

PROJECT 172-05 Large Diameter Trenchless Pipe Rehabilitation, Nicholson Rd: Olive St to Utah Pump Station

SPECIAL CONDITION ITEM 900 SERIES (Creates a new item outside the scope of JEA Water and Sewer Standards)

901. MEASUREMENT AND PAYMENT

- 901.1. This section supplements JEA Section 801 for Measurement and Payment. Specifically, this specification addresses additional pay items. In the case of contradictory information, this specification takes precedence over Section 801.
- 901.2. Payment for Mobilization, shall be at the lump sum price set forth in the Contract Documents and shall be full compensation for the item of work, complete, including mobilization, demobilization, bonding, insurance, and any other work required to commence field activities.
- 901.3. Payment for Cured in Place Pipe (CIPP), shall be at the unit price per linear footage and diameter of actual pipe lined, and shall be full compensation for lining the mainline, site restoration and all warranty work. Includes furnishing all material, labor, tools and equipment; and all incidental and related work to complete the item. Includes any manhole cover, ring and cone removal and replacement, and site restoration required to access the pipe for lining.
- 901.4. Payment for Preparatory Sewer Cleaning and CCTV Inspection, shall be at the unit price per linear footage and diameter of pipe cleaned and actual pipe televised, and shall be full compensation for the item of work, complete, including all required materials; and furnishing all material, labor, tools and equipment; and all incidental and related work to complete the item. Item shall include cleaning of pipeline and manholes along segments of mainline cleaned to facilitate CCTV, including disposal of debris.
- 901.5. Payment for Temporary Pumping, shall be at the lump sum price set forth in the Contract Documents and shall be full compensation for the item of work, complete, including setup, operation, removal of required bypass pumping systems, and site restoration; piping, bedding, fittings, and all other materials; and furnishing all material, labor, tools and equipment; and all incidental and related work to complete the item.
- 901.6. Payment for Maintenance of Traffic, shall be at the lump sum price set forth in the Contract Documents and shall be full compensation for the item of work, complete, including setup, operation, removal of signage and personnel, and all other materials; and furnishing all material, labor, tools and equipment; and all incidental and related work to complete the item.
- 901.7. Payment for Manhole Rehabilitation, shall be at the unit price per vertical footage set forth in the Contract Documents and shall be full compensation for the item of work, complete, including all surface preparation, manhole rehabilitation, ring and cover coating (if applicable), disposal of all debris, temporary plugging of existing lines,

bypass pumping, installation of liner and warranty as specified in SECTION 446 Subsections III or IV of the JEA Water & Wastewater Standards. Utilization of line item must be requested and approved by OWNER prior to work commencing. No payment shall be issued under this line item for restoration of manhole damaged during CIPP.

902. SEQUENCING AND COORDINATION OF THE WORK

902.1. Coordination will be required between CONTRACTOR, his Subcontractors and individual property owners to ensure that the Work is performed in the proper sequence and to achieve the following project coordination goals:

- Unless otherwise specifically authorized by the ENGINEER and Bishop Kenny staff, work on Bishop Kenny property shall only occur during the school's summer recess. This occurs from June 8th to July 31st in 2020 and to-be-determined schedule of similar time and duration for 2021.
- Work on Bishop Kenny property shall accommodate Bishop Kenny's softball camp as shown on the plans. This occurs from June 8th to June 12th in 2020 and to-be-determined schedule of similar time and duration for 2021.
- Should work be started and not completed within Bishop Kenny property during the 2020 summer recess Contractor shall pause work and fully restore disturbed sections prior to the start of the school year. Any remaining work within BK property shall be completed during the 2021 summer recess and prior to the total duration allowed for this Project.
- Private property restoration shall occur as soon as practical following completion of all invasive work on a given property.
- Private property disruption shall be for the shortest duration practical.

902.2. Contractor shall submit a proposed schedule of work for bypass, cleaning, lining, and restoration efforts that meets these coordination goals prior to conducting any field work.

903. TECHNICAL SPECIFICATIONS

See attached specifications:

- Section 01 51 41 –Temporary Pumping
- Section 01 55 26 - Maintenance of Traffic
- Section 33 01 30.16 - CCTV Inspection of Sewers
- Section 33 01 30.47 - Preparatory Sewer Cleaning
- Section 33 01 30.72 – Cured-in-Place Pipe

SECTION 33 01 30.72 CURED-IN-PLACE PIPE

1. GENERAL

1.1. SCOPE

- 1.1.1. The scope of work comprised the large diameter pipeline rehabilitation of the Nicholson Road Trunk Sewer from the intersection of Olive Street and Tiber Avenue to the Utah Pump Station. The rehabilitation will be conducted via Cured-In-Place Pipe (CIPP) lining method. Placement of temporary bypass piping will be necessary to divert flows away from the trunk sewer section to be rehabilitated.
- 1.1.2. The work specified in this section provides for the reconstruction of pipelines and conduits by the installation of a resin-impregnated flexible tube that is formed to the original conduit by use of a hydrostatic head. The resin is cured by circulating hot water or steam within the tube. The CIPP shall be continuous and tight fitting.

1.2. REFERENCES

- 1.2.1. This specification references ASTM F1216 (Rehabilitation of pipelines by inversion and curing a resin impregnated tube), ASTM F1743 (rehabilitation of pipelines by pulled-in-place installation of a cured-in-place thermosetting resin pipe), ASTM D5813 (Cured-in-Place, Thermosetting Res-in Sewer Pipe), ASTM D790, ASTM2990.
- 1.2.2. This section supplements JEA Wastewater Standards. In the case of contradictory information, this specification takes precedence over JEA Wastewater Standards, located on JEA.com

https://www.jea.com/Engineering_and_Construction/Water_and_Wastewater_Standards/

1.3. MINIMUM QUALIFICATIONS

- 1.3.1. For each method of installation and curing used on this project, CONTRACTOR shall have a history of at least 50,000 linear feet of CIPP work of 36-inch or larger sewers using a similar resin and flexible tube and using the specific method of installation and curing being used.
- 1.3.2. For each method of installation and curing used on this project, the CIPP Work shall be supervised by a foreman having previously supervised a minimum of 10,000 linear feet of CIPP work of 36-inch or larger sewers using a similar resin and flexible tube and using the specific method of installation and curing proposed.

- 1.3.3. The entity performing the wet-out of the CIPP shall have been performing this type of work for a minimum of two years and previously wet-out at least 50,000 linear feet of 36-inch or larger diameter CIPP.
- 1.3.4. The Field Supervisory Personnel employed by the Contractor and assigned to supervise Work for JEA shall have three (3) years of current Field Supervisory experience and a minimum of 50,000 linear feet (total experience) of installation of underground piping using cured in place piping replacement methods described in this Solicitation. The Contractor shall use the same supervisor during the performance of the contract. If the Contractor needs to utilize another supervisor, JEA will require the Contractor to meet the same qualifications listed above. If the Contractor cannot provide another approved Supervisor, JEA may terminate the Contract.

1.4. QUALITY ASSURANCE

- 1.4.1. The process (materials, methods, and workmanship) must be proven through previous successful installations, commensurate with the prequalification levels.
- 1.4.2. Sewer rehabilitation products that will be utilized must have had successful independent third-party test results prepared in accordance with ASTM F1216 substantiating the performance and design of the proposed product. No product shall be approved without independent third-party testing verification. (Submitted with pre-qualification submittal)
- 1.4.3. The contractor is to provide a narrative of the Contractor Quality Control program employed during the manufacture of the reconstruction system components, the installation of the proposed reconstruction system, and certification of qualification of the personnel proposed to provide design, engineering, technical support, project management, installation, and supervisory duties. (Submitted with pre-qualification submittal)

1.5. PROJECT MANAGEMENT

- 1.5.1. By Friday at 9:00 am, at the latest, the Contractor will provide the project schedule for the following week to: Construction Inspector, Project Outreach, and Manager – Maintenance Planning and Engineering.

1.6. PUBLIC OUTREACH

- 1.6.1. The Contractor will place JEA approved door hangars in the neighborhoods a minimum of 48-hours prior to the work, where the work will be performed, as well as being responsive to JEA's Project Outreach or City of Jacksonville inquiries.
- 1.6.2. Crews will need to demobilize the following dates to accommodate for holidays and events:
- Thanksgiving week: November 23-30, 2020

- Christmas week: December 21-28, 2020
- Gate River Run: March 6-8, 2021

1.6.3. The Contractor will hold coordination meetings with Bishop Kenny High School and OWNER representatives. Meetings will be held weekly for the period starting June 1st, 2020 and concluding July 31st, 2020 or the week following completion all work on the site, whichever is earlier. The Contractor will hold additional coordination meetings between start of contract and June 1st, 2020 if requested by OWNER. At each meeting, the Contractor will provide updated schedule, including anticipated service outages and changes to traffic flow or active worksite locations.

