuse project, in operation since 2016, illustrates how water reuse addresses both sides of the “water management coin.” During the

growing season, the project redirects highly treated wastewater from discharge into the Peconic River to the irrigation system of the nearby Indian Island County Golf Course.

Road Map and Action Plan

The Long Island Water Reuse Road Map and Action Plan’s goal is to catalyze the implementation of water reuse on Long Island and ensure that the strategy plays a larger and more meaningful role in safeguarding the region’s drinking water and surface water resources.

The passage of the federal Infrastructure Investment and Jobs Act in 2021 and New York voters’ 2022 approval of the \$4.2 billion Clean Water, Clean Air Green Jobs Bond Act can provide meaningful funding to advance water reuse projects in the coming years.

The Road Map and Action Plan provides the background, vision and technical details to help water reuse proponents connect the dots and take advantage of this unique opportunity to advance projects across Long Island.

Opportunity Screening and Summary Cards

There are a total of 48 public wastewater treatment plants (WWTPs) on Long Island, in addition to more than 130 small, privately owned treatment plants not included in this analysis. Nine of the public WWTPs are in Nassau County and 39 are in Suffolk County.

The area within a 2-mile radius of each of these 48 public facilities was carefully screened for water reuse application opportunities (golf

Continued on Page 20



Purple pipes carrying reclaimed water in Florida.
Credit: Sawgrass Wastewater Treatment Plant, City of Sunrise, Florida

Water Reuse Regulations & Guidelines

Title 6 of Article 15 of the New York Environmental Conservation Law, under “Water Efficiency and Reuse,” provides requirements for water reuse in New York state. The law, passed in 2005, required NYSDEC to:

1. Conduct a statewide water reuse feasibility study.
2. Establish and maintain a water reuse registry.
3. Develop standards governing, among other items, levels of treatment needed for each proposed use.

While the Department has fulfilled the first two legislative mandates, the third mandate has not been fulfilled, it has not yet developed the required standards; to this end NYSDEC and NYSDOH commenced discussions in 2021 to develop treatment and use standards for reclaimed water.

California’s water reuse program, which is the oldest in the country (the first measures date back to 1918), is managed by the State Water Resources Control Board (SWRCB) through regulations found in Title 17 and 22 of the California Code of Regulations. California regulations have the following categories:

- Disinfected Secondary—Recycled Water
- Disinfected Tertiary—Recycled Water

The disinfected tertiary category allows unrestricted access to golf courses and is the most stringent and is the current standard guideline considered for application on Long Island.

Source: Long Island Water Reuse Road Map and Action Plan

Continued from Page 19

courses, nurseries, industrial facilities, etc.). The results fell into four major categories:

1. **Irrigation.** Reclaimed water is ideal for non-potable watering at locations such as golf courses, sod farms and greenhouses, as well as for lawns and fields at educational and commercial campuses. Ninety-two potential irrigation projects were identified as possible end-users for reclaimed water from the 48 Long Island public WWTPs. With more than 140 water-reliant golf courses on Long Island, golf course irrigation, not surprisingly, represents a majority of these opportunities.
2. **Commercial/Industrial.** Commercial centers, industrial parks and job sites have considerable potential to utilize reclaimed water for a range of purposes, from cooling to cleaning to mixing non-consumptive products (e.g., concrete).
3. **Internal.** Wastewater treatment plants have tremendous potential to reclaim treated water and use it on-site for various internal processes, including cleaning, makeup water, spray water systems and fire protection. These internal applications at WWTPs are considered the “low hanging fruit” for water reuse and should be a high priority.
4. **Environmental.** Reclaimed water can be used to address hydrological or ecological needs, especially those associated with over-pumping, such as augmenting streamflow or restoring aquatic habitat.

A Summary Card profile was created for each of the 48 public WWTPs that identified all potential projects within the 2-mile radius and provided detailed information about the facility’s size, treatment volume, existing technology, etc.

Irrigation Prioritization Ranking

The primary analytical component of the Road Map and Action Plan is a detailed review and ranking of each of the 92 potential irrigation projects identified in the screening process. This was done through an analytical framework (Reuse Matrix) that scored each potential project pursuant to a range of factors. While there is considerable potential on Long Island for the commercial/industrial, internal and environmental reuse projects identified through the screening process, these projects were not specifically analyzed in the Reuse Matrix or included in the prioritization ranking in the Road Map and Action Plan.

To score and rank the potential irrigation reuse projects, the following seven categories were considered as part of the Reuse Matrix:

1. **Normalized capital cost.** The cost to install the tertiary micro-fiber filtration and UV treatment system and to install the distribution line for the length of the transmission distance. To normalize the comparison of projects of varying size, the capital cost was divided by the gallons of reclaimed water the project would consume annually.
2. **Nitrogen reduction.** The reduction of nitrogen loading from the WWTP discharge to marine and estuarine waterways.
3. **Annual quantity of potable water savings.** The amount of new freshwater pumping that is eliminated by the use of reclaimed water.
4. **Water supply pumping concerns.** This factor considers whether the project is in an area of Long Island where there are existing or imminent concerns about drawdowns of the aquifer.
5. **Effect on water management at the project location.** This factor considers whether the addition of extra water infiltration will have a positive or negative impact on local water management at the project location. In other words, will increase filtration at the project site help counter saltwater intrusion or, on the other hand, increase local flooding?
6. **Transmission distance.** The impact of the distance between the WWTP and the project site on annual operational costs.
7. **Potential for associated projects to share infrastructure.** This final factor considers the potential to execute one project in coordination with another, which reduces overall costs and eases implementation.

All irrigation projects received a score (from 1 to 4) in each of the seven categories and were then ranked, based on their overall score, into three tiers, with Tier 1 projects having the highest feasibility and Tier 3 the lowest. The projects have also been organized into five “Top Ten” lists, based on the following criteria:

- Most water reused
- Most nitrogen removed
- Lowest normalized project cost
- Priority projects for Nassau County and Suffolk County

Reuse Matrix Highlights

Highlights of the Reuse Matrix include the following:

Tier 1 Of the 17 projects that scored high enough to rank in Tier 1, 16 involved golf course irrigation. Turf irrigation at Stony Brook University was the other Tier 1 project. Estimated capital costs for Tier-1 projects range from \$4.4 million to \$28 million.

Tier 2 Of the 21 Tier-2 projects, nine are golf courses. Other projects in this tier include farms, greenhouses, municipal parks and educational campuses. Estimated capital costs for Tier-2 projects range from \$4.2 million to \$51 million.

Major Recommendations

Based on the results of the Reuse Matrix analysis, an action plan was developed that provides recommendations for advancing water reuse projects on Long Island. The following are the seven major recommendations from the Road Map and Action Plan:

1. **Develop Water Reuse Regulations/Guidelines.** New York state must develop and implement water reuse guidelines and standards to provide regulatory clarity for project proponents, as required in Article 15, Title 6 of the New York State Environmental Conservation Law. Many other states have developed and adopted regulations.
2. **Promote Water Reuse.** Promote water reuse practices by:
 - Convening a Long Island Water Reuse Workgroup to develop and implement strategies for advancing water reuse on Long Island, including meeting with elected and other public officials.
 - Developing a communication and outreach plan to engage the

public and build acceptance with water reuse projects.

- Exploring inter-utility partnerships with water suppliers and other stakeholders.
- Researching grant funding opportunities.

3. **Implement Irrigation Projects.** Promote and advance irrigation projects by:

- Obtaining letters of commitment from stakeholders (WWTP owners and end users).
- Conducting engineering studies on the most feasible projects.
- Engaging Long Island Golf Course Association in plan development and advocacy.
- Initiating meetings with regulatory agencies to initiate the permitting process.
- Conducting small-scale testing of technology to evaluate efficiency and mitigate risks, as well as ensure reliable achievement of California Title 22 water quality criteria (see sidebar).

4. **Internal Reuse.** On-site reuse of treated water at wastewater treatment plants represents the most achievable and affordable opportunities to rapidly advance water reuse rates on Long Island. All WWTPs should be encouraged to explore opportunities for reusing wastewater at their facilities.

5. **Environmental Reuse.** Use reclaimed water to address ecological problems, such as insufficient stream flow and saltwater intrusion.

6. **Commercial/Industrial Reuse.** Use reclaimed water in commercial and industrial settings.

7. **Private WWTPs.** The more than 130 private treatment plants in Suffolk County have considerable potential to develop water reuse projects, including through internal reuse projects.

Stephen Hadjiyane, PE, BCEE, is an associate principal with IMEG (formerly Cameron Engineering & Associates, LLC) who may be reached at steve.hadjiyane@imegcorp.com. Enrico G. Nardone, Esq., is the executive director of Seatuck Environmental Association who may be reached at egnardone@seatuck.org. John Turner is a senior conservation policy advocate with Seatuck who may be reached at jturner@seatuck.org.

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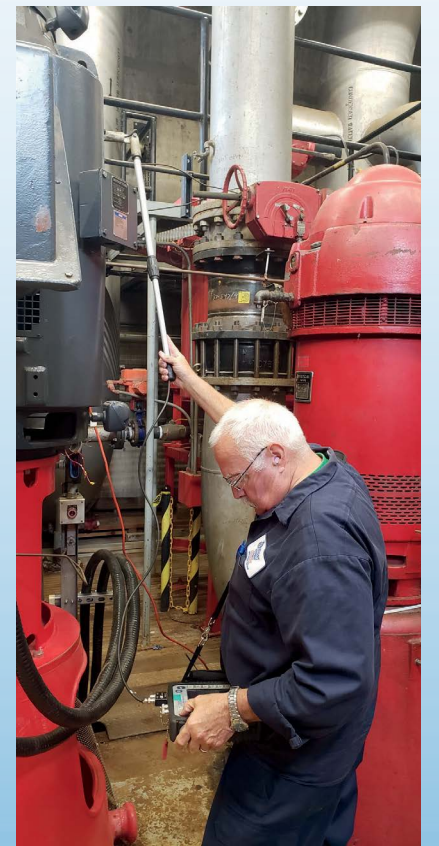
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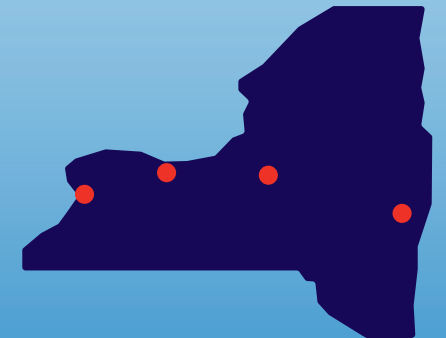
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KINGS PARK SEWERS— PIPELINES TO ECONOMIC SUCCESS



L-to-R Above: Sewer trench located in NYS 25A. Crane to set prefabricated pump station control building.

