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ADDENDUM NO. 1

DATE: November 7, 2022

FROM: Baxter & Woodman, Inc., Consulting Engineers

TO: Planholders of record for the Work titled:

City of Joliet, Illinois
Black Road Acres Phase 1 Water Main Improvements
City of Joliet Contract No. 2680-0123

The Bidding Documents are amended as follows:

1. SPECIFICATIONS

A. Section 00 11 13, ADVERTISEMENT FOR BIDS:

Delete Section 00 11 13, ADVERTISEMENT FOR BIDS in its entirety and insert the attached ADVERTISEMENT FOR BIDS, revision dated November 7, 2022 in lieu thereof in order to add the City of Joliet Contract number to Paragraph 1 Time and Place of Opening Bids.

B. Section 01 32 53, DIGITAL UTILITY DATA COLLECTION:

Delete Section 01 32 53, DIGITAL UTILITY DATA COLLECTION in its entirety and insert the attached DIGITAL UTILITY DATA COLLECTION section, revision dated November 7, 2022 in lieu thereof.

C. Section 33 01 10.83, CURED IN PLACE PRESSURE PIPE:

Delete Section 33 01 10.83, CURED IN PLACE PRESSURE PIPE in its entirety and insert the attached CURED IN PLACE PRESSURE PIPE section, revision dated November 7, 2022 in lieu thereof.

Nothing in this Addendum shall be construed as changing other requirements of the Bidding Documents. Each Bidder shall acknowledge receipt of this Addendum where indicated in the Bid Form.

END OF ADDENDUM NO. 1

ADDENDUM NO. 1
00 91 13-1 (211917.40)

00 11 13

ADVERTISEMENT FOR BIDS

CITY OF JOLIET, ILLINOIS
CITY OF JOLIET CONTRACT NO. 2680-0123

1. Time and Place of Opening Bids. Sealed proposals for the construction of the City of Joliet Contract No. - 2680-0123 - Black Road Acres Phase 1 Water Main Improvements for the City of Joliet, Will County, Illinois, will be received at the Office of the City Clerk, City of Joliet Municipal Building, 150 West Jefferson Street, Joliet, Illinois 60432 until 2:00 P.M, December 14, 2022, and at that time will be publicly opened and unit price total read aloud. It is highly recommended that bids be tabbed to mark the Bid Bond and unit price total pages. It is required that an electronic copy of the entire submission be included on a USB flash drive. Those in attendance must adhere to the current City of Joliet City Hall COVID-19 policy. The City of Joliet follows current CDC guidelines regarding COVID-19. Bid results will also be posted on the City's website, and emails sent out to individuals who have subscribed to the related RSS feed. It is preferred that you mail your bids/proposals. They should be addressed as follows:

**CITY OF JOLIET – SEALED BID ENCLOSED
OFFICE OF THE CITY CLERK
150 W. JEFFERSON ST.
JOLIET, IL 60432**

If you do choose to hand deliver your bid/proposal, they are to be hand delivered to the East or West side of City Hall, 150 W. Jefferson St., Joliet, IL 60432 and marked clearly on the outside of the SEALED package with the BID NUMBER AND NAME OF THE PROJECT, DATE AND TIME OF THE BID OPENING, NAME AND ADDRESS AND PHONE NUMBER OF YOUR COMPANY, and RECEIPT OF ALL ADDENDA (if applicable). All other doors will be locked. Please make sure to mention you are delivering a sealed bid/proposal, so the receiver knows to time stamp the envelope upon receipt. If dropping off a bid in person, bids must be dropped off during business hours only between 8:00 A.M. and 4:30 P.M.

2. Description of Work. The proposed construction consists of installing approximately 1,490 lineal feet of 6-inch, 10,540 lineal feet of 8-inch, and 3,360 lineal feet of 12-inch water main, including new hydrants and valves; sanitary sewer point repairs; and other miscellaneous items of work. The contract will include all work necessary to install the water main, install water service lines via directional drilling or open cut methods, reconnect existing water service lines, restore the roadway, and perform all restoration to return the area to its original condition.

