

SECTION 02540
SEWER CLEANING FOR
PIPE REHABILITATION /REPLACEMENT WORK

PART 1. GENERAL

1.01 SCOPE

- A. This Section covers the cleaning of sewers to remove all dirt, debris, solids, sand, grease, grit, roots, etc. from the sewers and manholes to improve pipe flow, facilitate television inspection for sewer evaluation, or as required for specified pipe rehabilitation/replacement work.

1.02 SUBMITTALS

- A. Action Submittals:
 - 1. Catalog and manufacturer's data sheets for cleaning equipment.
- B. Informational Submittals:
 - 1. List of staff, their experience, and equipment to be utilized on Project.
 - 2. Equipment manufacturer's operational manual and guidelines.
 - 3. Liquid Waste Manifest.
 - 4. Traffic control plan.

1.03 QUALITY ASSURANCE

- A. **CONTRACTOR:** Performed work successfully for at least three other projects, within the last 5 years.
- B. All equipment and devices shall be operated by experienced operators in an effort to prevent pipe damage during the cleaning process and to provide optimal cleaning of pipes.
- C. Prior to the start of any Work under this Project, **CONTRACTOR** shall submit to **OWNER** all equipment that is to be utilized in the execution of this contract. **OWNER** will hold a preconstruction conference at which the sequence of work, methods, inspection, and monitoring requirements and debris disposal shall be discussed.
- D. **CONTRACTOR**, when instructed by **OWNER**, will be required to demonstrate the performance capabilities of the cleaning equipment proposed for use on the Project. If the results obtained by the proposed sanitary sewer cleaning equipment or attachments are not satisfactory, **CONTRACTOR** shall use different equipment/attachments, as required, to meet Specifications. More than one type of equipment/attachments may be required at a location.

- E. Selection of cleaning equipment and the method for cleaning shall be based on the condition of the sanitary sewer mains at the time Work commences and will be subject to OWNER's approval.

PART 2. PRODUCTS

2.01 EQUIPMENT

- A. Equipment shall be capable of removing dirt, debris, solids, grease, rocks, sand, grit, roots, and obstructions from sanitary sewer mainlines and manholes.
- B. Sewer television equipment shall be in compliance with Section 02541, Sewer Television Inspection.
- C. High Velocity, Hydro Cleaning Equipment:
 - 1. All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation.
 - 2. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned.
 - 3. CONTRACTOR shall use in addition to conventional nozzles, a nozzle which directs the cleaning force to the bottom of the pipe for sewers 18-inch and larger.
 - 4. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and benches and produce at least 2,000 psi pressure. The gun shall be capable of producing flows from a fine spray to a solid stream.
 - 5. Equipment shall operate above ground and be a combination of high-velocity (hydro-cleaning) jet and vacuum system, truck-mounted for mobility and ease of operation.
 - 6. The hydro-cleaning equipment shall include a minimum 1,000-gallon water storage tank, auxiliary engines and pumps, and include a minimum of 600 feet of 1-1/4-inch I.D. high-pressure hose on a power driven hose reel. Pump nozzle combinations shall be capable of producing water flow rates up to 120 gpm, and a minimum of 60 gpm at a working pressure up to 2,000 psi.
 - 7. A working pressure gauge shall be used on the discharge of all high-pressure water pumps.
 - 8. The vacuum system shall consist of a minimum 6-inch suction line and equipped with a fluidizing nozzle capable of removing material from beneath water surface at depths from ground surface to the sewer invert of at least 35 feet.

- D. Mechanically Powered Cleaning Equipment:
 - 1. Bucket machines:
 - a. Shall be furnished with buckets in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drives will not be allowed.
 - 2. Power rodding machines:
 - a. Shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat-treated steel. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

- E. Root Removal Equipment:
 - 1. Use tools and accessories designed for removing roots, such as hydraulic root cutters, porcupines, or high-velocity hydro cleans. Use of equipment shall not result in damage to the host pipe.

PART 3. EXECUTION

3.01 GENERAL

- A. When sewer flow depth is greater than 25 percent, flow depth shall be decreased by plugging or bypass pumping. Bypass pumping submittals shall be in accordance with Section 02542, Sewer Flow Control.

- B. Designated sanitary sewers and manholes shall be cleaned with the specified cleaning equipment herein. The cleaning process shall remove all dirt, grease, roots, grit, sand, silt, solids, rags, debris, etc. from each sewer segment, including the manhole(s).

- C. Precautions shall be taken to protect the sanitary sewer mains and manholes from damage that might be inflicted by the use of the cleaning process or equipment. Any damage to a sewer caused by improper or careless use of cleaning equipment by CONTRACTOR shall be repaired by the CONTRACTOR at no additional cost to OWNER and to the satisfaction of OWNER.

