



**TOWN OF TRUMBULL, CONNECTICUT
WATER POLLUTION CONTROL AUTHORITY
REQUEST FOR PROPOSAL FOR ON-CALL
SEWER & DRAIN SYSTEM REHABILITATION & RELATED SERVICES
TOWN WIDE**

BID NUMBER 6336: DUE: MARCH 20, 2019 AT 2:00PM

BID DOCUMENTS PREPARED BY TOWN OF TRUMBULL PURCHASING DEPARTMENT.

CONSULTING FIRM FOR THE TOWN

Wright-Pierce 169
Main Street
700 Plaza Middlesex
Middletown, CT 06457
(860) 343-98297

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GENERAL INSTRUCTIONS TO BIDDERS

This section includes the town of Trumbull's general instructions to bidders and shall prevail over any conflicting statements made in other sections of these specifications.

This RFP is not a contract offer, and no contract exists until a written contract is signed by the Town and the successful proposer.

The Town of Trumbull Water Pollution Control Authority and the Town of Trumbull Engineering Department, (hereinafter referred to as Town), through the office of the Purchasing Agent, will accept sealed bids for the **SEWER AND DRAIN SYSTEM REHABILITATION AND RELATED SERVICES TOWN WIDE** in accordance with the specifications and requirements contained in this request. The Town is requesting qualifications and proposals for on call work related to the rehabilitation of sewer manholes and sewer and drain pipelines throughout the Town's sewer and storm drain system including, but not limited to; cleaning and sealing manholes, spot lining sections of gravity sewer and storm drain mains, testing and sealing of pipe joints and laterals, chemical grouting of gravity sewer and storm drain mains, chemical root control of gravity sewer mains; and pavement and lawn restoration, and appurtenant work as indicated in the contract documents. All qualified and interested parties are invited to submit qualifications and bids under the terms and conditions set forth as follows:

1. PREPARATION OF PROPOSALS

- a. Bidders shall submit company qualifications for related work to the On-call Sewer and Drain System Rehabilitation and Related Services Town Wide Project. Proposals should include various components identified in the Specifications for the On-call Sewer and Drain System Rehabilitation and Related Services Town Wide Project for which your company is prime contractor.
- b. Proposals shall be submitted by using the enclosed BID PROPOSAL FORM that accompanies this request. Submit one (1) ORIGINAL and two (2) EXACT COPIES. Bidders should submit bids in a clear, concise and legible manner to permit proper evaluation of responsive bids. Proposals received after the advertised time and date due shall not be opened or considered. The Town reserves the right to communicate with any or all of the proposers to clarify the provisions of Proposals. The Town further reserves the right to request additional information from any proposer at any time after proposals are opened.
- c. Proposers may also submit, under separate cover with their proposal, any samples of reports and documents that are necessary to meet the requirements (deliverables) of this request should a purchase order be awarded. Please be advised that the person signing the formal proposal must be authorized by your organization to contractually bind your firm with regard to prices and related contractual obligations for the delivery period requested.
- d. No oral, Email, telephonic, or faxed proposals will be considered. No telephone corrections, deletions, or additions will be accepted. The Town reserves the right to reject any or all bids, and to waive any or all formalities in connection therewith.

2. BID SUBMISSION

Bids are to be submitted in a sealed envelope addressed as follows:

Bid 6336 SEWER & DRAIN SYSTEM REHABILITATION & RELATED SERVICES
Due: March 20, 2019 @ 2:00 PM.
Kevin Bova
Purchasing Agent
Town of Trumbull
5866 Main Street
Trumbull, CT 06611

- a. Please be advised that the person(s) signing the formal proposal must be authorized by your organization to contractually bind your firm with regard to prices and related contractual obligations for the delivery period requested.
- b. All Proposals must be made on the enclosed Proposal form. All blank spaces for Proposal prices must be filled in, in ink or typewritten, and the proposal form must be fully completed and executed when submitted.
- c. The Town reserves the right to correct, after proposer verification, any mistake in a proposal that is a clerical error, such as a price extension or decimal point error.

3. **BID TIME**

- a. Bids shall be received at the office of the Purchasing Agent Kevin Bova, Town Hall, prior to the advertised hour of opening, at which time all proposals will be publicly opened and read aloud. Any bids submitted or received after the advertised hour shall not be accepted, opened or read.
- b. A bidder may withdraw a proposal at any time prior to the above scheduled date and time. Any bid received after the above scheduled date and time shall not be considered or opened.

4. **TOWN OPTIONS**

- a. The TOWN reserves the right to reject any and all bids and does not bind itself to accept the lowest bid or any proposal. The Town reserves the right to ask for new bids in whole or in part, or to reject any or all bids, or any part thereof, and to waive any requirements, irregularities, technical defects or service therein when it is deemed to be in the best interest of the Town.
- b. If a bid proposal does not meet or better the required specifications, requirements, and scope of work requested on all points that must be outlined in a letter attached to the bid proposal otherwise it will be presumed that the bid as proposed is in accordance with the required specifications.

5. **TAXES**

- a. All purchases made by the Town, and associated with the award of this requirement shall be tax exempt. Any taxes must not be included in bid prices. A Town Tax Exemption Certificate shall be furnished upon request.

6. **SPECIFICATIONS**

- a. If quoted materials and/or equipment do not meet or better the attached specifications on ALL points, the proposer must note ALL exceptions as separate attachments to their formal response; otherwise, it will be presumed that the proposal is in accordance with all specifications requested herein. Each Bidder will be held responsible to have studied the Specifications, visit the site (if necessary) regarding the proposed work, satisfied itself regarding all existing conditions and measurements, and to have included in the proposal an amount sufficient to cover all work.
- b. Should any Bidder find discrepancies in the Specifications, or be in doubt as to the exact meaning, notify the Town at once. The Town may then at their option, issue Addenda clarifying same. The Town shall not be responsible for oral instructions or misinterpretations of Specifications.
- c. The Town reserves the right to issue Addenda at any time prior to the Bid Opening. All such Addenda become, upon issuance part of the Specifications. Each Bidder shall cover such Addenda in the proposal and shall acknowledge receipt of same on the blank provided therefore. It is the bidders' responsibility to access the Town's website or contact the Town for any addenda that may be issued in conjunction with this bid.
- d. The Town reserves the right to require any or all Bidders to submit statements as to previous experience in performing comparable work; and as to financial and technical organizations and resources available for this work. The mere opening and reading aloud of a bid shall not constitute or imply the Town's acceptance of the suitability of a Bidder or the bid, nor shall possession of Specifications constitute an invitation to bid. The competency and responsibility of Bidders as well as the number of working days required for completion will be considered in making an award.

7. **INQUIRIES & ADDENDUMS**

- a. All technical inquiries regarding this request shall be answered up to the close of business 5 pm on March 13, 2019, after which time no additional questions will be accepted to Joe Hausmann, PE. – Wright-Pierce (860)-852-1908, joe.hausmann@wright-pierce.com). All other questions may be directed to Kevin J. Bova Purchasing Agent (203-452-5042) kbova@trumbull-ct.gov.
- b. To ensure consistent interpretation of certain items, answers to questions the Town deems to be in the interest of all bidders will be made available in writing, email or by Fax as appropriate to all bidders.
- c. The Town reserves the right to communicate with any or all of the bidders to clarify the provisions of this request; the Town further reserves the right to request additional information from any bidder at any time after proposals are opened.
- d. **It is the sole responsibility of a bidder to verify any addendums that may have been issued relating to this request prior to submission of a proposal. Any notice of addendum shall be published on the Purchasing Department Website www.trumbull-ct.gov. Failure to submit a response that does not address any changes or addendums may result in a disqualification of a proposal submission.**
- e. Additionally, after proposals are received, the Town reserves the right to communicate with any or all of the bidders to clarify the provisions of Proposals. The Town further reserves the right to request additional information from any bidder at any time after proposals are opened.

8. **AWARD AND AUTHORITY**

- a. The Town Purchasing Agent will issue notification of Award in writing with a Town standard Contract, followed by a Purchase Order on an as needed basis.

9. **ASSIGNMENT OF RIGHTS, TITLES, AND INTERESTS**

- a. Any assignment or subcontracting by a bidder, vendor, or contractor for work to be performed, or goods and/or services to be provided, in whole or in part, and any other interest in conjunction with Town procurement shall not be permitted without the express written consent of the Town of Trumbull.

10. **HOLD HARMLESS CLAUSE**

- a. The Contractor agrees to indemnify, hold harmless and defend the Town from and against any and all liability for loss, damage or expense which the Town may suffer or for which the Town may be held liable by reason of injury, including death, to any person or damage to any property arising out of or in any manner connected with the operations to be performed under this Contract, whether or not due in whole or in part of any act, omission or negligence of the Town or any of his representatives or employees.

11. **WORK REGULATIONS AND STANDARDS**

All work activities performed in association with this request must be performed and completed for the Town in accordance with current Federal State and Local regulations. All services performed shall also conform to the latest OSHA standards and/or regulations. The Contractor shall comply with all of the Connecticut General Statutes and comply with the EEO requirements.

12. **INSURANCE**

- a. The successful bidder shall provide the Town Purchasing Agent with a Certificate of Insurance before work commences. The Town and Engineer shall be named as an additional insured with Insurance Company licensed to write such insurance in Connecticut, against the following risks and in not less than the following amounts:
 - Worker's Compensation
 - Contractor's Public Liability and Property Damage
 - Automobile Insurance

General Liability	Each Person	Each Occurrence	Aggregate
Bodily Injury Liability	\$2,000,000	\$2,000,000	\$2,000,000
Property Damage Liability	\$2,000,000	\$2,000,000	\$2,000,000
Personal Injury Liability	\$2,000,000	\$2,000,000	\$2,000,000
Comprehensive Automobile Liability			
Bodily Injury	\$1,000,000	\$1,000,000	\$5,000,000
Property Damage	\$1,000,000	\$1,000,000	\$1,000,000

Such policies shall provide that no coverage shall be changed or cancelled unless thirty- (30) day's prior notice of such change or cancellation shall be made to the Owner. Such notice shall be made by registered mail; postage prepaid, to the Purchasing Agent, Town of Trumbull, Town Hall, Trumbull, Connecticut 06611.

In the event of cancellation, the contractor shall cease all operations on or before the effective date of said cancellation and he shall not commence work again until he has obtained replacement insurance and has delivered a Certificate of Insurance to the office of the Owner's Purchasing Department.

13. **CONFLICT OF INTEREST**

Public officials shall be prohibited from receiving any town work procured through a Public Bid or bid waived process so as to avoid any appearance of Impropriety or Conflict of interest; and; Public officials cannot circumvent the Intent of this Ordinance by receiving town work through a bid waiver, as proscribed by the Trumbull Town Charter.

13. **AWARD AND PRICING**

- a. Individual requirements and or assignments shall be awarded to the successful respondent to this request on an as needed basis for specific projects designated by the Town. **The Town's intention is to obtain the services of at least Two (2) qualified contractors in order to provide services for any parts or all of the specified General Specifications and Requirements but may only choose one if the Town cannot obtain 2 qualified proposers. The Town's intention is to obtain at least one, preferably two, qualified contractors for the service as in the bid form.** Such assignments shall require a complete breakdown of all labor and material and guided by the rates and pricing structure identified in the proposal form contained herein PRIOR to the commencement of any work assignments. The work assigned shall primarily be for preventative maintenance, special projects or emergency services for existing Town systems and facilities per Technical specifications and Requirements listed below.
- b. All pricing quoted shall remain firm fixed for a period of Two and a half (2 ½) years from the date of proposal opening. Special consideration will be given to responses with extended firm price dates.
- c. The duration of the contract shall be for Town and half (2 ½) years and may be renewed for (1) one additional year if both parties mutually agree upon a price by giving the Contractor at least thirty (30) days written notice and upon mutual consent of both parties. Notwithstanding the foregoing, the Town may cancel the contract at any time.

- d. All awards for specific assignments shall be awarded by purchase order; however certain emergency requirements may be authorized directly by the Director of Facilities or its designee. The contract will be for 2 & ½ years estimated to be from April 1, 2019 to June 30, 2021.

The Town requires firmed fixed prices for a period of two and a half (2 ½) years following Quotation opening and nothing elsewhere in this Quotation shall abrogate this firm period. A letter of extension may be sent if both parties mutually agreed on pricing extended for one (1) additional year which would be July 2021 to June 30, 2022

14. **WARRANTIES**

- a. A copy of all applicable warranties must be submitted in full detail.

15. **REQUIREMENTS**

- a. The Town reserves the right to issue Addenda at any time prior to the Bid Opening. All such Addenda become, upon issuance, part of the Specification. Each Bidder shall cover such Addenda in their proposal and shall acknowledge receipt of same on the blank provided therefore. It is the Bidder's responsibility to access the Town's website or contact the Town for any addenda that may be issues in conjunction with this bid
- b. The Town reserves the right to require any or all Bidders to submit statements as to previous experience in performing comparable work; and as to financial and technical organizations and resources available for this work. The mere opening and reading aloud of a bid shall not constitute or imply the Town's acceptance of the suitability of a Bidder or the bid, nor shall possession of this Request constitute an invitation to bid. The competency and responsibility of Bidders will be considered in making the award.
- c. Due to the on-call nature of the work, the Bidder shall supply, where indicated on the bid form, an approximate minimum value of work to be included in a single on-call request, for each table. This value shall be used in the evaluation of the bids to determine the suitability of the Bidder for the nature of the work, and to ensure that both parties understand the limitation of the unit prices within the bid.

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BID NUMBER 6336: DUE: MARCH 20, 2019 AT 2:00PM

TECHNICAL SPECIFICATIONS AND REQUIREMENTS

See Attached Technical Specifications for On-Call Sewer and Drain System Rehabilitation and Related Services.

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PROPOSAL FORM

THE UNDERSIGNED AFFIRMS AND DECLARES that this Bid is executed with full knowledge and acceptance of the specifications, requirements, terms and conditions contained herein and with complete understanding and full compliance of all requirements and hereby submits this Bid for the request contained herein and certifies that this Bid meets all the specifications and conditions requested herein. Any substitutions to the specifications requested are clearly and completely noted. Any alternate proposals are presented in a similar format to those requested and are attached herein. It is understood that the Town reserves the right to reject any or all proposals or waive any formalities in this proposal request.

Having received the specifications prepared by the Town the undersigned hereby submits the following Unit Prices to perform the work outlined for the subject project, and attests that this Bid meets all the specifications and conditions stated in this Request for Proposal as follows:

THE QUANTITIES IN THIS BID FORM ARE FOR PURPOSES OF ILLUSTRATION ONLY. THE FINAL QUANTITIES WILL BE DETERMINED BY THE ACTUAL WORK COMPLETED. THE LOW BIDDER WILL BE DETERMINED BASED UPON THE SUM TOTAL OF THE BID SUBMITTED, WHICH ARE WEIGHTED BASED UPON THE ESTIMATED QUANTITY OF EACH BID ITEM.

These Prices for On Call will be for the entire length of the contract estimated to be from April 1, 2019 to June 30, 2021

ADDENDA

The following Addenda have been received. The modifications to the Bid Documents noted therein have been considered and all costs thereto are included.

Addenda # _____, _____, _____, _____, _____

UNIT PRICE SCHEDULE

Bid Table 1: Pipe Maintenance

Item No.	Estimated Quantity	Brief Description of Item with Unit Bid Price in Words	Unit Price In Figures	Total Estimated Price In Figures
1-1	5 EA*	Site Setup for 8" to 24" Pipe Maintenance including bypass pumping and coordination of traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
1-2	2,000 LF*	CCTV Inspection of 8" to 12" Dia. Pipes The Sum of \$ _____ _____	\$ _____	\$ _____
Per Linear Foot				
1-3	2 000 LF*	CCTV Inspection of 15" to 24" Dia. Pipes The Sum of \$ _____ _____	\$ _____	\$ _____

Item No.	Estimated Quantity	Brief Description of Item with Unit Bid Price in Words	Unit Price In Figures	Total Estimated Price In Figures
Per Linear Foot				
1-4	2,000 LF*	Cleaning of 8" to 12" Diameter Pipes The Sum of \$ _____ _____	\$ _____	\$ _____
Per Linear Foot				
1-5	2,000 LF*	Cleaning of 15" to 24" Diameter Pipes The Sum of \$ _____ _____	\$ _____	\$ _____
Per Linear Foot				
1-6	2,000 LF*	Chemical Root Control (All pipe sizes) The Sum of \$ _____ _____	\$ _____	\$ _____
Per Linear Foot				

* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

TABLE 1 TOTAL Bid Price: Total of Items 1-1 through 1-6 above.

\$ _____
(Use figures)

\$ _____
(Use words)

TABLE 1 minimum value per on-call request:

\$ _____
(Use figures)

\$ _____
(Use words)

Bid Table 2: Pipeline Spot Rehabilitation

Item No.	Estimated Quantity	Brief Description of Item with Unit Bid Price in Words	Unit Price In Figures	Total Estimated Price In Figures
2-1	5 EA*	Site setup for 8" to 12" Pipeline Spot Rehabilitation including bypass pumping and coordination of traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-2	5 EA*	Site setup for 15" to 24" Pipe Rehabilitation including bypass pumping and traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-3	20 LF*	CIPP Spot-Lining of 8" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-4	20 LF*	CIPP Spot-Lining of 10" to 12" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-5	10 LF*	CIPP Spot-Lining of 15" to 18" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-6	10 LF*	CIPP Spot-Lining of 24" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-7	10 EA*	Service Reinstatement including grouting of lateral opening The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
2-8	250 EA*	Test and Seal Pipe Joints- 8" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each Joint		
2-9	250 EA*	Test and Seal Pipe Joints- 10" to 12" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each Joint		
2-10	100 EA*	Test and Seal Pipe Joints- 15" to 18" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each Joint		

2-11	100 EA*	Test and Seal Pipe Joints- 20" to 24" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each Joint				
2-12	50 EA*	Test and Seal Pipe Joints- Laterals The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each Joint				

* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

TABLE 2 TOTAL Bid Price: Total of Items 2-1 through 2-12 above.

\$ _____
(Use figures)

\$ _____
(Use words)

TABLE 2 minimum value per on-call request:

\$ _____
(Use figures)

\$ _____
(Use words)

Bid Table 3: Full Pipeline Rehabilitation

Item No.	Estimated Quantity	Brief Description of Item with Unit Bid Price in Words	Unit Price In Figures	Total Estimated Price In Figures
3-1	5 EA*	Site setup for 8" to 12" Full Pipeline Rehabilitation including bypass pumping and coordination of traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
3-2	5 EA*	Site setup for 15" to 24" Full Pipeline Rehabilitation including bypass pumping and traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
3-3	2,000 LF*	Full Pipeline CIPP Lining of 8" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				

3-4	2,000 LF*	Full Pipeline CIPP Lining of 10" to 12" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
3-5	1,000 EA*	Full Pipeline CIPP Lining of 15" to 18" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
3-6	1,000 EA*	Full Pipeline CIPP Lining of 24" Pipe The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				
3-7	50 EA*	Service Reinstatement including grouting of lateral opening The Sum of \$ _____ _____	\$ _____	\$ _____
Per Each				

* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

TABLE 3 TOTAL Bid Price: Total of Items 3-1 through 3-7 above.

