CITY OF Grand Junction COLORADO

Purchasing Division

ADDENDUM NO. 1

DATE: **February 8, 2019**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **2019 Sewer Interceptor Repair and Replacements IFB-4602-19-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Subcontractors that propose to perform CIPP work must be prequalified specifically for CIPP work by the City of Grand Junction. Contact the Project Engineer for information regarding prequalified CIPP subcontractors or to make arrangements for prequalification. Note that the prequalification process can be time consuming. Subcontractors interested in prequalifying should begin the process as soon as possible.

Q. If the general Contractor plans on self-performing this do they need to be pre-qualified, and if so is there enough time to do so prior to this bid?

A. Subcontractors will not be required to be prequalified specifically for CIPP work by the City of Grand Junction. This requirement has been removed from the Invitation to Bid document for the 2019 Sewer Interceptor Repair and Replacements project. However, all other qualification items as listed in the project specifications will be required by the subcontractor as part of their bid proposal.

2. It states in the specifications in 2.1 This specification references and incorporates ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the pull in and inflate curing of a resin impregnated tube), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

Q. If the UV CIPP Product meets and exceeds the materials and flexural modules and will exceed the testing requirements will the City allow the UV Cured Material?

A. Yes.

3. 3.1 Since sewer products are intended to have a 50 year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long term track records will be approved. All trenchless rehabilitation products and installers must be pre-approved prior to the

formal opening of proposals. Products and Installing Companies seeking approval must supply information verifying that they meet all of the following criteria to be deemed Commercially Acceptable:

3.1.1 For a Product (materials, process, and workmanship) to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater/storm water collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 50,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.

Q If the UV Cured CIPP meets and Exceeds the requirements will the City accept the use ASTM F-2019 and allow UV Cured CIPP lining systems? F-2019 is made from F1216 and F1743

A. The City will allow pipe rehabilitation by UV Cured-In-Place Pipe (CIPP) Process. The City will accept the use of ASTM F-2019.

4. Q. I believe there is a **355' ft discrepancy in the 12" dia** Grand Junction Bid List. It looks like they may have missed

D2-271-003	D2-271-007	355.00

next-to-last shot of 355' ft that is on the Plans (see Plan Sheet #34). Please check it out and let me know. Q is the above mentioned line segment omitted on purpose ?

A. The 355-ft segment of 12-inch CIPP was not intentionally left out of the Bid Schedule. The total 12-inch CIPP quantity should be 1,961 LF.

5. Q. We are wondering if the City will allow us to use the parallel lines 24” and 30” segments for bypass, and divert the flows to one diameter pipe while we CCTV and CIPP the other diameter pipe? The overview map page 4 is the best map page for reference. The Sewer Interceptor Line A and B drawings listed below will also help. Please let me know if you have any questions or need clarification. Walking the site next week will be helpful in determining the layout.

- Overview Map page 4
- Sewer Interceptor Line A (Sheets 5 to 11) – 30” Segments
- Sewer Interceptor Line B (Sheets 12 to 19) – 24” Segments

A. Utilization of the existing 24” and 30” Interceptor lines for bypass and diversion during CCTV and CIPP operations will be allowed. The Contractor will be required to submit a bypass pumping plan prior to approval. The contractor must meet all requirements as outlined in Appendix B (Bypass Pumping Specifications), to assure unanticipated flow increases will not surcharge any portion of either sewer line.

6. Q. We would like to submit an “as equal” substitute material for the manhole rehab portion of the 2019 Sewer Interceptor Repair and Replacements project. The product that we would like to submit is **GeoKrete**®, which is a corrosive resistant geopolymer material with superior structural strength.

A. This will be addressed in Addendum 2.

7. Q. Have you considered Electro Scan for the 2019 Sewer Interceptor Repair and Replacements project?

A. This will be addressed in Addendum 2.

8. Section 1.1 Purpose has been updated or modified as follows:

Purpose: The City of Grand Junction is soliciting competitive bids from qualified and interested companies for all labor, equipment, and materials required for the 2019 Sewer Interceptor Repair and Replacement Project. The project generally consists of, but may not be limited to, 1,961 LF of 12 inch cured in place pipe (CIPP); 878 LF of 15 inch CIPP; 2894 LF of 18 inch CIPP; 5,943 LF of 24 inch CIPP, 5535 LF if 30 CIPP. the coating of 37 sanitary sewer manholes (approximately 240 VLF), and bypass pumping necessary to complete said work. All dimensions and scope of work should be verified by Contractors prior to submission of bids.

9. Section 3.3.19 Quality Control Testing has been updated or modified as follows:

Quality Control Testing: The Contractor shall perform QA/QC on CIPP per Appendix D.1/D.2, Cured-In-Place-Pipe (CIPP) Specification.

