

CASE STUDY

COST-SAVING HORIZONTAL DIRECTIONAL DRILLING, PVC UPGRADE TOWN'S ENTIRE WATER SYSTEM

While residents of Wheeler, Indiana enjoy a plentiful, dependable supply of clean, good-tasting drinking water, that wasn't always the case. Not long ago, the roughly 160 homes and dozen businesses in this small northwest Indiana town were serviced by individual water wells.

Besides the need to install a modern water distribution system, there was concern that contamination from septic tank systems, used before the community's sewer system was installed, may have leached from a closed landfill and impacted the safety of the town's wells.

CHALLENGE

An entirely new water distribution system was necessary to insure a plentiful supply of safe drinking water and an ample supply of water for fire protection. However as plans for a new system were developed, concerns grew over the project possibly causing significant surface damage in the town's developed areas.

APPLICATION

Construction of the system, including mains and services, was conducted entirely with trenchless methods with 95 percent of the mains installed by horizontal directional drilling (HDD). It is believed to be the first time in Indiana that a complete water system was installed via trenchless construction.

"Directional drilling was a good choice since it permits trenchless installation of new pipe beneath streets and other surface improvements with minimal surface disturbance," said Jeff DeWitt, P.E., senior project engineer for the Bonar Group, consulting engineers on the project.

SOLUTION

Mains included 29,400 linear feet of C900/RJ PVC Certa-Lok pipe by Westlake Pipe & Fittings: 10,300 feet of 6-inch diameter pipe; 4,300 feet of 8-inch; and 4,800 feet of 12-inch. Project leaders say the Certa-Lok pipe was ideal for installation by directional boring since its sections are connected with tight-locking couplings which don't pull apart when pipe is pulled into place by the drilling machine.

Precision-machined grooves of pipe and couplers were aligned and a nylon spline was inserted to lock the pipe and coupling together. Services were 3/4- and 1-inch type K copper, the size depending on the length of the service. They, too, were installed by HDD.

Mains were installed primarily in residential areas. One line went along a state highway with mains branching off in easements adjacent to streets. Surface conditions of easements included asphalt and concrete streets and landscaped areas.



Project Type:
Water & Force Main
Sewer

Application:
Horizontal Directional
Drilling

Owner:
White Oak Conservancy
District

Product Used:
Certa-Lok® C900/RJ
PVC Pressure Pipe

Contractor:
Atlas Excavating

Engineer:
Bonar Group

"We made approximately 300 bores for the mains and individual bores for each service connection," said Tina Dillon, president of Atlas Excavating. "Subsurface conditions included sandy clay and clay. Bore lengths for mains ranged from 45 to 900 feet."

Two of the company's four HDD units were used: a 24,000-pound pullback Vermeer D24x40 and 30,000-pound pullback Case 6030. Pipe for 6- and 8-inch mains was pulled in directly behind a backreamer. For 12-inch pipe, one backreaming pass was made before the pull-in with PVC pipe pulled in a joint at a time.

"The connections were made so quickly it wasn't necessary to assemble a string to install this type of pipe," added Tony Kinsler, project manager for Atlas Project.

Kinsler says another interesting aspect of the job was that pilot holes for services went under the foundation of homes and exited into the houses. Plus, the town of Wheeler is separated by two sets of parallel railroad tracks owned by different railroads.

"Six railroad crossings were required," DeWitt explained. "Since mains under the tracks had to be placed in steel casings, ductile iron pipes were installed by the jack-and-bore method, so these segments also employed trenchless construction."

Originally budgeted for \$2 million, the contract for the project came in at \$1.6 million.

"The cost was lower in part because of directional drilling," said DeWitt. "The project documents there can be significant cost savings when restoration items such as repairs to roadways, sidewalks and landscaping are not needed."

DeWitt adds at one point during construction, the White Oak Conservancy District received complaints from citizens asking why construction had not started.

"When the district council replied that 50 percent of the pipe was already in the ground, the attitude changed," he said. "Residents simply didn't realize water pipe could be installed without digging trenches."

The project's innovative use of trenchless construction earned an award from the American Council of Engineering Companies of Indiana.