Credit: H2M architects + engineers

By James Vierling

In 2009, Suffolk County Department of Public Works engaged H2M architects + engineers (H2M) to begin planning and design for the extension of Suffolk County Sewer District (SCSD) No. 6 to provide service to the King’s Park Business District. The hope was to bring a much-needed boost to the local Main Street businesses, as well as to replace aging on-site septic systems that leach high levels of nitrogen into the groundwater. However, due to funding limitations, the project was shelved before bid and the future of a downtown Kings Park Sewer Extension was in question.

Fortunately, in 2022 the Suffolk County was able to secure additional funding through New York state and the American Rescue Plan Act. With funding secured, the project was picked back up and put out to bid in July 2022.

Project Background

The 65-acre Kings Park business district includes commercial buildings, medical offices, mixed-use properties and vacant land. The district is centered along New York State Route 25A (NYS 25A) and is adjacent to the former King’s Park Psychiatric Center, which is state parkland. With the closing of the psychiatric center in the 1990s came the loss of over 2,500 jobs in the immediate vicinity. Consequently, the downtown area has struggled, resulting in ongoing vacancies.

Revitalization of the corridor became a focal point for the Town of Smithtown and Suffolk County, but without the needed infrastructure improvements this became impossible. Sanitary wastewater generated within the Kings Park business district is currently treated by on-site cesspools, septic tanks and leaching pools, with no existing sanitary collection and conveyance infrastructure in the Kings Park sewer area. Development within the business district has been hindered by sanitary flow density restrictions, which are dictated by the current Suffolk County Sanitary Code. This code, which is based on parcel acreage, was

implemented to prevent future development from resulting in adverse environmental conditions. Furthermore, many of the existing on-site septic systems in the Kings Park business district have reached their useful life and are in need of replacement. In juggling these limitations with aspirations for the future of Kings Park, Suffolk County put together a plan to bring sewers to the central business district.

Since the overarching goal was to allow future revitalization of the downtown, existing flow estimates were combined with projected future flows from redevelopment to determine the ultimate flow from the expanded sewer district. The existing flow for the proposed district was estimated to be approximately 144,000 gallons per day (gpd) allowing for some expansion of existing uses. Additionally, the Town of Smithtown identified 22 sites as “core build-out sites” where future development was likely to occur. Likewise, four “opportunity sites” were identified outside of the core downtown district. These build-out flows total to approximately 118,000 gpd, in addition to the existing flow, for a total district flow of 262,000 gpd.

Finding the Solution

After identifying the problem, the county set out on a course to implement a solution. Suffolk County owns and operates the SCSD No. 6 sewage treatment plant (STP) located approximately 1.5 miles from the business district. The existing facility was determined to have existing available capacity to accept flows from an expanded district, with a permit capacity of 600,000 gpd and an existing flow of 306,000 gpd, leaving 294,000 gpd for future connections. With the issue of where the flow could go resolved, the design team had to determine how to convey it to the treatment plant.

After evaluating a number of alternatives, including vacuum and low-pressure sewers, a conventional gravity sewer collection district was found to be the most cost-effective option. The topography of the

area lends itself to gravity collection over most of the district; however, some excavation over 20 feet deep would be necessary to maintain the slope of the proposed sewer.

With the treatment plant over a mile and a half from downtown, a pump station would be necessary to convey the flow from the gravity collection system to the STP. Suffolk County and the Town of Smithtown worked together to identify a site for the pump station on an existing town property. This inter-municipal cooperation helped to avoid costly and time-consuming land acquisition proceedings and was critical to the implementation of the design.

Implementing the Plan

Construction of the sewage collection and conveyance began in early 2023 and is projected to be completed before the end of 2024. The general scope identified in the bid documents included:

- 12,000 linear feet of gravity sewer ranging from 8 to 16 inches in diameter
- 7,300 linear feet of 10-inch-diameter force main
- 52 sanitary maintenance holes
- 123 laterals to in-district properties
- New duplex pumping station including:
 - Prefabricated control building
 - Emergency generator
- Curb-to-curb pavement restoration
- Concrete panel restoration in New York State Department of

Transportation (NYSDOT) right of way.

The total construction costs came in at over \$25 million, which was funded through state and local grants.

As previously mentioned, some of the sewer install is more than 20 feet deep and requires extensive sheeting and shoring to install. The county, town and H2M worked closely with the contractor to ensure minimal disturbances to the local businesses.

In addition to the depth of sewer install, the project was further complicated by the need to perform all sewer work in NYS 25A during nighttime hours. This was done at the request of the NYSDOT to minimize impacts to commuters, including those commuters traveling to the local Long Island Rail Road station.

Looking to the Future

With the anticipated completion of the sewer project, a number of property owners have already begun looking to the future and are submitting connection applications to Suffolk County. These sites are paving the way for a revitalized Kings Park that would not have been possible without the county’s foresight to invest in sewers.

Vacant and underutilized properties can now be redeveloped to promote economic development and create jobs. The proximity of the downtown to the Long Island Rail Road also makes it a prime candidate for transit-oriented development. Fifteen years after the inception of this plan and design effort in 2009, Kings Park will finally have the infrastructure necessary to foster a booming downtown.

James Vierling, PE, is a senior project engineer for H2M architects + engineers in Melville, New York. He may be contacted at jvierling@h2m.com.

Coastal Systems Resiliency on Long Island

By Thomas Immerso

To the surprise of no one, protection of Long Island's sole source drinking water aquifer and coastal resources is of the utmost importance for those living within the counties of Nassau and Suffolk—the two major geographic locations comprising Long Island.

Following the devastating effects of Superstorm Sandy in late October 2012, along with more recent risks posed by climate change and, accordingly, sea level rise, continued action is required in an effort to protect the shorelines and improve coastal resiliency in this densely populated region. In addition, nitrogen pollution in particular has become the bane of Long Island's sensitive estuaries and embayments, weakening marshland root structures which, in turn, creates coastal vulnerability when inundated during storms. It also enhances the proliferation of sea lettuce, a macro-alga that can readily create anoxic conditions. Furthermore, nitrogen is destructive to eelgrass, an important nursery component of marshes for harboring eggs and spat from marine organisms.

The source of this nitrogen loading is predominantly the discharge of treated wastewater from the numerous Long Island facilities flowing into north and south shore waterways, along with the application of fertilizer and pesticide products by coastal homeowners and businesses. In addition to contaminating many of Long Island's waterways, groundwater aquifers—which, of course, recharge from the surface—suffer the same tainted fate.

In an effort to literally "stem the tide" in addressing these concerns, the New York State Department of Environmental Conservation – in conjunction with the Governor's Office and local county offices – has undertaken an intensive consultation process with lead scientists, engineers and stakeholders to mitigate nitrogen pollution on Long Island. To this end, the Long Island Pine Barrens Protection Act has served to help protect various recharge areas and, in turn, the three major aquifers underlying the island.

In addition, under the federal Clean Water Act, many of Long Island's municipalities are incorporating tertiary denitrification processes at their wastewater treatment facilities. And lastly, new concepts incorporating green infrastructure practices are being implemented to assist in addressing the destruction of critical and resilient coastal wetlands.

Over the past two decades, New York (New York City and Long Island) and Connecticut have mutually entered into nitrogen reduction programs concerning Long Island Sound. Approximately \$2 billion has been invested in an upgrade program covering some two dozen wastewater facilities discharging into the Sound.

Similarly, reduced nitrogen processes are being utilized at Long Island's largest south shore wastewater facilities and, in particular, the Bay Park Facility located in East Rockaway. Treated effluent has been discharging into the marshlands of the western bays for decades, creating coastal erosion and shoreline damage, exacerbated by even marginal storms, which place the low-lying communities at heavy risk of loss. Currently, a massive flow consolidation project bringing treated effluent from Bay Park to comingle with similarly treated flow from the Cedar Creek Facility located in Wantagh, is envisioned to eliminate nitrogen discharge into the back bays, not only serving as an effective mitigation measure protecting property, but enabling the recovery and restoration of damaged wetlands.

Improvements along these lines will help preserve the economic vitality of Long Island. Enhanced tourist economies, recreational beaches, vacation homes, etc. can all be expected to flourish as these positive actions are undertaken and carried forward by the communities of Long Island.

Thomas Immerso is a Department of Public Works project engineer with the Town of Oyster Bay in Nassau County, New York, who may be reached at timmerso@oysterbay-ny.gov.

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Aerial view on the eastern coast of Long Island. Credit: Adobe Stock, Murmakova

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The Forge River Watershed Sewer Project: Implementation of a New Advanced Water Treatment Facility and Low-Pressure Sewer System in Mastic and Shirley

By Jenna Greenberg



Figure 1. Four phases of the Mastic-Shirley Study Area. The current project encompasses the areas labeled as Phase I and Phase II. Credit: Gannett Fleming

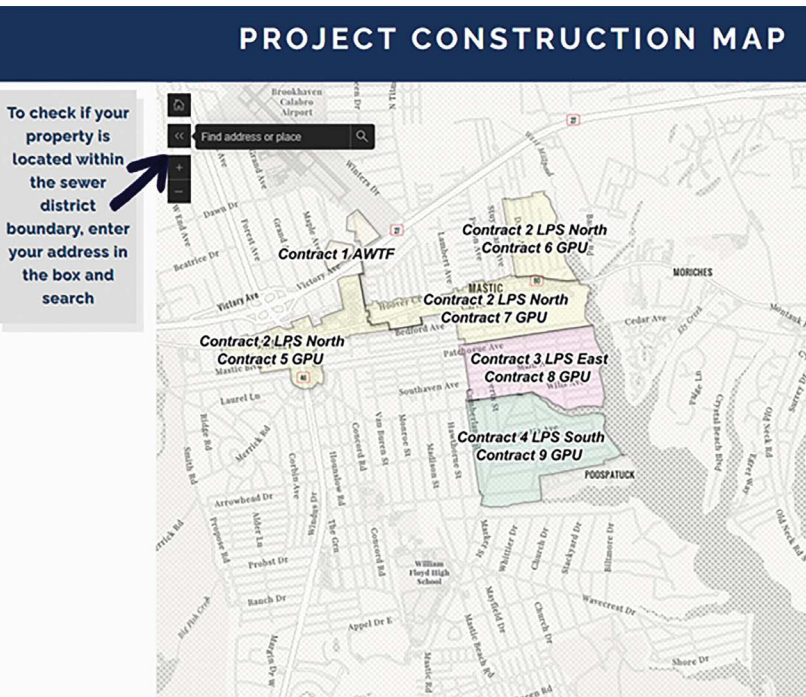


Figure 2. The Forge River Watershed Sewer Project official website (<https://www.forgewatershedsewers.com>). Credit: Gannett Fleming

The Forge River Watershed Sewer Project is one of four related Suffolk County Coastal Resiliency Initiative (SCCRI) projects. These four projects are located in the Forge River, Carlls River, Connetquot River and Patchogue River watersheds, as well as the Southwest Sewer District No. 3. The purpose of these projects is twofold:

- Mitigate the short-term and repeated adverse impacts to people and property caused by on-site sewer system failures that result mainly from heavy rainfall and tidal flooding.
- Address the long-term impact of nitrogen pollution caused by on-site sewer system failures on surface waters and coastal wetlands, such as rivers and bays.

