



# ORCHARD MEADOW CSO

## CHALLENGE

AFTER WET WEATHER CONDITIONS NEGATIVELY IMPACTED THE SURROUNDING AREA, THE ORCHARD MEADOW COMBINED SEWER SYSTEM REQUIRED MULTIPLE UPGRADES FOR ENVIRONMENTALLY-FRIENDLY SOLUTION.

## SERVICES

- Bidding
- Construction Inspection
- Environmental Engineering
- Survey

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As the result of a consent order issued by the Ohio EPA, the City of Youngstown was required to perform a combined sewer overflow (CSO) determination and provide comprehensive permit assistance on a 650-mile collection system. The City retained ms consultants to conduct a complete system inventory and model, to provide assistance with OEPA permit compliance, to analyze the impact of the overflow

charges on the receiving streams, and to evaluate and recommend improvements to the system.

One of the highest priority improvement projects identified by ms was the Orchard Meadow Combined Sewer Overflow Elimination.

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## ORCHARD MEADOW COMBINED SEWER

The Orchard Meadow Combined Sewer was constructed in the early 1980s, but was never properly documented. As a result, this CSO was not included in the original OEPA permit. The CSO discharged into Bears Den Run approximately 1,000 feet above its tributary point into the Mill Creek, in Mill Creek Park, one of the nations' largest metropolitan parks. Because of its potential environmental impact during Wet Weather conditions, this CSO was a sensitive issue for two decades between the City and the Park District, and therefore took high priority for remediation.

The Orchard Meadow Combined Sewer Elimination required design plans and specifications for the

replacement of the existing 36- to 42-inch sewer with approximately 840 feet of 60-inch sewer in a tunnel, and approximately 925 feet of 60-inch sewer by the direct burial method.

The ms project team included a geotechnical and tunneling subconsultant, who provided the drilling program and geotechnical baseline report that described the anticipated ground conditions during construction. Shafts for the tunnel went through fill, residual soil, and shale. Since the sewer runs through areas of shallow bedrock, and sewer depths range up to 22 feet, the tunnel was drilled with a Tunnel Boring Machine.

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## LONG-TERM RELIABILITY

Long-term reliability was an important issue for this project, so ms evaluated different pipe materials and recommended Hobas pipe, which is a fiberglass-reinforced polymer-mortar pipe that provides excellent resistance to corrosion, and a maintenance-free life cycle of up to 100 years. In addition, this pipe material

ensures zero infiltration/exfiltration, as well as excellent hydraulic properties due to the smoothness of the interior surface. The City selected this alternative, allowing ms consultants to provide the City with the best combination of initial capital outlay and long-term value.

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## AN UNEXPECTED OBSTACLE

In addition to design services, ms provided bidding assistance, construction administration and inspection services, and was faced with a challenge that demonstrated the firm's ability to respond quickly and effectively.

During the tunneling portion of construction, the tunnel crossed an old mine shaft that was not documented on any historical records. Before the tunneling could

continue, the construction engineers had to develop a solution to filling the mine. The best design solution was to use a pump truck to fill the shaft with grout, and then to continue the tunnel. Even with this interruption, the project was completed in time for compliance with the EPA's Consent Order.