

CLEANING AND VIDEO INSPECTION OF SEWER PIPE**1.01 SCOPE**

This section covers the cleaning and video inspection of sewer pipelines and video processing software and equipment. The word "clean" in this section is defined as the removal of all accumulations including sludge, dirt, sand, rocks, grease, roots, and other solid or semisolid material in the pipe or manhole and on the pipe or manhole inside wall, down to the parent material.

1.02 SUBMITTALS

- 1.12.1 Each of the Contractor's crews, upon completion of their first 1000 LF, shall submit one copy of the video logs and one copy of the DVD for review and acceptance prior to continuing work.
- 1.12.2 One copy of the video logs, one copy DVD discs, and download color video and audio information to the City's server of all sewer reaches inspected shall be submitted to the City. Work will not be considered complete until these items have been received and approved by the Engineer.
- 1.12.3 Upon completion of the project, the Contractor shall deliver the video processing software and equipment purchased under this contract in good working order. Documentation for the 1 year software and equipment warrantee upon project completion shall be submitted.

1.03 EXPERIENCE

Camera Technician Experience: Each camera technician shall have a minimum of 5 years experience with at least 100,000 LF in projects televising sanitary sewer lines and commenting on observed defects.

1.04 MATERIALS

Video Processing System – The system specified herein is the same as the existing system used by the City. The Contractor can lease or purchase a unit, if the trucks are not equipped with them already.

- 1) Video Processing Software
 - (1) Field video processing software shall meet the following requirements:
 - (a) Compatible with supplied hardware
 - (b) Enforces data consistency through built-in immediate error checking
 - (c) Automatically catalogs captured images
 - (d) Captured image can be enhanced by drawing, selecting colors, and rotating the image.
 - (e) Customizable rating system
 - (f) Condition assessment is performed in real time.
 - (g) Captures both single images (JPEG) with annotations and streaming video (MPEG-4).
 - (h) Video compression and decompression in MPEG-4 (640x480). Up to 800 minutes on a standard 4.7 GB DVD.
 - (i) Provides post inspection editing. The process must be simplified by not requiring additional software. All changes are tracked.
 - (j) All cataloged images are cataloged, quickly retrievable and easily accessible.
 - (k) Ease of use.

- (i) In minimizing key strokes the program can
 - 1. Capture, name, and store images (3 key strokes)
 - 2. Log inspection, event data, restart (3 keystrokes)
 - 3. Capture live video
 - 4. Back-up data
 - (ii) Camera direction and footage readings shall be entered automatically
 - (iii) Pre-filled Uniform Data Fields
 - (l) Provides fast retrieval of images and video. Video selection by footage and thumbnail image.
 - (m) Provides ability to add, remove, or edit observation codes on video.
 - (n) Windows XP Operating System
 - (o) Program compatible with Windows 2000 and Windows XP Pro Operating System
 - (p) Compatible with all major observation code systems.
 - (q) Uses weighting factors along with the code system.
 - (r) Codes are unique codes for each observation.
 - (s) All data available as a text file and an XML file for easy import to ANY asset management system and ACCESS database.
 - (t) Static-free Imaging
 - (i) Video processing software shall be PicAx manufactured by the ICOMMM Group represented by WECO Indust. (707) 644-6661.
- (2) Office Viewing Version includes the following:
- (a) A viewer to analyze and edit images and video
 - (b) Operations simulator to train individuals to consistently evaluate defects.
 - (c) Create graphical and text reports
 - (d) Image improvement (image contract, brightness, sizing,etc)
 - (e) Easy CD/DVD Creation
 - (i) Office viewing version shall be PicAx Office manufactured by the ICOMMM Group represented by WECO Indust. (707) 644-6661.
- 2) Video Processing Equipment
- (1) Easily integrates into existing video equipment
 - (2) Compatible with Aries, CUES, and RST cameras
 - (3) Ruggedized shock-proof 4U rack mount case
 - (4) Pentium 4 processor – 3.0 GHz
 - (5) 1GB DDR SDRAM
 - (6) 3 External Bays 5x5.25” – shock mounted drive carriers
 - (7) Dual 250 GB shock resistant, hot swappable hard drives
 - (8) Drives able to withstand 320 Gs of shock
 - (9) RAID–1 continuous data backup system
 - (10)DVD/CD Burner (CD/DVD/RW/DVD+RW)
 - (11)10/100 LAN interface
 - (12)Internal footage counter interface card
 - (13)VCR Controls
 - (14)PS/2 Mouse and Keyboard Inputs
 - (15)USB 2.0 Port
 - (16)460W ATX Power Supply
 - (17)Dimensions: 19”x7”x17-1/8” (WxHxD)
 - (18)Standard ‘Plug and Play’ Installation. Portable units are available.
 - (19) Video – IN
 - (a) Analog to Digital Video Conversion Hardware
 - (b) Video Input compatibility with a major camera vendors

- (c) Footage input compatible with all major reel vendors
- (20) Video - OUT
 - (a) Analog video output to VCR, CD, and DVD with text overlay.
- (21) Video Processing Equipment shall be PicAx manufactured by the ICOMMM Group represented by WECO Indust. (707) 644-6661.

