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OTHER OFFICE LOCATIONS

Bloomfield Hills
Delhi Township
Grand Rapids
Howell
Jackson
Kalamazoo
Lansing

**ADDENDUM NO. 1
FOR THE
SANITARY COLLECTION SYSTEM REPAIRS – CHEMICAL GROUTING
DELHI CHARTER TOWNSHIP
HOLT, MICHIGAN**

ISSUED: October 31, 2018

HRC Job No. 20180205

This Addendum No. 1 is issued prior to receipt of bids to provide for certain changes and clarifications to the specifications and/or the Drawings, as herein specified, and is hereby made a part of the Contract Documents and shall be taken into consideration in preparing the Proposal. All other conditions remain the same. **The Proposer shall acknowledge the receipt of this Addendum by signing below, including this addendum with their proposals, and completing the Addenda section on Page 2 of the Proposal Form (Section 00150).** Failure to sign the Addenda Section of the Proposal Form in the submission of the proposal may be justification for the proposal being rejected as non-responsive.

The following lists the extent of this Addendum. Descriptions of the changes or clarifications are given within each heading.

CONTRACT DOCUMENTS

1. SPECIFICATION SECTION 00 010 – TABLE OF CONTENTS (Revised and Reissued)
 - Removed specification references 1700 and 1730 from the Chemical Grouting and Sewer Line Cleaning special provisions respectively.
 - Added Chemical Grouting Summary Table to the Appendix
 - Updated page numbers
2. SPECIFICATION SECTION 00030 – ADVERTISEMENT (Revised and Reissued)
 - Revised bid opening location and time.
3. SPECIAL PROVISION – CHEMICAL GROUTING (Issued)
4. SPECIAL PROVISION – SEWER LINE CLEANING (Issued)
5. Chemical Grouting Summary Table (Issued)
 - Summary of the repairs including pipe length, diameter, upstream and downstream manhole IDs, and anticipated quantity of chemical grout areas in each pipe.
 - Included in Appendix of the project Specifications.

CONTRACTOR QUESTIONS

Q: Is there a disposal site available for any vector waste generated by cleaning the sewer before grouting?

A: Waste from the sewer lines may be disposed at the wastewater treatment plant or an approved landfill.

Q: Are there videos to review and logs of where the grouting is taking place in each of the 16 lines?

A: Videos for the sewer lines will be made available to the Contractor who is awarded the contract for the project.

Q: Can you please send me the plan holders list?

A: The plan holders list is continuously updated as requests for documents arrive. The most recent plan holders list can always be found at <http://www.hrcengr.com/bid-info/>

A copy of the amended pages of the Contract Documents noted in this Addendum No. 1 have been posted online at <http://www.hrcengr.com/bid-info/> and should be utilized during the preparation of the bids and incorporated into the Bid Documents.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.



Todd J. Sneathen, P.E.

TJS/jdk

Attachment:

- Specification Section 010 – Table of Contents
- Specification Section 030 -Advertisement
- Special Provision – Chemical Grouting
- Special Provision – Sewer Line Cleaning
- Chemical Grouting Summary Table

pc: All Prospective Bidders
Delhi Charter Township; S. Diorka
HRC; N. Womack, S. Carver, File

Received and Acknowledged by:

Company Name: _____

Name: _____

Written Name: _____

Address: _____

Telephone: _____ Fax: _____

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ADVERTISEMENT FOR BIDS
CHEMICAL GROUTING
SANITARY COLLECTION SYSTEM REPAIRS
DELHI CHARTER TOWNSHIP

Sealed proposals for the Sanitary Collection System Repairs – Chemical Grouting will be received by Delhi Charter Township at the Township Hall located at 2074 Aurelius Road, Holt, MI 48842, until 2:00 p.m., Local Time on Tuesday, November 13th, 2018. All bids will be publicly opened and read at the Public Services building located at 5961 McCue Road, Holt, MI 48842 at 2:15 p.m., Local Time.

Bidders shall review and comply with the Instructions to Bidders, which are incorporated by reference, and carefully review all Contract Documents, as defined in the Instructions to Bidders. Bids submitted after the exact time specified for, receipt will not be considered.

