CONTRACT DATA SHEET

Monroe County Division of Purchasing
200 County Office Building, Rochester NY 14614

TITLE: CURED-IN-PLACE PIPELINING TERM CONSTRUCTION CONTRACT (TCC#7)

CONTRACT #: 0109-16 (4700007351)

CONTRACT DATES: 06/02/16 – 12/31/20

BUYER: SEAN WILCOX
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VENDOR(S): KENYON PIPELINE INISPTECTION, LLC
68 PARK ROAD
QUEENSBURY, NY 12804

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CONDITIONS OF CONTRACT

(The following are pertinent excerpts from Kenyon Pipeline Inspection LLC's contract bwith Monroe County for "Other Agencies" use.)

CONTRACT TERM

The Contract shall extend from January 1, 2016 through December 31, 2016 with the option to extend for four (4) additional one (1) year periods at the mutual consent of both parties.

SCOPE OF WORK

Cured-In-Place Pipelining - Term Construction Contract (TCC#7) consists principally of the furnishing of plant, equipment, superintendence, labor, skill and materials and all other items necessary for the rehabilitation of sewers and appurtenances using cured-in-place pipelining *(CIPP)* as defined in the CONTRACTOR's Bid Proposal, attached as Appendix B, at locations directed by the OWNER via Purchase Order(s).

PURCHASE ORDERS

A. A PURCHASE ORDER is defined as the written authorization by the OWNER to the CONTRACTOR to perform a defined quantity of work, as defined in Article 3 of this Agreement.

B. No Work shall be performed until a written Purchase Order has been issued by the OWNER to the CONTRACTOR. Any work performed by the CONTRACTOR prior to the receipt of the Purchase Order shall be at the CONTRACTOR's own risk.

C. Work will be authorized through one or more Purchase Orders. Each individual Purchase Order shall not total more than One Hundred Thousand Dollars ($100,000).

D. Each Purchase Order will describe the location, size, and estimated quantity of pipe and appurtenances to be rehabilitated, with a total estimated price for performing the work.

E. The work to be completed under each Purchase Order shall commence within ten (10) days after the written authorization of Purchase Order.

F. The entire Purchase Order shall be completed within the time stipulated in the Purchase Order. If the time stipulated in the Purchase Order extends beyond the time of the Contract, the Contract shall be extended to the completion date of the Purchase Order.

PAYMENTS

A. Payments for the work performed under each Purchase Order of the Contract will be made by the OWNER to the CONTRACTOR based on the terms and conditions stated in the Agreement.

B. At least five (5) days before the submission of application for payment, the CONTRACTOR shall furnish to the OWNER a complete breakdown of all work performed. This breakdown, when approved, will be used as a basis for preparing an approvable invoice for payment. The CONTRACTOR shall furnish a Monroe County Claim Voucher with each application for payment.

C. Payments shall be calculated based on multiplying the quantity of the work performed, times the unit pricing submitted in the CONTRACTOR's Bid Proposal (Appendix B), or cost plus fifteen percent (15%) for general overhead and profit, or a negotiated price, or any combination thereof.

D. The CONTRACTOR shall provide the closed circuit televising video/digital recording of the improvements completed prior to submission of the Contractor's payment application or invoice for the Purchase Order.

E. Neither the final payment nor any partial payment shall constitute acceptance of any defective workmanship or material, or noncompliance with the Contract Documents.

ACCEPTANCE AND GUARANTEE OF WORK

A. Upon completion of the work under a Purchase Order, the OWNER shall approve all of the work done and shall, within fifteen (15) days of approval, prepare a final certificate of work done and the value thereof. The OWNER shall upon approval of the final certificate and the application for payment, including a Monroe County Claim voucher submitted by the CONTRACTOR, promptly pay the CONTRACTOR the entire sum due after

deduction of all previous payments and amounts to be kept and retained under provisions of this Contract. All prior payments shall be subject to correction in the final estimate and payment.

B. Before issuance of the final certificate, the CONTRACTOR shall submit evidence satisfactory to the OWNER that all payrolls, material bills and other indebtedness connected to the work have been paid.

C. The CONTRACTOR shall guarantee the work accomplished under this Contract for a period of one year from the date of issuance of final certificate for a Purchase Order. The guarantee period shall be considered as work remaining to be completed under this Agreement and shall have a value of one percent (1%) of the final Purchase Order amount during the Guarantee Period. During the Guarantee Period, twice the value of the guarantee (i.e., two percent (2%) of the contract Purchase Order amount) shall be retained by the OWNER.

D. Upon expiration of the guarantee period, the CONTRACTOR shall submit an invoice for approval to the OWNER for final payment, which shall include any and all monies due to the CONTRACTOR, including the amount withheld during the guarantee period. All prior partial payments shall be subject to correction in the final invoice and payment.

BRAND REFERENCE

A. Reference to a manufacturer's product by brand name or number with the CONTRACTOR's Bid Proposal, attached as Appendix B, is done solely to establish the minimum quality and performance characteristics required. Alternates that are proposed must have a sufficient operating track record to demonstrate that the equipment will perform as well as the specified brand. The acceptance of a CONTRACTOR'S alternate rests solely with the OWNER.

MATERIALS

A. The furnishing of all materials shall be the responsibility of, and paid for by the CONTRACTOR.

B. All materials shall be new and unused and shall be essentially the standard product of a manufacturer regularly engaged in the production of such material. The OWNER reserves the right to reject any material or supplier who, although he meets the above requirements, does not provide satisfactory evidence indicating availability and prompt delivery of materials. Items of any one type of material shall be the product of a single manufacturer or supplier. All materials or equipment delivered to the site shall be accompanied by certificates, signed by an authorized officer of the manufacturing company, guaranteeing that the materials conform to Specification requirements. Such certificates shall be immediately turned over to the OWNER. Materials delivered to the site without such certificates will be subject to rejection.

C. Prior to award of the Contract and within forty-eight (48) hours of request by the OWNER, the CONTRACTOR shall furnish for approval the identification of the materials to be used and all samples and testing data as required by the technical specification. The submittal shall include the identification of the availability of all materials. Work shall be in accordance with the approved materials.

D. The CONTRACTOR shall have the full continuing responsibility to install all materials supplied and purchased, to protect the same, to maintain them in proper condition and to forthwith repair, replace and make good any damage thereto without cost to the OWNER until such time as the work covered by the Contract is fully accepted by the OWNER.

INSURANCE

A. The CONTRACTOR shall secure and maintain for the entire length of the Contract, including the guarantee period, insurance policies, protecting the CONTRACTOR and his Subcontractors, including their officers, officials, employees and agents, from claims for bodily injuries, death or property damage which may arise from operations under this Contract whether such operations be by himself or by any Subcontractor or anyone employed by them directly or indirectly. The following occurrence-based insurance policies with insurance companies authorized to do business in New York State are required:

(1) Statutory New York State Worker's Compensation and Disability insurance.

(2) General Liability Insurance; occurrence form; single limits of liability $1,000,000; aggregate limits of liability in a minimum amount of $3,000,000. This coverage may be in the form of a single policy or a basic policy plus umbrella coverage. This coverage shall include CONTRACTORS's Protective Liability covering

operations of Subcontractors and CONTRACTOR whose work encompasses storage of use of explosives shall provide evidence of blasting coverage. If any of the rating classifications embody property damage exclusions X (explosion), C (collapse) or U (underground), coverage eliminating such exclusions must be provided with same limits. Original certificates and endorsements evidencing such coverage shall be delivered to the County before final execution of this Agreement.

(3) Contractual Liability covering Hold Harmless Clause.

(4) Automobile Liability and Property Damage coverage for owned, non-owned, and hired vehicles. (Bodily Injury $1,000,000 each person, $1,000,000 each accident; Property Damage $1,000,000 each accident), or a combined single limit policy of $1,000,000 (bodily injury and property damage).

(5) All Risk Builders Risk or All Risk Installation Floater, as appropriate, in an amount equal to one hundred percent (100%) of the amount of the Contract, specifying the OWNER as Named Insured.

(6) CONTRACTOR whose Contract encompasses hazardous material work in any part shall provide a certificate evidencing insurance coverage of such work on an occurrence basis. Insurance policies excepting coverage for hazardous materials are not acceptable.

B. All insurance carriers for the policies of insurance required herein must carry an “A” or better BEST rating.

C. The County of Monroe and the OWNER if different than the County, its officers, officials, employees, agents and CONSULTANT must be named as an Additional Insured on the CONTRACTOR's General Liability and Automobile Liability policies, and on any Excess/Umbrella policies if required to meet the minimum liability thresholds. The policy(ies) must be endorsed by the insurance carrier to authorize the additional insured designations. The CONTRACTOR's coverage shall be specified as primary.

D. Certification of such insurance shall be filed with the OWNER and CONSULTANT prior to Contract signing and shall be subject to approval for adequacy of protection. Said certificates of insurance shall contain a thirty (30) day written notice of cancellation in favor of the OWNER. The evidence of coverage required therein shall be provided on the County’s certificate form or an ACORD form.

E. The above outlined insurance requirements are the minimum during construction.

F. During the guarantee period, CONTRACTOR may furnish completed operations liability insurance in a minimum amount of $1,000,000 each occurrence, $3,000,000 aggregate in lieu of the coverage required by paragraph a. above. Prior to the release of the semi-final payment, the CONTRACTOR shall provide a certificate of insurance for this coverage which may not be canceled prior to the end of the guarantee period.

RIGHTS OF OWNER

OWNER'S failure to exercise any of its rights under this Contract, including its right to terminate the work or to withhold payment, shall not constitute a waiver by the OWNER of any such rights. No inference of waiver of any option or right of the OWNER shall be drawn from OWNER's failure to enforce such rights or CONTRACTOR's failure to complete any portion of the work in accordance with any interim date, final date or any other deadline agreed upon as part of the project construction schedule. CONTRACTOR shall remain liable for any damages arising from its failure to perform in accordance with the schedule, notwithstanding any action or failure to act by OWNER, including but not limited to any delay in or failure to: terminate the Contract; send any notice to the CONTRACTOR; or to take any action required or permitted by OWNER under this Contract.

OWNER'S RIGHT TO TERMINATE AND/OR COMPLETE CONTRACT

Should the CONTRACTOR become insolvent, or should he refuse or neglect to perform the work in a proper manner and as directed by the OWNER, or otherwise fail in the performance of any of his obligations under this Contract, and Surety after proper request fails to complete the Contract, then the OWNER, upon the certificate of the CONSULTANT that sufficient cause exists to justify such action, and after giving the CONTRACTOR and his Surety seven (7) calendar days written notice, may, without prejudice to any other right or remedy, terminate the employment of the CONTRACTOR and take possession of the premises and of all materials, tools, and appliances thereon and finish the work by whatever method he may deem expedient. In such cases, no further payment shall be made to the CONTRACTOR until the work is completed, at which time, if the unpaid balance of the Contract price shall exceed the expense of finishing the work, such excess shall be paid to the CONTRACTOR. Should

such expense exceed the unpaid balance, the CONTRACTOR and his Surety shall pay the difference to the OWNER. The OWNER shall audit and certify the expense incurred by him in finishing the work and the damage incurred through the CONTRACTOR'S fault.

DISPUTE RESOLUTION

In an effort to resolve any conflicts that arise during the term of this Contract or following the completion of Work, the OWNER and the CONTRACTOR agree that all disputes between them arising out of or relating to this Contract shall first be submitted to non-binding mediation unless the parties mutually agree otherwise. After direction by the CONSULTANT to proceed with the disputed work, and throughout the mediation procedures, the CONTRACTOR shall diligently proceed with the performance of the Contract and in accordance with all instructions of the CONSULTANT.

The OWNER and the CONTRACTOR further agree to include a similar mediation provision in all contracts with independent contractors, subcontractors and subconsultants retained for the project and to require all independent contractors, subcontractors and subconsultants also to include a similar mediation provision in all contracts with subcontractors, subconsultants, suppliers or fabricators so retained, thereby providing for mediation as the primary method for dispute resolution between the parties to those contracts.

OTHER AGENCIES

The CONTRACTOR(S) must honor the prices, terms and conditions of this contract with political subdivisions, school districts, fire districts or other district or public authority located entirely or partly within Monroe County. Usage of this contract by any of these other political subdivisions or agencies or corporations will have to be coordinated between that subdivision or agency or corporations and the CONTRACTOR. Orders placed against this contract between any subdivision or agency or corporation will be contracts solely between the CONTRACTOR(S) and those entities. Monroe County will not be responsible for, nor will it have any liability or other obligation for, such contract between the CONTRACTOR(S) and any third party.

DIVISION 1: GENERAL REQUIREMENTS

SECTION 01015
GENERAL PROVISIONS

1. GENERAL

The provisions of Section 200 through 700 and any subsections in Section 100 which are included as part of the requirements in Sections 200 through 700 of the New York State Department of Transportation Specifications of January 9, 2014 or latest revision and all addenda in effect on the date of advertising for bids shall apply except as amended by the City of Rochester, Department of Environmental Services, Standard Construction Contract Documents, November 1991 or latest revision, and where modified by these Specifications.

2. SCOPE OF WORK

The work to be done under this Contract and in accordance with these specifications consist of furnishing of plant, equipment, superintendence, labor, skill and materials and all other items necessary for the rehabilitation of sewers and appurtenances using cured-in-place pipelining *(CIPP)* in the County or in the Districts. The CONTRACTOR shall perform all work required for such rehabilitation in accordance with the specifications and subject to the terms and conditions of the contract, complete and ready for use. The principal feature of the work is the installation of CIPP for the rehabilitation of sanitary, storm, combined sewers and laterals, for four inch (4") to thirty-six inch (36") diameter pipe by insertion of a thin walled, resin impregnated polyester felt tube into existing sewer pipe, which is then conformed to the inside of the existing pipe and lateral and cured into permanent position.

This description is general only and shall not be construed as a complete listing of every item of work required.

In addition, this Contract may be utilized by other agencies within Monroe County as identified in Article 14, "Other Agencies", of the Form of Contract.

3. DEFINITION

a. Within this section (Section 01015, "General Provisions"), where reference is made to the ENGINEER, the OWNER and or the OWNER's designated representative shall be substituted.

b. Where reference is made to "as shown on the plans", or "as shown on the Standard Detail Drawings" the term "as shown on the Purchase Order" may be substituted.

c. Where reference is made in the New York State Department of Transportation Specifications to New York State Department of Transportation, Commissioner, etc., the appropriate Monroe County department, or official shall be substituted.

4. CONTRACT DRAWINGS AND SPECIFICATIONS

a. Included by reference as part of the Contract Documents are:

1. New York State Department of Transportation, "Standard Specifications for Construction and Materials", May 4, 2006 and Addenda (NYSDOT).

2. City of Rochester, Department of Environmental Services, "Standard Construction Contract Documents", November 1, 1991 or latest revision (CORSCCD).

b. In the event of a conflict between the specification requirements, the order of precedence shall be:

1. These Specifications.
2. CORSCCD Specifications.
3. NYSDOT Specifications.

5. PROTECTION OF PROPERTY

The CONTRACTOR shall be responsible for the preservation and protection of property adjacent to the work site against damage and or injury as a result of his operations under this Contract. Any damage or injury occurring on account of any act, omission or neglect on the part of the CONTRACTOR shall be restored in a proper and satisfactory manner or replaced by and at the expense of the CONTRACTOR.

6. EXISTING UTILITIES AND STRUCTURES

a. The term "existing utilities" shall be deemed to refer to both publicly and privately owned utilities such as storm drains, sanitary sewers, water lines, gas, electrical telephone cable television services and appurtenances.

b. It shall be the responsibility of the CONTRACTOR to ascertain the actual extent and exact location of existing utilities and structures.

c. The work shall be carried out in a manner to prevent disruption of existing services and to avoid damage to the existing utilities. Any damage resulting from the work of this contract shall be promptly repaired by the CONTRACTOR at his own expense in a manner approved by the ENGINEER and further subject to the requirements of the authority having jurisdiction.

d. Where excavations by the CONTRACTOR require any utility lines or appurtenant structures to be temporarily supported and otherwise protected during the construction work, such support and protection shall be provided by the CONTRACTOR. All such work shall be performed in a manner satisfactory to the ENGINEER and the respective authority having jurisdiction over such work. In the event the CONTRACTOR fails to provide proper support or protection to any existing utility, the ENGINEER may at his discretion, have the respective authority provide such support or protection as may be necessary to insure the safety of such utility, and the costs of such measures shall be paid by the CONTRACTOR.

7. DRAINAGE AND DEWATERING OF EXCAVATIONS

a. Except as noted in paragraph (b) below, the CONTRACTOR shall be responsible at all times for preventing the accumulation of groundwater and the removal of all water in and in the vicinity of excavations.

b. Where the OWNER determines that unstable soil conditions exist because of groundwater, the OWNER will authorize the CONTRACTOR and separately reimburse to stabilize these conditions.

c. The proposed methods of controlling and removing groundwater and water and stabilizing shall be submitted to the OWNER for approval prior to their use.

8. WORK ON PROPERTIES AND IN STREETS AND ROADWAYS

a. The CONTRACTOR shall be responsible for securing all permits and licenses required to perform the Work including the Permit for work within the applicable municipal rights-of-way. The CONTRACTOR shall provide the OWNER a copy of the applicable permits prior to the start of construction.

b. The CONTRACTOR shall restrict his operations to the areas within permanent and temporary easements if such easements have been obtained by the OWNER, and to areas within existing municipal street rights-of-way.

c. Temporary easements required by the CONTRACTOR for additional work areas shall be obtained and paid for by the CONTRACTOR. All temporary easements obtained by the CONTRACTOR shall contain a provision holding the District and County of Monroe harmless to any and all claims thereto related. The agreement shall bear the signature of the OWNER of the land. Copies of all temporary easements shall be supplied to the OWNER prior to utilization of the temporary easements.

d. Prior to the start of work, the CONTRACTOR shall have his job surveyor locate the temporary and permanent easement lines and other key features associated with construction of the improvements.

A continuous snow type fence shall be installed and maintained in place along these lines during construction operations until this area has been restored to its original condition. The fence shall be in place five (5) days in advance of work in any area. No construction activity, access, storage, or other use shall take place exterior of the fencing.

Snow type fencing for individual tree protection during the construction shall be installed and maintained by the CONTRACTOR as required or ordered by the OWNER.

