CITY OF FLINT
FINANCE DEPARTMENT - DIVISION OF PURCHASES AND SUPPLIES

City Hall
1101 S. Saginaw Street, M203 – Flint, Michigan 48502
(810) 766-7340 FAX (810) 766-7240 www.cityofflint.com TDD 766-7120

Dr. Karen W. Weaver
Mayor

REQUEST FOR PROPOSAL

OWNER/RETURN TO:

THE CITY OF FLINT
FINANCE DEPARTMENT - DIVISION OF PURCHASES AND SUPPLIES
1101 S. SAGINAW ST., ROOM 203, 2nd FLOOR
FLINT, MI 48502

PROPOSAL NO.: **19000580**

SCOPE OF WORK:

The City of Flint, Finance Department – Division of Purchases & Supplies, is soliciting sealed proposals for providing:

Construction Engineering Services for Court St. Rehabilitation

Per the attached additional requirements.

If your firm is interested in providing the requested goods or services, please submit one (1) original and one (1) copy of your detailed proposal to the City of Flint, Finance Department - Division of Purchases and Supplies, 1101 S. Saginaw St., Room 203, Flint, MI, 48502, **Thursday, July 18, 2019 @ 3:00 PM (EST)**. Please note: all detailed proposals received after 3:00 PM (EST) will not be considered. Proposals must be in a sealed envelope clearly identifying the proposal and number. Faxed proposals into the Finance Department - Division of Purchases and Supplies are not accepted.

All additional proposal documents, requirements, addendums, specifications, and plans/drawings (if utilized) are available on the Purchasing page of the City of Flint's web site at https://www.cityofflint.com/finance/purchasing/bids-2/ under "open bids" and the specific bid or proposal number assigned to this notice.

Successful proposers should complete and submit a vendor application, IRS W-9 Form, and Vendor ACH Payment Authorization Form with the City of Flint. Contact (810)766-7266 or accountspayable@cityofflint.com for Vendor ACH Payment Authorization Form and instructions.

Results may be viewed next business day online at https://www.cityofflint.com/finance/purchasing/results/ under "bid results".

Any questions regarding the proposal process may be directed to Joyce McClane in writing by no later than 7/8/19 to jmcclane@cityofflint.com.

Sincerely,

Joyce A. McClane, Purchasing Manager
Finance Department - Division of Purchases and Supplies

INSTRUCTIONS TO VENDORS

1) **PRE-BID INFORMATION AND QUESTIONS:** Each proposal that is timely received will be evaluated on its merit and completeness of all requested information. In preparing proposals, Proposers are advised to rely only upon the contents of this RFP and accompanying documents and any written clarifications or addenda issued by the City of Flint. If a Proposer finds a discrepancy, error or omission in the RFP package, or requires any written addendum thereto, the Proposer is requested to notify the Purchasing contact noted on the cover of this RFP, so that written clarification may be sent to all prospective Proposers. **THE CITY OF FLINT IS NOT RESPONSIBLE FOR ANY ORAL INSTRUCTIONS**. All questions must be submitted in writing to the Purchasing Department before any Pre-Bid Question Deadline (if specified) or at least one (1) week prior to the proposal opening date indicated on the front of this document.

2) **RFP MODIFICATIONS:** The City of Flint has the right to correct, modify or cancel the RFP, in whole or in part, or to reject any Proposal, in whole or in part, within the discretion of the City of Flint, or their designee. If any such changes are made, all known recipients of the RFP will be sent a copy of such changes. If any changes are made to this RFP document by any party other than the City of Flint, the original document in the City of Flint's files takes precedence.

3) **PROPOSAL SUBMISSION:**
   a) The Proposer must include the following items, or the proposal may be deemed non-responsive:
      i) All forms contained in this RFP, fully completed.
   b) Proposals must be submitted to the Finance Department – Purchases and Supplies, City of Flint, 1101 S. Saginaw Street – Room 203, Flint, Michigan 48502 by the date and time indicated as the deadline**.** The Purchasing Department time stamp will determine the official receipt time. It is each Proposer's responsibility to insure that its' proposal is time stamped by the Purchasing Department by the deadline. This responsibility rests entirely with the Proposer, regardless of delays resulting from postal handling or for any other reasons. Proposals will be accepted at any time during the normal course of business only, said hours being 8:00 a.m. to 5:00 p.m. Local Time, Monday through Friday, legal holidays as exception.
   c) Proposals must be enclosed in a sealed, non-transparent envelope, box or package, and clearly marked on the outside with the following: RFP Title, RFP Number, Deadline and Proposer's name.
   d) Submission of a proposal establishes a conclusive presumption that the Proposer is thoroughly familiar with the Request for Proposals (RFP), and that the Proposer understands and agrees to abide by each and all of the stipulations and requirements contained therein.
   e) All prices and notations must be typed or printed in ink. No erasures are permitted. Mistakes may be crossed out and corrections must be initialed in ink by the person(s) signing the bid.
   f) Proposals sent by email, facsimile, or other electronic means will not be considered unless specifically authorized in this RFP.
   g) All costs incurred in the preparation and presentation of the proposal are the Proposer's sole responsibility; no pre-bid costs will be reimbursed to any Proposer. All documentation submitted with the proposal will become the property of the City of Flint.
   h) Proposals must be held firm for a minimum of 120 days.

4) **EXCEPTIONS:** Proposer shall clearly identify any proposed deviations from the Terms or Scope in the Request for Proposal. Each exception must be clearly defined and referenced to the proper paragraph in this RFP. The exception shall include, at a minimum, the proposed substitute language and opinion

as to why the suggested substitution will provide equivalent or better service and performance. If no exceptions are noted in the proposal, the City of Flint will assume complete conformance with this specification and the successful Proposer will be required to perform accordingly. Proposals not meeting all requirements may be rejected.

5) **DUPLICATE BIDS:** No more than one (1) proposal from any Proposer including its subsidiaries, affiliated companies and franchises will be considered by the City of Flint. In the event multiple proposals are submitted in violation of this provision, the City will have the right to determine which proposal will be considered, or at its sole option, reject all such multiple proposals.

6) **WITHDRAWAL:** Proposals may only be withdrawn by written notice prior to the date and time set for the opening of proposals. No proposal may be withdrawn after the deadline for submission.

7) **REJECTION/GOOD STANDING:** The City of Flint reserves the right to reject any or all proposals, or to accept or reject any proposal in part, and to waive any minor informality or irregularity in proposals received if it is determined by the City of Flint, or their designee, that the best interest of the City will be served by doing so. No Proposal will be considered from any person, firm or corporation in arrears or in default to the City on any contract, debt, taxes or other obligation, or if the Proposer is debarred by the City of Flint from consideration for a contract award pursuant to Section 18-21.5 (d) of Article IV of the "Purchasing Ordinance of the City of Flint.

8) **PROCUREMENT POLICY:** Procurement for the City of Flint will be handled in a manner providing fair opportunity to all businesses. This will be accomplished without abrogation or sacrifice of quality and as determined to be in the best interest of the City. The City of Flint and their officials have the vested authority to execute a contract, subject to City Council and Mayoral approval where required.

9) **PROPOSAL SIGNATURES:** Proposals must be signed by an authorized official of the Proposer. Each signature represents binding commitment upon the Proposer to provide the goods and/or services offered to the City of Flint if the Proposer is determined to be the lowest Responsive and Responsible Proposer.

10) **CONTRACT AWARD/SPLIT AWARDS:** The City of Flint reserves the right to award by item, group of items, or total proposal to the lowest responsive, responsible Proposer. The Proposer to whom the award is made will be notified at the earliest possible date. Tentative acceptance of the proposal, intent to recommend award of a contract and actual award of the contract will be provided by written notice sent to the Proposer at the address designated in the proposal if a separate Agreement is required to be executed. After a final award of the Agreement by the City of Flint, the Contractor/Vendor must execute and perform said Agreement. All proposals must be firm for at least 120 days from the due date of the proposal. If, for any reason, a contract is not executed with the selected Proposer within 14 days after notice of recommendation for award, then the City may recommend the next lowest responsive and responsible Proposer.

11) **NO RFP RESPONSE:** Proposers who receive this RFP but who do not submit a proposal should return this RFP package stating "No Proposal" and are encouraged to list the reason(s) for not responding. Failure to return this form may result in removal of the Proposer's name from all future lists.

12) **FREEDOM OF INFORMATION ACT REQUIREMENTS:** Proposals are subject to public disclosure after the deadline for submission in accordance with state law.

13) **ARBITRATION:** Contractor/Vendor agrees to submit to arbitration all claims, counterclaims, disputes and other matters in question arising out of or relating to this agreement or the breach thereof. The Contractor's agreement to arbitrate shall be specifically enforceable under the prevailing law of any court having jurisdiction to hear such matters. Contractor's obligation to submit to arbitration shall be subject to the following provisions:

    (a) Notice of demand for arbitration must be submitted to the City in writing within a reasonable time after the claim; dispute or other matter in question has arisen. A reasonable time is hereby determined to be fourteen (14) days from the date the party demanding the arbitration knows or should have known the facts giving rise to his claim, dispute or question. In no event may the demand for arbitration be made after the time when institution of legal or equitable proceedings based on such claim dispute or other matters in question would be barred by the applicable statute of limitation.

    (b) Within fourteen (14) days from the date demand for arbitration is received by the City, each party shall submit to the other the name of one person to serve as an arbitrator. The two arbitrators together shall then select a third person, the three together shall then serve as a panel in all proceedings. Any decision concurred in by a majority of the three shall be a final binding decision.

    (c) The final decision rendered by said arbitrators shall be binding and conclusive and shall be subject to specific enforcement by a court of competent jurisdiction.

    (d) The costs of the arbitration shall be split and borne equally between the parties and such costs are not subject to shifting by the arbitrator.

14) **PROPOSAL HOLD:** The City of Flint may hold proposals for a period of one hundred twenty - (120) days from opening, for the purpose of reviewing the results and investigating the qualifications of proposers prior to making an award.

15) **NONCOMPLIANCE:** Failure to deliver in accordance with specifications will be cause for the City of Flint and they may cancel the contract or any part thereof and purchase on the open market, charging any additional cost to the Contractor/Vendor.

16) **DISCLAIMER OF CONTRACTUAL RELATIONSHIP:** Nothing contained in these documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

17) **ERRORS AND OMISSIONS:** Proposer is not permitted to take advantage of any obvious errors or omissions in specifications**.**

18) **INTERPRETATION:** In the event that any provision contained herein shall be determined by a court of competent jurisdiction or an appropriate administrative tribunal to be contrary to the provision of law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal having jurisdiction over this Agreement and the interpretation thereof, or the parties hereto, so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision.

19) **LAWS AND ORDINANCES:** The proposer shall obey and abide by all of the laws, rules and regulations of the Federal Government, State of Michigan, Genesee County and the City of Flint,

applicable to the performance of this agreement, including, but not limited to, labor laws, and laws regulating or applying to public improvement, local government, and its operational requirements.

20) **LOCAL PREFERNECE:** Proposers/bidders located within the corporate city limits of Flint, Michigan may be given a seven percent (7%) competitive price advantage. Additionally, if the lowest responsible bidder is not located within the limits of the City of Flint, but is located within the County of Genesee, and said bidder does not exceed the bid of the lowest non-local bidder by more than three and one-half percent (3-1/2%), then said lowest Genesee County bidder may be determined to be the lowest responsible bidder, and make the award to such Genesee County bidder accordingly, subject to the approval of the city council. If the lowest non-local bidder does not exceed that of any proposers/bidders by (7%) inside the City of Flint or (3-1/2%) inside the County of Genesee, then the Purchasing Director shall be allowed to request that the lowest local vendor match the price offered by the lowest non-local vendor.

21) **MATERIAL WORKMANSHIP AND STANDARDS OF PERFORMANCE:** The proposer agrees to exercise independent judgment and to complete performance under this Agreement in accordance with sound professional practices. In entering into this Agreement, the City is relying upon the professional reputation, experience, certification and ability of the proposer by him/her or by others employed by him/her and working under his/her direction and control. The continued effectiveness of this Agreement during its term or any renewal term shall be contingent, in part, upon the proposer maintaining his/her operating qualifications in accordance with the requirements of federal, state and local laws. All materials furnished must be new, of latest model and standard first grade quality, or best workmanship and design, unless otherwise expressly specified. Proposer, if required, must furnish satisfactory evidence of quality materials; offers of experimental or unproven equipment may be disregarded.

22) **MODIFICATIONS/CHANGES:** Any modification to this agreement must be in writing and signed by the authorized employee, officer, board or council representative authorized to make such modifications pursuant to the State law and local ordinances.

23) **NON-COLLUSION:** The proposer acknowledges that by signing this document that he/she is duly authorized to make said offer on behalf of the company he/she represents and that said bid is genuine and not sham or collusive and not made in the interests or on behalf of any person not therein named, and that he/she and said bidder have not directly induced or solicited any other person(s) or corporation to refrain from responding to this solicitation and that he/she and said bidder have not in any manner sought by collusion to secure to himself/herself and said bidder any advantage over any other proposer.

24) **NON-DISCRIMINATION:** Pursuant to the requirements of 1976 P.A. 453 (Michigan Civil Rights Act) and 1976 P.A. 220 (Michigan Handicapped Rights Act), the local unit and its agent agree not to discriminate against any 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 race, color, religion, national origin, age, sex, height, weight, marital status or because of a handicap that is unrelated to the person's ability to perform the duties of nondiscrimination provision identical to this provision and binding upon any and all contractors and subcontractors. A breach of this covenant shall be regarded as a material breach of this contract.

25) **SUBCONTRACTING:** No subcontract work shall be started prior to the written approval of the subcontractor by the City. The City reserves the right to accept or reject any subcontractor.

26) **UNION COMPLIANCE:** Contractor agrees to comply with all regulations and requirements of any national or local union(s) that may have jurisdiction over any of the materials, facilities, services or personnel to be furnished by the City.

27) **WAIVER:** Failure of the City to insist upon strict compliance with any of the terms, covenants or conditions of this Agreement shall not be deemed a waiver of that term, covenant or condition or of any other term, covenant or condition. Any waiver or relinquishment of any right or power hereunder at any one or more times shall not be deemed a waiver or relinquishment of that right or power at any other time.

28) **PREVAILING WAGE:** If applicable, the successful proposer providing any contractual labor services must comply with all requirements and pay prevailing wages and fringe benefits on this project per the City's Resolution R-12 adopted 4/8/91. The bidder is aware of City of Flint Resolution #R-12 dated April 8, 1991, a copy of which is annexed hereto and incorporated herein, and agrees to abide by all of the applicable covenants and requirements set forth in said resolution. The prevailing wage information is available on the city's website @ www.cityofflint.com.

29) **CITY INCOME TAX WITHHOLDING:** Contractor and any subcontractor engaged in this contract shall withhold from each payment to his employees the City income tax on all of their compensation subject to tax, after giving effect to exemptions, as follows:

(a) Residents of the City:
At a rate equal to 1% of all compensation paid to the employee who is a resident of the City of Flint.

(b) Non-residents:
At a rate equal to 1/2% of the compensation paid to the employee for work done or services performed in the City of Flint.

These taxes shall be held in trust and paid over to the City of Flint in accordance with City ordinances and State law. Any failure to do so shall constitute a substantial and material breach of this contract.

30) **CONTRACT DOCUMENTS:** The invitation for proposal, instructions to proposal, proposal, affidavit, addenda (if any), statement of proposer's qualifications (when required), general conditions, special conditions, performance bond, labor and material payment bond, insurance certificates, technical specifications, and drawings, together with this agreement, form the contract, and they are as fully a part of the contract as if attached hereto or repeated herein.

31) **DISCLAIMER OF CONTRACTUAL RELATIONSHIP WITH SUBCONTRACTORS:** Nothing contained in the Contract Documents shall create any contractual relationship between the City and any Subcontractor or Sub-subcontractor.

32) **EFFECTIVE DATE:** Any agreement between the City and the contractor shall be effective upon the date that it is executed by all parties hereto.

33) **FORCE MAJURE:** Neither party shall be responsible for damages or delays caused by Force Majeure nor other events beyond the control of the other party and which could not reasonably have anticipated the control of the other party and which could not reasonably have been anticipated or prevented. For purposes of this Agreement, Force Majeure includes, but is not limited to, adverse weather conditions, floods, epidemics, war, riot, strikes, lockouts, and other industrial disturbances; unknown site conditions, accidents, sabotage, fire, and acts of God. Should Force Majeure occur, the parties shall mutually agree on the terms and conditions upon which the services may continue.

34) **INDEMNIFICATION:** To the fullest extent permitted by law, Contractor agrees to defend, pay on behalf of, indemnify, and hold harmless the City of Flint, its elected and appointed officials, employees and volunteers and other working on behalf of the City of Flint, including the Project Manager, against any and all claims, demands, suits, or losses, including all costs connected

therewith, and for any damages which may be asserted, claimed, or recovered against or from the City of Flint, its elected and appointed officials, employees, volunteers or others working on behalf of the City of Flint, by reason of personal injury, including bodily injury or death and/or property damage, including loss of use thereof, which may arise as a result of Contractor's acts, omissions, faults, and negligence or that of any of his employees, agents, and representatives in connection with the performance of this contract. Should the Contractor fail to indemnify the City in the above-mentioned circumstances, the City may exercise its option to deduct the cost that it incurs from the contract price forthwith.

35) **INDEPENDENT CONTRACTOR:** No provision of this contract shall be construed as creating an employer-employee relationship. It is hereby expressly understood and agreed that Contractor is an "independent contractor" as that phrase has been defined and interpreted by the courts of the State of Michigan and, as such, Contractor is not entitled to any benefits not otherwise specified herein.

36) **NO THIRD-PARTY BENEFICIARY:** No contractor, subcontractor, mechanic, material man, laborer, vendor, or other person dealing with the principal Contractor shall be, nor shall any of them be deemed to be, third-party beneficiaries of this contract, but each such person shall be deemed to have agreed (a) that they shall look to the principal Contractor as their sole source of recovery if not paid, and (b) except as otherwise agreed to by the principal Contractor and any such person in writing, they may not enter any claim or bring any such action against the City under any circumstances. Except as provided by law, or as otherwise agreed to in writing between the City and such person, each such person shall be deemed to have waived in writing all rights to seek redress from the City under any circumstances whatsoever.

37) **NON-ASSIGNABILITY:** Contractor shall not assign or transfer any interest in this contract without the prior written consent of the City provided, however, that claims for money due or to become due to Contractor from the City under this contract may be assigned to a bank, trust company, or other financial institution without such approval. Notice of any such assignment or transfer shall be furnished promptly to the City.

38) **NON-DISCLOSURE/CONFIDENTIALITY:** Contractor agrees that the documents identified herein as the contract documents are confidential information intended for the sole use of the City and that Contractor will not disclose any such information, or in any other way make such documents public, without the express written approval of the City or the order of the court of appropriate jurisdiction or as required by the laws of the State of Michigan.

39) **RECORDS PROPERTY OF CITY:** All documents, information, reports and the like prepared or generated by Contractor as a result of this contract shall become the sole property of the City of Flint.

41) **SEVERABILITY:** In the event that any provision contained herein shall be determined by a court or administrative tribunal to be contrary to a provision of state or federal law or to be unenforceable for any reason, then, to the extent necessary and possible to render the remainder of this Agreement enforceable, such provision may be modified or severed by such court or administrative tribunal so as to, as nearly as possible, carry out the intention of the parties hereto, considering the purpose of the entire Agreement in relation to such provision. The invalidation of one or more terms of this contract shall not affect the validity of the remaining terms.

42) **TERMINATION:** This contract may be terminated by either party hereto by submitting a notice of termination to the other party. Such notice shall be in writing and shall be effective 30 days from the date it is submitted unless otherwise agreed to by the parties hereto. Contractor, upon receiving such notice and prorated payment upon termination of this contract shall give to the City all pertinent records, data, and information created up to the date of termination to which the City, under the terms of this contract, is entitled.

43) **TIME PERFORMANCE:** Contractor's services shall commence immediately upon receipt of the notice to proceed and shall be carried out forthwith and without reasonable delay.

44) **EVALUATION OF PROPOSAL:** In the City's evaluation of proposals, at minimum: cost, serviceability, financial stability, and all requirements set forth in this document shall be considered as selection and award criteria unless otherwise specified.

Request for Proposals for Construction Engineering Services for the Reconstruction of Court Street from Crapo Street to Center Road

The City of Flint has procured the Court Street Reconstruction project through the MDOT's Local Agency Program. The project includes an optional new water main through WIIN Funding. This will be a two-season project starting with Crapo Street to Dort Highway and then from Dort Highway to Center Road.

All RFP shall include the following minimum items. (See Basic Scoring for RFP)

1. Table of Contents (including titles and page numbers).
2. Letter of Interest (A)
3. Experience of Engineer(s) doing Project Oversight. (Street and Water Main Related Resume) (B)
4. Experience of the Survey Crew Chief. (Street and Water Main Related Resume) (C)
5. Experience of all inspectors for these projects. (Street and Water Main related Resume) (D)
6. Challenges for the Project. (E)
7. How you will handle the Challenges. (F)
8. Location of office handling these projects. (G)
9. Resolution Methods. (H)
10. Scheduling. (I)
11. Firms asset for these projects. (J)
12. Understanding of the Street and Water Main Projects and what the City Requires. (K)
13. Experience setting up and maintaining Public website. (L)

Within a seal envelop with Firms Name and Address on the outside, place the following:

Hourly Cost for all staff on these projects includes assumed mileage.
Engineering Firms Construction Engineer Bid Cost for each of the following items, the cost of sidewalk CE, Cost of optional water main CE, cost of the Court Street Reconstruction CE, Cost of optional Public website creating and maintaining and the Total not to exceed Construction Engineer Bid Cost with and without options.

Attachment 1 Supplemental Specifications
Attachment 2 Court Street Construction Plans
Attachment 3 Estimated Cost and Funding
Attachment 4 Basic Scoring for RFP

Optional Water Main and Website will be base on available Funding and Cost

Scope of Work

Consultant shall provide all work necessary to administer a construction contract through FHWA and the MDOT's program, WIIN Funding guidelines including the following:

- **Provide construction surveying and layout**
  - Supply and maintain all surveying grade and location stakes as needed to complete this project.
  - All new water main valves and fixtures shall have location and grade stakes.
  - New sidewalks will have location and grading stakes.
  - Roads, curbs, driveways, sidewalks, storm, and water main will be survey staked as needed.

- **Construction engineering administration services in accordance with MDOT requirements for Federal Aid including, but not limited to, the following:**
  - MDOT Certified Office Technician is required for the Administration Services.
  - Administration cost will be based on an average of 20 hours per week for 72 weeks.
  - Bi-weekly pay estimates.
  - Separate billing for CE and Construction for water main, sidewalks and road reconstruction work.
  - Justify and receive pre-approved from City Engineer for any change orders.
  - Contract modifications.
  - Shop drawings review.
  - Review Material source list. (including Buy American)
  - Prevailing wage rate interviews and wage rate reviews.
  - Complete all MDOT reports and documents for this Project.
  - Coordinate, lead and provide meeting minutes for the Pre-Construction meeting as well as bi-weekly progress meetings on-site.
  - Coordinate and lead all meetings and public hearing if needed.
  - Coordinate and keep the general public, local business, MTA, General Motors, emergency services, and utilities informed during construction.

- **Setup and maintain a website for updating the general public: (Optional)**
  - The website to be on a separate server that the general public can reach 24/7.
  - The website is to be updated a minimum of twice weekly during construction.
  - The City of Flint should be able to directly link this website on City's website.
  - Simple flyer with Website information to be distributed to neighborhoods that are affected by Construction.
  - Information on where the contractor is working, blocks, and cross-street being affected.
  - Update all detour routes for both general and local residents.
  - Notify the public of any MTA bus stop changes in the construction zone.
  - Show a schedule of where Contractors will be, what they are working on, and where they should be by when in the future.
  - Inform the public of any construction delays.
  - Keep public informed of water main, sidewalk, driveways, road work, and restoration work throughout the project.
  - Post positive photos of the Construction.
  - Have a place for the public to post comments and complaints.
  - Review and answer all complaints daily.
  - If required respond to comments weekly.

- Cost of website and updating should average 20 hours or less per week of Construction.

- **Comprehensive Photographic documentation with the following:**
  - Pre-construction digital photographic documentation of the construction site and at selected milestones minimum beginning and end of the project.
  - Documentation inclusive of electronic indexing, navigation, hosting, storage, and remote access, as applicable, throughout construction.
  - Security of information.
  - Digital photographs to use overlap techniques or multi-angle to ensure maximum coverage of the project with clear and sharp images.
  - All photos are to be easily accessible online using mobile devices.
  - Photos location shall be easily retrieved.
  - Digital images shall be taken with professional grade camera with a minimum size of 6 megapixels capable of producing 8x10 inch print with 2272 x 1704 pixels and a 16 x 20 print with a minimum 2592 x 1944 pixels.
  - Indexing and navigation system for photos shall relate to construction drawings and be organized by time (date-stamped), location (GPS if possible) and direction of photos.
  - Engineering Firm may provide an alternative method with the approval of the City of Flint.
  - All cost related to photographic documentation shall be included in the Bid price.

- **Construction Inspection Services**
  - Inspector and Engineer to cooperate with Preliminary Design Engineer and City of Flint to resolve all issues.
  - Inspector must have at least 10 years of field experience with bridges
  - Full-time inspection based on 62-weeks of variable working construction duration.
  - Inspection based on 60 hours per week on site.
  - Court Street from Crapo Street to Center Road time schedule is from approximately September 2019 to November 16, 2020
  - Mileage shall be included in the hourly rates for Administrator, Inspectors, Surveyors, and Engineer and be part of the Bid price for the Construction Engineering.
  - All material testing to be included in the projects including soil, density, material, concrete and HMA, The estimated cost for these services shall be included in the bid price. Please note your assumptions for this cost and included mileage.
  - Inspector will ensure construction plans and specifications are followed unless changes are approved by City Engineer.
  - Construction materials testing in accordance with MDOT frequency guidelines
  - All soil density and pavement tests results are to be sent to the City Engineer within a week of construction engineers receiving test results including the location of the test.
  - Engineering and inspectors will cooperate with the City of Flint inspectors for water main installation and testing.
  - Engineering Firm will cooperate with other ongoing projects within or near project limits.

- **As-built Record Documentation**
  - Record keeping is assumed to take no more than 620 hours.
  - Water main, valves, bend's, deflections, tees, coupling, reducers, hydrants, and tie-ins locations to be GPS in X, Y and Z coordinates as being built.
  - GPS accuracy shall be within 4 cm.
  - Water main pipe, valve and fittings, types and manufacturers shall be noted on plans.
  - Location of any changes in pipe type will be GPS in X, Y, & Z coordinates.
  - All Utilities disturbed within the project limits shall be identified and surveyed or GPS in X, & Z coordinates.
  - New storm sewer inverts, location and length to be GPS in X, Y, & Z coordinates.
  - All changes from original plans must be GPS and noted on the as-builts.
  - Contractors names, addresses, and type of work done shall be added within the first three sheets with the date of completion.
  - Listing of all GPS points and identification shall be digitally submitted to the City in a form that is compatible with ArcGIS.
  - Construction Engineering Firm will cooperate with Design Engineering Firm for as-built record plans.
  - As-built records and drawings shall be sent in hard copy and digital form that is compatible with City Works ArcGIS program (AutoCAD).
  - As-built records shall be given to City within thirty (60) day of completion of the Project Construction.
  - Cost of digital photos, as-builts, all pay estimates, all MDOT and WIIN reporting will be included in the bid cost for Construction Engineering.
  - Consulting Construction Engineer will verify that As-builts records are accurate
  - Electronic copies of all digital photos from the project shall be indexed with time and location and sent to the City within sixty (60) day of completion of the Project Construction.

THIS PAGE MUST BE COMPLETED AND INCLUDED WITH SUBMITTAL:
The undersigned herby certifies, on behalf of the respondent named in this Certification (the "Respondent"), that the information provided in this offer submitted to the City of Flint is accurate and complete, and that I am duly authorized to submit same. I hereby certify that the Respondent has reviewed all documents and requirements included in this offer and accept its terms and conditions.

Cash Discounts will be computed from the date of receipt of invoice. Prices firm unless stated otherwise by bidder. Delivery can be made in ( ) days ARO (after receipt of order).

Payment Terms:_____ Delivery Dest.:_____ Fed. ID #:_____
(All Freight Terms are considered F.O.B., Prepaid unless otherwise noted by seller)

COMPANY NAME (Respondent):_____
(Printed)
ADDRESS :_____

CITY/STATE/ZIP :_____

PHONE :_____FAX:_____

EMAIL :_____

PRINT NAME and Title :_____
(Authorized Representative)
SIGNED :_____ DATE: _____

(Authorized Representative)

Please submit original documents plus one copy.

Bid results may be viewed next business day online at
https://www.cityofflint.com/finance/purchasing/results/ under “bid results”.

CITY OF FLINT, MICHIGAN

AFFIDAVIT

AFFIDAVIT FOR INDIVIDUAL

STATE OF .....

s.s.

COUNTY OF .....

..... .being duly sworn, deposes and says that he is the person making the above bid; and that said bid is genuine and not sham or collusive, and is not made in the interest of or on behalf of any person not therein named, and that he has not directly or indirectly induced or solicited any bidder to put in a sham bid; that he has not directly or indirectly induced or solicited any other person or corporation to refrain from bidding, and that he has not in any manner sought by collusion to secure to himself any advantage over other bidders.