The Forge River Watershed Sewer Project will connect hundreds of properties in the Mastic-Shirley area to a new sewer collection system that will flow to a new advanced wastewater treatment facility (AWTF) with advanced nitrogen treatment. The project has involved extensive public outreach to approve the new sewer district, assessment of available and innovative technologies such as low-pressure sewers, system design that is compliant with regulatory requirements, and data management using geographic information systems (GIS). Public outreach has been ongoing throughout the construction process, which is expected to be completed in 2026.

Background

Since the 1950s housing boom, residential development and expansion in Suffolk County has been a major focus of the economy. Throughout the era of rapid construction, on-site wastewater disposal systems were far easier to manage than creating large-scale sewage treatment conveyance systems. Consequently, approximately 70% of Suffolk County's residences use on-site systems such as septic tanks and cesspools.

With anthropogenic climate change increasing the frequency and intensity of storms, failure of on-site wastewater disposal systems is a growing concern. These failures create potential public health risks because of high levels of nitrogen getting into surface waters and groundwater. To protect the underlying sole source aquifer—the only source of potable water for the county's nearly 1.5 million residents—development density for properties utilizing these on-site systems must be limited to prevent excessive nitrogen loading into the groundwater supply.

In recognition of this need to protect surface waters and groundwater while responding to community requests for downtown revitalization and more affordable housing, Suffolk County worked together with local community representatives to identify "critical areas of need" where investment in sanitary sewers and treatment facilities could provide environmental, economic and social benefits. The Mastic-Shirley Corridor was one of the unsewered study areas that was identified by the county as a critical area. This corridor includes the Forge River, which is one of the most eutrophic water bodies in the county. This is attributed to the failure of on-site sewage treatment systems in the area.

Following Superstorm Sandy in October 2012, Suffolk County applied to the Federal Emergency Management Agency (FEMA) Hazard Mitigation Grant Program for the funding of the SCCRI to help mitigate the adverse impacts of the on-site septic system and cesspool failures on the environment. This includes surface waters

and wetlands, whose strength and sound health are vital to the protection of the coastline against storm surge.

Between federal grant funding and various New York state funding programs, Suffolk County was granted over \$390 million for SCCRI. The Forge River Watershed Sewer Project, a \$224 million investment, is the largest sewer collection system program undertaken by the Suffolk County Department of Public Works in the past 40 years.

Project Overview

The overall study area within the Mastic-Shirley corridor was divided into four phases (Figure 1). The current project only includes Phases I and II due to limitations in the amount of federal funding awarded for the project. The county is actively pursuing additional sources of federal funding to build Phases III and IV in the future.

Approximately 90% of the Phases I and II areas are located within the Forge River watershed, while the remaining 10% is located within the Carmans River watershed to the west. The Forge River is an estuary along Moriches Bay while the Carmans River is an estuary along Bellsouth Bay. Both bays are connected by Narrow Bay. All three bays are part of the Great South Bay. Phases I and II encompass more than 2,400 tax parcels. These parcels are predominantly residential in use. Other parcel uses within the project area include commercial, community services, recreation and entertainment.

Public Outreach

In order to provide sewers within the Forge River watershed, a new sewer district had to be created. A public outreach program was initiated, consisting of informational open houses, distribution of educational flyers and the creation of a project website. The open house sessions allowed the public, project team members and stakeholders to interact, which provided opportunities to answer questions and explain various project aspects such as the advancement in grinder pump technology (equipment selected for the new collection system) and the plans for the AWTF. This outreach was an integral step in getting property owners to vote in favor of the formation of the new sewer district at the public referendum.

Public outreach remains an important focus of the Forge River

Watershed Sewer Project during construction to ensure residents are informed and up to date on project construction activities. This is accomplished through updates to the project website on a regular basis and distribution of public notification letters about anticipated construction activities to the impacted residences. Figure 2 depicts a screen shot of the website.

Collection System Evaluation

The sewer system design, as well as the design of a 1.0-million-gallon-per-day ATWF for the Forge River area, was authorized in 2016. The 30% design was completed in 2017, and project cost estimates at that time indicated that there would be insufficient funds to complete this project and the other SCCRI projects.

In November 2017, a feasibility study was completed that presented the advantages of low-pressure sewers, methods of construction and a comparison of grinder pump, centrifugal pump and positive displacement pump technologies. In December 2017, based on the results of this study, Suffolk County authorized all SCCRI projects to be designed around the use of low-pressure sewer systems. The resulting project costs for the Forge River Watershed Sewer Project were approximately \$224 million, falling within the budgeted SCCRI costs for the project.

New AWTF

The new AWTF is located on the property of the Town of Brookhaven Calabro Airport. This site was chosen for its availability of space to build the main treatment building, headworks building, filter building and subsurface leaching pools, as well as achieving the required buffers between adjacent properties. Figure 3 depicts a rendering of the completed AWTF.

The design of the AWTF met all town, state and federal regulatory requirements. The elevation of this site is located at approximately 60 feet above mean sea level, which is outside of the FEMA 100- and 500-year floodplain elevations.

The Federal Aviation Administration (FAA) Advisory Circular for Hazardous Wildlife Attractants on or near airports requires a 5-mile buffer between potential hazardous wildlife attractants and the run-

Continued on Page 30



Figure 3. Rendering of the completed AWTF. Credit: Gannett Fleming



Figure 4. Subsurface leaching pools for groundwater recharge.
Credit: Gannett Fleming

Continued from Page 29

way approach. If this buffer is not achievable, the FAA requires that all potential attractants must be covered or housed inside of a structure. Since the proposed AWTF is within the 5-mile buffer, all tanks are located inside a building or are covered. The effluent disposal system consists of subsurface leaching pools since open recharge beds were not an acceptable alternative; the open beds would attract birds, which are a known hazard to airplane traffic. **Figure 4** depicts the subsurface leaching pools before being backfilled.

One of the primary purposes of bringing wastewater treatment to the Forge River watershed is to remove nitrogen from sanitary wastewater to protect the county's water resources. As set forth by Article 6 of the Suffolk County Sanitary Code, increased development density is allowed when a community sewerage system is available. The new AWTF and conveyance/collection system will open opportunities for increased downtown development and revitalization within the sewer district.

The State Pollutant Discharge Elimination System (SPDES) wastewater permits for discharges to groundwater in Suffolk County currently limit effluent nitrogen to less than 10 mg/L. However, because groundwater provides the baseflow to the county's surface water resources and considering the study area's proximity to the Forge and Carmans rivers, Suffolk County has recognized that reduction of effluent nitrogen to the lowest levels that can be practically achieved by the current limits of technology was desired for this area. Therefore, the design of the AWTF was based on the use of Sequencing Batch Reactor (SBR) technology to achieve effluent nitrogen levels down to the current limit of technology (effluent nitrogen between 3 mg/L and 5 mg/L). **Figure 5** depicts a construction progress photo of an SBR tank inside the AWTF.

Low-Pressure Sewer Design Features

As part of the design process, the project team performed property investigations to determine the existing conditions and optimum location for each grinder pump unit. Property owner input into the design process was obtained to minimize changes during construction and reduce potential change orders.

The low-pressure sewer system consists of approximately 105,000 linear feet of high-density polyethylene (HDPE) pipe ranging from 1.5 to 12 inches in diameter. Parcels were provided a 1.25-inch service connection consisting of a lateral extension from the main pressure sewer, a shut-off valve and check valve. Residential properties are being provided with an individual grinder pump unit and their homes will be connected to the low-pressure sewer system. The connection of a power supply to the grinder pump units from the home's existing electrical service required coordination and approvals from the local electrical utility. Finally, each home's existing on-site sewage treatment system will be decommissioned in accordance with the requirements of the Suffolk County Health Department.

Grinder pump technology was an important consideration for Suffolk County. The county solicited bids for an annual requirements contract for grinder pump units. The design of the grinder pump system was based upon the preselected manufacturer's equipment and modeling of the Forge River watershed system. Preselecting the grinder pump manufacturer results in design consistency among the other watersheds under the SCCRI. This will help facilitate operation and maintenance of these systems by the county.

Sewer construction methods were also considered during the design phase of the project. Directional drilling versus open

cut methods were evaluated. It was the desire of Suffolk County Department of Public Works (SCDPW) to minimize the amount of earth disturbance during construction. Therefore, directional drilling was selected as the primary method for sewer installation. Also, since part of the project area is located adjacent to the Forge River as well as having a high water table, dewatering was required. **Figure 6** depicts a jacking pit and installation of 12-inch sewer piping at the Sunrise Highway crossing.

GIS Database

To keep track of the large number of parcels within the project, GIS has been a prominent tool during design and construction. Ultimately, the GIS database will contain all the project as-built information and will be delivered to SCDPW for use in managing and maintaining the sewage collection and conveyance system.

With the use of the "Field Maps" app, contractors in the field can update the GIS maps and add pictures in real time during the construction process. Although phone or tablet GPS systems are limited in their spatial accuracy, GIS can take AutoCAD drawings and geospatially synchronize the two, resulting in accurate field information and locations of all installed valves, pumps and other equipment. **Figure 7** depicts a screen shot of the GIS database.

Conclusion

Utilizing low-pressure sewers with individual grinder pump units has allowed Suffolk County to replace on-lot sewage disposal systems with a public sewer collection and treatment system for 2,400 properties within the Forge River watershed within the budget constraints of the SCCRI. Construction of the AWTF and sewer system will be completed in 2024 and the connection of residential properties within the project area will be completed in early 2026.

The completion of the project will provide long-term benefits and improve the quality of life by mitigating the potential harmful impacts on human life and property associated with the failure of on-site septic systems and cesspools, while allowing for economic revitalization of the area through increased development.

Jenna Greenberg is an associate designer with Gannett Fleming who may be reached at JGreenberg@gfnet.com.