9. MAINTENANCE AND PROTECTION OF TRAFFIC

a. Any maintenance and protection of traffic required by the work performed under this contract shall be in accordance with the "Manual of Uniform Traffic Control Devices NYSDOT".

b. For projects within the City of Rochester, the Permit Section in the City of Rochester Department of Environmental Services shall be advised of commencement of the operations at least seven (7) working days prior to construction. The Permit Section will determine if the Monroe County Division of Traffic Engineering must review and approve the temporary traffic disruption.

c. Where a traffic plan is required, the CONTRACTOR shall be responsible for developing, installing, and maintaining the approved plan at no additional cost to the OWNER.

d. The CONTRACTOR shall submit the traffic plan to the Monroe County Division of Traffic Engineering, allowing a minimum of five (5) working days for approval.

e. When traveled way is closed for any reasons, detour routes shall be as designated by the Monroe County Division of Traffic Engineering.

10. TESTING AND CHECKING

a. Unless specifically identified as the responsibility of the OWNER, the CONTRACTOR shall be responsible for the performing and paying for all laboratory and field-testing and checking required by the Contract.

b. **Work within the City of Rochester:** Tests required by the City of Rochester to determine if the work has been performed in accordance with the specifications shall be the responsibility of the OWNER. However, should the tests show the work to be unacceptable to the City of Rochester, the CONTRACTOR shall be responsible for paying the cost of the test and penalties, in addition to correcting the work.

c. The OWNER shall be responsible for field compaction density tests. Where test results indicate insufficient compaction and additional compaction is required, the CONTRACTOR shall be responsible for all field compaction density retesting, until sufficient compaction is achieved.

11. DUST CONTROL

The CONTRACTOR shall take all necessary measures to control dust resulting from his operations and to prevent spillage and excavated material on public roads. When directed by the OWNER, the CONTRACTOR shall sprinkle water in such quantities and at such frequencies as may be required to control such dust and prevent it from becoming a nuisance to the surrounding area at no additional cost to the OWNER. All roads must be maintained dust free at all times. Daily cleaning will be required.

12. DISPOSAL OF MATERIALS

a. It shall be the responsibility of the CONTRACTOR to remove from the site and dispose of, according to applicable regulations, all rubbish, construction debris and waste materials, "unsuitable excavation material", and unused materials.

b. "Unsuitable excavation material" shall include, but not be limited to, excavated earth not suitable for pipe/structure support or backfill, rock, pavement/surface materials, and abandoned sewer facilities.

c. Unless otherwise directed by the OWNER, all "unsuitable excavation material" shall be loaded directly from the excavation and removed from the construction site on the same day.

e. Materials to be disposed of shall be disposed of at a permitted/authorized "construction and demolition" debris disposal facility, and/or facility permitted/authorized for respective materials. Discharge of unused material, including, but not limited to concrete and controlled density fill, to sewer mains, laterals, catch basins, manholes and other sewer system appurtenances is strictly prohibited.

13. CONSTRUCTION PHOTOGRAPHS

The CONTRACTOR shall provide "before" and "after" construction photographs, as directed by and at no additional cost to the OWNER, at mutually agreed upon locations so as to avoid disputes concerning the restoration work. Digital photographs shall be provided on a compact disc to the OWNER. CONTRACTOR shall provide a minimum of twelve (12) "before" and twelve (12) "after" photographs, or quantity as directed by the OWNER. Final photographs shall be taken at the same location and in the same direction as preconstruction photograph.

END OF SECTION

SECTION 01050
MEASUREMENT AND PAYMENT

1.01 SECTION INCLUDES

A. Measurement and payment criteria applicable to the Work performed under a unit price payment method.

B. Defect assessment and non-payment for rejected work.

C. Procedures for preparation and submittal of applications for payment.

1.02 GENERAL

A. Measurement methods delineated in the individual specification sections are intended to complement the criteria of this section. In the event of conflict, the requirements of the individual specification section shall govern. Actual quantities provided will determine payment.

B. Within this section (Section 01050, "Measurement and Payment"), where reference is made to the ENGINEER, the OWNER and or the OWNER's designated representative shall be substituted.

C. Take all measurements and compute quantities. The ENGINEER will verify measurements and quantities.

D. Assist ENGINEER by providing necessary equipment, workers, and survey personnel as required.

1.03 UNIT QUANTITIES SPECIFIED

A. Quantities and measurements indicated in the Bid are for bidding and contract purposes only. Quantities and measurements for materials supplied or placed in the Work and verified by the ENGINEER shall determine payment.

B. If the actual Work requires more or fewer quantities than those quantities indicated, provide the required quantities at the unit sum/prices stated in the Bid.

C. The quantities included in the Bid Proposal are approximate only and cannot be determined prior to issuance of a Purchase Order. The quantities are utilized solely for the purpose of establishing unit prices for the term of the Contract and for determining the Low Bidder. The quantities are not guaranteed nor promises given as to the work ordered during the term of the Contract.

1.04 MEASUREMENT OF QUANTITIES

A. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

B. Measurement by Area: Measured by square dimension using mean length and width or radius.

C. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

D. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed item or unit of the Work.

E. Lump Sum: Items described in Bid.

1.05 APPLICATION FORMAT

A. For each item, provide a column for listing: Item Number; Item Description, Estimated Quantity, Units (LF, EA, CY, etc.), Quantity for this Estimate, Quantity from Previous Estimates, Quantity to Date, Unit Price, Dollar Amount this Estimate, Dollar Amount to Date, Percent Complete, Balance to Finish. Authorized modifications, listed as subcategories under their associated Change Orders and retainage must be listed separately.

B. Base estimates of lump-sum items on a schedule dividing each item into its appropriate component parts together with a quantity and a unit price for each part such that the sum of the products of prices and quantities will equal the contract price for the item. Submit schedule for ENGINEER's approval before the first estimate becomes due.

C. Submit invoices for force account work which include, in addition to the above, a complete description of the work performed. Also, include a summary of totals for labor, equipment, materials, labor overhead, construction overhead, and profit as set forth in the Form of Contract.

1.06 PREPARATION OF APPLICATIONS

A. Present required information in typewritten form.

B. Execute certification by signature of authorized officer.

C. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for the portion of work performed.

D. List each authorized Change Order as an extension on continuation sheet, and include Change Order number and dollar amount as outlined for original items of work.

E. Utilize the Contract Unit Prices for calculation of the Payment Items.

1.07 SUBMITTAL PROCEDURES

A. Submit four copies of all pay requests and change orders, all with original signatures, are to be submitted for review and approval.

B. Submit an updated construction schedule and certified payrolls with each Application for Payment.

C. Submit under transmittal letter.

1.08 SUBSTANTIATING DATA

A. When the ENGINEER requires substantiating information, submit data justifying dollar amounts in question.

B. Provide one copy of data, with cover letter, for each copy of submittal. Show Application number, date and line item by number and description.

1.09 DEFECT ASSESSMENT

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. When, in the ENGINEER's opinion, it is not practical to remove and replace defective Work, the ENGINEER will direct one of the following remedies:

1. Defective work may remain, but the unit sum/price will be adjusted to a new sum/price at the discretion of the ENGINEER.

2. Defective work will be partially repaired according to ENGINEER's instructions, and the unit sum/price will be adjusted to a new sum/price at the discretion of the ENGINEER.

C. Individual specification sections may modify these options or may identify a specific formula or percentage sum/price reduction.

D. The authority of the ENGINEER to assess defects and identify payment adjustment is final.

1.10 NON-PAYMENT FOR REJECTED PRODUCTS

A. Payment will not be made for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.

2. Products determined as unacceptable before or after placement.

3. Products not completely unloaded from the transporting vehicle.

4. Products placed beyond required lines and levels of the Work.

5. Products remaining on hand after completion of the Work.

6. Loading, hauling and disposing of rejected products.

1.11 SHOP DRAWING SUBMITTALS

A. All shop drawings, if necessary and/or as requested by the OWNER or ENGINEER, must comply with the Contract Documents.

B. Submit a minimum of three (3) copies of each shop drawing for ENGINEER's

review.

1. Two (2) copies will be retained for the ENGINEER's use and the remainder will be returned.

C. The ENGINEER will review and stamp shop drawings as follows:

1. "APPROVED": shop drawing complies with the Contract Documents and is acceptable as it is. No re-submittal or revision is required.

2. "MAKE CORRECTIONS NOTED": shop drawing partially complies with the Contract Documents and is acceptable with some minor revisions. ENGINEER will note revisions on shop drawing. No re-submittal is required.

3. "REVISE AND RESUBMIT": shop drawing partially complies with Contract Documents and is not acceptable as it is. Resubmit shop drawing with additional information.

4. "REJECTED": shop drawing does not comply with Contract Documents and is not acceptable at all. Resubmit a shop drawing for a different product, method, layout, etc. which complies with Contract Documents.

5. "SUBMIT SPECIFIED ITEM": shop drawing does not comply with Contract Documents and is not acceptable at all. Resubmit a shop drawing for a product, method, layout, etc. which complies with Contract Documents.

D. Submit and receive back all shop drawings prior to using any associated methods or materials.

E. ENGINEER's acceptance of shop drawings indicates that the submittal has been reviewed to the extent necessary to ensure conceptual compliance with the Contract Documents.

F. Acceptance of shop drawings does not relieve the CONTRACTOR from verifying details such as, but not limited to, dimensions, field conditions, spacing, tolerances, materials, etc.

1.12 PAYMENT ITEM DESCRIPTIONS

A. The following pages include the description of Payment Items in the Contract, along with a description of the Measurement and Payment for each Payment Item.

PAYMENT ITEM # **DESCRIPTION**

ITEM 250C: TEST/INSERTION PIT EXCAVATION

GENERAL DESCRIPTION:

This work shall consist of the excavation of all materials, disposal of excavated materials, protection from the hazards of falling or sliding material, backfill and compaction required for trenches and structures as shown on the plans and specified, or as ordered by the ENGINEER.

METHOD OF MEASUREMENT:

250C – TEST/INSERTION PIT EXCAVATION: The quantity of excavation shall be the number of cubic yards, measured to the nearest cubic yard, of material excavated as measured in its original position within the payment limits indicated in this item. The top payment limit shall be the existing ground surface. The bottom payment limit shall be the bottom of excavation as ordered by the ENGINEER. Side payment limits shall be vertical and spaced minimum four feet by eight feet, or larger as ordered by the ENGINEER.

BASIS OF PAYMENT:

ITEM NO.	ITEM	PAY UNIT
250C	TEST/INSERTION PIT EXCAVATION	Cubic Yard

END OF SECTION

PAYMENT ITEM #	**DESCRIPTION**
ITEM 402I	TURF RESTORATION

GENERAL DESCRIPTION:

This work shall consist of furnishing and placing turf restoration including grading, topsoil, grass seed, fertilizer, mulch, mulch anchorage and maintenance as shown on the plans and specified, or as ordered by the ENGINEER.

METHOD OF MEASUREMENT:

The quantity shall be the number of square feet, measured to the nearest square foot, of turf surface area restoration installed.

BASIS OF PAYMENT:

ITEM NO.	**ITEM**	**PAY UNIT**
402I	TURF RESTORATION	Square Feet

END OF SECTION

PAYMENT ITEM #	DESCRIPTION
501B	MOBILIZATION (DIRECTED BY THE OWNER)

GENERAL DESCRIPTION:

This work is defined as a condition when the OWNER directs the CONTRACTOR to mobilize materials and equipment from a project site where work is being performed to a second project site to perform work for the convenience of the OWNER. Mobilization means the act of transporting materials and equipment from one project site to another.

Under normal circumstances, the CONTRACTOR will be provided with a Purchase Order from the OWNER that will provide for greater than twenty-four (24) hours for mobilization. In those cases, NO MOBILIATION will be paid to the CONTRACTOR for Mobilization of materials, equipment and work force.

However, during emergency situations, the OWNER will reimburse the CONTRACTOR for Mobilization based upon the time frame the OWNER requires the CONTRACTOR to mobilize their labor, materials and equipment, AND be prepared to begin the necessary emergency repairs.

METHOD OF MEASUREMENT:

The quantity shall be the number of hours, to the nearest one-half of an hour, for the transport of materials and equipment from one project site to a second site plus the return transport of equipment to the initial site. The OWNER shall determine the number of hours measured for each mobilization.

BASIS OF PAYMENT:

ITEM NO.	ITEM	PAY UNIT
501B	MOBILIZATION (DIRECTED BY THE OWNER)	Hour

END OF SECTION

PAYMENT ITEM #	DESCRIPTION – FULL SECTION REHABILITATION
ITEM 700L	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL
ITEM 700	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 701L	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL
ITEM 701	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 702	8-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 703	10-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 704	12-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 705	15-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 706	18-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 707	21-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 708	24-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 709	27-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP))
ITEM 710	30-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 711	36-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 712	42-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)

GENERAL DESCRIPTION:

This Specification consists of the method and process for furnishing all labor, materials, tools, equipment, and incidentals necessary to provide for the complete rehabilitation of full sections of deteriorated gravity sewer pipes and laterals by the CIPP process. Full section rehabilitation shall be defined as those that both begins and ends at an existing point of access to the sewer system.

All sewers and laterals rehabilitated by the CIPP process will either be located within a municipal right-of-way or within the OWNER'S easement.

The CIPP process is defined as the rehabilitation of sewer and lateral pipe by the installation of (one of the following; a polyester resin, an epoxy resin and hardener, or an epoxy vinyl ester, thermosetting resin), vacuum-impregnated flexible polyester felt fiber tube, having an impermeable inner surface. The resin-impregnated tube shall be formed to the host pipe by means of a water column or steam. Curing shall be accomplished by circulating hot water or steam throughout the length of the tube in accordance with the specified curing schedule supplied by the resin manufacturer. The CIPP shall extend the full length of the pipe reach being rehabilitated, and shall provide a structurally sound, impermeable, jointless, close-filling, pipe

that, when cured, is mechanically bonded to the host pipe.

The standard methods of installation for the system being practiced by the successful licensed CONTRACTOR shall become a part hereof by such reference. ASTM F 1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube, shall govern when this Specification does not address installation method and/or materials.

METHOD OF MEASUREMENT:

ITEM 700L	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL
ITEM 700	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 701L	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL
ITEM 701	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 702	8-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 703	10-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 704	12-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 705	15-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 706	18-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 707	21-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 708	24-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 709	27-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP))
ITEM 710	30-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)
ITEM 711	36-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)

Measurement for payment for Cured-in-Place Pipelining shall be by the actual horizontal length in linear feet, measured to the nearest foot of rehabilitated sewer pipe or lateral, as measured from end of lined pipe to end of lined pipe.

BASIS OF PAYMENT:

The unit price bid for rehabilitating the sewer main and laterals by CIPP shall be full compensation for all materials, labor, equipment, permits, traffic control, clean-up, and incidentals required to install the liner pipe within the sewer main. Payment for the liner shall also include the cost of sealing the liner in the manholes, pre- and post-rehabilitation television inspection, videos and logs, written summary of work, pipe cleaning and disposal, restoration and relevant submittals.

All costs for testing the liner and the service connections shall be considered incidental to the cost of rehabilitating the sewer. The CONTRACTOR shall clarify for himself any pay item or extent of required work, incidental or otherwise in case of doubt, before bidding.

The CONTRACTOR shall be responsible for making adequate and suitable arrangements for any bypass pumping or wastewater flow handling that may become necessary to maintain uninterrupted flow from upstream sewers and service connections and to prevent any backflow into houses or buildings or on to the streets between the time the liner is inserted and the service reconnections have been made, tested, and approved by the OWNER. Payment will be under Items 742A – 742C TEMPORARY BYPASS SYSTEM(S).

ITEM NO.	**ITEM**	**PAY UNIT**
700L	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL	Linear Foot
700	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
701L	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) LATERAL	Linear Foot
701	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
702	8-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
703	10-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
704	12-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
705	15-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
706	18-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
707	21-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
708	24-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
709	27-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
710	30-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot
711	36-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP)	Linear Foot

END OF SECTION

PAYMENT ITEM #	DESCRIPTION – SPOT SECTION REHABILITATION
ITEM 720	4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 721	6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 722	8-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 723	10-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 724	12-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 725	15-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 726	18-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 727	21-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 728	24-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 729	27-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 730	30-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION
ITEM 731	36-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

GENERAL DESCRIPTION:

This Specification consists of the method and process for furnishing all labor, materials, tools, equipment, and incidentals necessary to provide for complete rehabilitation of spot sections of deteriorated gravity sewer and lateral pipes by the CIPP process. Spot section rehabilitation shall be applicable to those sections of sewer that have at least one end not connecting to an existing access point of the sewer system.

Lateral pipes shall consist of branch lines discharging into the gravity sewer and are generally located within a municipal right-of-way or within the OWNER'S easement. Gravity sewers and lateral pipes rehabilitated by the CIPP process will either be located within a municipal right-of-way or within the OWNER'S easement.

The CIPP process is defined as the rehabilitation of gravity sewer and lateral pipe by the installation of (one of the following; a polyester resin, an epoxy resin and hardener, or an epoxy vinyl ester, thermosetting resin), vacuum-impregnated flexible polyester felt fiber tube, having an impermeable inner surface. The resin-impregnated tube shall be formed to the host pipe by means of a water column or steam. Curing shall be accomplished by circulating hot water or steam throughout the length of the tube in accordance with the specified curing schedule supplied by the resin manufacturer. The CIPP shall extend the full length of the pipe reach being rehabilitated, and shall provide a structurally sound, impermeable, jointless, close-filling, pipe that, when cured, is mechanically bonded to the host pipe. The spot section rehabilitation method shall be for a minimum five (5) foot length.

The standard methods of installation for the system being practiced by the successful licensed

CONTRACTOR shall become a part hereof by such reference. ASTM F 1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube, shall govern when this Specification does not address installation method and/or materials.

METHOD OF MEASUREMENT:

ITEM 720 4&5-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 721 6-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 722 8-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 723 10-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 724 12-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 725 15-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 726 18-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 727 21-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 728 24-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 729 27-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 730 30-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

ITEM 731 36-INCH DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION

Measurement for payment for Cured-in-Place Pipelining spot section rehabilitation shall be by the actual horizontal length in linear feet, measured to the nearest foot of rehabilitated sewer pipe or lateral, as measured from end of lined pipe to end of lined pipe. Cured-in-Place Pipelining spot section rehabilitation will generally be located where at least one end point of the section to be rehabilitated is not at an existing access point to the sewer system.

Measurement for payment for each Cured-in-Place Pipelining Spot Rehabilitation shall consist of a minimum five (5) foot length section. Payment for additional length of rehabilitation beyond a five (5) foot length shall be paid at the unit pricing specified in Pay Items 700 - 711.

BASIS OF PAYMENT:

The unit price bid for rehabilitating the sewer main and laterals by CIPP shall be full compensation for all materials, labor, equipment, permits, traffic control, clean-up, and incidentals required to install the liner pipe within the sewer main. Payment for the liner shall also include the cost of sealing the liner in the manholes, pre- and post-rehabilitation television inspection, videos and logs, written summary of work, pipe cleaning and disposal, restoration and relevant submittals.