Subscribed and sworn to before me at ..... ……., in said County and State,

this ……... day of ..... , A. D. 20.....,

……

*Notary Public, ...County,……

My Commission expires ..... , 20..... .

FOR CORPORATION

STATE OF .....

s.s.

COUNTY OF .....

..... being duly sworn, deposes and says

that he is..... of .....
(Official Title) (Name of Corporation)

a corporation duly organized and doing business under the laws of the State of .....
the corporation making the within and foregoing bid; that he executed said bid in behalf of said corporation by authority of its Board of Directors; that said bid is genuine and not sham or collusive and is not made in the interests of or on behalf of any person not herein named, and that he has not and said bidder has not directly or indirectly induced or solicited any bidder to put in a sham bid; that he has not and said bidder has not directly or indirectly induced or solicited any other person or corporation to refrain from bidding; that he has not and said bidder has not in any manner sought by collusion to secure to himself or to said corporation an advantage over other bidders.

Subscribed and sworn to before me at ..... , in said County and State,

this …….. day of ..... , A. D. 20 .....,

……..

*Notary Public, ...…..... County,……

My Commission expires……, 20……

FOR PARTNERSHIP

STATE OF…….. .....

s.s.

COUNTY OF .....

…… , being duly sworn, deposes and says that he is a member of the firm of ..... …….. ……. , a co-partnership, making the above bid; that he is duly authorized to make said bid in behalf of said co-partnership; that said bid is genuine and not sham of collusive and not made in the interests of or on behalf of any person not therein named, and that he has not and said bidder has not directly or indirectly induced or solicited any bidder to put in a sham bid; that he has not and said bidder has not directly or indirectly induced or solicited any other person or corporation to refrain from bidding, and that he has not and said bidder has not in any manner sought by collusion to secure to himself or to said bidder any advantage over other bidders.

Subscribed and sworn to before me at ....., in said County and State

this …….. day of ....., A. D. 20 ....,

……

*Notary Public, ……..

County,……..

My Commission expires ..... , 20 .....

FOR AGENT

STATE OF .....

s.s.

COUNTY OF .....

…… being duly sworn, deposes and says that he executed the within and foregoing bid in behalf of ..... ……. , the bidder therein named, he having been theretofore lawfully authorized, as the agent of said
bidder, so to do; that said bid is genuine and not sham or collusive and not made in the interests of or on behalf of any person not therein named, and that he has not and said bidder has not directly or indirectly induced or solicited any bidder to put in a sham bid; that he has not and said bidder has not directly or indirectly induced or solicited any other person or corporation to refrain from bidding, and that he has not and said bidder has not in any manner sought by collusion to secure to himself or to said bidder any advantage over other bidders.

Subscribed and sworn to before me at ..... , in said County and State,

this …… day of ....., A. D. 20 ..... ,

……

* Notary Public, ... …… County,……..

My Commission expires ..... , 20 ..... .

NOTE: If executed outside of the State of Michigan, certificate by Clerk of the Court of Record, authenticating the Notary's Signature and authority should be attached.

Scoring for Contraction Engineering for Court Street from Crapo Street to Center Road	
	200 Max Points for Evaluation
Category's	
Experience of Engineer doing Project Oversight for this Projects (10 points)	
Experience of Head Surveyor for this Projects (10 points)	
Experience of the Lead Inspectors for this Projects (10 points)	
Experience of Second Inspector (10 points)	
Experience of Material Testor (10 points)	
Inspectors GPS Expereince (10 points)	
What does your Firm see as the biggest challenge for this Project (5 point)	
How will your Firm handle these Challenges (25 points)	
Location of your Office handling this Project (7 points)	
Experience of MDOT Certified Office Technician (10 points)	
How will your firm resolve issues with Contractors, City water Inspectors, Design Engineer, MDOT, MDEQ, Consumers Energy, MTA and City of Flint (13 points)	
Experience with creating and maintaining a Construction Project Website (10 points)	
What will your construction website do? (10 points)	
How will your Firm meet the schedule of this Projects (10 points)	
What is your biggest asset for this Projects (10 points)	
Understanding of the this Projects and what the City wants and deeds (20 points)	
What other extra services will you provide. (20 points)	
Total Evalulation Points	

Best Qualified Construction Engineer Firm

Cost per Hour for each person and their position that will be involved with this project including support staff and mileage
Not to exceed Construction Engineer Bid Cost

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
STAKING MICHIGAN DEPARTMENT OF TRANSPORTATION ELECTRICAL INFRASTRUCTURE

BAY:EAT 1 of 1 APPR:NAL:BMB:09-05-18

a. Description. This work consists of contacting the appropriate people to ensure the proper staking of MDOT infrastructure for electrical devices. Contact Travis Phillips, Bay Region - Signals Engineer and Scott Holzhei, Bay Region Electrician, 72 hours in advance with staking requests and prior to any work commencing near any of the traffic signals, electrical devices or freeway lighting. Note: that MDOT underground infrastructure is not part of the MISS DIG system.

Travis Phillips
Bay Region Signals Engineer
5859 Sherman Road
Saginaw, Michigan 48604
Cell: 989-233-7363
phillipst3@michigan.gov

Scott Holzhei
Bay Region Electrician
3510 E. Washington Road
Saginaw, Michigan 48601
Cell: 989-239-6392
holzheis@michigan.gov

Contact Erik Tamlyn, Bay Region Traffic, Safety and Operations Engineer, 72 hours in advance with staking requests and prior to any work commencing near any Intelligent Transportation Systems devices (ITS). Send staking requests to mdot-ITS-staking-bay@michigan.gov

Erik A. Tamlyn, P.E.
Bay Region Traffic, Safety & Operations Engineer
5859 Sherman Road
Saginaw, Michigan 48604
Cell: 989-737-9128
tamlyne@michigan.gov

b. Materials. None specified.

c. Construction. None specified.

d. Measurement and Payment. This work to contact various people for Staking Electrical Infrastructure will not be paid for separately but will be considered included in other items of work.

CITY OF FLINT

COORDINATION CLAUSE
FOR
MICHIGAN DEPARTMENT OF TRANSPORTATION SIGNAL PROJECT

The following information may be pertinent to the determination of construction methods. Coordination with Michigan Department of Transportation (MDOT) personnel is required during installation and operation of traffic signals, detection systems, and underground utility upgrades at the intersection of Court Street and Dort Highway (M-54).

Within Stage 2A limits, MDOT will be conducting signal upgrades at the intersection of Court Street and Dort Highway (M-54) from April 2020 to June 2020. No work shall be completed within 500 feet east of Dort Highway (M-54) between April 2020 to June 2020 or until MDOT project is completed.

MICHIGAN DEPARTMENT OF TRANSPORATION CONTACTS

Travis Phillips
Bay Region Signals Engineer
5859 Sherman Road
Saginaw, MI 48604
(989) 233-7363

John Welch II
Davison TSC Construction
9495 E. Potter Road
Davison, MI 48423
(810) 653-7470

CITY OF FLINT

COORDINATION CLAUSE
FOR
WORK ON RAILROAD PROPERTY

The following information may be pertinent to the determination of construction methods and railroad protective insurance rates.

RAILROAD COMPANY

Grand Trunk Western Railroad and its Parents
700 Pershing Road
Pontiac, MI 48340

Contact: Mr. Thomas Brasseur, Manager of Public Works
Cell: (715) 544-9145
Office: (248) 452-4854

Prior to any entry onto Railroad Company's property Contractor, Sub-Contractors, and other non-Railroad personnel will not be allowed until the following training requirements have been met and documentation provided to Railroad:

All employees and/or contractor(s) of Licensee not hired by Railroad Company that will work on CN property are required to have minimum www.contractororientation.com.

This training must be obtained through the website. If not done before, the contractor must call (855) 383-7434 to be issued either a vendor number or issued instructions on obtaining a non-Railroad contractor vendor number prior to accessing the noted website.

All employees of the Contractor and Sub-contractors must be fully aware of “Safety and Related Requirements and Instructions for Work on CN Railway Right-of-Way by Non CN Personnel”.

TRAIN MOVES

East Court Street (NI# 283797L)
There are approximately 24 freight and 2 passenger train moves at 45 miles per hour daily; maximum time table is 65 miles per hour.

The train movement and speed information does not represent a commitment by the railroad and is subject to change without notice.

Any damage caused by the Contractor’s work operations to the railroad property will be the Contractor’s responsibility to repair and/or replace to railroad’s specifications. Any necessary protection required by the railroad will be included in Railroad Protection, at Grade Crossing.

CITY OF FLINT

COORDINATION CLAUSE
FOR
WORK ON CSX RAILROAD PROPERTY

The following information may be pertinent to the determination of construction methods and railroad protective insurance rates.

RAILROAD COMPANY

CSX Transportation
Amanda DeCesare
CSX Project Manager II – Public Projects
500 Meijer Drive, Suite 305
Florence, KY 41042
(859) 372-6124

See below link for information on applying for Right of Entry Permit Application:
http://csx.com/index.cfm/customers/non-freight-services/propertyreal-estate/permitting-utility-installations-and-rights-of-entry/

CSX Transportation must be the named insured on the Railroad Protective Liability Insurance Policy. The named insured's address should be listed as:

CSX Transportation
500 Water Street, C-907
Jacksonville, FL 32202

Contractor must submit the complete Railroad Protective Liability policy, Certificates of Insurance, and all notices and correspondence regarding the insurance policies in an electronic format to:

insurancedocuments@csx.com

Neither Agency nor Contractor may begin work on or about CSXT property until written approval of the required insurance has been received from CSXT.

TRAIN MOVES

East Court Street (NI# 232361V)
There are approximately 6 freight moves at 35 miles per hour daily; maximum time table is 35 miles per hour.

The train movement and speed information does not represent a commitment by the Railroad and is subject to change without notice.

CSX TRANSPORTATION INC.

SPECIAL PROVISION
FOR
RAILROAD INSURANCE REQUIREMENTS

a. Description. This work consists of providing Railroad Protective Liability Insurance before work is commenced and keeping it in effect until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by the formal acceptance by the Michigan Department of Transportation (Department).

b. Insurance Requirements. Carry the following insurance, in a form, and with an insurer or insurers, acceptable to the Department and CSX Transportation Inc. (CSXT) on all insurance forms listed below with the railroad contact information as noted in Coordination Clause for Work on Railroad Property.

1. Railroad Protective Liability Insurance in behalf of CSX Transportation Inc., as the named insured.

The Contractor must furnish to the Department and to the Railroad copies of policies as evidence that, with respect to Contractor and, if applicable, subcontractor operations, standard Railroad Protective Liability Insurance is carried providing for limits of liability in the amount of five million dollars ($5,000,000) combined single limit per occurrence for bodily injury, death, and property damage with an aggregate limit of ten million dollars ($10,000,000) applying separately to each annual period. Said insurance must conform to the regulations prescribed therefore in the Federal-Aid Policy Guide, Part 646, Subpart A of the Federal Highway Administration dated December 9, 1991, and amendments thereto.

A. The Railroad Protective Insurance Policy must be on the ISO/RIMA Form of Railroad Protective Insurance - Insurance Services Office (ISO) Form CG 00 35.

B. Name and Address of Contractor and Agency must appear on the Declarations page.

C. Description of operations must appear on the Declarations page and must match the Project description.

D. Authorized endorsements must include the Pollution Exclusion Amendment - CG 28 31, unless using form CG 00 35 version 96 and later.

E. Authorized endorsements may include:

(1) Broad Form Nuclear Exclusion - IL 00 21
(2) 30-day Advance Notice of Non-renewal or cancellation
(3) Required State Cancellation Endorsement
(4) Quick Reference or Index - CL/IL 240

F. Authorized endorsements may not include:

(1) A Pollution Exclusion Endorsement except CG 28 31
(2) A Punitive or Exemplary Damages Exclusion
(3) A “Common Policy Conditions” Endorsement
(4) Any endorsement that is not named in Section D or E above.
(5) Policies that contain any type of deductible

2. Provide insurance as required in subsection 107.10 of the Standard Specifications for

Construction except with the modifications stated herein.

A. Commercial General Liability coverage at their sole cost and expense with limits of not less than $5,000,000 in combined single limits for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional named insured. The policy shall include endorsement ISO CG 24 17 evidencing that coverage is provided for work within 50 feet of a railroad. If such endorsement is not included, railroad protective liability insurance must be provided as described above.

B. Statutory Worker's Compensation and Employers Liability Insurance with limits of not less than $1,000,000, which insurance must contain a waiver of subrogation against CSXT and its affiliates.

C. Commercial automobile liability insurance with limits of not less than $1,000,000 combined single limit for bodily injury and/or property damage per occurrence, and such policies shall name CSXT as an additional named insured. The policy shall include endorsement ISO CA 20 70 evidencing that coverage is provided for work within 50 feet of a railroad. If such endorsement is not included, railroad protective liability insurance must be provided as described above.

D. All insurance companies must be A. M. Best rated A- and Class VII or better.

E. The CSXT OP number or CSXT contract number, as applicable, must appear on each Declarations page and/or certificates of insurance.

F. Such additional or different insurance as CSXT may require.

G. Each policy must contain the following endorsement:

"It is hereby agreed that 30 days prior written notice of cancellation, expiration, termination, or reduction of coverage provided by this policy will be given to the Department and CSX Transportation Inc."

c. Construction. If any of the insurance is canceled, all operations must cease as of the date of cancellation and cannot resume until new insurance is in force.

d. Measurement and Payment. The Contractor must pay for all railroad insurance. Insurance costs as described in this special provision will be included as part of other pay items.

.

GRAND TRUNK WESTERN

SPECIAL PROVISION
FOR
RAILROAD INSURANCE REQUIREMENTS

a. Description. This work consists of providing Railroad Protective Liability Insurance before work is commenced and kept in effect until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by the formal acceptance by the Department.

b. Insurance Requirements. Carry the following insurance, in a form, and with an insurer or insurers, acceptable to the Department and the Grand Trunk Western Railroad Company ("Railroad") and its parents on all insurance forms listed below with railroad contact information as noted in Coordination Clause for Work on Railroad Property.

1. Railroad Protective Liability Insurance in behalf of the Grand Trunk Western Railroad Company and its parents, as the named insured.

The Contractor must furnish to the Department and to the Railroad copies of policies as evidence that, with respect to Contractor and, if applicable, subcontractor operations, standard Railroad Protective Liability Insurance is carried providing for limits of liability in the amount of five millions dollars ($5,000,000) combined single limit per occurrence for bodily injury, death, and property damage with an aggregate limit of ten million dollars ($10,000,000) applying separately to each annual period. Said insurance must conform to the regulations prescribed therefore in the Federal-Aid Policy Guide, Part 646, Subpart A of the Federal Highway Administration dated December 9, 1991, and amendments thereto.

2. Provide insurance as required in subsection 107.10 of the Standard Specifications for Construction except with the modifications stated herein.

A. Grand Trunk Western Railroad Company insurance required of Contractor:

(1) Statutory Workers Compensation and Employer's Liability Insurance.

(2) Automobile Liability Insurance in an amount not less than five millions dollars ($5,000,000) combined single limit.

(3) Commercial General Liability Insurance in an amount not less than five million dollars ($5,000,000) per occurrence with an aggregate limit of not less than ten million dollars ($10,000,000). The policy must name the Railroad and its parents as additional issued and as noted in the Coordination Clause for Work on Railroad Property

B. General.

(1) The insurance specified must be with an insurance company authorized by the State of Michigan and must be in effect before work is commenced and kept in effect until all work required to be performed under the terms of the contract are satisfactory completed as evidenced by the formal acceptance by the Department. Each policy must

contain the following endorsement:

"It is hereby agreed that 30 days prior written notice of cancellation, expiration, termination, or reduction of coverage provided by this policy will be given to MDOT, and the Grand Trunk Western Railroad Company and Its Parents, to the attention of the contact included in Coordination Clause for Work on Railroad Property.

(2) The policy must not contain any provisions excluding coverage for injury, loss or damage arising out of or resulting from (a) doing business or undertaking construction or demolition on, near, or adjacent to railroad track or facilities, or (b) surface or subsurface pollution, contamination or seepage, or from handling, treatment, disposal or dumping of waste materials or substances.

(3) Include description of operations, railroad milepost, highway or street name, city and state of location, project number, and Railroad contact person on the certificate.

(4) Before commencing work in the railroad right of way, Contractor must deliver to the Railroad a certificate of insurance evidencing the foregoing coverages and true and complete copies of the policies described herein.

(5) Common Policy Provisions. Each policy described in subsections b.1 and b.2 of this special provision must include the following provisions:

(a) Each policy must include a waiver by the insurer of any right of subrogation against any recovery by or on behalf of any insured.

(b) Each policy must provide for not less than 30 days prior written notice to the Railroad of cancellation of or any material change in that policy.

(c) Each policy will cover the work of the Contractor and the work of any subcontractor of the Contractor.

(6) It is understood and agreed that the foregoing insurance coverage requirements, and Contractor's compliance with those requirements, is not intended to, and must not, relieve Contractor from, or serve to limit, Contractor's liability and indemnity obligations under the provisions herein.

It is further understood and agreed that the Railroad must have the right, from time to time, to revise the amount or form of insurance coverage as circumstances or changing economic conditions may require. The Railroad must give Contractor written notice of any such requested change at least 30 days before the date of expiration of the then-existing policy or policies; Contractor agrees to, and must, thereupon provide the Railroad with such revised policy or policies.

c. Construction. If any of the insurance is canceled, the Contractor and all subcontractors must cease operations as of the date of cancellation and cannot resume operations until new insurance is in force.

d. Measurement and Payment. The Contractor must pay for all railroad insurance. Insurance costs as described in this special provision will be included as part of other pay items.

CITY OF FLINT

NOTICE TO BIDDERS
UTILITY COORDINATION

The Contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in section 104.08 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction. In addition, for the protection of underground utilities, the Contractor shall follow the requirements in section 107.12 of the MDOT 2012 Standard Specifications for Construction. Contractor delay claims, resulting from a utility, will be determined based upon section 180.09.E of the MDOT 2012 Standard Specifications for Construction.

The existing utilities shown on these plans represent the best information available as obtained on our surveys. This information does not relieve the Contractor of the responsibility in case utilities have been constructed or removed since the survey date.

Public Utilities

The following public utilities have facilities located within the project area:

AT&T Jeff Heath 54 North Mill Street, PO Box 32 Pontiac, MI 48342	Telephone	(313) 263-9939
City of Flint Water Service Center Rob Bincsik Rob Smith 3310 E. Court Street Flint, MI 48506	Water Sewer	(810) 766-7202
City of Flint Transportation Betty Wideman Rod McGaha 1101 S. Saginaw Street Flint, MI 48502	Transportation	(810) 766-7165 (810) 766-7135
City of Flint Traffic Engineering Sheri Tolbert – Traffic Signals 1101 S. Saginaw Street Flint, MI 48502	Traffic Signals	(810) 766-7350
Consumers Energy Matthew Cox 3201 East Court Street Flint, MI 48506	Natural Gas	(810) 760-3486

Consumers Energy Tracy Mahar 1801 W. Main Street Owosso, MI 48867	Electric	(989) 729-3250
Comcast Cablevision Chris Cyr 25626 Telegraph Road Southfield, MI 48033	Cable TV	(248) 809-2717
Flint Community Schools Larry Watkins, Superintendent 923 East Kearsley Street Flint, MI 48503	School Bus Routes	(810) 760-1249
Genesee County Drain Commission Surface Water Management Enayet Ullah G-4610 Beecher Road Flint, MI 48502	County Drains	(810) 732-1590
Mott Community College c/o Fiberlink Tina Snoblen 3529 W. Genesee, Suite 6 Lapeer, MI 48446	Mott	(810) 591-4400
Mass Transportation Authority Edgar Benning 1401 South Dort Highway Flint, MI 48503	Bus Routes	(810) 767-6950
Midwest Fiber Networks, LLC Richard Trgovec Emergency Notification Number 3701 W Burnham Street Milwaukee, WI 53215	Fiber Optic	(414) 672-5612 (866) 831-1661
Sigma Network Services Nick Stamper 27096 Oakmead Drive Perrysburg, OH 43551	Telecom	(419) 874-9252 #208
Spectrum Broadband, LLC c/o Lightspeed Communications LLC Edward Reimann 4942 Dawn Avenue East Lansing, MI 48823	Fiber Optic	(517) 899-2506

Michigan Department of Transportation
Bay Region Signals Engineer
Travis Phillips MDOT Signals (989) 233-7363
5859 Sherman Road
Saginaw, MI 48604

The owners of existing service facilities that are within grading or structure limits will move them to locations designated by the Engineer or will remove them entirely from the avenue right-of-way. Owners of public utilities will not be required by the county/city to move additional poles or structures in order to facilitate the operation of construction equipment unless it is determined by the Engineer that such poles or structures constitute a hazard to the public or are extraordinarily dangerous to the Contractor's operations.

The City of Flint will be completing the tree removals necessary to construct this project.

AT&T will complete adjustments of all AT&T structure covers. Contractor to coordinate work with AT&T. AT&T will be replacing their existing conduit in the sidewalk at the Gilkey Creek crossing. Contractor to coordinate with AT&T prior to completing sidewalk removal at the Gilkey Creek crossing.

Traffic signal and sidewalk ramp improvements will be completed at Averill Avenue and Court Street (JN130885) while this project is being constructed. The Contractor shall coordinate traffic control and work with this project.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
WORK NEAR RAILROAD CROSSING

RAL:DGT 1 of 1 APPR:CRB:JJG:06-25-15

a. Description. This work consists of the Contractor consulting with the representative of the Grand Trunk Western and CSX Transportation, Inc. (herein after called the Railroad) to determine the necessity for, the type of, and cost of protection required for ensuring the safety and continuity of Railroad traffic and payment to the Railroad for protective services when doing work on, above, or below the Railroad property.

b. Materials. None specified.

c. Construction. Contact the Railroad 30 calendar days prior to starting work in the vicinity of their tracks. Provide documentation to the Engineer with the details of the contact including the person contacted, phone number or email used and the specific time and date. Ensure construction methods are in compliance with the requirements in the contract and as directed by the Engineer.

Pay (or pre-pay when required by the Railroad) the cost for right of entry permit, flagpersons, watchpersons, training, and other protective services and devices furnished or required by the Railroad and made necessary in the judgment of the representative of the Railroad because of the Contractors' operations which are within 25 feet of each side of centerline of track or impacted by traffic control operations. All Railroad bills for such protection costs must be paid within 14 days if not prepaid.

Monitor and provide immediate preference to clearing any traffic which backs up over the crossing as a result of flag control away from the crossing.

d. Measurement and Payment. Review the accuracy of costs from the Railroad and resolve any inconsistencies prior to submitting to Engineer for reimbursement. Submit satisfactory evidence or certification to the Engineer indicating all bills for protective services and devices furnished by the Railroad have been paid.

The Department will reimburse the Contractor for the costs incurred that have satisfactory evidence of payment to the Railroad using the following pay item.

Railroad Protection, at Grade Crossing ..... Dollar

PROGRESS CLAUSE: Submit a complete, detailed and signed Michigan Department of Transportation (MDOT) Form 1130, Progress Schedule, to the Engineer within seven (7) calendar days after award. The Engineer for this project is as follows:

Mark Adas, P.E.
City of Flint
1101 S. Saginaw Street
Flint, MI 48502
(810) 766-7135 Ext. 2603
madas@cityofflint.com

The progress schedule submittal must include, as a minimum, the controlling work items for the completion of the project and the planned dates or work days that the work items will be the controlling operations. All contract dates including open to traffic, project completion, interim completion, and any other controlling dates in the contract must be included in the progress schedule.

The Owner anticipates that construction can begin no earlier than 10 calendar days after award or as directed by the Engineer. In no case, may any work be commenced prior to receipt of formal notice of award by MDOT.

All contract work for Stage 1 must be complete and the road/culvert fully open to traffic no later than the interim completion date of August 28, 2020. Stage 1 is from the point of beginning Station 11+50 to Station 72+40 Dort Highway (M-54).

Stage 2 is from Station 72+40 Dort Highway (M-54) to point of ending Station 124+28. All work in Stage 1 must be complete and open to traffic prior to starting Stage 2. No work shall be completed in Stage 2 until Stage 1 is complete and open to traffic. No work shall be completed in Stage 1 and Stage 2 at the same time.

Stage 2 shall be divided into Stage 2A and Stage 2B. Stage 2A shall start at Station 72+40 Dort Highway (M-54). The Contractor shall determine the point of ending for Stage 2A and include the point of ending for Stage 2A on the progress schedule. All contract work for Stage 2A must be complete and the road fully open to traffic no later than the interim completion date and start of the seasonal suspension date of November 13, 2020. The Contractor shall make a temporary hard connection to the existing Court Street water main at the Stage 2A point of ending. The new water mains shall be in service and all lateral water mains and services shall be transferred over to the new water main through the Stage 2A limits. Within Stage 2A limits, MDOT will be conducting signal upgrades at the intersection of Court Street and Dort Highway (M-54) from April 2020 to June 2020. No work shall be completed within 500 feet east of Dort Highway (M-54) between April 2020 to June 2020 or until MDOT project is completed.

Stage 2B is from the point of ending of Stage 2A to the project point of ending Station 124+28. No work shall be completed in Stage 2B until Stage 2A is complete and open to traffic. No work shall be completed in Stage 2B until after the end of project seasonal suspension period, April 19, 2021.

The project will be in seasonal suspension from November 15, 2019 through April 20, 2020 and November 13, 2020 through April 19, 2021 as needed. The entire project shall be open to traffic during the seasonal suspension periods. All temporary traffic control devices shall be removed from the work zone. All contract work for Stage 1 and Stage 2A must be complete prior to

November 13, 2020 seasonal suspension. No temporary driving surfaces or temporary pedestrian paths shall be allowed in the work zone through the seasonal suspension period. Underground utility work may be allowed during the seasonal suspension periods as approved by the Engineer.

The project must be completely open to traffic on or before August 6, 2021.

The entire project must be completed on or before the final project completion date of October 1, 2021.

The project completion date for this project is October 1, 2021. This date is to accommodate an establishment period for turf establishment. All contract work except turf establishment must be completed in its entirety, by August 6, 2021. The Contractor has until October 1, 2021 to meet the specifications associated with turf establishment. Failure to complete all contract work, except turf establishment, by October 1, 2021 will result in the Contractor being assessed liquidated damages in accordance with subsection 108.10.C.1 of the MDOT 2012 Standard Specifications for Construction.

Failure by the Contractor to meet interim, final, and/or any open to traffic and stage completion dates will result in the assessment of liquidated damages in accordance with subsections 108.10.C.1 and 108.10.C.2 of the MDOT 2012 Standard Specifications for Construction. Liquidated damages will be assessed separately, simultaneously, and concurrently for failure to meet interim, final, and any stage completion dates. Liquidated damages will continue to be assessed for each calendar day that the work associated with the interim, final and/or any stage completion dates remains incomplete, even if these days extend into or beyond the normal seasonal suspension period as specified in the MDOT 2012 Standard Specifications for Construction, unless approved otherwise by the Engineer.

Unless specific pay items are provided in the contract, any extra costs incurred by the Contractor due to cold-weather protection, winter grading, sufficient manpower and equipment necessary to maintain the schedule, and/or meet the final completion date, and any overtime will not be paid for separately, but will be included in payment of other contract items.

After award and prior to the start of work, the Contractor must attend a pre-construction meeting with the Engineer. The Engineer will determine the day, time and place for the preconstruction meeting. The meeting will be conducted after project award and may be rescheduled if there are delays in the award of the project.

The named subcontractor(s) for, designated and/or specialty items, as shown in the proposal, is recommended to be at the preconstruction meeting if such items materially affect the work schedule.

The Contractor may be required to meet with Department representatives for a post-construction review meeting, as directed by the Engineer. The Engineer will schedule the meeting.

Failure on the part of the Contractor to carry out the provisions of this Progress Clause may be considered sufficient cause to prevent bidding future projects.

CITY OF FLINT

SPECIAL PROVISION
FOR
PAVT, REMOVAL, MODIFIED

a. Description. This work shall be done in accordance with sections 204 and 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as modified herein.

b. Materials. None specified.

c. Construction. Work includes saw cutting and removal of existing pavement regardless of pavement depth, type, or material to the depth specified on the plans or as directed by the Engineer. This work also includes the removal of any existing curb and gutter and reinforcement within the pavement.

The Contractor shall assume ownership of any removed materials and shall dispose of materials in accordance with sections 204 and 501 of the MDOT 2012 Standard Specifications for Construction.

d. Measurement and Payment. The completed work as measured will be paid for at the contract unit price for the following pay item(s).

Pay Item	**Pay Unit**
Pavt, Rem, Modified	Square Yard

The item of **Pavt, Rem, Modified** includes all labor, materials, and equipment necessary to perform the removal operation as required to complete the work. The area will be measured in square yard after the completion of removal.

