

CITY OF ANN ARBOR
INVITATION TO BID



West Liberty Street Reconstruction
S. First Street to N. Main Street

ITB No. 4496

Due Date: Thursday, May 11, 2017, 2:00pm (Local Time)

Public Services/Project Management Unit
Administering Service Area/Unit

Issued By:

City of Ann Arbor
Procurement Unit
301 E. Huron Street
Ann Arbor, MI 48104

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- City of Ann Arbor Prevailing Wage Declaration Form*
- City of Ann Arbor Living Wage Forms*
- City of Ann Arbor Vendor Conflict of Interest Disclosure Form*
- City of Ann Arbor Non-Discrimination Ordinance Notice and Declaration Form*
- MDOT Certified Payroll Form*

NOTICE OF PRE-BID CONFERENCE

A pre-bid conference for this project will be held on **Thursday, April 27, 2017, at 10:30am** at **Larcom City Hall, 4th Floor Conference Room**.

Attendance at this conference is highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-bid conference is for information only. Any answers furnished will not be official until verified in writing by the Financial Service Area, Procurement Unit. Answers that change or substantially clarify the bid will be affirmed in an addendum.

INSTRUCTIONS TO BIDDERS

General

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

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

Preparation of Bids

Bids should be prepared providing a straight-forward, concise description of the Bidder's ability to meet the requirements of the ITB. Bids shall be written in ink or typewritten. No erasures are permitted. Mistakes may be crossed out and corrected and must be initialed and dated in ink by the person signing the Bid.

Bids must be submitted on the "Bid Forms" provided with each blank properly filled in. If forms are not fully completed it may disqualify the bid. No alternative bid will be considered unless alternative bids are specifically requested. If alternatives are requested, any deviation from the specification must be fully described, in detail on the "Alternate" section of Bid form.

Each person signing the Bid certifies that he/she is the person in the Bidder's firm/organization responsible for the decision as to the fees being offered in the Bid and has not and will not participated in any action contrary to the terms of this provision.

Questions or Clarification on ITB Specifications

All questions regarding this ITB shall be submitted via email. Emailed questions and inquires will be accepted from any and all prospective Bidders in accordance with the terms and conditions of the ITB.

All questions shall be due on or before **Wednesday, May 3, 2017, by close of the business day at 5:00pm** and should be addressed as follows:

Specification/Scope of Work questions emailed to **jnelson@a2gov.org**
Bid Process and Compliance questions emailed to **cspencer@a2gov.org**

Any error, omissions or discrepancies in the specification discovered by a prospective contractor and/or service provider shall be brought to the attention of **Jennifer Nelson** at **jnelson@a2gov.org** after discovery as possible. Further, the contractor and/or service provide shall not be allowed to take advantage of errors, omissions or discrepancies in the specifications.

Addenda

If it becomes necessary to revise any part of the ITB, notice of the Addendum will be posted to Michigan Inter-governmental Trade Network (MITN) www.mitn.info and/or City of Ann Arbor web site www.A2gov.org for all parties to download.

Each Bidder must in its Bid, to avoid any miscommunications, acknowledge all addenda which it

has received, but the failure of a Bidder to receive, or acknowledge receipt of; any addenda shall not relieve the Bidder of the responsibility for complying with the terms thereof.

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

Bid Submission

All Bids are due and must be delivered to the City of Ann Arbor Procurement Unit on or before **Thursday, May 11, 2017, 2:00pm EST**. Bids submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each Bidder must submit one (1) original Bid and **one (1)** Bid copies in a sealed envelope clearly marked: **ITB No. 4496 - West Liberty Street Reconstruction**.

Bids must be addressed and delivered to:

City of Ann Arbor
Procurement Unit,
c/o Customer Services, 1st Floor
301 East Huron Street
Ann Arbor, MI 48107

All Bids received on or before the Due Date will be publicly opened and recorded immediately. No immediate decisions are rendered.

The following forms provided within this ITB Document must be included in submitted bids.

- **City of Ann Arbor Prevailing Wage Declaration of Compliance**
- **City of Ann Arbor Living Wage Ordinance Declaration of Compliance**
- **Vendor Conflict of Interest Disclosure Form**
- **City of Ann Arbor Non-Discrimination Ordinance Declaration of Compliance**

Bids that fail to provide these completed forms listed above upon bid opening will be rejected as non-responsive and will not be considered for award.

Hand delivered bids will be date/time stamped/signed by the Procurement Unit at the address above in order to be considered. Normal business hours are 9:00 a.m. to 3:00 p.m. Monday through Friday, excluding Holidays. The City will not be liable to any Bidder for any unforeseen circumstances, delivery or postal delays. Postmarking to the Due Date will not substitute for receipt of the Bid. Each Bidder is responsible for submission of their Bid.

Additional time for submission of bids past the stated due date and time will not be granted to a single Bidder; however, additional time may be granted to all Bidders when the City determines in its sole discretion that circumstances warrant it.

Award

The City intends to award a Contract(s) to the lowest responsible Bidder(s). On multi-divisional contracts, separate divisions may be awarded to separate Bidders. The City may also utilize alternatives offered in the Bid Forms, if any, to determine the lowest responsible Bidder on each division, and award multiple divisions to a single Bidder, so that the lowest total cost is achieved

for the City. For unit price bids, the Contract will be awarded based upon the unit prices and the lump sum prices stated by the bidder for the work items specified in the bid documents, with consideration given to any alternates selected by the City. If the City determines that the unit price for any item is materially different for the work item bid than either other bidders or the general market, the City, in its sole discretion, in addition to any other right it may have, may reject the bid as not responsible or non-conforming.

The acceptability of major subcontractors will be considered in determining if a Bidder is responsible. In comparing Bids, the City will give consideration to alternate Bids for items listed in the bid forms. All key staff and subcontractors are subject to the approval by the City.

Official Documents

The City of Ann Arbor officially distributes bid documents from the Procurement Unit or through the Michigan Intergovernmental Trade Network (MITN). Copies of the bid documents obtained from any other source are not Official copies. Addenda and other bid information will only be posted to these official distribution sites. If you obtained City of Ann Arbor Bid documents from other sources, it is recommended that you register on www.MITN.info and obtain an official Bid. Bidders do not need to be shown on the plan holders list provided by MITN to be considered an official plan holder.

Bid Security

Each bid must be accompanied by a certified check, or Bid Bond by a surety licensed and authorized to do business within the State of Michigan, in the amount of 5% of the total of the bid price.

Withdrawal of Bids

After the time of opening, no Bid may be withdrawn for the period of ninety (90) days

Contract Time

Time is of the essence in the performance of the work under this Contract. The available time for work under this Contract is indicated on page C-2, Article III of the Contract. If these time requirements can not be met, the Bidder must stipulate on Bid Form Section 3 - Time Alternate its schedule for performance of the work. Consideration will be given to time in evaluating bids.

Liquidated Damages

A liquidated damages clause, as given on page C-2, Article III of the Contract, provides that the Contractor shall pay the City as liquidated damages, and not as a penalty, a sum certain per day for each and every day that the Contractor may be in default of completion of the specified work, within the time(s) stated in the Contract, or written extensions.

Liquidated damages clauses, as given in the General Conditions, provide further that the City shall be entitled to impose and recover liquidated damages for breach of the obligations under Chapter 112 of the City Code.

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

to preclude recovery of actual damages in addition to the recovery of liquidated damages.

Human Rights Information

All contractors proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Section 5, beginning at page GC-3 shall be a material breach of the contract. Contractors are required to post a copy of Ann Arbor's Non-Discrimination Ordinance attached at all work locations where its employees provide services under a contract with the City.

Wage Requirements

Section 4, beginning at page GC-1, outlines the requirements for payment of prevailing wages and for payment of a "living wage" to employees providing service to the City under this contract. The successful bidder and its subcontractors must comply with all applicable requirements and provide proof of compliance.

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

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

For the purposes of this ITB the Construction Type of Heavy will apply.

Conflict Of Interest Disclosure

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

Major Subcontractors

The Bidder shall identify on Bid Form Section 4 each major subcontractor it expects to engage for this Contract if the work to be subcontracted is 15% or more of the bid sum or over \$50,000, whichever is less. The Bidder also shall identify the work to be subcontracted to each major subcontractor. The Bidder shall not change or replace a subcontractor without approval by the City.

Debarment

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

Disclosures

After bids are opened, all information in a submitter's bid is subjected to disclosure under the provisions of Michigan Public Act No. 442 of 1976, as amended (MCL 15.231 et seq.) known as the "Freedom of Information Act." The Freedom of Information Act also provides for the complete disclosure of contracts and attachments thereto except where specifically exempted.

Bid Protest

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

Cost Liability

The City of Ann Arbor assumes no responsibility or liability for costs incurred by the Bidder prior to the execution of a contract with the City. By submitting a bid, a bidder agrees to bear all costs incurred or related to the preparation, submission and selection process for the bid.

Reservation of Rights

The City of Ann Arbor reserves the right to accept any bid or alternative bid proposed in whole or in part, to reject any or all bids or alternatives bids in whole or in part and to waive irregularity and/or informalities in any bid and to make the award in any manner deemed in the best interest of the City.

INVITATION TO BID

City of Ann Arbor
Guy C. Larcom Municipal Building
Ann Arbor, Michigan 48107

Ladies and Gentlemen:

The undersigned, as Bidder, declares that this Bid is made in good faith, without fraud or collusion with any person or persons bidding on the same Contract; that this Bidder has carefully read and examined the bid documents, including City Nondiscrimination requirements and Declaration of Compliance Form, Living Wage requirements and Declaration of Compliance Form, Prevailing Wage requirements and Declaration of Compliance Form, Vendor Conflict of Interest Form, Notice of Pre-Bid Conference, Instructions to Bidders, Bid, Bid Forms, Contract, Bond Forms, General Conditions, Standard Specifications, Detailed Specifications, all Addenda, and the Plans (if applicable) and understands them. The Bidder declares that it conducted a full investigation at the site and of the work proposed and is fully informed as to the nature of the work and the conditions relating to the work's performance. The Bidder also declares that it has extensive experience in successfully completing projects similar to this one.

The Bidder acknowledges that it has not received or relied upon any representations or warrants of any nature whatsoever from the City of Ann Arbor, its agents or employees, and that this Bid is based solely upon the Bidder's own independent business judgment.

The undersigned proposes to perform all work shown on the plans or described in the bid documents, including any addenda issued, and to furnish all necessary machinery, tools, apparatus, and other means of construction to do all the work, furnish all the materials, and complete the work in strict accordance with all terms of the Contract of which this Bid is one part.

In accordance with these bid documents, and Addenda numbered _____, the undersigned, as Bidder, proposes to perform at the sites in and/or around Ann Arbor, Michigan, all the work included herein for the amounts set forth in the Bid Forms.

The Bidder declares that it has become fully familiar with the liquidated damage clauses for completion times and for compliance with City Code Chapter 112, understands and agrees that the liquidated damages are for the non-quantifiable aspects of non-compliance and do not cover actual damages that may be shown and agrees that if awarded the Contract, all liquidated damage clauses form part of the Contract.

The Bidder declares that it has become fully familiar with the provisions of Chapter 14, Section 1:320 (Prevailing wages) and Chapter 23 (Living Wage) of the Code of the City of Ann Arbor and that it understands and agrees to comply, to the extent applicable to employees providing services to the City under this Contract, with the wage and reporting requirements stated in the City Code provisions cited. Bidder certifies that the statements contained in the City Prevailing Wage and Living Wage Declaration of Compliance Forms are true and correct. Bidder further agrees that the cited provisions of Chapter 14 and Chapter 23 form a part of this Contract.

The Bidder declares that it has become familiar with the City Conflict of Interest Disclosure Form and certifies that the statement contained therein is true and correct.

The Bidder encloses a certified check or Bid Bond in the amount of 5% of the total of the Bid Price. The Bidder agrees both to contract for the work and to furnish the necessary Bonds and insurance documentation within 10 days after being notified of the acceptance of the Bid.

If this Bid is accepted by the City and the Bidder fails to contract and furnish the required Bonds and insurance documentation within 10 days after being notified of the acceptance of this Bid, then the Bidder shall be considered to have abandoned the Contract and the certified check or Bid Bond accompanying this Bid shall become due and payable to the City.

If the Bidder enters into the Contract in accordance with this Bid, or if this Bid is rejected, then the accompanying check or Bid Bond shall be returned to the Bidder.

In submitting this Bid, it is understood that the right is reserved by the City to accept any Bid, to reject any or all Bids, to waive irregularities and/or informalities in any Bid, and to make the award in any manner the City believes to be in its best interest.

SIGNED THIS _____ DAY OF _____, 201__.

Bidder's Name

Authorized Signature of Bidder

Official Address

(Print Name of Signer Above)

Telephone Number

Email Address for Award Notice

LEGAL STATUS OF BIDDER

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

Bidder declares that it is:

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

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

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

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

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

Authorized Official

_____ **Date** _____, 201__

(Print) Name _____ Title _____

Company: _____

Address: _____

Contact Phone () _____ Fax () _____

Email _____

BID FORM
Section 1 - Schedule of Prices
Project: ITB 4496 - West Liberty Street Reconstruction

ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
1507051	Audiovisual Tape Coverage	LS	1	\$ _____	\$ _____
1507051	General Conditions, Max \$	LS	1	\$ _____	\$ _____
1507051	Project Supervision, Max \$	LS	1	\$ _____	\$ _____
1507051	Certified Payroll Compliance and Reporting	LS	1	\$ _____	\$ _____
2020004	Tree, Rem, 6 inch to 18 inch	Ea	9	\$ _____	\$ _____
2030011	Dr Structure, Rem	Ea	18	\$ _____	\$ _____
2037001	Sewer, Rem	Ft	355	\$ _____	\$ _____
2037001	Sewer, Abandon	Ft	46	\$ _____	\$ _____
2040020	Curb and Gutter, Rem	Ft	2477	\$ _____	\$ _____
2040055	Sidewalk, Rem	Syd	12940	\$ _____	\$ _____
2047011	Pavement, Rem	Syd	7806	\$ _____	\$ _____
2047050	Exploratory Excavation	Ea	3	\$ _____	\$ _____
2050041	Subgrade Undercutting, Type II	Cyd	370	\$ _____	\$ _____
2057002	Machine Grading, Modified,	Sta	15.4	\$ _____	\$ _____
2057002	Sidewalk Grading	Sta	13641	\$ _____	\$ _____
2057021	Non-hazardous Contaminated Material Handling and Disposal	Cyd	450	\$ _____	\$ _____
2087050	Erosion Control, Inlet Filter	Ea	24	\$ _____	\$ _____
3017021	Granular Material Class II Sand	Cyd	490	\$ _____	\$ _____
3017021	Subbase, CIP, Class II Granular Material	Cyd	1752	\$ _____	\$ _____
3020020	Aggregate Base, 8 inch	Syd	787	\$ _____	\$ _____
3027011	Aggregate Base, 8 inch, 21-AA, Modified	Syd	6307	\$ _____	\$ _____
4011120	Steel Casing Pipe, 12 inch, Jacked in Place	Ft	55	\$ _____	\$ _____
4021230	Sewer Bulkhead, 12 inch	Ea	5	\$ _____	\$ _____
4021260	Trench Undercut and Backfill (6A, limestone)	Cyd	50	\$ _____	\$ _____

Total This Page \$ _____

BID FORM
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ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
4027001	Sewer, CI C 76 IV, 12 inch, Tr Det I, Modified	Ft	544	\$ _____	\$ _____
4027001	Sewer, CI C 76 IV, 15 inch, Tr Det I, Modified	Ft	109	\$ _____	\$ _____
4027001	Sewer, CI C 76 IV, 18 inch, Tr Det I, Modified	Ft	52	\$ _____	\$ _____
4027001	Sewer, CI C 76 IV, 24 inch, Tr Det I, Modified	Ft	120	\$ _____	\$ _____
4027001	Sewer, CI C 76 IV, 48 inch, Tr Det I, Modified	Ft	205	\$ _____	\$ _____
4030005	Dr Structure Cover, Adj, Case 1	Ea	29	\$ _____	\$ _____
4030006	Dr Structure Cover, Adj, Case 2	Ea	2	\$ _____	\$ _____
4030010	Dr Structure Cover, Type B	Ea	30	\$ _____	\$ _____
4030050	Dr Structure Cover, Type K	Ea	22	\$ _____	\$ _____
4030390	Dr Structure, Temp Lowering	Ea	90	\$ _____	\$ _____
4037001	Additional Depth Structure Adjust	Ft	19	\$ _____	\$ _____
4037001	Dr Structure, 48 inch dia, Add Depth	Ft	3.86	\$ _____	\$ _____
4037001	Dr Structure, 72 inch dia, Add Depth	Ft	5.86	\$ _____	\$ _____
4037050	Dr Structure Cover, Water-tite	Ea	8	\$ _____	\$ _____
4037050	Dr Structure, CIEanout, 8 inch dia	Ea	8	\$ _____	\$ _____
4037050	Dr Structure, 48 inch dia	Ea	3	\$ _____	\$ _____
4037050	Dr Structure, 48 inch dia, Inlet LEaching	Ea	8	\$ _____	\$ _____
4037050	Dr Structure, Type III, 48 inch dia	Ea	2	\$ _____	\$ _____
4037050	Dr Structure, 72 inch dia	Ea	7	\$ _____	\$ _____
4037050	Dr Structure, 84 inch dia	Ea	2	\$ _____	\$ _____
4037050	Dr Structure, 24 inch dia	Ea	8	\$ _____	\$ _____
4037050	Dr Structure, 36 inch dia	Ea	5	\$ _____	\$ _____
4037050	Reconstruct Structure	Ea	3	\$ _____	\$ _____
4037050	Storm Water Control Structure 84 inch dia	Ea	1	\$ _____	\$ _____

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ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
4040063	Underdrain, Subbase, 6 inch	Ft	1393	\$ _____	\$ _____
4040075	Underdrain, Subgrade, 8 inch	Ft	250	\$ _____	\$ _____
4047001	Infiltration Trench	Cyd	111	\$ _____	\$ _____
5010045	HMA, 3E3	Ton	1085	\$ _____	\$ _____
5010051	HMA, 4E3	Ton	724	\$ _____	\$ _____
5010057	HMA, 5E3	Ton	545	\$ _____	\$ _____
5010703	HMA, LVSP Hand Patching	Ton	75	\$ _____	\$ _____
5017011	Temporary Pavement	Syd	111	\$ _____	\$ _____
8027001	Curb and Gutter, Concrete	Ft	2270	\$ _____	\$ _____
8027001	Driveway Opening, Conc, Detail M	Ft	414	\$ _____	\$ _____
8027010	Integral Sidewalk Retaining Wall, 6 inch to 18 inch	sFt	120	\$ _____	\$ _____
8037001	Detectable Warning Surface	Ft	130	\$ _____	\$ _____
8037010	Brick, Rem and Salvage	SFt	2821	\$ _____	\$ _____
8037010	Sidewalk, Concrete, 6 inch, Modified	SFt	7751	\$ _____	\$ _____
8037010	Sidewalk, Ramp, Approach Concrete, 8 inch, Modified	SFt	5441	\$ _____	\$ _____
8037010	Brick Pavers, New	SFt	3414	\$ _____	\$ _____
8037050	Bike Hoops, Rem	Ea	6	\$ _____	\$ _____
8037050	Bike Hoops, Surface Mount	Ea	8	\$ _____	\$ _____
8080007	Fence, Protective	Ft	2500	\$ _____	\$ _____
8107050	Remove and Replace Parking Meter Posts	Ea	12	\$ _____	\$ _____
8107050	Sign, Rem and Salvage	Ea	3	\$ _____	\$ _____
8110049	Pavt Mrkg, Ovly Cold Plastic, Bike Arrow Sym	Ea	4	\$ _____	\$ _____
8110058	Pavt Mrkg, Ovly Cold Plastic, Bike, Small Sym	Ea	4	\$ _____	\$ _____
8110063	Pavt Mrkg, Ovly Cold Plastic, Lt Turn Arrow Sym	Ea	1	\$ _____	\$ _____

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BID FORM
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ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
8110068	Pavt Mrkg, Ovly Cold Plastic, Only	Ea	1	\$ _____	\$ _____
8110078	Pavt Mrkg, Ovly Cold Plastic, Thru Arrow Sym	Ea	1	\$ _____	\$ _____
8110079	Pavt Mrkg, Ovly Cold Plastic, Sharrow	Ea	4	\$ _____	\$ _____
8110092	Pavt Mrkg, PolyurEa, 4 inch, Yellow	Ft	1738	\$ _____	\$ _____
8110094	Pavt Mrkg, PolyurEa, 6 inch, White	Ft	245	\$ _____	\$ _____
8110110	Pavt Mrkg, PolyurEa, 12 inch, Crosswalk	Ft	1119	\$ _____	\$ _____
8110114	Pavt Mrkg, PolyurEa, 24 inch, Stop Bar	Ft	283	\$ _____	\$ _____
8110411	Pavt Mrkg PolyurEa Railroad Symbol	Ea	4	\$ _____	\$ _____
8120012	Barricade, Type III, High Intensity, Double Sided, Lighted, Furn	Ea	25	\$ _____	\$ _____
8120013	Barricade, Type III, High Intensity, Double Sided, Lighted, Oper	Ea	25	\$ _____	\$ _____
8120030	Channelizing Device, 42 inch, Furn	Ea	20	\$ _____	\$ _____
8120031	Channelizing Device, 42 inch, Oper	Ea	20	\$ _____	\$ _____
8120130	Lighted Arrow, Type B, Furn	Ea	1	\$ _____	\$ _____
8120131	Lighted Arrow, Type B, Oper	Ea	1	\$ _____	\$ _____
8120170	Minor Traf Devices	LS	1	\$ _____	\$ _____
8120210	Pavt Mrkg, Longit, 6 inch or Less Width, Rem	Ft	150	\$ _____	\$ _____
8120220	Pavt Mrkg, Wet Reflective, Type NR, Paint, 4 inch, White, Temp	Ft	2569	\$ _____	\$ _____
8120250	Plastic Drum, High Intensity, Furn	Ea	200	\$ _____	\$ _____
8120251	Plastic Drum, High Intensity, Oper	Ea	200	\$ _____	\$ _____
8120310	Sign Cover	Ea	5	\$ _____	\$ _____
8120330	Sign, Portable, ChangEable Message, Furn	Ea	2	\$ _____	\$ _____
8120331	Sign, Portable, ChangEable Message, Oper	Ea	2	\$ _____	\$ _____
8120350	Sign, Type B, Temp, Prismatic, Furn	SFt	981	\$ _____	\$ _____
8120351	Sign, Type B, Temp, Prismatic, Oper	SFt	981	\$ _____	\$ _____

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BID FORM
Section 1 - Schedule of Prices
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ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
8120370	Traf Regulator Control	LS	1	\$ _____	\$ _____
8127001	Pavt Mrkg, Type NR, 24 inch, White, Temp	Ft	60	\$ _____	\$ _____
8127001	Part-Width Construction, Special	Ft	1365	\$ _____	\$ _____
8127050	Pedestrian Type II Barricade	Ea	4	\$ _____	\$ _____
8127050	Temporary Curb Ramp Perpedicular to Curb	Ea	2	\$ _____	\$ _____
8127050	Temporary Curb Ramp Parallel to Curb	Ea	2	\$ _____	\$ _____
8157050	Nyssa Sylvatica (Blackgum) 2.5" B-B	Ea	13	\$ _____	\$ _____
8157050	Ulmus Americana New Marmony (American Elm)	Ea	13	\$ _____	\$ _____
8157050	Tree Grates	Ea	42	\$ _____	\$ _____
8157050	Tree Pit	Ea	26	\$ _____	\$ _____
8167011	Slope Restoration	Syd	210	\$ _____	\$ _____
8167011	Tree Pit Compost/Topsoil	Syd	25	\$ _____	\$ _____
8190505	Wood Pole, Rem	Ea	1	\$ _____	\$ _____
8197001	Conduit, DB, 2, Schedule 80 PVC, 3 inch	Ft	3125	\$ _____	\$ _____
8197001	Electrical Cable, DB, 600V, 3C, 1-#6, 2-#4	Ft	6250	\$ _____	\$ _____
8197010	Street Light, Rem	Ea	28	\$ _____	\$ _____
8197010	Remove Street light foundation	Ea	28	\$ _____	\$ _____
8197050	Communication Handhole Assembly, Complete	Ea	20	\$ _____	\$ _____
8197050	Electrical Handhole Assembly, Complete	Ea	14	\$ _____	\$ _____
8197050	Street Light Foundations LTFX-1	Ea	18	\$ _____	\$ _____
8197050	Street Light Foundations LTFX-2	Ea	10	\$ _____	\$ _____
8197050	Street Light Assembly, Complete LTFX-1	Ea	18	\$ _____	\$ _____
8197050	Street Light Assembly, Complete LTFX-2	Ea	10	\$ _____	\$ _____
8197050	Street Light Disconnect Box, Complete	Ea	1	\$ _____	\$ _____

Total This Page \$ _____

BID FORM
Section 1 - Schedule of Prices
Project: ITB 4496 - West Liberty Street Reconstruction

ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
8207050	Remove Mast Arm foundation	Ea	5	\$ _____	\$ _____
8207050	Remove Ped Foundation	Ea	4	\$ _____	\$ _____
8207050	Mast Arm Foundation	Ea	5	\$ _____	\$ _____
8237001	4 inch thru 8 inch Water Main, Abandon	Ft	625	\$ _____	\$ _____
8237001	10 inch and 12 inch Water Main, Abandon	Ft	175	\$ _____	\$ _____
8237001	D.I. Water Main, w/ Polyethylene Wrap, 4 inch, Tr Det I, Mod	Ft	100	\$ _____	\$ _____
8237001	D.I. Water Main, w/ Polyethylene Wrap, 6 inch, Tr Det I, Mod	Ft	40	\$ _____	\$ _____
8237001	D.I. Water Main, w/ Polyethylene Wrap, 8 inch, Tr Det I, Mod	Ft	20	\$ _____	\$ _____
8237001	D.I. Water Main, w/ Polyethylene Wrap, 10 inch, Tr Det I, Mod	Ft	20	\$ _____	\$ _____
8237001	D.I. Water Main, w/ Polyethylene Wrap, 12 inch, Tr Det I, Mod	Ft	916	\$ _____	\$ _____
8237001	Polyethylene Wrap, 12 inch Directional Drilled	Ft	302	\$ _____	\$ _____
8237001	Excavate and Backfill Water Service Trench Tap and LEad	Ft	341	\$ _____	\$ _____
8237050	Gate Valve-in-Box, Rem	Ea	4	\$ _____	\$ _____
8237050	Gate Valve-in-Well, Rem	Ea	2	\$ _____	\$ _____
8237050	Fire Hydrant, Rem	Ea	3	\$ _____	\$ _____
8237050	90 deg Bend, 4 inch	Ea	1	\$ _____	\$ _____
8237050	45 deg Bend, 6 inch	Ea	1	\$ _____	\$ _____
8237050	90 deg Bend, 6 inch	Ea	1	\$ _____	\$ _____
8237050	11.25 deg Bend, 12 inch	Ea	6	\$ _____	\$ _____
8237050	22.5 deg Bend, 12 inch	Ea	1	\$ _____	\$ _____
8237050	45 deg Bend, 12 inch	Ea	6	\$ _____	\$ _____
8237050	Tee, 6 inch x 6 inch x 6 inch	Ea	1	\$ _____	\$ _____
8237050	Tee, 10 inch x 10 inch x 10 inch	Ea	1	\$ _____	\$ _____
8237050	Tee, 12 inch x 12 inch x 4 inch	Ea	1	\$ _____	\$ _____

Total This Page \$ _____

BID FORM
Section 1 - Schedule of Prices
Project: ITB 4496 - West Liberty Street Reconstruction

ITEM No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT (\$)
8237050	Tee, 12 inch x 12 inch x 8 inch	Ea	3	\$ _____	\$ _____
8237050	Tee, 12 inch x 12 inch x 12 inch	Ea	6	\$ _____	\$ _____
8237050	Fire Hydrant Assembly, with Extensions, Complete	Ea	3	\$ _____	\$ _____
8237050	Gate Valve-in-Box, 4 inch	Ea	4	\$ _____	\$ _____
8237050	Gate Valve-in-Box, 12 inch	Ea	1	\$ _____	\$ _____
8237050	Gate Valve-in-Well, 12 inch	Ea	7	\$ _____	\$ _____
8237050	Water Main Line Stop 6 inch and 8 inch	Ea	6	\$ _____	\$ _____
8237050	Water Main Line Stop 10 inch and 12 inch	Ea	3	\$ _____	\$ _____
8237050	Reducer, 8 inch x 6 inch	Ea	2	\$ _____	\$ _____
8237050	Reducer, 10 inch x 12 inch	Ea	1	\$ _____	\$ _____
8237050	Reducer, 12 inch x 6 inch	Ea	2	\$ _____	\$ _____
8237050	Reducer, 12 inch x 4 inch	Ea	4	\$ _____	\$ _____
8507001	Sewer, SDR 35 PVC, Service Lead, 4 inch or 6 inch, Tr Det I Mod	Ft	50	\$ _____	\$ _____
Total This Page					\$ _____
Total From BF-1					\$ _____
Total From BF-2					\$ _____
Total From BF-3					\$ _____
Total From BF-4					\$ _____
Total From BF-5					\$ _____
Total From BF-6					\$ _____
Total Base Bid					\$ _____
Contractor: _____					

BID FORM

Section 2 - Material and Equipment Alternates

The Base Bid proposal price shall include materials and equipment selected from the designated items and manufacturers listed in the bidding documents. This is done to establish uniformity in bidding and to establish standards of quality for the items named.

If the Contractor wishes to quote alternate items for consideration by the City, it may do so under this Section. A complete description of the item and the proposed price differential must be provided. Unless approved at the time of award, substitutions where items are specifically named will be considered only as a negotiated change in Contract Sum.

<u>Item Number</u>	<u>Description</u>	<u>Add/Deduct Amount</u>
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If the Bidder does not suggest any material or equipment alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any material or equipment alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

BID FORM

Section 3 - Time Alternate

If the Bidder takes exception to the time stipulated in Article III of the Contract, Time of Completion, page C-2, it is requested to stipulate below its proposed time for performance of the work. Consideration will be given to time in evaluating bids.

If the Bidder does not suggest any time alternate, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT propose any time alternate under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

BID FORM

Section 4 - Major Subcontractors

For purposes of this Contract, a Subcontractor is anyone (other than the Contractor) who performs work (other than or in addition to the furnishing of materials, plans or equipment) at or about the construction site, directly or indirectly for or on behalf of the Contractor (and whether or not in privity of Contract with the Contractor), but shall not include any individual who furnishes merely the individual's own personal labor or services.

Contractor agrees that all subcontracts entered into by the Contractor shall contain similar wage provision to Section 4 of the General Conditions covering subcontractor's employees who perform work on this contract.

For the work outlined in these documents the Bidder expects to engage the following major subcontractors to perform the work identified:

<u>Subcontractor (Name and Address)</u>	<u>Work</u>	<u>Amount</u>
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If the Bidder does not expect to engage any major subcontractor, the Bidder **MUST** complete the following statement:

For the work outlined in this request for bid, the bidder does NOT expect to engage any major subcontractor to perform work under the Contract.

Signature of Authorized Representative of Bidder _____ Date _____

SAMPLE STANDARD CONTRACT

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

CONTRACT

THIS AGREEMENT is made on the _____ day of _____, 2017, between the CITY OF ANN ARBOR, a Michigan Municipal Corporation, 301 East Huron Street, Ann Arbor, Michigan 48104 ("City") and _____ ("Contractor")

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

(Address)

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

ARTICLE I - Scope of Work

The Contractor agrees to furnish all of the materials, equipment and labor necessary; and to abide by all the duties and responsibilities applicable to it for the project titled West Liberty Reconstruction – ITB No. 4496 in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, which are incorporated as part of this Contract:

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

General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means **Project Management Unit**

Project means **West Liberty Reconstruction – ITB No. 4496**

ARTICLE III - Time of Completion

- (A) The work to be completed under this Contract shall begin immediately on the date specified in the Notice to Proceed issued by the City.
- (B) The entire work for this Contract shall be completed within _____ () consecutive calendar days.
- (C) Failure to complete all the work within the time specified above, including any extension granted in writing by the Supervising Professional, shall obligate the Contractor to pay the City, as liquidated damages and not as a penalty, an amount equal to \$1,000.00 for each calendar day of delay in the completion of all the

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

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

ARTICLE IV - The Contract Sum

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

_____ Dollars (\$_____)

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

ARTICLE V - Assignment

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

ARTICLE VI - Choice of Law

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

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

ARTICLE VII - Relationship of the Parties

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

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

ARTICLE VIII - Notice

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

ARTICLE IX - Indemnification

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

ARTICLE X - Entire Agreement

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

FOR CONTRACTOR

By _____

Its: _____

FOR THE CITY OF ANN ARBOR

By _____
Christopher Taylor, Mayor

By _____
Jacqueline Beaudry, City Clerk

Approved as to substance

By _____
City Administrator

[signatures continue on next page]

By _____

Services Area Administrator

Approved as to form and content

Stephen K. Postema, City Attorney

PERFORMANCE BOND

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

SIGNED AND SEALED this _____ day of _____, 201_.

(Name of Surety Company)
By _____
(Signature)
Its _____
(Title of Office)

(Name of Principal)
By _____
(Signature)
Its _____
(Title of Office)

Approved as to form:

Stephen K. Postema, City Attorney

Name and address of agent:

LABOR AND MATERIAL BOND

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

SIGNED AND SEALED this _____ day of _____, 201_

(Name of Surety Company)
By _____
(Signature)
Its _____
(Title of Office)

(Name of Principal)
By _____
(Signature)
Its _____
(Title of Office)

Approved as to form:

Stephen K. Postema, City Attorney

Name and address of agent:

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

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

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

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

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

Section 2 - Order of Completion

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

Section 3 - Familiarity with Work

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

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

Section 4 - Wage Requirements

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

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

Pursuant to Resolution R-16-469 all public improvement contractors are subject to prevailing wage and will be required to provide to the City payroll records sufficient to demonstrate compliance with the prevailing wage requirements. A sample Prevailing Wage Form is provided in the Appendix herein for reference as to what will be expected from contractors. Use of the Prevailing Wage Form provided in the Appendix section or a City-approved equivalent will be required along with wage rate interviews.

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

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

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

Section 5 - Non-Discrimination

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

Section 6 - Materials, Appliances, Employees

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

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

Adequate sanitary facilities shall be provided by the Contractor.

Section 7 - Qualifications for Employment

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

Section 8 - Royalties and Patents

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

Section 9 - Permits and Regulations

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

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

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

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

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

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

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

Section 11 - Inspection of Work

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

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

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

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

Section 12 - Superintendence

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

Section 13 - Changes in the Work

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

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

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

Section 14 - Extension of Time

Extension of time stipulated in the Contract for completion of the work will be made if and as the

Supervising Professional may deem proper under any of the following circumstances:

- (1) When work under an extra work order is added to the work under this Contract;
- (2) When the work is suspended as provided in Section 20;
- (3) When the work of the Contractor is delayed on account of conditions which could not have been foreseen, or which were beyond the control of the Contractor, and which were not the result of its fault or negligence;
- (4) Delays in the progress of the work caused by any act or neglect of the City or of its employees or by other Contractors employed by the City;
- (5) Delay due to an act of Government;
- (6) Delay by the Supervising Professional in the furnishing of plans and necessary information;
- (7) Other cause which in the opinion of the Supervising Professional entitles the Contractor to an extension of time.

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

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

Section 15 - Claims for Extra Cost

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

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

- (1) The Contractor shall be reimbursed for all reasonable costs incurred in doing the work, and shall receive an additional payment of 15% of all the reasonable costs to cover both its indirect overhead costs and profit;
- (2) The term "Cost" shall cover all payroll charges for employees and supervision required under the specific order, together with all worker's compensation, Social Security, pension and retirement allowances and social insurance, or other regular payroll charges on same;

the cost of all material and supplies required of either temporary or permanent character; rental of all power-driven equipment at agreed upon rates, together with cost of fuel and supply charges for the equipment; and any costs incurred by the Contractor as a direct result of executing the order, if approved by the Supervising Professional;

- (3) If the extra is performed under subcontract, the subcontractor shall be allowed to compute its charges as described above. The Contractor shall be permitted to add an additional charge of 5% percent to that of the subcontractor for the Contractor's supervision and contractual responsibility;
- (4) The quantities and items of work done each day shall be submitted to the Supervising Professional in a satisfactory form on the succeeding day, and shall be approved by the Supervising Professional and the Contractor or adjusted at once;
- (5) Payments of all charges for work under this Section in any one month shall be made along with normal progress payments. Retainage shall be in accordance with Progress Payments-Section 16.

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

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

Section 16 - Progress Payments

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

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

In the case of Contracts which include only the Furnishing and Delivering of Equipment, the payments shall be; 60% of the Contract Sum upon the delivery of all equipment to be furnished, or in the case of delivery of a usable portion of the equipment in advance of the total equipment delivery, 60% of the estimated value of the portion of the equipment may be paid upon its delivery in advance of the time of the remainder of the equipment to be furnished; 30% of the Contract

Sum upon completion of erection of all equipment furnished, but not later than 60 days after the date of delivery of all of the equipment to be furnished; and payment of the final 10% on final completion of erection, testing and acceptance of all the equipment to be furnished; but not later than 180 days after the date of delivery of all of the equipment to be furnished, unless testing has been completed and shows the equipment to be unacceptable.

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

Section 17 - Deductions for Uncorrected Work

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

Section 18 - Correction of Work Before Final Payment

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

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

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

Section 19 - Acceptance and Final Payment

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

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

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

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

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

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

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

Section 20 - Suspension of Work

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

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

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

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

If the Contractor is adjudged a bankrupt, or if it makes a general assignment for the benefit of creditors, or if a receiver is appointed on account of its insolvency, or if it persistently or repeatedly refuses or fails except in cases for which extension of time is provided, to supply enough properly skilled workers or proper materials, or if it fails to make prompt payments to subcontractors or for material or labor, or persistently disregards laws, ordinances or the instructions of the Supervising Professional, or otherwise is guilty of a substantial violation of any provision of the Contract, then the City, upon the certificate of the Supervising Professional that sufficient cause exists to justify

such action, may, without prejudice to any other right or remedy and after giving the Contractor 3 days written notice, terminate this Contract. The City may then take possession of the premises and of all materials, tools and appliances thereon and without prejudice to any other remedy it may have, make good the deficiencies or finish the work by whatever method it may deem expedient, and deduct the cost from the payment due the Contractor. The Contractor shall not be entitled to receive any further payment until the work is finished. If the expense of finishing the work, including compensation for additional managerial and administrative services exceeds the unpaid balance of the Contract Sum, the Contractor and its surety are liable to the City for any excess cost incurred. The expense incurred by the City, and the damage incurred through the Contractor's default, shall be certified by the Supervising Professional.

Section 22 - Contractor's Right to Terminate Contract

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

Section 23 - City's Right To Do Work

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

Section 24 - Removal of Equipment and Supplies

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

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

Section 25 - Responsibility for Work and Warranties

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

The Contractor shall guarantee the quality of the work for a period of one year. The Contractor shall also unconditionally guarantee the quality of all equipment and materials that are furnished and installed under the contract for a period of one year. At the end of one year after the Contractor's receipt of final payment, the complete work, including equipment and materials

furnished and installed under the contract, shall be inspected by the Contractor and the Supervising Professional. Any defects shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. Any defects that are identified prior to the end of one year shall also be inspected by the Contractor and the Supervising Professional and shall be corrected by the Contractor at its expense as soon as practicable but in all cases within 60 days. The Contractor shall assign all manufacturer or material supplier warranties to the City prior to final payment. The assignment shall not relieve the Contractor of its obligations under this paragraph to correct defects.

Section 26 - Partial Completion and Acceptance

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

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

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

Section 27 - Payments Withheld Prior to Final Acceptance of Work

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

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

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

Section 28 - Contractor's Insurance

- (1) The Contractor shall procure and maintain during the life of this Contract, including the guarantee period and during any warranty work, such insurance policies, including those set forth below, as will protect itself and the City from all claims for bodily injuries, death

or property damage which may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor or by any subcontractor or anyone employed by them directly or indirectly. In the case of all contracts involving on-site work, the Contractor shall provide to the City, before the commencement of any work under this contract, certificates of insurance and other documentation satisfactory to the City demonstrating it has obtained the policies and endorsements required on behalf of itself, and when requested, any subcontractor(s). The certificates of insurance endorsements and/or copies of policy language shall document that the Contractor satisfies the following minimum requirements.

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

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

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

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

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

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

- (2) Insurance required under subsection (1)(b) and (1)(c) above shall be considered primary as respects any other valid or collectible insurance that the City may possess, including any self-insured retentions the City may have; and any other insurance the City does possess shall be considered excess insurance only and shall not be required to contribute with this insurance. Further, the Contractor agrees to waive any right of recovery by its insurer against the City.

- (3) Insurance companies and policy forms are subject to approval of the City Attorney, which

approval shall not be unreasonably withheld. Documentation must provide and demonstrate an unconditional 30 day written notice of cancellation in favor of the City of Ann Arbor. Further, the documentation must explicitly state the following: (a) the policy number; name of insurance company; name and address of the agent or authorized representative; name and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which shall be approved by the City, in its sole discretion; (c) that the policy conforms to the requirements specified Contractor shall furnish the City with satisfactory certificates of insurance and endorsements prior to commencement of any work. Upon request, the Contractor shall provide within 30 days a copy of the policy(ies) to the City. If any of the above coverages expire by their terms during the term of this Contract, the Contractor shall deliver proof of renewal and/or new policies and endorsements to the Administering Service Area/Unit at least ten days prior to the expiration date.

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

Section 29 - Surety Bonds

Bonds will be required from the successful bidder as follows:

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

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

Section 30 - Damage Claims

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

Section 31 - Refusal to Obey Instructions

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

Section 32 - Assignment

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

Section 33 - Rights of Various Interests

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

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

Section 34 - Subcontracts

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

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

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

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

Section 35 - Supervising Professional's Status

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

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

Section 36 - Supervising Professional's Decisions

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

Section 37 - Storing Materials and Supplies

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

Section 38 - Lands for Work

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

Section 39 - Cleaning Up

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

Section 40 - Salvage

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

Section 41 - Night, Saturday or Sunday Work

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

Section 42 - Sales Taxes

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

Section 43

CONTRACTOR'S DECLARATION

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

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

Contractor

Date

By _____
(Signature)

Its _____
(Title of Office)

Past due invoices, if any, are listed below.

STANDARD SPECIFICATIONS

All work under this contract shall be performed in accordance with the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction. All work under this Contract which is not included in these Standard Specifications, or which is performed using modifications to these Standard Specifications, shall be performed in accordance with the City of Ann Arbor Detailed Specifications, MDOT Supplemental Specifications, and MDOT Special Provisions included in these contract documents. Any reference to the Michigan Department of Transportation (the "Department") in the above Standard Specifications, Supplemental Specifications, and Special Provisions shall also mean the City of Ann Arbor.

The Michigan Department of Transportation 2012 Standard Specification for Construction may be downloaded from the following web link:

<http://mdotcf.state.mi.us/public/specbook/2012/>

DETAILED SPECIFICATIONS

DETAILED SPECIFICATION FOR PROJECT SCHEDULE

The entire work under this Contract shall be completed in accordance with, and subject to, the scheduling requirements as outlined below, and all other requirements of the Contract Documents.

By no later than Pre-Construction Meeting, the Contractor shall submit a detailed schedule of work for the Engineer's review and approval. The proposed schedule must fully comply with the scheduling requirements contained in this Detailed Specification. The Contractor shall update the approved work schedule each week and present it to the Engineer at the weekly progress meeting.

The Contractor will receive two (2) copies of the Contract, for his/her execution, on or before **May 16, 2017**. The Contractor shall properly execute both copies of the Contract and return them, with the required Bonds and Insurance Certificate, to the City **no later than June 20, 2017**.

Contractor may begin construction on only after receiving the copy of executed contract documents and the Notice to Proceed from the City, **and no earlier than July 24, 2017**. Appropriate time extensions shall be granted if the Notice to Proceed is delayed due to the circumstances controlled by the City.

All contract work for Phase I must be complete and open to traffic by **October 27, 2017** or within **ninety (90)** calendar days from the date specified in the Notice to Proceed. Project completion includes, but not limited to: water main installation and transfer all water service leads, storm sewer, street lights, placement of HMA thru the top course, restoration of all disturbed areas, tree planting, pavement markings, and the removal of any and all traffic control devices for the limits of work noted in Phase I.

Contractor may begin Phase II construction **no earlier than April 16, 2018**, or as weather and frost laws permit.

All contract work for Phase II must be complete and open to traffic by **June 30, 2018** or within **seventy-six (76)** calendar days. Project completion includes, but not limited to: water main installation and transfer all water service leads, storm sewer, street lights, placement of HMA thru the top course, restoration of all disturbed areas, tree planting, pavement markings, and the removal of any and all traffic control devices for the limits of work noted in Phase II.

Failure to complete all work as specified herein within the times specified herein, including time extensions granted thereto as determined by the Engineer, shall entitle the City to deduct from the payments due the Contractor, **\$1,000.00** in "Liquidated Damages", and not as a penalty, for each and every calendar day beyond the allowed number of calendar days to complete the above specified work.

The Contractor may propose to adjust the limits or sequencing of construction in order to complete the work more efficiently. Changes to the recommended construction sequence must be approved in writing by the Engineer prior to construction and must assure all required coordination with other projects and time lines.

