

## SECTION S930 - CLEANING AND LINING OF WATER MAINS

### S930-1 DESCRIPTION

Work consists of cleaning and cement-mortar lining existing buried metallic water main pipe as required in the Contract Documents and as directed by the Project Manager.

Work is to be in conformance with the requirements of Section S900 General Water Provisions and AWWA C602 Cement-Mortar Lining of Water Pipelines in Place- 4 In. and Larger.

### S930-2 MATERIALS

#### S930-2.01 Pipe and Fittings

Water main pipe and fittings shall be ductile iron in conformance with the requirements of Section S901 Water Main Pipe and Fittings.

#### S930-2.02 Thrust Restraint

Thrust restraint shall be in conformance with the requirements of Section S900 General Water Provisions.

#### S930-2.03 Sleeves and Couplings

Sleeves and couplings shall conform to the requirements of Section S906 Insertion Sleeve.

#### S930-2.04 Portland Cement

Portland cement shall conform to the requirements of ASTM C150 Standard Specification for Portland Cement, for Type I or Type II cement, or as otherwise specified by the Project Manager.

#### S930-2.05 Sand

Sand shall consist of inert granular material. The grains shall be strong, durable and uncoated. The sand shall be well graded and shall pass a No. 16 mesh screen, with not more than 5 percent passing a US Standard Sieve No. 100. (For screen and sieve sizes, refer to ASTM E11). Sand shall be clean. The total combined weight of dust, clay lumps, shale, soft or flaky particles, mica, loam, oil, alkali and other deleterious substances shall not exceed 3 percent of the total combined weight of the deleterious substances and the sand containing them. In addition, the following limitations shall apply to specific substances: The maximum percentages by weight of deleterious substances shall not exceed the following limits:

| SUBSTANCE  | MAXIMUM ALLOWABLE PERCENTAGE BY WEIGHT |
|--|--|
| Shale  | 1                                      |
| Clay Lumps   | 1                                      |
| Mica and Other Deleterious Substances Other Than Shale or Clay Lumps | 2                                      |

Sand shall not show a color value darker than the reference standard color solution prepared as required in ASTM C40 Standard Method of Test for Organic Impurities in Sands for Concrete.

### **S930-2.06 Water**

The water used shall be potable water as approved, by the Project Manager. Water shall be supplied by the City without charge as specified. Disposal of cleaning water shall be done by the Contractor so as to provide as little interference to traffic as possible. Cleaning water is to be discharged to a sanitary or combined sewer and not to the storm sewer or the ground surface. Solids shall be separated from the cleaning water and not be allowed to enter the sewer system.

### **S930-2.07 Admixtures**

To improve workability, density, and strength in the mortar, admixtures conforming to ASTM C494 may be used at the option of the Contractor, unless otherwise required by the Project Manager, provided that the ratio of admixture to portland cement does not exceed that used in the qualification tests of ASTM C494. No admixtures shall be used that would have deleterious effect on potable water flowing in the pipe after the lining has been placed.

### **S930-2.08 Bedding, Backfill and Surface Restoration**

Bedding, backfill, and surface restoration materials, and methods of placement shall conform to the requirements of Section S900 General Water Provisions, unless otherwise indicated in the Contract Documents or directed by the Project Manager.

## **S930-3 CONSTRUCTION DETAILS**

### **S930-3.01 Equipment**

The Contractor's equipment for cleaning, applying and troweling cement-mortar in the pipe and for curing the cement-mortar shall be so designed and manufactured and in a condition to permit the workers to follow the procedure and obtain the results prescribed in this specification. The City shall have the option of inspecting the Contractors' equipment for conformance to these requirements prior to award of the Contract.

All water main cleaning, lining, and investigation equipment shall be drawn from water main cleaning and lining equipment stocks that are dedicated for use only in projects involving contact with only potable water.

### **S930-3.02 Excavation**

The Contractor shall saw cut the pavement in a straight and neat fashion. The saw cut depth shall be equal to the depth of the pavement.

The excavations and removal of all materials shall be made in such a manner that the edges of the trench will be in a reasonably straight line and the width thereof at a minimum consistent with good workmanship.