All costs for testing the liner and the service connections shall be considered incidental to the cost of rehabilitating the sewer. The CONTRACTOR shall clarify for himself any pay item or extent of required work, incidental or otherwise in case of doubt, before bidding.

The CONTRACTOR shall be responsible for making adequate and suitable arrangements for any bypass pumping or wastewater flow handling that may become necessary to maintain uninterrupted flow from upstream sewers and service connections and to prevent any backflow into houses or buildings or on to the streets between the time the liner is inserted and the service reconnections have been made, tested, and approved by the OWNER. Payment will be under Item(s) 742A – 742C, TEMPORARY BYPASS SYSTEM(S).

ITEM NO.	ITEM	PAY UNIT
720	4”-5” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
721	6” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
722	8” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
723	10” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
724	12” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
725	15” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
726	18” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
727	21 DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
728	24” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
729	27” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
730	30” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each
731	36” DIAMETER CURED-IN-PLACE PIPELINING (CIPP) SPOT REHABILITATION	Each

END OF SECTION

PAYMENT ITEM #	**DESCRIPTION**
ITEM 740	SERVICE LATERAL RECONNECTION BY REMOTE

GENERAL DESCRIPTION:

Any service lateral connections within the sewer section being rehabilitated are to be opened using a remote-controlled televised cutting device specifically designed for cutting CIPP. The exact location and number of service connections shall be determined from videos and/or in the field. It shall be the CONTRACTOR's responsibility to accurately field locate all existing service connections, whether in service or not. The CONTRACTOR shall reconnect all service connections to the liner pipe, including those from unoccupied, abandoned, or vacant lots, unless directed otherwise by the OWNER. The CONTRACTOR shall be responsible for restoring/correcting without delay all missed or faulty reconnections, as well as for any damage caused to property owners for not reconnecting the services in a timely manner, or for not giving notice to the owners.

CONSTRUCTION DETAILS

Service lateral connections shall be done by remote-controlled televised cutting device and be made by experienced operators so that no blind attempts or holes are made in the liner pipe. Location shall be re-verified carefully with pre-rehabilitation videos for accuracy, especially where dimples are not defined or clearly ascertained. The remote cut shall be smooth and circular in nature, as seen by a 360 degree television camera. The hole shall be a maximum of 100 percent and a minimum of 95 percent of the service pipe diameter. It shall be properly aligned and be concentric to the existing connection.

Excess wrong holes or trial cuts shall not be made and must be repaired at no cost to the OWNER to the full satisfaction of the OWNER. Defective connections shall be repaired to the OWNER’s satisfaction, at no extra cost. The OWNER reserves the right to require service connection by excavation at certain or all locations, at the CONTRACTOR’s expense, if the quality, workmanship, and approval rating for remote cut is poor and not satisfactory.

One or more homes discharging into a common connection shall be considered as one service connection. The number of total reconnections shall not be increased without prior approval.

METHOD OF MEASUREMENT:

The quantity shall be the number of service laterals reconnected, to the satisfaction of the OWNER.

BASIS OF PAYMENT:

ITEM NO.	**ITEM**	**PAY UNIT**
740	SERVICE LATERAL RECONNECTION BY REMOTE	Each

END OF SECTION

PAYMENT ITEM #	DESCRIPTION
ITEM 741	REPAIR PROTRUDING LATERAL CONNECTION

GENERAL DESCRIPTION:

Protruding taps or service connections, which will obstruct or hinder the insertion of the liner, shall be removed to allow the liner to be properly installed.

CONSTRUCTION DETAILS

Work will be done using a remote-controlled televised cutting device designed for this purpose. The work shall be done by experienced operators. The exact location and number of protruding service connections shall be determined from pre-rehabilitation videos and/or in the field. It shall be the CONTRACTOR's responsibility to accurately field locate all protruding service connections, whether in service or not. The CONTRACTOR shall cut or grind protruding lateral to be flush with the host pipe, including those from unoccupied, abandoned, or vacant lots, unless directed otherwise by the OWNER.

METHOD OF MEASUREMENT:

The quantity shall be the number of service laterals repaired.

BASIS OF PAYMENT:

The unit price shall include the full cost of equipment, materials, labor, maintenance of traffic and safety, and incidentals required to perform the work.

ITEM NO.	ITEM	PAY UNIT
741	REPAIR PROTRUDING LATERAL	Each

END OF SECTION

PAYMENT ITEM #	DESCRIPTION
ITEM 742A	TEMPORARY BYPASS SYSTEM FOR SEWERS 6-INCH TO 12-INCH DIAMETER
ITEM 742B	TEMPORARY BYPASS SYSTEM FOR SEWERS 15-INCH TO 24-INCH DIAMETER
ITEM 742C	TEMPORARY BYPASS SYSTEM FOR SEWERS 27-INCH TO 36-INCH DIAMETER

GENERAL DESCRIPTION:

Pipe dimensions refer to the inside diameter of the host pipe.

The work under this item shall consist of the design, obtaining approval and providing all labor, equipment and material for an installation and restoration (if necessary) of temporary bypass facilities. Specific requirements for this work activity are described in Section 01510 of the General Requirements, "Temporary Bypass Pumping."

METHOD OF MEASUREMENT:

ITEM 742A	TEMPORARY BYPASS SYSTEM FOR SEWERS 6-INCH TO 12-INCH DIAMETER
ITEM 742B	TEMPORARY BYPASS SYSTEM FOR SEWERS 15-INCH TO 24-INCH DIAMETER
ITEM 742C	TEMPORARY BYPASS SYSTEM FOR SEWERS 27-INCH TO 36-INCH DIAMETER

The quantity to be measured for payment shall be the number of days the bypass system is in operation moving sewage and approved by the ENGINEER prior to starting or continuing the system. The need for bypass, during any operation shall be verified with the ENGINEER. The CONTRACTOR shall not assume the need or application. No payment will be made for bypass time not previously authorized by the ENGINEER. Partial days shall be rounded to the nearest half day increments for payment.

BASIS OF PAYMENT:

The unit price shall include the cost of furnishing, installing and removal of all material and equipment required to connect and operate the bypass system. The unit price for the system shall include the temporary power, pumps, plugs, pipe, fittings, maintenance of traffic and safety, and all other incidental items required to complete the work, including costs associated with any surface restoration. Also labor, including emergency time and overtime, shall be included in the unit price. No additional payment will be considered for repairs to and replacement of the bypass system, regardless of the time such activities occurred. Damage incurred to the system by outside forces shall not constitute a claim for additional payment. Temporary plugs or other methods used for the convenience of the CONTRACTOR, which do not transfer sewage flow from one point to another, shall not be considered for payment under this

item. Only pre-approved systems for an agreed upon duration shall be considered for payment under this item.

ITEM NO.	ITEM	PAY UNIT
742A	TEMPORARY BYPASS SYSTEM FOR SEWERS 6-INCH TO 12-INCH DIAMETER	Day
742B	TEMPORARY BYPASS SYSTEM FOR SEWERS 15-INCH TO 24-INCH DIAMETER	Day
742C	TEMPORARY BYPASS SYSTEM FOR SEWERS 27-INCH TO 36-INCH DIAMETER	Day

END OF SECTION

PAYMENT ITEM # **DESCRIPTION**

ITEM 790 STANDARD COMPOSITE MANHOLE REPAIR – MASONRY & EPOXY COATING

GENERAL DESCRIPTION:

This work shall consist of furnishing and installing masonry coatings to manhole walls, benches and inverts as may be directed by the OWNER and in accordance to all manufacturer's recommendations.

METHOD OF MEASUREMENT:

The quantity shall be the number of square feet of the manhole repaired utilizing the application of the specified coating products, and as measured to the nearest square foot.

BASIS OF PAYMENT:

ITEM NO.	ITEM	PAY UNIT
790	STANDARD COMPOSITE MANHOLE REPAIR – MASONRY & EPOXY COATING	Square Foot

END OF SECTION

PAYMENT ITEM #	**DESCRIPTION**
ITEM 791	ADDITIONAL MANHOLE REPAIR – MASONRY COATING EXCEEDING 3" THICKNESS

GENERAL DESCRIPTION:

As may be directed by the OWNER, this work shall consist of furnishing and installing masonry coatings to manhole walls, benches and inverts beyond 3" thickness as covered under payment Item 790, Standard Composite Manhole Repair.

METHOD OF MEASUREMENT:

The quantity shall be the number of pounds of the specified coating product applied, and measured to the nearest pound.

BASIS OF PAYMENT:

ITEM NO.	**ITEM**	**PAY UNIT**
791	ADDITIONAL MANHOLE REPAIR – MASONRY COATING EXCEEDING 3" THICKNESS	Pound

END OF SECTION

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SECTION 01100
COORDINATION AND MEETINGS

1.01 SECTION INCLUDES

A. Coordination

B. Field Engineering

C. Preconstruction Conference

D. Progress Meetings

E. Construction Progress Schedules

F. Final Inspection Conferences

G. Communication

H. Emergency Call Out

1.02 COORDINATION

A. Coordinate scheduling, submittals, and work of the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.

B. Coordinate completion and cleanup of work of separate sections in preparation for Substantial Completion for portions of the Work designated for OWNER's partial use.

1.03 FIELD ENGINEERING

A. Employ a Land Surveyor registered in the State of New York and acceptable to the OWNER.

B. Locate and protect all survey control, survey monuments, property pins and reference points.

C. Control datum for survey is that shown on Drawings.

D. Provide field engineering services. Establish elevations, lines, and levels, utilizing recognized engineering survey practices.

1.04 PRECONSTRUCTION CONFERENCE

A. OWNER will schedule a conference at the time of Notice of Award.

B. Attendance required by OWNER and CONTRACTOR.

C. Agenda:

1. Regulatory Agencies

2. Utilities

3. Owner's Representatives

4. Submission of bonds and insurance certificates.

5. Distribution of Contract Documents or supplemental information.

6. Submission of list of subcontractors, list of products, Schedule of Values and Progress Schedule.

7. Designation of personnel representing the CONTRACTOR, and the OWNER.

8. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and contract closeout procedures.

9. Scheduling

10. Construction facilities and controls provided by OWNER

11. Temporary utilities provided by OWNER

12. Survey layout

13. Housekeeping procedures

14. Procedures for testing

15. Procedures for maintaining record documents

16. Requirements for start-up of equipment

17. Inspection and acceptance of equipment put into service during construction period

1.05 PROGRESS MEETINGS

A. Attend scheduled meetings throughout progress of the Work at one to four week intervals, as determined by the OWNER.

B. OWNER will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to participants and those affected by decisions made.

C. Required Attendance: Job superintendent, major Subcontractors and

suppliers, OWNER, Funding Agency and others, as appropriate to agenda topics for each meeting.

D. Agenda:

1. Review minutes of previous meetings

2. Review of work progress

3. Field observations, problems, and decisions

4. Identification of problems which impede planned progress

5. Review of submittals schedule and status of submittals

6. Review of off-site fabrication and delivery schedules

7. Maintenance of progress schedule

8. Corrective measures to regain projected schedules

9. Planned progress during succeeding work period

10. Coordination of projected progress

11. Maintenance of quality and work standards

12. Effect of proposed changes on progress schedule and coordination

13. Other business relating to Work

1.06 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate as established in Notice of Award.

B. Revise and resubmit as required.

C. Submit schedule with each Application for Payment, identifying changes since previous version.

D. Submit a computer generated or horizontal bar chart with separate line for each major section of Work. Or submit a computer generated network analysis diagram using the critical path method, generally as outlined in Associated General Contractors of America (AGC) publication, "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

E. Show complete sequence of construction by activity, identifying work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates and duration.

E. Indicate estimated percentage of completion for each item of work at each

submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by OWNER and under Allowances

1.07 FINAL INSPECTION CONFERENCES

A. When required in individual Materials and Performance Sections or to meet a project Milestone, a work site Final Inspection Conference will be convened prior to commencing other work.

B. Attendance of parties directly affecting, or affected by, work of the specific Section is required.

C. OWNER will prepare agenda, preside at conference, record minutes and distribute copies after conference to participants.

D. Review conditions of installation, preparation and installation procedures and coordination with related work.

E. OWNER will issue a punch list of items which need repair, replacement and/or restoration.

1.08 COMMUNICATION

A. Notify OWNER of start of work on project.

B. Notify OWNER of hours to be worked.

C. Notify OWNER in advance when work will be suspended for any reason.

D. Notify OWNER of each subsequent startup.

E. There will be a charge of $200.00 for each time required notification is not provided.

1.09 EMERGENCY CALL OUT

A. Have an employee available at all times for calls and problems which may arise during the project. Employee shall:

1. Have authority to act and resolve any problems,

2. Be available after normal working hours, weekends and holidays,

3. Carry a pager or cellular phone.

B. Provide the OWNER with employee's name, home phone number, place of residence and pager/cell number.

C. Respond within one hour to a call from the OWNER.

D. Notify the OWNER's office when problem has been resolved.

E. The ENGINEER or OWNER will resolve or repair the problem if there is no response within one (1) hour of the call. If deemed an emergency situation by the OWNER, no written notice that the OWNER may correct defective work shall be required.

F. All costs incurred by the OWNER or ENGINEER shall be billed to the CONTRACTOR with a minimum charge of One Thousand dollars ($1,000.00) for each event.

G. Failure of the CONTRACTOR or the emergency call out employee to respond to two (2) call outs will result in a work stop order, potential termination of the Contract and/or replacement of that employee as emergency call out employee.

END OF SECTION

SECTION 01101
REFERENCE STANDARDS

1.01 SECTION INCLUDES

A. Quality assurance

B. Schedule of references

1.02 QUALITY ASSURANCE

A. For products or workmanship specified by association, trade, or Federal Standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by date of issue current on date for receiving bids.

C. Obtain copies of standards when required by Contract Documents and maintain at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.

D. Should specified reference standards conflict with Contract Documents, request clarification from ENGINEER before proceeding.

E. The contractual relationship of the parties shall not be altered by mention or inference contained in any reference document.

1.03 SCHEDULE OF REFERENCES

AASHTO American Association of State Highway and Transportation Officials
444 North Capitol
Street, N.W. Washington, DC 20001

ACI American Concrete Institute
Box 19150
Reford Station
Detroit, MI 48219

AI Asphalt Institute
Asphalt Institute Building
College Park, MD 20740

AIA American Institute of Architects
1735 New York Avenue, N.W.
Washington, DC 20006

AISC American Institute of Steel Construction
400 North Michigan Avenue
Eighth Floor
Chicago, IL 60611

AISI American Iron and Steel Institute
1000 16th Street, N.W.
Washington, DC 20036

ANSI American National Standards Institute
11 West 42nd Street
New York, NY 10036

ASTM American Society for Testing and Materials
1916 Race Street
Philadelphia, PA 19103

AWS American Welding Society
550 LeJeune Road, N.W.
Miami, FL 33135

AWWA American Water Works Association
6666 West Quincy Avenue
Denver, CO 80235

CRSI Concrete Reinforcing Steel Institute
933 Plum Grove Road
Schaumburg, IL 60195

HYDRAULIC INSTITUTE STANDARDS
712 Lakewood Center North
14600 Detroit Avenue
Cleveland, Ohio 44107

MUTCD Manual of Uniform Traffic Control Devices
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623

NEW YORK STATE STANDARD SPECIFICATION
New York State Department of Transportation
1530 Jefferson Road
Rochester, New York 14623

STATE BUILDING CODE
New York State - Department of State
162 Washington Avenue
Albany, New York 12231

SSPC Steel Structures Painting Council
4400 Fifth Avenue
Pittsburgh, PA 15213

UL Underwriters' Laboratories, Inc.
333 Pfingston Road
Northbrook, IL 60062

END OF SECTION

SECTION 01102
CARE AND PROTECTION OF PROPERTY

1.01 SECTION INCLUDES

A. Protection of Property

B. Work within Highway Right-of-Way

C. Notice to Property Owner

1.02 PROTECTION OF PROPERTY

A. Entering or occupying with men, tools, materials or equipment any land other than the right-of-way and easements without written, notarized consent from the property owner is prohibited. Provide a copy of the written, notarized consent to the ENGINEER. Assume full responsibility for use of said private properties and defend OWNER against all claims for damages from use of same.

B. Provide and maintain all necessary watchman, barricades, lights and warning signs and take all necessary precautions for the protection and safety of the public, OWNER, ENGINEER and property.

C. Continuously maintain adequate measures to protect all Work from damage and take all reasonable precautions to protect the public's and OWNER's property from injury or loss arising in connection with this Agreement.

D. Make good any damage, injury or loss to the Work, property of the OWNER and the public resulting from lack of reasonable protective precautions.

E. In an emergency affecting the safety of life, the Work, or adjoining property, the CONTRACTOR shall act to prevent such threatened loss or injury without special instructions or authorization from the ENGINEER. Also act, without appeal, if so authorized or instructed by the ENGINEER.

F. Exercise extreme care to prevent damage to trees, flowers, shrubs, etc. Replace or repair any damaged trees, shrubs, flowers, etc.

G. Replace or re-erect fences and guard rails taken down or disturbed, to the satisfaction of the ENGINEER.

H. Conduct work in a manner to properly protect all Underground Facilities. Work near Underground Facilities shall be in accordance with the utility's requirements, rules and regulations. If any utility is damaged, immediately notify the utility involved so that proper inspection and repair can be made.

I. The OWNER or ENGINEER will attempt to notify the CONTRACTOR of any hazardous condition during non-working hours by telephone. If the OWNER or ENGINEER is unable to reach the CONTRACTOR or the CONTRACTOR fails to correct the hazardous condition utilizing all necessary safety devices within one hour after notification, the OWNER will make all necessary repairs at the

expense of the CONTRACTOR. If the hazardous condition is of such a nature, in the opinion of the ENGINEER, that it should be remedied immediately and the CONTRACTOR is unable or refuses to do so, OWNER's personnel will make all necessary repairs at the expense of the CONTRACTOR.

J. Prior to construction, install snow fence to protect trees and plantings as shown on the drawings or directed by the Engineer. Secure fence with stakes every five (5) feet.

K. Maintain drainage throughout construction.

1.03 NOTICE TO PROPERTY OWNERS

A. The CONTRACTOR shall provide property owners at least one day advance written notice of pending construction. Keep driveways open and in good condition at all times.

1.04 WORK WITHIN HIGHWAY RIGHTS-OF-WAY

A. Perform and complete all work within the state, county, city and town rights-of-way to the full satisfaction of the various Departments of Public Works concerned.

