

**CITY OF ANN ARBOR  
REQUEST FOR PROPOSAL**

**RFP # 977**

**ON-CALL SEWER SYSTEM SERVICES**



Due Date: Thursday, June 16, 2016 by 10:00 A.M.

Public Services Area  
Field Operations Unit

Issued By:  
City of Ann Arbor  
Procurement Unit  
301 E. Huron Street  
Ann Arbor, Michigan 48107-8647

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## **SECTION I GENERAL INFORMATION**

### **A. OBJECTIVE**

The purpose of this Request for Proposal (RFP) is to select a firm or firms to provide qualified services for the maintenance, repair, and improvement of existing sanitary and storm sewer infrastructure within the City of Ann Arbor. Specific services to be performed by the Contractor include video inspection of sewers, cleaning of sewers, full length and spot repair cured-in-place pipe rehabilitation, manhole rehabilitation and sanitary sewer joint testing and grouting.

### **B. QUESTIONS ABOUT AND CLARIFICATIONS OF THE RFP**

All questions regarding this RFP shall be submitted via e-mail. E-mailed questions will be accepted from any and all prospective respondents in accordance with the terms and conditions of this RFP.

All questions shall be submitted on or before June 6, 2016 at 5:00 PM and should be addressed as follows:

Scope of Work/Proposal Content questions emailed to [celenbaas@a2gov.org](mailto:celenbaas@a2gov.org)

RFP Process and Compliance questions emailed to [cspencer@a2gov.org](mailto:cspencer@a2gov.org)

Should any prospective proposer be in doubt as to the true meaning of any portion of this Request for Proposal, or should the proposer find any ambiguity, inconsistency, or omission therein, the Proposer shall make a written request for an official interpretation or correction. Such requests must be received by Chris Elenbaas at [celenbaas@a2gov.org](mailto:celenbaas@a2gov.org) on, or before, June 6, 2016 at 5:00 PM.

All interpretations, corrections, or additions to this RFP will be made only as an official addendum that will be posted to [a2gov.org](http://a2gov.org) and [MITN.info](mailto:MITN.info) and it shall be the respondent's responsibility to ensure they have received all addenda before submitting a Proposal. Any addendum issued by the City shall become part of the RFP and must be incorporated in the Proposal where applicable.

Each respondent must in its proposal, to avoid any miscommunications, acknowledge all addenda which it has received, but the failure of a respondent to receive or acknowledge receipt of any addenda shall not relieve the respondent of the responsibility for complying with the terms thereof.

The City will not be bound by oral responses to inquiries or written responses other than official written addenda.

### **C. PRE-PROPOSAL MEETING**

No pre-proposal meeting will be held for this RFP. Please contact staff indicated above with general questions regarding the RFP.

## **D. PROPOSAL FORMAT**

To be considered, each firm must submit a response to this RFP using the format provided in Section III. No other distribution of proposals is to be made by the respondent. The proposal must be signed in ink by an official authorized to bind the respondent to its provisions. Each proposal must remain valid for at least ninety days from the due date of this RFP.

Proposals should be prepared simply and economically providing a straightforward, concise description of the Respondent's ability to meet the requirements of the RFP. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed in ink by the person signing the proposal.

Each person signing the Proposal is required to certify that he/she is the person in the Respondent's Firm/organization responsible for the decision as to the fees being offered in the Proposal and has not and will not participated in any action contrary to the terms of this provision.

Respondents must submit copies of the sealed Proposal including the fee proposal in the manner specified in subsection F below. Failure to do so may result in the Proposal being disqualified.

## **E. SELECTION CRITERIA**

Responses to this RFP will be evaluated using a point system as shown in Section III. The evaluation will be completed by a selection committee comprised of staff from the City of Ann Arbor.

At the initial evaluation, the fee proposals will not be reviewed. After initial evaluation the City will determine top respondents, and open only those fee proposals. The City will then determine which, if any, firms will be interviewed. During the interviews, the selected firms will be given the opportunity to discuss their proposal, qualifications, past experience, and their fee proposal in more detail. The City further reserves the right to interview the key personnel assigned by the selected contractor to this project.

All Proposals submitted may be subject to clarifications and further negotiation. All agreements resulting from negotiations that differ from what is represented within the RFP or in the respondent's response shall be documented and included as part of the final contract.

## **F. SEALED PROPOSAL SUBMISSION**

All Proposals are due and must be delivered to the City Procurement Unit on, or before, **Thursday, June 16, 2016 at 10:00 a.m.** (local time). Proposals submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Respondent **must submit in a sealed envelope one (1) original Proposal, three (3) additional Proposal copies, one (1) digital copy in PDF format, and two (2) copies of**

**the Fee Proposal in a separate sealed envelope marked Fee Proposal.** Proposals submitted must be clearly marked: RFP No. 977 – On-Call Sewer System Services and list the Respondent’s name and address.

Proposals must be addressed and delivered to:

City of Ann Arbor  
Procurement Unit  
c/o Customer Services, 1<sup>st</sup> Floor  
301 East Huron Street  
P.O. Box 8647  
Ann Arbor, Michigan 48107

All Proposals received on, or before, the Due Date will be publicly opened and recorded on the due date. No immediate decisions are rendered.

Hand delivered Proposals must be date/time stamped by the Customer Service Department at the address above in order to be considered. Delivery hours are 9:00 a.m. to 3:00 p.m. Monday through Friday, excluding Holidays.

The City will not be liable to any Respondent for any unforeseen circumstances, delivery, or postal delays. Postmarking on the Due Date will not substitute for receipt of the Proposal. Each Respondent is responsible for submission of their Proposal. Additional time will not be granted to a single Respondent; however, additional time may be granted to all Respondents when the City determines that circumstances warrant it.

**A proposal will be disqualified if:**

- 1. The fee proposal is not contained within a separate sealed envelope.**
- 2. The fee proposal is submitted as part of the digital copy. Provide fee proposal in hard copy only.**
- 3. The following forms provided within the RFP Document are not included in the submitted proposal package**
  - Attachment C - City of Ann Arbor Prevailing Wage Declaration of Compliance**
  - Attachment D - City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
  - Attachment E - Vendor Conflict of Interest Disclosure Form**
  - Attachment F - City of Ann Arbor Non-Discrimination Declaration of Compliance**

**Proposals that fail to provide these completed forms listed above upon proposal opening will be deemed non-responsive and will not be considered for award.**

**G. DISCLOSURES**

Under the Freedom of Information Act (Public Act 442), the City is obligated to permit review of its files, if requested by others. All information in a respondent’s proposal is subject to

disclosure under this provision. This act also provides for a complete disclosure of contracts and attachments thereto.

## H. TYPE OF CONTRACT

A sample of the standard Contract is included in Section 4. Those who wish to submit a proposal to the City are required to carefully review the Contract. **The City will not entertain changes to terms and conditions of the standard Contract.**

For all construction work, the respondent must further adhere to the City of Ann Arbor General Conditions. The General Conditions are included in Section 4. Retainage will be held based on individual tasks and not on the total contract value. The Contractor shall provide the required bonds included in the Contract Documents for a value of \$50,000 for the duration of the Contract. The cost for these bonds shall be included in the fee schedule and paid for by the City quarterly. If the value of work at any one time exceeds \$50,000, the Contractor shall adjust the bonding amount appropriately.

The City reserves the right to award the total proposal, to reject any and all proposals in whole or in part, and to waive any informality or technical defects if, in the City's sole judgment, the best interests of the City will be so served.

## I. HUMAN RIGHTS REQUIREMENTS

All contractors proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Attachment F shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

## J. WAGE REQUIREMENTS

Section 4 of the General Conditions, beginning at page GC-2, outlines the requirements for payment of prevailing wages and for payment of a "living wage" to employees providing service to the City under this contract. The successful respondent and its subcontractors must comply with all applicable requirements and provide documentary proof of compliance when requested.

For laborers whose wage level are subject to federal, state and/or local prevailing wage law, the appropriate Davis-Bacon wage rate classification is identified based upon the work included within this contract. **The wage determination(s) current on the date 10 days before bids are due shall apply to this contract.** The U.S. Department of Labor (DOL) has provided explanations to assist with classification in the following resource link: [www.wdol.gov](http://www.wdol.gov).

The following forms are attached:

- Prevailing Wage Declaration of Compliance (Attachment C)
- Living wage declaration form (Attachment D)

## **K. CONFLICT OF INTEREST DISCLOSURE**

The City of Ann Arbor Purchasing Policy requires that prospective Vendors complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected Vendor unless and until the Procurement Unit and the City Administrator have reviewed the Disclosure form and determined that no conflict exists under applicable federal, state, or local law or administrative regulation. Not every relationship or situation disclosed on the Disclosure Form may be a disqualifying conflict. Depending on applicable law and regulations, some contracts may awarded on the recommendation of the City Administrator after full disclosure, where such action is allowed by law, if demonstrated competitive pricing exists and/or it is determined the award is in the best interest of the City. A copy of the Vendor Conflict of Interest Disclosure Form is included as Attachment E.

## **L. COST LIABILITY**

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the contractor prior to the execution of a Professional Services Agreement. The liability of the City is limited to the terms and conditions outlined in the Agreement. By submitting a Proposal, Respondent agrees to bear all costs incurred or related to the preparation, submission and selection process for the Proposal.

## **M. DEBARMENT**

Submission of a proposal in response to this RFP is certification that the Respondent is not currently debarred, suspended, proposed for debarment, and declared ineligible or voluntarily excluded from participation in this transaction by any State or Federal departments or agency. Submission is also agreement that the City will be notified of any changes in this status.

## **N. AWARD PROTEST**

All Proposal protests must be in writing and filed with the Purchasing Agent within five (5) business days of the award action. The respondent must clearly state the reasons for the protest. If a respondent contacts a City Service Area/Unit and indicates a desire to protest an award, the Service Area/Unit shall refer the respondent to the Purchasing Agent. The Purchasing Agent will provide the respondent with the appropriate instructions for filing the protest. The protest shall be reviewed by the City Administrator or designee whose decision shall be final.

## **O. SCHEDULE**

The following is the solicitation schedule for this procurement.

<b>Activity/Event</b>	<b>Date</b>
Written Question Deadline	Monday, June 6, 2016 by 5:00 p.m.
Proposal Due Date	Thursday, June 16, 2016 by 10:00 a.m.
Contractor Selection	Week of June 20, 2016

The above schedule is for information purposes only and is subject to change at the City's discretion.

#### **P. IRS FORM W-9**

The selected Respondent will be required to provide the City of Ann Arbor an IRS form W-9.

#### **Q. INDEPENDENT FEE DETERMINATION**

1. By submission of a proposal, the Respondent certifies, and in the case of joint proposal, each party thereto certifies as to its own organization, that connection with this proposal:
  - a) They have arrived at the fees in the proposal independently, without consultation, communication, or agreement, for the purpose of restricting competition as to any matter relating to such fees with any other proposal submitted or with any competitor.
  - b) Unless otherwise required by law, the fees which have been quoted in the proposal have not been knowingly disclosed by the submitter and will not knowingly be disclosed by the submitter prior to award or indirectly to any other prospective submitter or to any competitor.
  - c) No attempt has been made or shall be made by the proposal submitter to induce any other person or firm to submit or not submit a proposal for the purpose of restricting competition.
  - d) Each person signing the proposal certifies that she or he is the person in the proposal submitter's organization responsible within that organization for the decision as to the fees being offered in the proposal and has not participated (and will not participate) in any action contrary to 1.a),b), or c) above.
2. A proposal will not be considered for award if the sense of the statement required in the Fee Analysis portion of the proposal has been altered so as to delete or modify 1.a),c), or 2 above. If 1.b) have been modified or deleted, the proposal will not be considered for award unless the submitter furnishes with the proposal a signed statement which sets forth in detail the circumstances of the disclosure and the Issuing Office determines that such disclosure was not made for the purpose of restricting competition.

#### **R. RESERVATION OF RIGHTS**

1. The City reserves the right in its sole and absolute discretion to accept or reject any or all Proposals, or alternative Proposals, in whole or in part, with or without cause.
2. The City reserves the right to waive, or not waive, informalities or irregularities in terms, or conditions of any proposal determined by the City to be in the best interests of the City even though not the lowest cost proposal submitted.
3. The City reserves the right to request additional information from any or all Respondents.



4. The City reserves the right not to consider any Proposal which it determines to be unresponsive and deficient in any of the information requested within RFP.
5. The City reserves the right to determine whether the scope of the project will be entirely as described in the RFP, a portion of the scope, or a revised scope be implemented.
6. The City reserves the right to select one or more respondents to perform services.
7. The City reserves the right to retain all proposals submitted and to use any ideas in a proposal regardless of whether that proposal is selected. Submission of a proposal indicates acceptance by the firm of the conditions contained in this Request for Proposals, unless clearly and specifically noted in the proposal submitted.
8. The City reserves the right to disqualify Proposals that fail to respond to any requirements outlined in the RFP, or failure to enclose copies of the required documents outlined within RFP.

## **SECTION II BACKGROUND AND SCOPE OF WORK**

The City of Ann Arbor, Michigan, maintains approximately 370 miles of sanitary sewer and 293 miles of storm sewer. To effectively maintain this infrastructure and respond to emergency sewer issues, the City is requesting proposals from qualified contractors to provide sewer cleaning, inspection and rehabilitation services as required by the City of Ann Arbor Field Operations Unit on an as-needed basis.

### **A. DESCRIPTION**

The scope of services will consist of individual tasks to be determined and assigned during the contract period. The type of work may include, but is not limited to the following:

- Cleaning of sewers ranging in size from 8 to 42 inches in diameter. This work includes flushing, debris removal, grease removal, root cutting, deposit cutting, and grinding protruding break-in service connections.
- Internal video inspection of sewers via Closed Circuit Television (CCTV) of sewers ranging from 8 to 42 inches in diameter. The inspections shall include providing the City with digital videos, images, and reports that include condition and other descriptive data related to the sewer in accordance with NASSCO's Pipeline Assessment Certification Program.
- Manhole video inspection in accordance with NASSCO's Manhole Assessment Certification Program.
- Full length manhole to manhole Cured-in-Place Pipe (CIPP) rehabilitation of sewers ranging in size from 8 to 42 inches in diameter.
- Spot repair CIPP rehabilitation of sewers ranging in size from 8 to 30 inches in diameter.
- Manhole rehabilitation including the application of a cementitious or calcium aluminate manhole lining system, sealing active leaks, and bench/channel reconstruction.
- Sewer joint and lateral connection testing and packer injection grouting to locate and seal joints and connections that are not watertight.

The Contractor shall be compensated based on the applicable unit prices included in the response to this proposal. The City may assign specific tasks to a Contractor based on availability, turnaround time for completion of tasks, experience and other factors relevant to the task.

Some tasks may require work beyond that included in the unit prices, including extraordinary bypass setups and extensive traffic control. For those tasks, the City may request a letter proposal from the contractor that identifies their approach and all costs associated with the task.

The City intends to award one contract at a value not-to-exceed \$500,000 per fiscal year, subject to the availability of funding each year. The term of the contract will be three (3) fiscal years ending on June 30, 2019.

The City does not guarantee either a minimum volume of work or a specific volume of work under this Contract. The estimated budget for sewer maintenance services is \$500,000 per fiscal year. This budget may be divided between multiple construction firms.

## **B. CONTRACT IMPLEMENTATION**

As sewer maintenance and rehabilitation projects develop within the Field Operations Service Unit, the City will prepare a written scope of work on each project, including a proposed schedule. The contractor(s) shall provide the City a price proposal to complete the project work including:

- Total costs for based on contract unit prices
- Schedule or date by which the work can be completed.
- Names and contact information of assigned Foreman or Superintendent.
- If a portion of the requested work is not covered under existing contract unit prices, the Contractor shall provide the following:
  - A letter detailing the work not covered under the existing contract unit prices
  - Proposed labor and material costs for self performed work
  - Subcontractor names and costs with allotted mark-up percentages.

The City will assign specific tasks to a Contractor based on availability, turnaround time for completion of tasks, experience and other factors relevant to the task.

The City does not guarantee either a minimum volume of work or a specific volume of work under this Contract.

The Contractor will be contractually obligated to use the unit prices included in their proposal to generate costs for individual tasks solicited by the City under this Contract. If work required under the proposal includes scope not covered by the unit prices, the Contractor shall provide justification for the additional work and

Proposals shall be structured with estimates of equipment usage and labor (whichever is appropriate for the duration of the task) and a list of materials and associated pricing. The Contractor shall be entitled to a 15% markup on material and equipment rental costs and a 5% markup on subcontractor costs. Back-up documentation for material, equipment rental, and subcontractor costs shall be provided with all proposals.

Under unique circumstances, the City may request emergency services to be performed. The Contractor shall make every effort to mobilize within 24 hours to perform the required task.

## **C. REQUIREMENTS**

1. The ability to work effectively with the City's Field Operations staff with respect to any of the construction services required by the City.

2. The ability to work effectively with the public and regulatory agencies.
3. The ability to function in a support role to the Field Operation Service Unit. The Contractor's services will be utilized for construction activities that exceed the staffing level, available equipment or expertise of the Field Operations Service Unit.
4. The ability to respond to emergency service requests by City Field Operations staff within 24 hours.
5. It is the responsibility of the Contractor to provide an up-to-date list of names and contact numbers of on-call personnel. The City will contact the Contractor by phone as emergencies occur, and will provide as much information as available about the emergency work assignment, including the location(s), type of work and site condition(s).

#### **D. GENERAL SAFETY REQUIREMENTS**

The Contractor shall be responsible for ensuring compliance with the most stringent provisions of the applicable statutes and regulations of the Michigan Occupational Safety and Health Act 154 of 1974, the Occupational Safety and Health Act of 1970, and all City of Ann Arbor safety policies. The Contractor shall supply all these requirements to any subcontractor performing work under the contract. Should charges of violation of any of the above be issued to the Contractor in the course of the work, a copy of each charge shall be immediately forwarded to the City along with a plan to correct the violation.

Upon the failure of the Contractor to comply with any of these requirements, the City's Representative shall have the authority to stop any and all operations of the Contractor affected by such failure until such failure is remedied. No part of the time lost due to any such stop orders shall be made subject to a claim or extension of time or increase in compensation.

All materials, equipment, and supplies used for projects under this contract with the City of Ann Arbor must comply fully with all safety requirements as set forth by the Michigan Occupational Safety and Health Act 154 of 1974 and all applicable OSHA Standards.

#### **E. STANDARD SPECIFICATIONS**

All work under this Contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Advertisement. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications provided during the implementation of individual tasks under this Contract.

Copies of the Standard Specifications can be downloaded from the following web link.

<http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx>

## **F. SCOPE OF SERVICES**

A typical project will have the following scope of services:

1. Visit the project site with City staff and identify a preliminary scope of services.
2. Review any drawings, specifications, reports, etc. provided by City staff on the proposed project.
3. Develop and agree on a final scope of services.
4. Provide schedule and quote for labor, material and equipment. Submit to City staff for review and approval.
5. Obtain written approval from the City for implementation of the scope of services.
6. Perform all work necessary.
7. City staff will review all work prior to final sign off. Contractor to address all identified deficiencies in the work.
8. Contractor to provide final documentation for all time and materials.

## **SECTION III MINIMUM INFORMATION REQUIRED**

The proposing Firm must supply a proposal containing, at a minimum, the information requested in Parts A through E below. The proposal must be signed in ink by an official authorized to bind the Respondent to its provisions. Proposing Firms will be evaluated on Parts A through C using the point system outlined below. The evaluation will be completed by a selection committee composed of City staff.

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the RFP.

Respondents should organize Proposals into the following Sections:

- A. Professional Qualifications
- B. Past Involvement with Similar Projects
- C. Fee Proposal (include in a separate sealed envelope clearly marked "Fee Proposal")
- D. Authorized Negotiator
- E. Attachments

The following describes the elements that should be included in each of the proposal sections and the weighted point system that will be used for evaluation of the proposals.

A. Professional Qualifications – 40 points

1. State the full name and address of your organization and, if applicable, the branch office or other subordinate element that will perform, or assist in performing, the work hereunder. Indicate whether it operates as an individual, partnership, or corporation. If as a corporation, include whether it is licensed to operate in the State of Michigan.
2. Include the name of executive and professional personnel by skill and qualification that will be employed in the work. Show where these personnel will be physically located during the time they are engaged in the work. Indicate which of these individuals you consider key to the successful completion of the project. Identify only individuals who will do the work on this project by name and title. Resumes and qualifications are required for all proposed project personnel, including all subcontractors. Qualifications and capabilities of any subcontractors must also be included.
3. State history of the firm, in terms of length of existence, types of services provided, etc. Identify the technical details which make the firm uniquely qualified for this work.
4. Respondent shall detail their capability to perform all services identified within Section II of the RFP.
5. Identify any value added services the respondent is able to provide to assist in the analysis of sewers or enhance the performance of work requested in this RFP.

B. Past involvement with Similar Projects – 30 points

The written proposal must include a list of specific experience in the project area that indicates a proven ability of the company and key personnel in implementing similar work. The proposal should also indicate the ability to have projects completed within the budgeted amounts. Provide a summary of at least ten (10) projects with similar work to that identified in Section II completed within the last three (3) years including project description, construction cost, and owner contact information. All proposers are to base their responses on projects that reflect the size, complexity, and services required under this RFP.

Provide information on key supervisory personnel as indicated below. All supervisory personnel shall be direct employees of the firm. Minimum information to be provided shall be educational background, work experience with the proposing firm, applicable work experience with prior employers, specific project experience and skills, and a list of at least five projects completed with proposing firm.