\$ _____
(Use figures)

\$ _____
(Use words)

TABLE 3 minimum value per on-call request:

\$ _____
(Use figures)

\$ _____
(Use words)

Bid Table 4: Manhole Rehabilitation

Item No.	Estimated Quantity	Brief Description of Item with Unit Bid Price in Words	Unit Price In Figures	Total Estimated Price In Figures
4-1	5 EA*	Site Setup for Manhole Rehabilitation including bypass pumping and coordination of traffic control The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
4-2	20 EA*	Manhole Injection Grouting The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
4-3	200 VF*	Installation of Cementitious Liner The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Vertical Foot		
4-4	50 VF*	Cementitious Liner and Corrosion Resistant Coating The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Vertical Foot		
4-5	20 EA*	Internally Applied Chimney Seal The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		
4-6	10 EA*	Repair/Replacement of Manhole Bench, Channel and/or Invert The Sum of \$ _____ _____	\$ _____	\$ _____
		Per Each		

* Indeterminate quantities assumed for comparison of bids. Quantities are not guaranteed. Payment will be based on actual quantities constructed.

TABLE 4 TOTAL Bid Price: Total of Items 4-1 through 4-6 above.

\$ _____
(Use figures)

\$ _____
(Use words)

TABLE 4 minimum value per on-call request:

\$ _____
(Use figures)

\$ _____

(Use words)

ALL TABLES TOTAL Bid Price: Total of Items 1-1 through 4-6 above.

\$ _____
(Use figures)

\$ _____
(Use words)

****Only Complete the ALL TABLES TOTAL if you have submitted prices for all items in all Four Tables****

Company Name

By (Signature)

Address

Print Name

City/Town

Title

Date

Telephone/Fax

Email

Emergency Phone

BIDDER:

By:

[Signature] _____

[Printed name] _____

(If Bidder is a corporation, a limited liability company, a partnership, a sole proprietorship, or a joint venture, attach evidence of authority to sign.)

Attest:

[Signature] _____

[Printed name] _____

Title: _____

Submittal Date: _____

Address for giving notices:

Bidder's

License

No.: _____

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REFERENCES

(To be submitted with proposal – attach additional pages as necessary)

List references for similar services provided for at least Four (4) clients in the past five (5) years (attach any other client references if desired). **PLEASE NOTE IT IS THE TOWN'S INTENT TO COMMUNICATE WITH THE REFERENCES LISTED HEREIN.**

CLIENT 1:

Organization Name: _____

Contact Name: _____ Phone: _____

Service Dates: _____

Project(s): _____

CLIENT 2:

Organization Name: _____

Contact Name: _____ Phone: _____

Service Dates: _____

Project(s): _____

CLIENT 3:

Organization Name: _____

Contact Name: _____ Phone: _____

Service Dates: _____

Project(s): _____

CLIENT 4:

Organization Name: _____

Contact Name: _____ Phone: _____

Service Dates: _____

Project(s): _____

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THE PROPOSER SHALL STATE THE NAMES OF ALL OF ALL PROPOSED SUBCONTRACTORS.

PROPOSED SUBCONTRACTORS (To be submitted with proposal – attach additional pages as necessary)

If none, write "None" _____.

*Description of Work _____
Proposed Subcontractor Name _____
Address _____

*Description of Work _____
Proposed Subcontractor Name _____
Address _____

*Description of Work _____
Proposed Subcontractor Name _____
Address _____

*Description of Work _____
Proposed Subcontractor Name _____
Address _____

*Insert description of work and subcontractors' names as may be required.
This is to certify that the names of the above-mentioned subcontractors are submitted with full knowledge and consent of the respective parties.
The Proposer warrants that none of the proposed subcontractors have any conflict of interest as respects this contract.

Proposer _____
(Fill in Name)

By _____
(Signature and Title)

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STATEMENT OF QUALIFICATIONS (To be submitted with proposal)

Submitted by:

Name of Organization _____

Name of Individual _____

Title _____

Address _____

Telephone _____ Fax: _____ Cell: _____

General Business Information

Check If: Corporation Partnership Joint Venture Sole Proprietorship

If Corporation:

a. Date and State of Incorporation

b. List of Officers

Name Title

If Partnership

a. Date and State of Organization

b. Names of Current General Partners

c. Type of Partnership

General Publicly Traded

Limited other (describe): _____

If Joint Venture:

a. Date and State of Organization

b. Name, Address and Form of Organization of Joint Venture Partners: (Indicate managing partner by an asterisk*)

If Sole Proprietorship:

a. Date and State of Organization

b. Name and Address of Owner or Owners

1. On Schedule A, attached, list major engineered construction projects completed by this organization in the past five (5) years. (If a joint venture list each participant's projects separately).
2. On Schedule B, attached, list current projects under construction by this organization. (If joint venture, list each participant's projects separately).
3. Name of Surety Company and name, address, and phone number of agent.

4. Is your organization a member of a controlled group of corporations as defined in I.R.C. Sec. 1563?
Yes___ No ___
If yes, show names and addresses of affiliated companies.

5. Furnish on Schedule C, attached, details of the construction experience of the principal individuals of your organization directly involved in construction operations.

6. Has your organization ever failed to complete any construction contract awarded to it?
Yes___ No ___

If yes, describe circumstances on attachment.

7. Has any Corporate officer, partner, joint venture participant or proprietor ever failed to complete a construction contract awarded to him or her in their own name or when acting as a principal of another organization?

Yes___ No ___

If yes, describe circumstances on attachment.

8. In the last five years, has your organization ever failed to substantially complete a project in a timely manner?

Yes___ No ___

If yes, describe circumstances on attachment.

I hereby certify that the information submitted herewith, including any attachment is true to the best of my knowledge and belief.

Name of Organization: _____

By: _____

Title: _____

Dated: _____

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BID NUMBER 6336: DUE: MARCH 20, 2019 AT 2:00PM

EXPERIENCE

Schedule A: Prior Experience (Add Additional Pages as Needed)

Project	Owner	Design Professional	Contract Price	Amount Completed	Date of Scheduled Completion

Schedule B: Current Experience (Add Additional Pages as Needed)

Project	Owner	Design Professional	Contract Price	Amount Completed	Date of Scheduled Completion

Schedule C: Key Personnel (Add Additional Pages as Needed)

Name	Position	Date of Hire	Date Started in Construction	Prior Positions & Construction Experience

**TOWN OF TRUMBULL, CONNECTICUT
WATER POLLUTION CONTROL AUTHORITY
REQUEST FOR PROPOSAL FOR ON-CALL
SEWER & DRAIN SYSTEM REHABILITATION & RELATED SERVICES
TOWN WIDE**

BID NUMBER 6336: DUE: MARCH 20, 2019 AT 2:00PM

State of _____)

) SS:

County of _____)

_____, being first duly sworn,

1. He is _____ of
The bidder that has submitted the attached bid.

2. He is fully informed respecting the preparation and contents of the attached Bid and of all pertinent circumstances respecting such bid.

3. Such price is genuine and is not a collusive or sham bid.

4. Neither the said Bidder nor any of its officers, partners, owners, agents, representatives, employees or parties in interest, including this affiant, has in any way colluded, conspired, connived or agreed, directly or indirectly with any other Bidder, firms or person to submit a collusive or sham Bid in connection with the Contract for which the Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communications or conference with any other Bidder, firm or person to fix the proceeds or prices in the attached Bid or of any other Bidder, or to fix any overhead, profit or cost element of the Bid price or the Bid price of any bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage, against the Town of Trumbull, (Owner) or any person interested in the proposed Contract; and

5. The price or prices quoted in the attached Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest including this affiant.

Signed _____

Title

Subscribed and sworn to before me this _____ day of _____, 20

Title

My Commission Expires

END OF GENERAL BID INSTRUCTIONS

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SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Location: Work under this contract includes, but is not limited to, locations within the rights-of-way on the streets and easements in the Town of Trumbull, Connecticut.
- B. Work Included: The On-call Work involves rehabilitation of manholes and pipelines throughout the Town's sewer and storm drain system including, but not limited to; cleaning and lining or sealing manholes; spot lining and full length lining of sewer and storm drain piping, testing and sealing of pipe joints and laterals, chemical grouting of gravity piping, chemical root control of gravity piping; and pavement and lawn restoration, and appurtenant work
- C. Removals, Relocations and Rearrangements
 - 1. Examine the existing site(s) for the work of all trades which will influence the cost of the work under the bid. This work shall include removals, relocations and rearrangements which may interfere with, disturb or complicate the performance of the work under the bid involving systems, equipment and related service lines, which shall continue to be utilized as part of the finished project. The Contractor is responsible for all coordination in this regard.
- D. Coordination:
 - 1. The Contractor shall be responsible for coordinating work with the Town of Trumbull, Town of Trumbull Water Pollution Control Authority, Trumbull Department of Public Works, Town of Trumbull Police Department, Local Bus Company and all other utilities.
 - 2. The Contractor shall become familiar with the Town of Trumbull and Connecticut DOT standards for roadway work. He shall retain any necessary permitting required to do work.
 - 3. The Contractor shall not (except after written consent from the proper parties) enter or occupy with men, tools, materials, or equipment, any land outside the right-of-way or property of the Town. A copy of the written consent shall be given to the Engineer.

PART 2 - PRODUCTS

Not Applicable.

PART 3 - EXECUTION

3.1 CONSTRUCTION SEQUENCE

- A. The Contractor shall conduct his operations in such a manner and sequence which shall neither result in a disruption of, nor interfere with, the functional workings of any existing utilities/facilities or wastewater flows.

- B. The Contractor shall furnish, install and operate any piping, equipment and appurtenances necessary to provide the temporary services, facilities, and bypasses required during construction including, but not limited to, bypass pumping, flow barriers and diversions. Temporary facilities, if required, shall have pumping capacity equal to or greater than the existing pumping and/or piping as applicable. The Contractor must submit a temporary by-pass plan to, and receive approval from, the Owner prior to conducting any bypassing.
- C. The Contractor shall include the cost of all temporary facilities required to bypass pump or otherwise handle and maintain flows during rehabilitation work as necessary in the bid price. The cost shall include all labor, tools, equipment and materials necessary. Due to potential high flows within the sewer and storm drain system during rain events, the contractor shall avoid working in wet weather conditions unless previously discussed with Engineer.
- D. Access to all residences and businesses must be maintained at all times. To the maximum extent practicable, the Contractor will work to limit the area impacted by his work while on public ways.
- E. The Contractor shall insure that no excavation be left open, unguarded, or water filled during any period of time when work is not actually in progress. It is the purpose and intent that all excavations and backfill, including consolidation operations, and temporary surfacing and pavements within an area be accomplished expeditiously before proceeding to other work areas.

3.2 DETOURS AND ROAD ACCESSIBILITY

- A. The Contractor shall contact the responsible heads of the Fire, Police, Highway and other appropriate governing bodies of the municipality in order to obtain necessary permits and determine the requirements of said departments with respect to traffic control, alternate vehicular access routes, etc. Wherever detours are permitted the size, construction and location of signs shall conform with local and state requirements and/or standards. Detour routes shall be adequately posted to assist the motorist to return to his route of travel. Where the roadway under construction is the only means of vehicular access to a particular area, the Contractor shall provide continual access to the area for residents and emergency vehicles. Contractor shall be responsible to provide detour plan to Town of Trumbull and necessary emergency services for approval.
- B. The Contractor is responsible for providing traffic control and/or coordination with the Towns project representative, who will coordinate the work with the local Police Department. The Contractor is responsible for maintaining two-way traffic during construction. Police Traffic control and protection requirements are listed in Section 01570 shall be the responsibility of the contractor under the respective bid item.

3.3 CHANGE IN AMOUNT OF WORK

- A. The Owner reserves the right to increase or decrease the amount of any item of the work listed as may be found desirable or necessary during the carrying out of this contract and the unit prices quoted in the Bid Proposal shall apply without change to such variation in the quantity of each of the

Items, except as otherwise provided in the Contract Documents. The Owner may elect to reduce or increase the areas where work is scheduled and reduce or increase other related work within the contract.

3.4 DISPOSAL OF EXCESS MATERIAL

- A. All surplus material removed from the excavations shall be disposed of at the cost of the Contractor as an incidental work item.

3.5 TECHNICAL SPECIFICATIONS

- A. All technical specifications such as ASTM, AWWA, AASHTO, etc., referred to in these specifications refer to the latest revision of such technical specifications.

3.6 SPECIAL CONDITIONS

- A. The Contractor is advised that protection of the existing utilities in the vicinity of the project, and the assurance of uninterrupted service during the contract period is of the essence.
- B. In the event that any operations undertaken by the Contractor under this contract result in damages to utilities, all necessary repairs to water piping, valves, hydrants, fittings, cables, sewer mains, storm drain piping, etc., shall be done by the Contractor. The Contractor shall provide, at no extra cost to the Owner, all necessary materials, equipment and labor necessary to satisfactorily excavate backfill, repair, etc., in conjunction with such repair work.
- C. Prior to commencing excavation work, the Contractor shall notify Call before You Dig (1-800-922-4455) to have all existing public and private utility lines and underground structures marked out.

3.7 PERMITS, FEES AND BONDS

- A. The Contractor shall obtain and comply with all required permits, pay all fees and provide all bonds and insurances necessary to complete the work as specified. All Town permit fees will be waived.

3.9 EXISTING UTILITIES AND STRUCTURES

- A. The plans do not show the location and depth of all utilities, nor do they show all utilities that may be encountered.
- B. The Contractor shall assume that there are existing underground utility connections to each and every building or structure along the line of work, whether they appear on the drawings or not. The Contractor shall notify the proper utility companies and obtain and preserve the locations as marked for all existing gas, electric and other utilities that may be encountered along the line of work, until such time as such markings are no longer required.
- C. The Contractor shall dig by hand in advance of the trenching machinery to determine the exact location and depth of each utility to be encountered. Excavating machinery shall be stopped at least two feet away from each side of the utility to be crossed and the Contractor shall tunnel by hand under these utilities after he has ascertained their exact location and depth.

3.10 TWENTY-FOUR (24) HOUR EMERGENCY SERVICE

- A. The Contractor shall maintain a 24-hour, 7-day a week telephone service and a local facility to handle emergency requirements such as settled trenches, rain damage, etc. The Contractor's emergency personnel shall be able to respond to emergency calls within thirty minutes. A list of the personnel and their telephone numbers shall be submitted to the Owner, Town Public Works and Engineering Departments and to the local Police and Fire Departments. This requirement shall apply during the entire length of the project.

- B. This list shall be submitted on the Contractor's letterhead and shall state that should an emergency arise during the implementation of this project, these people are to be contacted. The Contractor shall submit this letter at the Pre-Construction Conference.

END OF SECTION

SECTION 01050COORDINATIONPART 1 - GENERAL1.1 DESCRIPTION

- A. Contractor is required to work in close proximity to Owner's existing facilities. The Contractor, under this Contract, will be responsible for coordinating construction activities with Owner and/or Engineer to ensure that services, facilities, and safe working conditions are maintained.
- B. Any damage to existing structures, equipment and property, accepted equipment or structures, and property or work in progress by others; as a result of the Contractor's or his subcontractor's operations shall be made good by the Contractor at no additional cost to the Owner.

1.2 COORDINATION WITH OTHERS

- A. PRIOR TO ANY CONSTRUCTION ACTIVITY: the Contractor shall call the statewide utility clearing center "CALL-BEFORE-YOU-DIG" at 1-800-922-4455. All existing utilities shall be marked in the field by the respective utility companies prior to any construction activities.
- B. Town of Trumbull, CT:
 - 1. Contractor shall coordinate access, egress, detours and traffic control, if required, at each site with the Town of Trumbull Police Department and CT State Police. The Contractor shall notify the Town of Trumbull Police, CT State Police, Fire Department and local school bus company at least twenty- four (24) hours in advance of any street closings or detours. All main roads shall have police patrol. Police patrols shall be scheduled through the Engineering department at least forty-eight (48) hours in advance of any activities occurring on main roads.
 - 2. Contractor shall coordinate all work on Town property with the Engineering department personnel.
 - 3. The Contractor shall be responsible for coordinating and maintaining public services to all public and private properties.
 - 4. The Contractor shall be responsible for notifying the Town prior to any work occurring in easements throughout the project. This includes inspection work as well as other construction related activities occurring in the easements so that the Town and Engineer can coordinate with the homeowners. The Contractor shall notify the Town no less than fourteen (14) days of advance of any activities occurring the easements so that the Town and Engineer can coordinate with the homeowners.
- C. The Contractor shall identify all utility companies who have facilities in the project vicinity and coordinate the Work of this Contract with said utility companies.
- D. The following is list of utilities/agencies that may be involved in this project:
 - 1. The Aquarian Water Company of CT 203.362.3061
 - 2. United Illuminating Company 203.447.7900

3. Southern CT Gas Company 1.866.268.2887
4. Trumbull WPCA/Sewer Department 203.452.5048
5. Trumbull Department of Public Works 203.452.5045
6. Trumbull Town Engineer 203.452.5053

The Contractor shall coordinate the Work of this Contract with the above utilities/agencies and with any and all others who become involved in the project, to provide a minimum disruption to utility services and to services regulated by said agencies. The Contractor shall provide not less than forty-eight (48) hours' notice to utilities prior to working in proximity of utilities or in areas under control of said agencies. The Contractor shall bear all costs for the utility company's inspection requirements

- E. The Contractor shall provide the Engineer and Owner a construction schedule indicating the times to perform the work required. The Contractor shall update the schedule when required and give the Engineer and Owner one week notice before the start of any work. The Contractor shall daily communicate with the Engineer and Owner concerning updating the schedule, job progress, delay or early starts, etc.

END OF SECTION

SECTION 01150

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.1 DESCRIPTION

- A. For lump sum items, payment shall be made to the contractor in accordance with the progress of the work and schedule of values on the basis of actual work completed.
- B. For unit-price items, payment shall be based on the actual amount of work accepted and for the actual amount of materials in place, as shown by final measurements.
 - 1. All units of measurement shall be standard United States convention as applied to the specific items of work by tradition and as interpreted by the Engineer.
 - 2. At the end of each day's work, the Contractor's Superintendent or other authorized representative of the Contractor shall meet with the Town and/or Engineer and determine the quantities of unit price work accomplished and/or completed during the work day.
 - 3. After the work is completed and before final payment is made, the Town and/or Engineer will make final measurements to determine the quantities of various items of work accepted as the basis for final settlement.