The Contracts will consist of the following principal items of work and appurtenances as specified herein and shown on the Contract Drawings.

Description of Work

Sanitary sewer lines throughout Delhi Charter Township have been televised and rated based on observed defects. This project consists of chemical grouting of identified defects within 10”-36” diameter sanitary sewer pipes at various locations as shown in the Contract documents. This work also includes necessary cleaning of the sanitary pipes to facilitate the chemical grouting along with CCTV inspections before and after chemical grouting processes.

Copies of Plans and Specifications and Proposal Forms shall be available on or after 10:00 am October 23rd, 2018 at the offices of Hubbell, Roth & Clark, Inc., Consulting Engineers, 555 Hulet Drive, Bloomfield Hills, Michigan 48302-0360.

A non-refundable payment of Fifty (\$50.00) Dollars, **CHECK ONLY, payable to “Hubbell, Roth & Clark, Inc.”** will be required for each set of Drawings and Specifications. Drawings and Specifications can be shipped by U.P.S. ground for a shipping and handling charge of Twenty (\$20.00) Dollars, CHECK ONLY, non-refundable, to Hubbell, Roth & Clark, Inc. The Bidder is advised that to submit a bid on this project, the Bidder must have purchased a set of Plans and Specifications from Hubbell, Roth & Clark, Inc.

Proposals submitted by Bidders who have been debarred, suspended, or made ineligible by any Federal Agency will be rejected.

Each bidder agrees to waive any claim it has or may have against the Owner, the Architect/Engineer, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any bid.

The successful bidder will be required to furnish satisfactory Performance, Payment, and Maintenance and Guarantee Bonds.

Delhi Charter Township reserves the right to reject all bids and to waive irregularities in bidding.

No Proposal will be received unless made on blanks furnished and delivered to the Delhi Charter Township Clerk on or before 2:00 p.m., local time, November 13th, 2018.

END OF SECTION

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**SPECIAL PROVISION
FOR
CHEMICAL GROUTING**

HRC

1 of 10

October 31, 2018

PART 1 – GENERAL

1.01 INTENT

- A. The work in this Section consists of providing for the rehabilitation of defective pipe joints, lateral joints, circumferential pipe cracks, other small pipe defects by the application of chemical grouting materials in Accordance with ASTM F2304. "Standard Practice for Rehabilitation of Sewers Using Chemical Grouting" (latest revision) and ASTM F2454 "Standard Practice for Sealing Lateral Connections and lines from the Mainline Sewer Systems by Lateral Packer Method, Using Chemical Grouting" (latest revision), and National Association of Sewer Service Companies Current Specification Guidelines for Sewer Collection System Maintenance and Rehabilitation. All maintenance of traffic (MOT) required to complete this project is also included and shall adhere to the MMTUC all other applicable local and State requirements.
- B. The Contractor shall furnish all labor, materials, equipment and incidentals to provide for the rehabilitation and stabilization of the sewer pipe by the stated methods.
- C. The rehabilitation shall be accomplished while maintaining flows by an approved method such as bypass pumping.
- D. The work includes the following:
 - 1. Pre-rehabilitation cleaning
 - 2. Pre-rehabilitation TV inspection
 - 3. Injection of Grout into Joints, Lateral Joints, and Cracks
 - 4. Post-rehabilitation TV inspection

1.02 SAFETY

Contractor shall be solely responsible for safety during the performance of all Work. Contractor shall take satisfactory precautions to protect the sewer segments and appurtenances from damage that might be inflicted upon them by the use of grouting equipment. Any damage inflicted upon a sewer segment or other public or private property as a result of the Contractor's grouting operations, regardless of the grouting method used and regardless of any other circumstance which may contribute to the damage, shall be repaired by Contractor at his sole expense.

Contractor shall not enter into any sewer segment where hazardous conditions may exist until such time as the source of those conditions is identified and eliminated by the Contractor. Contractor shall perform all work in accordance with the latest OSHA confined space entry regulations. Contractor shall coordinate his work with local fire, police and emergency rescue units. All MOT shall be in accordance with MMUTCD standards and shall be coordinated with the Owner and all local

emergency response units.

