SECTION 02455

CURED-IN-PLACE LATERAL LINING

PART 1 - GENERAL

1.1 DESCRIPTION

A. Scope:

1. The work included under this section includes installing a cured-in-place liner within existing building lateral pipes (sanitary sewer service pipes), associated with the Great Neck Water Pollution Control District (GNWPCD) collection system.

2. Work specified under this Section shall include, but not be limited to: mobilization/demobilization, maintenance and protection of traffic, preparatory cleaning of the pipe; television inspection and video taping of pipe prior to liner installation; removal of obstructions in the pipe by means of conventional sewer cleaning or internal cutting devices; furnishing and installing the cured-in-place pipe liner; sealing of the liner at termination points; television inspection and video taping of pipe after installation of liner; restoration of damaged facilities; and all other work required for the complete installation of the lateral liner subject to acceptance by the GNWPCD.

1.2 QUALITY ASSURANCE

A. Experience Requirements: The cured-in-place pipe liner Contractor shall have a minimum of five (5) years of demonstrated experience in installing CIPP liner systems in municipal sanitary sewers/laterals.

1.3 SUBMITTALS

A. Shop Drawings: Submit for approval the following:

1. The Contractor shall submit to the GNWPCD for approval, shop drawings indicating liner size and thickness, equipment to be used for the installation, installation methods/procedures, and certifications for the proposed liner materials including certified test data and any other information requested by the GNWPCD.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General:

1. The cured-in-place lateral pipe liner shall be Epros Drain Flex Liner (or Drain Plus Liner 2.0) as manufactured by Trelleborg, Nu Drain as manufactured by Nu Flow Technologies, or approved equal.

2. The pipe liner shall be a flexible polyester needle fleece tube (PES-tube) with a flexible silicone or polypropylene coating. The silicone (or polypropylene) coating, which is on the exterior of the lining prior to installation, becomes the inside surface when the tube lining is turned inside out during the inversion process.

3. The polyester felt shall be fully impregnated with a two-part resin system in amounts recommended by the manufacturer. The resin shall contain no styrene. When cured the resin shall develop into a hard, impermeable pipe-within-a-pipe. All materials used to fabricate the liner shall, when cured, be chemically resistant to withstand the corrosive effects of the existing domestic sewage effluents. Resin system shall be provided by the same manufacture as the polyester felt.

4. The cured sewer pipe liner shall conform to the minimum structural standards, as listed below.

Cured Liner	Standard	Results
Tensile strength	ASTM D-638	3,000 psi
Flexural strength	ASTM D-790	4,500 psi
Flexural modulus of elasticity	ASTM D-790	250,000 psi

5. The pipe liner shall be fabricated to a size that when installed will neatly fit the internal circumference of the lateral sewer. Allowance shall be made for circumferential stretching during insertion. The liner shall be designed for the required external soil and hydrostatic pressures and for internal pressure. The thickness of the liner shall be a minimum of 3.0 mm.

6. Curing of the liner shall be accomplished by applying steam or other approved method to cure the resin into a hard impermeable lining. When cured, the hardened liner shall extend from the upstream point

of connection to the existing sewer main in the roadway in a continuous, tight fitting, watertight pipe-within-a-pipe.

7. The minimum length of the liner shall be that deemed necessary by the Contractor to effectively span the required distance of pipe, and to provide for a tight seal at the termination points. The Contractor shall be responsible to verify the existing sewer pipe lengths and diameters in the field to confirm the required materials. The pipe liner shall not protrude into the existing sewer main. Pipe liner shall terminate approximately 4 inches prior to the sewer main.

2.2 TELEVISION INSPECTION OF PIPE

A. Each lateral to be lined shall have a television inspection performed on the pipe both before and after the liner installation. The television inspection prior to the liner installation shall be performed to verify that the pipe is adequately clean, no obstructions or collapses exist and to confirm the pipe is ready for liner installation. The television inspection after the liner is installed shall be performed to verify correct installation of the liner. Any deficiencies found during the television inspection shall be immediately addressed by the Contractor.

B. All television inspections shall be performed in the presence of a GNWPCD inspector and shall be recorded. A CD containing the video files of the recorded television inspections shall be provided to the inspector after completion of the television inspection.

PART 3 - EXECUTION

3.1 MAINTENANCE OF FLOW

A. The Contractor's attention is directed to the fact that sewer lining work may be performed in existing laterals which are connected to active sanitary sewer mains, and it is necessary to maintain uninterrupted sewage flow through the existing sewer main throughout the entire construction period.