10. Section 3.5 Attachments has been updated or modified as follows:

Attachments:

- Appendix A: Project Submittal Form
- Appendix B: Bypass Pumping
- Appendix C: Request to Discharge Industrial Process Wastewater
- Appendix D1: Pipe Rehabilitation by Hot Water/Steam Cured-In-Place Pipe (CIPP).
- Appendix D2: Pipe Rehabilitation by UV Cured-In-Place Pipe (CIPP)
- Appendix E: Construction Drawings

11. Appendix D1 – Pipe Rehabilitation by Hot Water/Steam Cured-In-Place Pipe (CIPP)

12. Appendix D2 – Pipe rehabilitation by UV Cured-In-Place (CIPP) shall be added to the solicitation documents. See attached.

13. Section 3.3.41 Bid Schedule shall be added as follows:

Bid Schedule: The descriptions of the pay items listed in the Bid Schedule for this Project may not agree with those listed in the Standard Specifications. Payment for all Work performed, as required in the Contract Documents, will be in accordance with the items and units listed in the Bid Schedule.

14. **Updated Bid Schedule:** Contractor shall utilize the attached Updated Bid Schedule when submitting their bid responses to this solicitation process.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

Bid Schedule: 2019 Sewer Interceptor Repair and Replacement Project

Contractor: _____

Item No.	CDOT, City Ref.	Description	Quantity	Units	Unit Price	Total Price
1	626	Portable Sanitary Facility	1.	Lump Sum	$ _____	$ _____
2	630	Mobilization	1.	Lump Sum	$ _____	$ _____
3	630	Traffic Control (Complete In Place)	1.	Lump Sum	$ _____	$ _____
4	630	Traffic Control Flagging	1,000.	Hours	$ _____	$ _____
5	630	Traffic Control Plan	1.	Lump Sum	$ _____	$ _____
6	SP	Bypass Pumping per City Specifications. See Appendix B in Bid Documents.	1.	Lump Sum	$ _____	$ _____
7	SP	Weekly Newsletter- See Bid Documents SC 3.3.13	1.	Lump Sum	$ _____	$ _____
8	SP	12 Inch CIPP (Complete in Place) See Appendix D.1/D.2 in Bid Documents.	1,961.	LF	$ _____	$ _____
9	SP	15 Inch CIPP (Complete in Place) See Appendix D.1/D.2 in Bid Documents.	895.	LF	$ _____	$ _____
10	SP	18 Inch CIPP (Complete in Place) See Appendix D.1/D.2 in Bid Documents.	2,894.	LF	$ _____	$ _____
11	SP	24Inch CIPP (Complete in Place) See Appendix D.1/D.2 in Bid Documents.	5,942.	LF	$ _____	$ _____
12	SP	30 Inch CIPP (Complete in Place) See Appendix D.1/D.2 in Bid Documents.	5,535.	LF	$ _____	$ _____
13	SP	Coat Manhole (48' I.D.) See Sec. 4 (Special Provisions) for Specifications.	240.	VF	$ _____	$ _____
MCR		Minor Contract Revisions	---	---	---	$ 80,000.00

Bid Amount: **$** _____

Bid Amount:

_____ **dollars**

Contractor Name:
Contractor Address:
Contractor Phone #:
Contractor Chosen CIPP Curing Method:

APPENDIX D1

Pipe Rehabilitation by Hot Water/Steam Cured-In-Place Pipe (CIPP) Specification

PIPE REHABILITATION BY HOT WATER/STEAM CURED -IN-PLACE PIPE (CIPP) SPECIFICATION

1. INTENT

1.1 It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube, which is formed to the original conduit by use of a hydrostatic head. The resin is cured using hot water under hydrostatic pressure within the tube. The Cured-In-Place Pipe (CIPP) will be continuous and tight fitting. The CIPP must be designed for a "Fully Deteriorated Condition" with a safety factor of 2.0. The following requirements apply generally to the CIPP portion of the work with additional specifications as provided below:

- The Subcontractor performing the CIPP work must be identified on the Bid Form and shall not be changed after bid opening without specific written approval from the Project Engineer.
- The Subcontractor shall verify host pipe diameter prior to design and fabrication of liner.
- Prior to installation of the CIPP, a design report shall be submitted to the Project Engineer, showing all assumptions, design calculations, test data and other pertinent information**. The design report must be stamped by the Licensed Professional Engineer that prepared it**. The design report is incidental to the lump sum pay item for installation of the CIPP.

2. REFERENCED DOCUMENTS

2.1 This specification references and incorporates ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the pull in and inflate curing of a resin-impregnated tube), and ASTM D790 (Test methods for flexural properties of non-reinforced plastics) which are made a part hereof by such reference and shall be the latest edition and revision thereof. In case of conflicting requirements between this specification and these referenced documents, this specification will govern.