Figure 5. SBR tank inside the AWTF.
Credit: Gannett Fleming

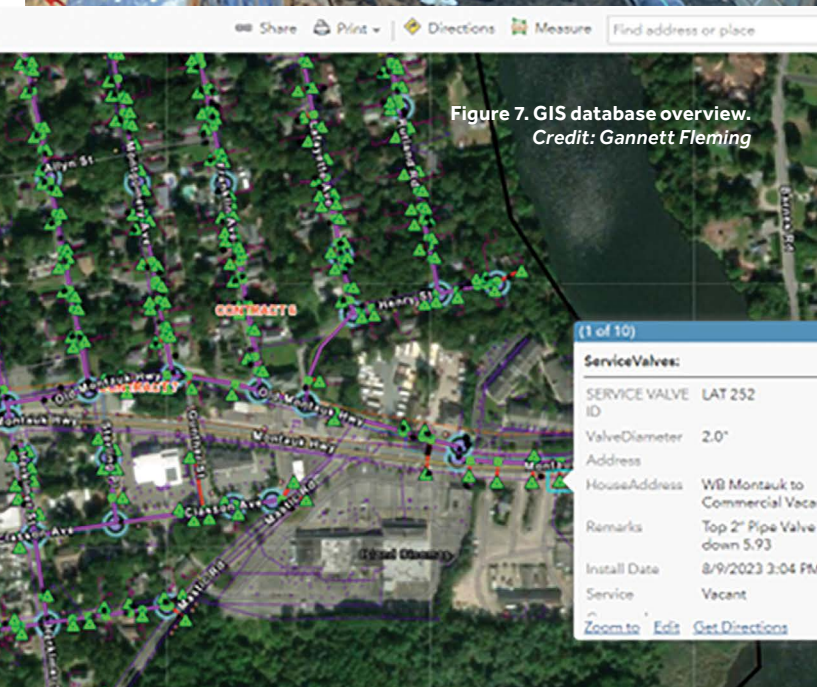


Figure 7. GIS database overview.
Credit: Gannett Fleming

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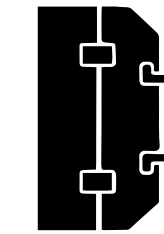
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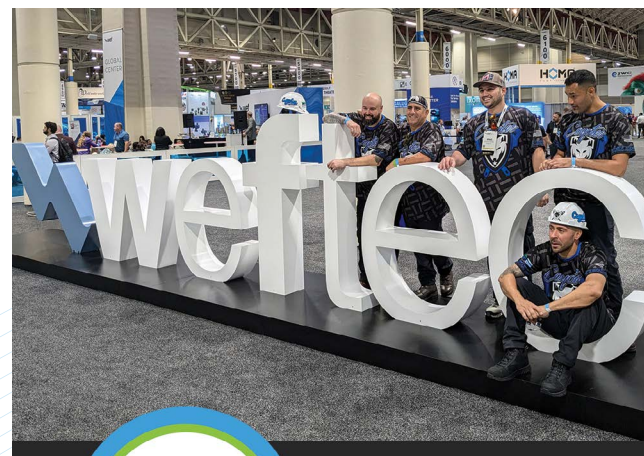


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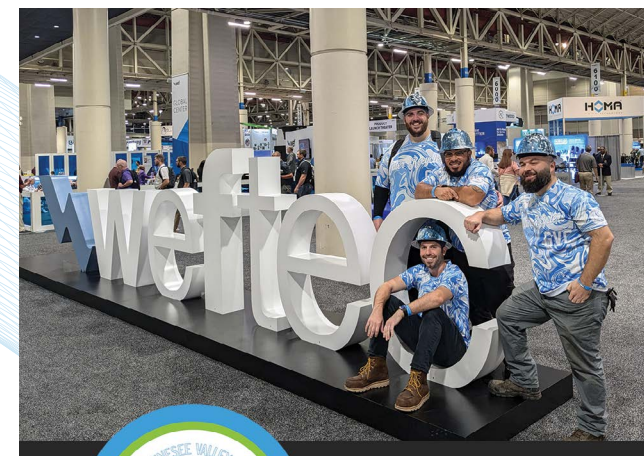


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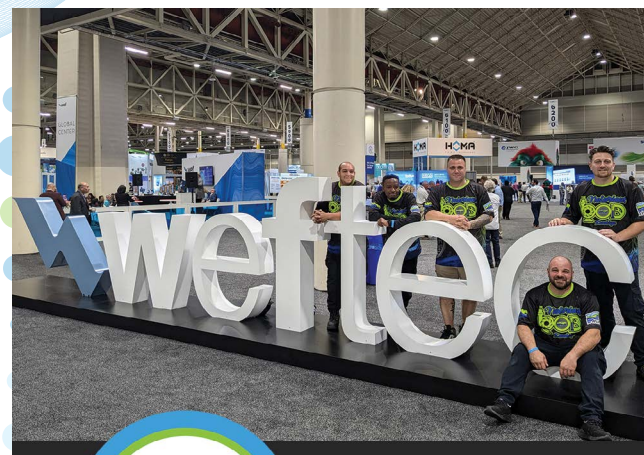
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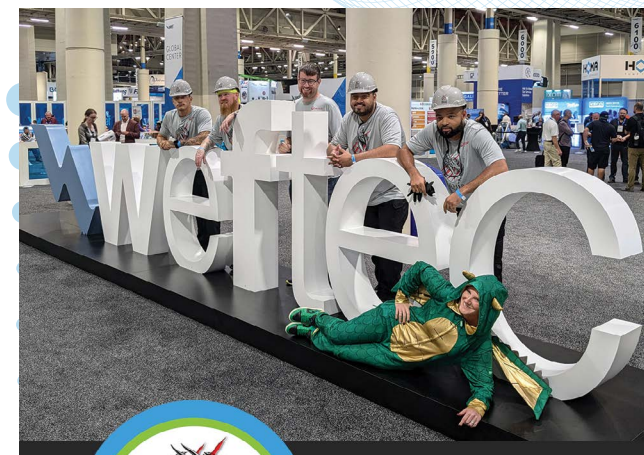
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PFAS: THE EVOLVING LANDSCAPE OF CONTAMINATION, REGULATION, AND REMEDIATION

Reprinted by permission from the Long Island Commission for Aquifer Protection's (LICAP) State of the Aquifer 2023 report.



INTRODUCTION

Since the 1940s, the industrial and consumer product landscapes worldwide have seen extensive use of a group of man-made chemicals known as PFAS (Per- and Polyfluoroalkyl Substances). These compounds have been hailed for their unique ability to resist heat, oil, stains, grease, and water, making them invaluable in a variety of applications. From the slick surface on nonstick pans, water-shedding capacity on raincoats, flame suppressing firefighting foams, to the stain-resistant nature of carpets, the influence of PFAS is undeniable. To date, more than 9,000 types of PFAS have been recognized. Among the vast family of PFAS, certain chemicals, namely perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS), have drawn attention from researchers because of their persistent nature. Despite PFOA and PFOS being phased out of production in the United States, their legacy lingers as other countries continue to manufacture and utilize them.

The worrisome aspect of PFAS chemicals lies in their ability to migrate and permeate throughout the environment. Their journey from manufacturing plants to commercial use often leads them to contaminate the soil, water, and even the air. Their resistance to breakdown ensures they remain present, turning them into unwelcome, permanent residents of the environment. This ubiquity has culminated in PFAS traces being detected in the bloodstreams of people and animals globally. These "forever chemicals," as they've been dubbed, are notorious for their ability to accumulate in living organisms. A study by the Centers for Disease Control and Prevention, which drew upon data from the National Health and Nutrition Examination Survey, revealed startling figures: PFAS were detected in the blood of an overwhelming 97% of Americans. Moreover, they have been identified at minimal levels in a range of food products and throughout the natural world. A 2021 study conducted by Johns Hopkins University identified PFAS in 39 of the over 100 bottled waters tested. The Food and Drug Administration, which regulates bottled water in the U.S., has not yet set limits on PFAS in bottled water. Recent studies have also shown rainwater in many parts of the world contain detectable levels of PFAS. The channels of human exposure to PFAS include consuming contaminated water or food, using PFAS-based products, or inhaling air laden with these chemicals. The magnitude of this issue became more evident in 2016 when states like New York, Vermont, and New Hampshire prompted the U.S. Environmental Protection Agency (EPA) to recognize PFAS contamination as a widespread challenge. Responding to this call, the EPA issued a lifetime health advisory, setting the limit for PFOA and PFOS in drinking water at 70 parts per trillion.



NEW YORK'S APPROACH TO TACKLING PFAS CONTAMINATION

Aware of the impending crisis, New York State took measures in February 2016, establishing the Water Quality Rapid Response Team (WQRRT). This team, guided by the New York State Department of Environmental Conservation (NYSDEC) and New York State Department of Health (DOH), embarked on an urgent mission to probe water contamination reports and take appropriate actions. Their investigations focused on public water sources and private wells in proximity to sites with suspected PFAS usage. In 2017 New York State also established The Drinking Water Quality Council to provide recommendations to the DOH on emerging contaminants in drinking water. In a bid to fortify these endeavors, the Clean Water Infrastructure Act of 2017 was signed, earmarking an unprecedented \$2.5 billion. As part of the Act's framework, an evaluation of inactive solid waste sites began in order to pinpoint any PFAS-related impacts on drinking water sources. New York also took a pioneering step by becoming the first state to officially designate PFOA as a hazardous substance in January 2016, followed by PFOS in April 2016. This classification not only imposed guidelines on storage and environmental release but also empowered the state to undertake investigations and clean-up actions where necessary. Subsequent evaluations determined if these facilities warranted water sampling. In situations where PFOA or PFOS concentrations were above acceptable levels, remedial measures were initiated. A prominent case occurred in the Hoosick Falls area in 2016, where public drinking waters contaminated by PFOA were addressed. To grasp the full extent of PFAS usage, DEC conducted surveys targeting businesses, airports and fire departments, between June and September 2016. Recognizing the hazards posed by firefighting foam containing PFOS, the state launched a collection program, successfully gathering and safely disposing of over 25,000 gallons of contaminated foam by the summer of 2018. The data accumulated was instrumental in determining facilities that might be potential sources of PFOA and PFOS contamination, especially those near drinking water sources.

PFAS THREAT IMPACTS LONG ISLAND: A LOCALIZED RESPONSE

In July 2016 the NYSDEC designated the Air National Guard Base, and fire training facility at Frances S. Gabreski Airport in Westhampton Beach as a Superfund site. This was due to the historical usage of PFOS-laden firefighting foam. The objective of the State's superfund site program is to investigate sites where hazardous waste might have been disposed of, aiming to assess potential threats to public health and the environment. Typically, the party found responsible for the contamination manages the cleanup. However, if a responsible party cannot be identified or is unwilling or unable to fund an investigation, the state covers the expenses through the 1986 Environmental Quality Bond Act, commonly referred to as the "State Superfund." The NYSDEC's investigations involved analyzing groundwater and soil samples from the base, leading to the validation of the site as a PFOS contamination source for the area. The Suffolk County Department of Health Services (SCDHS) installed wells upgradient of the Suffolk County Water Authority (SCWA) Meetinghouse Road wellfield and sampled private wells downgradient of the Air National Guard Base and detected PFOS and PFOA levels above the health advisory in several wells. Working with the NYSDEC and SCDHS, the SCWA successfully connected over 60 properties to public water.