B. As noted herein, the existing laterals are connected to active sewer mains. The Contractor is responsible to ensure that no wastewater enters the existing lateral during the liner installation. Contractor shall be responsible for any damage incurred on the lining system due to back up of wastewater into the lateral during the liner installation process. No work in the existing sewer mains, including any proposed bypass systems, shall be performed without prior approval from the GNWPCD.

3.2 PREPARATORY CLEANING

A. The Contractor shall provide all labor, materials and equipment necessary for the proper and complete cleaning of the existing laterals prior to the installation of the lateral pipe liner.

B. During all lateral cleaning operations, satisfactory precautions shall be taken to protect the existing laterals and sewer mains from damage that might be inflicted by the improper use of cleaning equipment. Whenever hydraulically propelled cleaning tools which depend upon water pressure to provide their cleaning force; or tools which retard the flow of water in the sewer line; or cutting tools which are utilized for root or obstruction removal; or high velocity hydrocleaning equipment is used, precautions shall be taken to ensure that the water pressure created or tool utilized does not cause any damage or flooding to public or private property. Any sewer damaged as a result of the Contractor's cleaning operation or liner installation shall be promptly repaired by, and at the expense of the Contractor.

C. All sludge, dirt, sand, rocks, grease, roots and other solid or semi-solid material resulting from the cleaning operation shall be removed. Passing material to existing sewer mains and manholes which could cause line stoppages, accumulations of sand or damage pumping equipment shall not be permitted.

D. All solids or semi-solids resulting from the cleaning operations shall be removed from the site and properly disposed of. All materials shall be removed from the site not less often than at the end of each work day.

E. The equipment selected for cleaning shall be capable of removing dirt, grease, rocks, sand, roots and other deleterious materials and obstructions from the lateral lines. All equipment shall be as approved by the GNWPCD. The use of chemicals for sewer cleaning shall not be utilized unless otherwise approved by the GNWPCD.

3.3 INSTALLATION

A. The Contractor shall provide all labor, materials and equipment necessary to ensure constant flow through the District's existing sewer mains.

B. In order to prepare the existing lateral pipe for installation of the liner, it shall be the responsibility of the Contractor to remove all internal debris out of the existing lateral pipe as specified herein under "Preparatory Cleaning."

C. The Contractor shall designate a location where the uncured resin in the original containers and the unimpregnated liner tube will be vacuum impregnated prior to installation. The Contractor shall allow the GNWPCD to

inspect the materials and "wet out" procedure. A resin and catalyst system compatible with the requirements of this method shall be used in the quantities required to provide the required liner thickness.

D. The wet out liner tube shall be inserted to the existing lateral or other approved access by means of an inversion process and the application of air pressure sufficient to fully extend it to a point immediately upstream of the existing sewer main connection. The liner tube shall be inserted into the inversion standpipe with the impermeable silicone membrane side out. At the lower end of the inversion standpipe, the liner tube shall be turned inside out and attached to the standpipe so that a leakproof seal is created. The inversion pressure will be adjusted to be sufficient to cause the impregnated liner tube to extend the full length of the lateral and hold the tube tight to the pipe wall. The use of a lubricant is recommended. Care shall be taken during the elevated curing temperature so as not to over stress the felt fiber.

E. After inversion is completed the Contractor shall supply a suitable steam source. The equipment shall be capable of delivering steam throughout the section to uniformly raise the temperature above the temperature required to effect a cure of the resin. This temperature shall be as required by the resin catalyst system employed.

F. The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming steam supply. Another such gauge shall be placed between the impregnated liner tube and the lateral invert to determine the temperatures during cure. Steam temperature in the line during the cure period shall be as recommended by the resin manufacturer.

G. Initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appear to be hard and sound and the remote temperature sensor indicates that the temperature is of a magnitude to realize an exotherm. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the installation process during which time the required temperature conditions are maintained.

H. The Contractor shall cool the hardened liner to a temperature below 100°F before relieving the air pressure in the pipe.

I. The finished liner shall be continuous over the entire length of the installation. The liner shall be free as commercially practicable from visual defects, damage, deflection, dry spots, holes, delamination, uncured resin, and the like. There shall be no visible infiltration through the liner or from behind the liner at any point including terminations.

J. Any defects which will effect the integrity or strength of the linings shall be repaired at the Contractor's expense, in a manner acceptable to the GNWPCD.

+ + END OF SECTION + +