The Contractor shall use care in all material removal so as not to damage any adjoining areas. All adjacent property, sidewalks and roadway sections shall be protected from damage by the Contractor for the duration of the work. The public shall be protected in the construction area for the duration of the Contract.

The Contractor shall be required to allay all dust caused by his work by means of sprinkling and covering or other suitable methods during all periods of excavation, material removal and construction.

Noise level on the construction site shall be limited to that allowed by City Ordinance and any plan to deviate from normal work hours must be approved by the Project Manager.

The provisions of NYSDOT Subsections 203-3.06 and 203-3.07 shall apply to all materials excavated under this section.

Trenches and openings made in pavements shall be protected prior to backfilling. When not in actual use for performing any of the work structurally safe steel plates shall be laid flush with the surface in order that pedestrian and vehicular traffic may be maintained. If road plates are not flush with the pavement, high performance asphalt material must be compacted around the plate perimeter as a ramp. Plates must be securely staked to the pavement. Unless approved by the Project Manager, steel road plates will not be allowed during the winter snow plowing season. Where approved for use, steel road plates shall be capable of supporting an AASHTO H20 Highway Loading, and must be countersunk into the pavement and staked to prevent movement.

### **S930-3.03 Protection of Utilities**

The Contractor will be required to give all utility companies/agencies at least 2 full working days for stakeout notice before doing any work which may interfere with the operation of such utilities. Utilities encountered during the work shall be protected and maintained in their existing locations, until provided for otherwise.

If service or utility lines not shown on the plans are encountered, excavation and grading shall be done with caution in order that these services are not disturbed until proper disposition of them is made by their Owners.

All costs for all ensuing repairs or replacement due to damage by the Contractor will be borne by the Contractor. All repair work shall be completed to the satisfaction of the Project Manager and the pertinent utility company.

All traffic detector loops that are disturbed or severed as a result of the Contractor's operations shall be replaced in conformance with the requirements of Monroe County Department of Transportation (MCDOT). Splicing of the loop detectors is not acceptable. All costs for replacement shall be borne solely by the Contractor.

All pavement markings disturbed by the Contractors' operations shall be repaired in conformance with the requirements of the Monroe County Department of Transportation. All costs for repair shall be borne solely by the Contractor.

The Contractor's plant and storage of material shall not be placed over the water lines. All necessary precautions shall be taken to prevent damage to the water lines. The Contractor shall make adequate provision for the protection of water lines from undermining or other damage which might result from action of the water discharge during the cleaning operation.

### **S930-3.04 Cleaning of Pipes**

The method for cutting the pipe must be approved by the Project Manager. Any damage to the adjacent pipe caused by the Contractor shall be repaired by the Contractor.

Locations chosen for openings shall be in the least offensive places possible and shall be approved by the Project Manager.

Where the Contractor requires additional openings into the water lines for the admission of material or equipment, the entire expense of making these openings, including excavation, cutting an opening into the water line, properly closing the opening, and backfilling shall be included in the bid price for cleaning and lining the lines.

Before any pipe cuts are made, temporary bypass pipe must be disinfected and approved for use by the Monroe County Department of Public Health Department and temporary water service connections completed. Additionally, all valve shuts must be held for a 24 hour period for testing purposes. Any exception to this must have a prior approval of the Project Manager.

Pipes shall be dewatered by the Contractor under the supervision of the Project Manager.

All valves, blow-offs, air valves and hydrants shall be operated by the Contractor as directed by the Bureau of Water, under the supervision of the Project Manager. Coordination of the work for operation of water valves shall be in conformance with Section S900 General Water Provisions. Valve operation cards shall be filled out by the Contractor under the supervision of the Project Manager. The Bureau of Water will supply the necessary cards.

After dewatering, the Contractor shall remove the remaining water from the low spots, dips and depressions in the pipe line.

The Contractor shall dewater all water main excavations required for the cleaning and lining procedure and shall maintain the water level in the excavation at least 1 foot below the invert of the water main. As an additional precaution, bulkheads or other means are to be used at the terminals of dewatering sections to prevent dirt, mud, water and debris from entering the water main.

