

# CHAPTER 2

## ASSESSMENT OF EXISTING PIPELINES

As sewer system networks age, municipalities are discovering the importance of proactive measures to improve performance levels of their sewer systems. Inspection and testing of sewer lines are essential to maintaining a properly functioning system.

Good inspection programs evaluating the condition of the pipe before undertaking replacement have saved municipalities millions of dollars. As VCP has been classified as non-age dependent pipe, there are many examples of pipe that are over 100-years old and in excellent condition. The only way to know is to perform a condition assessment.

Cleaning the pipe is the first step in that assessment.

### Inspection Methods

The most common methods of inspection as part of a proactive, comprehensive asset management program are:

- Low-Pressure Air Test
- CCTV (which may include LIDAR, sonar, laser profile)
- Smoke Testing
- Flow Monitoring
- Dye Testing
- Deflection Mandrel Testing (primarily used in flexible pipe systems)
- Visual Inspection (of the pipeline and associated structures)

No matter the method selected, a qualified and trained staff is critical to the efficiency and accuracy of any condition assessment program.

# Common Operations & Maintenance Issues

## Common Sewer Obstructions

Obstructions of various sorts are an unfortunate fact of life in the operations and maintenance of a sewer system, regardless of the pipe material. The three most common causes of these obstructions are root intrusion, FOG (Fats, Oils, and Grease) and debris.

### Root Intrusion

More than 90% of municipal sewer systems have reported issues due to root intrusion. The large majority of intrusions originate from private lateral connections due to vegetation seeking moisture and nutrients. Once roots find their way into a pipe, two things happen:

1. The root mass creates a screen that traps grease, sand, paper, rags, and debris. (see Figure 1)
2. An unchecked root mass can cause structural damage to the pipe and/or the joint.



**Figure 1:** Root mass which entered the pipe line from a lateral.

Root growth is year-round but generally more aggressive seasonally on a regional basis. The use of chemical root control treatment, either alone or in conjunction with hydro-mechanical cleaning techniques, may be used as part of a pipeline maintenance program to combat root growth. Due to the inert nature of VCP, any chemical root control product as well as any odor control product in the marketplace are appropriate.

## FOG (Fats, Oils & Grease)

EPA's Report to Congress on combined sewer overflows (CSOs) and sanitary sewer overflows (SSOs) identified that grease from restaurants, homes, and industrial sources are the most common cause (47%) of reported blockages. Grease solidifies, reduces sewer capacity, and blocks flow. Controlling FOG discharges helps municipalities prevent blockages that impact sanitary sewer systems.



**Figure 2:** FOG is the most common cause of pipeline blockages.

Hydro-mechanical cleaning techniques are a proven means of reducing FOG blockages.

## Debris

Unfortunately, debris makes its way into the sewers. Debris such as sand, rocks, wood, toys, and concrete have long been common problems.

Household products (including some marked 'flushable') such as baby wipes, facial wipes, feminine hygiene products, and prophylactics have become a national problem as identified causes of clogged sewers.



**Figure 3:** Construction concrete is found in many locations.

## *Inflow and Infiltration*

Inflow and Infiltration (I & I) of stormwater and groundwater into sanitary sewers can affect the capacity and operational efficiency of collection systems.

**Inflow** is surface or stormwater that can enter the collection system via:

- Gutter/Downspout Connections
- Sump Pumps
- Manhole Lids/Covers

**Infiltration** is groundwater that can enter the collection system via:

- Pipe Joints
- Manhole Structure
- Pipe Penetrations
- Service Connections



*Figure 4: Manholes can be a common source of inflow in a system.*

Excessive I & I can be a significant cause of sanitary sewer overflows (SSOs). Many utilities are investing significant resources to reduce I & I through sewer rehabilitation, separation of combined sewers and other efforts.