Manhole Maintenance in Tonawanda, New York

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Situated along the Niagara River and adjacent to Lake Erie, the Town of Tonawanda, New York (Town), a metropolitan suburb of greater Buffalo, was tasked by consent decree to address its aging infrastructure and creating a plan for the mitigation and reduction of inflow and infiltration (I&I) issues throughout its collection system.

Serving a population of approximately 72,000, this modest-size Town opted to apply for grants awarded by the New York DEC, rather than burden its ratepayers to comply with the decree. The situation afforded the Town officials a “silver lining” as they have been the recipient of several grants that are allowing them to proactively address their collection system issues and the long-range reduction of I&I utilizing a combination of flow monitoring, CCTV inspection and assessment along with various forms of trenchless technology. Begun in 2018, Tonawanda is now well into a progressive, proactive, methodical and repeatable program.

Steps to Prepare

In order to qualify for the DEC grants, the Town needed to substantiate the extent of its needs, create a plan for rehabilitation and attach the needed budgetary requirements to execute. “For the purposes of receiving the grant, our goal was to acquire as much funding as needed to complete the rehabilitation of as many linear feet of sewer pipeline and number of manholes as possible for each grant period,” explains Jeff Morris, working crew chief, Town of Tonawanda Engineering. The grants are awarded yearly but the work that is encompassed as part of the individual grant takes approximately two years to complete. Tonawanda’s current grant for 2022 is for the rehabilitation of 81,000 ft of mainlines and approximately 493 manholes.

Tonawanda’s first step to receive funding was to perform flow testing in the areas they recognized as needing rehabilitation and prove to the DEC the levels of I&I and system condition. The Town submitted videos and pipeline inspection data collected from its recent years of CCTV inspections, which provided a good deal of history to prove their case. The entire process to prepare for the grant application takes an average of two years prior to it advancing to the bidding stage and project award. Because of this, the Town works far out in advance on an ongoing basis, always in the development and planning stage for the next phase of grant funding.

The Town's first grant, from 2018, was for the rehabilitation of 75,000 lf of mainline and 335 manholes. The second grant, in 2022 allows them to complete 120,000 ft of sewer mains and 493 manholes. The primary diameter sizes of the Town's lines are from 8 to 24 in. and comprised of vitrified clay pipe with manhole structures being predominantly brick-and-mortar.

The Town is unique in its ability to respond to pipe or structure repairs as they are discovered during the pre-televising process. This is a valuable commitment by the Town because it helps to efficiently use grant money for rehabilitation and not on repairs that are difficult to estimate and incorporate in a contractor's bid.

The Approach and Solutions

"We wanted to cover full neighborhoods to the extent that it was possible to make sure that all of the problems in a particular area had been corrected," explains Morris."However, as a result of inspection findings and flow monitoring, a priority approach was adopted to address those particular structures that were showing the highest probability of eminent failure or excessive I&I that was contributing to stress on the system."

Groups of main lines and their associated manholes were selected and mapped out for project packets. CIPP for the lining of the main lines was determined as the best and most cost-effective rehabilitation method. A number of methods and solutions for manhole rehabilitation were also examined.
Originally the spec had been written for an epoxy application over mortar. Before the final product was selected for the manhole rehabilitation portion of the project, several manufacturers were called to Tonawanda to perform a test manhole application and allow it to stand and be inspected several times later to determine its effectiveness and suitability.

One of these was OBIC. Its licensed installer, Advanced Rehabilitation Technologies (ART), came to Tonawanda in 2018 to install its test application and was given one of the worse structures in the system to use. The structure in question was in a section of the collection system that receives discharge from a 3M manufacturing facility and the flow can contain caustic materials at times.

Other manufacturers were given similar proving sites. After several months, all the test sites were visited and lining materials were evaluated by Tonawanda staff to ensure their choice would meet required standards.

After the test application reviews were completed, the Town determined OBIC Armor 1000 suited its needs. The Armor 1000 also offered one unique characteristic beyond passing the durability test an unusual 10-year warranty, not only on the material but also on the

installation. To track and document installation and validate warranty, as each manhole rehabilitation is completed, the installer stamps just under the lip of the manhole into the polyurethane, the manufacturers' logo and the date of project completion.

"If someone from the Town comes back to examine a manhole that may have a problem, there are no worries trying to remember when the manhole was completed or if the warranty is still in effect," explains OBIC director of business development Mike Hoffmaster. "We do this because it creates ease and also provides an added layer of confidence for the asset owner regarding their rehabilitation investment."

Prep, Prep and Prep

All of the manholes were cleaned, along with some degree of grouting and preparing of the surface, to accept the lining materials. The key component to any successful coating application is preparation process. The depth of the manholes, as well as their diameters, varied greatly.

Kenyon Pipeline Inspection (KPI), a New York-based construction company, is the general contractor for this project and was responsible for pipeline cleaning, inspection and CIPP rehabilitation. KPI chose to work with subcontractor, ART for the manhole rehabilitation since ART had performed the original demo project and were experienced with the OBIC product lines and the logical choice to perform the surface prep, grouting and application of the spray-applied manhole linings.

"We had confidence in the product but even more with ART. We knew that ART wouldn't need to have their hands held. They would go out, get the job done, execute to spec and business would be as it should be," says Kenyon Pipeline Inspection project manager Tony Doherty.

The Manhole Rehab Process

Each manhole structure was prepared and profiled with groundwater stops if needed to make it ready to receive the application of the multi-layer OBIC Armor lining system. An initial polyurea layer is spray-applied to the substrate, which is then followed by a proprietary foam followed by another layer of polyurea to complete the rehabilitation by adding a protective barrier to sewer gases and creating structural integrity. An application of lining material approximately 500 mils thick was utilized.

Any existing metal ladders and access hardware was removed before the spray application took place. Doing this ensured that all future manhole access will be performed under OSHA confined space guidelines with the appropriate harnesses and tripod safety gear.

Nonstop Progress

The sheer volume of structures needed to be rehabilitated meant that KPI and ART would work year-round regardless of weather, which can be challenging in an area like Tonawanda that is subject to freeze-thaw conditions and heavy snowfall. To keep up with the workload, ART deployed multiple crews daily, each with two crew members; each crew was able to complete two to three manholes per day, for an average of 20 to 25 structures per week.

“The team’s commitment to production and deliverables was vital, especially in the face of such adverse environmental conditions. It’s important to us that whoever we’re working with that at the end of the day, the job is going to be done to our client’s satisfaction,” says Doherty.

Results and Outcomes

Data on the current project is not yet available as that will not be discernible until post-project extensive flow monitoring is conducted. Town officials have noticed a reduction by at least 50 percent, if not more, of service calls pertaining to backups, basement flooding and related matters due to heavy rain in those neighborhoods where some work has been completed.

At the conclusion of this third grant project, the Town estimates it will have completed 15 to 20 percent of the community’s collection system rehabilitation with the goal of continuing this progress until the entire community system has been renewed through the grant process.

Photos are courtesy of Logan Clemens