The Contractor shall exercise the side line valves prior to beginning the cleaning operation. This work shall be performed by the Contractor under the supervision of a representative of the Bureau of Water and shall consist of locating and operating valves for appropriate mainline subsections and identifying potential leaking or inoperative valves. This evaluation shall indicate to the Contractor the general magnitude of side line valve replacement required to properly perform the work prior to mobilization of the full-scale cleaning and lining operation. This work must be performed in such a manner as to minimize customer disturbance and/or interference. Work may have to be performed nights or other off-hours as required. Work shall be coordinated with the Bureau of Water.

Equipment (pigs, scrappers, cameras, etc.) shall be disinfected by brushing with a 5 percent hypochlorite solution prior to insertion into the water main.

All rust, tubercles, deposits, loose or deteriorated remains of original coatings, projecting wooden plugs that have been inserted to make repairs, and other foreign materials shall be removed from the inside of the pipe by hydraulic cleaning, and hand cleaning, or other approved methods. The cleaned surface shall be treated as may be necessary to insure a successful application of a durable lining. Oil and grease shall be removed. Cleaning water shall be discharged to a sanitary or combined sewer and not to a storm sewer or the ground surface. Accumulations of water on the bottom of the interior of the pipe shall be removed.

The water main cleaning debris that is pushed inside the side street water mains/laterals must be removed via scouring by manipulating the respective side street water main/lateral gate valve.

The open water main ends that are left unattended shall be wrapped by a double-layered polyethylene plastic fabric and tightly tied to prevent contamination.

The Contractor shall use flushing or other appropriate methods of removing rust deposits and leave the street in a condition satisfactory to the Project Manager.

The Contractor shall remove all 16 inch and smaller main line valves prior to lining. The work for this shall be included under item S905. Cutting-in-Valve. All valves shall be replaced with new valves unless otherwise noted on the plans. All sleeves used for installation of the new valves shall be as specified under Section S930-3.13 of this specification. See detail drawings for valve installation configuration.

The Contractor will be responsible for any damage done to water valves during the cleaning process. Any damage to valves must be repaired by the Contractor to the satisfaction of the Project Manager at no cost to the Owner.

Where main line valves in vaults, larger than 16 inches are encountered, lining shall not be applied by mechanical means within 3 feet of the seat ring of the valve on either side. Lining in this area must be done by hand and must be approved by the Project Manager. Where ordered by the Project Manager, the Contractor shall allow Bureau of Water personnel access to the vault in order to make repairs on the valves.

### **S930-3.05 Cement-Mortar Lining**

Immediately prior to the lining, all foreign material, including sand and loose mortar shall be removed by flushing.

#### **A. Machine Application**

The lining shall be applied in one or more courses by a machine traveling through the pipe and distributing the mortar uniformly across the full section and long radius bends of the pipe. The mortar shall be projected against the interior surfaces without injurious rebound and with sufficient velocity to cause the mortar to be densely packed and to adhere in place. The rate of travel of the machine and the rate of mortar discharge shall be mechanically controlled to produce a smooth surface and uniform thickness of lining throughout the interior of the pipeline. The machine shall be provided with attachments for mechanically troweling the mortar. Both the application and troweling of mortar shall take place at the rear of the machine so that freshly placed and troweled mortar will not be damaged. The trowel attachment shall be such that the pressure applied to the lining will be uniform and produce a lining of uniform thickness with a smooth, finished surface, free of spiral shoulders.

Under no circumstances will lining through valves be permitted.

#### **B. Hand Mortar Work**

Where machine placed mortar is impractical, cement-mortar lining of sharp bends, specials, and areas closely adjacent to valves, together with the correcting of defective areas, shall be done by handwork.

Cement-mortar for handwork shall be of the same materials as the mortar for machine lining.

Areas shall be thoroughly cleaned of all loose and foreign material, and, if necessary, shall be moistened with water just prior to the placing of the mortar being applied by hand.

Steel finishing trowels shall be used for the hand application of cement-mortar, except at bends. The outer edges of hand troweled areas may be brushed to reduce the abutting offset.

All hand finishing work in a section of the pipe line shall be completed within 24 hours after the machine application of mortar lining to that particular section of the pipe line which has been completed. Machine application of mortar lining shall be slowed down or stopped, if necessary, to assure hand patching of defective machine-lined areas in accordance with this schedule.