1.7. SUBMITTALS

1.7.1. Work Plan

- Prior to beginning work, the contractor should describe the installation procedures including equipment staging area requirements, means of sewer access, methods of maintaining sewage flow, methods used to reactivate service laterals, method used to rehabilitate service connections and if pits or other excavations are required.
- For each section being lined, the calculation data used to determine the minimum design thickness.
- Material and method of installation for hydrophilic end seals.
- An As-Built Data Sheet (attached to this section) for each length of pipe installed, including resultant manhole inverts and service connection locations at the main pipe and right of way, and except for the sketch, shall be prepared in Microsoft Excel.
- Third party tests results as required under ASTM F 1216

1.7.2. Contingency Plan, including methods and equipment to be used to repair unacceptable liner defects and for removing failed liners, and for availability and accessibility of backup equipment such as air compressors.

1.7.3. Curing log of CIPP temperatures and pressures/water head at the upstream and downstream manholes during the curing process to document that proper temperatures, pressures and cure times have been achieved. Curing log shall list as a minimum the temperature of the hot water or steam, the temperature of external thermocouples, and pressures at least once every five minutes or as recommended by the resin and tube manufacturers, whichever is more frequent.

1.6. RELATED SECTIONS

- 1.6.1. Section 01 51 41, Bypass Pumping.
- 1.6.2. Section 01 55 26 - Maintenance and Protection of Traffic

2. PRODUCTS

2.1 MATERIALS

- 2.1.1 The liner material shall be a polyester fiber felt resin-impregnated tubing.
 - 2.1.1.1 Inspection of equipment may be made.
 - 2.1.1.2 Seams in the Tube shall meet or exceed the design properties required for the entire tube in accordance with ASTM D 1216.
 - 2.1.1.3 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.
 - 2.1.1.4 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 shall comply with the structural and chemical resistance requirements of this specification.
- 2.1.2. Structural Requirements
 - 2.1.2.1. The CIPP shall be designed as per ASTM F1216. The CIPP design shall assume no bonding to the original pipe wall.
 - 2.1.2.2. 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 shall be cut from the work. Any reoccurrence may cause rejection of the work.
 - 2.1.2.3. The cured pipe material (CIPP) shall conform to the structural properties, as listed below:

Test Method		Minimum Physical Properties	
		Minimum Resin per ASTM F1216	Resin 400,000 psi Properties
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

- 2.2.2.4. 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) shall be used in design calculations for external buckling. The percentage, or the long-term creep retention value utilized, shall be verified by this testing. 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. The cured pipe material (CIPP) shall conform to the long-term structural properties, as listed below:
- 50-Year Flexural Strength (ASTM D790, D2990, or DIN EN 761): 2,500 psi minimum.
 - 50-Year Flexural Modulus (ASTM D790, D2990, or DIN EN 761): 200,000 psi minimum, with no greater than a 55% reduction from initial (hour 0.02) strength.
- 2.2.2.5. The required structural CIPP wall thickness shall be based as a minimum, on the physical properties and in accordance with the Design Equations in ASTM F1216, and the following design parameters:

Design Safety Factor	2.0
Retention Factor for Long-Term Flexural Modulus to be used in Design	As determined by Long-Term tests described above
Ovality	10%
Enhancement Factor, k	7
Groundwater Depth (above invert)*	At grade
Soil Depth (above crown)	See table 1
Soil Modulus	850 Psi
Soil Density	120 Pcf
Poisson's ratio	0.3
Live Load	AASHTO HS-20
Design Condition (partially or fully deteriorated)	FD

2.1.3. Testing Requirements

2.1.3.1. 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 without plastic coating meet these chemical testing requirements.

2.1.3.2. 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.

2.1.4. Hydrophilic Seals

2.1.4.1. Provide hydrophilic end seals to prevent water from migrating between the liner and host pipe into the manhole. Provide one of the following:

- Seamlessly molded neoprene end seal. Product and Manufacturer: Insignia End Seal Sleeve as manufactured by LMK Technologies or equal.
- Hydrophilic bands that are 23 mm wide, 7mm high, with double bump. Miter cut and glued to form circular bands. Product and Manufacturer: Sika, Hydrotite Style RS-0723-3.5i (16" to 36")

3. EXECUTION

3.1. PRE-INSTALLATION

- 3.1.1. The Contractor shall clean and remove all internal debris out of the sewer line to permit proper installation. The work of pipe cleaning shall conform to the requirements of Section 33 01 30.41, Cleaning of Sewers.
- 3.1.2. The Contractor shall make a point repair excavation to uncover and remove or repair the obstruction if the pre-installation inspection reveals an obstruction previously not identified such as a protruding sewer connection, dropped joint, or a collapse, that shall prevent the inversion process.
- 3.1.3. If liner cannot be installed through existing manhole opening, notify OWNER prior to lining the segment of main. CONTRACTOR may remove portions of the manhole as required to install the liner. Following installation of the liner, replace removed portions of the manhole and restore site. CONTRACTOR may replace the removed portions of manhole in good condition with approval of ENGINEER.

3.2. INSTALLATION

- 3.2.1. CIPP installation shall be in accordance with ASTM F1216, Section 7, or ASTM F1743, Section 6, with the following modifications:
 - 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 or equivalent shall be used to ensure thorough resin saturation throughout the length of the felt tube.
 - Temperature gauges shall be placed inside the tube at the invert level of each end to monitor the temperatures during the cure cycle.
 - Curing shall be accomplished by utilizing hot water under hydrostatic pressure in accordance with the manufacturer's recommended cure schedule or with any alternative method deemed acceptable by JEA.

3.3. END SEALS

- 3.3.1. Insert continuous or properly trimmed hydrophilic seals at each manhole opening, centered within the intersection of the host pipe and the manhole wall. Trimmed seals edges (shall be butted up against each other at the crown of the pipe using a 45° miter cut. Seals with any gap between the ends will not be accepted. If defects in the host pipe near the manhole are such that the end seal will not form a watertight seal between the liner and host pipe, apply hydraulic cement to the defects in the host pipe to provide a smooth surface to receive the end seal.

3.4. INSPECTION

- 3.4.1. CIPP samples shall be prepared and physical properties tested in accordance with ASTM F1216, Section 8.1 using either method proposed. The flexural modulus must meet or exceed the value used in design in Section 2.4 (Structural requirements for the pipe size and thickness furnished in design).
- 3.4.2. Leakage testing of the CIPP shall be accomplished during cure while under a positive head. CIPP products in which the pipe wall is cured while not in direct contact with the pressurizing fluid (e.g., a removable bladder) must be tested by an alternative method approved by JEA.
- 3.4.3. Visual inspection of the CIPP shall be in accordance with ASTM F1743, Section 8.6.

3.5. TELEVISION INSPECTION

- 3.5.1. A preliminary CCTV must be performed clearly identifying the condition of the pipe, elevations, material types, and location of all lateral connections
- 3.5.2. Post lining CCTV is required. The finished video shall be continuous over the entire length of the sewer between two manholes and prove to be free from visual defects.
- 3.5.3. Defects including damage, unacceptable sags, faulty service connections, leaks, etc. which may affect the integrity or strength of the pipe in the opinion of JEA and/or their representative shall be corrected at the Contractor's expense.

3.6. SITE RESTORATION

- 3.6.1. The Contractor is responsible to repair any site damage and provide site restoration, which shall be remediated as follows: Sod – 7 calendar days, Concrete – 8 calendar days, Asphalt – 7 calendar days (<200 sq ft) or 14 days (>200 sq ft). The remediation time is additive. For example, if Sod and Concrete requires restoration, both must be complete within 15 calendar days.
- 3.6.2. Disturbed areas within City right of way shall be restored to original or better conditions and comply with JEA standards.
- 3.6.3. Disturbed areas in FDOT right of way must be restored to original or better conditions and comply with FDOT requirements and specifications.