1.2 INCIDENTAL WORK

- A. Incidental work items for which separate payment will not be made includes, but is not limited to, the following items:
 - 1. Contract administration and insurances
 - 2. Pre-Construction photographs, videos, and manhole inspections.
 - 3. Safety and health plan
 - 4. Clearing, grubbing and stripping
 - 5. Project Record Documents
 - 6. Traffic control plan and traffic regulation.
 - 7. Clean-up and restoration of property.
 - 8. Restoration of property, and replacement of fences, curbs, structures and other minor items disturbed by the construction activities
 - 9. Cooperation and coordination with other Contractors and utility companies including related inspection costs and other costs (Refer to Section 01050).
 - 10. Temporary utility services to buildings, as required to maintain service during construction.
 - 11. Minor Items--such as relocation of sign posts, guard rails, rock wall, mail boxes, curbs, traffic loop detectors, pavement markings, etc., damaged as a result of construction activities.

12. Dewatering as necessary.
13. Dust control.
14. Erosion control.
15. Noise Control
16. Quality assurance testing.
17. Post-work cleaning of sewers, force mains and storm drains.
18. Clearing, grubbing and stripping.
19. Loam, seeding, grading, liming, fertilization, mulching, and watering.
20. Construction schedules, bonds, insurance, shop drawings, warranties, guarantees, certifications and other submittals required by the Contract Documents.
21. Materials testing
22. Repair and replacement of water lines (all sizes), culverts, underdrains, rock lined drainage trenches in streets and other utilities damaged by construction activities and corresponding proper disposal of removed materials unless otherwise paid for.
23. Temporary utilities for construction and to maintain existing service during construction
24. Temporary construction necessary for construction sequencing and other facilities not permanently incorporated into the work.
25. Weather protection
26. Permits not otherwise paid for or provided by the Owner.
27. Visits to the project site or elsewhere by personnel or agents of the Contractor, including manufacturer's representatives, as may be required.
28. On-site and other facilities acceptable to Engineer for the storage of materials, supplies and equipment to be incorporated into the Work
29. Test pits to determine existing utility locations, soils conditions, and as required to complete the project
30. Pavement markings.
31. Earthwork (except ledge)
32. Locating and verifying the locations of water, drain, and sewer services within the limits of work. Capping or plugging existing underground utilities as shown on the plans and Dye testing as required to determine bulk heading and reconnection requirements.
33. Removal and subsequent delivery of replaced or obsolete frames and covers to a location within the City limits designated by the Owner.
34. Post Completion CCTV and report of all pipelines and structures rehabilitated under this Contract.
35. Miscellaneous demolition required by the construction

1.3 DESCRIPTION OF PAY ITEMS

- A. The following sections describe the measurement of and payment for the work to be done under the respective items listed in the Bid Form.
- B. Each unit or lump-sum price stated in the Bid Form shall constitute full compensation, as herein specified, for each item of the work completed.

SECTION 1: Pipe Maintenance

Item No.1-1: Site Setup for 8" to 24" Pipe Maintenance including bypass pumping and coordination of traffic control

- A. Method of Measurement: Will be paid on a per day basis.
- B. Basis of Payment: Site setup costs include furnishing and installing all required traffic controls, bypass pumping required to perform all work, mobilization, and demobilization to perform any and all work covered under Item Nos. 1-2 through 1- 6 of Bid Table 1- Pipe Maintenance.
 - 1. On Streets listed in Appendix A, and when otherwise required by the Owner. Uniformed Police Officers will be required for the maintenance and protection of traffic. Contractor shall coordinate all required Uniformed Police officer details when required.
 - 2. Billing for Uniformed Police Officers shall be sent directly to the Owner and shall be paid for by the Owner.
 - 3. The contractor shall not be allowed any markup or payment for Uniformed Police Officer details.

Item No.1-2: CCTV Inspection of 8" to 12" Diameter Pipes

- A. Method of Measurement: Will be paid on a linear foot basis of pipeline inspected.
 - 1. This item shall be used only where inspection/maintenance only is requested. Inspection required as part of a rehabilitation request shall be included in the relevant rehabilitation items.
- B. Basis of Payment: Furnish all necessary labor, materials, supervision and equipment to satisfactorily inspect gravity sewer and drain lines by means of a closed circuit television (CCTV) system, including providing the required records and documentation to the Owner.

Item No.1-3: CCTV Inspection of 15" to 24" Diameter Pipes

- A. Method of Measurement: Will be paid on a linear foot basis of pipeline inspected.
 - 1. This item shall be used only where inspection/maintenance only is requested. Inspection required as part of a rehabilitation request shall be included in the relevant rehabilitation items.
- B. Basis of Payment: Furnish all necessary labor, materials, supervision and equipment to satisfactorily inspect gravity sewer and drain lines by means of a closed circuit television (CCTV) system, including providing the required records and documentation to the Owner.

Item No.1-4: Cleaning of 8" to 12" Diameter Pipes

- A. Method of Measurement: Will be paid on a linear foot basis of pipeline cleaned.
 - 1. This item shall be used only where inspection/maintenance only is requested. Inspection required as part of a rehabilitation request shall be included in the relevant rehabilitation items.
- B. Basis of Payment: Furnish all necessary labor, materials, supervision and

equipment to satisfactorily clean gravity sewer and drain lines and remove and dispose of debris. This includes root cutting and removal and grease removal and disposal.

Item No.1-5: Cleaning of 15” to 24” Diameter Pipes

- A. Method of Measurement: Will be paid on a linear foot basis of pipeline cleaned.
 - 1. This item shall be used only where inspection/maintenance only is requested. Inspection required as part of a rehabilitation request shall be included in the relevant rehabilitation items.
- B. Basis of Payment: Furnish all necessary labor, materials, supervision and equipment to satisfactorily clean gravity sewer and drain lines and remove and dispose of debris. This includes root cutting and removal and grease removal and disposal

Item No.1-6: Chemical Root Control (All pipe sizes)

- A. Method of Measurement: Chemical Root Control of pipe accepted for payment shall be the actual distance in linear feet measured along the pipe from pipe connection point to pipe connection point chemically treated and accepted as complete.
- B. Basis of Payment: The chemical root control shall be paid for at the Contract unit price per linear foot stated in the Bid Schedule. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary for chemical root control. Work under this item shall also include compliance with all local, state and federal regulations, protection of existing facilities from damage, providing water, disposal of material removed from the pipe, maintaining flows and service to all users, notices to abutters, and all appurtenant work as needed to complete the work. Root removal is included in this item and these pipes are not eligible for additional heavy cleaning costs.

SECTION 2: Pipeline Spot Rehabilitation

Item No. 2-1 and 2-2: Site Setup for 8” to 12” or 15” to 24” Pipeline Spot Rehabilitation including bypass pumping and coordination of traffic control

- A. Method of Measurement: Will be paid on a per day basis.
- B. Basis of Payment: Site setup costs include furnishing and installing all required traffic controls, bypass pumping required to perform all work, mobilization, and demobilization for Item Nos. 2-3 through 2-12 of Bid Table 2- Pipe Spot Rehabilitation.
 - 1. On Streets listed in Appendix A, and when otherwise required by the Owner. Uniformed Police Officers will be required for the maintenance and protection of traffic. Contractor shall coordinate all required Uniformed Police officer details when required.
 - 2. Billing for Uniformed Police Officers shall be sent directly to the Owner and shall be paid for by the Owner.
 - 3. The contractor shall not be allowed any markup or payment for Uniformed Police Officer details.

Item No.2-3 through 2-6: Cured in Place Pipe (CIPP) Spot-Lining of 8", 10" to 12", 15" to 18" and 24" Pipe

- A. Method of Measurement: Spot-lining of pipeline accepted for payment shall be the actual number of spot repairs installed and accepted as complete.
 - 1. If a spot repair requires two overlapping liner segments, for a defect in excess of 8-feet in linear length, each segment shall be paid as a separate spot repair.
- B. Basis of Payment: The Spot-lining shall be paid for at the unit price per each repair stated in the Bid. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary for pipe lining, complete, satisfactorily tested, and operational. Work under this item shall also include pipeline cleaning, disposal of material removed from the pipe, CCTV inspection of the pipeline (prior to lining, immediately after lining, and at the end of the 1-year warranty period), video DVDs and written logs, sealing around liner in manholes or structures, collection of a restrained or plate sample during installation and submission of the sample to the Engineer, notices to abutters, verification of service reinstatement with TV inspection and all appurtenant work as needed to complete the work.

Item No.2-7: Service Reinstatement including Grouting of Lateral Opening

- A. Method of Measurement: Reinstatement of services accepted for payment shall be the actual number of services reinstated and accepted as complete.
- B. Basis of Payment: The Contract Unit Price for reinstatement of a service connection shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including, cutting of the liner at each service, polishing the cut hole, grout and seal of each service connection, and all else incidental thereto for which payment is not provided under other items.
 - 1. Price for the lateral reinstatement shall include grouting of the reinstated service connection.

Item No. 2-8 through 2-11: Test and Seal Pipe Joints- 8", 10" to 12", 15" to 18" and 20" to 24" Pipe

- A. Method of Measurement: Test and Seal Pipe Joints accepted for payment shall be the actual number of existing pipe joints tested, sealed and accepted as complete.
- B. Basis of Payment:
 - 1. Test and Seal Pipe Joints shall be paid for at the Contract unit price per joint stated in the Bid Schedule. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary for pipe joint testing and sealing, complete, satisfactorily tested, and operational. Work under this item shall include pipeline cleaning, disposal of material removed from the pipe, TV inspection of the pipe, video DVDs and written logs, testing of each joint, chemical

injection sealing of joints failing the initial test, re-testing and re-grouting of all joints according to the specification, maintaining and bypassing existing flows and maintaining service to all users, final cleaning of access manholes, notices to abutters, and all appurtenant work as needed to complete the work.

2. Joints tested and accepted without requiring chemical joint sealing shall also be paid for under this item.

Item No. 2-12 – Test and Seal Pipe Joints - Laterals

- A. Method of Measurement: Test and Seal Pipe Joints – Laterals accepted for payment shall be the actual number of laterals tested, sealed and accepted as complete.
- B. Basis of Payment:
 1. Test and Seal Pipe Joints – Laterals shall be paid for at the Contract unit price per lateral as stated in the Bid Schedule. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary for building lateral pipe joint testing and sealing, complete, satisfactorily tested, and operational. Work under this item shall include pipeline cleaning, disposal of material removed from the pipe, TV inspection of the lateral, video DVDs and written logs, testing of each joint, chemical injection sealing of joints failing the initial test, re-testing and re-grouting of all joints according to the specification, maintaining and bypassing existing flows and maintaining service to all users, final cleaning of access manholes, notices to abutters, and all appurtenant work as needed to complete the work. It is assumed that each building lateral designated for testing and sealing shall be tested and sealed from the main to approximately five (5) feet up the lateral. This includes testing and sealing the lateral connection point to the main.
 2. Joints tested and accepted without requiring chemical joint sealing shall also be paid for under this item.

SECTION 3: Full Pipeline Rehabilitation

Item No. 3-1 and 3-2: Site Setup for 8" to 12" or 15" to 24" Full Pipeline Rehabilitation including bypass pumping and coordination of traffic control

- A. Method of Measurement: Will be paid on a per day basis.
- B. Basis of Payment: Site setup costs include furnishing and installing all required traffic controls, bypass pumping required to perform all work, mobilization, and demobilization for Item Nos. 3-3 through 3-7 of Bid Table 3- Full Pipeline Rehabilitation.
 1. On Streets listed in Appendix A, and when otherwise required by the Owner. Uniformed Police Officers will be required for the maintenance and protection of traffic. Contractor shall coordinate all required Uniformed Police officer details when required.
 2. Billing for Uniformed Police Officers shall be sent directly to the Owner and shall be paid for by the Owner.
 3. The contractor shall not be allowed any markup or payment for

Uniformed Police Officer details.

Item No.3-3 through 3-6: Full Pipeline Cured in Place Pipe (CIPP) of 8", 10" to 12", 15" to 18" and 24" Pipe

- A. Method of Measurement: CIPP lining of sewer or drain pipe accepted for payment shall be the actual number of feet of pipe lined and accepted as complete.
 - 1. Pipeline footage shall be measured from inside face of structure to inside face of structure.
- B. Basis of Payment: The full pipeline lining shall be paid for at the unit price per linear foot as stated in the Bid. Said unit price shall include compensation for furnishing all labor, materials, tools, and equipment necessary for pipe lining, complete, satisfactorily tested, and operational. Work under this item shall also include pipeline cleaning, disposal of material removed from the pipe, CCTV inspection of the pipe (prior to lining, immediately after lining, and at the end of the 1-year warranty period), video DVDs and written logs, sealing around liner in manholes and end structures, collection of a restrained or plate sample during installation and submission of the sample to the Engineer, notices to abutters, verification of service reinstatement with TV inspection and all appurtenant work as needed to complete the work.

Item No.3-7: Service Reinstatement including Grouting of Lateral Opening

- A. Method of Measurement: Reinstatement of services accepted for payment shall be the actual number of services reinstated and accepted as complete.
- B. Basis of Payment: The Contract Unit Price for reinstatement of a service connection shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including, cutting of the liner at each service, polishing the cut hole, grout and seal of each service connection, and all else incidental thereto for which payment is not provided under other items.
 - 2. Price for the lateral reinstatement shall include grouting of the reinstated service connection.

SECTION 4: Manhole Rehabilitation

Item No.4-1: Site Setup for Manhole Rehabilitation including bypass pumping and coordination of traffic control

- A. Method of Measurement: Will be paid on a per day basis.
- B. Basis of Payment: Site setup costs include furnishing and installing all required traffic controls, bypass pumping required to perform all work, mobilization, and demobilization for Item Nos. 4-2 through 4-6 of Bid Table 4- Manhole Rehabilitation
 - 1. On Streets listed in Appendix A, and when otherwise required by the Owner. Uniformed Police Officers will be required for the maintenance

- and protection of traffic. Contractor shall coordinate all required Uniformed Police officer details when required.
2. Billing for Uniformed Police Officers shall be sent directly to the Owner and shall be paid for by the Owner.
 3. The contractor shall not be allowed any markup or payment for Uniformed Police Officer details.

Item No. 4-2: Manhole Injection Grouting

- A. Method of Measurement: Manhole rehabilitation by injection grouting accepted for payment shall be the actual number of manholes injection grouted to stop any leaks.
- B. Basis of Payment: The unit price per each manhole injection grouting shall be full compensation for all labor, materials and equipment necessary to complete the work including power wash cleaning and preparation of structure; disposal of materials removed; drilling holes for injection grouting; injection of grout to seal leaks; patching grout holes; grouting and sealing around leaking pipe connections or other defects; maintaining and bypassing existing flows; and all else incidental thereto for which payment is not provided under other items. Payment shall not be made until visual inspection and acceptance by the Town and/or Engineer.

Item No. 4-3: Installation of Cementitious Liner

- A. Method of Measurement: Manhole rehabilitation by injection grouting accepted for payment shall be the actual number of vertical feet of manhole structures coated and accepted complete in place.
 1. Manholes fully lined shall be measured from the lowest invert to rim elevation.
 2. In cases where only part of the manhole is lined, on the portion of the manhole wall lined shall be measured.
- B. Basis of Payment: The contract unit price per manhole shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including cleaning of the manhole, surface preparation, installation of the cementitious liner, and all else incidental thereto for which payment is not provided under other items.

Item No. 4-4: Installation of Cementitious Liner and Corrosion Resistant Coating

- A. Method of Measurement: Manhole rehabilitation by cementitious liner and corrosion resistant coating accepted for payment shall be the actual number of vertical feet of manhole structures coated and accepted complete in place.
 1. Manholes fully lined shall be measured from the lowest invert to rim elevation.
 2. In cases where only part of the manhole is lined, on the portion of the manhole wall lined shall be measured.
- B. Basis of Payment: The contract unit price per manhole shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including cleaning of the manhole, surface preparation, installation of the cementitious liner, installation of the corrosion resistant coating, and all else incidental thereto for which payment is not provided under

other items.

Item No. 4-5: Internally Applied Chimney Seal

- A. Method of Measurement: Manhole Chimneys measured for payment shall be the actual number of manhole chimney seals furnished and installed.
- B. Basis of Payment: The unit price per each Line Manhole Chimney lined shall be full compensation for all labor, materials and equipment necessary to complete the work including cleaning and preparation of structure for installation of internally applied chimney seal. Payment shall not be made until visual inspection and acceptance by the Engineer or Owner.

Item No. 4-6: Repair/Replacement of Manhole Bench, Channel and/or Invert

- A. Method of Measurement: Repair or replacement of manhole bench, channel and/or invert accepted for payment shall be the actual number of manholes where the bench, channel, and/or invert repaired or replaced.
- B. Basis of Payment: The contract unit price per manhole shall be full compensation for all labor, materials, tools and equipment necessary to complete this work including cleaning, removal of damaged material and reinstalling new material, concrete, and/or brick, and all else incidental thereto for which payment is not provided under other items.

END OF
SECTION

SECTION 01340

SUBMITTALS

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Submit all shop drawings, operations and maintenance manuals, Manufacturers' certificates, project data, and samples required by the Specifications.

B. Submittals: This project shall utilize:

1. Submittals – Electronic via Email/FTP with Hard Copy for Record

- a. The Contractor shall submit to the Engineer an electronic submittal of shop drawings and O&M Manuals in portable document format (PDF) transmitted via email or file transfer protocol (FTP). The Engineer shall return an electronic PDF of the submittal review comments to the Contractor for distribution to subcontractors, suppliers and manufacturers. The electronic submittals shall serve as the electronic record of the project.
- b. In addition, completed shop drawings and completed operations and maintenance (O&M) manuals shall be provided in hard copy (paper) format, for the record, in accordance with the following requirements.
 - i. Shop drawings and O&M manuals shall be considered “completed” once an action code of “0” or “1” has been attained, as specified below, unless otherwise directed by the Engineer.
 - ii. Once completed, the Contractor shall provide three hard copy sets (for Owner, Engineer and Resident Project Representative, respectively).
 - iii. Hard copy submittals shall be updated on a monthly basis, for those submittals completed during the preceding month.

1.2 SHOP DRAWINGS

- A. Shop Drawings are required for each and every element of the work.
- B. Shop Drawings are generally defined as all fabrication and erection drawings, diagrams, brochures, schedules, bills of material, manufacturers data, spare parts lists, and other data prepared by the Contractor, his subcontractors, suppliers, or manufacturers which illustrate the manufacturer, fabrication, construction, and installation of the work, or a portion thereof.
- C. The Contractor shall provide a completed Contractor Submittal Certification Form (copy provided for Contractor's use at the end of this Specification Section) which shall be attached to every copy of every shop drawing and signed by the Contractor and Manufacturer (where applicable). Shop Drawings shall show the principal dimensions, weight, structural and operating features, space required, clearances, type and/or brand of finish or

shop coat, grease fittings, etc., depending on the subject of the drawing. When it is customary to do so, when the dimensions are of particular importance, or when so specified, the drawings shall be certified by the manufacturer or fabricator as correct for the work.

