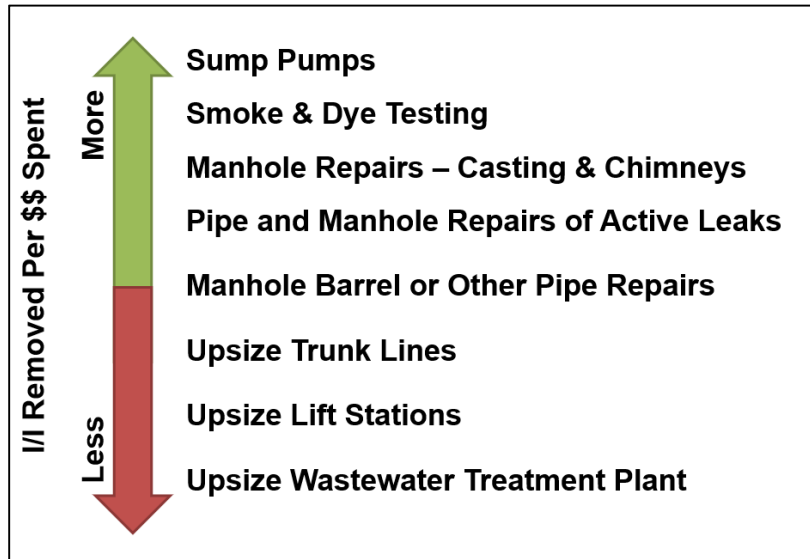


SANITARY SEWER BACKUP PLAN

This memorandum serves as a summary of the strategies identified to help reduce the frequency of the sanitary sewer backups that the City has been experiencing. These techniques have been proven successful in other communities and are items that would be a benefit for the City.

The City’s approach to reduce backups is generally recommended to involve an Inflow and Infiltration (I/I) reduction strategy. Inflow and Infiltration is clear water such as rainwater or groundwater entering the sewer system during wet weather. The approach should be to maximize cost effectiveness of removing I/I from the sanitary sewer. The graph below represents the general cost effectiveness of I/I reduction.



Each strategy item that follows includes a short description and an estimated budget cost to complete each task. Please note that some of the action items will identify potential improvements and future capital costs. These improvements will require additional investment to the City’s public infrastructure.

Sump Pump and Sewer Service Lateral Inspection Program

This program includes a City wide comprehensive sump pump inspection and sewer service lateral televising of each individual property. The goal of the program is to identify improper connections such as sump pumps and footing drains to the sanitary sewer. These connections contribute to I/I which contribute to the backups. Any deficiencies identified would be the homeowner's responsibility to correct.

Budget Amount - \$300,000 - \$350,000

Additional direct costs to homeowners for installation

Smoke Testing of Sanitary Sewer

This program consists of smoke testing of the sanitary sewer collection system to identify areas where clear water is entering the collection system. Public notices would be sent to inform the area residents of the smoke testing activities. Notices generally include periodic newspaper notices, cable TV channel notices and use of the City's website, if applicable, to keep residents informed of the smoke testing activities. A summary report would be prepared at the completion of the fieldwork to document the smoke testing results.

The smoke testing effort includes approximately 170,000 feet of sanitary sewer. Approximately 200 smoke candles will be required.

Budget Amount - \$30,000 to \$35,000

Additional Funding Required to repair deficiencies found during testing

Manhole Inspection and Inventory Program

This program consists of conducting a manhole inspection program to identify deficiencies in the sanitary sewer manholes which need correction and contribute to Inflow and Infiltration (I/I). All sanitary manholes located within the City are inspected from the street surface. Manhole entry is typically not included. Each manhole is opened and inspected to document any defects in the manhole casting, barrel sections, base, and pipe connections. Invert elevations are measured for all pipes in the manhole. The lid and interior of the structure are also digitally photographed. GPS coordinates for each manhole to sub meter accuracy are recorded. All observations of manhole condition and leakage are recorded in an Access database suitable for use with Geographic Information System (GIS) software. A summary to document manhole observation results would be completed.

Budget Amounts

\$20,000 to \$25,000 – Trunk-line/Flood-Prone Manholes

\$30,000 to \$35,000 - All Remaining Manholes

\$50,000 to \$60,000

Televising of Public Sanitary Sewer Mains

This program consists of visually inspecting the inside of the sanitary sewers by means of closed-circuit televising. The televising will identify pipe defects or cross connections that contribute to Infiltration and Inflow in the system. At the completion of the televising work, written reports and videos are prepared to document the results of the televising work. Typical recommendations include cleaning, lining, and/or pipe replacement. The budget is based on televising approximately 170,000 feet of sanitary sewer with light cleaning, heavy cleaning in approximately 20% of the sewer system, and root cutting in approximately 20% of the sewer system. Unit prices for estimating are \$1.10/L.F. for televising and light cleaning, \$1.50/L.F. for heavy cleaning, and \$0.75/L.F. for root cutting:

Budget Amount - \$275,000 to \$300,000

Additional funding required to repair deficiencies found during inspection

Repair Damaged Manhole and Remove Trees along Masten Creek

The recent rainfall event eroded Masten Creek near a sanitary sewer trunkline manhole which knocked off the manhole casting and deposited large trees near the railroad bridge. This allowed the creek water to drain directly into the sanitary sewer trunkline and poses a threat for future damage if not immediately corrected. The manhole casting should be replaced, the trees removed, and rip-rap installed around the manhole.

Budget Amount - \$15,000 to \$25,000

Develop Sanitary Sewer Bypass Pumping Plan

The bypass pumping plan would develop a protocol and identify equipment needs that will help increase the effectiveness of bypass pumping of the sanitary sewer into surface waters. The plan will include possible monitoring locations and water levels to determine when the City will begin sanitary sewer bypassing to reduce the risk and number of home backups.

Budget Amount - \$5,000 to \$10,000

Additional Funding Required for Equipment Needs

Sanitary Sewer Backflow Preventer Program

The program will review the benefits and effectiveness of backflow preventers to reduce backups to properties that are at a high risk of sanitary sewer backups. The program will include a discussion of a City led petition and waiver program for the installation.

Budget Amount - \$5,000 to \$10,000

Addition direct costs to homeowners for installation

Develop Public Education Documents

The effort will develop educational documents geared to the citizens regarding flooding, backups, bypass pumping, backflow preventers, city infrastructure, homeowner involvement, ect. These documents will be available on the City web site and social media.

Budget Amount - \$5,000 to \$10,000

Feasibility Report and Modeling for Sanitary Sewer Trunkline Upsizing

This item includes the possible upsize of the trunkline along Masten Creek. The upsizing would reduce the risk of backups and allow for future development within the City. The feasibility report would include modeling to determine the need for the upsizing

Budget Amount - \$10,000 to \$30,000

Additional Funding Required for Capital Improvements