#### **C. Appurtenances**

Pipe less than 24 inches in diameter. After the mortar lining has been placed, but before it takes final set, laterals and services 2 inches and smaller in diameter shall be cleared by backflushing with water wherever necessary. The backflushing shall be performed in a manner that will not damage the freshly applied lining. Unless a lateral is to be cleaned and lined, it shall not be excavated.

Pipe 24 inches and larger in diameter. Before the lining is placed, the openings in the pipeline that lead to air valves, blow-offs, manholes and other appurtenances, as well as to laterals and connections from the pipeline shall be temporarily covered or plugged with suitable devices. These devices shall be removed later without damaging the cement-mortar. When working inside the pipe is impractical, the Contractor may clear connecting pipelines by flushing. Such protection shall be inspected and approved by the Project Manager before lining begins. and shall repair to the satisfaction of the Project Manager any lining damaged in the removal of these devices. Where the pipeline has been cut to provide for admission of materials or equipment, the Contractor shall, in the area of the resulting patch, take particular care to provide a smooth lining that will firmly bond to the patch and the adjacent pipe.

#### D. Proportions

Mortar for the lining shall be composed of cement, sand and water, well-mixed and of proper consistency to obtain a dense, homogeneous lining that will adhere firmly to the pipe surface.

The proportions of cement and sand in the mortar for lining shall be one part of portland cement, to one to one and one-half parts of sand by volume, the exact proportions to be determined by the characteristics of the sand used. Admixtures, if added, shall be used in strict compliance with the manufacturer's printed recommendations.

The water content shall be the minimum quantity that produces a workable mixture, with full allowance made for moisture collecting on the interior of the pipe surfaces. Slump tests should be made periodically on freshly mixed mortar immediately before the mortar is conveyed to the lining machine. The tests shall be made in accordance with ANSI/ASTM C143. Nominal slumps of cement-mortar mixes for application of linings are based on type of feed system and pipe inside diameters as indicated in Figures 1 and 2 of ANSI/AWWA C602 Cement-Mortar Lining of Water Pipelines In Place – 4 In. and Larger.

Pre-mixing of mortar used in the lining process, shall be for a sufficient length of time to obtain maximum plasticity. The mortar shall be used promptly after mixing and in no case shall mortar which has attained its initial set be used.

#### E. Thickness of Cement-Mortar Lining

The cement-mortar lining shall be continuous, dense, and smooth, without variation in quality and of uniform thickness. The thickness shall be 3/16 to 5/16 inch for pipes 24 inches in diameter and smaller and 1/4 to 3/8 inch for pipes 30 inches in diameter and larger. No minus tolerance for thickness is allowed.

#### **S930-3.06 Water**

The City will furnish water at normal operating pressure for the hydraulic cleaning, flushing, disinfection and temporary bypass lines. The Bureau of Water does not guarantee the pressure and volume of water provided. The Contractor may need to supply a booster pump so that the pressure is adequate to perform hydraulic cleaning. Hydrant permits will be required for water used for any other purpose. They are available from the Bureau of Water's Maps and Records Office.

#### **S930-3.07 Curing**

Curing operations shall begin immediately after completion of the mortar lining and hand finishing of a section of the pipe line. This pipe shall be closed, and a moist atmosphere shall be maintained in this section of the pipe line to keep the lining damp and to prevent evaporation of water from the mortar lining.

After a section of pipe has been cement-lined, all 2 inch and smaller services shall be flushed back with water. A minimum of three hours shall elapse after completion of the lining before these flush backs are begun. All flush backs shall be performed by the Contractor using water. Air flush backs will not be permitted.

Sections of the cement-mortar-lined pipe shall be filled with water, in such a manner as not to damage the lining, as soon as possible after lining operations have been completed and the pipe has been televised or otherwise inspected by the Project Manager.. There shall be no pressure on any section until the mortar lining has been in place for at least 24 hours, except for pressure induced by variations in the grade of the pipe-line. The Contractor shall be responsible for careful curing of the mortar lining of completed sections of the pipe lines until the lining work has been accepted by the Project Manager.