Time is of the essence in the performance of the work of this contract. The Contractor is expected to mobilize sufficient personnel and equipment, and work throughout all authorized hours in order to complete the project by the final completion date. Costs for the Contractor to organize, coordinate, and schedule all of the work of the project, will not be paid for separately, but shall be included in the bid price of the Contract Item "General Conditions."

DETAILED SPECIFICATION
FOR
MAINTAINING TRAFFIC

AA:JN

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a. Description. Traffic shall be maintained by the Contractor throughout the project duration in accordance with the City of Ann Arbor Standard Specifications, subsection 104.11 and section 812 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, the Michigan Manual of Uniform Traffic Control Devices (MMUTCD), applicable supplemental specifications, as directed by the Engineer, and as herein specified.

The following, and herein included, Michigan Department of Transportation (MDOT) Maintaining Traffic Typical and Work Zone Device Details apply to the project: m0020a, m0040a, m0110a, m0140a, WZD-100-A, and WZD-125-E.

These maintaining traffic provisions are subject to change in the event of special community activities.

The permanent pavement marking items are included in the contract and shall be placed per the MDOT 2012 Standard Specifications for Construction prior to the removal of any devices required to temporarily maintain traffic during construction, and also prior to opening the project to traffic.

b. Materials. Materials for all devices used to temporarily control and maintain traffic shall meet the requirements of section 812 of the MDOT 2012 Standard Specifications for Construction, the MMUTCD, and the applicable MDOT typicals and details included herein.

All signs shall be 48 inches by 48 inches, unless otherwise noted. Temporary signs, which are to remain in the same place for 14 days or more, shall be installed on driven posts. All other temporary signs may be installed on portable supports. All signs shall have a minimum bottom height of 7.0 feet.

c. Construction. Construction methods shall meet the requirements of section 812 of the MDOT 2012 Standard Specifications for Construction.

The Contractor shall furnish and place all necessary temporary traffic control devices to maintain traffic during construction. All work, construction equipment, and material storage shall be kept behind the curb, or behind barricades or channelizing devices, all in combination with protective fencing, and shall not in any way hamper vehicle and pedestrian movement or impair traffic vision. The contractor shall also provide protection to all uncured concrete sidewalk, driveways, and curb and gutter as may be needed until all traffic, either foot or otherwise, can cross without damage. Additional barricades and protective fencing shall be installed at the end of each day to insure no disturbance to the work area.

Distances between warning, regulatory, and guide signs as shown on the typicals and details are approximate, and may require field adjustment, as directed by the Engineer.

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

1. Construction Influence Area (CIA). The CIA shall include the area within the width of the right of-way of the following roads, within the approximate limits described below:

- West Liberty Street – approximately 150 feet west of the railroad tracks to North Main Street

In addition, the CIA includes the right-of-way for a distance before and after the limits of construction as outlined above, the detour route, and the right-of-way of any intersecting road adjacent to the work zone as far as the construction or detour signing extends.

The Contractor shall furnish, erect, maintain, and upon completion of the work, remove all traffic control devices within and around the CIA for the safety and protection of traffic. This includes, but is not limited to, regulatory and warning signs, barricades, channeling devices and other minor devices where required by the Engineer.

The Contractor shall coordinate its operations with all subcontractors, utilities, and/or other contractors performing work on this and other projects within, or adjacent to, the Construction Influence Area (CIA). The contractor shall avoid conflicts in maintaining traffic operations, signing, and orderly progress of other contract work.

2. Permits. Prior to the start of construction, the Contractor shall obtain a "Right-of-Way" Permit from City of Ann Arbor Customer Services Unit. The Contractor shall notify the Project Engineer and obtain a "Traffic Detour or Lane Closure" Permit from City of Ann Arbor Project Management Services Unit a minimum of 72 business hours prior to the implementation of any traffic shifts, lane closures and street closures.

3. Work Times and Restrictions. All work shall be conducted Monday through Saturday between 7:00am and 8:00pm; unless an alternate plan identifying the days and hours of work has been authorized by the City prior to commencement of construction. Should night work be required for any reason, the Project Engineer must be notified three (3) working days (72 hours) in advance of such work, and the work must have the approval of the City prior to commencement.

Work outside of these hours will be permitted for the transfer of water services to prevent disruptions to businesses. The Contractor shall give three (3) working days notice.

Only work of an emergency nature or work required to insure traffic safety shall be performed on Sunday and only with prior approval by the City.

No road work shall be performed nor traffic interruptions be permitted on Sundays, and during the Memorial Day and Labor Day holiday periods. All streets and sidewalks that can be opened shall be opened. Trucking on or off site will not be permitted.

During non-working periods, any area with uncompleted work shall have plastic drums at specific locations and protective fencing, as directed by the Engineer.

4. Traffic Restrictions. The Contractor shall, at all times, conduct its work to insure the least possible obstruction to traffic and inconvenience to the general public, businesses, and residents in the vicinity of the work.

All major changes in traffic control shall be made either between 9:00 a.m. and 3:30 p.m. or between 7:00 p.m. and 6:30 a.m. in order to minimize interference with rush hour traffic. All traffic controls must be in place and ready for traffic each day by 6:30 a.m. and 3:30 p.m.

Pedestrian access to businesses, and residences within the CIA shall be maintained for the duration of the project. Vehicle access to alleys and side streets to be maintained as much as possible, per the plans. The Contractor shall make every effort to coordinate its operations to minimize interruptions impacting this access. The Contractor shall notify the Project Engineer forty-eight (48) hours in advance of any work to be performed on or near business or residential driveways, and stage work so that it is part-width when it is necessary to work in these areas. Prohibiting access to businesses and residences will not be allowed during any phase of construction, and flagging will be required at the discretion of the Engineer.

A minimum of one lane of traffic must be maintained on North Main Street, South Ashley Street and South First Street at all times by use of signage and other traffic control devices unless other authorized by the Engineer.

Lane width shall be a minimum of 10 feet wide. Contractor shall schedule work so that under no circumstances traffic is stopped.

5. Emergency Services. The Contractor shall notify local police, fire departments and emergency response units a minimum of three business days (72 hours) prior to the closure of any lanes, or traffic shifts causing restricted movements of traffic or restricted access. Fire hydrants in or adjacent to the work shall be kept "live" and fire fighting forces made aware of their availability at all times during construction.

d. Project Phasing. The Contractor shall notify the Engineer a minimum of 72 hours prior to the implementation of lane or road closures. See Maintenance of Traffic plans for details and limits of construction.

- **Phase 1** The work zone is limited to the east portion of the West Liberty Street project limits, from approximately 100 feet west of Ashley Street to the POE. Traffic to be maintained in accordance with the plans, utilizing temporary pavement to restore utility trenches to maintain traffic. This includes the construction of new water main, including the transfer of services to the new main, storm sewer within Ashley in addition to the sewer in the Phase I limits, street lights, new traffic signals, landscaping, placement of parking meters, paving thru the top course, and pavement markings.

- **Phase 2** The work zone is limited to the west portion of the West Liberty Street project limits, from the POB to approximately 100 feet west of Ashley Street. Traffic to be maintained in accordance with the plans, utilizing temporary pavement to restore utility trenches to maintain traffic. This includes the construction of new water main, including the transfer of services to the new main and drilling under the railroad, storm sewer, street lights, new traffic signals, landscaping, infiltration trench, placement of parking meters, paving thru the top course, and pavement markings.

e. Traffic Control Devices. All signs, barricades, warning lights, and other traffic control devices shall be in accordance with the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD). Signing for lane closures shall be in accordance with MDOT maintaining

traffic typical plans M0020a, M0040a, M0110a, M0150a and the maintaining traffic sheets in the plans.

Also, when work is in the proximity of a cross street, signing according to the MMUTCD shall be placed on the cross street.

The Contractor shall place all Sign, Type B, Temp, Prismatic with locations shown on the maintaining traffic sheets in the plans and maintaining traffic typical detail WZD-100-A on driven supports only (posts driven in ground), or securely sandbag them to prevent movement.

Distances shown between construction warning, regulatory and guide signs shown on the plans are approximate and may require field adjustment, as directed by the Engineer.

Portable Changeable Message Signs (PCMS) - Contact the Engineer for the initial message to be displayed upon delivering the PCMS to their appropriate location. PCMS may not be in place without a message.

Each PCMS shall be delineated with three (3) lighted high intensity plastic drums. The drums shall be placed on the shoulder at an offset and alignment as directed by the Engineer. Displaying different messages will be expected through the life of the project. All messages shall have the approval of the Engineer prior to displaying the message. **All PCMS shall have the ability to change/update the message from a remote location.** PCMS shall be turned off and removed from the roadway and outside of the clear zone when not being used to display a message approved by the Engineer. Turning the sign parallel to traffic or turning the PCMS off and leaving in place is not acceptable.

All traffic regulators must be properly trained and verification of training may be required.

A minimum of two traffic regulators will be required. They are to be assigned only to traffic control; they may not be members of the crew performing other duties.

Traffic regulators are required to wear high-visibility clothing, be equipped with a two-way radio system, and must have stop/slow paddles in accordance with the MMUTCD.

f. Measurement and Payment. The completed work for maintaining traffic, as described, will be paid for at the contract unit prices for the following items in accordance with subsection 812.04 of the Standard Specifications for Construction.

<u>Pay Item</u>	<u>Pay Unit</u>
Barricade, Type III, High Intensity, Double Sided, Furn	Each
Barricade, Type III, High Intensity, Double Sided, Oper.....	Each
Lighted Arrow, Type B, Furn	Each
Lighted Arrow, Type B, Oper.....	Each
Plastic Drum, High Intensity, Furn.....	Each
Plastic Drum, High Intensity, Oper	Each
Sign, Portable, Changeable Message, Furn	Each
Sign, Portable, Changeable Message, Oper.....	Each
Sign, Type B, Temp, Prismatic, Furn	Square Foot
Sign, Type B, Temp, Prismatic, Oper.....	Square Foot
Sign Cover	Each

Traffic Regulator Control	Lump Sum
Minor Traffic Control, Modified, Max \$_	Lump Sum

The estimated quantities for maintaining traffic are based on the signing and related traffic control devices deemed necessary for this project as shown on the applicable MDOT Maintaining Traffic Typical, and include traffic regulators, lighted arrows and minor traffic devices.

Payment for traffic control devices shall be based on the maximum quantity in place at any one time during the project, as determined by the Engineer. Non-standard specially fabricated signs, other than those used to determine the maximum square feet of signage, will be paid for separately by the unit square foot for each sign furnished and operated during construction.

Any additional signing or maintaining traffic devices required to expedite the construction shall be at the Contractor's expense.

Temporary traffic control devices will be paid for only once irrespective of the number of times moved. Traffic control devices not paid for separately shall be included in the payment for the pay item "Minor Traffic Control, Modified, Max \$_".

CITY OF ANN ARBOR

NOTICE TO BIDDERS

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Utilities Coordination

The Contractor shall cooperate and coordinate construction activities with the owners of utilities as stated in subsection 104.08 of the Standard Specifications for Construction. In addition, for the protection of underground utilities, the Contractor shall follow the requirements in subsection 107.12 of the Standard Specifications for Construction. Contractor delay claims resulting from a utility will be determined based upon subsection 108.09 of the Standard Specifications for Construction.

The following Utility Owners have facilities located within the Right-of-Way:

<u>Utility</u>	<u>Type of Service</u>
City of Ann Arbor W.R. Wheeler Service Center 4251 Stone School Road Ann Arbor, MI 48108 734 794-6351	Sanitary Sewer (Pat Maino - ext. 43318) Water (Daniel Wooden - ext. 43324) Storm Sewer (Kevin Ernst - ext. 43327) Communications/Signs/Signals/Street Lighting (Chuck Fojtik - ext. 43322)
AT&T 550 South Maple Ann Arbor, MI 48103 Attn: Debora Renner 734-996-5485 debora.a.renner@att.com	Telephone/Fiber Optic
Comcast 27800 Franklin Road Southfield, MI 48034 Attn: Ron Southerland 248-359-6544 ronald_southerland@cable.comcast.com	Cable/Fiber Optic
DTE Energy 2000 2 nd Ave, Room 518 S.B. Detroit, MI 48226 Attn: Julie Gottardi 734-884-0585 gottardij@dteenergy.com	Electric
DTE Energy (Michcon) 17150 Allen Road Melvindale, MI 48122 Attn: Laurie Forrester 313-389-7261 forresterl@dteentergy.com	Gas

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MCI/Verizon
5688 W Grand River Avenue
Lansing, MI 48906
Attn: Rick Chalmers
517-318-8064
rick.chalmers@verizonbusiness.com

Telephone/Fiber Optic

For protection of underground utilities, the Contractor shall call "MISS DIG" toll free at 1-800-482-7171 or call 811 a minimum of three (3) working days prior to excavation within the project limits. The Contractor must also notify utility owners who may not be part of the "MISS DIG" system.

The Contractor shall notify the City of Ann Arbor a minimum of three (3) days prior to beginning construction.

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

The Contractor shall verify the location and depth of all utilities through Miss Dig and coordinate with the utilities to ensure that all utilities are protected during the project.

Protection of existing utility facilities is necessary during the project. Protection may include: holding utility poles, supporting underground facilities, temporary sheeting, bracing, poles, cables, sand fill or other means to complete the work. The Contractor is responsible for furnishing all labor, equipment and materials required to protect existing facilities during construction. Costs associated with protecting existing utilities will not be paid for separately.

LICENSE #

**ANN ARBOR RAILROAD, INC.
INSURANCE REQUIREMENTS**

Licensee shall maintain a policy of commercial general liability and for at least **\$5,000,000.00** combined single limit, bodily injury and property damage per occurrence, **\$5,000,000.00** aggregate. The policy shall include: Completed operations liability, Contractual liability which would cover liabilities assumed under the contract with The Railroad, **An endorsement deleting all exclusions for work performed near a railroad**, an endorsement adding The Railroad as an additional insured and providing the Railroad 30 days' Notice Of Cancellation or intent not to renew. Further, Licensee or Licensee's Contractor shall maintain a policy of **railroad protective liability insurance** for the benefit of Railroad in the amount of at least **\$2,000,000.00** single limit and **\$6,000,000.00** aggregate. Licensee shall furnish certificates to Railroad and provide not less than 30 days' notice of cancellation or materials change in coverage.

**ANN ARBOR RAILROAD, INC.
315 WEST 3RD STREET
PITTSBURG, KS 66762**

NOTICE TO BIDDERS

CONSTRUCTION PHASING NOTES

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The following are notes to supplement the Construction Phasing plans included in the contract documents. These provide more specific detail for the sequence of construction.

Phase I

This phase will be constructed in 2017 and includes all work between Sta 19+85 and the POE.

The contractor shall begin by closing West Liberty between First Street and Main Street. Traffic must be maintained on First Street, Ashley Street and Main Street. Pedestrian traffic must be maintained at all times. Protective fencing must be installed prior to starting construction and must be maintained at all times.

Access to the alley must be re-established at the end of every work day to permit solid waste and recycling trucks access to dumpsters within the alley. Trucks will be travelling north to south thru the alley, and will have to be able to cross Liberty Street. Collection will occur prior to 7am, Monday thru Saturday. Business delivery trucks will not be permitted to travel down the alley and across Liberty; they will have to back out of the alley if they enter. Deliveries will be maintained on Ashley, therefore access on Ashley must be maintained at all times to the extent possible. Utility trenches will receive temporary pavement to permit delivery trucks to utilize Ashley instead of the alley; deliveries are made 7 days a week.

Construct the water main within the limits noted above. The Contractor shall maintain the existing pavement surface within the construction limits for construction traffic maintenance, and this surface should be swept periodically to prevent dust in this busy business area. Test the new system again valve 8 prior to constructing the water main in the Main Street intersection. Upon passing, implement lane closures and construct water main and connect to existing water main in Main Street.

Transfer water services to new water main. This work may be completed outside of regular contract hours to minimize impacts on businesses. Coordinate this work with the City of Ann Arbor Public Works Department.

Upon transferring the services, take the existing main out of service. Complete the manhole reconstruction in Main Street upon abandoning the water main, and remove the portion of water main that was constructed thru the storm sewer manhole.

Construct the storm sewer within the phase I project limits. The traffic signals at Ashley will have to be removed prior to construction in the Ashley. Coordinate removal of the signals and placement of stop signs with the City of Ann Arbor Signs and Signals Department. Street light service must be repaired if damaged by storm sewer construction; street lighting the full length of Liberty must be maintained at all times. Construction between manholes 200 and 201 shall occur during a period of dry weather due to the flows carried by the existing system. If by pass pumping is to be used, a back up pump MUST be on site.

Begin roadway grading and construction. Maintain existing sidewalk ramps to the extents possible. Implement temporary ramps when required to maintain access along the corridor. Construct roadway thru leveling course prior to starting work within the amenity zone. Install new street lights while maintaining service to 50% of the lights on the same side of the street.

NOTICE TO BIDDERS

CONSTRUCTION PHASING NOTES

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Upon completing all traffic signal and work in the amenity zone, place the top course of HMA and place permanent pavement markings.

Open roadway to traffic.

Phase II

This phase will be constructed in 2018 and includes all work between the POB and Sta 19+85.

The contractor shall begin by closing West Liberty between Second Street and Ashley Street. Traffic must be maintained on First Street, and Ashley Street. Pedestrian traffic must be maintained at all times. Protective fencing must be installed prior to starting construction and must be maintained at all times.

Complete the directionally drilled water main construction under the railroad and pressure test. Fill with water while the remainder of the water main is constructed to prevent the drilled main from 'floating'. Construct the water main within the limits noted above. The Contractor shall maintain the existing pavement surface within the construction limits for construction traffic maintenance, and this surface should be swept periodically to prevent dust in this busy business area. Pressure test new main. Upon passing, connect to drilled water main and complete all testing.

Transfer water services to new water main. This work may be completed outside of regular contract hours to minimize impacts on businesses. Coordinate this work with the City of Ann Arbor Public Works Department. Upon transferring the services, take the existing main out of service.

Construct the storm sewer within the phase II project limits. The traffic signals at First Street will have to be removed prior to construction of storm sewer within First Street. Coordinate removal of the signals and placement of stop signs with the City of Ann Arbor Signs and Signals Department. Street light service must be repaired if damaged by storm sewer construction; street lighting the full length of Liberty must be maintained at all times. Construction between manholes 102 and the Allen Creek Drain shall occur during a period of dry weather due to the flows carried by the existing system. If by pass pumping is to be used, a back up pump **MUST** be on site. Construction of the infiltration trenches may occur as storm sewer progresses between First Street and Sta 19+50.

Begin roadway grading and construction. Maintain existing sidewalk ramps to the extents possible. Implement temporary ramps when required to maintain access along the corridor. Construct roadway thru leveling course prior to starting work within the amenity zone. Install new street lights while maintaining service to 50% of the lights on the same side of the street. Upon completing all traffic signal and work in the amenity zone, place the top course of HMA and place permanent pavement markings.

Open roadway to traffic.

CITY OF ANN ARBOR

NOTICE TO BIDDERS

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Parking Meter Removal and Covers

The proposed work and/or staging area will be along streets which contain parking meters for on-street parking. The Contractor shall coordinate directly with Republic Parking, telephone (734) 761-7235 for the removal of meter heads from standards requiring removal and for the provision of Parking Meter Covers (Meter Bags), which, when properly installed by the Contractor in a timely manner, will prohibit parking at metered parking spaces.

Parking Meter Covers

Meter Bags must be installed a minimum of 24-hours prior to the desired time of enforcement. Written documentation and/or visual inspection by City personnel may be required to adequately verify this requirement. The Parking Enforcement Office will be unable to enforce the desired "No-Parking Zone" unless the Contractor installs the Meter Bags in a proper and timely manner.

The Contractor has the sole responsibility for obtaining the Meter Bags from Republic Parking, placement, and maintenance. Delays due to on-street parking shall not be cause for any extra payments to the Contractor.

Information regarding obtaining the Meter Bags, and the temporary prohibition of on-street parking, is available from Republic Parking, telephone (734) 761-7235.

Republic Parking is waiving all Meter Bag rental fees for this project. The Contractor will be responsible for all costs associated with obtaining, installing, and maintaining the Meter Bags.

Parking Meter Removals

The project will require the removal and/or relocation of Parking Meters. The Contractor must contact Republic Parking at (734) 761-7235 at least three (3) days prior to removing the standards marked for removal. Republic Parking will remove the meter heads from the existing standards. The standards may not be removed until the meter heads have been removed by Republic Property. The Contractor may not remove the meter heads.

**DETAILED SPECIFICATION
FOR
GENERAL CONDITIONS, MAX \$**

1 of 2

DESCRIPTION

This item shall include all work described and required by the Plans and Specifications for which no item of work is listed in the Bid Form, including but not limited to:

- Scheduling and organization of all work, subcontractors, suppliers, testing, inspection, surveying, and staking
- Coordination of, and cooperation with, other contractors, agencies, departments, and utilities
- Protection and maintenance of Utilities
- Maintaining drainage
- Maintaining drives, drive openings, sidewalks, bikepaths, mail deliveries, and solid waste/recycle pick-ups, including moving bins as necessary
- Storing all materials and equipment off lawn areas
- Temporary relocation and final replacement/re-setting of mailboxes
- Coordination efforts to furnish various HMA mixtures as directed by the Engineer
- Coordination efforts to furnish and operate various-size vehicles/equipment as directed by the Engineer
- Furnishing and operating vacuum-type street cleaning equipment a minimum of once per week or more frequently as directed by Engineer
- Furnishing and operating vacuum-type utility structure cleaning equipment as directed by Engineer
- Furnishing and operating both vibratory plate and pneumatic-type ("pogo-stick") compactors
- Furnishing and operating a backhoe during all work activities
- Furnishing and operating a jackhammer and air compressor during all work activities
- Noise and dust control
- Mobilization(s) and demobilization(s)
- Furnishing submittals and certifications for materials and supplies
- Disposing of excavated materials and debris
- All miscellaneous and incidental items such as overhead, insurance, and permits.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

MEASUREMENT AND PAYMENT

This item of work will be paid for on a pro rata basis at the time of each progress payment. Measurement will be based on the ratio between work completed during the payment period and the total contract amount. When all of the work of this Contract has been completed, the measurement of this item shall be 1.0 Lump Sum.

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

**DETAILED SPECIFICATION
FOR
GENERAL CONDITIONS, MAX \$**

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PAY ITEM

General Conditions, Max \$

PAY UNIT

Lump Sum

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

**DETAILED SPECIFICATION
FOR
PROJECT SUPERVISION, MAX \$**

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DESCRIPTION

The Contractor shall designate a full-time Project Supervisor to act as the Contractor's agent/representative, and to be responsible for scheduling and coordination of all subcontractors, suppliers, other governmental agencies, and all public and private utility companies.

The Project Supervisor shall not be an active crew member of the Contractor, shall not be an active member or employee of any subcontractor's work force, and shall not perform general or specialized labor tasks.

The Project Supervisor shall work exclusively on this project, and shall put forth his/her full effort into the organization and coordination of the work of this project.

Prior to the pre-construction meeting, the Contractor shall designate a proposed Project Supervisor by name, and shall furnish the City with a current, thorough, detailed summary of the proposed Project Supervisor's work history, outlining all previous supervisory experience on projects of a similar size and nature. The detailed work history shall include personal and professional references (names and phone numbers) of persons (previous owners or agents) who can attest to the qualifications and work history of the proposed Project Supervisor. Proposed candidates for Project Supervisor shall have a demonstrated ability to work harmoniously with the City, the public, subcontractors, and all other parties typically involved with work of this nature. The Supervising Professional will have the authority to reject a proposed Project Supervisor whom he/she considers unqualified.

The Project Supervisor shall be available 24 hours-per-day to provide proper supervision, coordination and scheduling of the project for the duration of the Contract. The Contractor shall furnish the City with telephone numbers of the Project Supervisor in order to provide 24 hour-per-day access during business and non-business hours, including weekends and holidays. While work is ongoing, the Project Supervisor or approved designee must be on site at all times.

The Project Supervisor shall be equipped by the Contractor with a mobile telephone to provide the City with 24 hour-per-day access to him/her during daily construction activities, during transit to and from the construction site, and during all non-business hours including weekends and holidays.

The Project Supervisor shall be equipped with assistants as necessary to provide project supervision as specified herein, and in accordance with the Contract.

DUTIES AND RESPONSIBILITIES

The Project Supervisor work harmoniously with the City, the public, subcontractors, and all other parties typically involved with work of this nature.

The Project Supervisor is responsible to notify and coordinate access to affected properties. This includes notifying and coordinating mail delivery and garbage pick-up and notifying businesses and residents at least 48 hours prior to restricting access to their street and property.

The Project Supervisor shall have a thorough, detailed understanding and working knowledge of all

**DETAILED SPECIFICATION
FOR
PROJECT SUPERVISION, MAX \$**

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construction practices and methods specified elsewhere herein, as well as the handling, placement, testing and inspection of aggregates, aggregate products, HMA concrete, and portland cement concrete materials.

The Project Supervisor shall be responsible for all of the work of all of the Contractor's, subcontractors' and suppliers' work forces.

The Project Supervisor shall be responsible for proper and adequate maintenance (emissions, safety, and general operation) of all of the Contractor's, subcontractors' and suppliers' equipment and vehicles.

The Project Supervisor shall be responsible for the legal, proper and safe parking/storage of all of the Contractor's, subcontractors' and suppliers' equipment, work vehicles, and employee's vehicles.

The Project Supervisor shall schedule and coordinate the work of all parties involved in the project, including utility companies, testing agencies, governmental agencies, all City departments (such as Utilities and Transportation), and City inspectors.

The Project Supervisor shall coordinate with both Testing inspectors and City inspectors in a timely manner, to assure proper and timely testing and inspection of the work.

The Project Supervisor shall review the Inspector's Daily Reports (IDRs) for agreement, and shall sign all IDRs on a daily basis as the representative of the Contractor. Items to be reviewed include descriptions, locations and measurements of quantities of work performed, workforce, equipment, and weather. The Project Supervisor shall also be responsible for its subcontractors' review and initialing of IDRs containing work items performed by each respective subcontractors.

The Project Supervisor shall submit to the Engineer, an updated, detailed schedule of the proposed work on a weekly basis, and an update of all proposed changes on a daily basis, all in accordance with the Detailed Specification for Project Schedule contained elsewhere herein.

The Project Supervisor shall schedule and chair a weekly progress meeting with the Engineer and all subcontractors to discuss the work. Upon the completion of each meeting, the Project Supervisor shall prepare and distribute, to all present, a written summary of the meeting's minutes. Those in attendance shall review the minutes and, if necessary, comment on any deficiencies or errors prior to or at the next scheduled progress meeting.

ADDITIONAL PERFORMANCE REQUIREMENTS

If, in the sole opinion of the Supervising Professional, the Project Supervisor is not adequately performing the duties as outlined in this Detailed Specification, the following system of notices will be given to the contractor with the associated penalties:

First Notice – A warning will be issued in writing to the contractor detailing the deficiencies in the Project Supervision. The contractor must respond within 7 calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within 7

**DETAILED SPECIFICATION
FOR
PROJECT SUPERVISION, MAX \$**

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calendar days will result in the issuing of a second notice.

Second Notice – A second warning will be issued in writing to the contractor further detailing the deficiencies in the Project Supervision. The contractor must respond within 7 calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within 7 calendar days will result in the issuing of a third notice. A deduction of 10% will be made from the original Project Supervision contract amount. At this time, the City reserves the right to meet with personnel with the necessary authority within the Contractor's organization to discuss the deficiencies in the Project Supervision.

Third Notice – An additional deduction of 25% will be made from the original Project Supervision contract amount, and the Project Supervisor shall be removed from the project, and replaced immediately with another individual to be approved by the Supervising Professional.

Should, in the sole opinion of the Supervising Professional, the Project Supervisor fail to perform his/her duties and responsibilities as described herein to such a degree that the successful completion of the project is put in jeopardy, the above system of notices may be foregone, and the Contractor shall immediately replace the Project Supervisor upon receipt of written notice. Failure to provide adequate project supervision, as determined by the Engineer, shall be considered basis for the Supervising Professional to suspend work without extension of contract time or additional compensation.

MEASUREMENT AND PAYMENT

This item of work will be paid for on a pro rata basis at the time of each progress payment. Measurement will be based on the ratio between work completed during the payment period and the total contract amount. When all of the work of this Contract has been completed, the measurement of this item shall be 1.0 Lump Sum, minus any deductions incurred for inadequate performance as described herein. This amount will not be increased for any reason, including extensions of time, extras, and/or additional work.

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

PAY ITEM

Project Supervision, Max \$

PAY UNIT

Lump Sum

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIOVISUAL TAPE COVERAGE

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a. Description. This work shall include providing a recording of the physical, structural, and aesthetic conditions of the construction site and adjacent areas as provided herein.

The audiovisual recording shall be:

1. Of professional quality, providing a clear and accurate audio and visual record of existing conditions.
2. Prepared during the period prior to bringing any materials or equipment within the areas described in this special provision.
3. Carried-out under the supervision of the Engineer.

The Contractor shall furnish two (2) copies of the completed recording to the Engineer at the preconstruction meeting, or five (5) business days prior to commencing with construction. An index of the recording, which will enable any area of the project to be easily found on the recording, shall be included. The Contractor shall retain a third copy of the recording for its own use.

Any portion of the recording determined by the Engineer to be unacceptable for the documentation of existing conditions shall be recorded again, at the Contractor's sole expense, and submitted to the Engineer prior to mobilizing onto the site.

b. Materials. The audiovisual recording shall be provided using digital video disk (DVD) media, or other media approved by the Engineer.

c. Construction. Complete audio-visual recording work in accordance with the requirements shown below.

1. Production:
 - A. DVD Format / No Editing. The audio-visual recording shall be performed using equipment that allows audio and visual information to be recorded simultaneously and in color. The recording shall be provided on compact discs in DVD format. The quality of the recording shall be equal to or better than the standard in the industry. The recording shall not be edited.
 - B. Perspective / Speed / Pan / Zoom. To ensure proper perspective, the distance from the ground to the camera lens shall not be less than 12 feet and the recording must proceed in the general direction of travel at a speed not to exceed 48 feet per minute (0.55 miles per hour). Pan and zoom rates shall be controlled sufficiently so that playback will ensure quality of the object viewed.
 - C. Display. The recording equipment shall have transparent time, date stamp and digital annotation capabilities. The final copies of the recording shall continuously

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIOVISUAL TAPE COVERAGE

AA:DAD

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and simultaneously display the time (hours:minutes:seconds) and the date (month/date/year) in the upper left-hand corner of the frame. Accurate project stationing shall be included in the lower half of the frame in standard station format (i.e. 1+00). Below the stationing periodic information is to be shown, including project name, name of area shown, direction of travel, viewing direction, etc.

D. On streets or in areas where there is no project stationing, assumed stationing shall be used, starting with 0+00 and progressing from west to east or from north to south.

E. Audio Commentary / Visual Features. Locations relative to project limits and landmarks must be identified by both audio and video means at intervals no longer than 100 feet along the recording route. Additional audio commentary shall be provided as necessary during the recording to describe streets, buildings, landmarks, and other details, which will enhance the record of existing conditions.

F. Visibility / Ground Cover. The recording shall be performed during a time of good visibility. The recording shall not be performed during periods of precipitation or when snow, leaves, or other natural debris obstruct the area being recorded.

2. Coverage. The audio-visual recording coverage shall include the following:

A. General Criteria. These general criteria shall apply to all recording and shall include all areas where construction activities will take place or where construction vehicles or equipment will be operated or parked and/or where materials will be stored or through which they will be transported. The recording shall extend an additional 50 feet outside of all areas. The recording shall include all significant, existing man-made and natural features such as driveways, sidewalks, utility covers, utility markers, utility poles, other utility features, traffic signal structures and features, public signs, private signs, fences, landscaping, trees, shrubs, other vegetation, and other similar or significant features.

B. Private Property. Record all private property that may be utilized by the Contractor in conjunction with this project. These project areas must be disclosed by the Contractor prior to using them for the work of this project.

C. Road Construction Area. The recording coverage shall:

- (1) Extend to 50 feet outside of the right-of-way and easements area as shown on the plans.
- (2) Extend 50 feet outside the construction limits on all streets, including side streets.
- (3) Both sides of each street shall be recorded separately.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIOVISUAL TAPE COVERAGE

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D. Detour Route / Maintenance of Traffic Areas. The entire detour route and maintenance of traffic areas shall be recorded as indicated in this special provision except as follows:

- (1) The recording must proceed in the general direction of travel at a speed not exceeding 176 feet per minute (2 miles per hour).
- (2) The coverage area shall include the street and not go beyond the curb except in areas where there is a fair possibility that the detoured traffic will drive over the curb, such as at intersections.
- (3) The recording shall focus in particular at sidewalk ramps and other features likely to have been damaged or likely to be damaged as a result of existing traffic, temporary detoured traffic and or construction traffic. In these areas, recording may need to proceed much more slowly.

Only the side of street with the detoured traffic must be recorded. However, the Contractor is advised that portions of the detour routes may operate in opposite directions at different times. In these cases, both sides of the street shall be recorded separately.

E. Private Property Bordering the Project Limits or Work Areas. Record all areas bordering the project where work is scheduled to occur or where construction traffic could damage the private property. This is to including buildings, driveways, decks, landscaping, trees, and all other similar features.

F. Other Areas. The Contractor shall record at his sole expense other areas where, in his/her opinion, the establishment of a record of existing conditions is warranted. The Contractor shall notify the Engineer in writing of such areas.

The Engineer may direct the recording of other minor areas not specified above at the Contractor's sole expense.

3. Audio-Visual Recording Services. The following companies are known to be capable of providing the recording services required by this special provision and shall be utilized, unless the Contractor receives prior written approval from the Engineer to utilize another company of comparable or superior qualifications.

- Construction Video Media
- Midwest Company
- Topo Video, Inc.
- Video Media Corp.
- Paradigm 2000, Inc.
- Finishing Touch Photo and Video

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIOVISUAL TAPE COVERAGE

AA:DAD

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04/08/15

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

<u>Pay Item</u>	<u>Pay Unit</u>
Audiovisual Tape Coverage	Lump Sum

Audiovisual Tape Coverage shall include all labor, equipment, and materials required to perform the recording and to provide the finished recording the Engineer.

Payment will be made for **Audiovisual Tape Coverage** following the review and acceptance of the recording by the Engineer. Within twenty-one (21) days following the receipt of the recording, the Engineer will either accept it and authorize payment or require that any discrepancies in the recording be addressed prior to making payment.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CERTIFIED PAYROLL COMPLIANCE AND REPORTING

AA:MGN

1 of 2

02/16/17

a. Description. This specification covers all administrative requirements, payroll reporting procedures to be followed by Contractors performing work on City-sponsored public improvements projects, and all other miscellaneous and incidental costs associated with complying with the applicable sections of the City of Ann Arbor Code of Ordinances with regard to payment of prevailing wages and its Prevailing Wage Compliance policy.

This specification is **not** intended to include the actual labor costs associated with the payment of prevailing wages as required. Those costs should be properly incorporated in all other items of work bid.

b. General. The Contractor is expected to comply with all applicable sections of Federal and State prevailing wage laws, duly promulgated regulations, the City of Ann Arbor Code of Ordinances, and its Prevailing Wage Compliance Policy as defined within the contract documents. The Contractor shall provide the required certified payrolls, city-required declarations, and reports requested elsewhere in the contract documents within the timeline(s) stipulated therein.

The Contractor shall also provide corrected copies of any submitted documents that are found to contain errors, omissions, inconsistencies, or other defects that render the report invalid. The corrected copies shall be provided when requested by the Supervising Professional.

The Contractor shall also attend any required meetings as needed to fully discuss and ensure compliance with the contract requirements regarding prevailing wage compliance. The Contractor shall require all employees engaged in on-site work to participate in, provide the requested information to the extent practicable, and cooperate in the interview process. The City of Ann Arbor will provide the needed language interpreters in order to perform wage rate interviews or other field investigations as needed.

Certified Payrolls may be submitted on City-provided forms or forms used by the Contractor, as long as the Contractor's forms contain all required payroll information. If the Contractor elects to provide their own forms, the forms shall be approved by the Supervising Professional prior to the beginning of on-site work.

c. Unbalanced Bidding. The City of Ann Arbor will examine the submitted cost for this item of work prior to contract award. If the City determines, in its sole discretion, that the costs bid by the Contractor for complying with the contract requirements are not

reasonable, accurately reported, or may contain discrepancies, the City reserves the right to request additional documentation that fully supports and justifies the price as bid. Should the submitted information not be determined to be reasonable or justify the costs, the City reserves the right to pursue award of the contract to the second low bidder without penalty or prejudice to any other remedies that it may have or may elect to exercise with respect to the original low-bidder.

The Contract Completion date will not be extended as a result of the City's investigation of the as-bid amount for this item of work, even if the anticipated contract award date must be adjusted. The only exception will be if the Contractor adequately demonstrates that their costs were appropriate and justifiable. If so, the City will adjust the contract completion date by the number of calendar days commensurate with the length of the investigation, if the published Notice to Proceed date of the work cannot be met. The contract unit prices for all other items of work will not be adjusted regardless of an adjustment of the contract completion date being made.

d. Measurement and Payment. The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Certified Payroll Compliance and Reporting	Lump Sum

The unit price for this item of work shall include all supervisory, accounting, administrative, and equipment costs needed to monitor and perform all work related to maintaining compliance with the tasks specified in this Detailed Specification, the City of Ann Arbor Code of Ordinances, its Prevailing Wage Compliance policy and the applicable Federal and State laws.

Payment for this work will be made with each progress payment, on a pro-rata basis, based on the percentage of construction completed. When all of the work of this contract has been completed, the measurement of this item shall be 1.0 times the Lump Sum bid amount. This amount will not be increased for any reason, including extensions of time, extra work, and/or adjustments to existing items of work.

**DETAILED SPECIFICATION
FOR
STORM SEWER REMOVAL AND ABANDONMENT**

DESCRIPTION

This work shall consist of removing sewer or grouting pipes designated for abandonment, as specified herein, as shown on the Plans, and as directed by the Engineer.

MATERIALS

Flowable fill, grout, and Class II granular material to meet the requirements of flowable fill and granular material as contained elsewhere in these construction documents.

CONSTRUCTION METHODS

The Contractor shall remove and properly dispose of all excavated materials, removed storm sewer and debris, and abandon existing pipe and structures, all as directed by the Engineer.

Grout is to be pumped into the full length of pipe to be abandoned.

MEASUREMENT AND PAYMENT

Furnishing and placing flowable fill as backfill for these items will not be paid separately, but shall be included in the bid prices for these items of work.

The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Sewer, Rem	Foot
Sewer, Abandon	Foot

**DETAILED SPECIFICATION
FOR
BRICK PAVERS**

1 of 2

DESCRIPTION

This work shall consist of removing, stockpiling and reinstalling sidewalk pavers, concrete base, fine aggregate leveling bed, fine aggregate joint filler, and any additional brick pavers as shown on the Plans, as shown in this Detailed Specification, and as directed by the Engineer.

MATERIALS

Sand base, where required, shall consist of Class II granular material in accordance with Section 902 of the 2012 MDOT Standard Specifications for Construction.

Concrete base shall be constructed of Grade P1 or PN-C concrete in accordance with Section 601 of the 2012 MDOT Standard Specifications for Construction..

Fine aggregate leveling bed shall consist of a 3:1 mix of MDOT 2NS (3 parts) and Type N mortar (1 part). Fine aggregate joint filler shall consist of MDOT 2MS.

Any additional brick pavers required shall match the existing brick in the areas adjoining the removal/replacement limits.

CONSTRUCTION METHODS

The Contractor shall remove and salvage existing pavers, remove any existing mortar or bituminous setting bed and concrete base, to the limits specified by the Engineer. Additional earthwork required for placement of the proposed sand base will be paid for under a separate pay item.

Salvaged pavers shall be stored on-site in an area approved by the Engineer until they are ready to be replaced.

The Contractor shall construct the 6 inch concrete base on the sand subbase.

Fine aggregate and mortar shall be uniformly blended to create the leveling bed mix. Leveling bed is to be placed on concrete base to the depth shown on the Plans. Control bars and/or guides shall be used to screed the fine aggregate leveling bed.

Brick installation is to match the pattern of the existing adjacent brickwork, or as specified on the plans. String lines or other devices are to be used as needed to insure straight joint lines and final surface elevations. Paving units are to be butted tight to adjacent concrete paving and to each other. Newly laid pavers are to be protected at all times by plywood panels on which workers stand. A minimum of three (3) passes of a plate vibrator (min. 5,000 lbs compaction force) shall be made to set paving units in leveling course prior to filling joints. Pavers should be protected from chipping and cracking during compaction.

Fine aggregate joint filler shall be spread over paver surface and broomed into joints, and misted lightly with water to settle sand into joints. Allow to surface dry and repeat process until joints are filled completely. Remove excess sand upon completion.

The Contractor shall take any necessary precautions to prevent damage to pavers during removal and replacement. The Contractor is not entitled to any additional compensation for such

**DETAILED SPECIFICATION
FOR
BRICK PAVERS**

2 of 2

replacement of damaged pavers.

MEASUREMENT AND PAYMENT

Completed work as measured for this item of work will be paid for at Contract Unit Price for the following Contract Pay Item:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Brick, Rem and Salvage	Square Foot
Brick Pavers, New	Square Foot

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

The pay item "Brick, Rem and Salvage" shall include the removal and disposal of concrete base; and furnishing and placing the 6 inch concrete base, and fine sand.

The pay item "Brick Pavers, New" shall include furnishing and installing new bricks to match existing in addition to furnishing and placing the 6 inch concrete base, and fine sand.

Earthwork and placement of sand subbase to be included in pay items included within the contract documents.

DETAILED SPECIFICATION
FOR
REMOVING PAVING ITEMS

AA:DAD

1 of 2

1/28/16

a. Description. This work shall consist of removing concrete curb, gutter, curb and gutter, integral curb, sidewalk, sidewalk ramps, pavement, drive openings, and drive approach pavements as shown on the plans, in accordance with section 204 2012 MDOT Standard Specifications for Construction, except as specified herein, and as directed by the Engineer.

b. Materials.

c. Construction. Construction methods shall be as described in section 204 of the MDOT 2012 Standard Specifications for Construction, as described below, and as directed by the Engineer.

Pavement removed will include concrete, asphalt, and composite pavement.

Prior to the start of work, the Engineer and Contractor together shall identify and field measure all items to be removed. The Engineer shall approve of all removal limits prior to any removals being performed by the Contractor.

The Contractor shall perform full-depth saw cutting at removal limits, including those necessary to construct 2-foot wide MDOT Type M drive openings, as shown on the Plans, as directed by the Engineer, and as marked for removal.

The Contractor shall cut steel reinforcement bars as directed by the Engineer at all areas of removal.

All saw cutting shall be performed under wet conditions to prevent excessive airborne dust. All resulting slurry and debris shall be cleaned up the satisfaction of the Engineer.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots.

Excavated/removal areas shall be adequately protected with barricades and/or fencing at all times.

Removed or excavated materials which are not incorporated into the work shall become the property of the Contractor and shall be immediately removed and properly disposed of off-site. Removed or excavated materials may not be stockpiled overnight on, or adjacent to, the site.

Base, subbase, or subgrade materials removed without authorization by the Engineer shall be replaced and compacted by the Contractor at the Contractor's expense, with materials specified by the Engineer.

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

<u>Pay Item</u>	<u>Pay Unit</u>
Pavement, Rem	Square Yard

DETAILED SPECIFICATION
FOR
REMOVING PAVING ITEMS

AA:DAD

2 of 2

1/28/16

Curb and Gutter, Rem.....Foot
Sidewalk, Rem..... Square Foot

Basis of payment shall be as described in subsection 205.04 of the Standard Specifications for Construction.

All sawcutting required for removals shall be included in the appropriate item of work, and will not be paid for separately.

Payment will be based on the area of pavement removed, regardless of thickness, or if it is composite.

**DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED
AND
SIDEWALK GRADING**

AA:JN

1 of 5

4/12/17

DESCRIPTION

This work shall consist of constructing earth grades by excavating, cutting, filling, trimming, and grading; general restoration, and sign removals in accordance with the Detailed Specifications elsewhere herein; and maintaining the work in a finished condition until such time that it is accepted by the Engineer. This work shall be done as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer, and in accordance with Section 205 of the 2012 edition of the MDOT Standard Specification for Construction, except as specified herein.

CONSTRUCTION METHOD

The Contractor shall construct earth grades as required to develop the typical and/or detailed cross-section(s) as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer. This shall include, but not be limited to, the excavation of soil, rocks of any size, trees under 6 inch DBH, stumps, logs, and bricks; the removal and proper disposal off-site of surplus excavated material; the scarifying, plowing, disking, moving and shaping of earth; the trimming, grading, compaction and proof-rolling of the prepared subgrade; the importing, furnishing, placement and compaction of embankment and/or fill materials; the full depth saw-cutting of pavement at the removal limits; the grading of sideslopes; general restoration in accordance with the Detailed Specifications elsewhere herein and the general items of the work as specified herein. Road subbase and base materials shall be paid for separately.

The Contractor shall remove, add to, re-shape, re-grade, and re-compact existing materials, and shall construct the cross-section(s) as indicated on the Plans, as detailed in the Specifications, and as directed by the Engineer. The Contractor shall use blade graders, maintainers, vibratory rollers, and/or other equipment as necessary, and as detailed in the Specifications and as directed by the Engineer, for this work. Use of each specific piece of equipment is subject to the approval of the Engineer.

The Contractor shall remove, salvage, deliver to any location within the City limits, and neatly stack/stockpile all bricks, if present, as directed by the Engineer.