B. Conduct operations associated with the Work so as not to interfere with the movement of traffic on highways and with operations of the particular Department of Public Works.

C. If at any time during the work, traffic or facilities of the State of New York, county, City of Rochester or town are endangered, immediately do such work as the representative of the particular Department of Public Works concerned may direct to restore safety. The expense of restoring safety based on the directions of the particular Department of Public Works representative shall be born solely by the CONTRACTOR.

D. Permit inspection by the State of New York, county, City of Rochester, town or village at all times as the Work progresses.

E. Provide written notice to the State of New York, county, City of Rochester, town or village five (5) days before such work is to begin within their right-of-way.

END OF SECTION

SECTION 01103
INTERRUPTION OF CUSTOMER SERVICE

1.01 SECTION INCLUDES

A. Interruption of Service

B. Planned Shutdowns and Notifications

C. Shutdowns

1.02 INTERRUPTION OF SERVICE

A. Do not shut down or interrupt flow through any facility unless specifically permitted to do so, in writing, by the OWNER.

B. Do not operate main line valves, pumps, electrical controls and other facilities controlling flow. Assist the OWNER in closing all valves necessary for interruption or shutdown of flow.

C. When an interruption of service occurs, work continuously and with expedience until completion of all work necessary to restore service to its normal state.

1.03 PLANNED SHUTDOWNS AND NOTIFICATIONS

A. Notify OWNER and ENGINEER in writing of proposed shutdown of any facility, and approximate duration thereof, a minimum of three (3) days in advance. Include date, time and extent of duration of shutdown in the written notification to OWNER.

B. Notify all customers, in writing, twenty-four (24) hours prior to shutdown with the notification form provided by OWNER. Completely fill out notification form and distribute it to all affected customers prior to shutdown.

C. Immediately prior to individual service and lateral work, notify the customer again to verify that all water use has been stopped.

D. Bear all responsibility for any loss or damage arising out of the failure of any such customer to receive notice of proposed shutdown or interruption of service.

E. Identify material, size and location of utility or service prior to making shutdown. Do not shut down or cause any interruption of flow until all labor, material and equipment necessary to perform the work are present at the work site.

F. Provide temporary service where utility cannot be restored within four hours.

G. Restore service as soon as possible. Immediately notify OWNER of said restoration of service.

1.04 EMERGENCY SHUTDOWNS

A. In the event of a rupture of a water main or other failure of any facility, whether the result of the CONTRACTOR's activities or other unrelated matters, act in accordance with the provisions of the Section entitled, "Care and Protection of Property".

B. As soon as the shutdown or interruption of service has actually taken place, notify the Owner of the area affected and the proposed number of hour's duration of the shutdown. In addition, notify the customers who are affected by the shutdown by going door-to-door.

END OF SECTION

SECTION 01104
TEMPORARY CONTROLS

1.01 SECTION INCLUDES

A. Water Control

B. Dust Control

C. Erosion and Sediment Control

D. Noise Control

1.02 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

1.03 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into atmosphere. This shall include as a minimum, sprinkling and sweeping on paved areas and sprinkling and mulching in unpaved areas.

C. Do not use calcium chloride unless directed by the ENGINEER/OWNER.

1.04 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

F. Utilize erosion control procedures, including mulching, on site. Furnish erosion control as required and, immediately following (weather permitting), completion of site and access clearing.

G. Allow sediment to settle out of water that interferes with construction before such water enters any surface waterway. Pump water as far as possible from waterway banks when dewatering. Do not damage or kill vegetation by excessive watering or accumulating silt in the discharge area. Install settling basins and plastic filter fabric to achieve environmental objectives as ordered by the ENGINEER.

1.05 NOISE CONTROL

A. Provide all construction equipment with adequate muffler devices.

B. Restrict work to the hours between 7:00 a.m. and 8:00 p.m., unless further restricted as a condition of permits, local regulations, or as specified in the Purchase Order or Owner's instructions.

1.06 SURFACE WATER CROSSINGS

A. Protect slopes at surface water crossings or drainage ways by installing riprap, sand bags, sod, jute mesh or excelsior blankets as conditions require.

B. Use water diversion berms, sodding, jute mesh or excelsior blankets on slopes exceeding 15 percent.

1.07 ENVIRONMENTAL CONTROLS

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.

B. Prohibited construction procedures include, but are not limited to:

1. Dumping of spoil material in any stream corridor, any wetland, surface waterway or at unspecified locations.

2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, wetland, or surface waterway.

3. Damaging vegetation beyond the extent necessary for construction of facilities.

4. Open burning of project debris.

5. Pumping of silt laden water from trenches or other excavations into any surface waterway, stream corridor, or wetland.

END OF SECTION

SECTION 01105
TRAFFIC REGULATION

1.01 SECTION INCLUDES

A. Work within Right-of-Ways

B. Signs, Signals, and Devices

C. Construction Parking

D. Flagmen

E. Flares and Lights

F. Haul Routes

G. Traffic Signs and Signals

H. Sign Removal

1.02 REFERENCES

A. MUTCD (available at the OWNER'S and ENGINEER's office for review)

1.03 WORK WITHIN RIGHT-OF-WAYS

A. Prevent damage to vehicles on highways and to facilities of the State of New York, county, or town in which the work is being done. Conduct operations so as not to interfere with the movement of traffic on highways and with operations of the particular Department of Public Works involved.

B. Provide written notice to the City of Rochester, State of New York, County or Town Department of Public Works five (5) days before work is to begin in their right-of-way.

1.04 SIGNS, SIGNALS, AND DEVICES

A. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Specified in Part 201 MUTCD.

B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions: Specified in Parts 292 and 294 in MUTCD.

C. Flagman Equipment: As approved by local jurisdictions and Part 293 in MUTCD.

D. Work Zone Warning Signs: As approved by local jurisdiction or as specified in MUTCD Section 238 and Section 300.

1.05 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic, parking and access by emergency vehicles.

B. Prevent parking on or adjacent to access roads or in non-designated areas.

1.06 FLAGMEN

A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.07 FLARES AND LIGHTS

A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic as specified in Part 294 of MUTCD.

1.08 HAUL ROUTES

A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic and minimize interference with public traffic.

1.09 TRAFFIC SIGNS AND SIGNALS

A. Locate traffic signs and/or signals at approaches to site, on-site, crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic, as specified in Part 201 of MUTCD.

B. Relocate as work progresses, to maintain effective traffic control.

1.10 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

1.11 TRAFFIC REGULATION

A. Maintain safe and continuous through traffic.

B. Maintain ingress and egress for all adjacent driveways, service roads and public streets.

END OF SECTION

SECTION 01510
TEMPORARY BYPASS PUMPING

PART 1: SYSTEM

1.01 SECTION INCLUDES

A. Under this item, the Contractor is required to furnish all materials, labor, equipment, power, and maintenance, etc. to implement a temporary pumping system for the purpose of diverting the existing flow around the work area for the duration of the project.

B. The design, installation, and operation of the temporary pumping system shall be the Contractor's responsibility. The Contractor shall employ the services of a vendor who can demonstrate to the engineer that the vendor specializes in the design and operation of temporary bypass pumping systems. The vendor shall provide at least five (5) references of projects of a similar size and complexity as this project performed by his firm within the past three years, upon request. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction as supplied by the contractor.

1.02 SYSTEM REQUIREMENTS

A. The Contractor shall prepare with the vendor a specific, detailed description of the proposed pumping system and submit it and the vendor's references.

B. The Contractor shall submit to the Engineer detailed plans and descriptions outlining all provisions and precautions to be taken by the Contractor regarding handling of existing wastewater flows. This plan must be specific and complete, including such items as schedules, locations, elevations, capacities of equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of the access and bypass pumping locations from damage due to the discharge flows, and compliance with the requirements and permit conditions specified in these Contract Documents. No construction shall begin until all provisions and requirements have been reviewed by the Engineer.

C. The plan shall include but not be limited to the details of the following:

1. Staging areas for pumps.
2. Sewer plugging method and types of plugs.
3. Size and location of manholes or access points for suction and discharge hose or piping.
4. Size of pipeline or conveyance system to be bypassed.
5. Number, size, material, location and method of installation of suction piping.
6. Number, size, material, method of installation and location of installation of discharge piping.
7. Bypass pump sizes, capacity, number of each size to be on site and power requirements.
8. Calculations of static lift, friction losses, and flow velocity (pump curves showing pump operating range shall be submitted)
9. Standby power generator size, location.
10. Downstream discharge plan.
11. Method of protecting discharge manholes or structures from erosion and damage.

12. Thrust and restraint block sizes and locations.
13. Sections showing suction and discharge pipe depth, embedment, select fill and special backfill.
14. Method of noise control for each pump and/or generator.
15. Any temporary pipe supports and anchoring requirements.
16. Design plans and computation for access to bypass pumping locations indicated on the drawings.
17. Calculations for selection of bypass pumping pipe size.
18. Schedule for installation of and maintenance of bypass pumping lines.
19. Plan indicating selection of location of bypass pumping line locations.

1.03 SYSTEM DESCRIPTION

A. Design Requirements

1. Bypass pumping systems shall have sufficient capacity.

2. The Contractor shall provide all pipeline plugs, pumps of adequate size to handle peak flow, and temporary discharge piping to ensure that the total flow of the main can be safely diverted around the section to be repaired. Bypass pumping systems will be required to be operated 24 hours per day.

3. The Contractor shall have adequate standby equipment available and ready for immediate operation and use in the event of an emergency or breakdown. One standby pump for each size pump utilized shall be installed at the mainline flow bypassing locations, ready for use in the event of primary pump failure.

4. Bypass pumping system shall be capable of bypassing the flow around the work area and be sized to handle any amount of flow up to full available flow as defined by the Owner into the work area as necessary for satisfactory performances of work.
5. The Contractor shall make all arrangements for bypass pumping during the time when the main is shut down for any reason. System must overcome any existence force main pressure on discharge.

B. Performance Requirements

1. It is essential to the operation of the existing system being bypassed that no interruptions in the flow occur throughout the duration of the project. To this end, the Contractor shall provide, maintain, and operate all temporary facilities such as dams, plugs, pumping equipment (both primary and back-up units as required), conduits, all necessary power, and all other labor and equipment necessary to intercept the incoming flow before it reaches the point where it would interfere with his work, carry it past the work area and return it to the existing system downstream of his work.
2. The design, installation and operation of the temporary pumping system shall be the Contractor's responsibility. The bypass system shall meet the requirements of all codes and regulatory agencies having jurisdiction.

3. The Contractor shall provide all necessary means to safely convey the sewage past the work area. The Contractor will not be permitted to stop or impede the main flows under any circumstances.
4. The Contractor shall divert the flow around the work area in manner that will not cause damage to, or surcharging of customers system and will protect public and private property from damage and flooding.

5. The Contractor shall protect water resources, wetlands, and other natural resources.

PART 2: PRODUCTS

2.01 EQUIPMENT

A. All pumps used shall be fully automatic self-priming units that do not require the use of foot-valves or vacuum pumps in the priming system. The pumps may be electric or diesel powered. All pumps used must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

B. The Contractor shall provide the necessary stop/start controls for each pump.

C. The Contractor shall include one stand-by pump of each size to be maintained on site. Back up pumps shall be online, isolated from the primary system by a valve.

D. It is recommended that the pump be contained inside a temporary portable berm or secondary containment to contain any fuel or sewage that may spill during the normal course of operation.

E. Discharge Piping – In order to prevent the accidental spillage of flows, all discharge systems shall be temporarily constructed of rigid pipe with positive, restrained joints. Under no circumstances will "irrigation" type piping or glued PVC pipe be allowed. Discharge hose will only be allowed in short sections and by specific permission from the engineer.

PART 3: EXECUTION

3.01 FIELD QUALITY CONTROL AND MAINTENANCE

A. Test:

1. The Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to the actual operation. The Engineer will be given 24 hours notice prior to testing.

B. Inspection:

1. Contractor shall inspect bypass-pumping system on a continuous basis to ensure the system is working correctly.

C. Maintenance Service:

1. Contractor shall ensure the temporary pumping system is properly maintained and a responsible operator shall be on hand at all times when pumps are operating.

2. Contractor shall monitor pump fuel levels if required and make arrangements for timely refueling as needed

D. Extra Materials:

1. Spare parts for pumps and piping shall be kept on site as required.

2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.02 PREPARATION

A. Precautions

1. Contractor is responsible for locating any existing utilities in the area selected for the bypass pipelines. The Contractor shall locate his bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner. All costs associated with relocating utilities and obtaining all approvals shall be paid by the Contractor.

2. During all bypass-pumping operations, the Contractor shall protect the Owner's system (Pumping Station, Conveyance System Etc.) as applicable from damage inflicted by any equipment. The Contractor shall be responsible for all physical damage to the Owner's system caused by human or mechanical failure.

3.03 INSTALLATION AND REMOVAL

A. The Contractor shall remove manhole sections or make connections to the existing conveyance system and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide adequate suction conduit.

B. Plugging or blocking of flows shall incorporate a primary or secondary plugging device. When plugging or blocking is no longer needed for performance and acceptance or work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging or causing other major disturbances downstream.

C. When working inside manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements when working in the presence of sewer gases, combustible or oxygen-deficient atmospheres, and confined spaces.

D. The installation of the bypass pipelines is prohibited in all wetland areas. The pipeline must be located if possible off streets and sidewalks and on shoulders of the roads. When the bypass pipeline crosses local streets and private driveways, the Contractor must place the bypass pipelines in trenches and cover with temporary pavement. Upon completion of the bypass pumping operations, and after receipt of written permission from the Customer, the Contractor shall remove all the piping, restore all property to pre-construction condition, and restore all pavements. The Contractor is responsible for obtaining any approvals for placement of the temporary pipeline from the Owner.

END OF SECTION

DIVISION 2: SITE WORK

SECTION 02200
EARTHWORK

PART 1 GENERAL

1.01 WORK INCLUDED

A. Provide labor, materials, equipment and supplies to perform the required clearing and grubbing, excavation, backfill, and grading indicated on the Contract Drawings.

1.02 REFERENCED STANDARDS

A. OSHA's Construction Standards for Excavation, 29 CFR 1926, Subpart P: Excavation, latest revision, as published in the F.R. Vol. 54, No. 209, dated 10/31/89.

B. New York State Department of Transportation Standard Specifications, May 4, 2006.

1.03 DEFINITIONS

A. The following terms shall have the meanings ascribed to them in this Section, wherever they appear in this specification.

B. Rock: Limestone, sandstone, shale, granite, or similar material in solid beds or masses in its original or stratified position which, in the opinion of the Engineer, can be removed only by blasting, drilling, wedging, or use of pneumatic tools, and all boulders with a volume greater than one (1.0) cubic yard. Removal of materials which can be loosened with a pick or backhoe, frozen materials, soft laminated shale or hardpan, pavements, curbs, and similar materials shall be considered as earth excavation.

C. Subgrade Surface: Surface upon which subbase or topsoil is placed.

D. Subbase: Select granular material or other porous material, which is placed immediately beneath pavement or concrete slabs.

E. Maximum Density: The dry unit weight in pounds per cubic foot of the soil at "Optimum Moisture Content" when determined by ASTM D 698 (Method C).

1.04 SUBMITTALS

A. Samples: Furnish pit location and current DOT acceptance number with each sample.

1. Select Granular Material: 40 - 50 lbs.
2. Selected Fill: 40 - 50 lbs.
3. Crushed Stone: 40 - 50 lbs.
4. Pea Gravel: 40 - 50 lbs.
5. Sand: 40 - 50 lbs.
6. Filter Fabric: 1 sq. yd.

B. Product Data: Manufacturer's specifications, performance characteristics and operating instructions for compaction equipment.

C. Sheeting, Shoring, Bracing: If deemed necessary, submit to the Engineer a detailed plan of any intended slope protection, by sheeting, shoring, or bracing, which shall be in conformance with OSHA's 29 CFR Part 1926, Subpart P, latest revision, and signed by a licensed Professional Engineer. This submittal will not relieve the Contractor of complete responsibility for the successful performance of the intended sheeting, shoring, and bracing methods.

1.05 JOB CONDITIONS

A. Protect newly graded areas from traffic and erosion, and keep them free of trash and debris until physical completion of the work.

B. Protect existing public and private utilities and/or structure below ground surface, adjacent to the work site.

C. Protect existing trees and plants during performance of the work. Box trees and plants within the grading limit lines with temporary snow fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.

D. Cold Weather Requirements: When freezing temperatures are predicted, do not excavate to final required elevations for Concrete Work unless concrete can be placed immediately. Retain enough earth over the bottom elevation of footings to prevent frost penetration.

PART 2 PRODUCTS

2.01 MATERIALS

A. Select Granular Material: Shall be angular crusher run limestone as delivered unsorted from the crusher and shall be well graded, durable and composed of rock pieces, chips and fines. Select Granular Material shall be free from organic or other deleterious materials and in also meet the requirements of (DOT Subbase Course Type 2):

Sieve	**Percent Passing**
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

Magnesium Sulphate Soundness Test: 20 percent maximum loss by weight after 4 test cycles.

B Select Fill: Covered under Section 2230.

C. Suitable Fill Material: For use as fill in landscaping and other such applications. Suitable Fill Material shall consist of available site material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man made origin, or mixtures thereof. Maximum particle size shall not exceed 2/3 of the layer thickness prior to compaction. Material containing cinders, industrial waste, sludge, building rubble, organic matter including topsoil, sod, muck and peat shall be considered unsuitable for fill and backfill.

D. Suitable Native Material: Shall be available site material consisting of mineral soil (inorganic), loose materials free from rocks and/or hard chunks of clay, free of sharp materials, and free of frozen materials. If materials on site are found to be not suitable, the Contractor shall import suitable material.

E. Crushed Stone and Crushed Gravel: Shall be clean, durable crushed stone or gravel consisting of regular fragments obtained by crushing. It shall be free from sand, silt, clay, shale, broken slag, organic material or any other deleterious materials. The material shall be obtained from sources which are approved by the New York State Department of Transportation (NYSDOT), and shall conform to the NYSDOT Standard Specifications, latest edition, Material Designation 703-0201 and 703-0202 respectively, in the sizes stated below.