CITY OF FLINT

SPECIAL PROVISION
FOR
AGGREGATE BASE, __ INCH, MODIFIED

a. Description. Aggregate base shall be constructed of 21AA limestone and shall meet the requirements of section 302 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as herein specified.

b. Materials. 21AA modified aggregate shall be crushed limestone.

c. Construction. Construction shall be in accordance with section 302 of the 2012 MDOT Standard Specifications for Construction.

d. Measurement and Payment. The completed work will be paid for at the contract unit price for the following contract pay item, and shall include all labor, materials, and equipment necessary to complete the work.

Pay Item	**Pay Unit**
Aggregate Base, __ inch, Modified	Square Yard

Aggregate Base, __ inch, Modified shall be measured by area in square yard. The longitudinal measurement will be made along the actual surface of the roadway, parallel to the centerline. The transverse dimension shall be the width shown on the plans or as authorized by the Engineer.

CITY OF FLINT

SPECIAL PROVISION
FOR
MAINTENANCE GRAVEL, MODIFIED

ROWE: COURT STREET 1 of 1 12-21-18

a. Description. This work consists of constructing an aggregate surface on a prepared grade, where directed by the Engineer, to maintain traffic during construction. Removal and disposal of the aggregate when no longer needed, is also included in this item of work. This work will be in accordance with section 306 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as modified by this special provision.

b. Materials. Maintenance Gravel, Modified will be Class 21AA and shall be crushed limestone aggregate and shall meet the requirements of section 302 of the MDOT 2012 Standard Specifications for Construction.

c. Construction. Maintenance Gravel, Modified is to be placed at locations to provide a flush transition to shoulders, driveways, and any other areas indicated by the Engineer where traffic is to be maintained.

The aggregate surface shall be maintained in a smooth and firm condition until no longer needed for maintaining traffic. When construction operations progress to the point that the maintenance gravel is no longer needed, removal of the maintenance gravel is to occur in the same workday as paving or aggregate surfacing of the removal area.

Maintenance Gravel, Modified may be incorporated into the construction of aggregate base, at the direction of the Engineer, but will only be paid for one time as **Maintenance Gravel, Modified**. Otherwise, the Contractor is responsible for removal and disposal of the material in accordance with the MDOT 2012 Standard Specifications for Construction.

d. Measurement and Payment. The completed work will be measured and paid for one time at the contract unit price for the following pay item:

Pay Item	**Pay Unit**
Maintenance Gravel, Modified	Ton

Payment for **Maintenance Gravel, Modified** shall be based on weight tickets and includes all labor, equipment, and materials required for the construction, maintenance, and removal of the aggregate surface as described in this special provision and as directed by the Engineer. Weight tickets shall be provided to the Engineer.

CITY OF FLINT

SPECIAL PROVISION
FOR
ADJUSTMENT OF PUBLIC UTILITY STRUCTURES

a. Description. This work shall consist of adjusting, reconstructing, and installing new waterproof covers on public utility structures to maintain the integrity of these structures and to keep water infiltration to an absolute minimum. This work shall be done in accordance with section 403 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, any Public Utilities owner's requirements, this special provision, and any details shown in the plans. "Public Utilities" include all other structures not classified as "Drainage Structures" which include water main and sanitary structures under the jurisdiction of the Local Municipal Department of Public Works (LM-DPW), or water main, sanitary, or telecommunication, gas, oil, electric structures under the jurisdiction of various public and or private corporations.

b. Materials. All materials shall be as specified in this special provision or in any details that may be in the plans. Materials used in the "adjustment" or "reconstruction" of manholes shall be the same as those used in the initial construction unless otherwise approved by the Engineer and public utility owner.

Covers CF-1 TO CF-6 shall meet City of Flint Standards, as shown on the plans. All other covers shall conform to MDOT's standard plans.

c. Construction. The Contractor must fulfill all permit requirements as applicable, including but not limited to, posting of all required fees, bonds, and insurance, and provide notice to the public utility owner to schedule and fulfill any and all inspection requirements.

Before start of work, the public utility owner or their representatives, the Engineer, and the Contractor shall meet and collectively inspect each structure prior to beginning work and decide as to the type of treatment that is necessary. The Contractor shall arrange this meeting one (1) week minimum prior to beginning work.

All structures are to be opened by the Contractor for inspection by the Engineer and utility representatives for confirmation and/or change of adjustment and reconstruction quantities prior to beginning any work. Payment for inspection of structures shall be paid as part of the structure adjustment items. When work is being performed, the Contractor shall notify the Engineer and utility owner (utility, city, etc.) for inspection. Final work shall not be accepted until written acceptance is received from the utility owner.

d. Measurement and Payment. The completed work as measured will be paid for at the contract unit price for the following pay items.

Pay Item	**Pay Unit**
Structure Cover, Adj, Case _	Each
Structure, Adj, Add Depth	Foot
Structure Cover, Special	Each

The items **Structure Cover, Adj, Case _**, **Structure, Adj, Add Depth**, and **Structure Cover, Special** include all equipment, labor, and materials to complete the items.

Structure Cover, Special includes the cost of obtaining a frame and cover that meets the specifications of the Engineer and public utility owner and the details shown in the plans.

Existing structure covers that have been replaced are to be disposed of in a legal manner off the project by the Contractor and the cost shall be included in the structure adjustment pay items.

CITY OF FLINT

SPECIAL PROVISION
FOR
MANHOLE COVER, ADJ

ROWE: COURT STREET 1 of 1 11-05-18

a. Description. This work consists of installing a concrete collar around existing and proposed storm sewer, sanitary sewer, combined sewer, telephone, electric, and water main manholes within the paved surface after the top course of HMA has been placed.

b. Materials. Materials shall be in accordance with section 403 and 601 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as modified herein. Concrete for concrete collars shall be Grade P1.

c. Construction. Construction methods shall be in accordance with section 403 of the MDOT 2012 Standard Specifications for Construction except as modified herein.

Prior to paving, the top of the concrete structure adjustment grade rings or blocks shall be removed. The structure shall be located by witness and/or GPS to the center of the proposed cover location by the Contractor. The structure opening shall be temporarily plated and the roadway base course, leveling course, and top course shall be constructed adjacent to and over the structure in a contiguous and homogenous manner to the surrounding road base and surface material. Density requirements over the structure plate for the HMA surface shall be the same as the surrounding material, pursuant to the specifications.

The Contractor shall core the existing pavement to the bottom of casting flange, centered on the manhole, remove loose material, remove drainage structure plate, install approved collar, trim collar to heights and slope, reinstall casting, and pour concrete to match the finished road pavement surface on new or existing drainage structures as described herein and as shown in the plans. The diameter of the core shall be sufficient to facilitate removal of the castings and shall be generally as follows:

24-inch Diameter – Gate Valve Boxes
36-inch Diameter Typical Sewer and Water Manholes
48-inch Diameter Larger Utility Manholes

d. Measurement and Payment. The completed work as measured for **Manhole Cover, Adj** will be paid for at the contract unit price for the following pay item.

Pay Item	**Pay Unit**
Manhole Cover, Adj	Each

The work of **Manhole Cover, Adj,** will be measured by the unit each. Payment shall include all labor, material, and equipment necessary to accomplish this work. Adjustment of existing structures will be paid for as Dr Structure Cover, Adj, Case _ along with **Manhole Cover, Adj**. Manholes that are installed new with this contract will not be paid for as Dr Structure Cover, Adj, Case _, but concrete collars will be required and will be paid for as **Manhole Cover, Adj**.

CITY OF FLINT

SPECIAL PROVISION
FOR
COLD MILLING

ROWE: COURT STREET 1 of 1 11-05-18

a. Description. Cold milling shall be in accordance with section 501 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as herein specified.

b. Materials. Materials shall be in accordance with section 501.02 of the MDOT 2012 Standard Specifications for Construction.

c. Construction. Construction shall be in accordance with section 501.03 of the MDOT 2012 Standard Specifications for Construction except as follows.

The Contractor shall cold mill the existing pavement regardless of pavement type (HMA or concrete) to the depth specified on the plans.

d. Measurement and Payment. The completed work will be paid for at the contract unit price for the following contract pay item, and shall include all labor, materials and equipment necessary to complete the work.

Pay Item	**Pay Unit**
Cold Milling	Square Yard

Cold Milling shall be measured by area in square yard. Payment shall include the cost of removing the existing pavement regardless of pavement type or material, loading, hauling, and disposing of the cold milled material, and cleaning the cold milled pavement surface.

CITY OF FLINT

SPECIAL PROVISION
FOR
CONCRETE SURFACE COATINGS

a. Description. This work consists of furnishing and applying an acrylic based concrete surface coating to concrete structures, including but not limited to substructure locations as specified on the plans. Ensure all work and materials are in accordance with the standard specifications, except as modified herein.

b. Materials. Select the acrylic based concrete surface coating from the products listed below. On any single structure, use the same product for all areas to be coated with a specified color. Do not mix colors or products from more than one source. Ensure the color of the first coat is in contrast with both the bare concrete and the finish coat.

For this project, furnish and apply a smooth textured, concrete coating of the following color, or another Engineer approved color:

JN 130647A: Substructures ..... Color Gray

Submit color samples to the Engineer for review and approval. If required by the Engineer, complete a test section to demonstrate the final color prior to application of the coating to the structure.

Company	Product
Benjamin Moore	Super Spec Masonry 100% Acrylic Elastomeric Coating Flat 056
Carboline Company	Carbocrylic 3350
ChemMasters	Colorcoat
ChemMasters	Colorlastic
Conspec	Permacoat
ICI Dulux Paints	Decra-Flex 300
O'Leary Paint Company	O'Leary 1375 Elastomeric
PPG Idustries, Inc.	Perma-Crete Pitt-Flex Elastomeric Coating 4-110
Sherwin-Williams	Concrete Texture Coating Smooth B97-160 Series
Sika Corporation	Elastocolor
Sika Corporation	Sikagard 550W Elastic
Sonneborn	Super Color Coat
Tamms Industries	Tammolastic
Thoro	Thorocoat
Thoro	Thorolastic

c. Construction.

1. Surface Preparation. Cure new concrete a minimum of 28 days before coating. Following the curing period, and prior to coating, test for moisture content in the concrete as described below.

Ensure all concrete to be coated is tested for the presence of moisture after surface preparation has been completed and prior to application of the coating. Ensure testing is in accordance with *ASTM D 4263*. Tape an 18 inch by 18 inch sheet (4 mil) of transparent polyethylene to the concrete surface to be coated. Ensure all edges are sealed with tape that will stick to the concrete substrate and not allow the infiltration of air. Leave the plastic sheet in place a minimum of 16 hours to detect the presence of moisture in the concrete. There must be no moisture visible on the polyethylene sheet after the minimum period of time has elapsed for coating work to begin. This must be verified by the Engineer before application of the coating begins. This test may not be reliable in cooler conditions. Alternate methods to detect moisture must be approved by the Engineer. This test should be performed a minimum of once every 100 lineal feet on barriers, walls etc., and a minimum of once on columns, piers, etc. Prepare the surface, including removing fins and projections and filling surface voids and cracks (if required), according to manufacturer's recommendations, except as modified by this special provision.

Ensure the surface to be coated is dry and free from all contamination including, but not limited to: dirt, form release agents, oil, grease, laitance, loose material and curing compounds. Clean surface by low-pressure water cleaning, steam cleaning, or abrasive blasting (followed by oil-free compressed air cleaning) or by combination to achieve an acceptable cleaned surface. When low-pressure water cleaning or steam cleaning is used, the concrete surface profile (CSP) must be CSP 1 in accordance with the International *Concrete Repair Institute Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays* (Guideline No. 310.2R-2013). When abrasive blasting is used, the concrete surface profile must be CSP 2 to CSP 4. Low-pressure water or steam cleaning primarily removes water soluble contaminants. Aged concrete with contaminants such as hardened curing compound may require light abrasive blasting to completely remove the curing compound. Since many curing compounds contain wax, even well adhered residue must be removed prior to coating to ensure a good bond between the surface coating and the concrete.

When low pressure water cleaning or steam cleaning is used, the power washer must deliver 3000 - 4500 psi and utilize a 15 degree or smaller nozzle tip held perpendicular to the surface being cleaned. When using light abrasive blasting to remove contaminants on new construction, be careful not to remove excessive concrete material.

2. Visual Inspection. Check surface cleanliness by lightly rubbing with a dark cloth or by pressing translucent adhesive tape onto the concrete surface in the presence of the Engineer. An acceptable level of residual dust can be agreed upon by the Engineer and the Contractor. Perform a water drop test in the presence of the Engineer prior to coating the concrete surface to detect for the presence of any hydrophobic contaminants. Hydrophobic contaminants include materials such as form release agents, curing compounds, oil, grease, wax, and resins. If contaminants are detected, as evidenced by a lack of rapid absorption of the water drop into the concrete, remove the contaminants and perform the tests again until no contaminants are detected.

3. Application. Apply two coats (do not dilute) of the acrylic based concrete surface coating. Apply each coat to provide the minimum wet film thickness as recommended by the manufacturer. A primer is not required unless stated as required in the manufacturer's product data sheet. Temperature limitations of the air, coating material and concrete for application will follow manufacturer's recommendations but must not be outside the

temperature range of 45 to 90 degrees F and the temperature of the air, coating material and concrete must be at least 5 degrees F above the dew point. Do not apply the concrete surface coating at a relative humidity greater than 90 percent or if rain is forecasted within the specified rain resistance period.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Conc Surface Coating (Gilkey Creek)	Lump Sum

Conc Surface Coating (Gilkey Creek) includes all labor, equipment, and materials to prepare the substrate concrete surface, conduct the visual inspection and apply the primer (if required) and two top coats of surface coating. No additional payment will be made for the test section.

CITY OF FLINT

SPECIAL PROVISION
FOR
SHOTCRETING VERTICAL AND OVERHEAD STRUCTURE REPAIRS

a. Description. Shotcreting vertical and overhead structure repairs consists of shallow repairs in vertical or overhead concrete using a dry-mix shotcrete method, including preparation, placement, and finishing of the repair. Repair locations will be determined by the Engineer. Preform all work according to section 710 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and ACI 506.2-95 Standard Specifications for Construction, published by the American Concrete Institute (ACI), except as modified herein.

b. Materials. Provide materials in accordance with the standard specifications except as modified herein.

Provide one of the following patching materials, or approved equal:

Thoroc SP10
King MS-D1

Provide embedded galvanic anodes selected from the Qualified Products List.

c. Construction Methods. Notify the Engineer a minimum of three working days prior to any test panels or shotcreting.

The nozzleman must be ACI certified for the dry-mix process for vertical and overhead positions and must have completed a minimum of five (5) projects of similar size and complexity in the last 5 years. Submit references and documentation for the previous projects to the Engineer.

1. Test Panels. Construct test panels for each proposed shotcrete mixture, each anticipated shooting orientation, and each proposed nozzleman. The forms for the test panels must be wood and constructed in accordance with ASTM C1140. Provide reinforcement of the same size and spacing required for the work. Obtain six cores from each panel, three non-reinforced specimens and three with reinforcing steel in accordance with ASTM C 1140, and as directed by the Engineer. The minimum diameter of each core must be 3.75 inches and they must be the full thickness of the panel. MDOT will score the test panel cores in accordance with ACI 506.2-95. Only nozzlemen with a test panel mean core grade less than or equal to 2.5 will be allowed to place shotcrete.

2. Surface Preparation. Do not patch overhead areas deeper than 3 inches. Do not patch vertical areas deeper than 6 inches. Remove all unsound or loose concrete using air hammers or by grinding. Hammers heavier than the nominal 30-pound Class are not permitted unless approved by the Engineer. Saw-cut the perimeter of the area to be patched, as determined by the Engineer, to a minimum edge depth of 0.5 inches. Thickness per lift must not exceed the manufacturer's recommendation. When reinforcing steel is exposed, remove the concrete to a minimum depth of 0.75 inches behind the steel. Furnish

and install 2-inch by 2-inch 12-gauge galvanized welded wire reinforcing according to subsection 710.03.D.2 of the MDOT 2012 Standard Specifications for Construction.

Clean the reinforcing steel of all scale or rust by sandblasting or other methods approved by the Engineer. Address all broken or missing reinforcement in accordance with subsection 712.03.I of the MDOT 2012 Standard Specifications for Construction. Exposed surfaces, including sawcut edges, must be cleaned by sandblasting to remove all debris followed by air blasting with oil-free compressed air having a minimum pressure of 90 psi. Where the areas to be patched are adjacent to a joint, install necessary edge forms to proper line. Flush the sound, cleaned area for patching with clean water under pressure, immediately prior to application of the shotcreting mixture. Do not apply shotcrete to surfaces with standing or flowing water.

3. Mixture Placement and Finishing. Protect the adjacent environment according to subsection 715.03.D.4 of the MDOT 2012 Standard Specifications for Construction. Place the patching mixture using equipment approved by the Engineer, in quantities which can be placed and finished before hardening begins. Place and finish the patching mixture according to the manufacturer's recommendations. Remove overspray and rebound from adjacent surfaces, including exposed reinforcement, before it hardens.

Do not reuse rebound or overspray material. Remove laitance from shotcrete surfaces that are to receive additional shotcrete layers. Allow shotcrete to stiffen sufficiently before applying subsequent layers. Dampen the surface at the time of application of the next layer of shotcrete.

Failure of the nozzleman to produce a satisfactory repair will result in re-evaluation or rejection of the nozzleman.

4. Curing. Cure patching mixtures according to the manufacturer's recommendations. Do not place patching mixtures if the ambient air temperature is less than 45 degrees Fahrenheit, or greater than 90 degrees Fahrenheit. Do not place shotcrete against frozen surfaces.

d. Acceptance. Obtain and submit to the Engineer daily two, 2-inch diameter cores of the previous day's work for evaluation, according to ASTM C1604. The daily cores must penetrate a minimum of 1.5 inches into the substrate concrete. Fill the core holes as directed by the Engineer. Hand packing the shotcrete material into the holes is acceptable, shotcreting the holes is not acceptable. The Engineer will perform a condition inspection on all repairs 30 days after the repairs are completed. All repairs that fail will be considered unacceptable work and must be removed and replaced to the satisfaction of the Engineer, at no additional cost to the Owner. Failure of a repair is considered to be sagging of the repair material, bond loss, sandy pockets, and/or delamination. Delaminations will be detected by sounding with a hammer or steel bar. Complete the above work prior to final project acceptance. Repair damage to any in-place pavement, roadway structure, or appurtenance caused by the Contractor's operations as directed by the Engineer, at no cost to the Owner.

e. Measurement and Payment. The complete work as described will be paid for at the contract unit price for the following pay item:

Pay Item **Pay Unit**

Vertical and Overhead Structure Repairs, Shotcrete .....Cubic Foot

Vertical and Overhead Structure Repairs, Shotcrete will be measured by volume in cubic feet as determined by measurement of the repair area. Payment includes all labor, equipment, and material needed to accomplish the work according to this special provision.

CITY OF FLINT

SPECIAL PROVISION
FOR
CURB AND GUTTER, CONC, DET C4, MODIFIED

a. Description. Concrete curb and gutters, valley gutters, shoulder gutters, and spillways shall be constructed in accordance with section 802 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as specified herein.

b. Materials. Materials shall be in accordance with section 802.02 of the MDOT 2012 Standard Specifications for Construction

c. Construction. Construction shall be in accordance with section 802.03 of the MDOT 2012 Standard Specifications for Construction, MDOT Standard Road Plan R-30 series expect as modified herein.

Curb and Gutter, Conc, Det C4, Modified shall be constructed in accordance with the cross sections and details provided on the plans.

d. Measurement and Payment. The completed work will be paid for at the contract unit price for the following pay item(s):

Pay Item	**Pay Unit**
Curb and Gutter, Conc, Det C4, Modified	Foot

Curb and Gutter, Conc, Det C4, Modified shall be measured in accordance with the MDOT 2012 Standard Specifications for Construction.

CITY OF FLINT

SPECIAL PROVISION
FOR
DETECTABLE WARNING SURFACES

a. Description. This work shall be done in accordance with section 803 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, except as herein provided.

b. Materials. The approved detectable warning surfaces shall be cast iron detectable warning plates and shall be Federal Color No. 30252 (Rust Red).

c. Construction. Install detectable warning surfaces in accordance with the manufacturer's instructions, section 803 of the MDOT 2012 Standard Specifications for Construction, and MDOT Standard Plan R-28 Series.

d. Measurement and Payment. The completed work as measured will be paid for at the contract unit price for the following pay item(s):

Pay Item	**Pay Unit**
Detectable Warning Surface, Modified	Foot

The item of **Detectable Warning Surface, Modified** includes all labor, materials, and equipment necessary to perform the removal operation as required to complete the work. The pay limits will be measured in place by length along the center of the 24-inch-wide detectable warning at the required locations.

CITY OF FLINT

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

a. Description. Local traffic shall be maintained by the Contractor throughout the project. The local traffic shall be maintained in accordance with sections 103 and 812 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications except as modified herein and in accordance with the plans.

All traffic control devices shall conform to the 2011 Michigan Manual on Uniform Traffic Control Devices (MMUTCD).

b. Materials. None specified.

c. Construction. Signing and barricading shall be provided by the Contractor in accordance with the MMUTCD and the MDOT 2012 Standard Specifications for Construction.

The project shall be constructed in stages. Stage 1 is from the point of beginning Station 11+50 to Station 72+40 Dort Highway (M-54). Stage 2 is from 72+40 Dort Highway (M-54) to the point of ending Station 124+28. Stage 1 shall be complete and open to traffic prior to starting Stage 2.

Stage 2 shall be divided into Stage 2A and Stage 2B. Stage 2A shall start at Station 72+40 Dort Highway (M-54). The Contractor shall determine the point of ending for Stage 2A. All contract work for Stage 2A must be complete and the road fully open to traffic prior to starting Stage 2B.

Stage 2B is from the point of ending of Stage 2A to the project point of ending Station 124+28. No work shall be completed in Stage 2B until Stage 2A is complete and open to traffic.

Traffic shall be detoured around the Stage 1 and Stage 2 work zones in accordance with the detour and maintaining traffic plans and this special provision. Court Street shall be closed to through traffic. The Contractor shall submit a detailed traffic control plan for each stage for maintaining local traffic through the work zones to the Engineer for approval prior to . The Contractor shall submit updates to the traffic control plan as directed by the Engineer if site conditions change.

The construction area shall be limited to 500 feet to 1,000 feet work zone at a time. Local traffic shall be maintained at all times on a minimum 11-foot-wide lane during working hours and a minimum of two 11-foot-wide lanes during nonworking hours. Traffic regulators shall be utilized during work hours to maintain traffic on minimum 11-foot-wide single lane. If two minimum 11-foot-wide lanes can be provided during work hours, traffic regulators may not be required if approved by the Engineer.

The water main construction shall be completed prior to cold milling. Joint repairs shall be completed within 5 to 7 calendar days after cold milling. Allow 5 to 7 calendar days of traffic on completed joint repairs to provide additional compaction prior to final paving operations.

Dort Highway will require the westerly southbound lane and easterly northbound lane to be closed at times during construction. The Contractor shall set up and maintain lane closures in accordance with M0020a, M0040a, and M0240a.

The Contractor shall have a maximum of 7 days lane closure to complete watermain construction, and a maximum of 7 days lane closure to complete the ADA ramp construction in the southwest quadrant of the Dort Highway and Court Street intersection for a total allotment of 14 days. The northbound right turn lane to Court Street on Dort Highway will only be in place when Stage 2 of construction is underway.

The Contractor shall coordinate with MDOT as to not disrupt the work for the signal construction at the Dort Hwy and Court Street intersection (JN 201268).

Averill Avenue shall remain open at all times except for the proposed water main construction through the intersection. The Contractor shall place W20-3 “Road Closed Ahead” with supplemental D3-1 “Court Street”, R11-4 “Road Closed to Thru Traffic” and Type III barricades at the intersection of Robert T. Longway Boulevard and Averill Avenue. Southbound traffic shall be detoured eastbound on Robert T. Longway Boulevard to southbound Center Road to westbound Lapeer Road to Averill Avenue. The Contractor shall place M4-9 “Detour” with supplemental D3-1 “Court Street” signs along the detour route.

The Contractor shall place W20-3 “Road Closed Ahead” with supplemental D3-1 “Court Street”, R11-4 “Road Closed to Thru Traffic” and Type III barricades at the intersection of Lapeer Road and Averill Avenue. Northbound traffic shall be detoured eastbound on Lapeer Road to northbound Center Avenue to westbound Robert T. Longway Boulevard to Averill Avenue. The Contractor shall place M4-9 “Detour” with supplemental D3-1 “Court Street” signs along the detour route.

Center Avenue will require the westerly southbound lane to be closed at times during construction. The Contractor shall set up and maintain lane closures in accordance with M0020a, M0040a, and M0240a.

Pedestrian traffic shall be maintained at all times through the work zone. The Contractor shall place temporary pedestrian Type II barricades to close sidewalk ramps designated for replacement. Temporary sidewalk ramps and walking paths shall be constructed as directed by the Engineer. The Contractor shall place temporary pedestrian sidewalk ramps at the curb line. Temporary pedestrian paths (OSB, plywood, dimensional lumber, or approved equal) shall be placed form the existing sidewalk to the temporary sidewalk ramps at the curb line.

Sidewalks and driveways must be removed and replaced on side of the road at a time with the sidewalk access closed on that side of the street while the opposite side is open and maintained. Pedestrians shall be detoured to the opposite side of the road around the sidewalk construction zones using pedestrian detour signs R9-11 “Sidewalk Closed Ahead Cross Here” and M4-9b pedestrian detour route signage.

Sections of sidewalk designated for partial replacement due to utility construction shall be maintained using temporary pedestrian paths (OSB, plywood, dimensional lumber, or approved equal). Pedestrian access paths shall be maintained to local business entrances using temporary pedestrian paths as directed by the Engineer.

The Contractor shall supply the City of Flint with the name, address, and telephone number of an employee or representative of the Contractor who can be called in case of an emergency to take necessary corrective measures as directed by the Engineer. The Contractor shall complete any necessary emergency work within 4 hours of notification from the Engineer or the city. The city will complete the work if the Contractor fails to complete the work within the allotted time frame. Any necessary emergency work performed by the city will be billed to the Contractor at a minimum of $500 per incident or cost of work.

The Contractor shall furnish, erect, maintain, and upon completion of the work, remove all traffic control devices required for the project in accordance with the plans and specifications or as directed by the Engineer. No work shall begin on any part of the project until proper traffic control has been placed.

The Contractor shall furnish properly equipped traffic regulators when deemed necessary by the Engineer.

Access to local commercial business and resident traffic shall be maintained at all times during construction.

The Contractor shall provide and maintain adequate emergency vehicle access to the project site at all times during the construction period. All work shall stop to allow emergency vehicles to pass.

Open trenches are not allowed overnight. The Contractor may not work before 7 a.m. nor after 7 p.m. except for water service transfers and water shutdowns for major water users unless approved by the Engineer and adequate lighting is provided. Water service transfers and shut downs shall be completed between the hours of midnight and 4:00 a.m. where major water users (restaurants, hotels, schools, medical facilities) will be affected. Any associated costs of working at night shall be the at the Contractor's cost and shall not be paid for separately. Work on weekends shall be approved by the Engineer.

No commercial driveway shall be completely closed unless specifically approved by the Engineer. Access to residential drives shall be maintained except when work is being completed directly adjacent to the drive.

Barricades used to control traffic at night shall be lighted. Plastic drums used for the project shall be from the state's approved project list.

Plastic drums shall be placed adjacent to locations where the sidewalk has been removed until the sidewalk has been replaced.

Signs shall be Type B temporary with a 7 feet bottom height, unless otherwise directed by the Engineer.

All traffic control devices shall be in accordance with the Special Detail WZD-100-Series and WZD-125-Series MDOT typical sections.

The above special provisions are subject to change due to an emergency or unforeseen traffic volumes as directed by the Engineer.

1. Special Considerations at Railroad Crossings. The following requirements will be

necessary during construction near the railroad crossing(s).

A. The Contractor will not obstruct the right-hand display of the railroad signal to traffic approaching the crossing.

B. No lane closure taper(s) may extend through the crossing. Traffic lane shifts cannot transition over the crossing.

C. No construction traffic control devices may be placed in the railroad crossing or closer than 25 feet from the outside rail on either crossing approach.

D. Provide traffic regulator at railroad crossing if movement of traffic is restricted to alternating one-way traffic through construction area at crossing. The traffic regulator will serve to stop traffic for vehicles traveling in the direction opposed to normal flow and prevent them from entering the crossing upon a train approaching the crossing. When the railroad crossing is in the influence zone of active construction work, but not in a lane closure, the roadway traffic regulator will give immediate preference to clearing any traffic which backup over the crossing as a result of the traffic regulator control away from the crossing.

E. The Contractor will place a temporary stop line and sign R15-1 (crossbuck) to indicate the stopping point in advance of the crossing for vehicles traveling in a direction opposed to normal flow.

F. Roadway traffic regulator control operations through crossing(s) with half-roadway gates will also have a railroad watchperson present to provide notice of train approach to the crossing in advance of railroad warning device activation, so the crossing may be cleared of vehicular traffic. The Contractor is responsible for contacting the applicable railroad to obtain and pay for a railroad watchperson as described in the Special Provision for Work Near Railroad Crossing.

G. Payment for intermediate traffic regulator(s) stationed at the crossing is included in the pay item Traffic Regulator Control. The presence of the railroad flagger does not relieve the Contractor of the responsibility for this intermediate traffic regulator.

d. Measurement and Payment. The completed work, as measured for maintaining traffic, including all materials, labor, and equipment will be paid for at the contract unit price per the MDOT 2012 Standard Specifications for Construction.