3.7. LINING SUMMARY

- 3.7.1. All depths indicated in the Lining Summary Table are approximate and should be field verified.
- 3.7.2. Host pipe diameters listed are nominal diameter and must be field measured before manufacturing the liner tube

Lining Summary Table									
Sheet No	Asset	Diam (in)	Length (ft)	US Manhole	US Depth (Ft)	US Clear Opening (in)	DS Manhole	DS Depth (Ft)	DS Clear Opening (in)
4	MAIN-624902	36	328	MH-009482	17.2	28.0	MH-063357	22.2	24.0
4	MAIN-624903	36	374	MH-063357	22.2	24.0	MH-034462	24.6	24.0
4	MAIN-624889	36	384	MH-034462	24.6	24.0	MH-045354	25.5	27.0
5	MAIN-624890	36	382	MH-045354	25.5	27.0	MH-050433	18.7	26.0
5	MAIN-624891	36	538	MH-015403	19.8	27.0	MH-050433	20.6	26.0
5	MAIN-624892	36	130	MH-015403	20.6	27.0	MH-060247	17.4	17.4
5	MAIN-624893	36	137	MH-060247	17.4	28.0	MH-040342	14.2	24.0
6	MAIN-624894	36	239	MH-040342	14.2	24.0	MH-020320	13.1	25.0
6	MAIN-624895	36	119	MH-020320	13.1	25.0	MH-060248	9.8	29.0
6	MAIN-624896	36	155	MH-060248	13.2	29.0	MH-010395	9.8	24.0
6	MAIN-624898	36	159	MH-010395	9.8	24.0	MH-060249	10.9	26.0
6	MAIN-624899	36	295	MH-060249	11.0	26.0	MH-040341	15.0	28.0
6	MAIN-624900	36	141	MH-040341	15.0	28.0	MH-015402	16.7	UNK
6	MAIN-624901	36	217	MH-015402	16.7	UNK	MH-055347	16.6	UNK
6	MAIN-624876	36	279	MH-055347	16.6	UNK	MH-010394	18.0	30.0
7	MAIN-624875	36	227	MH-010394	18.0	30.0	MH-025437	17.1	27.0
7	MAIN-624874	36	414	MH-025437	17.1	27.0	MH-045352	17.2	27.0
7	MAIN-624873	36	160	MH-045352	17.2	27.0	MH-015434	14.8	25.0
7	MAIN-624872	36	284	MH-015434	14.8	25.0	MH-005413	14.2	28.0
7	MAIN-624904	36	398	MH-005413	14.2	28.0	MH-010412	13.7	UNK
8	MAIN-624888	36	248	MH-010412	13.7	UNK	MH-000459	14.0	30.0
8	MAIN-624887	36	335	MH-000459	14.0	30.0	MH-050373	14.9	28.0
8	MAIN-624870	42	203	MH-050373	15.9	28.0	MH-035378	16.9	26.0

++END OF SECTION++

SECTION 01 51 41.00
TEMPORARY PUMPING

1. GENERAL

1.1. SCOPE

- 1.1.1. CONTRACTOR shall provide all labor, materials, tools, equipment, and incidentals shown, specified, and required for temporary pumping and handling of fluids during the Project.
- 1.1.2. Design and provide temporary pumping systems, including plugs, bulkheads, and line stops as required; pumps; piping, supports, and valves; temporary instrumentation and control systems; fuel and electricity as required; personnel; and appurtenances. Comply with requirements of JEA. System shall be suitable for its service and operating environment.

1.2. ALIGNMENT

- 1.2.1.1. Bypass lines will serve to redirect flow from connecting lines upstream of CIPP rehabilitation section to a manhole downstream of the same section. With the exception of work on the Bishop Kenny property, alignment of these discharges are not shown on the plans.
- 1.2.1.2. Alterations to pump locations and discharge piping alignment shown on the Bishop Kenny property are subject to approval of the property owner.
- 1.2.1.3. Plug and release will not be considered an acceptable alternative.
- 1.2.2. Location of temporary pumping systems shall not affect OWNER's operations, utility owners, public access to streets and drives, or access to private property, unless approved by authorities having jurisdiction.
- 1.2.3. No temporary pumping system within 200 feet of a residential property shall remain in place for longer than three(3) weeks, unless otherwise approved by OWNER.

1.3. CAPACITY

- 1.3.1.1. Required capacity of each temporary pumping system shall be determined by CONTRACTOR.
- 1.3.1.2. Each temporary pumping system shall be adequate to convey the discharge rate conveyed through the associated permanent conduits. Temporary pumping systems shall not result in: flow back-ups into buildings or structures; overflows to storm sewers or receiving waters; or adverse effects on system of OWNER, utility owners, or owners of transportation systems (including streets and roads).

- 1.3.1.3. Basis of capacity of each temporary pumping system shall consider results of system hydraulic modeling, sewer inspection video and associated data capacity of the pipe or conduit temporarily removed from service, whether system experiences surcharges during high-flow events, nature of drainage area tributary to the pipe or conduit temporarily removed from service, weather, and other factors. Data will be made available upon request by CONTRACTOR.
- 1.3.1.4. Pay costs associated with repairing damage to property, including cleaning, caused by undersized or inadequate temporary pumping systems.
- 1.3.1.5. Provide temporary pumping system of necessary capacity with not less than one of the largest pumps out of service.

1.4. COORDINATION

- 1.4.1. Review installation procedures under other Sections and coordinate Work that must be performed with or before Work specified in this Section.
- 1.4.2. Notify other contractors in advance of Work requiring coordination with temporary pumping, to provide other contractors with sufficient time to coordinate work included in their contracts with the Work specified in this Section.
- 1.4.3. Written Notice to Property Owners and Occupants:
 - 1.4.3.1. Provide written notice delivered to property owners and occupants of each building and structure that will be affected by temporary pumping.
 - 1.4.3.2. Deliver written notices thirty days, seven days, and one day prior to starting temporary pumping.
 - 1.4.3.3. Each such written notice shall include: estimated start and end days and times that permanent pipe or conduit will be temporarily out of service; and instructions for building or structure occupants during the outage.

1.5. RELATED SECTIONS

- 1.5.1. Section 33 01 30.72 - Cured-in-Place

1.6. QUALITY ASSURANCE

1.6.1. Qualifications

- 1.6.1.1. Contractor shall have not less than five years of experience providing temporary pumping systems for bypassing gravity sewer pipes 30-inches in size or larger.
- 1.6.1.2. Contractor shall have provided not less than five temporary pumping systems on other projects for bypassing gravity sewer pipes 30-inches in size or larger.

1.6.2. Regulatory Requirements:

- 1.6.2.1. Secondary containment for fuel tanks shall be in accordance with Laws and Regulations.
- 1.6.2.2. Leakage from temporary pumping system or improper discharge is not allowed.
- 1.6.2.3. Quality of exhaust emissions from internal-combustion engines associated with temporary pumping systems shall comply with Laws and Regulations, including applicable air permits. Before furnishing temporary pumping system, verify compliance with air quality standards and provide temporary emissions controls to comply with such standards when required.
- 1.6.2.4. Noise Controls: Provide noise controls for temporary pumping system. Noise emitted from temporary pumping system shall comply with the Jacksonville Noise Control Ordinance. Where pumps are located within 500 feet of a residence, provide redundant noise controls in the form of Temporary Construction Sound Barriers or equal. Noise controls shall include control options for intake manholes.

1.7. SUBMITTALS

1.7.1. Informational Submittals: Submit the following:

- 1.7.1.1. Draft Notification Letter: Draft of typical notice letters for property owners and occupants of buildings and structures.
- 1.7.1.2. Schedule for Temporary Pumping in Collection System:
 - 1.7.1.2.1. Schedule for temporary pumping for each work area. Include dates of mobilizing each temporary pumping system, testing, starting and ending dates of temporary pumping, and demobilizing each temporary pumping system in each work area.
 - 1.7.1.2.2. At CONTRACTOR's option, such information may be included on the Progress Schedule prepared and maintained in accordance with Section 01 32 16, Progress Schedule. When such option is exercised, however, upon request of ENGINEER break

out as separate sub-schedule the schedule of temporary pumping in collection system and furnish to ENGINEER.