- D. Cleaning shall also include the initial manhole wall washing by high-pressure water jet.

- E. When hydraulic or high velocity cleaning equipment is used, a suitable sand trap, weir, dam, or suction shall be constructed in the downstream manhole in such a manner that all the solids and debris are trapped for removal.

- F. CONTRACTOR shall not increase the hydraulic gradient of the sanitary sewers beyond the elevation that could cause overflow of sewage into area waterways or into structures.
- G. If water backups a lateral and enters a building or residence during cleaning, the CONTRACTOR shall notify OWNER of the occurrence. It is the CONTRACTOR's responsibility to clean any backups which occur at no additional cost to OWNER. If prior knowledge of backups is available, the CONTRACTOR shall take measures to prevent another backup from occurring (i.e., plugging the lateral) before cleaning.
- H. Cleaning shall restore pipe to a minimum of 95% of original carrying capacity. No more than 5 percent debris shall remain in existing pipe. Pipe shall be 100% of original carrying capacity (no debris) for post construction inspections.
- I. Clean using hydraulically propelled, high velocity hydro, or mechanically powered equipment supplemented with additional equipment as required based on conditions of lines at time Work commences and suitable to obtain a clean sewer line free from dirt, sand, rocks, gravel, grease, sludge, roots, and other debris.
- J. Begin cleaning at upstream end of system and proceed in downstream direction. Unless otherwise permitted by the OWNER, cleaning pipeline segments upstream of a section of pipe already cleaned will not be allowed. If entire section cannot be cleaned from upstream manhole, it will be assumed a major blockage exists. CONTRACTOR shall with the OWNER's approval, abandon effort and document what was completed to point of blockage.
- K. Notify OWNER immediately of any observed pipe failures or instances where the pipe cannot be cleaned.

3.02 HIGH-VELOCITY CLEANING

- A. CONTRACTOR shall operate the equipment so that the pressurized nozzle continues to move at all times.
- B. The pressure nozzle shall be turned off or water pressure be reduced anytime the hose is held or delayed in order to prevent damage to the line. In heavy debris the step cleaning method should be used.
- C. CONTRACTOR shall make a minimum of two passes through pipe segment.

3.03 MECHANICAL CLEANING

- A. Mechanical cleaning, in addition to normal cleaning when required by OWNER, shall be approved equipment and accessories driven by power winching devices.
- B. Approved buckets, scrappers, scooters, porcupines, kites, heavy duty brushes, metal pigs and other debris removing equipment/accessories shall be used as appropriate and necessary in the field, in conjunction with the approved power machine(s).

3.04 WATER USAGE

- A. Any and all OWNER water used by CONTRACTOR shall be from a metered supply with an approved backflow device to protect the water supply. All metered water supply shall be paid to OWNER through the regular billing system.
- B. CONTRACTOR shall be responsible for obtaining transient water meter(s) from OWNER, which shall be installed on the trucks or at fire hydrant(s). All related charges for the set-up shall be considered incidental to the cleaning of the existing sanitary sewer mains.
- C. CONTRACTOR shall be responsible for preventing contamination of the potable water system. CONTRACTOR when drawing water from a public hydrant shall use a backflow preventer or an 18-inch air gap.
- D. No fire hydrant shall be obstructed or used when there is a fire in the area.
- E. It shall be CONTRACTOR's responsibility to obtain approval to use OWNER's fire hydrants.
- F. CONTRACTOR shall remove the water meter(s)/piping etc. from all fire hydrants at the end of each working day.

3.05 REMOVAL AND DISPOSAL OF DEBRIS

- A. All materials removed from the sewer lines during cleaning operations shall be trapped and removed from the system at the downstream manhole of the section being cleaned. All materials shall be disposed of in compliance with all applicable laws and regulations and in a manner approved by OWNER.
- B. Passing of debris to a downstream manhole section will not be allowed.
- C. Any Debris, or liquid waste, sludge, etc. shall not be accumulated on site except in totally enclosed containers that are permitted by OWNER and the Tennessee Department of Environment and Conservation (TDEC) for liquid waste hauling.

- D. All solids or semi-solids resulting from the cleaning operations shall be removed from the Site at the end of each workday, hauled to and disposed of at the OWNER's dump station located at Loves Creek Wastewater Treatment Plant, unless otherwise directed by the OWNER. CONTRACTOR shall coordinate access with OWNER and receive training from KUB prior to utilizing the facility.
- E. Under no circumstances shall sewage or solids removed in the cleaning process be dumped onto streets or into ditches, catch basins, storm drains, sanitary sewer manholes, cleanouts, or dumps.

END OF SECTION