3. Information for Bidders. Any contract or contracts awarded under this invitation for bids are expected to be funded in part by a loan from the Illinois Environmental Protection Agency (IEPA). Neither the State of Illinois nor any of its departments, agencies, or employees is or will be a party to this invitation for bids or any resulting contract. The procurement will be subject to regulations contained in the procedures for issuing loans from the Public Water Supply Loan Program (35 IAC Part 662), the Davis-Bacon Act (40 USC 276a through 276a-5) as defined by the United States Department of Labor, the Employment of Illinois Workers on Public Works Act (30 ILCS 570), the Illinois Works Jobs Program Act Apprenticeship Initiative, the Disadvantaged

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Business Enterprise policy per 40 CFR Part 33, as amended, and the "Use of American Iron and Steel" requirements as contained in Section 436 of H.R. 3547, the Consolidated Appropriations Act, 2014. This procurement is also subject to loan recipient's policy regarding the increased use of disadvantaged business enterprises. The loan recipient's policy requires all bidders to undertake specified affirmative efforts at least sixteen (16) days prior to bid opening. The policy is contained in the specifications.

Bidders are also required to comply with the President's Executive Order No. 11246, as amended. The requirements for Bidders and Contractors under this order are explained in 41 CFR 60-4. The City of Joliet Local Bidders Ordinance does not apply to this contract.

All pertinent documents may be examined at the Office of the City Clerk, City of Joliet Municipal Building, 150 West Jefferson Street, Joliet, Illinois 60432 between the hours of 8:00 A.M. and 4:30 P.M., Monday through Friday. Hard copies will not be available for purchase. Electronic copies of the Bidding Documents can be downloaded free of charge at <https://www.joliet.gov/government/departments/purchasing/bids-proposals>.

Contractor(s) shall pay prevailing wages at rates not less than those under Davis-Bacon Wage Act Provisions as determined by U.S. Department of Labor to all laborers, workmen and mechanics performing work under this contract.

All Bidding Document holder should sign up for RSS feeds at <https://www.joliet.gov/government/departments/purchasing/bids-proposals/construction-public-utilities> and provide first and last name and email address to automatically receive addendums. Addendums will also be posted on the City of Joliet's website at <https://www.joliet.gov/government/departments/purchasing/bids-proposals>. The potential Contractor remains responsible for obtaining all addenda to the original specifications and should check the specific bid page before submitting a bid to ensure they have received all addenda.

Prequalification pursuant to Ordinance No. 7345 is necessary. Bidders are required to be pre-qualified through the Illinois Department of Transportation, the Capital Development Board or the City of Joliet. It is the responsibility of the bidder to ensure that their pre-qualification information is provided to the City of Joliet Purchasing Division prior to the bid opening. If bidders are not prequalified through IDOT or Capital Development Board, then they must be prequalified with the City of Joliet. Financial prequalification forms can be obtained from the City of Joliet website at <https://www.joliet.gov/government/departments/purchasing/prequalification-process>. This prequalification MUST be renewed yearly. To check on your current prequalification status, you can contact purchasing@joliet.gov. The current price for City of Joliet prequalification is \$175, which offsets the costs for independent auditor review of the documents. Those documents are to be submitted to the Purchasing Division, City of Joliet, 150 West Jefferson Street, Joliet, IL 60432 at least 6 days prior to the bid opening

If at the time the Agreement for this Project is executed, or if during the term of the Agreement, there is excessive unemployment in Illinois as defined in the Employment of Illinois Workers on Public Works Act, 30 ILCS 570/0.01 et seq., as two consecutive months of unemployment exceeding 5%, the Bidder agrees to employ Illinois laborers in accordance with the "Employment of Illinois Workers on Public Works Act". An "Illinois laborer" is defined as any

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person who has resided in Illinois for at least thirty (30) days and intends to become or remain an Illinois resident.