The Contractor shall remove and properly dispose of off-site all vegetation; brush; roots; and trees and stumps less than 6 inch in diameter, as shown on the plans, and as directed by the Engineer as required to complete the project.

The Contractor shall remove other surface features, including signs, located within the grading limits and not otherwise identified, as directed by the Engineer. Signs and posts shall become the property of the Contractor and shall be disposed of properly.

Protection of Utilities.- Utility lines may become exposed at, above, or below, the subgrade elevation during grading or subgrade undercutting operations. If this occurs, the Contractor shall excavate around, above and/or below the utility lines, as directed, to complete the operations. Payment included in respective item of work.

**DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED
AND
SIDEWALK GRADING**

AA:JN

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4/12/17

Removal of Cable, Conduits and Pipe.- The Contractor shall remove, and properly dispose of off-site, all abandoned cables, conduit, and pipe encountered at, or above the bottom of any earthwork excavation or undercut. This shall include abandoned gas main pipe. Where the inverts of abandoned, or to be abandoned or removed, conduits or pipe are less than 16 inches below the bottom of any earth excavation or undercut, the conduits and/or pipe shall be removed and the resulting void filled with an Engineer approved material. The fill material shall be compacted to 95% of its maximum unit weight in lifts not exceeding 12 inches. No separate payment will be made for removal of conduit or pipe, or any of the work, described in this section.

Subgrade Construction.- Subgrade is defined as the final earth grade which extends from grading limit to grading limit. The subgrade shall be constructed by performing earth excavation and roadway embankment work in accordance with Section 205 of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, and as specified herein.

The subgrade shall be constructed to the contours and cross-sections shown on the plans, as specified herein, and as directed by the Engineer. To achieve this, the work shall include, but not be limited to:

1. Removal and disposal off-site of any surplus or unsuitable materials.
2. Furnishing from off-site any additional Engineer approved fill materials necessary.
3. Moving existing and/or furnished materials longitudinally and transversely as necessary.
4. Cutting, placing, compacting, and trimming existing and/or furnished materials to construct the roadway embankment and subgrade to the specified tolerances.
5. Stockpiling, and moving again, any cut materials which cannot be immediately placed upon excavation due to construction staging.

The subgrade shall be graded to accommodate all subbases and aggregate bases.

The subgrade shall be prepared so as to ensure uniform support for the pavement structure. The finished subgrade shall be placed to within 1 inch below and $\frac{3}{4}$ inch above plan grade. Variations within this tolerance shall be gradual.

The subgrade shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of 10 inches. If this cannot be achieved, in the opinion of the Engineer, he/she will direct the Contractor to perform "Subgrade Undercutting, Type ___" or "Subgrade Manipulation" as described herein.

The Contractor shall move excavated and/or imported materials longitudinally and/or transversely where necessary, and as directed by Engineer.

The Contractor shall keep the work well graded and drained at all times.

The Contractor shall not use rubber-tired equipment on the subgrade, when its use causes or may cause, in the opinion of the Engineer, damage to the subgrade. The Contractor shall conduct its operation(s), and provide all necessary equipment, to insure the satisfactory completion of the

**DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED
AND
SIDEWALK GRADING**

AA:JN

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4/12/17

work without damaging the subgrade. This includes the transporting, stockpiling, rehandling, and movement of materials over additional distances, in lieu of driving on an unprotected, or partially unprotected, subgrade.

The Contractor is solely responsible for the maintenance and protection of the subgrade. Further, any damage to the subgrade which, in the opinion of the Engineer, is caused as a result of the Contractor's operation(s), or its subcontractors' or suppliers' operation(s), shall be repaired by the Contractor at the Contractor's expense. This includes any additional earthwork and/or maintenance materials as directed by the Engineer, for the purposes of the Contractor's maintenance and protection of the subgrade. The Contractor shall not be entitled to any additional compensation for the implementation of these procedures.

The Contractor shall perform all rough and/or finish grading and compaction to the grades shown on the Plans, as detailed in the Specifications, and as directed by the Engineer.

At various times throughout the work, the Engineer may direct the Contractor to use smaller and/or lighter equipment, and to defer certain work tasks, in order to protect the grade and/or adjacent areas. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Test Rolling.- The Contractor shall test-roll the roadway subgrade with a pneumatic tired roller with a suitable body for ballast loading and a gross load capacity that can be varied from 25 and 40 tons. In lieu of this test roller, with the approval of the Engineer, the Contractor may use a fully loaded single axle or tandem axle dump truck.

Subgrade Undercutting.- "Subgrade Undercutting, Type ___" shall be performed on the roadway subgrade in accordance with Section 205 of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, as specified herein, and as directed by the Engineer.

Subgrade Manipulation.- "Subgrade Manipulation" shall be performed on the roadway subgrade in accordance with Section 205 of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, as specified herein, and as directed by the Engineer.

Where subgrade manipulation is required, the subgrade shall be thoroughly scarified, blended, and mixed to a depth of 12 inches. The work shall be accomplished by means of a large diameter disc, motor grader, or other equipment approved by the Engineer. After the foundation or subgrade has been manipulated to the satisfaction of the Engineer and allowed to dry, the soil shall be compacted to 95% of its maximum dry density as measured by the AASHTO T-180 method. The time required for drying the soil will not be a basis for an extension of time.

The cost of Subgrade Manipulation shall be included in the cost of "Machine Grading, Modified" unless a pay item for "Subgrade Manipulation" is included in the Proposal.

The Contractor shall take any and all steps necessary to avoid interruption in solid waste, recycling, and compostable pick-up within the project limits. This shall be accomplished by

**DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED
AND
SIDEWALK GRADING**

AA:JN

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maintaining thru access for the eastern-most alley. At the end of each day, provide access for the City's solid waste and recycling trucks, travelling in the alley, to cross Liberty Street in the early morning hours.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots 2 inches or larger in size. The Contractor shall coordinate with the City Field Services Unit to schedule trimming of trees by City forces or authorized subcontractor. The Contractor shall not be entitled to an extension of time or any additional compensation for the coordination of this work.

Structure and Sewer Cleanliness.- All sewers, and structures, including manholes, gate wells, valve boxes, inlet structures and curbs shall be protected from damage and contamination by debris and construction materials. Structures shall be maintained clean of construction debris and properly covered at all times during the construction. The Contractor shall immediately clean any structures and/or sewers that become contaminated with construction debris. The Contractor shall be responsible for all direct and indirect damages which are caused by sewers or structures which have been made unclean or have been damaged by the Contractor.

Estimated Earthwork & Pavement Removal Quantities.- The Engineer's estimate of the earth excavation (cut) and the embankment (fill) to prepare the foundation as defined herein for the project are as follows:

Excavation – 6240 Cyd
Embankment – 6799 Cyd

These quantities do not take into consideration the suitability of the soils for their intended use, their possible availability due to construction staging or storage limitations, bulking of the material upon excavation, changes in volumes due to moisture content or soil types, or other similar related issues. The Contractor shall remain responsible for determining the actual amount(s) of work to be performed to complete the project as shown on the plans and as specified herein.

Butt joints are included in the pay item "Machine Grading".

Topsoil, seeding and mulch shall be paid for as applicable restoration contract items.

**DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED
AND
SIDEWALK GRADING**

AA:JN

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MEASUREMENT AND PAYMENT

Measurement for payment of the item "Machine Grading, Modified" shall be computed in Stations along West Liberty Street, First Street and South Ashley Street alignments within the project limits.

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

PAY ITEM

Machine Grading, Modified
Sidewalk Grading

PAY UNIT

Station
Square Yard

The unit price for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

Sidewalk Grading shall occur in the locations of proposed sidewalk construction, and shall prepare the subgrade for the placement of sand subbase. Grading for subgrade preparation under the brick pavers in the amenity zone is included in other items of work.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
NON-HAZARDOUS CONTAMINATED MATERIAL

AA:JN

1 of 2

3/7/17

a. Description. This work shall include all labor, equipment, and materials necessary to handle, transport, and dispose of non-hazardous contaminated material as described herein, as detailed in the soil investigation report, as shown on the plans, and as directed by the Engineer.

All existing granular soils within the project limits have been identified as non-hazardous contaminated material. However, they may be used as embankment or fill materials on the project site if they meet the applicable engineering properties of the work for which they are proposed. The existing granular materials shall not be used elsewhere or disposed of in a manner inconsistent with this special provision, or applicable federal, state, or local regulations unless otherwise directed by the Engineer.

b. Method of Construction. This work shall be performed in accordance with Sections 204 and 205 of the MDOT 2012 Standard Specifications for Construction, except as modified herein or as directed by the Engineer.

The Contractor shall have all manifests signed by its representative, the Engineer's representative, the authorized representative of the waste hauler and the waste disposal facility.

c. Excavation of Non-Hazardous Contaminated Material. Non-Hazardous contaminated material shall be excavated as shown on the plans and as directed by the Engineer.

d. Temporary Storage of Non-Hazardous Contaminated Material. Excavated non-hazardous contaminated material which is to be temporarily stockpiled shall be placed on plastic sheeting or tarps having a minimum thickness of 6 mils or in trucks, roll-off boxes, or other containers, such that no liquid may escape from the containment. At the end of each work day, the non-hazardous contaminated material shall be covered securely with plastic sheeting of 6 mils thickness or greater.

Excavated non-hazardous material shall be disposed of as soon as approval is received from the disposal site. In no case shall this material be stockpiled for longer than 30 days prior to disposal.

The Contractor is responsible for the necessary coordination such that his/her work activities are not adversely impacted by the stockpiling of contaminated soil. Stockpiled soil shall not impair sight distance or drainage.

e. Sampling and Analysis of Non-Hazardous Contaminated Material. The Contractor shall utilize the Soil Investigation Reports prepared by Tetra Tech, Test America and Eurofins Eaton Analytical dated November 7, 8, and 30, 2017. A summary of this report has been included in the proposal. To obtain a copy of the full report contact:

Jennifer Nelson, P.E., Project Manager
City of Ann Arbor – Project Management Services Unit
Phone: (734) 794-6410 ext. 43672
E-mail: jnelson@a2gov.org

The information contained in this report shall be utilized to secure a Type II disposal facility for

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
NON-HAZARDOUS CONTAMINATED MATERIAL

AA:JN

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3/7/17

disposal of the non-hazardous contaminated material. The contractor shall be responsible for performing all required testing and preparing any forms or applications required by the disposal facility prior to their acceptance of the non-hazardous contaminated material for disposal.

The contractor shall also be responsible for familiarizing themselves with the information contained in the report and adjusting their operations accordingly to meet the safety and health requirements as set forth in Section 104.07.B of the MDOT 2012 Standard Specifications for Construction.

f. Disposal of Non-Hazardous Contaminated Material. Disposal of non-hazardous contaminated material shall be at a licensed Type II sanitary landfill. The Contractor shall submit at the preconstruction meeting the name of the Type II landfill to be used for disposal, the sampling and analysis requirements of the landfill, and verification that the use of the proposed landfill will meet the requirements of the County solid waste plan.

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

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Non-Hazardous Contaminated Material Handling and Disposal (LM)	Cubic Yard

Non-Hazardous Contaminated Material Handling and Disposal will be measured by volume in cubic yards, loose measure, as contained in the hauling unit. Under no circumstance will the Contractor be paid for quantities of this material that have not been approved for payment by the Engineer and as measured and tracked by the Engineer and the Contractor. The Contractor will not be paid "standard amounts" that have been determined by the disposal facility; only measured volumes as computed by the Engineer will be paid. Prior to payment, the Engineer shall be given receipts from the disposal facility for the number of cubic yards disposed of at that facility. Payment shall include all costs for materials, labor and equipment needed for storage, loading, transportation, and disposal of the non-hazardous contaminated material. Disposal costs shall include all documentation required by the landfill. Payment for this item shall be the same, regardless of whether or not the Contractor temporarily stores the contaminated material; the Contractor shall not be paid for re-handling of the material due to construction staging, stockpiling, or other related activities.

Payment for excavation of non-hazardous contaminated materials shall be included with the related items of work.

**DETAILED SPECIFICATION
FOR
SAND AND AGGREGATE BASE**

DESCRIPTION

All granular and dense graded aggregate used for subbase, base, and gravel shoulder construction shall be placed in accordance with Sections 301, 302 and 307 of the 2012 edition of the MDOT Standard Specifications for Construction.

MATERIAL

All aggregates shall be crushed limestone meeting the gradation of MDOT 21AA in accordance with Section 902 of the 2012 MDOT Standard Specifications for Construction.

All sand shall meet the gradation of MDOT Class II granular material in accordance with Section 902 of the 2012 MDOT Standard Specifications for Construction.

CONSTRUCTION

This work shall consist of constructing shoulders and a subbase or base course on an existing prepared grade in accordance with Sections 301, 302 and 307 of the 2012 edition of the MDOT Standard Specifications for Construction.

MEASUREMENT AND PAYMENT

The completed work as measured will be paid for at the contract unit prices for the following contract items (pay items):

<u>Pay Item</u>	<u>Pay Unit</u>
Subbase, CIP, Class II Granular Material	Cubic Yard
Granular Material Class II Sand	Cubic Yard
Aggregate Base, ___ inch, 21-AA, Modified	Square Yard

The items of work will be paid for at the contract unit prices, which shall be payment in full for all labor, material and equipment needed to deliver, place, compact, and shape the items.

The subbase will be calculated using the nominal width and depth of the subbase indicated on the plans. The aggregate base will be calculated using the nominal width of the aggregate base indicated on the plans.

**DETAILED SPECIFICATION
FOR
STORM SEWER**

DESCRIPTION

This work shall consist of constructing storm sewer in accordance with section 402 of the 2012 MDOT Standard Specifications for Construction, and as modified herein.

MATERIALS

The sewer pipe shall meet the requirements of the City of Ann Arbor Standard Specifications.

Trench backfill shall be Class II sand in accordance with the Detailed Specification for Sand and Aggregate contained herein.

Connections between new and existing pipe and/or structures shall be by "Fernco" type joint fasteners/couplings, or other methods approved by the Engineer,

CONSTRUCTION METHODS

The Contractor shall install storm sewer in accordance with section 402 of the 2012 MDOT Standard Specifications for Construction, and per the appropriate Trench Detail contained within these Contract Documents.

The Contractor shall remove and properly dispose of all excavated materials, removed storm sewer and debris, and shall bulkhead or abandon existing pipe and structures, all as directed by the Engineer.

The Contractor shall maintain line and grade of the sewer by means of a laser. The Engineer will establish line and grade for the sewer construction and will provide cut sheets for the Contractor's use.

In areas where the road is to be reconstructed, the Contractor may elect to perform sewer work prior to the removal of pavement and subgrade preparation. In such cases, the work associated with pavement removal, excavation, backfill, and the temporary patching of the trench as necessary for traffic maintenance, will not be paid for separately, but shall be included in these items of work.

MEASUREMENT AND PAYMENT

Where the contractor elects to furnish and place flowable fill as backfill for these items, it will not be paid separately, but shall be included in the bid prices for these items of work.

The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

PAY ITEM

PAY UNIT

Sewer, CI C 76 IV, __ inch, Tr Det __, Modified

Foot

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

**DETAILED SPECIFICATION
FOR
FLOWABLE FILL**

DESCRIPTION

This work shall consist of furnishing and placing flowable fill as backfill material at miscellaneous locations as shown on the Plans, and as directed by the Engineer.

MATERIALS

Flowable fill shall meet the requirements of the City of Ann Arbor Standard Specifications.

CONSTRUCTION METHODS

The Contractor shall furnish and place flowable fill at miscellaneous locations as shown on the Plans and as directed by the Engineer.

MEASUREMENT AND PAYMENT

Flowable fill used at the Contractor's option will not be paid for separately, but shall be included either in the bid price(s) for the associated work item(s), or in the bid price for the item of work "General Conditions".

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
WATER-TITE STRUCTURE COVERS

AA:JN

1 of 1

4/10/17

a. Description.- This work shall consist of furnishing sanitary structure covers as detailed on the plans and as specified herein.

<u>Type of Casting</u>	<u>MDOT Designation</u>	<u>Approx. Pay Weight (lb)</u>	<u>East Jordan Iron Works Casting No.</u>	<u>Neenah Foundry Casting No.</u>
Manhole Flange and Cover, Sanitary	Q	400 LB	1040 w/ Type A cover	R-1642 w/ Type C cover

Frames and covers shall have machined bearing surfaces. No open vent holes will be permitted on the cover. Each cover shall have the word "SEWER" cast in the surface.

b. Materials.- The materials used for this work shall conform to Section 908.05 of the Michigan Department of Transportation 2012 Standard Specifications for Construction except as specified herein.

c. Construction Methods.- The construction methods shall be as specified in the related items of work for which the structure covers are provided.

d. Measurement and Payment.- The completed work as measured shall be paid at the contract unit price for the following contract items (pay items):

<u>(Contract Item) Pay Item</u>	<u>Pay Unit</u>
Dr Structure Cover, Water-tite	Each

Payment for this item of work shall include all labor, materials and equipment needed to furnish the drainage structure cover.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
DRAINAGE STRUCTURES

AA:JN

1 of 3

4/11/17

a. Description.- This work shall consist of constructing drainage structures in accordance with Section 403 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, as shown on the plans, and as specified herein.

b. Materials.- The materials used for this work shall conform to Subsection 403.02 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, except as specified herein.

Storm sewer drainage structures shall be constructed of precast or cast-in-place reinforced concrete sections, or concrete masonry units. All sanitary sewer manholes and gate wells (water main valve manholes) shall be constructed of precast reinforced concrete sections.

Precast reinforced concrete bases, bottom sections, manhole risers, grade adjustment rings, concentric cones, eccentric cones, and flat slab tops shall conform to the requirements of ASTM C-478. Joints on precast manholes used on all sanitary sewers shall meet ASTM C-443, rubber O-ring gasket.

If precast drainage structures are used, they shall be designed to accommodate HL-93 Modified Live Load requirements as determined by a Professional Engineer licensed by the State of Michigan, regardless of where they are to be installed. For the purposes of design, a HL-93 Modified Live Load shall consist of 1.2 times the design truck or 1.2 times a single 60 kip load, whichever produces the greater stresses.

If precast structures are used, the Contractor shall field verify inverts prior to fabricating precast units. No additional payment will be made to the Contractor for precast units that cannot be used due to existing inverts being different than shown on the plans, changes in vertical or horizontal alignment due to conditions found in the field, or similar unforeseen circumstances.

If the Contractor elects to use pre-cast drainage structures, or if portions of the drainage structures are constructed with pre-cast concrete elements, the Contractor shall submit to the Engineer for review and approval shop drawings in accordance with Section 104.02 of the Michigan Department of Transportation 2012 Standard Specifications for Construction.

For each submittal or resubmittal, the Contractor shall allow at least 14 calendar days from the date of the submittal to receive the Engineer's acceptance or request for revisions. The Engineer's comments shall be incorporated into the submitted plans, calculations and descriptions. The Engineer's acceptance is required before beginning the work. Resubmittals shall be reviewed and returned to the General Contractor within 14 calendar days. Required revisions will not be a basis of payment for additional compensation, extra work, or an extension of contract time. The Contractor shall include time for this entire review process in his/her CPM network schedule.

Concrete masonry units shall conform to the requirements for concrete masonry units for catch basins and manholes, ASTM C-139.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
DRAINAGE STRUCTURES

AA:JN

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4/11/17

Concrete brick shall conform to the requirements for concrete building brick, ASTM C-55, Grade N-1.

Plastic coated manhole steps shall be injection molded of copolymer, polypropylene, encapsulating a 1/2 inch grade 60 steel reinforcing bar. Plastic-coated manhole steps shall meet the performance test described in ASTM C-478, Paragraph II, and shall have an impact resistance of 300 ft.-lbs. with only minor deflection and no cracking or breaking. The steps shall resist pull out forces of 1500 lbs.

c. Methods of Construction.- The construction methods used shall conform to Section 403.03 of the Michigan Department of Transportation 2012 Standard Specifications for Construction except as specified herein.

Excavation shall be carried to the depth and width required to permit the construction of the required base. The excavation width shall be greater than the base. The bottom of the excavation shall be trimmed to a uniform horizontal bed and be completely dewatered before any concrete is placed therein. Precast manhole bases and precast bottom sections are allowed.

Concrete block construction shall only be allowed for storm sewer manholes and inlets and shall be built of the size and dimensions shown on the Plans. The block shall be clean, laid in a full bed of mortar, and thoroughly bonded by completely filling the vertical end grooves with mortar so as to interlock with the adjacent block. The mortar beds and joints shall not exceed 3/4 inch thickness. The vertical joints are to be completely filled with the joints on the inside face rubbed full of mortar and struck smooth as the manhole, inlet or structure is built up. The entire outside face of the structure shall receive a 1/2 inch thick mortar coat and struck smooth. All masonry materials, sand, and water shall be heated to over 50° F during freezing weather, and the completed work shall be covered and protected from damage by freezing.

Circular precast manhole sections shall be constructed in accordance with the details as shown on the plans. Manhole stack units shall be constructed on level poured-in-place bases, precast concrete bases, or precast concrete bottom sections.

Precast cone sections shall be constructed in accordance with the details as shown on the plans. These units shall be eccentric for all manholes, precast or block. All structures shall be topped with a minimum of one, and a maximum of three, 2 inch tall, brick or precast adjustment courses.

Manholes, inlets, gate wells and structures shall be constructed within 2-1/2 inches of plumb.

Frames and cover castings shall be set in full mortar beds and pointed on the structure interior to a smooth, brushed finish. The covers shall be set flush with sidewalk, roadway pavement, or ground surfaces. The Engineer shall be notified prior to the final paving so as to

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
DRAINAGE STRUCTURES

AA:JN

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4/11/17

allow inspection of the final casting adjustments for all utility structures. In gravel streets, covers shall be set six to eight inches below finished gravel surface.

Sewer pipes shall extend into structures a minimum of 1/2 inch and a maximum of 3 inches.

Flow channels for sewer structures shall be finished in accordance with the details as shown on the plans. All flow channels shall be screeded and floated to a smooth, uniform surface and troweled to a hard surface finish.

Stubs for future sewer connections shall be furnished and placed by the Contractor as shown on the Plans and as directed by the Engineer. Connections shall be properly supported and braced when not resting on original ground so that any settlement will not disturb the connection. Stubs shall consist of one length of sewer pipe, of the size indicated on the Plans, with a watertight plug.

All necessary adjustments for new structures shall be included in the cost of the structure.

d. Measurement and Payment.- The completed work as measured shall be paid at the contract unit price for the following contract items (pay items):

<u>(Contract Item) Pay Item</u>	<u>Pay Unit</u>
Dr Structure, ___ inch dia	Each
Dr Structure, ___ inch dia, Add Depth	Foot
Dr Structure, Type III, ___ inch dia	Each

Payment for drainage structures includes furnishing the labor, equipment and materials for all necessary excavation, disposing of surplus excavated material, backfilling, and constructing the structure complete, including pipe connections and structure cleaning. A standard depth manhole shall be considered to be 10 feet or less in depth (including sump).

Payment for additional depth for drainage structures includes furnishing the labor, equipment, and materials for all necessary excavation, disposing of surplus excavated material, backfilling, and constructing the structure complete, including pipe connections and structure cleaning, for the portion of the structure which is deeper than 10 feet (including sump).

In addition to the above, payment for Dr Structure, Manhole, Type III, ___ inch dia, shall include all labor, equipment, and materials required to construct a shallow manhole with a flat slab top to the elevations as detailed on the plans.

Payment for adjusting of drainage structure covers shall be included in payment for the structure. Drainage structure covers will be paid for separately.

**DETAILED SPECIFICATION
FOR
STORM WATER TREATMENT STRUCTURE**

AA:JN

1 OF 2

4/11/17

DESCRIPTION

This work shall include the complete installation of a storm water treatment structure, as shown on the Plans, and as directed by the Engineer.

MATERIALS

The 3" vortex flow control valve shall be self-activated by utilizing the upstream hydraulic head. The unit shall consist of an intake, a volute and an outlet and shall be installed into the precast weir wall as shown on the Plans.

The vortex flow control valve shall be capable of limiting the discharge flow from the over-sized storm sewer to less than 0.5 cfs throughout the range of upstream head conditions of 0 to 5.5 feet.

The unit shall be constructed of 304 stainless steel and shall include a pivoting bypass door to allow maintenance should plugging occur.

The manhole and weir wall shall be precast structures and shall conform to the SPECIAL PROVISION FOR DRAINAGE STRUCTURES, contained elsewhere in these contract documents. Submit Shop Drawings that include all dimensions, reinforcement sizes and locations, material strengths, and noting any work to be done by others at point of installation.

Submit structural calculations by a Structural Engineer registered in the State of Michigan to Owner's Engineer for review upon request. Engineer review shall not relieve the Contractor of the design responsibility.

Polyurethane elastomeric sealant and primer shall be from the same manufacturer and specifically designed to be compatible. Sealant and primer shall be suitable for moist installation environment, vertical installation, and totally submerged service conditions. Sealant shall meet requirements for ASTM C920, Type S, Grade NS, Class 35, using T, NT, O, M, G, I. The material shall be Sikaflex-1A and Sikaflex Primer 429, or approved equal.

Butyl rubber based preformed flexible sealant conforming to ASTM C-990, paragraph 6.2. The material shall be PRO-STIK, EZ-STIK or approved equal.

CONSTRUCTION METHODS

Construction of the manhole structure shall comply with all requirements and standards of the City of Ann Arbor Standard Specifications for Type II manholes and the Special Provision for Drainage Structures.

Seal between base slab and bottom of precast riser with 3/4" diameter butyl preformed flexible sealant.

Prime and seal the vertical joints on each side of the flow control wall and precast manhole wall with polyurethane elastomeric sealer and compatible primer. Apply primer and sealant in accordance with manufacturer's instructions. Allow seven days for sealant to cure before allowing to be submerged in water.

**DETAILED SPECIFICATION
FOR
STORM WATER TREATMENT STRUCTURE**

AA:JN

2 OF 2

4/11/17

The vortex flow control valve unit shall be installed in the precast structure weir wall using an appropriately sized sleeve and o-ring gaskets.

MEASUREMENT AND PAYMENT

All work will be paid for at the Contract unit price for the following:

PAY ITEM

PAY UNIT

Stormwater Control Structure, 84 inch dia

Each

Payment includes furnishing the labor, equipment and materials for all necessary excavation; disposal of surplus excavated material; backfill and compaction; construction of the structure complete, including concrete base, pipe connections, precast structure sections or concrete block, precast weir wall, flow channels, steps, concrete bricks, mortar, adjustment to finish grade, and structure cleaning; and installation of the vortex flow control valve unit.

**DETAILED SPECIFICATION
FOR
INFILTRATION TRENCH**

AA:JN

1 OF 2

4/13/17

DESCRIPTION

This work shall include the installation of an infiltration trench, as specified herein, as shown on the Plans, and as directed by the Engineer.

MATERIALS

Stone reservoir material to consist of 6A Aggregate in accordance with Section 902 of the 2013 MDOT Standard Specifications for Construction, except that it shall consist of a minimum of 90% crushed material, and shall have Voids \geq 30%. If approved aggregate has less than 30% voids, increase thickness to accommodate design volume as directed by the Engineer at the Contractor's expense.

Geotextile liner to consist of a non-woven geotextile similar to ADS Geosynthetics 601T or equivalent. The material shall have the following properties:

PROPERTY	TEST METHOD	UNIT	M.A.R.V. (Min Avg Roll Value)
Weight (Typical)	ASTM D 5261	oz/yd ² (g/m ²)	6.0 (203)
Grab Tensile	ASTM D 4632	lbs (kN)	160 (0.711)
Grab Elongation	ASTM D 4632	%	50
Trapezoid Tear Strength	ASTM D 4533	lbs (kN)	60 (0.267)
CBR Puncture Resistance	ASTM D 6241	lbs (kN)	410 (1.82)
Permittivity*	ASTM D 4491	sec ⁻¹	1.5
Water Flow*	ASTM D 4491	gpm/ft ² (l/min/m ²)	110 (4480)
AOS*	ASTM D 4751	US Sieve (mm)	70 (0.212)
UV Resistance	ASTM D 4355	%/hrs	70/500

* At the time of manufacturing. Handling may change these properties.

Delivery, Storage, and Handling:

1. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and according to Manufacturer's directions.
2. Protection: Use all means necessary to protect the materials of this Section before, during, and after installation.
3. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

**DETAILED SPECIFICATION
FOR
INFILTRATION TRENCH**

AA:JN

2 OF 2

4/13/17

CONSTRUCTION METHODS

1. Excavate to the lines and grades as noted on the plans.
2. Prepare subgrade for construction of infiltration trench:
 - a. Avoid compaction of subgrade soil unless directed or approved by Engineer.
 - b. Proof Roll to identify soft or unstable areas. Use light equipment to avoid over compacting subgrade.
 - c. Scarify compacted or disturbed subgrade soils to a minimum depth of 6 inches with a york rake and light tractor, or equivalent method.
 - d. Remove accumulated fine materials due to ponding or surface erosion with light equipment. Excavate, fill, re-grade, and scarify areas damaged by erosion, ponding or traffic compaction.
 - e. Do not place geotextile or permeable media bed until subgrade surface has been inspected and approved by Engineer.
3. Construct infiltration trench
 - a. Begin installation of infiltration trench immediately after approval of subgrade preparation.
 - b. Place geotextile in accordance with Manufacturer's standards and recommendations.
 - i. Overlap Adjacent Strips: Minimum 16 inches.
 - ii. Prevent runoff or sediment from entering the storage bed.
 - c. Place reservoir course to grades indicated on Drawings.
 - i. Maximum Lift Thickness: 10 inches.
 - ii. Minimum Lift Thickness: 6 inches.
 - iii. Compact each layer to a minimum of 95% of the maximum density as per City of Ann Arbor Standard Specifications.
 - iv. Fine grade as necessary to conform to elevations and cross section indicated on the Drawings.
 - v. Roll aggregate layer with paving roller until smooth, as directed by Engineer.

MEASUREMENT AND PAYMENT

The completed work as measured for these items of work will be paid for at the Contract Unit Prices for the following Contract (Pay) Items:

PAY ITEM

PAY UNIT

Infiltration Trench

Cubic Yard

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified including, but not limited to: excavation and removal of existing earth; proof rolling and undercutting; furnishing, placement, and compaction of all aggregate materials; and furnishing and placement of geotextile.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
HMA APPLICATION ESTIMATE

AA: JAN

1 of 1

4/5/17

a. Description. This work shall consist of furnishing and placing (HMA) hot mix asphalt on the prepared aggregate or milled surfaces in accordance with the details shown on the plans and as specified in Section 501 of the Michigan Department of Transportation Standard Specifications for Construction, 2012 Edition with the exceptions and additions specified herein.

b. Materials.

Mainline Paving:

The HMA, 5E3 used for top course shall be 1.5 inches thick and have a yield of 170 pounds per square yard with a PG 64-28 binder. The HMA, 5E3 used for top course shall have an AWI = 260 minimum. The use of RAS is prohibited.

The HMA, 4E3 used for leveling course shall be 2 inches thick and have a yield of 226 pounds per square yard with a PG 64-28 binder.

The HMA, 3E3 used for base course shall be 3 inches thick and have a yield of 339 pounds per square yard with a PG 58-22 binder.

HMA Approaches and Finish Wedging:

The LVSP used for the approaches shall consist of two lifts of 2 inches and have a yield of 452 pounds per square yard total with a PG 58-28 binder. The LVSP used for top course shall have an AWI = 260 minimum.

HMA Hand Patching:

The LVSP used for hand patching shall have a variable yield, with an average of 220 pounds per square yard with a PG 58-28 binder.

c. Construction. Construction shall be in accordance with Section 501 of the 2012 MDOT Standard Specifications for Construction, and the Detailed Specifications for HMA Paving and HMA Acceptance contained within the contract documents.

A bond coat shall be applied before each lift of HMA mixture is placed. The rate of application shall be 0.10 gallons per square yard.

d. Measurement and Payment. Measurement shall be based on load weight tickets from a certified scale and accepted at the job site by a City of Ann Arbor agent.

Payment for HMA 5E3, 4E3, 3E3, and HMA LVSP Hand Patching shall include all labor, equipment and materials to complete this work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE CURB AND GUTTER, AND DRIVEWAY OPENINGS

AA:DAD

1 of 1

4/10/17

a. Description. This work shall consist of constructing concrete curb and gutter, and concrete driveway openings in accordance with the detail included in the contract documents, section 802 of the MDOT 2012 Standard Specifications for Construction, and as specified herein.

b. Materials. The materials shall meet the requirements as specified in section 802 of the MDOT 2012 Standard Specifications for Construction and as specified herein:

The concrete mixture for driveway openings and curb and gutter shall be Grade P-NC (658 lbs/cyd cement content) concrete with 6AA coarse aggregate.

All concrete mixtures shall contain 6AA coarse aggregates which are either natural or limestone and meet the requirements of section 902 the MDOT 2012 Standard Specifications for Construction.

It shall be the Contractor's sole responsibility to propose specific concrete mix designs which meet the requirements of this Detailed Specification.

c. Construction. Construction methods shall be in accordance with section 802 of the MDOT 2012 Standard Specifications for Construction.

Curb and gutter shall be 2 feet wide barrier curb and gutter with steel reinforcement per the detail included in the contract documents, and constructed where shown in the plans.

Expansion joints of the thickness shown on the details shall be placed as directed by the Engineer.

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

<u>Pay Item</u>	<u>Pay Unit</u>
Curb and Gutter, Concrete	Foot
Drive Opening, Conc, Detail M	Foot

The pay items will be measured in length by the foot and will be payment in full for all labor, equipment and material needed to properly complete this work, including but limited to steel reinforcement, curing compound, and expansion joint material.

At curb openings for sidewalk ramps, the concrete curb and gutter (without the curb face) will be measured and paid for at the contact unit price for curb and gutter.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
Integral Sidewalk Retaining Wall

AA:JN

1 of 1

3/11/17

a. Description. This work shall consist of constructing concrete retaining walls adjacent to sidewalks, in accordance with Section 802 of the 2012 edition of the MDOT Standard Specifications for Construction, except as specified herein, as shown in this Detailed Specification, and as directed by the Engineer.

b. Material. Concrete mixtures shall be Grade P1 or S2 concrete, or as directed by the Engineer, meeting the requirements specified in Section 803 of the MDOT Standard Specifications.

c. Construction. The Contractor shall construct the Integral Sidewalk Retaining Walls as shown in accordance with the detail contained in the Contract Documents. Construction shall be in accordance with Section 802 of the 2012 MDOT Standard Specifications for Construction.

d. Payment. Payment shall be measured by the exposed face area of the retaining wall in lineal feet. The completed work, as described, will be measured and paid for at the contract unit price for the following pay item:

Contract Item (Pay Item)	Pay Unit
Integral Sidewalk Retaining Wall, 6 inch to 18 inch	Foot

Payment for Integral Sidewalk and Retaining Wall for the respective height shall include all labor, equipment and materials to complete this work.

**DETAILED SPECIFICATION
FOR
CONCRETE DURABILITY**

1 of 6

DESCRIPTION

The Contractor shall furnish a Portland cement concrete mixture for this project that has been tested under this specification and shown to be resistant to excessive expansion caused by alkali-silica reactivity (ASR) and provides adequate air entrainment for freeze thaw durability. The Contractor shall construct the project with practices outlined in this specification.

MATERIALS

The materials provided for use on this project shall conform to the following requirements:

Portland cement	ASTM C 150
Fine Aggregate	ASTM C 33*
Coarse Aggregate	ASTM C 33*
Fly Ash, Class F	ASTM C 618
Slag Cement, Grade 100, 120	ASTM C 989
Silica Fume	ASTM C 1240
Blended Cements	ASTM C-595
Air Entraining Admixtures	ASTM C-260
Chemical Admixtures	ASTM C-494
White Membrane Cure	ASTM C-309 Type 2

* Fine and coarse aggregates shall consist of natural aggregates as defined in the 2012 MDOT Standard Specifications Section 902.02.A.1.

The Contractor shall provide documentation that all materials to be incorporated into proposed mixed designs meet the requirements of this section.

Alkali-Silica Reactivity

The Contractor shall supply to the Engineer preliminary concrete mix designs including a list and location of all suppliers of concrete materials. The Contractor shall evaluate the mixtures for the potential for excessive expansion caused by ASR and provide documentation to the Engineer. The Contractor's evaluation shall include a review of any previous testing of the material sources intended to be used for both the fine and coarse aggregates for the concrete mixtures. The previous testing may be from other projects or records provided by the material suppliers.

Aggregates shall be tested under ASTM C-1260. If the expansion of the mortar bars is less than 0.10%, at 14 days, the aggregates shall be considered innocuous and there are no restrictions for ASR mitigation required with this material.

Previous aggregate test data may be used. If no previous test data is available, for the concrete mix, that shows that it is resistant to ASR, a concrete mixture that will mitigate the potential for ASR must be designed using either method 1 or 2 as described below.

Method 1. Substitution of a portion of the cement with Class F Fly Ash, Slag Cement Grade 100 or 120 or a ternary mix (blended cement) containing a blend of Portland cement and slag cement, or Class F fly ash, or silica fume.

The maximum substitution of cement with the fly ash permitted shall be 25% by weight of total cementitious material (cement plus fly ash). Additional requirements for the Fly Ash, Class F are that the Calcium Oxide (CaO) percent shall be less than 10 % and the available alkalis shall not exceed a maximum of 1.5%. A copy of the most recent mill test report shall be submitted to verify. Note: a Class C fly ash with a minimum total oxides ($\text{SiO}_2 + \text{Al}_2\text{O}_3 + \text{Fe}_2\text{O}_3$) of 66% and a minimum SiO_2 of 38% may be used in lieu of Type F fly ash.

The maximum substitution of cement with the Slag Cement permitted shall be 40% by weight of total cementitious material (cement plus Slag Cement). The minimum replacement rate with Slag Cement shall be 25%.

For a ternary blend the total replacement of supplementary cementitious materials is 40% with a blend consisting of a maximum of 15% type F fly ash, and/or 8% silica fume and/or slag cement.

For method 1, the effectiveness of the proposed mix combination to resist the potential for excessive expansion caused by ASR shall be demonstrated using current or historic data. To demonstrate the effectiveness of the proposed mix the Contractor shall construct and test mortar bars per ASTM C1567 (14 day test) using both the fine and coarse aggregate along with the proposed cementitious material for the concrete mixture. If a mortar bar constructed of these materials produces an expansion of less than 0.10%, concrete mixture will be considered to be resistant to excessive expansion due to ASR.

If a mortar bar constructed produces an expansion of 0.10% or greater, concrete mixtures containing these materials shall not be considered resistant to the potential for excessive expansion due to ASR and shall be rejected. Additional testing, including alternate proportions or different materials will be required.

Method 2. Use low alkali cement and maintain the total alkali content from the cementitious at no more than 3.0 lbs/cyd (Na_2Oeq). The total alkali contribution is calculated by the quantity contained in the Portland cement only.

Requirements for Low Alkali Cement are that the alkali content does not exceed 0.60% expressed as Na_2O equivalent. Equivalent sodium oxide is calculated as: (percent Na_2O + 0.658 x percent K_2O).

For either method 1 or 2, if the Contractor intends to change any component material supplied after the mix design has been approved all concrete work will be suspended with no cost to the project or extensions of time, unless approved, until evaluation of the new mixtures and testing of the new materials demonstrates that it is resistant to excessive expansion due to ASR.

The Engineer and Contractor shall monitor the concrete that is delivered to the project site so as to insure that the approved mix design is being followed. The supplier shall include on the delivery ticket for each batch of concrete delivered to the job, the identification and proportions of each material batched.

When concrete is placed during cold weather, defined for the purposes of this Detailed Specification to be, air temperatures below 40° F, the use of accelerators, heated aggregates, silica fume and/or additional forms of cold weather protection will be required. Cold weather will not eliminate the requirement for furnishing and placing a concrete mix that is considered resistant to ASR attack.

Prior to cool weather placement, defined for the purposes of this detailed specification to be, air temperatures between 40° and 60° F, the set time of the proposed mix shall be verified under anticipated field conditions. This information shall be used when scheduling pours and saw crews.

Air Entrainment

Air entrainment shall be accomplished by addition of an approved air entraining agent. Air content as determined by ASTM C 231 or ASTM C 173, shall be determined on each day of production as early and as frequently as necessary until the air content is consistently acceptable. If during the period of time while adjustments are being made to the concrete to create a mixture that is consistently acceptable, concrete is produced that does not meet the requirements of this Detailed Specification, the Engineer may reject the material and direct it to be removed from the jobsite. Any rejected material shall be removed from the jobsite at the Contractor's sole expense. Quality Control testing performed by the Contractor to ensure compliance with the project specifications shall be performed on the grade ahead of the placement operation.

Paver placement: During production, the plastic concrete material shall be tested for acceptance at a point ahead of the paver. The air content of the concrete mixture that the Contractor shall provide shall be known as the Acceptance Air Content (AAC). The Contractor shall also provide additional entrained air in the concrete mixture to account for the air loss which occurs in the concrete mixture experienced during transportation, consolidation and placement of the concrete. The "air loss" shall be added to the air content of the concrete mixture as established on the approved concrete mix design. The AAC for the project will be 6.0% plus an amount equal to the air loss.

For up to the first four loads, the air content measured on-site prior to placement shall be at least 8.0% and no more than 12.0%. To establish the initial AAC on the first day of paving, the air content of the first load shall be tested at the plant. After initial testing at the plant the Contractor shall provide at least two sample sets to determine the actual air loss during placement. A sample set shall consist of two samples of concrete from the same batch, one taken at the point of discharge and the other from the in-place concrete behind the paver. The air loss from the two sample sets shall be averaged and added to 6.0% to establish the AAC (rounded to the next higher 0.5%). After the testing and adjustment procedure(s) have been completed, the project acceptance air tests shall be taken prior to placement. The Contractor shall provide concrete to the jobsite that has an air content of plus 2.0%, or minus 1.0%, of the AAC.

After the AAC has been established, it shall be verified and/or adjusted through daily checks of the air loss through the paver. The Contractor shall check the air loss through the paver a minimum of two times a day. A Revised AAC shall be required to be established by the Contractor if the average air loss from two consecutive tests deviates by more than 0.5% from the current accepted air loss. The testing operations performed by the Contractor to establish a

revised AAC shall be performed to the satisfaction of the Engineer. The Contractor shall be solely responsible for any delays and/or costs that occur to the project while establishing revised AACs.

Hand placed concrete: The air content for non-slip-form paving shall be 7.0% plus 1.5%, or minus 1.0%, at the point of placement.

CONSTRUCTION METHODS

Aggregate Control

Gradation control – The supplier shall provide a detailed stockpile management plan, describing their process control procedure for shipping, handling, and stockpiling of each aggregate including workforce training.

Moisture control – All aggregate materials must be conditioned to a moisture content of not less than saturated surface dry (SSD) prior to batching. A watering process using an effective sprinkler system designed and operated by the Contractor shall be required on all coarse aggregate material stockpiles.

The Contractor shall provide verification that these processes have been performed by the supplier. The Engineer reserves the right to independently verify that the supplier has complied with these standards.

Mixing

Central mix plants - The total volume of the batch shall not exceed the designated size of the mixer or the rated capacity as shown on the manufacturer's rating plate.

Drum Mix Plants: After all solid materials are assembled in the mixer drum; the mixing time shall be a minimum of 60 seconds and a maximum of 5 minutes. The mixing time may be decreased if the ASTM C-94 11.3.3 mixer efficiency tests show that the concrete mixing is satisfactory. The Engineer may require an increase in the minimum mix time if the mixer efficiency test determines that the concrete is not being mixed satisfactorily. The minimum mixing time shall start after the mixer is fully charged. Mixers shall be operated at the speed recommended by the manufacturer as mixing speed. The mixer shall be charged so that a uniform blend of materials reached the mixer through out the charging cycle. Any additional slump water required shall be added to the mixing chamber by the end of the first 25% of the specified mixing time. Mixers shall not be used if the drum is not clean or if the mixing blades are damaged or badly worn

Ribbon mixers: After all solid materials are assembled in the mixer; the mixing time shall be a minimum of 30 seconds and a maximum of 2.5 minutes. The mixing time may be decreased if the ASTM C-94 11.3.3 mixer efficiency tests show that the concrete mixing is satisfactory. The Engineer may require an increase in the minimum mix time if the mixer efficiency test determines that the concrete is not being mixed satisfactorily. The minimum mixing time shall be indicated by an accurate timing device which is automatically started when the mixer is fully charged. Mixers shall be operated at the speed recommended by

the manufacturer as mixing speed. The mixer shall be charged so that a uniform blend of materials reached the mixer through out the charging cycle. After any additional slump water is added to the mixing chamber the mixing shall continue for a minimum of 10 seconds. Mixers shall not be used if the mixer is not clean or if the mixing blades are damaged or badly worn.

Truck Mixers -The capacities and mixing capabilities shall be as defined in ASTM C 94, and each unit shall have an attached plate containing the information described therein. The plate may be issued by the Truck Mixer Manufacturer. The mixer capacity shall not be exceeded, and the mixing speeds shall be within the designated limits. Truck mixers shall be equipped with a reliable reset revolution counter. If truck mixers are used for mixing while in transit, the revolution counter shall register the number of revolutions at mixing speed.

An authorized representative of the concrete producer shall certify that the interior of the mixer drum is clean and reasonably free of hardened concrete, that the fins or paddles are not broken or worn excessively, that the other parts are in proper working order, and that the unit has been checked by the representative within the previous 30 calendar day period to substantiate this certification. The current, signed certification shall be with the unit at all times.

The required mixing shall be between 70 and 90 revolutions. The mixing shall be at the rate designated by the manufacturer and shall produce uniform, thoroughly mixed concrete.