3. PRODUCT, MANUFACTURER/INSTALLER QUALIFICATION REQUIREMENTS

3.1 Since sewer products are intended to have a 50 year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long term track records will be approved. All trenchless rehabilitation products and installers must be pre-approved prior to the formal opening of proposals.

Products and Installing Companies seeking approval must supply information verifying that they meet all of the following criteria to be deemed Commercially Acceptable:

3.1.1 For a Product (materials, process, and workmanship) to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater/storm water collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 50,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.

3.1.2 For an Installer to be considered as Commercially Proven, the Installer must satisfy all insurance, financial, and bonding requirements of the City, and must have had at least 3 (three) years active experience in the commercial installation of the product bid. In addition, the Installer must have successfully installed at least 3,000 feet of the product bid in wastewater, stormwater, or

irrigation water systems. Acceptable documentation of these minimum installations must be included with the bid package as described in the Instructions to Bidders.

3.1.3 Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9001 or other internationally recognized organization standards. Proof of certification shall be required for approval of the CIPP sub-contractor.

3.1.4 The owner authorizes the use of proven materials that serve to enhance the pipe performance specified herein. Proven materials have passed independent laboratory testing, not excluding long-term (10,000 hour) structural behavior testing, and have been successfully installed to repair failing host pipes in the U. S. for at least 4 years. In addition to the aforementioned, the owner may require that the contractor demonstrate that the enhancements proposed exceed the specifications herein, prior to the installation of the enhanced material systems. This section in no way shall be interpreted as authorization to deviate from the minimum standard practices set forth herein.

3.1.5 **The CIPP subcontractor shall provide resumes of experience for the site supervisor (superintendent) to the City, demonstrating a minimum of 2 years of CIPP installation experience using the methods stipulated for this project.**

4. MATERIALS

4.1 Tube

4.1.1 The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216, Section 5. The tube shall be constructed to withstand installation pressures, have sufficient strength to bridge missing pipe, and stretch to fit irregular pipe sections.

4.1.2 The wet out Tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the Design thickness.

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

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

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

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

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

4.1.8 The outside of the Tube shall be marked for distance at regular intervals along its entire length, not to exceed 5 ft. Such markings shall include the Manufacturers name or identifying symbol. The tubes must be manufactured in the USA.

4.2 Resin

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

5. STRUCTURAL REQUIREMENTS

5.1 The CIPP shall be designed as per ASTM F1216, Appendix X.1. The CIPP design shall assume no bonding to the original pipe wall. The CIPP shall be designed for a fully deteriorated host pipe condition.

5.2 The Contractor must have performed long-term testing for flexural creep of the CIPP pipe material installed by his Company. Such testing results are to be used to determine the Long-term, time dependent flexural modulus to be utilized in the product design. This is a performance test of the materials (Tube and Resin) and general workmanship of the installation and curing. A percentage of the instantaneous flexural modulus value (as measured by ASTM D-790 testing) will be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, will be verified by this testing. Values in excess of 50% will not be applied unless substantiated by qualified third party test data. The materials utilized for the contracted project shall be of a quality equal to or better than the materials used in the long-term test with respect to the initial flexural modulus used in Design.

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

5.4 The cured pipe material (CIPP) shall conform to the structural properties, as listed below.

MINIMUM PHYSICAL PROPERTIES

Property	Test Method	**Cured Composite** min. per ASTM F1216	**Cured Composite** (400,000 psi Resin)
Modulus of Elasticity	ASTM D-790 (short term)	250,000 psi	400,000 psi
Flexural Stress	ASTM D-790	4,500 psi	4,500 psi

The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in the table

above and in accordance with the Design Equations in the appendix of ASTM F 1216. All calculations shall be submitted to the Project Engineer prior to ordering of the pipe. The submittal shall show ALL information used in the calculations, including original equations, parameters, variables, definitions, values assigned, and intermediate results as well as final results. The purpose of this submittal is to allow the Project Engineer to examine all aspects of the design calculations. Submittal of governing equations and final results shall not be sufficient. Delays in proper submittal of a complete design package will not constitute a valid reason for schedule extension.

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

6. TESTING REQUIREMENTS

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

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

6.3 CIPP Field Samples – The Contractor shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in Section 5.5 have been achieved in previous field applications. Samples for this project shall be made and tested as described in Section 10.1.

6.4 Installed CIPP Testing – The Contractor shall provide samples for testing to the City from the actual installed CIPP. Samples shall be provided at a minimum for one location per 1000 feet of installed CIPP. The sample shall be cut from a section of cured CIPP that has been pulled through a like diameter pipe which has been held in place by a suitable heat sink, such as sandbags. All curing, cutting, and identification of samples shall be witnessed by the City.

7. INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

7.1 The Contractor/subcontractor shall be responsible for reopening connections to all laterals shown on the drawings. This work shall be incidental to the CIPP pay item.

7.2 Cleaning of Host Line - The Contractor, when required, shall remove all internal debris out of the line that will interfere with the installation of CIPP. All debris removed from the sewer line shall be taken to the Persigo Wash Wastewater Treatment Plant located at 2145 River Road. Any hazardous waste material encountered during this project will be considered as a changed condition. The cleaning of the host lines shall be considered incidental to CIPP installation and will not be paid for separately.

7.3 Inspection of Pipelines - Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles and service connections by close circuit television. The interior of the pipeline shall be carefully inspected to determine the location of any conditions which may prevent proper installation of CIPP into the pipelines, and it shall be noted so that these conditions can be corrected. A video tape and suitable log shall be kept for later reference by the Owner.

7.4 Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, roots, projecting service pipes, mineral deposits, and other obstructions that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the inversion process, that was not evident on the pre-bid video and it cannot be removed by conventional sewer cleaning equipment, then the Contractor shall make a point repair excavation to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Owner's representative prior to the commencement of the work and shall be considered as a separate pay item.

8. INSTALLATION

8.1 Installation of the CIPP shall conform with Traffic Control specifications and Special Conditions stipulated elsewhere in the Contract Documents. CIPP installation shall be in accordance with ASTM F1743 with the following modifications:

8.2 Resin Impregnation - The quantity of resin used for tube impregnation shall be sufficient to fill the volume of air voids in the tube with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. A vacuum impregnation process shall be used. To insure thorough resin saturation throughout the length of the felt tube, the point of vacuum shall be no further than 25 feet from the point of initial resin introduction.

After vacuum in the tube is established, a vacuum point shall be no further than 75 feet from the leading edge of the resin. The leading edge of the resin slug shall be as near to perpendicular as possible. A roller system shall be used to uniformly distribute the resin throughout the tube. If the Installer uses an alternate method of resin impregnation, the method must produce the same results. Any alternate resin impregnation method must be proven.

8.3 Tube Insertion – The wet out tube shall be positioned in the pipeline using the pull-through or inversion method.

8.4 Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.

8.5 Curing shall be accomplished by utilizing steam pressure in accordance with the manufacturer’s recommended cure schedule.

8.6 Cooling shall be performed using chilled air.

8.7 Reinstatement of Services– Sanitary Service connections (taps) at the main be reopened without excavation, utilizing a remotely controlled cutting device, monitored by a video TV camera. The Contractor shall certify that he has a minimum of two complete working units plus spare key components on site before each inversion. No additional payment will be made for excavations for the purpose of reopening connections (unless noted otherwise on the Construction Drawings) and the Contractor will be responsible for all costs and liability associated with such excavation and restoration work. Any damage to the CIPP or service lateral resulting from removing the coupon of CIPP material at the service tap shall be repaired at the Contractor’s expense by open-cut excavation and installation of repair coupling and service tap as directed by the Engineer.

9. INSPECTION

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

9.2 Wall thickness of samples shall be determined as described in ASTM F1216. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as specified in this appendix.

9.3 Visual inspection of the CIPP shall be in accordance with ASTM F1216 and F1743. The Contractor shall provide a TV-log of the installation after all work is complete and prior to placing the sewer back in service.

10. CLEAN-UP

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

11. PAYMENT

11.1 Payment for the CIPP installation shall be per lineal foot of CIPP installed, measured from end of pipe to end of pipe and shall include all aspects of the work described herein and on the Construction Drawings. This shall include the capture and treatment of all process water. Payment for trenchless connection of services shall be made separately.

Add the following to **104.2.b Installation/Opening of Sewer Service Lines**:

Verification of Active Taps

It is the Contractors responsibility to verify all existing sewer taps to determine active vs inactive by smoke testing, use of dye, inserting a snake through a clean-out or roof vent and tracing to sewer main, etc. and only connect the active taps. There will be no separate measurement or payment for this work which will be considered incidental. Any damage to property or costs associated by failing to open active taps shall be the responsibility of the Contractor.

SECTION 105 – PIPELINE TESTING

Delete Section 105.2. The City of Grand Junction will not require the new sanitary sewer main to be pressure or leakage tested.

APPENDIX D2

Pipe Rehabilitation by UV Cured-In-Place Pipe (CIPP) Specification

1. INTENT

1.1 It is the intent of this specification to provide for the reconstruction of pipelines and conduits by the

installation of UV Cured-In-Place Pipe (CIPP). The UV Cured-In-Place Pipe (CIPP) will be continuous and tight fitting. The CIPP must be designed for a "Fully Deteriorated Condition" with a safety factor of 2.0. The following requirements apply generally to the CIPP portion of the work with additional specifications as provided below:

- The Subcontractor performing the CIPP work must be identified on the Bid Form and shall not be changed after bid opening without specific written approval from the Project Engineer.
- Prior to installation of the CIPP, a design report shall be submitted to the Project Engineer, showing all assumptions, design calculations, test data and other pertinent information**. The design report must be stamped by the Licensed Professional Engineer that prepared it**. The design report is incidental to the lump sum pay item for installation of the CIPP.