The exterior surfaces of pipe exposed to sunlight shall be sprinkled with water in the daytime during the lining, finishing, and curing period.

### **S930-3.08 Surface Finish**

The mortar lining of all pipe shall be mechanically troweled, except where otherwise noted in these specifications or otherwise approved by the Project Manager. The finished surface shall be smooth and shall not have a sand finish. For pipe sizes 24 inch diameter and larger, 10 places shall be selected in straight sections of the pipe lined and troweled in each day's run. In each of the 10 places, a 12 inch straightedge shall be laid parallel to the axis of the pipe. In 9 of the 10 places, the space between the lined surface and the straightedge shall at no point be greater than 1/16 inch for smoothbore pipe in good condition and 1/8 inch for pipe with a rough or irregular interior

For locations where machine applied, untroweled linings are placed, with prior approval by the Project Manager, the finished surface shall be smooth and regular, except that it may exhibit a slightly dimpled appearance similar to the surface of an orange. Ridges or uneven buildup caused by irregularity in the travel rate of the machine shall not be allowed.

Hand-placed mortar shall have a uniform surface with smooth transitions to adjacent machine-placed linings.

### **S930-3.09 Permits**

Permits will be required by the City prior to any excavation, construction, water use, erection of barricades or any other related activity undertaken within City limits. All City permits will be granted at no cost to the prime Contractor only. Subcontractors will be required to pay the standard cost for any such permits. Permits shall be obtained at the Permit Office, Room 121B, City Hall, 30 Church Street, Rochester, New York.

The Contractor shall abide by the Industrial Code of the State of New York, Rule 753, Construction and Demolition Operations at or near Underground Facilities, and all other applicable Federal, State and Local laws.

The Contractor shall comply with all New York State Traffic Control Laws and requirements of the New York State Department of Transportation, and shall clear all work to be done in New York State right-of-way with the NYS Resident Engineer in sufficient time to avoid delays.

Shop drawings indicating specific locations of access holes and traffic control devices - including flagmen - must be submitted to the NYS Resident Engineer for approval when or before applying for the State Permit. Refer to New York State Manual for Traffic Control Devices.

All replacement materials used in the state right-of-way must conform to NYS Standard Specifications.

### **S930-3.10 Guarantee of Lining**

Every precaution shall be taken to prevent damage to the lining. Should it be damaged by fault of the Contractor, or reveal evidence of defective work or materials, at any time prior to the completion of the work or during the guarantee period, such damaged or defective portions shall be removed to the extent directed, and replaced to the satisfaction of the Project Manager. Defective lining work or material including, but not restricted to, sand pockets, voids, over sanded areas, blisters, dummy areas, excessively cracked areas, and unsatisfactory thin spots shall be removed to the pipe wall, and the area shall be repaired by hand application to the full required thickness of the mortar lining. Defective areas encompassing the full diameter of the pipe shall be replaced by machine wherever practical. The lining shall be guaranteed for a period of two years from the time of substantial completion of the Project.

### **S930-3.11 Guarantee of Coefficient**

The Contractor guarantees to restore all cleaned and cement-mortar lined water mains to the following minimum coefficient "C" in the Hazen-Williams formula, all based on nominal pipe diameters with proper allowance being made for bends and fittings in accordance with accepted practice.

| NOMINAL PIPE DIAMETER | GUARANTEED COEFFICIENT "C"<br>HAZEN-WILLIAMS FORMULA |
|-----------------------|--|
| 4 inch                | 90   |
| 6 inch                | 100  |
| 8 inch                | 110  |
| 10 inch               | 115  |
| 12 inch               | 120  |
| 14 to 20 inch         | 125  |
| Greater than 20 inch  | 130  |

After the mains under this Contract have been cleaned and cement-mortar lined and restored to service, the Bureau of Water shall perform hydraulic testing, at the City's expense, to determine the coefficient "C" in the Hazen-Williams formula.

If in any section of cleaned and lined water main, the coefficient "C" as determined by the loss of head coefficient is less than the guaranteed figure, the Contract price for payment will be decreased as follows:

For a drop of fifteen points or less below the guaranteed coefficient the Contract price shall be reduced 1 percent per point.