The Engineer may inspect mixer units at any time to assure compliance with certification requirements, and removal of inspection ports may be required. Should the Engineer question the quality of mixing, the Engineer may check the slump variation within the batch. Should the slump variation between two samples taken, one after approximately 20% discharge and one after approximately 90% discharge of the batch, show a variation greater than 3/4 inch (20 mm) or 25% of the average of the two, whichever is greater, the Engineer may require the mixing to be increased, the batch size reduced, the charging procedure be modified or the unit removed from the work.

The practice of adding water on the site shall be discouraged. After the slump of the concrete in the first round of trucks has been adjusted on-site, the amount of water added at the plant shall be adjusted accordingly for that day's work. All additions of water on site shall be approved by the Engineer.

Curing

Apply liquid curing compound in a fine atomized spray to form a continuous, uniform film on the horizontal surface, vertical edges, curbs and back of curbs immediately after the surface moisture has disappeared, but no later than 30 minutes after concrete placement. With approval of the Engineer, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties.

The cure system shall be on site and tested prior to concrete placement.

Apply a curing compound at a rate of application not less than 2 gallons per 25 square yards. The Contractor shall keep the material thoroughly mixed per the Manufacturer's recommendations. The curing compound shall not be diluted.

The finished product shall appear as a uniformly painted solid white surface. Areas exhibiting a

blotchy or spotty appearance shall be recoated immediately.

COMPLIANCE WITH STANDARDS

The Engineer will review and approve all material test reports and mix designs supplied by the Contractor before any placement of concrete. The Engineer will visually inspect the placed concrete and review the concrete test reports prior to final acceptance.

Acceptance sampling and testing will be performed using the sampling method and testing option selected by the Engineer. Acceptance testing will be performed at the frequency specified by the Engineer. Quality control measures to insure job control are the responsibility of the Contractor. The Engineer's testing and/or test results will not relieve the Contractor from his/her responsibilities to produce, deliver, and place concrete that meets all project requirements. The Engineer's test results are for acceptance purposes only.

If the results of the testing are not in compliance with the project specifications, the Engineer shall determine appropriate corrective action(s). Time extensions will not be granted to the Contractor during the time that the Engineer is determining the necessary corrective actions.

If, in the Engineer's judgment, the rejected material must be replaced, the material in question will be removed and replaced at the Contractor's sole expense. The removal costs will be deemed to include all relevant and associated costs including, but not limited to; re-mobilization, traffic control, re-grading the aggregate base course, if required, placement of material meeting the project specifications, and all other expenses. Time extensions will not be granted to the Contractor for any required repair work to meet the requirements of this specification.

If the Engineer decides that the material in question can remain in place, an adjustment to the contract unit price(s) may be made of up to 100% of the bid price(s) for the affected items of work.

MEASUREMENT AND PAYMENT

The cost associated with complying with the requirements as described herein, including any required remedial action(s), shall be included in the cost of other items of work and shall not be paid for separately.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CONCRETE SIDEWALKS, SIDEWALK RAMPS, AND DRIVEWAY APPROACHES

AA:JN

1 of 2

3/11/16

a. Description. This work shall consist of constructing concrete sidewalks, sidewalk ramps, or driveway approaches of the types as indicated on the plans in accordance with attached details, and as directed by the Engineer. All sidewalks and ramps shall contain fibermesh reinforcement. All work shall be in accordance with sections 801 and 803 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction, and as specified herein.

b. Materials. The materials shall meet the requirements as specified sections 801 and 803 of the MDOT 2012 Standard Specifications for Construction and as required herein. The concrete mixture shall be Grade P-NC as specified in section 601 of the MDOT 2012 Standard Specifications.

Fibermesh reinforcement shall consist of polypropylene fibrillated fibers added at the rate of 1.5 pounds per cubic yard to the concrete. The fibers shall meet the requirements of ASTM C1116-89 "Specification for Fiber Reinforced Concrete and Shotcrete" Classification 4.1.3 Type III. The concrete shall be thoroughly mixed for a minimum of 5 minutes after the addition of the fibers to assure uniform distribution throughout the concrete.

All concrete mixtures shall contain 6AA coarse aggregates which are either natural or limestone and meet the requirements of section 902 of the MDOT 2012 Standard Specifications for Construction.

It shall be the Contractor's sole responsibility to propose specific concrete mix designs which meet the requirements of this Detailed Specification.

c. Construction Methods. The Contractor is responsible to construct all sidewalks, sidewalk ramps, curbs, and all other concrete items within ADAAG compliance. All sidewalk and curb ramps must be constructed in accordance with the current MDOT Standard Plan Series R-28.

The Contractor shall trim, place, and compact granular material as needed to construct new concrete items and to relocate existing concrete items to their new elevations and locations.

Where concrete is to be placed, it shall be placed on a minimum of 4 inches of Granular Material Class II compacted to 95% of its maximum dry density. In the downtown area, all sidewalk and ramps shall be placed on a minimum of 8 inches of Granular Material Class II compacted to 95% of its maximum dry density.

Where indicated on the plans, the Contractor shall horizontally sawcut curbs to provide openings for sidewalk ramps. The Engineer shall define the extent of sawcutting both horizontally and vertically. This work will not be paid for separately, but shall be included in the corresponding price of the ADA ramp to be placed.

All sidewalk ramps shall be installed with detectable warning units. Reference the Detailed Specification entitled "Detectable Warning Surface" for additional requirements.

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

<u>Pay Item</u>	<u>Pay Unit</u>
Sidewalk, Concrete, ___ inch, Modified	Square Foot
Sidewalk Ramp, Approach, Concrete, ___ inch, Modified	Square Foot

The above items will be measured by area in square feet and be paid for at their respective contract unit price, which price shall be payment in full for all labor, equipment and material needed to accomplish this work.

The unit price for "Sidewalk Ramp, Approach, Concrete, ___ inch, Modified" shall also include all costs associated with sawcutting curbs to provide openings for sidewalk ramps as indicated on the plans.

The above items will be constructed of high early strength concrete, Grade P-NC concrete. The additional cement shall be paid for separately.

The furnishing and adding the fibermesh reinforcement materials shall also be included in the contract unit price for the respective sidewalk and ramp pay items.

Detectable warning units shall be paid for in accordance with the Detailed Specification for Detectable Warning Surface.

**DETAILED SPECIFICATION
FOR
CAST IRON DETECTABLE WARNING SURFACE**

AA:JN

1 of 1

4/12/17

a. Description. This work consists of constructing and/or reconstructing sidewalk ramps with cast iron detectable warning surfaces at the specified location(s). Complete this work according to the standard specifications and Standard Plan R-28 Series, except as modified herein.

b. Materials. Use detectable warning surfaces that provide tactile and visual warning and contrast visually with adjacent walking surfaces, either light-on-dark or dark-on-light. Provide cast iron detectable warning surfaces that conform to the dimensions shown on Standard Plan R-28 Series. Select one of the following products, or provide an approved equal, for this project.

Neenah Foundry
2121 Brooks Ave
Neenah, WI 54956
Phone: 920-725-7000
Product Name: NF Detectable Warning Plates

East Jordan
301 Spring Street
East Jordan, MI 49727
Phone: 800-874-4100
Product Name: EJ Cast Iron Detectable Warning Plate

Provide all detectable warning surfaces from the same manufacturer unless otherwise approved by the Engineer.

c. Construction. Construct sidewalk ramps according to subsection 803.03 of the Standard Specifications for Construction and Standard Plan R-28 Series, except that the ramps must be the thickness as shown on the plans. Install detectable warning surfaces according to the manufacturer's instructions and Standard Plan R-28 Series.

When replacing gutters in addition to sidewalk ramps, transition the gutter cross section in advance of the sidewalk ramp to meet the dimensions and profile in Standard Plan R-28-series.

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
Detectable Warning Surface	Foot

Detectable Warning Surface will be measured in place by the area of detectable warning material installed at specified locations. Payment includes all labor, materials, and equipment to install detectable warning surface.

All concrete work required for this work will be measured and paid for as specified elsewhere in this contract.

**DETAILED SPECIFICATION
FOR
PARKING METERS**

1 of 2

DESCRIPTION

This work shall consist of removing parking meter standards and installing new meter standards where directed.

MATERIALS

Republic Parking will supply all standards. Standards are steel tubes 60" to 63" in length and 2" square.

All sand shall meet the gradation of MDOT Class II granular material in accordance with Section 902 of the 2012 MDOT Standard Specifications for Construction.

Concrete shall be Grade P2 in accordance with Section 601 of the MDOT 2012 Standard Specifications for Construction.

CONSTRUCTION METHODS

1. Removal. Meter standards requiring removal will be marked by the City. Prior to removal, contact Republic Parking at (734) 761-7235 for the removal of the parking meter heads. The Contractor is not permitted to remove the meter heads, nor remove the standard with the meter head still in place.

The Contractor shall removal the standard and concrete foundation. The void is to be backfilled with Class II Granular Material or Engineer approved backfill. The standards and concrete will then become of the property of the Contractor and shall be properly disposed of offsite.

2. Installation. The City will stake the location for the new meter locations. The location is approximately 18" to 24" from curb line, and 48" from front end of stall for parallel parking.

a. Installation in sidewalk/concrete. Core an 8" diameter hole through the concrete sidewalk at the meter location points. When working in close proximity of underground lines, use caution to avoid drilling beyond the thickness of the sidewalk in order to prevent damage to lines. For installation in new sidewalk, the standard may be installed prior to placing walk, or the walk may be placed around a form in the location of the proposed standard.

After drilling through the sidewalk, excavate approximately 30" deep, with an 8" diameter opening, and tapering outward to 10" at the bottom.

Set the standards into the concrete filled holes with the REAMED END to the TOP and WEEP HOLE on LOWER END FACING THE STREET. The meter standard is to project 37" above the sidewalk level.

Check the vertical plumb with the surface level, first in one direction and then in the other and then hold the standard securely in position with forms until the concrete has set.

**DETAILED SPECIFICATION
FOR
PARKING METERS**

2 of 2

After the standards have been plumbed, check the vertical alignment down the street and the height uniformity, making such corrections and adjustments as necessary.

b. Installation in soil. Excavate holes approximately 30” deep, with an 8” diameter opening, and tapering outward to 10” at the bottom.

Set the standards into the concrete filled holes with the REAMED END to the TOP and WEEP HOLE on LOWER END FACING THE STREET. The meter standard is to project 37” above the finished grade.

Check the vertical plumb with the surface level, first in one direction and then in the other and then hold the standard securely in position with forms until the concrete has set.

After the standards have been plumbed, check the vertical alignment down the street and the height uniformity, making such corrections and adjustments as necessary.

The Contractor is responsible for the protection of the standard until the concrete foundation has set. If the standard is not plumb upon curing of the foundation, then the standard will be removed and reset at the contractor’s expense. The Contractor shall use plastic drums and caution tape, “Wet Paint” signs, or other methods to protect the standards.

Meter heads will be installed by Republic Parking upon installation of the standards.

MEASUREMENT AND PAYMENT

The completed work as measured for this item of work will be paid for at the Contract Unit Price for the following Contract (Pay) Item:

PAY ITEM

PAY UNIT

Remove and Replace Parking Meter Post

Each

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in this Detailed Specification.

Disposal of standards, concrete foundations, and all excavated material is included in the unit prices for the above items.

Material to backfill voids after removing the standards is included in the pay item “Remove and Replace Parking Meter Post”.

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.

SPECIAL PROVISION
FOR
PART-WIDTH CONSTRUCTION, SPECIAL

AA:JN

1 of 1

4/12/17

a. Description.- This work shall consist of constructing roadway, including intersections and driveways by the part-width construction method in accordance with Section 812 of the 2012 Michigan Department of Transportation Standard Specifications for Construction, and as herein specified, including any special provisions.

“Part-Width Construction, Special” shall also include adequate noise control.

“Part-Width Construction, Special” shall also include all expenses involved in the interruption of paving operations, moving back to pave gapped areas, and maintenance of cross-traffic. Gapping of curbs, curb and gutter, gutters, driveways and sidewalks required to maintain traffic shall not be paid for separately; payment for this work is included in the unit price bid for the contract item being constructed.

This item of work also includes the furnishing or placement of maintenance aggregate for the purposes of maintaining pedestrian or vehicular traffic at utility crossings, side streets, drive approaches, alleys, or any other areas where the maintenance of traffic is required by the Engineer.

Street name signs, stop signs, and traffic regulatory/warning signs in the way of construction shall be carefully removed and reset immediately in a temporary location approved by the Engineer. Street name signs shall be finally set by the Contractor in a location designated by the Engineer upon the completion of final grading in the section involved. Any signs damaged by the Contractor’s operations shall be grounds for replacement of the signs by City of Ann Arbor forces at the Contractor’s sole expense.

b. Measurement and Payment.- The completed work as measured for “Part-Width Construction, Special” will be paid for at the contract unit price for the following contract item (pay item):

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Part-Width Construction, Special	Foot

The unit price for “Part-Width Construction, Special” shall include the costs associated with the part-width construction of pavement during multiple stages of the project to maintain local access, as depicted on the Plans, as detailed in the specifications, and as directed by the Engineer.

**DETAILED SPECIFICATION
FOR
TREES AND PLANTINGS**

AA:JN

1 of 2

4/12/17

DESCRIPTION

This work shall consist of planting Deciduous Trees and placement of shredded bark mulch at the locations shown on the plans and as directed by the Engineer. Work shall be in accordance with Sections 815, 816 and 917 of the 2003 Michigan Department of Transportation Standard Specifications for Construction with the following amendments or additions.

Tree drip irrigation bags are in addition to planting specifications 815, 816 and 917 of the 2003 Michigan Department of Transportation Standard Specifications.

MATERIALS

All planting methods and materials shall conform to Sections 815, 816 and 917 and the planting details shown on the plans. In addition, tree planting shall include and Tree Drip Irrigation Bags and Watering and Cultivating. Tree types and sizes shall be as shown on the planting plans.

Tree Drip Irrigation Bags shall be Treegator Original 20 gallon slow release watering bags available from John Deere Landscape @ Ann Arbor, 734-668-1020, Christensen's Plant Nursery, 734-454-1400, or approved substitution.

Fertilizer shall be slow release, at minimum 50% derived from a natural, organic source, 12-0-6 or approved substitution.

The contractor shall submit a minimum size sample of ½ gallon-sized container of structural soil and topsoil for approval prior to installation.

The CONTRACTOR shall submit to the ENGINEER sources for all plant material 30 (thirty) days after contract award and submit an invoice following purchase and delivery of the plants.

CONSTRUCTION METHODS

The construction methods shall be in accordance with the 2003 Michigan Department of Transportation Standard Specifications for Construction Section 815.03 and 816.03 unless otherwise stated in this special provision.

All open tree pits shall be excavated to the full extent of their dimensions as shown in the details.

Watering and Cultivating shall follow the schedule in the 2012 Michigan Department of Transportation Standard Specifications for construction section 815 with the adjustment of filling the tree drip irrigation bags with water and using the fertilizer as dictated in this special provision. For each watering and cultivating visit, verification in the form of a report of maintenance activities and certified payroll covering visits, shall be provided to the OWNER by the end of each month that the visits have taken place.

**DETAILED SPECIFICATION
FOR
TREES AND PLANTINGS**

AA:JN

2 of 2

4/12/17

MEASUREMENT AND PAYMENT

The completed work as measured shall be paid for at the contract unit price for the following contract items (pay items):

<u>Pay Item</u>	<u>Pay Unit</u>
Nyssa Sylvatica (Blackgum) 2.5 inch B-B	Each
Ulmus Americana New Marmomy (American Elm)	Each

Measurement and payment for the items shall include excavation, backfill, topsoil, shredded bark mulch, tree drip irrigation bags, water, and all other equipment necessary, and as described herein, for a complete installation. Watering and Cultivating for two seasons shall also be included in this this item.

The final inspection of all planting work under the Contract will be made by the contractor and Engineer at the end of the maintenance and establishment periods. Before final acceptance is given, the terms of the establishment shall be met and the site shall be cleared of all debris, soil piles and containers.

DETAILED SPECIFICATION
FOR
SLOPE RESTORATION

AA:JN

1 of 2

1/28/16

a. Description. This work consists of preparing all manicured lawns and slopes designated for slope restoration on the plans or by the Engineer, and applying topsoil, fertilizer, seed, and mulch to those areas. Turf establishment shall be in accordance with section 816 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction and Standard Plan Series R-100, except as modified herein or otherwise directed by the Engineer.

b. Materials. The materials and application rates specified in sections 816 and 917 of the MDOT 2012 Standard Specifications for Construction apply unless modified by this special provision or otherwise directed by the Engineer.

1. Topsoil Surface: Place **4 inches** of topsoil in area disturbed areas to be restored. Topsoil shall be free of all stones one inch in diameter or greater.
2. Turf Seed Mixture: Use seed mixture type THM (Turf Loamy to Heavy) with an application rate of 220 lb/acre.
3. Chemical Fertilizer Nutrient: Use Class A fertilizer with an application rate of 176 lb/acre.
4. The erosion control blanket used shall be CN125BN as manufactured by North American Green, or equivalent. The coconut fiber erosion control blanket shall have the following properties:

Matrix: 100% coconut fiber. (0.50 lbs/square yard)

Netting: Top-Leno woven 100% biodegradable organic jute fiber (9.30 lbs/1000sft. approx. wt.) Bottom – 100% biodegradable organic jute fiber (7.7 lbs/1000 sft approximate weight.)

Thread: Biodegradable.

Width: 6.67ft. (+/- 5%)

Length: 108 ft. (+/- 5%)

Weight: 52.22 lbs. (+/-10%)

Area: 80 syd.

Stitch Spacing for all rolls: 1.50 inches.

Erosion control blanket shall be manufactured with a colored line or thread along outer edges to ensure proper material overlapping. Manufacturer's recommended fastening pattern must be clearly marked on blanket to insure proper anchorage to soil. Biodegradable fasteners supplied by manufacturer based on type of installation required. Installation instructions must be included with each delivery of erosion control blankets.

c. Construction. Construction methods shall be in accordance to subsection 816.03 of the MDOT 2012 Standard Specifications for Construction. Begin this work as soon as possible after final grading of the areas designated for slope restoration but no later than the maximum time frames stated in subsection 208.03 of the Standard Specifications for Construction. It may be necessary, as directed by the Engineer, to place materials by hand.

Prior to placing topsoil, shape, compact and assure all areas to be seeded **are weed free**. Place topsoil to the minimum depth indicated above, to meet proposed finished grade. Remove

any stones greater than or equal to 1 inch in diameter. If the area being restored requires more than the minimum depth of topsoil to meet finished grade, this additional depth must be filled using topsoil. Furnishing and placing this additional material is included in this item of work.

Topsoil shall be **weed and weed seed free** and friable prior to placing seed. Remove all stones from the topsoil greater than 1 inch in diameter. Apply seed mixture and fertilizer to prepared soil surface. Seed shall be incorporated into top 1/2 inch of topsoil.

In general, all edges of parallel blankets must be staked with approximately 2 inches overlap. When the blankets must be spliced down a slope, place blankets end over end (shingle style) with approximately 6 inches of overlap. Stake through overlapped area approximately 12 inches apart. In general, stake blanket approximately two stakes per square yard using manufacturer's recommended stapling pattern.

Each blanket roll shall be wrapped with a material that will protect it from damage due to shipment, water, sunlight, and contaminants. During storage, blanket rolls shall be elevated off the ground and adequately covered to protect them from construction damage, precipitation, extended ultraviolet radiation, chemicals that are strong acids or bases, flames, excess temperatures, and any other environmental conditions that may damage the physical property values of the blankets.

If erosion control blanket is required in areas where plugs are present, install erosion control blanket after seeding, but prior to plugging.

If an area washes out after this work has been properly completed and approved by the Engineer, make the required corrections to prevent future washouts and replace the topsoil, fertilizer, seed and mulch. This replacement will be paid for as additional work using the applicable contract items.

If an area washes out for reasons attributable to the Contractor's activity or failure to take proper precautions, replacement shall be at the Contractor's expense.

The Engineer will inspect the seeded turf to ensure the end product is well established, weed free, in a vigorous growing condition, and contains the species called for in the seeding mixture. **If areas do not promote growth, the Contractor shall apply new seed at its expense.**

If weeds are determined by the Engineer to cover more than ten percent of the total area of slope restoration, the Contractor shall provide weed control in accordance to subsection 816.03.J of the MDOT 2012 Standard Specifications for Construction. Weed control shall be at the Contractor's expense with no additional charges to the project for materials, labor or equipment.

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:

<u>Pay Item</u>	<u>Pay Unit</u>
Slope Restoration.....	Square Yard

Slope Restoration shall be performed in all areas disturbed by the Contractor to construct the Project as shown on the plans and as directed by the Engineer. The Contractor will restore areas disturbed by its operations not required by the Project at its own expense.

SPECIAL PROVISION
FOR
ELECTRICAL AND COMMUNICATION HANDHOLES

AA:JN

1 of 2

02/10/14

a. Description.- This work shall consist of furnishing and installing traffic signal handholes and communication handhole assemblies at the locations shown in the Plans, or as directed by the Engineer. All work shall be completed in accordance with the current National Electric Code (NEC), Section 819 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, except as specified herein.

b. Materials.- All materials shall be new and meet the requirements of the current IEEE, NEMA, ANSI Standards as applicable, and as specified herein.

The Contractor shall submit product data sheets for all handholes, covers and other parts for Engineer approval prior to ordering materials. The manufacturer "Quazite Composolite," referenced below, is located in Lenoir City, Tennessee.

12 inch x 18 inch handhole assemblies shall consist of "Quazite Composolite" box. The box shall be #PG1118BA12. The cover shall be, #PG1118HA41, a locking heavy-duty bolt-down type with a logo that reads "Street Lighting." The total depth of the handhole shall be 12 inches.

17 inch x 30 inch handhole assemblies shall consist of two, stacked "Quazite Composolite" boxes. The lower box shall be #PG1730BB18. The upper box shall be #PG1730BA18. The cover shall be #PG1730HA46, a locking heavy-duty bolt-down type with a logo that reads "Traffic Signal." The total depth of the handhole shall be 36 inches.

24 inch x 36 inch handhole assemblies shall consist of "Quazite Composolite" box. The box shall be #PG2436BA24. The cover shall be # PG2436HA12, a locking heavy-duty bolt-down type with a logo that reads "Traffic Signal." The total depth of the handhole shall be 24 inches.

Provide Granular Material, Class II as detailed elsewhere in these contract documents.

c. Methods of Construction.- Handholes shall be placed at all junctions of traffic signal or electrical conduit, and as shown on the plans. Maximum distance between any two handholes shall be as shown on the Plans, but in no case shall exceed 500 feet.

Place foundation material consisting of 4 inches of MDOT Class II sand compacted to 95% of its maximum unit weight.

Set the handhole or stacked units to the proper depth and elevation.

Connect handholes to new and existing conduits, whether shown on the plans or not. All conduits shall be connected to the handholes in accordance with the latest revision of Article 346 of the National Electrical Code (NEC).

Backfill around the perimeter of the handhole with MDOT Class II material compacted to 95% of its maximum unit weight.

d. Measurement and Payment.- The completed work shall be paid for at the contract unit

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FOR
ELECTRICAL AND COMMUNICATION HANDHOLES

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price for the following contract items (pay items):

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Electrical Handhole Assembly, Complete	Each
Communication Handhole Assembly, Complete	Each

Electrical Handhole Assembly, Complete shall be paid for at their contract unit prices and shall include all labor, equipment, and materials to complete the work as specified herein, including supplying and installing a 12x18 handhole.

Communication Handhole Assembly, Complete shall be paid for at their contract unit prices and shall include all labor, equipment, and materials to complete the work as specified herein, including supplying and installing a 17x30 handhole.

The pay item shall also include the excavation and disposal of materials, furnishing, installing and compacting MDOT Class II sand, and all work related to connecting handholes to new and existing conduits, whether shown on the plans or not.

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SPECIAL PROVISION
FOR
PVC ELECTRICAL CONDUIT

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a. Description.- This work shall include the excavation and proper disposal off-site of excess excavated material, the installation of conduits, the placement of MDOT Class II bedding and backfill compacted to 95% of its maximum unit weight, and the installation of pull strings and detection tape. All work shall be completed in accordance with Sections 819 and 918.01 of the MDOT 2012 Standard Specifications for Construction, as shown on the plans, as directed by the Engineer, and as modified herein.

b. Construction Methods.- Schedule 40 PVC conduit will be used in areas outside the influence of the roadway or in areas where the conduit will be placed in concrete encasement or placed in permanent structures. Schedule 80 PVC conduit will be used for roadway crossings and in other areas as directed by the Engineer.

All conduits, including sweeps into handholes, and fittings shall be installed in accordance with the latest revision of Article 347 of the National Electric Code (NEC). The minimum sweep radius of the conduit shall measure at least 7 inches. After clearing the conduits, the Contractor shall install a pull line and install a plug or cap (suitable for removal at the time of future cable installation) for each conduit.

Detectable Marking Tape shall also be installed with the conduit which will allow for detection using an inductive method. The tape shall be pigmented polyolefin film with a printed message on one side. The ink used to print the material shall be permanent which cannot be removed by normal handling or upon underground burial. The polyethylene shall be chemically inert and shall not degrade when exposed to alkalis, acids and other destructive substances commonly found in soil. The tape shall be placed continuously, 6 to 8 inches above the buried conduits with overlap where splices are required. Over the conduit between the communication handhole assemblies, the tape shall be orange in color and shall read "Fiber Optic Cable - City of Ann Arbor Transportation." Over the conduit between the street lighting handholes, the tape shall be red in color and shall read "Caution—Buried Electrical Line."

A Tracer Wire, 1/C #10 RHH/RHW/USE, shall be placed around the conduits that are to be utilized for future traffic signal interconnection. The tracer wire shall be continuous and run from handhole to handhole.

The Contractor shall install conduit utilizing trenchless excavation methods for placing conduit under existing curb and gutter, sidewalks, driveway approaches, etc. which will remain in place.

The Contractor shall provide and install appropriate non-metallic sleeves and gasketed expansion couplings for each conduit if it is required to be installed in a bridge at each bridge joint. The Contractor shall submit catalog "cuts" of the proposed materials for review by, and approval of, the Engineer prior to ordering materials or performing any of the work.

c. Measurement and Payment.- The completed work shall be paid for at the contract unit price for the following contract items (pay items):

Contract Items (Pay Items)

Pay Unit

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Conduit, DB, 2, Schedule 80 PVC, 3 inch

Foot

All work indicated herein shall be included in the unit prices for the above pay items and shall include all labor, materials and equipment required to complete the work.

The per foot unit price for “Conduit, DB, 2, Schedule 80 PVC, 3 inch” shall include the installation of two adjacent conduits in a single bank. Also included in the unit price shall be the labor, materials, and equipment costs associated with the installation of the conduits, including, but not limited to, fittings, sweeps, pull strings, end caps, sleeves, tracer wire, and all other materials necessary for placing conduit as shown on the plans, and specified herein.

SPECIAL PROVISION
FOR
STREET LIGHT DISCONNECT BOX, COMPLETE

AA:JN

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a. Description.- This work shall consist of furnishing and installing a pole mounted disconnect box meeting the requirements of Section 819 and 820 of the 2012 Michigan Department of Transportation Standard Specifications for Construction. Also included shall be the necessary coordination with the Detroit Edison Company needed to arrange for secondary electrical power to be provided at the disconnect box location.

b. Materials.- The disconnect box shall be pole mounted adjacent to the Detroit Edison power supply, not to exceed a distance of 10 feet. The disconnect box shall be made for outdoor use and be sealed and watertight. It shall be a Lighting Control Center manufactured by Trinetics® RCOC® (Part No. 31183000; Model MR-YO; Specification 6442), or Engineer approved equal, with a rating of no less than 3 amps per lamp, with a maximum of 100 amps per circuit. A Tork, Model No. 2005 Photocontrol cell shall be provided with each disconnect box.

c. Construction Methods.- Cable entering the breaker shall be #8 AWG, or larger. All construction methods shall conform to the requirements of Sections 819 and 820.

d. Measurement and Payment.- The completed work shall be paid for at the contract unit price for the following contract items (pay items):

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Street Light Disconnect Box, Complete	Each

Street Light Disconnect Box, Complete shall be paid for at the contract unit price and shall include all labor, material, and equipment costs required to complete the work as specified herein. Scheduling and coordinating this work with Detroit Edison shall also be included. The Contractor shall also be responsible for any fees charged by Detroit Edison associated with the installation of the disconnect box.

SPECIAL PROVISION
FOR
DB CABLE, 600V

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a. Description.- This work shall consist of installing direct bury cable as shown on the Plans, or as directed by the Engineer. All work shall be completed in accordance with Section 819 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, the National Electric Code (NEC), and as specified herein.

The City of Ann Arbor Public Services Department shall be the maintaining agency for this work.

b. Materials.- All materials shall be new and meet the requirements of the current IEEE, NEMA, ANSI Standards as applicable, and as specified herein.

All cables shall be sized in accordance with AWG and be U.L. listed Type RHH/RHW/USE. All cable shall be copper, 600V with XLPE insulation. All #8 wire and larger shall be stranded. Aluminum cables or conductors are not acceptable.

All conductor color-coding shall adhere to coating and not be easily removed by abrasion or rubbing.

All cable and wire shall be manufactured by one of the following manufacturer's:

Alcan	Collyer	Hatfield	Reynolds
Alcoa	Esses	Kaiser	Rome
Anaconda	General Cable	Okonite	Southwire
Cerro	General Electric	Phelps Dodge	Triangle

c. Methods of Construction.- All poles must utilize a three wire system including dead ends. All splices shall be waterproof.

All cable in poles must be marked to indicate connection to power source. Color code phase identification shall be repeated at all connections.

SPECIAL PROVISION
FOR
DB CABLE, 600V

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

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Electrical Cable, DB, 600V, 3C, 1-#6, 2-#4.....	Foot

“Electrical Cable, DB, 600V, 3C, 1-#6, 2-#4” shall include all cable, labor, equipment, and materials, including all splices and connections, testing, excavation, backfill with MDOT Class II granular material, and removal and disposal of excess excavated material required for a complete installation.

“Electrical Cable, DB, 600V, 3C, 1-#6, 2-#4” will be measured in place by the foot. Measurements will be taken at grade between centers of handholes, light poles, or other similar elements with no additional allowance for looping, sag, trainers, splicing, racking, slack length or length inside light poles or columns.

**DETAILED SPECIFICATION
FOR
MAST ARM POLE, FDN
PEDESTAL, FDN**

DESCRIPTION

This work shall consist of installing new pedestal and mast arm pole foundations and grounding and grounding rods. This work shall be completed in accordance with the drawings and detailed specifications of this contract, the MDOT 2012 Standard Specifications for Construction, and as herein specified, including any detailed specifications

MATERIALS, EQUIPMENT, AND CONSTRUCTION METHODS

Foundations shall be constructed and placed in accordance with Section 206, 701, 810 and 820 of the MDOT 2012 Standard Specifications for Construction. All foundations shall be installed with Two (2), 3" conduits for future use.

MEASUREMENT AND PAYMENT

The completed work as measured for these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Pedestal, Fdn	Each
Mast Arm Foundation	Each

The unit price for Pedestal, Fdn and Mast Arm Foundation includes the cost of all labor, equipment and materials required to complete the work as described above, including all excavation, concrete, grounding and ground rods, and backfill.

**DETAILED SPECIFICATION
FOR
REMOVE TRAFFIC AND STREET LIGHTS**

AA:JN

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DESCRIPTION

This work shall include removal of street lights, and foundations for traffic signals, pedestrian signals and street lights, as required by the Plans. All work shall be done in accordance with the City of Ann Arbor Public Services Department Standard Specifications, as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer, in accordance with Section 820 of the 2012 edition of the MDOT Standard Specifications for Construction, except as specified herein, and as directed by the Engineer.

CONSTRUCTION METHODS

The Construction Methods shall meet all requirements of the City of Ann Arbor Standard Specifications.

In locations as shown on the Plans or where foundations are within 2.5 feet of the proposed subgrade the resulting hole or trench shall be backfilled with Class II Sand, in maximum lifts of 12 inches, and be compacted to 95% of its modified proctor value, if located within the influence paved surfaces or structures. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its modified proctor value, in lifts of 12 inches or less, unless otherwise noted on the plans.

Street light standards and globes, and all related appurtenances are to become the property of the Contractor and require proper disposal.

MEASUREMENT AND PAYMENT

Completed work as measured for this item of work will be paid for at Contract Unit Price for the following Contract Pay Items:

<u>PAY ITEM</u>	<u>PAY UNIT</u>
Remove Mast Arm Foundation	Each
Remove Ped Foundation	Each
Remove Street Light Foundation	Each
Street Light, Rem	Each

The unit prices for these items of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

The unit price for the pay items includes all labor, material and equipment costs associated with the complete removal of the existing foundation, as specified herein, including but not limited to, excavation, MDOT CL II Backfill and compaction, and disposal of all materials.

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FOR
WATER MAIN AND APPURTENANCES

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a. Description.- The Contractor shall furnish all labor, equipment, pipe, valves, fittings, restrained-joint pipe, restrained-joint gaskets, special gaskets as detailed on the plans and in the specification, polywrap, blow-off assemblies, fire hydrant, fire hydrant extensions, supplemental lighting towers, and all other materials necessary to complete the work as shown on the Plans, as detailed in this Special Provision, and as directed by the Engineer.

All water main installation and testing procedures shall be performed in accordance with the project plans, the requirements of this Special Provision, and as directed by the Engineer.

b. Materials.-

1. Submittals. Prior to beginning construction, the Contractor shall submit the following:
 - A. Product data on all ductile iron pipe, valves, fittings, and hydrants.
 - B. Manufacturer's certifications on all pipe, fittings, and precast concrete units indicating that all materials meet the minimum requirements of these specifications.
 - C. Information on equipment and methods to be used for flushing, chlorination, pressure and bacteriological testing.
2. General Specifications.
 - A. Cast Ductile Iron Pipe and Fittings:

Cast ductile iron pipe shall be Iron Grade 60-42-10 and meet the requirements of ANSI/AWWA C151/A21.51 in all respects; with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4; and, coated outside with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. 100% of the ferrous metals used in the manufacture of cast ductile iron pipe shall be recycled from scrap and other sources. All pipe shall be Pressure Class 350 (Table 50.5 ANSI/AWWA C150/A21.50), or Thickness Class 50 (Table 50.15, ANSI/AWWA C150/A21.50). Ductile iron pipe crossing under a railroad shall be thickness Class 56.

Cast ductile iron river crossing pipe shall be Clow Corp. "F-141 River Crossing Pipe", U.S. Pipe "USIFLEX Boltless Flexible Joint Pipe" or equal approved by the Engineer, and shall be thickness Class 56 minimum. The pipe shall have a boltless flexible joint of the ball and socket type, and be designed for, and rated at, a minimum interior working water pressure of 250 psi.

Cast ductile iron directional drilled pipe shall be TR-Flex restrained joint pipe manufactured by U.S. Pipe, and shall be thickness Class 56 minimum. The pipe shall have a boltless flexible restrained joint.

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Restrained joint pipe, where called for on the Plans, shall be factory manufactured by the installation of retainer weldment and ductile iron locking segments or rings. Restrained joint pipe shall be TR-Flex restrained joint pipe manufactured by U.S. Pipe, Lok-Ring joint pipe manufactured by American Ductile Iron Pipe, or equal as approved by the Engineer.

Cast ductile iron fittings shall be push-on joint, unless otherwise specified (with the exception of solid sleeves and fire hydrants which shall be mechanical joint), meeting the requirements of ANSI/AWWA C110/A21.10 for short body cast iron fittings. Fittings shall have a cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4 and ANSI/AWWA C110/A21.10. The outside of all fittings shall have an asphaltic coating in accordance with ANSI/AWWA C110/A21.10.

Solid sleeves shall be long-pattern sleeves.

B. Gate Valves and Gate Valve Boxes :

All gate valves shall be resilient seated meeting the requirements of AWWA C509. All valves shall be of the push-on joint type, unless used on tapping sleeve assemblies, or noted otherwise on the plans. The valves supplied shall be:

- a. Metroseal 250 Resilient Seated Gate Valve as manufactured by U.S. Pipe & Foundry Company
- b. U. S. Pipe and Foundry Tyton Joint, Resilient Wedge Seated Gate Valve, meeting the requirements of AWWA C 509, AWWA C550, and ASTM D 2794
- c. American Flow Control, Series 2500, Single Resilient Wedge
- d. East Jordan Iron Works FlowMaster Resilient Wedge Valve
- e. Mueller Series, 4" through 12", A-2360-38, Resilient Wedge – SL x SL
- f. Tyler Series DRS 250-22 Double Resilient Wedge

All valves shall come equipped with a two-inch square operating nut, opening right.

Valve Boxes shall be Tyler 6860 Buffalo type, Size D, screw-type, 3 piece, 5-1/4 inch shaft and a No. 6 Base for a valve 8 inches or less and a No. 8 base for 10 and 12 inch valves.

C. Fire Hydrants:

Fire hydrants shall be East Jordan Iron Works Model 5-BR Water Master BR 250 with traffic flange; American Flow Control 5-1/4" Pacer, WB 67-250; or, Waterous Model TCV-5 with traffic flange. All fire hydrants shall have the following features: a 6 inch mechanical joint pipe connection, ANSI/AWWA C111/A21.11; two 2-1/2 inch National Standard hose connections; one 4 inch Stortz pumper connection; 1-3/8 inch pentagon

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operating and cap nuts (1-3/8 in. point-to-flat at top; 1-7/16 in. point-to-flat at base); open left; breakable flange construction; no barrel drain; and a painted red finish. Depth of bury (bottom of pipe to ground surface) is generally 6 feet but may vary depending on specific site conditions. The Stortz pumper connection must be 21 in. ± 3 in. above finished grade, and the breakable traffic flange must be between finished grade and 8 in. above finished grade.

Fire hydrant extensions shall be fully compatible with the manufacturer of the fire hydrant assembly provided and be approved by the Engineer. East Jordan Iron Works hydrants shall be provided with a model 5-BR extension kit; and, Waterous Fire Hydrants shall be provided with a F1-K562-6 extension kit.

All fire hydrants must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

D. Tapping Sleeves and Valves:

Tapping sleeves and valves shall be manufactured of cast iron or stainless steel and designed for water service with a minimum working pressure of 150 psi. The sleeve shall be a full-bodied split sleeve design manufactured by one of the following manufacturers:

- a) Clow No. F-5205;
- b) Mueller Co. No. H-615;
- c) Waterous Series 800;
- d) East Jordan Iron Works MJ Tapping Sleeve with East Jordan FlowMaster RW Valve;
- e) Tyler/Union D.I. MJ Tapping Sleeve;
- f) Ford Meter Box Company Style FTSS;
- g) Power Seal Model No. 3490 AS;
- h) Smith Blair Model No. 622;
- i) JCM 432 All Stainless Steel Tapping Sleeve; and
- j) Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel Cylinder Pipe (only to be used on concrete water mains.)

Tapping Sleeves for Prestressed Concrete Steel Cylinder Pipe shall be in accordance with AWWA M-9. The sleeves shall have a separate gland which permits installation of the sleeve prior to cutting of the prestress wires. The gland shall have a fusion epoxy coated (per AWWA C-213) waterway, and a broad gasket set in a retaining groove of a pressure plate gusseted to eliminate flexing. The gland shall be equipped with load bearing set screws to protect the cylinder. Grout under saddle is needed whether saddle is epoxy coated or not. Sleeves shall be furnished with grouting seals and grout horns to facilitate filling the space between the sleeve and the pipe. Tapping sleeves shall be a Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel

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Cylinder Pipe or approved equal.

Tapping valves shall be double-disk type of the same manufacture as the sleeve, NRS with two-inch square operating nut-opening right, with a mechanical joint outlet.

All tapping sleeves and valves must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

E. Joints:

Push-on joints shall be single gasket joint meeting the requirements of ANSI/AWWA C111/A21.11.

Mechanical joints for fire hydrants and solid sleeves shall be in accordance with ANSI/AWWA C111/A21.11 and shall be the Mega Lug Series 1100 joint restraint system manufactured by EBAA Iron Sales, Inc. or the Ford Meter Box Co. Uni-flange Retainer (UFR 1400-D-x style.)

Bolts for mechanical joints shall be high strength, low alloy steel bolts, only, meeting the requirements of ANSI/AWWA C111/A21.11. All bolts, nuts, and washers if required, shall be coated with a factory-applied flouropolymer coating meeting the following requirements:

- Use Temperature: -100°F to 500°F
- Salt Spray – ASTM B117 up to 4000 hours (nuts must not become frozen)
- Pencil Hardness – 5H to 6H – ASTM D3363-92A
- Kinetic Coefficient of Friction – 0.06 to 0.08
- Thickness – nominal 0.001” (1 mil)
- Impact – 160 in-lbs as measured by ASTM D2794-93
- Adhesion – 5B – ASTM D3359-95
- Di-electric Strength – 500V per mil
- Elongation – 35% to 50%
- Tensile Strength – 4,000 psi
- Operating Pressure – up to 100,000 psi
- Kesternich Test – Nuts not frozen up to 30+ cycles (DIN 50018)

Corrosion Resistance: as measured by;

ASTM D 1308	Muriatic Acid 31% HCL	24 hours	No Effect
	Sulfuric Acid 93% H ₂ SO ₄	24 hours	No Effect
	Caustic Soda 100% NaOH	24 hours	No Effect
	Methy Ethyl Keytone MEK	24 hours	No Effect
ASTM B117	Salt Fog	1,000 hours	No Effect

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The flouropolymer coating shall strongly adhere to surface being coated and shall not flake off or be easily removed by rubbing or brushing.

Cast ductile iron river crossing pipe joints shall be a push-on type ball and socket joint utilizing a first grade rubber gasket. The joint shall be capable of 15-degree full turning deflection without separation, leakage, or restriction of the pipe waterway. Joint restraint shall be provided by a boltless means which is locked against accidental disengagement of the restraining component. Pipe shall be furnished with the necessary gaskets, lubricant, and retainer locking accessories.

Joints for restrained joint pipe shall be in accordance with ANSI/AWWA C111/A21.11. Bolts and nuts for the retainer assembly shall be stainless steel.

Restrained, push-on joint, pipe shall be U.S. Pipe's Tyton Nitrile gasket system.

The use of retainer glands and set screws shall not be acceptable.

Lubricants used in making up joints shall be supplied by the pipe manufacturer and the joints shall be coupled in accordance with the manufacturer's requirements.

F. Pipe Wrapping:

All Cast Ductile Iron Pipe, Fittings, and Valves shall be fully wrapped with polyethylene per ANSI/AWWA C105/A21.5 and the details as contained on the plans.

Directional drilled cast ductile iron pipe shall be double wrapped with polyethylene per ANSI/AWWA C105/A21.5 and the details as contained on the plans

G. Casing Pipe:

Steel casing pipe used for construction at railroad or State highway crossings shall comply with the following minimum requirements unless more stringent requirements are established by the railroad or State. Casing pipes at other locations shall comply with the following minimum requirements unless otherwise indicated on the Plans or in the Specifications.

<u>Nominal Diameter of Casing Pipe (Inches)</u>	<u>Minimum Wall Thickness (Inches)</u>
Under 14	0.250
14, 16, and 18	0.312
20 and 22	0.375
24, 26, 28, and 30	0.500

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32 and 34	0.563
36, 38, 40, 42, and 48	0.625

Steel pipe shall be non-spiral pipe and have a minimum yield strength of 35,000 psi. All joints shall be made leakproof using full penetration, continuous welds. Welds shall be ground smooth outside and inside (except inside 22 in. diameter and less) to prevent conflict with the soil or pipe placement. Steel pipe shall meet the requirements of ASTM A 53, Type E or S, Grade B.

Pipe Marking

The following information shall be clearly marked on each length of pipe:

- a) The pipe designation and class (e.g. A 53, Type S, Grade B.)
- b) The name or trademark of the manufacturer.
- c) Identification of the manufacturing plant.

Inspection

All casing pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe that, independent of physical tests specified under the standard specifications designated herein, fails to conform to the requirements of these Specifications.

Rejected pipe shall be plainly marked by the Inspector and immediately removed from the site of the work by the Contractor, without cost to the City.

H. Water Main Pipe Marking:

The following information shall be clearly marked and/or cast on each length of pipe:

- a) The pipe designation and class (e.g., D.I., Class 50).
- b) The name or trademark of the manufacturer.
- c) Country where cast.
- d) The year in which the pipe was produced.

The following shall be distinctly cast on each fitting:

- a) The pressure rating of the fitting.
- b) Nominal diameters of openings.
- c) The name or trademark of the manufacturer.
- d) Country where cast.
- e) The number of degrees or fraction of the circle on all bends.

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f) Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.

I. Manufacturer's Certification:

All pipe furnished shall be accompanied by the manufacturer's certificate of test showing conformity with the Specifications. Each certificate shall identify a specific lot number, quantity of pipe, and show actual test results for the lot furnished. These certificates shall be submitted to the Inspector at the time of unloading.

All materials that will potentially be in contact with the City of Ann Arbor water supply must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system. These materials shall include pipe coatings, pipe metals, cement linings, and joint lubricants and gaskets.

J. Inspection:

All pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe or fittings that, independent of physical tests specified under the standard specifications designated herein, fail to conform to the requirements of these Specifications.

The Contractor shall notify the Engineer sufficiently in advance so that an Inspector may be on the job during the unloading of materials. A minimum notice of 24 hours is required for such unloading and inspection. The Contractor shall also notify the Engineer when the material has arrived at the site.