Project Manager: Person who will be responsible being the main contact person and responsible for the management of the Contractor's team assigned to a particular project.

Foreman/Field Superintendent: Person(s) who will be on site once construction commences and responsible for the direct supervision of the laborers, daily coordination of the work on site and, on site management such as material deliveries, outages, etc.

Provide a table with a list of equipment available for use on City project tasks. The list shall include a description of the type of equipment and size, if relevant. The equipment list shall include only equipment owned by the Contractor.

Finally, identify any subcontractors whom may assist you with potential services identified in this RFP. Include similar reference data for subcontractors and employees as requested above for the main proposer.

C. Fee Proposal - 30 points

The respondent should use the Fee Proposal Form provided in this RFP. **Fee quotations shall be submitted in a separate, sealed, envelope as part of the proposal.** The Fee Proposal Form must be completed and any additional fee information shall be appended.

Scoring for the Fee Proposal will be based on a comparison of hourly rates for commonly used labor and equipment. The hourly rates may be adjusted after negotiations with the City and prior to signing a formal contract, if justified. A sample of the required City/Contractor agreement form is included as Attachment A in Section IV of this RFP.

D. Authorized Negotiator and Contract Person

Include the name, phone number, and e-mail address of a person(s) in the organization authorized to negotiate the Professional Services Agreement with the City. Also provide the same information for a designated contact person should the City have any

questions regarding the proposal, or to follow up with should the Firm be selected, if that person is different from the Authorized Negotiator.

E. Attachments

Legal Status of Respondent, Vendor Conflict of Interest, Living Wage Compliance Form and the Non-Discrimination Compliance Form must be completed and returned with the proposal. These elements should be included as attachments to the proposal submission.

**PROPOSAL EVALUATION**

1. The Selection Committee will evaluate each proposal by the above described criteria and point system (A through B) to select a short-list of firms for further consideration. The City reserves the right to not consider any proposal which it determines to be unresponsive and deficient in any of the information requested for evaluation. A proposal with all the requested information does not guarantee the proposing firm to be a candidate for an interview. The Committee may contact references to verify material submitted by the Proposers.
2. The Committee then may schedule interviews with the selected firms if necessary. The selected firms will be given the opportunity to discuss in more detail their qualifications, past experience and fee proposal.

The interview must include the project team members expected to complete a majority of work on the project, but no more than 6 members total. The interview shall consist of a presentation of up to thirty (30) minutes by the Proposer, including the person who will be the project manager on this Contract, followed by approximately thirty (30) minutes of questions and answers. Audiovisual aids may be used during the oral interviews. The oral interviews may be recorded on tape by the Evaluation Team.

3. The firms interviewed will then be re-evaluated by the above criteria (A through C), and adjustments to scoring will be made as appropriate. After evaluation of the proposals, further negotiation with the selected firm may be pursued leading to the award of a contract by City Council.

The City reserves the right to not consider any proposal which is determined to be unresponsive and deficient in any of the information requested for evaluation. The City also reserves the right to waive the interview process and evaluate the consultants based on their proposals and fee schedules alone.

Work to be done under this Contract is generally described through the detailed specifications and must be completed fully in accordance with the contract documents. All work to be done under this Contract is located in or near the City of Ann Arbor.

Any Bid which does not conform fully to these instructions may be rejected.



## FEE PROPOSAL FORM

City of Ann Arbor – RFP #977  
On-Call Sewer System Services

Respondent's Name: \_\_\_\_\_

Item	Description	Unit	Unit Price
<b>Section 1 - Sewer Cleaning and Inspection</b>			
1	Normal Sewer Cleaning, 8" to 23" Dia.	LF	\$
2	Normal Sewer Cleaning, 24" to 42" Dia.	LF	\$
3	Heavy Sewer Cleaning, 8" to 23" Dia.	LF	\$
4	Heavy Sewer Cleaning, 24" to 42" Dia.	LF	\$
5	Extra Heavy Cleaning, All Diameters	HOUR	\$
6	Cutting Protruding Service Leads	EA	\$
7	Sewer Video Inspection, 8" to 23" Dia.	LF	\$
8	Sewer Video Inspection, 24" to 42" Dia.	LF	\$
9	Manhole Video Inspection	EA	\$
<b>Section 2 - Cured-in-Place Pipe Lining, Manhole to Manhole</b>			
10	8" Dia., CIPP Sewer Lining	LF	\$
11	10" Dia., CIPP Sewer Lining	LF	\$
12	12" Dia., CIPP Sewer Lining	LF	\$
13	15" Dia., CIPP Sewer Lining	LF	\$
14	18" Dia., CIPP Sewer Lining	LF	\$
15	21" Dia., CIPP Sewer Lining	LF	\$
16	24" Dia., CIPP Sewer Lining	LF	\$
17	30" Dia., CIPP Sewer Lining	LF	\$
18	36" Dia., CIPP Sewer Lining	LF	\$
19	42" Dia., CIPP Sewer Lining	LF	\$
20	CIPP Lateral Liner, Up to 18" in Length	EA	\$
21	Service Reconnection	EA	\$
<b>Section 3 - Cured-in-Place Pipe Spot Repair, Up to 10' in Length</b>			
22	8" Dia., CIPP Spot Repair	EA	\$
23	10" Dia., CIPP Spot Repair	EA	\$
24	12" Dia., CIPP Spot Repair	EA	\$
25	10" Dia., CIPP Spot Repair	EA	\$
26	15" Dia., CIPP Spot Repair	EA	\$
27	18" Dia., CIPP Spot Repair	EA	\$
28	24" Dia., CIPP Spot Repair	EA	\$
29	30" Dia., CIPP Spot Repair	EA	\$

30	24" Dia., CIPP Spot Repair	EA	\$
31	30" Dia., CIPP Spot Repair	EA	\$
Section 4 - Manhole Rehabilitation			
32	Cementitious Manhole Lining	VF	\$
33	Calcium Aluminate Manhole Lining	VF	\$
34	Spot Seal Leak	EA	\$
35	Internal Chimney Seal	EA	\$
36	Reconstruct Bench/Channel	EA	\$
Section 5 - Sanitary Joint Testing and Grouting			
37	Sewer Joint Testing, 8" to 15"	EA	\$
38	Lateral Connection Testing, 8" to 15"	EA	\$
39	Packer Injection Joint Grouting, 8" to 15"	EA	\$
40	Packer Lateral Connection Grouting, 8" to 15"	EA	\$
41	Chemical Grout Material	GAL	\$

The term of the contract is three (3) fiscal years ending on June 30, 2019. It is understood that the submitted unit prices in the proposal are to be honored over the term of the contract.

The undersigned hereby declares that he/she has carefully examined the conditions of this request for proposal and will provide the services as specified for the prices set forth in this proposal.

Representative's Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Firm Name: \_\_\_\_\_

Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Fax Number: \_\_\_\_\_

Email: \_\_\_\_\_

## **SECTION IV ATTACHMENTS**

Attachment A – Sample Standard Contract and Bonds

Attachment B – Legal Status of Bidder

Attachment C – Prevailing Wage Declaration of Compliance

Attachment D – Living Wage Ordinance Declaration of Compliance and Living Wage Poster

Attachment E – Vendor Conflict of Interest Form

Attachment F – Non-Discrimination Ordinance Declaration of Compliance

Attachment G – General Conditions

Attachment H – Detailed Specifications

# ATTACHMENT A - SAMPLE STANDARD CONTRACT

*If a contract is awarded, the selected contractor will be required to adhere to a set of general contract provisions which will become a part of any formal agreement. These provisions are general principles which apply to all contractors of service to the City of Ann Arbor such as the following:*

## CONTRACT

THIS AGREEMENT is made on the \_\_\_\_\_ day of \_\_\_\_\_, 2016, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and \_\_\_\_\_ ("Contractor")

\_\_\_\_\_  
(An individual/partnership/corporation, include state of incorporation)

\_\_\_\_\_  
(Address)

Based upon the mutual promises below, the Contractor and the City agree as follows:

### ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled [Insert Title of Bid and Bid Number] in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

Non-discrimination and Living Wage  
Declaration of Compliance Forms (if  
applicable)  
Vendor Conflict of Interest Form  
Prevailing Wage Declaration of  
Compliance Form (if applicable)  
Bid Forms  
Contract and Exhibits  
Bonds

General Conditions  
Standard Specifications  
Detailed Specifications  
Plans  
Addenda

### ARTICLE II - Definitions

Administering Service Area/Unit means Public Services Area, Field Operations Services Unit.

Project means On-Call Sewer System Services, RFP No. 977.

### ARTICLE III - Time of Completion

- (A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.
- (B) The entire work for this Contract shall be completed by June 30, 2019. The second fiscal year of the contract from July 1, 2017 to June 30, 2018, and the third fiscal year of the contract from July 1, 2018 to June 30, 2019 shall both be subject to the availability of funding.
- (C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to \$0.00 for each calendar day of delay in the completion of all the

work. If any liquidated damages are unpaid by the Contractor, the City shall be entitled to deduct these unpaid liquidated damages from the monies due the Contractor.

The liquidated damages are for the non-quantifiable aspects of any of the previously identified events and do not cover actual damages that can be shown or quantified nor are they intended to preclude recovery of actual damages in addition to the recovery of liquidated damages.

#### **ARTICLE IV - The Contract Sum**

- (A) The City shall pay to the Contractor for the performance of the Contract, the unit prices as given in the Bid Form for the estimated bid total of:

\_\_\_\_\_ Dollars (\$\_\_\_\_\_)

- (B) The amount paid shall be equitably adjusted to cover changes in the work ordered by the Supervising Professional but not required by the Contract Documents. Increases or decreases shall be determined only by written agreement between the City and Contractor.

#### **ARTICLE V - Assignment**

This Contract may not be assigned or subcontracted any portion of any right or obligation under this contract without the written consent of the City. Notwithstanding any consent by the City to any assignment, Contractor shall at all times remain bound to all warranties, certifications, indemnifications, promises and performances, however described, as are required of it under this contract unless specifically released from the requirement, in writing, by the City.

#### **ARTICLE VI - Choice of Law**

This Contract shall be construed, governed, and enforced in accordance with the laws of the State of Michigan. By executing this agreement, the Contractor and the City agree to venue in a court of appropriate jurisdiction sitting within Washtenaw County for purposes of any action arising under this Contract. The parties stipulate that the venue referenced in this Contract is for convenience and waive any claim of non-convenience.

Whenever possible, each provision of the Contract will be interpreted in a manner as to be effective and valid under applicable law. The prohibition or invalidity, under applicable law, of any provision will not invalidate the remainder of the Contract.

#### **ARTICLE VII - Relationship of the Parties**

The parties of the Contract agree that it is not a Contract of employment but is a Contract to accomplish a specific result. Contractor is an independent Contractor performing services for the City. Nothing contained in this Contract shall be deemed to constitute any other relationship between the City and the Contractor.

Contractor certifies that it has no personal or financial interest in the project other than the compensation it is to receive under the Contract. Contractor certifies that it is not, and shall not become, overdue or in default to the City for any Contract, debt, or any other obligation to the City including real or personal property taxes. City shall have the right to set off any such debt against compensation awarded for services under this agreement.

## **ARTICLE VIII - Notice**

All notices given under this Contract shall be in writing, and shall be by personal delivery or by certified mail with return receipt requested to the parties at their respective addresses as specified in the Contract Documents or other address the Contractor may specify in writing. Notice will be deemed given on the date when one of the following first occur: (1) the date of actual receipt; or (2) three days after mailing certified U.S. mail.

## **ARTICLE IX - Indemnification**

To the fullest extent permitted by law, Contractor shall indemnify, defend and hold harmless the City, its officers, employees and agents harmless from all suits, claims, judgments and expenses including attorney's fees resulting or alleged to result, in whole or in part, from any act or omission, which is in any way connected or associated with this Contract, by the Contractor or anyone acting on the Contractor's behalf under this Contract. Contractor shall not be responsible to indemnify the City for losses or damages caused by or resulting from the City's sole negligence. The provisions of this Article shall survive the expiration or earlier termination of this contract for any reason.

## **ARTICLE X - Entire Agreement**

This Contract represents the entire understanding between the City and the Contractor and it supersedes all prior representations, negotiations, agreements, or understandings whether written or oral. Neither party has relied on any prior representations in entering into this Contract. No terms or conditions of either party's invoice, purchase order or other administrative document shall modify the terms and conditions of this Contract, regardless of the other party's failure to object to such form. This Contract shall be binding on and shall inure to the benefit of the parties to this Contract and their permitted successors and permitted assigns and nothing in this Contract, express or implied, is intended to or shall confer on any other person or entity any legal or equitable right, benefit, or remedy of any nature whatsoever under or by reason of this Contract. This Contract may be altered, amended or modified only by written amendment signed by the City and the Contractor.

**FOR CONTRACTOR**

By \_\_\_\_\_

Its: \_\_\_\_\_

**FOR THE CITY OF ANN ARBOR**

By \_\_\_\_\_  
Christopher Taylor, Mayor

[signatures continue on next page]

By \_\_\_\_\_  
Jacqueline Beaudry, City Clerk

**Approved as to substance**

By \_\_\_\_\_  
City Administrator

By \_\_\_\_\_  
Services Area Administrator

**Approved as to form and content**

\_\_\_\_\_  
Stephen K. Postema, City Attorney

**PERFORMANCE BOND**

- (1) \_\_\_\_\_(referred to as "Principal"), and \_\_\_\_\_, a corporation duly authorized to do business in the State of Michigan (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for \$ \_\_\_\_\_, the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City dated \_\_\_\_\_, 201\_, for: \_\_\_\_\_ and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq.
- (3) Whenever the Principal is declared by the City to be in default under the Contract, the Surety may promptly remedy the default or shall promptly:
- (a) complete the Contract in accordance with its terms and conditions; or
  - (b) obtain a bid or bids for submission to the City for completing the Contract in accordance with its terms and conditions, and upon determination by Surety of the lowest responsible bidder, arrange for a Contract between such bidder and the City, and make available, as work progresses, sufficient funds to pay the cost of completion less the balance of the Contract price; but not exceeding, including other costs and damages for which Surety may be liable hereunder, the amount set forth in paragraph 1.
- (4) Surety shall have no obligation to the City if the Principal fully and promptly performs under the Contract.
- (5) Surety agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder, or the specifications accompanying it shall in any way affect its obligations on this bond, and waives notice of any such change, extension of time, alteration or addition to the terms of the Contract or to the work, or to the specifications.

**SIGNED AND SEALED** this \_\_\_\_\_ day of \_\_\_\_\_, 201\_.

\_\_\_\_\_  
(Name of Surety Company)  
By \_\_\_\_\_  
(Signature)  
Its \_\_\_\_\_  
(Title of Office)

\_\_\_\_\_  
(Name of Principal)  
By \_\_\_\_\_  
(Signature)  
Its \_\_\_\_\_  
(Title of Office)

Approved as to form:

Name and address of agent:

\_\_\_\_\_  
Stephen K. Postema, City Attorney

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



**LABOR AND MATERIAL BOND**

- (1) \_\_\_\_\_  
of \_\_\_\_\_ (referred to as "Principal"), and \_\_\_\_\_, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of \$ \_\_\_\_\_, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.
- (2) The Principal has entered a written Contract with the City, dated \_\_\_\_\_, 201\_, for \_\_\_\_\_; and this bond is given for that Contract in compliance with Act No. 213 of the Michigan Public Acts of 1963 as amended;
- (3) If the Principal fails to promptly and fully repay claimants for labor and material reasonably required under the Contract, the Surety shall pay those claimants.
- (4) Surety's obligations shall not exceed the amount stated in paragraph 1, and Surety shall have no obligation if the Principal promptly and fully pays the claimants.

**SIGNED AND SEALED** this \_\_\_\_\_ day of \_\_\_\_\_, 201\_

\_\_\_\_\_  
(Name of Surety Company)  
By \_\_\_\_\_  
(Signature)  
Its \_\_\_\_\_  
(Title of Office)

\_\_\_\_\_  
(Name of Principal)  
By \_\_\_\_\_  
(Signature)  
Its \_\_\_\_\_  
(Title of Office)

Approved as to form:

Name and address of agent:

\_\_\_\_\_  
Stephen K. Postema, City Attorney

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**ATTACHMENT B  
LEGAL STATUS OF BIDDER**

(The Bidder shall fill out the appropriate form and strike out the other three.)

Bidder declares that it is:

\* A corporation organized and doing business under the laws of the State of \_\_\_\_\_, for whom \_\_\_\_\_, bearing the office title of \_\_\_\_\_, whose signature is affixed to this Bid, is authorized to execute contracts.

**NOTE: If not incorporated in Michigan, please attach the corporation's Certificate of Authority**

• A limited liability company doing business under the laws of the State of \_\_\_\_\_, whom \_\_\_\_\_ bearing the title of \_\_\_\_\_ whose signature is affixed to this proposal, is authorized to execute contract on behalf of the LLC.

\* A partnership, organized under the laws of the state of \_\_\_\_\_ and filed in the county of \_\_\_\_\_, whose members are (list all members and the street and mailing address of each) (attach separate sheet if necessary):

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\* An individual, whose signature with address, is affixed to this Bid: \_\_\_\_\_  
(initial here)

**Authorized Official**

\_\_\_\_\_ **Date** \_\_\_\_\_, 201\_\_

(Print) Name \_\_\_\_\_ Title \_\_\_\_\_

Company: \_\_\_\_\_

Address: \_\_\_\_\_

Contact Phone ( ) \_\_\_\_\_ Fax ( ) \_\_\_\_\_

Email \_\_\_\_\_



**ATTACHMENT D  
CITY OF ANN ARBOR  
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE**

The Ann Arbor Living Wage Ordinance (Section 1:811-1:821 of Chapter 23 of Title I of the Code) requires that an employer who is (a) a contractor providing services to or for the City for a value greater than \$10,000 for any twelve-month contract term, or (b) a recipient of federal, state, or local grant funding administered by the City for a value greater than \$10,000, or (c) a recipient of financial assistance awarded by the City for a value greater than \$10,000, shall pay its employees a prescribed minimum level of compensation (i.e., Living Wage) for the time those employees perform work on the contract or in connection with the grant or financial assistance. The Living Wage must be paid to these employees for the length of the contract/program.

*Companies employing fewer than 5 persons and non-profits employing fewer than 10 persons are exempt from compliance with the Living Wage Ordinance. If this exemption applies to your company/non-profit agency please check here  No. of employees \_\_\_\_*

The Contractor or Grantee agrees:

- (a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$12.93/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$14.43/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance (Section 1:815(3)).

***Check the applicable box below which applies to your workforce***

- Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits
- Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits
- (b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

The undersigned states that he/she has the requisite authority to act on behalf of his/her employer in these matters and has offered to provide the services or agrees to accept financial assistance in accordance with the terms of the Living Wage Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Living Wage Ordinance, obligates the Employer/Grantee to those terms and acknowledges that if his/her employer is found to be in violation of Ordinance it may be subject to civil penalties and termination of the awarded contract or grant of financial assistance.

\_\_\_\_\_  
Company Name

\_\_\_\_\_  
Signature of Authorized Representative

\_\_\_\_\_  
Date

\_\_\_\_\_  
Print Name and Title

\_\_\_\_\_  
Address, City, State, Zip

\_\_\_\_\_  
Phone/Email address

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500

# CITY OF ANN ARBOR LIVING WAGE ORDINANCE

**RATE EFFECTIVE APRIL 30, 2016 - ENDING APRIL 29, 2017**

**\$12.93 per hour**

If the employer provides health care benefits\*

**\$14.43 per hour**

If the employer does **NOT** provide health care benefits\*

Employers providing services to or for the City of Ann Arbor or recipients of grants or financial assistance from the City of Ann Arbor for a value of more than \$10,000 in a twelve-month period of time must pay those employees performing work on a City of Ann Arbor contract or grant, the above living wage.

## **ENFORCEMENT**

The City of Ann Arbor may recover back wages either administratively or through court action for the employees that have been underpaid in violation of the law. Persons denied payment of the living wage have the right to bring a civil action for damages in addition to any action taken by the City.

Violation of this Ordinance is punishable by fines of not more than \$500/violation plus costs, with each day being considered a separate violation. Additionally, the City of Ann Arbor has the right to modify, terminate, cancel or suspend a contract in the event of a violation of the Ordinance.

\* Health Care benefits include those paid for by the employer or making an employer contribution toward the purchase of health care. The employee contribution must not exceed \$.50 an hour for an average work week; and the employer cost or contribution must equal no less than \$1/hr for the average work week.

**The Law Requires Employers to Display This Poster Where Employees Can Readily See It.**

**For Additional Information or to File a Complaint Contact:  
Colin Spencer at 734/794-6500 or [cspencer@a2gov.org](mailto:cspencer@a2gov.org)**

## ATTACHMENT E



# Vendor Conflict of Interest Disclosure Form

All vendors interested in conducting business with the City of Ann Arbor must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the City of Ann Arbor's conflict interest policies as stated within the certification section below.

If a vendor has a relationship with a City of Ann Arbor official or employee, an immediate family member of a City of Ann Arbor official or employee, the vendor shall disclose the information required below.

