

TECHNICAL SPECIFICATION

Rapid Sewer Screening Inspection

Part 1 General

This technical specification provides requirements for Service Providers to perform rapid sewer screening inspections in gravity sewers. Specifications related to equipment, experience and training, procedures, and deliverables are detailed in the following sections.

Part 2 Equipment

The Service Provider shall perform rapid sewer screening inspection using inspection equipment designed for use in operational gravity sewers. The inspection equipment shall meet the following minimum requirements:

- A. The Service Provider shall use inspection equipment using an untethered free-floating platform suitable for use in sewers with a minimum pipe diameter of 15 inches (375 mm).
- B. The Service Provider shall use inspection equipment that provides geolocation and mapping in Global Positioning System (GPS) denied environments. Required components include:
 - a. Visual Simultaneous Localization and Mapping (VSLAM) that combines visual data with inertial measurements to create a 3-dimensional map of the inspected environment, correlate it to Geographic Information System (GIS) records, and compute the inspection equipment position relative to its surrounding.
 - b. Inertial Measurement Unit (IMU) that measures acceleration and angular velocity data for motion tracking and orientation of the inspection equipment to enable geolocation, flow velocity, and flow profiling.
- C. The Service Provider shall use inspection equipment that includes features to assist in locating and retrieving the equipment such as audible and visible indicators that indicate that the equipment is near or is approaching.
- D. The Service Provider shall use portable inspection equipment that can be transported on foot to sewers in remote easement areas not accessible by vehicle.
- E. The Service Provider shall use portable inspection equipment that can be set up and deployed at sewer maintenance holes with a variety of configurations, including above grade maintenance holes that are located above floodplain elevations.
- F. The Service Provider shall use inspection equipment that includes a color video camera with a 360-degree field of view and a minimum nominal horizontal resolution of 4K, a minimum actual resolution of 3840 x 2160 pixels, and a minimum frame rate setting of 30 frames per second.

- G. The Service Provider shall use inspection equipment that includes lighting with a minimum output of 1,500 lumens to provide adequate illumination in urban sewer environments. Lighting should be modular, with the ability to add additional lighting, if needed, for larger diameter sewers.
- H. The Service Provider shall use inspection equipment with a minimum battery life of 45 minutes.
- I. In addition to the inspection equipment described above, the Service Provider shall provide all other equipment, tools, and materials required to perform inspections as outlined in these specifications including, but not limited to, confined space entry equipment and traffic control equipment.

Part 3 Experience and Training

The Service Provider must have the proper experience to perform rapid sewer screening inspection and shall meet the following minimum requirements:

- A. The Service Provider shall have at least three years of experience providing rapid sewer screening inspections.
- B. The Service Provider shall have completed at least 100 miles (160 km) of rapid sewer screening inspections.
- C. The Service Provider personnel performing geospatial analysis associated with inspection activities must have at least three years of experience working with GIS data and at least three years of experience using ESRI GIS software products.
- D. The Service Provider personnel must be professionally trained and certified to deploy, operate, and retrieve the inspection equipment.
- E. The Service Provider personnel must be professionally trained and certified in traffic control and confined space entry required to complete the scope of services.
- F. The Service Provider personnel performing detailed defect coding in accordance with Part 5 Paragraph B shall be certified to perform such work in accordance with the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP).

Part 4 Procedures

The Service Provider shall perform rapid sewer screening inspection using documented standard operating procedures that meet the following minimum requirements:

- A. Prior to inspection, the Service Provider shall review GIS records provided by the Owner or the Owner's Representative and identify target maintenance holes to deploy and retrieve the inspection equipment.