All ductile iron water main pipe shall be stacked on pallets off of the existing grade, with each end plugged or bagged so as to keep the pipe interior clean until final installation.

Cast ductile iron pipe and fittings shall be subject to rejection on account of any of the following:

- a) Variation in any dimension exceeding the permissible variations given in the material specifications.
- b) Any crack or defect in the cement mortar lining which, in the opinion of the Engineer, is non-repairable, including, but not limited to, loose or "hollow" lining.
- c) Any signs of physical damage or poor manufacturing which might render the material unsuitable for its intended use.
- d) Variation of more than 1/16 inch per lineal foot in alignment of pipe intended to be straight.
- e) Damaged ends, where in the judgment of the Engineer such damage would prevent making a satisfactory joint.
- f) Improper handling during delivery, unloading, or installation.

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Rejected pipe shall be plainly marked by the Inspector and immediately removed from the site of the work by the Contractor, without cost to the City.

K. Water Main Bedding and Backfill Materials:

Bedding and backfill material for Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902. Bedding and backfill for Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, shall be Granular Material, Class II and Engineer approved native material, placed in accordance with the trench details.

c. Construction. Water Main Installation, Bacteriologic and Hydrostatic Testing, and Acceptance Requirements.- Installation of proposed water mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. All excavation shall conform to all relevant MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

A. Directional Drill:

A minimum of fourteen (14) calendar days prior to beginning actual drilling operations, the Contractor shall submit a Directional Drilling Plan for review and acceptance by the Engineer. The plan shall indicate entrance and exit locations, stationing, depth of cover, and curve data. The plan shall also describe the method to be used for handling drilling fluid and emergency procedures for containing fluids in cases of accidental discharge. Work shall not commence on any directional drilling activities until such time as the Directional Drilling Plan has been accepted by the Engineer. Contract time shall continue during the review period of the Directional Drilling Plan.

Prior to beginning drilling operations the Contractor shall prepare the entrance and exit locations and provide adequate supplies of drilling fluid, dewatering equipment, drill rods, and boring equipment to ensure a continuous operation when drilling begins.

The Contractor shall be responsible for any sheeting and shoring, dewatering with well points where necessary, and determining types of subsurface materials, which may be found, and determining their effect on subsequent construction operations.

As the drilling proceeds the Contractor shall create an accurate as-built record of the alignment and elevation of the pipe with stationing.

The minimum depth of cover at any location shall be 4 feet and the maximum depth of cover at any location shall not exceed 15 feet. Depth of cover is measured from the finished grade to the top of the pipe.

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The method of installation shall consist of drilling or jacking a steerable rod with equipment capable of continuous, accurate monitoring of the drill bit location. Upon reaching the exit point, the Contractor shall attach a cone or wing cutter to the rod which when pulled back will obtain the required diameter.

The diameter of the cone or wing cutter shall not exceed the diameter of the pipe by more than one and one half (1½) times. When the diameter of the cone or wing cutter is more than 2" larger than the pipe diameter, flowable fill shall be pumped into the void between the pipe and the drill hole to displace the drilling fluid. The method of placement of the flowable fill shall be approved prior to the issuance of the permit to place pipe.

The ductile iron pipe shall be connected to the rods per the manufacturer's specifications to be pulled back through the hole.

Restrained connections to conventional ductile iron water main, valves, or appurtenances shall be made using a mechanical joint adaptor with a stainless steel stiffener inserted, unless otherwise shown on the plans. All mechanical joints shall be in accordance with AWWA/ANSI C111/A21.11 and include the Mega-Lug Joint Restraint System manufactured by EBAA Iron Sales, Inc. or the Ford Valve Box Company Uni-flex Retainer (UFR 1400-D-x style.)

B. Dry Tap:

When a connection to an existing water main is to be made in the dry, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped out or removed by other means so that the connection may be made in the dry. All pipe materials and appurtenances which will come into contact with potable City water after the restoration of water service following the connections shall be disinfected with a strong chlorine solution prior to installation.

The Contractor may not operate City water main valves. For valve operation, contact City of Ann Arbor Public Services Area personnel; the City of Ann Arbor personnel will direct the operation of all valves by Contractor personnel. It is recommended that the Contractor request that the existing valves, which will need to be operated in order to perform the water main work, are checked in advance of the work to ensure that they operate properly. If the Contractor elects not to request the operation of the valves in advance of any required water main operation, then a request for extension of contract time will not be allowed.

It is possible that the valves which need to be operated to facilitate a shutdown will not close entirely, thereby allowing water to leak past the valve into the area of the shut down. The Contractor shall provide the necessary labor, material, and equipment to

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enable work to be completed with a poor shut down. Under no circumstances shall the Contractor be compensated for "downtime" associated with water main valve or appurtenance failure or its inability to properly operate or close fully. An extension of contract time may be allowed, if the Contractor has requested that the water main valves have been exercised in advance of the intended water main shutdown.

Due to the size and length of pipe being shut down, and the quality of shut-down attained, large amounts of water may need to be removed from the excavation. Where possible, the water shall be run directly into nearby storm sewer inlets via pumps and hose.

The Contractor shall have all pipe, fittings and appurtenances required to complete the water main connection prior to the excavation for the connection, or the work will not be allowed to commence.

The Contractor shall complete the water main work in a manner which minimizes the disruption of water service to the greatest extent possible.

The City must notify all businesses 48 hours in advance of a water main shut-down; residences must be notified 24 hours in advance. To give the City an opportunity to provide such notification, the Contractor shall schedule the water main shut-downs at least 72 hours in advance, and preferably a full four or five days in advance, of the water main shut-down.

No water main shutdown shall take place after 12:00 p.m. (noon), unless written permission has been granted by the Engineer and that the Contractor has sufficient lighting equipment to provide a safe and efficient work area for working after dark. No water main will be shut down until the main has been exposed and cleaned, and is ready to be cut.

There shall be no gap larger than 1/4 inch left in the existing water main as a result of the tie-in. If needed, a closure piece ("thrust ring") of such size so as to meet this requirement shall be installed.

C. Wet Tap:

Prior to the installation of a tapping sleeve, the section of pipe to be tapped shall be cleaned of all foreign material and wire brushed to a smooth surface. The two halves of the sleeve shall be placed around the pipe with the gaskets installed per the manufacturer's instructions. The bolts shall be tightened evenly from the center toward the ends. The bolts shall be tightened to the manufacturer's specified torque.

When performing a wet tap in a prestressed concrete steel cylinder water main, grout is to be placed under the tapping saddle whether or not the saddle is epoxy coated.

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All pipe materials and appurtenances which may come into contact with potable City water shall be disinfected with a strong chlorine solution prior to installation. This includes the pipe section to be tapped, the two halves of the sleeve, gaskets and the gate valve.

Prior to installation of the end gaskets, the sleeve shall be blocked with cement bricks such that the outlet is in proper position. The end gaskets shall be installed with an overlap as specified by the manufacturer.

The glands shall be assembled on the pipe. The bolts around the gland shall be tightened evenly, causing the gaskets to uniformly compress.

The valve shall be installed on the sleeve following the manufacturer's instructions.

Prior to tapping, the assembly shall be tested using the test plug tap in the sleeve with the valve closed, or by placing a tapped plug on the outlet of the valve with the valve open. The assembly shall be pressurized to 150 psi and hold the pressure fifteen minutes.

After the pressure test is complete, the pipe shall be tapped.

D. Oversized Water Mains:

Portions of the proposed water mains or fittings may connect with existing water mains or fittings. The possibility exists that some of the existing water mains may have been constructed using oversized, cast iron, pipe. Where tie-ins or interconnections are specified and the existing main is found to be oversized, the Contractor shall furnish and install Clow 3501B Sleeves, Tyler Dual Sleeve 5-146L, or Rockwell 441 Sleeves. These sleeves are to be present on the jobsite prior to the excavation for the water main connection, or the work will not be allowed to commence.

E. Permissible Deflection at Joints:

Wherever it is necessary to deflect ductile iron pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions, to plumb valve stems, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint, and shall be approved by the Engineer. The deflection shall not exceed the following amounts:

Size of Pipe (Inches)	Joint Angle (Degrees)	Deflection in 18 ft. (Inches)	Approx. Radius of Curve Produced by Succession of 18 ft. Lengths (Feet)
4	5	19	205

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6	5	19	205
8	5	19	205
10	5	19	205
12	5	19	205
16	3	11	340
20	3	11	340
24	3	11	340

The above joint deflection angles apply to fittings as well as pipe joints.

F. Cutting Pipe:

Cutting cast iron or ductile iron pipe for inserting valves, fittings, or closure pieces shall be performed in a neat and workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the longitudinal axis. Where the type of pipe joint in use is such that it employs push-on assembly to effect the joint seal, the outside of the cut end shall be tapered back 1/8 inch with a coarse file or a portable grinder at an angle of about 30 degrees. The tapering must remove all sharp and/or rough edges which might injure the gasket.

The flame cutting of pipe will not be allowed. Reinforced concrete water main pipe shall not be cut.

G. Setting Water Main Fittings and Accessories:

Valves, fittings, plugs, hydrants, etc. shall be set and joined to pipe in the manner specified in the Section entitled "Making Joints."

Hydrants shall be located as shown on the Plans or as directed by the Engineer in such a manner as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

H. Making Joints:

Mechanical means shall be used for pulling home all rubber-gasket pipes regardless of trench condition where manual means will not result in pushing and holding the pipe home. When a trench box or liner is used, a cable shall be used to pull the joints home and hold them in position.

Where work is performed in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making up the joint and for holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside or outside of the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.

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Where not required by these Specifications, manual means will be acceptable only if the joints can be pushed home and held.

Hydrants shall be set to stand plumb with their nozzles parallel to the street and the pumper nozzle facing the street. Hydrants shall be set with pumper nozzles between 18 and 24 inches above finished grade, or as directed in writing by the Engineer.

I. Anchorage for Water Main Fittings and Accessories:

All plugs, caps, tees, hydrants, and bends shall be provided with MDOT Grade S2 concrete meeting the requirements of Section 701 of the 2012 MDOT Standard Specifications for Construction reaction backing (thrust block) as shown on the Plans or specified herein. Valves shall be restrained from movement at adjacent sleeves by the use of a closure piece, or thrust ring (full size pipe section cut to fill the gap inside the sleeve to within 1/4") as specified herein.

Reaction backing shall be placed between unexcavated solid ground and the fitting to be anchored. The area of bearing on the pipe and on the ground in each instance shall be that shown on the details or directed by the Engineer. The reaction backing shall, unless otherwise shown or directed, be so placed that the pipe and fitting joints will be accessible for repairs. This shall include adequate protection of any bolts from direct contact with the concrete.

Metal harnesses of tie rods or clamps may not be used instead of concrete reaction backing. Mega Lug joint restraint systems and restrained, push-on joint, pipe shall be used where connections to existing lines require immediate pressurization, as specified herein.

In the event that the Engineer determines a change in the anchorage or design is required due to unsuitable earth conditions, changes may be ordered by the Engineer.

The use of friction clamps or set-screw type retainer glands for thrust restraint will not be allowed.

J. Abandonment or Removal of Water Main:

The Contractor shall abandon or remove water main(s) where shown on the Plans. All work shall be performed in accordance with the Special Provision entitled "Water Main and Appurtenances, Remove or Abandon."

K. Water Main Testing:

The water main shall be disinfected and tested by the Contractor in the presence of the

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Engineer in accordance with the requirements below. The Contractor shall furnish all piping, pumps, hoses, gauges, and other materials and equipment required to carry out the tests using water from the City's water mains. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. Any hoses which are needed to direct water from blow-offs and/or hydrants during water main testing and flushing shall be supplied by the Contractor. The City shall furnish and install one inch corporation stops at all necessary locations, at the expense of the Contractor. The tapping of water mains, the installation of all corporation stops, and the operation of valves and hydrants is reserved for City personnel. The Contractor is required to assist in valve and hydrant operation, however. The Contractor shall give the City forty-eight hours prior written notice of intent and desire to test water mains.

Bacteriological Testing Sequences:

In the case of all water mains connected to existing facilities, flushing, chlorination and bacteriological testing must precede pressure testing. Where mains can be totally isolated from existing facilities with air gaps or double valves, pressure testing may precede chlorination and bacteriological testing. The normal sequence and time requirements for testing are:

Isolated (Gapped) Water Main	Connected Water Main
1. Fill Main	1. Flush and Swab*
2. Pressure Test	2. Chlorinate
3. Connect One End of Main	3. Wait; 24 hours
4. Flush and Swab*	4. Flush**
5. Chlorinate	5. Wait; 24 hours
6. Wait; 24 hours	6. Bacteriological Samples
7. Flush**	7. Wait; 24 hours
8. Wait; 24 hours	8. Bacteriological Samples
9. Bacteriological Samples	9. Wait; 48 hours
10. Wait; 24 hours	10. Pressure Test (If both sets of Bacteriological samples pass)
11. Bacteriological Samples	11. Flush
12. Wait; 48 hours	12. Wait; 24 hours
13. Make Final Connection(s) – Place in Service (If both sets of bacteriological samples pass)	13. Bacteriological Samples
	14. Wait; 24 hours
	15. Bacteriological Samples
	16. Wait; 48 hours

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	17. Place in Service (If both sets of bacteriological samples pass)
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*Collect flush water in operable storm water retention/detention facility.

**Discharge flush water into approved sanitary sewer.

The Contractor shall not connect any end of a newly constructed water main to an existing, in-service, water main, until the newly constructed water main passes the hydrostatic test, unless approved in writing by the Engineer.

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L. Hydrostatic (Pressure Test):

Insofar as is practical, mains shall be pressure tested between valves. The maximum length of water main to be tested in any one test shall be 1500 feet. The section of main to be tested shall be slowly filled with potable water and the entrained air within the pipe removed or absorbed and pumped up to a pressure of 150 psi (or other pressure if specified) and the test period shall start immediately thereafter. The lines shall then be maintained under a test pressure of 145-155 psi for a continuous period of three hours by pumping chlorinated (25 ppm) water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the line under test during the interval. Visible leaks shall be repaired regardless of test results. The leakage under the conditions of the test shall not exceed the values shown in the table below. If one side of a double disc gate valve is under test pressure, that seat shall count as four joints.

Maximum Allowable Leakage per 100 Joints at 150 psi Avg. Test Pressure

Pipe Diameter (Inches)	4	6	8	10	12	16	20	24	30	36
Leakage (gallons/hr)	0.66	0.99	1.32	1.66	1.99	2.65	3.30	3.97	4.97	5.96

In the event that the leakage exceeds the maximum allowable leakage as specified above, the joints in the line shall be carefully inspected for leaks and repaired where necessary. Any pipes or fittings found to be leaking shall be removed and replaced with new pieces by the Contractor. After this work has been performed, all tests shall be repeated.

M. Flushing and Swabbing:

The Contractor shall flush the water main after making a connection to the existing City water main where a valve separates the new water main from the existing main. As a result, flushing will be accomplished using flow through the full size of the new water main. If a storm water retention/detention facility is to be constructed as part of the project, this facility is to be completed, stabilized, operable, and utilized for the collection of the flushing water. All pipe, materials, and appurtenances which will come into contact with potable City water after the restoration of water service following the connection shall be disinfected with a strong chlorine solution prior to installation.

Water main shall be cleaned using a high density poly-pig, Girard Aqua Swab (2 lbs/ft³ density) swab, or Engineer approved equal and flushed. The diameter of the blow-off pipes shall be at least 50% of the diameter of the pipe being flushed. Hydrants, with

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internal components removed, may serve as blow-offs for mains 12 inches and less. The Contractor shall provide details, for the review and approval of the Engineer, for the various required blow-offs. Blow-off pipes, discharge hoses, where needed, and associated costs shall be included in the cost of the permanent water main being installed and will not be paid for separately. If there are no branch connections to be swabbed, the poly-pig shall be inserted in the new water main at the time of connection described above. The poly-pig shall be located on the "downstream" or new side of the separation valve. The poly-pig shall then be forced through the new water main during the first flush and discharged through a construction blow-off of sufficient size to allow passage of the poly-pig. For water mains with branch connections, a launching tee or wye shall be installed as shown in the details, for launching multiple poly-pigs. The main line and each branch main shall be flushed and swabbed individually. Following the successful final bacteriological testing of the water main, the launching tee/wye shall be permanently capped at its branch.

During the flushing and swabbing of a water main, the discharge point for the main shall be left open, with all other discharge points closed, to direct the poly-pig completely through the main being swabbed to its point of termination. Following the initial swabbing of water main, the separation valve shall be closed, and then the discharge point closed. If a branch water main is to be swabbed, the poly-pig is then to be placed in the launcher; the discharge point for the branch water main is to be opened; the poly-pig is to be inserted into the water main; the separation valve partially opened and the branch water main flushed and swabbed.

Following the swabbing of the water main(s), the water main(s) are to be flushed as required. If approved or directed by the Engineer, the water main(s) may be flushed overnight, provided that proper controls (i.e. hoses directed into storm structures, etc.) are installed to direct and control the flushing water.

N. Chlorination:

After the water mains to be tested have been acceptably flushed, they shall be disinfected in accordance with AWWA C651 "Disinfecting Water Mains" and these Specifications. All new mains and fittings, and any existing mains contaminated by the Contractor, shall be chlorinated to a minimum residual of fifty (50) parts per million (ppm) with commercial liquid chlorine solution (sodium hypochlorite - pool type). Other forms of chlorination and disinfection methods of water mains may be presented by the Contractor and shall receive prior approval in writing by the Engineer before being used. The minimum recommended dosage of sodium hypochlorite is as follows (based on 10% available chlorine):

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Recommended Minimum Chlorine Dosage to Disinfect 100 L.F. of Pipe

<u>Pipe Diameter (inches)</u>	<u>10% Chlorine Solution (gallon)</u>
6	0.153
8	0.272
10	0.426
12	0.613
16	1.090
20	1.703
24	2.452

The chlorinated water shall remain in the mains for a minimum of 24 hours, at the end of which period the chlorinated water at all parts of the main must show free available chlorine residual of at least twenty-five (25) ppm. If less than 25 ppm residual is shown at the end of the first 24 hour period, additional chlorine shall be added until a residual of not less than 25 ppm at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and disposed of into an existing, approved City sanitary sewer main, or other location approved in writing by the Engineer. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. The mains shall then be left full of water ready for bacteriological testing.

O. Bacteriological Testing:

The City will obtain bacteriological samples of the water in the mains for analysis from testing blow-offs, corporations, or other sampling points as determined acceptable by the City. Samples will be taken after the mains have been satisfactorily chlorinated in accordance with these Specifications, the chlorinated water flushed out and removed, and the mains filled with potable water. If the newly constructed water main is connected at one end to an in-service section of the City water main, and the chlorination precedes pressure testing, the City will also take samples after satisfactory pressure testing. In each case, two sets of samples shall be taken; a period of 24 hours must elapse between flushing of the main and drawing of the first samples, with the second samples being drawn 24 hours after the first samples were drawn. For each sample, a minimum of 48 hours is required to obtain test results. All samples must pass the bacteriological test.

The Contractor shall plan for these testing sequences and durations in his construction schedule. Contract time will continue during all water main testing phases, regardless of duration.

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d. Construction, General Requirements.- The Contractor shall be responsible for coordination with the City of Ann Arbor Field Operations Unit for the installation of 1-inch corporations in the gate wells to be used for water main testing and/or filling of new main.

The Contractor must have all materials, fittings, pumps and other miscellaneous equipment, and personnel on-site before the City of Ann Arbor Public Services personnel will prepare and shutdown and existing main.

The bedding and backfill for Trench Detail I (under roadbed), Modified, shall be MDOT Granular Material, Class II compacted to 95% of its maximum dry density in maximum lifts of 12 inches. The bedding and backfill for Trench Detail V (within 1:1 influence of the roadbed or curb and gutter), Modified, to a point 12 inches above the top of pipe, shall be MDOT Class II sand compacted to 95% of its maximum dry density. The material above this point shall be Engineer-approved native material compacted to 90% of its maximum dry density.

The Contractor shall dig-up and expose all utility crossings prior to laying any water main pipe. This will allow the Engineer to adjust the grade of the water main, if possible, to avoid the existing utilities. The costs of the 'dig-ups", and all related costs, shall be included in the respective items of work in this Special Provision. Some "dig-ups" may need to occur out of Phase.

Should the water main, or other pay items in this special provision, conflict with abandoned sewers or water mains, the conflicting section of the abandoned sewer or water main shall be removed and the remaining sections shall be (re)abandoned in accordance the Special Provision for "Water Main and Appurtenances, Abandon" and the Special Provision for "Sewer, Any Size or Depth, Abandon," except that flow filling the sewer will not be required. All the work shall be included in the cost of the water main, or other pay items in this special provision.

Night work shall be lighted to an average intensity of 108 lux minimum. Sufficient light sources shall be provided to achieve this illumination requirement. The lighting scheme shall be submitted to the Engineer for review and approval a minimum of 72 hours prior to the anticipated commencement of the nighttime water main work. Nighttime water main work will not be allowed to begin until such time as the lighting scheme has been approved by the Engineer.

The lighting shall allow the inspector to clearly see and inspect all work operations, including pipe, fitting, and valve installations, disinfection of the pipe, pipe cleaning, and all other night work.

Lighting systems may be fixed, portable, or equipment mounted. A power source shall be supplied with sufficient capacity to operate the lighting system. The lighting system(s) shall be arranged such that they do not interfere with the vision of motorists or unnecessarily illuminate surrounding properties or residences.

All water main and appurtenances shall be pressure tested, cleaned, disinfected and bacteriological tested in accordance with the specifications outlined within this special provision.

After acceptance of each section of new main the Contractor shall begin coordination with the City

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of Ann Arbor Public Services Area for the installation of water services, curb stops and boxes in accordance with the Special Provision entitled "Excavate and Backfill for Water Service Tap and Lead."

e. Measurement and Payment.- The work for all items shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; connections to new and existing water mains; the furnishing and installation of solid sleeves and push-on-joint plugs where needed; the furnishing, installation, and removal of sheeting and/or shoring where needed; polywrap; the furnishing, placement and compaction of approved bedding and backfill materials; thrust blocks; additional labor and equipment costs associated with any required nighttime water main work; cleaning, disinfecting, flushing, bacteriological and hydrostatic testing; and any other required items to complete the work as shown on the plans, as detailed in this Special Provision, and as directed by the Engineer. The completed work will be paid for at the contract unit prices for the following contract items (pay items):

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
D.I. Water Main, w/ Polyethylene Wrap, ___ inch, Tr Det ____, Mod	Foot
D.I. W M TR-Flex w/ Double Polyethylene Wrap, 12 inch, Directional Drill...	Foot
___ deg Bend, ___ inch	Each
Reducer, ___ inch x ___ inch	Each
Tee, ___ inch x ___ inch x ___ inch	Each
Gate Valve-in-Box, ___ inch	Each
Gate Valve-in-Well, ___ inch	Each
Fire Hydrant Assembly, with Extensions, Complete	Each

D.I. W M TR-Flex w/ Double Polyethylene Wrap, 12 inch, Directional Drill shall include all labor, equipment, and materials required for excavation, dewatering, including well points where needed, bore pit and/or trench sheeting and shoring, directional drilling, assembly, furnishing proper backfill material, compaction, proper disposal off-site of excess excavated material and drilling fluid, disinfection, testing, flushing, and placing new mains in service, and will be measured in place by length in lineal feet along the centerline of the main with no reductions for fittings or valves. Payment for thrust blocks, restrained joints, plugs, or any other special fittings shall be considered as having been included with this pay item and will not be paid for separately. Payment to include TR-Flex joints, double wrapping pipe and taping or tying the wrap as detailed, and a tracer wire.

Fittings other than those specifically listed as separate contract items, blow-off assemblies, hoses, and restrained joint pipe and gaskets, special gaskets, and the like, shall not be paid for separately, but shall be considered included in the payment for "D.I. Water Main, w/Polyethylene Wrap, ___ inch, Tr Det ___."

Tees, Bends, and Reducers and other fittings specifically listed as separate contract items (pay items), shall be paid for at the contract unit price for each unit installed.

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Valve Box Extensions will only be paid for if they are required by the plans and they are not required due to the Contractor's operations.

The work of installing a gate valve-in-well shall include installation and backfill of the specified valve, furnishing and installing precast concrete gate wells including the concrete base, straight precast concrete sections, transition sections, gate well frame and cove, and the adjustment of the structure cover. No separate payment will be made for adjusting the structure covers on new gate wells. Upon completion of the work, the Contractor shall clean the Gate Well to the approval of the Engineer.

The gate valve box shall be paid for as Gate Valve-in-Box, ___ inch. The cost of adjusting new gate valve-in-boxes shall be included in the unit price for Gate Valve-in-Box and shall not be paid for separately.

The fire hydrant assembly work shall include the hydrant, the 6 inch gate valve-in-box, 3 feet of 6 inch pipe, the thrust block, and any required extensions to install the fire hydrant to the finish grade as shown on the plans.

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a. Description.- The Contractor shall furnish all materials, labor and equipment to properly install and set water main line stops into the existing ductile iron main(s) at the locations as shown on the plans and as directed by the Engineer. All work shall be performed in accordance with the requirements as detailed herein.

The existing mains, upstream and downstream of the proposed line stop(s) cannot be shut down or taken out of service. To ensure that the entire operation shall be accomplished without interruption of service or flow, the installation shall be accomplished by Contractor personnel skilled and experienced in the procedures specific to line stops of the required size(s).

The work shall include, but not be limited to; pavement sawcutting; excavation and disposal of excavated material; the furnishing, installation, and removal of sheeting and/or shoring where needed; the furnishing, placement and compaction of approved bedding and backfill materials; furnishing and placing suitable, clean, gravel to create a stable working surface at the bottom of the excavation; dewatering; pipe cleaning, measuring, and performing all advance work necessary to prepare for the performance of the line stop; nighttime lighting as required; the removal of all materials and equipment associated with the work when no longer needed; and, any other items needed to complete the work as detailed on the plans and as specified herein.

b. Materials.- Bedding and backfill for areas contained within a segment of water main designated as Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902. For work within a segment of water main designated as Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, Granular Material, Class II and Engineer approved native material, placed in accordance with the trench details, shall be used.

The Contractor shall submit to the Engineer two (2) sets of drawings, furnished by manufacturers, illustrating and describing the Line Stop fittings proposed to be furnished. Work shall not commence until such time as the drawings have been reviewed and accepted by the Engineer.

Line Stop Fittings shall be full encirclement, pressure retention type split tee. It shall consist of two steel weldments; an upper line stop flange saddle plate and a lower saddle plate. These two saddle plates shall be contiguous.

Line Stop Flange: The outlet of each fitting shall be machined from a 150 lb. forged steel flange (ASTM A181 or A105) or from pressure vessel quality steel plate (ASTM A285, Grade C); flat faced and drilled per ANSI B16.5). Suitable independently operated locking devices shall be provided in the periphery of the flange to secure the completion plug.

Line stop Nozzle: The nozzle, which lies between the saddle and the flange shall be fabricated from steel pipe (ASTM A234). After welding and stress relief, the nozzle shall be accurately bored as follows to accommodate the Line stop plugging head:

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- a) Machine an internal circular shoulder to seal against the circumferential gasket carried on the plugging head.

Completion Plug: The completion plug shall be machined from a stress relieved carbon steel weldment. It shall contain two (2) circumferential grooves: one to receive the locking devices from the Line stop flange, and the second to contain a compressible "O" ring to seal pressure tight against the bore of the flange.

Blind Flange: Each Line stop fitting shall be closed with a blind flange. Facing and drilling of the blind flange shall be compatible with that of the Line stop flange. Minimum blind flange thickness shall be that of AWWA Spec. 207, Class D.

Saddle Alignment Marking: Each saddle-half shall be matched and marked with serial numbers, to insure proper alignment in the field.

Fasteners: All bolts, studs, and nuts used on Line stop, drain/equalization fittings, blind flange, and other elements that shall remain upon completion of the work shall be stainless steel and meet the requirements of ASTM F 593.

General: Manufacturer will exercise extreme care to insure that weldments are of adequate strength, properly shaped, securely reinforced, and free from distortion that could stress the ductile iron main during installation, pressure tapping, or Line stopping operations. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

Gaskets: Shall be molded from elastomer compounds that resist compression setting and are compatible with water in the 32 to 140 deg. F temperature range.

Upper Line stop Flange Saddle: Shall consist of a saddle plate, a Line stop flange, and a Line Stop nozzle. The interior of the saddle plate, adjacent to and concentric with the O.D. of the nozzle, shall be grooved to retain a gasket which shall seal the saddle plate to the exterior of the ductile iron main. This gasket shall constitute the only seal between the main and the fitting. The flange saddle shall also meet the following requirements:

- a) Saddle plate shall be of a minimum of 0.375" in thickness. It shall be shaped to be concentric to the outside of the ductile iron main. The smallest I.D. of the saddle and its interior rings shall exceed the O.D. of the main by a minimum of 0.250" to allow for ovality of the main;
- b) Line stop nozzle of 0.375" min. wall thickness shall be securely welded to the saddle plate;
- c) The Line Stop flange shall be securely welded to the nozzle. After welding, the assembly shall be braced, stress relieved, and bored to receive the completion plug and the circumferential gasket of the Line Stop machine plugging head; and,
- d) Bolt, nut of stud, nut, and washer assemblies shall be furnished to draw the upper and

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lower saddles together for sealing. Bolting brackets shall be gusseted.

Lower Saddle Plate: Saddle plate shall be of a minimum 0.375" thickness and shall be shaped to be concentric to the outside brackets shall match upper half.

c. Equipment.- The equipment shall consist of a cylindrical plugging head that contains a flat, expandable elastomer sealing element. The plugging head shall be advanced into and retracted from the main by means of a linear actuator. When retracted, the plugging head and carrier are housed in an adapter, bolted pressure tight between the tapping valve and the actuator.

Sealing Element: The element shall be monolithically molded from a suitable polyurethane compound. The element shall be flat in a plane perpendicular to the flow in the main. Minimum thickness of the element shall be 4". The bottom of the element shall be semi-circular to conform to the bore of the main.

Drilling equipment: Shall be in good working condition, equipped with power drive to insure smooth cutting, and to minimize shock and vibration. Cutting equipment shall be carbide tipped and capable of being replaced without removal from the jobsite.

Plugging Head: The diameter of the cylindrical plugging head shall be slightly smaller than the bore of the Line Stop nozzle. The plugging head shall have a suitable circumferential gasket to seal against the shoulder in the Line stop nozzle. This gasket shall also seal against the sealing element to prevent bypass flow around the Line stop.

Deposits in Bore of Main: The semi-cylindrical bottom of the plugging head shall be designed to break and dislodge tuberculation and other deposits in the bore of the main which might interfere with a satisfactory Line stop.

d. Method of Construction.- Installation of proposed line stops mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. All excavation shall conform to MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

If necessary, The City will reduce the pressure to 100 psig or less for the duration of the installations. The entire operation of installing the line stop shall be accomplished without reduction of water pressure in the main(s) below 100 psig. It shall be the responsibility of the Contractor to verify pressure prior to commencing the installation.

Preliminary Field Inspection of Water Main:

Dimensional, specification, and other data regarding the existing mains have been taken from existing records. This information may be inaccurate, out of date, and/or inadequate. The data have not been verified by field inspections. Further, the water main consists of

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ductile iron pipe which may contain dimensional and structural flaws. In addition, the Contractor shall anticipate that exterior main conditions, bells, service connections, or presence of adjoining utilities may require relocation of proposed line stop. Prior to proceeding with the installation of any line stop, it is necessary to know the exact main outside diameter of the water main, if it has any ovality, and the internal diameter of the pipe before line stop fittings and plugging head sealing elements can be manufactured and/or ordered.

Prior to ordering material, Contractor shall excavate at each proposed location and carefully measure the outside diameter of the water main with calipers along at least four (4) locations to determine ovality and the critical outside diameter of the water main. The Contractor shall determine main wall thickness, uniformity, and structural integrity by means of ultrasonic testing. Data shall be taken to determine extent of internal deposits, tuberculation, etc..

If the Engineer determines that Contractor's data are not adequate, the Engineer may direct Contractor to make one or more pressure taps on main to obtain test pipe coupons for the Engineer's evaluation. The minimum size of the test coupon shall be 5" diameter, drilled through a nominal 6" valve. Pressure tapping saddles and other materials used for inspection taps shall conform to the requirements of this Special Provision. The Contractor shall anticipate that heavy interior corrosion and/or tuberculation exists within the water main.

If, in Engineer's opinion, the proposed location is unsatisfactory based on measurements of the existing pipe at the locations of the proposed line stops, the Engineer will direct excavation at another site. Excavating, de-watering, inspections, backfill, and restoration will be paid for separately in accordance with the applicable contract unit prices or Section 109.05.C and 109.05.D whichever the Engineer deems most appropriate.

Because of possible internal corrosion and deposits in existing water mains, a "bottle-tight" shut down may not occur. A satisfactory shutdown which allows the work to be accomplished (i.e. valve replacement, water main tie-in, etc.) using drainage pumps to de-water excavations, with workmen wearing boots and raingear, if necessary, must be obtained. The Contractor will not be allowed to proceed with further work until an acceptable shutdown is achieved. The Contractor shall be aware that this may require the halting of work and re-scheduling of all work operations.

Contractor shall power wire brush and grind the exterior of the water main to remove any debris, corrosion deposits, or other surface irregularities that might interfere with proper seating and sealing of each line stop fitting against each main. Any structural defects in the water main, service connections, appurtenances, adjacent utilities, etc., that could interfere with the line stop installation shall be immediately reported to Engineer.

All line stop fittings and appurtenances shall be cleaned and disinfected in accordance with the

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current City of Ann Arbor Public Services Area Standard Specifications prior to bolting any of the line stop fittings in place or commencing any pipe cutting.

Contractor shall fit upper and lower saddle plate assemblies to main, thoroughly checking for proper fit to main. Under no circumstances shall Contractor attempt to force, reshape, or bend saddle plates by excessive tightening of saddle studs while the line stop fitting is assembled around the main. Any required retrofitting shall be accomplished with the fitting removed from the main. Any damage to fitting, accessories, or main shall be repaired at Contractor's expense to the satisfaction of Engineer.

Upper and Lower saddle halves shall be drawn together by bolt assemblies and the Saddle plates shall be bolted together in the horizontal position.

All line stop work shall be performed in accordance with the equipment manufacturers approved work procedures and installation guidelines.

Final closure of the water main shall be accomplished by insertion of a manufacturer-approved completion plug. The Contractor shall test the completion plug sealing through the use of a bleed off assembly in the machine housing.

The Contractor shall remove the temporary valve and the installation of a blind flange shall be completed.

The Contractor shall place polyethylene encasement meeting the requirements of the City of Ann Arbor Standard Specifications for Construction around the upper and lower saddle halves, the blind flange, and to a point at least 1 foot on either side of the saddle halves. All polyethylene encasement shall be securely taped to the water main such that water entry is minimized to the greatest extent possible.

e. Measurement and Payment.- The completed work will be paid for at the contract unit prices for the following contract items (pay items):

<u>Contract Item (Pay Item)</u>	<u>Pay Unit</u>
Water Main Line Stop ___ inch to ___ inch	Each

All work shall be paid in full at the contract unit prices which shall include all the labor, materials, and equipment required to perform the work as detailed herein. This shall also include all required costs associated with night time work, supplemental lighting, and all other required elements of the work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
EXCAVATE AND BACKFILL FOR WATER SERVICE TAP AND LEAD

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a. Description. This work shall consist of exposing new or existing water mains and excavating and backfilling a trench, at the locations shown on the drawings, or as directed by the Engineer, for the purpose of installing new water services or transferring existing water services to new water mains or replacing existing water services on existing water mains.

b. Materials. The backfill material shall meet the requirements for Granular Material, Class II specified in section 902 of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction.

c. Construction. The trench is to be excavated to the applicable MIOSHA standards for the purposes of transferring water services, installing water service taps, leads, and curb stops and boxes. The City will furnish all labor and materials for taps, leads, and curb stops and boxes. The Contractor will not be entitled to extra compensation due to delays caused by City of Ann Arbor personnel in performing work on the project. The Contractor shall be responsible for all coordination with the City of Ann Arbor – Field Operations personnel for the scheduling and execution of the work.

Granular Material Class II bedding (3 inch) and backfill material shall be placed in lifts not to exceed 12 inches and compacted to a minimum of 95% of its maximum dry density as measured by the AASHTO T-180 test.

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

<u>Pay Item</u>	<u>Pay Unit</u>
Excavate and Backfill Water Service Trench Tap and Lead	Foot

Excavate and Backfill Water Service Trench Tap and Lead shall be measured by length in feet from the new or existing water main to the curb stop and box or the location where the new and existing water services are to be reconnected. The Contractor shall be aware that the plan quantities are estimates only. The actual amount of excavation and backfill may be significantly more or less based on actual field conditions. Price adjustments based upon subsection 103.02.B of the MDOT 2012 Standard Specifications for Construction shall not apply to this item of work.

Payment for **Excavate and Backfill Water Service Trench Tap and Lead** shall include, but not be limited to all labor, material, and equipment costs necessary to schedule and coordinate with City of Ann Arbor personnel for the work of transferring and/or installing new water services; expose and backfill the new water main; excavate, backfill, and compact the water service trenches; and, properly dispose of all excess excavated materials.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
WATER MAIN AND APPURTENANCES, REMOVE OR ABANDON

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a. Description. This work shall include abandoning or removing existing water mains, valves, valve wells, valve boxes, and fire hydrant assemblies of various sizes as required by the Plans. All work shall be performed in accordance with the project plans, as detailed in this Special Provision, and as directed by the Engineer.

b. Materials. All materials shall meet the requirements specified in the following sections of the Michigan Department of Transportation (MDOT) 2012 Standard Specifications for Construction as follows:

Mortar Type II.....	Section 702
Granular Material, Class II	Section 902
Masonry Units	Section 913

Push-on joint plugs and thrust blocks shall conform to the requirements as detailed in the Special Provision entitled “Water Main and Appurtenances.”

c. Construction. The Contractor shall abandon water mains where shown on the Plans. This includes, but is not limited to, cutting the main at each end, plugging the live main at the end(s) with push-on joint plug(s) and thrust block(s), plugging the abandoned main at its end(s) with brick and mortar, concrete, or mechanical joint plug, breaking down any manholes (remove manhole ring and cover and the top 4' of manhole structure, breaking out the manhole base, and backfilling as specified herein) in the abandoned line, removing and salvaging any valves and fittings, plugging the pipe in manholes with brick and mortar, concrete, or mechanical joint plugs.

In locations as shown on the Plans or where abandoned water main, valves or valve wells are within 30 inches of the proposed subgrade, the pipe, valves or valve wells shall be removed completely. The resulting hole or trench shall be backfilled with Granular Material Class II in maximum lifts of 10 inches, and be compacted to 95% of its maximum dry density, if located within the public rights-of-way, or within the influence of paved surfaces or structures. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum dry density, in lifts of 12 inches or less, unless otherwise noted on the plans.

Abandoned (salvaged) or removed valves and fire hydrant assemblies shall be neatly stacked on-site in a single location so that City of Ann Arbor forces can retrieve them at a later date. The Contractor shall assist City forces by loading them into City trucks.

d. Measurement and Payment.- The completed work, as described, shall be paid at the contract unit prices respectively for the following pay items:

<u>Pay Item</u>	<u>Pay Unit</u>
___ inch thru ___ inch Water Main, Abandon	Foot
Gate Valve-in-Box, Remove	Each
Gate Valve-in-Well, Remove	Each
Water Main, Remove	Foot
Fire Hydrant, Remove	Each

___ inch thru ___ inch Water Main, Abandon and Water Main, Remove shall be measured and paid for by length in lineal feet and shall include all labor, materials, and equipment necessary to abandon or remove the pipe including, but not limited to, excavation, cutting of pipe, push-on joint plugs and thrust blocks, brick and mortar bulkheads, the furnishing, placement, and compaction of approved granular backfill material, as required, and the removal and proper disposal off-site of excess materials.

Fire Hydrant, Remove shall be paid for at the contract unit price for each unit removed. Fire Hydrant, Remove includes payment for storing, stockpiling, and loading hydrants into City vehicles, and for abandoning or removing the companion valve, as directed by the Engineer.

Gate Valve-in-Box, Rem and Gate Valve-in-Well, Rem shall be paid for at the contract unit price for each unit removed.

Payment shall include all labor, materials, and equipment necessary to completely remove the valve, including removing and salvaging the valve, valve boxes, and manhole rings and covers. Also included is the removal of the top 4 feet of valve wells, breaking out the valve well base, furnishing, placement, and compaction of approved granular backfill material, as required, and the removal and disposal of excess materials.

**DETAILED SPECIFICATION
FOR
SANITARY SEWER LEAD
REMOVE AND REPLACE IN TRENCH**

DESCRIPTION

This work shall consist of removing and replacing existing lead in new utility trenches. Work includes cutting lead, carefully removing, replacing with SDR 35 PVC pipe and fittings along with fernco connections. All materials need to accomplish this work is included in this pay item. All work shall be done in accordance with the City of Ann Arbor Public Services Department Standard Specifications, and as directed by the Engineer.

CONSTRUCTION METHODS

The Construction Methods shall meet all requirements of the City of Ann Arbor Standard Specifications.

Sewer leads are private and no official City records are kept. Leads have been located and placed on plans per video inspection of sewer. Contractor to carefully excavate leads, not dig through lead but to saw cut out of way. Lead to be kept clean, have positive fall, and replaced as soon as possible. Contractor to coordinate with homeowner/business as needed to complete work. Trench must be carefully backfilled to prevent damage. Prior to placement of HMA contractor will have entire lead televised. Any defects in repair contractor will excavate and make repair at contractors expense.

MEASUREMENT AND PAYMENT

The unit price for the pay item "Sewer, SDR 35 PVC, Service Lead, 4 inch or 6 inch, Tr Det I Mod" includes all labor, material and equipment costs associated with the complete installation of the sewer lead, as specified herein, including but not limited to, excavation MDOT CL II backfill, compaction.

Payment shall include all labor, equipment, and materials necessary to remove and store the existing sewer lead as directed by the Engineer.

The unit prices for this item of work shall include all labor, material, and equipment costs to perform all the work specified in the Standard Specifications and as modified by this Detailed Specification.

PAY ITEM

PAY UNIT

Sewer, SDR 35 PVC, Service Lead, 4 inch or 6 inch, Tr Det I Mod

Each

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

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

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

The Contractor is hereby notified that the City of Ann Arbor Field Services Unit may be installing traffic control conduits, traffic signal sensors, and the like, at various locations.

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

The following Utility Owners may have overhead and/or underground facilities located within the Right-of-Way:

The City of Ann Arbor
DTE - MichCon (Michigan Consolidated Gas Company)
DTE - Edison (Detroit Edison Company)
SBC - (Ameritech)
Comcast
MCI Communications
Sprint Communications
The University of Michigan

On all projects:

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

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

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

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

**DETAILED SPECIFICATION
FOR
DISPOSING OF EXCAVATED MATERIAL**

The Contractor shall dispose of, at the Contractor's expense, all excavated material. Costs for this work will not be paid for separately, but shall be included in the bid price of the Contract Item "General Conditions."

**DETAILED SPECIFICATION
FOR
PROTECTION OF UTILITIES**

Damages to utilities by the Contractor's operations shall be repaired by the utility owner at the Contractor's expense.

Delays to the work due to utility repairs are the sole responsibility of the Contractor.

The Contractor shall keep construction debris out of utilities at all times. The Contractor shall be back charged an amount of \$50.00 per day for each manhole/inlet/utility pipe that contains construction debris caused as a result of the Contractor's (including subcontractors and suppliers) work.

The Contractor is solely responsible for any damages to the utilities or abutting properties due to construction debris.

Certain sanitary and storm sewers within the influence of construction may have been cleaned and videotaped prior to construction. The City may also choose to videotape utility line(s) during or after the work of this Contract to inspect them for damages and/or construction debris. If such inspection shows damage and/or debris, then all costs of such inspection, cleaning, repairs, etc, shall be the Contractor's sole responsibility. If such inspection is negative, the City will be responsible for the costs of such inspection.

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

**DETAILED SPECIFICATION
FOR
SOIL EROSION CONTROL**

The Contractor shall furnish, place, maintain and remove soil erosion and sedimentation control measures, including but not limited to, fabric filters at all drainage structures, all in accordance with all applicable City (and other governmental agencies) codes and standards, as directed by the Engineer, as detailed in the Standard Specifications, and as shown on the Plans.

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

**DETAILED SPECIFICATION
FOR
VACUUM TYPE STREET AND UTILITY STRUCTURE CLEANING EQUIPMENT**

The Contractor shall furnish and operate throughout the construction period, vacuum type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer, as and when directed by the Engineer for dust control, for dirt/debris control, and for street cleaning immediately prior to, and for street and utility structure cleaning after any and all paving. The cleaning equipment shall be of sufficient power to remove dust, dirt, and debris from the pavement and from utility structures in and adjacent to the construction area.

Costs for this work will not be paid for separately, but shall be included in the bid price of the

Contract Item "General Conditions."

**DETAILED SPECIFICATION
FOR
SITE CLEAN-UP**

Immediately after completion of construction on each street, the Contractor shall clean the entire area within the influence of construction, including but not limited to all pavement, sidewalks, lawn areas, and underground utility structures, of all materials which may have accumulated prior to or during the construction.

