

## **CCTV INSPECTION OF SEWER LINES**

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### **PART 1 GENERAL**

#### 1.1 SECTION INCLUDES

A. CCTV Inspections

#### 1.2 RELATED SECTIONS

A. Section 02730 – Sanitary Gravity Sewer Lines

B. Section 02731 – Sanitary Gravity Sewer Line Testing

### **PART 2 EXECUTION**

#### 2.1 GENERAL

A. Perform inspection after successful Low Pressure Air Testing and Deflection Testing. Should CCTV inspection reveal line issues that require repairs, low pressure air testing of additional segments will be required.

#### 2.2 CCTV INSPECTION

A. Perform the inspection in accordance with Pipeline Assessment Certification Program (PACP).

##### B. Equipment

1. Television inspection equipment shall have an accurate footage counter that will display on the monitor and record the camera distance from the centerline of the starting manhole.
2. The camera shall be of the remotely operated pan and tilt type. The rotating camera and light head configuration shall have the capability of panning 360° with pan and tilt capability of providing a full view of the pipe to ensure complete inspection of the mainline pipe and service laterals.
3. The camera, television monitor, and other components shall be color. To ensure peak picture quality throughout all conditions encountered, the color camera shall be equipped with the necessary circuitry to allow for the remote adjustment of the optical focus iris from the power control unit at the viewing

station. A variable intensity control of the camera lights shall also be located at the viewing station.

4. Lighting and camera quality shall be suitable to allow a clear, in-focus picture for the entire inside periphery of pipelines extending at least ten (10) feet in front of the camera. In High Density Polyethylene (HDPE) or ductile iron poly-lined pipe, lighting should be sufficient enough to provide a clear view at least two (2) feet in front of the camera. The replay of the recorded video information shall be free of electrical interference and shall provide a clear stable image.
5. Camera quality shall be suitable to provide a full 360° view of the pipe during the inspection.
6. The travel speed of the camera shall be variable but uniform and shall not exceed 30 feet per minute. Any means of propelling the camera through the sewer line which would produce non-uniform or jerky movement of the camera, will not be acceptable.
7. The television system shall be capable of performing line segment inspection in increments of 400 feet with one setup.
8. Service laterals shall be inspected utilizing a CCTV inspection push camera system, capable of inspecting up to one hundred (100) feet of pipe.

#### C. Procedure

1. Prior to performing CCTV inspection activities, the Contractor shall thoroughly clean the sewer line(s) and service laterals designated to be televised.
2. All invert work, slides, shelves and inside drops must be complete prior to performing video inspection.
3. Just prior to performing the video inspection procedure, water must be introduced into the nearest upstream manhole until observed at the nearest downstream manhole. This will insure that any pipe segments with bellies are easily identified during CCTV inspection.
4. All fog shall be evacuated from the pipeline and the pipeline kept clear of any fog during the CCTV inspection process.

## 5. Main Line Inspection

- i. Perform the inspection on all mainline sections from manhole to manhole.
- ii. Should access to a particular sewer segment be difficult, and where adjacent segments require television inspection, the CCTV Contractor may be allowed to complete the inspection of multiple sewer line segments with one setup. When multiple sewer line segments are inspected utilizing one setup, the CCTV Contractor shall zero the footage counter at each subsequent sewer manhole to establish a uniform starting point for each line segment televised
- iii. The interior of the pipe shall be carefully inspected to determine the location and extent of all deficiencies. Pipe conditions that result in a question of proper installation procedures shall be noted so that these conditions can be reviewed and, if necessary, corrected before actual acceptance of the sewer system.
- iv. At all service connections, the camera shall be stopped and the pan and tilt features shall be used to obtain a clear picture. At each service lateral, the camera shall be panned to view up each lateral or point of connection. Make note of any deficiencies through the use of Data Collection Software.
- v. Prior to the beginning of each CCTV inspection, manhole identification numbers, as indicated on the record drawings, will be displayed in the title and shall become a part of the video record.
- vi. As directed by BCWS, the Developer's Engineer or his representative, the camera shall be stopped to view and analyze conditions that appear unusual or uncommon. The CCTV inspection technician shall, at all times, be able to move the camera through the lines in either direction without the loss of quality in the video presentation.

## 6. Service Lateral Inspection

- i. Perform the inspection of all service laterals from property corner cleanout to the mainline connection.