2. REFERENCED DOCUMENTS

A. ASTM D-543 Standard Test Method for Resistance of Plastics to Chemical Reagents.

B. ASTM D-790 Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.

C. ASTM D-1682 Test Methods for Breaking Load and Elongation of Textile Fabric.

D. ASTM D-3567 Standard Practice for Determining Dimensions of Reinforced Thermosetting Resin Pipe (RTRP) and Fittings.

E. ASTM D-3681 Standard Test Method for Chemical Resistance of Reinforced Thermosetting Resin Pipe in a Deflected Condition.

F. ASTM D-5813 Standard Specification for Cured-in-Place Thermosetting Resin Sewer Pipe.

G. ASTM F-1216 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube.

H. ASTM F-1743 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by Pulled-in-Place Installation of Cured-in-Place Thermosetting Resin Pipe (CIPP).

I. ASTM F-2019 Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Pulled in Place Installation of Glass Reinforced Plastic (GRP) Cured-in-Place Thermosetting Resin Pipe (CIPP).

J. ASTM D-2990 Standard Test Methods for Tensile, Compressive, and Flexural Creep and Creep-Rupture of Plastics.

K. DIN EN 761 Plastic Piping Systems: Glass—Reinforced Thermosetting Plastics (GRP) Pipes - Determination of' the Creep Factor Under Dry Conditions.

L. APS Water Porosity Standard.

2.1 SUBMITTALS

A. Product Data: Resin; tube material, qualification testing results for laminate sample, resin enhancer, bond enhancer, certification of applicability of resin; sealant/caulking material, resin curing schedule showing time and temperature for each reach, Manufacturer's recommended installation pressures, minimum and maximum for each reach.

B. Design Information: Wall thickness design calculations for each pipe section.

C. Inspection Information: Video recordings (DVD) of pre and post-insertion inspections and curing

logs.

D. Qualifications: Documentation for experience of lining manufacturer and installer.

E. Certification: Affidavit for flat plate samples.

F. Public Relations: Notification Flyers.

G. Lateral Reinstatement: Products and Methods.

H. Resumes of the superintendents, foremen, and applicable lead personnel for the resin impregnation (wetout) crews and the field installation crews that will be used on this project. These must demonstrate competency and experience to perform the work scope as defined in the contract specifications.

3. PRODUCT, MANUFACTURER/INSTALLER QUALIFICATION REQUIREMENTS

3.1 Since sewer products are intended to have a 50 year design life, and in order to minimize the Owner's risk, only proven products with substantial successful long term track records will be approved. All trenchless rehabilitation products and installers must be pre-approved prior to the formal opening of proposals.

3.2 Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years' experience, or otherwise allowed prior to bid acceptance**.**

ISO-9001 manufacturer certification is required.

3.3 Installer: Company specializing in performing the work of this section and who is licensed and approved by the manufacturer. Company shall have experience with projects of similar size and complexity as this project, minimum of 500,000 feet of installed UV CIPP product within the last 5 years, or otherwise allowed prior to bid acceptance.

Product Manufacturer experience shall not be utilized in lieu of actual installer experience. Installer experience refers to the actual Contractor intending to do the work. No exceptions.

3.4 Project Superintendent: Project Superintendent shall have a minimum of 3 years' experience as a Superintendent on UV-Cured CIPP projects, and have supervised the installation of 500,000 feet of installed UV CIPP product within the last 5 years, or otherwise allowed prior to bid acceptance.

Full Time Project Superintendent will be required and MUST be on site at all times throughout the duration of the lining work.

4. MATERIALS

4.1 Tube:

4.1.1 The tube material shall meet the requirements of ASTM F 2019. Standard felt lining systems are not acceptable.

4.1.2 The tubes shall have a uniform thickness that when compressed at installation pressures will equal the designed nominal tube thickness.

4.1.3 Contractor shall present tube thickness design calculations based on structural requirements listed below.

4.1.4 The tube shall be fabricated to a size that when installed, will tightly fit the internal circumference and length of the original pipe. Allowance should be made for circumferential stretching during

insertion. The minimum length shall be that deemed necessary by the Contractor to effectively span the distance between respective access points unless otherwise specified. The Contractor shall verify the lengths and diameters in the field before fabricating the tube. Individual insertion runs can be made over one or more manhole sections as determined in the field by the Contractor, as long as traffic control restrictions are adhered to.