For a drop in excess of fifteen points below the guaranteed coefficient, the Project Manager will decide whether a further reduction in payment of 2 percent per point below fifteen points will be made or if the cement mortar lining shall be removed and the water main properly cement mortar lined at no expense to the Owner.

For the purpose of establishing the "C" coefficient of such mains where it is not practical to carry the loss-of-head test through the full extent of the cleaned and cement-mortar lined main, several sections thereof shall be tested and the weighted average coefficient "C" from tests of such portions shall be considered to be acceptable for the whole of the cleaned and cement-mortar lined main.

All tests for establishing the coefficient "C" for water mains cleaned and cement-mortar lined under this Contract shall be completed prior to final acceptance of this job.

### **S930-3.12 Inspection**

The entire procedure of applying cement-mortar lining may be subject to continuous inspection by the Project Manager, but such inspection shall not relieve the Contractor of his responsibility to furnish material and perform work in accordance with this specification. All cement-mortar lining not applied in accordance with these specifications shall be subject to rejection by the Project Manager. Lining so rejected shall be removed and replaced by the Contractor at his own expense with lining complying in all respects with these specifications.

The Project Manager shall have free access to those parts of all areas, places, or facilities that are concerned with the furnishing of material or the performance of work under this standard.

The Contractor shall furnish the Project Manager reasonable assistance, without charge, for inspection and obtaining such information as he desires with respect to the character of material used and the progress and manner of the work. The Contractor shall provide the Project Manager a 2-way radio for this purpose, which will be returned to the Contractor at the end of the Contract.

The Project Manager may collect standard test cylinder samples and test the cement-mortar for compressive strength. Cement-mortar test cylinders shall attain a minimum compressive strength of 4,500 pounds per square inch in 28 days. Pipe with cement-mortar lining that does not meet this strength requirement shall be subject to rejection.

After the cleaning operation, the Project Manager shall without delay, examine the pipe for any deep pitting, defective joints or other defects or for any evidence of leakage or infiltration which must be repaired before the lining of the water line so that the City may, at its own expense, effect repairs, and the Contractor shall not line any defective section until it has been repaired unless otherwise directed by the Project Manager.

When, in the opinion of the Contractor, the work is ready for final inspection, he shall so notify the Project Manager in writing. The Project Manager, with assistance furnished by the Contractor shall give the work a complete and thorough inspection in person or by a designated representative. Before final payment is made, any defects or omissions in the work performed which are noted in this inspection must be corrected to the satisfaction of the Project Manager without additional compensation to the Contractor.

### **S930-3.13 Restoring Pipe to Service**

Upon completion of the cleaning and cement lining, portions of pipelines removed in connection with the work shall be replaced by the Contractor in conformance with Section S906 – Insertion Sleeve. The interior of all water main pipe and fittings not receiving 24 hour chlorine disinfection contact time must be spray or swab disinfected with a 1 to 5 percent solution of chlorine no more than 30 minutes prior to installation. The interior and exterior of cut ends of existing pipe shall also be cleaned and disinfected.

There shall be no restrictions to any lateral or service pipe, unless otherwise approved by the Project Manager, as a result of the placing of the lining and all other work in this Contract.

Any and all thrust blocks damaged, disturbed or removed shall be replaced in accordance with Section S900 - General Water Provisions. The cost of repairing or replacing thrust blocks shall be borne by the Contractor.

Before backfilling excavations where pipe and appurtenances were removed and replaced, the water main shall be filled with potable water furnished by the City and installation tested for leaks under line pressure in the presence of the Project Manager. Before the line is placed in service following any cleaning or lining operation, the Contractor shall thoroughly flush the main and disinfect it using the continuous feed method in accordance with Section S900 General Water Provisions, the Monroe County Department of Public Health and the Contract Documents. The main shall be flushed by operating the gate valves on each lateral side street water main.

The water main shall not be placed in service until after the Monroe County Department of Public Health has collected and tested water samples and test results indicate that the samples are bacteriologically potable and authorization has been granted by the Project Manager.