The Firematics Training Facility in Yaphank, operational since 1959, used Aqueous Film Forming Foam (AFFF) until 2016. The Suffolk County Department of Health Services (SCDHS) tested water from nearby private wells in July 2016 and conducted a groundwater investigation and found elevated levels of PFOS and PFOA. Affected residents were supplied with bottled water, and by January 2017, 16 homes were connected to public water. The sampling scope expanded in February 2017, with more homes receiving bottled water and 32 additional properties being slated for public water connection. In April 2017, the Firematics site was designated a State Superfund site.

In 2017, the SCDHS uncovered levels of PFOS and PFOA exceeding the EPA's health advisory level in private wells around the East Hampton Town Airport in Wainscott. The origin of this contamination was traced back to the firefighting foam used at the airport, prompting the designation of a portion of the airport's land as a Superfund site. Testing areas for these chemicals expanded, affected residents were supplied with bottled water, and there were rebates offered by the Town of East Hampton for the installation of specialized water treatment systems. To address long-term water safety, a water supply district was established, allowing the Suffolk County Water Authority to extend water mains to potentially affected residences. By 2018, approximately 45,000 feet of water main had been added to the hamlet.

On August 26, 2020, the New York State Department of Health published new maximum contaminant levels for emerging contaminants in the NYS register, which include 1,4-dioxane, PFOS and PFOA. Since that time both the New York State Department of Health and EPA have placed an emphasis to review and regulate additional emerging contaminants of concern with a focus on additional perfluorinated compounds.

Notification levels are currently being considered for various other emerging compounds of concern including additional long and short chain PFAS compounds. On October 4, 2022 the New York State Department of Health announced that they were issuing proposed regulations for 23 additional emerging contaminants in drinking water in the State Register. The proposed rulemaking was developed with input and support by the New York State Drinking Water Quality Council (DWQC) in accordance with amendments to Public Health Law signed by the Governor. Action has been delayed so that state action can be potentially reconciled and coordinated with a recent EPA proposal to regulate PFAS compounds at the federal level. On March 14, 2023, EPA announced the proposed National Primary Drinking Water Regulation (NPDWR) for six PFAS including perfluorooctanoic acid (PFOA), perfluorooctane sulfonic acid (PFOS), perfluorononanoic acid (PFNA), hexafluoropropylene oxide dimer acid (HFPO-DA, commonly known as GenX Chemicals), perfluorohexane sulfonic acid (PFHxS), and perfluorobutane sulfonic acid (PFBS). EPA anticipates finalizing the regulation by the end of 2023. Based on state and federal regulatory actions and proposals 1,4 dioxane testing is imperative along with the myriad of prefluorinated compounds that are, or will be, subject to regulatory action. Many water suppliers are performing proactive PFAS testing that employ EPA drinking water methods 533 and 537.1 for testing of 29 perfluorinated compounds.



UPDATE:
USEPA finalized the NPDWR in April 2024.
Scan here to read the implementation memo.

COMMUNITY RISES TO OCCASION: ROCKAWAY BEACH COASTAL RESTORATION PROJECT, NEW YORK CITY



Allan Little planting vegetation on dunes on Rockaway Beach, Queens, New York City, as part of RISE's Dune Squad. Credit: RISE

By JoAnne Castagna

Allan Little, a 62-year-old Far Rockaway resident, who is deaf, is sitting next to a beach dune, digging into the sand with his bare hands, under the warm sun. He is planting vegetation to help make Rockaway Beach more resilient to coastal storm erosion and flooding.

It is a far cry from his previous job at McDonald's, where he worked for 20 years in midtown Manhattan before the pandemic. He says his life has a bit more purpose now because he is making a difference in his own community. Plus, it keeps him active, moving and out in nature—all good things.

He is not alone. Alongside him are other adults and children of all ages. They are all taking part in a dune restoration program being carried out by the nonprofit, RISE (Rockaway Initiative for Sustainability and Equity).

RISE's work is supporting a more extensive coastal restoration project that is being carried out by its longtime partner the U.S. Army Corps of Engineers, New York District. The Army Corps is collaborating with RISE and other partners to make Rockaway Beach more resilient to coastal storm erosion and flooding that has increased due to more frequent and stronger coastal storms.

They are doing this using a combination of hard features with natural and nature-based solutions, such as dune creation and planting, to create a healthy, vibrant beach for Little, his community and future generations.

Jeanne DuPont, founder, and executive director of RISE said, "The

work that Allan and the rest of our Dune Squad is performing is not only helping Rockaway Beach, but it is also making a positive impact on them and giving them a sense of pride. Allan is so excited about what he has been doing that he has even shared it with other deaf people. It's also even encouraged his team to learn sign language."

Rockaway Beach is a neighborhood located on the Rockaway peninsula in the New York City borough of Queens.

The neighborhood is named for the Rockaway Beach and the boardwalk, which is the largest urban beach in the United States.

The Rockaway peninsula stretches approximately 10 miles and has the Atlantic Ocean on the south side and Jamaica Bay on its north side (Figure 1).

The area, generally referred to as "the Rockaways," has been a popular summer destination for decades and is home to over 850,000 residents and over 48,000 residential and nonresidential structures, including schools, hospitals and nursing homes.

The peninsula has been vulnerable to coastal storms for years, which have caused tremendous erosion and sand loss of the beach, making the community vulnerable to flooding.

To reduce the risk of flooding, the Army Corps, since the 1970s, has been replenishing this lost sand by dredging sand from the ocean and pumping it onto the beach to increase the height and width of the beach berm.



The berm is the flat area of the beach between the dunes and the ocean where beachgoers typically sunbathe. An enlarged berm acts as a buffer, protecting the structures and infrastructure behind the beach from the storm surges and flood damages.

The area has been battered by many storms including a recent Christmas storm in 2022 and historic Hurricane Sandy in 2012.

Sandy's intense winds created an unexpected storm surge that created 14-foot-high waves that pushed sand and water up into the community.

Ahmed Radwan, project manager, New York District, U.S. Army Corps of Engineers said, "The Rockaway Beach community was bombarded by the water surge from all directions—the Atlantic Ocean side and the Jamaica Bay side—causing extensive beach erosion and flooding."

As a result, Rockaway Beach lost millions of cubic yards of sand, which the Army Corps has replaced.

With stronger coastal storms occurring more frequently, another Sandy-like storm is likely to happen again, so the Army Corps has been working in collaboration with its partners to develop long-term solutions to help make Rockaway Beach more resilient.

These partners include the New York State Department of Environmental Conservation (non-federal sponsor), New York City Department of Parks and Recreation, New York City Department of Environmental Protection, New York City Department of Transportation, New York City Mayor's Office of Climate and Environmental Justice, New York City Mayor's Office for People with Disabilities, National Park Service and RISE.

Radwan said, "Ensuring the success of our projects hinges significantly on maintaining strong coordination with key stakeholders from the private sector and nonprofit organizations like RISE."

"These entities play a vital role in assisting the federal government by identifying local needs and leveraging local resources. Moreover, their extensive research capabilities offer valuable insights that can greatly benefit our projects. We are committed to offering full support to encourage and facilitate their involvement in our initiatives."

The Army Corps and RISE have collaborated for over 18 years to educate schoolchildren about the work they are performing on their beach, and to show them why it is important for their community and wildlife.

This has included performing workshops at PS 43Q The School by the Sea, which is located right next to the boardwalk and bringing touch tanks filled with sea life to have a show-and-tell for the students.

DuPont values this relationship with the Army Corps, "One time we had an Army Corps workshop on the beach where the kids were watching dredge pipes while the sand was being dredged and placed

on the beach.

"I thought, you know, most of the kids in Rockaway Beach didn't really understand what was going on right on their own beach and how this work was helping to conserve our beach. So, it was kind of a great moment for these kids to be able to ask the Army Corps questions and learn. It's also a way for them to find out about different career fields and learn what it means to be an engineer or biologist."

This relationship continues today. The dune restoration work being performed by RISE is supporting the Army Corps' efforts to incorporate natural and nature-based features on the Rockaway Beach Coastal Restoration Project.

Natural and nature-based engineering features are landscape attributes used in combination with hard ones. Natural features occur naturally in the landscape and nature-based features are engineered, constructed or restored to mimic natural conditions.

Examples of these features include beaches and dunes; vegetated environments, such as maritime forests, salt marshes, freshwater wetlands, fluvial flood plains and seagrass beds; coral and oyster reefs; and barrier islands.

The Army Corps has become a leader in natural and nature-based features and published the collaboratively written report, International Guidelines on Natural and Nature-Based Features for Flood Risk Management, which is used industry-wide.

According to Michael Oseback, a former project manager, New York District, U.S. Army Corps of Engineers, "Nature-based features are sustainable and attenuate typical flooding. These features may also allow the opportunity to strengthen the surrounding ecological environment."

These natural and nature-based features are being implemented on portions of the project where work is being performed in two areas—along the south side of the peninsula on the Atlantic Ocean and along the north side of the peninsula on Jamaica Bay.

On the Atlantic coast side, a large, reinforced dune is currently under construction. It is actually not a natural or nature-based dune, but a seawall that looks like a seven-mile dune, which will be covered with beach grass, shrubs and perennials.

To create this, a 30-foot steel sheet pile wall was inserted 20 feet into the ground and capped with several feet of concrete. In front of the structure, two layers of heavy armor stone were laid. On top of everything, millions of cubic yards of sand were placed, and the sand will be planted with native vegetation and trees.

The root structure of these plants and trees will hold the sand in place and stabilize it on the dune and it reduces erosion.

Rockaway Beach resident Daniel Falt said, "It's a sand dune with a skeleton inside." He is also a former project manager, New York District, U.S. Army Corps of Engineers.

According to the International Guidelines, beaches and dunes are valuable to flood risk reduction because they dissipate wave energy, can trap sediments, have the potential to grow with rising sea levels, and provide habitat for diverse species.

Dunes are areas of the beach where sand is elevated several feet to act as a buffer between the waves, wind, stormwater levels and the infrastructure landward on the beach.

In addition, 19 groins were constructed along the Atlantic coast. These are structures that extend out perpendicular from the shore into the water and interrupt water flow and limit the movement of sand, to reduce the frequency of beach erosion.

As work continues on the Atlantic Ocean side of the project, plans are starting to be worked out for the low-lying coastal area of Jamaica Bay. A variety of flood reduction measures, including natural and nature-based features, are being considered.

RISE's office is located in the middle of the peninsula, between the ocean and the bay, where, according to DuPont, flooding is a

Continued on Page 42



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SUSTAINABILITY
AND EQUITY



U.S. Army Corps of Engineers New York District constructing groins on Rockaway Beach, Queens, New York City. Credit: USACE

Continued from Page 41

regular problem and not just during coastal storms. “When it’s high tide in Jamaica Bay,” said DuPont, “the water comes up from the storm drains all along the entire length of the peninsula and floods the streets, including in front of our building. Cars can’t even get through. It’s really bad.”