- 1.7.1.2.3. Maintain and update schedule for temporary pumping for collection system, and submit updated schedules in accordance with requirements for updating the Progress Schedule as indicated in Section 01 32 16, Progress Schedule.
- 1.7.1.3. Temporary Pumping Submittal: Submit the following for each temporary pumping system:
 - 1.7.1.3.1. Basis for capacity of the system proposed.
 - 1.7.1.3.2. System curve of flow plotted against total dynamic head, and calculations that substantiate the proposed temporary pumping system, including comparison of net positive suction head required and net positive suction head available.
 - 1.7.1.3.3. Manufacturer's data and specifications on each type and size of pump proposed and its capacity, including pump curves.
 - 1.7.1.3.4. Manufacturer's data and specifications for engines and other equipment required for temporary pumping system, including expected exhaust emissions data.
 - 1.7.1.3.5. Technical information and specifications on noise controls for noise-emitting equipment.
 - 1.7.1.3.6. Technical data on temporary piping, pipe joints, valves, pipe supports, controls, flow meter, secondary containment for fuel tanks, emissions controls when required, and other information pertinent to the temporary pumping system.
 - 1.7.1.3.7. Protection for the public at the suction and discharge manholes and any other open manholes.
 - 1.7.1.3.8. Layout Drawings:
 - 1.7.1.3.8.1. Sketches showing proposed layout of temporary pumping system, including locations of temporary plugs, bulkheads, and line stops, suction and discharge locations, location of the pumps and associated piping and valves, and source of power and fuel (as applicable) for temporary pumping system. Sketches shall be scale drawings acceptable to ENGINEER, and shall include site plans similar to those in the Contract Documents.
 - 1.7.1.3.8.2. Details of system suction and discharge locations. Discharge details shall include measures to protect the receiving structure and dissipate energy of the pumped fluid.

- 1.7.1.3.9. Temporary Plugs, Bulkheads, and Line Stops: Manufacturer's literature and fabrication drawings showing type of plug, bulkhead or line stop as applicable, materials, and hydrostatic head the plug, bulkhead, or line stop is designed to withstand. Submit complete technical information for CONTRACTOR-proposed line stops, installation procedures, name of proposed line stop installer, and documentation of experience on at least five similar projects.
- 1.7.1.3.10. Narrative describing proposed operation of temporary pumping system, including who will operate system, staffing, planned frequency of fueling, contingency plan in event of pump failure, contingency plan in event of pipe failure, and statement of existing systems that may be affected during operation of temporary pumping system.
- 1.7.1.3.11. Monitoring plan to ensure surcharge levels maintained five feet below rim elevation for all manhole upstream of the suction manhole.
- 1.7.1.3.12. Monitoring plan to ensure discharge piping is in working order
- 1.7.1.3.13. No temporary pumping shall begin until all provisions and requirements have been reviewed and approved by the ENGINEER.
- 1.7.1.3.14. Qualifications Statements: Submit qualifications of temporary pumping system Supplier
- 1.7.2. Obtain ENGINEER's acceptance of each temporary pumping system submittal. Temporary pumping systems for which ENGINEER's acceptance is not obtained in advance will not be eligible for payment.
- 1.7.3. ENGINEER's acceptance of temporary pumping submittals does not relieve or mitigate CONTRACTOR from responsibility for the temporary pumping system in accordance with the Contract Documents.

2. PRODUCTS

2.1. TEMPORARY PUMPING SYSTEM

2.1.1. General

2.1.1.1. System components shall be suitable for continuous operation with the fluid pumped.

2.1.1.2. Exhaust Emissions Controls:

2.1.1.2.1. Provide controls to limit emissions from internal-combustion engines associated with temporary pumping systems meet EPA requirements for standby power generation.

2.1.1.3. For all temporary pumping operations using eight-inch diameter or larger pumps or multiple pumps manifolded, design discharge piping, joints, and accessories to withstand at least twice the maximum system pressure or 40 pounds per square inch (PSI), whichever is greater. For all temporary pumping operations using single, smaller than eight-inch pumps, the discharge piping, joints, and accessories shall be designed to withstand maximum temporary pump surge pressures.

2.1.1.4. Pumps shall be self-priming type or submersible, in good working order. Provide a working pressure gauge and a flow meter on the discharge for all pumping operations using eight-inch diameter or larger pumps or more than two pumps manifolded together. Supply all power.

2.1.1.5. All pumps used must be constructed to allow dry running for extended periods of time to accommodate the cyclical nature of sewer flows.

2.1.1.6. Fuel-consuming temporary pumping system components intended for use when CONTRACTOR is not present shall include fuel tanks sized for not less than 24 hours of uninterrupted operation at system's operating capacity, and means to automatically notify CONTRACTOR upon high and low suction water level and low fuel level.

2.1.2. Instrumentation and Controls

2.1.2.1. Controls: Provide controls for temporary pumping system to maintain suction structure liquid level that does not result in flow backups and that does not adversely affect OWNER's system and private property.

2.1.3. Temporary Piping System

2.1.3.1. Durable hoses in good condition and suitable for system pressures can be used where accepted by ENGINEER.

- 2.1.3.2. Piping shall be steel, ductile iron, high density polyethylene, durable hoses or other material accepted by ENGINEER and suitable for system operating pressures. Aluminum piping and PVC piping not mechanically restrained are not allowed.
- 2.1.3.3. Piping system shall have watertight joints of the following types: fused joints, restrained couplings, flanged coupling adapters, quick-connects, flanged joints, grooved and shouldered end-type couplings, and other watertight joints accepted by ENGINEER.
- 2.1.3.4. Size discharge piping for flow velocity of not greater than 10 feet per second.
- 2.1.3.5. Provide check valves or pump control valves as required.
- 2.1.3.6. Provide air valves on discharge piping as required. Air valves shall expel air upon pipe filling and admit air upon pipe dewatering, and release small quantities of entrained air during operation. Air valves shall be suitable for service with the pumped fluid.
- 2.1.3.7. Discharge from temporary pumping system shall not adversely affect collection system structures, pipe or conduits, OWNER's operations, private property, and shall not result in flow backups, flooding, or damage. Provide energy-dissipating measures at discharge point as necessary.
- 2.1.4. Temporary Plugs, Bulkheads, and Line Stops:
 - 2.1.4.1. Acceptable temporary plugs and bulkheads include inflatable dams specifically designed for such service, brick bulkheads, timber bulkheads, and other bulkhead methods suitable for the service and conduit conditions.
 - 2.1.4.2. Each plug, temporary bulkhead, and line stop shall be suitable for the maximum pressure encountered.
 - 2.1.4.3. Use of sandbags to plug or block a sewer line is prohibited unless approved by ENGINEER on a site by site basis.
 - 2.1.4.4. Where temporary plugs and bulkheads are under pressure or surcharged, provide either two plugs or a plug and temporary bulkhead.
- 2.1.5. Standby Pumps
 - 2.1.5.1. Systems shall be designed with largest pump or largest generator (if equipped) out of service and still meet design flow conditions. All pumps, including stand-by, shall be connected and ready to be started.

3. EXECUTION

3.1. PREPARATION

- 3.1.1. Provide written notice delivered to owners and occupants of each building and structure affected by temporary pumping.
- 3.1.2. Temporary piping shall be located off of roads, driveways, and sidewalks, except as detailed on the plans. Piping shall not be located in environmentally-sensitive areas such as wetlands.
- 3.1.3. Burying of temporary piping is not allowed unless otherwise approved by ENGINEER.
- 3.1.4. Hydrostatic Testing of Temporary Piping System:
 - 3.1.4.1. Perform successful hydrostatic testing of any temporary piping system using 8-inch or larger pumps. Test using clean water at pressure equal to 1.2 times highest expected system operating pressure, for one hour while maintaining test pressure within 3.0 psig of required test pressure.
 - 3.1.4.2. ENGINEER will witness hydrostatic test.
 - 3.1.4.3. Hydrostatic test criteria for acceptance: No leakage. Verify that entire temporary pumping system is ready for operation before commencing temporary pumping. Verify that controls and flow meter are properly connected and functional.
- 3.1.5. Remedy any accidental spill or overflow immediately. Stop the discharge and act to clean up, disinfect the spill and promptly notify the OWNER and ENGINEER with specifics include time of day, volume, and remedies implemented.
- 3.1.6. Except where otherwise shown, locate the temporary pipeline off streets and sidewalks in gutters, at the back edges of sidewalks or on shoulders of the roads. Protect all coupling on or adjacent to streets and gutters with barricades or cones.
- 3.1.7. When the temporary pipeline crosses streets and driveways, traffic flow shall be maintained through utilization of ENGINEER-approved ramps, hose-bridges, or other protection methodology. Pipeline protection methodology provided shall be sized appropriately to bypass pipe size. Pipeline protection methodology provided shall have adequate strength to withstand traffic loading and provide sufficient clearance for vehicles to pass over it. Laying of bypass piping in a shallow trench covered with temporary surfacing shall not be allowed with ENGINEER approval.

