JAMES CITY SERVICE AUTHORITY
Utility Operations Division

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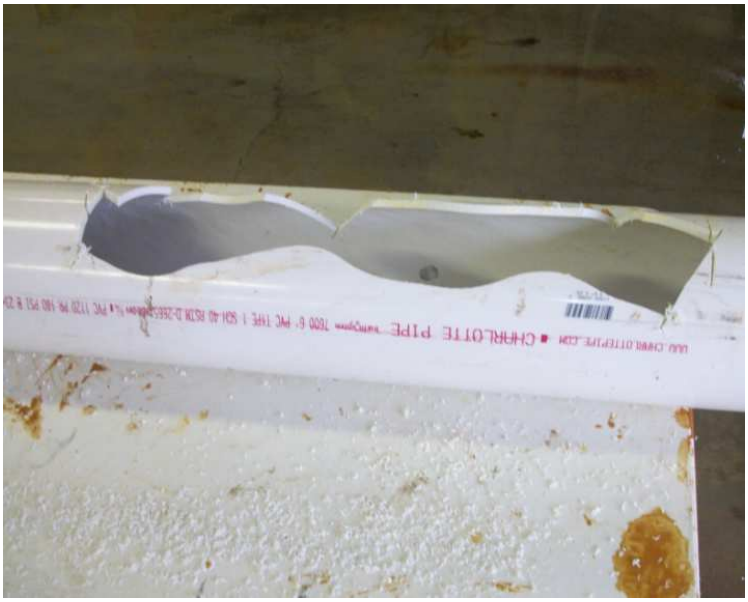
The James City Service Authority (JCSA), Williamsburg, Virginia, voluntarily joined the Hampton Roads area Consent Order to show solidarity in a continuing effort to emphasize our commitment to our customers and our environment. One primary objective of the Consent Order is the reduction of Inflow and Infiltration (I/I). Therefore, as the JCSA explored options to repair pipe defects, assurance of a watertight seal was a major consideration.

CCTV inspections and smoke testing uncovered many small damaged sewer sections where groundwater infiltration was evident. Many of these sites were in wet, environmentally sensitive areas or buried deeper than our excavation equipment capability. Either way, an open trench was not a very efficient or cost effective manner to address these small but extremely detrimentally high infiltration locations.

We turned to small sectional cured-in-place point repairs for the solution. We needed a Minimally Invasive Precision Point Repair (MIPPR) that did not require a major funding source and something that would be easily performed in-house with existing staff. The MIPPR had to be faster and less expensive than the traditional excavation repair, or we weren't interested. We tested two products for 12-months. For the sake of positive reinforcement we'll address only the product we chose, Infrastructure Repair System, Inc. Gold Liner Kit.

Infrastructure Repair System's, training team presented the certification training and supervised our field performance. After several successful installations we ventured out on our own. After installing 17 Gold sectional liners our Engineering staff suggested that we perform a test to determine if the seal between the liner and host pipe was sufficient to preclude ground water infiltration.

To wit, we developed an in-house test for our Chief Wastewater Engineer. We started with a 5-foot section of 6-inch diameter schedule 40 PVC. Then we cut a hole into the pipe which exceeded anything we had yet observed in the field. We wanted to test the best characteristics of the Gold sectional liner, the ability to refrain from blowing out into a void, shredding at sharp edges, and providing structurally effective bridging. All these defects we introduced into a perfectly good piece of Schedule 40.



We then installed a 6-inch by 4-ft Winter Gold Liner and let it cure.

After repairing the pipe we devised a test to replicate our ground water field conditions.

After ensuring the interior of the repaired section was perfectly dry, we glued caps on each end.

Then we fabricated a makeshift water column tank out of 12-inch diameter 20-foot long C900 pipe. One end of the C900 pipe received an MJ cap and the other left open. The C900 was set in the corner of the garage bay and secured vertically. The repaired and capped test section was placed into the pipe and mechanically held on the bottom of the C900 pipe. It was then filled with water to simulate our ground water conditions. True, the mean pressure was only about 7-psi on the repair, but rarely would we see much more in the field. That was November 22, 2010.

On January 3, 2011, with the Chief Engineer present, we drained the water from the C900 and removed the repaired test section. We cut it open and found it to be perfectly dry.

We examined the repaired section of pipe to see if the Gold liner had, in fact, adhered to the host pipe securely. It had. To further evaluate the liner integrity and ability to adhere we performed make-shift destructive testing.

A sensational validation of cohesion was essential. Acquiring a face shield and sledge hammer, I told everyone to stand back. Using the asphalt parking lot as my anvil I struck the host pipe, the Gold liner, and a combination of the two mediums repeatedly!

After extensive abuse with the sledge hammer, the repair never fractured through and there was only localized laminate separation while the remaining Gold liner continued to adhere to the host pipe.

The sectional liner withstood far more abuse than it would ever encounter from natural field conditions. Unlike the other point repair we were using, as a temporary stop gap repair, I now have every confidence that a repair made with the Gold Liner MIPPR restores the structural integrity of the host pipe and prevents infiltration between the host pipe and the liner.

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