

SECTION 02732

CLEANING AND CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SEWER PIPE

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. This section covers the initial and final cleaning, and the initial and final closed circuit TV (video) inspection of sewer pipelines. 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.
- B. Supplying all labor, materials, equipment and apparatus not specifically mentioned herewith or noted on the plans, but which are incidental and necessary to complete the work specified.

1.02 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification:
- B. Standard Specifications for Public Works Construction latest Edition, (refer as the Green Book herein) Section 500-1.1.4 - Cleaning and Preliminary Inspection.
- C. Standard Specifications for Public Works Construction latest Edition (refer as the Green Book herein) Section 500-1.1.5 - Television Inspection.

1.03 JOB CONDITIONS

- A. The Contractor shall conduct operations and schedule cleanup in a manner to cause the least possible obstruction and inconvenience to traffic, pedestrians and to adjacent property owners or tenants.

1.04 SUBMITTALS

- A. The Contractor shall submit a plan for bypassing sewage around the work area and facilities where sewage flows must be interrupted to carry the work. The plan shall be reviewed by the engineer and shall be acknowledged as acceptable before any work is started.
- B. For each of the initial and final inspection, Contractor shall submit to an external hard drive containing all the videos, images, and inspection reports in Wincan V8 inspection software format with audio of all sewer reaches inspected. Work will not be considered complete until the following items have been received and approved by the City.
 - 1. Initial and final video inspection shall be in digital format using Wincan Version 8 Inspection software recorded digitally to an external drive. At the beginning of

the inspection, the information of the inspection shall be displayed in the following PACP format:

- A. Surveyed by
- B. Street
- C. Locations Code
- D. Direction of inspection
- E. Pipe material
- F. Pipe diameter
- G. Length of reach to be televised
- H. Manhole number from which the camera is traveling
- I. Manhole number to which the camera is traveling
- J. Pipe ID
- K. Inspection Time/Date

In addition, each recording shall continuously display the following information:

- A. City
 - B. Number of the manhole from which the camera is traveling
 - C. Number of the manhole to which the camera is traveling
 - D. Direction of flow (indicated by arrow)
 - E. Date of recording
 - F. Pipe diameter
 - G. Pipe material
 - H. Footage
2. The video shall be labeled with the Contractor's name, date televised, street name, identification of the sewer reach(es) inspected, and run number. The audio portion of the CCTV inspection shall be in English and intelligible in its entirety. If the CCTV inspection 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-televiser the sanitary sewer and provide a new CCTV inspection of good quality at no cost to the City. No payment will be made for CCTV inspection that does not meet the requirements of these specifications.

PART 2 - PRODUCT - NOT APPLICABLE

PART 3 - EXECUTION

3.01 INITIAL AND FINAL CLEANING OF SEWER PIPE

- A.** The Contractor shall clean sewer pipe of any obstruction and debris including roots in accordance with the "Standard Specifications for Public Works Construction latest Edition," (refer as the Green Book herein) Section 500-1.1.4 - Cleaning and Preliminary Inspection - and the following additions and added subsections.
- B.** Add the following to paragraph (b) of Section 500-1.1.4 of the Green Book to read:

High velocity hydrocleaning equipment shall have the following:

1. A minimum of 700 feet of high pressure hose.
2. A 1,000-gallon minimum water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
3. Equipment operating controls located above ground.
4. Minimum working pressure of 1,000 pounds per square inch at a 50 gpm rate.

C. Add the following subsections to Section 500-1.1.4 of the Green Book to read:

1. Cleaning Precautions

During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools which depend upon water pressure to provide their cleaning force, or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. Care shall be exercised to avoid pipe damage.

2. Root Removal

Videotapes and TV log of existing sewers, if available, will be provided upon request for general guidance only. The Contractor is responsible for all interpretations made from these logs. The omission of noting on the Drawings of the existence of roots within a sewer line shall not relieve the Contractor of the responsibility of removal of roots as part on the cleaning of the sewer at bid cost. Roots shall be removed where shown on Video Tape or revealed by the Contractor's television inspection. Special attention shall be used during the cleaning operations to assure removal of roots from the joints. Procedures may include the use of mechanical equipment such as rodding machines and bucket machines using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Chemical root treatment shall not be used by the Contractor.