**Certification:** I hereby certify that to my knowledge, there is no conflict of interest involving the vendor named below:

1. No City official or employee or City employee's immediate family member has an ownership interest in vendor's company or is deriving personal financial gain from this contract.
2. No retired or separated City official or employee who has been retired or separated from the City for less than one (1) year has an ownership interest in vendor's Company.
3. No City employee is contemporaneously employed or prospectively to be employed with the vendor.
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any dollar value or any other gratuities to any City employee or elected official to obtain or maintain a contract.
5. Please note any exceptions below:

Vendor Name	Vendor Phone Number
Conflict of Interest Disclosure *	
Name of City of Ann Arbor employees, elected officials, or immediate family members with whom there may be a potential conflict of interest.	( ) Relationship to Employee _____ ( ) Interest in vendor's company _____ ( ) Other _____

\*Disclosing a potential conflict of interest does not disqualify vendors. In the event vendors do not disclose potential conflicts of interest and they are detected by the City, vendor will be exempt from doing business with the City.

I certify that the information provided is true and correct by my signature below:

Signature of Vendor Authorized Representative	Date	Printed Name of Vendor Authorized Representative
---	------	--

**PROCUREMENT USE ONLY**

- Yes, named employee was involved in Bid / Proposal process.
- No, named employee was not involved in procurement process or decision



# CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

Relevant provisions of Chapter 112, Nondiscrimination, of the Ann Arbor City Code are included below. You can review the entire ordinance at [www.a2gov.org/departments/city-clerk](http://www.a2gov.org/departments/city-clerk)

**Intent:** It is the intent of the city that no individual be denied equal protection of the laws; nor shall any individual be denied the enjoyment of his or her civil or political rights or be discriminated against because of actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight.

**Discriminatory Employment Practices:** No person shall discriminate in the hire, employment, compensation, work classifications, conditions or terms, promotion or demotion, or termination of employment of any individual. No person shall discriminate in limiting membership, conditions of membership or termination of membership in any labor union or apprenticeship program.

**Discriminatory Effects:** No person shall adopt, enforce or employ any policy or requirement which has the effect of creating unequal opportunities according to actual or perceived age, arrest record, color, disability, educational association, familial status, family responsibilities, gender expression, gender identity, genetic information, height, HIV status, marital status, national origin, political beliefs, race, religion, sex, sexual orientation, source of income, veteran status, victim of domestic violence or stalking, or weight for an individual to obtain housing, employment or public accommodation, except for a bona fide business necessity. Such a necessity does not arise due to a mere inconvenience or because of suspected objection to such a person by neighbors, customers or other persons.

**Nondiscrimination by City Contractors:** All contractors proposing to do business with the City of Ann Arbor shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the guidelines of this section. All city contractors shall ensure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity and tends to eliminate inequality based upon any classification protected by this chapter. All contractors shall agree not to discriminate against an employee or applicant for employment with respect to hire, tenure, terms, conditions, or privileges of employment, or a matter directly or indirectly related to employment, because of any applicable protected classification. All contractors shall be required to post a copy of Ann Arbor's Non-Discrimination Ordinance at all work locations where its employees provide services under a contract with the city.

**Complaint Procedure:** If any individual has a grievance alleging a violation of this chapter, he/she has 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the alleged discriminatory action to file a complaint with the city's Human Rights Commission. If an individual fails to file a complaint alleging a violation of this chapter within the specified time frame, the complaint will not be considered by the Human Rights Commission. The complaint should be made in writing to the Human Rights Commission. The complaint may be filed in person with the City Clerk, by e-mail at [aahumanrightscommission@gmail.com](mailto:aahumanrightscommission@gmail.com), or by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107). The complaint must contain information about the alleged discrimination, such as name, address, phone number of the complainant and location, date and description of the alleged violation of this chapter.

**Private Actions For Damages or Injunctive Relief:** To the extent allowed by law, an individual who is the victim of discriminatory action in violation of this chapter may bring a civil action for appropriate injunctive relief or damages or both against the person(s) who acted in violation of this chapter

THIS IS AN OFFICIAL GOVERNMENT NOTICE AND  
MUST BE DISPLAYED WHERE EMPLOYEES CAN READILY SEE IT.



# **ATTACHMENT G - GENERAL CONDITIONS**

## **Section 1 - Execution, Correlation and Intent of Documents**

The contract documents shall be signed in 2 copies by the City and the Contractor.

The contract documents are complementary and what is called for by any one shall be binding. The intention of the documents is to include all labor and materials, equipment and transportation necessary for the proper execution of the work. Materials or work described in words which so applied have a well-known technical or trade meaning have the meaning of those recognized standards.

In case of a conflict among the contract documents listed below in any requirement(s), the requirement(s) of the document listed first shall prevail over any conflicting requirement(s) of a document listed later.

(1) Addenda in reverse chronological order; (2) Detailed Specifications; (3) Standard Specifications; (4) Plans; (5) General Conditions; (6) Contract; (7) Bid Forms; (8) Bond Forms; (9) Bid.

## **Section 2 - Order of Completion**

The Contractor shall submit with each invoice, and at other times reasonably requested by the Supervising Professional, schedules showing the order in which the Contractor proposes to carry on the work. They shall include the dates at which the Contractor will start the several parts of the work, the estimated dates of completion of the several parts, and important milestones within the several parts.

## **Section 3 - Familiarity with Work**

The Bidder or its representative shall make personal investigations of the site of the work and of existing structures and shall determine to its own satisfaction the conditions to be encountered, the nature of the ground, the difficulties involved, and all other factors affecting the work proposed under this Contract. The Bidder to whom this Contract is awarded will not be entitled to any additional compensation unless conditions are clearly different from those which could reasonably have been anticipated by a person making diligent and thorough investigation of the site.

The Bidder shall immediately notify the City upon discovery, and in every case prior to submitting its Bid, of every error or omission in the bidding documents that would be identified by a reasonably competent, diligent Bidder. In no case will a Bidder be allowed the benefit of extra compensation or time to complete the work under this Contract for extra expenses or time spent as a result of the error or omission.

## **Section 4 - Wage Requirements**

Under this Contract, the Contractor shall conform to Chapter 14 of Title I of the Code of the City of Ann Arbor as amended; which in part states "...that all craftsmen, mechanics and laborers employed directly on the site in connection with said improvements, including said employees of subcontractors, shall receive the prevailing wage for the corresponding classes of craftsmen,

mechanics and laborers, as determined by statistics for the Ann Arbor area compiled by the United States Department of Labor. At the request of the City, any contractor or subcontractor shall provide satisfactory proof of compliance with the contract provisions required by the Section."

Where the Contract and the Ann Arbor City Ordinance are silent as to definitions of terms required in determining contract compliance with regard to prevailing wages, the definitions provided in the Davis-Bacon Act as amended (40 U.S.C. 278-a to 276-a-7) for the terms shall be used.

If the Contractor is a "covered employer" as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this Agreement a "living wage," as defined in Section 1:815 of the Ann Arbor City Code, as adjusted in accordance with Section 1:815(3); to post a notice approved by the City of the applicability of Chapter 23 in every location in which regular or contract employees providing services under this Agreement are working; to maintain records of compliance; if requested by the City, to provide documentation to verify compliance; to take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee or person contracted for employment in order to pay the living wage required by Section 1:815; and otherwise to comply with the requirements of Chapter 23.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision covering subcontractor's employees who perform work on this contract.

## **Section 5 - Non-Discrimination**

The Contractor agrees to comply, and to require its subcontractor(s) to comply, with the nondiscrimination provisions of MCL 37.2209. The Contractor further agrees to comply with the provisions of Section 9:158 of Chapter 112 of Title IX of the Ann Arbor City Code, and to assure that applicants are employed and that employees are treated during employment in a manner which provides equal employment opportunity.

## **Section 6 - Materials, Appliances, Employees**

Unless otherwise stipulated, the Contractor shall provide and pay for all materials, labor, water, tools, equipment, light, power, transportation, and other facilities necessary or used for the execution and completion of the work. Unless otherwise specified, all materials incorporated in the permanent work shall be new, and both workmanship and materials shall be of the highest quality. The Contractor shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

The Contractor shall at all times enforce strict discipline and good order among its employees, and shall seek to avoid employing on the work any unfit person or anyone not skilled in the work assigned.

Adequate sanitary facilities shall be provided by the Contractor.

## **Section 7 - Qualifications for Employment**

The Contractor shall employ competent laborers and mechanics for the work under this Contract. For work performed under this Contract, employment preference shall be given to qualified local residents.

## **Section 8 - Royalties and Patents**

The Contractor shall pay all royalties and license fees. It shall defend all suits or claims for infringements of any patent rights and shall hold the City harmless from loss on account of infringement except that the City shall be responsible for all infringement loss when a particular process or the product of a particular manufacturer or manufacturers is specified, unless the City has notified the Contractor prior to the signing of the Contract that the particular process or product is patented or is believed to be patented.

## **Section 9 - Permits and Regulations**

The Contractor must secure and pay for all permits, permit or plan review fees and licenses necessary for the prosecution of the work. These include but are not limited to City building permits, right-of-way permits, lane closure permits, right-of-way occupancy permits, and the like. The City shall secure and pay for easements shown on the plans unless otherwise specified.

The Contractor shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the Contractor observes that the contract documents are at variance with those requirements, it shall promptly notify the Supervising Professional in writing, and any necessary changes shall be adjusted as provided in the Contract for changes in the work.

## **Section 10 - Protection of the Public and of Work and Property**

The Contractor is responsible for the means, methods, sequences, techniques and procedures of construction and safety programs associated with the work contemplated by this contract. The Contractor, its agents or sub-contractors, shall comply with the "General Rules and Regulations for the Construction Industry" as published by the Construction Safety Commission of the State of Michigan and to all other local, State and National laws, ordinances, rules and regulations pertaining to safety of persons and property.

The Contractor shall take all necessary and reasonable precautions to protect the safety of the public. It shall continuously maintain adequate protection of all work from damage, and shall take all necessary and reasonable precautions to adequately protect all public and private property from injury or loss arising in connection with this Contract. It shall make good any damage, injury or loss to its work and to public and private property resulting from lack of reasonable protective precautions, except as may be due to errors in the contract documents, or caused by agents or employees of the City. The Contractor shall obtain and maintain sufficient insurance to cover damage to any City property at the site by any cause.

In an emergency affecting the safety of life, or the work, or of adjoining property, the Contractor is, without special instructions or authorization from the Supervising Professional, permitted to act at its discretion to prevent the threatened loss or injury. It shall also so act, without appeal, if authorized or instructed by the Supervising Professional.

Any compensation claimed by the Contractor for emergency work shall be determined by agreement or in accordance with the terms of Claims for Extra Cost - Section 15.

## **Section 11 - Inspection of Work**

The City shall provide sufficient competent personnel for the inspection of the work.

The Supervising Professional shall at all times have access to the work whenever it is in preparation or progress, and the Contractor shall provide proper facilities for access and for inspection.

If the specifications, the Supervising Professional's instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the Contractor shall give the Supervising Professional timely notice of its readiness for inspection, and if the inspection is by an authority other than the Supervising Professional, of the date fixed for the inspection. Inspections by the Supervising Professional shall be made promptly, and where practicable at the source of supply. If any work should be covered up without approval or consent of the Supervising Professional, it must, if required by the Supervising Professional, be uncovered for examination and properly restored at the Contractor's expense.

Re-examination of any work may be ordered by the Supervising Professional, and, if so ordered, the work must be uncovered by the Contractor. If the work is found to be in accordance with the contract documents, the City shall pay the cost of re-examination and replacement. If the work is not in accordance with the contract documents, the Contractor shall pay the cost.

## **Section 12 - Superintendence**

The Contractor shall keep on the work site, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the Supervising Professional. The superintendent will be responsible to perform all on-site project management for the Contractor. The superintendent shall be experienced in the work required for this Contract. The superintendent shall represent the Contractor and all direction given to the superintendent shall be binding as if given to the Contractor. Important directions shall immediately be confirmed in writing to the Contractor. Other directions will be confirmed on written request. The Contractor shall give efficient superintendence to the work, using its best skill and attention.

## **Section 13 - Changes in the Work**

The City may make changes to the quantities of work within the general scope of the Contract at any time by a written order and without notice to the sureties. If the changes add to or deduct from the extent of the work, the Contract Sum shall be adjusted accordingly. All the changes shall be executed under the conditions of the original Contract except that any claim for extension of time caused by the change shall be adjusted at the time of ordering the change.

In giving instructions, the Supervising Professional shall have authority to make minor changes in the work not involving extra cost and not inconsistent with the purposes of the work, but otherwise, except in an emergency endangering life or property, no extra work or change shall be made unless in pursuance of a written order by the Supervising Professional, and no claim for an addition to the Contract Sum shall be valid unless the additional work was ordered in writing.

The Contractor shall proceed with the work as changed and the value of the work shall be determined as provided in Claims for Extra Cost - Section 15.

## **Section 14 - Extension of Time**

Extension of time stipulated in the Contract for completion of the work will be made if and as the Supervising Professional may deem proper under any of the following circumstances:

- (1) When work under an extra work order is added to the work under this Contract;
- (2) When the work is suspended as provided in Section 20;
- (3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which

were not the result of its fault or negligence;

- (4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;
- (5) Delay due to an act of Government;
- (6) Delay by the Supervising Professional in the furnishing of plans and necessary information;
- (7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

The Contractor shall notify the Supervising Professional within 7 days of an occurrence or conditions which, in the Contractor's opinion, entitle it to an extension of time. The notice shall be in writing and submitted in ample time to permit full investigation and evaluation of the Contractor's claim. The Supervising Professional shall acknowledge receipt of the Contractor's notice within 7 days of its receipt. Failure to timely provide the written notice shall constitute a waiver by the Contractor of any claim.

In situations where an extension of time in contract completion is appropriate under this or any other section of the contract, the Contractor understands and agrees that the only available adjustment for events that cause any delays in contract completion shall be extension of the required time for contract completion and that there shall be no adjustments in the money due the Contractor on account of the delay.

## **Section 15 - Claims for Extra Cost**

If the Contractor claims that any instructions by drawings or other media issued after the date of the Contract involved extra cost under this Contract, it shall give the Supervising Professional written notice within 7 days after the receipt of the instructions, and in any event before proceeding to execute the work, except in emergency endangering life or property. The procedure shall then be as provided for Changes in the Work-Section 13. No claim shall be valid unless so made.

If the Supervising Professional orders, in writing, the performance of any work not covered by the contract documents, and for which no item of work is provided in the Contract, and for which no unit price or lump sum basis can be agreed upon, then the extra work shall be done on a Cost-Plus-Percentage basis of payment as follows:

- (1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;
- (2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same; the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;
- (3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's

supervision and contractual responsibility;

- (4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;
- (5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

No additional compensation will be provided for additional equipment, materials, personnel, overtime or special charges required to perform the work within the time requirements of the Contract.

When extra work is required and no suitable price for machinery and equipment can be determined in accordance with this Section, the hourly rate paid shall be 1/40 of the basic weekly rate listed in the Rental Rate Blue Book published by Dataquest Incorporated and applicable to the time period the equipment was first used for the extra work. The hourly rate will be deemed to include all costs of operation such as bucket or blade, fuel, maintenance, "regional factors", insurance, taxes, and the like, but not the costs of the operator.

## **Section 16 - Progress Payments**

The Contractor shall submit each month, or at longer intervals, if it so desires, an invoice covering work performed for which it believes payment, under the Contract terms, is due. The submission shall be to the City's Finance Department - Accounting Division. The Supervising Professional will, within 10 days following submission of the invoice, prepare a certificate for payment for the work in an amount to be determined by the Supervising Professional as fairly representing the acceptable work performed during the period covered by the Contractor's invoice. To insure the proper performance of this Contract, the City will retain a percentage of the estimate in accordance with Act 524, Public Acts of 1980. The City will then, following the receipt of the Supervising Professional's Certificate, make payment to the Contractor as soon as feasible, which is anticipated will be within 15 days.

An allowance may be made in progress payments if substantial quantities of permanent material have been delivered to the site but not incorporated in the completed work if the Contractor, in the opinion of the Supervising Professional, is diligently pursuing the work under this Contract. Such materials shall be properly stored and adequately protected. Allowance in the estimate shall be at the invoice price value of the items. Notwithstanding any payment of any allowance, all risk of loss due to vandalism or any damages to the stored materials remains with the Contractor.

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

With each invoice for periodic payment, the Contractor shall enclose a Contractor's Declaration - Section 43, and an updated project schedule per Order of Completion - Section 2.

## **Section 17 - Deductions for Uncorrected Work**

If the Supervising Professional decides it is inexpedient to correct work that has been damaged or that was not done in accordance with the Contract, an equitable deduction from the Contract price shall be made.

## **Section 18 - Correction of Work Before Final Payment**

The Contractor shall promptly remove from the premises all materials condemned by the Supervising Professional as failing to meet Contract requirements, whether incorporated in the work or not, and the Contractor shall promptly replace and re-execute the work in accordance with the Contract and without expense to the City and shall bear the expense of making good all work of other contractors destroyed or damaged by the removal or replacement.

If the Contractor does not remove the condemned work and materials within 10 days after written notice, the City may remove them and, if the removed material has value, may store the material at the expense of the Contractor. If the Contractor does not pay the expense of the removal within 10 days thereafter, the City may, upon 10 days written notice, sell the removed materials at auction or private sale and shall pay to the Contractor the net proceeds, after deducting all costs and expenses that should have been borne by the Contractor. If the removed material has no value, the Contractor must pay the City the expenses for disposal within 10 days of invoice for the disposal costs.

The inspection or lack of inspection of any material or work pertaining to this Contract shall not relieve the Contractor of its obligation to fulfill this Contract and defective work shall be made good. Unsuitable materials may be rejected by the Supervising Professional notwithstanding that the work and materials have been previously overlooked by the Supervising Professional and accepted or estimated for payment or paid for. If the work or any part shall be found defective at any time before the final acceptance of the whole work, the Contractor shall forthwith make good the defect in a manner satisfactory to the Supervising Professional. The judgment and the decision of the Supervising Professional as to whether the materials supplied and the work done under this Contract comply with the requirements of the Contract shall be conclusive and final.

## **Section 19 - Acceptance and Final Payment**

Upon receipt of written notice that the work is ready for final inspection and acceptance, the Supervising Professional will promptly make the inspection. When the Supervising Professional finds the work acceptable under the Contract and the Contract fully performed, the Supervising Professional will promptly sign and issue a final certificate stating that the work required by this Contract has been completed and is accepted by the City under the terms and conditions of the Contract. The entire balance found to be due the Contractor, including the retained percentage, shall be paid to the Contractor by the City within 30 days after the date of the final certificate.

Before issuance of final certificates, the Contractor shall file with the City:

- (1) The consent of the surety to payment of the final estimate;
- (2) The Contractor's Affidavit in the form required by Section 44.

In case the Affidavit or consent is not furnished, the City may retain out of any amount due the Contractor, sums sufficient to cover all lienable claims.

The making and acceptance of the final payment shall constitute a waiver of all claims by the City except those arising from:

- (1) unsettled liens;

- (2) faulty work appearing within 12 months after final payment;
- (3) hidden defects in meeting the requirements of the plans and specifications;
- (4) manufacturer's guarantees.

It shall also constitute a waiver of all claims by the Contractor, except those previously made and still unsettled.

## **Section 20 - Suspension of Work**

The City may at any time suspend the work, or any part by giving 5 days notice to the Contractor in writing. The work shall be resumed by the Contractor within 10 days after the date fixed in the written notice from the City to the Contractor to do so. The City shall reimburse the Contractor for expense incurred by the Contractor in connection with the work under this Contract as a result of the suspension.

If the work, or any part, shall be stopped by the notice in writing, and if the City does not give notice in writing to the Contractor to resume work at a date within 90 days of the date fixed in the written notice to suspend, then the Contractor may abandon that portion of the work suspended and will be entitled to the estimates and payments for all work done on the portions abandoned, if any, plus 10% of the value of the work abandoned, to compensate for loss of overhead, plant expense, and anticipated profit.

## **Section 21 - Delays and the City's Right to Terminate Contract**

If the Contractor refuses or fails to prosecute the work, or any separate part of it, with the diligence required to insure completion, ready for operation, within the allowable number of consecutive calendar days specified plus extensions, or fails to complete the work within the required time, the City may, by written notice to the Contractor, terminate its right to proceed with the work or any part of the work as to which there has been delay. After providing the notice the City may take over the work and prosecute it to completion, by contract or otherwise, and the Contractor and its sureties shall be liable to the City for any excess cost to the City. If the Contractor's right to proceed is terminated, the City may take possession of and utilize in completing the work, any materials, appliances and plant as may be on the site of the work and useful for completing the work. The right of the Contractor to proceed shall not be terminated or the Contractor charged with liquidated damages where an extension of time is granted under Extension of Time - Section 14.

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.



## **Section 22 - Contractor's Right to Terminate Contract**

If the work should be stopped under an order of any court, or other public authority, for a period of 3 months, through no act or fault of the Contractor or of anyone employed by it, then the Contractor may, upon 7 days written notice to the City, terminate this Contract and recover from the City payment for all acceptable work executed plus reasonable profit.

## **Section 23 - City's Right To Do Work**

If the Contractor should neglect to prosecute the work properly or fail to perform any provision of this Contract, the City, 3 days after giving written notice to the Contractor and its surety may, without prejudice to any other remedy the City may have, make good the deficiencies and may deduct the cost from the payment due to the Contractor.

## **Section 24 - Removal of Equipment and Supplies**

In case of termination of this Contract before completion, from any or no cause, the Contractor, if notified to do so by the City, shall promptly remove any part or all of its equipment and supplies from the property of the City, failing which the City shall have the right to remove the equipment and supplies at the expense of the Contractor.

The removed equipment and supplies may be stored by the City and, if all costs of removal and storage are not paid by the Contractor within 10 days of invoicing, the City upon 10 days written notice may sell the equipment and supplies at auction or private sale, and shall pay the Contractor the net proceeds after deducting all costs and expenses that should have been borne by the Contractor and after deducting all amounts claimed due by any lien holder of the equipment or supplies.

