Water Technologies & Solutions
case study

underground sewage treatment plant (STP) uses SUEZ's ZeeWeed* membrane bioreactor ultrafiltration technology

challenge

As the second largest city in Korea, Busan is home to more than 3.5 million people. When the city decided to replace the aging Suyeong conventional sewage treatment plant (STP), it faced a number of challenges, including strict discharge effluent quality requirements and limited land area for construction.

Residents also called for a more environmentally friendly and sanitary facility, especially since the old Suyeong STP was now surrounded by a sprawling urban landscape.

An increasingly common trend in Korea, the city decided to build the new STP completely underground with a residential park at ground level. It became part of the city's 20-year three-phase infrastructure development plan to build/expand the Suyeong STP.

The most difficult design factor for phase I of the new STP was facilitating a 100,000 m^3/day capacity STP in the limited underground area.

solution

SUEZ developed a three-process sewage treatment plant that includes pretreatment, bio-treatment, and membrane filtration.

The compact A20+ membrane bioreactor (MBR) system was chosen after a comprehensive analysis of performance, applicability, reliability, environmental impact, simple operation and maintenance, and constructability.

The system utilizes SUEZ's ZeeWeed MBR technology, which eliminates the need for large, costly concrete settling tanks that conventional wastewater processes rely on to separate contaminants from treated effluent. The ZeeWeed system occupies a fraction of the space to consistently produce tertiary-quality effluent that can be safely discharged to sensitive receiving bodies or reused for various non-potable applications.

The A20+ MBR solution created for this project includes 5,760 membrane modules and 120 membrane cassettes immersed in 12 membrane trains. The system eliminates the need for the secondary clarifier and tertiary filtration, has a smaller footprint than A20-only and bio-filtration alternatives, and boasts reduced construction costs.

results

The combined A20 MBR process meets the effluent quality limit of 7 mg/L biological oxygen demand (BOD), 40 mg/L chemical oxygen demand (COD), 20 mg/L total suspended solid (SS), 20 mg/L total nitrogen (TN), and 2 mg/L total phosphorus (TP).

Meeting these strict limits was extremely important for the city; the effluent from the STP is discharged into the Suyeong River, which flows directly to the ocean near some of Korea's most popular beach resorts.

SUEZ's ZeeWeed MBR technology will provide long-term performance reliability and continued environmental benefits at Busan, which looks to implement phase II and phase III of their long-term infrastructure development plan.

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