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## MICROTUNNELING BENEATH THE NAPA RIVER

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**ABSTRACT:** The North Napa Bypass Sewer and Siphon Project is being undertaken by Napa Sanitation District to relocate existing 36-inch and 45-inch diameter sewers out of the U.S. Army Corps of Engineers' Napa River Bypass Project. The new bypass sewer and siphon will also allow Napa Sanitation District to eliminate two existing pump stations. The overall sewer project involves the construction of approximately 3,365 feet of new 48-inch diameter gravity pipeline with an inverted siphon beneath the Napa River. The inverted siphon will consist of twin 30-inch diameter, one 18-inch diameter, and one 8-inch diameter fiberglass pipes, installed within a 72-inch diameter steel casing tunneled beneath the river. The crossing is located in downtown Napa, a historic and highly developed center for regional Napa Valley tourism. The Napa River depth at the undercrossing is approximately 15 feet and is navigable to small recreational crafts. The depth of the tunnel is approximately 20 feet below the river bed. Jacking and receiving shafts on either side of the Napa River will be approximately 55 feet deep. The 72-inch diameter steel casing will be installed by microtunnel pipe jacking approximately 300 feet between shafts, and an incline bore of approximately 250 feet. Additionally, a 360 foot long, 60-inch diameter, steel casing will be installed under a main arterial road and parallel railroad track by traditional bore and jack construction.

This paper describes the engineering process in planning and designing the North Napa Bypass Sewer and Siphon, including siphon design, elimination of existing pump stations, subsurface geotechnical conditions, review of local construction precedent, considered construction options for the river crossing, design of microtunneling beneath the Napa River and project impacts on the City of Napa's downtown businesses and tourism.