Grass Valley, California, Determines Rehabilitation Effectiveness for Pre- and Post-Cured-in-Place Pipe (CIPP) and Grouted Lateral Connections

Serving a population of 12,500, the City of Grass Valley maintains a network of approximately 20 miles of sewer main. In late 2017, began an innovative Pre- and Post-CIPP assessment project to quantify rehabilitation effectiveness and a percent reduction in flow from the repair and rehabilitation using Cured-In-Place Pipe (CIPP). While Pre-CIPP Focused Electrode Leak Location (FELL) was completed in accordance with ASTM F2550-13, in late December 2017, Post-CIPP FELL inspection was completed less than seven-months later after all pre-rehabilitated sewers were relined and lateral connections were additionally sealed with acrylamide grout.

Representing a 31,426LF project, Electro Scan's scope of work was limited to the contractual testing of 5,545LF or 17.6% of the total project, scanned twice: once before CIPP and again, after CIPP lining and lateral reinstatement. Despite vigorous opposition by the CIPP lining supplier and contractor, arguing that FELL technology was based on untested science, was prone to false-positive readings especially when running water was traveling from lateral to sewer main, and inability to appropriately test water-based acrylamide grout, recognition by the State of California Environmental Protection Agency Office of Enforcement, adoption by WRc plc in the UK (i.e. developers of CCTV coding standards used by the for-profit National Association of Sewer Service Contractors, Inc.), multiple published ASTM standards, publication by the Office of Water Programs, California State University, Sacramento, of a standalone chapter on Electro Scanning as part of Volume 1, Operation and Maintenance of Wastewater Collection System, the City of Grass Valley, California, specifically included FELL as part of its testing requirements.

A total of 28 pipe segments had both a Pre- and a Post-CIPP FELL inspection completed. Additionally, three (3) pipes were FELL tested after CIPP inspection, without having the benefit of a corresponding Pre-CIPP FELL Test, representing an additional 557 feet of scanning, representing a Total Footage FELL Tested of 11,675. But since many contractors use Acrylamide mixtures to Grout defective joints and laterals, its water-based solution represents a hydrophilic condition that typically causes FELL readings to register Maximum levels while the joint, lateral, or crack is watertight. As a result, a FELL Grout Allowance may be employed to deduct any resulting defect flow from its measurement to represent a watertight connection. However, based on additional testing, FELL testing of Grouted Joints and Laterals, with active visually-observed infiltration, Electro Scan Inc.'s electric current readings actually confirm decayed or under-performance of grout. Furthermore, if high groundwater conditions do not exist in areas where laterals have been grouted, and Post-Grouted Joints or Laterals have undergone one or more periods of FREEZE/THAW or WET/DRY WEATHER events, then cities and consulting engineers are recommended to test laterals having low FELL readings using dye flood testing or pressure testing to confirm water tightness of repairs.
This paper represents a landmark study of using unbiased and unambiguous machine-intelligent technology to consistently measure Pre- and Post-CIPP lining, including the testing of lateral connections that were grouted.