4.1.5 The outside layer of the tube (before insertion) shall be plastic coated with a flexible material.

4.1.6 The tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers.

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

4.1.8 Over Expansion Sleeves shall be used in the following locations and as directed by the Engineer after the pipeline has cleaned and inspected via CCTV per the contract documents:

a. Each end of the pipe segment

b. At each section of pipe that has complete or significant wall loss.

4.2 UV Materials:

4.2.1 For UV products, the finished UV Light Cured Fiberglass pipe liner in place shall be fabricated from materials which when complete are chemically resistant to and will withstand internal exposure to domestic sewage having a pH range of 5 to 11 and temperatures up to 150 F.

4.2.2 The liner thickness shall be sized for a minimum hydrostatic and earth load as per design criteria or per ASTM F1216. The earth load and hydrostatic load shall be increased to the manhole depth unless otherwise noted as shown on the Drawings.

4.2.3 The liner shall be structurally designed to the following standards:

a. minimum service life: 50 years

b. fully deteriorated host pipe/direct bury condition

c. prism loading: 120 PCF soil

d. factor of safety: 2.0

e. ovality factor: 2%

f. maximum deflection: 5%

g. soil modulus: 1000 PSI

h. maximum lining enhancement factor: 5

i. H-20 live loading, applicable long term modulus reduction factor

j. groundwater: assume the groundwater elevation is at the existing ground surface

4.2.4 All UV cured-in-place fiberglass lining products shall comply with ASTM F 2019-03 or the intent thereof as determined by the Engineer, minimum finished liner thickness as defined by design calculation.

4.2.5 The Contractor shall furnish a general-purpose polyester or vinyl ester UV curing resin and catalyst system compatible with the Ultra Violet Light Curing process that provides cured physical strengths specified herein

4.3 Resin:

4.3.1 Submit data certifying that resin system is not recycled. Only PREMIUM, NON-RECYCLED resins will be accepted.

4.3.2 The resin shall be a corrosion, shrinkage and abrasion resistant UV cured isophthalic polyester resin that when properly cured within the tube composite meets the requirements of ASTM F2019, the physical properties herein, and those to be utilized in the design of the CIPP for this project. The resin shall produce CIPP that will comply with the structural and chemical resistance requirements of this specification.

4.3.3 The acceptable resin shall have been tested according to ASTM D2990, D5813, and F1216 by accredited third party testing facilities. Results of these tests shall be made available to the Engineer upon request.

4.3.4 The resin must be manufactured under ISO 9001:2015 certified procedures. The resin must have heat deflection temperature greater than 224 degrees Fahrenheit.

4.3.5 The quantity of resin used for tube impregnation shall be sufficient to fill the volume of all voids in the tube material with additional allowances for polymerization shrinkage and the loss of resin through cracks and irregularities in the original pipe wall. The amount of resin used shall exceed the calculated value by five to ten percent (5%-10%). Resin in excess of the calculated value shall be uniformly distributed throughout the length of the liner. The volume of resin required to meet the conditions listed above, shall be calculated for the diameter, thickness and targeted addition allowance of each diameter and thickness of CIPP liner per unit length, typically, per foot, and submitted to the Owner/Engineer for review.

4.4 End Sealing:

4.4.1 Each end of the CIPP shall be sealed to provide a watertight seal between the original pipe and the CIOPP liner. Sealing materials shall be compatible with the original pipe material and shall be suitable for application to moist surfaces.

4.4.2 Acceptable end sealing products include:

a. A two component, 100% solids, solvent-free, moisture tolerant, high-modulus, High-strength, structural epoxy paste adhesive conforming to ASTM C-881, Types I and IV, Grace-3, Class B and C. Product shall be Sikadur 31, Hi-Mod Gel manufactured by Sika, or approved equal.

b. A quick setting fiber reinforced calcium aluminate sulfate resistant cementitious material. Product shall be Strong-Seal QSR, or approve equal.

c. A single component hydrophilic polyurethane sealant. Product shall be Swellseal WA manufactured by DeNeef, or approved equal.

4.5 Lateral Seals:

4.5.1 ASTM F2561 compliant LMK T-Liner lateral sealing system shall be used to reconnect existing service laterals.

5. CHEMICAL RESISTANCE REQUIREMENTS

5.1 CIPP samples for testing shall be of tube and resin system same as to that proposed for actual construction. It is required that CIPP samples with and without plastic coating meet these chemical-testing requirements.

6. STRUCTURAL REQUIREMENTS

6.1 The layers of the cured CIPP shall he uniformly bonded. It shall not be possible to separate any two layers with a probe or point of a knife blade so that the layers separate cleanly or the probe or knife blade moves

freely between the layers; nor shall separation of the layers occur during testing performed under the requirements of this specification.

