CITY OF RAYMORE
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ADDENDUM NO. 1
Hunter's Glen Storm Repair
Project #23-429-201

All plan holders are hereby notified and agree by signature below, that the proposal includes consideration of the following changes, amendments, and/or clarifications and costs associated with these changes and are included in the proposal.

Addendum No. 1 - Question and clarification.

1. Question: Please provide the CIPP specifications.

Response: Attached.

Any other questions regarding this proposal shall be submitted to Kim Quade, CPPB by email at kquade@raymore.com or by phone at (816) 892-3045. There will be no questions allowed after June 23, 2023 at 5 p.m.

I hereby certify that the above have been considered and associated costs have been included in this bid.

Company Name: _____

By: _____

Title: _____

Address: _____.

City, State, Zip: _____

Date: _____Phone: _____

Signature of Bidder: _____

ADDENDUM MUST BE SUBMITTED WITH BID

SPECIFICATIONS FOR CURED-IN-PLACE PIPE (CIPP)

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.

2. REFERENCED DOCUMENTS

2.1 This specification references ASTM F1216 (Rehabilitation of pipelines by the inversion and curing of a resin-impregnated tube), ASTM F1743 (Rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), 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, CONTRACTOR 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 trench-less rehabilitation products and installers must be pre-approved prior to receiving bid documents.

Products and Contractors seeking approval must meet all of the following criteria to be deemed Commercially Acceptable:

3.1.1 For a Product to be considered Commercially Proven, a minimum of 1,000,000 linear feet or 4,000 manhole-to-manhole line sections of successful wastewater collection system installations in the U.S. must be documented to the satisfaction of the Owner to assure commercial viability. In addition, at least 100,000 linear feet of the product shall have been in successful service within the State for a minimum of five years.

3.1.2 For a Contractor to be considered as Commercially Proven, the Contractor must satisfy all insurance, financial, and bonding requirements of the Owner, and must have had at least 5 (five) years active experience in the commercial installation of the product bid. In addition, the Contractor must have successfully installed at least 1,000,000 feet of the same product bid in wastewater collection systems and a minimum of 50,000 of forty-eight (48) inch or greater in diameter. Field Supervisor/Foreman: Minimum five (5) years as a foreman/superintendent for a cured-in-place lining crew (installing actual product included with this bid/project), and a minimum of 300,000 lineal feet of cured-in-place lining,

diameters up to, and including, twenty-three (23) inch *(Engineer shall select appropriate experience requirement based upon work included with project. If work includes work in both diameter ranges please include both clauses)* ***or*** Minimum of five (5) years as a foreman/superintendent for a cured-in-place lining crew, a minimum of 50,000 lineal feet of cured-in-place lining of twenty-four (24) inch or greater, installed under his/her supervision. Such experience shall include the actual product, by trade name, CONTRACTOR proposes to install. Acceptable documentation of these minimum installations must be submitted to the Owner.

3.1.3 For a product and installer to be Commercially Proven, the installer must own and operate a legally permitted permanent facility to impregnate the CIPP tubes. To ensure the Owner all installed products will meet the minimum product quality control standards set forth by the manufacture, all CIPP liners shall be impregnated by the approved product's licensed installer that is performing the work. No pre-impregnated CIPP products will be accepted from a third-party vendor. Please provide a copy of your permits for this facility with the bid.

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

3.1.5 Both the rehabilitation manufacturing and installation processes shall operate under a quality management system which is third-party certified to ISO 9001. Proof of certification shall be required for approval.

3.1.6 Proposals must be labeled clearly on the outside of the proposal envelope, listing the product name and Contractor being proposed. Only proposals using pre-approved products and Contractors will be opened and read. Proposals submitted on products and/or from Contractors that have not been pre-approved will be returned unopened.

Documentation for products and Contractors seeking pre-approved status must be submitted no less than 2 weeks prior to proposal due date to allow time for adequate consideration. The Owner will advise of acceptance or rejection a minimum of 1 week prior to the due date. All required submittals must be satisfactory to the Owner.

4. MATERIALS

4.1 Tube - The sewn Tube shall consist of one or more layers of absorbent non-woven felt fabric and meet the requirements of ASTM F1216 or ASTM F1743, 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.

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

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

4.1.3 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.

4.1.4 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.

4.1.5 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.

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

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

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

5.4 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 occurs during testing of field samples, new samples will be cut from the work. Any reoccurrence may cause rejection of the work.

