Large Austin Tunnel Completed with Hobas Pipe

HOBAS®

Because the pipeline was constructed in a 3.5-mile long tunnel, the pipe had to be light enough to be transported through the tunnel. One of the many benefits of CCFRPM pipe is its lightweight.

Due to the proximity to downtown, the City of Austin selected tunneling methods to avoid major public disruption.

THE TEXAS CAPITAL of Austin is the thirteenth most populous city in the United States of America and the fourth most populous city in the state of Texas, home to over 800,000 residents. As with any growing city, Austin is addressing the infrastructure necessary to support those residents.

Austin's Downtown Wastewater Tunnel was constructed to alleviate the stress on the two major sewers that were running at capacity. These sewers serve downtown Austin, running along the north and south shores of Lady Bird Lake, a reservoir on the Colorado River in downtown used primarily for flood control and recreation. The added capacity from the new tunnel takes sewer flows from both existing lines to prevent sewer overflow and provides the additional capacity needed for existing and future expansion in the downtown area. Another benefit of the project is that several lift stations were taken off line by the Austin Water Utility thus improving the efficiency and reliability of the system. Austin Water Utility is owned and operated by the City of Austin.

Due to the sewer's proximity to downtown, the City selected tunneling methods to avoid major public disruption. The five shaft locations were also chosen based on geotechnical investigations and to limit the public impact by the project. The project includes over 3.5 miles of gravity tunnel 50 to 80 feet deep and crosses under Lady Bird Lake three times, picking up flows from several interceptors.

Challenging Alignment

Designed by the Austin office of Parsons, an engineering and construction company, the project includes 54-inch through 90-inch diameter centrifugally cast fiber reinforced polymer mortar (CCFRPM) pipe. The design considerations included the varied geologic profile and the crossing of several fault zones, design flows and the maintenance of adequate flow velocity. Odor and corrosion problems were also considered. Since the tunnel passes through populated areas and would be difficult to repair in the future, a long service life was critical and the use of corrosion resistant materials imperative.

According to the Parsons website, "Selection of the final alignment was critical because of the fixed end points, the low rock cover over the tunnel and the presence of groundwater associated with Lady Bird Lake along the entire alignment. The final design incorporated innovative solutions to reduce community impacts and construction costs."

(continued on reverse)

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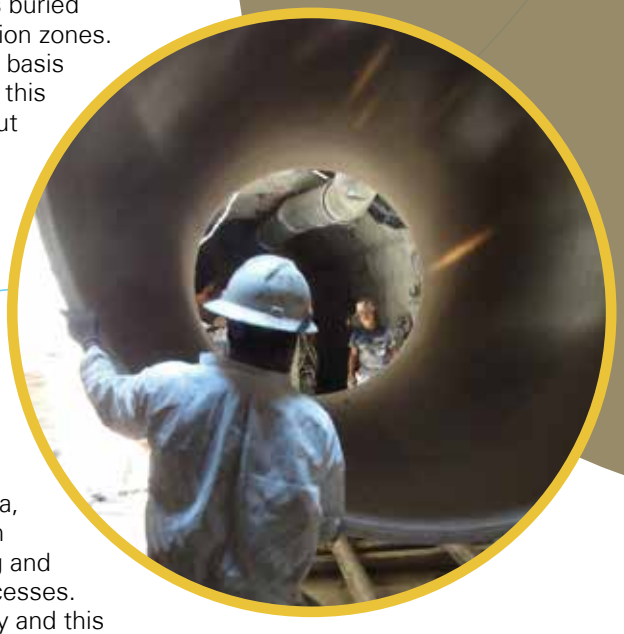
Year of construction
2010 to 2012
Total length of pipe
20,554 feet
Diameter
54- to 90-inch
Stiffness class
25 psi
Installation method
Tunneling
Application
Sanitary sewer
Client
City of Austin
Installer
SAK Construction
Advantages
High-strength, long-life

Environmental Considerations

Hobas has supplied many projects in the Austin area dating back to 1988 when 48-inch diameter pipes were manufactured for the West Bull Creek Wastewater Interceptor. Many of these projects have been in environmentally sensitive areas such as the Sunset Valley – Travis County Wastewater Interceptor which is buried within the Edwards Aquifer recharge and transition zones. The Austin project finally gained approval on the basis of providing a zero leakage system. All pipes for this project tested leak-free on their first test, without any pressure drop during the one hour five psi air test.

"In addition to Hobas pipes benefiting the environment, Hobas is an environmentally friendly company. The manufacturing facility has earned ISO 14001 certification, the international standard for environmental management. Award of the ISO 14001 certification reaffirms our commitment to the environment. This internationally recognized management standard is the gold standard in environmental performance," stated Victor Rivera, area manager for Hobas Pipe USA. "The system provides an effective framework for establishing and continually improving management system processes. We are an environmentally responsible company and this certification will serve as a tool to continually improve our environmental performance."



With tunnel depths reaching 50 to 80 feet, future repairs would prove difficult. Designers wanted a corrosion resistant material leading them to choose Hobas CCFRPM.

The project was bid in October of 2009; notice to proceed was issued in February 2010 and included over two years of contract time to complete. The original completion date was set for November 2012. The successful low bidder on the project was SAK Construction, headquartered in St. Louis, Mo.

A.H. Beck Foundation Company, Inc. was sub-contracted to provide design/build secant pile shoring for four, 28-foot inside diameter tunnel access shafts. The shaft design was critical due to the location of the granular Lower Colorado River Terrace deposits, which caused high groundwater conditions for the close proximity shafts. Once the shafts were secured, "We utilized TBM's that could be fitted with disc cutters for hard rock and drag cutters for soft rock. Crews changed the cutters as needed, as the TBM's progressed through both types of rock," stated James Byrd, sr. project manager with SAK. Due to the geology of the chosen alignment, the eight- to 10-foot primary tunnel included both lined and unlined primary tunnels. The 54-inch through 90-inch CCFRPM liner was then placed within the primary tunnel.

SAK installed 20-foot pipe sections where possible and utilized some shorter sections of pipe to navigate the curves. There were 13 curves within the reach of the 120-inch diameter primary tunnel that housed the 78-inch and 90-inch liner pipes. The 84-inch diameter primary tunnel had eight curves into which 54-inch and 84-inch diameter liners were placed. The curves ranged in size from 800 feet in radius to 2,500 feet in radius. After liner installation, lightweight cellular grout was installed in the annular space. Two methods were utilized. For the 54-, 84- and 90-inch diameters, the pipes were grouted from inside through grout ports supplied by Hobas. The 36-inch diameter was grouted by filling the liner with water for ballast and grout was installed through the bulkheads.

Ahead of Schedule

The designer chose CCFRPM pipe due to its corrosion resistance and long life, but SAK enjoyed the quick installation and leak-free service of the couplings. "The entire length of the project was below the water table and therefore infiltration testing was performed. All pipe passed the infiltration test," noted Byrd. "Substantial completion of the project was on August 3, 2012 and the entire 20,554 linear feet was in service on that date," which was three months ahead of the original schedule.