3. Material Removal

All sludge, dirt, sand, rocks, grease and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section which could cause line stoppages, accumulations of sand in wet wells, or damage pumping equipment, shall not be permitted.

4. Material Disposal

All solids or semisolids resulting from the cleaning operations shall be removed from the site and disposed of at a suitable sanitary landfill site as defined by the Titles 22 and 23 of the California Administrative Code. All Materials shall be removed from the site no less often than at the end of each workday. Under no

circumstances will the Contractor be allowed to accumulate debris, etc, on the site of work beyond a single workday, except in totally enclosed containers and as approved by the Engineer.

5. Sewer Flow Control

a. General

When depth of flow in the pipe upstream of the manhole section being worked is above the maximum allowable for television inspection, joint testing and/or sealing; or when necessary to accomplish the specified sewer line replacement; the flow shall be reduced to the required level by plugging or blocking of the flow, and by pumping the flow around the section being worked.

Depth of flow shall not exceed that shown below for the respective pipe sizes as measured in the manhole when performing television inspection, joint testing and/or sealing.

Maximum Depth of Flow in Inches

Pipe Sizes in Inches	Television Inspection	Joint Testing/ Sealing
6	1.20	1.50
8	1.60	2.00
10	2.00	2.50
12	3.00	3.00
15	3.75	4.50
18	4.50	5.40
21	5.25	6.30
24	6.00	7.20
27	8.10	9.45
30	9.00	10.50
33 and up	30% of Pipe Diameter	35% of Pipe Diameter

Amount of the flow allowed in sewer line shall be in accordance with the manufacturer's recommendations and as approved by the Engineer.

Plugging, Blocking, and Pumping

When sewer flow control is required, the Contractor shall furnish, install, and operate pumps, plugs, conduits, and other equipment to divert the flow of sewage around the pipeline reach in which work is to be performed. The plug shall be provided with a tag line. The pumping system shall be of sufficient capacity to handle existing flow plus additional flow that may occur during a rainstorm. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum. Standby pumps shall be provided as required. Pumping shall be done by the Contractor in such manner as will not damage public

or private property of create a nuisance or health menace. The pumped sewage shall be in an enclosed hose or pipe and shall be reinserted into the sanitary sewer system. Sewage shall not be allowed to free flow in gutters, streets or over sidewalks, etc. Nor shall any sewage be allowed to flow into the storm inlets or conduits. After the work has been completed, flow shall be restored to normal.

D. Additional Requirement for Final Cleaning of Sewer Pipe:

The Project is ready for cleaning when the following work has been completed:

- a. All sewer mains and laterals are rehabilitated/installed, backfilled, and compacted.
- b. All structures are in place, all channeling is complete, and pipelines are accessible from structures.
- c. All other underground facilities, utility piping, and conduits are installed.
- d. Placement of aggregate base has been completed.
- e. Final air test has been completed.

Acceptance of the cleaning shall be based upon the subsequent video inspection of the line.

3.02 INITIAL AND FINAL CLOSED CIRCUIT TELEVISION (CCTV) INSPECTION OF SEWER LINE

- A.** Prior to rehabilitation of each sewer section, the Contractor shall be required to conduct a manhole to manhole Closed Circuit Television (CCTV) survey of the lines to determine the general condition of the sewer, to determine defective pipe sections for point repairs, to log the location of all house laterals and to verify location of active house laterals.
- B.** The Contractor will abide by the requirements of the "Standard Specifications for Public Works Construction latest Edition," (refer as the Green Book herein) Section 500-1.1.5 - Television Inspection - and the following additions and added subsections.
- C.** Add the following to Section 500-1.1.5 of the Green Book to read:
 1. When sewer line depth of flow at the upstream manhole of the section being televised is above the maximum allowable for television inspection, the Contractor shall reduce the flow in accordance with Subsection 500 - 1.1.4 of the Sewer Line Cleaning Specification above to permit proceeding with the television inspection.
 2. Television inspection shall be done one sewer section at a time. The section being inspected shall be isolated from the remainder of the sewer with upstream sewage flow by-passed. The camera shall be moved through the sewer section

in either direction at a uniformly slow rate of means of power cable winches at each manhole, stopping at each defect to allow adequate evaluation

3. Should the camera get stuck in the sewer, the Contractor shall be responsible for all costs involved in extracting it. Costs related to difficulties encountered during internal television inspection are incidental to the Contract and claims, therefore, will not be considered.