1.03 EXISTING TELEVISED TAPES

Tapes may be available upon request.

1.04 ACCESS

The Contractor shall determine locations of appropriate access points (manholes) for grout injection and void filling. The Owner shall designate the Rights-of-Way and access for the work availability. The Contractor shall provide adequate notification to private property owners when crossing private property is necessary to reach access points due to easement congestion which limits equipment travel within existing easements. All property in the project work area shall be restored to a condition equal to or better than existing following completion of construction.

1.04 MINIMUM QUALIFICATIONS

Materials: Chemical sealant shall have documented service of successful performance in similar usage, with a minimum of 12,000 joints grouted.

1.04 SUBMITTALS

In addition to the requirements for Schedule and Shop Drawing submittals contained in the General Conditions, and in addition to the equipment and material submittals required elsewhere in this Specification, Contractor shall submit:

- A. The Contractor shall provide a minimum 48-hour advance written notice of proposed testing schedules and testing procedures for review and concurrence of the Engineer.
- B. Equipment operating procedures and systems.
- C. Chemical Grout information:
 - 1. Description of chemical grout materials to be used per sections 2.01.
 - 2. Description of proposed additives to be used per sections 2.01.
 - 3. Manufacturers recommended procedures for storing, mixing, testing and handling of chemical grouts.
 - 4. MSDS sheets for all materials to be used.
- D. Identify the manufactures & models of the packers to be utilized on the project.
- E. Upon completion of each pipe segment, submit to the Engineer a report showing the following data for each joint, crack, and/or lateral connection tested, grouted or attempted to be grouted as required by PACP.

1. Identification of the sewer pipe section tested by assigned sewer ID (if available) and length.
2. Type of pipe material, diameter & depth of pipe to the surface at manholes.
3. Length of pipe sections between joints.
4. Test pressure used and duration of test.
5. Pass/fail results for each joint/connection tested.
6. Location stationing of each joint/connection tested and location of any joints/connections not tested with an explanation for not testing.
7. Volume of grout material used on each joint or connection.
8. Gel set time used (cup test results from tanks)
9. Grout mix record of the batches mixed including amount of grout and catalyst, additives, temperature of the grout solution in tanks.
10. Operator conducting testing and sealing shall be noted on the reports.
11. Video recordings
 - a. Pre-installation recording shall include inspection of the pipe or lateral prior to commencing grouting work and identifying the locations of proposed rehabilitation.
 - b. Video recording shall include testing and sealing operations for each joint/lateral (including inflation and deflation over the joint/lateral) displaying the final air test of joints or laterals.
 - c. Additional final recording shall include inspection of the pipe or lateral after all grouting work is complete.

PART 2 – PRODUCTS

2.01 MATERIALS

- A. *Delivery, Storage and Handling.* Contractor shall deliver materials to job site in undamaged, unopened containers bearing manufacturer's original labels. Materials used as chemical grout shall be transported, stored, and placed in manner prescribed by manufacturer of those materials, as detailed in published data provided by manufacturer.
- B. *Materials*
 1. *Chemical Grout.* Grout used shall be Avanti AV-100, de neef Construction Chemicals AC 400, or approved equal. Contractor shall provide a chemical sealant solution containing principal chemical sealant constituent, initiator (trigger) and catalyst specifically recommended for the purpose of sealing leaks in sanitary sewer lines and manholes. Chemical sealant constituent, initiator (trigger) and catalyst shall be compatible when mixed. Solution shall have ability to tolerate dilution and react in moving water. After final reaction, it shall be a stiff, impermeable, yet flexible gel. The grout proportions shall be such that dilute aqueous solutions — when properly catalyzed — will form stiff gels. Grout shall make true solution at concentrations as high as three pounds per gallon of water. Solutions shall have ability to accept dilution by groundwater of at least 50% by volume, without significantly changing sealing ability of the gel when

at rest or in motion. Solutions shall gel in a predetermined time when exposed to normal groundwater pH ranges, and be capable of formula adjustments to compensate for changing conditions. Final reaction shall produce a continuous, irreversible, impermeable stiff gel at chemical concentrations as low as 0.4 lbs per gallon of water that is able to break away from the joint sealing packer when the packer is deflated. Gel shall not be rigid or brittle. Gel shall have negligible corrosion rate on mild steel plates.

