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CASE STUDY:

KEEPING LAKE ERIE CLEAN



THE FIRST CHOICE OF ENGINEERS



WORLDWIDE

BACKGROUND

When heavy rains fall in Northern Ohio, the increased flow through sewers sometimes caused overflow of the combined storm water and wastewater into area waterways and Lake Erie. The Northeast Ohio Regional Sewer District (NEORS D) initiated a number of projects with the aim of addressing this pollution. The project, which has been ongoing for a number of years under the guidance of Brown and Caldwell and MWH Global, consists of several phases and is planned to continue at least until 2019. Included in the overall project is the expansion of the Easterly Wastewater Treatment Plant.



PROBLEM

The area in question, on the northeast side of Cleveland, was developed in the 1930s. Since that time, there have been significant additions and changes to the infrastructure, many involving buried pipes and other utility conduits. Constructability was therefore a major challenge facing the project contractor, Shook Walbridge Joint Venture. Another complicating factor in the project was the fact that groundwater levels could vary anywhere from eight to 48 feet below grade, fluctuating according to precipitation and other weather conditions.

SOLUTION

Although the original project specifications called for the use of prestressed concrete

cylinder pipe (PCCP), the contractor proposed using Flowtite® FRP instead. Using the filament-wound pipe, which was only a tenth the weight of the PCCP, meant that smaller—and lighter and less costly—equipment could be used during installation. Shook Walbridge, with the support of the Thompson Pipe Group – Flowtite engineering and project management staff, was able to implement the design changes with the Flowtite® FRP pipe for the project. Construction time could be reduced, leading to further savings.



To address potential buoyancy issues, the pipe was anchored to a reinforced concrete slab wherever the 60-, 72- and 84-inch pipes were to be installed. This effectively eliminated any risk of buoyancy problems.

Since the original PCCP design included harness restraints, three different applications were used, as appropriate. For small-diameter pipes (36- and 48-inch) the Flowtite® Key-lock Restrained Joint System was utilized. For larger diameters (60-, 70- and 84-inch),



carbon fiber internal laminate restraints were used. Finally, for effluent conduits connected to rigid structures, bolted harness-style joints were used. This allowed the joints to maintain their flexibility.

OUTCOME

The use of Flowtite® FRP pipes and fittings led to a number of significant savings for the Northeast Ohio Regional Sewer District. These benefits included:

- ▶ **Savings in installation cost**
- ▶ **Shorter construction time due to revised foundation design**
- ▶ **Reduced long-term maintenance costs of the system**

Construction on further stages of the Easterly Secondary System Improvements (ESSI) project will continue through 2019. The goal is to increase processing capacity at the Easterly plant from 330 MGD to 400 MGD.

This, together with the two tunnel systems, will help prevent a billion gallons of untreated water from polluting Lake Erie each year.