## **Section 25 - Responsibility for Work and Warranties**

The Contractor assumes full responsibility for any and all materials and equipment used in the construction of the work and may not make claims against the City for damages to materials and equipment from any cause except negligence or willful act of the City. Until its final acceptance, the Contractor shall be responsible for damage to or destruction of the project (except for any part covered by Partial Completion and Acceptance - Section 26). The Contractor shall make good all work damaged or destroyed before acceptance. All risk of loss remains with the Contractor until final acceptance of the work (Section 19) or partial acceptance (Section 26). The Contractor is advised to investigate obtaining its own builders risk insurance.

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days.

The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

## **Section 26 - Partial Completion and Acceptance**

If at any time prior to the issuance of the final certificate referred to in Acceptance and Final Payment - Section 19, any portion of the permanent construction has been satisfactorily completed, and if the Supervising Professional determines that portion of the permanent construction is not required for the operations of the Contractor but is needed by the City, the Supervising Professional shall issue to the Contractor a certificate of partial completion, and immediately the City may take over and use the portion of the permanent construction described in the certificate, and exclude the Contractor from that portion.

The issuance of a certificate of partial completion shall not constitute an extension of the Contractor's time to complete the portion of the permanent construction to which it relates if the Contractor has failed to complete it in accordance with the terms of this Contract. The issuance of the certificate shall not release the Contractor or its sureties from any obligations under this Contract including bonds.

If prior use increases the cost of, or delays the work, the Contractor shall be entitled to extra compensation, or extension of time, or both, as the Supervising Professional may determine.

## **Section 27 - Payments Withheld Prior to Final Acceptance of Work**

The City may withhold or, on account of subsequently discovered evidence, nullify the whole or part of any certificate to the extent reasonably appropriate to protect the City from loss on account of:

- (1) Defective work not remedied;
- (2) Claims filed or reasonable evidence indicating probable filing of claims by other parties against the Contractor;
- (3) Failure of the Contractor to make payments properly to subcontractors or for material or labor;
- (4) Damage to another Contractor.

When the above grounds are removed or the Contractor provides a Surety Bond satisfactory to the City which will protect the City in the amount withheld, payment shall be made for amounts withheld under this section.

## **Section 28 - Contractor's Insurance**

- (1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death or property damage which may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. In the case of all contracts involving on-site work, the Contractor shall provide to the City, before the commencement of any work under this contract, certificates of insurance and other documentation satisfactory to the City demonstrating it has obtained the policies and endorsements required on behalf of itself, and when requested, any subcontractor(s). The certificates of insurance endorsements and/or copies of policy language shall document that the Contractor satisfies the following minimum requirements.

- (a) Worker's Compensation Insurance in accordance with all applicable state and federal statutes. Further, Employers Liability Coverage shall be obtained in the following minimum amounts:

Bodily Injury by Accident - \$500,000 each accident  
Bodily Injury by Disease - \$500,000 each employee  
Bodily Injury by Disease - \$500,000 each policy limit

- (b) Commercial General Liability Insurance equivalent to, as a minimum, Insurance Services Office form CG 00 01 07 98 or current equivalent. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements specifically for the following coverages: Products and Completed Operations, Explosion, Collapse and Underground coverage or Pollution. Further there shall be no added exclusions or limiting endorsements which diminish the City's protections as an additional insured under the policy. The following minimum limits of liability are required:

\$1,000,000	Each occurrence as respect Bodily Injury Liability or Property Damage Liability, or both combined.
\$2,000,000	Per Job General Aggregate
\$1,000,000	Personal and Advertising Injury
\$2,000,000	Products and Completed Operations Aggregate

- (c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 07 97 or current equivalent. Coverage shall include all owned vehicles, all non-owned vehicles and all hired vehicles. The City of Ann Arbor shall be named as an additional insured. There shall be no added exclusions or limiting endorsements which diminish the City's protections as an additional insured under the policy. Further, the limits of liability shall be \$1,000,000 for each occurrence as respects Bodily Injury Liability or Property Damage Liability, or both combined.

- (d) Umbrella/Excess Liability Insurance shall be provided to apply excess of the Commercial General Liability, Employers Liability and the Motor Vehicle coverage enumerated above, for each occurrence and for aggregate in the amount of \$1,000,000.

- (2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City.
- (3) Insurance companies and policy forms are subject to approval of the City Attorney, which approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional 30 day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering

Service Area/Unit at least ten days prior to the expiration date.

- (4) Any Insurance provider of Contractor shall be admitted and authorized to do business in the State of Michigan and shall carry and maintain a minimum rating assigned by A.M. Best & Company's Key Rating Guide of "A-" Overall and a minimum Financial Size Category of "V". Insurance policies and certificates issued by non-admitted insurance companies are not acceptable unless approved in writing by the City.
- (5) City reserves the right to require additional coverage and/or coverage amounts as may be included from time to time in the Detailed Specifications for the Project.
- (6) The provisions of General Condition 28 shall survive the expiration or earlier termination of this contract for any reason.

## **Section 29 - Surety Bonds**

Bonds will be required from the successful bidder as follows:

- (1) A Performance Bond to the City of Ann Arbor for the amount of the bid(s) accepted;
- (2) A Labor and Material Bond to the City of Ann Arbor for the amount of the bid(s) accepted.

Bonds shall be executed on forms supplied by the City in a manner and by a Surety Company authorized to transact business in Michigan and satisfactory to the City Attorney.

## **Section 30 - Damage Claims**

The Contractor shall be held responsible for all damages to property of the City or others, caused by or resulting from the negligence of the Contractor, its employees, or agents during the progress of or connected with the prosecution of the work, whether within the limits of the work or elsewhere. The Contractor must restore all property injured including sidewalks, curbing, sodding, pipes, conduit, sewers or other public or private property to not less than its original condition with new work.

## **Section 31 - Refusal to Obey Instructions**

If the Contractor refuses to obey the instructions of the Supervising Professional, the Supervising Professional shall withdraw inspection from the work, and no payments will be made for work performed thereafter nor may work be performed thereafter until the Supervising Professional shall have again authorized the work to proceed.

## **Section 32 - Assignment**

Neither party to the Contract shall assign the Contract without the written consent of the other. The Contractor may assign any monies due to it to a third party acceptable to the City.

## **Section 33 - Rights of Various Interests**

Whenever work being done by the City's forces or by other contractors is contiguous to work covered by this Contract, the respective rights of the various interests involved shall be established by the Supervising Professional, to secure the completion of the various portions of the work in general harmony.

The Contractor is responsible to coordinate all aspects of the work, including coordination of, and with, utility companies and other contractors whose work impacts this project.

### **Section 34 - Subcontracts**

The Contractor shall not award any work to any subcontractor without prior written approval of the City. The approval will not be given until the Contractor submits to the City a written statement concerning the proposed award to the subcontractor. The statement shall contain all information the City may require.

The Contractor shall be as fully responsible to the City for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as it is for the acts and omissions of persons directly employed by it.

The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the work to bind subcontractors to the Contractor by the terms of the General Conditions and all other contract documents applicable to the work of the subcontractors and to give the Contractor the same power to terminate any subcontract that the City may exercise over the Contractor under any provision of the contract documents.

Nothing contained in the contract documents shall create any contractual relation between any subcontractor and the City.

### **Section 35 - Supervising Professional's Status**

The Supervising Professional has the right to inspect any or all work. The Supervising Professional has authority to stop the work whenever stoppage may be appropriate to insure the proper execution of the Contract. The Supervising Professional has the authority to reject all work and materials which do not conform to the Contract and to decide questions which arise in the execution of the work.

The Supervising Professional shall make all measurements and determinations of quantities. Those measurements and determinations are final and conclusive between the parties.

### **Section 36 - Supervising Professional's Decisions**

The Supervising Professional shall, within a reasonable time after their presentation to the Supervising Professional, make decisions in writing on all claims of the City or the Contractor and on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

### **Section 37 - Storing Materials and Supplies**

Materials and supplies may be stored at the site of the work at locations agreeable to the City unless specific exception is listed elsewhere in these documents. Ample way for foot traffic and drainage must be provided, and gutters must, at all times, be kept free from obstruction. Traffic on streets shall be interfered with as little as possible. The Contractor may not enter or occupy with agents, employees, tools, or material any private property without first obtaining written permission from its owner. A copy of the permission shall be furnished to the Supervising Professional.

### **Section 38 - Lands for Work**

The Contractor shall provide, at its own expense and without liability to the City, any additional land and access that may be required for temporary construction facilities or for storage of

materials.

### **Section 39 - Cleaning Up**

The Contractor shall, as directed by the Supervising Professional, remove at its own expense from the City's property and from all public and private property all temporary structures, rubbish and waste materials resulting from its operations unless otherwise specifically approved, in writing, by the Supervising Professional.

### **Section 40 - Salvage**

The Supervising Professional may designate for salvage any materials from existing structures or underground services. Materials so designated remain City property and shall be transported or stored at a location as the Supervising Professional may direct.

### **Section 41 - Night, Saturday or Sunday Work**

No night or Sunday work (without prior written City approval) will be permitted except in the case of an emergency and then only to the extent absolutely necessary. The City may allow night work which, in the opinion of the Supervising Professional, can be satisfactorily performed at night. Night work is any work between 8:00 p.m. and 7:00 a.m. No Saturday work will be permitted unless the Contractor gives the Supervising Professional at least 48 hours but not more than 5 days notice of the Contractor's intention to work the upcoming Saturday.

### **Section 42 - Sales Taxes**

Under State law the City is exempt from the assessment of State Sales Tax on its direct purchases. Contractors who acquire materials, equipment, supplies, etc. for incorporation in City projects are not likewise exempt. State Law shall prevail. The Bidder shall familiarize itself with the State Law and prepare its Bid accordingly. No extra payment will be allowed under this Contract for failure of the Contractor to make proper allowance in this bid for taxes it must pay.

## Section 43

### CONTRACTOR'S DECLARATION

I hereby declare that I have not, during the period \_\_\_\_\_, 20\_\_\_\_, to \_\_\_\_\_, 20\_\_\_\_, performed any work, furnished any materials, sustained any loss, damage or delay, or otherwise done anything in addition to the regular items (or executed change orders) set forth in the Contract titled \_\_\_\_\_, for which I shall ask, demand, sue for, or claim compensation or extension of time from the City, except as I hereby make claim for additional compensation or extension of time as set forth on the attached itemized statement. I further declare that I have paid all payroll obligations related to this Contract that have become due during the above period and that all invoices related to this Contract received more than 30 days prior to this declaration have been paid in full except as listed below.

There is/is not (Contractor please circle one and strike one as appropriate) an itemized statement attached regarding a request for additional compensation or extension of time.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Date

By \_\_\_\_\_  
(Signature)

Its \_\_\_\_\_  
(Title of Office)

Past due invoices, if any, are listed below.





## **STANDARD SPECIFICATIONS**

All work under this contract shall be performed in accordance with the Public Services Department Standard Specifications in effect at the date of availability of the contract documents stipulated in the Bid. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the Detailed Specifications included in these contract documents.

Standard Specifications are available online:

<http://www.a2gov.org/departments/engineering/Pages/Engineering-and-Contractor-Resources.aspx>

# ATTACHMENT H - DETAILED SPECIFICATIONS

**DETAILED SPECIFICATION  
FOR  
PROJECT SCHEDULE**

**DESCRIPTION**

**Examination of Plans, Specifications, and Work Site:** Bidders shall carefully examine the Proposal Form and specifications until the Bidder is satisfied as to all local conditions affecting the contract and the detailed requirements of construction. The submission of the proposal shall be considered prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and all requirements of the contract.

The Contractor is expected to be furnished with three (3) copies of the Contract, for his/her execution, on or before August 1, 2016. The Contractor shall properly execute the Contract and return them, with the required Bonds and Insurance Certificate, to the City within ten (10) days. The Contractor shall not begin any work as described herein without approval from the Project Owner, and in no case before the receipt of the fully executed Contract. City Council approval is expected on August 4, 2016.

The Owner may delay or stop the work due to threatening weather conditions. The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain. The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

The Contractor shall not work in the dark except as approved by the Owner and only when proper lighting for night work is provided. The Owner may stop the work, or may require the Contractor to defer certain work to another day, if, in the Owner's opinion, the work cannot be completed within the remaining daylight hours, or if inadequate daylight is present to either properly perform or inspect the work. The Contractor will not be compensated for unused materials or downtime, when delays or work stoppages are directed by the Owner for darkness and/or inadequate remaining daylight reasons.

**DETAILED SPECIFICATION  
FOR  
COORDINATION AND COOPERATION WITH OTHERS  
AND  
WORK BY OTHERS**

The Contractor is reminded as to the requirements of article 104.07 of the 2012 edition of the MDOT Standard Specifications, "Cooperation by the Contractor."

The Contractor shall directly coordinate his/her work with individual City Departments/Divisions/Units.

No additional compensation will be paid to the Contractor, and no adjustments to contract unit prices will be made, due to delays and/or the failure of others in the performance of their work, nor for delays due to the encountering of existing utilities that are, or are not, shown on the Plans.

The following Utility Owners, and others not listed specifically, may have overhead and/or underground facilities located within the Right-of-Way/Public Easements:

The City of Ann Arbor  
University of Michigan (UM)  
Michigan Department of Transportation (MDOT)  
AT&T  
Comcast  
DTE Energy - Detroit Edison Company (Edison)  
DTE Energy - Michigan Consolidated Gas Company (Michcon)  
Fiber Link Inc.  
Light Core (Century Tel)  
MCI Communications  
Windstream Communications

**On all projects:**

**"3 Working Days before you Dig - Call MISS DIG - Toll Free" Phone No. 1-800-482-7171.**

The Owners of public or private utilities which will not interfere with the completed project and which do not present a hazard to the public or an extraordinary hazard to the Contractor's operations will not be required to move their facilities on or from the street right-of-way.

Stoppages created solely by the operations of the utility companies which delay utility revisions on any portion of this project may be considered as a basis of claim for an extension of time for project completion.

Costs for this work will not be paid for separately, but shall be included in the bid price of the Contract Item "General Conditions."

**DETAILED SPECIFICATION  
FOR  
TRAFFIC CONTROL**

**DESCRIPTION**

This work shall consist of protecting and maintaining vehicular and pedestrian traffic, in accordance with Sections 104.11, 812, and 922 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction; the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD); and the City Standard Specifications, except as modified herein.

The Contractor shall furnish, erect, maintain and, upon completion of the work, remove all traffic control devices and barricade lights as required on the project for the safety and protection of local traffic. This includes, but is not limited to, temporary advance, regulatory, and warning signs; barricades and channelizing devices at intersections and on streets where traffic is to be maintained; barricades at the ends of the project and at right-of-way lines of intersecting streets, and traffic control devices for moving construction operations.

**MATERIALS, EQUIPMENT, AND METHODS**

The work of Traffic Control shall include, but not be limited to:

- The furnishing and operating of lighted plastic drums
- The furnishing and operating of Type III lighted barricades
- The furnishing and operating of all temporary "Type B" signs
- The furnishing and operating of arrow panels as required by the Owner
- The furnishing of signposts and installation of No Parking signs
- The furnishing and operating of miscellaneous signs, warning devices, flag-persons, and cones;
- The operation of additional signs furnished by the City;
- Furnishing and installing meter bags;
- Coordinating with the City to have meter heads removed and reinstalled;
- Maintaining pedestrian traffic;
- Temporarily covering traffic controls;
- Temporarily covering existing signs as directed;
- Any and all other miscellaneous and/or incidental items which are necessary to properly perform the work.

Materials and equipment shall meet the requirements specified in the above-designated sections of the MDOT Standard Specifications.

The Contractor shall maintain two-way traffic on major streets, access for local traffic on local streets, and keep all intersections open to traffic at all times, unless specifically authorized in writing by the Owner. The Contractor shall maintain traffic such that no vehicle shall be required to drive into active work areas. The Contractor shall maintain vehicular and pedestrian traffic during the work by the use of flag-persons, channelizing devices, and signs as necessary, as directed by the Owner, and in accordance with MMUTCD.

Local access shall be maintained at all times for emergency vehicles, refuse pick-up, mail delivery, school buses, and ingress/egress to public and private properties.

The Contractor shall maintain pedestrian traffic at all times. For maintaining normal pedestrian traffic while performing sidewalk and driveway repair, Type I barricades shall be placed by the Contractor, as directed by the Owner. "Sidewalk Closed" and/or "Cross Here" signs shall be placed, by the Contractor, when directed by the Owner..

The contractor shall schedule and conduct all work operations such that sidewalks and driveways will remain open along one side of each street being worked upon while work is on-going on the opposite side. The Contractor shall maintain an accessible route at all times as defined within the Americans with Disabilities Act along each street upon which construction is occurring.

All temporary traffic/pedestrian control devices furnished by the Contractor shall remain the property of the Contractor. The City shall not be responsible for stolen or damaged signs, barricades, barricade lights or other traffic maintenance items. The Contractor shall replace missing traffic control devices immediately, at no additional cost to the City.

All existing signs, and signs erected by the City of Ann Arbor on this project shall be preserved, protected, and maintained by the Contractor. Existing City owned signs which are damaged by the Contractor during the work will be repaired by the City at the Contractor's expense.

A lane-closure permit shall be obtained by the Contractor from the City at least 48 hours in advance of any proposed lane or street closing. No street or lane closures shall be performed without the written approval of the Owner, a minimum of one week in advance of the work.

The hours of work on all Local streets are 7:00 a.m. to 8:00 p.m., Monday through Saturday, or as specified on the lane-closure permit. No equipment will be allowed in the street before or after these hours. Local streets may only be closed to through traffic (local access only) with written authorization of the Owner. Work must be completed each day such that all streets are re-opened to through traffic by 8:00 p.m. unless otherwise specified, directed, or authorized in writing by the Owner. All major changes in traffic control shall be made either between 9:30 a.m. and 3:30 p.m. or between 7:00 p.m. and 6:30 a.m. in order to minimize interference with rush-hour traffic. All traffic controls must be in-place and ready for traffic each day by 6:30 a.m. and 3:30 p.m.

The Contractor shall temporarily cover conflicting traffic and/or parking signs when directed by the Owner.

Parking violation citations issued to the Contractor, subcontractor and material suppliers, including their employees, shall be enforced under appropriate City Code.

The Contractor shall replace missing or damaged traffic control devices, as directed by the Owner. When traffic control devices have been damaged by, or due to, the negligence of the Contractor, his subcontractors or material suppliers, the traffic control devices shall be replaced at the Contractor's expense.

The Contractor shall furnish and operate all lighted arrow boards; lighted plastic drums; type III barricades; and Type B temporary signs as directed by the Owner. Specifically:

- Lighted Arrow boards shall be type A or B as directed by the Owner, and shall be electric powered (either battery or solar). Motor generators using gasoline, diesel, LP gas, or other such fuel are not approved for use.
- Type III Barricades shall have standard orange-and-white stripes on both sides of the barricade.

- “Construction Ahead” warning signs shall be placed as directed by the Owner prior to the start of work, regardless of the nature, magnitude, or duration of the work.

Sufficient signs shall be provided by the Contractor to insure the safety of the workers and the general public in accordance with the current MMUTCD.

#### Prohibiting Parking

On occasions where the Contractor shall need to reserve parking areas for staging equipment, prior to the commencement of any construction activity, the Contractor shall place No-Parking signs as directed by the Owner. The Contractor shall obtain a permit for “Temporary Permission of Reserve Parking Lane for Work Related Purposes” from the City of Ann Arbor Project Management Services Unit. This permit shall be obtained a minimum of 5 days prior to the posting of No-Parking signs.

The City will furnish No-Parking signs to the Contractor at no cost. The Contractor shall furnish the signposts and shall securely bolt the signs to the signposts as directed by the Owner. The Contractor shall install the signposts at least 2-feet deep into the ground, and there shall be a minimum 6-foot and maximum 7-foot clearance maintained between the bottom of the sign and the ground. The signs shall be placed at 75-foot intervals (or as necessary) to eliminate parking in the construction area.

The installation of No-Parking signs shall be in accordance with the permit. No-Parking signs shall be installed by the Contractor, as directed by the Owner, **at least 48 hours prior to the proposed start-of-work/enforcement date.**

No-Parking signs shall be returned to the City at the completion of the work. The cost of unreturned signs will be back charged to the Contractor.

No-Parking signs shall be covered by the Contractor, thereby allowing on-street parking, until between 48 and 36 hours prior to the start of the work. No-Parking signs shall be covered by the Contractor whenever there is no work being performed for a period of time longer than 72 hours.

Where there is metered parking, the Contractor shall install meter bags.

#### **MEASUREMENT AND PAYMENT**

Costs for traffic control on local streets will not be paid for separately, but shall be included in the bid price of the work items included in this Contract.

Where traffic control is required on a major street, a proposal for the additional traffic control costs shall be submitted to the supervising professional for approval prior to conducting the work.

**DETAILED SPECIFICATION  
FOR  
SEWER CLEANING**

**DESCRIPTION**

The work shall consist of all labor, material, and equipment necessary to clean existing storm or sanitary sewers ranging in size from 8 to 42 inches in diameter. The work includes flushing, debris removal, root cutting, deposit cutting, grinding protruding break-in service connections, and remote televising of the sewer. Except as otherwise specified herein, all work shall be performed in accordance with the City of Ann Arbor Public Services Area Standard Specifications, and as directed by the Owner.