2. *Chemical Root Inhibitor.*

- a. Dichlobenil (2-6-dichlorobenzonitrile): Norosac 50W or approved equal. Contractor must have all chemical handling documents on hand prior to handling the additive.
- b. Contractor shall add root inhibitor to the chemical grout mixture at a safe level of concentration having the ability to remain active within the grout for a minimum of 12 months.
- c. Contractor shall mix root inhibitor with the grout according to the instructions of the grout manufacturer and in the specified quantities as recommended by the grout manufacturer.

3. *Gel Time Modifier.* A gel time extending agent may be used in accordance with the manufacturer's recommendations to extend gel time as necessary.
4. *Freeze/Thaw.* In those lines where the grouting material may be exposed to a freeze-thaw cycle, ethylene glycol or other approved equal additive shall be used to prevent chemical grout cracking once set.
5. *Insoluble (Particulate) Additives.* Inactive solids such as diatomaceous earth may be mixed with grout by Contractor as filler only upon written approval of Owner.
6. Water shall be potable.

2.02 EQUIPMENT

Contractor shall provide equipment consisting of closed-circuit television systems, necessary chemical sealant containers/tanks, pumps, regulators, valves, hoses, etc. and joint sealing packers for appropriate sizes of pipe designated to receive chemical grouting. The packer shall be cylindrical and have a diameter less than the pipe size. The packer shall be constructed in a manner to allow restricted amounts of sewage to flow and shall be pneumatically operated. Hydraulically or mechanically expanded devices shall not be permitted.

To test the accuracy, integrity, and performance capabilities of sealing equipment units, Contractor shall perform a demonstration test in a test cylinder constructed so that a minimum of two known leak sizes can be simulated. Contractor shall provide test cylinders and pressure gauges. Contractor shall perform the demonstration test for each chemical sealing unit prior to beginning work. This technique will establish test equipment performance capability in relationship to test criteria and insure that there is no leakage of the test medium from the system or other equipment defects that could affect joint testing results. Tests may be required at any other time during joint

testing work if the Owner suspects testing equipment is not functioning properly. All testing costs shall be borne by the Contractor.

The device for testing lateral connections shall consist of inflatable mainline end elements and a lateral grouting plug that creates a void area extending beyond the main connection. Whenever possible, use a lateral grouting plug sized to match the diameter of the lateral being grouted with an effective sealing length of at least two (2) feet. Where the lateral is capped, utilize alternate lateral grouting plug or equipment sized appropriately for the capped lateral.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. *Cleaning.* Prior to the application of chemical grouting materials, Contractor shall thoroughly clean the sewer designated to receive the chemical grouting. Cleaning shall constitute removal of all debris, solids, roots and other deposits in the sewer line; particularly at the sewer pipe joints to permit proper grout installation. All costs associate with cleaning of sewer lines and debris disposal to a qualified landfill site shall be included in unit prices bid for grout injection.

Acceptance of cleaning work in sewer line sections shall not be made until testing and sealing of joints and cracks in section of the respective sewer have been completed.

- B. *Inspection of Pipelines.* After cleaning and prior to application of chemical grouting materials, Contractor shall inspect the sewer designated to receive the chemical grouting. The inspection shall be conducted using CCTV camera and the Contractor shall provide the Owner with digital videos and images that include condition and other descriptive data related to the sewer. Sewer line inspection requirements shall be performed prior to and after chemical grouting application processes and shall be included in the cost of chemical grouting.
- C. *Bypass Sewage.* Contractor shall provide for maintenance of flow in the affected portions of the sewer system during grouting of the sewer line. The Contractor shall notify all affected residents of rehabilitation sewer work prior to commencing such work.

Flow control shall be accomplished by bypass pumping of flow from upstream of the sewer segment to be grouted to a point downstream of the sewer segment to be grouted. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent sanitary sewer system. The pump and bypass system shall be of adequate capacity and size to handle the flow. If pumping is required on a 24-hour basis, equipment shall function in a manner to keep noise to a minimum.

