

Gelco Completes Massive Liner Project in Santa Rosa, CA

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by Jeff Griffin • Senior Editor

Replacing or rehabilitating large-diameter sewer lines buried deep in the ground is a challenge made more difficult by the presence of nearby utilities and surface improvements made after the pipe was buried.

In California, the Llano Road trunk line is an integral component of the City of Santa Rosa Utility Department's sanitary wastewater collection system, carrying approximately 70 percent of the city's treatment flows. When studies determined that a portion of the trunk line approximately two miles upstream from the city's treatment plant was badly deteriorated, planners considered alternatives to address the problem.

The 66-inch-diameter segment of reinforced concrete pipe has been in the ground for more than 25 years; grapevines from a

commercial vineyard were growing directly above it.

All alternatives, including open cut, were looked at during planning stages said Robert L. (Bob) Harder, P.E., deputy director of engineering for the utilities department, and Darren Dalby, P.E., Winzler & Kelly, consulting engineers hired by the city to evaluate and develop a plan to repair or replace the pipe. Because of the depth of the pipe and other factors, digging was not practical. Ultimately, trenchless construction using cured-in-place pipe (CIPP) lining was determined to be the best choice.

CIPP rehabilitation involves installation of a flexible lining material through existing pipe. The lining, made of felt or similar material that is impregnated with a thermo-setting resin, is brought to job sites in the form of an

"inside-out" tube. Liner is installed in the host pipe using the water inversion method where a column of water turns the tube inside out and expands it tightly against the walls of the existing pipe. Once the liner is inside the host pipe, the installation water is heated and the liner is cured. Bypass pumping is necessary to maintain system flow during the lining process because the tube installation completely blocks the existing pipe. CIPP installations require little or no excavation and pipe can be installed in a wide range of sizes and wall thicknesses. The finished segment of pipe is monolithic with no internal joints. After curing, laterals are reinstated with remote control cutters equipped with television cameras.

New challenge

CIPP projects are not new in Santa Rosa. "We had used it before, and are comfortable with the technology," said Mark Powell, Santa Rosa utility system manager. "However, we had never used CIPP for pipe this large. But considering the depth of the pipe, its location and the presence of other buried utilities that are very close to the trunk line, there really was no other way to do the job."

Low bidder for the CIPP lining of 550 feet of the 66-inch pipe was Gelco Services Inc., Salem, OR.

The first step was to construct bypass lines to carry sewage flow while the trunk line was out of service during construction. That work subcontracted to Baker Pumps Inc., Seal Beach, CA.

John Coons, Baker Pumps project manager, said crews from the company's Pittsburg, CA, office constructed four 1,500-foot-long, 18-inch diameter HDPE pipe bypass lines. The existing flow was pumped by 10 Thompson pumps – four 12-inch and six 6-inch models. Four of the 6-inch pumps were high-pressure, high-volume units. Bypass pipes had to cross under a busy highway. A little more than two weeks were required to get the bypass system ready for service. Specifications called for the bypass to accommodate flows to 32 million gallons per day.

Manufactured in Virginia, the Applied Felts liner was brought cross country by truck. The 550 feet of 48 mm thick liner tube weighed in excess of 25,000 pounds, making the logistics of handling it on the job site a



challenge in itself. The liner was pulled onto a conveyor system where polyester resin was injected and the liner transported to the entry manhole and inserted into the host pipe.

"We would add only so much resin at a time; invert the liner, allowing the resin slug to fully saturate into the felt; then repeat the process," said Steve Johnson, Gelco foreman for the project. "Because the host pipe was so deep, we had plenty of available water column for the inversion and did not have to construct an elevated tower to install the liner. More than 100,000 pounds of resin were used to construct the new pipe."

Inversion took about 32 hours. When the liner reached the exit manhole, two 7-million btu boilers provided hot water for the cure.

"It took about 18 hours to get the water up to temperature, and then another three to four hours to cure the lining at 180 degrees," said Johnson. "Cool down took eight to 10 hours with cold water blended in to gradually reduce liner temperature to 100 degrees."

The curing water then was drained from the tube through the downstream end. Both ends of the new pipe-within-a-pipe were trimmed and grouted with epoxy. From start to finish, lining the old pipe took slightly over 60 hours, said Johnson.



Additional work

Gelco then rehabilitated both manholes, repairing interior walls and spraying them with Chemtron neopoxy structural manhole coating resin.

"The project can be described as non eventful, and in construction, that's good," Glen Wright, P.E., supervising engineer for the utilities department, commented after the job was complete. "It also was completed on budget without major problems. The biggest issue was delaying the start of work until groundwater level - raised by rains - dropped. There was concern that the higher level would create too much groundwater pressure."

Gelco Services specializes CIPP lining, pipe bursting, sliplining, pipeline video inspection and cleaning, grouting, structural repairs to concrete structures, and internal pipe point repairs. In addition to its headquarters in

Salem, facilities are operated in Auburn, WA, and Woodland, CA. Crews from Salem and Woodland performed work on the Santa Rosa project.

Baker Pumps is a specialist in industrial containment and transfer equipment rentals and has more than 50 locations in the United States.

Winzler & Kelly's services include civil, structural, mechanical, electrical and environmental engineering, environmental science, and surveying. The company operates six offices in California and two in the Pacific, one in Guam and the other in Saipan.

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