The Contractor performing the work shall be a company specializing in performing sewer cleaning, and shall have a minimum experience of at least three other projects of similar size and scope within the last five years that included cleaning, surveying, processing, and interpretation of data associated with CCTV inspections.

The work shall be performed under the supervision of personnel trained and certified in the use of the National Association of Sewer Service Companies's (NASSCO) Pipeline Assessment and Certification Program (PACP) for the inspection of sewer mains and Manhole Assessment and Certification Program (MACP) for the inspection of manholes.

The Contractor shall carry out his operations in strict accordance with all OSHA, MIOSHA, and manufacturer's safety requirements.

**CLEANING**

**General**

It shall be the responsibility of the Contractor to remove all internal deposits from the pipeline. This shall include dirt, debris, mud, bricks, mineral deposits, roots, pieces of broken pipe, etc. Cleaning of sewers shall be in accordance with the City of Ann Arbor Public Services Area Standard Specifications, and as directed by the Owner.

It is recognized that there are some conditions such as broken pipe and major blockages that prevent cleaning from being accomplished or where additional damage would result if cleaning were attempted or continued. Should such conditions be encountered, the Contractor shall notify the Owner immediately.

The sewers shall be cleaned by using a high pressure water cleaning machine. A high pressure hose with a jet nozzle shall be introduced into the sewer so that a spray shall scour and clean the sewer line without applying internal pressure and damaging the pipe. The hose shall be self propelled by a minimum water pressure of 1,000 psi. The jet nozzle hose, upon withdrawal, will scour the pipe, flushing light materials down the line and depositing heavy materials in the downstream manhole for removal. All debris shall be completely removed from the sewer and disposed of by the Contractor at his expense.



The Contractor shall furnish suitable power machinery which shall be used to remove tree roots, and deposits remaining after jet cleaning.

A power rodding machine shall be either a sectional or continuous rod type capable of holding a minimum of 750 feet of rod. The rod shall be specifically heat - treated steel. To ensure safe operation, the machine shall be fully enclosed and have an automatic safety clutch or relief valve.

Bucket machines shall be in pairs with sufficient power to perform the work in an efficient manner. Machines shall be belt operated or have an overload device. Machines with direct drive that could cause damage to the pipe will not be allowed.

The Contractor shall maintain detailed documentation of cleaning efforts on each sewer segment. Such documentation shall be made available to the Owner at any time.

Sewers to be cleaned may be located in difficult to access locations. The Contractor shall review the sewer locations to determine how best to access, clean and televise the sewers. Easement machines or similar remote access equipment may be required.

All water necessary for the cleaning operations shall be furnished by the Owner at agreed fire hydrant locations. Contact the Wheeler Center: 4251 Stone School Road at 734-794-6350 for procedures and fees for the hydrant meter, backflow preventer, and hydrant meter cage. All fees and water use charges shall be paid by Contractor. Hydrants used by the Contractor shall be pumped down by the Contractor to prevent freezing. Frozen hydrants that were used by the Contractor and not properly closed or pumped down shall be repaired by the Contractor at no additional cost.

### **Material Removal & Disposal**

Sludge, dirt, sand, rocks, grease, and other solid or semisolid material resulting from the cleaning operation shall be removed at the downstream manhole of the section being cleaned. Passing material from manhole section to manhole section shall not be permitted, unless approved by the City due to limited manhole access. Under no circumstances shall sewage solids be dumped onto the surface, street, or into ditches, inlets, or storm drains.

All dirt, debris, roots and other material removed from the sewers shall be loaded and hauled by the Contractor to an approved waste disposal location secured by the Contractor. The City shall be provided a copy of all manifests if requested. Any costs or fees associated with the disposal of the material, including material testing shall be paid by the Contractor. No additional payment will be made for disposal fees and shall be incidental to the cleaning of the sewers. The Contractor shall provide for the discharge of the liquid removed the manholes and using an approved manhole as specified by the City. No debris shall be allowed to pass on to downstream portions of the sewer system. The Contractor will be responsible to clean downstream sewers at his own expense if debris is allowed to pass beyond the work area.

### **Root Removal**

Roots shall be removed from all sewer sections identified to be cleaned where root intrusion is a problem. Procedures may include the use of mechanical equipment such as rodding machines, bucket machines and winches using root cutters and porcupines, and equipment such as high-velocity jet cleaners. Chemical root treatment may only be used by the Contractor with prior approval of the Owner.

**Line Obstructions**

It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, protruding branch connections or broken pipe. If video inspection reveals an obstruction that cannot be removed by conventional cleaning equipment, then the Contractor shall notify the Owner.

Services which protrude more than 3/4 inch into the sewer lines shall be ground down as flush as possible with the wall of the sanitary sewer. Grinding shall be done with equipment operating inside of the sewer and shall not cause damage to the sewer or the service being ground. If the protruding service is in such condition that grinding is not possible or if the condition of the sewer is such that repairs cannot be performed from inside the sewer then the Contractor shall notify the Owner of the condition.

**Cleaning Precautions**

The Contractor shall supply a notice to be hand delivered to residents and business owners with information on the sewer cleaning operations and precautions. A draft of the notice shall be submitted to the City for approval prior to use. The Contractor shall assist in delivery of this notice and coordinating the schedule of work to ensure that this notice will be delivered before any sewer line cleaning is started. The Contractor shall ensure that every user is so notified. Notification shall include telephone number(s) for contacting the Contractor at any time, day or night.

During sewer cleaning operations, satisfactory precautions shall be taken in the use of cleaning equipment. When hydraulically propelled cleaning tools (which depend upon water pressure to provide their cleaning force) or tools which retard the flow in the sewer line are used, precautions shall be taken to ensure that the water pressure created does not damage or cause flooding of public or private property being served by the sewer. If such back-ups or flooding occurs, it shall be the Contractors responsibility to respond, coordinate, and pay for, any cleaning and or restoration of private property.

**Site Access**

The Contractor may be requested to clean sewers that are located in difficult to access locations with 1,500 feet or greater between manhole access points. The Contractor shall review the sewer locations to determine how best to access, clean and televise the sewers. Easement machines or similar remote access equipment may be required.

If cleaning locations require access through side yard easements, the Contractor shall be responsible for coordinating access with the impacted property owners and will be assisted by the City during this process.

**Final Acceptance**

Acceptance of sewer line cleaning shall be made upon the successful completion of the final CCTV investigation and shall be to the satisfaction of the Owner. If CCTV investigation shows the cleaning to be unsatisfactory, the Contractor shall be required to reclean and reinvestigate the sewer line until the cleaning is shown to be satisfactory.

**MEASUREMENT AND PAYMENT**

The completed work as measured for this item of work will be paid for at the contract unit price for the following contract items:

**Pay Item**

**Pay Unit**

Normal Sewer Cleaning, \_\_\_” to \_\_\_” Dia.

Linear Foot

Normal Sewer Cleaning will be paid for at the Contract Unit Price per linear foot. Price paid shall be payment in full for all labor, material, and equipment required for cleaning of existing sanitary sewer so that the sewer is ready for the final televising. This item of work shall include removal of settled deposits and obstructions up to the limits identified below by sewer diameter:

- Up to 12-inches 25%
- 13- to 24-inches 15%
- 25- to 40-inches 10%

The settled deposits and obstructions shall be removed by an unlimited number of passes of a hydraulic flusher and collected for removal at the downstream manhole. All debris must be removed from the sewer, including any debris that may have been washed up into any service connections (does not include known pre-existing conditions in service connections), drop connections or the bench wall of the manholes. This item does not include root cutting, deposit removal, or grinding of protruding service connections. All video inspection necessary to verify the cleanliness of the lines shall be incidental to this item of work.

Measurement of the actual number of feet cleaned shall be made based on the distance from the wall of the starting access point to the wall of the finishing access point.

**Pay Item**

**Pay Unit**

Heavy Sewer Cleaning, \_\_\_” to \_\_\_” Dia.

Linear Foot

Heavy Sewer Cleaning will be paid for at the Contract Unit Price per linear foot. Price paid shall be payment in full for all labor, material, and equipment required for cleaning of existing sanitary sewer so that the sewer is ready for the final televising. This item of work shall be paid for sewers requiring continuous rodding, root cutting, deposit removal or cleaning above the limits identified under the “Normal Sewer Cleaning” Pay Item.

Measurement of the actual number of feet cleaned shall be made based on the distance from the wall of the starting access point to the wall of the finishing access point.

**Pay Item**

**Pay Unit**

Extra Heavy Sewer Cleaning

Hour

Extra Heavy Sewer Cleaning will be paid for at the Contract Unit Price on a per hour basis and will be paid in addition to the unit price for Normal Sewer Cleaning or Heavy Sewer Cleaning. It shall be paid only for those sewers that require additional services beyond continuous rodding, root cutting, or deposit cutting as defined under the "Heavy Sewer Cleaning" Pay Item.

The use of "Extra Heavy Sewer Cleaning" shall be agreed upon by both the construction observer and the Contractor, and shall be approved by the Owner. It shall only be utilized for abnormal cleaning circumstances beyond those described under the "Normal Sewer Cleaning" and "Heavy Sewer Cleaning" Pay Items.

**Pay Item**

**Pay Unit**

Cutting Protruding Service Leads

Each

Cutting Protruding Service Leads will be paid for at the Contract Unit Price per each service lead cut. This item of work shall include all labor, equipment and material necessary to cut protruding laterals and remove roots and/or mineral deposits in laterals that intrude into the sewer main. Contractor shall cut back any size service lead protrusions and remove roots/mineral deposits to a maximum protrusion of 1/4". This work shall be accomplished with video monitored remote controlled cutting devices, or other approved method. Use of video monitoring shall be included in this item of work.

**DETAILED SPECIFICATION  
FOR  
SEWER VIDEO INSPECTION**

**DESCRIPTION**

This work shall consist of internal inspection of sewer via Closed Circuit Television (CCTV). The inspection shall include providing the Owner with digital videos, images, reports and associated databases that include condition and other descriptive data related to the sewer.

The City may request a preliminary video inspection to determine if sewer cleaning is necessary. If cleaning is required, the City will then pay for the cleaning and an additional video inspection.

Where the Contractor is performing cured-in-place pipe (CIPP) lining, all required video inspection work shall be included in the unit prices for the CIPP lining.

The Contractor performing the work shall be a company specializing in performing internal sewer inspections, and shall have a minimum experience of at least three other projects of similar size and scope within the last five years that included surveying, processing, and interpretation of data associated with CCTV inspections.

All inspection and recording of sewer features and condition shall be in accordance with National Association of Sewer Service Companies (NASSCO) standards. The work shall be performed under the supervision of personnel trained and certified in the use of the Pipeline Assessment and Certification Program (PACP) for the inspection of sewer mains and Manhole Assessment and Certification Program (MACP) for the inspection of manholes.

**Submittals**

Prior to initiation of work, the Contractor shall submit for Owner review and approval the following:

1. Data sheets for proposed CCTV equipment, description of proposed electronic storage device (flash drive, etc.) and proposed electronic file formats.
2. Description of proposed software for recording inspection logs along with a sample of a typical log and all reports as specified.

If requested by the Owner, the Contractor shall notify affected residents/businesses at least one day prior to starting cleaning and sewer inspection with a "Resident Notification Letter" informing the residents/businesses of the Contractor's activities and to provide contact information for the Contractor and Owner.

**Bypassing Flow**

Costs for flow control shall not be included in the unit prices for sewer television inspection. If bypass pumping is required by the Owner for sewer video inspection, the Contractor shall provide a written cost proposal detailing the bypass pumping/diversion scheme for approval not less than 15 days prior to any anticipated bypass pumping/diversion. The plan shall include pumping capacity and expected flow rates. The Contractor will not be allowed to bypass any flows until the flow control plan has been reviewed and accepted by the Owner.

The requirements for bypassing flow shall meet the requirements identified under the Detailed Specification for CIPP Sewer Lining.

## **Inspection**

All recording of sewers shall be continuous from structure to structure. The camera shall be positioned at the center of the sewer pipe. All inspection shall be completed during times of dry weather flow, and the camera shall record in the same direction as the flow. Inspection against the flow, especially during high flow conditions, must be approved by the Owner.

The Contractor shall use a color pan, tilt and zoom, camera or a digital side scanning camera (panoramic) specifically designed and constructed for sewer inspection. Lighting for the camera or panoramic scanning camera shall provide a clear picture of the entire periphery of the existing sewer. The pan, tilt, zoom camera shall pause, pan, and visually inspect all service connections, pipe ends, and maintenance or structural defects. If utilizing a panoramic view inspection system, pausing and panning is not necessary during the inspection and can be used by the Owner if the image clearly depicts the inside of the lateral for post processing of the scans.

The rate of speed shall be adjusted to produce a clear, concise record of the piping system and shall not exceed 30 feet per minute for conventional CCTV cameras. Travel shall stop for minimum of 10 seconds to record lateral connections, mainline connections, defects, features, and other observations. Advanced camera systems with high resolution recording and lighting characteristics will be allowed to record at faster rates subject to Owner review and approval of images.

CCTV inspections will be conducted entirely in digital format. The entire pan, tilt, and zoom inspection survey shall be recorded in MPEG format written in a digital format (ex. DVD, Hard Drive) and submitted with digital links to the survey. All panoramic side scanning inspection survey shall be recorded in an acceptable panoramic format and submitted with digital links to the survey. All cleaning and television inspection reports shall be within +/- two (2) feet of the measured linear footage between manholes along the existing sewer centerline from the start of pipe to end of pipe. Work not following these specifications may be rejected for payment and the Contractor may be required to re do the work.

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 shall be used to move the camera through the sewer line.

If the camera will not pass through the entire sewer line section being investigated, the Contractor shall, at no additional cost set up equipment so that inspection can be performed from the opposite manhole. If under the reverse set-up the camera again fails to pass through the entire sewer line section, inspection shall be considered complete. All obstructions in the sewer segment that prohibit passage of the television camera shall be immediately reported to the Owner referencing location and nature of the obstruction. Measurement of the actual number of feet inspected shall be made from the center of the manhole to the point where the survey was abandoned from each direction.

Should the Contractor's televising equipment become lodged in any sewer line, it shall be removed by the Contractor at his expense. This shall include, if necessary, excavation and repair of the sewer, underground utility repairs, backfilling and surface restoration. The Contractor shall re-televising any line segment in which his equipment became lodged after said equipment has been removed to demonstrate to the Owner that no damage exists as a result of his televising operations.

Generally, inspection shall be completed one sewer section at a time. Access for televising purposes shall only be via existing manholes. Should access to particular sewer section be difficult and adjacent sections require television inspection, Contractor may be allowed to complete inspection in multiple sewer line sections. When multiple sewer line sections are inspected using one setup, Contractor shall

zero the camera's footage metering device at each subsequent sewer manhole to establish uniform starting location of Station 0+00, in center of each manhole, for each line section televised.

### **Reporting**

The Contractor shall record all defects such as radial and linear cracks, dips, blockages, or obstructions, pipe joint conditions, infiltration and calcite buildup, lateral connections, root infiltration, deterioration of pipe material surface, penetrating utilities, etc. The Contractor shall record the characteristics and defects observed using the NASSCO PACP Inspection Report format and coding for each sewer segment. The Report shall include a linear sketch of the sewer segment showing defect locations and code. All pipes, manholes, laterals and other structures shall be identified using Owner naming convention. The operator's PACP certification number shall be recorded on the Report.

The Contractor shall also prepare a Defect Assessment Report for each sewer segment that lists the individual pipe defects and assigns a defect "grade" using the NASSCO PACP Condition Grading System guidelines. The individual Defect Assessment Reports shall then be listed by category on a Defect Summarization Table spreadsheet.

The Defect Summarization Table shall list all categories of defects. It shall be capable of tabulating continuous and repeating continuous defect grades. The summarization spreadsheet shall have a category for both age-related constant defects and service lead-related defects.

The Defect Summarization Table shall then calculate the "Defect Ratio" for each sewer segment by dividing the totaled defects by the total length of each sewer segment. (Defect Ratio = Total Defect Grade/Total Length).

The Contractor shall deliver to the Owner all electronic records copied onto a suitable data storage device (CD, DVD, hard drive, etc.). The devices shall be labeled to correspond with the hard copy Inspection Reports. Labels shall be permanent with complete project information. The Defect Assessment Report shall be in Adobe PDF. The Defect Summarization Table shall be viewable and editable using standard Microsoft Office software. An electronic database formatted to work with to the most recent PACP standards shall also be included with the submittal.

The Owner reserves the right to reject any or all televising and recording of sewer segments due to poor quality or clarity of defects. If necessary the Contractor shall re-inspect those segments as determined by the Owner at no additional cost to the Owner.

All video recordings, still images and reports shall become property of the Owner without restriction for copying, re-use or publication.

All inspection recordings and reports will be reviewed by the Owner. The Owner shall have the authority to reject all or any portion of recordings not conforming to Specifications. These areas shall be re-inspected at no additional charge.

### **Manholes**

The City may request detailed manhole inspections to be performed separate from the main line sewer inspections. These manhole inspections must be performed with a digital panoramic camera that provides a complete 360 degree view of the manhole.

The inspection camera system must have two independently or simultaneously controlled digital cameras, one facing in the downward direction and one facing in the upward direction. Each camera must have a minimum of 185 degree field of view. The inspection camera system must illuminate the

interior of the manhole using a xenon strobe light. The light shall be positioned 360 degrees around the camera lens to distribute the light evenly onto the structure walls. The lighting must be able to illuminate manholes up to 120” in diameter without the need of any auxiliary lighting. Any systems not using strobe light technology will be deemed unacceptable due to motion blur during imaging recording.

The inspection system shall produce individual images or frames with no more than 0.001 inches of movement during image or frame exposure to produce crisp, clear images. The inspection camera must provide a minimum of 3000 line of vertical resolution in the side view and a minimum of 500 lines in the perspective view.

Collected digital film files and header files shall be recorded onto a hard drive provided to the City along with the associated MACP database. Contractor is responsible for reviewing collected data, coding observations, and completing a full MACP Level 2 evaluation of each inspected manhole. The City must have the ability to view the digital film file in the way that the Contractor can view them, including full control of the virtual pan and tilt.

The digital film files must include the capability to produce a three dimensional representation of the manhole structure along with an unfolded view. The digital file files must include a distortion-free virtual pan and tilt allowing the review of the manhole structure from any angle from any depth. This data must be able to be used to perform geometric measurements and shall be exportable to common CAD programs for further analysis.

**MEASUREMENT AND PAYMENT**

The completed work as measured for this item of work will be paid for at the contract unit price for the following contract item:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Sewer Video Inspection, __ to __ Diameter	Linear Foot

Sewer video inspection will be paid for at the Contract Unit Price per linear foot. Price paid shall be payment in full for all labor, material, and equipment required for video inspection of existing sanitary sewer and shall include, but is not limited to, all minor traffic control, water, electrical bills, temporary plugging, disposal of debris, cleanup and any other applicable item required to successfully complete the inspection and assessment of the designated lines, as well as the required reporting and deliverables. Measurement of the actual number of feet inspected shall be made based on the distance from the wall of the starting access point to the wall of the finishing access point.

If the inspection equipment cannot make full passage through the pipe during the inspection, the payment will be based on the actual length of sewer inspected from the wall of the starting access point.



**Pay Item**

**Pay Unit**

Manhole Video Inspection

Each

Manhole video inspection will be paid for at the Contract Unit Price per each manhole fully inspected. Price paid shall be payment in full for all labor, material, and equipment required for inspection of existing sanitary or storm manholes and shall include, but is not limited to, all minor traffic control, water, electrical bills, temporary plugging, disposal of debris, cleanup and any other applicable item required to successfully complete the inspection, as well as the required reporting and deliverables.

**DETAILED SPECIFICATION  
FOR  
CIPP SEWER LINING**

**DESCRIPTION**

This work shall consist of rehabilitating pipelines by the insertion of a resin impregnated flexible lining and cured in place to form a pipe. The cured in place pipe (CIPP) shall be saturated with a thermosetting resin and inserted into the existing pipeline. Curing shall be accomplished by circulating hot water, steam, or ambient cure, to harden the resin into a hard impermeable pipe. When cured, the hardened CIPP shall be a tight fitting watertight pipe within a pipe. When full length liners are specified, the CIPP shall be continuous from manhole to manhole with no circumferential joints or seams. Except as otherwise specified herein, all work shall be performed in accordance with the City of Ann Arbor Public Services Area Standard Specifications, and as directed by the Engineer.

For a CIPP system to be considered acceptable, the CIPP system must have at least two million linear feet of successful, documented installations, a minimum of 250,000 linear feet of which shall have been in the state in which the work is located.

When requested by the Owner, the Contractor shall submit test results from previous field installations of the same resin system and tube materials as proposed for this installation. The test results must verify that the CIPP physical properties specified in this Section have been achieved in the field.

The Installer shall have at least 100,000 linear feet and five (5) years documented experience in CIPP liners of all types specified for use in this Project with a minimum of 500 separate installs. Installations must have been in northern states or Canada.

The Contractor is responsible for videotaping and cleaning the pipe prior to lining, and videotaping after lining. If videotape reveals conditions in the sewer are such that spot repairs will be required, the Contractor shall submit in writing a request for authorization to perform spot repairs along with sufficient proof that these repairs are indeed necessary. Such requests shall include method of spot repair, type and manufacturer of repair pipe, method of connection, etc., and shall be submitted prior to commencement of the rehabilitation process.

The Contractor shall notify the Owner and all sewer users affected by the work a minimum of seven days prior to beginning work. Notification shall be by means of a written notice on Owner letterhead, delivered to each user and shall advise user as to when service will be interrupted and to minimize water usage during this period. The Owner will supply the notices. The Contractor shall ensure that every user is so notified. Notification shall include telephone number(s) for contacting the Contractor at any time, day or night.

