



Critical Connection Brings Revolutionary Wastewater Tech to U.S.

Through its global network and innovation programming, The Water Council brought together two organizations with complementary needs: Tomorrow Water, a wastewater technology provider, and the Milwaukee Metropolitan Sewerage District (MMSD), a national leader in wastewater treatment looking to modernize its aging infrastructure.

The resulting pilot and the permanent R&D facility it inspired could reshape how wastewater is treated in Milwaukee and across the U.S.



Tomorrow Water

Tomorrow Water, based in Anaheim, Calif., is the U.S. subsidiary for BKT Co. of South Korea. The company develops technologies that improve the efficiency of wastewater and biosolids treatment, biogas generation and upcycling of organic waste into valuable end products. Its Proteus technology combines physical filtration and biological treatment techniques to improve primary treatment and wet weather flow.

Proteus uses plastic filtration media to conduct primary clarification more quickly.

Milwaukee Metropolitan Sewerage District

The Milwaukee Metropolitan Sewerage District (MMSD) is a regional government agency that provides water reclamation and flood management services for more than 1 million people in 29 communities in the greater Milwaukee area. It is considered a national leader in wastewater treatment, flood management and green infrastructure.

Some of MMSD's coverage area operates under a combined sewer system, with wastewater and stormwater flowing through the same pipes to be treated at the district's two plants. This creates challenges during times of heavy precipitation that can lead to combined sewer overflows, when untreated wastewater is sent directly to Lake Michigan.



MMSD operates two wastewater treatment plants, including the South Shore Water Reclamation Facility in Oak Creek, Wis..



Since construction of its “Deep Tunnel” underground storage system, MMSD has reduced its sewer overflows from more than 50 per year to two. The district has captured and cleaned 98.4% of all stormwater and wastewater entering the regional sewer system since 1994, well above the national goal of 85%.

The Challenge

MMSD would like to increase that total to 100% while improving its energy efficiency. However, climate change has made that goal more difficult as increasingly intense storms strain the current system. Aging infrastructure is also a challenge; for example, the primary clarifiers at MMSD’s South Shore Water Reclamation Facility went into service in 1968.

Tomorrow Water believes its Proteus technology can help MMSD achieve its goals. Unlike traditional primary clarification, which uses gravity to allow solids to settle to the bottom of the tanks, Proteus uses plastic filtration media. The result is a faster process that requires a smaller footprint and removes more solids – 80-90%, as opposed to 50-60% in traditional primary clarification. The separated biosolids can then be converted to biogas, generating energy for the plant and reducing costs.

The company had already demonstrated Proteus’ effectiveness in South Korea, where it is deployed at several wastewater treatment plants. However, it had only conducted a small pilot in the U.S. and was not well known here.

Enter The Water Council

In early 2021, [The Water Council](#) held a virtual roundtable with the Wisconsin Economic Development Corporation for its cluster partners in South Korea, including the Korea Water Partnership. Dr. Joh Kang, a technical adviser for Tomorrow Water, attended and learned about The Water Council’s [Pilot Program](#), which facilitates pilots for emerging water technology at sites in southeastern Wisconsin.

Tomorrow Water applied for the Pilot Program in spring 2021 and was accepted for a pilot at MMSD’s South Shore facility. The pilot operated in late 2021 and early 2022 with successful results.



The Jungnang Wastewater Recovery Facility in Seoul, South Korea, was able to decrease its footprint with the Proteus technology and convert former treatment space to parkland.



“It’s difficult to overcome that first hurdle for a foreign technology to come to the U.S. and be demonstrated by an independent process,” said Mohamed Abdelbadie, Tomorrow Water chief commercial officer. “The Water Council’s extensive network and expertise helped us navigate the process during the application as well as during the piloting project itself.”



MMSD tested the Proteus pilot at its South Shore facility in 2021-22.

Tomorrow Water, MMSD and MMSD’s engineering partner, Black & Veatch, presented the results at WEFTEC in 2023.

“That initial pilot was very encouraging for MMSD and extremely useful for the Black & Veatch team to be able to look at that data to help us decide that this is something we should evaluate further,” said Matt Magruder, MMSD environmental research manager.