D. Add the following subsections to Section 500-1.1.5 of the Green Book to read:

1. Initial CCTV Inspection

- a. The Contractor is required to clean the sewers and manholes per Section 500-1.1.4 and television inspect all proposed rehabilitative pipes shown on plans.
- b. No construction work shall be started on a particular sewer unless the Engineer has had five working days to review the inspection documentation for the sewer. The method of rehabilitation/replacement of each sewer will be re-evaluated by the Engineer on the basis of the television inspection information furnished by the Contractor and the replacement/rehabilitation method will be changed if it is determined necessary or advisable. Such changes in the method replacement/rehabilitation shall not be considered substantial changes in the character of the work.
- c. As directed by the Engineer and at locations where CCTV inspection or pipe installation work is hampered by an obstruction which cannot be removed by conventional sewer cleaning equipment or by other approved internal means, spot excavations shall be performed to expose and remove the obstruction. Spot excavations shall be performed as specified elsewhere in this contract document.

E. Additional Requirement for performing Closed Circuit Television (CCTV) inspection of sewer line.

1. Contractor shall take at least one picture of all mid-to-major defects in pipe that will be in JPEG format. Each JPEG file will be named in accordance with the line and footage. One photograph shall also be taken of each lateral connection looking up into the lateral.
2. Contractor shall setup at the upstream manhole whenever possible to video inspect with the flow. The camera will move at a uniform rate at a speed no greater than 30 feet per minute. Distance of the line will be measured and recorded from the center of manhole to the center of the next manhole. The distance will be accurate within 2 feet of every 1000 linear feet inspected. If more than one manhole reach is inspected in a single run, the footage counter shall be reset to zero at the center of all intermediate manholes. The camera shall pause for a sufficient amount of time to adequately document and provide accurate distance measurements of all defects in pipe and the connections observed in the line. The camera shall rotate and look directly at each defect and look into each connection to thoroughly document the conditions and determine if the lateral is in service.

Contractor shall capture photos of any moderate and above damages or abnormal conditions.

3. The recording shall include an audio portion describing the condition of the lines with the video image. The audio portion will be sufficiently free of background noise to produce an oral report that clear and easily discernible. At the beginning of each inspection run, the audio shall identify Contractor's name, the crew member, date, time, street location, name of line, pipe size, pipe material, direction of inspection, and the pipe numbers at the beginning and end of the reach. The audio shall note during the inspection the location and condition of the pipe defects, including all cracks, breaks, cracked or misaligned joints, root intrusion, infiltration, missing pieces of pipe, corrosion, deposits, obstructions, and any other items which reflect the condition of the sewer line. The audio shall also note the location of the connections, and whether the connection is in service. All observations shall be included on the inspection report.
4. Continuous digital recordings of the inspection view as it appears on the monitor shall be stored. A digital recording will be made of the entire inspection. The video will be recorded in MPEG 4 unless prior arrangements are made between the City and Contractor.
5. In case the camera cannot pass from upstream to downstream, a reverse setup shall be attempted. In case of this type of setup, a separate MPEG file will be stored. Inspection data shall be obtained using WinCan software. This shall include data tables, observations, pictures, and video. Contractor shall use standard observation codes consistent with PACP coding. Once all inspections are complete, Contractor shall give the City of Redwood City a hard drive that details all of the captured information, and WinCan reader program that has full rights for viewing all videos, pictures, and observations.

F. Additional Requirement for Final CCTV Inspection of sewer line:

The project is ready for final video inspection when pipelines and structures have been cleaned a maximum of thirty (30) minutes before the inspection is to take place.

The following observations from television inspections shall be considered defects in the construction of new sewer pipelines and shall require correction prior to project completion:

- a. Sags greater than fifteen percent (15%) of the inside pipe diameter.
- b. Open or offset joints.
- c. Cracked or damaged pipe.
- d. Out of round pipe.
- e. Joint infiltration.
- f. Debris or other foreign objects.

g. Other obvious deficiencies.

G. Traffic Control requirement in performing Closed Circuit TV (CCTV) inspection.

1. CONTRACTOR shall adhere to the WATCH Manual for traffic control. All Contractor's trucks shall have an arrow board and beacons as well as a full set of cones, candle sticks, and "Men at Work" signs and tripods that shall be used to provide safety for both employees and the general public.

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