NYSDOT (Table 704-4 Size)
1B
1A
1ST
1
2
3A
3
4A
4
5

F. Pea Gravel: Screened Gravel, DOT Material Designation 703-0203, Size 1ST (Table 703-4)

G. Sand cushion: Sand meeting NYS DOT Standard Specifications Section 703-06

H. Sand: ASTM C 33.

I. Stone Filling: (Meeting the requirements of DOT 620-2.01 and 620-2.02)

Fine Stone Filling:	90-100%	smaller than 8 inches
	50-100%	larger than 3 inches
	0-10%	smaller than No. 10 Sieve
Light Stone Filling:	90-100%	lighter than 100 pounds
	50-100%	larger than 6 inches
	0-10%	smaller than 1/2 inch
Medium Stone Filling:	50-100%	heavier than 100 pounds
	0-10%	smaller than 4 inches
Heavy Stone Filling	50-100%	heavier than 600 pounds
	0-10%	smaller than 6 inches

J. Dry Rip-Rap: (Meeting the requirements of DOT 620-2.01 and 620-2.03) Dry Rip-Rap shall consist of stones shaped a nearly as practicable in the form of right rectangular prisms. At least 50%, by weight of the stones shall weigh in excess of 300 pounds each, and the remainder of the stones shall weigh from 100 to 300 pounds each.

2.02 COMPACTION EQUIPMENT

A. Compaction equipment used for the Work is subject to approval by the Engineer. Any equipment not originally manufactured for compaction purposes and equipment which is not in proper working order will not be approved. Furnish manufacturer's specifications covering data not obvious from a visual inspection of the equipment to determine its classification and performance characteristics.

2.03 SHEETING, SHORING AND BRACING

A. Steel sheet piling: Continuous interlock type complete with all required accessories conforming to ASTM A 328 or to ASTM A 572.

1. Provide steel sheet piling of design, configuration and length to sustain pressure of earth to be retained.

B. Timber Sheeting, Shoring and Bracing: Timber sheeting, structural grade timber or lumber uprights, stringers and cross braces of sufficient dimension to resist pressure of work to be retained, in conformance with OSHA's 29 CFR Part 1926 Subpart P, latest revision.

PART 3 EXECUTION

3.01 CLEARING AND GRUBBING

A. Remove all trees, shrubs and other vegetation and all existing improvements both above and below grade only to the extent required to provide new construction.

B. Protect all trees which are to remain with fencing erected beyond the drip line of outermost branches. Contractor shall take all precautions necessary to prevent damage to trees or shrubs to be retained.

C. Where limbs are removed to accommodate construction, they shall be removed carefully, and exposed wood treated with approved dressing. Where roots are exposed or damaged by construction, they shall be carefully and cleanly cut, and the area backfilled to prevent desiccation.

D. Where necessary, the trees shall be pruned to restore the appearance of the tree, or to restore the balance between the root system and top growth.

E. Any tree which is designated to remain that dies or becomes damaged beyond repair shall be replaced by the Contractor at his expense, with a tree of a size and species as directed by the Engineer.

3.02 REMOVAL OF TOPSOIL

A. Strip and stockpile topsoil that will be reused in the Work. Place, grade, and shape stockpiles as directed by the Engineer for protection against erosion and for proper drainage.

3.03 UNDERGROUND UTILITIES

A. Support and protect to the satisfaction of the utility owner, active utilities from any damage during excavation operations.

B. In areas where there appears to be conflict between the existing underground utilities and the construction of the work covered by this Contract, it shall be the responsibility of the Contractor to dig test pits, uncover the existing utility, and promptly inform the Engineer of the existence of a conflict for his review and determination regarding resolving such situations. The Contractor shall perform the required task of uncovering existing utilities well ahead of the time he intends to perform the new work in such areas. No payment will be made for uncovering existing utilities where they appear to be in conflict with the construction of the new work.

3.04 EXCAVATION AND TRENCHING

A. Effective January 2, 1990, the Contractor shall familiarize himself, and strictly comply with OSHA's Construction Standards for Excavation, 29 CFR Part 1926, Subpart P: Excavation, latest revision, as published in the Federal Register, Vol. 54, No. 209, dated Thursday October 31, 1989. The intended effect of these revised Standards is to increase the protection and safety of employees working in excavations.

B. Excavate earth as required for the Work.

C. Unauthorized Excavations (removal of any material below subgrade elevations indicated on the Drawings, or beyond lateral dimensions indicated or specified herein, without specific written instruction from the Engineer): Backfill and compact unauthorized excavations as specified for authorized excavations of the same classification, unless otherwise directed by the Engineer.

D. Slope the sides of excavations to retain soil repose. Sheet and shore excavations where sloping is not possible due to space restrictions or stability of material. Maintain sides and slopes of excavation in a safe condition to conform to OSHA and NYS Department of Labor rules and regulations, latest revisions, until completion of backfilling.

E. Concrete Slabs and Bases: Excavate to the following depths below bottom of concrete for addition of select granular material, unless otherwise indicated:

1. Interior : 6 inches.
2. Exterior : 12 inches.

F. Bell and Spigot Pipe: Unless otherwise indicated on the drawings, excavate trenches 24 inches wide for pipes up to 18” diameter plus the outside diameter of the pipe. Excavate trenches 36 inches wide for pipes greater than 18” diameter plus the outside diameter of the pipe. Cut trench bottom true and even. Excavate adequate bell holes to allow ample room for pipe connections and to allow for uniform bearing of pipe on a minimum of 6” depth of stone bedding or as shown on the applicable pipe bedding detail, for its full length.

G. Conduit, Cable, Tubing and Piping (other than bell and spigot): Provide sufficient trench width for installation and to accommodate special backfill when specified.

H. Comply with applicable governing restrictions during excavation and trenching. Shore and brace, or slope sides of excavations when directed in order to conform to governing laws of OSHA, NYS Labor Department.

I. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade and shape stockpiles for proper drainage as directed.

3.05 SHEETING, SHORING AND BRACING

A. Where sloping of excavations is not possible due to space restrictions, provide temporary sheeting with shoring and bracing as required to prevent damage or settlement to adjacent grounds and structures resulting from excavation operations. Shore and brace sheeting in compliance with OSHA's 29 CFR Part 1926, Subpart P, latest revision. Promptly remove temporary sheeting and shoring when no longer required.

B. Provide permanent steel sheet piling or pressure creosoted timber sheet piling wherever subsequent removal of temporary sheet piling might permit lateral movement of soil under adjacent structures. Cut off tops 12 inches below grade.

3.06 DEWATERING

A. Prevent surface and subsurface water from flowing into excavations and trenches which will interfere with the progress of the work. Pump out any accumulated water, and dispose of in a manner approved by the Owner and the Engineer.

3.07 EXISTING DRAINAGE DITCHES

A. Provide positive drainage of surface water at all times during construction of work required under this Contract.

B. Restore existing ditches to their original condition or better, immediately after installing the new work.

C. The Contractor shall be responsible for any damages to public and/or private property resulting from blockage of drainage due to his construction activities and/or any delay in restoration of existing drainage ditches.

D. Fertilize and seed slopes and bottom of ditches to prevent erosion after restoration of these ditches.

3.08 PLACING FILL AND BACKFILL

A. Backfill as promptly as practical, but only after approval by the Engineer. Do not backfill with excavated material unless it meets the requirements of this section.

B. Place backfill and fill materials in layers not more than 12 inches loose depth, except under pavements where layers shall be not more than 6 inches of loose depth. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen or contain frost or ice.

C. Under Exterior Concrete Slabs and Bases:

1. Up to subgrade surface elevation: Place selected fill when fill or backfill is required.

2. Subbase material: Place 12 inches of select granular material over subgrade surface.

D. Under Exterior Pavement and Walks:

1. Up to subgrade surface elevation: Place selected fill when fill or backfill is required.

2. Subbase material: Select granular material.

E. Landscaped Areas: Place suitable excavated native material or select fill if ordered in writing by the Engineer up to subgrade surface elevation. Do not use material containing rocks over 4 inches diameter within the top 12 inches of suitable material.

3.09 COMPACTION

A. Compact each layer of fill and backfill to the percentage of maximum density specified below. Compact bearing surface material at a moisture content suitable to obtain the required densities, but at not less than 3 percent drier than the optimum content as determined by ASTM D-1557.

1. Structures (area within 10 ft outside perimeter): 95 Percent

2. Lawn or unpaved areas: 85 percent

3. Pavements and walks: 95 percent

3.10 GRADING

A. Rough Grading: Trim and grade excavations required by this contract, to a level 4 inches below finished grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.

B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:

1. Grassed areas: Finish areas to receive topsoil to within not more than 1 inch above or below the required subgrade surface elevations.

2. Pavements, Walks, and Building Slabs: Grade subbase material smooth and even, free of voids, compacted as specified to within 1/4 inch above or below the required subbase elevation.

C. Spread approved topsoil directly upon prepared subgrade surface to a depth measuring 4 inches after natural settlement of topsoil has occurred in areas to be seeded or to receive sod. Provide greater depth to adjust grades when directed by the Engineer.

3.11 RESTORATION

A. Restore grades to indicated levels where settlement or damage due to performance of Work has occurred. Correct conditions contributing to settlement. Remove and replace improperly placed or poorly compacted fill materials.

B. Restore asphalt concrete pavements, drives, gutters, curbs, and other exterior surfaces damaged during performance of the Work, to match the appearance and performance of existing adjacent surfaces as closely as practicable and in

conformance with the applicable municipality's requirements.

C. Restore damaged lawn areas by topsoiling and seeding, or sodding. Water restored lawn areas as required until physical completion of the Work.

3.12 DISPOSAL OF EXCESS AND WASTE MATERIALS

A. Remove and dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing.

B. Transport surplus topsoil to area designated by the Owner or the Engineer. Smooth grade deposited topsoil.

END OF SECTION

SECTION 02225
TRENCHING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Trenches for pipelines and appurtenances

B. Maintaining trenches

C. Encountering underground facilities

D. Existing structures and pavements within the trench limits

E. Trees, bushes and plantings

F. Surplus material

G. Dust control

H. Voids under adjacent structures

1.02 DEFINITIONS

A. Trenching or Excavation

1. Grubbing, stripping, removing, storing and rehandling of all materials of every name and nature necessary to be removed for all purposes incidental to the construction and completion of all the work under construction;

2. All dikes, ditches, flumes, cofferdams, pumping, bailing, draining, well points, or otherwise disposing of water;

3. The removing and disposing of all surplus materials from the excavations in the manner specified;

4. The maintenance, accommodation and protection of travel and the temporary paving of highways, roads and driveways;

5. The supporting and protecting of all tracks, rails, buildings, curbs, sidewalks, pavements, overhead wires, poles, trees, vines, shrubbery, pipes, sewers, conduits or other structures or property in the vicinity of the work, whether over or underground or which appear within or adjacent to the excavations and the restoration of the same in case of settlement or other injury;

6. All temporary bridging and fencing and the removing of same.

B. Earth

1. All materials such as sand, gravel, clay, loam, ashes, cinders, pavements, muck, roots or pieces of timber, soft or disintegrated rock, not requiring blasting, barring, or wedging from their original beds, and specifically excluding all ledge or bedrock and individual boulders or masonry larger than one-half cubic yard in volume.

C. Backfill

1. The refilling of excavation and trenches to the line of filling indicated on the Contract Drawings or as directed using materials suitable for refilling of excavations and trenches; and the compacting of all materials used in filling or refilling by rolling, ramming, watering, puddling, etc., as may be required.

D. Spoil

1. Surplus excavated materials not required or not suitable for backfill or embankments.

E. Embankments

1. Fills constructed above the original surface of the ground or such other elevation as specified or directed.

F. Limiting Subgrade

1. The underside of the pipe barrel for pipelines.

G. Excavation Below Subgrade

1. Excavation below the limiting subgrade of pipelines.

2. Excavate to such new lines and grades as required when material encountered at the limiting subgrade is not suitable for proper support of pipelines.

PART 2 PRODUCTS - None

PART 3 EXECUTION

3.01 PREPARATION

A. Identify required lines, levels, contours, and datum. Locate all utilities and underground obstructions prior to starting excavations, including cutting pavements.

B. Cut pavement and pavement base over the proposed trench before excavating for pipeline installation. Utilize a jackhammer, wheel cutter ("Pizza Cutter") or power driven saw. Cut pavement to the required trench width as approved by the OWNER.

C. Relocate, remove and later restore, or replace existing structures in the proposed trench limits and those structures which would be damaged or impede progress.

D. Protect the trunks of trees adjacent to the Work that are not to be cut. Tie back overhanging branches and limbs not to be cut to prevent injury from excavating machinery or any other operations related to the work.

E. Do not cut or remove branches, limbs and roots except for those plantings included in clearing and grubbing areas. In the case of unavoidable damage to plantings, neatly trim the injured portions without splitting or crushing.

F. Remove and temporarily store in soil, any plants and flowers which would be injured by the work. Replant in their original position after the Work has been substantially completed. Maintain until re-established. Replace with plantings of the same kind, quality and size that existed prior to construction when the original plantings die or their growth, beauty or usefulness is diminished as a result of the work.

G. Maintain support of existing power, lighting, telephone, traffic control and utility poles adjacent to excavations as required by the owners of the poles.

H. Do not operate on paved surfaces equipment which has treads or wheels that would cut or damage the pavement.

I. Avoid damage to existing pavement other than pavement within the limits of the trench. Provide the pads of outriggers with protective covers, or place planks or timbers under the pads to prevent damaged to pavements. No payment shall be made for replacement or restoration of pavements beyond the payment limits which are damaged during the Work.

J. Strip and stockpile topsoil in areas to be restored as field for eventual redistribution to its original profile location. Strip the entire depth of topsoil to a width of the trench payment limit plus 2 feet or greater as may be required by conditions or other installations. Stockpile topsoil on the parcel of land from which it was stripped at locations approved by the ENGINEER. Remove 10" and larger rocks from the topsoil.

3.02 EXCAVATION

A. Excavate trenches to the lines and grades specified and as required. Backfill with special granular materials, concrete or other materials as directed by the ENGINEER, any excavated space carried beyond or below the lines and grades shown on the Contract Drawings, or as directed by the ENGINEER. Backfill unauthorized excavations at the CONTRACTOR's expense.

B. Excavate the trench sides vertically between the centerline of the pipe and an elevation 1 foot above the top of the pipe unless this conflicts with the requirements of OSHA. In the case of rock excavation, excavate to 6 inches below invert elevation of pipe and 12 inches wider than the nominal pipe diameter. Maintain a minimum clearance of 6 inches around the pipe.

C. Provide and maintain proper and satisfactory means and devices for the

removal of all water entering the excavations, and remove all such water as fast as it may collect, in such a manner as shall not interfere with the progression of the work or the proper placing of pipes, or other work.

D. Prevent damage to surrounding pavement, gutters and structures while excavating.

E. Furnish, place and maintain such sheeting, bracing and shoring as may be required to support the sides and ends of excavations in such manner as to prevent any movement which could, in any way, damage the pipe, structures, or other work; diminish the width necessary for construction; otherwise damage or delay the work of the Contract; endanger existing structures, pipes or pavements; or cause the excavation limits to exceed the right-of-way limits.

In no case will bracing be permitted against pipes or structures in trenches or other excavations.

Drive sheeting vertically with the edges tight together as the excavation progresses, and in such manner as to maintain pressure against the original ground at all times. Design all bracing to maintain sheeting in its proper position.

The adequacy of all sheeting and bracing is the sole responsibility of the CONTRACTOR.

Remove and dispose all material which slides, falls or caves into the established limits of excavations due to any cause whatsoever, at the CONTRACTOR's expense. No extra compensation will be paid to the CONTRACTOR for any materials ordered for refilling the void areas left by the slide, fall or cave-in.

F. Discontinue machine excavation in the vicinity of pipes, conduits and other underground structures and facilities and complete the excavation with hand tools as required by Industrial Code Rule 753.

G. When determination of the exact location of a pipe or other underground structure is necessary for completing the work properly, excavate test holes to determine such locations.

H. When the bottom of any excavation is taken out beyond the limits indicated or prescribed, backfill and compact the resulting void with #1 or #2 crusher run compacted to 95% maximum modified Proctor density.

I. Remove material which, in the opinion of the ENGINEER, is found to be unsuitable for foundation of the pipeline and appurtenances during excavation. Payment shall be made under the appropriate item of the bid.

J. Use suitable surplus excavated materials for backfill of excavations in rock or to replace other materials unacceptable for use as backfill except in areas which require select backfill. Surplus excavated materials may be stockpiled at appropriate locations as needed for future use or as directed by the ENGINEER.

K. Remove from the site all surplus excavated materials not needed.

L. Replace existing structures (including concrete gutters, concrete sidewalks and curbs that are crossed by the proposed utility) and stone shoulders or other stone areas which are damaged or removed during the Work.

M. When existing driveway culverts are encountered, replace with adequate size (minimum 12-inch diameter). Methods, materials and alignment to be determined by the applicable highway department.

N. Minimize the creation and dispersion of dust. Sweep and sprinkle with water as required by conditions.

O. Completely fill all voids which occur under existing sidewalks, curbs, gutters or other structures during the excavation with Type 5 Select Fill.

P. Place and maintain a 2" thick layer of compacted temporary asphalt over backfilled trenches until permanent pavement is placed. Materials and workmanship for temporary pavement shall conform to the State of New York Department of Transportation specifications, the City of Rochester's Standard Specifications, and the specifications of any applicable municipality. The plant mix (cold patch or other approved material) shall be suitable for providing a smooth surface for traffic. Temporary pavement, if required, shall be paid for under the appropriate item in the bid.

END OF SECTION

SECTION 02227
BACKFILLING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Backfilling around and above pipe and appurtenances

B. Consolidation and compaction

C. Backfill in paved areas, lawn areas and field areas

D. Surplus material

E. Fine grading

1.02 REFERENCES

A. ANSI/ASTM D1556 - Test Method for Density of Soil in Place by the Sand-Cone Method.

B. ASTM D2167 - Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method.

C. ASTM D2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

D. ASTM D3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.

PART 2 PRODUCTS

2.01 SELECT FILL MATERIALS

A. As specified in Section 02230.

2.02 SUITABLE NATIVE MATERIALS

A. Suitable Native Material: Shall be available site material consisting of mineral soil (inorganic), loose materials free from rocks and/or hard chunks of clay, free of sharp materials, and free of frozen materials. If materials on site are found to be not suitable, the CONTRACTOR shall import suitable material.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify installation has been inspected by the ENGINEER.

3.02 PREPARATION

A. Cut out soft areas of subgrade not capable of in situ compaction. Backfill with select fill and compact to 95% maximum modified Proctor density.

B. When required to obtain the optimum moisture content, add, at no additional cost to OWNER, sufficient water during compaction to assure the specified maximum density of the backfill. If, due to rain or other causes, the material exceeds the optimum moisture content, it shall be allowed to dry, assisted if necessary, before resuming compaction or filling efforts.

3.03 BACKFILLING

A. Backfill all excavations to the original surface of the ground or to such other grades as may be shown, specified or directed.