All proposals are subject to the requirements of the City of Joliet Procurement Code (Section 2-430 – 2-453) of the Bidder Instructions.

All Bids must be accompanied by a Bidder's bond, certified check, bank cashier's check or bank draft payable to the City of Joliet for ten percent 10% of the total amount of the Bid as provided in the Bidder Instructions.

A **mandatory** Pre-Bid Conference of all prospective Bidders and/or their representatives will be held on November 10, 2022 at 10:00 A.M at City of Joliet East Side WWTP, 815 Adler Street, Joliet, Illinois 60436. Bidders are **required** to attend and participate in the conference.

Direct all questions about the meaning or intent of the Bidding Documents to the Engineer Peter Kozak (pkozak@baxterwoodman.com).

4. Rejection of Bids. The Council reserves the right to reject any or all Bids and to waive technicalities. Unless the Bids are rejected for good cause, award of contract shall be made to the lowest responsible and responsive Bidder.

Advertisement Date(s):

Herald News, October 27, 2022

James V. Capparelli, City Manager

Dawn A. Kochan, Purchasing/Contracts Administrator

END OF ADVERTISEMENT FOR BIDS

SECTION 01 32 53

DIGITAL UTILITY DATA COLLECTION

PART 1 - GENERAL

1.1 SUMMARY

- A. The purpose of this specification is to provide real-time utility and infrastructure asset data for delivery into the City of Joliet's Geographic Information System (GIS). The Contractor is required to utilize GPS equipment to obtain project data points, assets, and real-time as-built utility information during construction.

1.2 SUBMITTALS

- A. Shop Drawing Submittals – (Reserved).
- B. Operation and Maintenance Manuals – (Reserved).
- C. Certificates and Guarantees – (Reserved).
- D. Spare Parts – (Reserved).

1.3 QUALITY ASSURANCE – (Reserved).

1.4 DELIVERY, STORAGE, AND HANDLING – (Reserved).

1.5 SITE CONDITIONS – (Reserved).

1.6 MAINTENANCE – (Reserved).

PART 2 - PRODUCTS

2.1 EQUIPMENT

- A. The City of Joliet will provide one complete GPS unit setup without a cellular device for each project.
 - 1. A deposit of \$7,500 in the form of cashier's check will be required and will be returned to the Contractor once the unit has been returned in good working order.
 - 2. The Contractor shall be responsible for providing a dedicated smart phone or tablet with 5G cellular connectivity for the GPS unit.
- B. The Contractor has the option to provide their own GPS units.
 - 1. Equipment requirements for data collection shall include GPS Rovers that meet the minimum accuracy and real-time GIS integration requirements. Equipment used to collect this data shall be properly calibrated and capable of meeting a minimum accuracy of 10 mm horizontally and 20 mm vertically (Trimble R2, DA2, or equal).

2. Only one GPS unit will be provided by the City. For multiple, simultaneous data collection operations with GPS, the Contractor may potentially need to provide multiple GPS units to collect required data.
 3. Additional GPS rentals are available from the following provider: Baxter & Woodman, Inc., Attn: Matt Washkowiak 815.301.7415. The cost for these services are not included in this project. The GPS provider shall be contacted for fees related to this service, if needed.
- C. The GPS equipment shall integrate and utilize the Esri ArcGIS Field Maps Application (downloadable from App Store and Google Play) with an Agency provided Project Map. The Contractor will provide real-time connectivity and data updates using a cellular data connection with the GPS unit. GPS units must be able to deliver real time, cellular networked data to an ESRI ArcGIS Online portal established by the Engineer. The Contractor will have access to collected data and can utilize this GIS information to assist them throughout the project. The Contractor will use a City provided ESRI license.
- D. The contractor will be responsible for successful operation of the GPS unit and data upload to the City's GIS database (including all necessary training, support, storage, maintenance, charging, and related operational requirements). City staff will not provide technical support of the GPS units.
1. Baxter & Woodman will provide a 2-hour training session at the start of construction and support for up to 4-hours per month.
 2. Additional GPS rental, setup, support, GIS integration, and training beyond the specified allotment is available from the following provider: Baxter & Woodman, Inc., Attn: Matt Washkowiak 815.301.7415. The cost for these services are not included in this project and the provider shall be contacted for fees related to this service, if needed.