6.2 The cured CIPP for fiberglass reinforced tubes shall also conform to the minimum structural standards as listed below:

Flexural Strength (ASTM D-790):	25,000 PSI
Modulus of Elasticity (ASTM D-790):	1,000,000 PSI

7. PREPARATION

7.1 Access Points - Contractor will locate and designate all manhole access points, open and make access points available for the Work.

7.2 Cleaning of Sewer Lines - The Contractor shall remove all roots and internal debris (including grease), from the sewer line prior to CIPP installation by any means necessary.

7.3 Inspection of Pipelines - Inspection of pipelines shall be performed by NASSCO PACP-certified personnel, experienced and trained in locating defects, breaks, obstacles and service connections by closed circuit television (CCTV).

7.4 Infiltration - Minor infiltration is a normal condition sometimes encountered during the CIPP process. It is not a "changed condition" and should not be regarded as a reason for change orders. If in the opinion of the Engineer, infiltration is significant enough to adversely affect the curing process, chemical grouting or other remedies may be required. Payment for this additional work will be negotiated by the Owner and documented as a change order.

7.5 Site Restoration - Areas damaged or modified by the Work for this project shall be repaired or restored to a condition equal to or better than the original condition. Site restoration is incidental to the Work and shall not be regarded as a reason for change orders.

7.6 Public Relations - A Public Information and Notification Program shall, as a minimum, require the Contractor to be responsible for contacting homeowners or businesses who will be affected by the construction activities and informing them of the Work to be done and the estimated timing for the Work. Written notice shall be delivered to each home or business 2 weeks prior to installation. Notice shall include a local telephone number of the Contractor they can call to discuss the project, and how the homeowner or business will be affected. The written notice must be reviewed by the Owner prior to the start of' any work.

7.7 Service connections - Determine by dye test, running water or visual inspection whether connections are active or abandoned and provide results to Engineer prior to insertion. Engineer and Contractor shall agree prior to insertion which services are to be reopened. Only reopened services will be paid for.

8. INSTALLATION

8.1. CIPP installation shall be in accordance with ASTM F2019 for UV light Curing Installations. Installation shall be in accordance with manufacturer's recommendations, which shall be available for verification by the Engineer.

8.2 Curing schedules shall be strictly adhered to, per manufacturer requirements.

8.3 The CIPP liner shall make a tight fitting seal with the existing pipe(s) in the manholes. If the CIPP liner fails to make a tight seal, the Contractor shall apply a seal at that point using a sealant or caulking material that is compatible with CIPP materials, watertight, flexible and impervious to hydrogen sulfide. The top half of the

CIPP through a manhole shall be neatly cut off and not broken or sheared off. The channel in the manhole shall be a smooth continuation of the pipe(s) and shall be merged with other lines or channels. Void space between liner and channel wall shall be filled with non-shrink grout and sealed with sealant. CIPP and the existing pipe in the manhole must be sealed before proceeding on to the next manhole section and all manholes shall he individually inspected for CIPP cut-offs and sealing works. Liner shall be cut off at the pipes and all liner removed within intermediate manholes with deflection angles greater than 45 degrees.

8.4 The finished CIPP shall be continuous over the entire length of an insertion run between two manholes and be free from visual defects such as foreign inclusions, dry spots, pinholes, and delamination. If in the opinion of the Engineer, a portion of the liner is inadequate, the Contractor shall correct the defect(s) to the satisfaction of the Engineer.

8.5 Contractor shall terminate and seal end of CIPP liner to structures using one of the previously addressed methods.

8.6 A pre-liner will be allowed without prior approval from the Owner.

8.7 The liner shall be pulled into place via the manufacturer's instructions.

8.8 The liner shall he inflated with air before curing with Ultra Violet light according to the manufacturer's specifications.

8.9 The reconstruction tube will be impregnated to meet manufacturer specifications with UV Curing Resins in the manufacturing facility prior to installation. The Contractor shall allow the Owner to inspect the materials before installation.

8.10 The Pre Impregnated UV Light Fiberglass Liner shall be inserted through the existing manhole or other approved access by means of a pull in place process utilizing a winch which will fully extend it to the next designated manhole or termination point. The Fiberglass Liner shall be inflated in place slightly with air to the manufacturer's specification for installing the UV Chain. Liner cure schedule shall be adhered to per manufacturer's specifications. The Fiberglass liner will then be inspected with a camera mounted on the UV Chain as it is pulled to the end of the liner. After inspection and complete inflation to manufacturer's specifications, the UV light bulbs will he turned on. The curing will commence at a rate specified by the manufacturer according to the total dimensions of the liner.

8.11 As the liner is curing, the UV Curing System shall record all curing data in DVD format for the viewing of the Owner.