Nature-based solutions are being considered for this area including the use of rock sills. Sills of rock would be placed parallel to the shore of Jamaica Bay to dampen wave energy and reduce shore erosion.

Other flood risk reduction features are being considered including a variety of wall structures (stone revetments, flood walls and bulkheads). Stone revetments are walls that protect against erosion caused by wave action, storm surge and currents. Flood walls keep tidal water from entering a community, and bulkheads or retaining walls help to stabilize a shoreline.

As work continues on the Rockaway Beach Coastal Restoration Project, DuPont says that the partnership that RISE has with the Army Corps is a winning combination for the project’s success.

“With the Army Corps handling the hard infrastructure like the jetties and the front line of defense and RISE handling the soft infrastructure including education, outreach and employment opportunities, both of our efforts together will help the community understand and

appreciate the work the Army Corps is doing for their community.”

RISE looks forward to continuing to support the Army Corps. DuPont says, “We’re open to continuing to have more meetings with the Army Corps and helping in any way we can, whether this is donating native plants from our nursery for planting on the dunes or inviting the Army Corps engineers and biologists for more events to speak to our community’s children.”

DuPont is confident of a positive future because there has already been great progress on the project. “It’s not the same beach it was 10 years ago. A lot has changed, since there’s been a lot of focus on improving the beach by the Army Corps.

“The buses, trains and subways are packed with beachgoers and people coming to see the piping plovers and terns in our new bird sanctuary and nature preserve. Not only are the beaches packed, but our waters are brimming with humpback whales, bottlenose dolphins, sharks and manta rays. It’s really amazing that in New York City we have a shoreline like this. It’s beautiful. Really beautiful.”

JoAnne Castagna, Ed.D., is a public affairs specialist and writer for the U.S. Army Corps of Engineers, New York District. She can be reached at Joanne.Castagna@usace.army.mil.

top performer
wastewater: OPERATOR

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Roots in Clean Water

THE CLEAN-WATER PROFESSION IS IN DALE GRUDIER’S FAMILY BACKGROUND. THE FAMILY APPROACH EXTENDS TO HIS LEADERSHIP OF A MAJOR COLLECTION AND TREATMENT SYSTEM ON LONG ISLAND.

STORY: **Jim Force** | PHOTOGRAPHY: **Erica Schroeder**



The Bergen Point Wastewater Treatment Plant uses an activated sludge process with 40 mgd design capacity and plans to expand to 50 mgd.

Wastewater treatment is a family affair for Dale Grudier II.

Now director of operations and maintenance at the 40 mgd Bergen Point treatment facility serving Suffolk County Sanitary District 3 in West Babylon, New York, Grudier got his start by going out on sewer calls with his late father back in the 1970s.

He joined the Suffolk County Department of Public Works in 1985, helping operate the scavenger waste facility. Today he holds a 4A (highest) Wastewater Operator license and oversees a staff of 100.

His wife Donna is also an operator, in charge of the treatment plant at the New York village of Northport and president of the New York Water Environment Association.

Now his daughter Deanna is studying for her operator’s license after starting out as an operator at another of Suffolk County’s 26 wastewater facilities. She likes the profession and noting the similarity of the relationship Dale Grudier had with his father (see sidebar).

SPRAWLING SYSTEM

The Suffolk County Sewer District No. 3 collection and treatment system serves a densely populated area on Long Island, immediately east of New York City. It comprises more than 1,500 miles of sewers and keeps growing as new housing projects around the county are connected to the system.

Dale Grudier, director of operations and maintenance, wastewater treatment, Suffolk County Sewer District No. 3

“People generally don’t know it, but it’s amazing what we do here.”

DALE GRUDIER



The plant itself is a basic activated sludge process, operated in the contact stabilization mode. Originally designed for 30 mgd, it was built in the 1970s and brought online in 1980. It has since been expanded to 40 mgd, and plans are to expand to 50 mgd in the near future.

“We have eight influent pumps (Flowserve), capable of going up to 180 mgd,” says Grudier. The headworks include three Infilco Degremont climber bar screens (Veolia Water Technologies) and an airlift grit system (Walker Process Equipment). The plant has three of these systems, and they are rotated to keep them free of clogging.

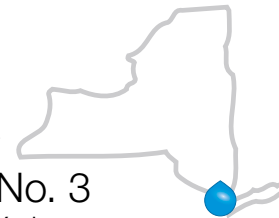
Eight primary tanks follow, and the overflow passes to 12 aeration basins equipped with fine-bubble diffusers (Aquarius). Treated water settles in a cluster of six circular clarifiers. The flow then passes through a four-channel UV light disinfection system (Trojan Technologies) before discharge to the Atlantic Ocean. “We have four large effluent pumps (Flowserve) to pump against the tide,” Grudier says. A small portion of the effluent is chlorinated and used around the plant.

Suffolk County recently finished a project to replace its outfall, boring a new 3-mile tunnel under the Great South Bay to replace a concrete line that was showing signs of rupturing. “The original line was trenched across the bay and environmentally we couldn’t do that again,” explains Grudier.

The solids operation has been updated as well. An old multiple-hearth furnace was shut down in 2004, and the county has been beneficially reusing its biosolids ever since. The solids are thickened on gravity belt thickeners (Alfa Laval) and dewatered on Ashbrook Winkle belt presses.

“Everything’s trucked out of here,” says Grudier. The material goes to landfills where there is a biogas recovery requirement, to mine reclamation or to composting sites. All electrical lines are directed to a SCADA system supplied by iFIX (GE Digital). “Howden provided the program to run our activated sludge process which ties into our SCADA,” says Grudier.

Dale Grudier II, Suffolk County Sewer District No. 3 Bergen Point, New York



POSITION:
Director of Operations and Maintenance, wastewater treatment

RESPONSIBILITIES:
Operate and maintain the treatment plant, collections system

YEARS IN PROFESSION:
36

EDUCATION:
Associate degree, mechanical technology, Suffolk County Community College

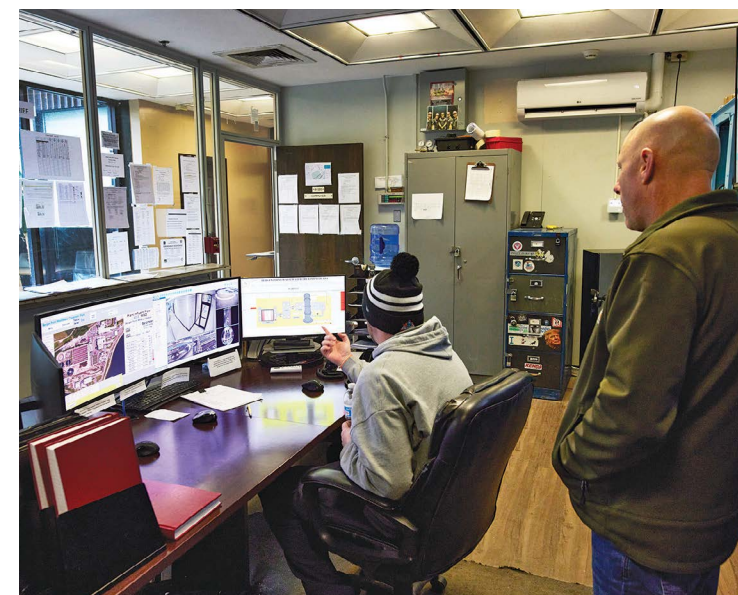
CERTIFICATION:
Grade 4A Wastewater Operator

AWARDS:
2022 William D. Hatfield Award, New York Water Environment Association

GOALS:
Develop young staff, leave plant and collection infrastructure in a healthy condition on retirement



Dale Grudier displays one of the Operations Challenge trophies his plant’s staff members have won over the years.



The plant’s iFIX SCADA system was supplied by GE Digital.

BROAD RESPONSIBILITIES

Grudier is responsible “for pretty much everything that goes on here. Every time I got promoted, I got another swath of responsibilities.” Four managers report directly to him: George Mueller, director of operations; Jon Waring, director of maintenance; Felipe Gonzalez, collection system supervisor; and administrative staffers Dawn Peterson and Cheryl Goldman.

“We have a strong support team,” Grudier says. Getting and keeping operators and mechanics is his biggest challenge, and pay is the biggest issue: “We just lost an operator to the next county where a private company is operating the treatment system. The pay is better there.”

Grudier implemented pay increases about a year ago, but the issue remains at the crisis stage.

Finding the right kind of people is also difficult. “This is a new generation,” Grudier says. “We need the kind of person who says ‘I’ll be there’ when the phone rings at midnight.” Prospective operators have to work hard to pass tests and gain certification. A varied skill set is needed, too: mechanics, hydraulics, housekeeping, math, biology, chemistry.

“There are distractions today, and cellphones,” says Grudier. “Training is everything. We’re coping as best we can. We have our up-and-comers but right now we’re down six operators. It takes a special kind of person.”

DEVOTED CAREER

Grudier is exactly that kind. Following his family background and his time in the scavenger waste area, he transferred to the main plant as a trainee. He began taking courses that led to his license in 1988. He spent 14 years operating the multiple-hearth furnace. He made time to earn an associate degree in mechanical technology at Suffolk County Community College. He has completed NASSCO certification training and is pursuing collection system certification.

“We need the kind of person who says ‘I’ll be there’ when the phone rings at midnight.”

DALE GRUDIER

After the hearth furnace was shut down, Grudier took other positions, and by 2009, he was operations crew chief on the 11 a.m. to 7 p.m. shift. He was promoted to director of operations in 2017. When the director of operations and maintenance retired, Grudier took that position and also became responsible for the collections system.

He received the William D. Hatfield Award from the New York WEA in 2022. He has served on the Long Island Utility Operations and Maintenance Committee and is operator representative to the NYWEA board of directors

LIKE FATHER, LIKE DAUGHTER

Dale Grudier's daughter Deanna, age 30, is following the family career path, studying for her operator's license while working in the Suffolk County wastewater treatment facility that serves the State University of New York campus at Stony Brook.

It didn't start out that way. She studied baking in college, but couldn't find a job in that field. So at her dad's suggestion and signed on at the Stony Brook treatment plant as a helper. That was eight years ago, and the position has enabled her to experience many tasks in the wastewater process.

"I've had a taste of everything in the last eight years, working for the different departments," she says. She appreciates that the job is close to her home, and the schedule works out well with her duties as a parent of two. On light duty during pregnancies, she's helped with paperwork, laboratory reports and permitting.

"I'm not sure I want to be the boss someday," she says. "I like this position. It's interesting. It's good to know that we are producing clean water for the community." The family clean-water tradition might well continue. "My son is five and he seems very interested in water," Deanna says. "He keeps asking if he can come to work with me."