A second notice to the sewer users affected shall be provided one working day prior to the installation work affecting those users.

The Contractor shall also provide a completion notice to each user within 12 hours of completion of the CIPP installation and restoring of service connections.

## **DESIGN CONSIDERATIONS**

The finished liner shall be designed per ASTM F 1216 Appendix X1; per the requirements of this specification, for the following condition:

Condition:	Fully deteriorated gravity pipe
Safety Factor:	2
Soil Density:	130 lbs/cft
Soil Modulus:	700 psi for pipe inverts up to and including 15 feet deep, 1,000 psi for pipe inverts greater than 15 feet deep
Surcharge Loading:	HS-20 (Highway) when any part of the sewer is under any major street, county road, or state highway; E-80 (Railroad) when under any railroad.
Ovality	2%, unless determined otherwise by video inspection
Groundwater Elev.	5.0 feet below grade

The acceptable resin system values to be incorporated into the formula for liner thickness shall not be greater than the following.

	<u>Polyester</u>	<u>Enhanced Polyester</u>	<u>Vinyl Ester</u>	<u>Epoxy</u>
Short Term Flexural Modulus	300,000	400,000	250,000	300,000
Long Term Flexural Modulus	150,000	200,000	125,000	150,000
Creep Retention Factor	50%	50%	50%	50%
Flexural Strength	4,500	4,500	4,500	5,000

Where the requirements of this specification conflict with ASTM F 1216 or ASTM D 5813 this specification shall govern.

The CONTRACTOR shall determine the liner thickness and resin quantity for this Project per ASTM F 1216, Appendix X1. Liner thickness, resin and resin quantity shall be furnished to Engineer for review and approval prior to beginning work.

CIPP designs shall use a minimum of 10% extra resin or a pre-liner to compensate for resin migration on deteriorated pipelines with fractures, broken pipe or holes. In all installation, the contractor is required to accommodate existing host pipe condition to maintain the minimum wall thickness specified.

## **MATERIAL**

### **Preliner Tube**

The Preliner shall be a polyethylene pre-liner compatible with the lining system, and shall be utilized where necessary to accommodate infiltration or missing pipe.

### **Felt Liner Tube**

The Tube shall consist of one or more layers of flexible, needled felt or an equivalent non-woven material. The material shall be capable of carrying the specified resin, be able to withstand installation pressures and curing temperatures, and be compatible with the resin used.

The outer tube coating shall consist of a translucent elastomer that allows for visual inspection and verification of proper resin impregnation. The plastic coating shall hold the resin inside the Tube

without leakage, accommodate installation, and stretch to the size and shape of the existing sewer, and shall not delaminate before, during, or after curing.

The Tube shall have a uniform thickness that when compressed at installation pressures will meet or exceed the design thickness.

The CIPP wall thickness shall be calculated from the equation in ASTM F 1216, Appendix X1, based upon the parameters given in this Section. The minimum CIPP wall thickness shall be not less than the value calculated by that equation. Any layers of tube that are not saturated with resin and totally cured shall not be included in the CIPP wall thickness.

The Tube shall be fabricated to a size that when installed will tightly fit the internal circumference of the conduit to be lined as specified by the Engineer. Allowance for circumferential stretching of the pipe during insertion shall be made as per manufacturer's recommendations.

The Tube shall be homogeneous across the entire wall thickness containing no intermediate or encapsulated elastomeric layers. No material shall be included in the Tube that may cause delamination in the cured CIPP. No dry or unsaturated layers shall be evident. The tube shall be constructed to withstand installation pressures and have sufficient strength to bridge missing pipe while meeting or exceeding the design wall thickness at all pipe location during installation conditions and pressures.

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

Seams in the Tube shall be stronger than the unseamed felt. Where the length requires joining along the circumference of the Tube, the sewn joint shall not be perpendicular to the long axis but spirally formed and sewn.

The outside of the Tube shall be marked for distance at regular intervals along its entire length, not to exceed five (5) feet. Such markings shall include the manufacturers name or identifying symbol.

The length of the Tube shall be that deemed necessary by the Contractor to effectively carry out the insertion and seal the pipe at the inlet and outlet points. The Contractor shall verify the lengths in the field before cutting the Tube to length. Lengths of sewer can be lined over one or more access points as determined in the field by the Contractor and approved by the Engineer.

### **Resin**

Resin shall be polyester, enhanced polyester, vinyl ester, or epoxy. Resin selected shall be resistant to the chemical composition of the sewage.

Resin with higher than minimum physical properties may be required for Contractor to meet minimum field cured physical properties of the completed liner.

The resin shall be thermosetting resin that is compatible with the lining process and shall meet the requirements of ASTM F 1216 except as otherwise specified in this section. The resin shall be able to cure in water with an initiation temperature for cure of not less than 120°F. The cured resin/felt system shall be suitable for the expected conditions within the existing sanitary sewer.

**Field Cured Liner**

The completed liner as installed and fully cured in place shall meet the minimum physical properties for short term flexural modulus and flexural strength given above.

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

**CONSTRUCTION METHODS**

The Contractor shall carry out his operations in strict accordance with all OSHA, MIOSHA, and manufacturer's safety requirements.

**Cleaning of Pipelines**

Prior to rehabilitation of any sewer, it shall be the responsibility of the Contractor to remove all internal deposits from the pipeline. This shall include dirt, debris, mud, bricks, mineral deposits, roots, pieces of broken pipe, etc. Cleaning of sewers shall be completed and paid for in accordance with the detailed specification for Sewer Cleaning

All water necessary for the cleaning and lining operations shall be furnished by the Owner at agreed fire hydrant locations. Contact the Wheeler Center: 4251 Stone School Road at 734-994-1760 for procedures and fees for the hydrant meter, backflow preventer, and hydrant meter cage. Fees shall be paid by Contractor. Hydrants used by the Contractor shall be pumped down by the Contractor to prevent freezing. Frozen hydrants that were used by the Contractor and not properly closed or pumped down shall be repaired by the Contractor at no additional cost.

**Pre-Rehabilitation Inspection of Pipelines**

Inspection of pipelines shall be performed after the pipe has been cleaned, by experienced personnel trained in locating breaks, obstacles, and service connections by closed circuit television. Pre-Rehabilitation television inspection of sewers shall be completed and paid for in accordance with the detailed specification for Sewer Video Inspection.

**Bypassing Flow**

The Contractor shall provide for the transfer of main line flow around the section or sections of pipe that are to be rehabilitated. The work shall consist of pumping and bypassing flow in the existing sewers.

The Contractor shall maintain flow in existing sewers at all times by pumping, bypassing, or fluming as necessary. During wet weather events, the flow in the sewer will rise rapidly and may become surcharged. The Contractor shall maintain flow in such a manner as the existing flow can be adequately transported including wet weather flow. The Contractor shall furnish, install, operate, and maintain temporary pumping facilities to service the upstream area including piping, temporary channels, pumps, sumps, controls, temporary plugs, and bulkheads. Pump or generator noise shall be kept at or below 40 decibels at 100 feet from the source.

For sanitary sewerage, by-pass piping shall be PVC Schedule 80, ABS truss pipe, or equivalent with solvent welded joints; HDPE with butt fused joints; or completely watertight Flexible hoses.

All by-passed flow shall be discharged to a sanitary sewer of acceptable size to handle the bypassed and existing flows. The Contractor shall plan his operation such that there will be no backups, leaks, or discharges of pollutants. The Contractor shall be completely responsible for any leaks, spills, or discharges of effluent or other pollutants.

The Contractor shall also furnish and have available on-site, redundant pumping facilities in case of any failure of the pumping system including pumps, piping, electrical, connections, etc. Redundant pumping facilities also include having a backup power generator in case the primary power source fails. The Contractor shall provide an adequate labor force to oversee the by-pass pumping including providing labor to maintain 24 hour per day operation and emergency backup service. The Contractor will not be allowed to obstruct flows in any sewer unless the primary and redundant pumping and by-passing equipment is on site and in an operable condition.

All costs for pumping and by-passing flow shall be included in the unit price bid for CIPP Sewer Lining or CIPP Spot Repair.

The Contractor shall submit a by-pass pumping/diversion scheme to the Engineer for approval not less than 15 days prior to any anticipated by-pass pumping/diversion. By-pass plan shall include pumping capacity and expected flow rates. The Contractor will not be allowed to by-pass any flows until the by-pass pumping plan has been reviewed and accepted by the Engineer. Contract time shall continue while the by-pass plan is being reviewed and during the time requested revisions are being made. Delays encountered due to Engineer requested revisions shall not be considered for an extension of contract time.

Construction of bypasses may be made by diversion of the main line flow at an existing upstream access point or manhole and pumping the flow into a downstream access point or manhole or by any other method approved by the Owner which will not cause a sewer backup. The pump and bypass lines shall be of adequate capacity and size to handle wet weather flow.

#### **Line Obstructions**

It shall be the responsibility of the Contractor to clear the line of obstructions such as solids, dropped joints, protruding branch connections or broken pipe that will prevent proper insertion of the liner. If the pre-rehabilitation video inspection reveals an obstruction that cannot be removed by conventional cleaning equipment, then the obstruction shall be removed by equipment operating within the pipeline.

Services which protrude more than 3/4 inch into the sewer lines shall be ground down as flush as possible with the wall of the sanitary sewer. Grinding shall be done with equipment operating inside of the sewer and shall not cause damage to the sewer or the service being ground. Cutting protruding service leads shall be completed and paid for in accordance with the detailed specification for Sewer Cleaning

If the protruding service is in such condition that grinding is not possible or if the condition of the sewer is such that repairs cannot be performed from inside the sewer then the Contractor shall make a spot repair excavation, to uncover and remove or repair the obstruction. Such excavation shall be approved in writing by the Engineer prior to the commencement of the work.

#### **Installation of Resin Impregnated Tube**

The Contractor shall designate a location where the uncured resin in the original containers and the unimpregnated liner will be resin impregnated prior to installation. The Contractor shall allow the Engineer to inspect the materials and procedure. A resin and catalyst system compatible with the

requirement of this section shall be used. The quantities of the liquid thermosetting materials shall be provided in accordance with manufacturer's standards to provide the cured liner properties specified.

Sufficient resin shall be used to fill the volume of air voids in the liner with additional allowance for polymerization, shrinkage and loss of resin through cracks and irregularities in host pipe wall. The Contractor shall ensure that the proper amount of resin is uniformly distributed throughout the entire length of the Tube.

The wetting out, installation, and curing of the resin impregnated Tube shall be in accordance with ASTM F 1216. The Tube shall be inserted through an existing manhole or other approved access by means of an inversion process, the application of a hydrostatic head sufficient to fully extend the liner to the next designated access point, or any other means approved by the Engineer.

The process will be adjusted as necessary to ensure a complete lining without over stressing or tearing the lining; and with sufficient pressure to hold the liner snug to the pipe wall and to produce dimples at side connections and flared ends at the entrance and exit access points. The use of a lubricant is recommended and if used, such lubricant shall be compatible with the rehabilitation process.

The manufacturer's standards shall be closely followed during the elevated curing temperature so as not to over stress the felt fiber and cause damage or failure of the liner prior to cure.

### **Curing**

Hot water or steam cured liners are required for full length liners. Ambient cure liners may be used for spot repair liners. After installation of the resin impregnated liner is completed the Contractor shall supply a suitable heat source and water recirculation equipment when necessary to cure the liner. The equipment shall be capable of delivering hot water to the far end of the liner through a hose, which has been perforated per manufacturer's recommendations, to uniformly raise the water temperature in the entire pipe above the temperature required to affect a cure of the resin. This temperature shall be determined by the resin/catalyst system employed.

The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing circulating water/air. Thermocouples shall be placed between the Tube and existing pipe at the access points to determine the temperature of the cure. Temperature in the line during the cure period shall be not less than 150°F or more than 200°F as measured at the heat exchanger return line.

Initial cure shall be deemed to be completed when inspection of the exposed portions of the liner appears to be hard and sound and the thermocouples indicate that an exotherm has occurred. The cure period shall be of a duration recommended by the resin manufacturer, as modified for the lining process, during which time the recirculation of the water/air and cycling of the heat exchanger to maintain the temperature in the liner continues.

### **Cool-Down**

The Contractor shall cool the CIPP to a temperature below 100°F before relieving the static head in the liner. Cool-down may be accomplished by the introduction of cool water into the liner to replace water being drained from the downstream end. Care shall be taken in the release of the static head such that a vacuum will not be developed that could damage the newly installed liner.

**Finish**

The cured liner shall be continuous over the entire length of an insertion run and be as free as commercially practicable from visual defects such as foreign inclusions, dry spots, pinholes and delamination. The lining shall be impervious and free of any leakage.

Any defects which will affect the integrity of the liner, or any deficiencies in required strengths or thicknesses, shall be repaired or removed and replaced at the Contractor's expense, in a manner acceptable to the Engineer.

**Sealing Liner at the Ends**

A seal, consisting of a resin mixture or hydrophilic seal compatible with the installed CIPP shall be applied at manhole/wall interface in accordance with the CIPP System manufacturer's recommendations.

**CIPP Spot Repairs**

Where requested, the Contractor shall provide Spot Repairs using

The spot liner shall meet all applicable requirements of the mainline sewer liner as dictated by this specification.

The saturated tube along with the inversion bladder will be inserted into the carrying device. The entire carrying device is pulled into the pipe using a cable winch. The pull is complete when the end of the launching device is aligned with the beginning of the section being reconstructed. The resin and tube are completely protected during the pull. No resin shall be lost by contact with manhole walls or the pipe during the pull. The resin should not be contaminated or diluted by exposure to dirt, debris, or water during the pull. The resin that provides a structural seal shall not contact the pipe until positioned at the point of repair.

The installer shall be capable of viewing the beginning of the liner contacting the host pipe verifying the exact placement of the liner. Video documentation of the placement, prior to curing, shall be provided to the owner. No measuring from a CCTV counter or estimating will be allowed. The liner must be installed at low pressure (not to exceed 10-PSI) to prevent damage to the host pipe.

The tube will be inverted out of the carrying device by controlled air or water pressure. The installer shall be capable of viewing the entire liner contacting the host pipe from the beginning to the end of the liner verifying the liner has covered the entire damaged section. Video documentation of the entire liner contacting the host pipe, prior to curing shall be provided to the owner. The tube is held tightly in place against the wall of the host pipe by the pressure until the cure is complete.

When the curing process is complete, the pressure will be released. The inflation bladder and launching device shall be removed from the host pipe with the winch. No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, should ever be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite is to be removed from the pipe by installer.

Any service lateral connections covered by the sectional repair are to be opened in accordance with this Detailed Specification.

A final CCTV inspection is performed to verify the proper cure of the material, the proper opening of service laterals, and the integrity of the seamless pipe. The owner will receive a digital copy documenting the inspection and a written report documenting the installation.



**CIPP Lateral Liner**

Where requested, the Contractor shall rehabilitate the lateral sewer pipe connection without excavation while providing a one piece connection at the junction of the mainline and lateral pipelines. The reconstruction will be accomplished using a CIPP type process with a tube of proper diameter and length impregnated with a thermosetting resin having physical and chemical properties appropriate for the application. The process shall be performed with a one-piece CIPP liner only. The lateral liner must extend into the lateral at least 18-inches and create a seal between the lateral and main line sewer. It shall also be compatible with the main line CIPP liner product.

The lateral liner shall meet all applicable requirements of the mainline sewer liner as dictated by this specification.

The installer shall clean and inspect the lateral line immediately prior to lining. All roots, debris, and deposits shall be removed from the liner prior to the CIPP process. All costs for cleaning and CCTV inspection shall be incidental to the CIPP Lateral Liner Pay Item.

The saturated tube shall be inserted into the launching device. The launching device is to be pulled into the pipe. The pull is complete when the open port of the launching device is aligned with the interface of the service connection and mainline pipe. The lateral liner should not be contaminated or diluted by exposure to dirt, debris, or water during the pull.

The lateral tube is inverted out of the launcher device by controlled air pressure. The installer shall be capable of viewing the lateral liner contacting the lateral pipe from the beginning to the end of the repair. The mainline / lateral tube is held tightly in place against the wall of the host pipe by controlled pressure until the cure is complete.

When the curing process is complete, the pressure will be released. The inversion bladder and launching device shall be removed from the host pipe. No barriers, coatings, or any material other than the cured tube/resin composite, specifically designed for desirable physical and chemical resistance properties, should ever be left in the host pipe. Any materials used in the installation other than the cured tube/resin composite are to be removed from the pipe by the Contractor.

A post installation CCTV inspection shall be performed to verify the proper cure of the material and the integrity of the pipe. The owner will receive a video tape on VHS format documenting the inspection and a written report documenting the project.

Prior to installing a lateral liner, the Contractor must receive a copy of a signed agreement for installation by the property owner whom the lateral serves. The City will provide this agreement to the property owner for the Contractor's records.

The Contractor shall also notify the lateral users affected by the work a minimum of seven days prior to beginning work. Notification shall be by means of a written notice on Owner letterhead, delivered to each user and shall advise user as to when service will be interrupted and to minimize water usage during this period. The Owner will supply the notices. The Contractor shall ensure that every user is so notified. Notification shall include telephone number(s) for contacting the Contractor at any time, day or night.

**Branch or Service Connections**

After the liner has been cured, the Contractor shall reconnect the existing service connections. This shall generally be done without excavation and in the case of non-man entry pipes, from the interior of

the pipeline by means of a television camera and a cutting device that re-establishes them to operational capacity.

Reconnection of service laterals shall begin immediately after curing of the CIPP has been completed. No service shall be interrupted for more than 12 hours unless otherwise approved by the Engineer.

The machined opening shall be at least 90 percent of the service connection opening and the bottom of both openings must match. The opening shall not be more than 100 percent of the service connection opening. The edges of the opening shall not have pipe fragments or liner fragments, which may obstruct flow or snag debris. In all cases the invert of the sewer connection shall be cut flush with the invert entering the mainline. In the event that service reinstatements result in openings that are greater than 100 percent of the service connection opening, the Contractor shall install a CIPP type repair, sufficiently in size to completely cover the over-cut service connection. No additional compensation will be paid for the repair of over-cut service connections.

Coupons of pipe material resulting from service tap cutting shall be collected at the next manhole downstream of the pipe rehabilitation operation prior to leaving the site. Coupons may not be allowed to pass through the system.

#### **Post Rehabilitation Television Inspection**

The completed sewer shall be television inspected and color video taped, by the Contractor, with a suitable log and voice description, after completion of the service connections. Video shall be in DVD format and shall be submitted to the Owner. Post rehabilitation television inspection of sewers shall be completed in accordance with the detailed specification for Sewer Video Inspection, but all costs shall be incidental to the CIPP pay items.

#### **CIPP Pipe Testing**

Testing in accordance with ASTM F 1216 (including appendixes) and ASTM D 5813 may be conducted at the discretion of the Owner. Actual sample testing shall be paid for by the Owner. Testing may be done anytime within one year of final completion except that air tests, or hydrostatic tests, if required, shall be done by the Contractor, at no additional cost to the Owner, prior to re-establishing service connections.

The Contractor shall prepare samples of the liner for each section of sewer lined in accordance with Section 8 of ASTM F 1216. Samples shall be labeled for date, diameter, section of sewer, and delivered to the Owner for future testing. When tested, each sample shall meet the physical properties for flexural modulus and flexural strength used in the design calculations.

Air testing on isolated sections of sewer (2 - 3 feet in length) shall be required if post-rehabilitation inspection indicates leaks in the liner. Such testing shall be paid for by the Contractor. The Contractor shall remove and replace or repair any defects in the installed liner to the satisfaction of the Owner at no additional costs.

#### **Clean-Up**

Upon completion of the installation work and after required testing indicates the linings are acceptable, the Contractor shall restore the project area affected by his operation.

#### **Traffic Control**

During the entire rehabilitation process, the Contractor shall provide all necessary barricades, signs, flag men, minor traffic devices, etc., to maintain both vehicular and pedestrian traffic in accordance with the Michigan Manual of Uniform Traffic Control Devices.

**MEASUREMENT AND PAYMENT**

The completed work as measured for this item of work will be paid for at the contract unit price for the following contract item:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
____ inch Diameter, CIPP Sewer Lining, Manhole to Manhole	Linear Foot

Cured-in-place pipe rehabilitation of sewer from manhole to manhole will be paid for at the Contract Unit Price per linear foot. Price paid shall be payment in full for all labor, material, and equipment required for rehabilitation of existing sanitary sewer by insertion of a cured in place liner and shall include, but is not limited to furnishing and installing liner; bypassing flow, post installation TV inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
____ inch Diameter, CIPP Spot Repair, Up to 10 feet in Length	Each

Cured-in-place pipe spot repairs of sewer will be paid for at the Contract Unit Price per each. Price paid shall be payment in full for all labor, material, and equipment required for the installation of a cured in place spot repair up to 10 feet in length and shall include, but is not limited to furnishing and installing liner; bypassing flow, post installation TV inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
CIPP Lateral Liner, Up to 18 inches in Length	Each

Cured-in-place pipe lateral liners for 4” or 6” laterals will be paid for at the Contract Unit Price per each. Price paid shall be payment in full for all labor, material, and equipment required for the installation of a cured-in-place lateral liner up to 18 inches in length and shall include, but is not limited to furnishing and lateral cleaning, inspection, installing liner; bypassing flow, installation TV inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

**Pay Item**

**Pay Unit**

Service Reconnection

Each

Service reconnections will be paid for at the Contract Unit Price per each. Price paid shall be payment in full for all labor, material, and equipment required for the reconnection of existing live sewer service connections to the installed CIPP liner regardless of size and shall include, but is not limited to, all television inspection, sealing the interface between the installed CIPP and the service pipe, bypassing flow, minor traffic control, gaining access to work site, and all other items necessary to complete the job, whether specifically mentioned or implied. This pay item shall apply to both full length manhole to manhole CIPP lining and CIPP spot repairs.