Backfill with suitable excavated materials which can be satisfactorily compacted during refilling of the excavation. In the event the excavated materials are not suitable, use select fill as specified or ordered by the ENGINEER.

Refill and compact settlements and repair finished work damaged by settlement at no additional cost to OWNER.

B. Backfill the zone around pipes (under, around and to a depth of 12 inches above the pipe) with washed #1 & #2 stone bedding in accordance with the Pipe Bedding Details. Place the material in by shovel in such a manner as not to damage pipe or appurtenances and in layers not to exceed 6 inches in depth. Compact to 95% maximum modified Proctor density.

C. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen or spongy subgrade surfaces.

D. Backfill trenches under streets, roads, driveways, walks, gutters and curbs or other areas requiring structural support with select fill, or as directed by the ENGINEER.

Place and compact the select fill or native soil in uniform layers not exceeding 6" in compacted depth. Compact to 95% maximum modified Proctor density. Maintain optimum moisture content of backfill materials to attain required compaction density. Use compaction equipment suitable for material excavated, and pipe or appurtenance installed.

E. For other areas use native soil which was removed in the course of the construction excavations or replacement fill. Distribute stones in the backfill to prevent the formation of voids. Do not incorporate in the backfill stones over 6 inches in any one dimension.

F. Trenches in open fields, lawn areas and wooded areas, may be backfilled by filling in the entire trench, except for the zone around the pipe and the topsoil when stripped and stockpiled, in one operation and compacting the backfill with construction equipment, leaving the fill mounded slightly over

the trench. Maintain the surface over the trench during the guarantee period.

For trenches in areas to be restored under the field restoration item, backfill to allow for the original depth of the topsoil which was stockpiled. Upon completion of the subsoil backfilling, place the stockpiled topsoil on top of the subsoil. Remove large rocks (2" and above) and boulders from the topsoil. The cost of this work shall be included in the field restoration item of the bid.

G. Employ a placement method that does not disturb or damage other work. Do not backfill against unsupported foundation walls.

H. Remove surplus backfill materials from site.

I. Each day complete fine grading operations of the work completed the previous day in areas other than pavement. In pavement areas, complete fine grading and install temporary asphalt the same day.

J. Fine grade by leveling disturbed areas to as close to final finish grade as possible, leaving the fill mounded slightly over the trench. Remove all debris and place temporary asphalt as specified in the bid or as directed by the ENGINEER. Payment for temporary asphalt shall be made under the appropriate item of the bid.

A.04 FIELD QUALITY CONTROL

A. The CONTRACTOR shall be responsible for all damage or injury done to pipes, structures, property or persons due to improper placing or compacting of backfill.

B. Compaction testing shall be performed in accordance with ANSI/ASTM D1556.

END OF SECTION

SECTION 02230
SELECT FILL

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Types of Select Fill

B. Placement and Installation

C. Disposal of Displaced Material

1.02 REFERENCES

A. ASTM D422, Standard Method for Particle-Size Analysis of Soils.

1.03 SUBMITTALS

A. Submit name of supplier and source for each type of select fill material.

B. Provide sample and test report for each type of select fill material.

PART 2 PRODUCTS

2.01 SELECT FILL MATERIALS

A. Type 1 is #1 Crusher Run Stone - NYSDOT Standard Specification Item No. 304.03: Hard durable limestone or approved equal with the following gradation:

Sieve Size Designation	Percent Passing By Weight
2 inch	100
1/4 inch	25 - 60
No. 40	5 - 40
No. 200	0 - 10

B. Type 2 is #2 Crusher Run Stone - NYSDOT Standard Specification Item No. 304.02: Hard durable limestone or approved equal with the following gradation:

Sieve Size Designation	Percent Passing By Weight
3 inch	100
2 inch	90 - 100
1/4 inch	30 - 65
No. 40	5 - 40
No. 200	0 - 10

C. Type 3 is Run-of-Bank Gravel: Run-of-bank gravel or other approved granular material free from organic matter with a gradation:

Sieve Size Designation	Percent Passing By Weight
1-1/2 inch	100
1/4 inch	30 - 65
No. 200	0 - 10

D. Type 4 is Sand: Coarse sand having the following gradation:

Sieve Size Designation	Percent Passing By Weight
3/8 inch	100
No. 4	90 - 100
No. 8	80 - 100
No. 16	50 - 85
No. 30	25 - 60
No. 50	10 - 30
No. 100	2 - 10

E. Type 5 is Controlled Density Fill (CDF): "K-Krete", "Flowable Fill", or approved equal with a compressive strength of 50 to 100 psi. Fly ash or other pozzolan-containing materials are not acceptable in the mix design. The consistency shall be suitable for pumping or flowing into the annular space between a casing pipe and the carrier pipe.

F. Type 6 Select Fill (Washed #1, or Washed #1 and #2 Mix).

PART 3 EXECUTION

3.01 STORAGE AND PROTECTION

A. Store loose granular materials on solid flat surfaces in a well-drained area.

B. Protect materials and prevent mixing with foreign matter.

3.02 INSTALLATION

A. Place select fill in accordance with Section 02227, "Backfill" or as otherwise specified or directed.

B. Employ a placement method that does not disturb or damage other work.

3.03 DISPOSAL OF DISPLACED MATERIALS

A. Remove and properly dispose of surplus or displaced materials.

END OF SECTION

SECTION 02608
SEWER MANHOLE REHABILITATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. Furnish and install masonry and epoxy coatings that provide structural integrity and corrosive correction to manhole walls, benches and inverts. All products shall meet the minimum requirements and standards referenced below and where products from different manufacturers are utilized the CONTRACTOR shall be responsible for demonstrating material compatibility to the OWNER.

1.02 SUBMITTALS

A. Submit product data including:

1. Manufacturer's specifications, catalog cuts, installation instructions, and dimensional data.

2. CONTRACTOR must demonstrate they are qualified by experience and where necessary provide evidence they are trained and approved by the manufacturer for application of specific products.

PART 2 PRODUCTS

2.01 MATERIALS

A. Manhole – Cement Mortar Manhole Lining Application Products:

Parson MH Liner Portland Cement Based Mortar, or approved equal, is recommended. All products must meet the following properties and standards.

Compressive Strength	ASTM C-190
1 Day	> 4,000 psi
28 Days	> 9,000 psi
Flexural Strength	ASTM C-293
28 Days	> 1,600 psi
Tensile Strength	ASTM C-496
28 Days	> 800 psi
Shrinkage	ASTM C-596
28 Days @ 90% RH	0.0 %
Bond	ASTM C-882
28 Days	> 2,000 psi
Freeze/Thaw	ASTM C-666 300 Cycles, No Damage
Permeability	AASHTO T-277 < 500 Coulombs
Density	130 pcf
Sulfide Resistance	ASTM C-267

B. Manhole – Epoxy Corrosion Barrier Coatings:

Parsonpoxy SEL-80 Epoxy, or approved equal, is recommended. All products must meet the following properties and standards.

Set Time @ 70F	6-8 Hours	
Cure Time @ 70F	18-20 Hours	
Compressive Strength	19,500 psi	ASTM D-695
Tensile Strength	8,000 psi	ASTM D-638
Flexural Strength	13,000 psi	ASTM C-790
Elongation	4.3% Min.	ASTM D-638
Flex Modulus (initial)	750,000 psi	ASTM D-790
Flex Modulus (long term)	375,000 psi	ASTM D-790
Modulus of Elasticity	554,000 psi	ASTM D-638

PART 3 EXECUTION

3.01 PREPARATION

A. Inspect manholes for suitability of products prior to installation, and prepare surfaces in accordance with all manufacturer's recommendations.

3.02 INSTALLATION

A. Masonry Surface Restoration for Manhole Walls, Benches and Inverts:

1. Thoroughly clean using a minimum 3,500 psi waterblast, and remove loose mortar, paints, protective coatings, efflorescence, and all contaminants and curing components to provide a clean, structurally sound substrate before application of products. Wire brush or sand blast where required.

2. Coatings shall be applied to a thickness recommended by the manufacturer, with a minimum thickness of ½". Application of product can be accomplished by low to medium velocity wet mix shotcrete equipment or by trowel, with application thickness up to 3" in single lifts. Finish may be done by trowel, float, and/or brush.

3. Where large voids exist in manhole walls or sewer structures, patching shall be required using recommended products, or products suitable to the repair.

B. Epoxy Coating Finish for Manholes with Moderate to High Corrosive Environments:

1. Prior to application of epoxy coating, manhole surfaces must be clean, intact and structurally sound as rehabilitated and repaired in accordance with Section 3.02A above.

2. Corrosion Barrier Coatings shall be accomplished through methods and equipment prescribed by the manufacturer.

3. Coatings shall be applied to a thickness recommended by the manufacturer, up to 80 mils. If additional coats are required to achieve greater thickness, product must be tack-free, but no more than 12 hours after first application.

END OF SECTION

SECTION 02750
CURED-IN-PLACE SEWER REHABILITATION

PART 1 GENERAL

1.01 WORK INCLUDED

A. The work covered by this section of the specifications includes the furnishing of all labor, tools, equipment and materials, and performing all operations required for the rehabilitation of pipelines, conduits and laterals by the installation of a resin-impregnated flexible tube, which is tightly formed to the original conduit by use of a hydrostatic head. The resin is cured using hot water under hydrostatic pressure within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting.

B. The resin-impregnated flexible tube rehabilitation system shall be designed, provided, and installed in accordance with the Partially Deteriorated Design method by an approved and qualified manufacturer and installer.

C. The work shall also include complete maintenance of all wastewater flows, and the locating and reopening of service wyes or tees.

1.02 SYSTEM DESCRIPTION

A. All materials shall be accompanied by test reports certifying that the material conforms to the ASTM listed herein. Materials shall be shipped, stored, and handled in a manner consistent with the written recommendations of the manufacturer. Storage locations shall be approved by the Engineer.

B. The CONTRACTOR shall conform with all work safety requirements of pertinent regulatory agencies, and shall secure the site for the working condition in compliance with the same. The CONTRACTOR shall erect such signs and other devices as are necessary for the safety of the work site.

C. The CONTRACTOR shall also perform all of the work in accordance with applicable OSHA standard.

D. The CONTRACTOR shall repair or replace any damaged pipe as recommended by the manufacturer or as required by the OWNER at the CONTRACTOR's expense.

1.03 REFERENCES

A. ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube).

B. ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe).

C. ASTM D5813 (Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe).

D. ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

1.04 SUBMITTALS

A. Product Data: Submit manufacturer's technical product data and installation instructions for all equipment and products of this section.

B. Shop Drawings: Submit shop drawings for all equipment and materials to be used during rehabilitation procedures.

C. Manufacturer's literature, specifications, engineering data, and shop drawings showing complete information on the pipe rehabilitation system including materials composition, physical properties, and dimensions of the pipe. Include pipe manufacturer's recommendations for handling, storage, and repair of damaged pipe.

D. The CONTRACTOR/installer shall provide CIPP liner thickness design calculations for the specific location.

E. Methods of construction and restoration of service including detailed drawings, schedules, and written descriptions of construction procedures to install pipe, and bypass sewage.

F. Two (2) copies of pre- and post-construction televised video inspection reports and two (2) copies of the televising videos (DVD format).

G. Copy of the proposed letter to the Homeowners advising them about the proposed repair and necessity of shutting the sewer service for a day shall be submitted for Engineers review and approval prior to distribution. Letter shall be distributed by the CONTRACTOR to the Homeowners not less than seven (7) days prior to the construction.

1.05 PRODUCT REQUIREMENTS

A. The system proposed (materials, methods, workmanship) must be proven through previous successful installations to an extent and nature satisfactory to the OWNER and the Engineer that is commensurate with the size of the project being proposed. Since CIPP is intended to have a 50-year design life, only products deemed to have this performance will be accepted.

B. For a Product to be considered Commercially Proven, a minimum of 250,000 linear feet or 1,000 manhole-to-manhole line sections of successful wastewater collection system installations in the United States must be documented to the satisfaction of the OWNER to assure commercial viability.

C. Sewer rehabilitation products submitted for approval must provide Third Party Test Results supporting the long term performance and structural strength of the product and such data shall be satisfactory to the OWNER. Test samples shall be prepared so as to simulate installation methods and trauma of the product. No product will be approved without independent third party testing verification.

D. CIPP Field Samples - When requested by the OWNER, the CONTRACTOR shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in paragraph 2.02.C have been achieved in previous field applications. Samples for this project shall be made and tested as described in paragraph 3.07.

E. Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9000 or other internationally recognized organization standards. Proof of certification shall be required for approval.

F. All required submittals must be satisfactory to the OWNER.

G. Regulatory Requirements: Comply with applicable local, state, and federal regulations, safety standards, and codes. Where conflicts arise, follow the stricter requirements.

1.06 CONTRACTOR/INSTALLER QUALIFICATIONS

A. Shall be in accordance with the Instructions to Bidders.

B. The Installer must have successfully installed at least 100,000 feet of the product bid in wastewater collection mainline systems and 5,000 feet in lateral lines. Acceptable documentation of these minimum installations must be submitted to the OWNER.

C. The CONTRACTOR shall be certified as a licensed installer of the manufacturer's pipe system.

D. The Contractor shall provide certificate of training for all personnel directly involved with installing the pipe.

E. Manufacturer's list of at least three (3) similar installations in satisfactory operation.

F. It is the responsibility of the CONTRACTOR to confirm that any subcontractor or manufacturer proposed for performance of the work can demonstrate the minimum requirements specified herein. Rejection of any subcontractor and/or manufacturer shall not be grounds for modifications to the Contract Documents. No change in contract time of completion or contract cost will be allowed as a result of such rejection of a subcontractor and/or manufacturer to meet the minimum requirements specified herein.

PART 2 PRODUCTS / MATERIALS

2.01 CIPP LINER MATERIALS

A. Tube

1. The tube shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven or woven material, or a combination of nonwoven and woven materials, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used on this project. The material should be able to stretch to fit irregular pipe sections and negotiate bends.

2. The Tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during inversion. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

3. The tube shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness.

4. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough that the resin is clearly visible, and shall be firmly bonded to the felt material.

5. The outside of the tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 feet. Such markings shall also include the lining manufacturer’s name or identifying symbol.

6. The outside layer of the Tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.

7. The Tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

8. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color so that a clear detailed examination with closed circuit television inspection equipment may be made.

9. Seams in the Tube shall be stronger than the non-seamed felt.

B. The Resin System

1. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy and catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this project.

2. The resin shall produce CIPP which will comply with the structural and chemical resistance requirements of this specification.

2.02 STRUCTURAL REQUIREMENTS FOR CIPP LINER

A. The design thickness of the liner for each individual Purchase Order shall be arrived at using standard engineering methodology. ASTM F1216, Appendix X1, has such an acceptable methodology that may be used where applicable. The long-term flexural modulus to be used in the design shall be verified through testing. The long-term modulus shall not exceed 50% of the short-term value for the resin system unless the tube contains reinforcements. In the event that a reinforced tube is utilized, the long-term flexural modulus shall be the percentage of the short-term modulus as determined by the above referenced testing.

B. The layers of the finished CIPP shall be uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or such that the knife blade moves freely between the layers. If separation of the layers occurs during testing of the field samples, new samples will be cut from the work. Any reoccurrence may be cause for rejection of the work.

C. The finished CIPP shall fit tightly to the host pipeline at all observable points and shall meet or exceed the minimum thickness established by the design process. The materials properties of the finished CIPP shall meet or exceed the following structural standards:

MINIMUM PHYSICAL PROPERTIES

Property	ASTM Test Method	Polyester System System	Filled Polyester System	Vinyl Ester System
Flexural Strength	D790	4,500 psi	4,500 psi	5,000 psi
Flexural Modulus (Initial)	D790	250,000 psi	400,000 psi	300,000 psi
Flexural Modulus (50 yr)	D790	125,000 psi	200,000 psi	150,000 psi
Tensile Strength	D638	3,000 psi	3,000 psi	4,000 psi

D. The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.

E. The CONTRACTOR must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the Long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by

ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in Design.

2.03 DESIGN REQUIREMENTS (FOR CIPP LINER THICKNESS)

A. The minimum thickness of the cured-in-place lining to be installed shall be as determined for the given conditions imposed. Calculations for the determination of the required liner pipe stiffness shall be the largest pipe stiffness for each CIPP installation reach (access point to access point), as determined by calculations provided for the following parameters:

1. Maximum Deflection
2. Minimum Pipe Stiffness
3. Ring Bending Strain
4. Constrained Buckling Resistance Using Long-Term Modulus of Elasticity

B. Design criteria may change for case-by-case design calculations, if approved by the OWNER. An analysis of design criteria and calculations for the liner thickness shall be provided to the OWNER for approval, whose decision shall be final. The OWNER may vary the liner thickness for the same size sewer, depending upon field condition of the pipes and/or depths.

C. Correction of failed liner or liner deemed unacceptable, as a result of the post-video inspection and/or test reports for structural values, thickness, chemical resistance, etc., shall be the responsibility of the CONTRACTOR, at no extra cost to the OWNER. Method of correction/repair shall be approved by the OWNER with prior field demonstration, if required. It shall be understood that minimum criteria of the specification shall not be lowered to compromise with lower than the required test values, unless approved in writing.

D. The Enhancement Factor 'K' to be used in 'Partially Deteriorated' Design conditions shall be assigned a value of 7. Application of Enhancement (K) Factors in excess of 7 shall be substantiated through independent test data.

E. The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in paragraph 2.02 C and in accordance with the Design Equations in the appendix of ASTM F 1216, and the following design parameters:

Depth of Cover[1]	Actual per project
Depth of Groundwater Above Pipe	Assumed Ground Surface or per project
Specific Weight of Soil	120 lbs./ft.
Wheel Load[2]	16,000 lbs.
Railroad Load[3]	80,000 lbs.
Design Temperature	80°F
Deflection Lag Factor, D_L	1.2 (50 years)

Modulus of Soil Reaction E'	1,200 psi
Ovality Correction Factor	As applicable to pipe material and installed shape.
Long-Term Modulus of Elasticity	50 years under constant stress, when submerged in water, to be used for constrained buckling resistance design for combined external loads from groundwater and earth cover.
Minimum Safety Factor	2.0, unless otherwise specified (not applicable for maximum bending strain)
Shape Factor	4
Deflection Coefficient	0.103

Notes:
[1]Design of the CIPP shall be based on prism load on the liner pipe, using the outside diameter of the CIPP in the calculations.
[2] Impact factors to be included when depth of cover is less than 3 feet, per values recommended by AASHTO.
[3] Impact factors to be included when depth of cover is less than 10 feet, per criteria established by AREA *"Manual of Recommended Practice"*.