Full-Scale Demonstration

Next, MMSD plans to launch a full-scale demonstration test. The demonstration test will compare Proteus with another technology it is considering, a cloth media disk filtration system. The test will treat about 2.25 million gallons of wastewater a day for two years.

MMSD estimates that adopting one of these technologies at a single plant could save millions of dollars over 20 years while increasing energy

recovery, reducing chemical use, and cutting overflows and basement backups even further.

“It’s a massive change for us, and that’s why we need to do these types of demonstrations,” Magruder said. “There aren’t a lot of data points for U.S. utilities that are using primary filtration at our scale.

“We can’t afford to have any backsliding in our level of performance, so we have to make sure the technology is reliable, that we’re able to comfortably operate and maintain the technology, and that it’s going to achieve the desired outcomes.”

Instead of just putting up a temporary building for the demonstration test, MMSD decided to build a [permanent research and development facility](#) to test additional wastewater technologies and concepts relevant to MMSD and the region. The facility will strengthen



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MMSD's ability to implement innovative technologies by providing a "safe-to-fail" testing space and demonstrate its commitment to the region by creating a space to accommodate public tours, meetings and training.

The utility hopes to award a construction contract in fall 2026 and begin the demonstration testing in early 2028. The project is supported by grants from the U.S. Department of Energy and Environmental Protection Agency.

The Water Council has connected MMSD to researchers, engineers and entrepreneurs to help design the facility in a way that benefits emerging technologies. Once the primary filtration demonstration is complete, The Water Council will continue supporting MMSD by bringing forward potential new technologies for piloting and demonstration.

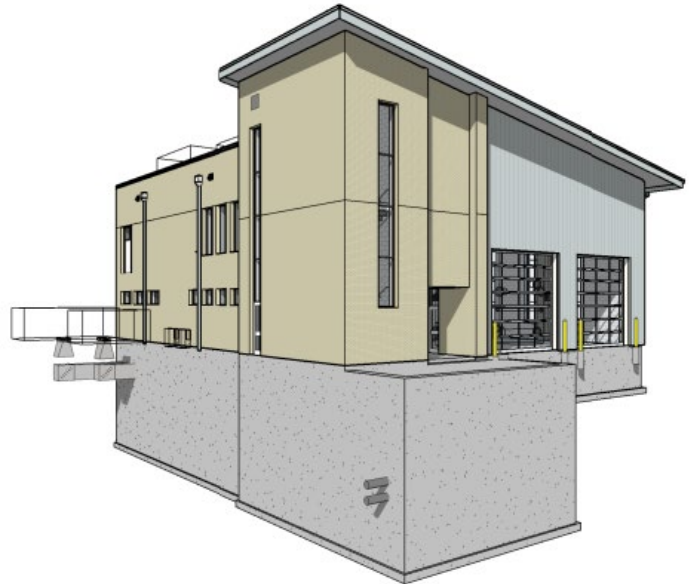
Growing Across North America

The original pilot and announcement of the demonstration test have helped Tomorrow Water gain exposure across the U.S. and Canada. It has since piloted Proteus in northern California and is now running pilots in Los Angeles and Quebec.

"Our connection to The Water Council was a pivotal moment," Abdelbadie said. "The Water Council's collaborative spirit and deep understanding of the sector have been instrumental in our success."

The Water Council's work connecting Tomorrow Water and MMSD and continuing efforts to help both organizations meet their goals highlight its value in the water technology sector, said Karen Frost, The Water Council's executive director.

"Our 16 years of experience and expertise gave us the right connections and the right programs to bring these two innovators together and smooth the path toward collaboration," she said. "We are proud to be part of this project that could significantly impact how we treat wastewater and protect freshwater resources in Milwaukee and across the U.S."



The piloting facility will help MMSD continue to test and integrate state-of-the-art wastewater technologies.

ABOUT THE WATER COUNCIL

The Water Council is a global membership organization dedicated to solving critical water challenges by driving innovation in water technology and advancing water stewardship.

Built on more than a century of freshwater innovation in southeastern Wisconsin, we have coalesced one of the most concentrated water technology clusters in the world from our headquarters in Milwaukee, Wisconsin, USA. Our work and reputation now spread across the country and around the globe.

Hand in hand with water technology innovation, we also promote responsible and sustainable organizational use of water through our water stewardship programs.

Contact us to learn how your organization can benefit from membership in The Water Council.