- D. Shop Drawings shall be submitted as a complete package by specification section, unless otherwise reviewed and approved by the Engineer. It is the intent that all information, materials and samples associated with each specification section be Included as a single submittal for the Engineer's review. Any deviation from this requirement, such as submitting miscellaneous metals grouped by structure, shall be requested in writing with an anticipated shop drawing breakdown/schedule prior to any associated submittal.
- E. The Contractor shall be responsible for the prompt and timely submittal of all shop and working drawings so that there shall be no delay to the work due to the absence of such drawings.
- F. No material or equipment shall be purchased or fabricated especially for the Contract until the required shop and working drawings have been submitted as hereinabove provided and reviewed for conformance to the Contract requirements. All such materials and equipment and the work involved in their installation or incorporation into the Work shall then be as shown in and represented by said drawings.
- G. Until the necessary review has been made, the Contractor shall not proceed with any portion of the work (such as the construction of foundations), the design or details of which are dependent upon the design or details of work, materials, equipment or other features for which review is required.
- H. All shop and working drawings shall be submitted to the Engineer by and/or through the Contractor, who shall be responsible for obtaining shop and working drawings from his subcontractors and returning reviewed drawings to them. Shop drawings shall be formatted to standard paper sizes to enable the Owner to maintain a permanent record of the submissions. Approved standard sizes shall be: (a) 24 inches by 36 inches; (b) 11 inches by 17 inches, and (c) 11 inches by 8-1/2 inches. Provision shall be made in preparing the shop drawings to provide a binding margin on the left hand side of the sheet. Shop drawings submitted other than as specified herein may be returned for resubmittal without being reviewed.
- I. Only drawings which have been checked and corrected by the fabricator should be submitted to the Contractor by his subcontractors and vendors. Prior to submitting drawings to the Engineer, the Contractor shall check thoroughly all such drawings to satisfy himself that the subject matter thereof conforms to the Drawings and Specifications in all respects. All drawings which are correct shall be marked with the date, checker's name, and indication of the Contractor's approval, and then shall be submitted to the Engineer.
- J. If a shop drawing shows any deviation from the Contract requirements, the Contractor shall make specific mention of the deviations in the transmittal. Shop Drawings that contain significant deviations that are not brought to the attention of the Engineer may be subject to rejection.
- K. Should the Contractor submit equipment that requires modifications to the structures, piping, electrical conduit, wires and appurtenances, layout, etc.,

detailed on the Drawings, he shall also submit details of the proposed modifications. If such equipment and modifications are accepted, the Contractor, at no additional cost to the Owner, shall do all work necessary to make such modifications.

- L. A maximum of two submissions of each Shop Drawing will be reviewed, checked, and commented upon without charge to the Contractor. Any additional submissions which are ordered by the Engineer to fulfill the stipulations of the Drawings and Specifications, and which are required by virtue of the Contractor's neglect or failure to comply with the requirements of the Drawings and Specifications, or to make those modifications and/or corrections ordered by the Engineer in the review of the first two submissions of each Shop Drawing, will be reviewed and checked as deemed necessary by the Engineer, and the cost of such review and checking, as determined by the Owner, and based upon Engineer's documentation of time and rates established for additional services in the Owner-Engineer Agreement for this Project, may be deducted from the Contractor to make all modifications and/or corrections as may be required by the Engineer in an accurate, complete, and timely fashion. Resubmittals for the sole purpose of providing written responses to review comments will not be considered a resubmittal counting towards the two submission limit.

1.3 SAMPLES

- A. The Contractor shall submit samples when requested by the Engineer to establish conformance with the specifications, and as necessary to define color selections available. Submittals of "samples" shall be documented through the electronic submittal process by including a photograph of the item(s) and indicating the date the sample was mailed and/or delivered.

1.4 MANUFACTURER'S CERTIFICATES

- A. Prior to accepting the installation, the Contractor shall submit manufacturer's certificates for each item specified.
- B. Such manufacturer's certificates shall state that the equipment has been installed under either the continuous or periodic supervision of the manufacturer's authorized representative, that it has been adjusted and initially operated in the presence of the manufacturer's authorized representative, and that it is operating in accordance with the specified requirements, to the manufacturer's satisfaction. All costs for meeting this requirement shall be included in the Contractor's bid price.

1.5 SUBMISSION REQUIREMENTS

- A. Accompany submittals with a transmittal cover sheet, containing:
1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. The sequential shop drawing number for each shop drawing, project data and sample submitted shall be:
 - a. Specification Section number followed by a dash and then a sequential number beginning with 01 (e.g., 16000-01).
 - b. Under limited situations when additional different pieces of

equipment are submitted under the same specification section, those submittals shall be numbered sequentially (e.g. 05500-01, 05500-02, 05500-03, etc.).

- c. Resubmittals shall include decimal point and an alphabetic suffix after the corresponding sequential number (e.g., 16000-01A).
 - d. O&M submittals shall be numbered with the Specification Section number followed by a dash, the letters "OM", another dash, and then a sequential number beginning with 01 (e.g. 16000-OM-01). Resubmittals of O&Ms shall include an alphabetic suffix after the corresponding sequential number (e.g., 16000-OM-01A).
5. Notification of deviations from Contract Documents.
 6. Other pertinent data.
- B. A completed Contractor Submittal Certification Form shall be attached to each hardcopy and electronic PDF of each shop drawing and must include:
1. Project name
 2. Specification Section and sequential number with alphabet suffix for resubmittal
 3. Description
 4. Identification of deviations from Contract Documents.
 5. Contractor's stamp, initialed or signed, certifying review of the submittal, verification of field measurements and compliance with Contract Documents.
 6. Where specified or when requested by the Engineer, manufacturer's certification that equipment, accessories and shop painting meet or exceed the Specification requirements.
 7. Where specified, manufacturer's guarantee.
- C. Additional Requirements for Electronic Submittals:
1. Each individual shop drawing or O&M submittal shall be contained in one PDF.
 2. The first page of the PDF shall be the Contractor Submittal Certification Form as described above.
 3. The electronic PDF shall be **exactly** as submitted in the hardcopy.
 4. The electronic PDF shall include an electronic table of contents that is bookmarked for each section of the submittal.
 5. The electronic PDF shall be configured such that is fully searchable.
 6. PDF versions of 24x36 drawings shall be converted to 24 x 36 PDFs so as not to lose the clarity of the original drawing.
 7. Electronic PDF submittals that are not submitted in accordance with the requirements stated above will not be reviewed by the Engineer.
 8. Electronic submittals shall be transmitted via the protocol established in Part 1 above.

1.6 RESUBMISSION REQUIREMENTS

- A. Revise initial submittals as required and resubmit as specified for initial submittal.
- B. Indicate on submittals any changes which have been made other than

those required by Engineer. All renumbering of shop drawings, relabeling of individual pieces or assemblies or relocating of pieces or assemblies to other Drawings within the submittal shall be clearly brought to the attention of the Engineer.

1.7 ENGINEER'S REVIEW

- A. The review of shop and working drawings hereunder will be general only, and nothing contained in this specification shall relieve, diminish or alter in any respect the responsibilities of the Contractor under the Contract Documents and in particular, the specific responsibility of the Contractor for details of design and dimensions necessary for proper fitting and construction of the work as required by the Contract and for achieving the result and performance specified thereunder.
- B. The Engineer's review comments will be summarized on a Submittal Review Form, which includes an action code. A description of each action code is provided below.
 1. No Exceptions Taken (Status 0 on shop drawing log). The shop drawing complies with the Contract Document requirements. No changes or further information are required. Where appropriate, the submittal review form will be used to alert the Contractor, Owner and Field personnel of remaining items within that specification section that still needs to be submitted.
 2. Make Corrections Indicated (Status 1 on shop drawing log). The shop drawing complies with the Contract Document requirements except for minor changes, as indicated. Engineer requires that all comments will be addressed by the Contractor, unless otherwise notified in writing prior to execution of the relevant work.
 3. Conditional to Remarks (Status 2 on shop drawing log). The shop drawing potentially complies with the Contract Document requirements, contingent upon satisfactory resolution of review comments. Remarks will explicitly list what information needs to be resubmitted. Resubmittal from the Contractor should include a cover letter or summary which indicates how each review comment has been addressed. **This action code will not be used, or will be sparingly used, for electronic submittals.**
 4. Revise and Resubmit (Status 3 on shop drawing log). The shop drawing does not comply with the Contract Document requirement as submitted, but may with changes indicated and/or submission of additional information. The entire package must be resubmitted with the necessary information and a cover letter which indicates how each review comment has been addressed and where to find the information in the resubmittal.
 5. Rejected (Status 4 on shop drawing log). The shop drawing does not comply with the Contract Document requirements, for the reasons indicated in the remarks, and is unacceptable.
 6. In Review (Status 5 on shop drawing log). The shop drawing is currently under review.
 7. For Information Only (Status 6 on shop drawing log). The shop drawing review was for information only.

CONTRACTOR SUBMITTAL CERTIFICATION FORM

PROJECT: _____ CONTRACTOR'S PROJ. NO: _____

CONTRACTOR: _____ ENGINEER'S PROJ. NO: _____

ENGINEER: _____

SHOP
DRAWING
NUMBER:

SPECIFICATION
SECTION OR
DRAWING NO:

SEQUENTIAL
NUMBER (& ALPHA
SUFFIX FOR
RESUBMITTAL)

DESCRIPTION: _____

MANUFACTURER: _____

The above referenced submittal has been reviewed by the undersigned and I/we certify that the material and/or equipment meets or exceeds the project specification requirements with

NO DEVIATIONS

Or

A COMPLETE LIST OF DEVIATIONS AS FOLLOWS^a:

By: _____

By: _____

Contractor

b

Manufacturer

c

Date: _____ Date: _____

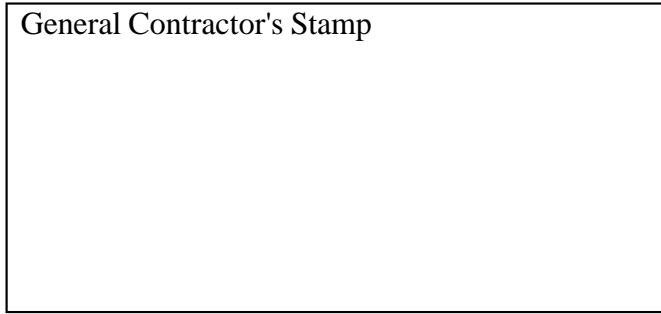
A Any deviations not brought to the attention of the Engineer for review and concurrence shall be the responsibility of the Contractor to correct, if so directed.

B Required on all submittals

C When required by specifications

Page_of _

General Contractor's Stamp



END OF SECTION

SECTION 01570

TRAFFIC REGULATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included:

1. Provide all materials and perform all work necessary to completely regulate traffic in the area of Work.
2. Perform all work in such a manner as to provide safe passage at all times for the public and with a minimum of obstruction to traffic.
3. Do not close roads or streets to passage of the public without the permission of the proper authorities.
 - B. The local police department and/or the CT State Police will decide if safe passage is being maintained and shall have the authority to require the Contractor to take any additional steps necessary to maintain safe passage.
 - C. Minimize the length of delays or traffic stoppage to the extent practicable. Maximum traffic stoppage time shall be 10 minutes.
 - D. The Contractor's designated traffic control representative shall respond to all traffic safety complaints and be available to direct traffic control subcontractors the entire time work is occurring on site. If the designated representative is not on site for a period of time, another on site representative shall be designated by the Contractor for that period.
 - E. The Contractor shall protect all phases of the work from damage due to traffic, etc., and provide necessary watchmen, flag person and/or police officer.

1.2 SCHEDULING WORK

- A. Schedule all work so that two adjacent parallel streets are not closed to passage by the public at any one time, if at all possible. Streets may be completely closed to traffic only upon written order of the Engineer. If permanent repairs are not completed immediately, the pavement surface along the line of work shall be maintained in a condition comparable to the adjacent road surface
- B. Revise the plan of work if it will create a traffic hazard or an unreasonably long detour.
- C. Do not start work in any new location without the permission of the Engineer.
- D. Notify all police, fire departments and Town of Trumbull Board of Education (for school bus route coordination) in writing at least 24 hours in advance of all scheduled detours and when streets are reopened. The Contractor shall cooperate with the Police Department in the establishment of alternate routes and shall provide adequate detour signs, plainly marked and well-lighted, in order to minimize confusion.

PART 2 - PRODUCTS

2.1 WARNING SIGNS AND BARRICADES

- A. Traffic control (plans, methods and devices) shall be as outlined in Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD) as published by U. S. Department of Transportation, and any local and state requirements.
- B. Provide adequate warning signs, barricades, signal lights, flaggers/uniformed police officers, and take other necessary precautions for the safety of the public.
- C. Provide and illuminate suitable warning signs to show where construction, barricades or detours exist.
- D. Provide barricades of substantial construction and painted with a finish that increases visibility at night, as outlined in the MUTCD.
- E. Keep signal lights illuminated at all barricades and obstructions from sunset to sunrise.
- F. Maintain all necessary signs, barricades, lights, watchmen and other safety precautions during authorized suspension of the Work, weekends, holidays or other times when the Work is not in progress.
- G. Contractor shall make periodic inspection throughout the day of the traffic control patterns, methods, signs and other devices to ensure that they are properly placed.

2.2 UNIFORMED POLICE OFFICER

- A. A uniformed police officer is a police officer (local, county or state) on regular or special duty dressed in uniform with the necessary high visibility vest and apparel needed for traffic control.
- B. Arrange the police detail with the local Chief of Police, County Sheriff, or State Police Captain depending on jurisdiction.
- C. Bills for Uniformed Police Officers shall be sent directly to the Owner and shall be paid for by the Owner.

1. The contractor shall not be allowed any markup or payment for Uniformed Police Officer details.

- D. Streets where Uniformed Police Officer details shall be required is included in Appendix A.

2.3 FLAG PERSON

- A. A flag person is a trained and certified individual assigned specifically to the task of directing traffic and is outfitted in the necessary high visibility vest and apparel needed for traffic control.
- B. Flag persons shall be provided by the Contractor.

PART 3 - EXECUTION

3.1 TRAFFIC CONTROL WORK PLAN

- A. Submit a traffic control work plan to the Owner for approval prior to construction. The traffic plan shall encompass all scenarios anticipated (i.e.

shoulder closure, lane closure, center of road work zone, work zone in close proximity to intersection, etc.). The location of uniformed police officers, certified flagmen, and work zone traffic control devices shall be set according to the approved traffic control work plan.

- B. Traffic control work plan must be submitted to owner and engineer and approved prior to commencing work.

3.2 DETOURS

- A. Provide, identify and maintain suitable detours when the project, or any part thereof, is closed to public travel.
- B. When the closed part of the project is reopened, restore the detour area and any other disturbed areas to the original condition.

3.3 INCONVENIENCE TO RESIDENTS OF VICINITY

- A. Whenever a traveled way is closed, perform the Work in such a manner that local travel, residents and businesses in the vicinity of the Work will be inconvenienced as little as possible.
- B. Allow access to residents and abutting land owners along the project to driveways and other normal outlets from their property.
- C. Where necessary, bridges shall be constructed and maintained for residents. Before closing any driveway or entrance, the Contractor shall give the owner or resident of the property involved, due notice of such temporary closing. When this is not practicable and an emergency arises, the Contractor shall, on the order of the Engineer, provide a satisfactory place to house temporarily, any motor vehicle, which may be prevented from being housed at night.
- D. Excavated materials and equipment shall be placed in such position as not to unnecessarily impede travel on the streets, or access to driveways. A sufficient clear space for pedestrian travel shall be maintained on the sidewalks, and all property entrances and driveways shall be kept clear, where possible.
- E. People living or having business within the barricaded zone shall be permitted to use the highway for auto traffic if possible.

3.4 TRAFFIC CONTROL OFFICERS

- A. Where required by the local, county or state police departments and/or when specified, traffic control officer shall be Uniformed Police Officers.
- B. Where the local, county or state police departments do not wish to or are unable to furnish traffic control officers and/or when specified, the traffic control officers shall be flag person.

END OF SECTION

SECTION 01710PROJECT CLEANINGPART 1 - GENERAL1.1 DESCRIPTION

A. Work Included:

1. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations.
2. At completion of work, remove waste materials, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces. Leave project clean and ready for use.

1.2 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Conduct cleaning and disposal operations in accordance with all applicable local and state laws, ordinances, and code requirements.

PART 2 - PRODUCTS2.1 MATERIALS

- A. Use only cleaning materials recommended by manufacturer of surfaces to be cleaned.
- B. Use cleaning materials only on surfaces recommended by cleaning material manufacturers.

PART 3 - EXECUTION3.1 PERFORMANCE

A. Cleaning During Construction:

1. Execute cleaning operations to ensure that buildings, grounds, and public properties are maintained free from accumulations of waste materials and rubbish.
2. Entirely remove and dispose of material or debris during the progress of the work that has washed into or has been placed in watercourses, ditches, gutters, drains, catch basins, or elsewhere as a result of the Contractor's operations.
3. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
4. At reasonable intervals during the progress of work, clean the site and dispose of waste materials, debris, and rubbish.
5. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw material from heights.

6. When applicable, schedule cleaning operations so that dust and other contaminants resulting from the cleaning process will not fall on wet, newly painted surfaces.
- B. Control of Hazards:
1. Store volatile wastes in covered metal containers, and remove from premises daily.
 2. Prevent accumulation of wastes which may create hazardous conditions.
 3. Provide adequate ventilation during use of volatile or noxious substances.
- C. Disposal:
1. Do not burn or bury rubbish and waste materials on project site.
 2. Do not dispose of volatile wastes, such as mineral spirits, oil, or paint thinner, in storm or sanitary drains.
 3. Do not dispose of wastes into streams or waterways.
- D. Final Cleaning:
1. Employ experienced workmen, or professional cleaners, for final cleaning.
 2. Remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials, from all sight-exposed interior and exterior finished surfaces.
 3. Repair, patch and touch up marred surfaces to specified finishes.
 4. Broom clean paved surfaces.
 5. Rake clean non-paved surfaces of the project site.
 6. Restore to their original condition those portions of the site not designated for alterations by the Contract Documents.

