TOP HAT TYPE SERVICE LATERAL SEALING SYSTEM (SLSS)

PART 1 – GENERAL

1.1 THE REQUIREMENT

A. It is the intent of this portion of this "top hat" type lateral sealing specification to provide for the rehabilitation of a service lateral connection to a newly rehabilitated sanitary sewer lines, normally without excavation, by the installation of a resin-impregnated fiberglass tube SLSS installed into the existing service lateral utilizing a pressure apparatus positioned in the mainline pipe. Service lateral connections may be a combination of tees or wyes of varying angle up to and beyond 30 degrees. The SLSS resin shall be cured by ultra violet light to form the tube into a hard impermeable pipe-within-a-pipe. When cured, the SLSS should extend from the mainline through the first joint of the lateral connection in a continuous tight-fitting, watertight pipe-within-a-pipe to eliminate any visible leakage between the lateral and mainline. SLSS systems shall be compatible with the liner system installed in the main pipe. If, within the warranty period, the SLSS seals installed in the sewer system are not acceptable due to leakage or any other defects, although originally accepted, the Contractor shall repair or replace the affected portion at no cost to the City. It is understood that if the Contractor fails to do such work as required, the Contractor shall be responsible for said costs of repair or replacement.

B. For quality assurance, the manufacturer of the specific SLSS system to be used must be able to document a minimum of 15,000 successful SLSS installations in the U.S. within the past 5 years.

C. The installer must be able to document a minimum of 1,500 successful SLSS installations, of the type to be used on this project, in the U.S. within the past 5 years.

PART 2 – PRODUCTS

2.1 GENERAL CORROSION REQUIREMENTS

A. The finished SLSS product shall be fabricated from materials which when cured will be chemically resistant to withstand internal exposure to domestic sewage.

B. All constituent materials will be suitable for service in the environment intended. The final product will not deteriorate, corrode or lose structural strength that will reduce the projected product life.

C. The SLSS product shall also be compatible with the lining system utilized in the main sanitary sewer line.

2.2 SLSS MATERIALS

A. A flexible fiberglass tube shall be fabricated to a size that when installed will nearly fit the internal circumference of the conduit specified by the City. Allowance shall be made for circumferential stretching during insertion.

B. The minimum length shall be that deemed necessary by the installer to effectively scan the distance from the lateral connection at the main to the desired termination location in the service lateral pipe. The minimum length of the SLSS connection shall not be less than 4 inches and the maximum length of the SLSS shall not exceed 8 inches.

C. Unless otherwise specified, the installer shall furnish a specially designed, unsaturated polyester or vinyl ester resin, and catalyst system compatible with the SLSS ultra violet light cure process that provides cured physical strengths specified herein.

2.3 PHYSICAL PROPERTIES

A. The structural performance of the finished pipe must be adequate to accommodate all anticipated loads throughout its design life.

B. Design methods are to be derived from traditionally accepted pipe formula for various loading parameters and modes of failure. All equations will be modified to include ovality as a design parameter. The design method shall be submitted to the Engineer for approval prior to the pre-construction conference.

C. The cured SLSS shall conform to the minimum structural standards as listed below:

Final SLSS	**ASTM Standard**	**Results**
Flexural Stress	ASTM 0790	4,500 psi
Flexural Modulus of Elasticity	ASTM 0790	250,000 psi

2.4 DEVIATIONS

A. The Installer shall submit a unit price proposal for the appropriate size and angle. The deterioration of service laterals is an ongoing process. Should pre-inspection reveal that the SLSS cannot be used, the installer, upon notifying

the City's representative can dig and replace the lateral(s) or advise the City's representative it is inadvisable to rehabilitate.

PART 3 - EXECUTION

3.1 SLSS INSTALLATION

A. Resin Impregnation:

1. The resin impregnated tube shall be loaded inside a pressure apparatus. The pressure apparatus, attached to a robotic device, shall be positioned in the mainline pipe at the service connection. The robotic device, together with a television camera will be used to align the SLSS repair with the service connection opening. Air pressure, supplied to the pressure apparatus through an air hose, shall be used to invert the resin impregnated SLSS into the lateral pipe. The inversion pressure will be adjusted to fully invert the SLSS into the lateral pipe and hold the tube tight to the pipe wall. Care shall be taken during the curing process so as not to over-stress the tube.

2. The pressure apparatus shall include a bladder which will inflate in the mainline pipe, effectively sealing the SLSS repair against the service connection.

B. Curing:

1. After inversion is completed, recommended pressure is maintained on the impregnated tube for the duration of the curing process. An ultraviolet (UV) light cured resin system must be used.

2. The initial cure shall be deemed to be completed when the SLSS has been exposed to the UV light or held in place for the time period specified by the manufacturer.

C. Cool-down:

1. The Installer shall cool the hardened SLSS before relieving the pressure in the pressure apparatus. Cool-down may be accomplished by the introduction of cool air into the pressure apparatus. Care shall be taken to maintain proper pressure throughout the cure and cool-down period.

D. Finish:

1. The finished SLSS shall be free of dry spots, lifts and delaminations. The lateral SLSS shall not inhibit the closed circuit television post

video inspection of the mainline or service lateral pipes. Frayed ends of the SLSS repair shall be removed prior to acceptance.

2. During the warranty period, any defects which will affect the integrity of strength of the SLSS shall be repaired at the CONTRACTOR'S expense in a manner acceptable to the City.

3. After work is completed, the CONTRACTOR will provide the City with a video tape showing the completed work including the restored conditions.

3.2 CLEAN-UP

A. Upon acceptance of the installation work, the Installer shall reinstate the project area affected by his operations.