SECTION 33 42 00

PIPE SEWER TV INSPECTION

PART 1 - GENERAL

1.01 SCOPE

A. Work consists of furnishing all materials, labor, supervision, and equipment for the television inspection of new pipe sewers.

B. Related Work Specified Elsewhere May Include But Is Not Limited To:
   1. Sanitary Sewer Utilities
   2. Storm Drainage Utilities
   3. Storm Drainage

1.02 QUALITY ASSURANCE

A. Experience:
   1. Television inspection work shall be performed by a Contractor who is regularly engaged in work of the character required.

B. Equipment:
   1. All equipment, devices and tools required for the contract shall be owned (or leased) and operated by the TV Inspection Contractor.

1.03 SUBMITTALS

A. Before commencing work, the Contractor shall submit to the University for approval:
   1. Specific documentation, information, and references that the TV Inspection Contractor and the on-site supervisor for the work have had successful experience in similar work under similar conditions.
   2. Detailed written descriptions, including pertinent supplemental drawings, literature, tables and other material, of equipment, methods, procedures and scheduling proposed for the work.

B. A television inspection log shall be maintained during the television inspection work. This log shall be on a printed form and shall include the following:
   1. Job/work assignment number;
   2. Date of inspection;
   3. Location and identification of sewer section televised;
   4. Size and type of pipe;
   5. Length of sewer section televised;
   6. Locations of all service connections;
   7. Locations of all structural problems encountered such as cracked or broken pipe; offset or open joints; protruding service connections;
   8. Sags (including length and estimated depth);
   9. Incidence of root intrusion;
   10. Areas where further cleaning is required;

11. Recommendation of lining requirement.
12. Locations of service connections as referenced by horizontal distance from identified manhole and circumferential position with respect to pipe axes.

C. A summary report shall be submitted to the University within ten days of the conclusion of TV inspection work including copies of all television inspection logs. The report shall be neatly bound in a protective cover.
   1. DVD/CDs shall be submitted to the University within ten days of the conclusion of fieldwork.

1.04 MEASUREMENT

A. Unit of measure will be the job with no direct measure taken, or per linear foot as provided in the Schedule of Prices and the Contract.

1.05 PAYMENT

A. Payment for Pipe Sewer TV Inspection will be made at Contract price, as specified, which price and payment will include preparation of logs for all sections inspected, television equipment, and a complete DVD of each section, and all labor, materials, tools, equipment, and incidentals needed to perform television inspection as specified.

PART 2 - EQUIPMENT

2.01 TELEVISION INSPECTION EQUIPMENT

A. Television inspection equipment shall include at least the following minimum items:
   1. A color, sewer television camera, specifically designed for operation through a minimum of 2,000 feet of single conductor cable in sanitary and storm sewers.
      a. Camera outside diameter no greater than 3-inches to allow for inspection in small size pipes. Camera operating temperature range of 0 to 50 degrees C.
      b. Capable of providing 320 lines of horizontal resolution and 350 lines of vertical resolution.
      c. Solid-state image pickup device containing in excess of 250,000 picture elements (pixels).
      d. 525 scanning lines, 60 fields, 30 frames, interlaces 2:1 - NTSC Color Standard, with geometrical image distortion not exceeding two percent (picture transmission systems requiring use of R.F. suppressors and subject to local transmitter interference not acceptable).
      e. Full, true color, sharp image video bandwidths with no sacrifice or visible streaking of low frequency response; also no visible streaking of the low frequency test bars when viewing a standard EIA Test Chart.
      f. l.OV (140 IRE units) composite camera video signal at the monitor after transmission through 2,000 feet of single conductor cable.
      g. Equipped with an f/l.4 wide angle lens with optical viewing angle to 70 degrees, auto iris type to control the illumination range for an acceptable picture between 10 and 100,000 Lux, with manual override remotely controlled from the viewing station.
      h. A minimum of 1,000 linear feet of cable to transmit picture from camera to recording and viewing unit.