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

**DETAILED SPECIFICATION
FOR
MATERIALS AND SUPPLIES CERTIFICATIONS**

The following materials and supplies shall be certified by the manufacturer or supplier as having been tested for compliance with the Specifications:

- HMA materials
- Hot-poured Joint Sealants
- Cements, coatings, admixtures and curing materials
- Sands and Aggregates
- Steel and Fabricated metal
- Portland Cement Concrete Mixtures
- Reinforcing Steel for Concrete
- Reinforcing Fibers for Concrete
- Pre-cast Concrete products
- Sanitary Sewer Pipe
- Storm Sewer Pipe
- Water Main Pipe
- Corrugated Metal Pipe
- High Density Polyethylene Pipe
- Timber for retaining walls
- Modular Concrete Block for retaining walls
- Edge Drain and Underdrain Pipe
- Geotextile Filter Fabric and Stabilization Fabric/Grids

The Contractor shall submit all certifications to the Engineer for review and approval a minimum of three business days prior to any scheduled delivery, installation, and/or construction of same.

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

**DETAILED SPECIFICATION
FOR
CONTRACT DRAWINGS/PLANS**

The Contractor shall carefully check and review all Drawings/Plans and advise the Engineer of

any errors or omissions discovered. The Drawings/Plans may be supplemented by such additional Drawings/Plans and sketches as may be necessary or desirable as the work progresses. The Contractor shall perform all work shown on any additional or supplemental Drawings/Plans issued by the Engineer.

**DETAILED SPECIFICATION
FOR EXISTING
SOIL BORING AND PAVEMENT SECTION DATA**

Data pertaining to existing soil borings and pavement sections which may be included in these Contract Documents are provided to help the Engineer and Contractor determine the soil conditions existing within the construction area. The City in no way guarantees existing conditions to be the same as shown in the data. The Contractor is solely responsible for any and all conclusions he/she may draw from the data.

**DETAILED SPECIFICATION
FOR
WORKING IN THE RAIN**

The Contractor shall not work in the rain unless authorized in writing by the Engineer.

The Engineer may delay or stop the work due to threatening weather conditions.

The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain.

The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

**DETAILED SPECIFICATION
FOR
WORKING IN THE DARK**

The Contractor shall not work in the dark except as approved by the Engineer and only when lighting for night work is provided as detailed elsewhere in this contract.

The Engineer may stop the work, or may require the Contractor to defer certain work to another day, if, in the Engineer's opinion, the work cannot be completed within the remaining daylight hours, or if inadequate daylight is present to either properly perform or inspect the work.

The Contractor will not be compensated for unused materials or downtime, when delays or work stoppages are directed by the Engineer for darkness and/or inadequate remaining daylight reasons.

The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the dark.

**DETAILED SPECIFICATION
FOR
QUANTITIES AND UNIT PRICES**

Quantities as given are approximate and are estimated for bidding purposes. Quantities are not guaranteed and may vary by any amount. While it is the City's intent to complete the project substantially as drawn and specified herein, quantities may be changed or reduced to zero for cost savings or other reasons. **The City reserves the right to change the quantities, delete streets, or add streets, and no adjustment in unit price will be made for any change in any quantity.**

**DETAILED SPECIFICATION
FOR
GENERAL CONSTRUCTION NOTES**

The following notes pertain to all Plan sheets issued as part of this Contract, and these notes shall be considered part of each Plan sheet or Detailed Information Sheet.

1. All work shall conform to latest revision of the City Standard Specifications.
2. The Contractor shall maintain access to all drives throughout the course of construction. Drives shall never be closed during non-working hours, unless otherwise authorized in writing by the Engineer.
3. The Contractor shall completely restore all existing site features to better than, or equal to, their existing condition.
4. The Contractor shall be aware that there are above-ground and below-ground utilities existing in and on these streets which include, but are not limited to: gas mains and service leads; water mains and service leads; storm sewer mains and service leads; sanitary sewer mains and service leads; telephone poles, wires, cables and conduits; electrical poles, wires, cables and conduits; cable television wires, cables and conduits, and other various utilities. The Contractor shall conduct all of its work so as not to damage or alter in any way, any existing utility, except where specified on the Plans or where directed by the Engineer. The City has videotaped and cleaned all sanitary and storm sewers, including storm sewer inlet leads, and has found all of these facilities to be in good condition, with the exception of those shown on the Plans for repairs or replacement.
5. The Contractor is solely responsible for any delays, damages, costs and/or charges incurred due to and/or by reason of any utility, structure, feature and/or site condition, whether shown on the Plans or not, and the Contractor shall repair and/or replace, at its sole expense, to as good or better condition, any and all utilities, structures, features and/or site conditions which are impacted by reason of the work, or injured by its operations, or injured during the operations of its subcontractors or suppliers.
6. No extra payments or adjustments to unit prices will be made for damages, delays, costs and/or charges due to existing utilities, structures, features and/or site conditions not shown or being incorrectly shown or represented on the Plans.

**DETAILED SPECIFICATION
FOR
WATER MAIN INSTALLATION AND TESTING**

DESCRIPTION

This Detailed Specification is intended to supplement the current City of Ann Arbor Standard Specifications for Construction with regard to water main installation and hydrologic and bacteriologic testing. It is also intended to establish minimum requirements for the work that the Contractor is responsible to follow.

CONSTRUCTION METHODS

During the delivery, handling, installation, and testing of the water main, the Contractor shall comply with the following requirements:

1. Keep all pipe clean and neatly stacked a minimum of six-inches off of the ground at all times. Ends of pipe shall be covered to prevent entry of dust, dirt, small animals, and any other objectionable matter at all times. During installation of the water main and all appurtenances no dirt, soil, or non-potable water shall be allowed to enter the pipe. If dirt, soil, or non-potable water does enter the pipe, the Contractor shall completely remove it prior to installing the next segment of pipe. Segments of pipe that have visible signs of contamination including, but not limited to; soil, dirt, mud, oil, grease, solvents, animal droppings, etc. shall have all visible traces of the offending substance completely removed by the Contractor in a manner acceptable to the Engineer. Sections of pipe or fittings that have been marked by the Engineer for cleaning shall not be approved for installation until such time as the Engineer has again approved them for use on the project. Acceptable methods of cleaning include flushing and/or power washing, compressed air, or other methods that the Engineer may approve. Approval by the Engineer of a cleaning method shall not be construed by the Contractor to include acceptance of the water main for the purposes of placing it into service. Water main pipe and fittings that have been placed shall remain covered on the advancing end until the next segment of pipe is connected. The Contractor may uncover no more than three segments of pipe in advance of placement. Water main pipe and fittings that have been laid out further in advance of the installation operation must remain covered.
2. Gasket lubricant shall only be applied immediately before connection to the next segment of pipe. Pipe with lubricant applied shall not come in contact with the ground. If the lubricated portion of the pipe end contacts the ground, it shall be thoroughly cleaned to the satisfaction of the Engineer, prior to its installation.
3. All water main shall be swabbed in accordance with the requirements of Section 3H, Flushing and Swabbing, of the current edition of the City of Ann Arbor Public Services Department Standards. During swabbing of the water main, the swab shall be flushed through the pipe in accordance with the manufacturer's recommendations and in a manner that is acceptable to the Engineer. The Contractor shall submit the product data of the swab from the manufacturer, for review and approval by the Engineer, at or before the pre-construction meeting.
4. Swabbing of the water main shall be followed immediately by flushing of the pipe so that any disturbed particles are washed out before they can resettle. The pipe shall be flushed in accordance with Section 3H, Flushing and Swabbing, of the current edition of the City of Ann Arbor Public Services Department Standard Specifications. The pipe shall be flushed until the water runs clear for a minimum of fifteen minutes or until two full pipe

volumes have been flushed (whichever is longer.) Flushing from the existing water main that is to be replaced shall not be allowed.

5. During the chlorination process, the proper level of chlorination must be achieved throughout the entire length pipe. Chlorine levels shall be checked at intermediate locations as directed by the Engineer and the Contractor shall add chlorine until such time as the required levels are achieved at all points. The "plug method" of chlorinating the pipe shall not be allowed. The Contractor shall chlorinate the proposed water main to a minimum residual concentration of 100 parts per million with commercial liquid chlorine solution. The chlorine concentrate shall be a minimum of 10% chlorine (sodium hypochlorite) by volume. Solid chlorine "pellets" or powder shall not be allowed. Any chlorine containing compound used on the project shall be approved by the Engineer. The minimum recommended dosage of chlorine (sodium hypochlorite) is as follows (based on 10% available chlorine):

Recommended Minimum Chlorine Dosage to Disinfect 100 L.F. of Pipe

<u>Pipe Diameter</u>	<u>10% Chlorine Solution (gallons)</u>
6	0.306
8	0.544
10	0.852
12	1.226
16	2.180
20	3.406
24	4.904

6. Bacteriological testing shall be performed by the City with the Contractor present. The Engineer shall determine the number, location, and type of testing points for each section of water main being tested. Bacteriological samples shall only be drawn from copper or brass sampling points. The use of galvanized steel blow-offs or sampling points are strictly prohibited. Obtaining bacteriological samples from fire hydrants will not be allowed.
7. If a new water main fails two consecutive sets of bacteriological tests, the Engineer may require the Contractor to re-swab the water main in accordance with Section 3H, Flushing and Swabbing, as described above. Additional flushing, prior to subsequent bacteriological sampling will also be required. The required additional swabbing and flushing of the water main by the Contractor shall be performed at no additional cost to the City of Ann Arbor.

MEASUREMENT AND PAYMENT

Payment for all labor, materials, and equipment that is required to comply with this Detailed Specification shall be considered as part of the unit price as bid for each respective water main pipe and fitting and will not be paid for separately.

Payment for all water main pipe shall be as follows:

The Contractor shall be paid for 50% of the water main pipe installed upon satisfactory completion of the installation and backfilling of the water main pipe. The remaining 50% shall be paid upon successful completion of all required bacteriological testing, the water main has been placed into service, and all water service leads have been connected and are in service.

**DETAILED SPECIFICATION
FOR
ASPHALTIC SEAL COATINGS
DUCTILE IRON PIPE FITTINGS**

DESCRIPTION

The Contractor may not operate City water main valves. For valve operation, contact the City of Ann Arbor Public Services Area. It is recommended that the Contractor request that the existing valves, which will need to be operated in order to perform the water main work, are checked in advance of the work to ensure that they operate properly.

Several items of work on this project require coordination with the City of Ann Arbor Public Services Area (The City). The Contractor shall notify the City three (3) full working days in advance of any items requiring coordination with the City.

The Contractor shall complete the water main work in a manner which minimizes the disruption of water service. Water quality issues arise and treatment costs increase when the well field system is taken off line. No shut downs at the well field shall occur on Saturdays or Sundays. Shut downs shall not be for longer than 8.0 hours for any given shutdown event. Liquidated damages as detailed and described on page C-2 of these documents shall apply to any shut downs that occur on Saturday or Sunday or for a period of time longer than 8.0 hours in any given 24 hour period.

The Contractor shall be responsible for coordination with the City of Ann Arbor Public Services Area for the installation of 1-inch corporations in the gate wells to be used for testing and filling of new main. The Contractor shall pay the City of Ann Arbor's Field Operations Unit all costs associated with installing the corporations.

The Contractor must have all materials, fittings, pumps and other miscellaneous equipment, and personnel on site before the City of Ann Arbor Public Services Area personnel will prepare and shutdown an existing main.

The Contractor shall dig-up and expose utility crossings 60-feet in advance of laying any water main pipe in their vicinity. This will allow the Engineer to adjust the grade of the water main, if possible, to avoid the existing utilities. The costs of the advance excavations, and related costs, shall be included in the respective items of work listed in the Bid Form. Some dig-ups may need to occur out of Phase.

All ductile iron pipe and fittings shall have an asphaltic seal coat on their cement-mortar linings. The coatings shall meet the requirements of ANSI/NSF Standard 61, Drinking Water System Components - Health Effects, and be approved for contact with drinking water.

MEASUREMENT AND PAYMENT

Asphaltic seal coat for ductile iron pipe and fittings shall not be measured or paid for separately. This work shall include all labor, materials and equipment costs necessary to provide asphaltic seal coat of ductile iron pipe and fittings. Payment for this work shall be considered as part of the unit price for each respective ductile iron pipe and fitting unit price.

APPENDIX 1

Soil Analytical Results
Liberty Street
Ann Arbor, Michigan

					Soil Residential Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk Based Screening Levels (RBSLs)									
Sample ID	CAS	Parameter	Result (ug/Kg)	Statewide Default Background Levels	Groundwater Protection		Indoor Air	Ambient Air			Contact	Csat		
					Drinking Water Protection Criteria And RBSLs	Groundwater Surface Water Interface Protection Criteria And RBSLs	Soil Volatilization to Indoor Air Inhalation Criteria And RBSLs	Infinite Source Volatile Soil Inhalation Criteria And RBSLs	Finite VSIC for 5 Meter Source Thickness	Finite VSIC for 2 Meter Source Thickness	Particulate Soil Inhalation Criteria And RBSLs	Direct Contact Criteria And RBSLs	Soil Saturation Concentration Screening Levels	
GP-16-04-8-11' 11/8/2016	7439-97-6	Mercury	44	130	1,700	50 (M); 1.2	48,000	52,000	52,000	52,000	20,000,000	160,000	NA	
	7440-38-2	Arsenic	5,200 B	5,800	4,600	4,600	NLV	NLV	NLV	NLV	720,000	7,600	NA	
	7440-39-3	Barium	33,000	75,000	1,300,000	440,000 (G)	NLV	NLV	NLV	NLV	330,000,000	37,000,000	NA	
	7440-43-9	Cadmium	160	1,200	6,000	3,600 (G,X)	NLV	NLV	NLV	NLV	1,700,000	550,000	NA	
	7440-47-3	Chromium	11,000	18,000 (Total)	30,000	3,300	NLV	NLV	NLV	NLV	260,000	2,500,000	NA	
	7440-50-8	Copper	14,000 B	32,000	5,800,000	73,000 (G)	NLV	NLV	NLV	NLV	130,000,000	20,000,000	NA	
	7439-92-1	Lead	14,000	21,000	700,000	5,100,000 (G,X)	NLV	NLV	NLV	NLV	100,000,000	400,000	NA	
	7440-02-0	Nickel	13,000	20,000	100,000	76,000 (G)	NLV	NLV	NLV	NLV	13,000,000	40,000,000	NA	
	7782-49-2	Selenium	760 B	410	4,000	400	NLV	NLV	NLV	NLV	130,000,000	2,600,000	NA	
	7439-97-6	Silver	30 J B	1,000	4,500	100 (M); 27	NLV	NLV	NLV	NLV	6,700,000	2,500,000	NA	
	7440-66-6	Zinc	39,000	47,000	2,400,000	170,000 (G)	NLV	NLV	NLV	NLV	ID	170,000,000	NA	
	75-09-2	Methylene chloride	140 J B	NA	100	30,000 (X)	45,000	210,000	590,000	1,400,000	6,600,000,000	1,300,000	2,300,000	
	91-57-6	2-Methylnaphthalene	16 J	NA	57,000	4,200	2,700,000	1,500,000	1,500,000	1,500,000	670,000,000	8,100,000	NA	
	208-96-8	Acenaphthylene	11 J	NA	5,900	ID	1,600,000	2,200,000	2,200,000	2,200,000	2,300,000,000	1,600,000	NA	
	120-12-7	Anthracene	11 J	NA	41,000	ID	1,000,000,000 (D)	1,400,000,000	1,400,000,000	1,400,000,000	67,000,000,000	230,000,000	NA	
	56-55-3	Benzo(a)anthracene	57 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	
	50-32-8	Benzo(a)pyrene	61 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	1,500,000	2,000	NA	
	205-99-2	Benzo(b)fluoranthene	97 J	NA	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA	
	191-24-2	Benzo(g,h,i)perylene	56 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	800,000,000	2,500,000	NA	
	207-08-9	Benzo(k)fluoranthene	27 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	200,000	NA	
	117-81-7	Bis(2-ethylhexyl)phthalate	65 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	700,000,000	2,800,000	10,000,000	
	218-01-9	Chrysene	65 J	NA	NLL	NLL	ID	ID	ID	ID	ID	2,000,000	NA	
	53-70-3	Dibenzo(a,h)anthracene	13 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	2,000	NA	
	206-44-0	Fluoranthene	98 J	NA	730,000	5,500	1,000,000,000 (D)	740,000,000	740,000,000	740,000,000	9,300,000,000	46,000,000	NA	
	193-39-5	Indeno(1,2,3-cd)pyrene	48 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	
	91-20-3	Naphthalene	14 J	NA	35,000	730	250,000	300,000	300,000	300,000	200,000,000	16,000,000	NA	
	85-01-8	Phenanthrene	55 J	NA	56,000	2,100	2,800,000	160,000	160,000	160,000	6,700,000	1,600,000	NA	
	129-00-0	Pyrene	87	NA	480,000	ID	1,000,000,000 (D)	650,000,000	650,000,000	650,000,000	6,700,000,000	29,000,000	NA	
	GP-16-05-13-16' 11/8/2016	7440-38-2	Arsenic	6,800 B	5,800	4,600	4,600	NLV	NLV	NLV	NLV	720,000	7,600	NA
		7440-39-3	Barium	8,600	75,000	1,300,000	440,000 (G)	NLV	NLV	NLV	NLV	330,000,000	37,000,000	NA
		7440-43-9	Cadmium	190	1,200	6,000	3,600 (G,X)	NLV	NLV	NLV	NLV	1,700,000	550,000	NA
		7440-47-3	Chromium	6,900	18,000 (Total)	30,000	3,300	NLV	NLV	NLV	NLV	260,000	2,500,000	NA
7440-50-8		Copper	15,000 B	32,000	5,800,000	73,000 (G)	NLV	NLV	NLV	NLV	130,000,000	20,000,000	NA	
7439-92-1		Lead	6,200	21,000	700,000	5,100,000 (G,X)	NLV	NLV	NLV	NLV	100,000,000	400,000	NA	
7440-02-0		Nickel	13,000	20,000	100,000	76,000 (G)	NLV	NLV	NLV	NLV	13,000,000	40,000,000	NA	
7782-49-2		Selenium	720 B	410	4,000	400	NLV	NLV	NLV	NLV	130,000,000	2,600,000	NA	
7440-22-4		Silver	17 J B	1,000	4,500	100 (M); 27	NLV	NLV	NLV	NLV	6,700,000	2,500,000	NA	
7440-66-6		Zinc	40,000	47,000	2,400,000	170,000 (G)	NLV	NLV	NLV	NLV	ID	170,000,000	NA	
75-09-2		Methylene chloride	190 J B	NA	100	30,000 (X)	45,000	210,000	590,000	1,400,000	6,600,000,000	1,300,000	2,300,000	
92-52-4		1,1'-Biphenyl	9.1 J	NC	NC	NC	NC	NC	NC	NC	NC	NC	NC	
91-57-6		2-Methylnaphthalene	23 J	NA	57,000	4,200	2,700,000	1,500,000	1,500,000	1,500,000	670,000,000	8,100,000	NA	
117-81-7		Bis(2-ethylhexyl)phthalate	21 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	700,000,000	2,800,000	10,000,000	
218-01-9		Chrysene	4.0 J	NA	NLL	NLL	ID	ID	ID	ID	ID	2,000,000	NA	
206-44-0		Fluoranthene	4.6 J	NA	730,000	5,500	1,000,000,000 (D)	740,000,000	740,000,000	740,000,000	9,300,000,000	46,000,000	NA	
85-01-8		Phenanthrene	15 J	NA	56,000	2,100	2,800,000	160,000	160,000	160,000	6,700,000	1,600,000	NA	
GP-16-06-13-16' 11/8/2016	7440-38-2	Arsenic	8,200 B	5,800	4,600	4,600	NLV	NLV	NLV	NLV	720,000	7,600	NA	
	7440-39-3	Barium	19,000	75,000	1,300,000	440,000 (G)	NLV	NLV	NLV	NLV	330,000,000	37,000,000	NA	
	7440-43-9	Cadmium	170	1,200	6,000	3,600 (G,X)	NLV	NLV	NLV	NLV	1,700,000	550,000	NA	
	7440-47-3	Chromium	12,000	18,000 (Total)	30,000	3,300	NLV	NLV	NLV	NLV	260,000	2,500,000	NA	
	7440-50-8	Copper	16,000 B	32,000	5,800,000	73,000 (G)	NLV	NLV	NLV	NLV	130,000,000	20,000,000	NA	
	7439-92-1	Lead	6,400	21,000	700,000	5,100,000 (G,X)	NLV	NLV	NLV	NLV	100,000,000	400,000	NA	
	7440-02-0	Nickel	17,000	20,000	100,000	76,000 (G)	NLV	NLV	NLV	NLV	13,000,000	40,000,000	NA	
	7782-49-2	Selenium	570 B	410	4,000	400	NLV	NLV	NLV	NLV	130,000,000	2,600,000	NA	
	7440-22-4	Silver	23 J B	1,000	4,500	100 (M); 27	NLV	NLV	NLV	NLV	6,700,000	2,500,000	NA	
	7440-66-6	Zinc	39,000	47,000	2,400,000	170,000 (G)	NLV	NLV	NLV	NLV	ID	170,000,000	NA	
	75-09-2	Methylene chloride	100 J B	NA	100	30,000 (X)	45,000	210,000	590,000	1,400,000	6,600,000,000	1,300,000	2,300,000	
	56-55-3	Benzo(a)anthracene	6.2 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	ID	20,000	NA	
	205-99-2	Benzo(b)fluoranthene	5.8 J	NA	NLL	NLL	ID	ID	ID	ID	ID	20,000	NA	
	191-24-2	Benzo(g,h,i)perylene	6.3 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	800,000,000	2,500,000	NA	
	117-81-7	Bis(2-ethylhexyl)phthalate	31 J	NA	NLL	NLL	NLV	NLV	NLV	NLV	700,000,000	2,800,000	10,000,000	
	218-01-9	Chrysene	9.8 J	NA	NLL	NLL	ID	ID	ID	ID	ID	2,000,000	NA	
	206-44-0	Fluoranthene	16 J	NA	730,000	5,500	1,000,000,000 (D)	740,000,000	740,000,000	740,000,000	9,300,000,000	46,000,000	NA	
	85-01-8	Phenanthrene	8.6 J	NA	56,000	2,100	2,800,000	160,000	160,000	160,000	6,700,000	1,600,000	NA	
	129-00-0	Pyrene	12 J	NA	480,000	ID	1,000,000,000 (D)	650,000,000	650,000,000	650,000,000	6,700,000,000	29,000,000	NA	

Notes:
All criteria units are micrograms per kilogram (ug/kg).
Table reflects analytical data comparison to Soil Residential Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels (RBSLs), December 30, 2013.
Shaded cells with bold font indicate Michigan Department of Environmental Quality (MDEQ) Criteria that are exceeded.
Explanations of laboratory qualifiers are presented in the associated Laboratory Analytical Reports.
Explanations of criteria shown in this table can be found in the MDEQ Footnotes document.
Default hardness and pH values were used to calculate values identified with MDEQ Footnote G (pH=8 and hardness=150 mg CaCO3/L). G Values are rounded down to 2 significant digits.
Only results above laboratory method detection limits are shown.
Chromium values are compared to Chrome VI criteria per MDEQ Footnote H.
J = This qualifier on a result indicates that the parameter was detected above the method detection limit but below the reporting limit. It is considered an estimate.
B = Compound was found in the blank and sample.
NC = No Part 201 Generic Cleanup Criteria.

**Groundwater Analytical Results
Liberty Street
Ann Arbor, Michigan**

Sample ID	CAS	Parameter	Result (ug/L)	Residential Drinking Water Criteria And RBSLs	Nonresidential Drinking Water Criteria And RBSLs	Groundwater Surface Water Interface Criteria And RBSLs	Residential Groundwater Volatilization to Indoor Air Inhalation	Nonresidential Groundwater Volatilization to Indoor Air Inhalation	Water Solubility	Flammability and Explosivity Screening Level
GP-16-04W 11/8/2016	7440-38-2	Arsenic	3.3 J	10 (A)	10 (A)	10	NLV	NLV	NA	ID
	7440-39-3	Barium	170	2,000 (A)	2,000 (A)	670 (G)	NLV	NLV	NA	ID
	7440-47-3	Chromium	3.3 J	100 (A)	100 (A)	11	NLV	NLV	NA	ID
	7440-50-8	Copper	8.9 B	1,000 (E)	1,000 (E)	13 (G)	NLV	NLV	NA	ID
	7439-92-1	Lead	3.6	4.0 (L)	4.0 (L)	29 (G,X)	NLV	NLV	NA	ID
	7782-49-2	Selenium	1.3 J	50 (A)	50 (A)	5	NLV	NLV	NA	ID
	7440-66-6	Zinc	24 J	2,400	5,000 (E)	73 (G)	NLV	NLV	NA	ID
	127-18-4	Tetrachloroethene	1.5	5.0 (A)	5.0 (A)	60 (X)	25,000	170,000	200,000	ID
91-20-3	Naphthalene	0.13 J	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	
GP-16-05W 11/8/2016	7440-38-2	Arsenic	3.5 J	10 (A)	10 (A)	10	NLV	NLV	NA	ID
	7440-39-3	Barium	47 J	2,000 (A)	2,000 (A)	670 (G)	NLV	NLV	NA	ID
	7440-47-3	Chromium	2.6 J	100 (A)	100 (A)	11	NLV	NLV	NA	ID
	7440-50-8	Copper	11 B	1,000 (E)	1,000 (E)	13 (G)	NLV	NLV	NA	ID
	7439-92-1	Lead	3.1	4.0 (L)	4.0 (L)	29 (G,X)	NLV	NLV	NA	ID
	7782-49-2	Selenium	1.2 J	50 (A)	50 (A)	5	NLV	NLV	NA	ID
	7440-22-4	Silver	0.044 J	34	98	0.2 (M) 0.06	NLV	NLV	NA	ID
	7440-66-6	Zinc	21 J	2,400	5,000 (E)	73 (G)	NLV	NLV	NA	ID
	91-57-6	2-Methylnaphthalene	0.28 J	260	750	19	25,000 (S)	25,000 (S)	24,600	ID
	208-96-8	Acenaphthylene	0.13 J	52	150	ID	3,900 (S)	3,900 (S)	3,930	ID
	120-12-7	Anthracene	0.20 J	43 (S)	43 (S)	ID	43 (S)	43 (S)	43.4	ID
	56-55-3	Benzo(a)anthracene	0.37 J	2.1	8.5	ID	NLV	NLV	9.4	ID
	50-32-8	Benzo(a)pyrene	0.32 J	5.0 (A)	5.0 (A)	ID	NLV	NLV	1.62	ID
	205-99-2	Benzo(b)fluoranthene	0.42 J	1.5 (S,AA)	1.5 (S,AA)	ID	ID	ID	1.5	ID
	191-24-2	Benzo(g,h,i)perylene	0.25 J	1.0 (M) 0.26 (S)	1.0 (M) 0.26 (S)	ID	NLV	NLV	0.26	ID
	20-70-89	Benzo(k)fluoranthene	0.13 J	1.0 (M) 0.8 (S)	1.0 (M) 0.8 (S)	NA	NLV	NLV	0.8	ID
	21-80-19	Chrysene	0.38 J	1.6 (S)	1.6 (S)	ID	ID	ID	1.6	ID
	132-64-9	Dibenzofuran	0.24 J	ID	ID	4	10,000 (S)	10,000 (S)	10,000	ID
	206-44-0	Fluoranthene	0.85 J	210 (S)	210 (S)	1.6	210 (S)	210 (S)	206	ID
	193-39-5	Indeno(1,2,3-cd)pyrene	0.21 J	2.0 (M) 0.022 (S)	2.0 (M) 0.022 (S)	ID	NLV	NLV	0.022	ID
91-20-3	Naphthalene	1.2 J	520	1,500	11	31,000 (S)	31,000 (S)	31,000	NA	
85-01-8	Phenanthrene	1.1 J	52	150	2.0 (M) 1.4	1,000 (S)	1,000 (S)	1,000	ID	
129-00-0	Pyrene	0.73 J	140 (S)	140 (S)	ID	140 (S)	140 (S)	135	ID	

Notes:

All criteria units are micrograms per liter (ug/L).

Table reflects analytical data comparison to Groundwater: Residential and Nonresidential Part 201 Generic Cleanup Criteria and Screening Levels; Part 213 Tier 1 Risk-Based Screening Levels, December 30, 2013.

Shaded cells with bold font indicate MDEQ Criteria that are exceeded.

Explanations of laboratory qualifiers are presented in the associated Laboratory Analytical Reports.

Explanations of criteria shown in this table can be found in the Michigan Department of Environmental Quality (MDEQ) Footnotes document.

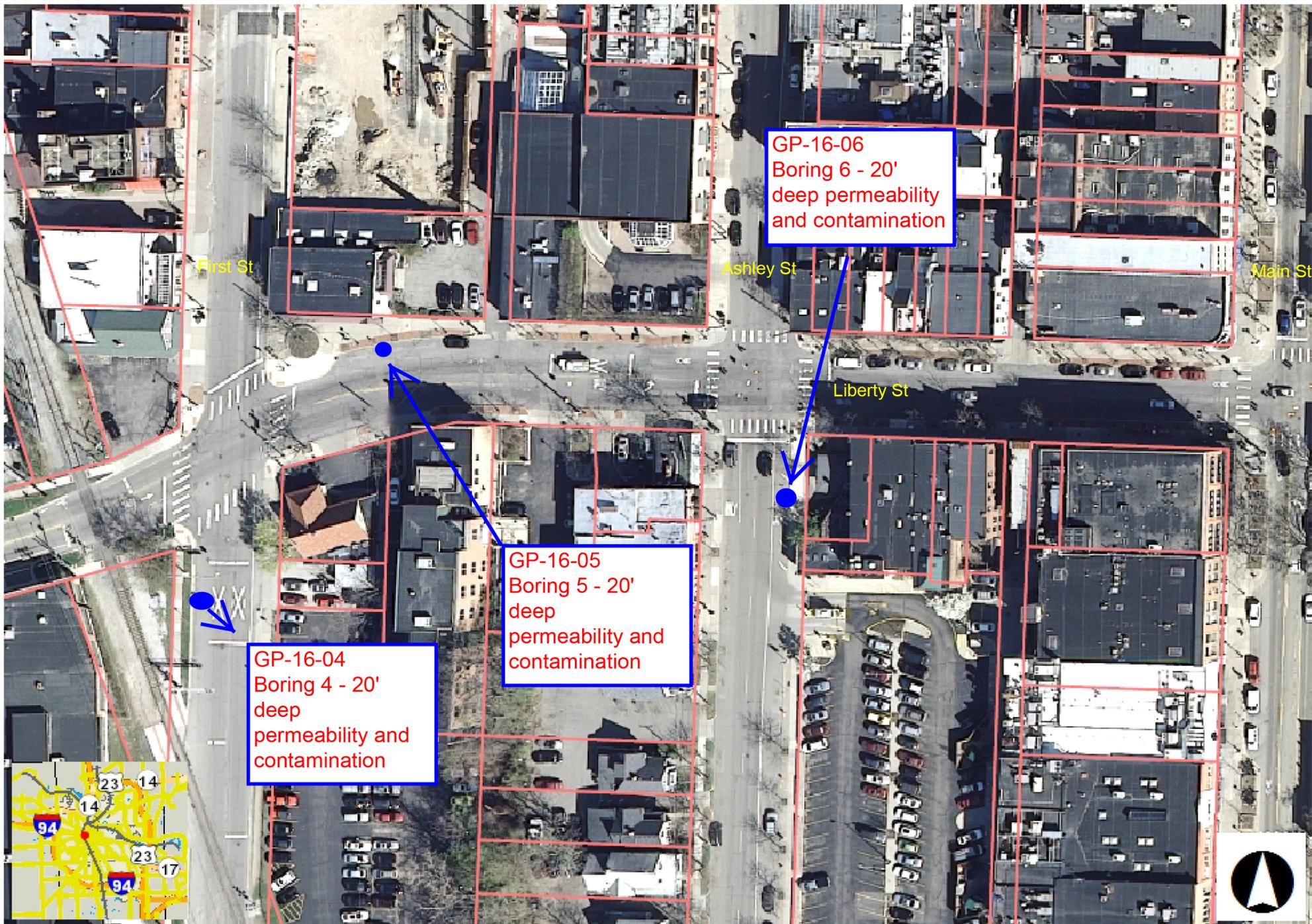
Default hardness and pH values were used to calculate values identified with MDEQ Footnote G (pH=8 and hardness= 150 mg CaCO3/L). G Values are rounded down to 2 significant digits.

Only results above laboratory method detection limits are shown.

Chromium values are compared to Chrome VI criteria per MDEQ Footnote H.

J = This qualifier on a result indicates that the parameter was detected above the method detection limit but below the reporting limit. It is considered an estimate.

B = Compound was found in the blank and sample.



Boring Locations Liberty-RR to Main St





Tetra Tech
 710 Avis Drive
 Ann Arbor, MI 48108
 Telephone: (734) 213-4030
 Fax: (734) 213-5008

LOG OF: **GP-16-03**
 (1 of 1)

117-1054014

Site: City of Ann Arbor			Drilling Company: Terra Probe		
Address: Fifth Street			Driller: Joe Fojtik		
City, State: Ann Arbor, MI			Sampling Method: Dual Rod		
Northing: NM		Easting: NM		Logged By: MES	Checked By: PJM
Total Depth: 20'	Elev: NM	Weather: 60°F, Sunny		Start Date: 11/7/2016	Finish Date: 11/7/2016
Hole Diameter: 2.25"	PID Model & Lamp eV: MiniRAE 2000, 10.6 eV			Sand Pack Interval: NA	Bentonite Chip Interval: NA
Casing (Interval, Diameter, Type): NA		Hole Abandonment: Soil Cuttings		Grout Type & Interval: NA	
Groundwater Sample Screen (Interval, Diameter, SLOT Size, Type): NA			Location: 6.7'S, 4.5'E of street light S40AJ603		

LOG A EWN07 - GINT STD US.GDT - 12/9/16 12:19 - \MERS008FS\1\PROJECTS-GEO\PROJECTS\ANN ARBOR\GEO\TECHNICAL PSA 2015 - 2016\GEO\TECH BORINGS.GPJ

Sample Type/No.	Blow Counts	Rec (%)	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	REMARKS	
HA-1		100	ASPHALT	0	nm		
			Gray, damp, fine GRAVEL				
HA-2		100	Brown, moist CLAY, with Sand and Silt, some fine Gravel	1	0.0	GP-16-03-10-13' (Soil Sample) @ 12:15	
HA-3		100		2	0.0		
HA-4		100		3	0.0		
			Brown, moist, fine GRAVEL, some fine to coarse Sand, little Silt	4	0.0		
HA-5		100		5	0.0		
			Dark brown, moist, fine to coarse SAND	6	0.0		
P-1		50		7	0.0		
				Light brown, dry GRAVEL, with fine to coarse Sand	8		0.0
					9		0.0
			Brown, damp, fine to coarse SAND	10	0.0		
P-2		60		11	0.0		
				12	0.0		
			Brown, damp CLAY, with Silt	13	0.0		
P-3		58		14	0.0		
			Brown, dry, fine GRAVEL, with fine to coarse Sand	15	0.0		
				16	0.0		
				17	0.0		
P-4		53		18	0.0		
				19	0.0		
				20	0.0		
			Boring terminated at 20 ft				



Tetra Tech
 710 Avis Drive
 Ann Arbor, MI 48108
 Telephone: (734) 213-4030
 Fax: (734) 213-5008

LOG OF: **GP-16-06**
 (1 of 1)

117-1054014

Site: City of Ann Arbor			Drilling Company: Terra Probe		
Address: Ashley Street			Driller: Joe Fojtik		
City, State: Ann Arbor, MI			Sampling Method: Dual Rod		
Northing: NM		Easting: NM		Logged By: MES	Checked By: PJM
Total Depth: 20'	Elev: NM	Weather: 50°F, Overcast		Start Date: 11/8/2016	Finish Date: 11/8/2016
Hole Diameter: 2.25"	PID Model & Lamp eV: MiniRAE 2000, 10.6 eV			Sand Pack Interval: NA	Bentonite Chip Interval: NA
Casing (Interval, Diameter, Type): NA		Hole Abandonment: Soil Cuttings		Grout Type & Interval: NA	
Groundwater Sample Screen (Interval, Diameter, SLOT Size, Type): NA			Location: E side of Ashley St, S of Liberty		

Sample Type/No.	Blow Counts	Rec (%)	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	REMARKS
HA-1		100	ASPHALT	0.0	0.0	
			CONCRETE	0.0		
HA-2		100	Brown, damp, fine to coarse SAND, with fine Gravel, some Silt	0.0	0.0	
HA-3		100		2.0	0.0	
HA-4		100		4.0	0.0	
			Brown, moist, fine GRAVEL and coarse SAND, some medium Sand	4.0	0.0	
			Brown, moist, fine GRAVEL and fine to coarse SAND, some Silt	6.0	0.0	
P-1		53		6.0	0.0	
				8.0	0.0	
				10.0	0.0	
P-2		63	Light Gray, dry, fine to coarse GRAVEL and fine to coarse SAND; (Crushed Limestone)	10.0	0.0	
			Brown, dry, fine to coarse GRAVEL and fine to coarse SAND	12.0	0.0	
			Light Gray, dry, fine to coarse GRAVEL and fine to coarse SAND; (Crushed Limestone)	12.0	0.0	
P-3		45	Brown, dry, fine to coarse GRAVEL and fine to coarse SAND, with Silt	14.0	0.0	
				16.0	0.0	
			No Recovery. No indication of groundwater. Rods were dry when pulled.	18.0	nm	
P-4		0		18.0	nm	
			Boring terminated at 20 ft	20.0		

GP-16-06-13-16'
 (Soil Sample) @
 13:00

LOG A EWMN07 - GINT STD US.GDT - 12/5/16 11:25 - \\MERS008FS\1\PROJECTS-GEO\PROJECTS\ANN ARBOR\GEO\TECH BORINGS.GPJ

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Canton

4101 Shuffel Street NW

North Canton, OH 44720

Tel: (330)497-9396

TestAmerica Job ID: 240-71909-1

Client Project/Site: City of Ann Arbor

For:

Tetra Tech GEO

710 Avis Drive

Ann Arbor, Michigan 48108

Attn: Patti McCall



Authorized for release by:

11/30/2016 4:16:11 PM

Kris Brooks, Project Manager II

(330)966-9790

kris.brooks@testamericainc.com



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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
*	LCS or LCSD is outside acceptance limits.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.
X	Surrogate is outside control limits

GC/MS Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

GC Semi VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Metals

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.
B	Compound was found in the blank and sample.
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

General Chemistry

Qualifier	Qualifier Description
F3	Duplicate RPD exceeds the control limit

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Job ID: 240-71909-1

Laboratory: TestAmerica Canton

Narrative

CASE NARRATIVE

Client: Tetra Tech GEO

Project: City of Ann Arbor

Report Number: 240-71909-1

With the exceptions noted as flags or footnotes, standard analytical protocols were followed in the analysis of the samples and no problems were encountered or anomalies observed. In addition all laboratory quality control samples were within established control limits, with any exceptions noted below. Each sample was analyzed to achieve the lowest possible reporting limit within the constraints of the method. In some cases, due to interference or analytes present at high concentrations, samples were diluted. For diluted samples, the reporting limits are adjusted relative to the dilution required.

TestAmerica Canton attests to the validity of the laboratory data generated by TestAmerica facilities reported herein. All analyses performed by TestAmerica facilities were done using established laboratory SOPs that incorporate QA/QC procedures described in the application methods. TestAmerica's operations groups have reviewed the data for compliance with the laboratory QA/QC plan, and data have been found to be compliant with laboratory protocols unless otherwise noted below.

The test results in this report meet all NELAP requirements for parameters for which accreditation is required or available. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced, except in full, without the written approval of the laboratory.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

All solid sample results are reported on an "as received" basis unless otherwise indicated by the presence of a % solids value in the method header.

This laboratory report is confidential and is intended for the sole use of TestAmerica and its client.

RECEIPT

The samples were received on 11/9/2016 9:30 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperatures of the 2 coolers at receipt time were 0.6° C and 0.6° C.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 11/14/2016.

Methylene Chloride was detected in method blank MB 240-255237/1-A at a level exceeding the reporting limit. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

1,2-Dichloroethane-d4 (Surr), 4-Bromofluorobenzene (Surr), Dibromofluoromethane (Surr) and Toluene-d8 (Surr) failed the surrogate recovery criteria high for GP-16-05-13-16' (240-71909-3). Refer to the QC report for details.

Bromoform failed the recovery criteria low for LCS 240-255237/2-A. Refer to the QC report for details.

Surrogate recovery for the following sample was outside the upper control limit: GP-16-05-13-16' (240-71909-3). This sample did not

Case Narrative

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Job ID: 240-71909-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

contain any target analytes above the reporting limit(RL) ; therefore, re-extraction and/or re-analysis was not performed.

The laboratory control sample (LCS) for preparation batch 240-255237 and analytical batch 240-255542 recovered outside acceptance limits for Bromoform. There was insufficient sample to perform a re-extraction or re-analysis; therefore, the data have been reported.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

VOLATILE ORGANIC COMPOUNDS (GCMS)

Samples GP-16-04W (240-71909-5), GP-16-05W (240-71909-6) and TRIP BLANK (240-71909-7) were analyzed for volatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8260B. The samples were analyzed on 11/17/2016.

Methylene Chloride was detected in method blank MB 240-256076/8 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (GCMS)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for semivolatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8270C. The samples were prepared on 11/10/2016 and analyzed on 11/14/2016.

Surrogates are added during the extraction process prior to dilution. When the sample is diluted, surrogate recoveries are diluted out and no corrective action is required.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

SEMIVOLATILE ORGANIC COMPOUNDS (GCMS)

Samples GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6) were analyzed for semivolatile organic compounds (GCMS) in accordance with EPA SW-846 Method 8270C. The samples were prepared on 11/10/2016 and analyzed on 11/14/2016.

Surrogates are added during the extraction process prior to dilution. When the sample is diluted, surrogate recoveries are diluted out and no corrective action is required.

Several analytes failed the recovery criteria low for the MS of sample 240-71867-4 in batch 240-255521.

For the MSD of sample 240-71867-4 in batch 240-255521, Several analytes failed the recovery criteria low. 2-Methylphenol and 3 & 4 Methylphenol failed the recovery criteria high. Also, Several analytes exceeded the RPD limit. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

POLYCHLORINATED BIPHENYLS (PCBS)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for polychlorinated biphenyls (PCBs) in accordance with EPA SW-846 Method 8082. The samples were prepared on 11/10/2016 and analyzed on 11/12/2016.

Surrogates are added during the extraction process prior to dilution. When the sample dilution is 5X or greater, surrogate recoveries are diluted out and no corrective action is required. All of the samples in this data set analyzed for PCBs were subjected to the sulfuric acid cleanup procedure before instrumental analysis, per EPA Method 3665A.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

POLYCHLORINATED BIPHENYLS (PCBS)

Samples GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6) were analyzed for polychlorinated biphenyls (PCBs) in accordance

Case Narrative

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Job ID: 240-71909-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

with EPA SW-846 Method 8082. The samples were prepared on 11/10/2016 and analyzed on 11/14/2016.

Surrogates are added during the extraction process prior to dilution. When the sample dilution is 5X or greater, surrogate recoveries are diluted out and no corrective action is required. All of the samples in this data set analyzed for PCBs were subjected to the sulfuric acid cleanup procedure before instrumental analysis, per EPA Method 3665A.

The following samples required a tetrabutylammonium sulfite (TBA) clean-up to reduce matrix interferences caused by sulfur: GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6). 2792419. 2596995, 2719942.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL METALS (ICP)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for total metals (ICP) in accordance with EPA SW-846 Method 6010B. The samples were prepared on 11/10/2016 and analyzed on 11/11/2016.

Some requested practical quantitation limits (PQLs) on the following samples fall below the laboratory's verified standard quantitation limit: GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4). The continuing calibration blanks and method blanks may not support the lower PQL.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL METALS (ICPMS)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for total metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 11/10/2016 and analyzed on 11/11/2016.

Arsenic, Copper, Selenium and Silver were detected in method blank MB 240-255154/1-A at levels that were above the method detection limit but below the reporting limit. The values should be considered estimates, and have been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

Some requested practical quantitation limits (PQLs) on the following samples fall below the laboratory's verified standard quantitation limit: GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3), GP-16-06-13-16' (240-71909-4), GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6). The continuing calibration blanks and method blanks may not support the lower PQL.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL RECOVERABLE METALS (ICPMS)

Samples GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6) were analyzed for total recoverable metals (ICPMS) in accordance with EPA SW-846 Method 6020. The samples were prepared on 11/10/2016 and analyzed on 11/11/2016.

Copper was detected in method blank MB 240-255112/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged. If the associated sample reported a result above the MDL and/or RL, the result has been flagged. Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Samples GP-16-04W (240-71909-5) and GP-16-05W (240-71909-6) were analyzed for total mercury in accordance with EPA SW-846 Methods 7470A. The samples were prepared on 11/10/2016 and analyzed on 11/11/2016.

No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

TOTAL MERCURY

Case Narrative

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Job ID: 240-71909-1 (Continued)

Laboratory: TestAmerica Canton (Continued)

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for total mercury in accordance with EPA SW-846 Method 7471A. The samples were prepared on 11/10/2016 and analyzed on 11/11/2016.

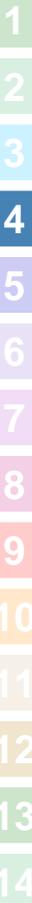
No analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

PERCENT SOLIDS

Samples GP-16-03-10-13' (240-71909-1), GP-16-04-8-11' (240-71909-2), GP-16-05-13-16' (240-71909-3) and GP-16-06-13-16' (240-71909-4) were analyzed for percent solids in accordance with EPA Method 160.3 MOD. The samples were analyzed on 11/10/2016.

