

Condition-Based Collection System Maintenance

Standard Operating Procedure

Background

In recent years condition-based maintenance, using acoustic assessments, has become the standard for maintaining collection systems. This maintenance model uses data provided by the Sewer Line Rapid Assessment Tool (SL-RAT) to score and prioritize the flow performance of each pipe segment. With this data, collection system managers are able to do the following:

- 1) Identify which pipes are at the highest risk of backing up and focus personnel and equipment on these pipes.
- 2) View the flow performance of the entire collection system every year.
- 3) Eliminate the effort of cleaning pipes that are already clean.
- 4) Maintain accurate documentation in a cloud-based GIS system.
- 5) Significantly reduce water usage to maintain the overall collection system.

Given these benefits, condition-based maintenance is more effective and efficient at handling collection system flow performance than the time-based maintenance models which were used in the past. This document defines the condition-based approach for wastewater collection system management.

Procedure

To implement and sustain a condition-based model for wastewater collection system maintenance, the following activities should be conducted each year.

Assessments, Conditional Cleaning, and Focused CCTV Activities

- 1) Prepare GIS field maps, so field crews can capture data via mobile data collection technologies.
- 2) Conduct field assessments on both sewer lines and manholes as follows:
 - a. Use the SL-RAT to run acoustic assessments on all lines within the collection system that are 6 inches to 12 inches in diameter.
 - b. Perform Level 1 inspections on all manholes in the collection system. Evaluate the condition of the lid, collar, riser, barrel, shelf, and trough. Also include infiltration, vermin, and other attributes as applicable within a specific region. Rate each of these attributes on a GOOD, FAIR, POOR scale and capture data in the field in GIS using mobile devices.
- 3) Using GIS technologies, combine SL-RAT and manhole inspection data. Review these findings and categorize all asset attributes as GOOD, FAIR, or POOR—including BLOCKED for sewer lines.
- 4) Clean all sewer lines marked as BLOCKED or POOR using traditional jetting techniques. As an optional additional risk reduction step, also clean lines noted as FAIR.
- 5) After cleaning, reassess the line with the SL-RAT to determine whether the line has improved to a FAIR or GOOD score. If so, no additional maintenance is required. If the line is still POOR or BLOCKED, conduct a Focused CCTV activity to diagnose the cause of the issue. Log and address issues per the findings of the Focused CCTV activity.
- 6) Review the Level 1 manhole inspection results. All manhole attributes that received a POOR rating should be resolved with standard maintenance or engineering activities.

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Trunk Line Maintenance

- 1) Maintain trunk lines following traditional time-based methods, since acoustic assessments are limited to pipes that are 12 inches and smaller. The recommended timeframe to clean and camera trunk lines is every 7 years.

Collection System CCTV

- 1) Perform annual condition-based maintenance as described above to identify high-risk lines that may affect system flow. To pinpoint other pipe issues that do not affect flow, such as in-line cracks and wall degradation, conduct CCTV activities on a rotation-based schedule. Since the life expectancy of pipes is between 60-100 years, depending on material, it is recommended that all pipes be assessed every 12 years for structural condition. Engineering and structural maintenance can then be conducted based on the CCTV findings.