Treated water passes through a four-channel Trojan UV3000 Plus disinfection system before discharge to the Atlantic Ocean.



The pump room at the Bergen Point treatment plant includes pumps from Flowserve.

Grudier can tell when a plant is sponsoring an Operations Challenge team, because that facility invariably looks sharp and operates well. That's important to him: "People generally don't know it, but it's amazing what we do here." He treats it like family. Because it is. **tpo**

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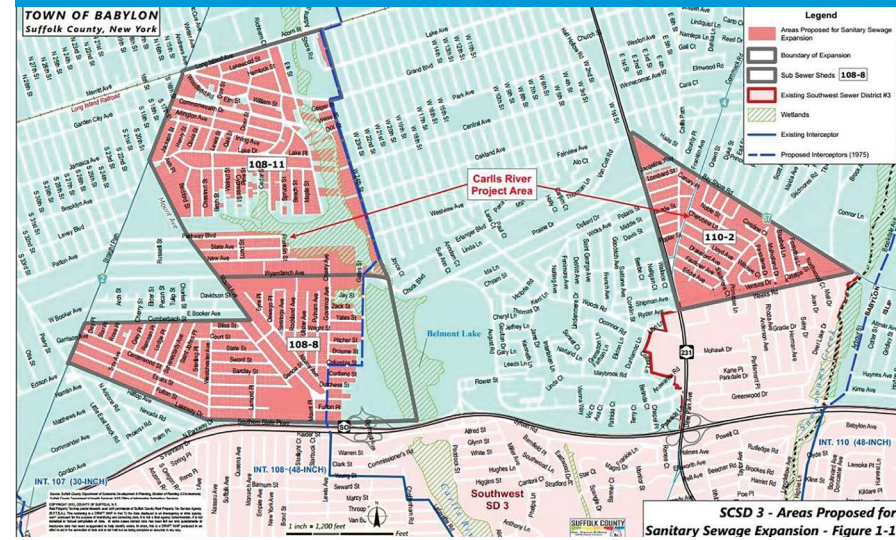
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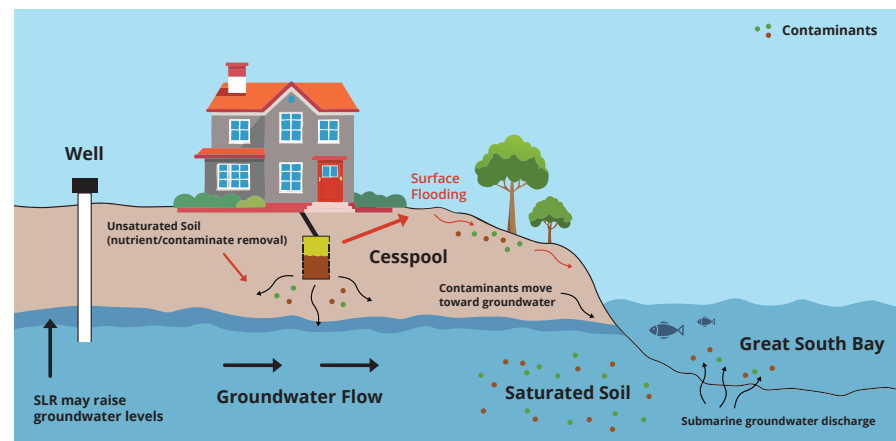
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Above: Project area map for Deer Park, West Babylon and North Babylon areas.
Below: Diagram of nitrogen pollution pathways into adjacent waterbodies.
Credit: D&B Engineers and Architects



Key planning and design considerations to ensure a successful project included:

- Geotechnical investigations
- Underground utilities
- Environmental permitting
- Funding
- Project costs
- Property owner agreements
- Public outreach
- Cost estimating
- Project schedules
- State Historic Preservation Office regulations
- Southern State Parkway crossing
- District extension
- Construction work on private property

and the Governance Council, where he was instrumental in educating members about the viability of the Professional Operator credential.

Outside the office, Grudier is a martial artist and holds a fourth-degree black belt in judo. He enjoys mountain bike racing, camping and relaxing with his wife and their children.

THE CHALLENGE

Nothing marks Grudier's career more than his involvement with the Operations Challenge, which brings operator teams from around the country together to demonstrate their skills and compete for top honors. "It's like a brotherhood," he says. "Everyone is into it, all together. It helps operators see other professionals, it involves all disciplines, it builds more pride among operators in what they do, and it takes away old stigmas about the profession."

For 10 years, Grudier was a member of the Long Island Brown Tide team. That enabled him to go out and educate the community about the importance of wastewater treatment. The team appeared on a TV station in Buffalo after the challenge was held there. Though no longer a member of an Operations Challenge team, he now judges local and national competitions.

He remembers his days as a competitor fondly: "It was a great learning experience. You're a team, and you cover the ins and outs of equipment. In the safety event, you learn the proper procedures. You work quickly, but especially in the lab event, you need to take the time to be exact. You don't want penalties."

COMMITTED TO EXCELLENCE

"You make a commitment to practice twice a week, and then every day leading up to the competition. When I was involved, I wanted to practice even more." Traveling around and meeting other operators was also rewarding: "You form connections, operators you can call and consult with if you needed to. It instills pride in our profession."

Grudier is most proud that several New York chapters have entered the competition. The state had four teams at the nationals in 2022. "Our younger operators are doing well," he says. "We're trying to promote the contest to chapters that don't yet participate."

The Carlls River Watershed Sewer Project

Clean Water for Carlls River

By Joseph H. Marturano & Janice McGovern

In 2011, as part of its Coastal Resiliency Initiative, the County of Suffolk on Long Island authorized funding for sanitary sewerage of the Deer Park, North Babylon, West Babylon and Wyandanch communities to address wastewater disposal. This initiative was undertaken to minimize the environmental impact of existing failing cesspools and septic systems on local wetland areas and Long Island's groundwater.

Background

With 4,500 unconnected parcels, the area's septic systems, cesspools and leaching pools provided solid waste settling and allowed wastewater containing an estimated 545 pounds of nitrogen per day to seep into the ground. The waste from these systems impacted surface waters within the nearby Carlls River, Sampawams Creek, Guggenheim Lake and Belmont Lake, as well as Long Island's groundwater. The nitrogen waste eventually discharged into sensitive coastal wetlands, which are Long Island's first line of defense in storm surge protection and slowing wave action on the south shore of Long Island, especially from the Great South Bay.

Surface water quality was a primary concern as contaminated water can potentially reach surface water bodies, cause further contamination and pose serious public health concerns. The lack

of sewerage in the densely populated Carlls River watershed sewer project area results in the discharge of untreated wastewater to the interconnected surface water bodies and groundwater aquifers, increasing the likelihood of algal blooms, brown tides and high nitrogen and phosphorus levels. Loss of wetlands and depleted coastal resiliency can potentially compromise or eliminate the area's greatest natural barrier against hurricanes and tropical storms.

The solution was to eliminate on-site septic systems and connect approximately 2,300 private residences, which use an average of 0.7 million gallons of water a day, to the existing county-owned Bergen Point Wastewater Treatment Plant. To address these concerns, the Suffolk County Department of Public Works initiated the project to provide planning, design and construction for the Clean Water for Carlls River watershed sewer project.

Selecting the Target Areas

Three sewer sheds in Suffolk County were evaluated, comprising 29 subareas. Specific areas were selected that would result in the largest impact if converted to a sewer collection system. This evaluation prioritized areas based on:

- shallow depth to groundwater
- high parcel density
- close proximity to streams and wetlands
- high potential for economic revitalization opportunities

The findings of the Feasibility Study of the region led to the selection of three high-priority target subareas and the extension

Continued on Page 48

of Suffolk County Sewer District No. 3.

Planning and design for the Clean Water for Carlls River watershed sewer project commenced in 2016 with actual construction beginning in 2021.

Unique and/or Innovative Application of New or Existing Technologies

The project made use of multiple advanced construction technologies, including trenchless construction methods and low-pressure sewer systems.

Trenchless Construction

The sewer pipe was installed utilizing a combination of trenchless technologies including horizontal directional drilling and pipe jacking. These methods were utilized to minimize overall disruption and potential area damage during the construction phase, particularly to Southern State Parkway (NYS 908M), a heavily traveled main transportation artery on Long Island.

A portion of the new sewer area was connected to the existing Suffolk County Sewer District No. 3 via a new 48-inch sewer interceptor extension that was installed utilizing micro-tunneling techniques. This method minimized surface and traffic disruptions and allowed for the heavily traveled Southern State Parkway to remain open throughout construction.

Ground freezing was also utilized to support the excavation for the launching and receiving pits and to limit groundwater intrusion.

Low-Pressure Sewer System

In some of the Coastal Resiliency Initiative areas, traditional gravity sewers required long, deep gravity mains and multiple permanent remote pump stations to convey flow to the existing Suffolk County Sewer District No. 3. The county decided to use low-pressure sewer systems for these areas, to standardize a cost-effective system for the proposed sewerage. Low-pressure sewer systems were selected because these systems reduce the size of the sewer main and depth of installation and are generally installed using trenchless horizontal directional drilling, thus reducing the construction costs and schedule.

The Carlls River watershed sewer project area is largely a lower- to middle-income community where Suffolk County undertook the unique initiative of installing a low-pressure sewer system. This installation included working on private property to fully connect each parcel to the sewer system. The county collected signed agreements from each property owner to allow access during con-

struction and for the installation of the sewer components on the private property, which included a grinder pump unit, a control panel, disconnect switch, electric meter, and system service piping and valves on each residential property.

Working on Private Property

Municipalities typically refrain from conducting work on private properties. However, unlike typical municipal sewer projects, which provide connection points in the right of way for private property owners to connect to at their own expense, Suffolk County provided the grinder pump units, the sewer connection, and closure of the on-site systems at no cost to the property owner. The existing on-site systems were removed to relieve the homeowner of the cost of connecting to the sewer main.

Suffolk County will also maintain the grinder pump units, monitor operating status through the telemetry system installed within the control panel and pay for the utility power to operate the system. Each home received an electric meter to track the system's electrical power usage.

Future Value to the Engineering Profession and Perception by the Public

Future value to the engineering profession lies in educating engineers to follow, observe and learn firsthand the rationale and the methodology of not merely informing, but interacting with the public, rallying support for the project and uniting municipal and private stakeholders in a cohesive effort to benefit all parties and deliver on the promise to provide generational environmental sustainability.

The scale of the Clean Water for Carlls River watershed sewer project represents a major undertaking that is at once broad and regional and yet hyperlocal. Since the project involved construction occurring directly on the private property of thousands of private residents, extreme discretion and a definitive outreach plan were vital to garner popular support throughout the Carlls River area.