3.2. TEMPORARY PUMPING

3.2.1. During Operation of the Temporary Pumping System:

- 3.2.1.1. Temporary pumping system shall operate continuously. In the event of equipment failure, immediately make repairs or replace equipment. Provide spare parts and redundant units as necessary for continuous operation.
- 3.2.1.2. Provide operator to monitor, operate, and maintain temporary pumping system 24 hours per day when system is in service.
 - 3.2.1.2.1. Provide an operator who has successfully operated two installations of similar capacity to monitor the operation, adjust pump speed, valves, etc., and make minor repairs to the system and report problems.
 - 3.2.1.2.2. Provide OWNER with names and numbers of contacts included in the auto-dialer. The temporary pumping operator shall be the primary contact for the system auto-dialer. Operator shall be able to respond on-site to an autodial alert within 20 minutes of alert while pumps are in operation.

3.3. DEMOBILIZATION

3.3.1. Upon Conclusion of Temporary Pumping:

- 3.3.1.1. Remove plugs, bulkheads, and line stops in manner that allows flow to slowly return to normal, without surging, surcharging, and adverse effects on existing system.
- 3.3.1.2. Flush out temporary pumping system with clean water discharged to an appropriate location.
- 3.3.1.3. Remove temporary pumping system and appurtenances from the Site.
- 3.3.1.4. When CONTRACTOR has obtained permit(s) for temporary pumping from authorities having jurisdiction, furnish written notice to such authorities that temporary pumping has been completed.
- 3.3.1.5. The Contractor is responsible to repair any site damage and provide site restoration, which shall be remediated as described in Section 3.2.6 of Section 33 01 30.72 - Cured-in-Place Pipe.

3.4. **SITE RESTORATION**

- 3.4.1. The Contractor is responsible to repair any site damage and provide site restoration, which shall be remediated as follows: Sod – 7 calendar days, Concrete – 8 calendar days, Asphalt – 7 calendar days (<200 sq ft) or 21 days (>200 sq ft). The remediation time is additive. For example, if Sod and Concrete requires restoration, both must be complete within 15 calendar days.
- 3.4.2. Disturbed areas in FDOT right of way must be restored to original or better conditions and comply with FDOT requirements and specifications
- 3.4.3. Disturbed areas within City right of way shall be restored to original or better conditions and comply with JEA standards as listed below:
- Site Preparation, Clean up and Restoration - Section 406
 - Grassing - Section 441
 - Paving - Section 490
 - Sidewalk, Driveway, Curb and Gutter - Section 491
 - Fencing - Section 492

+ + END OF SECTION + +

SECTION 01 55 26
MAINTENANCE AND PROTECTION OF TRAFFIC

1. GENERAL

1.1 SCOPE

1.1.1 CONTRACTOR shall keep all roads, streets, and traffic ways open for passage of traffic and pedestrians during the Work, unless otherwise approved by owner of the street, traffic way, or right-of-way, as applicable.

1.1.2 Unless otherwise shown or indicated in the Contract Documents, maintenance and protection of traffic shall be in accordance with Index 600 of Florida Department of Transportation (FDOT) FY 2017-18 Design Standards, JEA Standards and related permits obtained by the Owner.

1.2 COORDINATION

1.2.1 Coordinate with owner of the highway or street right-of-way, as applicable, for maintenance and protection of traffic requirements.

1.2.2 Give required advance notice to fire departments, police departments, and other emergency services as applicable of proposed construction operations.

1.2.3 Give reasonable notice to owners or tenants of private property who may be affected by construction operations. Give such notice not less than 10 days prior to when such property will or may be affected by construction operations.

1.3 SUBMITTALS

1.3.1 Informational Submittals: Submit the following:

1.3.1.1 Procedure Submittals: Detailed plan, procedures, and sequencing for maintaining and protecting traffic in accordance with the Contract Documents and requirements of authorities having jurisdiction. Include in the submittal the following:

1.3.1.1.1 Traffic staging plan, and construction sequencing as applicable to maintain and protect traffic.

1.3.1.1.2 Product data, including manufacturer's catalog information and specifications, for temporary signage, temporary signals, temporary illumination devices, and other products to be utilized in maintaining and protecting traffic.

1.3.1.1.3 Indication of number and types of personnel dedicated to maintaining and protecting traffic during construction.

1.3.1.1.4 Indication of plan acceptance from authorities having jurisdiction.

2. PRODUCTS

2.1. MATERIALS AND EQUIPMENT

2.1.1. Materials and equipment used for maintenance and protection of traffic shall comply with the reference specification indicated in Paragraph 1.1.2 of this Section.

3. EXECUTION

3.1. GENERAL PROVISIONS

3.1.1. When required to cross, obstruct, or temporarily close a street or traffic way, provide and maintain suitable bridges, detours, or other acceptable temporary expedient for the accommodation of traffic. Closings shall be for shortest duration practical, and passage shall be restored immediately after completion of filling and temporary paving or bridging.

3.1.2. Temporary Control Devices:

3.1.2.1.1. Provide temporary signs, signals, barricades, flares, lights and other equipment, services, and personnel required to regulate and protect traffic and warn of hazards.

3.1.2.1.2. Such Work shall comply with requirements of OWNER and authorities having jurisdiction at the Site.

3.1.2.1.3. Remove temporary equipment and facilities when no longer required, and restore grounds to condition indicated in the Contract Documents; if not indicated, resort to pre-construction conditions.

3.1.3. Keep accessible for use permanent facilities such as hydrants, valves, fire alarm boxes, postal boxes, delivery service boxes, and other facilities that may require access during construction.

3.1.4. Maintain at least one lane of traffic at all times unless prior, written permission otherwise is secured by the CONTRACTOR from each and every public body, agency, and/or authority having jurisdiction. Maintain access for homeowners at all times. Submit such written permission to close any lane(s) to traffic to the OWNER at least ten calendar days prior to the proposed closing of same. In addition, at least ten calendar days prior to such proposed closing, notify each and

every emergency service, such as the state and local police, fire departments rescue squads, ambulance services, hospitals, gas, electric, water and sewer utilities, and all other emergency services that normally use the affected roadway or lane(s) or that are located within a radius of five (5) miles of the proposed closing, by certified mail, of such proposed lane to be closed, indicating full information as to dates, times, duration, and alternate routes therein.

- 3.1.5. If and where allowed by the traffic controlling agency/permit, provide steel road plates over all excavations in roads that must remain open in order to complete the Work. The road plates shall be in good condition and shall be of sufficient enough strength to withstand all traffic loads imposed upon them. Notify the authority having jurisdiction before any road plates are placed.
- 3.1.6. Provide and maintain vehicle access to all driveways and side streets along the construction route. CONTRACTOR will notify any property owner which will have their driveway impacted by construction a minimum of 48-hours prior to the work. If property driveway access will be impacted as a result of work in the public right of way adjacent to the property CONTRACTOR to provide plan to coordinate driveway access with property owner.
- 3.1.7. Re-open access to all driveways and roadways at the conclusion of work each day except where longer closures specified in DRAWINGS.
- 3.1.8. No roadway may be closed at any time, unless authorized by the ENGINEER.
- 3.1.9. Steel plates may be used to permit vehicles to cross the trench in driveway areas where specified in DRAWINGS. All steel plates must be removed and driveways restored prior to Substantial Completion.
- 3.1.10. Protect temporary pumping piping across all driveways, roadways, and other points of potential vehicle contact with proper ramps or other means approved by the ENGINEER.

3.2. TRAFFIC SIGNALS AND SIGNS

- 3.2.1. Provide and operate temporary traffic controls and directional signals required to direct and maintain an orderly flow of traffic in areas under CONTRACTOR's control, and areas affected by construction operations.
- 3.2.2. Provide temporary traffic controls and directional signs, mounted on temporary barriers or standard posts, at the following locations:
 - 3.2.2.1. Each change of direction of a roadway and at each crossroad.
 - 3.2.2.2. Detours and areas of hazard.
 - 3.2.2.3. Parking areas.
 - 3.2.2.4. Traffic entrance to and exit from each construction area.

3.3. TRAFFIC CONTROL PERSONNEL

- 3.3.1. When construction operations encroach on traffic lanes, furnish qualified and suitably-equipped traffic control personnel as required for regulating traffic and in accordance with requirements of authorities having jurisdiction.
- 3.3.2. Traffic control personnel shall use appropriate flags or mobile signs.
- 3.3.3. Equip traffic control personnel with appropriate personal protection equipment and suitable attire.
- 3.3.4. Attire and conduct of traffic control personnel shall be appropriate and shall not create nuisances or distractions for traffic.