Maintaining traffic includes all additional work and materials necessary for traffic maintenance, utility maintenance, and coordination.

Temporary signs, barricades, and plastic drums will be paid for at the contract unit price, for the maximum quantity of each type required at any one time during the life of the project. The Contractor should consider the need for additional temporary signs, barricades, and plastic drums needed when two construction phases of the project may occur simultaneously. If a traffic control device is required to be relocated from one location to another, it will not be paid for again.

Any additional work necessary to adjust barricades or signs for construction phasing shall be included in the maintaining traffic items of work and will not be paid for separately.

CITY OF FLINT

SPECIAL PROVISION
FOR
RIPRAP, MODIFIED

a. Description. The Riprap, Modified shall meet the requirements of section 813 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction except as modified herein.

b. Materials. Riprap, Modified shall be composed of 100 percent limestone riprap. Broken concrete will not be allowed to be used for Riprap, Modified.

c. Construction. Riprap, Heavy, Modified for this project shall be composed of two (2) layers of riprap for a total thickness of 32 inches. Riprap, Plain, Modified for this project shall be composed of two (2) layers of riprap for a total thickness of 16 inches.

d. Measurement and Payment. The completed work Riprap, Modified will be paid for at the contract unit price for the following pay item.

Pay Item	**Pay Unit**
Riprap, Heavy, Modified	Square Yard

All riprap shall be paid for by the square yard, which shall include all headers and footer and geotextile fabric as shown on the proposed plans.

CITY OF FLINT

SPECIAL PROVISION
FOR
TURF ESTABLISHMENT, PERFORMANCE

a. Description. Delete section 816 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and replace with this special provision. The Contractor is responsible for the performance and quality of turf growth in the areas indicated on the plans and as identified by the Engineer. Comply with all local, state, and federal laws when completing this work.

Establish a durable, permanent, weed-free, mature, perennial turf. The work consists of fundamental turf work, including but not limited to topsoiling, seeding, mulching, erosion control, maintenance, watering, and repair of turf as described herein during the life of the contract and during the life of any supplemental performance bond which may ensue.

Choose and implement proven turf establishment industry practices; provide all necessary labor and equipment; select and provide all turf establishment materials; and control erosion and any subsequent sedimentation at all times.

Perform a site analysis and interpret it to ensure compliance with this special provision. The site analysis must take into consideration topsoil needs, fertilizer and pH requirements, seed mix, existing and future soil moisture levels, slopes and grades, required erosion control items and devices, maintenance requirements, local highway snow deicing practices, and any other characteristics that influence and affect turf establishment.

Subsection 107.11 of the MDOT 2012 Standard Specifications for Construction is revised relative to the Contractor's responsibility for the repair of turf establishment work as follows. The Contractor is responsible, at no additional cost to the contract, for the repair of turf establishment work occasioned by storm events up to and including 3 inches of rain in a 24-hour period as documented by local meteorological data submitted to the Engineer for review and approval. All other portions of subsection 107.11 remain unchanged.

1. Contractor Turf Establishment Experience Requirements. Weed control must be done by a commercial herbicide applicator, licensed by the State of Michigan, and certified by the Michigan Department of Agriculture (MDA) in the appropriate category to apply herbicides. Use application procedures and materials according to federal, state, and local regulations. The Contractor must provide appropriate documentation and secure approval from the Engineer before application of herbicides. No restricted use chemical will be allowed.

At least ten work days prior to start of turf establishment, the Contractor performing the turf establishment work must provide the Engineer with documentation that they meet one or both of the following requirements.

A. At least one person employed by the Contractor and assigned to the job site must have a degree or certificate in Turf Management, Horticulture or related field.

B. At least one person employed by the Contractor and assigned to the job site must have at least five (5) years of experience in roadside turf establishment.

b. Materials. Provide topsoil, seed, mulch, pesticide, herbicide and/or mulch blankets, and any other unique erosion control materials as necessary to fulfill this specification, as detailed in the plans. Use additional materials, as necessary, to meet the standards set forth for turf establishment in this special provision. The use of sod on the project requires the prior approval of the Engineer and if approved, may be used at limited site locations only.

Selection of all materials is the responsibility of the Contractor with the following minimum conditions.

1. Soil. Provide furnished or salvaged topsoil which may be blended compost that will support vigorous growth. It must be humus bearing and placed at least 4 inches deep. It must be free of stones larger than 1 inch (2 inches on freeway projects) in diameter and other debris.

The finished slope must be trimmed and graded according to subsection 205.03.N of the MDOT 2012 Standard Specifications for Construction.

2. Seed. Use a seeding mixture that is composed of four or more species of perennial grass. All species and their cultivars or varieties must be guaranteed hardy for Michigan.

Following is a list of recommended species of perennial grasses: Kentucky Bluegrass, Perennial Ryegrass, Hard Fescue, Creeping Red Fescue, Chewings Fescue, Turf-type Tall Fescue, Buffalo grass, and Alkaligrass-Fults Puccinellia Distans. The cultivars or varieties of grasses selected must be disease and insect resistant and of good color. No one species in the mix will be more than 25 percent of the mixture by weight. No one species in the mix will be less than 5 percent of the mixture by weight. No grass species selected will be considered noxious or objectionable, such as Quack Grass, Smooth Brome, Orchard Grass, Reed Canary Grass, and others.

A. The seed must be legally saleable in Michigan. The seed product must not contain more than 10 percent inert materials. The seed source must be from an MDOT approved certified vender.

B. The species and varieties of seed must be adapted to the site conditions, to the site use, and to the soils, moisture, and local climate. Site use may include but is not limited to detention pond, wildlife habitat, playground, wetlands, forested wetland, rural roadside, urban roadside, and highly maintained front yard.

C. At least two of the species in the mixture proposed to be planted within 15 feet behind the curb or the shoulder must be salt tolerant.

3. Mulch. Seeded areas must be mulched with the appropriate materials for the site conditions. Mulch must promote germination and growth of seed and must mitigate soil erosion and sedimentation. Mulch netting and blankets must be biodegraded or removed prior to final acceptance.

4. Herbicides. Comply with all federal, state, and local laws as noted in section 107 of the MDOT 2012 Standard Specifications for Construction. As part of the MDA weed control application, the Contractor is required to make proper notifications and/or postings as per label and MDA requirements for all locations that will be sprayed. Notify the Engineer 48 hours prior to any applications being made. Furnish and apply herbicide(s) as needed. It is the Contractor's responsibility to select the herbicide(s) and the rate at which it will be used. The work and herbicide(s) must be approved by the Engineer prior to the application of the material. A spray log must be completed and submitted to the project office each day an application is made.

No water can be drawn from any waterway (i.e. river, ditch, creek, lake etc.) that is located on any state, county, or municipal right-of-way, for mixing with herbicides.

5. Fertilizers. Furnish and apply fertilizer(s) as needed. It is the Contractor's responsibility to select the fertilizer(s) and the rate at which it will be used. Phosphorus can only be used at the time of planting and when soil conditions require it. The work and fertilizer(s) must be approved by the Engineer prior to the application of the material.

6. Water. Furnish and apply water from an approved source at a rate to promote healthy growth.

c. Construction. The Contractor is responsible for all work and all construction methods used in completing this work. Any part of MDOT 2012 Standard Specifications for Construction or standard plans chosen to be implemented by the Contractor does not imply responsibility on the part of MDOT for acceptability of the Contractor's construction methods or for the quality of the Contractor's work outcome at any time.

1. Inspection of the Work. The Contractor is responsible for all inspection of turf establishment work.

Use a Contractor's Daily Report, approved by the Engineer, to report inspections made and to document turf establishment work performed on this project. The Contractor's Daily Report must be completed and submitted to the Engineer when any work performed under this special provision is in progress.

The Contractor's Daily Report must be accompanied by all necessary materials documentation including tests slips, certifications, etc.

The Engineer will determine the acceptability of these reports in terms of their completeness and accuracy. The Engineer reserves the right to verify all submitted measurements and computations. Failure by the Contractor to submit acceptable and timely reports to the Engineer may result in withholding of progress pay estimates on turf-related items until such time as reports are submitted and deemed acceptable.

The Engineer reserves the right to inspect the project for any reason in accordance with subsection 104.01 of the MDOT 2012 Standard Specifications for Construction, including the fulfillment of other inspection requirements such as soil erosion and sedimentation control, NPDES, etc. Inspections made by the Engineer do not relieve the Contractor of the inspections required by this special provision or the Contractor's responsibilities for erosion control and turf establishment.

2. Erosion Control. Erosion must be controlled at all times according to section 208 of the MDOT 2012 Standard Specifications for Construction. Control of soil erosion is the responsibility of the Contractor. However, sedimentation controls must be placed as indicated on the plans or as directed by the Engineer. The site must be continuously monitored by the Contractor for needed erosion repair from any cause as addressed in the contract documents. All eroded areas must be returned to original grade as detailed in the contract documents.

If sedimentation occurs in drainage structures or any watercourse or water containment area, corrective action must be taken immediately and all disturbed areas contributing to this sedimentation must be stabilized within 24 hours after the erosion occurrence. Sediment deposited as a result of the Contractor's inability to control the soil erosion will be removed at the Contractor's expense.

The Contractor must reimburse MDOT for any costs levied against MDOT, such as fines, environmental costs, costs for remedies required, or any other costs as a result of the Contractor's failure to comply with this special provision and with all federal, state, and local laws.

3. Erosion Repair. The Contractor is responsible for all repairs and liable for all consequences (legal, monetary or other) associated with erosion or sedimentation damage to finished or unfinished work.

All erosion occurrences and the repairs made by the Contractor must be reported to the Engineer in the format and at the frequency required by the Engineer. Any erosion, displacement, or disturbance to ongoing or completed work by any cause must be repaired by the Contractor at no additional cost to the contract unless otherwise noted herein.

The Contractor is responsible and liable for all traffic control and safety measures required to repair and protect damaged turf areas. Any eroded area that may affect the support of the roadbed or safety of the public must be repaired within 24 hours of the erosion occurrence.

Protective devices such as barriers, directional signs/signals, temporary fence, or any other safety measures must be placed by the Contractor immediately after any erosion damage occurs that has the potential of endangering the public. In these instances, the Contractor must, within 24 hours of the occurrence of the damage, provide the Engineer with a written summary of the immediate action taken describing the repairs made and the safety measures taken.

4. Mowing and Weeding. Turf must be maintained to a visually appealing level and not more than 8 inches in height at any time prior to acceptance. Weeds must be controlled to less than 10 percent of the turf establishment area at all times during construction.

5. Final Acceptance

A. Final Acceptance Parameters. Before final acceptance of the turf establishment work, all of the following minimum parameters must be met throughout all exposed areas of the project designated on the plans or identified by the Engineer as turf establishment areas. There must be no exposed bare soil and the turf must be fully germinated, erosion free, weed free, disease free, dark green in color and in a vigorous growing

condition. All mulch netting/blankets must be fully biodegraded or removed from the turf areas.

The Engineer will notify the Contractor of the dates and times of all acceptance inspections. The Contractor may accompany the Engineer during these inspections. If the Contractor does not agree with the decision made by the Engineer, the Contractor can request an inspection by a mutually agreed upon third party (Michigan State University Extension service or other). A joint inspection, including the Engineer, the Contractor, and the third party, will be scheduled. All expert fees and expenses charged by the third party will be paid by the Contractor.

Any and all claims for extra compensation must be made according to subsection 104.09 of the MDOT 2012 Standard Specifications for Construction.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Turf Establishment, Performance	Square Yard

Turf Establishment, Performance will be measured in place by area in square yards. All materials, labor, and equipment required or selected by the Contractor to install, maintain, inspect, repair, and meet the acceptance parameters for turf establishment specified in this special provision, including preparation, updating, and submittal of the Contractor's Daily Reports, will not be paid separately but will be considered included in the contract unit price bid for **Turf Establishment, Performance**.

Repairs made to damaged turf establishment areas as a result of a documented storm by local meteorological data resulting in rainfall amounts of more than 3 inches in a 24-hour period will be paid for as an increase to original quantities as described in subsection 109.07 of the MDOT 2012 Standard Specifications for Construction.

The following schedule of payment applies to work performed according to this special provision. Upon completion of topsoil surfacing stage, 50 percent of the authorized amount for **Turf Establishment, Performance** will be paid to the Contractor. The remaining authorized amount will be paid upon completion of all other work necessary to comply with this special provision and to meet all final acceptance parameters for **Turf Establishment, Performance**.

CITY OF FLINT

SPECIAL PROVISION
FOR
THE REHABILITATION OF POTABLE WATER PIPELINES WITH CURED IN PLACE PIPE

a. Description. It is the intent of this special provision to provide for the rehabilitation of the designated potable water pipeline(s) by installing and curing a new cured in place pipe (CIPP) within an existing (host) pipe.

1. Referenced Documents. This special provision references the following industry standards and shall be the latest editions thereof. In case of conflicting requirements between this special provision and these standards, this special provision will govern.

A. ASTM F1216, "Standard Practice for Rehabilitation of Existing Pipelines and Conduits by the Inversion and Curing of a Resin-Impregnated Tube"

B. ASTM F2994, "Standard Practice for Utilization of Mobile, Automated Cured-In-Place Pipe (CIPP) Impregnation Systems"

C. ASTM D638, "Standard Test Method for Tensile Properties of Plastics"

D. ASTM D790, "Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials"

E. ASTM D2290, "Standard Test Method for Apparent Hoop Tensile Strength of Plastic or Reinforced Plastic Pipe"

F. ASTM D3039/D3039M, "Standard Test Method for Tensile Properties of Polymer Matrix Composite Materials"

G. AWWA, Rehabilitation of Water Mains M28, Third Edition

H. AWWA, Manual of Water Supply Practices M45, Fiberglass Pipe Design, Third Edition

I. AWWA C651, "Disinfecting Water Mains"

J. NSF/ANSI Standard 61: Drinking Water System Components - Health Effects

2. Product, Manufacturer/Installer Qualification Requirements.

A. All trenchless rehabilitation products must be pre-approved prior to the formal opening of bids. The following information for the proposed product must be submitted to the Owner for consideration no later than two (2) weeks prior to the bid date. Upon completing all product evaluations, the Owner will disclose an approved product list by addendum no later than one (1) week prior to the bid opening. The Owner's decision shall be final.

(1) For a product to be considered commercially proven, a minimum of five (5) years of performance history and 100,000 linear feet of successful pressure pipe CIPP installations of the product bid must be documented to the satisfaction of the Owner.

(2) Mobile, Automated Epoxy Impregnation System. The Contractor shall submit documentation that the equipment to be used for epoxy impregnation of the liner tube is in full accordance with ASTM F2994 and subsection b.5 of these contract special provisions.

(3) The CIPP product bid must be certified by NSF International to NSF/ANSI Standard 61: Drinking Water System Components – Health Effects for use in potable water lines. A copy of the current NSF/ANSI-61 certification shall be provided.

B. The following submittals must be submitted to the Owner with the bid. Failure to submit any or all of this supporting documentation shall deem the bid non-responsive.

(1) To be commercially proven, an installer must satisfy all insurance, financial, and bonding requirements of the Owner. In addition, the Contractor must be a certified installer of the CIPP technology bid as established by the CIPP product manufacturer. Acceptable documentation supporting the above must be submitted to the Owner.

(2) Design. Detailed design calculations for both the internal and external loading parameters specified in subsection b.6 shall be submitted for review and approval. The Owner shall further designate design conditions of the subject pressure pipeline(s) as partially deteriorated or fully deteriorated. The CIPP shall be designed in accordance with ASTM F1216, Appendix X1.3 based on said condition specified and shall follow the requirements specified in subsection b.6. The design submittal shall also clearly identify the physical properties used for design that shall be the basis for acceptance of the final product (see subsection c.6).

(3) Fittings and End Seals. The Owner shall submit details of how existing fittings (tees, air release valves, blow-off valves, etc.) and services will be reconnected and how mechanical end seals will be installed. Whenever possible, mechanical end seals shall be installed at each end of the lined pipe and shall provide a sufficient seal to prevent water tracking between the CIPP and the host pipe (see subsection c.5).

C. Acceptable products shall be RS BlueLine® by HammerHead Trenchless or approved equal.

b. Materials. The materials shall be in accordance with ASTM F2994 as further described in this Section b.

1. Liner Tube. The liner tube should consist of one or more layers of flexible needled felt and fiberglass capable of carrying resin, withstanding installation pressures, and curing temperatures. The felt/fiberglass layers shall be needled together and constructed as full, concentric rings. Liner tubes incorporating independent layers of felt and overlapping fiberglass are not permitted. The liner tube shall be compatible with the resin system used. The outside layer of the liner tube shall be coated or protected with a translucent flexible material that is compatible with the resin system used and clearly allows inspection of the resin impregnation procedure. The liner tube shall be designed to radially expand against the host pipe and should be fabricated to dimensions that, when installed, will tightly fit the internal

circumference and the length of the existing pipe. Liner tubes that do not radially expand during installation and/or are oversized to ensure a tight fit are not permitted.

2. The liner tube shall have a uniform thickness that, when installed as recommended, installation pressures will meet or exceed the minimum required thickness specified in the design submittals (see subsection a.2.B.(3)).

3. The wall color of the interior pipe surface of the CIPP after installation shall be a light reflective color so that a clear, detailed examination may be made of the final product with closed circuit television inspection (CCTV) equipment or by man entry.

4. An epoxy resin system that is compatible with the automation and installation process and liner tube materials shall be used. The resin shall have an initiation temperature for cure that is less than 180 degrees Fahrenheit (82.2°C). Acceptable resin systems shall be MaxPox 8D/480D, MaxPox 15D/480D or approved equal.

5. Equipment. The equipment shall be in accordance with ASTM F2994 as further described in this subsection b.5.

A. Resin Impregnation Unit. A mobile system, usually mounted on a trailer or truck, used to manufacture CIPP at or nearby the point of installation using CIPP automation.

(1) CIPP Automation. The use of programmable logic controllers and human machine interface (HMI) to control the operation of a resin impregnation unit. As a minimum, the following functions shall be controlled and monitored by the CIPP automation process: Operating speed and pressure of resin and curing agent pumps; resin and curing agent temperature, mixing ratio, material supply container levels, utilization, recirculation, and dispense; vacuum pump operation; calibration roller speed, direction and gap setting. Data from all installations shall be electronically stored on an internal memory device integrated into the HMI and shall be downloadable to an external storage device for project quality assurance recordkeeping. The data stored shall include at a minimum: project name, identification number and location; date and time of processing wet out; liner tube diameter, thickness, and length; and resin and curing agent temperatures and volumes utilized. Additional data recorded may include the calibration roller gap setting, roller speed, length of CIPP liner calibrated, and vacuum level.

(2) Resin Pumps. Positive displacement pumps specifically designed for the formulated epoxy resin and curing agent utilized shall be used. The pumps shall be capable of delivering the required volume of mixed resin to the liner tube during impregnation in a suitable time frame and shall also be self-priming.

(3) Piping, Fittings, and Containers. All piping, fittings, and containers used to convey, circulate, and store resin and curing agent shall be made of a material suitable for constant contact with the respective material(s). Resin and curing agent containers shall meet all federal, state, and local regulations for material transport.

(4) Flow Meters. Precision metering devices used to measure resin and curing agent quantities with an accuracy tolerance of +/- 1.0 percent or better by volume.

(5) Temperature Control System. A heat exchange system used to regulate resin and curing agent temperatures. Acceptable methods may include utilizing temperature-controlled air or water, glycol lines, or heat tracing and insulation.

(6) Static Mixer. Plastic or stainless-steel device consisting of mixing elements within a carrier tube that is used to thoroughly mix resin and curing agent prior to liner tube impregnation. The static mixer shall be appropriately designed and sized for the mixed resin viscosity and flow rate.

(7) Vacuum System. A device used to remove air from a liner tube and assist with liner tube impregnation. The vacuum pump shall have a minimum capacity of 9.4 ft^3/min (16 m^3/hr) for up to 12-inch (300 mm) diameter CIPP and 23.5 ft^3/min (40 m^3/hr) for CIPP greater than 12 inches (300 mm). The vacuum system shall have an integrated vacuum regulator, vacuum gauge with a range of 0-30 in Hg, distribution piping/hoses with the necessary connections and service points, and a ball valve and suction cup attached to the terminating end of each vacuum hose. Vacuum hose should be made of a suitable material, such as clear reinforced PVC, with a minimum inside diameter of 0.375 in (9.5 mm). Suction cups shall be 2.5-inch bellows or similar style and capable of accommodating flat, concave, or slanted surfaces.

6. Structural Requirements.

A. The CIPP shall be designed as per ASTM F1216, Appendix X1.3 based on said condition specified for AWWA M28 Class III (partially deteriorated pressure pipe condition) or AWWA M28 Class IV (fully deteriorated pressure pipe condition) and shall be provided with the bid (see subsection a.2.B.(3)). These detailed calculations shall provide the input data as well as the actual calculations. The design submittal shall also clearly identify the physical properties used for design.

B. The CIPP design for a fully deteriorated pressure pipe condition shall assume no bonding to the original pipe wall.

C. The design of the CIPP shall be based on the following parameters:

(1) Pressure pipe design condition (Class III or IV)

(2) Nominal diameter of host pipe, inches

(3) Host pipe material

(4) Normal operating pressure, psi

(5) Surge pressure, psi

(6) Vacuum, psi

(7) Test pressure, psi

(8) Burial depth (ground surface to top of pipe), feet

(9) Ground water depth (phreatic surface to top of pipe), feet

(10) Surface live load, if applicable (HS20, HS25, E80 or airport)

(11) Constrained soil modulus, psi

(12) Soil density, lb/ft^3

D. Groundwater levels and subsurface information shall be determined from geotechnical investigations provided and as indicated on the plans.

E. Constrained soil modulus shall be determined from geotechnical investigations and should reflect suggested design values listed in AWWA M45, Table 5.6.

From Table 5.6 of *AWWA Manual of Water Practices M45, Third Edition*						
Granular Native Soils		**Cohesive Native Soils**			**Constrained Soil Modulus**	
		Unconfined compressive strength (q_u)		**Description**		
Blows/ft (per ASTM D1586)	**Description**	**tons/sf**	**kPa**		**psi**	**kPa**
> 0 - 1	very, very loose	> 0 - 0.125	0 - 13	very, very soft	50	0.3
1 - 2	very loose	0.125 - 0.25	13 - 25	very soft	200	1.4
2 - 4		0.25 - 0.50	25 - 50	soft	700	4.8
4 - 8	loose	0.50 - 1.0	50 - 100	medium	1,500	10.3
8 - 15	slightly compact	1.0 - 2.0	100 - 200	stiff	3,000	20.7
15 - 30	compact	2.0 - 4.0	200 - 400	very stiff	5,000	34.5
30 - 50	dense	4.0 - 6.0	400 - 600	hard	10,000	69.0
> 50	very dense	> 6.0	> 600	very hard	20,000	138.0

F. The physical properties used in the design submittal (see subsection a.2.B.(3)) shall be clearly identified. These physical properties shall be the basis for the acceptance of the final product (see subsection c.6.E). The minimum physical properties of the CIPP shall be as listed in Table 1:

Table 1: CIPP Physical Properties			
Physical Property	**Test Method(s)**	**Test Direction**	**Minimum Design Value**
Initial Flexural Modulus of Elasticity	ASTM D790	Radial or Axial	300,000 psi
Initial Flexural Strength	ASTM D790	Radial or Axial	10,000 psi
Initial Tensile Strength	ASTM D638, ASTM D2290, ASTM D3039	Radial	9,000 psi
		Axial	4,500 psi

Minimum design values listed in Table 1 reflect CIPP designed as a Class IV lining system where a single layer of fiberglass is utilized. Enhanced physical properties may be achieved by increasing fiberglass content to meet pressure rating requirements and/or resist negative pressures (vacuum). Contact the CIPP product manufacturer for additional guidance.

G. For the external load design in Appendix X.1 of ASTM F1216, the long term (time-corrected) flexural modulus of elasticity shall be determined by multiplying the design initial flexural modulus of elasticity by a creep retention factor (CL). At a minimum, a creep retention factor of 50 percent shall be applied.

H. The external load design shall be based on an enhancement factor (K) of 7.0, an ovality (q) of 2 percent, a Poisson's (v) ratio of 0.30 and a factor of safety of 2.0.

I. For the internal pressure design in Appendix X.1 of ASTM F1216, the design shall be based on a factor of safety of 2.0.

J. The design physical properties shall be adjusted, as necessary, to account for the normal internal operating temperature specified in subsection b.6.C.

c. Construction.

1. Temporary Water Service, Bypass, Access, Cleaning, and Inspection

A. The Contractor shall be responsible for providing temporary water service to affected residents and businesses and/or bypassing flow as necessary during the renovation process.

B. Prior to entering pipeline access points and performing inspection or cleaning operations, the Contractor shall make an evaluation of the atmosphere to determine the presence of toxic or flammable vapors or lack of oxygen. This shall be undertaken in accordance with local, state, or federal safety regulations.

C. The Contractor shall state in their prequalification submittals (see subsection a.2.B.(6)) the number and location of access points required. The Owner shall provide rights of access to the pipeline. The Contractor or Owner, as specified in the contract documents, shall provide the excavation, pipe work, reconnection, and restoration for installation access points.

D. The pipe shall be cleaned to remove mineral deposits, tuberculation, obstructions, dirt, rust, and other debris that will interfere with the installation to the nominal host pipe diameter without altering the soundness of the host pipe. Where services are to be reinstated robotically, the cleaning method utilized shall not damage the integrity of the connections. Standing water shall be removed prior to installation of the CIPP. Before the lining installation work is performed, the status of the cleaning should to be checked by visual or video inspection.

Pipes shall be cleaned by the Contractor as needed, with high-velocity water jetting equipment, mechanically powered equipment, cable-attached devices or fluid-propelled devices (e.g., pipe pigs). The Owner shall provide a disposal site for all debris removed from the pipe during the cleaning operation. Unless specified otherwise, this site shall be at or near the project site. Any hazardous waste material encountered during this project shall be considered as a changed condition.

E. Inspection of pipelines shall be performed by experienced personnel trained in locating breaks, obstacles, etc., by CCTV or man entry. The interior of the pipeline shall be carefully inspected to determine the location of any conditions that may prevent proper installation of the CIPP, and it shall be noted so that these conditions can be corrected. A video record and suitable log shall be kept for reference. If unseen obstructions are encountered such as, but not limited to, reducers, line valves, protruding connections, etc. that will prevent proper installation, the Contractor shall remove such obstructions on written order from the Owner.

2. Resin Impregnation. The materials, equipment and practices for resin impregnation shall be in accordance with ASTM F2994 and CIPP product manufacturer guidelines.

A. The liner tube shall be vacuum impregnated (wet out) with resin using an automated resin impregnation unit under controlled conditions. Liner tube impregnation shall be controlled through precision equipment and computer automation via programmable logic controls (PLCs) and human machine interface (HMI). The HMI shall be utilized to input project specific information, including customer and jobsite data; liner tube diameter, thickness, and length; and/or other applicable data points, and shall monitor and control all aspects of the impregnation system's functionality. All input and process data shall be continuously recorded and saved as a CSV file to an internal hard drive or external flash drive.

B. The resin components and mixed quantity of resin used for liner tube impregnation shall be sufficient to fill the volume of air voids in the liner tube as directed by the CIPP product manufacturer. Precise amounts of resin and hardener shall be automatically metered in accordance with the resin system manufacturer guidelines and NSF/ANSI Standard 61 listing for the CIPP product being installed.

C. The Contractor shall follow the resin impregnation unit manufacturer's recommended procedures for impregnation of the liner tube. A roller system shall be used to uniformly distribute the resin throughout the liner tube. The Contractor shall allow the Owner to inspect the materials and procedures used and/or to be present during vacuum impregnation of the liner tube.

3. Installation.

A. Inversion Process. The resin impregnated liner tube (referred to as "CIPP" once impregnation is complete) shall be installed in accordance with CIPP product manufacturer guidelines and ASTM F1216.

(1) The existing pipeline shall be dewatered and free of incoming water. If water is present, measures shall be taken to minimize contact of the water with the inverting CIPP.

(2) The CIPP shall be inserted through an existing structure or approved access point by means of an inversion process and the application of air pressure or hydrostatic head sufficient to extend it to the next designated manhole or termination point.

(3) Before the installation begins, the Contractor shall determine the minimum pressure required to hold the CIPP tight against the existing pipeline, and the maximum allowable pressure so as not to damage the CIPP. Once the installation has started, the pressure shall be maintained between the minimum and maximum pressures until the installation has been completed.

(4) The use of a lubricant during inversion is required to reduce friction. The lubricant used shall be a nontoxic product that has no detrimental effects on the CIPP or boiler and pump system, shall not support the growth of bacteria, and shall not adversely affect the fluid to be transported.

4. Curing. Circulated heated water or controlled steam curing processes shall be used

after installation is completed. CIPP product manufacturer guidelines, referenced ASTM standards and the CIPP product NSF/ANSI Standard 61 product listing requirements shall be followed.

A. Hot Water Cure. Contractor shall determine required curing process based upon CIPP product manufacturer guidelines and ASTM F1216.