*All preliminary cleaning and video inspection required for the CIPP lining work shall be paid for in accordance with the in accordance with the detailed specifications for Sewer Cleaning and Sewer Video Inspection. Only post rehabilitation television inspection shall be incidental to the unit price for CIPP Sewer Lining and CIPP Spot Repair.*

*Traffic control on local streets shall be included in the unit price for CIPP Sewer Lining and CIPP Spot Repairs. Where traffic control is required on a major street, a proposal for the additional traffic control costs shall be submitted to the supervising professional for approval prior to conducting the work.*

**DETAILED SPECIFICATION  
FOR  
MANHOLE REHABILITATION**

**DESCRIPTION**

This work shall include the furnishing of all materials, equipment, tools, and labor as required for the rehabilitation of sewer manholes. This work includes lining the manhole interiors, internal sealing of the chimney area, and reconstructing manhole benches and channels, if necessary.

Rehabilitation products shall be applied to the manhole from the cover seat to and including the benches. The rehabilitation system must provide a non-prorated warranty as herein described in manholes to stop infiltration, prohibit root intrusion, protect the existing structure from further deterioration, and provide a surface coating resistant to sewer gases and chemicals.

**MATERIALS**

**Cementitious Manhole Lining System:**

The cementitious manhole lining system for the interior of manholes shall be a monolithic system suitable for use as a trowel or spray-applied monolithic surfacing in sewer manholes. The cementitious lining system shall be one of the following products or approved equal:

- Strong Seal MS-2A by Strong Seal Systems
- QM-IS Restore or Aluminaliner by Quadex
- Permacast MS-10,000 by AP/M Permaform
- PerpetuCrete MSC by Protective Liner Systems
- Mainstay ML-72 by Madewell
- Reliner MSP Cement by Standard Cement Materials

Where hydrogen sulfide resistance is required, the cementitious lining system shall be a calcium aluminate based product. The calcium aluminate products shall be one of the following products or approved equal:

- High Performance by Strong Seal Systems
- Aluminaliner by Quadex
- Permacast CR-9,000 by AP/M Permaform
- PerpetuCrete CA by Protective Liner Systems
- Sewpercoat PG by Kemeos, Inc.
- Mainstay ML-PF by Madewell
- Maximum CA Cement by Standard Cement Materials

The cementitious lining system shall be a pumpable cementitious mortar product designed specifically for manhole rehabilitation and shall be installed via low-pressure application only. The materials shall be suitable for all the specified design conditions.

The cementitious lining shall be installed on the benches and walls of existing manholes. All cementitious lining shall be troweled smooth after spray application. The cured cementitious lining shall be applied to a minimum total thickness of 1 inch. The cured surfacing thickness shall be smooth, even (without ridges or bumps) and continuous with proper sealing connections to all unsurfaced areas.

The materials used in the cementitious lining systems shall be mixed on site in accordance with the

manufacturer's recommendations. Water shall only be added to the materials during the mixing process and prior to material pumping or spray application. No water shall be added at the nozzle.

The cementitious liner when cured shall have the following minimum characteristics at 28 days as measured by the applicable ASTM standards referenced herein:

- Minimum compressive strength of 6,000 psi
- Minimum bond strength of 130 psi
- Shrinkage of less than 0.05%

The cementitious lining shall provide a minimum service life of 25 years.

The cured cementitious lining shall be continuously bonded to all the brick, mortar, concrete, chemical sealant, grout, pipe and other surfaces inside the sewer manhole. Provide bond strength data on cured, cementitious lining based on ASTM test methods.

When cured, the monolithic cementitious lining shall form a continuous, tight-fitting, hard, impermeable surfacing which is suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage.

The monolithic cementitious lining shall cover the complete interior of the existing sewer manhole including the benches (shelves). The lining shall effectively seal the interior surfaces of the sewer manhole and prevent any penetration or leakage of groundwater infiltration.

The lining shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20°F to 100°F. Provide test data on shrinkage of the cementitious lining based on the ASTM standards referenced herein.

All invert channels shall be coated with grout or cementitious mortar to build up the invert channel to the invert elevations of the new liner pipes; to fill all voids, cracks, holes, etc.; and to form a smooth flow channel. The entire channel shall be coated. The coating shall be a minimum 1/4-inch thick.

The Contractor shall submit complete shop drawings of manhole lining system to demonstrate compliance with these specifications, to show materials of construction and to detail installation procedures. Testing procedures and quality control procedures shall also be submitted. Certifications that the manhole lining was manufactured in accordance with these specifications and the appropriate ASTM standards shall be submitted with each shipment.

### **Sealants or Grouts**

Chemical sealants or grouts shall be used to seal active manhole leaks, patch cracks, fill voids and to otherwise prepare the manhole surfaces for the lining installation. They shall be suitable for the intended purpose and compatible with the lining as certified by the manufacturer.

The grout used to completely stop identified leaks shall be Hydro Active Cut by DeNeef Construction Chemicals or approved equal.

The grout shall provide a minimum service life of 25 years. When cured, the grout shall be suitable for sewer system service and chemically resistant to any chemicals or vapors normally found in domestic sewage. The grout shall be compatible with the thermal condition of the existing sewer manhole surfaces. Surface temperatures will range from 20°F to 100°F.

The grout shall effectively seal the identified leak in the sewer manhole and prevent any penetration or leakage of groundwater infiltration at this location or other nearby locations or within the same manhole joint/crack as a direct result of the injected grout.

The Contractor shall submit complete shop drawings of the injectable grout to demonstrate compliance with these specifications, to show materials of construction and to detail installation procedures. Testing procedures and quality control procedures shall also be submitted.

All water necessary for rehabilitation or lining operations shall be furnished by the City at agreed fire hydrant locations. Contact the Wheeler Center: located at 4251 Stone School Road at 734-994-1760 for procedures and fees for the hydrant meter, backflow preventer, and hydrant meter cage. Fees shall be paid by Contractor. Hydrants used by the Contractor shall be pumped down by the Contractor to prevent freezing. Frozen hydrants that were used by the Contractor and not properly closed or pumped down shall be repaired by the Contractor at no additional cost.

### **QUALIFICATIONS**

The cementitious product and grout product shall have been manufactured for installation specifically in manholes for at least five years. The products shall have been installed in at least 5,000 manholes. References that are documented and that can be verified shall be submitted to demonstrate that the cementitious product meets these requirements. Contact names and numbers shall be included with the references.

In addition, the Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer as certified and licensed by the manufacturer.

The Contractor shall have held such certification by the manufacturer to install the specific product being used for a minimum of one year prior to the bid date. The Contractor, as a company, must have at least three years of experience coating manholes with cementitious mortar and shall have successfully installed a cementitious lining in a minimum of 1,000 manholes as documented by verifiable references. Further, the Contractor's proposed superintendent/foreman for the work under this Contract shall have successfully installed a cementitious lining product in a minimum of 500 manholes as documented by verifiable references.

The Contractor shall submit information to demonstrate that he meets the experience requirements.

### **DELIVERY, STORAGE AND SHIPPING**

Care shall be taken in shipping, handling and placing to avoid damaging the lining and/or grout products. Any lining or grout product damaged in shipment, showing deterioration, or which has been exposed to any other adverse storage condition that may have caused damage, even though no such damage can be seen, shall be marked as rejected and removed at once from the work site. While stored, the lining products shall be adequately packaged and protected from UV radiation. The lining products shall be stored in a manner as recommended by the manufacturer.

### **CONSTRUCTION METHODS**

Prior to performance of the work carefully inspect the entire site and locate those manholes designated to be rehabilitated.

**Notification**

The Contractor shall notify all property owners who discharge sewage directly to the manhole being rehabilitated 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted and the impacts to the property owner.

**Bypassing Flow**

The Contractor shall provide for the transfer of main line flow around the manholes that are to be rehabilitated. The work shall consist of pumping and bypassing flow in the existing sewers.

The Contractor shall maintain flow in existing sewers at all times by pumping, bypassing, or fluming as necessary. During wet weather events, the flow in the sewer will rise rapidly and may become surcharged. The Contractor shall maintain flow in such a manner as the existing flow can be adequately transported including wet weather flow. The Contractor shall furnish, install, operate, and maintain temporary pumping facilities to service the upstream area including piping, temporary channels, pumps, sumps, controls, temporary plugs, and bulkheads. Pump or generator noise shall be kept at or below 40 decibels at 100 feet from the source.

For sanitary sewerage, by-pass piping shall be PVC Schedule 80, ABS truss pipe, or equivalent with solvent welded joints; HDPE with butt fused joints; or completely watertight Flexible hoses.

All by-passed flow shall be discharged to a sanitary sewer of acceptable size to handle the bypassed and existing flows. The Contractor shall plan his operation such that there will be no backups, leaks, or discharges of pollutants. The Contractor shall be completely responsible for any leaks, spills, or discharges of effluent or other pollutants.

The Contractor shall also furnish and have available on-site, redundant pumping facilities in case of any failure of the pumping system including pumps, piping, electrical, connections, etc. Redundant pumping facilities also include having a backup power generator in case the primary power source fails. The Contractor shall provide an adequate labor force to oversee the by-pass pumping including providing labor to maintain 24 hour per day operation and emergency backup service. The Contractor will not be allowed to obstruct flows in any sewer unless the primary and redundant pumping and bypassing equipment is on site and in an operable condition.

All costs for pumping and by-passing flow shall not be paid for separately and shall be considered incidental to manhole rehabilitation and lining.

The Contractor shall submit a by-pass pumping/diversion scheme to the Engineer for approval not less than 15 days prior to any anticipated by-pass pumping/diversion. By-pass plan shall include pumping capacity and expected flow rates. The Contractor will not be allowed to by-pass any flows until the by-pass pumping plan has been reviewed and accepted by the Engineer. Contract time shall continue while the by-pass plan is being reviewed and during the time requested revisions are being made. Delays encountered due to Engineer requested revisions shall not be considered for an extension of contract time.

Construction of bypasses may be made by diversion of the main line flow at an existing upstream access point or manhole and pumping the flow into a downstream access point or manhole or by any other method approved by the Owner which will not cause a sewer backup. The pump and bypass lines shall be of adequate capacity and size to handle wet weather flow.



**Cleaning**

The Contractor shall clean each sewer manhole to be lined and shall dispose of any resulting material. The cleaning shall be performed using a high power jet wash at a minimum of 3,500 psi water pressure to remove all dust biological growths, grease, oil, paint or any other surface contaminants or coatings. Coatings that cannot be removed shall be sanded with coarse sand paper to rough the surface sufficient to obtain and insure adequate bonding of the cementitious lining.

**Manhole Rehabilitation**

All active, hydrostatic infiltration leaks shall be plugged or sealed with an appropriate grout compatible with the cementitious lining system. A premixed fast-setting volume stable waterproof cement plug consisting of hydraulic cement, graded silica aggregates, special plasticizing and accelerating agents may be used to seal active leaks. It shall not contain chlorides, gypsums, plasters, iron particles, aluminum powder, or gas-forming agents, or promote the corrosion of steel that it may come in contact with. Set time shall be approximately 60 seconds or less. The ten-minute compressive strength of the plug shall be a minimum of 500 psi.

Injection grouting may be required to seal active leaks including leaks in existing invert channels and benches. All injection grouts shall be mixed per the manufacturers recommendations.

All loose mortar and rubble of existing walls, benches and inverts shall be removed. The Contractor shall prepare the manhole to receive cementitious lining as necessary by reshaping and repairing benches, inverts, and walls where required including smoothing out irregular shaped corbel and chimney sections prior to spray application. All interior surfaces shall be prepared as recommended by the manufacturer. Minimum requirements are as listed below.

1. All cracks and other voids must be repaired and filled with suitable non-shrinking cements, sealants or grouts, including all voids between the existing sewer pipes and manhole walls. All patches shall be smooth and even with the manhole wall.
2. Removal of all steps and filling of all voids around existing manhole rungs/steps.
3. All surfaces shall be suitably prepared for the required bonding of the cementitious lining as recommended by the manufacturer.

Site conditions may preclude the Contractor from mobilizing the sealing, coating and/or lining equipment near the manhole. If the manhole is inaccessible, as determined by the Contractor and the Engineer, the Contractor shall hand apply the coatings and/or liners per the manufacturer's instructions and recommendations? Hand application shall be completed at no additional cost to the City.

Prior to installing the lining, the Engineer (or appointed representative) along with the Contractor must inspect and approve the grouting and/or surface preparation work. The Contractor shall notify the Engineer when the manholes are ready for inspection. The Contractor is responsible for ensuring proper preparation and installation conditions including temperature and moisture regardless of the findings by the Engineer during his inspection.

The manhole lining shall be completed immediately after the inspection, or the manhole may need to be re-cleaned prior to spraying to remove accumulated debris on the benches and walls.

For cementitious lining applications, the walls and benches shall be coated monolithically to the required thickness by spray-on methods in one pass or application. Spray-applied cementitious linings shall be troweled smooth after application.

The invert channel shall be coated with an appropriate quick-set grout product in complete accordance with the manufacturer's instructions.

A complete, watertight seal shall be provided at pipe and manhole wall connections. Contractor shall submit details of how the watertight connections will be made to the Engineer for review and approval.

The manhole lining shall not be installed until all required main sewer rehabilitation and other manhole rehabilitation work are complete.

Field acceptance of the manhole lining shall be based on the Engineer's field inspections and evaluation of the appropriate installation and curing test data.

The lining shall provide a continuous monolithic surfacing with uniform thickness throughout the manhole interior. If the thickness of the lining is not uniform or is less than specified, it shall be repaired or replaced at no additional cost to the City.

### **INSPECTION AND TESTING**

#### **Manhole lining Video Inspection**

After the manholes are completely lined, the Contractor shall inspect all lined manholes via closed circuit television (CCTV).

All work submitted by the Contractor shall be completed by PACP Certified professionals. A current PACP certification number shall be included for each person creating/gathering inspection reports or performing video inspections.

The purposes of the CCTV inspections are to confirm that the lining has been properly installed and cured.

The camera equipment used for the CCTV inspections shall be one specifically designed and constructed for such inspection. Camera must be operative in 100% humidity conditions. The live image obtained by the camera shall be transmitted to a color monitor of not less than 19 inches. Camera and monitor shall have a minimum 500 line resolution. The monitor shall be located inside the mobile recording studio.

Lighting for the camera shall be adequate to allow a clear picture of the entire periphery of the manholes inspected. Remote control of lighting brilliance, camera focus, and camera movement shall be from a control panel inside the mobile recording studio. Cables and equipment used to propel the camera shall not obstruct the camera view or interfere with the documentation of the manhole conditions.

Camera shall be moved through manhole at a uniform rate. The camera shall be stopped at pipe openings and shall be panned, tilted and rotated to fully view the manhole and all pipe connections. All such inspections shall be documented on computer-generated logs.

#### **Documentation**

All post rehabilitation televised manhole inspections performed shall be submitted to the Engineer in electronic (digital) format.

The contractor shall use the City's manhole numbering system on all documentation, which shall be provided by the City.

The Contractor shall provide the City inspection logs listing the location in relation to adjacent manholes and other discernible features. The logs shall indicate size and type of pipe material, length of line from manhole and direction of sewage flow, if present. The logs shall also indicate the time and date of recording.

The digital recording shall include both audio and video information that accurately reproduces the original picture and sound of the video inspection. The video portion of the digital recording shall be free of electrical interference and shall produce a clear and stable image. The audio portion shall be sufficiently free of background and electrical noise as to produce an oral report that is clear and discernible.

### **Video Overlay**

The video shall include overlay/text display with an initial display screen and with a continuous running screen. Each inspection start shall include overlay display of section details including at a minimum:

1. Date/Time of Inspection
2. MH (City manhole identification number)
3. Pipe connections
4. Pipe Size
5. Direction of Video
6. Flow Level

The continuous running screen shall include a constant display of the MH #, date and depth shall appear on screen. The CCTV inspector shall move or remove overlay display accordingly so it does not interfere with the inspection review of particular observations/defects as the inspection is occurring.

### **Video Media**

The database file and the corresponding video files shall be submitted to the Engineer on DVD, flash drive or portable external hard drives. One copy of the printed logs (in color) that correspond to the inspections shall be submitted to the Engineer. The Engineer will return the hard drive to the Contractor after the inspections have been reviewed.

Each submittal to the Engineer shall include a transmittal letter, listing the file names and all sewer segments and video files included on the hard drive.

### **Cementitious Mortar Lining Testing**

Samples shall be taken of the installed liner each day that cementitious lining is installed as follows:  
one sample if one to five manholes were coated that day,  
two samples if six to ten manholes were coated that day,  
three samples if eleven to fifteen manholes were coated that day,  
four samples if sixteen or more manholes were coated that day.

Samples shall be taken at equally spaced intervals throughout the day. The frequency of tests may be increased by the Engineer and performed by the Contractor at no additional cost to the City when the required tests show that the installed lining does not meet the specifications.

Samples shall be cube samples. At least six cubes shall be taken for each sample for testing. All cube samples shall be taken in the field from the material being sprayed. The Contractor shall show the

samples to the Engineer each day and the Engineer shall initial the samples for delivery to the testing laboratory. The Contractor shall properly take and store the samples and shall deliver the samples to the City of Ann Arbor.

The City may have the samples tested in accordance with the applicable ASTM standards to verify that the installed liner meets the compressive strength requirements specified herein and the lining manufacturer's published data on the product. All costs for the testing shall be paid for by the City. Tests shall include 7-day and 28-day strength tests (3 tests/cubes for each time period for each sample). Shrinkage and bond strength tests may also be performed on each batch or lot of material shipped to the Contractor.

**MEASUREMENT AND PAYMENT**

The completed work as measured for these items of work will be paid for at the unit prices for the following pay items:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Cementitious Manhole Lining	VF
Calcium Aluminate Manhole Lining	VF

Cementitious and Calcium Aluminate Manhole Lining shall be paid for at the Contract Unit Price per vertical foot of manhole to be lined. Price paid shall be payment in full for all labor, material, and equipment required for rehabilitation of existing manholes by grouting and/or sealing the interior wall of manholes; insertion of a cementitious liner and shall include, but is not limited to: furnishing and installing liner; reconnection of service leads; bypassing flow, dewatering; gaining access to work site; removal and replacement of site improvements; post rehabilitation video inspection; and all other items necessary to complete the job, whether specifically mentioned or implied.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Spot Seal Leak	Each

Spot Seal Leak shall be paid for at the Contract Unit Price per each location sealed where active running water is entering the manhole. Price paid shall be payment in full for all labor, material, and equipment required for sealing active leaks and shall include, but is not limited to waterproof cement plugs, chemical grouts, cleaning the manhole, bypassing flow, post rehabilitation video inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Internal Chimney Seal	Each

Internal Chimney Seal shall be paid for at the Contract Unit Price per each manhole chimney sealed. Price paid shall be payment in full for all labor, material, and equipment required for the complete chimney seal installation and shall include, but is not limited to cleaning the manhole, bypassing flow, post rehabilitation video inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

**Pay Item**

Reconstruct Bench/Channel

**Pay Unit**

Each

Reconstruct Bench/Channel shall be paid for at the Contract Unit Price per each manhole bench and channel reconstructed. Price paid shall be payment in full for all labor, material, and equipment required for the complete reconstruction of the existing manhole bench and flow channel shall include, but is not limited to cleaning the manhole, bypassing flow, post rehabilitation video inspection, minor traffic control, dewatering; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied.

**DETAILED SPECIFICATION  
FOR  
PRESSURE TESTING AND GROUTING OF SEWER JOINTS AND LATERAL  
CONNECTIONS**

**DESCRIPTION**

This work shall include the furnishing of all materials, equipment, tools, and labor as required for the testing of sewer pipe joints and lateral connections by application of positive air pressure and sealing joints and connections that are not watertight by packer injection grouting. Packer injection grouting shall be accomplished by pressure injection of chemical grout into the soils encompassing the exterior of the pipe joint or lateral connection.

All work performed under this specification shall be in accordance with ASTM F2304 and ASTM F2454.

**SUBMITTALS**

Submit the following information prior to beginning any sewer joint or connection pressure testing and grouting.

- A. Equipment operating procedures and systems.
- B. Chemical Grout information:
  - 1. Description of chemical grout materials to be used.
  - 2. Description of proposed additives to be used.
  - 3. Manufacturers recommended procedures for storing, mixing, testing and handling of chemical grouts.
  - 4. MSDS sheets for all materials to be used.
- C. Identify the manufactures & models of the packers to be utilized on the project.
- D. Proposed flow bypass plan.
- E. Emergency plan detailing procedures to be followed in event of health and safety emergency, pump failures, sewer overflows, service backups, and sewage spillage. Maintain copy on site for duration of project.
- F. Upon completion of each pipe segment, submit to the City a report showing the following data for each joint or lateral tested, grouted or attempted to be grouted as required by PACP.
  - 1. Identification of the sewer pipe section tested by assigned sewer ID (if available) and length.
  - 2. Type of pipe material, diameter & depth of pipe to the surface at manholes.
  - 3. Length of pipe sections between joints.
  - 4. Test pressure used and duration of test.
  - 5. Pass/fail results for each joint/connection tested.
  - 6. Location stationing of each joint/connection tested and location of any joints/connections not tested with an explanation for not testing.
  - 7. Volume of grout material used on each joint or connection.
  - 8. Gel set time used (cup test results from tanks)
  - 9. Grout mix record of the batches mixed including amount of grout and catalyst,

- additives, temperature of the grout solution in tanks.
10. Operator conducting testing and sealing shall be noted on the reports.
  11. Video recordings
    - a. Video recording shall include testing and sealing operations for each joint/lateral (including inflation and deflation over the joint/lateral) displaying the final air test of joints or laterals.
    - b. Additional final recording, if specified, shall include inspection of the pipe or lateral after all grouting work is complete.