3.4. LIGHTS

- 3.4.1. During periods of low visibility provide temporary lights for the following
 - 3.4.1.1. To clearly delineate traffic lanes, to guide traffic, and to warn of hazardous areas.
 - 3.4.1.2. For use by traffic control personnel directing traffic.
- 3.4.2. Provide adequate illumination of critical traffic and parking areas.

3.5. PARKING CONTROL

- 3.5.1. Control CONTRACTOR-related vehicular parking at the Site to preclude interfering with: traffic and parking, access by emergency vehicles, OWNER's and facility manager's operations, and construction operations. Provide

temporary parking facilities for the public, as required because of construction operations.

3.5.2. Control parking of construction and private vehicles at the Site as follows:

3.5.2.1. Maintain free vehicular access to and through parking areas.

3.5.2.2. Prohibit parking on or adjacent to access roads, and in non-designated areas.

3.5.2.3. Construction vehicles shall possess current vehicle registration.

3.5.2.4. Private vehicles shall park only in designated areas.

3.6. REMOVAL

3.6.1. Maintain and protect traffic until Substantial Completion and at all times thereafter when CONTRACTOR is working at the Site. Provide maintenance and protection of traffic measures at the Site until no longer required due to the progress of the Work. When no longer required, completely remove maintenance and protection of traffic measures and restore the Site to condition required by the Contract Documents or, when not indicated in the Contract Documents, to pre-construction conditions.

+ + END OF SECTION + +

SECTION 33 01 30.16
CCTV INSPECTION OF SEWERS

1. GENERAL

1.1. SCOPE

- 1.1.1. Provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to perform closed-circuit television (CCTV) inspection of existing, new and rehabilitated piping.
- 1.1.2. Provide accurate, actual, repeatable and continuous measurements of the final condition, such as cracks and ovality, of a pipeline utilizing low barrel distortion video equipment using laser profile technology in conjunction with a non-contact laser aim video micrometer, other observation and defect measuring apparatus, and associated software.

1.2. DEFINITIONS

- 1.2.1. Pre-Construction Inspection: CCTV inspection of sewers to determine the location of construction, structural and operations and maintenance (O&M) features and to ascertain that the condition of the pipe meets acceptable standards for the proposed rehabilitation.
- 1.2.2. Post-Construction Inspection: CCTV inspection of repaired or rehabilitated sewer mains and lateral connections to determine the location of construction, structural and O&M features and to verify that all repairs have been performed

1.3. RELATED SECTIONS

- 1.3.1. Section 33 01 30.47 - Preparatory Sewer Cleaning

1.4. REQUIREMENTS

- 1.4.1. The CONTRACTOR shall be aware that this Contract requires work in active sewers and shall follow all federal, state and local requirements for safety in confined spaces.

1.5. PERFORMANCE REQUIREMENTS

- 1.5.1. Inspection shall be performed by a National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) certified operator and shall meet the coding and reporting standards and guidelines as set by PACP as referenced in paragraph 1.7. All report annotations, pipe conditions and pipe defects shall be identified properly using PACP codes as defined by PACP, and severity ratings shall be calculated according to PACP.

- 1.5.2. Quality of inspection recording shall be acceptable to ENGINEER when viewed on a 25" standard computer monitor.
- 1.5.3. CCTV software used to document inspection shall be PACP v7.0-certified.

1.6.SUBMITTALS

- 1.6.1. CCTV equipment, including make, model, age of video systems and tractors
- 1.6.2. Documentation that CCTV software is PACP v7.0 -certified. PACP-compliant software will not be accepted.
- 1.6.3. Copies of PACP certificate for inspectors completing the work.
- 1.6.4. Inspection deliverables.

1.7. REFERENCE STANDARDS

- 1.7.1. NASSCO prepared Pipeline Assessment and Certification Program, Reference Manual, latest edition. This manual includes a standard TV inspection form and sewer condition codes.

2. PRODUCTS

2.1. TELEVISION EQUIPMENT

- 2.1.1. Closed Circuit TV Equipment: Select and use closed-circuit television equipment that will produce a color recording. The camera and video system components shall have the following properties:
 - 2.1.1.1. Equipped with footage counter accurate to two tenths of a foot that displays on the TV monitor the exact distance of the camera from the starting point of the recording.
 - 2.1.1.2. Lighting system that allows the features and condition of the pipe to be clearly seen. Lighting shall not cause shadows or loss of color within the field of view of the camera.
 - 2.1.1.3. Capable of operating in 100 percent humidity conditions.
 - 2.1.1.4. Capable of producing a high definition (1080p) resolution color video picture. Picture quality and definition shall be to the satisfaction of the ENGINEER.
- 2.1.2. Pipe Inspection Camera: The pipe inspection camera and video components shall have the following additional properties:

- 2.1.2.1. Capable of producing a video recording using a pan-and-tilt, radial viewing, pipe inspection camera that pans ± 275 degrees and rotates 360 degrees.
- 2.1.2.2. Camera height adjustment so that the camera lens is always centered at one-half the inside diameter, or higher, in the pipe being televised.
- 2.1.2.3. Include a reflector in front of the camera if necessary to provide acceptable video image quality in large diameter pipe.
- 2.1.3. TV Studio: TV studio is to be contained in an enclosed truck, trailer or van. It shall have room and seating for the operator and the ENGINEER and also room for at least one standing visitor with the doors closed. The studio shall have air conditioning and heating. Normal operation of all equipment, including the TV camera, monitor, and winches is to be from a control panel in the studio.
- 2.1.4. Recording: All recordings are to be in digital format.
- 2.1.4.1. Image Capture – Digitized picture images shall be stored and be exportable as JPEG formats.
- 2.1.4.2. Video Capture - Full time live video and audio files shall be captured for each pipe segment inspected. The files shall be stored in industry standard Windows Media or MPEG-4 format. Alternate digital formats will not be accepted unless approved by the ENGINEER in advance of submittal. The video recording shall be free of electrical interference and shall produce a clear and stable image. The audio recording shall be sufficiently free of background and electrical noise as to produce an oral report that is clear and discernable. The digital recordings and inspection data shall be cross-referenced to allow instant access to any point of interest within the digital recording.

3. EXECUTION

3.1. CCTV INSPECTION

- 3.1.1. Prior to CCTV inspection:
 - 3.1.1.1. Clean sewer lines and manholes in accordance with Section 33 01 30.47, Preparatory Sewer Cleaning. Re-clean any sewer line found by the CCTV inspection to be insufficiently cleaned.
- 3.1.2. Televiser the sewer line to document the condition of the line. Notify the ENGINEER 48 hours in advance of any TV inspection so that the ENGINEER may observe inspection operations. Provide a color recording showing the completed work.
- 3.1.3. Center camera in manhole invert as far from the mouth of the pipe to be inspected to the extent allowed by the channel geometry. For inspections from manholes, pan and

- record the entire circumference of the pipe penetration/manhole wall. Record all other pipe penetrations visible from this start position, including any penetrations that are between the channel and the rim.
- 3.1.4. With camera rolling and recording, perform the distance counter preset. If a preset point on the CCTV cable is used to set the counter, back up the camera after setting the preset and rerecord the entry to the pipe.
 - 3.1.5. Pipeline inspection shall be from center of the starting manhole to the center of the ending manhole. Measure distances along the pipe from the inside of manhole wall of the starting manhole to inside of manhole wall of the downstream manhole.
 - 3.1.6. Prior to recording the location of defects, construction features and service connections, remove slack in the cable of the television inspection camera to ensure metering device is designating proper footage. Check accuracy of the measurement meters daily by use of a walking meter, roll-a-tape, or other suitable device.
 - 3.1.7. Center the camera in the middle of the pipe unless flow characteristics dictate a higher mount point, as approved by the ENGINEER.
 - 3.1.8. Move the camera through the line (in the downstream direction whenever possible) at a uniform rate not to exceed 30 feet per minute.
 - 3.1.9. When infiltration or other defects are evident, stop camera movement and use pan and tilt to document pipe condition. Stop camera movement elsewhere when necessary to ensure proper documentation of the sewer's condition.
 - 3.1.10. Use manual winches, power winches, TV cable, and powered rewinds or other devices that do not obstruct the camera view or interfere with proper documentation of the sewer conditions to move the camera through the sewer line.
 - 3.1.11. TV inspection recordings shall be continuous for each pipe segment. Any stoppage of recording shall be accompanied by a verbal statement as to reason recorded on the video.
 - 3.1.12. Adjust light levels, clean fouled or fogged lens, and allow vapor to dissipate from camera lights to produce acceptable recordings. All TV inspection recordings that do not meet the specified requirements shall be televised at no additional cost to the OWNER.
- 3.2. FLOW CONTROL**
- 3.2.1. Adequately control the flow in the section being televised. Flow bypassing, in accordance with Section 01 51 41, Temporary Pumping, of the flows may be used to accomplish this. Recordings made where the depths of wastewater flow shown below are exceeded will be rejected:

- 3.2.1.1. For final post-construction, unless otherwise indicated or approved by ENGINEER, excepting sags, depth of flow shall not exceed 20 % of Pipe Diameter
- 3.2.1.2. For all other inspections, unless otherwise indicated or approved by ENGINEER, excepting sags, depth of flow shall not exceed 30% of Pipe Diameter
- 3.2.2. Take precautions to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. No overflows are permitted. The CONTRACTOR is responsible for all damages.
- 3.2.3. CONTRACTOR is responsible for all damages to CONTRACTOR owned and operated equipment, OWNER facilities, and privately-owned facilities caused by malfunction of plugs, pumps or other CONTRACTOR equipment. In the event of a failure or malfunction of CONTRACTOR equipment, CONTRACTOR is responsible for all work necessary to restore facilities to pre-construction condition including but not limited to excavation and restoration of sewer lines and roadways required to retrieve malfunctioning or stuck cameras, plugs and hoses.
- 3.2.4. It is anticipated that portions of the sanitary sewer are bowed or bellied and thus the camera will be submerged. Wherever the camera encounters a submerged condition, or where the wastewater flow depth exceeds the maximum allowable, reduce the flow depth to an acceptable level by performing the survey TV inspection during minimum flow hours, floating the camera, or by pulling a camera with swab, high-velocity jet nozzle or another acceptable dewatering device.

3.3. PASSAGE OF TV CAMERA

- 3.3.1. If during TV inspection of a pipe segment the camera is unable to pass an obstruction even though flow is unobstructed, televise the pipe segment from the opposite direction to obtain a complete recording of the line. Measure the distance between the manholes (centerline to centerline) with a tape or wheel to accurately determine the total length of the manhole segment.

3.4. INSPECTION DELIVERABLES

- 3.4.1. Written Inspection Reports
 - 3.4.1.1. Provide printed location records to clearly identify the location of each defect, or lateral connection, in relation to adjacent manholes, using a standard stationing system zeroed on the upstream manhole. Record all information requested using proper and current NASSCO PACP defect codes. Color still shot images of all defects encountered shall be included with each pipe segment. The reports shall include at least the minimum amount of information required by PACP, including required PACP header information fields, plus the following optional PACP header fields.

Field Number	Field Name
5	Owner
6	Customer
10	Project
12	Time
14	Weather
16	Date Cleaned
17	Flow Control
18	Purpose of Survey
20	Inspection Technology Used
24	Drainage Area
25	Pipe Segment Reference
35	Lining Method
36	Coating Method
37	Pipe Joint Length
38	Total Length
39	Length Surveyed
43	US MH Rim to Invert
44	US MH Rim to Grade
46	US MH Northing
47	US MH Easting
50	DS MH Rim to Invert
51	DS MH Rim to Grade
53	DS MH Northing
54	DS MH Easting
58	GPS Accuracy

3.4.2. Electronic Inspection Reports

- 3.4.2.1. Provide a NASSCO PACP v7.0 certified database listing all PACP required data fields for each pipe segment.

- 3.4.2.2. PDF of each paper copy of the PACP inspection report, with the file name matching the pipe segment identification code.
- 3.4.2.3. Provide one inspection per sewer main. If the conditions of the main do not permit inspection of the entire asset from one direction, provide a second inspection from the opposite end to the point the initial inspection was abandoned.
- 3.4.2.4. Each inspection record shall contain the video file associated with the inspection in the "Tape/ media number" PACP Header field. Provide only the video file name and extension this field. Do not provide file paths or drive letters.
- 3.4.3. Inspection Recordings
 - 3.4.3.1. Provide digital inspection recordings for all inspections.
 - 3.4.3.2. Recording shall be of a quality sufficient for ENGINEER to evaluate the condition of the sewer, locate the sewer service connections, and verify cleaning and joint testing. If ENGINEER determines that the quality is not sufficient, re-televis the sewer segment and provide a new recording and report at no additional compensation. Payment for televised inspection will not be made until ENGINEER approves the recordings and reports.
 - 3.4.3.2.1. Camera distortions, inadequate lighting, dirty lens, or blurred/hazy picture will be cause for rejection.
 - 3.4.3.2.2. Pipe stationing not shown on the video or in a font style or color that is unreadable will be cause for rejection.
 - 3.4.3.3. Digital recordings: Electronic recording file must allow snap scrolling to allow easy and quick access of the entire recording.
 - 3.4.3.4. Digital Recording file management:
 - 3.4.3.4.1. Provide one electronic video file of each inspection. Multiple inspections per video file and multiple video files per inspection will be cause for rejection.
 - 3.4.3.5. Maintain a master copy of all recordings and Inspection Reports for two years after delivery of reports and recordings.
 - 3.4.3.6. Label each hard drive with the following information:
 - File Number.
 - CONTRACTOR's Name.
 - Project Name.
 - Contract Number.
 - Drawing Number
 - Inspection Type
 - Tape Number.

- Date Televised.
- Pipe Segment Asset Identification Number.

3.4.4. Inspection deliverables for different types of inspections are defined below.

3.4.4.1. Pre-Construction Inspection: One copy on a USB 2.0 external hard drive of PACP formatted database including, but not limited to, digital inspection recordings, defect call-out tables, defect snapshots, notes fields and asset condition reports, plus pdfs for all PACP paper reports.

3.4.4.2. Post-construction Inspection:

3.4.4.2.1. One copy on a USB 2.0 external hard drive of the PACP formatted database including, but not limited to, digital inspection recordings, defect call-out tables, defect snapshots, notes fields, PDFs for all PACP paper reports and asset condition reports.

+ + END OF SECTION + +

SECTION 33 01 30.47
PREPARATORY SEWER CLEANING

1. GENERAL

1.1. DESCRIPTION

- 1.1.1. Provide all labor, materials, tools, equipment and incidentals as shown, specified, and required to clean the pipelines and manholes.
- 1.1.2. The cleaning Work required includes, but is not limited to, the following:
 - 1.1.2.1. Field locating all manholes along the sewer reaches to be cleaned.
 - 1.1.2.2. Normal and heavy cleaning of existing sanitary sewers.
 - 1.1.2.3. Cutting of roots, grease, intruding sealing ring material and objects wedged in pipe joints from existing sanitary sewers.
 - 1.1.2.4. Removal of debris from the sewers.
 - 1.1.2.5. Disposal of waste and sediment.
 - 1.1.2.6. Cleaning up as the Work progresses and after the completion of all Work activities.
 - 1.1.2.7. All other Work required for the complete and satisfactory cleaning of the pipelines and manholes.

1.2. DEFINITIONS

- 1.2.1. Normal cleaning – cleaning accomplished using water jets to scour and remove debris, grease, etc. from pipe and manhole in 1 to 3 complete passes of the nozzle.
- 1.2.2. Root cutting and grease cutting – removal of roots larger than fine roots (as defined by National Association of Sewer Service Companies (NASSCO) pipeline assessment certification program (PACP)), hardened grease and intruding sealing ring material using cutting device.
- 1.2.3. Heavy cleaning – cleaning accomplished using water jets to scour and remove debris, grease, deteriorated coating etc. from pipe in greater than 3 complete passes of the nozzle or using high output pump/nozzles systems. Obtain approval from ENGINEER prior to utilization of a chain whip, spiral saw, or other mechanical cleaning. Bypass pumping shall be made available for any sections of heavy cleaning if the heavy cleaning damages the pipe. The CONTRACTOR shall have open cut repair materials, supplies, and labor available during heavy cleaning if the host pipe is damaged during heavy cleaning and requires open cut replacement.

1.3. RELATED SECTIONS

- 1.3.1. Section 33 01 30.16, Television Inspection of Sewers.