PART 3 - EXECUTION

3.1 STANDARDS OF DATA COLLECTION

- A. The Contractor shall utilize and maintain the GPS equipment in accordance with manufacturer and local agency recommendations.
- B. Contractor shall obtain survey data during or immediately after installation of the utility. For open trench and exposed water main or sewer utilities, data points shall be obtained at intervals of 50 feet and at directional changes with a minimum of 2 points. Utilities that are bored (trenchless) will be surveyed at the exposed pit locations at both ends and along the boring route with depths manually inputted every 10 feet from the above ground locating devices. For water and sanitary services, data points shall be obtained at intervals of 10 feet and at directional changes with a minimum of 2 points.
- C. Data collection with the GPS device shall be completed by the contractor on a real-time basis as the project is being constructed. The contractor shall verify that data is being collected real-time with a provided GIS portal (simple website link) on a regular basis, no less than two times per day.

- D. GPS control points will be provided at the project start-up, and the contractor shall check in daily (beginning of day) to verify and maintain calibration of the device.
- E. At least 95% of collected data must meet GPS accuracy requirements. As a production guideline to the Contractor, GPS data collection may require occupying a point for 1-minute to gather the desired accuracy. If any point needs to be occupied in excess of 5-minutes to obtain the desired accuracy, the Contractor will note that shot in the data collection application, inform the Engineer, and move on to the next location. No point shall be occupied for more than 5-minutes.

3.2 DATA COLLECTION FEATURES

- A. The following features are anticipated and designated to be collected by the contractor during construction for the purpose of delivering GIS Digital As-Builts:
 - 1. Water main, services, fittings, valves, hydrants, meters, corporation stops, curb stops, structures, b-boxes, and related features (horizontal, vertical elevation top of pipe, sizes, model data)
 - a. In the event that polywrap is observed to not be properly installed on ductile iron pipe, the contractor will be required to take photos of all installed ductile iron pipe to verify that polywrap is properly installed. Photos shall be provided (within Field App) as determined by the Engineer.
 - 2. Proposed sanitary sewer, services, manholes, cleanouts, and related features (horizontal, vertical elevation top of pipe, sizes, model data)
 - 3. Proposed storm sewer, structures, and related features (horizontal, vertical elevation top of pipe, sizes, model data)
 - 4. Exposed Sanitary Services (horizontal, vertical elevation, sizes, regardless of type)
 - 5. Proposed Manhole and Structure attributes (horizontal, vertical elevation, depth, sizes, rims, inverts)
 - 6. Connections to existing utilities
 - 7. Any other proposed or modified underground utility work or related feature
- B. Final GPS survey code and data input requirements will be provided at project start-up.

3.3 DATA ACCEPTANCE

- A. The Contractor will be responsible for obtaining all designated features and verify collection standards are being met. If data has been found to be missing or omitted, the Engineer will notify the Contractor to obtain that data as deemed necessary, including the option to excavate, expose, and collect the missing information at no additional expense to the owner.
- B. The Engineer shall verify within the Local Agency's GIS quality reviewer that all data has been collected satisfactorily prior to payment for this item. Failure to do so will be grounds for denying the pay request. If, at any time, the Contractor fails to perform this work, the Engineer reserves the right to utilize an outside provider and deduct any expense from the contract due to perform the work.

- C. The Contractor shall be fully responsible for the safe and efficient gathering of data and use of equipment. No additional compensation shall be provided from any delays resulting from the operation and performance of Digital Data Collection.