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

MINIMUM PHYSICAL PROPERTIES

Composite Property	Test Method	Cured Composite min. per ASTM F1216	Cured (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

5.6 The required structural CIPP wall thickness shall be based as a minimum, on the physical properties in Section 5.5 and in accordance with the Design Equations in the appendix of ASTM F 1216, and the following design parameters:

Design Safety Factor = 2.0

Retention Factor for Long-Term Flexural Modulus to be used in Design = 50% - 75%
(*as determined by Long-Term tests described in paragraph 5.2*)

Ovality* = 2%

Enhancement Factor, k = See Section 5.3

Groundwater Depth (above invert)* = ft.

Soil Depth (above crown)* = ft.

Soil Modulus** = Psi

Soil Density** = 120 pcf

Live Load** =____H20
Highway____
Design Condition (partially or fully deteriorated)*** =_____***_____

* Denotes information which can be provided here or in inspection video tapes or project construction plans. Multiple line segments may require a table of values.
** Denotes information required only for fully deteriorated design conditions.
*** Based on review of video logs, conditions of pipeline can be fully or partially deteriorated. (See ASTM F1216 Appendix) The Owner will be sole judge as to pipe conditions and parameters utilized in Design.

5.7 Refer to the attached Dimensional Ratio table for specific pipe section requirements, based on the pipe condition, depth, ovality, etc. as computed for the conditions shown, using ASTM F 1216 Design Equations.

5.8 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 - When requested by the Owner, the Contractor shall submit test results from field installations in the USA of the same resin system and tube materials as proposed for the actual installation. These test results must verify that the CIPP physical properties specified in 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.

7. INSTALLATION RESPONSIBILITIES FOR INCIDENTAL ITEMS

7.1 It shall be the responsibility of the Owner to locate and designate all manhole access points open and accessible for the work, and provide rights of access to these points. If a street must be closed to traffic because of the orientation of the sewer, the Owner shall institute the actions necessary to do this for the mutually agreed time period. The owner shall also provide free access to water hydrants for cleaning, inversion and other work items requiring water.

7.2 Cleaning of Sewer Lines - The Contractor, when required, shall remove all internal debris out of the sewer line that will interfere with the installation of CIPP. The Owner shall also provide a dump site for all debris removed from the sewers during the cleaning operation. Unless stated otherwise, it is assumed this site will be at or near the sewage treatment

facility to which the debris would have arrived in absence of the cleaning operation. Any hazardous waste material encountered during this project will be considered as a changed condition.

7.3 Bypassing Sewage - The Contractor, when required, shall provide for the flow of sewage around the section or sections of pipe designated for repair. The bypass shall be made by plugging the line at an existing upstream manhole and pumping the flow into a downstream manhole or adjacent system. The pump and bypass lines shall be of adequate capacity and size to handle the flow. The Owner may require a detail of the bypass plan to be submitted.

7.4 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.

7.5 Line Obstructions - It shall be the responsibility of the Contractor to clear the line of obstructions such as solids and roots that will prevent the insertion of CIPP. If pre-installation inspection reveals an obstruction such as a protruding service connection, dropped joint, or a collapse that will prevent the 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.

7.6 Public Notification - The Contractor shall make every effort to maintain service usage throughout the duration of the project. In the event that a service will be out of service, the maximum amount of time of no service shall be 8 hours for any property served by the sewer. A public notification program shall be implemented, and shall as a minimum, require the Contractor to be responsible for contacting each home or business connected to the sanitary sewer and informing them of the work to be conducted, and when the sewer will be off-line. The Contractor shall also provide the following:

A. Written notice to be delivered to each home or business the day prior to the beginning of work being conducted on the section, and a local telephone number of the Contractor they can call to discuss the project or any problem which could arise.

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

7.7 The Contractor shall be responsible for confirming the locations of all branch service connections prior to installing and curing the CIPP.

8. INSTALLATION

8.1 CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:

8.1.1 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.

8.1.2 Tube Insertion – The wet out tube shall be positioned in the pipeline using either inversion or a pull-in method. If pulled into place, a power winch should be utilized and care should be exercised not to damage the tube as a result of pull-in friction. The tube should be pulled-in or inverted through an existing manhole or approved access point and fully extend to the next designated manhole or termination point.