END OF
SECTION

SECTION 02568PRESSURE TESTING AND CHEMICAL GROUTING
OF SANITARY SEWER PIPE JOINTSPART 1 - GENERAL1.1 SCOPE OF WORK

- A. The work covered by this Section of the Specifications consists of furnishing all labor, supervision, equipment, appliances and materials and performing all operations in connection with pressure testing and joint sealing, by chemical grouting, of sanitary sewer mains and building laterals, and as directed by the Owner and/or Engineer, complete in place and accepted, in accordance with the Specifications.
- B. The work and materials required in this Section of the Specifications generally consists of the following:
 - 1. Sewer mains to be pressure tested and sealed shall be televised before and after sealing with results kept in a logbook. It is assumed that each building lateral designated for testing and sealing shall be tested and sealed from the main to approximately five (5) feet up the lateral, including the lateral connection point to the main.
 - 2. A notification form should be given to each building for which laterals have been grouted. This notification to the occupant should state that the lateral servicing the particular address was grouted on the particular date and if blockage occurs, the occupant should call a given phone number of the Contractor.
 - 3. Sewer flow control to maintain flows in the sewer system allowing the specified work to be performed in a manner acceptable to the Owner or Engineer.
 - 4. Following the testing and grouting of sewer main joints, the Contractor shall clean and dispose of all debris in manholes prior to visual inspection by the Engineer.
- C. Sewer joints shall be pressure tested and grouted where indicated by the Owner or Engineer throughout the duration of the On Call Contract.

1.2 RELATED SECTIONS

- | | |
|---|---------------|
| A. Flow Control | Section 02751 |
| B. Pipeline Cleaning | Section 02752 |
| C. Television Inspection of Sewers and Drains | Section 02753 |

1.3 SUBMITTALS

- A. Shop drawings, a list of materials, and technical data shall be submitted to the Owner and/or Engineer for approval prior to any work being performed under this Section of the Specifications.

1.4 DESIGN CRITERIA

- A. The CONTRACTOR shall provide CCTV testing-grouting rigs plus all necessary support equipment and personnel for full-time operation.
- B. The Contractor shall provide an experienced Chief Operator for each of the CCTV

Testing-grouting rigs. The Chief Operator shall have a minimum of six (6) months active experience as Chief Operator of similar CCTV testing-grouting rigs.

PART 2 - PRODUCTS

2.1 SEWER CLEANING AND TELEVISION INSPECTION EQUIPMENT

- A. Cleaning and Television Inspection Equipment used in performing pressure testing and joint sealing shall be as designated in Sections 02752 Pipeline Cleaning, and 02753 Television Inspection of Sewers and Drains.

2.2 PRESSURE TESTING EQUIPMENT

- A. The basic equipment used shall consist of a television camera, joint testing device (such as a low void packer), and test monitoring equipment. The equipment shall be constructed in such a way as to provide means for introducing a test medium, under pressure, into the VOID area created by the expanded ends of the joint-testing device and a means for continuously measuring the actual static pressure of the test medium within the VOID area. A fluid (liquid or gas) shall be used as the test medium. Both liquid (usually water) and air are acceptable, but the test procedure is different for each.
- B. VOID pressure data shall be transmitted electrically and without the use of the test medium (water) or hoses. All test monitoring shall be above ground and in a location that allows for simultaneous, continued observation of the television monitor and test monitoring equipment by the Owner's representative.
- C. The Contractor shall supply a test cell in order to ensure accuracy of the testing equipment.

2.3 JOINT SEALING EQUIPMENT

- A. The basic equipment shall consist of a closed-circuit television system, necessary chemical sealant containers, pumps, regulators, valves, hoses, etc., and LOW VOID joint sealing packers for the various sizes of sewer pipes. The packer shall be a cylindrical case of a size less than pipe size, with the cables at either end used to pull it through the line. The packer device shall be constructed in such a manner as to allow a restricted amount of sewage to flow at all times. Generally, the equipment shall be capable of performing the specified operations in lines where flows do not exceed the normal maximum line flows. When the packer is inflated, two (2) wide spaced annular bladders shall be formed, each having an elongated shape and producing an annular void around the center portion of the packer. The packer shall be equipped with a lateral sealing inversion tube for testing and sealing of the building lateral.

2.4 JOINT SEALING MATERIALS

- A. Chemical Grout Sealant
 - 1. The chemical grouting material shall be a liquid that can be easily transported to the pipe joint and injected into the joint. The grout shall

PRESSURE TESTING AND CHEMICAL GROUTING
OF SANITARY SEWER PIPE JOINTS

react quickly to seal the joint against infiltrating groundwater and shall be capable of withstanding the environment within the sewer or drain system and normal maintenance operations. The chemical grout shall provide a seal that will withstand a water or air pressure test of four pounds per square inch (4 psi) above the hydrostatic pressure for a minimum of thirty (30) seconds.

2. The Contractor shall use an appropriate root inhibitor mixed with the grout as recommended by the manufacturer; such as Barrier 50W as manufactured by Avanti International, or approved equal.
3. The seal effectiveness of the grout may not be required to be demonstrated by laboratory testing in a soil box on standard pipe of various configurations, if acceptable testing documentation is supplied to and approved by the OWNER. Otherwise, the test will be an exfiltration test performed at a ten (10) foot head of water on a single joint, grout with a standard packing device. Under the following criteria, the test results must meet the specification relating to an acceptable seal for a new pipe.
 - a. Soil Box - A box of such dimensions as to contain a standard 8-inch concrete joint (bell and spigot area) and approximately one yard of soil. One end must allow protrusion of the pipe so that the standpipe can be affixed. The bell end of pipe must be strapped securely to the box and the box designed with a sliding panel so that the spigot end can be flexed.
 - b. Pipe Failure Configuration - The following configurations used in the Western Report (Improved Sealants for Infiltration Control, The Western Company, June 1969) shall each be tested.
 - 1) Open Joint - 1/8" open gap from dead tight joint.
 - 2) Broken Bell - Approximately 1/3 of the bell is broken away.
 - 3) Slot - 3" x 1/8" slot in barrel of pipe.
 - c. Flexure Test - The open joint configuration shall be subjected to a deflection of at least 0.3 inch per foot of pipe without causing failure of the seal. (This corresponds to 20% of the possible deflection before breakage of the bell.).
 - d. Soils - All tests will be performed in two soils:
 - 1) Sand (particle size greater than 0.05mm)
 - 2) Clay (at least 30% of soil with particle size less than 0.02 mm)
 - e. In lieu of laboratory tests, the grout manufacturer may submit other proof that the sealant used meets the above requirements.
 - f. The grouting material shall be an acrylamide gel, AV-100 as manufactured by Avanti International, urethane gel 5610 as manufactured by 3-M or an approved equal. The Contractor shall receive the Owner and/or Engineer's approval prior to using any grouting material.
- B. All chemical sealing materials used in the performance of the work specified must conform to the following minimum performance standards:
 1. While being injected, the chemical grout must be able to react in moving water.
 2. The final cured grout must be capable of withstanding submergence in water without degradation.
 3. The resultant grout formation must be impervious to water penetration.
 4. The grout material, after fully curing, must be flexible, not brittle or rigid.
 5. The final grout should be able to withstand freeze-thaw and wet-dry cycles

PRESSURE TESTING AND CHEMICAL GROUTING
OF SANITARY SEWER PIPE JOINTS

without causing adverse changes to the grout.

6. The final grout formation must not be biodegradable.
 7. The cured grout should be chemically stable and resistant to concentrations of Acids, alkalis, and organics found in normal sewage.
 8. The chemical grout sealing effectiveness shall meet or exceed that stated in "Chemical Sealants for Elimination of I/I", page 23, published by the U.S.E.P.A., September 28, 1973.
- C. All chemical sealing materials used shall meet the following minimum application requirements.
1. All component materials should be easily transportable by common carriers.
 2. Packaging of component materials should be compatible with field storage requirements.
 3. Grout components must be packaged in such a fashion as to provide for maximum worker safety when handling the materials and minimize spillage when preparing for use.
 4. Mixing of the components should be compatible with field applications and not require precise measurements.
 5. Catalyzation shall take place at the point of injection/repair.
 6. Cleanup must be done without inordinate use of flammable or hazardous chemicals.
 7. Materials must be capable of being pumped through a minimum of 500 feet of ½ inch to ¾ inch diameter hose.
 8. Residual sealing materials must be removable from the sewer after injection to ensure no flow reduction, restriction or blockage of normal sewer flows.
- D. Acrylamide Base Gel sealing materials shall have the following basic properties:
1. A controllable reaction time ranging from ten (10) seconds to greater than one (1) hour.
 2. Viscosity that can be made near two (2) centipoise or greater.
 3. Viscosity to remain constant throughout the induction period.
 4. The ability to tolerate some dilution and react in moving water.
 5. The final reaction shall produce a homogeneous chemically stable, non-biodegradable, firm, flexible gel.
 6. The gel shall not be rigid or brittle.
 7. The gel shall have a negligible corrosion rate on mild steel plates.
 8. The base compounds may be varied considerably by additives to increase the strength, adhesion, solution density and viscosity.
 9. The gel shall be prepared from a minimum of ten percent (10%) (By weight) aqueous solution of the basic chemicals. The activator and initiator catalysts shall be introduced in such proportions, as recommended by the manufacturer, as to produce the most effective gel time for the existing field conditions and temperatures.
 10. Proportion control tests shall be made daily to determine that the proper amount of catalysts and additives are being used for the prevailing conditions. The concentration of the initiator (ammonium persulfate) shall be less than three percent (3%) by weight.
- E. Urethane Base Gel sealing materials shall have the following basic properties:
1. 1 Part urethane prepolymer thoroughly mixed with between 5 and 10 parts of water weight. The recommended mix ratio is 1 part urethane prepolymer

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- to 8 parts of water (11% prepolymer).
2. A liquid prepolymer having a solids content of 77% to 83%, specific gravity of 1.04 (8.65 pounds per gallon), and a flash point of 20° F.
 3. A liquid prepolymer having a viscosity of 600 to 1200 centipoise at 70°F than can be pumped through 500 feet of ½-inch hose with a 1000 psi head at a flow rate of 1 ounce per second.
 4. The water used to react the prepolymer should have a pH of 5 to 9.
 5. A cure time of 80 seconds at 40°F, 55 seconds at 60°F, and 30 seconds at 80°F when 1 part prepolymer is reacted with 8 parts of water only.
 6. A cure time that can be reduced to 10 seconds for water temperatures of 40°F to 80°F when 1 part prepolymer is reacted with 8 parts of water containing a sufficient amount of gel control agent additive.
 7. A relatively rapid viscosity increase of the prepolymer/water mix. Viscosity increases from about 10 to 60 centipoise in the first minute for 1 to 8 prepolymer ratio at 50°F.
 8. A reaction (curing) which produces a chemically stable and non-biodegradable, tough, flexible gel.
 9. The ability to increase mix viscosity, density, gel strength and resistance to shrinkage by the use of additives to the water.
- F. None of the materials in the grouting system shall present undue hazard to job site personnel, the general public, or the environment. Material Safety Data Sheets (Form OSHA-20 or equivalent) shall be made available for each material outlining proper fire and explosion hazard data, health hazard data, spill and leak procedures, and special protective equipment information.
- G. Proper procedures for waste disposal of all residues of each material in the grouting system shall be used. Manufacturers' recommendations shall be strictly adhered to. Disposal shall be made at a sanitary landfill site or other applicable disposal site. Neither the grout nor its component materials shall be disposed of in the sewer drain system.
- H. All equipment and the surrounding area shall be cleaned up properly and completely. The method of cleaning equipment shall be based on the manufacturer's recommendations.
- I. The chemical sealing materials used shall have a minimum of five (5) years documented "in place" successful use in the sealing of sewer line joints. At the request of the Owner and/or Engineer, proof of such documentation will be provided by the Contractor. If such documentation is inadequate or unsatisfactory to the Owner, the material shall not be allowed for use on this project unless verified by the soil box test and approved by the Owner and/or Engineer.
- J. An additive to increase the compressive and tensile strength as well as elongative properties shall be added to the grout mix. If an acrylamide gel is used then AV-257 as manufactured by Avanti International is acceptable or if a urethane gel is used an acceptable additive is 5612 as manufactured by 3-M. Mixing ratios shall be a minimum of 4 gallons in lieu of water per 30-gallon mix if acrylamide and 4 gallons in lieu of water per 40-gallon mix if urethane. The grout shall be mixed as defined by the Manufacture.

PART 3 – EXECUTION

3.1 CLEANING AND TELEVISION INSPECTION OF SEWERS

- A. All lines that are scheduled for grouting shall be cleaned. Cleaning shall include the complete removal and disposal of all dirt, rocks, roots, gravel and other debris and obstructions from the sewers. Cleaning and Television Inspection shall be performance in accordance with Sections 02752 Pipeline Cleaning, and 02753 Television Inspection of Sewers and Drains.

3.2 PRESSURE TESTING

- A. The technique of sewer line joint testing is used to test the integrity of individual pipe joints. Testing cannot be performed and will not be required on cracked or broken pipe, or sections of the pipe between joints. Testing also will not be required on visibly leaking joints. Test all joints except those with visible infiltration. Joints with visible infiltration shall be sealed immediately.
- B. Procedure:
 - 1. Position the packer on each joint to be tested.
 - 2. Inflate the sleeves on each end of the packer.
 - 3. Apply four (4.0) psi pressure above the existing hydrostatic pressure on the outside of the joint to the void area created around the inside perimeter of the joint.
 - 4. Shut off the supply of air once the pressure has stabilized at the required amount.
 - 5. Monitor the void pressure for thirty (30) seconds.
 - 6. Repair the joint if the pressure drops more than one half (1/2) psi in the thirty (30) seconds.
- C. Water or chemical pressure testing may be used in lieu of air testing subject to review and approval by the Owner and/or Engineer.

3.3 JOINT SEALING

- A. Joints showing visible leakage, or joints that have failed the joint test, shall be sealed as specified. Joint sealing shall be accomplished by forcing chemical sealing materials into or through infiltration points by a system of pumps, hoses, and sealing packers. The amount of grout necessary for each joint shall conform to manufacturer's recommendations and to further requirements of this Section.
- B. The packer shall be positioned over the area of infiltration by means of a metering device and the closed-circuit television camera in the line. It is important that the procedure used by the Contractor for positioning the packer be accurate to avoid over pulling the packer and thus not effectively sealing/grouting the intended joint from infiltration.
- C. The packer sleeves shall then be expanded using precisely controlled pressures. The pneumatically expanded sleeve or elements shall seal against the inside periphery of the pipe to form a void area at the point infiltration, now completely isolated from the remainder of the pipeline.
- D. Into this isolated area, sealant materials shall be pumped through the hose system at controlled pressures that are in excess of groundwater pressures.

- E. The pumping, metering, and packer device shall be integrated so that proportions and quantities of materials can be regulated in accordance with the type and size of the leak being sealed.
- F. Sewer main and lateral sealing is performed if video inspection shows visible leakage; however, the OWNER reserves the right to seal additional sewer joints as it sees fit. Final field determination of joint sealing will be made by the Owner and/or Engineer. The packer should remain in position, maintaining the isolated VOID. Chemical grout sealant is pressure injected through the packer into the annular space between the inversion tube and the sewer pipe. Under pressure, the grout material is then forced out into the soil through leaking joints and pipe defects. It is assumed that each building lateral designated for testing and sealing shall be tested and sealed from the main to approximately five (5) feet up the lateral.

3.4 JOINT SEALING VERIFICATION

- A. Joint sealing verification is completed by performing air testing a second time. The air test is the same as defined above. The sequence of air testing, grouting and subsequent air testing is repeated until either the joint is sealed or it is determined that the grout consumption is too high and may result in the blockage of the pipe. The final determination to stop subsequent attempts to seal a joint will be made by the Owner and/or Engineer.

3.5 RESIDUAL GROUT MATERIAL

- A. Any residual sealing materials that extend into the pipe, reducing the pipe diameter, or restrict the flow shall be removed from the joint. The sealed joints shall be left reasonably "flush" in dimension with the existing pipe surface. If excess residual sealing materials accumulate in the line and/or as directed by the Owner and/or Engineer, the entire line section shall be re-cleaned to remove excess material, at no expense to the Owner. In the case where lateral sealing has taken place, the Contractor shall take precautions not to inject excess material; shall notify the homeowner by written notice that the lateral has been grouted, and shall be responsible to clean laterals where blockage occurs due to excess grout material.

3.6 RECORDS

- A. Documentation of television inspection results shall be as follows:
 - 1. Television Inspection Logs: Printed location records shall be kept by the Contractor and will clearly show the location, in relation to adjacent manholes, of each infiltration point discovered by the television camera. In addition, other points of significance such as locations of building sewer, unusual conditions, roots, storm sewer connections, collapsed sections, presence of scale and corrosion and other discernible features will be recorded and a copy of such records will be supplied to the Owner.
 - 2. Photographs: Standard size photographs of the television monitor or problem areas shall be taken by the Contractor upon request of the Owner and/or Engineer and at no cost to the Owner.
 - 3. DVD Recordings: The purpose of recordings shall be to supply a visual and audio record of problem areas of the lines that may be replayed both daily

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and at future presentations. Video recording playback shall be at the same speed that it was recorded. Slow motion or stop motion playback features shall be supplied at the option of the Owner. DVD's shall remain available to the Owner along with a viewing machine, for a period of up to thirty days following completion of all work by the Contractor. All DVDs (and any other recordings) shall become the property of the Owner. All DVDs shall be compatible with DVD equipment.

- B. During the joint testing program, complete records shall be kept, recording the location of the line section in which the testing is being done, the location of each joint tested, the test pressures used, flow rates of the test liquid and the test results. A specific statement shall be included to indicate if the referenced joint passed or failed the test and if the joint is to be sealed.
- C. Complete records shall be kept of all joint sealing performed in each line section certified and submitted to the Owner and/or Engineer. The records will document the location of the line section in which the sealing was done, the location of each joint sealed, the amount of material used to seal the joint the numbers of injections required to seal the joint and the joint test verification results. Two copies of the certified test results shall be submitted to the Owner and/or Engineer for review and approval.
- D. The complete procedure for sealing sewer mains and laterals should be videotaped during the air testing and sealing operation. The DVDs are to be submitted to the Owner and/or Engineer for review and permanent record.

3.7 INSPECTION

- A. Work shall only be performed in the presence of a duly authorized representative of the Owner. This includes blending the various chemicals (set-up and tear down operations need not be performed in the presence of the Owner and/or Engineer).
- B. The Owner and/or Engineer may direct the Contractor to alter testing pressure gel time, and/or pumping rate, based on actual conditions encountered during sealing.
- C. The Owner and/or Engineer may direct the operator to position the air-inflatable sleeves along a clean barrel of pipe to verify that the unit is holding pressure. Similarly, the Owner and/or Engineer may direct the operator to position the air-inflatable sleeves on either side of a house connection to determine that air leakage is being properly recorded.
- D. The Owner and/or Engineer shall determine which joints pass and fail the pressure test based on compliance with these specifications. A daily log of work accomplished shall be duly recorded and acknowledged by the Owner and/or Engineer and the Contractor's superintendent.
- E. Video Inspection of each sewer main and lateral grouted will be required immediately following the process to determine cleanliness before moving on to the next location.