(1) After the CIPP is inverted in place, a suitable heat source and water recirculation equipment shall be used to circulate heated water throughout the pipeline. The equipment shall be capable of delivering hot water throughout the pipeline to uniformly raise the water temperature above the temperature required to effect cure of the resin. Water temperature in the line during the cure period shall be as recommended by the resin manufacturer or determined by the Contractor.

(2) The heat source shall be fitted with suitable monitors to gauge the temperature of the incoming and outgoing water supply. To determine the temperatures during the cure cycle, thermocouples (connected to thermometers) should be placed between the CIPP lining and the host pipe invert and crown at both termination points to monitor the temperatures during cure.

(3) The installed CIPP shall be cured in accordance with the CIPP product manufacturer guidelines. The curing process shall take into account the existing pipe material, resin system utilized, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

(4) The CIPP shall be cooled in accordance with the CIPP product manufacturer guidelines. Cool-down shall be accomplished by the introduction of cool water to replace water being drained from the system. Care shall be taken in the release of the static head so that a vacuum will not be developed that could damage the newly installed CIPP.

B. Controlled Steam Cure. Contractor shall determine required curing process based upon CIPP product manufacturer guidelines and ASTM F1216.

(1) After installation is complete, a suitable air compressor or blower and steam-generating equipment is required to distribute controlled steam throughout the pipe. The equipment shall be capable of delivering adequate airflow and steam output throughout the section to uniformly raise the temperature within the pipe above the temperature required to effect cure of the resin. The temperature in the line during the cure period shall be as recommended by the resin manufacturer or determined by the Contractor.

(2) The steam generating equipment shall be fitted with suitable monitors to measure the temperature of the outgoing steam. To determine the temperatures during the cure cycle, thermocouples (connected to thermometers) should be placed between the CIPP lining and the host pipe invert and crown at both termination points to monitor the temperatures during cure.

(3) The installed CIPP shall be cured in accordance with CIPP product manufacturer guidelines. The curing process shall take into account the existing pipe material, the resin system, and ground conditions (temperature, moisture level, and thermal conductivity of soil).

(4) Once curing is complete, steam supply shall be cut off while maintaining air flow and pressure. The cured CIPP shall be cooled down gradually in accordance with CIPP product manufacturer guidelines. The cool-down process may be assisted by chilling the air or by mixing water into the air flow.

5. Internal End Seals and Reinstatements.

A. The Contractor shall install mechanical end seals at each of the CIPP beginning and termination points whenever possible. Prior to installing end seals, the ends of the CIPP lining shall be sealed with an approved two-part epoxy resin compatible with the CIPP.

B. The end seals shall be a mechanical, expansion type constructed of stainless steel and elastomeric rubber seals. The end seals shall be rated by the manufacturer for the operating pressure and shall be compatible with the piped fluid. The existing pipeline at the end seal installation points shall be structurally sound and free of any significant pitting or heavy corrosion. This is required to ensure an adequate seal between the CIPP and the existing pipeline. Otherwise, replacement with a new steel spool piece at these ends may be required.

C. All reinstatements of services, tees, air release valves, blow-off valves, etc., shall be completed following the procedures identified in the submittal described in subsection a.2.B.(4) of this special provision.

6. Inspection and Testing.

A. The installation shall be inspected visually, if appropriate, and by CCTV. Variations from true line and grade may be inherent because of the conditions of the original piping.

B. The finished CIPP shall be tight-fitting to the host pipe, continuous over the entire length of an installation run, and be free of dry spots, lifts, longitudinal fins, and delamination.

C. For each inversion length designated by the Owner in the contract documents or purchase order, one CIPP sample shall be prepared for physical property testing. The sample shall be fabricated from material taken from the CIPP and the resin/hardener system used and cured in a restrained section (PVC pipe, clamped mold, etc.) placed in a horizontal orientation during the curing process. Flat plate samples may be prepared in lieu of restrained samples where appropriate. Pre-liner, mylar, or similar material should be used as a barrier between the CIPP and restraint or plates for ease of sample removal for testing and to prevent damage to the sample. The CIPP samples shall be of sufficient size to permit proper flexural testing and tensile testing procedures for the diameter and thickness of CIPP installed. One (1) sample per every 1,500 linear feet of each diameter of CIPP installed shall be collected for testing. Each sample shall, as a minimum, be appropriately labeled with the following information: date of collection, project name, Owner, Contractor, installation location, CIPP product, diameter, thickness, desired test direction, and orientation (radial or axial).

D. All exposed areas of the CIPP (down tube, intermediate and downstream access points, etc.) shall be radially restrained with suitable materials during the curing process as directed by the CIPP product manufacturer, and the terminating end of the CIPP should be bulkheaded to prevent longitudinal stretching.

E. The CIPP samples shall be tested for initial flexural properties in accordance with ASTM D790, and initial tensile properties per ASTM D638, ASTM D2290 or ASTM D3039 to confirm that the minimum values specified in the design submittal of the proposed CIPP product (see subsection a.2.B.(3)), and subsection b.6.F, have been achieved.

F. The CIPP shall meet the pressure testing requirements of subsection c.7.

7. Pressure Testing for Water Tightness. This subsection provides procedures for pressure testing for water tightness of CIPP used in the renovation of pressure pipelines. Pressure testing for water tightness shall be provided on all CIPP sections identified by the Owner in the contract documents or purchase order. A qualified Owner representative should be present during set up and testing.

A. Test Procedure.

(1) The CIPP shall be cooled down to the original ambient ground temperature, which existed before CIPP installation, prior to proceeding with the pressure test.

(2) If required by the Owner, the CIPP lined sections may be subjected to a hydrostatic pressure test in accordance with ASTM F1216, subsection c.5.C. Unless otherwise directed by the Owner, the recommended test pressure shall be two (2x) times the operating pressure, or operating pressure plus 50 psi (whichever is less), measured at the lowest point in the section being tested.

(3) The pressure test shall be conducted on each individual section after installing the CIPP and end seals, but before placement of all new appurtenances such as new connections, tees, hydrants, etc. Where services are reinstated robotically, the pressure test shall be conducted prior to performing the reinstatements. To avoid the testing of other associated piping, the side connections, corporation stops, etc. shall be capped or otherwise isolated. When sections of rehabilitated piping are reconnected with new spool pieces, ensure that all flange connections are watertight during the pressure test. *Note: The emphasis is that only renovated piping (and its appurtenances) shall be tested. Otherwise, leakage in other side piping could contribute to a leakage rate measured for the CIPP.*

(4) The pipe section to be tested shall be isolated with blind flanges or other appropriate method rated for the required test pressure. Means for temperature measurement, air release, and filling the test section with water shall be provided. The line tested shall be configured such that leakage from the ends and branch lines can be visually monitored.

(5) The ends, termination points, elbows, etc. that are removed shall be properly braced, blocked, and supported for the duration of the test. The test pressure shall not exceed the safe pressure on such fittings.

(6) The test shall be one hour in duration after the pressure has stabilized.

(7) The test section shall be filled slowly from any available water source. All air shall be expelled from the pipeline during filling. This is a very critical step of the process since trapped air will compress during pressurization giving erroneous leakage measurements. When filling the pipeline with water, all air release valves and the high elevation end of the pipeline shall be opened until a free flow of water is

visible, to release all air from the pipeline to be tested. Ensure the rate of filling does not significantly pressurize the pipeline prematurely.

If the above technique for expelling air is not sufficient, another approach may be more effective. One alternative is to push a pig through the line with the fill water behind it. This is done after each end of the test section is sealed off so the pig remains in the pipe during the pressure test. When the pipe is full and the pig reaches the far end of the test section, the air in front of the pig is bled off through a release valve in the blind flange or pressure plug at the termination end.

(8) Once the test section is filled, the specified test pressure, based on the elevation of the lowest point of the line or section under test and corrected to the elevation of the test gauge, shall be applied by means of a pump connected to the pipe in a manner satisfactory to the Owner. The test pressure shall be applied in steps, in 10 psi intervals, until the test pressure is reached. The pressure shall be held at the intermediate step(s) for a minimum of 5 minutes.

(9) A minimum stabilization period of two 2 to 3 hours (or more) is recommended, but not required, before starting the pressure test. During this time, the test pressure shall be maintained within close proximity of the required test pressure. During this stabilization period, CIPP expansion, trapped air in the pipe, fluctuation of the mean water temperature, etc., may cause erroneous readings if the pressure test is run during this period. Therefore, the required stabilization period may be considerably longer than expected for some installations. Decreasing make-up water during the stabilization period should indicate that at least one of these effects is present and is gradually being counteracted.

(10) Bleed off any air at the ends of the test section prior to beginning the test. As stated previously, the pressure test shall be for a duration of 1 hour after the stabilization period is completed. Begin the test at the required test pressure. After the 1-hour test, the amount of make-up water needed to return to the required pressure shall be quantified.

(11) After testing is completed, the elevated pressure within the test section is to be safely reduced in accordance with the test plan. When the test section is ready to be drained, the air vents specified shall be opened and the water drained from low points, at a flow-rate in accordance with the test plan. The test water shall be reused, treated, or drained to an approved waterway, after which all connections shall be closed or otherwise reinstated. Remove all temporary blinds, supports, and test connections.

B. Acceptance. The test shall require that the quantified make-up water (from subsection c.7.A.(10) above) for the one-hour test shall not exceed 20 gallons per inch diameter, per mile of pipe, per 24-hour day (20 GIDMD). The quantified make-up water for the one-hour test shall be extrapolated to the 24-hour rate for comparison purposes. Any visible leakage at termination points shall be eliminated. If not feasible or possible at the time of the test, the termination point leakage shall be kept to a minimum, collected, and then deducted from the actual make-up water rate. If the loss at test pressure exceeds the allowable, the Contractor shall endeavor to identify the source of the loss and minimize it in a manner acceptable to the Owner. Trapped air can significantly affect internal pressure and may require extensive continued testing until stabilization occurs. The pressure test for water tightness shall be deemed acceptable if that actually measured

during the 1-hour test (which has been extrapolated to a 24-hour day rate) is equal to or less than the allowable make up water rate of 20 GIDMD.

8. Disinfection/Chlorination. Once all pipe work is complete, the newly installed CIPP shall be disinfected in accordance with AWWA C651 or as directed by the Engineer.

9. Clean-Up. Upon acceptance of the installation, the Contractor shall reinstate, to original conditions, the project area affected by the operations.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay item(s):

Pay Item	**Pay Unit**
Water Main, ___ inch, CIPP Liner	Foot

Water Main, CIPP Liner of the size specified, will be measured in place by length in feet, from center to center of crosses, tees, and bends, including fittings. Payment includes providing and installing the CIPP liner. Payment also includes providing temporary water service and other materials required for proper installation. Payment also includes excavation, trenching, de-watering, placing and removing temporary sheeting and bracing as needed, support and protection for existing utilities, backfilling with approved onsite granular material, compaction, disposal of surplus earth removal, tree root protection, all work and materials required for the necessary testing, and all other work required for a complete job.

All additional work necessary for the completion of this work but not specifically listed as a pay item will be deemed included in one or more of the contract items listed in the proposal.

CITY OF FLINT

SPECIAL PROVISION
FOR
WATER MAIN CONSTRUCTION

a. Description. Water main work includes all labor, equipment, and materials necessary to complete the water main, water services, hydrants, and other related construction.

b. Materials. All materials shall be of United States manufacture. The Contractor shall direct all requests for any variances to the Engineer in writing. The manufacturer shall supply a sworn statement (certification) that all pipe, hydrant valves, fittings, gaskets, and all appropriate appurtenances furnished comply with the standards referenced in theses specifications. Catalog cuts for all materials to be installed shall be provided to the Engineer for review prior to or at the pre-construction meeting. No materials shall be installed prior to the approval of the catalog cuts by the Engineer.

1. Ductile Iron Pipe. Ductile iron pipe shall meet or exceed the requirements of ANSI/AWWA C150/A21.50-81 for zinc-coated Thickness Class 52 or 54 and ANSI/NSF Standard 61. Ductile iron pipe shall be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4. Gaskets for ductile iron pipe shall be push-on type and shall meet ANSI/AWWA C111/A21.11. One gasket per length of pipe shall be furnished. Gaskets shall be compatible with the pipe joint furnished. Gasket lubrication meeting the requirements of ANSI/AWWA C111/A21.11 shall be furnished for each gasket. ALL hydrant leads shall be ductile iron pipe.

2. The exterior of ductile iron pipe shall be coated with a layer of arc-sprayed zinc per ISO 8179. The mass of the zinc applied shall be 200 g/m2 of pipe surface area. A finishing layer topcoat shall be applied to the zinc. The coating system shall conform in every respect to IS 8179-1 “Ductile iron pipes – External zinc-based coating – Part 1: Metallic zinc with finishing layer. Second Edition 2004-06-01.

3. Polyethylene Encasement. Ductile iron water main, fittings, and appurtenances and non-copper service connections shall be encased with polyethylene in accordance with ANSI/AWWA C105/A21.5. Encasement material shall be linear low-density polyethylene film with a minimum thickness of 8 millimeters (mil).

4. Polyvinyl Chloride (PVC) Pipe. PVC pipe shall meet the requirements of ANSI/AWWA C900 for Pressure Class 305, DR14 pipe and ANSI/NSF Standards 14 and 61. All PVC pipe shall be stamped “NSF-pw” on the exterior pipe wall. PVC pipe is not allowed where it may be exposed to significant concentrations of pollutants comprised of low molecular weight petroleum products or organic solvents or their vapors. Joints shall be gasket, push-on type. Joints and gaskets shall meet the requirements of ASTM D3139 and ASTM F477. One gasket per length of pipe shall be furnished. Gaskets shall be compatible with the pipe joint furnished. Gasket lubrication shall be furnished for each gasket.

High Density Polyethylene (HDPE) – Directional Drilling Only. Pipe shall be manufactured from a PE 3608 resin listed with the Plastic Pipe Institute (PPI) as TR-The resin material will meet the specifications of ASTM D3350 with a cell classification of 34564C. Pipe shall have

a manufacturing standard of ASTM F714. Pipe shall be DR 17 (100 psi WPR) unless otherwise specified on the plans. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification form the same raw material.

5. Fittings. All fittings shall be ANSI/AWWA C110/A21.10 or C153/A21.53, mechanical joint type, and be cement-mortar lined in accordance with ANSI/AWWA C104/A21.4.

6. Mechanical Joint Bolts. Mechanical joint bolts (T-bolts) shall be high-strength, low-alloy steel meeting ANSI/AWWA C111/A21.11 requirements.

7. Mechanical Joint Restraints. Mechanical Joint Restraint shall be MJ FIELD LOK® Gasket or devices that consist of multiple gripping wedges incorporated into a follower gland meeting the applicable requirements of ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11. The gripping wedges shall have individually actuated wedges with torque limiting twist off nuts. Gland body, wedges, and wedge actuating components shall be ductile iron conforming to ASTM A536.

8. Ductile iron pipe mechanical joint restraints shall have a working pressure rating of 350 psi and be EBAA Iron Megalug Series 1100, Uni-Flange Series UFR 1400, or Engineer approved equal.

9. PVC Pipe mechanical joint restraints shall meet the requirements of ASTM F1674 and have a working pressure rating of 200 psi. PVC joint restraints shall be EBBA Iron Series 2000PV, Uni-Flange Series UFR 1500-C, or Engineer approved equal.

10. MJ FIELD LOK® Gasket. The restraint system shall be completely integral to the gasket, requiring only standard mechanical joint assembly techniques. The restraining system for ductile iron shall be pressure rated to 350 psi. The restraining system for PVC shall be rated at a 2:1 safety factor for the pipe on which it is installed. The restraining system shall be rated in accordance with the performance requirements of ANSI/AWWA C111/A21.11 Rubber Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

11. Pipe Bell Restraints. Ductile iron pipe bell restraint shall be locking gasket or devices that consist of a restraint ring on the spigot joined to a ring behind the bell. The restraint ring shall have individually actuated wedges with torque limiting twist off nuts. Bell restraint rings and wedging components shall be made of ductile iron conforming to ASTM A536. Connecting tie rods shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11. The assembly shall have a rated pressure of 350 psi. Ductile iron bell restraint shall be the EBAA Iron Series 1700 Megalug restraint harness, Uni-Flange Series UFR 1450, or Engineer approved equal.

12. Locking Gasket. Locking gaskets for ductile iron pipe shall be a boltless, integral restraining system and shall be rated for 350 psi in accordance with the performance requirements of ANSI/AWWA C111/S21.1. Gaskets for TYTON® joints shall be Field Lok 350 manufactured by U.S. Pipe. Gaskets for American, pipe shall be Fast-Grip® manufactured by American Cast Iron Pipe Co.

PVC pipe bell restraint devices shall meet the requirements of ASTM F1674 and consist of split serrated rings to grip behind the pipe bell and on the connecting pipe. The restraint shall be manufactured of ductile iron conforming to ASTM A536. Connecting tie rods shall be made of low alloy steel that conforms to ANSI/AWWA C111/A21.11. The assembly shall

have a minimum working pressure rating of 200 psi. The restraint shall be the EBAA Iron Series 1500, Uni-Flange Series UFR 1390-C, or Engineer approved equal.

13. HDPE Fittings. Butt Fusion Fittings: Fittings shall be PE3608 HDPE, minimum cell classification of 345464C as determined by ASTM D3350. Molded fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans. Fabricated fittings are to be manufactured using a Data Logger. Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

14. Electrofusion Fittings: Fittings shall be PE3608 HDPE, minimum cell classification of 345464C as determined by ASTM D3350. Electrofusion fittings shall have a manufacturing standard of ASTM F1055. Fittings shall have the same pressure rating as the pipe unless otherwise specified on the plans.

15. Hydrants. Hydrants shall conform to ANSI/AWWA C502. Hydrants shall be Mueller Super Centurion BR-250 with the following:

5'-6" bury
OPEN VALVE CLOCKWISE
5-1/4" valve opening
Mechanical joint inlets with accessories
7/8" square operating nut (top nut) Nozzle caps shall have 7/8" square nuts
One 4-1/2" pumper nozzle (facing curb or pavement) Two 2-1/2" hose nozzles
Hose nozzles shall be national standard fire hose coupling thread
Drains shall be open before installation
O-ring seals
Hydrants shall be painted YELLOW above the ground line
Hydrant caps shall be color coded per Standard Detail SD-1W

16. Gate valves. Gate valves shall be resilient seated gate valves, mechanical joint on both ends, 2-inch square operating nut, O-ring seals, and **open right**. Valves shall conform to ANSI/AWWA C509 or C515 and be supplied with accessories. Valves shall be CLOW R/W, Kennedy Kenseal R/W, US Pipe Metroseal 250 R/W, East Jordan Iron Works Flowmaster, or American Flow Control Series 2500. American AVK Series 25 may be used for hydrant leads.

17. Tapping Valves. Tapping valves shall be resilient seated gate valves with mechanical joint on one end and flange with alignment ring on the other end. Tapping valves shall accommodate a full-size shell cutter. Valves shall have 2-inch square operation nut, O-ring seals, and **open right**. Valves shall conform to ANSI/AWWA C509 or C515 and be supplied with accessories. Valves shall be CLOW R/W, Kennedy Kenseal R/W, US Pipe Metroseal 250 R/W, East Jordan Iron Works Flowmaster or American Flow Control Series 2500.

18. Tapping Sleeves. Tapping sleeves, nuts, bolts, and lugs shall be 304 stainless steel. Lugs shall be of extra-heavy gauge construction, welds must be fully passivated to ensure maximum corrosion protection, sleeves shall have full circle virgin SBR or neoprene gasket in accordance with ASTM D2000 with 360 degrees of sealing surface, and flanges shall be recessed for tapping valve alignment. Sleeves shall be Powerseal 3490, Ford FTSS, Romac SST III, or JCM 432.

19. Valve Boxes. Valve boxes shall be buffalo-type complete, 5¼-inch shaft, screw-type with #6 base. Sleeves shall be Tyler 6860 series, Item D or Bibby 45 to 66 inches extension, or Bingham & Taylor (B&T) Figure No. 4906, size D. Lids shall be marked "WATER."

20. Service Lines. Water service connections shall be ASTM-B88 Type-K soft temper copper.

21. Corporation Stops. Corporation stops for copper service pipes shall conform to ANSI/AWWA C800 with AWWA corporation stop inlet threads and outlet external threads for use with flared copper pipe (no compression types). Corporation stops shall be Mueller Company (H-15000), McDonald (4701), or Ford Meter Box (F-600).

22. Service Saddles. Service saddles for 2 inches and smaller service connections to PVC water pipe shall conform to ANSI/AWWA C800. Saddles shall be cast brass construction with internal threads compatible with AWWA corporation stop inlet threads. O-ring gasket shall be EPDM rubber conforming to ASTM D2000. The saddle shall provide full support around the circumference of the pipe. Service Saddles shall be Mueller Company (BR2B), McDonald (3805), or Ford Meter Box (S90).

23. Curb Stops (Service Stops). Curb stops for copper service pipe shall conform to ANSI/AWWA C800 with threading for use with flared copper pipe (no compression types). Curb stops shall be Mueller (B-25204), McDonald (6100), or Ford Meter Box (ball valve B22).

24. Service Boxes (Curb Stop Boxes). Curb boxes shall be buffalo-type complete, screw-type 2½-inch shaft, extension 41 to 64 inches, Tyler 6500 series, Item 95E, or Bibby 95E or B&T Figure No. 4901, Size 94F with Figure No. 4901-A old-style top and cover. Lids shall be marked "WATER."

25. Cast Couplings. Cast coupling shall be Rockwell 441, Power Seal System 3503, Dresser Style 253, or Dresser Hymax.

c. Installation. Ductile iron water main pipe shall be installed in accordance with ANSI/AWWA C600, "Installation of Ductile Iron Water Mains and Their Appurtenances." PVC water main pipe shall be installed in accordance with ANSI/AWWA C605, "Underground Installation of Polyvinyl Chloride (PVC) Pressure Pipe and Fittings for Water". Additional requirements are as indicated on the construction drawings and standard details, and as specified herein.

1. Laying Pipe. Pipe shall be laid to line and grade and shall have bearing over its entire length except at joints where joint holes shall be of such size as to give adequate room for working. Depth of excavation shall be such as to give between 5 feet and 6 feet of cover over the pipe. The bottom of the trench shall be excavated to the required grade so that the pipe shall have a full 4 inches of bedding. Where pipe is being laid in future streets, the depth of excavation shall be sufficient to provide a minimum of 5½ feet of cover below established grades as indicated on the drawings.

2. Temporary Plugs. Plugs with watertight seals shall be installed to keep water, sand, mud, animals, etc. out of newly installed water pipe. A plug shall be placed into the open end of each pipe section as it is installed into the trench and shall remain in place until immediately before the next section of pipe is connected to it. Non-pressure plugs with rubber gaskets shall be as manufactured by Plug-It Products, Taylor Made Plastics, or other

plug acceptable to the Engineer.

3. Isolation. The new water main shall be kept isolated from the active distribution system using a physical separation (see standard detail drawing) until satisfactory bacteriological testing has been completed and the disinfectant water flushed out. Water required to fill the new main for hydrostatic pressure testing, disinfection, and flushing shall be supplied through a temporary connection between the distribution system and the new main. The temporary connection shall include an appropriate cross-connection control device consistent with the degree of hazard and shall be disconnected (physically separated) from the new main during the hydrostatic pressure test. It will be necessary to re-establish the temporary connection after the completion of the hydrostatic pressure test to flush out the disinfectant water before final connection of the new main to the distribution system.

4. Insulation. Where water and sewer are approximately the same elevation, the water shall pass over the sewer where possible. If in going over sewers, the minimum required cover cannot be maintained, 2-inch by 4-foot by 8-foot Styrofoam insulation shall be used. The inspector will provide needed instructions. Cost of insulation and installation shall be included in cost of water main installation.

5. Separation of water mains and storm and sanitary sewers shall meet Michigan Department of Public Health recommendations as outlined in the Recommended Standards for Water Works.

A. Parallel Installation. Water main shall be laid at least 10 feet horizontally from any existing or proposed sewer. The distance shall be measured edge to edge. In cases where it is not practical to maintain a 10-foot separation, the reviewing authority may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a sewer, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the sewer at such an elevation that the bottom of the water main is at least 18 inches above the top of the sewer.

B. Crossings. Water mains crossing sewers shall be laid to provide a minimum vertical distance of 18 inches between the outside of the water main and the outside of the sewer. This shall be the case where the water main is either above or below the sewer. At crossings, one full length of water pipe shall be located so both joints will be as far from the sewer as possible. Special structural support for the water and sewer pipes may be required.

C. Exception. The reviewing authority must specifically approve any variance from the above requirements when it is impossible to obtain the specified separation distances. Where sewers are being installed and these requirements cannot be met, the sewer materials shall be water pipe or equivalent and shall be pressure tested to ensure water tightness.

D. Force Mains. There shall be at least a 10-foot horizontal separation between water mains and sanitary sewer force mains. There shall be an 18-inch vertical separation of crossings as required above.

E. Sewer Manholes. No water pipe shall pass through or come in contact with any part of a sewer manhole.

6. Joints. Push-on joints shall be used and installed in strict accordance with the manufacturer's specifications.

7. Mechanical Restraints for 12-inch and Smaller Pipe. All tees, bends, dead ends, reducers, valves and hydrant watch valves, and hydrants for water main 12 inches and smaller are to be restrained by mechanical joint retainer glands, bell restraint harnesses, or locking gaskets. Restrained lengths shall be a minimum of 2 pipe lengths on either end of all appurtenances including connection to HDPE directional drill piping. Other methods of restraint shall be only as authorized by the Engineer and may include the following:

A. Thrust blocks (poured against undisturbed earth with concrete. No precast blocks).

B. Tie rod joint restraints using Duc-lugs or 3/4-inch Corten Steel Anchor Eyebolts. Two restraints per joint are required for 4-inch through 8-inch pipe. Four restraints per joint are required for 10- and 12-inch pipe.

8. Thrust Blocks for Pipe Larger than 12 inches. All tees, bends, and dead ends for water main larger than 12 inches are to be restrained by thrust blocks. Thrust blocks shall be concrete (no precast) having a compressive strength of 3,000 psi at 28 days, placed between the pipe and undisturbed earth of the trench wall. Exposed bolts and/or flanges shall not be covered with concrete. Concrete shall extend from the bottom of the trench to the top of the pipe within the limits of laying length of the fitting. Thrust block dimensions shall be as specified on the Standard Water drawings.

9. Polyethylene Encasement of Ductile Iron Pipe. The polyethylene encasement shall prevent contact between the pipe and the surrounding backfill and bedding material, but is not intended to be a completely airtight or watertight enclosure. All lumps of clay, mud, cinders, etc., on the pipe surface shall be removed before installation of the polyethylene encasement. During installation, care shall be exercised to prevent soil or embedment material from becoming trapped between the pipe and the polyethylene. The polyethylene film shall be fitted to the contour of the pipe to affect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack shall be provided in contouring to prevent stretching the polyethylene where it bridges irregular surfaces, such as bell-spigot interfaced, bolted joints or fittings, to prevent damage to the polyethylene due to backfilling operations. Overlaps and ends shall be secured with adhesive tape, string, or any other material capable of holding the polyethylene encasement in place until backfilling operations are complete.

For installations below the water table, both ends of the polyethylene tube shall be sealed as thoroughly as possible with adhesive tape at the joint overlap.

Installation of polyethylene encasement shall be in accordance with ANSI/AWWA C105, Method A, and as described below unless otherwise authorized by the Engineer.

A. Cut polyethylene tube to a length approximately 2 feet longer than the pipe section. Slip the tube around the pipe, centering it to provide a 1-foot overlap on each adjacent pipe section, and bunching it accordion fashion lengthwise until it clears the pipe ends.

Lower the pipe into the trench and make up the pipe joint with the preceding section of pipe. A shallow bell hole must be made at joints to facilitate installation of the polyethylene tube.

After assembling the pipe joint, make the overlap of the polyethylene tube. Pull the bunched polyethylene from the preceding length of pipe, slip it over the end of the new length of pipe and secure it in place. Then slip the end of the polyethylene from the new pipe section over the end of the first wrap until it overlaps the joint at the end of the preceding length of pipe. Secure the overlap in place. Take up the slack width at the top of the pipe to make a snug, but not tight, fit along the barrel of the pipe, securing the fold at the quarter points.

Any cuts, tears, punctures, or other damage to the polyethylene shall be repaired as described herein. Proceed with installation of the next section of pipe in the same manner.

B. Pipe-shaped Appurtenances. Cover bends, reducers, offsets, and other pipe-shaped appurtenances with polyethylene in the same manner as the pipe.

C. Odd-shaped Appurtenances. When it is not practical to wrap valves, tees, crosses, and other odd-shaped pieces in a tube, wrap with a flat sheet of split length of polyethylene tube by passing the sheet under the appurtenance and bringing it up around the body. Make seams by bringing the edges together, folding over twice and taping down. Handle width and overlaps at joints as described above. Tape polyethylene securely in place at valve stem and other penetrations.

D. Repairs. Repair any cuts, tears, punctures, or damage to the polyethylene with adhesive tape or with a short length of polyethylene sheet or a tube cut open, wrapped around the pipe to cover the damaged area and secured in place.