2. DVDs documenting all the television inspection with a ninety (90) minutes duration maximum, with "labels" indicating project address identification, date, along with voice description of sewer inspected during video recording.
3. An on-board television viewing monitor consisting of high quality, industrial grade color unit providing in excess of 500 lines of resolution.
    a. High-resolution "trinitron" type picture tube or approved equivalent, measuring a minimum of 12 inches diagonally.
    b. Include voltage compensation circuits to reduce picture distortion to less than one percent under voltage conditions varying from l05V to l20V.
    c. Housed in a steel cabinet which acts as shield to minimize effects of local magnetic fields such as transformers, coils, wraps of cable, etc. (monitors having inadequate or no protection from local magnetic fields, thereby contributing to loss of color picture purity, not acceptable).
    d. Equipped with a speaker to allow for audio playback from the DVD recording.
4. Lighting Equipment:
    a. The halogen lighting system or approved equivalent system shall be comprised of controlled-beam, reflector-sealed lamps with an automatic light compensator. The lighting system shall be capable of supplying variable light of high intensity.

B. Camera Transport:
1. Portable, manual winches or motorized mechanical equipment of indirect drive type shall be provided complete with sufficient cable or rods to permit inspection of all sewer sections specified and capable of moving camera through the sewer pipe in either direction at a uniform, slow rate.

C. Metering Device:
1. A remote reading, footage metering device(s) shall be provided such that camera location at ground level is visually displayed at all times on the television screen. Footage metering device shall be designed so that the distance recorder can be set at zero when camera is at entrance of pipe. Metering device shall have an accuracy of one percent + of actual distance between manholes. Marking of cable or similar means that require interpolation of depth of sewer, will not be permitted.
2. A measuring target in front of the television camera shall be an exact measurement reference point, and the meter reading shall show the exact location of the reference point.

D. Monitor Trailer:
1. A lighted trailer or other suitable shelter, complete with table and chairs, shall be provided for observation of the television monitor and record keeping. Trailer shall be large enough to accommodate at least three people at any time for the purpose of viewing the monitor while TV inspection is in progress.

E. Accessories:
1. Accessory items shall include barricades, ladders, pulleys, safety equipment, etc.

PART 3 - EXECUTION

3.01 TV INSPECTION

A. General
1. The interior of new pipe sewers and the interior of existing pipe sewers and building sewers shall be visually inspected as directed by means of closed circuit television in the presence of the University.
2. Inspection for all sewers shall be performed by moving the camera through the line along the axis of the pipe in either direction at a uniform slow rate by remote means, stopping at each joint or defect to allow adequate evaluation by the University. For sewers 42-inches diameter and larger, camera movement shall be on a "hand held" basis.
3. The University shall have access to the television monitor and all other operations at all times. The Contractor shall provide space for two University personnel at the same time in the trailer.
4. Picture quality and definition shall be as approved by the University. If unsatisfactory, Contractor shall remove equipment, replace it with satisfactory equipment and repeat the inspection at no additional cost to the University.
5. The Contractor shall make visual (with audio) tape recordings of each sewer inspection. Date, station (distance from manhole) and manhole identification shall be visually displayed on the videotape at all times.
6. All points of interest including all obstructions, broken pipe and other problems shall be indicated via audio during inspection.
7. Throughout the television inspection activities, the University reserves the right to alter the speed at which the camera is moved through the sewer. Should the quality of the television picture fail to provide a clear view of the entire sewer, the Contractor shall make appropriate adjustments in his monitoring equipment or discontinue work until the University agrees an acceptable picture has been obtained. Telephones or other suitable means of communication shall be set up between the two winches and the control monitor to coordinate the work.
8. Should the camera become stuck in the sewer, the Contractor will be responsible for its removal at no additional cost to the University.

B. Safety:
1. Contractor is responsible for safety of personnel and the public during Contract period. The Contractor shall provide all devices, material and equipment necessary to assure the safety and health of personnel and the public.