### **S930-3.14 Bedding and Backfill**

Pipe bedding and cover shall be sand, and shall extend to 12 inches minimum on each side of the pipe, 6 inches below the bottom of the pipe, and 12 inches above the top of the pipe. All pipe bedding and cover shall be compacted according to the requirements of Section S203 Excavation and Embankment. Bedding shall provide a solid bearing through the entire pipe length. Timber blocking shall not be used without the permission of the Project Manager. Timber blocking, if allowed in the work, shall be removed prior to trench backfilling. Trenches and excavations shall be restored in accordance with the Standard Detail Drawings.

Backfill shall be placed according to the requirements of NYSDOT Section 203-3.15 with the following modifications:

- A. Lift thickness of select granular backfill shall not exceed 8 inches.
- B. Minimum density for all backfill materials shall be 95 percent of Standard Proctor Maximum Density.

The Contractor is required to strictly adhere to this pavement and compaction requirement.

The Contractor shall use select granular backfill (water) for backfill in areas outside of pavement. The backfill shall conform to the requirements of Section S203 Excavation and Backfill.

### **S930-3.15 Pavement Restoration**

After completion of the work, the Contractor shall reconstruct foundation and pavement courses required to replace similar foundation and surface courses removed and/or disturbed during the work of this Contract. Access openings shall be restored to their original condition within 10 working days after completion of cleaning and lining in that particular area.

Pavement restoration shall be performed in accordance with Standard Detail Drawings, or as shown on the plans, the cost of which is included in the unit price bid for this work. The seam cap material for asphalt pavement joints shall be in accordance with NYSDOT, material designation 702-0700.

All saw cuts in pavement shall be saw cut to a minimum depth of 6 inches or the actual thickness of the pavement (whichever is greater) so that none of the adjoining pavement is disturbed. The saw cuts shall be straight and clean and outside of the former trench wall.

The surface paving shall be removed an additional distance of not less than 6 inches around the entire perimeter of the excavation in order to provide a bond on the original base.

After the satisfactory completion of the required cleaning and lining, and in accordance with the specification and as directed by the Project Manager, the Contractor shall be required to clean and sweep the street and other work areas of all debris, unused materials and equipment. All debris to be removed as specified herein shall be transported and disposed of at locations secured by the Contractor. The disposal sites must be approved by the Project Manager.

The Contractor shall have a local representative available during the guarantee period to fulfill the obligations set forth under the guarantees.

### **S930-4 METHOD OF MEASUREMENT**

The quantity to be measured for payment shall be the number of linear feet of water main pipe cleaned and lined, as measured from end to end of the cleaned and lined water main pipe, without deductions for valves, bends, branches, or other special fittings in the sections in which the lining has been placed.

### **S930-5 BASIS OF PAYMENT**

The unit price bid shall include the cost of: coordination of work with all agencies/utilities; obtaining all approvals and permits; exercising valves, blow-offs, hydrants; mechanically scrapping and cleaning water main; furnishing and installing cement-mortar lining; couplings; sleeves; pipe; cutting and gaining access to the pipe; removal and reinstallation of known water main obstructions; restoration of pipe to original capacity; leak testing the main; disinfection; bacteriological sampling and associated fees; saw cutting; excavation; rock excavation; removal and disposal of excavated material; bedding; backfill; surface restoration; pavement restoration; and furnishing all labor, material and equipment necessary to complete the work.

Any costs associated with restoring water service to plugged services shall be included in this item.

The cost for replacing all existing mainline and leaking side branch valves with new resilient seat gate valves shall be paid under the appropriate item in Section S905 Cutting-In Valve With Valve Box and Sleeve(s).

The cost for removing and reinstalling existing valves in vaults or where specified, shall be included in the unit price bid for this item, unless otherwise indicated on the plans.

Removal and reinstallation of additional water main obstructions that are encountered and are not shown on the plans will be paid for separately under item S931 Removal and Replacement or Reinstallation of Water Main Obstruction.

Payment will be made under:

| <b>ITEM NO.</b> | <b>ITEM</b>                                | <b>PAY UNIT</b> |
|-----------------|--|-----------------|
| S930.01XX       | Clean and Line Existing X" Water Main Pipe | Linear Foot     |

REVISED: November 10, 2010