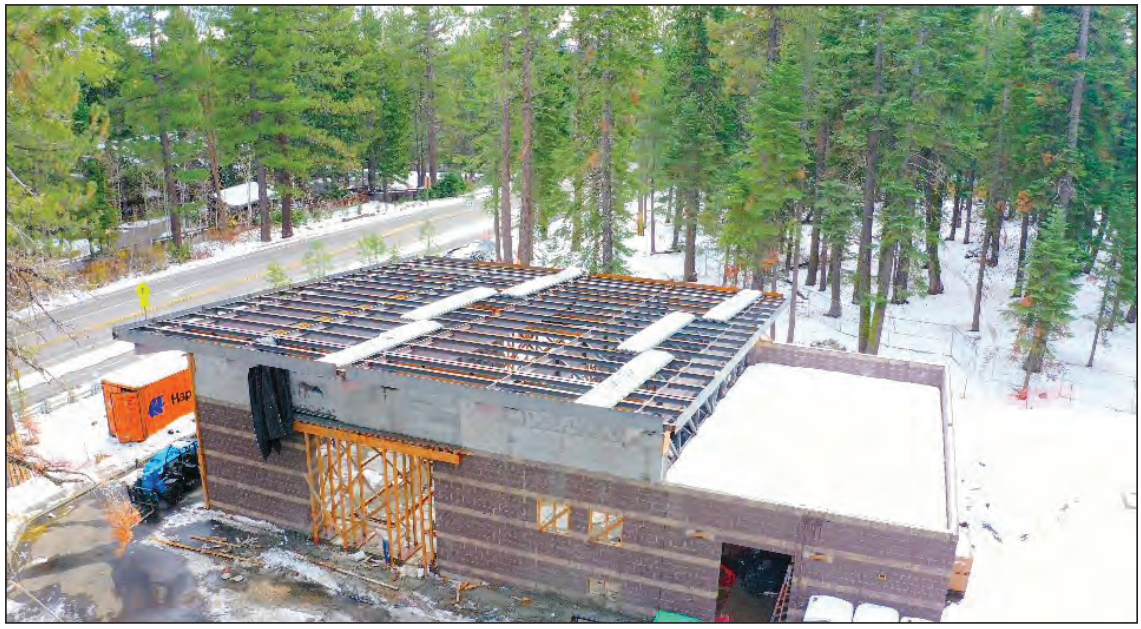
HIDING A PUMP STATION in PLAIN SIGHT in SCENIC LAKE TAHOE

An aerial shot of the concrete blocks off the shore of Lake Tahoe. Photo credit: TCPUD.

BY *Spencer Archer, P.E., BCEE, DBIA*

Tahoe City Public Utility District's (TCPUD's) new one million gallon per day (MGD) capacity surface water treatment plant will provide both drinking water and fire protection to the west shore communities of Tahoma and Homewood, California. Photo credit: TCPUD.

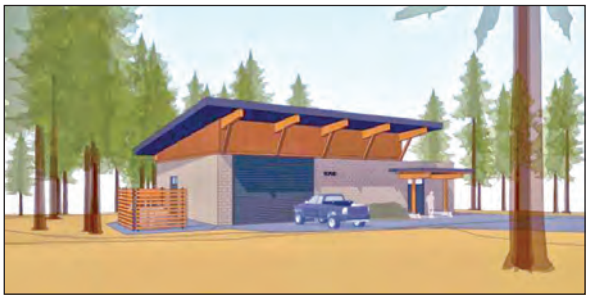


OFFERING YEAR-ROUND RECREATION, from world-famous ski resorts to watersports and beach activities, North Lake Tahoe offers something for everyone, including its permanent residents and more than three million annual visitors. The Tahoe City Public Utility District (TCPUD) is responsible

for bringing clean drinking water to approximately 5,500 water customers and the influx of seasonal visitors. TCPUD historically relied on groundwater, supplemented by a seasonal, temporary surface water treatment plant, to serve its customers on the west shore of Lake Tahoe.

With a need for a more permanent, drought-resistant solution, in 2013, TCPUD began design of a one million gallon per day (MGD) capacity surface water treatment plant to provide both drinking water and fire protection to the west shore communities of Tahoma and Homewood, California. The plant has been designed to facilitate potential future expansion for further regionalization of water supply in TCPUD's west shore service areas.

Kennedy Jenks (KJ) has been involved in every step of project development and implementation. Early in the project development phase, teams from KJ prepared the preliminary design, developed the California Environmental Quality Act (CEQA) environmental review documents, supported a land acquisition for the new plant, and prepared the final design and public bid documents.



With design completed in 2020, KJ has continued to provide construction management support while the walls of the treatment plant go up and the lake intake pump station goes out of sight.

Extreme Coordination to Relocate the Pump Station

The pre-existing lake intake pump station was located on, and adjacent to, a public beach with an intake structure in Lake Tahoe. A primary goal for the project was to camouflage the new water treatment plant infrastructure into the surrounding natural environment, reduce visual impacts to public recreation facilities, and protect environmentally sensitive areas, including Lake Tahoe.

The project relocated the above-ground pump infrastructure to a submersible pump station in Lake Tahoe. Construction of the new in-lake infrastructure requires close coordination between the contractor, Thompson Builders Corporation (TBC), the dive team from Crescent Diving, the TCPUD, the public, and various regulatory and permitting entities. Early engagement and collaboration between these parties has been critical to successful implementation.

Below the Surface

Innovative construction techniques are being used to construct the infrastructure in Lake Tahoe. To

construct the submersible pump station, divers set up a ramp that conveys construction material into the water so that a barge can be used to float the materials to the approximate location they are sunk to the lakebed.

From there, the dive team goes underwater, with a live video and audio feed, to communicate with teams at the surface regarding final placement and other underwater conditions.

The team relies on the eyes and hands of what the divers can do underwater, and setting blocks underwater is a real constructability challenge to overcome.

Monitoring a Remote, Submersible Pump Station

The intake pump station, 650 feet offshore and 30 feet below the water surface, has three submersible pumps. In addition to the pumps, the unique pump station includes intake screens, pre-assembled components that can be installed by divers underwater, and coiled power cables to facilitate bringing the pumps to the water surface for future maintenance.

To monitor the remote pump station, innovative options including real-time pump curves, enhanced thermal cable modeling, and power quality monitoring are utilized. Source water is chlorinated for disinfection at the lake intake pump station, and the water is then treated at the water treatment plant building using membrane filters followed by ultraviolet light (UV) reactors. The treated water is conditioned with caustic soda prior to being pumped to the domestic distribution system.

Turning Designs into Reality

Lingering pandemic supply chain issues, extensive regulatory construction constraints, inclement weather, forest fires, and nonstandard construction methods are just some of the hurdles encountered in the construction phase of the project, which began in the summer of 2021.

"Successful implementation of a project of this complexity requires close coordination and partnership between all project members including the contractor, the district, the design engineer, the public, and the number of regulatory and permitting agencies," said Sarah Hussong Johnson, Senior Civil Engineer for TCPUD.

Through this commitment to partnership, the project team looks forward to the successful implementation of this important project to provide drought-resistant water supply and fire protection to communities along the west shore of Lake Tahoe.

More Information

For more information about the TCPUD West Lake Tahoe Regional Water Treatment Plant, visit *www.tcpud.org/watertreatmentplant.*

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