

## SEWER CLEANING, INSPECTION AND ASSESSMENT

### 3.1 OVERVIEW

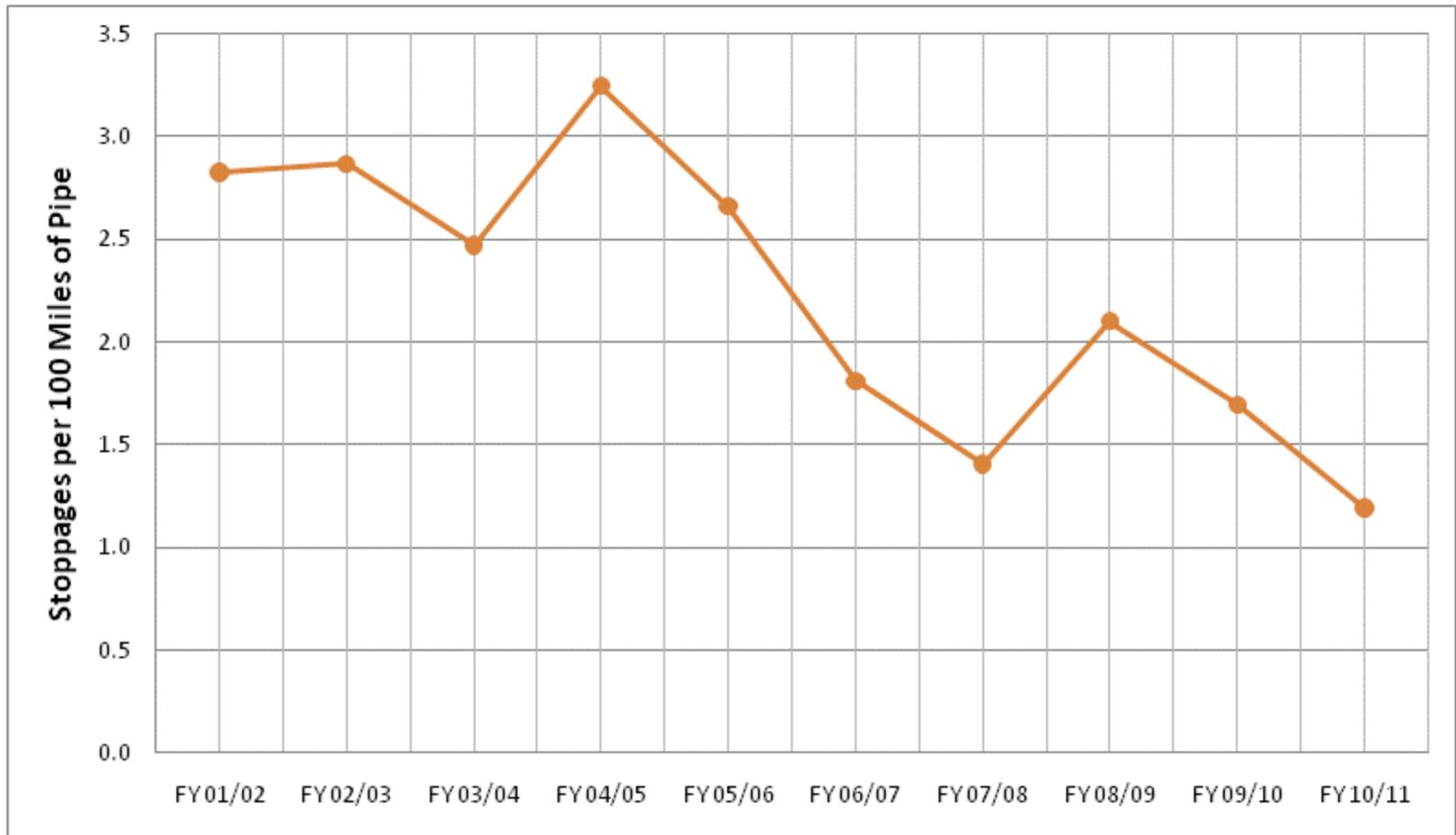
Preventive maintenance protects the investment of the sanitary sewer collection system infrastructure. Higher frequency cleaning of gravity sewers, for example, should be scheduled in areas with a history of overflows, stoppages, FOG, root issues, and odor control problems. Force mains and air release valves should be inspected and cleaned as needed to maintain pump station efficiency and prevent pumping issues that may cause back ups. Maintenance of electrical and mechanical components of the pump stations is also a critical component of preventive maintenance. Each component of the collection system should be inspected, cleaned, and televised on a schedule determined by condition and maintenance needs.

A good cleaning, inspection, and assessment program is an integral part of understanding how the City's wastewater collection system operates. It is essential for keeping the sanitary sewer system in good repair by minimizing stoppages, I/I, and other potential deficiencies that can result in poor performance and potentially SSOs.

Cleaning includes jetting (pressure cleaning) to remove grease buildup, scale, roots, and other debris in the pipe. Cleaning crews also provide root treatment at identified sewer sections to inhibit root growth in pipes and/or mechanically remove roots by using a root saw. This effort has been successful as indicated by the number of sewer stoppages noted in the collection system, which is shown graphically in Figure 3.1. The data reveals that the number of stoppages has generally decrease, while the miles of installed sewer pipe has increased.

During the routine videoing of the sanitary sewer system, crews operating the video equipment look for leaking pipe joints, obstructions or excessive deposits, as well as other pipe defects. In addition, when a leaking or defective service lateral is identified, the service address is determined and verified. In the past, when service lateral issues were identified, a letter was sent to the property owner describing the problem and requiring that the service lateral be fixed within 180 days. At the end of the 180-day period, the service lateral was then re-inspected to determine if the repairs have been made. Currently, the City is not sending letters and this policy is under consideration by City leaders.