1.04 CLEANING AND VIDEO INSPECTION

1.04.01 Cleaning

Pipelines and structures shall be cleaned using a high velocity jet cleaner. The equipment shall be truck mounted for ease of operation. The equipment shall have a minimum of six hundred (600) feet of high pressure hose with a selection of two or more high velocity nozzles. Nozzles shall be capable of producing a scouring action from 15 degrees to 45 degrees in all designated line sizes. The equipment shall carry its own water tank capable of holding corrosive or caustic cleaning or sanitizing chemicals, auxiliary engines and pumps, and hydraulically driven hose reel. All controls shall be located so that the equipment can be operated above ground. Equipment shall include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream.

Roots shall be removed in the designated sections where root intrusion is a problem. Roots shall not be a reason for reverse set-ups. Special attention should be used during the cleaning operation to ensure complete removal of roots from the joints for 33"-diameter and smaller pipes and to ensure 90-95% removal of roots from the joints for 36"-diameter and larger pipes. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners.

The material resulting from the cleaning operation shall be removed at the downstream manhole of the reaches being cleaned, through the use of a filtering device. The material collected at the downstream manholes shall become the property of the Contractor. It shall be removed from the site by the Contractor in a closed container and disposed of in a legal manner. It shall not be dumped into streets, ditches, catch basins, or storm sewers. Flushing of the material from manhole reach to manhole reach is unacceptable.

Acceptance of the sewer line cleaning shall be made upon the successful completion of the video inspection and shall be to the satisfaction of the Engineer. If video inspection shows the cleaning to be unsatisfactory, the Contractor shall be required to re-clean and re-inspect the sewer main at no additional cost to the City.

1.04.02 Material Dewatering and Disposal

Contractor shall screen all the debris collected prior to analysis and disposal. Contractor shall haul and properly dispose of material at a class 3 landfill.

1.04.03 Video Inspection

Depth of flow shall not exceed twenty percent (20%) of the inside pipe diameter as measured in the manhole when performing video inspection. In the event the depth of flow of the reach being televised exceeds twenty percent (20%) of the inside pipe diameter, the Contractor shall provide the necessary flow control or reschedule the inspection for a time when such flow is reduced to permit proceeding with the work. If nighttime work is necessary, the Contractor shall obtain a "Noise Exception Permit" from the CPA Police Department.

Video equipment shall include a multi-angle television camera capable of spanning 360-degrees circumference and 270-degrees on horizontal axis to televise sewer lines 6-inch diameter or larger; the purpose of the rotating head camera is to view all service connections, upstream and downstream manhole structures, and to locate all defects, as well as questionable problem areas; focal distance shall be adjustable through a range of one (1) inch to infinity. The television camera shall be color format and specifically designed and constructed for operation in connection with sewer inspection, and for operation in sewers under 100% humidity conditions. Lighting and camera quality shall produce a clear, in-focus picture of the entire periphery of the pipe for a minimum distance of six feet. Other required equipment are television monitor, cables, power sources, lights, and other equipment necessary to do the work.

The camera shall be moved through the pipeline in either direction at a uniform rate, stopping when necessary to ensure proper documentation of the sewer's condition. In no case shall the television camera be pulled or propelled at a speed greater than thirty (30) feet per minute. The camera height shall be adjusted such that the camera lens is always centered in the pipe being inspected. The equipment shall have an accurate footage counter, which shall display on the monitor the exact distance of the camera from the centerline of the starting manhole. Unless otherwise approved by the Engineer, footage measurements shall begin at the centerline of the upstream manhole.

Video capture hardware and software shall be Pic Ax. Video shall be captured, modified, and saved directly from the camera to the Pic Ax equipment. Video inspection recordings shall be archived in DVD format and downloaded to the City's server.

The date, identification of sewer reach(es) by upstream and downstream manhole numbers, and manhole to manhole footage shall be displayed on the video data view at all times. Each recording shall be permanently labeled with the Contractor's name, date televised, project name, street name(s), identification of the sewer reach(es) inspected, and run number. If the recordings are of such poor quality that the Engineer is unable to evaluate the condition of the sewer, locate sewer service connections, or verify cleaning, the Contractor shall re-televise the sanitary sewer and provide a new recording of good quality at no cost to the City. No payment will be made for recordings that do not meet the requirements of these specifications.

Video inspection logs furnished by the Contractor shall be typed or printed as a computerized report. The Engineer will provide the log format, or a sample copy may be submitted for approval. Data of significance includes the locations of service connections, types of upstream and downstream manhole structures, and any pipe defects.

The observations from television inspections shall be considered defects and shall be consistently noted per the event code and rating file supplied by the City.

*** END OF SECTION ***