The Contractor shall take adequate precautions to assure that no backup of sewage into basement drains occur. The Contractor shall be fully responsible for any damages resulting from their operation. All costs associated with bypassing sewage shall be included in the unit prices bid for the work.

- D. *Flow Control Precautions.* When flow in a sewer line is plugged, blocked, or bypassed: sufficient precautions must be taken to protect the sewer line from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewer involved.

E. Pressure Testing Joints in Sanitary Sewer.

1. *Preconstruction Testing.* Contractor shall provide equipment such as pumps, gauges, regulators, and hoses, necessary to perform air tests of each joint in those sewer sections designated for grouting work. Equipment configuration shall be such that there are no valves on or along the air line between the measuring point at the joint and the pressure transducer or sensing device located in the control unit on the surface. Systems which incorporate bladders, hoses, or the like for monitoring the pressures and which have questionable accuracy shall not be allowed. The amount of pressure being exerted on the joint shall be readable above ground on a pressure gauge.

The accuracy and calibration of pressure sensing/monitoring system shall have been certified by an independent testing firm within a one-month period preceding the use of equipment. Proof of certification shall be submitted to the Owner.

To confirm that joint testing is not a more severe test than the pipe itself can pass, Contractor shall perform an on-job barrel test between joints in each pipe line to be tested to determine that the pipe barrel can pass the test criteria. If the pipe barrel will not pass decay rate limits, adjustment of maximum pressure levels will be evaluated jointly between Contractor and Owner. Owner shall render final written decision on each such situation.

2. *Sewer Pipe Joint Testing.* To determine if a joint needs grouting, Contractor shall test each joint by isolating the area to be tested within the testing device and applying positive pressure into the joint and void area created by the test device. Contractor shall then introduce pressurized air into the isolated void created by testing device. Pressure shall be applied until it is determined that the pressure cannot be built in the void or until the test pressure of 1/2 psi per ft of depth plus four psi to a maximum of 10 psi is reached as recorded by the void pressure monitor. When either of these conditions is reached, Contractor shall shut off the air supply.

If the required pressure cannot be developed, joint shall have failed the test. If the required test pressure in the void was increased to 1/2 psi per ft of depth plus four psi, rate of decay of this pressure shall not exceed 1 psi in 30 sec. The joint being tested will also have failed if the pressure drops more than 1 psi in 30 seconds. Failure of the joint indicates the need for sealing and shall be accomplished by Contractor.

3. *Test Records.* During grout testing, records shall be kept which include identification of the sewer section tested, test pressure used, location (footage) of each grouted defect tested and location of grouted defects not tested due to close proximity to building service connections and sanitary sewer manholes, a statement indicating test results (passed or failed) for each grouted defect tested, test pressure achieved and maintained for each grouted defect passing air test, weekly equipment pressure test results, sewer section barrel test results, daily gel check results, and air temperature at time of testing joints.

- F. *Chemical Grout Application for Sealing Joints.* Repairs shall take place at joints, generally small circumferential cracks, small holes, or similar points of infiltration as identified. The repair shall be such that the original cross-sectional area and shape of the interior of sewer pipe shall not be

permanently reduced or changed.

1. *Placement of Chemical Grout.* Contractor shall position the sealing packer over the area of infiltration by means of a metering device at the surface and closed circuit television camera in the line. Accurate measurement of the location of the defect to be sealed shall be made, using the portion of sealing packer as "Datum" or measurement point or target. Such measurement to the target shall also be used to obtain necessary measurement for positioning the injection area of sealing packer over area to be sealed.

Contractor shall expand the sealing packer sleeves using controlled pressures. Expanded sleeve shall seal against the inside periphery of pipe to form a void area at the point of infiltration, completely isolated from the remainder of the line. Contractor shall pump sealant materials into this isolated area through hose systems at controlled pressures which are in excess of groundwater pressures. Contractor shall pump as much grout as is field-required to seal any leaks and fill the voids. Grout shall break away from the packer and stay in place when the packer is deflated and moved from the point of infiltration.

