

THINKING ON THE SPOT

RELINING PROJECT IN STEUBENVILLE, OHIO, CALLS FOR QUICK SOLUTION

By Brian Brown

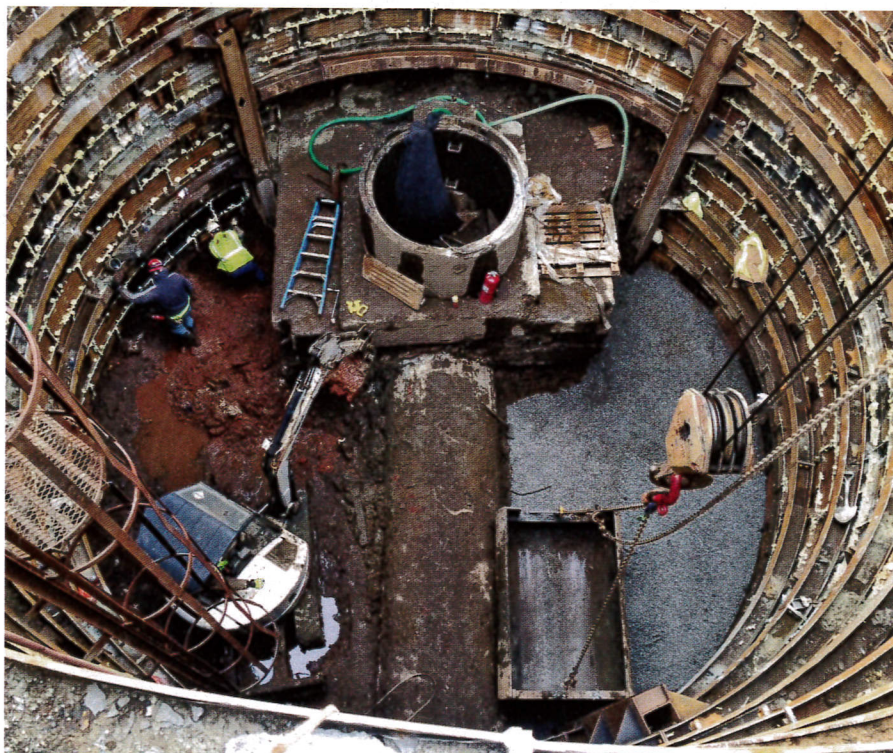
ALONG THE BANKS OF THE OHIO RIVER SITS THE CITY OF STEUBENVILLE, OHIO — HOME TO MORE THAN 20,000 CITIZENS, DOZENS OF HISTORIC SITS AND MUSEUMS, AND ONE LARGE SEWER PROBLEM.

Midwest Mole, a leading trenchless technology company based in Greenfield, Ind., was contracted by MWH Constructors to reline a deteriorating section of the City's existing sewer line, starting in December 2015. City of Steubenville officials had provided CCTV footage of the sewer line that indicated it had a number of collapsing and deteriorating sections that had developed over the years and needed to be addressed. Putting together the plan for the project, Midwest Mole, MWH Constructors and city officials determined the overall project would include the following actions:

1. Bypassing a section of the existing sewer by pumping the sewage from upstream of the work area over to a different sewer line to facilitate the work.
2. Relining the 700-ft section of the sewer with 30-in. Hobas flush reline pipe.
3. Reinstating any functioning laterals.
4. Grouting the annular space between the original sewer and the liner pipe with cellular grout.



INSTALLING HDPE PIPE PROVED TO BE A WELL THOUGHT OUT AND WISE SOLUTION.



RELINING WAS DONE UPSTREAM AND DOWNSTREAM FROM THE WORK SHAFT.

5. Two manholes on the site would need to be reinstated as well.

The plan called for Midwest Mole to install two shafts: One was for installation of the bypass pumping operation and the other was used as the main work shaft from which the lining would commence. After the shafts were installed and the bypass operation up and running, the upstream section would be lined first. After the upstream section was complete, the jacking frame used to install the pipes would be reset up in the opposite direction and in the same hole so that crews could reline downstream of the main work pit.

The mission of Midwest Mole is to provide clients with the most responsive, innovative and dependable trenchless technology services, and its employees take pride in working with clients from the planning stages through project execution to ensure complete satisfaction. Midwest Mole's commitment to providing high-quality service and value engineering played a large role in this particular project as the site was located near two important businesses in the

City — LaBelle News Agency and the local Hampton Inn. After discussing the initial plans, Midwest Mole evaluated the affected parties involved and in order to limit the number of disruptions to city residents, decided it was best to propose a new plan. Specifically, the newly proposed plan would move the working shaft to the beginning of the relined section of sewer, which was located in the parking lot of LaBelle News Agency. This move would allow LaBelle News Agency access to their garage bays located on the main level, instead of restricting access to the garage bays altogether. Since Midwest Mole is consistently looking for the best way to reduce costs and inconveniences, is committed to maintaining an open and honest line of communication with clients and dedicated to helping affected parties understand the scope of the project at-hand, it was able to create a plan that was in the best interests of all companies, crews and citizens involved. After discussion, all parties agreed this was the approach to be taken, and set out to get the job done.