- ii. Prior to beginning each CCTV inspection, service addresses, as indicated on the record drawings, will be displayed in the title and shall become a part of the video record.

#### D. DELIVERABLES

1. Contractor shall record inspection in a PACP format and the video shall be recorded in an extra-high quality CD/DVD format. The title block shall include the following information.
  - i. Date
  - ii. Television operator's identification (Name, ID number, etc.)
  - iii. Sewer segment number. Segment numbers shall be assigned by the Engineer
  - iv. Upstream manhole number
  - v. Downstream manhole number
  - vi. Size of sewer pipe
  - vii. Pipe material and lining method
  - viii. Direction of movement of camera and direction of normal flow
  - ix. Location of service connections indicated by clock position and with counter distance in feet from beginning manhole's centerline
  - x. Location (start and end counter distances in feet from the beginning manhole's centerline) and description of obstructions, structural defects, longitudinal and/or circumferential cracking, joints including open and/or offset joints, ovality, leakage or evidence thereof, break in connections, protruding connections, mineral deposits, roots, previous repairs, deposits on pipe walls, sags, and other abnormalities with respect to the sewer's condition with counter distance in feet from the beginning manhole's centerline. Contractor shall use PACP standardized defect codes.

- xi. CCTV Contractor's log shall contain the same information.
2. CD/DVD shall visually display, at a minimum, CCTV Contractor's name, project name, date of inspection, pipe segment number, manhole numbers or lateral lot numbers. The distance between manholes shall be verified by measuring tape. If the counter distance and the taping distance differ by more than 2 feet per 100 feet, the run shall be re-televised by CCTV Contractor.
3. CD/DVD shall be maintained and delivered in a hard case, which shall display the project name, project number, date of inspection, manhole segment number(s) inspected, and camera operator's identification. No segment shall be split between two disks. A disk may have multiple segments, so long as an entire section is on one disk. Original disks of all sections will be submitted to BCWS as a part of the closeout submittals along with the respective television inspection field logs to be reviewed for completeness and soundness of construction.

#### E. ACCEPTANCE

1. CCTV Contractor/EOR shall present inspection video and inspection logs on CD/DVD disk. If the required format is not delivered as requested or is incomplete, it could result in a delay of review by BCWS and the package being rejected, thus requiring a resubmission. A continuous image in complete conformance with these specifications with a full view of the internal pipe surface is required. CCTV Contractor shall re-clean and televise any segment for which the video does not present a clear image of the internal pipe surface at all times, and/or is accompanied by an incomplete inspection log. All videos are required to be reviewed for completeness and for defects by both contractor and Engineer of Record (EOR) as this should be final copy submitted for acceptance prior to submission to BCWS. Submission to BCWS must be at least 10 days prior to scheduling a final walkthrough inspection. Any repairs identified by BCWS review shall be re-videoed and reviewed again by EOR prior to resubmission to BCWS. No final walkthrough inspections will be scheduled if BCWS is not given reasonable time for review of videos.
2. A signed letter of review shall accompany the CCTV package submission stating the EOR or firm field representative has reviewed the package and agrees with completeness and

accuracy according to approved construction plans and that no defects are noted for repair. Attach a copy of the record drawings even if preliminary for the CCTV review by BCWS. This will be used for comparison against the construction plans to rule out any discrepancies during the review.

3. Any of but not limited to the following observations shall be considered defects:
  - i. Any bellies in a joint of pipe
  - ii. Joint separations
  - iii. Offset joints
  - iv. Chips in pipe ends
  - v. Cracked or damaged pipe or evidence of the presence of an external object bearing upon the pipe (rocks, roots, etc.)
  - vi. Infiltration
  - vii. Roots
  - viii. Debris or other foreign objects inside of pipe
  - ix. Other obvious deficiencies when compared to approved plans, permits, and/or minimum standards
4. BCWS will require corrections prior to acceptance of the project.
5. The Contractor shall be notified in writing of any deficiencies revealed by the television inspection that will require repair. The Contractor shall excavate and make the necessary repairs. Upon completion of discrepancies, the line segment(s) shall be re-inspected at the Developer's/Contractor's expense. CCTV inspection video shall be submitted to BCWS for review upon completion of discrepancies.

**END OF SECTION**