No joint shall be considered sealed unless, while under continual pressure, a minimum of 1/4 gallon per inch of pipe diameter has been applied, i.e. 2 gallons for 8" pipe. This is to ensure that sufficient chemical has been dispersed into the soil surrounding the joint and that a temporary seal has not been made by applying a minimum amount of chemical to the void and joint area inside the pipe. Sealant shall be pumped "to resistance", however, sealant volume shall not exceed 1/2 gallon per inch diameter without authorization from the Owner's representative.

Upon completion of injection, Contractor shall retest the point of repair. If retesting shows the seal was not completely effective, Contractor shall repeat the sealing process until the defect successfully passes the pressure test. After sealing the entire sewer section, Contractor shall remove surplus grouting material from section at the immediate downstream manhole. If surplus grouting materials left in the sewer section by Contractor results in sewer surcharging and subsequent damage to public or private property, Contractor shall be responsible for damage to property and expenses incurred by Owner.

2. *Field Records.* Contractor shall keep field records for each sewer section prior to, during, and after completion of the chemical grouting operation. Records shall include information such as accurate locations, gel times, grout volumes, grout pressures, air temperatures, and joints not sealed due to close proximity to building service connections and sanitary sewer manholes.

G. Lateral Connection Testing Procedure

1. *Lateral connection joint testing.* Pressure shall be equal to 0.5 psi per vertical foot of pipe depth plus 2 psi; however, test pressure shall not exceed 10 psi without approval of the ENGINEER.
2. *Air testing lateral connections.* Shall be accomplished by isolating the area to be tested with the lateral connection packer and by applying positive pressure into the isolated

void area. A pan and tilt camera shall be used to position the lateral packer for laterals directly connected to the mainline sewer. The lateral bladder shall be inverted from the mainline assembly into the lateral pipe and inflated. The mainline elements shall then be inflated to isolate the lateral connection and the portion of the lateral to be tested. A sensing unit shall monitor the pressure of the packer void and will accurately transmit a continuous readout of the void pressure to the control panel at the grouting truck or to a pressure gauge on the packer recorded by the CCTV camera.

3. *Test procedure.* Will consist of applying a controlled air pressure into each isolated void area. Air shall then be slowly introduced into the void area until a pressure equal to or greater than the required test pressure, but in no cases greater than 2 psi above the required test pressure, is observed on the pressure monitoring equipment. Once the designated pressure in the isolated void is displayed on the meter of the control panel, the application of air pressure will be stopped and a 15 second waiting period will commence. The void pressure will be observed during this period. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral shall be considered to have failed the air test and shall be grouted and retested.
 4. *Upon completion.* After completing the air test for each individual lateral specified herein, deflate the lateral packer, with the void pressure meter continuing to display void pressure. If the void pressure does not drop to 0.0 +/- 0.5 psi, the equipment shall be adjusted to provide a zero void pressure reading at the monitor.
- H. *Lateral Connection Sealing from the Mainline by Packer Injection Grouting.* Lateral connection sealing begins if the lateral connection does not pass the air test, shows evidence of leakage, has been successfully cleaned to remove roots, or where CONTRACTOR has been directed. The lateral packer shall remain in position during the pressure test, thus maintaining the isolated void. Pressure inject grout through the lateral packer into the annular space between the lateral grouting plug and the lateral pipe.
1. *Placement of Grout.* When pumping grout, operate the pumps until the mixed grout has flowed through any joint failure, through any annular space, and into the surrounding soil; gelled or filled the available void space; formed a cohesive seal stopping further grout flow; and minimum of 8 psi back pressure is achieved while pumping. As grout pumping continues the void pressure will slowly rise to a range of about 2 to 4 psi, continue pumping until a point where there is a sudden increase in the void pressure. This increase from 2 to 4 psi to over 8 to 10 psi takes place in a matter of a few seconds. If the grout pumped exceeds 1 gallon per foot of lateral bladder plus 3 gallons, it will be suspected that there are significant voids on the outside of the pipe or that the packer is not properly sealed. Check that the packer is sealed properly. If it is, modify grouting procedure to stage grouting by pumping additional grout equivalent to 1 gallon plus 0.25 gallon per foot of lateral bladder, waiting 1 full minute, and retesting. The maximum

number of stages shall not exceed two stages unless authorized by Engineer.

