



Tenth Street Culvert Replacement

Municipal Engineering & Planning/Structural Engineering

Hanover Engineering assisted the Borough of Emmaus with inspection, structural evaluation, alternatives analysis, design, bidding, and construction observation of a new precast concrete culvert to replace the severely deteriorated corrugated metal arch pipe culvert carrying a tributary of Leibert Creek under North Tenth Street.

The original 8' x 12' culvert, built in the 1970s, was found to be in poor structural condition. There was heavy rust-through of the flow line, cracking through the steel at lines of bolts in the sidewall joints, and downward deflection of the culvert ceiling. The concrete wingwalls had open and offset cracks, disclosing the lack of any steel reinforcing. The wingwall footings were found to be shallow with heavy scour, especially at the downstream end of the culvert. Complete replacement of the culvert was recommended.

The environmental study performed by Hanover Engineering identified the waterway as tributary to the Leibert Creek natural reproduction trout stream. Accordingly, the replacement project required a design that would provide a three-sided structural enclosure with a naturalized streambed. Hanover Engineering partnered with Contech Engineered Solutions to develop the designs for the precast concrete culvert. Poor subsoil bearing capacity resulted in the use of Contech's EXPRESS® Foundations, the equivalent of a full-width spread footing, buried two feet under the channel bottom, with fish baffles extending up into the rock lining of the culvert channel bottom.

Hanover Engineering coordinated the project with PennDOT staff and the administrators for the Multi-Modal Grant Program, which provided partial funding for the project.

PROJECT DETAILS

- **Location**
Borough of Emmaus, Lehigh County
- **Client**
Borough of Emmaus
- **Completion Date**
January 2019
- **Total Project Cost**
\$421,000