1.4. GENERAL PRECAUTIONS

- 1.4.1. This Contract requires work in active sewers. Adhere to all federal, state and local requirements for safety in confined spaces.
- 1.4.2. Take precautions to protect sewer mains, laterals and manholes from damage that might be inflicted by the improper selection of the cleaning process or improper use of the equipment.
- 1.4.3. When using hydraulically propelled devices, take precautions to ensure that the water pressure created does not cause damage or flooding to public or private property.
- 1.4.4. Do not surcharge the sewer beyond the elevation that could cause overflow of sewage into area waterways, homes, or buildings or onto the ground.
- 1.4.5. Some of the manholes accessing sections of the sewer included in this work are on private property where either specific easements and/or trespass agreements with individual property owners have or have not been negotiated. All easements are typically shown on the Drawings, and copies of the pertinent trespass agreements are available for review by contacting the ENGINEER. Do not enter private property for which access agreements with the OWNER have not been executed. Limit operations to those specifically approved in said trespass agreements.
- 1.4.6. Restore or repair any facility, public or private, which is damaged by CONTRACTOR actions at no cost to OWNER.

1.5. SUBMITTALS

- 1.5.1. Specifications of the sewer cleaning equipment, including performance data on pump, hose diameter and length, tank capacity, and intended nozzles, root cutters, and debris baskets to be used on the job. Provide a chart that shows hose length and diameter versus volume and pressure.
- 1.5.2. Specifications on the equipment to be used to remove sediment and debris at the downstream manhole of each reach to be cleaned.
- 1.5.3. Valid waste disposal permit as issued by the local permitting Authority or other licensed disposal facility as approved by the ENGINEER.
- 1.5.4. Plan for storage, dewatering, transportation, and disposal of debris and sediment removed from the sewer lines.

1.6. QUALIFICATIONS

- 1.6.1. CONTRACTOR shall have experience in the cleaning of sewers. Documentation of experience shall be furnished to the ENGINEER upon request.

2. PRODUCTS

2.1. MAINLINE SEWER CLEANING EQUIPMENT

- 2.1.1. Sewer cleaning equipment shall consist of truck-mounted, high velocity hydro-cleaning equipment. The equipment shall be provided with a minimum of 500 feet of one-inch inner diameter high-pressure hose with a selection of high velocity nozzles, as required for the cleaning operation. The various nozzles shall produce a scouring action from 10 to 45 degrees in all size sewers to be cleaned. Use nozzles matched to the pumps and the site-specific cleaning requirements. Mount all nozzles with skids. A tiger tail, boot, or downhole roller is required. A pressure gauge shall show operating pressure and a flow meter shall show flow rate. A table to translate shown pressures to delivery pressure shall accompany each cleaner unit.
- 2.1.2. Provide proposed flow and pressure to the Engineer for review and approval. A relief valve shall regulate pressure to the nozzle. The unit shall carry its own water tank, minimum of 1,000 gallons, auxiliary engines and pumps, and a hydraulically driven hose reel with sufficient hose length to clean the entire length of the segment.
- 2.1.3. All controls shall be located so that the equipment can be operated above ground.

2.2. VACUUM EQUIPMENT

- 2.2.1. Provide equipment capable of removing all sand, dirt, rocks, roots, and other debris from the sewer and manhole.
- 2.2.2. Provide screens to prevent scoured debris from migrating downstream of the limits of the Work.

2.3. CUTTING EQUIPMENT

- 2.3.1. Mainline Sewers: Provide equipment capable of mechanically removing roots, grease, and intruding seal material. Devices shall include a root saw, spring blade root cutter chuck, chaincutter, or approved equal.

2.4. FLUSHING/CLEANING WATER

- 2.4.1. Provide all flushing water required for the cleaning of sewers.

2.5. DEBRIS BASKETS

- 2.5.1. Provide debris buckets with ¼" hole pattern or smaller sized to fit into the effluent manhole effluent pipe.

3. EXECUTION

3.1. MAINLINE SEWER CLEANING

- 3.1.1. Thoroughly clean all pipeline reaches to permit an unrestricted inspection by closed circuit television. Emphasis shall be afforded to the removal of accumulated grease, roots, sand, rocks, sludge and other debris so that the video inspection will show clearly all portions of the pipe being inspected. Pressure at the nozzle shall be between 1200 psi and 1600 psi and flow rate shall be between 60 gpm and 80 gpm during cleaning operations in the sewer, unless otherwise approved by the ENGINEER.
- 3.1.2. Clean upstream reaches of sewers before the downstream reaches.
- 3.1.3. Insert cleaning equipment into the downstream manhole of a given reach and pull the debris downstream. Reverse setups may be used if all debris is removed (i.e., no material is passed to the adjacent pipe segment).
- 3.1.4. In mainlines where a two-pass minimum is stipulated, at a minimum, make one pass with a 30° - 45° nozzle at a rate not greater than 20 feet per minute, then one pass with a 10° - 15° nozzle at a rate not greater than 30 feet per minute. Otherwise, clean pipe until clean enough for intended purpose or objective. Reduce pressures and increase pull back rates in consultation with ENGINEER when cleaning through holes, breaks, and partial collapses in pipe to effectively clean pipe but minimize further damage pipe integrity.
- 3.1.5. Rig winching equipment so as not to damage the existing pipeline or manholes.
- 3.1.6. Continuously observe flow from cleaning operations. If any evidence of clean sand, dirt, or pipe bedding stone or of pipe fragments are observed, decrease jetting pressures, move nozzle away from likely source areas, and insert camera into sewer to observe pipe conditions that might be contributing to these observations to minimize damage to pipe integrity caused by jetting operations. Alter cleaning pressures, pullback rates, and nozzles types to minimize potential for damage in consultation with ENGINEER.
- 3.1.7. During cleaning, restrict the flow level in the pipe to a maximum of 30 percent of the pipe diameter. Take care to avoid flooding house connections during cleaning operations.

- 3.1.8. Remove any blockages of lateral building connections resulting from the cleaning or other items of Work by cleaning of the building connection at no additional cost to the OWNER.

3.2. MANHOLE CLEANING

- 3.2.1. Wash the wall, bench, channel and rungs of each manhole to remove accumulated debris, grease, sediment, and grit.

3.3. ROOT, GREASE, CORROSION SCALE, AND INTRUDING SEAL MATERIAL REMOVAL

- 3.3.1. Remove all roots that could prevent the sealing of a packer, the proper application of chemical sealants or installation of a cured-in-place liner. Remove roots by suitable mechanical cutting devices or by hydraulic procedures such as with high-pressure jet cleaners. No roots of length greater than one and a half inches (1½-inch) shall remain following root removal procedures.
- 3.3.2. Remove all grease and corrosion scale which could prevent the sealing of a packer, the proper application of chemical sealants, or the installation of a cured-in-place liner. Use suitable mechanical cutting devices to remove grease or scale.
- 3.3.3. Remove objects wedged in pipe joints and intruding sealing ring material that interferes with the rehabilitation of sewer lines.

3.4. DEBRIS REMOVAL

- 3.4.1. Insert debris baskets into manholes toward which jetted flow is pushed. Remove debris manually or using vacuums. Record volume of debris removed.
- 3.4.2. Remove all bricks, rocks, debris, sludge, dirt, sand, grease, roots, and other materials from the sewer and manhole and collect and remove the resulting debris from the downstream manholes of the sewer sections being cleaned. Utilize control measures in downstream manholes as necessary to prevent debris, sludge and other materials from passing through manholes to a downstream sewer section not scheduled for cleaning by CONTRACTOR that same day.
- 3.4.3. When removing materials from manholes, return the discharge and drainage liquid stream to the downstream sewer and discharge downstream for disposal. Under no circumstances shall sewage or solids be dumped onto the ground surface, street, stream, ditches, catch basins, or storm drains. All solids and semi solids shall be placed in a watertight container so that no spillage or leakage will occur, covered to minimize odors, and disposed by the CONTRACTOR. The CONTRACTOR is responsible for all operations and costs associated with removal, transportation, and disposal of debris collected during the cleaning operations.

- 3.4.4. Decant of debris tank is permitted only into segments of sewer that will then be immediately cleaned.

3.5. DISPOSAL

- 3.5.1. Maintain and have available for inspection upon request a valid waste disposal permit as issued by the local permitting authority or disposal permit from another licensed disposal facility as approved by the ENGINEER.

3.6. FIELD QUALITY CONTROL

- 3.6.1. Acceptance of pipeline cleaning shall be made upon the successful completion of the television inspection documenting that all required debris, roots, and grease are removed to the satisfaction of the ENGINEER. If television inspection shows debris, solids, sand, grease, or grit remaining in the line, re-clean and re-inspect the pipeline at no additional compensation.

++END OF SECTION++