Upon completion of the lateral connection sealing procedure, deflate the lateral bladder, re-inflate and air test the lateral connection a second time to confirm the sealing of the connection in accordance with the air testing procedure. If the lateral connection fails this air test, repeat the grouting procedure at no additional cost to the Owner, except for the additional grout used. Air tests after grouting laterals containing roots is not required.

Confirm lateral flow after sealing of each lateral connection. If a grout blockage exists, the Contractor shall immediately clear the lateral at no additional cost to the Owner. Blockages in the lateral that are not the result of grouting operations shall not be the responsibility of the Contractor.

2. Refer to Part 2 under Chemical Grout Application for Sealing Joints.

3.02 WARRANTY

The Contractor shall guarantee the sealing of the pipe joint by the grout for one full year from the date of acceptance of the Owner to the extent that he will repair and/or re-grout any defects including, but not limited to, root penetration, signs of infiltration, and cracks in the pipe or grouting material, which may appear in the structure because of faulty design, workmanship, or material furnished by him.

Prior to the expiration of the guaranty period, an initial retest area consisting of specific manhole sections shall be selected by the Engineer/Owner. Manhole sections to be retested shall be randomly selected throughout the project area and shall be representative of the majority of the sealing work originally performed. The initial test area shall consist of at least 5%, but not exceed 10%, of the linear feet contained in the original project.

Within the initial retest area, the Contractor shall retest all previously sealed joints as specified. Any joints failing the retest shall be resealed. If the failure rate of the retested joints is less than 5% of the joints retested, the work shall be considered satisfactory and no further retesting will be required. Payment for retesting the initial area shall be considered incidental and included in the cost of Chemical Grouting. No compensation shall be provided for resealing (grouting) joints that fail.

If in the initial retest area, the failure rate of the retested joints exceeds 5% of the joints retested, an additional retest area of equivalent size shall be selected and all previously sealed joints shall be retested. This additional testing and sealing, if necessary, will continue until a failure rate of less than 5% is met. Any additional testing/sealing required beyond the initial retest area shall be accomplished at no cost to the owner.

Should as much 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.

3.03 PAYMENT

Chemical Grouting shall be paid for at the unit price negotiated per pipe joint/defect/lateral per the size of the pipe rehabilitated. Cleaning, and pre- and post-televising are to be included.

END OF SECTION

SPECIFICATION
FOR
SEWER LINE CLEANING

HRC

1 of 3

October 19, 2018

PART 1 – GENERAL

1.01 INTENT

The intent of sewer line cleaning is to remove foreign materials from the lines and restore the sewer to a minimum of 95% of the original carrying capacity or as required for proper seating of internal pipe joint sealing packers. Since the success of the other phases of work depends a great deal on the cleanliness of the lines, the importance of this phase of the operation is emphasized. It is recognized that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where additional damage would result if cleaning were attempted or continued. Should such conditions be encountered, the Contractor will not be required to clean those specific manhole sections. If in the course of normal cleaning operations, damage does result from pre-existing and unforeseen conditions such as broken pipe, the Contractor will not be held responsible.

1.02 CLEANING EQUIPMENT

- A. *Hydraulically Propelled Equipment.* The equipment used shall be of a movable dam type and be constructed in such a way that a portion of the dam may be collapsed at any time during the cleaning operation to protect against flooding of the sewer. The movable dam shall be equal in diameter to the pipe being cleaned and shall provide a flexible scraper around the outer periphery to insure removal of grease. If sewer cleaning balls or other equipment which cannot be collapsed is used, special precautions to prevent flooding of the sewers and public or private property shall be taken.
- B. *High-Velocity Jet (Hydrocleaning) Equipment.* All high-velocity sewer cleaning equipment shall be constructed for ease and safety of operation. The equipment shall have a selection of two or more high-velocity nozzles. The nozzles shall be capable of producing a scouring action from 15 to 45 degrees in all size lines designated to be cleaned. Equipment shall also include a high-velocity gun for washing and scouring manhole walls and floor. The gun shall be capable of producing flows from a fine spray to a solid stream. The equipment shall carry its own water tank, auxiliary engines, pumps, and hydraulically driven hose reel. The NASSCO Jetter Code of Practice shall be consulted as a guide for the selection of different type nozzles and recommended pressure applications for various cleaning requirements.
- C. *Mechanically Powered Equipment.* Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed. A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat treated steel. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.
- D. *Large Diameter Cleaning.* For cleaning large diameter sewer, storm or combination pipes, consideration should be given to a combination hydraulic high volume water and solids