E. Openings in Encasement. Provide openings for branches, service taps, blowoffs, air valves, and similar appurtenances by making an x-shaped cut in the polyethylene and temporarily folding back the film. After the appurtenance is installed, tape the slack securely to the appurtenance and repair the cut, as well as any other damaged areas in the polyethylene with tape. Service taps may also be made directly through the polyethylene with any resulting damaged areas being repaired as described above.

F. Junctions Between Wrapped and Unwrapped Pipe. Where polyethylene wrapped pipe joins an adjacent pipe that is not wrapped, extend the polyethylene wrap to cover the adjacent pipe for a distance of at least 3 feet. Secure the end with circumferential turns of tape.

G. Service lines of dissimilar metals shall be wrapped with polyethylene or a suitable dielectric tape for a minimum clear distance of 3 feet away from the ductile iron pipe.

H. Exercise care to prevent damage to the polyethylene wrapping when placing backfill. Backfill material shall be free from cinders, refuse, boulders, rocks, stones, or other material that could damage polyethylene.

10. Fire Hydrants. All hydrants shall stand plumb and shall have their nozzles parallel with or at right angles to the curb, with the pumper nozzle facing the curb, except that the hydrants having two-hose nozzles 90 degrees shall be set with each nozzle facing the curb

at an angle of 45 degrees.

A. Set to Grade. Hydrants shall be set to the established grade, with the center of the lowest nozzle at least 18 inches above the ground. The lowest nozzle shall be installed away from the curb line at a sufficient distance to avoid damage from or to vehicles. Traffic model hydrants shall be installed so that the breakaway flange is not less than 2 inches nor more than 6 inches above the established grade. Any fittings used to set the hydrant to grade shall be included in the unit price bid for hydrant installation.

B. Hydrant Valve. Each hydrant shall be connected to the main with a 6-inch diameter branch controlled by an independent valve, unless otherwise specified. The valve shall be restrained to allow shutoff when the hydrant is to be removed.

C. Drainage. When a hydrant is set, drainage shall be provided at the base of the hydrant by placing coarse gravel or crushed stone mixed with coarse sand from the bottom of the trench to at least 6 inches above the drain port opening in the hydrant and to a distance of one foot around the elbow. Where ground water rises above the drain port or when the hydrant is located in contaminated soils or when the hydrant is located within 10 feet of a sanitary or storm sewer main, the drain port shall be plugged.

D. Backfill. All backfill within the influence of the road shall be Michigan Department of Transportation (MDOT) Class II, compacted to 95 percent maximum density in accordance with Standard Detail SD-7W.

11. Valve and Fitting Installation.

A. Prior to installation, valves shall be inspected for direction of opening, number of turns to open, freedom of operation, tightness of pressure containing bolting and test plugs, cleanness of valve ports, and especially seating surfaces, handling damage, and cracks. Defective valves shall be marked and held for disposition as required. All bolts and nuts, with the exception of seat adjusting bolts or screws in butterfly valves, shall be checked for proper tightness. Seat adjusting bolts in butterfly valves shall be adjusted only on the recommendation from the manufacturer.

B. Placement. Valves, fittings, plugs, and caps shall be set and joined at the pipe according to ANSI/AWWA C600 or ANSI/AWWA C605, as applicable. Valves connecting to PVC pipe and all valves 12 inches or larger shall be provided with special support, such as crushed stone, concrete pads, or a sufficiently tamped trench bottom so that the pipe will not be required to support the weight of the valve. Valves shall be installed in the closed position.

C. Drainage Branches and Blowoffs. Mains shall be drained through drainage branches or blowoffs. Drainage branches, blowoffs, and appurtenances shall be provided with control valves and shall be located and installed as indicated on the drawings. Drainage branches or blowoffs shall not be directly connected to any storm or sanitary sewer, submerged in any stream, or be installed in any manner that will permit a back siphonage into the distribution system.

D. Vents. Air-release of vacuum vents shall be provided at high points in the line and in areas of potential negative pressure. The air release or vacuum vents shall not be connected to any storm or sanitary sewer and they shall be protected from freezing.

E. Valve Box. A valve box shall be provided for every valve that has no gearing or operating mechanism, or in which the gearing or operating mechanism is fully protected with a gear case. The valve box shall not transmit shock or stress to the valve. The valve box shall be centered over the operating nut of the valve with the box cover flush with the surface of the finished area or another level as specified.

F. Valve Vault. A vault designed to prevent settling on the pipe shall be provided for every valve that has exposed gearing or operating mechanisms. The operating nut shall be readily accessible for operation through the opening in the valve vault. The opening shall be set flush with the surface of the finished pavement or another level as specified. Vaults shall be constructed to permit minor valve repairs and to protect the valve and pipe from impact where they pass through the vault walls.

G. Plugs and Caps. All dead ends on new mains shall be closed with plugs or caps that are suitably restrained to prevent blowing off under test pressure. If a blowoff valve precedes the plug or cap, it too shall be restrained against blowing off. All dead ends shall be equipped with suitable blowoff or venting devices.

H. Valve Manholes (Gatewells). Gatewells (gate valve in manhole) and well structures (check valve in manhole) shall be built in accordance with the details and at the locations shown on the plans and in accordance with the applicable portions of section 403 of the MDOT 2012 Standard Specifications for Construction, and as specified in this Special Provision.

Manhole bottoms shall be of "Class A" concrete floated smooth. Sidewalls shall be of brick or manhole blocks. Brick or block shall be laid with the long dimension radially in the manhole. Every brick or block shall have full mortar joints on the bottom and sides, which shall be formed at one operation by placing sufficient mortar on the bed and forcing the brick or block into it. Horizontal joints shall not exceed ¾-inch except for exterior joints in the domed portion of the manhole and the vertical joints on the inside of the manhole are built up. Brick or block manholes shall be plastered on the outside with a 2-inch coat of mortar. Mortar used for masonry work shall only be mixed in quantities which are immediately useable. Any mortar which is set sufficiently to require retempering shall not be used. When the manhole is completed, cast iron ring and cover are to be set in place to line and grade.

If the Contractor is approved to use precast manholes, the gatewell shall be in accordance with section 403 of the MDOT 2012 Standard Specifications for Construction, and as shown on the plans. Where Contractor is approved to use precast manhole components, it shall be the Contractor’s responsibility to order manhole components with proper pipe hole location and orientation and Contractor accepts all costs for re-ordering new components and disposition of unacceptable components.

12. Backfilling. After the water line has been properly positioned for grade and horizontal alignment, the trench shall be backfilled in accordance with the following described methods.

A. Pipe Bedding and Initial Backfill. Pipe bedding and initial backfill shall be performed to properly set the pipe. Bedding shall conform to details indicated on the drawings and as specified herein. Pipe laid in sandy soils will be bedded with hauled-in Class IIIA granular material or approved on-site material. Pipe laid in a rocky, dry trench will be bedded with Class IIIA granular material. Use coarse aggregate 6A as directed

by the Engineer for bedding pipe in unstable soil conditions. The Engineer reserves the right to use alternate pipe bedding.

Initial backfill to 12 inches above the pipe shall be with Class IIIA granular material or approved onsite material. The Contractor shall take all necessary actions and precautions to ensure that initial backfill is properly placed around the pipe, especially from the spring line of the pipe to the bottom of the trench. This shall be accomplished to the satisfaction of the Engineer. Initial backfill shall be compacted to a minimum of 90 percent of the maximum unit weight.

B. Final Backfilling. After proper pipe bedding and initial backfill, the Contractor shall begin final backfill operations. Backfill shall be accomplished by placing layers, 12 inches maximum, of the appropriate backfill material in the excavation and compacting.

Trenches under road surfaces, pavement, curb, driveway, sidewalk, and within their zone of influence shall be backfilled with Class II granular material. Compaction shall be by the controlled-density method or other effective means and shall be a minimum of 95 percent of the maximum unit weight. Other trenches may be backfilled with suitable onsite material and compacted to a minimum of 90 percent of its unit weight.

Wherever utilities cross the trench, the backfill material shall be thoroughly compacted for the full depth beneath such pipe and a stone-free sand cushion tamped under and around the pipe a minimum of 12 inches measured in any direction.

Stones exceeding 6 inches in diameter, logs, stumps, and other debris shall not be allowed in the backfill material in the roadway or within 6 inches of the pipe. Muck or other unstable organic soils which may be encountered in excavation shall be hauled and disposed of and the Contractor shall furnish sufficient approved material to complete the backfill as required.

C. Granular Material. Granular material which is encountered in the excavated material may be used for the required MDOT Class II granular material if approved by the Engineer. The use of such material shall not be allowed without prior approval of the Engineer.

13. Damaged Materials. Any pipe, manholes, valves boxes, stop boxes, or structures which are damaged during construction shall be replaced by the Contractor at no expense to the Owner.

14. Salvaged Materials. Old fire hydrants removed as part of the work that will not be re-used shall remain city property and be set aside for pickup by the City of Flint Water Department. The Contractor shall exercise caution during removal to avoid damage to the hydrant and remove the head, barrel, and foot piece intact in one piece.

15. Connecting to Existing Water Lines. The Contractor shall make connections to existing water lines as indicated on construction drawings. <u>All new water system mains shall be constructed, backfilled, pressure tested, chlorinated, and approved by the Engineer, and water tests shall be taken and approved for potable use by the Michigan Department of Environmental Quality or the City of Flint Water Department prior to connecting the new system mains to existing water distribution mains.</u> Temporary connections for filling, chlorinating, and testing new mains shall be as specified herein and shown on the drawings.

16. Notification Prior to Shutting Off Water. Where water main construction under this contract requires shutting off water supply in existing mains supplying residents, the Contractor shall provide advance notice to the Owner and to all residents who will be affected. Residents and businesses shall be notified at least 24 hours prior to shutting off the water supply. Facilities with critical water needs may require more advance notice. Water supply shall not be shut off until approved by the Engineer. If faulty valves or other unforeseen conditions require expanding the area of shut off, the shut off shall be delayed until proper notification is provided. Delays will not be cause for extra compensation to the Contractor. Water supply shut off shall be limited to a period of not longer than four hours between 8 a.m. and 6 p.m. and this period shall be selected for the time of day which will least affect the residents and businesses. Other restrictions may be specified elsewhere in the contract documents. The Contractor shall be required to maintain an adequate water supply at all times (except as described above for brief periods) to all residents adjacent to the project, and change over to new mains or services shall be coordinated to eliminate any long periods for residents without water.

17. Filling New Water Main. Provision shall be made to fill the main at a proper rate of approximately 1 foot per second. Air shall be bled off the water main prior to testing. Unless approved otherwise, this will require one-inch corporations and bypass at main line valves. Tap and materials required to install 1-inch corporations shall be included in the cost of construction.

18. Service Connections. Minimum size shall be 1 inch. Water service connections shall be constructed with a minimum of 5 feet cover, at right angles to water main between main and curb stop, and as close as possible to the existing service that is being replaced. Where obstructions (e.g., trees) make open cut installation impractical or when directed by the Engineer, the service shall be installed by boring.

A. Service Taps. Service taps should be located at 10 o'clock or 2 o'clock on the circumference of the pipe. Service taps on ductile iron pipe may be screwed directly into the tapped and threaded main without any additional appurtenances.

B. All service taps on PVC pipe shall utilize a tapping saddle (NO DIRECT TAPS). The equipment and procedures specified in ANSI/AWWA C605 for saddle tapping shall be followed.

C. Service Taps in Polyethylene Encasement. Service taps may be accomplished by making an x-shaped cut in the polyethylene encasement and temporarily folding back the film. After the tap has been completed, cuts in the polyethylene and any other areas of damage to the film shall be repaired with tape as described in ANSI/AWWA C105/A21.5. Direct service taps may also be made through the polyethylene, with any resulting damaged areas being repaired as described previously. The preferred method of making direct service taps consists of applying two or three wraps of polyethylene adhesive tape completely around the pipe to cover the area where the tapping machine and chain will be mounted. After the direct tap is completed, the entire circumferential area should be closely inspected for damage and repaired if needed.

D. Disinfecting Service. Prior to connecting customer's service line to curb stop, the service in the street right-of-way shall be flushed and filled with a 200 milligrams/liter (mg/L) (200 parts per million (ppm)) minimum chlorine solution. Solution shall stand for a minimum of one hour after which time the service shall be flushed free of chlorine solution. A sample will then be taken by the Water Department after which the curb stop

shall be installed, if not already in place, and the customer's service shall be reinstated.

E. Backfill. The service shall be bedded with Class IIIA granular material and backfilled with Class II granular material or approved onsite material. Backfill under road surfaces, curb, driveways, or sidewalk or within their zone of influence shall be compacted to 95 percent of the maximum unit weight. Other trenches shall be backfilled with suitable onsite material and compacted to a minimum of 90 percent of its maximum unit weight.

19. Directional Drilling.

A. Prior to beginning work, the Contractor must submit to the Engineer a work plan and, Engineer sealed, design detailing the procedure and schedule to be used to execute the project. The design shall include all design considerations, calculations, details including thrust restraints, and/or thrust collar for longitudinal expansion and contraction, mainline water main connection details and any other information necessary to complete the work. The work plan shall include a description of all equipment to be used, down-hole tools, a list of personnel and their qualifications and experience list of subcontractors, a schedule of work activity, a safety plan traffic control plan (if applicable), an environmental protection plan and contingency plans for possible problems. Work plan shall be comprehensive, realistic and based on actual working conditions for the project. Plan shall document the thoughtful planning required to successfully complete the project. All drilling fluids and loose cuttings shall be contained. No fluids shall be allowed to enter any unapproved areas or natural waterways. Upon completion of the directional drill project, all excess drilling fluid, drilling spoils, and other material shall be removed by the Contractor.

B. Contractor shall submit specifications on directional drilling equipment to be used to ensure that the equipment will be adequate to complete the project. Equipment shall include but not be limited to: drilling rig, mud system, mudmotors (if applicable), down-hole tools, guidance system and rig safety systems. Calibration records for guidance equipment shall be included. Specifications for any drilling fluid additives that Contractor intends to use or might use will be submitted.

C. Specifications on material to be used shall be submitted to Engineer and material shall include the pipe, fittings, drilling mud, drilling additives, and any other item which is to be an installed component of the project or used during construction.

D. Work site as indicated on drawings, within right-of-way, shall be graded or filled to provide a level working area. No alterations beyond what is required for operations are to be made. Contractor shall confine all activities to designated work areas.

E. Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If Contractor is using a magnetic guidance system, drill path will be surveyed for any surface geo-magnetic variations or anomalies.

F. Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway, or other area designated for such protection by contract documents or state, federal, and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable

environmental regulations. Fuel or oil may not be stored in bulk containers within 200 feet of any water-body or wetland.

G. Pipe shall be welded/fused together in one length. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe.

H. Pilot hole shall be drilled on bore path with no deviations greater than 5 percent of depth over a length of 100 feet. In the event that pilot does deviate from bore path more than 5 percent of depth in 100 feet, Contractor shall notify A/E, and A/E may require Contractor to pull-back and re-drill from the location along bore path before the deviation.

I. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, Contractor shall cease operations and shall discuss corrective options with the Engineer, work shall then proceed accordingly.

J. Upon approval of the pilot hole location by the Engineer, the hole enlarging or back reaming phase of the installation shall begin. The borehole diameter shall be increased to accommodate the pullback operation of the required size of PE pipe. The type of back reamer to be utilized in this phase shall be determined by the types of subsurface soil conditions that have been encountered during the pilot hole drilling operation. The reamer type shall be at the Contractor's discretion with the final hole diameter being a maximum of 20 percent larger than the outside diameter of the product pipe being installed in the borehole.

K. The open borehole may be stabilized by means of bentonite drilling slurry pumped through the inside diameter of the drill pipe and through openings in the reamer. The slurry will also serve as an agent to carry the loose cuttings to the surface through the annulus of the borehole. These cuttings and bentonite slurry are to be contained at the exit hole or entry side of the directional bore in pits or holding tanks. The slurry may be recycled at this time for reuse in the hole opening operation or it shall be hauled by the Contractor to an approved dump site and properly disposed. A complete list of all drilling fluid additives and mixtures to be used in the directional operation will be submitted to the A/E along with their respective material safety data sheets.

L. Excess pipe shall be removed and the bore hole associated with this excess pipe shall be filled with flowable fill or grout, unless the area of the excess pipe is excavated and backfilled as part of the tie-in operations.

d. Hydrostatic Testing. Hydrostatic testing shall be performed in accordance with ANSI/AWWA C600 (Ductile Iron pipe) or ANSI/AWWA C605 (PVC pipe), and as specified herein.

1. Test Restrictions. Test pressure shall not be less than 150 psi at the highest point along the test section. Test pressure shall not exceed pipe or thrust-restraint design pressures. The hydrostatic test shall be of at least a two-hour duration. Test pressure shall not vary by more than ±5 psi for the duration of the test. Valves shall not be operated in either direction at a differential pressure exceeding the rated valve working pressure. The test setup should include a provision, independent of the valve, to reduce the line pressure to the rated valve pressure on completion of the test. The valve can then be opened enough to equalize the trapped pressure with the line pressure, or the valve can be fully

opened if desired. The test pressure shall not exceed the rated pressure of the valves when the pressure boundary of the test section includes closed, resilient-seated gate valves, or butterfly valves.

2. Pressurization. After the pipe has been laid, all newly-laid pipe or any valved section thereof shall be subjected to a hydrostatic pressure of at least 150 psi at the point of testing. Each valve section of pipe shall be slowly filled with water, and the specified test pressure shall be applied using a pump connected to the pipe. Valves shall not be operated in either the opened or the closed direction at differential pressures above the rated pressure. The system should be allowed to stabilize at the test pressure before conducting the hydrostatic test.

3. Air Removal. Before applying the specified test pressure, air shall be expelled completely from the section of piping under test. If permanent air vents are not located at all high points, corporation cocks shall be installed at these points to expel air as the line is filled with water. After the air has been expelled, the corporation cocks shall be closed and test pressure applied. At the conclusion of the pressure test, the corporation cocks shall be removed and the pipe plugged or left in place as required.

4. Examination. Any exposed pipe, fittings, valves, hydrants, and joints shall be examined carefully during the test. Any damage or defective pipe, fittings, valves, hydrants, or joints that are discovered following the pressure test shall be repaired or replaced with reliable material, and the test shall be repeated until satisfactory results are obtained.

5. Testing Allowance Defined. Testing allowance shall be defined as the quantity of makeup water that must be supplied into the newly-laid pipe or any valved section thereof to maintain pressure within 5 psi of the specified test pressure after the pipe has been filled with water and the air has been expelled. Testing pressure shall not be measured by a drop in pressure in a test section over a period of time.

6. Testing Allowance. No pipe installation will be accepted if the amount of makeup water is greater than that determined by the following formula:

Where:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

L = testing allowance (makeup water), in gallons per hour
S = length of pipe section tested, in feet
D = nominal diameter of the pipe, in inches
P = average test pressure during the hydrostatic test, in pounds per square inch (gauge)

7. Hydrants in Test Section. When hydrants are in the test section, the test shall be made against the main valve in the hydrant.

8. Acceptance. Acceptance shall be determined on the basis of testing allowance. If any test of laid pipe discloses a testing allowance greater than that specified, repairs or replacements shall be accomplished. After this work has been done, the tests shall be repeated. Final acceptance of the lines will not be made until satisfactory tests are obtained.

e. Disinfection and Testing of Water Main. Water mains shall be disinfected and pass bacteriological test prior to hydrostatic testing. All pressure testing and disinfection of water mains shall be in accordance with these specifications, and shall be included in the cost of construction.

The effectiveness of disinfection depends, in large measure, on maintaining clean pipes and avoiding major contamination during construction. Therefore, it is strongly recommended that sanitary practices be used for handling and installing pipe, valves, fittings, and accessories.

The interiors of pipes, fittings, and valves shall be protected from contamination. Pipe delivered for construction shall be strung to minimize the entrance of foreign material. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or for other reasons, such as rest breaks or meal periods. Rodent proof plugs may be used when watertight plugs are not practicable and when thorough cleaning will be performed by flushing or other means.

1. The Flint Water Department will disinfect the water main and appurtenances using the continuous feed method outlined in ANSI/AWWA C651. Either calcium hypochlorite (HTH) containing 65 percent available chlorine by weight or liquid sodium hypochlorite containing approximately 10 percent available chlorine, conforming with ANSI/AWWA B300, will be used for disinfection.

2. The Contractor shall provide all hoses and personnel needed to flush the mains in a manner that is safe and will not damage adjacent property. The Contractor shall not operate any existing valve. Water Department personnel will control water flow with assistance from the Contractor.

3. Disinfectant Procedures.

A. Place 4 ounces minimum (½ cup) of HTH granules in each length of pipe as it is installed (optional).

B. Fill the main and appurtenances, including hydrants, with water from the distribution system through corporations at a rate of approximately 1 foot per second as follows:

Nominal Pipe Size Size (inches)	Rate (gallons per minute)
6	80
8	160
12	360
16	640

Note: The existing distribution system shall be protected from backflow caused by hydrostatic pressure tests and disinfection procedures. The Contractor shall commence filling the main before 9 a.m.

C. Allow a minimum of two hours contact time with the HTH in the new main (if Step A is used).

D. With assistance from the Water Department, flush the main at a minimum velocity of 3.0 feet per second.

E. Chlorinate the main and appurtenances, including hydrants, using the "continuous feed method" as follows:

Water from the existing distribution system or other approved source shall be made to flow at a constant metered rate into the new main at a point not more than 10 feet downstream from the beginning of the new main.

Water entering the main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 50 mg/L (50 ppm) free chlorine. Chlorine concentration will be measured by the Water Department at regular intervals using appropriate chlorine test kits or other approved method to ensure even distribution throughout the main.

(1) The chlorinated water shall be retained in the main for at least 24 hours during which time valves and hydrants shall be operated to ensure disinfection at the end of this 24-hour period.

(2) The treated water in all portions of the main after the 24-hour period shall have a residual of not less than 10 mg/L (10ppm) free chlorine.

4. Flushing Chlorinated Water. Heavily chlorinated water shall be flushed from the main and appurtenances until the chlorine measurements in the water leaving the main is absent or no higher than that normally maintained in the distribution system. Disposal of chlorinated water during flushing operations shall conform with AWWA Standard C655 (Field Dechlorination).

5. Bacteriological Samples. After the satisfactory chlorination of the mains has been completed as described above, the chlorinated water flushed out and the mains filled with potable water, the Water Department will take for analysis two consecutive bacteriological samples of the water in the mains, 24 hours apart. If the analysis of the samples shows the water to be non-potable as a result of unsatisfactory disinfection of the mains, the mains shall be re-chlorinated at the Contractor's expense until satisfactory samples are obtained.

f. Final Connections to Existing Mains. Water mains and appurtenances must be completely installed, flushed, disinfected, and have satisfactory bacteriological sample results received before permanent connections are made to the active distribution system. Sanitary construction practices shall be followed during installation of the final connection so that there is no contamination of the new or existing water main with foreign material or groundwater.

1. Disinfection of Fittings and Pipe Used for Connection. The new pipe, fittings, and valves required for the connections may be spray-disinfected or swabbed with a minimum of 1 percent to 5 percent solution of chlorine just prior to being installed if the total length of the connection from the end of a new main to the existing main is equal to or less than 18 feet. If the length is greater than 18 feet, the pipe required for the connection must be set up above ground, disinfected and bacteriological samples taken as described in the disinfection section above. After satisfactory bacteriological sample results have been received for the "pre-disinfected" pipe, the pipe can be used in connecting the new main to the active distribution system. Between the time the satisfactory bacteriological sample results are received and the time that the connection piping is installed, the ends of the piping must be sealed with plastic wrap, watertight plugs, or caps.

2. Flushing. To assure complete removal of foreign materials that might have entered the main during the course of the installation, the new water main shall be thoroughly

flushed following connection to the existing system or any other procedure that exposes new components to external sources of contamination. This is in addition to flushing required under "Disinfection and Testing of Water Main." With assistance from the Water Department, flushing shall be done following connection to the existing water system, but before any service connections are made. The new water main shall be flushed again after all final tie-ins are completed. The Contractor shall coordinate flushing operations by submitting a support request to the Water Department at least one working day in advance. If no fire hydrants or other convenient outlets for flushing are available, the Contractor shall install temporary hydrants for flushing at no additional cost.

Whenever practical, initial connection to the existing system shall be to a larger main so that desired flushing velocity can be achieved. All valves and hydrants shall be fully opened and closed under water pressure to ensure proper operations during flushing and to dislodge foreign material.

Flush new mains, hydrant leads, and service connections to fire system risers thoroughly before connection is made to system piping. Flushing shall be of sufficient magnitude and duration to flush all foreign material out of the lines, valves, and hydrants. The flushing velocity shall be a minimum of 3.0 feet per second (5 feet per second preferred) for non-fire protection lines. Where the main supplies a fire protection system, the velocity shall meet the NFPA 24 requirement of 10 feet per second. The flow required to produce a velocity of 10 feet per second in various pipe sizes is as follows:

Nominal Pipe Size

Inches (in)	Gallons per Minute (gpm)
6	880
8	1560
10	2240
12	3520

Direct flushing water away from traffic, pedestrians, and private property. Prevent erosion damage to streets, lawns, and yards by the use of tarpaulins and lead-off discharge devices.

g. Abandoning Water Mains. Mix flowable fill in automated batch plant and deliver it to site in ready-mix trucks. Performance additives may be added at placement site if required by mix design. Use concrete or grout pumps capable of continuous delivery at planned placement rate.

Abandon existing water mains underneath roadways and paved areas by completely filling pipes with flowable fill. Abandon manholes and other structures by removing the top 3 feet and filling with flowable fill, together with ballast as applicable, within depth of structures left in place.

Place flowable fill to fill volume between manholes or valves. Continuously place flowable fill from manhole to manhole or valve to valve with no intermediate pour points, but not exceeding 500 feet in length.

Have filling operation performed by experienced crews with equipment to monitor density of flowable fill and to control pressure.

Pump flowable fill through bulkheads constructed for placement of two 2-inch PVC pipes or use other suitable construction methods to contain flowable fill in lines to be abandoned. These

pipes will act as injection points or vents for placement of flowable fill.

Place flowable fill under pressure flow conditions into properly vented open system until flowable fill emerges from vent pipes. Pump flowable fill with sufficient pressure to overcome friction and to fill pipes from downstream end, to discharge at upstream end when applicable.

Inject flowable fill through replaced ballast using grouting equipment and series of grout pipes discharging at bottom of placement, allowing fill to rise through ballast effectively filling all voids. Alternatively, sequentially place individual pieces of ballast at same time as flowable fill is placed. Do not fill with ballast more than 50 percent of volume at any level, to prevent nesting and void formation.

Remediate placement of flowable fill which does not fill voids in pipe and in manholes or other structures, or where voids develop due to excessive shrinkage or bleeding of fill, by using pressure grouting either from inside sewer or from surface.

Clean inside surface of pipes at least 12 inches from ends to achieve firm bond and seal grout plug or manufactured plug to pipe surface. Similarly, clean and prepare exterior pipe surface if manufactured cap is to be used.

When using grout plug, place temporary plug or bulkhead approximately 12 inches inside pipe. Fill pipe end completely with dry-pack grout mixture.

When using manufactured plug or cap, install fitting as recommended by manufacturer's instructions, to form water tight seal.

Backfill to surface, above pipe or structures left in place, with flowable fill in restricted areas, compacted bank run sand in unrestricted areas to be paved or select fill in unrestricted areas outside of pavement.

Collect and dispose of excess flowable fill material and other debris in accordance with local requirements or as directed by the AW Project Manager.

h. Disinfection When Cutting into or Repairing Existing Mains. The following procedures apply primarily when existing mains are wholly or partially dewatered. After the appropriate procedures have been completed, the existing main may be returned to service prior to the completion of bacteriological testing in order to minimize the time customers are without water. Leaks or breaks that are repaired with clamping devices while the mains remain full of pressurized water may present little danger of contamination and, therefore, may not require disinfection.

1. Trench Treatment. When an existing main is opened, either by accident or by design, the excavation will likely be wet and may be badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from this pollution. Tablets have the advantage in this situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

2. Swabbing with Hypochlorite Solution. The interior of all pipes and fittings (particularly couplings and sleeves) used in making the repair shall be swabbed or sprayed with a 1 percent hypochlorite solution before they are installed.

3. Flushing. Thorough flushing is the most practical means of removing contamination

introduced during repairs. If the valve and hydrant locations permit, flushing toward the work location from both directions is recommended until discolored water is eliminated.

4. Slug Chlorination. Where practical, in addition to the procedures previously described, the section of the main in which the break is located shall be isolated, all service connections shut off and the section flushed and chlorinated by the slug method. The dose may be increased to as much as 300 mg/L (300 ppm) and the contact time reduced to as little as 15 minutes. After chlorination, flushing shall be resumed and continued until discolored water is eliminated and the chlorine concentration in the water exiting the main is no higher than the prevailing water in the distribution system or that which is acceptable for domestic use.