3.4 SUBMITTALS

- A. Digital Data Collection will be conducted real-time during construction and visible with the ArcGIS Online portal. No final GIS package delivery will be required of the contractor.
- B. The Engineer will finalize data collection by completing final utility connected linework for the purpose of delivering GIS shapefiles compatible with ESRI supported GIS. Utility lines connected shall include all identified attributes. If needed, the Contractor will assist the Engineer and clarify final pipe data and connections within GIS.
- C. The Contractor may utilize data in the portal to estimate quantity computation and the progress of work.

END OF SECTION

SECTION 33 01 10.83

CURED IN PLACE PRESSURE PIPE – WATER MAIN

PART 1 - GENERAL

1.1 SUMMARY

- A. Provide cured-in-place pressure pipe – water main water system rehabilitation as shown on the Drawings, as specified herein, and as needed for a complete and proper installation, and in accordance with the latest edition of the “Standard Specifications for Water and Sewer Construction in Illinois”, except as revised herein.
- B. Provide pipeline cleaning, televising, and pressure pipe lining as shown on the Drawings, specified herein, and as needed for a complete and proper rehabilitation of the pipeline.
- C. Provide labor, materials, tools, and equipment necessary to perform all work specified in this Section.
- D. No previous television inspections are available. Closed circuit televising of pressure pipe must be performed prior to cleaning, after cleaning, and after installation of the liner.
- E. Related work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, Supplementary Conditions, and Division 01 - General Requirements of these Specifications.
- F. References – (Reserved).

1.2 SUBMITTALS

- A. Submit shop drawings, including:
 - 1. Manufacturer's recommended installation procedures and written certification of compliance with ASTM standards for all materials.
 - 2. Pressure pipe lining design calculations, including manufacturer's validation of contractor's design calculations or manufacturer's design worksheet, and minimum wall thickness.
 - 3. Manufacturer's recommendation for the following:
 - a. Minimum and maximum temperature to be maintained during the cure period and post-cure period.
 - b. Minimum and maximum pressures to be during the inversion and during the cure period.
 - 4. Television inspections conducted in digital format (.mpg or .avi) and submitted on USB flash drives.

- B. Submit at the preconstruction meeting for review and approval by Owner and Engineer:
 - 1. Plan for temporary water service where necessary.
 - 2. Traffic control plans.
 - 3. Manufacturer's Affidavit verifying lining system is manufactured and tested in accordance with the requirements of the applicable ASTM standard.
 - 4. Temporary Water Distribution System Plan
 - a. Shall consist of a temporary water distribution system while the new main is being cleaned, lined, tested, and disinfected.

- C. Submit after installation of the lining product:
 - 1. Written log of pressure readings during the inversion and cure period.
 - 2. Written log of temperatures for each thermocouple used during the cure period and post-cure period.
 - 3. Test results from two labeled, lining product samples for each pipe diameter and liner thickness.
 - a. Testing to be done by a third party independent laboratory.
 - 4. Written log of results for pressure and leakage testing.
 - 5. Two sets of post-rehabilitation television inspection videos and written logs.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

- B. Certifications:
 - 1. Furnish manufacturer's certificates of compliance stating contractor is certified to perform the work.
 - 2. Provide manufacturer's certification that the proposed resin system and cure schedule are appropriate for the proposed application and have been tested in laboratory and field conditions.

- C. Refer to subsequent sections for Contractor qualification requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with the pertinent provisions of Section 01 66 11.

- B. Liner materials that are defective or damaged prior to installation shall be rejected and replaced at the Contractor's expense. Liner materials damaged during installation shall be repaired or replaced as recommended by the manufacturers and approved by the Engineer.

PART 2 - PRODUCTS

2.1 PIPE CLEANING EQUIPMENT

- A. Provide high-velocity water jetting machines, mechanically powered equipment, cable attached devices, pipe pigs, and all other equipment necessary to clean pipe in preparation for televising and installation of pipe liner.

