

CONCRETE PIPES *to serve Tioga County*

PENNDOT LAUNCHES
RECONSTRUCTION PLAN

By Dave Crockett



The countryside of Tioga County in north central Pennsylvania is home to three state parks, two national parks and seven lakes. The county also features Pine Creek Gorge, a 50-mile-long chasm nicknamed the Pennsylvania Grand Canyon. Much of Tioga, though, has long been isolated from the rest of Pennsylvania.

Out-of-staters looking to partake in the area's year-round recreational

offerings have struggled with traveling into and from Tioga County. The only main thoroughfares are I-80, located 60 miles to the south, and the future I-86 (Rte. 17), 20 miles to the north.

Connecting these two interstates is Rte. 6015 (U.S. Rte. 15), a two-lane highway running from Williamsport, Pa., to Corning, N.Y. And while U.S. Rte. 15 provides plenty of scenery, its congestion creates headaches for drivers

commuting to New York state.

The Pennsylvania Department of Transportation (PennDOT) Project Needs Analysis established that road improvements would be made to accommodate local and long-distance travel demands in a safe and efficient manner. The project aims to reduce current congestion, ensure sufficient capacity for anticipated traffic growth, improve safety by reducing conflict

between through and local traffic, and provide system continuity with other U.S. Rte. 15 improvements that are under way.

Project planners included a new four-lane highway to direct traffic into Pennsylvania, opening the center of the state for additional commerce and creating a windfall for the local economy.

The \$115 million project incorporated:

- Grading and drainage for the new four-lane highway;
- Removal of 3.8 million cu yd of earth and rock;
- Relocation of one township road;
- Mitigation of two acres of wetlands; and
- Diversion of two streams.

Although the streams were small, they were vulnerable to heavy rains throughout the summer and substantial snowfall in winter, necessitating hydraulic solutions. In order to apply these solutions while protecting the local environment, crews built a positive projecting embankment, placing the streams 60 ft under the finished roadway.

APPLYING CONCRETE PIPE SOLUTIONS

“Reinforced concrete pipe was the foundation for this project,” said Lance Ridall, project manager for PennDOT. “The Northeast Pipe Group added water management know-how in creating a cutting-edge, environmentally sound solution.”

Cayuga and Kerr Concrete Pipe, sister companies who make up the Northeast Pipe Group of Oldcastle Materials, are known for engineering innovations and have designed and manufactured pipe for many projects with special conditions over the years. This is the tenth PennDOT project involving special design-heavy, wall-reinforced concrete pipe made under the Pennsylvania Installation Direct Design (PAIDD) guidelines.

PennDOT Engineering District 3-0 oversaw the Tioga County roads project. This district covers the nine counties of north central Pennsylvania, including Tioga, and is responsible for maintaining 4,300 miles of state highway and 2,900 bridges. PennDOT’s

District 3 is the largest district user of concrete pipe in the state.

The projecting embankment required 15,000 ft of reinforced concrete pipe. Engineers also needed to consider geological shifts that loosened shale and bedrock and deal with the various underground bogs that could instigate additional settling problems. The possibility of landslides could not be overlooked.

“The amount of earth moved on this project was astounding,” said Debbie Loomis-Major, administrative manager for Cayuga Concrete Pipe and overseer of the project. “We literally cut through mountains to make this happen.”

The reconstruction involved two runs

“Using the 72-in. pipe in place of box culverts in some areas was a major cost savings for PennDOT,” said Loomis-Major. “Normal Class V pipe at 3000D would not have been adequate to withstand the loads, so a special design pipe had to be utilized.”

Careful planning by the plant’s production and dispatching department was required to transport 1,250 tons of concrete pipe in 200 truckloads. The haul from Cayuga’s Montrose plant to the site was a relatively short run of 130 miles round-trip. The loads going from the Farmingdale, N.J., Kerr plant to Tioga County logged nearly 450 miles round-trip.



Road improvements aim to alleviate Tioga County’s travel problems.

of 72-in. heavy wall-reinforced concrete pipe (RCP). The first run was 528 In ft with a fill height of 60 ft, and the second was 320 In ft with a fill height of 40 ft.

Using the guidelines of Publication 280, “Manufacturing Specification for Reinforced Concrete Pipe,” the solution was to design and manufacture a 72-in. heavy-wall RCP that could withstand a D-load of 4,841 lb/In ft/ft for the 60-ft fill and 3,232 lb/In ft/ft for the 40-ft fill. This phase of construction also included additional runs of 30-in. and 36-in. heavy-wall pipe with 30 ft of fill.

“Inspection in District 3 is second to none,” said Loomis-Major. “They insist on perfection, which is exactly what the taxpayers deserve.”

The pipe was installed with a Type-A standard installation and followed the stringent guidelines for Publication 280 of PAIDD. PennDOT specification RC-30 governs with regard to bedding and backfill.

OVERCOMING THE CHALLENGE

“Because of the project’s complexities, it was beneficial for us to work with



PennDOT has used special design-heavy, wall-reinforced concrete pipe in 10 PAIDD projects.

one supplier," said Ridall. "We have obtained a consistency throughout the job and a solid working relationship, helpful to both parties. Schedules were more easily met and any obstacles that arose were handled quickly."

The multitude of engineering and environmental challenges that were

overcome during the development of this project required extensive coordination with many state and federal agencies. These included PennDOT, NYDOT, U.S. Army Corps of Engineers, Pennsylvania Department of Environmental Resources and the American Indian tribes that hold ancestral ties to the project area. In

addition to these agencies, interested citizen groups and the general public provided valuable insight that was useful in avoiding problem areas and being as context-sensitive as possible.

The American Concrete Pipe Association honored the Northeast Pipe Group in July 2006 for the most innovative use of a precast culvert with efficient and practical use of the direct design method and application of heavy-wall pipe for culverts under substantial fill.

All work is expected to be completed and the new highway opened to traffic by fall 2008.

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