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

8.1.4 Curing shall be accomplished by utilizing hot water under hydrostatic pressure or steam in accordance with the manufacturer's recommended cure schedule.

9. REINSTATEMENT OF BRANCH CONNECTIONS

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

10. INSPECTION

10.1 For each work order released, one CIPP sample for each diameter shall be prepared and physical properties tested in accordance with ASTM F1216 or ASTM F1743, Section 8, using either method proposed. The flexural properties must meet or exceed the values listed in Table 1 of the applicable ASTM.

10.2 Wall thickness of samples shall be determined as described in paragraph 8.1.6 of ASTM F1743. The minimum wall thickness at any point shall not be less than 87½% of the design thickness as calculated in paragraph 5.6 of this document.

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

11. CLEAN-UP

11.1 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.

12. PAYMENT

12.1 Payment for the work included in this section will be in accordance with the prices set forth in the proposal for the quantity of work performed. Progress payments will be made monthly based on the work performed during that period.

CIPP WALL THICKNESS

PARTIALLY DETERIORATED DESIGN (PD)

Ovality	Range of Depth to invert (feet)	Required DR (D / t)			
		Ei = 250,000 psi		Ei = 400,000 psi	
		Ground Water Depth			
		50% Depth	Full Depth	50% Depth	Full Depth
2 % *	4 - 8	78	62	92	73
	8 - 12	69	55	80	64
	12 - 16	62	50	73	58
	16 - 20	58	46	68	54
	20 - 24	55	44	64	51
5 %	4 - 8	72	57	84	67
	8 - 12	63	50	73	58
	12 - 16	57	46	67	53
	16 - 20	53	42	62	49
	20 - 24	50	40	58	47
8 %	4 - 8	66	52	77	61
	8 - 12	58	46	67	54
	12 - 16	52	42	61	49
	16 - 20	49	39	57	45
	20 - 24	46	37	54	43

PD wall thickness varies with the height of the groundwater above the invert of the host pipe. The table assumes the height of the groundwater equal to half or full depth to the pipe invert. The table represents CIPP pipe wall thickness for a host pipe range of 8 to 48 inches. This is a guideline only. Specific calculations should refer to ASTM F-1216, Appendix X.1.

Design Parameters:
Poisson's Ratio = 0.3
Factor of Safety = 2.0
Enhancement Factor = 7
DR = Dimension Ratio = Diameter / thickness ⇒ **t = D / DR**
Effective reduction of Ei modulus to approximate effects of creep = 50 %
Ovality % = 100 x (Mean Dia. - Minimum Dia.) / Mean Dia.

- 2% ovality is typically assumed when the host pipe measurements have not been field verified.

CIPP WALL THICKNESS

FULLY DETERIORATED DESIGN (FD)

Ovality	Range of Depth to invert (feet)	Required DR (D / t)			
		Ei = 250,000 psi		Ei = 400,000 psi	
		Ground Water Depth			
		50% Depth	Full Depth	50% Depth	Full Depth
2 % *	4 - 8	49	43	58	51
	8 - 12	49	43	58	51
	12 - 16	44	39	52	46
	16 - 20	40	36	47	41
	20 - 24	37	33	44	38
5 %	4 - 8	41	37	48	43
	8 - 12	41	36	48	43
	12 - 16	37	33	44	38
	16 - 20	34	30	40	35
	20 - 24	31	27	37	32
8 %	4 - 8	35	31	40	36
	8 - 12	35	30	41	36
	12 - 16	31	27	37	32
	16 - 20	28	25	33	29
	20 - 24	26	23	31	27

FD wall thickness considers groundwater, soil and live loads upon the CIPP pipe. The table assumes two heights of groundwater, 120-lbs/cu. ft. of soil density and an AASHTO H20 highway load. The table represents CIPP pipe wall thickness for a host pipe range of 8 to 48 inches. This is a guideline only. Specific calculations should refer to ASTM F-1216, Appendix X.1.

Design Parameters:
Factor of Safety = 2.0
DR = Dimension Ratio = Diameter / thickness ⇒ **t = D / DR**
Effective reduction of Ei-modulus to approximate effects of creep = 50 %
Soil Modulus = 1,000 psi, assumed for highway loads or depths ≥ 10 feet (all others 700 psi).
Ovality % = 100 x (Mean Dia. - Minimum Dia.) / Mean Dia.
* 2% ovality is typically assumed when the host pipe measurements have not been field verified.