2.2 TELEVISIONING EQUIPMENT

- A. Provide closed circuit color televising (CCTV) equipment meeting following requirements:
 - 1. Television Camera:
 - a. Use a digital color television camera designed and constructed for pipe inspection with the following capabilities:
 - b. High-resolution color-chip camera and monitor capable of producing a minimum of 650 lines of resolution.
 - c. Adequate and adjustable directional lighting to allow a clear picture of the entire periphery of the pipe.
 - d. Provide auxiliary lighting for pipes larger than 12-inch diameter.
 - e. Operable in 100 percent humidity conditions.
 - f. Use a camera that has a 360^o radial by 270^o pan-and-tilt viewing field.
 - g. Remote or manually propelled.
 - h. Electronic footage counters accurate to less than 1 percent error over the length of the particular pipe being inspected.
 - i. Skids or wheel assembly specifically sized for each pipe diameter where it is necessary to raise the camera in large pipes to position the camera in the center of the pipe.
- B. Audio-Video Recording System:
 - 1. General:
 - a. Provide the total audio-video recording system and procedures as required to produce a high quality digital video and audio production of bright, sharp, clear pictures with accurate colors, free from distortion.
 - (1) The audio portion shall have proper volume and clarity and shall be free from distortion.
 - 2. Video Record Equipment:
 - a. Record inspection electronically and create USB flash drives directly from digital content without an intermediate analog conversion.
 - b. Provide the documentation of the inspection in digital format (.mpg, .avi, or other approved format) and submitted on USB flash drives or (2.0/3.0) powered portable hard drives.

2.3 CURED-IN-PLACE PIPE (CIPP) WATER MAIN LINING PRODUCT

A. General:

1. Provide complete lining product that meets the following specifications in addition to the manufacturer's standards and ASTM F1216.
2. Basis of Design:

Pipe Condition	Fully deteriorated
Depth to pipe invert	5-8 feet
Design life (years)	50
Safety factor	2
Groundwater level	At surface
Ovality circumference	2%
Soil Modulus	1,000 psi
Internal design pressure	70 psi
Soil Unit Weight	120 pcf Minimum
Creep Reduction Factor	50% Maximum
Live Load	AASHTO HS20-44 Loading under Roadways

B. Material:

1. Provide material per manufacturer's recommendations of selected lining system.
2. Selected material must comply with ANSI/NSF 61 Class IV and ASTM F-1216.
 - a. The ASTM F1216 standard is a procedure for reconstruction that covers all aspects of rehabilitation, including but not limited to, materials, design considerations, installation, inspection, and chemical resistance of the material, etc.
 - b. Finished lining must at a minimum be Class IV lining and comply with ASTM F1216, Appendixes, X1, "Design Considerations", X1.3.2. "Fully Deteriorated Pressure Pipe Condition."

C. Certification:

1. Provide manufacturer's certification that the proposed resin system and cure schedule are appropriate for the proposed application and have been tested in laboratory and field conditions.
2. IEPA approval of the proposed water main lining manufacturer is required.
 - a. All the multiple water contact material used in the reconstruction of the water main must be certified under ANSI/NSF Standard 61 to verify that none of the products migrate or leach any harmful contaminant in to the drinking water.

D. Acceptable manufacturers and systems:

1. Sanexen Environmental Services, Inc. – ALTRA10X Structural Liner.
2. No substitutions.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed.
 - 1. Correct conditions detrimental to timely and proper completion of the Work.
 - 2. Do not proceed until unsatisfactory conditions are corrected.
- B. Protect utilities in area of construction.
 - 1. Contact JULIE at any locations where excavation is required.
- C. Restore all areas of construction to preconstruction condition, including streets, sidewalks, curbs and gutters, trees and shrubbery of same type and size, and lawns and parkways.