H. Any layers of the tube that are not saturated with resin prior to insertion into the existing pipe shall not be included in the structural CIPP wall thickness computation.

I. The cured-in-place lining shall be designed such that the lining shall not fail, collapse, buckle, crack, or delaminate under load. The maximum long-term (50 years) calculated deflection under all loads shall not exceed five percent (5%). For glass, fiber-reinforced liner pipe, the bending strain (50 years) developed shall not exceed the higher of the minimum long-term value in ASTM D 3262 for the pipe stiffness supplied, or that substantiated by long-term strain tests done in accordance with ASTM D 3681 using 1.0 *N* sulfuric acid.

2.04 CHEMICAL RESISTANCE

A. The CIPP shall meet the chemical resistance requirements of ASTM F1216, Appendix X2. CIPP samples for testing shall be of tube and resin system similar to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical-testing requirements.

B. For glass, fiber-reinforced liner materials, the CONTRACTOR shall provide chemical resistance test reports required under ASTM 3681 "Chemical Resistance of Fiberglass (Glass-Fiber-Thermosetting-Resin) Pipe in a Deflected Condition", as indicated in the Design Criteria of this section.

PART 3 EXECUTION

3.01 RESPONSIBILITIES FOR INCIDENTAL ITEMS

A. It shall be the responsibility of the OWNER to locate and designate all access points for the work, and to provide rights of access to these points. In the event the contractor elects to conduct lateral lining from locations within private property, the CONTRACTOR shall obtain a temporary easement or otherwise written evidence to the OWNER demonstrating permission of the property owner. This temporary easement or written evidence of permission

shall also include hold harmless clauses protecting both the property owner and the OWNER.

B. The CONTRACTOR shall be responsible to coordinate with the appropriate governing agency regarding access to water from fire hydrants for cleaning, installation of the tube, and other work items requiring water.

C. The CONTRACTOR, when required, shall remove and properly dispose of all internal debris out of the pipeline that will interfere with the installation of the CIPP.

D. The CONTRACTOR shall perform a pre-construction televised video inspection to document the physical condition of the sewer pipe including, but not limited to, the location and description of all pipe defects, infiltration/exfiltration leaks, service connections, and other observed conditions. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP into the pipelines, and it shall be noted so that these conditions may be corrected. All televising shall be performed in accordance with paragraph 3.08.

E. It shall be the responsibility of the CONTRACTOR to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the installation process, and it cannot be removed by conventional sewer cleaning equipment, then the CONTRACTOR shall notify the OWNER. If the OWNER elects to continue the CIPP insertion of this section, the OWNER, at their expense, will implement the necessary measures to uncover and remove or repair the obstruction, and will notify the CONTRACTOR of the estimated schedule for completion of the repair and the consequential resumption of the CIPP insertion activity.

F. After installation of the new sewer pipe and reinstatement of service connections, the CONTRACTOR shall perform a post-construction close circuit television inspection of the rehabilitated section. If requested, this inspection shall be done in the presence of the OWNER or their representative. The television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The installed sewer pipe shall be free of significant visual defects, damage, deflection, holes, etc. All televising shall be performed in accordance with paragraph 3.08.

3.02 PUBLIC NOTIFICATION

A. Prior to beginning construction, the CONTRACTOR will prepare and distribute to all property OWNERs and tenants affected by the project a letter outlining the proposed improvements and the anticipated duration of each phase of construction. This letter will be reviewed and approved by the OWNER and Engineer prior to distribution and will be distributed by the CONTRACTOR not less than seven (7) days prior to the beginning of work or within such other time as the Engineer may direct.

B. The CONTRACTOR shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer.

C. A public notification program shall be implemented, and shall as a minimum, require the CONTRACTOR to be responsible for contacting each home, tenant or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The CONTRACTOR shall also provide the following:

1. Written notice to be delivered to each home, tenant or business 24 hours prior to the beginning of work being conducted on the section, and a local telephone number of the CONTRACTOR they can call to discuss the project or any problems which could arise.

2. Personal contact with any home or business, which cannot be reconnected within the time stated in the written notice.

3.03 BYPASS PUMPING

A. The CONTRACTOR shall provide bypass pumping, when required, for the flow of sewage around the section, or sections, of pipe designated for rehabilitation. The bypass shall be made by plugging the line at the existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the anticipated flow. The OWNER may require a detail of the bypass plan to be submitted.

B. Bypass pumping shall be in accordance with Specification Section 01510.

3.04 INSTALLATION

A. The CIPP shall be installed in accordance with the practices given in ASTM F1216 (for direct inversion installations) or ASTM F1743 (for pulled-in-place installations).

B. The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method as defined within relevant ASTM standards previously stipulated. If pulled into place, a power winch or its equivalent should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

C. The quantity of resin used for the tube’s impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances being made for polymerization shrinkage and the anticipated loss of any resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used in conjunction with a roller system to achieve a uniform distribution of the resin throughout the tube.

D. Temperature gauges shall be placed at the upstream and downstream ends of

the reach being lined to monitor the pressurized fluid's (air or water) temperature. In addition to monitoring the temperature inside the tube, temperature gauges shall be placed between the host pipe and the liner at as many points as is practical to record the heating that takes place on the outside of the liner.

E. Curing of the resin system shall be as per the Manufacturer (Licensor) of the CIPP product. The temperatures achieved and the duration of holding the pressurized fluid at those temperatures shall be per the Manufacturer's (Licensor's) established procedures.

3.05 REINSTATEMENT OF BRANCH CONNECTIONS

A. All sewer service connections shall be identified and located by the CONTRACTOR using non-intrusive methods such as video TV camera or "M-scoping" prior to the pipe insertion to expedite reconnection. Upon commencement, pipe insertion shall be continuous and without interruption from access point to access point, except as approved by the Engineer. Upon completion of insertion of the new pipe, the CONTRACTOR shall expedite the reconnection of services so as to minimize any inconvenience to the customers.

B. It is the intent of these specifications that branch connections to buildings be reopened without excavation, utilizing a remote controlled cutting device, monitored by a video TV camera. The CONTRACTOR shall certify he has a minimum of 2 complete working cutters plus spare key components on the site before each inversion. Unless otherwise directed by the OWNER or Engineer, all laterals will be reinstated. No additional payment will be made for excavations for the purpose of reopening connections and the CONTRACTOR will be responsible for all costs and liability associated with such excavation and restoration work.

3.06 QUALITY ASSURANCE PROCEDURES

A. The CONTRACTOR shall prepare a sample for each installation of CIPP. The samples shall be restrained samples for diameters of CIPP less than 18"; and flat plate samples for diameters of CIPP 18" and larger. The flat plate samples shall be taken directly from the wet out tube, clamped between flat plates, and cured in the downtube. The restrained samples shall be tested for thickness and initial physical properties; flat plate samples shall be tested for initial physical properties only.

B. Hydraulic Capacity - Overall, the hydraulic profile shall be maintained as large as possible. The CIPP shall have a minimum of the full flow capacity of the original pipe before rehabilitation. Calculated capacities may be derived using a commonly accepted roughness coefficient for the existing pipe material taking into consideration its age and condition.

3.07 INSPECTION

A. CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in Table 1 of the

applicable ASTM.

B. Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as calculated in paragraph 2.03.F. of this document.

C. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

3.08 TELEVISION INSPECTION

A. The television camera used for inspection shall be one specifically designed and constructed for sewer inspection. Lighting for the camera shall be suitable to allow a clear picture for the entire periphery of the pipe. The camera shall be operative in 100% humidity conditions. Focus and iris settings on the camera shall result in a crisp, clear, illuminated view of the interior of the sewer pipe. The camera shall be capable of being moved through the sewer line in either direction at a uniform, slow rate of about one-half foot per second. Final products that are out of focus or improperly exposed are not acceptable. Picture quality and definitions shall be to the complete satisfaction of the ENGINEER.

B. During the actual television inspection, a log shall be maintained by the CONTRACTOR's Operating Technician. This log will be a complete record of all structural defects, service connections, abnormal conditions and other pertinent data observed, together with the footage distance of each. This log will be maintained on forms to be supplied by the CONTRACTOR, in a format approved by the ENGINEER. The CONTRACTOR shall use a separate log sheet for each section of sewer pipe.

C. The Operating Technician will utilize a title panel to document on the video pertinent data observed and pipe footage. Video shall display the title panel and indicate pipe footage by character generation. Audio narration is not acceptable.

D. The video shall be DVD format. Videos shall be compatible for playback in a DVD player. The videos and logs will become the property of the OWNER. If the OWNER determines the quality of the DVDs to be unacceptable, the CONTRACTOR shall re-inspect and televise the sewer at no additional cost to the OWNER.

E. The CONTRACTOR shall be responsible for any and all potable water necessary for cleaning, liner installation, testing, clean-up or any other requirements of the work. All ropes, strings, and or cables, if used, shall be removed from the sewer pipe immediately upon completion of the television inspection.

F. For each Purchase Order, the CONTRACTOR shall submit the DVD’s and logs to the ENGINEER within ten (10) business days of completing the work.

G. The section of sewer being inspected shall be isolated from the remainder of the sewer during the televised video inspections. CONTRACTOR shall bypass all sewage flow around the section of sewer being inspected. Bypass pumping shall be in accordance with Specification Section 01510.

H. Defects which may affect the integrity or strength of the sewer, service connections, or manhole connections as determined by the Engineer shall be repaired or replaced by the CONTRACTOR at no additional cost to the OWNER. Post-construction television inspection should be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections. The installed sewer liner shall be free of significant visual defects, damage, deflection, holes, etc.

3.09 RESTORATION AND CLEANUP

A. Upon acceptance of the installation work and testing, the CONTRACTOR shall restore the project area affected by the operations to a condition at least equal to that existing prior to the work.

B. CONTRACTOR shall be responsible for final site restoration including, but not limited to, restoring all lawn, pavement, gutters, curbs, sidewalks, and roadways disturbed or otherwise damaged by the CONTRACTOR's operations to as good condition as existed prior to commencement of the Work and in accordance with applicable local and state specifications, details, standards, and requirements.

3.09 WARRANTY

A. New sewer pipe shall be certified by the manufacturer for specified material properties. The CONTRACTOR shall warrant the pipe and installation in accordance with maintenance bond. During the warranty period, any defects which affect the integrity of strength of the pipe shall be repaired at the CONTRACTOR's expense in a manner mutually agreed by the OWNER and the CONTRACTOR.

3.10 LATERAL LINING

A. In accordance with all provisions and requiremens described herein, it is the intent of this section to also include and provide these same specifications for the CIPP lining of laterals, usually from a clean out (without the need for excavation) to the point of junction with the main sewer.

B. The lateral liner shall be a tubular resin impregnated sleeve with sufficient stretch such that it can transition from 4” to 6” in diameter and can negotiate bends without excessive wrinkling. The method involves the impregnation of an absorbent carrier material; the inversion of the material into the lateral, the curing of the sleeve leaving behind a hard plastic sleeve mechanically bonded to the host pipe.

C. Prior to lining of the lateral video taped evidence must document that the section of lateral pipe to be relined is free of debris, obstructions, scale or any other material that effectively reduces the bore of the pipe. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations.

D. The lateral liner must be designed and installed so that it extends completely to the inside wall of the mainline pipe. In cases where the liner protrudes into the mainline pipe, the contractor shall be responsible for the mechanical

removal of that section of liner, leaving a smooth bore to the inside of the mainline sewer.

E. All other applicable standards and requirements of this technical specification shall apply to the CIPP lining of lateral pipelines.

END OF SECTION

SECTION 02751
CURED-IN-PLACE PIPELINING - SEWER LATERALS
SPECIFICATION

1.0 **GENERAL**

1.01 Description

A. Under this Section, and as provided under all general provisions of Section 02750 of this specification, the CONTRACTOR shall furnish all labor, materials and equipment for the complete installation of cured-in-place epoxy lining of sewer laterals.

B. This section addresses work issued to the CONTRACTOR specific to the performance of cured-in-place lining of laterals from an outside cleanout, without excavation. In the event the CONTRACTOR elects to install a lateral liner from locations within private property rather than an outside cleanout as designated by the OWNER, the CONTRACTOR shall provide either a temporary easement or otherwise written evidence of permission from the property owner to the OWNER documenting such authority. The easement or otherwise written authority shall include explicit hold harmless clauses protecting both the property owner and the OWNER.

C. The lateral liner shall be a tubular resin impregnated sleeve with sufficient stretch such that it can transition from 4" to 6" in diameter and can negotiate bends without excessive wrinkling. The method involves the impregnation of an absorbent carrier material; the inversion of the material into the lateral, the curing of the sleeve leaving behind a hard plastic sleeve mechanically bonded to the host pipe.

D. Prior to lining of the lateral video taped evidence must document that the section of lateral pipe to be relined is free of debris, obstructions, scale or any other material that effectively reduces the bore of the pipe. The repair sleeve should be monitored for excessive wrinkling, exposed unwetted fibers, pinhole leaks, and infiltration around the terminations.

E. All other applicable standards and requirements identified within the technical specifications provided herein shall apply.

1.02 Submittals

A. License and Certificates

1. The CONTRACTOR shall provide documentation that he/she is a licensed installer of the manufacturer's CIPP system.

2. The CONTRACTOR shall provide a certificate of training for all personnel directly involved with the CIPP of sewer laterals.

B. Product Data: Submit manufacturer's technical product data, literature, specifications, engineering data, design parameters for liner/tube thickness for each lateral, shop drawings, and installation instructions for all equipment and products of this section.

C. Draft Notification Letter to Property Owners and Tenants. The letter shall advise the property owner and tenants (if any) of pending proposed repair and necessity (if any) of interrupting sewer service.

D. The Recorded Pre- and Post- Work CCTV Video Inspection of Sewer Laterals on DVD.

E. CIPP Installation Log. For each individual lateral a log shall be prepared by the CONTRACTOR with all aspects of the pipe and the liner recorded including: pipe diameter; material; defects; cleaning; liner length and thickness; resin mix and curing times.

1.03 References

A. ASTM D543 Testing Method of Plastics to Chemical Reagents.

B. ASTM D1600 Abbreviations of Terms Relating to Plastics.

C. ASTM D790 Test Methods for Flexural Properties of Un-reinforced and Reinforced Plastics.

D. ASTM F1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

E. ASTM F1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured–in-place Thermosetting Resin pipe (CIPP).

F. ASTM D638 Standard Test Method for Tensile Properties of Plastics.

2.00 **PRODUCT**

2.01 The cured-in-place epoxy pipelining system shall be *Nu Flow, or approved equal*.

2.02 Lining Tube:

A. The tube shall consist of one or more layers of a flexible needled felt or an equivalent nonwoven or woven material, or a combination of non-woven and woven materials, capable of carrying resin and withstanding the installation pressures and curing temperatures. The tube should be compatible with the resin system to be used. The material should be able to stretch to fit and conform to the irregular pipe sections, offset bends, bells, and negotiate bends.

B. The tube shall be sewn to a size that when installed will tightly fit the internal circumference and length of the original pipe. Overlapped layers of felt in longitudinal seams that cause lumps in the final product shall not be utilized.

C. The tube shall be uniform in thickness and when subjected to the installation pressures will meet or exceed the designed finish wall thickness.

D. Any plastic film applied to the tube on what will become the interior wall of the finished CIPP shall be compatible with the resin system used, translucent enough the resin is clearly visible, and shall be firmly bonded to the felt material.

E. The outside layer of the tube (before wet out) shall be coated with an impermeable, flexible membrane that will contain the resin and facilitate monitoring of resin saturation during the resin impregnation (wet out) procedure.

F. The tube shall be homogenous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident.

G. The wall color of the interior pipe surface of CIPP after installation shall be a light reflective color, such as light blue, so that a clear detailed examination with closed circuit television inspection equipment may be made.

H. Seam in the tube shall be stronger than the non-seamed felt.

I. The felt tube will have an integrated bladder inside it, the bladder will be made from materials compatible with the felt and resin systems used and will withstand the required installation pressure.

2.03 Resin System

A. The resin system shall be a corrosion resistant polyester, vinyl ester, or epoxy catalyst system that when properly cured within the tube composite meets the requirements of ASTM F1216 and ASTM F1743, the physical properties herein, and those which are to be utilized in the Design of the CIPP for this work.

B. The resin shall produce a CIPP which will comply with the structural and chemical resistance requirements of this specification.

C. The resin used to impregnate the tube shall produce a cured tube that shall be resistant to shrinkage, shall not corrode or oxidize, and shall also be resistant to abrasion from solids, grit, and sand in wastewater. The resin shall have proven resistance to the municipal wastewater environment.

D. The resin shall have proven resistance to ultra-violet light (sunlight) at any stage prior to installation.

E. The resin shall be an epoxy resin and shall be solvent free. Polyester and vinyl ester resin are not acceptable.

F. The resin system proposed shall not contain silicones, stearates, and/or natural waxes that would adversely affect the adhesives properties or any other chemical or physical properties of the CIPP liner.

G. Exposure to the chemical solutions listed in Table 1 shall be conducted at temperatures of up to 75 degrees F. This test shall be conducted for a

minimum period of one month and shall result in a loss of not more than 20 percent of the initial structural properties.

Table 1.
Minimum Chemical Resistance Requirements for Typical Municipal Sewer Applications. ASTM D543.

Chemical Solution Concentration	%
Tap Water (pH 6-9)……..	100
Nitric Acid……..	5
Phosphoric Acid……	10
Sulfuric Acid……..	10
Gasoline ……..	100
Vegetable Oil……..	100
Detergent or Soap……	0.1

H. Structural Requirements for CIPP Liner

1. The minimum thickness for the CIPP, after curing, shall be calculated in accordance with ASTM 1743, and the design parameters provided for each case.

2. The finished CIPP shall fit tightly to the host pipeline at all observable points and shall meet or exceed the minimum thickness established by the design process. The material's properties of the finished CIPP shall meet or exceed the following structural standards:

Table 2.
CIPP Initial Structural Properties – ASTM F1743

Property	**ASTM Test Method**	**Minimum Value**
Tensile Strength	D638	3,000 psi
Flexural Strength	D790	4,500 psi
Short Term Flexural Modulus of Elasticity	D790	250,000 psi
Flexural Modulus of Elasticity (50 year)	*D790*	*125,000 psi*

3. The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall.

3.00 **EXECUTION**

3.01 Property Notification

The CONTRACTOR shall provide written notification to property owners and tenants (if any) no less than three (3) days prior to the beginning of work.