The data that is collected is entered into the asset management system. The cleaning, inspection, and assessment program includes: sewer cleaning, CCTV inspection of piping, visual inspection and classification of the manhole structures and their flow channels, an evaluation of the condition of the pipes and manholes. Results from the assessment program are used to categorize the cleaning and inspection frequencies, and to identify any needed repairs or rehabilitation. This data is also used to develop the sewer rehabilitation portion of the CIP program.



**FIGURE 3.1 – STOPPAGES PER 100 MILES OF PIPE**  
SEWER SYSTEM MANAGEMENT PLAN  
CITY OF LINCOLN, NEBRASKA

## 3.2 RECORDS

Information from cleaning and inspections, including any findings, are entered into the asset management system, and, if needed, entered into the Capital Improvement Program (CIP). This information is also used to for long term preventive maintenance planning.

The following information relating to the cleaning and inspection tasks is collected:

- Date and location of cleaning activity.
- Specific lines cleaned.
- Equipment used.
- Identity of cleaning crew.
- Presence of root, grease, or debris.
- Problems identified or other follow up actions necessary.
- Conditional assessment of structural integrity of pipe.

## 3.3 PIPE CLEANING

The primary activity of the sewer maintenance staff is sanitary sewer line cleaning. During the line cleaning process the crews also inspect the manholes and other appurtenances. Any deficiencies are noted and entered into the asset management system.

### 3.3.1 Cleaning Frequencies

Currently, over 90 percent of the sanitary sewer system is on a six year or less cleaning frequency. The cleaning frequencies are entered in the asset management system and kept updated as the sewers are cleaned. Also located in the asset management system is a listing of priority cleaning locations that may need special attention due to a history of grease build up, roots, blockages, or other problems. Shown in Table 3.1 below is the current sewer system cleaning frequencies.

<b>Table 3.1 Current Sanitary Sewer Cleaning Frequencies SSMP Update - 2013 City of Lincoln, Nebraska</b>	
<b>Frequency</b>	<b>Percent of System</b>
More than once per year	0.4 percent
Every Year	38.4 percent
Every Two Years	51.7 percent
2 to 6 year cleaning schedule	5.6 percent
Not schedule to be cleaned	3.9 percent

### **3.3.2 SOP For Cleaning**

The City has Standard Operating Procedures (SOP's) in place for sewer cleaning activities. These SOP's are intended to be dynamic, and should be updated and revised as new information and equipment is employed. The SOP's for cleaning are located as follows:

- The Standard Operating Procedure for Jet Flushing 15-inch and Smaller Lines is located in Appendix C.
- At this time, the City contracts with specialized firms for cleaning lines that are over 15-inches in diameter.

### **3.4 PIPE AND MANHOLE INSPECTION**

Planned CCTV inspections are generally performed on a rotating 12 year schedule following the cleaning of the pipe segment. In the event of a stoppage, CCTV inspection may be used to view the cause of the stoppage. After the stoppage is removed, the line is re-inspected using the CCTV crawler to assess the condition of the pipe and to aid in determining the cause of the stoppage. In certain instances, the City may contract with specialty Contractors to televise and clean larger sewers.

All newly constructed sewer lines are required to be CCTV inspected by the City prior to final acceptance. This occurs after the line has been installed for 30 days and other inspection tests have been completed. The other tests include air, joint, deflection, and other construction acceptance and/or visual inspection tests. This information is required to ensure that the line has no construction defects and is installed per the construction plans and specifications. This process also sets the baseline for the data recorded into the asset management system.

New manholes are inspected to confirm construction methods match the construction plans and specifications. An air vacuum test is performed to measure the tightness of the manhole. Visual inspection is performed to look at the general construction and for any

infiltration of water. The manhole invert is especially scrutinized for laminar flow and ability to access the incoming and outgoing lines with maintenance and inspection equipment.

Existing manholes are inspected for structural integrity, water infiltration, invert performance, insect infestation, hydrogen sulfide presence, manhole ring and lid condition, GPS location, and surrounding vegetation. A pole camera is used during the inspection process to video the interior of the manhole and help develop the conditional assessment of the manhole. Data acquired is entered into the asset management system. Items that are in need of repair are identified and assigned to the construction crews to repair. Such repairs include, reconstructing inverts and replacing or raising riser and rings/lids. More comprehensive repairs, such as complete relining of the manhole structure, can be performed by either City crews, or contracted out.

### **3.5 ASSESSMENT**

While routine cleaning and visual inspection are used to assess the condition of manholes and surface facilities, CCTV video inspections are the primary method used to assess the condition of the sewer mains. In addition to the scheduled video inspections, observations made from routine cleaning and monitoring are also used as part of the assessment process, and may suggest when a video inspection is warranted.

The condition assessment determines and records the following data into the asset management system:

- Pipe diameter.
- Pipe material.
- Length of pipe.
- Segment identification.
- Low spots.
- Grease build-up.
- Root intrusion.
- Sediment accumulation and encrustation.
- Structural condition, including cracks and holes.
- Joint alignment and movement.
- Reverse slope.
- Obstructions.
- Protruding services.
- Service locations.
- Prior repairs.
- Deformations in line.

This information is recorded by location, noting the distance from the starting manhole. Pipe condition information derived from video inspection is used to determine both short and

long-term maintenance strategies including increased cleaning, root treatment, sewer line repair, replacement, and rehabilitation. The condition assessment also helps to establish the cleaning frequency and any root control measures needed.

### **3.5.1 SOP FOR VIDEO INSPECTION**

The City has Standard Operating Procedures (SOP's) in place for Television Inspection activities. This SOP is intended to be dynamic, and should be updated and revised as new information and equipment is employed. The SOP is located in Appendix D.