3.2 ACCESS PITS

- A. Sheeting: Comply with OSHA requirements.
- B. Granular backfill material:
 - 1. Comply with Section 31 23 79.

3.3 INSTALLATION AND RECEIVING PITS

- A. Provide pits as required to install and receive pipes and/or liners.
 - 1. Provide tight sheeting where required to provide protection to public, permitting agency and public property, and adjacent utilities.
 - 2. Comply with OSHA requirements for type, installation, and removal of sheeting.
 - 3. Provide fencing of pits to provide protection to the public.
 - a. Submit type and systems to Owner at Preconstruction Meeting for approval.
- B. Provide pits of lengths and widths as necessary for Work.
- C. Backfilling of pits:
 - 1. Backfill with compacted granular backfill materials for pits in paved areas.
 - 2. Backfill with compacted excavated materials where granular backfill material is not required.
 - 3. Comply with compaction requirements outlined in Section 31 23 79.
 - 4. Re-grade to match preconstruction condition and adjacent area.
 - 5. Remove all construction debris, materials, excess excavated material, and sheeting from construction site upon completion of the Work.

3.4 EXISTING PIPING

- A. Protect existing piping throughout the area of proposed work.
 - 1. All existing piping to remain in use unless a change is approved by the Engineer.
- B. Excavate and remove the minimum length of pipe necessary for the liner insertion and receiving operations as per the manufacturer's recommendations.
- C. The existing main shall be cut square using an approved cutting machine, leaving no split or fractured ends.
 - 1. All cut faces of the existing main shall be chamfered on the inside surface to a suitable profile to prevent damage to the liner pipe during or after insertion.

3.5 PREPARATORY CLEANING AND INTERNAL PIPE INSPECTION

- A. Clean and televise pipes to be lined prior to installation of lining product.
 - 1. Schedule and coordinate times of televising with the Engineer prior to televising.
 - 2. Televise pipe prior to installation of lining product and provide one copy of the video and written log to the Engineer for viewing.
- B. Inspect pipes by closed circuit television to determine locations of conditions, joints, and building service connections.
 - 1. Utilize pan-and-tilt camera to locate each service.

3.6 CORRECTION OF EXISTING CONDITIONS

- A. Correct conditions in existing pipe that would prevent proper installation of lining product.
 - 1. Clean pipe surface of all rust, scales, tuberculation, deposits, loose or deteriorated remains of any original coatings and other foreign materials.
 - 2. Flush host pipe with clean water after cleaning operations and remove all standing water with a tight fitting rubber plunger and foam swabs.

3.7 WATER MAIN LINING

- A. All access pits must be adequately protected by fencing or plates/plywood to properly protect the public.
- B. Conduct operations in strict accordance with applicable OSHA standard involving scaffolding and working in confined spaces.
- C. Install lining product by either the direct inversion method or by the pull-in-place method per manufacturer's recommendations.
 - 1. Provide lubricants as recommended by manufacturer.

2. Puller unit/winch cable shall be equipped with a tension gauge to measure tension during pull through.
 3. The shaping of the liner may be achieved by pushing a pig through the hose using water pressure.
 4. The head used will fall within the manufacturer's guidelines to ensure that a proper finished thickness is achieved and that the liner fits snug to the existing pipe wall, producing dimples at service connections and/or flared ends at the entrance and exit points.
- D. Cure the product using hot water or steam per the manufacturer's recommendations and approved shop drawings.
1. The equipment shall be capable of delivering hot water or steam to the far end of the liner to uniformly raise the temperature in the entire liner above the temperature required to initiate and effect curing of the resin system.
 2. The heat source shall be fitted with suitable monitors to gauge the temperature and pressure of the incoming and outgoing heat exchanger circulating heating medium.
 3. Thermocouples or temperature gauges or infra-red gun shall be used at insertion and extraction points so as to determine and record the temperature of the liner and time of exotherm.
 4. Initial cure shall be deemed to be completed when inspection of the exposed portions of the liner show it to be hard and sound; and when temperature reading(s) at the interface of the liner with the host pipe indicate sufficient heating has occurred.
 5. Once the cure is complete, the Contractor shall cool the hardened liner to a temperature below one hundred degrees Fahrenheit (100°F) before relieving the internal pressure.
 6. Cool down shall be accomplished as recommended by the manufacturers.
 7. The finished liner shall be continuous over the entire length and be free from visual defects such as foreign inclusions, dry spots, pinholes, and delaminations. The lining shall be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to the inside of the lined pipe.
 8. If at the insertion/extraction ends the lining fails to make a tight seal, the Contractor shall apply a seal of a resin mixture compatible with the liner.
- E. Seal voids between lining product and host pipe per manufacturers recommendations and approved shop drawings.
- F. Any residual water that adheres to the inner wall of the liner shall be collected and pumped from the channel of the insertion/extraction points and circulated through a separate carbon filtration unit before discharge into a downstream storm manhole.
- G. Provide connections to existing pressure piping.