3.8 WARRANTY

- A. All sewer pipe joint sealing work performed shall be guaranteed against faulty workmanship and/or materials for a period of one year after the completion of work.

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- B. Prior to the expiration of the guarantee period, the Owner reserves the right to select an initial retest area consisting of specific sealed sewer mains and laterals. The sewer mains and laterals to be retested shall be randomly selected throughout the project area and shall be representative of the majority of the sealing work originally performed.
- C. Within the initial retest area, the Contractor shall retest all previously sealed sewer mains and laterals as previously specified. Any joints failing the retest shall be resealed. If the failure rate of the retested sewer mains and laterals is less than 5% of the sewer mains and laterals retested, the work shall be considered satisfactory and no further retesting will be required.
- D. If, in the initial retest area, the failure rate of the retested sewer mains and laterals exceeds 5% of the sewer mains and laterals retested, an additional retest area of equivalent size shall be selected and all previously sealed sewer mains and laterals shall be retested. This additional retesting and resealing, if necessary, will continue until a failure rate of less than 5% of the total sewer mains and laterals retested is met. If a sewer main fails the initial retest, no additional payment shall be made for resealing the failed joints.
- E. Any additional testing/sealing required beyond the initial retest area shall be accomplished at no cost to the Owner. The initial retesting shall be considered as being included for payment under the appropriate pipe size unit bid item for pressure testing and sealing.
- F. Should as much as 25% of the original project be retested and fail to meet the 5% requirement, the Contractor will be required to provide the same number of crews as utilized in the original project so that the retesting will proceed at a more rapid rate.

3.9 LINE OBSTRUCTIONS

- A. It shall be the responsibility of the Contractor to clear the line of all obstructions such as solids, dropped joints, collapsed pipe that will prevent the line from being grouted. As a general guide, if the camera or grouting equipment cannot pass by the obstruction as determined by the Owner and/or Engineer then the obstruction should be considered for repair or removal.
- B. If inspection reveals an obstruction that cannot be removed by conventional sewer cleaning equipment, or an internal cutter to remove such things like protruding services, then the sewer main shall not be sealed and the Owner and/or Engineer shall be notified of the recommended repair.

END OF SECTION

SECTION 02601

MANHOLES, COVERS AND FRAMES

PART 1 - GEN

ERAL 1.1

DESCRIPTIO

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- A. Work Included: Construct manholes, covers, frames, brick masonry, inverts and apply waterproofing in conformance with the dimensions, elevations, and locations indicated by the Owner and/or Engineer during the duration of the On Call Contract.
 - B. Related Work Specified Elsewhere (when applicable):
 - 1. Final pipeline and structure testing is specified in this Division.
 - 2. Pipe is specified in the appropriate Sections in this Division
3. For manhole Frames and Covers to be rehabilitated, refer to 02758 Manhole Rehabilitation.

1.2 QUALITY ASSURANCE

- A. Frames and Covers:
 - 1. Acceptable
 - a. Manufacturer
s: EJ
Castings
 - b. LeBaron Foundry Company.
 - c. Or equivalent.
 - B. Masonry:
 - 1. Brick: Shall comply with the ASTM Standard Specifications for Sewer Brick (made from clay or shale), Designation C32, for Grade SS, hard brick.
 - 2. Cement: ASTM C-150.
 - 3. Hydrated Lime:
ASTM C-207
 - 4. Sand:
ASTM C144

1.3 SUBMITTALS

- A. Shop drawings shall be submitted to the Owner and/or Engineer for approval prior to any work being performed under this Section of the Specifications.

PART 2 - PRODUCTS

2.1 FRAMES AND COVERS

A. Standard Units:

1. Made of cast iron conforming to ASTM A48-76, Class 30 minimum.
2. Have machined bearing surfaces to prevent rocking.
3. Castings shall be smooth with no sharp edges.
4. Constructed to support an HS-20 wheel loading.
5. Dimensions and Style shall conform to the Town's Standards and this specification. Castings differing in non-essential details are subject to approval by the Owner and/or Engineer:
 - a. Covers -solid with sewer in 3-inch letters diamond pattern.
Frame - 24-inch diameter clear opening, with flange bracing ribs.
6. Minimum weight of frame and cover shall be 370 lbs.

B. Water Tight Units:

1. Same features as above for Standard Units, with 22-inch diameter minimum clear opening.
2. Sealing features: Inner lid held by a bronze tightening bolt in a locking bar.
 - b. Neoprene gasket Watertight pick hole.
3. Minimum weight of frame and cover shall be 510 lbs.

2.2 MASONRY

A. Brick:

1. Sound, hard, uniformly burned, regular and uniform in shape and size, compact texture, and satisfactory to the Owner and/or Engineer.
2. Immediately remove rejected brick from the work.

B. Mortar:

1. Composition (by volume):
 - a. 1 part portland cement.
 - b. 1/2 part hydrated lime.
 - c. 4-1/2 parts sand.
2. The proportion of cement to lime may vary from 1:1/4 for hard brick to 1:3/4 for softer brick, but in no case shall the volume of sand exceed 3 times the sum of the volume of cement and lime.

- C. Cement shall be Type II Portland cement.
- D. Hydrated lime shall be Type S.
- E. Sand: Shall consist of inert natural sand

1. Grading:

<u>Sieve</u>	<u>Percent Passing</u>
No. 4	100
No. 8	95-100
No. 16	70-100
No. 30	40-75
No. 50	10-35
No. 100	2-15
No. 200	0-5

PART 3 - EXECUTION

3.1 PERFORMANCE

- A. Remove existing frame and cover. Contractor shall utilize a circular drill bit to provide saw cut in a circular pattern around the manhole frame and cover. See Section 02578 "Manhole Rehabilitation" of these Specifications for additional requirements regarding replacing existing frames and covers and adjusting to grade existing frames and covers.
- B. Adjust to Grade: Adjust tops of manholes to grade with brick masonry.
 - 1 Concrete rings are not acceptable for adjusting to grade.
- C. Masonry:
 - 1. Laying Brick:
 - a. Use only clean bricks in brickwork for manholes.
 - b. Moisten the brick by suitable means until they are neither so dry as to absorb water from the mortar nor so wet as to be slippery when laid.
 - c. Lay each brick in a full bed and joint of mortar without requiring subsequent grouting, flushing, or filling, and thoroughly bond as directed.
 - d. Construct all joints in a neat workmanlike manner. Construct the brick surfaces inside the manholes so they are smooth with no mortar extending beyond the bricks and no voids in the joints. Maximum mortar joints shall be 1/2 inch.
 - e. Outside faces of brick masonry shall be plastered with mortar from 1/4- inch to 3/8-inch thick.
 - f. Completed brickwork shall be watertight.
 - 2. Curing:

- a. Protect brick masonry from drying too rapidly by using burlaps which are kept moist, or by other approved means.
 - b. Protect brick masonry from the weather and frost as required.
- D. Frames and Covers:
1. Set all frames in a full bed of mortar, true to grade and concentric with the manhole opening.
 2. Completely fill all voids beneath the bottom flange to make a watertight fit.
 3. Place a ring of mortar at least one inch thick around the outside of the bottom flange, extending to the outer edge of the manhole all around its circumference.
 4. Clean the frame seats before setting the covers in place.
- E. Plugging and Patching:
1. Fill all exterior cavities with non-shrink grout and with bituminous waterproofing once the concrete and mortar has set.
 2. Touch up damaged water proofing.
- F. Cleaning:
1. Thoroughly clean manholes, steps, frames and covers of all debris and foreign matter.

END OF
SECTION

SECTION 02751FLOW CONTROLPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: During the rehabilitation of manholes and pipelines, the Contractor shall control flows in sewer and drain lines at all times. The manholes and pipelines that may require flow control include, but may not be limited to, manholes indicated for sealing and/or lining of the bench and channel, and sewer and drain pipeline runs requiring various types of internal rehabilitation. During sewer line joint testing the contractor shall control flows in sewer lines when they exceed 1/4 of the pipe diameter or when inspection of the complete periphery of the pipe is necessary to effectively conduct inspection operations.
- B. Related Work Specified Elsewhere:
1. Manhole rehabilitation is specified in the appropriate sections in this Division.
 2. Pipeline rehabilitation and appurtenant work is specified in the appropriate sections of this Division.

1.2 PERFORMANCE

- A. Plugging or Blocking:
1. Insert plug at a manhole upstream of the manhole or pipeline to be rehabilitated.
 2. Plug shall be so designed that all or any portion of the flows can be released.
 3. Flows shall be shut off or substantially reduced during manhole and pipeline rehabilitation.
- B. Pumping and Bypassing:
1. When required, supply the necessary pumps, conduits and other equipment (including standby equipment) to divert the flow around the manhole or pipeline in which work is being performed.
 2. Furnish the necessary labor and 24-hour supervision to set up and operate the pumping and bypassing system.
 3. When required on a 24-hour basis, all engines shall be equipped with silencers.

END OF SECTION

SECTION 02752PIPELINE CLEANINGPART 1 - GENERAL1.1 DESCRIPTION

- A. Work Included: Provide all equipment necessary for the proper cleaning of the sewers prior to closed circuit television inspection, pressure testing and grouting sewer main joints, and sewer pipe lining.
- B. Sewer flow control to maintain flows in the sewer system allowing the specified work to be performed in a manner acceptable to the Owner and/or Engineer.

1.2 RELATED SECTIONS

- A. Pressure Testing and Chemical Grouting of Sanitary Sewer Pipe Joints - Section 02568
- B. Sewer Flow Control - Section 02751
- B. Television Inspection of Sewers - Section 02753
- C. Sewer Pipe Lining - Section

02756 PART 2 - PRODUCTS2.1 MATERIALS

- A. High Velocity Hydro-Cleaning Equipment shall:
 - 1. Have a minimum of 400 feet of high pressure hose.
 - 2. Have multiple high velocity nozzles, as follows:
 - a. Standard 35 degree nozzle with multiple rear jets and one front jet.
 - b. Sand nozzle capable of transporting sand and gravel to the downstream manhole; and
 - c. Rotating nozzle for removal of grease and scale.
 - 3. Include a high velocity gun for washing and scouring manhole walls and floor.
 - 4. Be capable of producing flows from a fine spray to a long distance solid stream.
 - 5. Include a water tank, auxiliary engines and pumps, and a hydraulically driven hose reel.
 - 6. Have equipment operating controls located above ground.

PART 3 - EXECUTION3.1 PERFORMANCE

- A. Select cleaning equipment based on the conditions of the lines at the time the work commences.
 - 1. Light cleaning (small amounts of debris exist within the sewer line): Use high pressure water jetting equipment, brushes and swabs.
 - 2. Heavy cleaning (large deposits of debris or heavy root growth exist within the sewer line): Use high pressure water jetting equipment specifically designed for the intended use.
- B. Use selected equipment to remove all dirt, grease, rock and other deleterious materials and obstructions.

- C. Protect existing sewer lines from damage caused by improper use of cleaning equipment.
- D. Take precautions to avoid damage or flooding to public or private property being served by the line being cleaned.
- E. Removal of Materials:
 - 1. Remove all solids and semi-solids at the downstream manhole of the section being cleaned.
 - 2. Passing material from one section of a line to another will not be permitted.
- F. Disposal of Materials: Remove from the site and dispose of all solids or other waste materials recovered during the cleaning operations in an approved manner.

3.2 FIELD QUALITY CONTROL

- A. Acceptance of this portion of the work may be made upon completion of subsequent television inspection and shall be to the complete satisfaction of the Owner and/or Engineer.

END OF SECTION

SECTION 02753TELEVISION INSPECTION OF SEWERS AND DRAINSPART 1 - GENERAL 1.1DESCRIPTION

- A. Work Included: Furnish all necessary labor, materials, supervision and equipment to satisfactorily inspect gravity pipe lines and service connection pipes as required by means of a closed circuit television (CCTV) system.
- B. Related Work Specified Elsewhere: Pipeline cleaning and flow control are specified in the appropriate sections in this Division.

1.2 QUALITYASSURANCE

- A. CCTV work shall be completed and delivered per the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) standards. Operators of CCTV equipment shall be NASSCO PACP certified.

PART 2 - PRODUCTS2.1 MATERIALS AND EQUIPMENT

- A. The cameras shall be designed and constructed for sewer and drain line inspection work. The mechanical design of the lens shall allow it to turn and rotate 360 degrees to provide a close up view of pipe walls and service pipes. The camera shall be designed to maintain proper orientation of the picture while the lens is turning and rotating.
- B. The cameras shall be operative in 100% humidity conditions.
- C. The lighting for the cameras shall be suitable to allow a clear picture of service pipes and the entire periphery of the mainline pipe, such that joints, root intrusions, cracks, offset joints, deposits, etc. can be seen and identified by the Owner and/or Engineer.
- D. The lens focus and rotational capabilities and the light intensity will be remotely controlled from an above ground television "studio".
- E. The cameras shall produce a continuous, full color picture with a quality acceptable to the Owner and/or Engineer.

PART 3 - EXECUTION

3.1 PERFORMANCE

A. Flow Control:

1. A minimum of 75% of the periphery of the pipeline shall be visible at all times. The Owner and/or Engineer may require that the line be plugged so that the entire periphery can be inspected. For details on flow control, see Section 02751.

B. Operation:

1. Perform inspection of sewer and drain lines after lines have been suitably cleaned.
2. When inspecting newly constructed lines, introduce water into the lines to be tested from the upstream manhole prior to the television inspection, but no more than 24 hours in advance of the inspection.
3. Lines will be suitably isolated from the remainder of the line as required.
4. Move the cameras through the line in either direction at a moderate rate, not to exceed 30 feet per minute, as recommended by NASSCO.
5. The Owner and/or Engineer may require Contractor to pull cameras back to get a second view of a section of the pipe.
6. Use manual winches, power winches, television cable reel powered rewinds, high-pressure hose and reels on jet-cleaning trucks, or a flexible pole, to move the camera through the sewer.
7. If, during the inspection operation, the camera will not pass through the entire pipe section, the Contractor shall set up the equipment so that the inspection can be performed from the opposite manhole on the pipe segment.
8. The screen monitor and winch operators shall be in full communication at all times.
9. Remove all wires, screens, sand bags, etc. used in the television inspection process from the pipeline at the completion of inspection of each section.

C. Measurement:

1. Measurement for location of defects, service connections, etc., shall be accurate to two tenths (0.2) of a foot over the length of the section being inspected.

D. Records:

1. Printed records shall be provided, reflecting location of defects, service connections, etc., and shall be recorded per PACP standards and stored to a NASSCO-certified digital reporting software:

TELEVISION INSPECTION OF SEWERS AND DRAINS

- a. Keep records and supply to the Owner and/or Engineer when the work has been completed.
 - b. Show the exact location in relation to adjacent manholes, of each infiltration point discovered by the television camera.
 - c. Show locations of laterals, unusual conditions, roots, break-in storm sewer connections, collapsed sections, presence of scale and corrosion, and other discernible features.
2. Inventory the houses and apparent empty lots bordering each section of sewer line that is inspected and compare results to the number and location of house services found during the inspection. Log inconsistencies and report them to the Owner and/or Engineer.
3. Video / Photographs:
- a. Two copies of the video shall be provided in DVD format, downloaded or output from a NASSCO certified software: one copy to the Engineer and one copy to the Owner.
 - b. The video shall be digitally recorded, indexed by pipe section (labeled by manhole number or other means acceptable to the Owner and/or Engineer. Engineer) and allow for printing of still photographs.
 - c. Photographs shall be printed at Owner and/or Engineer's request and shall be identified on the back as follows:

Date_____; Section: MH#_____to MH#_____
 Diameter of Pipeline____; Distance from MH#_____is_____LF
 Description of item photographed _____

END OF
SECTION

SECTION 02756

CURED IN PLACE PIPE LINING

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: Provide all equipment necessary for the lining of sanitary sewer and storm drain lines by the cured-in-place-pipe (CIPP) method and the reinstatement of service connections.
- B. Sewer and storm drain pipe lining shall occur on an on-call basis as directed by the Town/Owner.
 - 1. Both full length pipe lining (structure to structure) and CIPP spot repairs are included within this section.
- C. Related Work Specified Elsewhere: Flow control, pipeline cleaning, and television inspection of sewers and drains are specified in this Division.

1.2 QUALITY ASSURANCE

- A. Standards:
 - 1. Cured-in-place-pipe (CIPP) shall meet all the requirements of the following standards:
 - a. ASTM F1216 – Standard Practice for rehabilitation of existing pipelines and conduits by the inversion and curing of a resin-impregnated tube
 - b. ASTM F1743 – Standard Practice for rehabilitation of existing pipelines and conduits by pulled-in-place installation of cured-in-place thermosetting resin pipe
 - c. ASTM D790 – Standard test methods for flexural properties of unreinforced and reinforced plastics and electrical insulating materials
 - d. ASTM F2454 – Standard Practice for Sealing Lateral Connections and lines from the mainline Sewer Systems by the Lateral Packer Method, Using Chemical Grouting
- B. Acceptable Contractors:
 - 1. Granite Inliner, LLC
 - 2. Green Mountain Pipeline Services, Inc.
 - 3. Insituform Technologies, Inc.
 - 4. Ted Berry Company, Inc.
 - 5. National Water Main Cleaning Company, Inc.

6. DIS, Inc.
7. Or qualified equivalent contractor with a minimum of 5 years' experience in sewer and drain pipe lining and a minimum of 100,000 feet of installed CIPP Liner, or the equivalent in spot linings.

1.3 SUBMITTALS

- A. The Contractor shall submit to the Owner and/or Engineer, complete design calculations for the liner that meet the requirements of ASTMs F1216, F1743, or F2019, whichever is applicable for the installation and curing methods to be used. The design shall be based on the following physical conditions of the existing pipe to be rehabilitated:
 1. All pipes shall be considered fully deteriorated and no bonding to the existing pipe shall be assumed.
 2. All pipes are subjected to a soil load of 120 lbs./cf with an H-20 live traffic load.
 3. The water table is assumed to be 3 feet below the ground surface.
 4. Pipe lengths are shown on the Plans, and shall be verified by the Contractor during the pre-installation inspection. Depths shall be field verified.
 5. The maximum pipe ovality is 2%, unless documented, measured by the Contractor and submitted to the Engineer.
 6. The minimum wall thickness for a felt tube CIPP liner is 4.5 mm. The minimum wall thickness for a fiberglass tube CIPP liner is 3 mm.
 7. The minimum flexural modulus of elasticity of the cured liner shall be 250,000 psi, with a flexural strength of 4,500 psi, as tested in accordance with ASTM D-790.
 8. The calculations shall account for a 50-year design life and include a documented factor of safety.
- B. Contractor to submit materials and installation procedures for review by Owner and/or Engineer, including information on resin, tube material including certifications, internal and exterior liner coatings, a pre-liner layer if required, manhole and service sealants, an installation schedule, the manufacturer's recommended curing schedule, means of obtaining and collecting samples for testing, method of monitoring liner temperature during curing, and other quality management programs, plans for by-passing or handling of flows, and traffic control.
- C. Contractor shall provide the location of the wet-out facility for the liner, and include documentation of its permitting status and QA/QC controls. If requested in writing by the Engineer, the Contractor shall assist the Engineer in setting up an inspection of the wet-out facility in advance of the manufacturing of the liner.
- D. Contractor to submit video tapes of pre-installation TV inspection and post-lining TV inspection, and a 1-year warranty inspection as specified in Section 02753.