5. Bacteriological Samples. Bacteriological samples shall be taken after repairs are completed to provide a record for determining the effectiveness of the procedure. If the direction of flow is unknown, then samples shall be taken on each side of the main break. If positive bacteriological samples are recorded, the situation shall be evaluated by the Water Department to determine corrective action. Daily sampling shall be continued until two consecutive negative samples are recorded.

i. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price for the following pay items:

Pay Item	**Pay Unit**
Water Main, ___ inch, Open Cut	Foot
Water Main, ___ inch, Direction Drill	Foot
Water Main Bedding and Backfill, SD-7W	Foot
Gate Valve and Box, ___ inch, Modified	Each
Gate Valve and Well, ___ inch, Modified	Each
Tapping Valve and Box, ___ inch	Each
Tapping Sleeve, ___ inch	Each
Hydrant Assembly, SD-1W	Each
Hydrant Extension	Foot
Water Main, _____ inch, Cut and Plug, Modified	Each
Water Main, Connect New ___ inch to Existing ___ inch	Each
Water Serv, ___ inch	Each
Water Serv, Long, ___ inch	Each
Water Serv, Retire	Each
Hydrant, Rem, Modified	Each
Water Structure, Abandon	Each
Abandon Water Main, _ inch	Each

Water Main, Open Cut of the size, class, and trench detail specified, will be measured in place by length in feet, from center to center of crosses, tees, and bends, including fittings. Payment includes providing and installing the specified pipe, bedding, and initial backfill material to 1 foot above the pipe. Payment also includes polyethylene encasement (for Ductile Iron), gaskets, restraints, and other materials required for proper installation. When required, payment includes providing and installing Styrofoam insulation. Payment also includes excavation, trenching, coffer dams, de-watering, placing and removing temporary sheeting and bracing, support and protection for existing utilities, backfilling with approved onsite granular material, compaction, disposal of surplus earth removal, tree root protection, abandoning old water main, removal of

gate wells as required on the drawings, temporary road or trench surface as directed by the Engineer, removal of temporary surfaces, all work and materials required for the necessary disinfection and testing, and all other work required for a complete job.

All additional work necessary for the completion of this work but not specifically listed as a pay item will be deemed included in one or more of the contract items listed in the proposal.

Water Main, Directional Drill, of the type, diameter and class specified, directional drilled, will be paid for at the contract unit price per linear foot. Price paid shall be payment in full for labor, material, and equipment necessary for designing, furnishing and installing directional bored water main and shall include, but is not limited to, specials and fittings, excavation, sheeting and bracing, shoring, draining, dewatering, excavating utility crossings, potholing, boring water main, jointing, grouting, testing, disinfecting, backfilling boring pits (including backfill with special materials where specified), excavating and installing fittings, disposal of excess excavated material, temporary blowoffs, thrust blocks, thrust restrainers, encasement, barricading, restoration, final cleanup, connections to existing mains and all other items necessary to complete the job, whether specifically mentioned or implied.

Measurement for water main directional drill will be in linear feet along the centerline of the pipe taken from end-to-end with no reduction for fittings, boring pits, and valves except for special structures, sections or connections for which either lump sum or unit prices have been taken will be deducted from the total length of water main and will be paid for at the prices bid therefore.

Water Main Bedding and Backfill, SD-7W will be measured by length in feet along the water main. Payment for Water Main Bedding and Backfill, SD-7W includes disposal of unsuitable material and furnishing Class II granular material for backfill from 1 foot above the pipe to the pavement base or finished grade. Where onsite backfill material is used in backfilling the water main, the payment will be reduced in proportion to the amount of onsite backfill material actually used.

Gate Valve and Box, Modified and **Tapping Valve and Box** of the size specified includes providing and installing the valve, retaining glands if needed, cast iron valve box with lid marked "WATER", excavation and backfill with Class II sand or approved onsite material and any other materials needed to properly install specified items. Where required by paving operations, payment shall include temporary lowering. (Note: Payment for Gate Box, Adjust, Case 1 will be made for gate boxes lowered for paving.)

Gate Valve and Well, Modified of the size specified includes providing and installing the valve, fittings, manhole, adjustment rings, and casting, excavation and backfill with Class II sand or approved onsite material and any other materials needed to properly install specified items. Where required by paving operations, payment shall include temporary lowering. (Note: Payment for Dr Structure, Adjust, Case 1 will be made for existing gate well rims lowered for paving.)

Tapping Sleeve of the size specified includes providing and installing stainless steel tapping sleeve, excavation, and backfill with Class II sand or approved onsite material and any other materials needed to properly install specified items. The Water Department will make the tap after the Contractor has installed the tapping sleeve and valve.

Hydrant Assembly, SD-1W includes providing and installing fire hydrant, 6-inch ductile iron hydrant lead, polyethylene encasement, 6-inch valve, cast iron valve box, retainer glands,

coarse gravel or crushed stone mixed with coarse sand for drainage, excavation, and backfill with Class II sand or approved onsite material.

Hydrant Extension will be for the actual length of extension installed in feet and includes providing and installing the hydrant extension necessary to raise hydrant to height specified, including all materials necessary for proper installation.

Water Main, Cut and Plug, Modified includes providing and installing plug or cap, polyethylene encasement, retainer glands, and any other materials needed to properly install specified items. Payment includes the removal of any valves, valve boxes, or valve manholes rendered unnecessary, bulkheading abandoned pipe with concrete and excavation and backfill with Class II sand or approved onsite material.

Water Main, Connect New ____ inch to Existing ___ inch includes providing and installing bends, couplings, retainer glands, and any other materials needed to properly make the connection. Pay item includes coordination deemed necessary by the Engineer with the city and adjacent property owners. Payment includes the removal of any valves, valve boxes, or valve manholes rendered unnecessary by the new connection, bulkheading abandoned pipes with concrete and excavation and backfill with Class II sand or approved onsite material. Water main will be paid separately as measured between the connection point to the existing main and the center of the new main. Water valves will also be paid separately.

Water Serv of the size specified includes providing and installing copper pipe, corporation stop and tap saddle, curb stop, stop box, excavation, and backfill with Class II sand or approved onsite material, and any other fittings required to connect new service to existing pipe in parkway. There will be no distinction in water service installation method (boring or open cut). This pay item will include connecting the new service to main and to the existing service line to building and disconnecting old service from main. A Water Service shall be defined as any service 30 feet or less in length. A **Water Service, Long** is any service greater than 30 feet in length.

Water Serv, Retire includes exposing the service at main, closing the existing corporation stop, and disconnecting the service from the main. It also includes removal of stop box and excavation and backfill with Class II sand or approved onsite materials. This applies **only** to services to vacant lots or services that are no longer in use on existing water mains that will not be retired.

Hydrant, Rem, Modified includes removing the existing hydrant lead, valve, and hydrant assembly as indicated on drawings and setting the hydrant aside (undamaged and in one piece) for retrieval by the Water Department. The work includes bulkhead of the existing lead and backfill with specified material.

Water Structure, Abandon includes removing the top three feet of the existing structure and casting from the site as well as filling the remainder of the structure flowable fill. This item includes all sawcutting and demolition necessary to remove the top 3 feet of the structure.

Abandon Water Main, _ inch of the size specified will be paid for at the contract unit price for the actual length of water main abandoned in-place. Payment for abandoning water main includes providing all work and materials required to completely fill the pipe with flowable fill.

CITY OF FLINT

SPECIAL PROVISION
FOR
SANITARY SEWER

a. **Description.** The Contractor shall supply all labor, material, and equipment required for the installation and testing of gravity sanitary sewers and appurtenances in compliance with these general specifications, project specifications, and the contract drawings.

1. References. Where materials or methods of construction are listed as being in conformance with a standard specification, it shall refer to the latest edition of the standard specification or any interim revision.

A. ASTM A48 – Standard Specification for Gray Iron Castings

B. ASTM A139 – Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over)

C. ASTM C76 – Standard Specification for Reinforced Concrete Culvert, Strom Drain, and Sewer Pipe

D. ASTM C443 – Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets

E. ASTM C478 – Standard Specification for Circular Precast Reinforced Concrete Manhole Sections

F. ASTM C700 – Standard Specification for Vitrified Clay Pipe, Extra Strength, Standard Strength, and Perforated

G. ASTM C923 – Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes, and Laterals

H. ASTM C1479 – Standard Practice for Installation of Precast Concrete Sewer, Storm Drain, and Culvert Pipe Using Standard Installations

I. ASTM D1785 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120

J. ASTM D2665 – Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings

K. ASTM D2680 – Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping

L. ASTM D3034 – Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings

M. ASTM D4101 – Standard Specification for Polypropylene Injection and Extrusion Materials

N. ASTM F477 – Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe

O. ASTM F1417 – Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air

P. ASTM F1668 – Standard Guide for Construction Procedures for Buried Plastic Pipe

Q. ANSI A21.4/AWWA C104 – Cement-Mortar Lining for Ductile-Iron Pipe and Fittings

R. ANSI A21.5/AWWA C105 – Polyethylene Encasement for Ductile-Iron Pipe Systems

S. ANSI A21.10/AWWA C110 – Ductile-Iron and Gray-Iron Fittings

T. ANSI A21.11/AWWA C111 – Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings

U. ANSI A21.51/AWWA C151 – Ductile-Iron Pipe, Centrifugally Cast

V. ANSI A21.53/AWWA C153 – Ductile-Iron Compact Fittings

W. Michigan Department of Transportation 2012 Standard Specifications for Construction

2. Submittals. The Contractor shall submit shop drawings or certificates of compliance to the Owner and Engineer for the following items.

A. Pipe, fittings, and joint material

B. Manholes and manhole adjusting rings and castings

C. Pipe bedding and backfill material

3. Quality Assurance and Quality Control

A. Grade and Alignment. Grade and alignment shall be maintained using a laser. The Contractor shall verify that the sewer is constructed at the proper alignment by checking grades and offsets at each manhole, at 50 feet upstream from manholes, and at 100-foot intervals. The Contractor shall report as-constructed measurements to the Engineer.

B. Acceptance Tests. The completed sewer(s) shall be subjected to the following tests, prior to acceptance by the Owner. Acceptance tests shall be completed by the Contractor, in the presence of the Engineer (or Owner's representative).

(1) Deflection Testing. All plastic sewers shall be subjected to a deflection test in accordance with Section c.9.A.

(2) Physical Inspection. The physical inspection shall be completed in accordance with Section c.9.B.

b. **Materials.** All material supplied shall be new and shall be designed and guaranteed to perform the service required.

1. Pipe. Pipe shall be of the material, class and/or thickness indicated on the plans or on the proposal. If no specific materials or classes are provided on the plans or on the proposal, any of the following pipe materials are permissible.

A. PVC Pipe. All PVC pipe shall be ASTM D3034 gasketed sewer pipe with a SDR of 26 or lower. PVC pipe conforming to ASTM D1785 Schedule 40 and ASTM D2665 is acceptable for 6-inch service leads.

2. Material Testing. All materials to be incorporated in the construction of gravity sewers and appurtenances shall be subject to inspection and tests, as specified by ASTM or AWWA references. The Owner reserves the right to subject any material supplied for a particular project to an independent testing laboratory. Such tests, if scheduled, shall be paid for by the Owner. The results of such tests shall be the basis of material acceptance.

The Contractor shall supply the Owner with shop drawings, a certificate of compliance, or actual test results stating that the material to be used is in conformance with the specifications prior to using material for construction.

c. Construction.

1. General. Sewers shall be constructed in accordance with the following standards, except as modified in this specification:

A. Plastic Pipe: ASTM F1417

2. Excavation. Excavation shall be completed in accordance with Sections 104 and 205 of the MDOT 2012 Standard Specifications for Construction.

3. Pipe Alignment. It shall be the Contractor's responsibility to transfer the line and grade to the bottom of the excavation for pipe laying. Lasers shall be used for pipe laying.

It shall be the Contractor's responsibility to protect the original survey control and benchmarks, as set by the Engineer.

4. Pipe Laying. Each pipe shall be laid on an even, firm bed, so that no uneven strain will come to any part of the pipe. Particular care shall be exercised to prevent the pipes bearing on the sockets. Bell holes for bell and spigot pipe shall be dug at each point as specified before. Each pipe shall be laid in the presence of the inspector. The bell-end of the pipe shall be laid up-grade. Pipe laying shall proceed in the upstream direction, except where otherwise approved by the Engineer.

The interior of the sewer shall be cleaned of all dirt, debris, jointing material, and other material.

All pipe shall be completely pushed to the “home” position.

Pipes laid in tunnel or casing pipe shall be supported on suitable blocks, cut or grouted into

position to place the invert of the sewer or drain at the slope, and to the elevations indicated on the contract drawings.

5. Connections to Existing Sewers. When replacing an existing sewer or manhole or constructing a new manhole over an existing sewer, the original sewer shall be reconnected to the new sewer or manhole. Existing sewer pipe shall be removed, salvaged, and reused to make connection to the new manhole, if possible. If existing pipe is not salvageable, a new sewer pipe shall be installed, as required, and connected to the existing sewer. When a new sewer is connected to an existing sewer, the existing sewer shall be removed to an existing joint, if existing joint is compatible with new sewer. If existing sewer joint is not compatible with new sewer, a watertight coupler shall be installed.

6. Pipe Joints. In all jointing operations, the trench must be dewatered when joints are made. Bell and spigot or tongue and groove ends of the pipe shall first be wiped clean before actual jointing operations are started.

Joints between consecutive bell and spigot or tongue and groove pipe shall be made with a rubber gasket. The gasket shall be fitted over the tongue or spigot of each pipe, as recommended by the manufacturer, and the pipe entered into the bell or groove and shoved home.

A. PVC Joints. All PVC pipe shall be joined with rubber compression gaskets that are factory installed. The joint shall be lubricated and joined so the “home” mark on the pipe is flush with the bell end.

B. Joints for Reinforced Concrete Pipe. Both the bell and spigot ends of the pipes to be joined shall be cleaned. The rubber joint shall be lubricated with material furnished by the joint manufacturer. The spigot end of the pipe shall be pushed “home” into the bell end of the receiving pipe.

7. Manholes. All manholes shall be constructed at the locations shown and in accordance with the contract drawings. Manholes shall be constructed of precast wall sections with a rubber gasket in the joint. The precast top section shall be an eccentric cone. Precast bases shall be installed on the subbase in such a way as to provide a uniform bearing under the manhole. Precast manholes with an integral bottom and channel may be used. The steps and castings shall be constructed in accordance with the standard details on the construction drawings.

Holes shall be cored through the manhole for necessary pipe connections. Each pipe opening shall be provided with a resilient connecter.

Openings into existing manholes (sewer tap), shall be made by a concrete drilling or coring machine. The opening shall be no larger than necessary for the new sanitary sewer. A watertight resilient connector shall be installed in the cored hole for the tapped sewer connection. The new tap shall be supported at the external side of the manhole with 6AA crushed limestone or concrete. The end of the tapped pipe shall be flush with the interior surface of the manhole. The existing flow channel shall be adjusted in accordance with the plan details.

Flow channels and/or drop connections shall be constructed as detailed on the construction drawings.

8. Backfill. Backfill shall meet the requirements of Section 401 of the MDOT 2012 Standard Specifications for Construction and the City of Flint Sanitary Sewer Standard Details.

9. Acceptance Tests - Sanitary Sewers. The methods of testing shall be approved by the Engineer. The Contractor shall provide the necessary equipment and labor for making the tests, and the cost of testing and repair shall be included in the unit price bid for completed sanitary sewer. The Engineer shall determine when grouting or relaying of faulty pipe is required.

A. Deflection Testing. All sanitary sewers constructed using plastic pipe shall be subjected to a deflection test. The Contractor shall furnish all labor, materials, and equipment necessary to perform deflection testing. The testing shall be completed after the pipeline has been backfilled for a period of at least 30 days. The pipeline shall be tested with a rigid ball or mandrel having at least 7 points, and having a diameter of not less than 95 percent of the average inside diameter of the pipe being tested. The average diameter for the pipe will be as specified by the ASTM specification for the pipe material, class, and size. Where testing indicates that the pipe deflection exceeds 5 percent of the pipe diameter, the pipe shall be removed and replaced. Pipe that is replaced shall be re-tested at least 30 days following its replacement.

Deflection testing shall be performed in the presence of the Engineer. The Contractor shall provide the Engineer with a least two working days' notice of conducting deflection testing.

B. Physical Inspection. Upon completion of all work, the Contractor shall open all manholes in the presence of the Engineer to demonstrate that the manholes are complete and free of debris.

10. Bypass Pumping. Bypassing of the existing sewage shall be provided, as required, to maintain uninterrupted sanitary sewer service. The line shall be plugged at an upstream manhole and the flow shall be pumped to a downstream point or adjacent system. The pump and bypass lines provided shall be of sufficient size to handle the normal and peak flow conditions for the system. Internal combustion engines shall have adequate exhaust silencers to muffle engine noise to an acceptable level for the area where located.

The bypass plan for each segment of pipe shall be submitted to the Owner and Engineer for review and approval prior to the start of the project, along with a list of equipment. All property owners affected by the bypass shall be notified by the Contractor a minimum of 48 hours in advance.

d. Measurement and Payment.

1. Pay Items. The work of constructing sanitary sewers will be paid for at the contract unit price for the following pay item(s), which are included on the proposal. Work not specifically listed as a pay item on the proposal is included in the pay item(s) listed and will not be paid for separately.

Pay Item	**Pay Unit**
Sanitary Sewer, Rem	Foot
Sanitary Sewer Manhole, Rem	Each

Sanitary Sewer Manhole, Tap, __ inch .....Each
Sanitary Sewer Tap, __ inch.....Each
Sanitary Sewer, PVC, SDR__, __ inch, Tr Det __ .....Foot

2. Measurement and Work Included.

A. **Sanitary Sewer, Rem.** The work of removing sewer will be paid for at the contract unit price when shown on the plans or directed by the Engineer. Sewer to be removed will be measured horizontally, in units of feet, with no deduction in the measurement for the dimension of manholes or pipe fittings which are also removed. Where the sewer to be removed abuts a manhole, the measurement of the length of sewer removed will be to the center of the manhole. There will be no adjustment in the payment because of pipe size or material. The work of removing sewer includes excavating, removing and disposing of the pipe, backfilling the void resulting from the pipe removal, and backfilling the excavation.

B. **Sanitary Sewer Manhole, Rem.** The work of removing sanitary manholes will be paid for at the contract unit price, when shown on the plans or directed by the Engineer, for each structure authorized for removal. The work of removing a sanitary manhole includes breaking down and disposing of the complete manhole structure and refilling the resulting void with soil (compacted sand within the influence of a road or structure).

C. **Sanitary Sewer Manhole, Tap, __ inch.** Pipe connections to existing manholes will be paid at the contract unit price for **Sanitary Sewer Manhole, Tap, __ inch** when included as a pay item on the proposal. Sanitary sewer manhole taps will be measured in units of each based on the size of the connecting pipe, with no adjustment made for differing manhole depths or construction materials. The work of coring a hole, furnishing a flexible boot, and reworking the manhole channel are included in the work and will not be paid for separately.

Where a connection to an existing manhole is with a drop connection, payment will be at the contract price for a drop connection only. The connection will not be eligible for payment for both a sanitary sewer manhole tap and drop connection.

D. **Sanitary Sewer Tap, __ inch.** Pipe connections and proposed manhole connections to existing sewer pipes will be paid at the contract unit price for Sanitary Sewer Tap, __ inch when included as a pay item on the proposal. Sanitary sewer taps will be measured in units of each, based on the size of the existing pipe for proposed manhole connections and based on the inlet pipe size for proposed pipe connections, with no adjustment made for differing construction materials. The work of cutting the existing pipe or coring a hole are included in the work and will not be paid for separately.

E. **PVC Sanitary Sewer.** PVC SDR 26 sanitary sewer will be paid for at the contract unit price for the actual quantity of PVC SDR 26 sewer authorized and constructed, when PVC sewer is specifically called for on the plans or on the proposal. The length of sewer to be paid for will be measured from the center of the manholes, with no deduction for the diameter of the manholes or the length of tees or wyes.

The contract unit price for sewer includes the work of excavation, protecting existing utilities, sheeting, bedding, backfilling, compacting, testing, and completing a video inspection of the completed pipeline. Unless dewatering is included on the proposal as a contract pay item, dewatering is included in the work of sewer construction and will not be

paid for separately. There will be no adjustment in the contract price for sewer construction because of soil conditions. Unless clearing or tree removal is included on the proposal as a contract pay item, clearing and tree removal are included in the work of sewer construction and will not be paid for separately. Coordination with utilities and minor changes in alignment to avoid conflicts with existing utilities is included in the work of sewer construction and will not be paid for separately.

Payment for sewer construction will be based on the contract price for Trench Detail B, when the sewer is within the influence of pavement or structures. The work of disposing of unsuitable excavated material and replacement with sand is included with the item of Trench Detail B. Sewer not within the influence of pavement or structures is considered Trench Detail A and can be backfilled with native material, as approved by the Engineer.

When sewer is shown on the plans to be installed by boring and jacking, payment will be at the contract unit price for the length of sewer installed by boring and jacking, up to the length shown on the plans or otherwise authorized by the Engineer. Payment for sewer installed by boring and jacking includes furnishing and installing both the casing pipe and the carrier pipe. The cost of excavating and backfilling boring pits is included in the work and will not be paid for separately.

CITY OF FLINT

SPECIAL PROVISION
FOR
PERMIT REQUIREMENTS

a. Description. This special provision describes the way the reimbursement, for permit fees as stated in section 107 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction will be paid.

The Contractor shall be responsible to secure the Genesee County Drain Commission Water and Waste Services soil erosion and sedimentation control (SESC) permit and Michigan Department of Environmental Quality (MDEQ) notice of coverage for National Pollutant Discharge Elimination System (NPDES) storm water discharges from construction activity. The Owner has secured the MDEQ part 399 water main construction permit and MDEQ part 31 and 301 joint permit which are included in the proposal. The Owner has applied for and received approval of the above permits with the conditions listed in this special provision.

1. Permits

A. A permit for SESC is required from Genesee County. The Contractor shall be responsible for securing the permit. The Contractor is responsible for a one-year permit fee of $800 and $24,000 cash or surety bond.

GENESEE COUNTY DRAIN COMMISSIONER – WATER & WASTE SERVICES
G-4610 Beecher Road
Flint, MI 48532
Contact: Mark Stephens
Office Phone: (810) 732-7870

B. A permit is required from Genesee County Drain Commissioner (GCDC) Water and Waste Services (WWS) to make any changes, modifications, or do any work within the county drain right-of-way. Plan approval has been received for this project. The Contractor shall be responsible to secure the permit. The Contractor is responsible for a minimum of $800 permit fee prior to the permit being issued. Upon completion of work done to the drain, an accounting of the inspection expenses will be made and an appropriate refund or invoice will be issued. Also required prior to construction is a $24,000 surety bond on GCDC soil erosion bond form, GCDC must be contacted 48 hours before construction to the county drain at the inspection department (810) 732-7870.

C. A notice of coverage for NPDES is required from MDEQ. The Contractor shall be responsible for securing the permit on MDEQ MiWaters system. The Contractor is responsible for an application fee of $400.

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY
525 West Allegan Street
PO Box 30473
Lansing, MI 48909
https://miwaters.deq.state.mi.us
Contact: Tiffany Wilson
Office Phone: (517) 284-5592

D. A permit is required from the MDEQ to make any changes, modifications, or do any work within the county drain right-of-way. The Contractor shall be responsible to secure the permit. The Contractor is responsible for a minimum of $400 permit fee prior to the permit being issued. A Notice of Termination must be submitted to the MDEQ once the construction site is completely stabilized. The Notice of Termination form is available in and submitted via the MDEQ's MiWaters system.

Obtaining all required permits for the project is the responsibility of the Contractor per subsection 107.02 of the MDOT 2012 Standard Specifications for Construction. Required information not submitted within the specified timeframe will not be a valid reason for an extension of time or additional compensation. Untimely submittals may cause a delay in receipt of comments and/or approvals.

b. Materials. None specified.

c. Construction. None specified.

d. Measurement and Payment. All work and coordination necessary to obtain the permits listed in this special provision shall be included in the unit price bid for affected items and shall not be paid for separately.

Pay Item	**Pay Unit**
Reimbursed Permit Fees	Dollar

Reimbursed Permit Fees includes the reimbursement for the eligible permit fees with supporting receipts or other proof of payment documentation from the Contractor. All labor, equipment, and materials required to restore disturbed areas in GCDC WWS right-of-way due to construction-related activities, which shall be included in the other pay items and not paid for separately.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
DRAINAGE STRUCTURE COVER, ADA COMPLIANT

COL:SEW 1 of 1 C&T:APPR:DMG:DBP:11-12-10

a. Description. Furnish all labor, equipment and materials necessary to install a drainage structure cover that is ADA compliant including the casting and grate as provided in the standard plans and modified for grate opening size.

b. Materials. Materials must be in accordance with sections 403 and 908 of the Standard Specifications for Construction and this special provision. The frame and cover must be manufactured by East Jordan Iron Works, Neenah Foundry, or approved equal, and must comply with all dimensioning in the standard plans for drainage structure covers except that the openings must not permit passage of a sphere more than 0.5 inch in diameter. Elongated openings must be placed so that the long dimension is perpendicular to the dominant direction of travel.

c. Construction. Furnish and install the drainage structure cover as indicated on the plans or as directed by the Engineer. All work must comply with section 403 of the Standard Specifications for Construction.

Delivered and unload the drainage structure cover at the job site in good condition. Any cracked or otherwise damaged units will not be accepted nor will any reimbursement be made for delivery or pick-up of damaged units.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following contract item (pay item):

Contract Item (Pay Item)	**Pay Unit**
Dr Structure Cover, ADA Compliant	Each

Dr Structure Cover, ADA Compliant includes cast iron frame and cover (grate), and removal and disposal of existing drainage structure cover and all associated material necessary to complete the work.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN PATH

a. Description. This work consists of furnishing, installing, maintaining, and removing a temporary pedestrian path as identified in the proposal or on the plans. Temporary pedestrian paths, or segments thereof, will be repaired or replaced as directed by the Engineer.

b. Materials. Provide materials to construct a temporary pedestrian path in accordance with the contract, the *Public Right of Way Accessibility Guidelines (PROWAG)*, the *MMUTCD*, as directed by the Engineer, and the following requirements:

1. Ensure the materials used to construct the temporary pedestrian path yields a continuous hard surface that is firm, stable and skid resistant. Ensure the path does not warp, buckle or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials to construct the path include asphalt materials, Oriented Strand Board (OSB), plywood, dimensional lumber, reclaimed, or other as approved by the Engineer. Compacted soils, aggregate and sand are prohibited.

2. If asphalt materials are not used to construct the path, provide an antiskid coating, or surface treatment as directed by the Engineer.

c. Construction. Construct the temporary pedestrian path in accordance with *PROWAG*, the *MMUTCD*, the contract, the direction of the Engineer, and the following:

1. The useable surface of the path must be a minimum of 48 inches wide, additional width may be provided to preclude the use of Temporary Pedestrian Passing Spaces (paid for separately). A minimum width of 60 inches is required if Temporary Pedestrian Passing Spaces are not provided as part of the temporary facility. The maximum cross slope for the path is 2 percent. The path, including transitions to the adjacent surface at both ends, must be free of vertical discontinuities greater than 1/4 inch. Eliminate any vertical discontinuities greater than 1/4 inch up to 1/2 inch or bevel with a slope not steeper than 1:2. If a vertical discontinuity greater than 1/2 inch or a running slope greater than 1:20 occurs on the project, a Temporary Pedestrian Ramp (paid for separately) is required.

A. Ensure an anti-skid surface treatment is applied to the surface of the path, if not constructed with asphalt materials, as directed by the Engineer.

B. If the surface of the path is constructed from OSB, plywood, or dimensional lumber securely connect all sections with appropriate fasteners to ensure a continuous, uniform and flat surface.

2. Ensure all debris and construction materials is cleared from the path throughout its use. Ensure snow and ice is removed; the use of an approved de-icing agent may be required.

3. Repair or replace the path, or segments thereof, if it becomes uneven, unstable, or displaces due to weather events, construction activities, or other causes as directed by the Engineer.

4. Following the use of the temporary path, the Contractor must remove and dispose all materials used to construct the path, and restore the area as directed by the Engineer.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Pedestrian Path, Temp	Foot

Pedestrian Path, Temp will be measured along the centerline of the path. **Pedestrian Path, Temp** includes all costs related to installation, maintenance, restoration, and removal of the path and disposal of all associated materials throughout the life of the contract.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN RAMP

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian ramp as identified in the proposal or on the plans. Use temporary pedestrian ramps to facilitate pedestrian travel on accessible facilities over curbs or other uneven terrain features with a vertical difference of 1/2 inch or greater. Damaged pedestrian ramps will be replaced as directed by the Engineer.

b. Materials. Provide materials to construct a temporary pedestrian ramp in accordance with the *Americans with Disabilities Act (ADA)*, the standard specifications, and the following:

1. Ensure the material used to construct the temporary pedestrian ramp is firm, stable, skid resistant, and forms a continuous hard surface. Ensure the surface does not warp, buckle or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials to construct the surface of the ramp include asphalt materials, Oriented Strand Board (OSB) or plywood, dimensional lumber, certain reclaimed or other materials as approved by the Engineer. Compacted soils, aggregate and sand are prohibited.

2. Provide a handrail on both sides of the ramp if the ramp is not exposed to vehicle traffic and has a total rise greater than 6 inches, and a length greater than 72 inches. Ensure the handrail is between 1.25 and 1.5 inches wide and configured to be a “graspable” cross-section. See construction subsection 2.A for additional details. When the ramp is exposed to traffic, in lieu of handrails, use a protective edge 2.5 inches minimum height above the ramp surface or 1:10 flare on both sides of the ramp.

