VORTEX

CASE STUDY

PROJECT SNAPSHOT

PROJECT
City of Houston

CONTRACTOR
Vortex Lining Systems - Houston, Texas

PROBLEM
Major artery of the City of Houston wastewater system that runs beneath the MetroRail suffering from severe degradation and I & I.

DIMENSIONS
5,600 LF of 60-inch RCP

OVERVIEW
Implemented completely trenchless application resulting in zero rail service interruption or road closures. overview Implemented completely trenchless application resulting in zero rail service interruption or road closures.

REFERENCE
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Geopolymer Lining System Used to Structurally Rehabilitate Deteriorated 60-Inch Sewer Pipe Running Beneath Metrorail System in Houston, TX

COMPLETELY TRENCHLESS SOLUTION ALLOWED STREET AND LIGHT RAIL TO REMAIN OPERATIONAL THROUGHOUT DURATION OF PROJECT

VORTEX PRODUCTS USED

GeoKrete®

THE CHALLENGE

Maintaining a proper sanitary sewer system is critical to the daily lives of Houston residents. Just as important to this thriving city is its 23-mile light rail system. Like many cities across the U.S., Houston is under a consent decree to fix its aging sewer lines and upgrade infrastructure. The City's wastewater system is one of the largest and most complex in the nation, with over 6,000 miles of wastewater lines, 390 lift stations, and 39 wastewater treatment plants.

One such section identified was 5,700 LF of 60-inch sanitary sewer, suffering from severe inflow and infiltration (I & I), that lay beneath a section of Fulton Street running through downtown. Left unrepaired, excessive I & I not only adds to the cost of wastewater treatment, but it also leads to erosion and can cause sinkholes and collapsed roadways. As it so happens, the City's light rail system, MetroRail, also runs down the center of Fulton Street. With more than a mile of large diameter reinforced concrete pipe in need of repair, the challenge for the City was how to fix the pipe without shutting down Fulton, and more importantly, avoid the closure of MetroRail while the repairs were being done.

Since the sewer line ran beneath several intersections along Fulton Street and many of the manholes were located between the tracks, the unique challenge on this project was how to work around the light rail system.

Trenchless TECHNOLOGY 2022 REHAB PROJECT of the YEAR

CASE STUDY

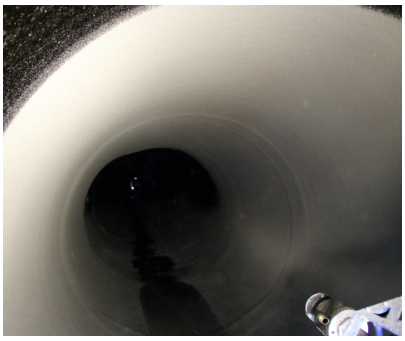
Any excavation or access requirements would have resulted in shutdown of the rail and a huge impact on the surrounding businesses and residences. It would also affect the daily commuters. With this in mind, the scope of this project needed to take into careful consideration all items associated with the rehabilitation to ensure it did not disrupt traffic and light rail service. In addition, the sewer bypass (internal and external), traffic control, manhole rehab, and restoration were critical for the solution.

Vortex was able to rehabilitate the 60″ sanitary sewer line running beneath a section of the City's light rail train tracks.

THE SOLUTION

While evaluating the best rehabilitation method for this project, the City of Houston debated between Cured-In-Place-Pipe (CIPP) lining or spin-cast geopolymer lining.
Ultimately, the City chose the Quadex Lining System® (QLS), a spin-cast geopolymer application process that utilizes GeoKrete® geopolymer. The installation contractor, Vortex Lining Systems (VLS), was chosen based on their project approach, history of success using GeoKrete, cost, and ability to handle the difficulty of the installation.

A key aspect of the project was Vortex's ability to perform a unique internal bypass to avoid any above-ground piping that would have prohibited MetroRail from operating, which would not have been possible utilizing any other method.



Example of the QLS spin-casting process, where GeoKrete can be applied to a multitude of surfaces for superior corrosion protection and fully structural rehabilitation of the affected pipe or structure.

THE INSTALLATION PROCESS

After cleaning and extensive patch and repair of the leaking sewer line's cracks, voids and offset joints, Vortex applied GeoKrete geopolymer to a 1.5″ design thickness. GeoKrete is formulated to provide excellent corrosion protection in high hydrogen sulfide environments and restore structural integrity, once fully cured.

Due to the versatility of the GeoKrete material, Vortex was able to both spray apply and spin-cast the material using application equipment.

This unique combination of experienced installers, precision equipment, finely tuned procedures, and the industry's leading geopolymer, GeoKrete®, is what made this project a success.

THE RESULTS

The 60-inch sanitary sewer pipe was fully rehabilitated and completed on time and within budget. The rehabilitation process also met all objectives and expectations of the project. Given the pipe's location beneath the MetroRail line, stakeholders were especially pleased there was no interruption to its service or closure of Fulton Street.

IMPACT

1 Provided quick, cost-effective, long-term repair solution to prevent roadway collapse

2 Busy roadway remained open during repair to avoid detours, saving time and costs to the taxpayers

3 Trenchless method, combined with the repair versatility of GeoKrete geopolymer helped client save roughly 40% vs. dig and replace