CURED IN PLACE PIPE LINING

- E. Contractor to submit an outreach plan to the Engineer at least 1 week prior to the commencement of lining activities, this plan shall at minimum include a schedule for 1 week and 24 hour advance notices to residents who will be affected by the pipe lining, samples of notices to be provided to residents, and an odor and noise mitigation plan.
- F. Contractor to submit documentation relative to the qualifications, training and experience of the installers.
- G. Contractor to supply an equipment listing including redundant tools and spare parts to be on site during the lining work.
- H. Contractor to supply information on proposed or potential repair and/or rehabilitation methods in the event of a failed liner installation.
- I. Following liner installation, contractor shall supply wet-out logs, curing schedules, including curing pressure and curing temperature measurements, and collected samples for testing.

PART 2 - PRODUCTS

- A. Pipe Liner
 - 1. The liner shall be fabricated from materials that are chemically resistant to exposure to domestic sewage and septic tank effluent and be suitable for use within storm drainage applications.
 - 2. The resin, tube and curing methods shall be compatible with each other and the installation method to be used, in accordance with manufacturer's recommendations.
 - 3. Liner shall be sized to provide a tight fit to the host pipe.
 - 4. The interior surface of the liner shall be a relatively light reflective color so that a clear detailed examination with closed circuit television equipment can be made.
 - 5. Where possible, interior and exterior liners shall be provided to mitigate styrene migration. The interior and exterior liners shall be included as part of the pipe design, or removed as part of the installation.
 - 6. Liner thickness calculations are discussed in Part 1 above.
 - 7. Liner material shall meet the requirements of ASTM F1216 and F1743.
 - 8. All Materials shall be stored and handled in accordance with the manufacturer's recommendations and consistent with the type or curing method to be used.
- B. Service connection grouting
 - 1. The grout materials and equipment used to seal service connections shall be in accordance with ASTM F2454

PART 3 - EXECUTION

- A. All work shall be done in compliance with all current OSHA safety regulations.

- B. Prior to conducting any work, Contractor shall deliver notices to all residents and/or building owners within the area of the pipe lining. Notice shall indicate when the work will take place and who to call with questions or in the event of an emergency. Notice to be approved by the Owner prior to distribution.
- C. Prior to lining the main, the pipe shall be cleaned in accordance with Section 02752 and inspected with CCTV equipment per Section 02753. Contractor to verify that the conditions of the pipes are acceptable for the methods of liner installation required. Prior to lining of pipe, Contractor shall trim back any protruding pipes/services extending into the pipe. Pipes shall be trimmed back to within ½-inch of the pipe wall, or as close as possible to avoid damaging the host pipe and also to prevent bulges in the liner to be installed. All debris from cleaning and trimming operations shall be removed from the sewer or drain system and not flushed downstream
- D. Active leaks shall be stopped prior to lining if they could, in the opinion of the Engineer, create pockets of trapped water or heat sinks which could cause improper curing of the liner.
- E. Contractor to control flow and bypass pump per Section 02751.
- F. The Contractor shall install and cure the liner per the method recommended by the liner manufacturer and as submitted in the shop drawing.
- A. Water used for installation shall be provided by the Contractor. The Contractor shall notify Owner prior to disposal or water into the sewer or drainage system.
- H. Following liner installation and curing, leakage testing shall be performed on the line According to the requirements of ASTM F1216.
- I. After liner installation and curing, Contractor shall cool the liner down to at least 100 degrees Fahrenheit prior to commencing service re-instatement and collection of samples. Liner temperature during curing and cool-down shall be monitored by a thermocouple or temperature monitoring strip and recorded at least at 15 minute intervals.
- J. After liner cool-down, the Contractor shall reinstate the existing service connections, using remote controlled equipment including a television camera meeting the requirements of Section 02753. The opening created for the service lateral shall be at least 95% of the original opening. After creating the hole in the liner, polish the edges of the hole to remove sharp edges and improve flow conditions from the service pipe into the lined main. Coupons of the lining material removed during service reinstatement shall be collected at the downstream manhole, and shall not be left within the sewer or drainage system.
- K. The Contractor shall grout and seal each reinstated service connection to prevent leakage between the existing pipe, the existing service connection, and the new liner.

- L. Any connections to the main that are not to be reinstated after liner installation shall be coordinated with the Owner. It is the Contractor's sole responsibility to confirm with the Owner that a connection is to be abandoned and not reinstated to the main. For each connection not reinstated, the Contractor shall obtain a sign-off from the Owner, using the form included at the end of this Section.
- M. Provide a watertight seal at the insertion and termination points. Seal any annular space between the liner and host pipe and provide for smooth merging of flows from other pipelines entering the manhole.
- N. After completion of the work, perform post-installation TV inspection of the completed liner and the restored service connections per the requirements of Section 02753. Any of the following defects that are observed shall be repaired immediately at the expense of the Contractor:
 - 1. Visible leaks, weeping or pinholes
 - 2. Fins, bulges, wrinkles or other obstructions of more than 5% of the cross-sectional area that were not identified on the pre-installation TV inspection
 - 3. Soft or uncured sections of the liner
 - 4. Visual discoloration or other visual anomalies.
- O. At a time approaching the end of the one-year warranty period, the Contractor shall clean and CCTV the lined pipes again. During the one-year warranty period, any defects which will affect the integrity or the strength of the liner shall be repaired at the expense of the Contractor.

END OF SECTION

SECTION 02758

MANHOLE REHABILITATION

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Work Included: The work includes the rehabilitation of existing sewer manholes or drainage structures, including but not limited to:
1. Injection grouting of cracks and leaking joints;
 2. Sealing and lining of various manhole components;
 3. sealing and lining of various manhole components with a liner material specifically formulated to prevent corrosion of the concrete.
 4. Installation / application of a seal at the joint of the manhole frame and chimney;
 5. repair of the bench, invert and channel of the manhole;
 6. The removal of roots, mineral build-up and debris, and other surface preparation work required for the proper application of the rehabilitation materials.
- B. The intent of the manhole rehabilitation work is to stop infiltration into the manhole (whether or not it was previously observed) and repair structural or operation and maintenance defects identified during previous inspections. This is to prevent future deterioration using various products and procedures and methods either singularly or in combination.
- C. Related Work Specified Elsewhere:
1. Summary of Work - Section 01010
 2. Manholes, Covers and Frames - Section 02601
 3. Flow Control – Section 02751

1.2 DESCRIPTION OF METHODS

- A. Manhole Injection Grouting: Manhole sealing (grouting) involves injection grouting to stop leakage includes surface preparation where required, drilling through the manhole walls, bench or channel at points of current and points showing signs of previous leakage and where directed by the Owner and/or Engineer, injecting grout material into the voids and earthen materials outside the structure; patching of the drill and grouting holes; and other associated work to stop leaks and prevent leakage into the structure. Grouting and patching around leaking pipe connections and other defects with non-shrink grout is also included; and other associated work to stop leaks, including patching of the drill and grouting holes. Seal Manhole includes the

pressure washing of the entire manhole and removal and disposal of all roots, deposits and loose debris.

- B. Line Manhole: Cementitious coating (liner) for precast, block or brick manholes includes the pressure washing of manhole and removal of all roots, deposits and loose debris and the lining of the manhole through the hand/tooled application, spray application and/or centrifugally spin casting a cementitious based liner to the inside of the manhole.
- C. Line Manhole with corrosion resistant coating: Lining manhole with a corrosion resistant coating for precast, block or brick manholes includes the pressure washing of manhole and removal of all roots, deposits and loose debris and the lining of the manhole through the hand/tooled application, spray application and/or centrifugally spin casting of either a single-coat, or multiple coat corrosion resistant liner suitable for sewer manholes with high corrosion potential inside of the manhole.
- D. Internally Applied Chimney Seal: this work includes surface preparation for the applied seal, furnishing and installing the applied sealing material to create a uniform barrier to prevent leakage of water into manhole.
- E. Repair/Replacement of the Manhole Bench, Channel and/or Invert: This work includes removing and disposing of existing brickwork in poor condition, preparation of Martials to remain to accept new masonry work, furnishing and installing new brick and mortar to reform the bench, channel and invert to provide smooth flow thorough the structure, and related workmanship.
- F. Miscellaneous Manhole Cleaning, including pressure washing, debris removal and other necessary work to properly prepare surfaces and manholes for the work to be performed. Protect pipe inlets and outlets to prevent debris from entering the collection system.
- A. Flow control required to control and maintain flows in the sewer or drainage system allowing the specified work to be performed in a manner acceptable to the Owner and/or Engineer.
- H. Final Acceptance: After the rehabilitation work has been completed, the manholes shall be visually inspected by the Owner and/or Engineer and tested (as required) in the presence of the Owner and/or Engineer.

1.3 QUALITY ASSURANCE

- A. All work shall be performed in accordance with the National Association of Sewer Service Companies (NASSCO) Specification Guidelines, latest edition. Workmanship shall be first-class in all respects.
- B. Contractor's personnel involved in the installation of material shall be certified by the manufacturer that they have successfully completed training in handling, applying and finishing the materials being used.
- C. The Contractor shall inspect pre-rehabilitation work, surface preparation, rehabilitation operations, and post-rehabilitation work.

1.4 SUBMITTALS

- A. Shop drawings, a list of materials, and technical data shall be submitted to the Owner and/or Engineer for approval prior to any work being performed under this Section of the Specifications.
- B. Submit all catalog data sheets, ASTM references, material composition, component physical properties and chemical resistance for all materials as applicable.
- C. Submit detailed descriptions of the recommended procedures for handling and storing materials including a proposed method for monitoring temperatures of the storage location.
- D. Submit a detailed description of all required field testing processes and procedures as applicable from the manufacturer.
- E. Submit a certified statement from the manufacturer that the contractor / installer is an approved installer and tester of the rehabilitation product with certificates of completed training for each crew member involved in each rehabilitation component.
- F. Submit manufacturer's "Certification of Conformance" that lining materials meet or exceed the requirements of these Specifications.
- A. Submit other documents as specified in the appropriate Sections of this Division.
- H. Submit a minimum of five recent verifiable references for similar project work in the United States indicating the successful application of the manhole rehabilitation as specified herein or to be furnished by the Contractor and applied in a similar project environment as included in these contract specifications.
- I. Submit documentation of a minimum of a three-year successful installation history of the products to be used.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Rehabilitation component materials are to be kept dry, protected from weather and stored under cover and in accordance with manufacturer's recommendations.
- B. Polymer and Cementitious protective coating materials are to be stored at temperatures as recommended by the manufacturer and handled according to their SDS. Do not store near flame, heat, or strong oxidants.

PART 2 - PRODUCTS

2.1 MANHOLE INJECTION GROUTING:

- A. Chemical Grout Sealing: Manhole sealing (chemical grouting) includes a high pressure washing of manhole, removal of all roots, deposits and loose debris and the sealing of individual leaks, barrel joints, base joint, pipe penetrations, lifting holes and other defects using pressure grouting with root inhibitor.

Manholes to be sealed may consist of precast concrete, cast-in-place concrete, masonry block or brick.

1. Equipment: The basic equipment shall consist of pumps, containers, injection packers, hoses, valves, and all necessary equipment and tools required to seal manhole joints and leaks. The chemical grout injection pumps shall be equipped with pressure meters that will provide for monitoring pressure during the injection of the chemical sealants. When necessary, liquid bypass lines equipped with pressure-regulating bypass valves will be incorporated into the pumping system.
- B. Materials:
1. Hydrophilic Polyurethane Chemical Grout: consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophilic polymer of the type which is applied in a crack or open joint by use of a packer. When mixed with water, the material shall expand up to 4 times its original volume and cure to a closed cell polyurethane foam.
 2. Hydrophobic Polyurethane Chemical Grout: consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophobic polymer of the type which is applied in a crack or open joint by use of a packer. Acrylamide Chemical Grout: consists of a low viscosity chemically reactive gel which is applied in a crack or open joint by use of a packer.
 3. Hydrophobic polyurethane chemical grout for large voids: consists of premeasured, prepackaged polyurethane chemical grout with root inhibitor that when mixed and makes contact with the water shall fill large voids in rock fissures, gravel layers and cracks in concrete structures and for the stopping of gushing water. The grout shall be non-toxic, non-flammable, high flash point (225° F) hydrophobic polymer of the type which is applied in a crack or open joint by use of a packer. Acrylamide Chemical Grout: consists of a low viscosity chemically reactive gel which is applied in a crack or open joint.
 4. Water: Potable from municipal/public water supply.
 5. Filler Gaskets: Oakum, use strong fibrous jute material, saturated with grout for use in plugging larger opening in combination with the polyurethane grout.
 6. Utilize proper grout for the intended application as recommended by the manufacturer. Grout conditions may be adjusted for catalyzing the reaction, inhibiting the reaction, lowering the freezing temperature of the grout solution, adding fillers, providing strength, or for inhibiting root growth according to the instructions of the grout manufacturer and in the specified quantities as recommended by the grout manufacturer.
 7. Utilize non-shrink grout for patching holes and filling gaps around pipe connections or left behind by drilling holes for injection.

- C. Acceptable Sealant Grout Manufacturers and Products are:
1. Hydrophilic Polyurethane Chemical Grout
 - a. Avanti AV-202 multigrout
 - b. or equal
 2. Hydrophobic Polyurethane Chemical Grout
 - a. Avanti AV-248 flex seal with AV-249 Catalyst LV
 - b. Or equal
 3. Hydrophobic polyurethane chemical grout for large voids
 - a. Avanta AV-275
 - b. De Neef Hydro-Active Flex
 - c. Sika Fix HH (hydrophilic polyurethane)
 - d. Sealing Systems Inc Aqua
 - e. Seal or equal

2.2 LINE MANHOLE CHIMNEY, LINE MANHOLE BENCH AND CHANNEL AND LINE MANHOLE WALLS

- A. Cementitious Liner:
1. Equipment: The basic equipment shall consist of pumps, containers, packers, hoses, nozzles, valves, and all necessary equipment and tools required to line manholes as required by the manufacturer.
 2. Materials: The liner mix shall be cement-based, fiber-reinforced calcium aluminate mortar specifically designed to prevent infiltration and restore structural integrity, and to be spray applied to form a structurally enhanced, monolithic cementitious liner covering all interior manhole surfaces. Minimum applied thickness shall be ½ inch but application thickness must provide structurally stable manhole and form a barrier to water and gases. Material shall be premixed and specially formulated to resist hydrogen sulfide bacterial corrosion and abrasion in municipal sanitary sewer systems. The liner shall have the following properties as determined by laboratory testing:
 3. The lining material shall meet the following minimum requirements at 28 days:

Compressive Strength	ASTM C109	9,000
psi Flexural Strength	ASTM C293	700 psi
Shrinkage @ 90% Humidity	ASTM C596	0%
Tensile Strength	ASTM C496	>600
psi		
Sulfide Resistance	ASTM C267	no visible attack at pH 2 or greater

4. Acceptable manufacturers and products
 - a. are: Strong Systems, Inc. - Strong Seal QSR
 - b. AP/M Permaform - Permacast
 - c. Process Quadex - QM-1s Restore
 - d. Or approved equal.

2.3 MANHOLE PROTECTIVE COATING

A. High Build Epoxy Coating System:

1. Equipment: The basic equipment shall consist of pumps, containers, hoses, valves, and all necessary equipment and tools required to coat manholes as required by the manufacturer.
2. Liner materials listed below are either a monolithic coating for the liner (such as Quadex product) or require multiple coatings for the epoxy liner (Epoxytec product).
3. Base Coat Liner Materials – A cementitious liner shall be utilized as the base coat liner to uniformly resurface and provide a barrier coat and structural reinforcement for rehabilitative conditions prior to the final coat utilizing the urethane-modified epoxy (UME). The same material specified in Section 2.2 for manhole lining can be used for this base coat, provided it meets both specifications.
 - a. Material will be an ultra-high density strength, high build, silica fume, fiber-reinforced, corrosion resistant mortar, based on Portland cement fortified with micro silica.
 - b. Approved material shall exhibit the following physical properties:
 - c. Set Time at 77F (ASTM C-403) = 24 hours
 - d. Modulus of Elasticity (ASTM C-469):
 - i. 24 hours 3,000,000+ psi
 - ii. 28 days 4,000,000+ psi
 - e. Flexural Strength (ASTM C-293)
 - i. 24 hours 600+ psi
 - ii. 28 days 800+ psi
 - f. Compressive Strength (ASTM C-109)
 - i. 24 hours 2,000+ psi
 - ii. 28 days 10,000+ psi
 - g. Tensile Strength (ASTM C-307) at least 600
 - h. psi Shear Bond (ASTM C-882) >1,000 psi

- i. Shrinkage (ASTM C-157) <0.005
 - j. Chloride Permeability (ASTM C-1202) <250 Coulombs
 - k. Acceptable Products and Manufacturers are:
 - i. Epoxytec International, Inc.
 - ii. For 1/16-inch to 1-inch thick coating – Mortared Ceramico (#RCME-K1)
 - iii. For greater than 1-inch thick coating – Mortartec Silicate (#RCHA1)
 - iv. Or approved equal.
4. Final Coat Liner Materials - Epoxy coating shall be resistant to all forms of chemical or bacteriological attack found in municipal sanitary sewer systems, including severe hydrogen sulfide (up to 600ppm).
- a. Epoxy coating must be moisture tolerant to moisture levels of concrete up to 90%.
 - b. Epoxy coating must adhere to concrete with adhesion testing results in PSI that outperformed the cohesion of concrete (CIGMAT CT-2/3).
 - c. Epoxy coating shall be self-priming.
 - d. Approved material shall exhibit the following physical properties:
 - i. Solids by Volume (ASTM D2697) 100%
 - g. Solvent (VOC) (ASTM D3960) 0%
 - iii. Water Absorption (ASTM D1653) < 0.1 g/sq.m.
 - iv. Tensile Strength (ASTM D638) 5,500 psi (min)
 - v. Flexural Modulus (ASTM D790) 55,000 psi
 - vi. Flexural Strength (ASTM D790) 8,000 psi (min)
 - vii. Compressive Strength (ASTM D695) 7,000 psi (min)
 - viii. Elongation (ASTM D2370) 30-40%
 - ix. Complete Cure (min) 18 hours (at 77F)
 - e. Acceptable Products and Manufacturers are:
 - i. Epoxytec International, Inc - Uroflex (#UME38-G4T)
 - ii. Quadex Structure Guard
 - iii. Or approved equal.