Percent Moisture exceeded the RPD limit for the duplicate of sample GP-16-06-13-16'DU (240-71909-4). Refer to the QC report for details.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.



Method Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL CAN
8270C	Semivolatile Organic Compounds (GC/MS)	SW846	TAL CAN
8082	Polychlorinated Biphenyls (PCBs) by Gas Chromatography	SW846	TAL CAN
6010B	Metals (ICP)	SW846	TAL CAN
6020	Metals (ICP/MS)	SW846	TAL CAN
7470A	Mercury (CVAA)	SW846	TAL CAN
7471A	Mercury (CVAA)	SW846	TAL CAN
Moisture	Percent Moisture	EPA	TAL CAN

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

Sample Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
240-71909-1	GP-16-03-10-13'	Solid	11/07/16 12:15	11/09/16 09:30
240-71909-2	GP-16-04-8-11'	Solid	11/08/16 14:15	11/09/16 09:30
240-71909-3	GP-16-05-13-16'	Solid	11/08/16 09:50	11/09/16 09:30
240-71909-4	GP-16-06-13-16'	Solid	11/08/16 13:00	11/09/16 09:30
240-71909-5	GP-16-04W	Water	11/08/16 04:45	11/09/16 09:30
240-71909-6	GP-16-05W	Water	11/08/16 10:15	11/09/16 09:30
240-71909-7	TRIP BLANK	Water	11/08/16 00:00	11/09/16 09:30

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Detection Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Lab Sample ID: 240-71909-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Carbon disulfide	23	J	220	20	ug/Kg	1	☼	8260B	Total/NA
Methylene Chloride	110	J B	220	73	ug/Kg	1	☼	8260B	Total/NA
Bis(2-ethylhexyl) phthalate	30	J	280	20	ug/Kg	1	☼	8270C	Total/NA
Barium	7.7		0.79	0.40	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.17		0.079	0.021	mg/Kg	1	☼	6010B	Total/NA
Chromium	6.9		0.79	0.074	mg/Kg	1	☼	6010B	Total/NA
Nickel	13		0.79	0.079	mg/Kg	1	☼	6010B	Total/NA
Lead	6.2		0.24	0.20	mg/Kg	1	☼	6010B	Total/NA
Arsenic	6.8	B	0.16	0.026	mg/Kg	2	☼	6020	Total/NA
Copper	12	B	0.79	0.096	mg/Kg	2	☼	6020	Total/NA
Selenium	0.50	B	0.32	0.039	mg/Kg	2	☼	6020	Total/NA
Zinc	32		1.6	0.49	mg/Kg	2	☼	6020	Total/NA
Silver	0.019	J B	0.16	0.0014	mg/Kg	2	☼	6020	Total/NA

Client Sample ID: GP-16-04-8-11'

Lab Sample ID: 240-71909-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	140	J B	260	83	ug/Kg	1	☼	8260B	Total/NA
2-Methylnaphthalene	16	J	300	0.57	ug/Kg	1	☼	8270C	Total/NA
Acenaphthylene	11	J	300	0.40	ug/Kg	1	☼	8270C	Total/NA
Anthracene	11	J	300	0.89	ug/Kg	1	☼	8270C	Total/NA
Benzo[a]anthracene	57	J	300	0.72	ug/Kg	1	☼	8270C	Total/NA
Benzo[a]pyrene	61	J	300	0.73	ug/Kg	1	☼	8270C	Total/NA
Benzo[b]fluoranthene	97	J	300	0.67	ug/Kg	1	☼	8270C	Total/NA
Benzo[g,h,i]perylene	56	J	300	0.40	ug/Kg	1	☼	8270C	Total/NA
Benzo[k]fluoranthene	27	J	300	0.77	ug/Kg	1	☼	8270C	Total/NA
Bis(2-ethylhexyl) phthalate	65	J	300	22	ug/Kg	1	☼	8270C	Total/NA
Chrysene	65	J	300	1.3	ug/Kg	1	☼	8270C	Total/NA
Dibenz(a,h)anthracene	13	J	300	0.75	ug/Kg	1	☼	8270C	Total/NA
Fluoranthene	98	J	300	0.63	ug/Kg	1	☼	8270C	Total/NA
Indeno[1,2,3-cd]pyrene	48	J	300	0.40	ug/Kg	1	☼	8270C	Total/NA
Naphthalene	14	J	300	0.93	ug/Kg	1	☼	8270C	Total/NA
Phenanthrene	55	J	300	0.83	ug/Kg	1	☼	8270C	Total/NA
Pyrene	87	J	300	0.50	ug/Kg	1	☼	8270C	Total/NA
Barium	33		0.70	0.36	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.16		0.070	0.018	mg/Kg	1	☼	6010B	Total/NA
Chromium	11		0.70	0.065	mg/Kg	1	☼	6010B	Total/NA
Nickel	13		0.70	0.070	mg/Kg	1	☼	6010B	Total/NA
Lead	14		0.21	0.17	mg/Kg	1	☼	6010B	Total/NA
Arsenic	5.2	B	0.14	0.023	mg/Kg	2	☼	6020	Total/NA
Copper	14	B	0.70	0.084	mg/Kg	2	☼	6020	Total/NA
Selenium	0.76	B	0.28	0.035	mg/Kg	2	☼	6020	Total/NA
Zinc	39		1.4	0.43	mg/Kg	2	☼	6020	Total/NA
Silver	0.030	J B	0.14	0.0012	mg/Kg	2	☼	6020	Total/NA
Mercury	0.044		0.043	0.018	mg/Kg	1	☼	7471A	Total/NA

Client Sample ID: GP-16-05-13-16'

Lab Sample ID: 240-71909-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	190	J B	330	110	ug/Kg	1	☼	8260B	Total/NA

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Detection Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05-13-16' (Continued)

Lab Sample ID: 240-71909-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
1,1'-Biphenyl	9.1	J	280	3.7	ug/Kg	1	☼	8270C	Total/NA
2-Methylnaphthalene	23	J	280	0.53	ug/Kg	1	☼	8270C	Total/NA
Bis(2-ethylhexyl) phthalate	21	J	280	20	ug/Kg	1	☼	8270C	Total/NA
Chrysene	4.0	J	280	1.2	ug/Kg	1	☼	8270C	Total/NA
Fluoranthene	4.6	J	280	0.58	ug/Kg	1	☼	8270C	Total/NA
Phenanthrene	15	J	280	0.77	ug/Kg	1	☼	8270C	Total/NA
Barium	8.6		0.77	0.39	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.19		0.077	0.020	mg/Kg	1	☼	6010B	Total/NA
Chromium	6.9		0.77	0.072	mg/Kg	1	☼	6010B	Total/NA
Nickel	13		0.77	0.077	mg/Kg	1	☼	6010B	Total/NA
Lead	6.2		0.23	0.19	mg/Kg	1	☼	6010B	Total/NA
Arsenic	6.8	B	0.15	0.025	mg/Kg	2	☼	6020	Total/NA
Copper	15	B	0.77	0.093	mg/Kg	2	☼	6020	Total/NA
Selenium	0.72	B	0.31	0.038	mg/Kg	2	☼	6020	Total/NA
Zinc	40		1.5	0.48	mg/Kg	2	☼	6020	Total/NA
Silver	0.017	J B	0.15	0.0013	mg/Kg	2	☼	6020	Total/NA

Client Sample ID: GP-16-06-13-16'

Lab Sample ID: 240-71909-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Methylene Chloride	100	J B	200	66	ug/Kg	1	☼	8260B	Total/NA
Benzo[a]anthracene	6.2	J	270	0.65	ug/Kg	1	☼	8270C	Total/NA
Benzo[b]fluoranthene	5.8	J	270	0.61	ug/Kg	1	☼	8270C	Total/NA
Benzo[g,h,i]perylene	6.3	J	270	0.36	ug/Kg	1	☼	8270C	Total/NA
Bis(2-ethylhexyl) phthalate	31	J	270	20	ug/Kg	1	☼	8270C	Total/NA
Chrysene	9.8	J	270	1.1	ug/Kg	1	☼	8270C	Total/NA
Fluoranthene	16	J	270	0.57	ug/Kg	1	☼	8270C	Total/NA
Phenanthrene	8.6	J	270	0.76	ug/Kg	1	☼	8270C	Total/NA
Pyrene	12	J	270	0.46	ug/Kg	1	☼	8270C	Total/NA
Barium	19		0.73	0.37	mg/Kg	1	☼	6010B	Total/NA
Cadmium	0.17		0.073	0.019	mg/Kg	1	☼	6010B	Total/NA
Chromium	12		0.73	0.068	mg/Kg	1	☼	6010B	Total/NA
Nickel	17		0.73	0.073	mg/Kg	1	☼	6010B	Total/NA
Lead	6.4		0.22	0.18	mg/Kg	1	☼	6010B	Total/NA
Arsenic	8.2	B	0.15	0.024	mg/Kg	2	☼	6020	Total/NA
Copper	16	B	0.73	0.089	mg/Kg	2	☼	6020	Total/NA
Selenium	0.57	B	0.29	0.036	mg/Kg	2	☼	6020	Total/NA
Zinc	39		1.5	0.46	mg/Kg	2	☼	6020	Total/NA
Silver	0.023	J B	0.15	0.0013	mg/Kg	2	☼	6020	Total/NA

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Tetrachloroethene	1.5		1.0	0.30	ug/L	1		8260B	Total/NA
Naphthalene	0.13	J	4.8	0.060	ug/L	1		8270C	Total/NA
Arsenic	3.3	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Barium	170		100	0.52	ug/L	1		6020	Total Recoverable
Chromium	3.3	J	10	0.26	ug/L	1		6020	Total Recoverable

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Detection Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04W (Continued)

Lab Sample ID: 240-71909-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Copper	8.9	B	4.0	0.36	ug/L	1		6020	Total Recoverable
Lead	3.6		3.0	0.16	ug/L	1		6020	Total Recoverable
Selenium	1.3	J	5.0	0.48	ug/L	1		6020	Total Recoverable
Zinc	24	J	50	6.2	ug/L	1		6020	Total Recoverable

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
2-Methylnaphthalene	0.28	J	4.8	0.086	ug/L	1		8270C	Total/NA
Acenaphthylene	0.13	J	4.8	0.046	ug/L	1		8270C	Total/NA
Anthracene	0.20	J	4.8	0.084	ug/L	1		8270C	Total/NA
Benzo[a]anthracene	0.37	J	0.95	0.028	ug/L	1		8270C	Total/NA
Benzo[a]pyrene	0.32	J	0.95	0.049	ug/L	1		8270C	Total/NA
Benzo[b]fluoranthene	0.42	J	0.95	0.038	ug/L	1		8270C	Total/NA
Benzo[g,h,i]perylene	0.25	J	0.95	0.044	ug/L	1		8270C	Total/NA
Benzo[k]fluoranthene	0.13	J	0.95	0.043	ug/L	1		8270C	Total/NA
Chrysene	0.38	J	0.95	0.048	ug/L	1		8270C	Total/NA
Dibenzofuran	0.24	J	3.8	0.019	ug/L	1		8270C	Total/NA
Fluoranthene	0.85	J	0.95	0.042	ug/L	1		8270C	Total/NA
Indeno[1,2,3-cd]pyrene	0.21	J	1.9	0.041	ug/L	1		8270C	Total/NA
Naphthalene	1.2	J	4.8	0.060	ug/L	1		8270C	Total/NA
Phenanthrene	1.1	J	1.9	0.059	ug/L	1		8270C	Total/NA
Pyrene	0.73	J	4.8	0.040	ug/L	1		8270C	Total/NA
Arsenic	3.5	J	5.0	0.35	ug/L	1		6020	Total Recoverable
Barium	47	J	100	0.52	ug/L	1		6020	Total Recoverable
Chromium	2.6	J	10	0.26	ug/L	1		6020	Total Recoverable
Copper	11	B	4.0	0.36	ug/L	1		6020	Total Recoverable
Lead	3.1		3.0	0.16	ug/L	1		6020	Total Recoverable
Selenium	1.2	J	5.0	0.48	ug/L	1		6020	Total Recoverable
Zinc	21	J	50	6.2	ug/L	1		6020	Total Recoverable
Silver	0.044	J	0.20	0.030	ug/L	1		6020	Total Recoverable

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-71909-7

No Detections.

This Detection Summary does not include radiochemical test results.

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Lab Sample ID: 240-71909-1

Date Collected: 11/07/16 12:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.0

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	31	U	45	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,1,2,2-Tetrachloroethane	27	U	45	27	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,1,2-Trichloro-1,2,2-trifluoroethane	26	U	220	26	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,1,2-Trichloroethane	26	U	45	26	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,1-Dichloroethane	35	U	45	35	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,1-Dichloroethene	40	U	45	40	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2,4-Trichlorobenzene	29	U	220	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2-Dibromo-3-Chloropropane	54	U	220	54	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2-Dichlorobenzene	20	U	90	20	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2-Dichloroethane	34	U	45	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2-Dichloropropane	34	U	45	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,3-Dichlorobenzene	43	U	90	43	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,4-Dichlorobenzene	30	U	90	30	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,4-Dioxane	1900	U	14000	1900	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
2-Hexanone	97	U	2200	97	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Acetone	110	U	670	110	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Benzene	27	U	45	27	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Bromoform	26	U *	90	26	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Bromomethane	31	U	220	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Carbon disulfide	23	J	220	20	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Carbon tetrachloride	30	U	45	30	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Chlorobenzene	34	U	45	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Chloroethane	31	U	220	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Chloroform	27	U	45	27	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Chloromethane	20	U	220	20	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
cis-1,2-Dichloroethene	39	U	45	39	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
cis-1,3-Dichloropropene	26	U	45	26	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Cyclohexane	34	U	1100	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Bromodichloromethane	20	U	90	20	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Dichlorodifluoromethane	25	U	90	25	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Ethylbenzene	39	U	45	39	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
1,2-Dibromoethane	26	U	220	26	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Isopropylbenzene	38	U	220	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Methyl acetate	84	U	1100	84	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
2-Butanone (MEK)	56	U	670	56	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
4-Methyl-2-pentanone (MIBK)	45	U	2200	45	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Methyl tert-butyl ether	29	U	220	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Methylene Chloride	110	J B	220	73	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Styrene	11	U	45	11	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Tetrachloroethene	24	U	45	24	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Toluene	27	U	90	27	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
trans-1,2-Dichloroethene	39	U	45	39	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
trans-1,3-Dichloropropene	17	U	45	17	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Trichloroethene	42	U	45	42	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Trichlorofluoromethane	38	U	90	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Vinyl chloride	19	U	36	19	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Xylenes, Total	31	U	130	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Methylcyclohexane	42	U	1100	42	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1
Dibromochloromethane	38	U	45	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:25	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Lab Sample ID: 240-71909-1

Date Collected: 11/07/16 12:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.0

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	100		54 - 147	11/10/16 21:36	11/14/16 12:25	1
4-Bromofluorobenzene (Surr)	90		53 - 142	11/10/16 21:36	11/14/16 12:25	1
Toluene-d8 (Surr)	109		57 - 151	11/10/16 21:36	11/14/16 12:25	1
Dibromofluoromethane (Surr)	101		58 - 136	11/10/16 21:36	11/14/16 12:25	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	3.7	U	280	3.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,2'-oxybis[1-chloropropane]	10	U	280	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4,5-Trichlorophenol	27	U	280	27	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4,6-Trichlorophenol	9.5	U	280	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4-Dichlorophenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4-Dimethylphenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4-Dinitrophenol	22	U	160	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,4-Dinitrotoluene	18	U	280	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2,6-Dinitrotoluene	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Chloronaphthalene	0.48	U	280	0.48	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Chlorophenol	8.7	U	280	8.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Methylnaphthalene	0.53	U	280	0.53	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Methylphenol	12	U	280	12	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Nitroaniline	9.7	U	210	9.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
2-Nitrophenol	8.8	U	280	8.8	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
3,3'-Dichlorobenzidine	19	U	1700	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
3-Nitroaniline	17	U	210	17	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4,6-Dinitro-2-methylphenol	9.8	U	160	9.8	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Bromophenyl phenyl ether	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Chloro-3-methylphenol	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Chloroaniline	18	U	210	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Chlorophenyl phenyl ether	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Nitroaniline	28	U	210	28	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
4-Nitrophenol	18	U	350	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Acenaphthene	0.81	U	280	0.81	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Acenaphthylene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Acetophenone	9.8	U	280	9.8	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Anthracene	0.83	U	280	0.83	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Atrazine	9.7	U	43	9.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzaldehyde	13	U	280	13	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzo[a]anthracene	0.67	U	280	0.67	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzo[a]pyrene	0.68	U	280	0.68	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzo[b]fluoranthene	0.63	U	280	0.63	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzo[g,h,i]perylene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Benzo[k]fluoranthene	0.72	U	280	0.72	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Bis(2-chloroethoxy)methane	23	U	280	23	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Bis(2-chloroethyl)ether	2.1	U	85	2.1	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Bis(2-ethylhexyl) phthalate	30	J	280	20	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Butyl benzyl phthalate	11	U	280	11	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Caprolactam	39	U	280	39	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Carbazole	29	U	280	29	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Chrysene	1.2	U	280	1.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Dibenz(a,h)anthracene	0.70	U	280	0.70	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Lab Sample ID: 240-71909-1

Date Collected: 11/07/16 12:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.0

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.70	U	280	0.70	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Diethyl phthalate	17	U	280	17	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Dimethyl phthalate	18	U	280	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Di-n-butyl phthalate	16	U	280	16	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Di-n-octyl phthalate	8.4	U	280	8.4	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Fluoranthene	0.58	U	280	0.58	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Fluorene	0.56	U	280	0.56	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Hexachlorobenzene	2.2	U	280	2.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Hexachlorobutadiene	6.0	U	43	6.0	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Hexachlorocyclopentadiene	8.6	U	280	8.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Hexachloroethane	9.6	U	280	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Indeno[1,2,3-cd]pyrene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Isophorone	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Naphthalene	0.87	U	280	0.87	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Nitrobenzene	2.3	U	280	2.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
N-Nitrosodi-n-propylamine	6.7	U	280	6.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
N-Nitrosodiphenylamine	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Pentachlorophenol	9.7	U	160	9.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Phenol	7.8	U	280	7.8	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Phenanthrene	0.78	U	280	0.78	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
Pyrene	0.47	U	280	0.47	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1
3 & 4 Methylphenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:05	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	65		39 - 120	11/10/16 10:29	11/14/16 10:05	1
2-Fluorophenol (Surr)	65		33 - 120	11/10/16 10:29	11/14/16 10:05	1
2,4,6-Tribromophenol (Surr)	33		10 - 120	11/10/16 10:29	11/14/16 10:05	1
Nitrobenzene-d5 (Surr)	59		32 - 120	11/10/16 10:29	11/14/16 10:05	1
Phenol-d5 (Surr)	64		32 - 120	11/10/16 10:29	11/14/16 10:05	1
Terphenyl-d14 (Surr)	67		47 - 120	11/10/16 10:29	11/14/16 10:05	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	25	U	830	25	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1221	24	U	830	24	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1232	17	U	830	17	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1242	21	U	830	21	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1248	18	U	830	18	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1254	15	U	830	15	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclor-1260	19	U	830	19	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1
Aroclors (Total)	25	U	160	25	ug/Kg	☼	11/10/16 09:45	11/12/16 13:58	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	84		14 - 128	11/10/16 09:45	11/12/16 13:58	1
DCB Decachlorobiphenyl	79		10 - 132	11/10/16 09:45	11/12/16 13:58	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	7.7		0.79	0.40	mg/Kg	☼	11/10/16 11:19	11/11/16 12:58	1
Cadmium	0.17		0.079	0.021	mg/Kg	☼	11/10/16 11:19	11/11/16 12:58	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
 Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Lab Sample ID: 240-71909-1

Date Collected: 11/07/16 12:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.0

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	6.9		0.79	0.074	mg/Kg	☼	11/10/16 11:19	11/11/16 12:58	1
Nickel	13		0.79	0.079	mg/Kg	☼	11/10/16 11:19	11/11/16 12:58	1
Lead	6.2		0.24	0.20	mg/Kg	☼	11/10/16 11:19	11/11/16 12:58	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.8	B	0.16	0.026	mg/Kg	☼	11/10/16 11:19	11/11/16 15:09	2
Copper	12	B	0.79	0.096	mg/Kg	☼	11/10/16 11:19	11/11/16 15:09	2
Selenium	0.50	B	0.32	0.039	mg/Kg	☼	11/10/16 11:19	11/11/16 15:09	2
Zinc	32		1.6	0.49	mg/Kg	☼	11/10/16 11:19	11/11/16 15:09	2
Silver	0.019	J B	0.16	0.0014	mg/Kg	☼	11/10/16 11:19	11/11/16 15:09	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.019	U	0.044	0.019	mg/Kg	☼	11/10/16 16:00	11/11/16 14:57	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	94.0		0.1	0.1	%			11/10/16 07:49	1
Percent Moisture	6.0		0.1	0.1	%			11/10/16 07:49	1

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04-8-11'

Lab Sample ID: 240-71909-2

Date Collected: 11/08/16 14:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 87.8

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	36	U	51	36	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,1,2,2-Tetrachloroethane	31	U	51	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,1,2-Trichloro-1,2,2-trifluoroethane	29	U	260	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,1,2-Trichloroethane	29	U	51	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,1-Dichloroethane	40	U	51	40	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,1-Dichloroethene	46	U	51	46	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2,4-Trichlorobenzene	33	U	260	33	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2-Dibromo-3-Chloropropane	61	U	260	61	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2-Dichlorobenzene	23	U	100	23	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2-Dichloroethane	38	U	51	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2-Dichloropropane	38	U	51	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,3-Dichlorobenzene	49	U	100	49	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,4-Dichlorobenzene	34	U	100	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,4-Dioxane	2200	U	16000	2200	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
2-Hexanone	110	U	2600	110	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Acetone	120	U	770	120	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Benzene	31	U	51	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Bromoform	29	U *	100	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Bromomethane	36	U	260	36	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Carbon disulfide	23	U	260	23	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Carbon tetrachloride	34	U	51	34	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Chlorobenzene	38	U	51	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Chloroethane	36	U	260	36	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Chloroform	31	U	51	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Chloromethane	23	U	260	23	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
cis-1,2-Dichloroethene	45	U	51	45	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
cis-1,3-Dichloropropene	29	U	51	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Cyclohexane	38	U	1200	38	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Bromodichloromethane	23	U	100	23	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Dichlorodifluoromethane	28	U	100	28	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Ethylbenzene	45	U	51	45	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
1,2-Dibromoethane	29	U	260	29	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Isopropylbenzene	43	U	260	43	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Methyl acetate	96	U	1200	96	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
2-Butanone (MEK)	64	U	770	64	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
4-Methyl-2-pentanone (MIBK)	51	U	2600	51	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Methyl tert-butyl ether	33	U	260	33	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Methylene Chloride	140	J B	260	83	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Styrene	13	U	51	13	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Tetrachloroethene	27	U	51	27	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Toluene	31	U	100	31	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
trans-1,2-Dichloroethene	45	U	51	45	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
trans-1,3-Dichloropropene	19	U	51	19	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Trichloroethene	47	U	51	47	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Trichlorofluoromethane	43	U	100	43	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Vinyl chloride	22	U	41	22	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Xylenes, Total	36	U	150	36	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Methylcyclohexane	47	U	1200	47	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1
Dibromochloromethane	43	U	51	43	ug/Kg	☼	11/10/16 21:36	11/14/16 12:50	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04-8-11'

Lab Sample ID: 240-71909-2

Date Collected: 11/08/16 14:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 87.8

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	99		54 - 147	11/10/16 21:36	11/14/16 12:50	1
4-Bromofluorobenzene (Surr)	96		53 - 142	11/10/16 21:36	11/14/16 12:50	1
Toluene-d8 (Surr)	115		57 - 151	11/10/16 21:36	11/14/16 12:50	1
Dibromofluoromethane (Surr)	106		58 - 136	11/10/16 21:36	11/14/16 12:50	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	4.0	U	300	4.0	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,2'-oxybis[1-chloropropane]	11	U	300	11	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4,5-Trichlorophenol	28	U	300	28	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4,6-Trichlorophenol	10	U	300	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4-Dichlorophenol	23	U	300	23	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4-Dimethylphenol	23	U	300	23	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4-Dinitrophenol	24	U	170	24	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,4-Dinitrotoluene	19	U	300	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2,6-Dinitrotoluene	24	U	300	24	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Chloronaphthalene	0.51	U	300	0.51	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Chlorophenol	9.3	U	300	9.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Methylnaphthalene	16	J	300	0.57	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Methylphenol	13	U	300	13	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Nitroaniline	10	U	230	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
2-Nitrophenol	9.5	U	300	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
3,3'-Dichlorobenzidine	21	U	1800	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
3-Nitroaniline	18	U	230	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4,6-Dinitro-2-methylphenol	10	U	170	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Bromophenyl phenyl ether	15	U	300	15	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Chloro-3-methylphenol	24	U	300	24	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Chloroaniline	19	U	230	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Chlorophenyl phenyl ether	15	U	300	15	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Nitroaniline	30	U	230	30	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
4-Nitrophenol	19	U	380	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Acenaphthene	0.87	U	300	0.87	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Acenaphthylene	11	J	300	0.40	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Acetophenone	10	U	300	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Anthracene	11	J	300	0.89	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Atrazine	10	U	46	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzaldehyde	14	U	300	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzo[a]anthracene	57	J	300	0.72	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzo[a]pyrene	61	J	300	0.73	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzo[b]fluoranthene	97	J	300	0.67	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzo[g,h,i]perylene	56	J	300	0.40	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Benzo[k]fluoranthene	27	J	300	0.77	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Bis(2-chloroethoxy)methane	25	U	300	25	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Bis(2-chloroethyl)ether	2.3	U	91	2.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Bis(2-ethylhexyl) phthalate	65	J	300	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Butyl benzyl phthalate	11	U	300	11	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Caprolactam	42	U	300	42	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Carbazole	31	U	300	31	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Chrysene	65	J	300	1.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Dibenz(a,h)anthracene	13	J	300	0.75	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04-8-11'

Lab Sample ID: 240-71909-2

Date Collected: 11/08/16 14:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 87.8

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.75	U	300	0.75	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Diethyl phthalate	18	U	300	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Dimethyl phthalate	19	U	300	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Di-n-butyl phthalate	17	U	300	17	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Di-n-octyl phthalate	9.0	U	300	9.0	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Fluoranthene	98	J	300	0.63	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Fluorene	0.60	U	300	0.60	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Hexachlorobenzene	2.4	U	300	2.4	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Hexachlorobutadiene	6.4	U	46	6.4	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Hexachlorocyclopentadiene	9.2	U	300	9.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Hexachloroethane	10	U	300	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Indeno[1,2,3-cd]pyrene	48	J	300	0.40	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Isophorone	15	U	300	15	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Naphthalene	14	J	300	0.93	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Nitrobenzene	2.5	U	300	2.5	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
N-Nitrosodi-n-propylamine	7.2	U	300	7.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
N-Nitrosodiphenylamine	24	U	300	24	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Pentachlorophenol	10	U	170	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Phenol	8.3	U	300	8.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Phenanthrene	55	J	300	0.83	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
Pyrene	87	J	300	0.50	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1
3 & 4 Methylphenol	23	U	300	23	ug/Kg	☼	11/10/16 10:29	11/14/16 10:30	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	59		39 - 120	11/10/16 10:29	11/14/16 10:30	1
2-Fluorophenol (Surr)	61		33 - 120	11/10/16 10:29	11/14/16 10:30	1
2,4,6-Tribromophenol (Surr)	34		10 - 120	11/10/16 10:29	11/14/16 10:30	1
Nitrobenzene-d5 (Surr)	54		32 - 120	11/10/16 10:29	11/14/16 10:30	1
Phenol-d5 (Surr)	60		32 - 120	11/10/16 10:29	11/14/16 10:30	1
Terphenyl-d14 (Surr)	67		47 - 120	11/10/16 10:29	11/14/16 10:30	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	27	U	890	27	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1221	26	U	890	26	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1232	18	U	890	18	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1242	22	U	890	22	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1248	19	U	890	19	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1254	16	U	890	16	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclor-1260	20	U	890	20	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1
Aroclors (Total)	27	U	170	27	ug/Kg	☼	11/10/16 09:45	11/12/16 14:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	78		14 - 128	11/10/16 09:45	11/12/16 14:17	1
DCB Decachlorobiphenyl	80		10 - 132	11/10/16 09:45	11/12/16 14:17	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	33		0.70	0.36	mg/Kg	☼	11/10/16 11:19	11/11/16 15:21	1
Cadmium	0.16		0.070	0.018	mg/Kg	☼	11/10/16 11:19	11/11/16 15:21	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04-8-11'

Lab Sample ID: 240-71909-2

Date Collected: 11/08/16 14:15

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 87.8

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	11		0.70	0.065	mg/Kg	☼	11/10/16 11:19	11/11/16 15:21	1
Nickel	13		0.70	0.070	mg/Kg	☼	11/10/16 11:19	11/11/16 15:21	1
Lead	14		0.21	0.17	mg/Kg	☼	11/10/16 11:19	11/11/16 15:21	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	5.2	B	0.14	0.023	mg/Kg	☼	11/10/16 11:19	11/11/16 15:34	2
Copper	14	B	0.70	0.084	mg/Kg	☼	11/10/16 11:19	11/11/16 15:34	2
Selenium	0.76	B	0.28	0.035	mg/Kg	☼	11/10/16 11:19	11/11/16 15:34	2
Zinc	39		1.4	0.43	mg/Kg	☼	11/10/16 11:19	11/11/16 15:34	2
Silver	0.030	J B	0.14	0.0012	mg/Kg	☼	11/10/16 11:19	11/11/16 15:34	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.044		0.043	0.018	mg/Kg	☼	11/10/16 16:00	11/11/16 15:04	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	87.8		0.1	0.1	%			11/10/16 07:49	1
Percent Moisture	12.2		0.1	0.1	%			11/10/16 07:49	1

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05-13-16'

Lab Sample ID: 240-71909-3

Date Collected: 11/08/16 09:50

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.8

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	47	U	67	47	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,1,2,2-Tetrachloroethane	40	U	67	40	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,1,2-Trichloro-1,2,2-trifluoroethane	38	U	330	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,1,2-Trichloroethane	38	U	67	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,1-Dichloroethane	52	U	67	52	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,1-Dichloroethene	60	U	67	60	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2,4-Trichlorobenzene	43	U	330	43	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2-Dibromo-3-Chloropropane	80	U	330	80	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2-Dichlorobenzene	30	U	130	30	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2-Dichloroethane	50	U	67	50	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2-Dichloropropane	50	U	67	50	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,3-Dichlorobenzene	64	U	130	64	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,4-Dichlorobenzene	45	U	130	45	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,4-Dioxane	2800	U	21000	2800	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
2-Hexanone	140	U	3300	140	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Acetone	160	U	1000	160	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Benzene	40	U	67	40	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Bromoform	38	U *	130	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Bromomethane	47	U	330	47	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Carbon disulfide	30	U	330	30	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Carbon tetrachloride	45	U	67	45	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Chlorobenzene	50	U	67	50	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Chloroethane	47	U	330	47	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Chloroform	40	U	67	40	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Chloromethane	30	U	330	30	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
cis-1,2-Dichloroethene	59	U	67	59	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
cis-1,3-Dichloropropene	38	U	67	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Cyclohexane	50	U	1600	50	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Bromodichloromethane	30	U	130	30	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Dichlorodifluoromethane	37	U	130	37	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Ethylbenzene	59	U	67	59	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
1,2-Dibromoethane	38	U	330	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Isopropylbenzene	57	U	330	57	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Methyl acetate	130	U	1600	130	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
2-Butanone (MEK)	84	U	1000	84	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
4-Methyl-2-pentanone (MIBK)	67	U	3300	67	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Methyl tert-butyl ether	43	U	330	43	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Methylene Chloride	190	J B	330	110	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Styrene	17	U	67	17	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Tetrachloroethene	35	U	67	35	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Toluene	40	U	130	40	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
trans-1,2-Dichloroethene	59	U	67	59	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
trans-1,3-Dichloropropene	25	U	67	25	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Trichloroethene	62	U	67	62	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Trichlorofluoromethane	57	U	130	57	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Vinyl chloride	28	U	54	28	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Xylenes, Total	47	U	200	47	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Methylcyclohexane	62	U	1600	62	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1
Dibromochloromethane	57	U	67	57	ug/Kg	☼	11/10/16 21:36	11/14/16 13:14	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05-13-16'

Lab Sample ID: 240-71909-3

Date Collected: 11/08/16 09:50

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.8

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	172	X	54 - 147	11/10/16 21:36	11/14/16 13:14	1
4-Bromofluorobenzene (Surr)	160	X	53 - 142	11/10/16 21:36	11/14/16 13:14	1
Toluene-d8 (Surr)	189	X	57 - 151	11/10/16 21:36	11/14/16 13:14	1
Dibromofluoromethane (Surr)	175	X	58 - 136	11/10/16 21:36	11/14/16 13:14	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	9.1	J	280	3.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,2'-oxybis[1-chloropropane]	10	U	280	10	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4,5-Trichlorophenol	26	U	280	26	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4,6-Trichlorophenol	9.4	U	280	9.4	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4-Dichlorophenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4-Dimethylphenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4-Dinitrophenol	22	U	160	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,4-Dinitrotoluene	18	U	280	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2,6-Dinitrotoluene	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Chloronaphthalene	0.47	U	280	0.47	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Chlorophenol	8.6	U	280	8.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Methylnaphthalene	23	J	280	0.53	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Methylphenol	12	U	280	12	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Nitroaniline	9.6	U	210	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
2-Nitrophenol	8.7	U	280	8.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
3,3'-Dichlorobenzidine	19	U	1700	19	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
3-Nitroaniline	17	U	210	17	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4,6-Dinitro-2-methylphenol	9.7	U	160	9.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Bromophenyl phenyl ether	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Chloro-3-methylphenol	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Chloroaniline	18	U	210	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Chlorophenyl phenyl ether	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Nitroaniline	27	U	210	27	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
4-Nitrophenol	18	U	350	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Acenaphthene	0.80	U	280	0.80	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Acenaphthylene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Acetophenone	9.7	U	280	9.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Anthracene	0.82	U	280	0.82	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Atrazine	9.6	U	42	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzaldehyde	13	U	280	13	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzo[a]anthracene	0.66	U	280	0.66	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzo[a]pyrene	0.67	U	280	0.67	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzo[b]fluoranthene	0.62	U	280	0.62	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzo[g,h,i]perylene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Benzo[k]fluoranthene	0.71	U	280	0.71	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Bis(2-chloroethoxy)methane	23	U	280	23	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Bis(2-chloroethyl)ether	2.1	U	84	2.1	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Bis(2-ethylhexyl) phthalate	21	J	280	20	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Butyl benzyl phthalate	11	U	280	11	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Caprolactam	39	U	280	39	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Carbazole	28	U	280	28	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Chrysene	4.0	J	280	1.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Dibenz(a,h)anthracene	0.69	U	280	0.69	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05-13-16'

Lab Sample ID: 240-71909-3

Date Collected: 11/08/16 09:50

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.8

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.69	U	280	0.69	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Diethyl phthalate	17	U	280	17	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Dimethyl phthalate	18	U	280	18	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Di-n-butyl phthalate	16	U	280	16	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Di-n-octyl phthalate	8.3	U	280	8.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Fluoranthene	4.6	J	280	0.58	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Fluorene	0.56	U	280	0.56	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Hexachlorobenzene	2.2	U	280	2.2	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Hexachlorobutadiene	5.9	U	42	5.9	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Hexachlorocyclopentadiene	8.5	U	280	8.5	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Hexachloroethane	9.5	U	280	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Indeno[1,2,3-cd]pyrene	0.37	U	280	0.37	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Isophorone	14	U	280	14	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Naphthalene	0.86	U	280	0.86	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Nitrobenzene	2.3	U	280	2.3	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
N-Nitrosodi-n-propylamine	6.6	U	280	6.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
N-Nitrosodiphenylamine	22	U	280	22	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Pentachlorophenol	9.6	U	160	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Phenol	7.7	U	280	7.7	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Phenanthrene	15	J	280	0.77	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
Pyrene	0.46	U	280	0.46	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1
3 & 4 Methylphenol	21	U	280	21	ug/Kg	☼	11/10/16 10:29	11/14/16 10:55	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	70		39 - 120	11/10/16 10:29	11/14/16 10:55	1
2-Fluorophenol (Surr)	69		33 - 120	11/10/16 10:29	11/14/16 10:55	1
2,4,6-Tribromophenol (Surr)	52		10 - 120	11/10/16 10:29	11/14/16 10:55	1
Nitrobenzene-d5 (Surr)	69		32 - 120	11/10/16 10:29	11/14/16 10:55	1
Phenol-d5 (Surr)	68		32 - 120	11/10/16 10:29	11/14/16 10:55	1
Terphenyl-d14 (Surr)	71		47 - 120	11/10/16 10:29	11/14/16 10:55	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	25	U	830	25	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1221	24	U	830	24	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1232	17	U	830	17	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1242	21	U	830	21	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1248	18	U	830	18	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1254	15	U	830	15	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclor-1260	19	U	830	19	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1
Aroclors (Total)	25	U	160	25	ug/Kg	☼	11/10/16 09:45	11/12/16 14:36	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	95		14 - 128	11/10/16 09:45	11/12/16 14:36	1
DCB Decachlorobiphenyl	89		10 - 132	11/10/16 09:45	11/12/16 14:36	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	8.6		0.77	0.39	mg/Kg	☼	11/10/16 11:19	11/11/16 15:26	1
Cadmium	0.19		0.077	0.020	mg/Kg	☼	11/10/16 11:19	11/11/16 15:26	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05-13-16'

Lab Sample ID: 240-71909-3

Date Collected: 11/08/16 09:50

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 94.8

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	6.9		0.77	0.072	mg/Kg	☼	11/10/16 11:19	11/11/16 15:26	1
Nickel	13		0.77	0.077	mg/Kg	☼	11/10/16 11:19	11/11/16 15:26	1
Lead	6.2		0.23	0.19	mg/Kg	☼	11/10/16 11:19	11/11/16 15:26	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	6.8	B	0.15	0.025	mg/Kg	☼	11/10/16 11:19	11/11/16 15:38	2
Copper	15	B	0.77	0.093	mg/Kg	☼	11/10/16 11:19	11/11/16 15:38	2
Selenium	0.72	B	0.31	0.038	mg/Kg	☼	11/10/16 11:19	11/11/16 15:38	2
Zinc	40		1.5	0.48	mg/Kg	☼	11/10/16 11:19	11/11/16 15:38	2
Silver	0.017	J B	0.15	0.0013	mg/Kg	☼	11/10/16 11:19	11/11/16 15:38	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.018	U	0.042	0.018	mg/Kg	☼	11/10/16 16:00	11/11/16 15:06	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	94.8		0.1	0.1	%			11/10/16 07:49	1
Percent Moisture	5.2		0.1	0.1	%			11/10/16 07:49	1

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-06-13-16'

Lab Sample ID: 240-71909-4

Date Collected: 11/08/16 13:00

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 96.1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1,1-Trichloroethane	29	U	41	29	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,1,2,2-Tetrachloroethane	24	U	41	24	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,1,2-Trichloro-1,2,2-trifluoroethane	23	U	200	23	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,1,2-Trichloroethane	23	U	41	23	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,1-Dichloroethane	32	U	41	32	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,1-Dichloroethene	37	U	41	37	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2,4-Trichlorobenzene	26	U	200	26	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2-Dibromo-3-Chloropropane	49	U	200	49	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2-Dichlorobenzene	18	U	82	18	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2-Dichloroethane	31	U	41	31	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2-Dichloropropane	31	U	41	31	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,3-Dichlorobenzene	39	U	82	39	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,4-Dichlorobenzene	28	U	82	28	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,4-Dioxane	1700	U	13000	1700	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
2-Hexanone	88	U	2000	88	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Acetone	99	U	610	99	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Benzene	24	U	41	24	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Bromoform	23	U *	82	23	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Bromomethane	29	U	200	29	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Carbon disulfide	18	U	200	18	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Carbon tetrachloride	28	U	41	28	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Chlorobenzene	31	U	41	31	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Chloroethane	29	U	200	29	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Chloroform	24	U	41	24	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Chloromethane	18	U	200	18	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
cis-1,2-Dichloroethene	36	U	41	36	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
cis-1,3-Dichloropropene	23	U	41	23	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Cyclohexane	31	U	980	31	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Bromodichloromethane	18	U	82	18	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Dichlorodifluoromethane	22	U	82	22	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Ethylbenzene	36	U	41	36	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
1,2-Dibromoethane	23	U	200	23	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Isopropylbenzene	35	U	200	35	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Methyl acetate	76	U	980	76	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
2-Butanone (MEK)	51	U	610	51	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
4-Methyl-2-pentanone (MIBK)	41	U	2000	41	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Methyl tert-butyl ether	26	U	200	26	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Methylene Chloride	100	J B	200	66	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Styrene	10	U	41	10	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Tetrachloroethene	21	U	41	21	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Toluene	24	U	82	24	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
trans-1,2-Dichloroethene	36	U	41	36	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
trans-1,3-Dichloropropene	15	U	41	15	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Trichloroethene	38	U	41	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Trichlorofluoromethane	35	U	82	35	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Vinyl chloride	17	U	33	17	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Xylenes, Total	29	U	120	29	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Methylcyclohexane	38	U	980	38	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1
Dibromochloromethane	35	U	41	35	ug/Kg	☼	11/10/16 21:36	11/14/16 13:39	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-06-13-16'

Lab Sample ID: 240-71909-4

Date Collected: 11/08/16 13:00

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 96.1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	101		54 - 147	11/10/16 21:36	11/14/16 13:39	1
4-Bromofluorobenzene (Surr)	96		53 - 142	11/10/16 21:36	11/14/16 13:39	1
Toluene-d8 (Surr)	113		57 - 151	11/10/16 21:36	11/14/16 13:39	1
Dibromofluoromethane (Surr)	99		58 - 136	11/10/16 21:36	11/14/16 13:39	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	3.6	U	270	3.6	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,2'-oxybis[1-chloropropane]	9.9	U	270	9.9	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4,5-Trichlorophenol	26	U	270	26	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4,6-Trichlorophenol	9.2	U	270	9.2	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4-Dichlorophenol	21	U	270	21	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4-Dimethylphenol	21	U	270	21	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4-Dinitrophenol	22	U	160	22	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,4-Dinitrotoluene	18	U	270	18	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2,6-Dinitrotoluene	22	U	270	22	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Chloronaphthalene	0.47	U	270	0.47	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Chlorophenol	8.5	U	270	8.5	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Methylnaphthalene	0.52	U	270	0.52	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Methylphenol	11	U	270	11	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Nitroaniline	9.5	U	210	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
2-Nitrophenol	8.6	U	270	8.6	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
3,3'-Dichlorobenzidine	19	U	1700	19	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
3-Nitroaniline	17	U	210	17	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4,6-Dinitro-2-methylphenol	9.6	U	160	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Bromophenyl phenyl ether	14	U	270	14	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Chloro-3-methylphenol	22	U	270	22	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Chloroaniline	18	U	210	18	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Chlorophenyl phenyl ether	14	U	270	14	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Nitroaniline	27	U	210	27	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
4-Nitrophenol	18	U	340	18	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Acenaphthene	0.79	U	270	0.79	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Acenaphthylene	0.36	U	270	0.36	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Acetophenone	9.6	U	270	9.6	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Anthracene	0.81	U	270	0.81	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Atrazine	9.5	U	42	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzaldehyde	12	U	270	12	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzo[a]anthracene	6.2	J	270	0.65	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzo[a]pyrene	0.67	U	270	0.67	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzo[b]fluoranthene	5.8	J	270	0.61	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzo[g,h,i]perylene	6.3	J	270	0.36	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Benzo[k]fluoranthene	0.71	U	270	0.71	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Bis(2-chloroethoxy)methane	23	U	270	23	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Bis(2-chloroethyl)ether	2.1	U	83	2.1	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Bis(2-ethylhexyl) phthalate	31	J	270	20	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Butyl benzyl phthalate	10	U	270	10	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Caprolactam	38	U	270	38	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Carbazole	28	U	270	28	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Chrysene	9.8	J	270	1.1	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Dibenz(a,h)anthracene	0.69	U	270	0.69	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-06-13-16'

