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Highway Runoff: Beyond the Highway

Storm Water Management [1]

In October 2015, the New Hampshire Department of Transportation (NHDOT) widened and reconstructed a 1.3-mile-long northbound stretch of Interstate 93 and a 1.8-mile southbound run at Exit 2, so each direction now has three lanes. At a cost of \$40.9 million, this is just one portion of the 20-mile-long I-93 project from Salem, N.H., at the Massachusetts

border to Manchester, N.H., and is one of the largest projects NHDOT has ever undertaken. Additional work will be done on other portions of I-93, and other roads—some near ponds, lakes and estuaries—will be relocated.

I-93 provides a critical link between the communities in south central New Hampshire and the Boston metropolitan area. When completed in 2020, the project will reduce congestion and improve safety. This section of I-93 was built in the early 1960s to accommodate 60,000 to 70,000 vehicles per day. Projections indicate that traffic will increase to 140,000 vehicles per day in Salem by 2020, prompting NHDOT and the Federal Highway Administration (FHWA) to widen the highway.

The \$795 million project will add two travel lanes in each direction over the entire 20-mile-long road and improve five interchanges south of Interstate 293 to the state line. Twenty bridges will be replaced and 23 will be rehabilitated or widened. New park-and-ride facilities already have been built at Exits 2 and 5, with another planned at Exit 3.

Past the Roadway

Rebuilding I-93 is more than just a roadway and bridge construction project. NHDOT and FHWA have invested in several other concurrent initiatives, including protecting the environment through wetland mitigation and managing storm water runoff. According to NHDOT, the water quality permits for the I-93 project require strict standards for storm water treatment. These include pre- and post-construction monitoring, as well as no net increase in total suspended solids, phosphorus or nitrogen. I-93 is one of the first projects to implement methods for meeting these new standards.

The interstate winds past Canobie Lake and the 302-acre Cobbetts Pond, plus numerous creeks, brooks and ponds. Near Exit 2, a 7.6-acre mitigation site and 9 acre-ft of floodplain mitigation have been constructed at Haige Avenue. All along I-93, storm water collection systems will gather runoff and direct it to a series of treatment areas.

Ensuring Adequate Drainage

For the storm water drainage system, the use of large-diameter, corrugated high-density polyethylene (HDPE) pipe provided cost and labor savings. A total of 190,360 ft of ADS N-12 pipe, a product of Advanced Drainage Systems Inc. (ADS), will be used for the I-93 project. The pipe will range in diameter from 6 to 36 in.

The corrugated HDPE pipe was selected based on structural and durability performance, competitive costs and its ability to withstand the corrosive nature of the soil and any contaminants such as salt in the runoff.

The project also protects the environment by using pipe that would last a long time and not have to be excavated and replaced in a few years.

"Wetlands and lakes that abut I-93 will also be protected by the pipe's inherent ability to withstand corrosive road salts used during the long and extreme winters experienced by the area," said Daniel Currence, director of engineering for the Plastics Pipe Institute Inc.'s (PPI) Corrugated Polyethylene Pipe Assn. Div. "HDPE pipe was selected because of the low cost and ease of installation. HDPE pipe is structurally sound, cost competitive, unsurpassed in abrasion and corrosion resistance, long lasting, and less intrusive to the environment. The project also demonstrates the use of HDPE pipe on high-volume thoroughfares."

Pipe Benefits

According to PPI, corrugated HDPE pipe is a flexible pipe system that performs well in both high- and low-cover applications. It has the ability to support and distribute live and dead loads, enabling it to meet most installation conditions.

HDPE resin is one of the most chemically inert of all plastics and therefore provides extreme chemical and corrosion

resistance. It also is resistant to abrasion. These two characteristics give corrugated polyethylene pipe a long-term advantage.

Silt-tight and watertight joints enable the pipeline to provide exfiltration and infiltration protection. This ensures that communities, groundwater supplies and wildlife are safer and more secure in their environment. These integral joints meet the standards mandated by the U.S. Environmental Protection Agency and comply with ASTM Intl. and AASHTO specifications.

Additionally, PPI has initiated a third-party certification program for manufacturers of corrugated HDPE pipe and resin. The certification program tests for the material, dimensional and physical performance properties as specified in AASHTO M294 and MP7.

"The NHDOT I-93 project demonstrates to other departments of transportation how corrugated HDPE pipe can be readily used on major road expansion projects and provide substantial savings and a long-life storm water drainage system," said Tony Radoszewski, president of PPI.

Deck:

New Hampshire road project makes the environment a priority

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Image:

 [The \\$795 million I-93 project will add an additional two travel lanes in each direction over the entire 20-mile-long road.](#)

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