

Methods for Cost-Effective Rehabilitation of Private Lateral Sewers

Millions of sewer laterals—portions of sewer networks that connect individual properties to the public sewer network—exist throughout the United States and elsewhere. As part of the wastewater collection system, it is critical that communities preserve and maintain all sections of their sewer network in a reliable, serviceable, and structurally sound condition. For many communities, their sewer system may be their most valuable asset.

Many laterals have not been maintained and as a result, allow a significant amount of inflow and infiltration (I/I) into sewer systems, which can lead to sanitary sewer overflows, increased cost of wastewater conveyance and treatment, and even damage to private property through sewer backups. Consequently, there is a compelling need to solve I/I problems of sewer laterals.

This report offers a clear understanding of the problems and relevant issues unique to the private lateral portion of the collection system network. The report explains available options for inspection, evaluation, and repair of sewer laterals. It also addresses the financial and legal issues that affect the means by which necessary work can be accomplished.

The Research Approach

This report illustrates the diversity of administrative and physical arrangements for private sewer laterals—often even within local regions. Using a web-based survey tool, 58 agencies within the United States and three foreign agencies responded to a questionnaire on their private lateral programs. The survey sampling represented a wide range of wastewater collection systems of different sizes (in terms of total length in miles, population served, and number of private laterals) and with different local conditions in



Example of the condition of laterals that were relined in Tacoma, Washington.

terms of climate, soil and groundwater conditions, age and condition of pipes.

All but one participating agency considered I/I into the wastewater collection system a problem. Despite the awareness of the problem, however, only 44.8% of the participating agencies have attempted to estimate how much private sewer laterals contribute to total I/I into their system. Out of the 26 agencies that had analyzed the issue, the contribution of private sewer laterals to total system I/I was estimated to be between 7% and 80%. The average I/I contribution of private laterals was estimated to be 24%. Issues with the private ownership of the lateral and the different definitions of the private and public boundaries influence the approach taken by each utility to address the problem.

In addition to the survey of private lateral practices, this report provides a comprehensive reference of the techniques used for inspecting, assessing and rehabilitating sewer laterals. In addition to the engineering, operations, and maintenance aspects of sustaining private lateral systems, this report addresses legal implications and financial options for implement-

BENEFITS

- Comprehensive reference with discussion of unique features of private laterals.
- Documents available techniques for inspection, assessment, and rehabilitation of sewer laterals.
- Includes case studies with results of inflow and infiltration (I/I) reduction programs involving sewer lateral rehabilitation.
- Identifies approaches for public agency financial support and encouragement of lateral repair programs.

RELATED PRODUCTS

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ing private lateral rehabilitation programs. This report includes, as appendices, case studies of lateral rehabilitation projects, detailed information on using closed-circuit TV for inspecting laterals, and technologies for lateral rehabilitation. The case studies are available alone as O2CTS5a.

What This Report Offers

The WERF report summarizes the findings of the survey and offers guidance on several key topics related to private sewer laterals:

■ **Locating, Inspecting, and Assessing Conditions of Private Sewer Laterals:** The surveyed agencies reported a range of methods for leak-testing laterals and provided examples of how they have applied these methods and collected data for condition assessments. Furthermore, the data have been used for quality control purposes and for planning ongoing programs for maintenance and rehabilitation.

■ **Quantifying I/I from Sewer Laterals:** Various methods are being used by the surveyed agencies to collect data, estimate I/I, and evaluate effectiveness of completed lateral rehabilitation. The survey responses indicated that lateral rehabilitation can yield savings in peak flow and annual volume in the range of 5% to more than 30%.

■ **Inflow Removal and Rehabilitation Methods:** Widespread and strong interest in I/I reduction has spurred the development of a variety of techniques for safe inflow source removal and lateral rehabilitation and replacement. Most municipalities reported good overall success rates with their chosen techniques. They also indicated that costs for inflow removal were generally quite low and that the quantities of inflow removed from the sewer system were usually very significant.

■ **Financing Issues:** The responsibility for covering the cost of rehabilitation falls primarily on property owners, but the benefits that accrue to wastewater system operation, the environment, and the public provide a strong incentive for agencies and local and national governments to support private lateral rehabilitation programs both administratively and with pub-

lic funds. This report describes possible approaches to garner financial support and encourage lateral repair programs, given the limits for the use of public funds on private property improvements (public purpose doctrine). Also several examples of specific programs adopted by various agencies across the country are offered.

■ **Legal and Liability Issues:** Testing and repair of private lateral sewers involves not only issues concerning access to private property, but also potential liability for personal injury or property damage resulting from such work on private property. The report explores such legal issues and provides examples of legal opinions and administrative arrangements adopted in some cities across North America.

■ **Decision Making:** After documenting and reviewing problems related to I/I, an agency typically must weigh more than one option to address such problems. Economic analysis of alternatives is very important, but other criteria that affect public health, the environment, and quality of life also must be considered. The participating agencies underscored the usefulness of pilot projects for lateral rehabilitation as a means to collect site- and system-specific data and to help select rehabilitation techniques and estimate their effectiveness.

Applying the Research Findings

The selection of approaches for rehabilitating private sewer laterals should be

based on an evaluation of system-wide problems, needs, and opportunities. When making such decisions, it is necessary to identify not only costs but benefits of the private lateral rehabilitation program, including consideration of nonfinancial or hard-to-quantify financial impacts (such as the cost of sewer backups). This research and resource document provides information on legal, financial, and regulatory frameworks upon which to build a private lateral rehabilitation program. A comprehensive approach offers the best opportunity for overall benefit to a community and can facilitate effective sequencing of projects to provide the best return-on-investment as either financial savings or reductions of sanitary sewer overflows and property damage.

This report can serve as a roadmap for assessing, analyzing, selecting methods, and developing such programs. This report assists by identifying legal and financial considerations up front which will make it easier for utilities to decide how to implement lateral rehabilitation within an overall wastewater system rehabilitation strategy. It is hoped that those who formulate policy recommendations (directors of public works agencies, city engineers, general managers, and so forth) will be able to present to politicians and to the public a sound course of action, including appropriate justification, for managing problems with sewer laterals in their communities.

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11/07