3.02 Pre-Installation Inspection and Preparation

A. The CONTRACTOR shall perform a pre-construction cctv televised video inspection to document the physical condition of the sewer pipe including but not limited to location and description of pipe defects, leaks, roots, and other observed conditions. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation

of the CIPP into the lateral and it shall be noted so that these conditions may be corrected.

B. It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of the CIPP.

C. If the pre CIPP installation inspection reveals any conditions that may or will prevent the installation process of the CIPP tube that cannot be corrected via auguring, snaking, and/or flushing the pipe etc., such as a severe drop joint, or a collapsed pipe, then the CONTRACTOR shall immediately notify the OWNER. If the OWNER elects to continue the CIPP insertion of the lateral, the OWNER, at their expense, will implement the necessary measures to uncover and remove or repair the adverse condition, and will notify the CONTRACTOR of the estimated schedule for completion of the repair and consequential resumption of the CIPP insertion activity.

3.03 Preparation of the tube: "Wet Out"

A. The amount of resin and catalyst required shall be accurately calculate based on the size and thickness of the felt, and thoroughly mixed per the manufacturer's requirements.

1. Quantity of resin used for the tube's impregnation shall be sufficient to fill the volume of air voids in the tube w/ additional allowances made for polymerization shrinkage and the anticipated loss of any resin through cracks and irregularities of the pipe wall.

B. Cover the wet out area with clean plastic to prevent any resin from spilling onto the ground.

C. The liner shall be laid out on the clean plastic with metal rollers in place ready to impregnate the resin into the felt.

D. The resin shall be poured between the felt and the rubber bladder thoroughly to saturate the flexible felt tube with resin using the metal rollers.

E. Fold and tape the resin impregnated tube to enable an easy installation.

3.04 Tube Insertion

A. The installation operation shall be carried out using trenchless technology eliminating the need for excavation.

B. The liner will be installed using *standard inversion methods* or the pull in place method where the liner bladder system will be pulled to the specified location in the pipe and the bladder will be inflated using compressed air or water to an adequate pressure forming the liner to tightly fit the internal circumference of the pipe.

C. The cured-in-place pipe shall provide a smooth bore interior and shall conform to the existing pipe eliminating groundwater and root infiltration. The tube will be continuous in length and wall thickness shall be uniform.

D. The lateral liner must be designed and installed so that it extends completely to the inside wall of the mainline pipe. In cases where the liner protrudes into

the mainline pipe, the CONTRACTOR shall be responsible for the mechanical removal of that section of liner, leaving a smooth bore to the inside of the mainline sewer.

3.05 Curing

A. The epoxy resin used shall be designed to have an ambient curing cycle and can be cured using one of the following methods:

1. The bladder will be inflated using air and the liner left in place until the resin curing cycle is complete.

2. The bladder can be inflated using hot water which will result in a shorter curing cycle.

3. Curing of the resin system shall be as per the Manufacturer (Licensor) of the CIPP product.

3.06 Post-Televising Inspection

A. After installation of the new sewer pipe and reinstatement of service, the CONTRACTOR shall perform a post-construction closed-circuit televised inspection of the rehabilitated pipe. If requested, this inspection shall be done in the presence of the OWNER.

B. The televising inspection shall be recorded on a DVD to be provided to the OWNER

C. The television inspection shall be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections.

D. The finished CIPP shall be continuous and free from visual defects such as foreign inclusions, dry spots, pinholes, delimitation, and wrinkles.

3.07 Documentation

A. The following items shall be provided to the OWNER at the completion of each lateral CIPP and prior to final payment.

1. An installation log for each individual lateral with all aspects of the pipe and the liner recorded including: pipe diameter; material; defects; cleaning; liner length; resin mix and curing times.

2. A separate DVD containing the Pre, Post CIPP and final video for each individual lateral.

3.08 After installation of the CIPP and reinstatement of service, the CONTRACTOR shall perform a post-construction cctv inspection of the rehabilitated pipe. If requested, this inspection shall be done in the presence of the OWNER. The television inspection shall be used to confirm tightness of the fit of the CIPP to the host pipe and to identify any imperfections.

END OF SECTION

SECTION 02936
SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Preparation of subsoil

B. Placing topsoil

C. Seeding, hydroseeding, mulching and fertilizing

D. Maintenance

1.02 REFERENCES

A. FS O-F-241 - Fertilizers, Mixed, Commercial.

1.03 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

B. Substantial Completion of Seeding: The Work shall not be accepted as substantially complete until such time as restoration of seeded areas has been completed in accordance with this Section, with the exception of Section 02936, Article 1.06, Maintenance and Protection of Seeded Areas and Article 3.07 Maintenance.

1.04 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

B. All seed to be fresh, clean and from current season's crop.

1.05 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of seed mixture.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site under provisions of General Conditions.

B. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable.

C. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

1.06 MAINTENANCE AND PROTECTION OF SEEDED AREAS

A. Maintain and protect seeded areas from vehicular and pedestrian traffic immediately after placement until grass is well established and exhibits a vigorous growing condition.

PART 2 PRODUCTS

2.01 SEED MIXTURE

A. Seed Mixture for Lawn Areas:

29.40% Kentucky Bluegrass, 80% germination

32.64% Creeping Red Fescue, 85% germination

35.64% Perennial Ryegrass, 90% germination

0.30% Crop

0.50% Weed

1.52% Inert

B. Seed Mixture for Field and other Non-Lawn Areas:

50% Annual Ryegrass, 90% germination

50% Perennial Ryegrass, 90% germination

C. Seed Mixture for Low Maintenance Areas:

15.0% Birdsfoot Trefoil (Empire), 80% germination

85.0% Red Fescue (Pennlawn), 85% germination

D. Germination rates shall be based on test results from the previous year.

2.02 SOIL MATERIALS

A. Topsoil for Lawn Areas: Screened, fertile, friable, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay, stone or impurities, plants, weeds and roots; pH value of minimum 5.5 and maximum 7.5.

B. Topsoil for Field and other Non-lawn Areas: Use the stockpiled topsoil which was stripped from these areas.

C. Topsoil for Low Maintenance Areas: Use stockpiled and screened topsoil as defined above.

D. Stockpile materials onsite at locations approved by the ENGINEER. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

2.03 ACCESSORIES

A. Fertilizer: FS O-F-241, Type I Grade A, recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil to the following proportions: Nitrogen 10 percent, phosphoric acid 6 percent, soluble potash 4 percent.

B. Water: Clean, fresh and free of substances or matter which could inhibit vigorous growth of grass.

C. Erosion Fabric: Jute matting, open weave.

D. Stakes: Softwood lumber, chisel pointed.

E. String: Inorganic fiber.

2.04 TESTS

A. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the ENGINEER for approval. Indicate, by test results, information necessary to determine suitability.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

3.02 PREPARATION OF SUBSOIL

A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated sub-soil.

C. Scarify subsoil to a depth of 3-inches where topsoil is to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted sub-soil.

3.03 PLACING TOPSOIL

A. Spread topsoil to a minimum depth of 4-inches in lawn areas. In field areas reapply topsoil that was stripped and stockpiled to its original depth. In areas designated as low maintenance, reapply topsoil that was stripped and stockpiled, and if necessary add topsoil to obtain a minimum depth of 3-inches. Rake until smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage. The compacted topsoil shall match the preconstruction grade.

3.04 FERTILIZING

A. Apply fertilizer at a rate of 5 pounds per 1000 square feet.

B. Apply after smooth raking of topsoil and prior to roller compaction.

C. Mix thoroughly into upper 2-inches of topsoil.

D. Water lightly to aid the dissipation of fertilizer.

3.05 HYDROSEEDING

A. If CONTRACTOR elects not to place fertilizer as per Article 3.04, fertilizer is to be incorporated into the seeded slurry.

B. Apply seeded slurry with a hydraulic seeder at a rate of 5 pounds per 1000 square foot evenly.

C. Seeded slurry shall contain wood cellulose fiber, green in color, applied at a rate of 1,000 to 1,500 pounds per acre.

D. Seeded slurry to contain soil seal applied at the manufacturer's recommended rate.

E. Apply water with a fine spray immediately after each area has been mulched. Saturate soil to a depth of 4-inches.

F. Planting Season: April 1 to July 1 and August 15 to October 15.

3.06 PROTECTION OF RESTORED AREAS

A. Identify seeded areas with stakes and string around area periphery. Set string height to 30-inches.

B. Cover seeded slopes where grade is 4-inches per foot or greater with erosion fabric. Roll fabric onto slopes without stretching or pulling.

C. Lay fabric smoothly on surface, bury top end of each section in 6-inch deep excavated topsoil trench. Provide 12-inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.

D. Secure outside edges and overlaps at 36-inch intervals with stakes.

E. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

F. At sides of ditches, lay fabric laps in direction of water flow. Lap ends and edges minimum 6-inches.

3.07 MAINTENANCE

A. Water seeded areas until these areas exhibit a dense, vigorous growth of grass.

After three weeks, reseed those areas which do not exhibit a dense, vigorous growth of grass.

B. Roll surface to remove minor depressions or irregularities.

C. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

D. Immediately reseed areas which show bare spots.

E. Protect seeded areas with warning signs during maintenance period.

3.08 SCHEDULE

A. Areas maintained as Lawns: Grass seed mixture specified, 4-inches topsoil hydroseed.

B. Field and other non-lawn Areas: Grass seed mixture specified, native soil, and hydroseed.

C. Low Maintenance Areas: Grass seed mixture specified, native and, if necessary, screened topsoil to achieve a minimum depth of 3-inches, hydroseed.

END OF SECTION

PROPOSAL
SCHEDULED PAYMENT ITEMS

The following Scheduled Payment Items are the only payment items under this Contract. Payment to the CONTRACTOR will be based on multiplying the appropriate payment item unit price, times the quantity of the item. The payment items shall include all labor and materials, equipment, overhead, bonds, insurances, profit, and other contingencies; no separate or additional compensation will be made under this Contract unless otherwise hereinafter specified.

For this bid, standard liner thicknesses as referenced in Note 1 and presented in Table 1 at the end of the Scheduled Payment Items shall be utilized. The deterioration of sewers is an ongoing process. Should preconstruction inspections reveal the sewers or site conditions to substantially differ from typical, the contractor shall then calculate a new design recommendation based on the current ASTM F1216 standard, and then request such adjustment of liner thickness as may be necessary. If requested by the OWNER, such requests for liner thickness adjustment shall be supported with design data and the calculations as per ASTM F1216. The deviation, if approved, shall be reflected by the appropriate adjustment to the Unit Cost of that Pay Item as represented in Table 2 of this Section. Any changes to Pay Item Unit Costs resulting from liner thickness adjustment shall be agreed upon by both OWNER and CONTRACTOR prior to issuance of the Purchase Order.

PAY ITEM	ITEM DESCRIPTION	UNIT PRICE	UNIT
501B	MOBILIZATION (DIRECTED BY OWNER)	**$ 65.00**	Hr
740	SERVICE LATERAL CONNECTION BY REMOTE	**$ 300.00**	Ea
741	REPAIR PROTRUDING LATERAL CONNECTIONS	**$ 500.00**	Ea
742A	TEMPORARY BYPASS PUMPING - 6"-12" IN DIAMETER	**$ 1,300.00**	Day
742B	TEMPORARY BYPASS PUMPING - 15"-24" IN DIAMETER	**$ 1,750.00**	Day
742C	TEMPORARY BYPASS PUMPING - 27"-36" IN DIAMETER	**$ 1,950.00**	Day
700L	4"&5" DIAMETER CIPP, LATERAL (FULL SECTION REHAB)	**$ 75.00**	LF
700	4"&5" DIAMETER CIPP (FULL SECTION REHAB)	**$ 65.00**	LF
701L	6" DIAMETER CIPP, LATERAL (FULL SECTION REHAB)	**$ 85.00**	LF
701	6" DIAMETER CIPP (FULL SECTION REHAB)	**$ 55.00**	LF
702	8" DIAMETER CIPP (FULL SECTION REHAB)	**$ 32.00**	LF
703	10" DIAMETER CIPP (FULL SECTION REHAB)	**$ 36.00**	LF
704	12" DIAMETER CIPP (FULL SECTION REHAB)	**$ 45.00**	LF
705	15" DIAMETER CIPP (FULL SECTION REHAB)	**$ 55.00**	LF
706	18" DIAMETER CIPP (FULL SECTION REHAB)	**$ 70.00**	LF
707	21" DIAMETER CIPP (FULL SECTION REHAB)	**$ 90.00**	LF
708	24" DIAMETER CIPP (FULL SECTION REHAB)	**$ 105.00**	LF
709	27" DIAMETER CIPP (FULL SECTION REHAB)	**$ 150.00**	LF
710	30" DIAMETER CIPP (FULL SECTION REHAB)	**$ 185.00**	LF
711	36" DIAMETER CIPP (FULL SECTION REHAB)	**$ 225.00**	LF
720	4"&5" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 700)	**$ 1,800.00**	Ea

PAY ITEM	ITEM DESCRIPTION	UNIT PRICE	UNIT
721	6" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 701)	**$ 1,800.00**	Ea
722	8" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 702)	**$ 1,800.00**	Ea
723	10" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 703)	**$ 1,800.00**	Ea
724	12" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 704)	**$ 2,000.00**	Ea
725	15" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 705)	**$ 2,500.00**	Ea
726	18" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 706)	**$ 2,800.00**	Ea
727	21" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 707)	**$ 3,000.00**	Ea
728	24" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 708)	**$ 4,500.00**	Ea
729	27" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 709)	**$ 5,000.00**	Ea
730	30" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 710)	**$ 5,000.00**	Ea
731	36" DIAMETER CIPP (SPOT REHAB - 1ST 5'; ADD'L LF PER ITEM 711)	**$ 7,800.00**	Ea
250C	TEST / INSERTION PIT EXCAVATION	**$ 125.00**	CY
402I	TURF RESTORATION	**$ 0.75**	SF
790	STANDARD COMPOSITE MH REPAIR - MASONRY & EPOXY COATING	**$ 30.00**	SF
791	ADD'L MH REPAIR - MASONRY COATING EXCEEDING 3" THICKNESS	**$ 75.00**	LB

NOTES:

(1) For purposes of this bid proposal, base bid liner thicknesses for the CIPP rehabilitations shall be based on typical conditions and at least equal to those values listed in **bold in Table 1** below. These thicknesses shall be assumed for all Pay Items 700 – 731. Accordingly, the shaded columns in Table 2 represent the payment allowances that will be provided to the contractor in the event pipe liner thickness may need to be upsized beyond those minimum thicknesses used in their base bid. Requests for upsizing of liner thickness shall be recommended by the CONTRACTOR to the OWNER with the appropriate technical justification as set forth in Technical Specification 02750, and shall be at the approval of the OWNER. Any adjustment to Payment Items will be agreed upon and reflected in the issuance of the Purchase Order. If a liner thickness as approved by the OWNER is of an incremental value between those listed in the two tables below, a prorated amount of increase per LF shall be interpolated as based on those values. This value shall be mutually agreed upon before commencement of work. If thicknesses less than those of the base bid are recommended by the CONTRACTOR and agreed to by the OWNER, a credit allowance shall be at the discretion of the OWNER.

Table 1:
CIPP Liner Thicknesses to be used for base bid.

Pipe Diameter	**Base Bid** Liner Thickness Typical Conditions
4 & 5 Inch	**3.0 mm**
6 Inch	**4.5 mm**
8 Inch	**6.0 mm**
10 Inch	**6.0 mm**
12 Inch	**6.0 mm**
15 Inch	**7.5 mm**
18 Inch	**9.0 mm**
21 Inch	**10.5 mm**
24 Inch	**12.0 mm**
27 Inch	**13.5 mm**
30 Inch	**15.0 mm**
36 Inch	**16.5 mm**

Table 2:
Compensation table for increased CIPP Thicknesses.

	Base Bid	**Contractor Allowances for Liner Thickness Upsizing**			
Pipe Diameter	Liner Thickness Typical Conditions	Thickness Moderately Heavy Conditions	Pay Allowance Increase per LF	Thickness Heavy Duty Conditions	Pay Allowance Increase per LF
4 & 5 Inch	**3.0 mm**	3.0 mm	0	3.0 mm	0
6 Inch	**4.5 mm**	4.5 mm	0	4.5 mm	0
8 Inch	**6.0 mm**	6.0 mm	0	6.0 mm	0
10 Inch	**6.0 mm**	6.0 mm	0	7.5 mm	+$2.25
12 Inch	**6.0 mm**	7.5 mm	+$2.75	9.0 mm	+$5.25
15 Inch	**7.5 mm**	9.0 mm	+$3.25	10.5 mm	+$6.25
18 Inch	**9.0 mm**	12.0 mm	+$9.25	13.5 mm	+$13.00
21 Inch	**10.5 mm**	13.5 mm	+$10.00	15.0 mm	+$14.75
24 Inch	**12.0 mm**	15.0 mm	+$10.75	16.5 mm	+$16.00
27 Inch	**13.5 mm**	16.5 mm	+$11.75	19.5 mm	+$23.50
30 Inch	**15.0 mm**	18.0 mm	+$16.50	21.0 mm	+$29.25
36 Inch	**16.5 mm**	21.0 mm	+$26.00	24.0 mm	+$41.50

(2) Spot Section Rehabilitation identified in Pay Items 720 – 731 shall be the per each price for the first five (5) feet of the rehabilitation only. Additional linear feet of spot rehabilitation beyond the first five (5) feet of repair shall be paid at the unit pricing per pipe diameter in the given unit pricing for Payment Items 700-711.

(3) Where the OWNER determines that work is required which is not included in or covered by the Payment Item Schedule, the payment for this work shall be either the actual cost for labor, direct overhead, materials, supplies, equipment and other services necessary to complete the work plus an added amount of fifteen (15) percent of the actual cost to cover the cost of general overhead and profit, or a negotiated price.

MONROE COUNTY PURCHASING
Vendor Performance Survey

Contract Title: _____

Contract Number: _____

Vendor: _____

Please rank the vendor performing the contract specified on a scale from “1" to “10" with “1' being poor, “5" average and “10" excellent. Please include any additional comments or suggestions in the space provided below. Monroe County Purchasing appreciates your input.

	Poor				Average					Excellent
	1	2	3	4	5	6	7	8	9	10
Item(s) supplied met specifications										
Product provided value (taking into account price, quality, etc.										
Completeness and accuracy of order										
Ability to contact representatives of vender when needed? (If unavailable, was call back promp?)										
Invoices received promptly and accurately										
Recommendations received from the vendor (i.e. product information, cost saving strategies, ideas for better us of resources, etc.)										

Survey Completed by:

Name: _____

Title: _____

Agency: _____

Telephone: _____ Fax: _____

E-Mail: _____

Please submit this survey to Monroe County Purchasing.