2.4 APPLIED URETHANE CHIMNEY SEAL FOR MANHOLE CHIMNEY

- A. Equipment
 - 1. The basic equipment shall consist of pumps, containers, injection packers, hoses, nozzles, brushes, valves, and all necessary equipment and tools required to apply urethane chimney seal as required by the manufacturer.
- B. Materials
 - 1. The urethane chimney seal materials shall be corrosion resistant.
 - 2. Mil thickness shall be determined by the manufacturer.
 - 3. The material shall have a minimum of 800% elongation per ASTM D412.
 - 4. The urethane chimney seal may require a primer resin applied to the entire surface before application. The sealing system shall line the interior of the adjustment area from the cone / top of the manhole and onto the inside of the casting.
 - a. If the manhole has been relined prior to the seal installation, the seal shall cover a maximum of 6 vertical inches to cover casting cone interface.
- C. Acceptable Manufacturers and Products include:
 - 1. Sealing Systems, Inc. FLEXSEAL
 - 2. Epoxytec International, Inc. Uroseal 45V
 - 3. CladLiner Cladseal
 - 4. Or approved equal.

2.5 REPAIR/REPLACEMENT OF MANHOLE BENCH, CHANNEL AND/OR INVERT

- A. Equipment
 - 1. Refer to Section 02601.
- B. Materials
 - 1. Refer to Section 02601.

PART 3 - EXECUTION

3.1 MANHOLE INJECTION GROUTING

- A. Sealing Procedures for Precast, Brick and Block Manholes:
 - 1. A high pressure washing of the manhole.
 - 2. Removal and disposal of all roots, deposits, and loose debris.
 - 3. At each point of leakage within the manhole structure (including at pipe penetrations), a hole shall be carefully drilled from within the manhole and shall extend through the entire manhole wall. In cases where there

are multiple leaks around the circumference of the manhole, fewer holes may be drilled, providing all leakage is stopped from these holes.

4. Grout ports or sealant injection devices shall be placed in these previously drilled holes in such a way as to provide a watertight seal between the holes and the injection device.
5. A hose, or hoses, shall be attached to the injection device from an injection pump. Chemical sealing materials as specified shall then be pumped through the hose until material refusal is recorded on the pressure gage mounted on the pumping unit or a predetermined quantity of sealant has been injected. Care shall be taken during the pumping operation to insure that excessive pressures do not develop and cause damage to the manhole structure.
6. Upon completion of the injection, the ports shall be removed and the remaining holes filled with mortar and troweled flush with the surface of the manhole walls or other surfaces. The mortar used shall be a non-shrink hydraulic cement.

B. Manhole Joint Sealing Procedures:

1. Set grout ports or injectors at 90° intervals at each joint in the manhole, as well as at each pipe penetration, or similarly evenly spaced around identified leak location, if different from examples above.
2. Inject chemical grout. Ensure that chemical grout fills entire circumference of each manhole joint or pipe penetration, or other identified leakage point.
3. Cut out all loose or protruding wall joints, mastic and fill all interior lift holes and pipe penetrations with hydraulic cement. Finish shall be trowel smooth.

3.2 INSTALL CEMENTITIOUS LINER

- A. Lining Procedures (Precast, Block and Brick Manholes): Liner materials shall be mixed per manufacturer's written specifications and applied using equipment specifically designed to meet required thickness and application requirements as set forth by the manufacturer.
- B. Any active flows shall be dammed, plugged or diverted as required to ensure that the liquid flow is maintained below the surfaces to be lined. Any active infiltration sources must be identified and stopped or handled in accordance with manufacturer recommendations prior to lining operations.
 1. All surface preparations must be performed to meet or exceed manufacturer's recommendations prior to application

- C. Repair and lining materials must be applied by an experienced Applicator of the specified cementitious material and in accordance with the manufacturer's recommendations.
- D. Minimum placement thickness shall be ½-inch.
- E. Immediately following application, the cementitious liner material shall be troweled or brushed to achieve an even consistent surface.
- F. Cementitious liner material shall be permitted to cure according to manufacturer recommendations.
- G. In locations where only the Bench and Channel area are identified to be lined, the lining shall extend up the walls of the manhole a minimum of 6-inches in order to provide a uniform coating to line the entire junction of the manhole wall and table.
- H. In areas where the manhole walls are identified to be lined, the lining shall extend up beyond the top of the manhole chimney and onto the manhole frame, unless an internal mechanical seal is to be applied, in which case the lining shall continue to a point contained within the mechanical seal. At the lower extent, the manhole should be lined to the junction of the manhole wall and table.
- I. Temporarily bypass pump wastewater around manholes, use flow through plugs, or otherwise divert flows as necessary. Refer to Section 02751.

3.3 MANHOLE PROTECTIVE COATING

- A. Epoxy Coating Procedures: Epoxy coating shall be mixed per manufacturer's written specifications and spray applied using equipment specifically designed to meet required thickness and safety precautions.
- B. Contractor shall protect the uncured epoxy coating from water damage and in accordance with manufacturer recommendations.
- C. All Surface preparations or base coat installations must be performed to meet or exceed manufacturer's recommendations prior to application
- D. An approved certified applicator shall apply the protective epoxy coating.
- E. Minimum placement thickness, maximum application thickness and multiple coats, if required, shall be in accordance with manufacturer's recommendations.
- F. Epoxy coating shall be permitted to cure according to manufacturer recommendations.

3.4 INTERNALLY APPLIED CHIMNEY SEAL

- A. All loose and protruding mortar and brick that would interfere with the chimney seal's performance shall be removed. All loose materials or excessive voids shall be repaired using a single component quick set repair mortar to create a smooth surface prior to installation.
- B. The Contractor shall obtain from the polymer chimney seal manufacturer in writing the materials compatibility and the recommended time required for the mortar to properly cure prior to installing the polymer chimney seal.
- C. Preparation of the chimney surface and casting may include using high pressure water, sandblasting, wire brushing, or other methods as described by the manufacturer to ensure a clean surface. The substrate surface must be dry and free of sand, loose debris, dust, oil, grease, or chemical contamination.
- D. The polymer chimney seal shall require the proper mixing of several components.
- E. If a primer is required, the primer shall cure properly before applying the polymer seal. The polymer chimney seal may be applied evenly by brush over the entire chimney area, including the frame joint area and the area above the manhole cone including all extensions to the chimney area.
- F. If the manhole has been relined prior to the seal installation, the seal shall cover a maximum of 6 vertical inches to cover casting cone interface.
- G. Installation procedures shall be in accordance with the manufacturer's recommended instructions.

3.5 REPAIR/REPLACEMENT OF MANHOLE BENCH, CHANNEL AND/OR INVERT

- A. Prior to the rehabilitation of the existing manhole, the Contractor is required to pressure wash (minimum of 3,000 psi) and thoroughly clean the inside of the manhole including walls and invert shelf.
- B. Remove and properly dispose of all roots, deposits, and other loose materials, defective brick, mortar and other items necessary to allow room for the new work. Surfaces shall be properly prepared to accept new masonry.
- C. As required, temporarily bypass pump wastewater around manholes, use flow through plugs, or otherwise divert flows as necessary. Refer to Section 02751.
- D. Masonry work shall be in accordance with section 02601.

3.6 MANHOLE CLEANING

- A. Prior to the rehabilitation of the existing manhole, the Contractor is required to pressure wash (minimum of 3,000 psi) and thoroughly clean

the inside of the manhole including walls and invert shelf in accordance with manufacturer's instructions for products being applied.

- B. Remove and properly dispose of all roots, deposits, and other loose materials, preventing and debris from entering the sewer or drainage pipeline.
- C. The Contractor is required to provide wash water for the cleaning.
- D. Coordinate the cleaning of the manholes with the Owner.

3.7 TESTING

- A. Manhole Structure Sealing Test: Manhole structure sealing shall be visually inspected in the presence of the Owner and/or Engineer for water tightness against leakage of water into the manhole. All visible leaks and defects observed during inspection shall be repaired to the Owner's satisfaction and at no additional cost to the Owner.
- B. Manhole Liner Test: Manhole cementitious liner shall be visually inspected in the presence of the Contractor for water tightness against leakage of water into the manhole. All visible leaks and defects observed during inspection shall be repaired to the Owner's satisfaction and at no additional cost to the Owner.
 - 1. The Owner and/or Engineer may require an adhesion test on any manhole exhibiting signs of delamination or sloughing. Contractor shall repair the site of the adhesion test at no additional cost to the Owner, as well as perform any liner repairs that may be required if the test fails.
- C. Holiday Testing of Manhole Protective Coating or Applied Polymer Chimney Seal
 - 1. The Contractor shall use an approved third-party National Association of Corrosion Engineers (NACE) accredited inspector or manufacturer's representative to perform holiday (spark) tests in accordance with the coating manufacturer's recommendations and check for voids. These tests shall be performed in the presence of the Engineer. Upon final completion of the work, the manufacturer shall provide a written certification to the Owner and the Engineer that the repair materials were applied per the manufacturer's recommendations.
 - 2. After the epoxy coating product has properly set and cured in accordance with manufacturer instructions, all surfaces shall be inspected for holidays with high-voltage holiday detection equipment. Reference NACE RPO 188-99 for performing holiday detection.
 - 3. All detected holidays shall be marked and repaired by abrading the coating surface with grit disk paper or other hand tooling method. After abrading and cleaning, additional coatings can be hand applied to the repair area.

4. All touch-up/repair procedures shall follow the coating manufacturer's recommendations and at no additional cost to the Owner.
 5. Documentation on areas tested, results, and repairs made shall be provided to the Owner and Engineer in writing by the General Contractor.
- D. The Engineer and Owner reserve the right to inspect the rehabilitated manholes during the warranty period (including during periods when the groundwater table is higher than at the time the work is completed). The Owner or Engineer shall notify the Contractor prior to inspection and the Contractor shall be present during the inspection. Any leakage or defects in the work found by this inspection shall be corrected by the Contractor at no additional cost to the Owner.

END OF
SECTION

SECTION 02766SEWER LINE CHEMICAL ROOT CONTROLPART 1 - GENERAL1.1 DESCRIPTIONS

A. Work Description:

1. The purpose of the project specified herein is to apply chemical root control agent to sanitary sewers, in order to kill the root growth present in the lines and to inhibit re-growth, without permanently damaging the vegetation producing the roots. The chemical agent shall be Razorooter II™ or equivalent products approved by the Owner and/or Engineer.

1.2 QUALITY ASSURANCE

- A. Bidders must be licensed with the Connecticut Department of Environmental Protection prior to the bid date. All Bidders must have a minimum level of pesticide application experience and employ a State Certified pesticide applicator on the job site at all times.
- B. Contractor shall provide Pollution Liability Insurance; in addition to all other insurance and bonds specified herein.
- C. The Contractor shall provide a money-back guarantee on all work specified herein as set forth below.

1.3 SUBMITTALS

- A. The Contractor shall submit a recent study from an accredited research facility documenting the effects of the proposed product on wastewater treatment plant facilities. At a minimum, this study shall address the toxicity of the product on wastewater treatment plant biota, including nitrifiers and denitrifiers, the toxicity of the product on treatment plant effluent, and the environmental fate of the product.
- B. Pollution and Liability Insurance:
 1. The Pollution Liability Insurance described herein is in addition to all other insurance required of the Contractor by the Owner, including any insurance described in the general conditions, any insurance required by law, or any other insurance requested by the Owner.
 2. At the time of the bid opening, the Contractor shall submit written evidence that he has obtained pollution liability coverage in accordance with the Standard General Conditions.
- C. Qualifications:
 1. The Contractor shall demonstrate a minimum level of five (5) years direct experience in applying chemical sewer root control agents. The Contractor must have performed at least 10 other jobs similar in size and scope to the

Work specified herein, and have treated in excess of 750,000 linear feet of sanitary sewer with it's own personnel within the last 24 months.

2. The Contractor shall be licensed as a pesticide application business with the Connecticut Department of Environmental Protection prior to the bid opening. Contractors who do not meet the experience and other qualifications specified herein shall not be considered for award of the contract. Each bidder is required to submit with his bid the contractor qualification form attached to these specifications. Additional references, up to ten, may be requested by the Owner.
3. All work shall be performed by Certified Pesticide Applicators licensed with the Connecticut Department of Environmental Protection. Certified Pesticide Applicators, shall have a minimum three years' experience in performing the type of work specified, and shall each have personally performed a minimum of 500,000 linear feet of treatments in the last three years as a Certified Pesticide Applicator. A minimum of three Certified Pesticide Applicators that are registered with the Connecticut Department of Environmental Protection, prior to the bid, is required. License numbers for these three applicators and years of experience shall be submitted with the bid. Additional proof of applicator experience may be requested by the Owner.

1.4 COORDINATE ASSISTANCE PROVIDED BY THE OWNER:

- A. A representative of the Owner will accompany the Contractor's crew, and/or sewer system drawings will be provided showing the locations of the pipes to be treated.
- B. The Owner shall provide for the entering of private lands, public lands and right of ways.

PART 2 - PRODUCTS

2.1 COMPOSITION OF THE CHEMICAL ROOT CONTROL MATERIAL

The chemical root control agent shall be Razorooter™ II or equivalent product that is approved by the Owner. The chemical root control agent shall be registered with the EPA and the Connecticut Department of Environmental Protection, prior to the bid opening, and shall be labeled for use in sewers to control tree roots. The chemical Root control agent shall contain an active ingredient for controlling sewer roots and deterring their re-growth. There shall also be a surfactant system to deliver the active ingredient (herbicide) to the target root tissue.

- A. Active ingredient:
 1. Shall be a Category "E" compound, the most favorable rating

attainable on the U.S. EPA's chronic exposure toxicological rating scale.

2. Shall not be considered a carcinogen, teratogen, mutagen, or oncogene, based on laboratory testing.
 3. Shall be non-volatile in order to minimize exposure to collections system workers, treatment plant operators and homeowners through inhalation.
 4. Products containing the active ingredient(s) metam-sodium or copper sulfate are not allowed.
- B. Surfactant system:
1. Shall produce a dense, small bubble, clinging foam, which sustains its shape for a minimum of one hour.
 2. Shall not be considered a carcinogen, teratogen, mutagen, or oncogene, based on laboratory testing.
 3. Shall contain an Alkylpolyglucoside (formulations of vegetable oil and carbohydrate from agricultural products).

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor is responsible for all property damage and for all cleanup and restoration associated with any chemical spill.
- B. The Contractor shall be responsible for Traffic Control.
- C. The Contractor shall use a reduced-pressure-zone backflow prevention device or air gap whenever accessing fresh water for mixing chemical.
- D. The Contractor shall return yearly throughout the life of the guarantee, in order to evaluate the success of the project, and to arrange any free guarantee work that may arise.
- E. The Contractor shall comply with all Federal, State and Local Laws, with special attention to those laws that pertain to the handling, transportation, and use of any hazardous materials, and disposal of all pesticide containers.

3.2 CONTRACTOR GUARANTEE

- A. For each sewer section (manhole-to-manhole) treated under the Contract:
 1. At the option of the Owner, the Contractor shall, at his own expense, re treat a sewer section in the event that live roots are found in the section within six months after the application.
 - a.) Re-treatments, performed at no charge in honor of the guarantee, do not extend the expiration date of the guarantee.
 2. The guarantee applies to sewer stoppages caused by live tree roots. It does not apply to stoppages caused by grease or other foreign matter; flat, collapsed or deformed pipe; or flooding caused by a surcharged or plugged sewer section downstream from a guaranteed sewer section. This guarantee applies to main line

sewers only.

3.3 MANNER OF APPLICATION

- A. All work shall be performed according to label instructions and in accordance with the best recommended practice for conditions present in the line under treatment. All applications shall be done by foaming or other methods as provided on the product label.
- B. The application of material shall be performed in such a way as to contact roots within the primary main line sewer to be treated. Effort will also be made to penetrate secondary lateral sewers in order to contact roots residing in the "wye" connections.
- C. Hydraulic sewer cleaning machines will reduce treatment effectiveness by damaging root growths and inhibiting their uptake of chemical. Hydraulic sewer cleaning machines shall not be used prior to, or during the treatment process.

3.4 PROPERTY DAMAGES CAUSED BY THE CONTRACTOR

- A. Should the Contractor or his employees cause any damage to public or private property, the Contractor will be required to make repairs immediately.

3.5 PROTECTION OF WASTEWATER TREATMENT PLANT

- A. The Contractor shall take all steps necessary and appropriate to prevent adverse effects on wastewater treatment plant processes during the application process.
- B. Notwithstanding the requirement that the active ingredient shall not adversely effect wastewater treatment plant processes, in the event that a wastewater treatment plant experiences any reduction in operating efficiency during the execution of the contract, the Contractor shall immediately suspend all applications, at the direction of the Owner. The contractor shall continue operations only after problems at the wastewater treatment plant have been corrected, satisfactory to the Wastewater Treatment Plant Operator.

3.6 COMPLIANCE WITH LAWS

- A. The Contractor is directed to ensure compliance with all Federal, State and Local ordinances pertaining to the type of work specified herein. Particular attention shall be paid to those laws and ordinances relating to transportation of material (DOT), the application of sewer root control herbicides (US EPA), and traffic safety regulations. The Contractor's Federal DOT number and material EPA registration number must be submitted with bid.

END OF SECTION

APPENDIX A

Street Classifications

FUTURE ROAD CLASSIFICATION

EXPRESSWAY:

Route 25
Route 15 (Merritt Parkway)
Route 8

PRINCIPAL ARTERIAL:

Route 111 (Main Street)
Route 111 (Monroe Tpke.)
Route 25 (Main St., North of Monroe Tpke.)
Route 127 (Church Hill Rd.)

Route 127 (White Plains Rd.)
Route 108 (Huntington Tpke.)
Route 108 (Nicholas Ave.)
Route 711 (Huntington Tpke.)

MINOR ARTERIAL:

Madison Ave.
Buck Hill Rd.
Chestnut Hill Rd.
Old Town Rd.
Edison Rd.
Whitney Ave.
Daniels Farm Rd.
Reservoir Ave.
Booth Hill Rd.

COLLECTOR:

Tashua Rd.
Stonehouse Rd.
Lake Ave.
Park Lane
Blackhouse Rd.
Plattsville Rd.
Teller Rd.
Porters Hill Rd.

Moose Hill Rd.
Hurd Rd.
Strobel Rd.
MacDonald Road
Mischa Hill Rd.
Unity Rd.
Shelton Rd.