Prior to starting construction, Midwest Mole needed to observe the sewer line to determine its current condition. In order to achieve this, the bypass shaft needed to be constructed and put in place, which was done in the nearby Hampton Inn parking lot. Midwest Mole then began excavation to the existing sewer line, cutting the sewer from the spring line and removing a top section in order to place in the pumps for the bypass operation. Following the construction of the shaft, the bypass pumps were installed and all flow was diverted from the sewer line and directed to a different section of the sewer.

Observation of the sewer line was completed with the use of CCTV inspection, and much to everyone's surprise, it showed that the problem was more significant than what was initially believed. The sewer's collapsed area posed additional concerns due to its location. Because the section of the sewer was located beneath University Blvd., Midwest Mole crews were afraid



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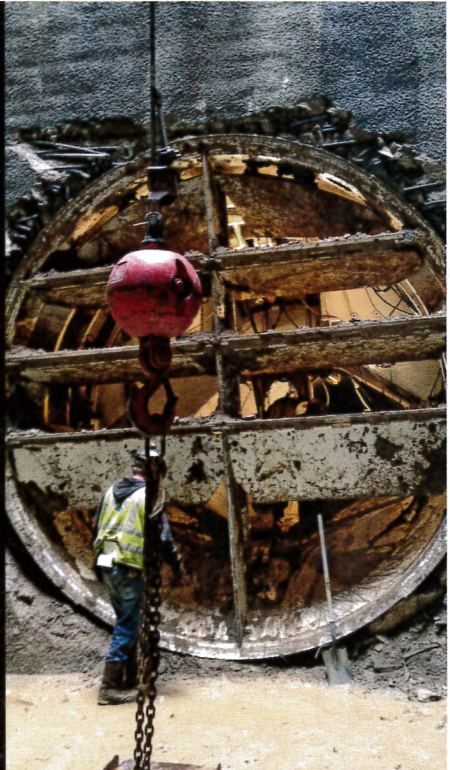
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ORIGINAL BRICK SEWER SHOWING CURVED SECTION.

that if there was to be a complete collapse of the sewer line and it wasn't able to be relined, the only other way to access the sewer would be by cutting open this entire section of the road. This didn't only pose critical safety concerns for crews and citizens alike, but it also posed serious financial concerns to the city and its allotted budget.

Due to the newfound severity of the project, Midwest Mole and MWH Constructors met with local law enforcement and city officials to discuss the situation and create a contingency plan surrounding the potentially catastrophic event. Press releases were written, plans were put into place, and Midwest Mole met with property owners in the potentially impacted area, local traffic providers, and the city, to inform citizens of the project's effects on everyday life in Steubenville. From road closings to changes in traffic routes and patterns, it was important that each citizen was aware and prepared for any potential issues and possible inconveniences.

The construction finally began of the working shaft, which measured 35-ft deep and 33-ft in diameter and consisted of steel ring beams and wood lagging and tunnel liner plates to provide optimal stability and protection. As the shaft was installed, another completely unforeseen and deeply concerning issue was discovered: the true size, shape and structure of the existing sewer line. What was originally thought to be straight, the sewer line instead

displayed curved sections that gave no indication whether the rigid Hobas pipe would be able to deflect through the curved sections of the sewer line.

Midwest Mole got to work taking field photographs, and concluded that the risk outweighed the reward of lining the sewer with the Hobas pipe. Given the excessive amount of flow the sewer facilitated, simply downsizing the Hobas pipe was out of the question. In response to the issue at hand, the Midwest Mole crew discussed using a solid wall high density polyethylene pipe (HDPE), which would allow for greater deflection. It was an approved material for relining by specifications, and was installed without any issues — proving to be a well-thought-out and wise solution. Once the HDPE was installed, the relined section of the sewer was filled with water and bulkheads were constructed at each of the four manholes, which the liner was installed in, to allow the annular space to be filled with cellular grout.

After the grouting, the water was released from within the liner and the two relined manholes and functioning

lateral were reinstated. Once the construction of the sewer line was completed and as the shaft was being back-filled and compacted, the ring beams, lagging and liner plates were removed until the existing ground elevation was reached. The final piece of the sewer line puzzle to be completed was the asphalt restoration in the LaBelle News and Hampton Inn parking lots.

Midwest Mole was dedicated to restoring the asphalt in the local businesses parking lots to a better condition than before the project began, and provided additional striping once the new pavement was laid. Once the project was completed and all ends were tied up, the vendors, City of Steubenville officials, law enforcement officials, property owners from the Hampton Inn and LaBelle News Agency, all met with Midwest Mole and MWH Constructors and expressed their satisfaction for a job well done. With all parties satisfied with the final results and overall execution of the project, Midwest Mole moved off-site in early June 2016, meeting the

expectations and the timeline initially laid out for the project.

Completing a project of this size and scope requires several moving pieces, including a well-advised and well-researched plan, the ability to quickly adapt to change and the willingness to work together with all entities involved to create a successful outcome. Because of the efforts of Midwest Mole, MWH Constructors, city of Steubenville officials and law enforcement, LaBelle News Agency, the Hampton Inn, Franciscan University and all subcontractors and vendors, the inconveniences to the citizens of Steubenville were significantly minimized.

Although many complex challenges and unforeseen issues arose throughout the process, the members of Midwest Mole as well as members from MWH and the City of Steubenville consistently showed their ability to work together, remain flexible and handle the increasing complexity of this specific project with expertise.

Brian Brown is project engineer at Midwest Mole.