

CONSTRUCTION STANDARD SPECIFICATION

SECTION 02959

TELEVISION INSPECTION

	<u>Page</u>
 <u>PART 1 - GENERAL</u>	
1.01 Summary	2
1.02 Submittals	2
 <u>PART 2 - PRODUCTS</u>	
2.01 Materials And Equipment	3
 <u>PART 3 - EXECUTION</u>	
3.01 Sewer Flow Requirements	4
3.02 Sequence Of Work	4
3.03 Inspection Requirements	5
3.04 Field Quality Control	6

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TELEVISION INSPECTION

PART 1 - GENERAL

1.01 SUMMARY

- A. Section includes internal television (TV) inspection of sewer before and after liner has been installed.
 - 1. Inspect sewer interior using color closed-circuit television (CCTV) camera, and document inspection on video with audio location and date information, video title information, and continuous tape counter. Provide hard copy of inspection logs.
 - 2. Additional TV inspections may be required at other stages of operation, to meet requirements specified in Field Quality Control article.
- B. Related Sections: Refer to the following sections for related work:
 - 1. Section 02955, "Sewer Flow Control".
 - 2. Section 02956, "Sewer Cleaning".
 - 3. Section 02957, "Sewer Pipe Lining".

1.02 SUBMITTALS

- A. Quality Assurance: Submit one example videotape of previous sewer inspection work that shows operational and structural defects in sewers, complete with audio commentary and inspection log(s). Prior to submittal, remove tab on videotape case which permits re-recording.
 - 1. Videotape and inspection logs will be reviewed to determine if quality of CCTV image is acceptable, and if defects were properly identified and documented according to Sandia National Laboratories (SNL) requirements.
 - 2. Modify equipment and/or inspection procedures to achieve report material of acceptable quality.

3. Do not commence Work prior to approval of report material quality by Sandia Delegated Representative (SDR). Upon acceptance, report material shall serve as standard for remaining Work.
- B. Inspection Logs: Unless otherwise indicated, submit inspection logs that include the following as a minimum:
1. Project title
 2. Name of Sandia National Laboratories
 3. Time of day
 4. Zone atlas map number
 5. Manhole to manhole pipe section
 6. Pipe segment length
 7. Pipe material
 8. Line size
 9. Compass direction of viewing
 10. Direction of camera's travel
 11. Pipe depth
 12. Operator name
 13. Tape counter reading at beginning and end of each manhole to manhole pipe segment.
- C. Videotapes: Submit completed videotapes after cleaning and rehabilitation. Prior to submittal, remove tab on videotape case which permits re-recording.
- D. Maintain copy of all inspection documentation (tapes, databases, and logs) for duration of Work and warranty period.

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

- A. Videotape: Two-hour, high-quality color, 1/2-inch Super VHS format magnetic tape at Standard Play (SP) speed.
1. Audio portion of composite videotape shall be sufficiently free from electrical interference and background noise to provide complete intelligibility of oral report.
 2. Store in upright position with temperature range of 45 to 80 degrees F (7 to 27 degrees C).
 3. Identify each tape with tape labels showing SNL's name, Contractor's name, and each manhole-to-manhole pipe segment of sewer line represented on tape.
- B. Television Inspection Camera(s): Equipped with rotating head, capable of 90-degree rotation from horizontal and 360-degree rotation about its centerline.
1. Minimum Camera Resolution: 400 vertical lines and 460 horizontal lines.
 2. Camera Lens: Not less than 140 degree viewing angle, with automatic or remote focus and iris controls.

- 3. Focal Distance: Adjustable through range of 6 inches (152 mm) to infinity.
 - 4. Camera(s) shall be intrinsically safe and operative in 100 percent humidity conditions.
 - 5. Lighting Intensity: Remote-controlled and adjusted to minimize reflective glare.
 - 6. Lighting and Camera Quality: Provide clear, in-focus picture of entire inside periphery of sewer.
- C. Footage Counter: Measures distance traveled by camera in sewer, accurate to plus or minus 2 feet (0.6 m) in 1,000 feet (305 m).
 - D. Video Titling: Video equipment shall include genlocking capabilities to extent that computer generated data (such as footage, date, and size) as determined by SDR, can be overlaid onto video, and be indicated on television monitor and permanently recorded on inspection videotape.

PART 3 - EXECUTION

3.01 SEWER FLOW REQUIREMENTS

- A. Do not exceed depth of flow shown in Table 1 for respective pipe sizes as measured in manhole when performing TV inspection.
- B. When depth of flow at upstream manhole of sewer line section being worked is above maximum allowable for TV inspection, reduce flow to level shown in Table 1, by plugging or blocking of flow, or by pumping and bypassing of flow as specified.

Comply with requirements of Section 02955, "Sewer Flow Control" to reduce flow.

TABLE 1
Maximum Depth of Flow for TV Inspection

Nominal Pipe Diameter	Maximum Depth of Flow
6" - 10"	20 percent of pipe diameter
12" - 24"	25 percent of pipe diameter

3.02 SEQUENCE OF WORK

Perform Work in the following sequence:

- A. Clean sewer lines and manholes in accordance with requirements of Section 02956, "Sewer Cleaning".
- B. Perform TV inspection to comply with requirements of this specification.

- C. Install sewer pipe lining in accordance with requirements of Section 02957, "Sewer Pipe Lining".
- D. Repeat TV inspection in same direction as previous inspection, after completed installation of sewer pipe lining.

3.03 INSPECTION REQUIREMENTS

- A. Access: SDR shall have access to observe monitor and other operations at all times.
- B. Videotape Commentary: Record the following information on audio track of video inspection tape: narrative of location, direction of view, manhole numbers, pipe diameter and material, date, time of inspection, and location of laterals and other key features
 - 1. Videotape shall visually display this information at beginning and end of each manhole-to-manhole pipe segment.
 - 2. Videotape between manholes shall visually display length in feet from starting point of given segment.
- C. Sewer Identification: Videotape and inspection documentation shall include sewer line and manhole identifiers shown on Drawings. After installation of liner, use upstream manhole as identifier in conjunction with distance meter.
- D. Image Perspective: Camera image shall be down center axis of pipe when camera is in motion.
 - 1. Provide 360-degree sweep of pipe interior at points of interest, to more fully document existing condition of sewer.
 - 2. Points of interest may include, but are not limited to the following: defects, encrustations, mineral deposits, debris, sediment, and any location determined not to be clean or part of proper liner installation, and defects in liner that include, but are not limited to bumps, folds, tears, and dimples.
 - 3. Cabling system employed to transport camera and transmit its signal shall not obstruct camera's view.
- E. Sewer Reach Length: Physically measure and record length of each sewer reach from centerline of its terminal manholes.
- F. Inspection Rate: Camera shall be pulled through sewer in either direction, but both inspections are to be in same direction. Maximum rate of travel shall be 30 feet (9 m) per minute when recording.

3.04 FIELD QUALITY CONTROL

- A. SDR will review videotapes and logs to ensure compliance with requirements listed in this specification, and Sections 02956, "Sewer Cleaning" and 02957, "Sewer Pipe Lining".
- B. If sewer line, in sole opinion of SDR, is not adequately clean, it shall be recleaned and CCTV-inspected by Contractor at no additional cost.
- C. If the liner, in sole opinion of SDR, has not been properly installed, it shall be reinstalled and CCTV-inspected by Contractor at no additional cost.

END OF SECTION