8.12 Initial cure shall be deemed to be complete when the UV Chain arrives at the initial entry point of insertion.

9. APPROVED PRODUCTS AND INSTALLERS (OR APPROVED EQUAL):

Saertex UV-Cured CIPP Liner System

Saertex USA, LLC.
12200 Mt. Holly-Huntersville Rd. Suite A
Huntersville, NC 28078
(704) 464-5998
Contact: Mark Hallett

Approved Installer for Saertex Liner System

C&L Water Solutions. Inc.
12249 Mead Way
Littleton, CO 80125
(303) 791-2521
Contact: Christopher Larson

10. TESTING

10.1 Testing will be required for each insertion of CIPP lining. The layers of the cured CIPP shall he uniformly bonded. It shall not be possible to separate any two layers with a probe so that the layers separate cleanly. If separation of the layers occurs during testing of field samples, new samples will be cut from the manhole samples. Any reoccurrence may cause rejection of the work. Contractor shall provide all labor and materials necessary to produce samples for laboratory and or field testing. Contractor to contract directly with certified laboratory for testing as required. Contractor shall contact testing lab prior to first insertion and determine sample size requirements. Samples shall be large enough to perform wall thickness test, flexural strength and modulus of elasticity test and porosity test.

10.2 Sample Preparation:

Samples will be submitted by the Contractor to an independent third party laboratory. The cured sample shall be tested by an independent testing laboratory approved by the Engineer. Final payment will not be made until acceptable test results are received by the Engineer.

The Contractor shall be responsible for any deviation from the specified physical properties. Failure to meet the specified physical properties will result in the liner being considered defective work. The Contractor shall be responsible for all costs associated with repair of defective work.

Samples used for testing shall be individually labeled to record the following:

1. Contract number and title
2. Sample number
3. Date of installation
4. Location of installation
5. Contractor Name including person responsible for collecting samples
6. Upstream and downstream manhole numbers from where the sample was taken
7. Type of restraint used

10.3 The wall thickness will be measured in accordance with the applicable sections of ASTM Test Method D5813 and D3567. Flexural strength and flexural modulus of elasticity shall be determined in accordance with ASTM D-790. Porosity test will be conducted in accordance with APS Water Porosity Standard. For pipe 15 inch and smaller, a constrained sample will he obtained by inverting through a like diameter inverted half-section of pipe which has been held in place by a suitable heat sink, such as sandbags. Sample location can be either the receiving manhole or an intermediate MH provided a straight through channel exists. For pipe greater than 15 inch but no greater than 24 inch a constrained sample will be obtained from an intermediate MH, if one exists.

10.4 A post-insertion CCTV log in a format acceptable to the Engineer shall he provided to the Engineer within two weeks of liner curing.

10.5 Wrinkle height shall not exceed 2% of the host pipe diameter.

10.6 Non-Conforming Work:

10.6.1 If the measured wall thickness of the installed ClPP is more than 5% less than specified, a minimum of 5% reduction in payment for that insertion will occur, or an additional liner sufficient to make up the deficiency must be installed, at the determination of the Engineer.

10.6.2 If the flexural strength, and/or flexural modulus of elasticity is more than 5% less than specified, a

minimum 5% reduction in payment for that insertion will occur, or an additional liner sufficient to make up the deficiency must be installed, at the determination of the Engineer.

10.6.3 If the liner fails the APS water porosity test (pass/fail test), a minimum 5% reduction in payment for that insertion will occur, or complete liner removal may be required or an additional liner sufficient to make up the deficiency must be installed, at the determination of the Engineer.

10.6.4 For all instances where the CIPP is deemed unacceptable, the Contractor shall submit a method of repair or replacement for review and approval by the Owner.

10.6.5 All Work required to remedy non-conforming work shall he at the sole cost of the Contractor.

11. PAYMENT

11.1 Payment for the CIPP installation shall be per lineal foot of CIPP installed, measured from end of pipe to end of pipe and shall include all aspects of the work described herein and on the Construction Drawings. This shall include the capture and treatment of all process water. Payment for trenchless connection of services shall be made separately.

Add the following to **104.2.b Installation/Opening of Sewer Service Lines**:

Verification of Active Taps

It is the Contractors responsibility to verify all existing sewer taps to determine active vs inactive by smoke testing, use of dye, inserting a snake through a clean-out or roof vent and tracing to sewer main, etc. and only connect the active taps. There will be no separate measurement or payment for this work which will be considered incidental. Any damage to property or costs associated by failing to open active taps shall be the responsibility of the Contractor.

SECTION 105 – PIPELINE TESTING

Delete Section 105.2. The City of Grand Junction will not require the new sanitary sewer main to be pressure or leakage tested.

12. PRIVATE PROPERTY

Care shall be taken to avoid damage to private property (i.e. sprinkler stems, lawn areas). If damage occurs, repairs shall be completed as soon as possible. Costs associated with repairs shall be the responsibility of the Contractor.

END OF SECTION