3. Ensure the surface of the ramp is free draining; in addition provide features that allow drainage to move past the ramp installation (i.e. along the gutter pan underneath the ramp if the ramp is installed on a curb).

4. Provide materials to construct detectable edging along open sides of the ramp if required.

5. If asphalt materials are not used to construct the surface of the ramp, provide an antiskid coating or surface treatment approved by the Engineer.

c. Construction. Construct the temporary pedestrian ramp in accordance with the manufacturer’s recommendations (if applicable), *ADA*, the plans, and the following:

1. Ensure the useable surface of the ramp is 48 inches wide and does not deflect due to pedestrian traffic. Ensure an anti-skid surface treatment is applied to the useable area of the ramp if it is not made from asphalt materials. The maximum cross slope of the ramp is 2

percent. Ensure both ends of the ramp smoothly transitions to the adjacent surface, with 1/4 inch or less vertical difference.

Construct the ramp to maintain a longitudinal slope from 1:10 to 1:12 where possible. Otherwise, a longitudinal slope from 1:8 to 1:10 may be used for a maximum rise of 3 inches. Temporary pedestrian ramps with longitudinal slopes greater than 1:8 are prohibited.

A. Provide a handrail on both sides of the ramp if required as stated herein. Ensure the top of the handrail is between 34 and 38 inches above the surface of the ramp. Ensure a minimum width of 36 inches is maintained between the handrails, with a minimum clearance of 1.5 inches behind and 18 inches above.

Construct the handrail such that the bending stress applied by a bending moment created by a 250 pound force is less than the allowable stress for the materials and the construction of the handrail. Construct the handrail to withstand the shear stress induced by a 250 pound force. Ensure all fasteners, mounting devices and support structures are also able to withstand shear stress induced by a 250 pound force.

2. Construct a detectable edging anytime a handrail is required, and anytime the path changes direction. This includes a turn onto the ramp from the path. Detectable edging must begin a maximum of 2.5 inches above the ramp surface, and extend at least 6 inches above the ramp surface.

3. Ensure a clear space (minimum 48 inches by 48 inches) is provided above and below the ramp.

4. Avoid locating ramps in areas of drainage collection, ponding or running water, which can produce slippery or unsafe conditions. If the ramp is located over a gutter pan or other drainage structure, provide features to facilitate water movement around or under the ramp as approved by the Engineer.

5. Ensure all debris and construction material is cleared from the surface of the ramp throughout its use. Ensure snow and ice is removed; the use of an approved de-icing agent may be required. Repair or replace the ramp if it becomes uneven, unstable, or displaces due to weather events, construction activities, or other causes as directed by the Engineer.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Pedestrian Ramp, Temp	Each

Pedestrian Ramp, Temp includes all labor, equipment, and materials to furnish, install and remove a temporary pedestrian ramp at the locations shown on the plans, as well as all costs for maintaining, clearing debris, deicing, reconfiguring, and relocating the temporary pedestrian ramp throughout the life of the contract.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
TEMPORARY PEDESTRIAN TYPE II BARRICADE

OFS:RAL 1 of 2 APPR:CAL:CT:08-02-16

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian Type II barricade section as identified in the proposal or on the plans. Use temporary pedestrian Type II barricades to close non-motorized facilities including sidewalks, bicycle paths, pedestrian paths, and shared use paths that are not part of the roadway. One pedestrian Type II barricade is defined as a barricade section at least 43 inches wide, including all supports, ballast, and hardware.

b. Materials. Provide a temporary pedestrian Type II barricade that meets the requirements of *National Cooperative Highway Research Program Report 350 (NCHRP 350)* or *Manual for Assessing Safety Hardware* (MASH), in addition to meeting the following requirements:

1. Provide barricade sections at least 43 inches wide, designed to interconnect to ensure a continuous *Americans with Disabilities Act (ADA)* compliant tactile barrier. Ensure the connection includes provisions to accommodate non-linear alignment as well as variations in elevation at the installation area.

2. Ensure the top surface of the barricade is designed to function as a hand-trailing edge, and has a height between 32 and 38 inches. Ensure the lower edge of the barricade is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the barricade is a minimum of 8 inches above the surface of the non-motorized facility. The barricade may have a solid continuous face. Finally, all features on the front face of the barricade (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the barricade with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the barricade section has a solid face. If the barricade consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. Construction. Construct the temporary pedestrian Type II barricade in accordance with the manufacturer's recommendations, Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the barricade as shown on the plans and as directed by the Engineer. Interconnect all barricade sections using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the barricade is ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.

2. When the barricade is installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists.

3. When pedestrian Type II barricades are used to close a non-motorized facility, ensure a sufficient number of barricade sections are used to block the entire width of the facility. The barricade may extend outside the edge of the non-motorized facility but must not be less than the full width of the facility.

4. If sections of multiple colored barriers are used (i.e. safety orange and white) install the sections such that the colors alternate to increase conspicuity.

5. Ensure pedestrian Type II barricades are not used to close a motor vehicle facility. Ensure these barricades are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic.

d. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

Pay Item	**Pay Unit**
Pedestrian Type II Barricade, Temp	Each

Pedestrian Type II Barricade, Temp, includes all labor, equipment, and materials to furnish, install, maintain, relocate, and remove one barricade section that is at least 43 inches wide. Additional payment will not be made if wider sections are provided. This includes all rails, supports, ballast, hinge points, reflective sheeting, and miscellaneous hardware needed to install and maintain a barricade section.

Engineer's Opinion of Costs

Project Number: 18C0137
Estimate Number: 1: Court Street Rehabilitation
Project Type: Miscellaneous
Location: City of Flint-Court Street
Description: Crapo Street to Center Road

Project Engineer: LAPS
Date Created: 8/15/2018
Date Edited: 6/5/2019
Fed/State #:
Fed Item:
Control Section:

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
Category: 0001		**Participating - STU**				
0001	1500001	Mobilization, Max	0.500	LSUM	$600,000.00	$300,000.00
0002	2020006	Stump, Rem, 19 inch to 36 inch	4.000	Ea	$300.00	$1,200.00
0003	2020008	Stump, Rem, 6 inch to 18 inch	1.000	Ea	$150.00	$150.00
0004	2040055	Sidewalk, Rem	1,604.000	Syd	$5.00	$8,020.00
0005	2047011	_ Pavt, Rem, Modified	7,627.000	Syd	$8.00	$61,016.00
0006	2050016	Excavation, Earth	2,101.000	Cyd	$10.00	$21,010.00
0007	2050031	Non Haz Contaminated Material Handling and Disposal, LM	50.000	Cyd	$35.00	$1,750.00
0008	2050041	Subgrade Undercutting, Type II	100.000	Cyd	$20.00	$2,000.00
0009	2080020	Erosion Control, Inlet Protection, Fabric Drop	55.000	Ea	$100.00	$5,500.00
0010	2080044	Erosion Control, Turbidity Curtain, Shallow	150.000	Ft	$10.00	$1,500.00
0011	3010002	Subbase, CIP	495.000	Cyd	$15.00	$7,425.00
0012	3027011	_ Aggregate Base, 8 inch, Modified	5,455.000	Syd	$8.00	$43,640.00
0013	3067031	_ Maintenance Gravel, Modified	2,000.000	Ton	$20.00	$40,000.00
0014	4030306	Dr Structure, Tap, 6 inch	67.000	Ea	$150.00	$10,050.00
0015	4037001	_ Structure, Adj, Add Depth	97.000	Ft	$175.00	$16,975.00
0016	4037050	_ Dr Structure Cover, ADA Compliant	2.000	Ea	$700.00	$1,400.00
0017	4037050	_ Manhole Cover, Adj	56.000	Ea	$800.00	$44,800.00
0018	4037050	_ Structure Cover, Adj, Case 1	101.000	Ea	$450.00	$45,450.00
0019	4037050	_ Structure Cover, Special	67.000	Ea	$650.00	$43,550.00
0020	4040063	Underdrain, Subbase, 6 inch	9,400.000	Ft	$4.00	$37,600.00
0021	5010020	Pavt Joint and Crack Repr, Det 7	2,175.000	Ft	$12.00	$26,100.00
0022	5010021	Pavt Joint and Crack Repr, Det 8	2,175.000	Ft	$15.00	$32,625.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0023	5010025	Hand Patching	512.000	Ton	$100.00	$51,200.00
0024	5010050	HMA, 4E1	2,401.000	Ton	$75.00	$180,075.00
0025	5010056	HMA, 5E1	2,401.000	Ton	$80.00	$192,080.00
0026	5017011	_ Cold Milling	28,667.000	Syd	$2.50	$71,667.50
0027	6030030	Lane Tie, Epoxy Anchored	3,965.000	Ea	$4.25	$16,851.25
0028	7100010	Conc Surface Coating (Gilkey Creek)	1.000	LSUM	$6,000.00	$6,000.00
0029	7107020	_ Vertical and Overhead Structure Repairs, Shotcrete	50.000	Cft	$640.00	$32,000.00
0030	7120007	Hand Chipping, Other Than Deck	50.000	Cft	$120.00	$6,000.00
0031	8010005	Driveway, Nonreinf Conc, 6 inch	2,202.000	Syd	$40.00	$88,080.00
0032	8010007	Driveway, Nonreinf Conc, 8 inch	535.000	Syd	$50.00	$26,750.00
0033	8020023	Curb and Gutter, Conc, Det C4	5,424.000	Ft	$20.00	$108,480.00
0034	8020050	Driveway Opening, Conc, Det M	479.000	Ft	$25.00	$11,975.00
0035	8027001	_ Curb and Gutter, Conc, Det C4, Modified	7,567.000	Ft	$30.00	$227,010.00
0036	8030030	Curb Ramp Opening, Conc	466.000	Ft	$20.00	$9,320.00
0037	8030037	Sidewalk Ramp, Conc, 7 inch	3,883.000	Sft	$6.00	$23,298.00
0038	8030044	Sidewalk, Conc, 4 inch	6,915.000	Sft	$4.00	$27,660.00
0039	8030046	Sidewalk, Conc, 6 inch	2,067.000	Sft	$5.00	$10,335.00
0040	8037001	_ Detectable Warning Surface, Modified	297.000	Ft	$75.00	$22,275.00
0041	8037010	_ Sidewalk, Conc, 8 inch	412.000	Sft	$6.00	$2,472.00
0042	8100371	Post, Steel, 3 lb	980.000	Ft	$5.50	$5,390.00
0043	8100403	Sign, Type III, Rem	134.000	Ea	$10.00	$1,340.00
0044	8100404	Sign, Type IIIA	197.000	Sft	$14.00	$2,758.00
0045	8100405	Sign, Type IIIB	243.000	Sft	$14.00	$3,402.00
0046	8100425	Sign, Type VB	8.000	Sft	$15.00	$120.00
0047	8110024	Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk	1,138.000	Ft	$2.50	$2,845.00
0048	8110045	Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar	400.000	Ft	$9.00	$3,600.00
0049	8110063	Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym	12.000	Ea	$150.00	$1,800.00
0050	8110071	Pavt Mrkg, Ovly Cold Plastic, Rt Turn Arrow Sym	1.000	Ea	$150.00	$150.00
0051	8110218	Pavt Mrkg, Thermopl, 24 inch, Stop Bar	34.000	Ft	$8.00	$272.00
0052	8110380	Pavt Mrkg, Ovly Cold Plastic, 4 inch, Wet Reflective, White	1,195.000	Ft	$3.75	$4,481.25

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0053	8110384	Pavt Mrkg, Ovly Cold Plastic, 4 inch, Wet Reflective, Yellow	12,355.000	Ft	$3.75	$46,331.25
0054	8120012	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn	26.000	Ea	$75.00	$1,950.00
0055	8120013	Barricade, Type III, High Intensity, Double Sided, Lighted, Oper	26.000	Ea	$6.50	$169.00
0056	8120026	Pedestrian Type II Barricade, Temp	20.000	Ea	$100.00	$2,000.00
0057	8120170	Minor Traf Devices	0.500	LSUM	$60,000.00	$30,000.00
0058	8120210	Pavt Mrkg, Longit, 6 inch or Less Width, Rem	300.000	Ft	$0.50	$150.00
0059	8120230	Pavt Mrkg, Type NR, Tape, 4 inch, White, Temp	2,640.000	Ft	$0.70	$1,848.00
0060	8120231	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow, Temp	1,450.000	Ft	$0.60	$870.00
0061	8120250	Plastic Drum, High Intensity, Furn	100.000	Ea	$18.50	$1,850.00
0062	8120251	Plastic Drum, High Intensity, Oper	100.000	Ea	$0.75	$75.00
0063	8120350	Sign, Type B, Temp, Prismatic, Furn	779.000	Sft	$5.75	$4,479.25
0064	8120351	Sign, Type B, Temp, Prismatic, Oper	779.000	Sft	$0.50	$389.50
0065	8120370	Traf Regulator Control	0.500	LSUM	$10,000.00	$5,000.00
0066	8127001	_ Pedestrian Path, Temp	480.000	Ft	$10.00	$4,800.00
0067	8127050	_ Pedestrian Ramp, Temp	24.000	Ea	$10.00	$240.00
0068	8137011	_ Riprap, Heavy, Modified	80.000	Syd	$60.00	$4,800.00
0069	8167011	_ Turf Establishment, Performance	8,075.000	Syd	$5.00	$40,375.00
0070	8200170	Traf Loop	1.000	Ea	$1,800.00	$1,800.00
0071	8200228	TS, Pedestrian, Two Way Bracket Arm Mtd, Salv	2.000	Ea	$500.00	$1,000.00
0072	8210001	Monument Box	1.000	Ea	$500.00	$500.00
0073	8210005	Monument Box Adjust	1.000	Ea	$300.00	$300.00
0074	8210010	Monument Preservation	1.000	Ea	$300.00	$300.00
0075	8507060	_ Reimbursed Permit Fees	1,200.000	Dlr	$1.00	$1,200.00

Category 0001 Total: $2,041,875.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
Category: 0003		**Non-participating**				
0076	2020006	Stump, Rem, 19 inch to 36 inch	6.000	Ea	$300.00	$1,800.00
0077	2020007	Stump, Rem, 37 inch or Larger	1.000	Ea	$450.00	$450.00
0078	2020008	Stump, Rem, 6 inch to 18 inch	16.000	Ea	$150.00	$2,400.00
0079	2030011	Dr Structure, Rem	1.000	Ea	$300.00	$300.00
0080	2030015	Sewer, Rem, Less than 24 inch	20.000	Ft	$15.00	$300.00
0081	2040055	Sidewalk, Rem	302.000	Syd	$5.00	$1,510.00
0082	2047011	_ Pavt, Rem, Modified	11,745.000	Syd	$8.00	$93,960.00
0083	2050016	Excavation, Earth	34.000	Cyd	$10.00	$340.00
0084	2050031	Non Haz Contaminated Material Handling and Disposal, LM	100.000	Cyd	$35.00	$3,500.00
0085	3010002	Subbase, CIP	53.000	Cyd	$15.00	$795.00
0086	3027011	_ Aggregate Base, 8 inch, Modified	13,387.000	Syd	$8.00	$107,096.00
0087	4020033	Sewer, Cl A, 12 inch, Tr Det B	20.000	Ft	$50.00	$1,000.00
0088	4030312	Dr Structure, Tap, 12 inch	2.000	Ea	$350.00	$700.00
0089	5010031	HMA, 3C	4,370.000	Ton	$70.00	$305,900.00
0090	8030037	Sidewalk Ramp, Conc, 7 inch	87.000	Sft	$6.00	$522.00
0091	8030044	Sidewalk, Conc, 4 inch	2,691.000	Sft	$4.00	$10,764.00
0092	8037010	_ Sidewalk, Conc, 8 inch	778.000	Sft	$6.00	$4,668.00
0093	8237001	_ Abandon Water Main, 12 inch	7,770.000	Ft	$10.00	$77,700.00
0094	8237001	_ Abandon Water Main, 24 inch	2,380.000	Ft	$15.00	$35,700.00
0095	8237001	_ Abandon Water Main, 6 inch	403.000	Ft	$5.00	$2,015.00
0096	8237001	_ Abandon Water Main, 8 inch	467.000	Ft	$8.00	$3,736.00
0097	8237001	_ Water Main Bedding and Backfill, SD-7W	13,124.000	Ft	$15.00	$196,860.00
0098	8237001	_ Water Main, 12 inch, CIPP Liner	360.000	Ft	$400.00	$144,000.00
0099	8237001	_ Water Main, 12 inch, Open Cut	8,167.000	Ft	$90.00	$735,030.00
0100	8237001	_ Water Main, 24 inch, Open Cut	2,402.000	Ft	$180.00	$432,360.00
0101	8237001	_ Water Main, 3 inch, Open Cut	28.000	Ft	$60.00	$1,680.00
0102	8237001	_ Water Main, 4 inch, Open Cut	41.000	Ft	$55.00	$2,255.00
0103	8237001	_ Water Main, 6 inch, Open Cut	1,035.000	Ft	$60.00	$62,100.00
0104	8237001	_ Water Main, 8 inch, Open Cut	2,799.000	Ft	$65.00	$181,935.00
0105	8237050	_ Gate Valve and Box, 3 inch, Modified	1.000	Ea	$1,200.00	$1,200.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0106	8237050	_ Gate Valve and Box, 4 inch, Modified	1.000	Ea	$1,200.00	$1,200.00
0107	8237050	_ Gate Valve and Box, 6 inch, Modified	17.000	Ea	$1,500.00	$25,500.00
0108	8237050	_ Gate Valve and Box, 8 inch, Modified	10.000	Ea	$1,500.00	$15,000.00
0109	8237050	_ Gate Valve and Well, 12 inch, Modified	16.000	Ea	$5,000.00	$80,000.00
0110	8237050	_ Gate Valve and Well, 24 inch, Modified	3.000	Ea	$10,000.00	$30,000.00
0111	8237050	_ Gate Valve and Well, 8 inch, Modified	7.000	Ea	$3,500.00	$24,500.00
0112	8237050	_ Hydrant Assembly, SD-1W	31.000	Ea	$5,500.00	$170,500.00
0113	8237050	_ Hydrant, Rem, Modified	21.000	Ea	$500.00	$10,500.00
0114	8237050	_ Water Main, 12 inch, Cut and Plug, Modified	9.000	Ea	$650.00	$5,850.00
0115	8237050	_ Water Main, 24 inch, Cut and Plug, Modified	2.000	Ea	$1,200.00	$2,400.00
0116	8237050	_ Water Main, 3 inch, Cut and Plug, Modified	1.000	Ea	$450.00	$450.00
0117	8237050	_ Water Main, 4 inch, Cut and Plug, Modified	2.000	Ea	$550.00	$1,100.00
0118	8237050	_ Water Main, 6 inch, Cut and Plug, Modified	16.000	Ea	$550.00	$8,800.00
0119	8237050	_ Water Main, 8 inch, Cut and Plug, Modified	15.000	Ea	$600.00	$9,000.00
0120	8237050	_ Water Main, Connect New 12 inch to Existing 12 inch	10.000	Ea	$3,500.00	$35,000.00
0121	8237050	_ Water Main, Connect New 24 inch to Existing 24 inch	2.000	Ea	$7,500.00	$15,000.00
0122	8237050	_ Water Main, Connect New 3 inch to Existing 3 inch	1.000	Ea	$300.00	$300.00
0123	8237050	_ Water Main, Connect New 4 inch to Existing 4 inch	1.000	Ea	$3,500.00	$3,500.00
0124	8237050	_ Water Main, Connect New 6 inch to Existing 4 inch	1.000	Ea	$3,000.00	$3,000.00
0125	8237050	_ Water Main, Connect New 6 inch to Existing 6 inch	16.000	Ea	$3,500.00	$56,000.00
0126	8237050	_ Water Main, Connect New 8 inch to Existing 8 inch	14.000	Ea	$3,500.00	$49,000.00
0127	8237050	_ Water Serv, 1 inch	61.000	Ea	$1,500.00	$91,500.00
0128	8237050	_ Water Serv, 2 inch	1.000	Ea	$3,000.00	$3,000.00
0129	8237050	_ Water Serv, Long, 1 inch	87.000	Ea	$2,500.00	$217,500.00
0130	8237050	_ Water Serv, Long, 1.5 inch	2.000	Ea	$3,500.00	$7,000.00
0131	8237050	_ Water Serv, Long, 2 inch	3.000	Ea	$5,000.00	$15,000.00
0132	8237050	_ Water Structure, Abandon	17.000	Ea	$350.00	$5,950.00
0133	8257001	_ Sanitary Sewer, PVC, SDR 26, 12 inch, Tr Det B	30.000	Ft	$60.00	$1,800.00
0134	8257001	_ Sanitary Sewer, Rem	30.000	Ft	$15.00	$450.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0135	8257050	_ Sanitary Sewer Manhole, Rem	1.000	Ea	$400.00	$400.00
0136	8257050	_ Sanitary Sewer Manhole, Tap, 12 inch	1.000	Ea	$250.00	$250.00
0137	8257050	_ Sanitary Sewer Tap, 12 inch	1.000	Ea	$300.00	$300.00

Category 0003 Total: $3,302,326.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
Category: 0005		**Participating - NH**				
0138	1500001	Mobilization, Max	0.500	LSUM	$600,000.00	$300,000.00
0139	2030011	Dr Structure, Rem	1.000	Ea	$300.00	$300.00
0140	2040055	Sidewalk, Rem	774.000	Syd	$5.00	$3,870.00
0141	2047011	_ Pavt, Rem, Modified	5,888.000	Syd	$8.00	$47,104.00
0142	2050016	Excavation, Earth	2,283.000	Cyd	$10.00	$22,830.00
0143	2050031	Non Haz Contaminated Material Handling and Disposal, LM	50.000	Cyd	$35.00	$1,750.00
0144	2050041	Subgrade Undercutting, Type II	100.000	Cyd	$20.00	$2,000.00
0145	2080020	Erosion Control, Inlet Protection, Fabric Drop	33.000	Ea	$100.00	$3,300.00
0146	3010002	Subbase, CIP	257.000	Cyd	$15.00	$3,855.00
0147	3027011	_ Aggregate Base, 8 inch, Modified	4,929.000	Syd	$8.00	$39,432.00
0148	3067031	_ Maintenance Gravel, Modified	1,000.000	Ton	$20.00	$20,000.00
0149	4020033	Sewer, Cl A, 12 inch, Tr Det B	30.000	Ft	$50.00	$1,500.00
0150	4021208	Sewer Tap, 30 inch	2.000	Ea	$800.00	$1,600.00
0151	4030210	Dr Structure, 48 inch dia	1.000	Ea	$1,800.00	$1,800.00
0152	4030220	Dr Structure, 60 inch dia	1.000	Ea	$3,000.00	$3,000.00
0153	4030230	Dr Structure, 72 inch dia	1.000	Ea	$3,500.00	$3,500.00
0154	4030306	Dr Structure, Tap, 6 inch	25.000	Ea	$150.00	$3,750.00
0155	4030312	Dr Structure, Tap, 12 inch	1.000	Ea	$350.00	$350.00
0156	4037001	_ Structure, Adj, Add Depth	38.000	Ft	$175.00	$6,650.00
0157	4037050	_ Manhole Cover, Adj	32.000	Ea	$800.00	$25,600.00
0158	4037050	_ Structure Cover, Adj, Case 1	54.000	Ea	$450.00	$24,300.00
0159	4037050	_ Structure Cover, Adj, Case 2	4.000	Ea	$375.00	$1,500.00
0160	4037050	_ Structure Cover, Special	27.000	Ea	$650.00	$17,550.00
0161	4040063	Underdrain, Subbase, 6 inch	4,500.000	Ft	$4.00	$18,000.00
0162	5010020	Pavt Joint and Crack Repr, Det 7	2,755.000	Ft	$12.00	$33,060.00
0163	5010021	Pavt Joint and Crack Repr, Det 8	2,755.000	Ft	$15.00	$41,325.00
0164	5010025	Hand Patching	693.000	Ton	$100.00	$69,300.00
0165	5010050	HMA, 4E1	2,214.000	Ton	$75.00	$166,050.00
0166	5010056	HMA, 5E1	2,214.000	Ton	$80.00	$177,120.00
0167	5017011	_ Cold Milling	26,348.000	Syd	$2.50	$65,870.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0168	6030030	Lane Tie, Epoxy Anchored	4,111.000	Ea	$4.25	$17,471.75
0169	8010007	Driveway, Nonreinf Conc, 8 inch	1,416.000	Syd	$50.00	$70,800.00
0170	8020023	Curb and Gutter, Conc, Det C4	308.000	Ft	$20.00	$6,160.00
0171	8020050	Driveway Opening, Conc, Det M	332.000	Ft	$25.00	$8,300.00
0172	8027001	_ Curb and Gutter, Conc, Det C4, Modified	8,051.000	Ft	$30.00	$241,530.00
0173	8030030	Curb Ramp Opening, Conc	87.000	Ft	$20.00	$1,740.00
0174	8030037	Sidewalk Ramp, Conc, 7 inch	781.000	Sft	$6.00	$4,686.00
0175	8030044	Sidewalk, Conc, 4 inch	5,052.000	Sft	$4.00	$20,208.00
0176	8037001	_ Detectable Warning Surface, Modified	50.000	Ft	$75.00	$3,750.00
0177	8037010	_ Sidewalk, Conc, 8 inch	1,043.000	Sft	$6.00	$6,258.00
0178	8070095	Post, Mailbox	14.000	Ea	$90.00	$1,260.00
0179	8100371	Post, Steel, 3 lb	663.000	Ft	$5.50	$3,646.50
0180	8100403	Sign, Type III, Rem	58.000	Ea	$10.00	$580.00
0181	8100404	Sign, Type IIIA	86.000	Sft	$14.00	$1,204.00
0182	8100405	Sign, Type IIIB	181.000	Sft	$14.00	$2,534.00
0183	8110024	Pavt Mrkg, Ovly Cold Plastic, 6 inch, Crosswalk	509.000	Ft	$2.50	$1,272.50
0184	8110045	Pavt Mrkg, Ovly Cold Plastic, 24 inch, Stop Bar	388.000	Ft	$9.00	$3,492.00
0185	8110063	Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym	5.000	Ea	$150.00	$750.00
0186	8110069	Pavt Mrkg, Ovly Cold Plastic, Railroad Sym	4.000	Ea	$150.00	$600.00
0187	8110218	Pavt Mrkg, Thermopl, 24 inch, Stop Bar	34.000	Ft	$8.00	$272.00
0188	8110380	Pavt Mrkg, Ovly Cold Plastic, 4 inch, Wet Reflective, White	8,264.000	Ft	$3.75	$30,990.00
0189	8110384	Pavt Mrkg, Ovly Cold Plastic, 4 inch, Wet Reflective, Yellow	11,245.000	Ft	$3.75	$42,168.75
0190	8120012	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn	18.000	Ea	$75.00	$1,350.00
0191	8120013	Barricade, Type III, High Intensity, Double Sided, Lighted, Oper	18.000	Ea	$6.50	$117.00
0192	8120026	Pedestrian Type II Barricade, Temp	20.000	Ea	$100.00	$2,000.00
0193	8120170	Minor Traf Devices	0.500	LSUM	$60,000.00	$30,000.00
0194	8120210	Pavt Mrkg, Longit, 6 inch or Less Width, Rem	300.000	Ft	$0.50	$150.00
0195	8120230	Pavt Mrkg, Type NR, Tape, 4 inch, White, Temp	2,640.000	Ft	$0.70	$1,848.00
0196	8120231	Pavt Mrkg, Type NR, Tape, 4 inch, Yellow, Temp	1,450.000	Ft	$0.60	$870.00

Line	Pay Item	Description	Quantity	Units	Unit Price	Total
0197	8120250	Plastic Drum, High Intensity, Furn	100.000	Ea	$18.50	$1,850.00
0198	8120251	Plastic Drum, High Intensity, Oper	100.000	Ea	$0.75	$75.00
0199	8120350	Sign, Type B, Temp, Prismatic, Furn	779.000	Sft	$5.75	$4,479.25
0200	8120351	Sign, Type B, Temp, Prismatic, Oper	779.000	Sft	$0.50	$389.50
0201	8120370	Traf Regulator Control	0.500	LSUM	$10,000.00	$5,000.00
0202	8127001	_ Pedestrian Path, Temp	120.000	Ft	$10.00	$1,200.00
0203	8127050	_ Pedestrian Ramp, Temp	6.000	Ea	$10.00	$60.00
0204	8127060	_ Railroad Protection, at Grade Crossing	1,000.000	Dlr	$1.00	$1,000.00
0205	8167011	_ Turf Establishment, Performance	5,825.000	Syd	$5.00	$29,125.00
0206	8200170	Traf Loop	1.000	Ea	$1,800.00	$1,800.00
0207	8210001	Monument Box	1.000	Ea	$500.00	$500.00
0208	8210005	Monument Box Adjust	1.000	Ea	$300.00	$300.00
0209	8210010	Monument Preservation	1.000	Ea	$300.00	$300.00
0210	8507060	_ Reimbursed Permit Fees	1,200.000	Dlr	$1.00	$1,200.00

Category 0005 Total: $1,659,553.25

Line	Pay Item	Description	Quantity	Units	Unit Price	Total

Estimate Total: $7,003,754.25