The Clean Water for Carlls River project benefited from a well-developed and well-executed communications program. Strategic marketing included creating an informative and easily navigable website. Residents were invited to sign up for the Carlls River watershed sewer project newsletter and a schedule of local meetings was established and promoted, resulting in a high degree of public attendance. Outreach was comprehensive, involving informative direct mailings to all property owners stressing the urgent, far-reaching nature and value of the program, increased coastal resiliency to sea level rising, coastal storms and flooding as well as groundwater protection.

Social, Economic and Sustainable Development Design Considerations

The Clean Water for Carlls River project plays a crucial role in preserving the vital ecosystems of Long Island's wetlands and the Great South Bay.

Beyond mitigation of nitrogen discharge, the installation of a viable sewer system diverts a great deal of other contaminants away from the area's natural water bodies and groundwater, emphasizing the project's title, Clean Water for Carlls River.

This project has the added benefit of improving the property values for all the connected homes and properties throughout the district. The high-water table throughout the project area means many property owners have to pump out their septic systems multiple times per year. The introduction of the low-pressure sewer system has eliminated that burden on the property owners and increased their homes' values.

In the Carlls River watershed area and beyond, the lack of sewer systems is prohibitive for developers. At a time where leadership across Long Island is prioritizing downtown revitalization and infill development (i.e., the process of developing vacant and underutilized parcels within existing urban areas), a project of this scope allows for the construction of compact, mixed-use development and affordable housing. This transforms the Carlls River watershed and the villages of Wyandanch, West Babylon, North Babylon and Deer Park from communities of aging sprawl to attractive investment and development targets, contributing to sustainable growth and opportunity at both the hyperlocal and regional levels.

Complexity

The project included the installation of approximately 150,000 linear feet (28.4 miles) of low-pressure sewer pipe, collecting wastewater from 2,300 residential grinder pump units and eliminating on-site wastewater disposal systems.

Beyond the size and scope of the construction, the work on private property required a great deal of consideration and communication with the public to make the process as unintrusive as possible and to minimize service interruptions. This required a delicate balance of addressing the public's concerns while maintaining the allocated county budget to allow the project to move forward. This balance was compounded by the COVID-19 pandemic during the project's bidding phase, which required cost-saving solutions to be implemented such as separating the public right of way work from the private property residential work into multiple contracts and providing

alternative designs within the bid documents.

The sewer interceptor extension was another challenge that included micro-tunneling a 48-inch extension to the existing 50-year-old reinforced concrete pipe originally built in 1975 beneath Southern State Parkway and connecting to the Bergen Point Wastewater Treatment Plant while the parkway remained active. This required using ground-freezing technologies, vibration monitoring, and precise location of the micro-tunneling equipment to ensure the new pipe precisely joined the existing reinforced concrete pipe invert.

Success

The project bid amount of \$134 million was below the construction cost estimate. The project is nearing completion and is on schedule and within budget.

The success of the Clean Water for Carlls River watershed sewer project is a testament to Suffolk County's foresight and the collaborative efforts of all the project stakeholders. Effective communication and coordination have been pivotal in overcoming challenges and achieving project milestones. This landmark project demonstrates that the capacity to deliver innovative, sustainable and community-focused solutions is possible.

This project promises to bring lasting environmental and public health benefits to the residents of Long Island, setting a new standard for excellence in wastewater infrastructure development.

Joseph H. Marturano is a senior vice president of D&B Engineers and Architects and may be reached at jmarturano@db-eng.com. Janice McGovern is chief engineer of the Suffolk County Department of Public Works and may be reached at janice.mcgovern@suffolkcountyny.gov.



Ground-freezing receiving pit.
Credit: D&B Engineers and Architects



Interceptor manhole.
Credit: D&B Engineers and Architects





Horizontal directional drilling.
Credit: D&B Engineers and Architects



Grinder pump units.
Credit: D&B Engineers and Architects



Recap
Conference

WOMEN OF WATER
— LEADERSHIP EXCHANGE —

The Women of Water Leadership Exchange was held at the Albany Renaissance Hotel on October 24, 2024.

Thanks to sponsors Hazen and Sawyer, GHD and JM Davidson Engineering for helping us put on this impactful event.

It was great getting to see and connect with my fellow women water warriors! Having an event focused around women—from the space, to the food, to the topics—is so refreshing. We get to really express and be ourselves in a non-judgmental way. I wish some of these details could be worked into the fabric of our regular meetings!

Julie Barown, J. Andrew Lange

It was truly an inspirational experience and an honor to be surrounded by reputable women and listen to the many stories of professional and personal growth. I was enlightened to learn that NYWEA offers resources to women in similar, but different fields where specialized services often overlap. Whether it be an engineer or grant administrator, we were all educated on effective ways of communicating, navigating challenges, and the values of mentorship programs. The forum validated women's outlooks and we will continue to lift each other and progress to success!

Melanie Krause, C.T. Male

I found this event refreshing and mutually supportive. I went back to the office both enthusiastic about NYWEA and encouraged about the positive work that all of our industry professionals put in every day. When this event comes up again, I will find a way to get there and will encourage my colleagues to join. Thank you for taking the time to support the water industry.

Kaitlin Penner, NYS EFC

The Women of Water event provided useful relevant interpersonal tools with meaningful examples. The tools were straightforward enough to implement immediately and can be used at work or at home. It would be valuable to any person working in water at any level. I will encourage administrators, the president, and anyone in-between to participate at the next event!

Karen Rusin, NYS EFC

Attending the Women of Water Leadership exchange was a fulfilling and incredible experience. Being able to freely share my experiences with other women in the water industry prompted meaningful and heartfelt conversations. I left the conference feeling hopeful—our shared stories and experiences transformed into messages to help us navigate the industry more confidently and reinforced the notion that we are not alone and have the support of others.

Brithney Malchan, GHD



Over 200 people gathered at the picturesque Bear Mountain Inn on September 10th in Tomkins Cove, New York, for the Annual Watershed Science and Technical Conference. Attendees enjoyed a robust technical program, and networking during the beautifully sunny breaks. For details on the program or to read the abstracts, scan the QR code to the right. **We'd love for you to join us in 2025!**



Program & Abstracts



Recap
Chapter Training

NYWEA CAPITAL CHAPTER

By Erin K. Moore
On September 13, the NYWEA Capital Chapter hosted their annual Fall Training Picnic at the Saratoga State Park.

This well attended event provided wastewater operator contact hours as well as engineer professional development hours with presentations from regulators, engineers, vendors and operators.

Two 5S shovels and a golden manhole were also awarded to Capital Chapter members by NYWEA President Lisa Derrigan and President-Elect Dan Rourke.

This great afternoon ended with a BBQ lunch and a competitive cornhole tournament.

Top photo: Attendees in session at the Spring Training. Next below: Cornhole tournament in full swing. Next below: Lisa Derrigan and Dan Rourke present 5S Award to Rebecca Lanahan. Bottom left: Exhibitor interaction. Bottom right: WEF representative Steve Sanders addresses Spring Training attendees.

All Photos: Joe Habib



Levi McMahon (pictured below hard at work) was a water intern at the City of Watertown Pollution Control Facility during the summer of 2024. He says he enjoyed making money learning about wastewater and also loved using the workout room during breaks. Please keep an eye out for the 2025 application period, as we are always interested in inspiring the next generation of water warriors!



Recap
Program

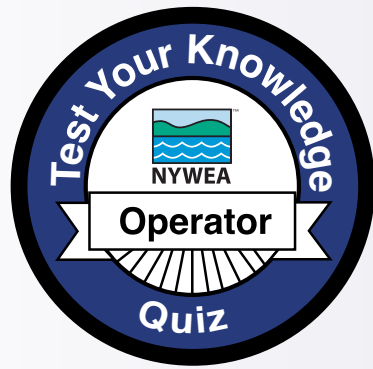


Photos: Angel French

"I've started to appreciate clean water more."
Levi McMahon



"This internship showed me responsibility."
Levi McMahon



FALL 2024 – SECONDARY TREATMENT

The following questions are designed for individuals/trainees pursuing certification as they prepare to take the ABC wastewater operator test. It is also designed for existing operators to test their knowledge. Each issue of *Clear Waters* will have more questions from a different process of wastewater treatment. Good luck!

1) During parallel settleometer tests, both samples settle to the same volume in 30 minutes. If one of the settleometer samples has been diluted to 50%, what can this indicate?

- A. sludge velocity is affected by MLSS concentration
- B. sludge velocity is unaffected by MLSS concentration
- C. sludge velocity is affected by filament concentration
- D. sludge velocity is unaffected by filament concentration

2) During parallel settleometer tests, both samples settle to different volumes in 30 minutes. If one of the settleometer samples has been diluted to 50%, what can this indicate?

- A. sludge velocity is unaffected by MLSS concentration
- B. sludge velocity is affected by MLSS concentration
- C. sludge velocity is unaffected by filament concentration
- D. sludge velocity is affected by filament concentration

3) Waste activated sludge influences all of the following EXCEPT:

- A. sludge settleability
- B. sludge concentration
- C. sludge age
- D. sludge color

4) Which of the following is commonly used in toxicity tests?

- A. nematodes
- B. fathead minnows
- C. large-mouth bass
- D. water bear

5) The theoretical dosage of sulfur dioxide when used for dechlorination is _____.

- A. 0.9 mg/L SO₂ per 1.0 mg/L chlorine residual
- B. 0.5 mg/L SO₂ per 1.0 mg/L chlorine residual
- C. 0.1 mg/L SO₂ per 1.0 mg/L chlorine residual
- D. 1.5 mg/L SO₂ per 1.0 mg/L chlorine residual

6) Nitrifying autotrophic bacteria mainly obtain their energy from _____.

- A. carbon
- B. ammonia
- C. nitrate, sulfate
- D. alkalinity

7) The discharge pressure for a positive displacement blower in a wastewater treatment plant can run as high as _____.

- A. 30 psi
- B. 28 psi
- C. 22 psi
- D. 19 psi

8) Heterotrophic bacteria obtain their carbon from _____.

- A. inorganic compounds
- B. dissolved carbon dioxide
- C. graphite
- D. organic compounds

9) When looking at a mixed liquor sample under a microscope, no large floc particles are seen. What is this describing?

- A. inter-bridging of particles
- B. dispersed floc
- C. irregular floc
- D. deflocculation

10) Which biochemical reaction may take place in an aerobic basin?

- A. conversion of ammonia to nitrate
- B. conversion of nitrate to nitrogen gas
- C. production of volatile fatty acids
- D. production of alkalinity

Answers:

- 10) A. conversion of ammonia to nitrate
- 9) B. dispersed floc
- 8) D. organic compounds
- 7) A. 30 psi
- 6) B. ammonia
- 5) A. 0.9 mg/L SO₂ per 1.0 mg/L chlorine residual
- 4) B. fathead minnows
- 3) D. sludge color
- 2) B. sludge velocity is affected by MLSS concentration
- 1) C. sludge velocity is affected by filament concentration



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