- B. Prior to inspection, the Service Provider shall perform field reconnaissance of potential maintenance holes to be used to deploy and retrieve the inspection equipment. The Service Provider shall observe and document field conditions to confirm if the target maintenance holes and surrounding work areas are accessible and safe for inspection purposes. Maintenance holes with drop connections should be avoided.
- C. Prior to inspection, the Service Provider shall communicate to the Owner or the Owner's Representative about which maintenance holes have been selected to deploy and retrieve inspection equipment.
- D. Prior to deploying inspection equipment, the Service Provider shall deploy an untethered, free-floating test probe to determine if appropriate conditions are available to effectively deploy the inspection equipment. The Service Provider shall observe and document the time required for the test probe to travel from the maintenance hole used to deploy the probe and the maintenance hole used to retrieve the probe. The Service Provider may then deploy the inspection equipment. If the test probe does not arrive at the retrieval maintenance hole, the Service Provider shall not deploy the inspection equipment.
- E. The Service Provider shall plan and execute standard deployments including multiple pipe segments from the maintenance hole where the inspection equipment is deployed to the maintenance hole where the inspection equipment is retrieved.
- F. In the event that the test probe or inspection equipment does not arrive at the retrieval manhole, the Service Provider shall notify the Owner or the Owner's Representative and shall inspect manholes located between the manhole used to deploy the equipment and the manhole used to retrieve the equipment to locate and retrieve the equipment.
- G. If the equipment is not located, the Service Provider shall install a level monitor at the maintenance hole used to deploy the inspection equipment, measuring flow depth in the sewer. The level monitor shall include blockage detection features, as well as high-depth alarming to notify the Service Provider and the Owner or Owner's Representative if backwater or surcharge conditions develop greater than a specified set point. The Service Provider shall maintain the level monitor in operation for 30 days or until the test probe or inspection equipment is located and removed, whichever occurs first.
- H. In the event that the test probe or inspection equipment is not removed at the retrieval manhole and continues downstream, the Service Provider shall notify the Owner or the Owner's Representative and shall determine the ultimate destination (pump station, wastewater treatment plant, outfall, or other structure) where the equipment might be retrieved.

Part 5 Deliverables

The Service Provider shall submit deliverables to the Owner or Owner's Representative that meet the following minimum requirements for either basic or detailed reporting as set forth in the scope of services:

A. Basic Reporting

1. The Service Provider shall provide a Site Report detailing on-site assessments performed on the deployment maintenance hole and retrieval maintenance hole for each inspection.
2. The Service Provider shall subdivide inspection video from each deployment and provide one inspection video file for each maintenance hole to maintenance hole segment within each deployment. The video shall be provided in .MP4 format and shall be distance-calibrated based on maintenance hole location data provided to the Service Provider by the Owner or Owner's Representative.
3. The Service Provider shall provide one digital report file for each maintenance hole to maintenance hole segment. The digital report shall be in .PDF format and reported observations shall be distance-calibrated based on maintenance hole location data provided to the Service Provider by the Owner or the Owner's Representative. The report shall include the project name, date and time of inspection, and the upstream and downstream maintenance hole identification numbers. Observations should include the observation type, video reference time, location reference relative to distance from the upstream maintenance hole, any related comments, and an observation image. If a test probe is detained at any location within a manhole-to-manhole segment, an observation and location of this occurrence shall be noted.
4. The Service Provider shall make inspection videos, flow profiles, and observations available in a secure, Cloud-based platform to view, download, and share.
5. The Service Provider is not required to provide PACP-certified defect code or PACP-compliant databases for basic reporting.

B. Detailed Reporting

1. The Service Provider shall provide a Site Report detailing on-site assessments performed on the deployment maintenance hole and retrieval maintenance hole for each inspection.
2. The Service Provider shall subdivide inspection video from each deployment and provide one inspection video file for each maintenance hole to maintenance hole segment within each deployment. The video shall be provided in .MP4 format and shall be distance-calibrated based on maintenance hole location data provided to the Service Provider by the Owner or Owner's Representative.

3. The Service Provider shall provide one digital report file for each maintenance hole to maintenance hole segment. The digital report shall be in .PDF format and reported observations shall be distance-calibrated based on maintenance hole location data provided to the Service Provider by the Owner or the Owner's Representative. The report shall include the project name, date and time of inspection, and the upstream and downstream maintenance hole identification numbers. Observations should include the observation type, video reference time, location reference relative to distance from the upstream maintenance hole, any related comments, and an observation image. If a test probe is detained at any location within a manhole-to-manhole segment, an observation and location of this occurrence shall be noted.
4. The Service Provider shall provide inspection results in a PACP-compliant exchange database that includes PACP defect codes as identified by a PACP-certified inspector in accordance with NASSCO PACP.