

Underground MBRs

By Nathan Antonneau

Lumberyard site
assumes new purpose,
builds new WWTP

When the city of Malibu, Calif., decided to turn a former lumberyard site into a high-end shopping center, it needed to build a wastewater treatment plant (WWTP) to serve the 30,000-sq-ft retail center, as no city wastewater treatment facility was available. The new plant had to meet Los Angeles Regional Water Quality Board (RWQB) water quality requirements and stringent subsurface discharge requirements. (The California Code of Regulations Title 22 was established in 1969 by the California Department of Health Services, and the state's nine RWQBs set stringent quality and usage standards for recycled water.)

The treatment system had to meet total nitrogen limits of 3 mg/L because of the site's environmentally sensitive area designation by the city's Department of Environmental Health and the RWQB. This is one of the lowest total nitrogen limits in the country for an onsite wastewater treatment system.

Meeting Challenges

The stringent wastewater discharge limits required technology capable of handling that type of treatment. The engineering team of Ensitu Eng. and Design and Integrated Performance Consultants Inc. (IPC) selected a membrane bioreactor (MBR) system and Vari-Cant jet aeration system from Siemens.

An extensive drip irrigation dispersal system, including more than 40,000 ft of drip tubing configured in 10 drip dispersal zones with automated controls, also was incorporated into the design to serve the future Malibu Legacy Park. Designed to handle up to 17,000 gal per day (gpd), the onsite system collects and treats the wastewater generated from the shopping and dining complex before onsite recycling via the drip irrigation system.

Because of space limitations, the MBR system had to be installed below ground—the first Siemens MBR system constructed this way. The project's contractor, Integrated Water Services Inc. (IWS), installed the concrete vaults first and then the MBR components later when they arrived at the site. Other project challenges included dewatering and treating several million gallons of groundwater before discharge to the Malibu Lagoon under National Pollutant Discharge Elimination System permit regulations, and installing extensive shoring systems to secure the deep excavations for the tanks and treatment equipment.

As the permit and discharge requirements were resolved, the system design had to be modified to meet the final treatment objectives. Ensitu, IPC, IWS, Malibu Lumber LLC and Siemens worked together during the final design process, making adjustments to the schedule and construction requirements. This ensured that the retail facility opened on schedule and that the WWTP



Installing the 75-ft MBR system tank through the shoring structure. (Photo courtesy of Integrated Water Services Inc.)

performed according to design and permit requirements.

“This was truly a team effort, with Siemens supporting us from start to finish,” said Jay Alman, vice president of IWS. “Their project management was first-rate. Because we had very little room for storage, equipment deliveries had to be accurate and on time. In my opinion, [the team] went above and beyond to meet a very tight delivery schedule.”

Producing Results

Started up in April 2009, the WWTP has been producing excellent results. The recycled water irrigates the adjacent property, Legacy Park, which is a 15-acre site that soon will serve as a community park and double as a catch basin to capture and clean storm water runoff. The wastewater plant is treating approximately 12,000 gpd of wastewater, and the entire process is monitored with a sophisticated computer system housed in its own small building on the site. It is producing Title 22 water quality and is meeting the stringent total nitrogen removal limit of less than 3 mg/L.

The two-story, open-air Malibu Lumber Yard Mall was designed with the environment in mind: Plants are suited to the coastal climate, wood comes from sustainable forests and decomposed granite is used instead of asphalt in the parking lot. Low-flow faucets and toilets and water-wise landscaping preserve precious water supplies. The builders also used materials once produced at the former lumberyard. This sustainable project is enhanced further by a wastewater treatment system that discharges nothing to the environment except clean water. **MT**

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Vegetation and environmentally friendly construction materials complement the Malibu Lumber Yard Mall's clean-water-discharge wastewater treatment system. (Photo courtesy of Siemens)



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