## **MATERIALS**

### **Testing and Grouting Equipment**

The equipment used for mainline pipe joints shall consist of a remotely operated CCTV camera, a packer joint testing device, and test monitoring equipment. The equipment shall provide a means for introducing air under pressure into the void area created by the expanded ends of the packer against the host pipe and shall provide a means for continuously measuring, viewing and recording the static pressure of the test medium and grout within the void area.

The device for testing lateral connections shall consist of inflatable mainline end elements and a lateral grouting plug that creates a void area extending beyond the main connection. Whenever possible, use a lateral grouting plug sized to match the diameter of the lateral being grouted with an effective sealing length of at least four feet. Where the lateral is capped, utilize alternate lateral grouting plug or equipment sized appropriately for the capped lateral. In cases where the lateral transitions from 6" to 4" in diameter, use a 4" lateral grouting plug.

The packer shall be of a size less than the diameter of the host pipe with bales at either end to pull it through the line. It may be constructed in such a manner so as to allow a restricted amount of sewage to flow at all times. The packer shall be expanded by air pressure.

Void pressure data shall be transmitted from the void area to the monitoring equipment or video picture of a pressure gauge mounted on the packer and connected to the void area. All test monitoring shall be above ground and in a location to allow for simultaneous and continuous observation of the televising monitor and test monitoring equipment.

Grouting equipment shall consist of the packer, appropriate pumping and hosing systems capable of supplying an uninterrupted flow of sealing materials to completely fill the voids. Grout pumping system shall be sized to deliver a mixed volume of grout at a minimum of 3 gpm and 30 gallons of uninterrupted flow within 10 minutes.

Volume of mixed grout pumped must be capable of being measured and recorded for each grouted joint/connection. Generally, the equipment shall be capable of performing the specified operations in sewers where flows do not exceed 25 percent of pipe diameter unless permitted by ENGINEER.

### **Grout Materials**

All grout materials must have the following characteristics:

1. While being injected, the grout must be able to react /perform in the presence of water (groundwater).
2. The ability to increase grout mix viscosity, density and gel strength by increased concentration of constituents or the use of approved additives.
3. The cured grout must withstand submergence in water without degradation.

4. The resultant grout formation must be homogeneous and prevent the passage of water (infiltration) through the pipe joint.
5. The grout must not be biodegradable.
6. The cured grout should be chemically stable and resistant to organics found in sewage.
7. Residual grout shall be easily removable from the sewer line to prevent blockage of the sewage flow.

Handle, mix, and store grout in accordance with the manufacturer's recommendations. The materials shall be delivered to the site in unopened original manufacturer's containers.

Water based chemical grouts shall have the following characteristics:

1. A minimum of 10% acrylamide base material by weight in the total grout mix. A higher concentration of acrylamide base material is recommended to increase strength or offset dilution during injection.
2. The ability to tolerate some dilution and react in moving water during injection.
3. A viscosity of approximately 2 centipoise, which can be increased with approved additives.
4. A controllable reaction time from 10 seconds to 1 hour.
5. A reaction (curing) that produces a homogenous, chemically stable, nonbiodegradable, firm, flexible gel.
6. The ability to increase mix viscosity, density and gel strength by increased concentrations of the mix constituents or by the use of approved additives.
7. Water based chemical grouts shall be Avanti AV-100, Avanti AV-118; or approved equal.

Acrylate base grout shall have the following characteristics:

1. A minimum of 10% acrylate base material by weight in the total grout mix.
2. The ability to tolerate some dilution and react in moving water during injection.
3. A viscosity of approximately 1-3 centipoise, which can be increased with approved additives.
4. A controllable reaction time from 10 seconds to 1 hour.
5. A reaction (curing) that produces a homogenous, chemically stable, nonbiodegradable, firm, flexible gel.
6. The ability to increase mix viscosity, density and gel strength by the use of approved additives.
7. Acrylate based grouts shall be DeNeef AC-400, DeNeef Gelacryl SR, Avanti AV-160; or approved equal.

At the CONTRACTOR'S discretion and according to field conditions, additives may be selected and used within the manufacturers recommended quantities.

For joint grouting, a latex or "diatomaceous earth" additive may be added to increase compressive and tensile strength. The quantity of strengthening agent additive shall be as recommended by the manufacturer and approved by ENGINEER. Strengthening agent shall be Avanti AV-257 Icoset, DeNeef Reinforcing Agent; or approved equal.

When roots are present at the joint a root deterrent chemical shall be added to control root re-growth. The quantity of inhibitor shall be as recommended by the manufacturer and approved by ENGINEER. The root inhibitor shall be Avanti AC-50W; or approved equal.

A manufacturer approved water soluble dye without trace metals may be added to the grout tank(s) for visual confirmation.



A gel time extending agent may be used in accordance with the manufacturer's recommendations to extend gel time as necessary.

In those lines where the grouting material may be exposed to a freeze-thaw cycle, ethylene glycol or other ENGINEER approved additive shall be used to prevent chemical grout cracking once set.

When using non soluble additives, the grout tanks must have mechanical mixing devices to keep the additives in suspension and maintain a uniform solution of grout and additive.

All water necessary for joint/lateral testing and sealing work shall be furnished by the City at agreed fire hydrant locations. Contact the Wheeler Center: located at 4251 Stone School Road at 734-994-1760 for procedures and fees for the hydrant meter, backflow preventer, and hydrant meter cage. Fees shall be paid by Contractor. Hydrants used by the Contractor shall be pumped down by the Contractor to prevent freezing. Frozen hydrants that were used by the Contractor and not properly closed or pumped down shall be repaired by the Contractor at no additional cost.

### **QUALIFICATIONS**

Chemical grout shall have documented service of successful performance in similar usage, with a minimum of 12,000 joints or lateral connections grouted.

The Contractor performing the work shall be fully qualified, experienced and equipped to complete this work expeditiously and in a satisfactory manner and shall be an approved installer as certified and licensed by the manufacturer. Personnel involved in sealing of joints and lateral connections shall be certified by grout manufacturer that they have successfully completed training in handling, mixing and application of grout for sanitary sewer line and joint sealing.

The Contractor shall submit information to demonstrate that he meets the experience requirements.

### **DELIVERY, STORAGE AND SHIPPING**

Care shall be taken in shipping, handling and storage to avoid damaging the grouting materials. Any grout material found defective or damaged due to manufacture or shipment shall be removed from the site and replaced at no additional cost.

### **CONSTRUCTION METHODS**

#### **Notification**

The Contractor shall notify all property owners who discharge sewage directly to the sewer or lateral being tested or grouted 72 hours in advance, giving the date, start time and estimated completion time for the work being conducted and the impacts to the property owner.

#### **Bypassing Flow**

The Contractor shall provide for the transfer of main line flow around the section or sections of pipe that are to be grouted. The work shall consist of pumping and bypassing flow in the existing sewers.

The Contractor shall maintain flow in existing sewers at all times by pumping, bypassing, or fluming as necessary. During wet weather events, the flow in the sewer will rise rapidly and may become surcharged. The Contractor shall maintain flow in such a manner as the existing flow can be adequately transported including wet weather flow. The Contractor shall furnish, install, operate, and maintain temporary pumping facilities to service the upstream area including piping, temporary channels, pumps, sumps, controls, temporary plugs, and bulkheads. Pump or generator noise shall be kept at or below 40 decibels at 100 feet from the source.

For sanitary sewerage, by-pass piping shall be PVC Schedule 80, ABS truss pipe, or equivalent with solvent welded joints; HDPE with butt fused joints; or completely watertight Flexible hoses.

All by-passed flow shall be discharged to a sanitary sewer of acceptable size to handle the bypassed and existing flows. The Contractor shall plan his operation such that there will be no backups, leaks, or discharges of pollutants. The Contractor shall be completely responsible for any leaks, spills, or discharges of effluent or other pollutants.

The Contractor shall also furnish and have available on-site, redundant pumping facilities in case of any failure of the pumping system including pumps, piping, electrical, connections, etc. Redundant pumping facilities also include having a backup power generator in case the primary power source fails. The Contractor shall provide an adequate labor force to oversee the by-pass pumping including providing labor to maintain 24 hour per day operation and emergency backup service. The Contractor will not be allowed to obstruct flows in any sewer unless the primary and redundant pumping and by-passing equipment is on site and in an operable condition.

All costs for pumping and by-passing flow shall be included in the unit price bid for sewer joint or lateral connection testing and grouting.

### **Cleaning and Inspection**

Prior to the application of the chemical grouting materials, the CONTRACTOR shall thoroughly clean the sewer or lateral designated to receive the chemical grouting. Cleaning shall constitute removal of all loose debris & solids which inhibit proper seating of the packer. Cleaning shall be paid under the pay items identified under the Detailed Specification for Sewer Cleaning.

During mainline sewer cleaning or joint testing, document all lateral connections containing roots, mineral deposits or obstructive conditions that are either (a) greater than fine roots or (b) of a nature to prevent testing and sealing of connection. For each such connection, submit a screen shot image clearly showing the extent of roots or obstructive condition to the City. Submit images in electronic format, labeled and organized in a manner to easily retrieve the image for the lateral connection in question. The list of lateral connections with roots shall include upstream and downstream manhole numbers and stationing. The City will review the list of lateral connections containing roots and obstructions and direct the Contractor as to which laterals are to be (a) cleaned and grouted, (b) grouted without cleaning – in which case such lateral connection would be excluded from warranty testing, or (c) removed from the scope of work – in which case no payment for such lateral will be made. Cleaning of lateral connections shall be incidental to the lateral connection testing pay item.

After cleaning, perform CCTV inspection to ensure main is sufficiently clean to perform sealing operations. Document protruding taps and structural defects found during the CCTV inspection. If the City determines the sewer is not sufficiently cleaned, remove CCTV and sealing equipment and re-clean at no additional cost. CCTV inspection shall be paid under the pay items identified under the Detailed Specification for Sewer Video Inspection.

Testing and grouting will not be required on pipe exhibiting the following conditions or characteristics:

1. Longitudinally cracked, fractured or broken pipe.
2. Sections of the pipe with structural defects between joints.
3. Any sections of pipe or joints that are in such poor structural condition that in the judgment of Owner or Contractor, significant structural damage of the pipe would occur as a result of the pressure test.

## **Testing**

Before beginning sewer joint or lateral connection air testing, perform control tests at ground surface to verify accuracy, integrity, and reliability of testing equipment following ASTM F2304.

Joint and lateral connection testing pressure shall be equal to 0.5 psi per vertical foot of pipe depth plus 2 psi; however, test pressure shall not exceed 10 psi without the approval of the Owner.

Individually test each sewer pipe joint at the above-specified pressure (and retest after sealing) in accordance with the following procedure:

1. The packer shall be positioned within the pipe in such a manner as to straddle the joint to be tested.
2. The packer ends shall be expanded so as to isolate the joint from the remainder of the pipe and create a void area between the packer and the pipe joint. The ends of the testing device shall be expanded against the pipe as per manufacturer's recommendations. If all attempts to isolate the joint fail, pump grout in an attempt to seal the leak around the packer end elements. The Contractor shall be paid the unit price for grout to seal the packer unless the City determines that the sewer was inadequately cleaned or the packer is not performing properly.
3. After the void pressure is observed to be equal to or greater than the required test pressure, the air flow shall be stopped. If the void pressure decays by more than 1.0 psi within 15 seconds, the joint will have failed the test and shall be sealed.

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

The lateral connection test procedure will consist of applying a controlled air pressure into each isolated void area. Air shall then be slowly introduced into the void area until a pressure equal to or greater than the required test pressure, but in no cases greater than 2 psi above the required test pressure, is observed on the pressure monitoring equipment. Once the designated pressure in the isolated void is displayed on the meter of the control panel, the application of air pressure will be stopped and a 15 second waiting period will commence. The void pressure will be observed during this period. If the void pressure drop is greater than 2.0 psi within 15 seconds, the lateral shall be considered to have failed the air test and shall be grouted and retested.

After completing all air testing, the packer shall be deflated with the void pressure meter continuing to display void pressure. Should the void pressure meter fail to drop to 0.0 +/- 0.5 psi, clean the test equipment of residual grout material or make the necessary equipment repairs to provide for an accurate void pressure reading.

## **Grout Preparation**

Follow the manufacturer's recommendations and safety procedures for the mixing of grout.

Adjust gel time as necessary to compensate for changes in temperature in grout component tanks or hoses. The addition of dilution water to extend gel times is not acceptable unless resulting base grout tank only material exceeds 20% by weight for solution grouts.

During the grouting process, the Grouting Technician shall monitor the grout component tanks to make sure that proper ratios are being pumped. If unequal levels are noted in the tanks, repeat the pump test as described above and correct any defective equipment.

To estimate gel set times, divide estimated volume of annular space (in gallons) by grout pumping rate (in gallons per minute), then add between 15 to 25 seconds. Adjust estimate by taking into account temperature of grout tanks, temperature of hoses, temperature of groundwater, amount of groundwater present and other field conditions.

The gel set time is typically between 20 and 40 seconds. Gel set times of less than 20 seconds may be required in presence of high infiltration.

Monitor induction periods and gel characteristics through daily gel time tests for each sealing vehicle. Check each new batch once. If only one batch is used, check at least twice per day.

Perform new gel time test when grout additives are modified to change gel times, at beginning of new setup with new starting manhole, or when temperature in tanks and hoses changes by more than 10 degrees F from previous gel time test.

Use water with known and controlled pH that will be used during actual grouting operations.

Allow grout mixture to settle to remove entrained oxygen, before testing gel time.

Use plastic or stainless steel tanks. Do not use tanks that contain iron or copper.

### **Grouting**

Grout all joint and lateral connections that failed the pressure test by the injection method. This shall be accomplished by forcing grout through a system of pumps and hoses into and through the joints of the sewer from the packer within the sewer pipe. Remove excess grout from pipe and laterals. Excess grout shall be defined as a thickness of grout that given its location, size and geometry, could cause a blockage. Flush or push forward to the next downstream manhole, remove from the sewer system, and properly dispose of excess grout.

Position the mainline packer over the joint or defect to be sealed by means of a CCTV camera in the line. Position the push/pull packer over the joint or defect to be sealed by a means of visual observation, marked push rod, or where a cleanout is available, through a CCTV camera in the lateral. For push packers, start work at the most distant point to be grouted. Take an accurate measurement of the location of the defect to be sealed using a portion of the packer as a point of reference for positioning the injection area of packer over the defect. Pneumatically expand the packer sleeves such that they seal against the inside periphery of the pipe to form a void area at the joint now completely isolated from the remainder of the pipe line.

Pump grout materials at mainline joints, in stages if needed, into this isolated area to refusal until and the void or surrounding soil has been filled or solidified with the goal of applying 0.25 to 0.5 gallons of grout per inch-diameter per pipe joint. Refusal is when the packer void pressure during grout pumping instantaneously rises or “spikes” by 4 to 5 psi or more above the normal void pressure experienced during grout pumping operation. Refusal may also be revealed when pumping void pressure exceeds the holding pressure of the packer end elements as evidenced by “blow-by” past the packer sealing end elements. Refusal shall mean, when the joint will not accept any more grout because it has flowed throughout the void, through any joint failure and into the surrounding soil;

gelled or filled the available void space; and formed a cohesive seal stopping further grout flow, then the joint will have then been sealed. Record the amount of grout pumped on the sealing log.

When pumping grout at lateral connections, operate the pumps until the mixed grout flows through any joint failure, through any annular space, and into the surrounding soil; gelled or filled the available void space; formed a cohesive seal stopping further grout flow; and minimum of 8 psi back pressure is achieved while pumping. As grout pumping continues the void pressure will slowly rise to a range of about 2 to 4 psi, continue pumping until a point where there is a sudden increase in the void pressure. This increase from 2 to 4 psi to over 8 to 10 psi takes place in a matter of a few seconds. If the grout pumped exceeds 1 gallon per foot of lateral bladder plus 3 gallons, it will be suspected that there are significant voids on the outside of the pipe or that the packer is not properly sealed. Check that the packer is sealed properly. If it is, modify grouting procedure to stage grouting by pumping additional grout equivalent to 1 gallon plus 0.25 gallon per foot of lateral bladder, waiting 1 full minute, and retesting. The maximum number of stages shall not exceed two stages unless authorized by ENGINEER.

If large voids are encountered on outside of sewer or lateral, including the possibility of “piping” holes to ground surface, which could cause excessive use of grout material, the Contractor shall change operating pressures and pumping rates as necessary.

Upon completion of the injection, deflate the packer to break away from the ring of gel formed by the packer void. The packer should then be re-inflated and the joint or lateral connection retested at a pressure equal to the initial test pressure. If the joint fails this air test, repeat the grouting procedure at no additional cost to the OWNER, except for the additional grout used. Repeat this sequence of air testing, grouting and subsequent air testing until either the joint is sealed or it is determined that the grout consumption is too high. The final determination to stop subsequent attempts to seal a joint will be made jointly between the Owner and the Contract. Should the void pressure meter not read zero  $\pm$  0.5 psi, clean the equipment of residual grout or make the necessary equipment repairs/adjustments to produce accurate void pressure readings.

If a mainline or lateral joints require more than 0.5 gallon of grout per inch-diameter per pipe joint, modify grouting procedure to perform stage grouting by pumping additional grout in up to 4 gallon increments, waiting 1 gel set cycle time or 1 full minute, whichever is greater between stages. Maximum number of stages shall not exceed two stages of 4 gallons each unless approved by Owner.

Record grouting of joints in conjunction with the testing of joints. Record the void pressure drop continuously on video and in writing immediately before sealing, and immediately after grouting. After the packer is deflated and moved, record on video the visual inspection of the joint. Use standardized test and seal data sheets with PACP data codes.

### **Joint Sealing Verification**

After grouting is complete, all pipe sections shall be final inspected by means of a color CCTV system. The inspection shall be conducted as per the NASSCO Pipeline Assessment and Certification Program. One set of DVD's and reports shall be submitted.

Record grouting of joints in conjunction with the testing of joints. Record the void pressure drop continuously on video and in writing immediately before sealing, and immediately after grouting. After the packer is deflated and moved, record on video the visual inspection of the joint. Use standardized test and seal data sheets with PACP data codes.

**WARRANTY**

Provide twelve month performance and workmanship warranty for the seals from date of acceptance.

Perform CCTV inspections during the first wet weather season after initial sealing, to evaluate quality of the initial sealing. The CCTV inspection area shall consist of at least 10 percent of grouted joints and 10 percent of grouted lateral connections. Costs for the warranty CCTV inspection shall be paid under the pay items identified under the Detailed Specification for Sewer Video Inspection.

Reseal all joints sealed under this Contract that inspector finds defective within warranty period, at no additional cost to the Owner. Defective seals include, but are not limited to, those with root penetration, signs of infiltration, and cracks in pipe or grouting material.

If failure rate of retested joints and lateral connections is 5 percent or less of joints and lateral connections retested, work shall be considered satisfactory and no further retesting will be required. If the failure rate of retested joints and lateral connections is greater than 5 percent, the City shall randomly select another retest area consisting of another 10 percent of the initially sealed joints and lateral connections. Continue this additional retesting and resealing until a failure rate of less than 5 percent is met.

All work submitted by the Contractor shall be completed by PACP Certified professionals. A current PACP certification number shall be included for each person creating/gathering inspection reports or performing video inspections.

**MEASUREMENT AND PAYMENT**

The completed work as measured for these items of work will be paid for at the unit prices for the following pay items:

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Sewer Joint Testing, 8” to 15”	Each
Lateral Connection Testing, 8” to 15” Mainline Sewer	Each

Sewer joint and lateral connection testing will be paid for by the unit each for the actual number of joints or lateral connections tested. The unit price paid shall be payment in full for all labor, material, and equipment required for the testing of sewer joints and lateral connections and shall include bypassing flow, minor traffic control; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether specifically mentioned or implied. Mainline sewer cleaning and inspection prior to testing shall be paid for under the pay items identified under the Detailed Specification for Sewer Video Inspection. Cleaning of roots, debris and deposits from the lateral shall be included in the Lateral Connection Testing pay item. CCTV observation of the testing process shall be incidental to the testing pay items.

<b><u>Pay Item</u></b>	<b><u>Pay Unit</u></b>
Packer Injection Joint Grouting, 8” to 15”	Each
Packer Lateral Connection Grouting, 8” to 15” Mainline Sewer	Each

Packer sewer joint and lateral connection grouting will be paid for by the unit each for the actual number of joints or lateral connections grouted. The unit price paid shall be payment in full for all labor, material, and equipment required for the grouting of sewer joints and lateral connections and shall include bypassing flow, minor traffic control; gaining access to work site; removal and replacement of site improvements; and all other items necessary to complete the job, whether

specifically mentioned or implied. CCTV observation of the grouting process shall be incidental to the grouting pay items.

**Pay Item**

Chemical Grout Material

**Pay Unit**

Gallon

Chemical Grout Material will be paid for by the unit gallon for the actual amount of grout material required to seal joints or lateral connections.