3.8 FLUSHING AND DISINFECTION

- A. After the water main rehabilitation work has been satisfactorily completed and tested and the liner is below one hundred degrees Fahrenheit (100°F), flush and disinfect the work in accordance with AWWA C651, and "Standard Specifications for Water and Sewer Construction in Illinois" as modified by these Specifications.

3.9 TESTING

- A. After curing, sample the water main for volatile (VOC) and semi-volatile organic chemicals (SVOC) including styrene, acetone, phenol, phthalates and any other contaminant of concern based upon resin composition.
 - 1. Submit results to Owner as soon as available.
- B. Provide lining product samples.
 - 1. Provide two samples for each pipe diameter and thickness even if the quantity is less than one thousand feet.
 - 2. Obtain one sample from termination point and one sample from a clamped mold placed in the downtube when heated water is used and in the silencer when steam is used.
 - 3. Label each sample.
 - a. Submit samples to an approved third party, independent laboratory for testing of Short-Term Flexural (Bending) properties, Tensile properties, and liner thickness.
 - (1) Installed liner must meet the minimum thickness requirements.
 - (2) Non-compliance will result in a credit based upon the percent of actual thickness to design thickness regardless of flexural and tensile properties.
 - b. If any test fails to meet the testing requirements, test the samples from the remaining inversions at no cost to the Owner.
- C. Test watertightness by hydrostatic water testing method in ASTM F1216 after stabilization of the CIPP.
 - 1. Proposed working pressure for the water main is approximately 70 psi.
 - 2. Testing requirement is 120 psi (2.0 times the working pressure or the working pressure plus 50 psi, whichever is less) for 1 hour.
- D. Provide final inspection test by closed circuit television as outlined in ASTM.
 - 1. Deliver videos and written logs to the Engineer.
- E. No visual defects, including delamination, pinholes, un-impregnated or cured spots, or foreign bodies are acceptable.
- F. The water main shall be pressure tested according to Section 33 11 43 of these Specifications.

3.10 CORRECTION OF DEFECTS

- A. The Engineer will review the final inspection test to identify any defects in the newly lined water main.
- B. Any defects that are determined by the Engineer to be repairable will be repaired at the sole expense of the Contractor.
- C. Should the results of this final inspection reveal any defects that are determined by the Engineer not to be repairable the Contractor will be required to remove and replace the existing water main as ordered by the Engineer at the sole expense of the Contractor.

3.11 RESTORATION

- A. Restore all areas of work to pre-construction conditions.
- B. Comply with requirements of Section 31 23 79, Trenching, Backfilling, and Compacting.
- C. Comply with requirements of Section 32 10 00, Street, Driveway, and Sidewalk Replacement.
- D. Comply with requirements of Section 32 92 00, Lawns and Grasses.
- E. Restoration required because of Contractor staging, materials, traffic, temporary water mains and services, and other non-excavation related tasks will be incidental to the contract.

END OF SECTION