separation system. The flow from the sewer will provide water for the pump operation so no potable water is necessary and treatment costs are not a factor. Water volume of up to 250 GPM at 2000 PSI+ will move solids to the downstream manhole in high flow conditions. The separation system will dewater solids to 95% (passing a paint filter test) and transfer them to a dump truck for transport to a sewage treatment plant or approved landfill. Sewer water will be filtered to a point where it can be used in the pump for continuous cleaning. No by-passing of sewer flows will be necessary. The unit shall be capable of 24-hour operation and the unit shall not leave the manhole until a section is fully cleaned.

1.03 CLEANING PRECAUTIONS

During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to insure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. When possible, the flow of sewage in the sewer shall be utilized to provide the necessary pressure for hydraulic cleaning devices. When additional water from fire hydrants is necessary to avoid delay in normal work procedures, the water shall be conserved and not used unnecessarily. No fire hydrant shall be obstructed in case of a fire in the area served by the hydrant.

1.04 SEWER CLEANING

The designated sewer manhole sections shall be cleaned using hydraulically propelled, high-velocity jet, or mechanically powered equipment. Selection of the equipment used shall be based on the conditions of lines at the time the work commences. The equipment and methods selected shall be satisfactory to the Owner's Representative. The equipment shall be capable of removing dirt, grease, rocks, sand, and other material and obstructions for the sewer lines and manholes. If cleaning of an entire section cannot be successfully performed from one manhole, the equipment shall be set up in the other manhole and cleaning again attempted. If, again, successful cleaning cannot be performed or the equipment fails to traverse the entire manhole section, it will be assumed that a major blockage exists and the cleaning effort shall be abandoned.

1.05 ROOT REMOVAL

Roots shall be removed in the designated sections where root intrusion is a problem. Special attention should be used during the cleaning operation to assure almost complete removal of roots from the joints. Any roots which could prevent the seating of a packer or could prevent the proper application of chemical sealants shall be removed. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Chemical root treatment may be used at the option of the Contractor.

1.06 CHEMICAL ROOT TREATMENT

To aid in the removal of roots and at the option of the Contractor, manhole sections that have root intrusion may be treated with an approved herbicide. The application of the herbicide to the roots shall be done in accordance with the manufacturer's recommendations and specifications in such a manner to preclude damage to surrounding vegetation. Any damaged vegetation so designated by the Engineer shall be replaced by the Contractor at no additional cost to the Owner. All safety

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precautions as recommended by the manufacturer shall be adhered to by concerning handling and application of the herbicide.

END SECTION.

Sanitary Sewer Repairs - Chemical Grouting Summary						
Pipe SLID	(Nearest) Street Name	Upstream MH	Downstream MH	Pipe Diameter (in)	Pipe Section Length (ft)	Anticipated Quantity of Chemical Grout Locations*
314	Applecroft Dr	1886	1885	36	314	1
315	Applecroft Dr	80	1886	30	389	2
317	Applecroft Dr	1888	1887	30	291	1
1867	Applecroft Dr	1885	1884	36	320	1
474	Dean Ave	396	397	10	257	2
66	Eastlund Cir	73	76	30	325	5
67	Eastlund Cir	76	77	30	348	5
69	Eastlund Cir	77	78	30	324	8
71	Eastlund Cir	78	80	30	344	5
486	Hamilton St	410	411	12	353	1
576	Holt Rd	404	410	12	386	1
322	South of Wilcox Rd	1893	1892	30	319	2
556	Sycamore St	479	414	15	329	2
63	Thimbleberry Ln	70	72	30	268	7
64	Thimbleberry Ln	72	73	30	260	8
1865	Westgate Cir	1883	1882	36	194	3

*Chemical grout locations and quantities for each pipe segment shall be determined by the Contractor's inspection of the sewer line prior to repairs.