Lab Sample ID: 240-71909-4

Date Collected: 11/08/16 13:00

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 96.1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.69	U	270	0.69	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Diethyl phthalate	17	U	270	17	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Dimethyl phthalate	18	U	270	18	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Di-n-butyl phthalate	16	U	270	16	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Di-n-octyl phthalate	8.2	U	270	8.2	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Fluoranthene	16	J	270	0.57	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Fluorene	0.55	U	270	0.55	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Hexachlorobenzene	2.2	U	270	2.2	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Hexachlorobutadiene	5.8	U	42	5.8	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Hexachlorocyclopentadiene	8.4	U	270	8.4	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Hexachloroethane	9.4	U	270	9.4	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Indeno[1,2,3-cd]pyrene	0.36	U	270	0.36	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Isophorone	14	U	270	14	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Naphthalene	0.85	U	270	0.85	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Nitrobenzene	2.3	U	270	2.3	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
N-Nitrosodi-n-propylamine	6.5	U	270	6.5	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
N-Nitrosodiphenylamine	22	U	270	22	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Pentachlorophenol	9.5	U	160	9.5	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Phenol	7.6	U	270	7.6	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Phenanthrene	8.6	J	270	0.76	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
Pyrene	12	J	270	0.46	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1
3 & 4 Methylphenol	21	U	270	21	ug/Kg	☼	11/10/16 10:29	11/14/16 11:20	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	63		39 - 120	11/10/16 10:29	11/14/16 11:20	1
2-Fluorophenol (Surr)	70		33 - 120	11/10/16 10:29	11/14/16 11:20	1
2,4,6-Tribromophenol (Surr)	51		10 - 120	11/10/16 10:29	11/14/16 11:20	1
Nitrobenzene-d5 (Surr)	60		32 - 120	11/10/16 10:29	11/14/16 11:20	1
Phenol-d5 (Surr)	66		32 - 120	11/10/16 10:29	11/14/16 11:20	1
Terphenyl-d14 (Surr)	70		47 - 120	11/10/16 10:29	11/14/16 11:20	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	25	U	820	25	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1221	24	U	820	24	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1232	17	U	820	17	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1242	21	U	820	21	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1248	18	U	820	18	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1254	14	U	820	14	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclor-1260	19	U	820	19	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1
Aroclors (Total)	25	U	160	25	ug/Kg	☼	11/10/16 09:45	11/12/16 14:54	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	88		14 - 128	11/10/16 09:45	11/12/16 14:54	1
DCB Decachlorobiphenyl	94		10 - 132	11/10/16 09:45	11/12/16 14:54	1

Method: 6010B - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	19		0.73	0.37	mg/Kg	☼	11/10/16 11:19	11/11/16 15:30	1
Cadmium	0.17		0.073	0.019	mg/Kg	☼	11/10/16 11:19	11/11/16 15:30	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-06-13-16'

Lab Sample ID: 240-71909-4

Date Collected: 11/08/16 13:00

Matrix: Solid

Date Received: 11/09/16 09:30

Percent Solids: 96.1

Method: 6010B - Metals (ICP) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	12		0.73	0.068	mg/Kg	☼	11/10/16 11:19	11/11/16 15:30	1
Nickel	17		0.73	0.073	mg/Kg	☼	11/10/16 11:19	11/11/16 15:30	1
Lead	6.4		0.22	0.18	mg/Kg	☼	11/10/16 11:19	11/11/16 15:30	1

Method: 6020 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	8.2	B	0.15	0.024	mg/Kg	☼	11/10/16 11:19	11/11/16 15:51	2
Copper	16	B	0.73	0.089	mg/Kg	☼	11/10/16 11:19	11/11/16 15:51	2
Selenium	0.57	B	0.29	0.036	mg/Kg	☼	11/10/16 11:19	11/11/16 15:51	2
Zinc	39		1.5	0.46	mg/Kg	☼	11/10/16 11:19	11/11/16 15:51	2
Silver	0.023	J B	0.15	0.0013	mg/Kg	☼	11/10/16 11:19	11/11/16 15:51	2

Method: 7471A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.017	U	0.040	0.017	mg/Kg	☼	11/10/16 16:00	11/11/16 15:08	1

General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Solids	96.1		0.1	0.1	%			11/10/16 07:49	1
Percent Moisture	3.9		0.1	0.1	%			11/10/16 07:49	1

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Date Collected: 11/08/16 04:45

Matrix: Water

Date Received: 11/09/16 09:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.8	U	10	1.8	ug/L			11/17/16 16:34	1
Benzene	0.28	U	1.0	0.28	ug/L			11/17/16 16:34	1
Bromodichloromethane	0.30	U	1.0	0.30	ug/L			11/17/16 16:34	1
Bromoform	0.43	U	1.0	0.43	ug/L			11/17/16 16:34	1
Bromomethane	0.42	U	1.0	0.42	ug/L			11/17/16 16:34	1
2-Butanone (MEK)	1.0	U	10	1.0	ug/L			11/17/16 16:34	1
Carbon disulfide	0.34	U	5.0	0.34	ug/L			11/17/16 16:34	1
Carbon tetrachloride	0.35	U	1.0	0.35	ug/L			11/17/16 16:34	1
Chlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 16:34	1
Chloroethane	0.41	U	1.0	0.41	ug/L			11/17/16 16:34	1
Chloroform	0.31	U	1.0	0.31	ug/L			11/17/16 16:34	1
Chloromethane	0.43	U	1.0	0.43	ug/L			11/17/16 16:34	1
1,1-Dichloroethane	0.25	U	1.0	0.25	ug/L			11/17/16 16:34	1
1,2-Dichloroethane	0.30	U	1.0	0.30	ug/L			11/17/16 16:34	1
1,1-Dichloroethene	0.27	U	1.0	0.27	ug/L			11/17/16 16:34	1
1,2-Dichloropropane	0.30	U	1.0	0.30	ug/L			11/17/16 16:34	1
cis-1,3-Dichloropropene	0.26	U	1.0	0.26	ug/L			11/17/16 16:34	1
trans-1,3-Dichloropropene	0.31	U	1.0	0.31	ug/L			11/17/16 16:34	1
Ethylbenzene	0.26	U	1.0	0.26	ug/L			11/17/16 16:34	1
2-Hexanone	1.2	U	10	1.2	ug/L			11/17/16 16:34	1
Methylene Chloride	0.53	U	5.0	0.53	ug/L			11/17/16 16:34	1
4-Methyl-2-pentanone (MIBK)	0.71	U	10	0.71	ug/L			11/17/16 16:34	1
Styrene	0.23	U	1.0	0.23	ug/L			11/17/16 16:34	1
1,1,2,2-Tetrachloroethane	0.32	U	1.0	0.32	ug/L			11/17/16 16:34	1
Tetrachloroethene	1.5		1.0	0.30	ug/L			11/17/16 16:34	1
Toluene	0.23	U	1.0	0.23	ug/L			11/17/16 16:34	1
Trichloroethene	0.33	U	1.0	0.33	ug/L			11/17/16 16:34	1
Vinyl chloride	0.45	U	1.0	0.45	ug/L			11/17/16 16:34	1
Xylenes, Total	0.24	U	2.0	0.24	ug/L			11/17/16 16:34	1
1,1,1-Trichloroethane	0.23	U	1.0	0.23	ug/L			11/17/16 16:34	1
1,1,2-Trichloroethane	0.34	U	1.0	0.34	ug/L			11/17/16 16:34	1
Cyclohexane	0.44	U	1.0	0.44	ug/L			11/17/16 16:34	1
1,2-Dibromo-3-Chloropropane	0.47	U	1.0	0.47	ug/L			11/17/16 16:34	1
1,2-Dibromoethane	0.23	U	1.0	0.23	ug/L			11/17/16 16:34	1
Dichlorodifluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 16:34	1
cis-1,2-Dichloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 16:34	1
trans-1,2-Dichloroethene	0.29	U	1.0	0.29	ug/L			11/17/16 16:34	1
Isopropylbenzene	0.21	U	1.0	0.21	ug/L			11/17/16 16:34	1
Methyl acetate	1.4	U	10	1.4	ug/L			11/17/16 16:34	1
Methyl tert-butyl ether	0.27	U	1.0	0.27	ug/L			11/17/16 16:34	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.41	U	1.0	0.41	ug/L			11/17/16 16:34	1
1,2,4-Trichlorobenzene	0.27	U	1.0	0.27	ug/L			11/17/16 16:34	1
1,2-Dichlorobenzene	0.26	U	1.0	0.26	ug/L			11/17/16 16:34	1
1,3-Dichlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 16:34	1
1,4-Dichlorobenzene	0.23	U	1.0	0.23	ug/L			11/17/16 16:34	1
Trichlorofluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 16:34	1
Dibromochloromethane	0.25	U	1.0	0.25	ug/L			11/17/16 16:34	1
Methylcyclohexane	0.45	U	1.0	0.45	ug/L			11/17/16 16:34	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Date Collected: 11/08/16 04:45

Matrix: Water

Date Received: 11/09/16 09:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		63 - 132		11/17/16 16:34	1
4-Bromofluorobenzene (Surr)	85		73 - 120		11/17/16 16:34	1
Toluene-d8 (Surr)	87		73 - 124		11/17/16 16:34	1
Dibromofluoromethane (Surr)	99		80 - 120		11/17/16 16:34	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	0.12	U	4.8	0.12	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,2'-oxybis[1-chloropropane]	0.38	U	4.8	0.38	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4,5-Trichlorophenol	0.29	U	4.8	0.29	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4,6-Trichlorophenol	0.23	U	3.8	0.23	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4-Dichlorophenol	0.18	U	9.5	0.18	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4-Dimethylphenol	0.24	U	4.8	0.24	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4-Dinitrophenol	0.30	U	19	0.30	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,4-Dinitrotoluene	0.24	U	4.8	0.24	ug/L		11/10/16 08:56	11/14/16 16:42	1
2,6-Dinitrotoluene	0.76	U	4.8	0.76	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Chloronaphthalene	0.095	U	4.8	0.095	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Chlorophenol	0.28	U	4.8	0.28	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Methylnaphthalene	0.086	U	4.8	0.086	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Methylphenol	0.16	U	4.8	0.16	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Nitroaniline	0.20	U	19	0.20	ug/L		11/10/16 08:56	11/14/16 16:42	1
2-Nitrophenol	0.27	U	4.8	0.27	ug/L		11/10/16 08:56	11/14/16 16:42	1
3,3'-Dichlorobenzidine	0.35	U	0.95	0.35	ug/L		11/10/16 08:56	11/14/16 16:42	1
3-Nitroaniline	0.27	U	19	0.27	ug/L		11/10/16 08:56	11/14/16 16:42	1
4,6-Dinitro-2-methylphenol	2.3	U	19	2.3	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Bromophenyl phenyl ether	0.21	U	4.8	0.21	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Chloro-3-methylphenol	0.20	U	4.8	0.20	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Chloroaniline	0.20	U	9.5	0.20	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Chlorophenyl phenyl ether	0.29	U	4.8	0.29	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Nitroaniline	0.21	U	19	0.21	ug/L		11/10/16 08:56	11/14/16 16:42	1
4-Nitrophenol	0.28	U	19	0.28	ug/L		11/10/16 08:56	11/14/16 16:42	1
Acenaphthene	0.042	U	4.8	0.042	ug/L		11/10/16 08:56	11/14/16 16:42	1
Acenaphthylene	0.046	U	4.8	0.046	ug/L		11/10/16 08:56	11/14/16 16:42	1
Acetophenone	0.32	U	4.8	0.32	ug/L		11/10/16 08:56	11/14/16 16:42	1
Anthracene	0.084	U	4.8	0.084	ug/L		11/10/16 08:56	11/14/16 16:42	1
Atrazine	0.32	U	2.9	0.32	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzaldehyde	0.37	U	4.8	0.37	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzo[a]anthracene	0.028	U	0.95	0.028	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzo[a]pyrene	0.049	U	0.95	0.049	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzo[b]fluoranthene	0.038	U	0.95	0.038	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzo[g,h,i]perylene	0.044	U	0.95	0.044	ug/L		11/10/16 08:56	11/14/16 16:42	1
Benzo[k]fluoranthene	0.043	U	0.95	0.043	ug/L		11/10/16 08:56	11/14/16 16:42	1
Bis(2-chloroethoxy)methane	0.30	U	4.8	0.30	ug/L		11/10/16 08:56	11/14/16 16:42	1
Bis(2-chloroethyl)ether	0.095	U	0.95	0.095	ug/L		11/10/16 08:56	11/14/16 16:42	1
Bis(2-ethylhexyl) phthalate	1.6	U	4.8	1.6	ug/L		11/10/16 08:56	11/14/16 16:42	1
Butyl benzyl phthalate	0.25	U	4.8	0.25	ug/L		11/10/16 08:56	11/14/16 16:42	1
Caprolactam	0.19	U	9.5	0.19	ug/L		11/10/16 08:56	11/14/16 16:42	1
Carbazole	0.27	U	9.5	0.27	ug/L		11/10/16 08:56	11/14/16 16:42	1
Chrysene	0.048	U	0.95	0.048	ug/L		11/10/16 08:56	11/14/16 16:42	1
Dibenz(a,h)anthracene	0.042	U	1.9	0.042	ug/L		11/10/16 08:56	11/14/16 16:42	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Date Collected: 11/08/16 04:45

Matrix: Water

Date Received: 11/09/16 09:30

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.019	U	3.8	0.019	ug/L		11/10/16 08:56	11/14/16 16:42	1
Diethyl phthalate	0.57	U	4.8	0.57	ug/L		11/10/16 08:56	11/14/16 16:42	1
Dimethyl phthalate	0.28	U	4.8	0.28	ug/L		11/10/16 08:56	11/14/16 16:42	1
Di-n-butyl phthalate	1.6	U	4.8	1.6	ug/L		11/10/16 08:56	11/14/16 16:42	1
Di-n-octyl phthalate	0.22	U	4.8	0.22	ug/L		11/10/16 08:56	11/14/16 16:42	1
Fluoranthene	0.042	U	0.95	0.042	ug/L		11/10/16 08:56	11/14/16 16:42	1
Fluorene	0.039	U	4.8	0.039	ug/L		11/10/16 08:56	11/14/16 16:42	1
Hexachlorobenzene	0.081	U	0.19	0.081	ug/L		11/10/16 08:56	11/14/16 16:42	1
Hexachlorobutadiene	0.26	U	0.95	0.26	ug/L		11/10/16 08:56	11/14/16 16:42	1
Hexachlorocyclopentadiene	0.23	U	4.8	0.23	ug/L		11/10/16 08:56	11/14/16 16:42	1
Hexachloroethane	0.18	U	4.8	0.18	ug/L		11/10/16 08:56	11/14/16 16:42	1
Indeno[1,2,3-cd]pyrene	0.041	U	1.9	0.041	ug/L		11/10/16 08:56	11/14/16 16:42	1
Isophorone	0.26	U	4.8	0.26	ug/L		11/10/16 08:56	11/14/16 16:42	1
Naphthalene	0.13	J	4.8	0.060	ug/L		11/10/16 08:56	11/14/16 16:42	1
Nitrobenzene	0.038	U	2.9	0.038	ug/L		11/10/16 08:56	11/14/16 16:42	1
N-Nitrosodi-n-propylamine	0.23	U	4.8	0.23	ug/L		11/10/16 08:56	11/14/16 16:42	1
N-Nitrosodiphenylamine	0.30	U	4.8	0.30	ug/L		11/10/16 08:56	11/14/16 16:42	1
Pentachlorophenol	0.26	U	4.8	0.26	ug/L		11/10/16 08:56	11/14/16 16:42	1
Phenol	0.57	U	4.8	0.57	ug/L		11/10/16 08:56	11/14/16 16:42	1
Phenanthrene	0.059	U	1.9	0.059	ug/L		11/10/16 08:56	11/14/16 16:42	1
Pyrene	0.040	U	4.8	0.040	ug/L		11/10/16 08:56	11/14/16 16:42	1
3 & 4 Methylphenol	0.76	U	4.8	0.76	ug/L		11/10/16 08:56	11/14/16 16:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	68		42 - 120	11/10/16 08:56	11/14/16 16:42	1
2-Fluorophenol (Surr)	40		10 - 120	11/10/16 08:56	11/14/16 16:42	1
2,4,6-Tribromophenol (Surr)	72		35 - 125	11/10/16 08:56	11/14/16 16:42	1
Nitrobenzene-d5 (Surr)	68		36 - 120	11/10/16 08:56	11/14/16 16:42	1
Phenol-d5 (Surr)	25		10 - 120	11/10/16 08:56	11/14/16 16:42	1
Terphenyl-d14 (Surr)	72		17 - 120	11/10/16 08:56	11/14/16 16:42	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	0.048	U	0.095	0.048	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1221	0.086	U	0.095	0.086	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1232	0.067	U	0.095	0.067	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1242	0.057	U	0.095	0.057	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1248	0.048	U	0.095	0.048	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1254	0.029	U	0.095	0.029	ug/L		11/10/16 08:44	11/14/16 20:23	1
Aroclor-1260	0.038	U	0.095	0.038	ug/L		11/10/16 08:44	11/14/16 20:23	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	53		21 - 120	11/10/16 08:44	11/14/16 20:23	1
DCB Decachlorobiphenyl	26		10 - 120	11/10/16 08:44	11/14/16 20:23	1

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.3	J	5.0	0.35	ug/L		11/10/16 14:00	11/11/16 18:35	1
Barium	170		100	0.52	ug/L		11/10/16 14:00	11/11/16 18:35	1
Cadmium	0.31	U	1.0	0.31	ug/L		11/10/16 14:00	11/11/16 18:35	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Date Collected: 11/08/16 04:45

Matrix: Water

Date Received: 11/09/16 09:30

Method: 6020 - Metals (ICP/MS) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	3.3	J	10	0.26	ug/L		11/10/16 14:00	11/11/16 18:35	1
Copper	8.9	B	4.0	0.36	ug/L		11/10/16 14:00	11/11/16 18:35	1
Lead	3.6		3.0	0.16	ug/L		11/10/16 14:00	11/11/16 18:35	1
Selenium	1.3	J	5.0	0.48	ug/L		11/10/16 14:00	11/11/16 18:35	1
Zinc	24	J	50	6.2	ug/L		11/10/16 14:00	11/11/16 18:35	1
Silver	0.030	U	0.20	0.030	ug/L		11/10/16 14:00	11/11/16 18:35	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.090	U	0.20	0.090	ug/L		11/10/16 14:00	11/11/16 13:28	1

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Date Collected: 11/08/16 10:15

Matrix: Water

Date Received: 11/09/16 09:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.8	U	10	1.8	ug/L			11/17/16 16:57	1
Benzene	0.28	U	1.0	0.28	ug/L			11/17/16 16:57	1
Bromodichloromethane	0.30	U	1.0	0.30	ug/L			11/17/16 16:57	1
Bromoform	0.43	U	1.0	0.43	ug/L			11/17/16 16:57	1
Bromomethane	0.42	U	1.0	0.42	ug/L			11/17/16 16:57	1
2-Butanone (MEK)	1.0	U	10	1.0	ug/L			11/17/16 16:57	1
Carbon disulfide	0.34	U	5.0	0.34	ug/L			11/17/16 16:57	1
Carbon tetrachloride	0.35	U	1.0	0.35	ug/L			11/17/16 16:57	1
Chlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 16:57	1
Chloroethane	0.41	U	1.0	0.41	ug/L			11/17/16 16:57	1
Chloroform	0.31	U	1.0	0.31	ug/L			11/17/16 16:57	1
Chloromethane	0.43	U	1.0	0.43	ug/L			11/17/16 16:57	1
1,1-Dichloroethane	0.25	U	1.0	0.25	ug/L			11/17/16 16:57	1
1,2-Dichloroethane	0.30	U	1.0	0.30	ug/L			11/17/16 16:57	1
1,1-Dichloroethene	0.27	U	1.0	0.27	ug/L			11/17/16 16:57	1
1,2-Dichloropropane	0.30	U	1.0	0.30	ug/L			11/17/16 16:57	1
cis-1,3-Dichloropropene	0.26	U	1.0	0.26	ug/L			11/17/16 16:57	1
trans-1,3-Dichloropropene	0.31	U	1.0	0.31	ug/L			11/17/16 16:57	1
Ethylbenzene	0.26	U	1.0	0.26	ug/L			11/17/16 16:57	1
2-Hexanone	1.2	U	10	1.2	ug/L			11/17/16 16:57	1
Methylene Chloride	0.53	U	5.0	0.53	ug/L			11/17/16 16:57	1
4-Methyl-2-pentanone (MIBK)	0.71	U	10	0.71	ug/L			11/17/16 16:57	1
Styrene	0.23	U	1.0	0.23	ug/L			11/17/16 16:57	1
1,1,2,2-Tetrachloroethane	0.32	U	1.0	0.32	ug/L			11/17/16 16:57	1
Tetrachloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 16:57	1
Toluene	0.23	U	1.0	0.23	ug/L			11/17/16 16:57	1
Trichloroethene	0.33	U	1.0	0.33	ug/L			11/17/16 16:57	1
Vinyl chloride	0.45	U	1.0	0.45	ug/L			11/17/16 16:57	1
Xylenes, Total	0.24	U	2.0	0.24	ug/L			11/17/16 16:57	1
1,1,1-Trichloroethane	0.23	U	1.0	0.23	ug/L			11/17/16 16:57	1
1,1,2-Trichloroethane	0.34	U	1.0	0.34	ug/L			11/17/16 16:57	1
Cyclohexane	0.44	U	1.0	0.44	ug/L			11/17/16 16:57	1
1,2-Dibromo-3-Chloropropane	0.47	U	1.0	0.47	ug/L			11/17/16 16:57	1
1,2-Dibromoethane	0.23	U	1.0	0.23	ug/L			11/17/16 16:57	1
Dichlorodifluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 16:57	1
cis-1,2-Dichloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 16:57	1
trans-1,2-Dichloroethene	0.29	U	1.0	0.29	ug/L			11/17/16 16:57	1
Isopropylbenzene	0.21	U	1.0	0.21	ug/L			11/17/16 16:57	1
Methyl acetate	1.4	U	10	1.4	ug/L			11/17/16 16:57	1
Methyl tert-butyl ether	0.27	U	1.0	0.27	ug/L			11/17/16 16:57	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.41	U	1.0	0.41	ug/L			11/17/16 16:57	1
1,2,4-Trichlorobenzene	0.27	U	1.0	0.27	ug/L			11/17/16 16:57	1
1,2-Dichlorobenzene	0.26	U	1.0	0.26	ug/L			11/17/16 16:57	1
1,3-Dichlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 16:57	1
1,4-Dichlorobenzene	0.23	U	1.0	0.23	ug/L			11/17/16 16:57	1
Trichlorofluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 16:57	1
Dibromochloromethane	0.25	U	1.0	0.25	ug/L			11/17/16 16:57	1
Methylcyclohexane	0.45	U	1.0	0.45	ug/L			11/17/16 16:57	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Date Collected: 11/08/16 10:15

Matrix: Water

Date Received: 11/09/16 09:30

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	89		63 - 132		11/17/16 16:57	1
4-Bromofluorobenzene (Surr)	84		73 - 120		11/17/16 16:57	1
Toluene-d8 (Surr)	86		73 - 124		11/17/16 16:57	1
Dibromofluoromethane (Surr)	98		80 - 120		11/17/16 16:57	1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	0.12	U	4.8	0.12	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,2'-oxybis[1-chloropropane]	0.38	U	4.8	0.38	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4,5-Trichlorophenol	0.29	U	4.8	0.29	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4,6-Trichlorophenol	0.23	U	3.8	0.23	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4-Dichlorophenol	0.18	U	9.5	0.18	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4-Dimethylphenol	0.24	U	4.8	0.24	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4-Dinitrophenol	0.30	U	19	0.30	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,4-Dinitrotoluene	0.24	U	4.8	0.24	ug/L		11/10/16 08:56	11/14/16 17:53	1
2,6-Dinitrotoluene	0.76	U	4.8	0.76	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Chloronaphthalene	0.095	U	4.8	0.095	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Chlorophenol	0.28	U	4.8	0.28	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Methylnaphthalene	0.28	J	4.8	0.086	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Methylphenol	0.16	U	4.8	0.16	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Nitroaniline	0.20	U	19	0.20	ug/L		11/10/16 08:56	11/14/16 17:53	1
2-Nitrophenol	0.27	U	4.8	0.27	ug/L		11/10/16 08:56	11/14/16 17:53	1
3,3'-Dichlorobenzidine	0.35	U	0.95	0.35	ug/L		11/10/16 08:56	11/14/16 17:53	1
3-Nitroaniline	0.27	U	19	0.27	ug/L		11/10/16 08:56	11/14/16 17:53	1
4,6-Dinitro-2-methylphenol	2.3	U	19	2.3	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Bromophenyl phenyl ether	0.21	U	4.8	0.21	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Chloro-3-methylphenol	0.20	U	4.8	0.20	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Chloroaniline	0.20	U	9.5	0.20	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Chlorophenyl phenyl ether	0.29	U	4.8	0.29	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Nitroaniline	0.21	U	19	0.21	ug/L		11/10/16 08:56	11/14/16 17:53	1
4-Nitrophenol	0.28	U	19	0.28	ug/L		11/10/16 08:56	11/14/16 17:53	1
Acenaphthene	0.042	U	4.8	0.042	ug/L		11/10/16 08:56	11/14/16 17:53	1
Acenaphthylene	0.13	J	4.8	0.046	ug/L		11/10/16 08:56	11/14/16 17:53	1
Acetophenone	0.32	U	4.8	0.32	ug/L		11/10/16 08:56	11/14/16 17:53	1
Anthracene	0.20	J	4.8	0.084	ug/L		11/10/16 08:56	11/14/16 17:53	1
Atrazine	0.32	U	2.9	0.32	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzaldehyde	0.37	U	4.8	0.37	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzo[a]anthracene	0.37	J	0.95	0.028	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzo[a]pyrene	0.32	J	0.95	0.049	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzo[b]fluoranthene	0.42	J	0.95	0.038	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzo[g,h,i]perylene	0.25	J	0.95	0.044	ug/L		11/10/16 08:56	11/14/16 17:53	1
Benzo[k]fluoranthene	0.13	J	0.95	0.043	ug/L		11/10/16 08:56	11/14/16 17:53	1
Bis(2-chloroethoxy)methane	0.30	U	4.8	0.30	ug/L		11/10/16 08:56	11/14/16 17:53	1
Bis(2-chloroethyl)ether	0.095	U	0.95	0.095	ug/L		11/10/16 08:56	11/14/16 17:53	1
Bis(2-ethylhexyl) phthalate	1.6	U	4.8	1.6	ug/L		11/10/16 08:56	11/14/16 17:53	1
Butyl benzyl phthalate	0.25	U	4.8	0.25	ug/L		11/10/16 08:56	11/14/16 17:53	1
Caprolactam	0.19	U	9.5	0.19	ug/L		11/10/16 08:56	11/14/16 17:53	1
Carbazole	0.27	U	9.5	0.27	ug/L		11/10/16 08:56	11/14/16 17:53	1
Chrysene	0.38	J	0.95	0.048	ug/L		11/10/16 08:56	11/14/16 17:53	1
Dibenz(a,h)anthracene	0.042	U	1.9	0.042	ug/L		11/10/16 08:56	11/14/16 17:53	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Date Collected: 11/08/16 10:15

Matrix: Water

Date Received: 11/09/16 09:30

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibenzofuran	0.24	J	3.8	0.019	ug/L		11/10/16 08:56	11/14/16 17:53	1
Diethyl phthalate	0.57	U	4.8	0.57	ug/L		11/10/16 08:56	11/14/16 17:53	1
Dimethyl phthalate	0.28	U	4.8	0.28	ug/L		11/10/16 08:56	11/14/16 17:53	1
Di-n-butyl phthalate	1.6	U	4.8	1.6	ug/L		11/10/16 08:56	11/14/16 17:53	1
Di-n-octyl phthalate	0.22	U	4.8	0.22	ug/L		11/10/16 08:56	11/14/16 17:53	1
Fluoranthene	0.85	J	0.95	0.042	ug/L		11/10/16 08:56	11/14/16 17:53	1
Fluorene	0.039	U	4.8	0.039	ug/L		11/10/16 08:56	11/14/16 17:53	1
Hexachlorobenzene	0.081	U	0.19	0.081	ug/L		11/10/16 08:56	11/14/16 17:53	1
Hexachlorobutadiene	0.26	U	0.95	0.26	ug/L		11/10/16 08:56	11/14/16 17:53	1
Hexachlorocyclopentadiene	0.23	U	4.8	0.23	ug/L		11/10/16 08:56	11/14/16 17:53	1
Hexachloroethane	0.18	U	4.8	0.18	ug/L		11/10/16 08:56	11/14/16 17:53	1
Indeno[1,2,3-cd]pyrene	0.21	J	1.9	0.041	ug/L		11/10/16 08:56	11/14/16 17:53	1
Isophorone	0.26	U	4.8	0.26	ug/L		11/10/16 08:56	11/14/16 17:53	1
Naphthalene	1.2	J	4.8	0.060	ug/L		11/10/16 08:56	11/14/16 17:53	1
Nitrobenzene	0.038	U	2.9	0.038	ug/L		11/10/16 08:56	11/14/16 17:53	1
N-Nitrosodi-n-propylamine	0.23	U	4.8	0.23	ug/L		11/10/16 08:56	11/14/16 17:53	1
N-Nitrosodiphenylamine	0.30	U	4.8	0.30	ug/L		11/10/16 08:56	11/14/16 17:53	1
Pentachlorophenol	0.26	U	4.8	0.26	ug/L		11/10/16 08:56	11/14/16 17:53	1
Phenol	0.57	U	4.8	0.57	ug/L		11/10/16 08:56	11/14/16 17:53	1
Phenanthrene	1.1	J	1.9	0.059	ug/L		11/10/16 08:56	11/14/16 17:53	1
Pyrene	0.73	J	4.8	0.040	ug/L		11/10/16 08:56	11/14/16 17:53	1
3 & 4 Methylphenol	0.76	U	4.8	0.76	ug/L		11/10/16 08:56	11/14/16 17:53	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	57		42 - 120	11/10/16 08:56	11/14/16 17:53	1
2-Fluorophenol (Surr)	36		10 - 120	11/10/16 08:56	11/14/16 17:53	1
2,4,6-Tribromophenol (Surr)	61		35 - 125	11/10/16 08:56	11/14/16 17:53	1
Nitrobenzene-d5 (Surr)	58		36 - 120	11/10/16 08:56	11/14/16 17:53	1
Phenol-d5 (Surr)	23		10 - 120	11/10/16 08:56	11/14/16 17:53	1
Terphenyl-d14 (Surr)	58		17 - 120	11/10/16 08:56	11/14/16 17:53	1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	0.048	U	0.095	0.048	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1221	0.086	U	0.095	0.086	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1232	0.067	U	0.095	0.067	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1242	0.057	U	0.095	0.057	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1248	0.048	U	0.095	0.048	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1254	0.029	U	0.095	0.029	ug/L		11/10/16 08:44	11/14/16 20:42	1
Aroclor-1260	0.038	U	0.095	0.038	ug/L		11/10/16 08:44	11/14/16 20:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	61		21 - 120	11/10/16 08:44	11/14/16 20:42	1
DCB Decachlorobiphenyl	46		10 - 120	11/10/16 08:44	11/14/16 20:42	1

Method: 6020 - Metals (ICP/MS) - Total Recoverable

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	3.5	J	5.0	0.35	ug/L		11/10/16 13:20	11/11/16 18:39	1
Barium	47	J	100	0.52	ug/L		11/10/16 13:20	11/11/16 18:39	1
Cadmium	0.31	U	1.0	0.31	ug/L		11/10/16 13:20	11/11/16 18:39	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
 Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Date Collected: 11/08/16 10:15

Matrix: Water

Date Received: 11/09/16 09:30

Method: 6020 - Metals (ICP/MS) - Total Recoverable (Continued)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chromium	2.6	J	10	0.26	ug/L		11/10/16 13:20	11/11/16 18:39	1
Copper	11	B	4.0	0.36	ug/L		11/10/16 13:20	11/11/16 18:39	1
Lead	3.1		3.0	0.16	ug/L		11/10/16 13:20	11/11/16 18:39	1
Selenium	1.2	J	5.0	0.48	ug/L		11/10/16 13:20	11/11/16 18:39	1
Zinc	21	J	50	6.2	ug/L		11/10/16 13:20	11/11/16 18:39	1
Silver	0.044	J	0.20	0.030	ug/L		11/10/16 13:20	11/11/16 18:39	1

Method: 7470A - Mercury (CVAA)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.090	U	0.20	0.090	ug/L		11/10/16 11:26	11/11/16 13:30	1



Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-71909-7

Date Collected: 11/08/16 00:00

Matrix: Water

Date Received: 11/09/16 09:30

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Acetone	1.8	U	10	1.8	ug/L			11/17/16 17:20	1
Benzene	0.28	U	1.0	0.28	ug/L			11/17/16 17:20	1
Bromodichloromethane	0.30	U	1.0	0.30	ug/L			11/17/16 17:20	1
Bromoform	0.43	U	1.0	0.43	ug/L			11/17/16 17:20	1
Bromomethane	0.42	U	1.0	0.42	ug/L			11/17/16 17:20	1
2-Butanone (MEK)	1.0	U	10	1.0	ug/L			11/17/16 17:20	1
Carbon disulfide	0.34	U	5.0	0.34	ug/L			11/17/16 17:20	1
Carbon tetrachloride	0.35	U	1.0	0.35	ug/L			11/17/16 17:20	1
Chlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 17:20	1
Chloroethane	0.41	U	1.0	0.41	ug/L			11/17/16 17:20	1
Chloroform	0.31	U	1.0	0.31	ug/L			11/17/16 17:20	1
Chloromethane	0.43	U	1.0	0.43	ug/L			11/17/16 17:20	1
1,1-Dichloroethane	0.25	U	1.0	0.25	ug/L			11/17/16 17:20	1
1,2-Dichloroethane	0.30	U	1.0	0.30	ug/L			11/17/16 17:20	1
1,1-Dichloroethene	0.27	U	1.0	0.27	ug/L			11/17/16 17:20	1
1,2-Dichloropropane	0.30	U	1.0	0.30	ug/L			11/17/16 17:20	1
cis-1,3-Dichloropropene	0.26	U	1.0	0.26	ug/L			11/17/16 17:20	1
trans-1,3-Dichloropropene	0.31	U	1.0	0.31	ug/L			11/17/16 17:20	1
Ethylbenzene	0.26	U	1.0	0.26	ug/L			11/17/16 17:20	1
2-Hexanone	1.2	U	10	1.2	ug/L			11/17/16 17:20	1
Methylene Chloride	0.53	U	5.0	0.53	ug/L			11/17/16 17:20	1
4-Methyl-2-pentanone (MIBK)	0.71	U	10	0.71	ug/L			11/17/16 17:20	1
Styrene	0.23	U	1.0	0.23	ug/L			11/17/16 17:20	1
1,1,2,2-Tetrachloroethane	0.32	U	1.0	0.32	ug/L			11/17/16 17:20	1
Tetrachloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 17:20	1
Toluene	0.23	U	1.0	0.23	ug/L			11/17/16 17:20	1
Trichloroethene	0.33	U	1.0	0.33	ug/L			11/17/16 17:20	1
Vinyl chloride	0.45	U	1.0	0.45	ug/L			11/17/16 17:20	1
Xylenes, Total	0.24	U	2.0	0.24	ug/L			11/17/16 17:20	1
1,1,1-Trichloroethane	0.23	U	1.0	0.23	ug/L			11/17/16 17:20	1
1,1,2-Trichloroethane	0.34	U	1.0	0.34	ug/L			11/17/16 17:20	1
Cyclohexane	0.44	U	1.0	0.44	ug/L			11/17/16 17:20	1
1,2-Dibromo-3-Chloropropane	0.47	U	1.0	0.47	ug/L			11/17/16 17:20	1
1,2-Dibromoethane	0.23	U	1.0	0.23	ug/L			11/17/16 17:20	1
Dichlorodifluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 17:20	1
cis-1,2-Dichloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 17:20	1
trans-1,2-Dichloroethene	0.29	U	1.0	0.29	ug/L			11/17/16 17:20	1
Isopropylbenzene	0.21	U	1.0	0.21	ug/L			11/17/16 17:20	1
Methyl acetate	1.4	U	10	1.4	ug/L			11/17/16 17:20	1
Methyl tert-butyl ether	0.27	U	1.0	0.27	ug/L			11/17/16 17:20	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.41	U	1.0	0.41	ug/L			11/17/16 17:20	1
1,2,4-Trichlorobenzene	0.27	U	1.0	0.27	ug/L			11/17/16 17:20	1
1,2-Dichlorobenzene	0.26	U	1.0	0.26	ug/L			11/17/16 17:20	1
1,3-Dichlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 17:20	1
1,4-Dichlorobenzene	0.23	U	1.0	0.23	ug/L			11/17/16 17:20	1
Trichlorofluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 17:20	1
Dibromochloromethane	0.25	U	1.0	0.25	ug/L			11/17/16 17:20	1
Methylcyclohexane	0.45	U	1.0	0.45	ug/L			11/17/16 17:20	1

TestAmerica Canton

Client Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-71909-7

Date Collected: 11/08/16 00:00

Matrix: Water

Date Received: 11/09/16 09:30

<i>Surrogate</i>	<i>%Recovery</i>	<i>Qualifier</i>	<i>Limits</i>	<i>Prepared</i>	<i>Analyzed</i>	<i>Dil Fac</i>
1,2-Dichloroethane-d4 (Surr)	88		63 - 132		11/17/16 17:20	1
4-Bromofluorobenzene (Surr)	82		73 - 120		11/17/16 17:20	1
Toluene-d8 (Surr)	84		73 - 124		11/17/16 17:20	1
Dibromofluoromethane (Surr)	96		80 - 120		11/17/16 17:20	1

Surrogate Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		12DCE (54-147)	BFB (53-142)	TOL (57-151)	DBFM (58-136)
240-71909-1	GP-16-03-10-13'	100	90	109	101
240-71909-2	GP-16-04-8-11'	99	96	115	106
240-71909-3	GP-16-05-13-16'	172 X	160 X	189 X	175 X
240-71909-4	GP-16-06-13-16'	101	96	113	99
LCS 240-255237/2-A	Lab Control Sample	99	89	103	99
MB 240-255237/1-A	Method Blank	92	91	105	100

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)			
		12DCE (63-132)	BFB (73-120)	TOL (73-124)	DBFM (80-120)
240-71909-5	GP-16-04W	89	85	87	99
240-71909-6	GP-16-05W	89	84	86	98
240-71909-7	TRIP BLANK	88	82	84	96
LCS 240-256076/5	Lab Control Sample	90	88	90	94
MB 240-256076/8	Method Blank	89	86	87	99

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
BFB = 4-Bromofluorobenzene (Surr)
TOL = Toluene-d8 (Surr)
DBFM = Dibromofluoromethane (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		FBP (39-120)	2FP (33-120)	TBP (10-120)	NBZ (32-120)	PHL (32-120)	TPH (47-120)
240-71909-1	GP-16-03-10-13'	65	65	33	59	64	67
240-71909-2	GP-16-04-8-11'	59	61	34	54	60	67
240-71909-3	GP-16-05-13-16'	70	69	52	69	68	71
240-71909-4	GP-16-06-13-16'	63	70	51	60	66	70
LCS 240-255135/19-A	Lab Control Sample	69	71	62	72	71	72
MB 240-255135/18-A	Method Blank	60	63	41	60	62	68

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)

TestAmerica Canton

Surrogate Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

TPH = Terphenyl-d14 (Surr)

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)					
		FBP (42-120)	2FP (10-120)	TBP (35-125)	NBZ (36-120)	PHL (10-120)	TPH (17-120)
240-71909-5	GP-16-04W	68	40	72	68	25	72
240-71909-6	GP-16-05W	57	36	61	58	23	58
LCS 240-255100/24-A	Lab Control Sample	80	45	85	82	29	103
MB 240-255100/23-A	Method Blank	71	50	67	74	33	81

Surrogate Legend

FBP = 2-Fluorobiphenyl (Surr)
2FP = 2-Fluorophenol (Surr)
TBP = 2,4,6-Tribromophenol (Surr)
NBZ = Nitrobenzene-d5 (Surr)
PHL = Phenol-d5 (Surr)
TPH = Terphenyl-d14 (Surr)

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Solid

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		TCX2 (14-128)	DCB2 (10-132)
240-71909-1	GP-16-03-10-13'	84	79
240-71909-2	GP-16-04-8-11'	78	80
240-71909-3	GP-16-05-13-16'	95	89
240-71909-4	GP-16-06-13-16'	88	94
LCS 240-255124/23-A	Lab Control Sample	78	71
MB 240-255124/22-A	Method Blank	79	70

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Surrogate Recovery (Acceptance Limits)	
		TCX2 (21-120)	DCB2 (10-120)
240-71909-5	GP-16-04W	53	26
240-71909-6	GP-16-05W	61	46
LCS 240-255094/21-A	Lab Control Sample	63	62
LCS 240-255094/22-A	Lab Control Sample Dup	71	83
MB 240-255094/20-A	Method Blank	68	81

Surrogate Legend

TCX = Tetrachloro-m-xylene
DCB = DCB Decachlorobiphenyl

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-255237/1-A

Matrix: Solid

Analysis Batch: 255542

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 255237

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	31	U	40	31	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2-Dichloroethane	30	U	40	30	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,1-Dichloroethene	36	U	40	36	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,4-Dioxane	1700	U	13000	1700	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2-Dichloropropane	30	U	40	30	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Acetone	97	U	600	97	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Benzene	24	U	40	24	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
2-Hexanone	86	U	2000	86	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Bromoform	23	U	80	23	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Bromomethane	28	U	200	28	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Carbon disulfide	18	U	200	18	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Carbon tetrachloride	27	U	40	27	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,1,2,2-Tetrachloroethane	24	U	40	24	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Chlorobenzene	30	U	40	30	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Chloroethane	28	U	200	28	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Chloroform	24	U	40	24	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Chloromethane	18	U	200	18	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
cis-1,3-Dichloropropene	23	U	40	23	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,1,1-Trichloroethane	28	U	40	28	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,1,2-Trichloroethane	23	U	40	23	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Bromodichloromethane	18	U	80	18	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Cyclohexane	30	U	960	30	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2-Dibromo-3-Chloropropane	48	U	200	48	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Ethylbenzene	35	U	40	35	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2-Dibromoethane	23	U	200	23	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Dichlorodifluoromethane	22	U	80	22	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
cis-1,2-Dichloroethene	35	U	40	35	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
2-Butanone (MEK)	50	U	600	50	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Isopropylbenzene	34	U	200	34	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
4-Methyl-2-pentanone (MIBK)	40	U	2000	40	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Methyl acetate	75	U	960	75	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Methyl tert-butyl ether	26	U	200	26	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,1,2-Trichloro-1,2,2-trifluoroethane	23	U	200	23	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Methylene Chloride	89.4	J	200	65	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2,4-Trichlorobenzene	26	U	200	26	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,2-Dichlorobenzene	18	U	80	18	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Styrene	10	U	40	10	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,3-Dichlorobenzene	38	U	80	38	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Tetrachloroethene	21	U	40	21	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
1,4-Dichlorobenzene	27	U	80	27	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Toluene	24	U	80	24	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
trans-1,2-Dichloroethene	35	U	40	35	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
trans-1,3-Dichloropropene	15	U	40	15	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Trichloroethene	37	U	40	37	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Trichlorofluoromethane	34	U	80	34	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Vinyl chloride	17	U	32	17	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Xylenes, Total	28	U	120	28	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Methylcyclohexane	37	U	960	37	ug/Kg		11/10/16 21:36	11/14/16 11:36	1

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-255237/1-A
Matrix: Solid
Analysis Batch: 255542

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255237

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Dibromochloromethane	34	U	40	34	ug/Kg		11/10/16 21:36	11/14/16 11:36	1
Surrogate	%Recovery	MB Qualifier	Limits				Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	92		54 - 147				11/10/16 21:36	11/14/16 11:36	1
4-Bromofluorobenzene (Surr)	91		53 - 142				11/10/16 21:36	11/14/16 11:36	1
Toluene-d8 (Surr)	105		57 - 151				11/10/16 21:36	11/14/16 11:36	1
Dibromofluoromethane (Surr)	100		58 - 136				11/10/16 21:36	11/14/16 11:36	1

Lab Sample ID: LCS 240-255237/2-A
Matrix: Solid
Analysis Batch: 255542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255237

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
1,1-Dichloroethane	1000	1000		ug/Kg		100	72 - 122
1,2-Dichloroethane	1000	947		ug/Kg		95	74 - 122
1,1-Dichloroethene	1000	1040		ug/Kg		104	63 - 141
1,4-Dioxane	20000	19300		ug/Kg		96	45 - 150
1,2-Dichloropropane	1000	1070		ug/Kg		107	78 - 122
Acetone	2000	1530		ug/Kg		77	22 - 141
Benzene	1000	1030		ug/Kg		103	76 - 121
2-Hexanone	2000	1830	J	ug/Kg		92	53 - 132
Bromoform	1000	417	*	ug/Kg		42	49 - 146
Bromomethane	1000	1010		ug/Kg		101	10 - 157
Carbon disulfide	1000	758		ug/Kg		76	27 - 177
Carbon tetrachloride	1000	761		ug/Kg		76	58 - 151
1,1,1,2-Tetrachloroethane	1000	937		ug/Kg		94	71 - 131
Chlorobenzene	1000	1040		ug/Kg		104	76 - 120
Chloroethane	1000	942		ug/Kg		94	10 - 156
Chloroform	1000	979		ug/Kg		98	73 - 124
Chloromethane	1000	823		ug/Kg		82	44 - 124
cis-1,3-Dichloropropene	1000	854		ug/Kg		85	66 - 129
1,1,1-Trichloroethane	1000	851		ug/Kg		85	65 - 141
1,1,2-Trichloroethane	1000	1030		ug/Kg		103	78 - 121
Bromodichloromethane	1000	717		ug/Kg		72	63 - 133
Cyclohexane	1000	1030		ug/Kg		103	68 - 134
1,2-Dibromo-3-Chloropropane	1000	581		ug/Kg		58	44 - 149
Ethylbenzene	1000	1050		ug/Kg		105	75 - 124
1,2-Dibromoethane	1000	978		ug/Kg		98	79 - 132
Dichlorodifluoromethane	1000	689		ug/Kg		69	10 - 139
cis-1,2-Dichloroethene	1000	997		ug/Kg		100	78 - 122
2-Butanone (MEK)	2000	1900		ug/Kg		95	44 - 132
Isopropylbenzene	1000	1050		ug/Kg		105	77 - 135
4-Methyl-2-pentanone (MIBK)	2000	1810	J	ug/Kg		91	64 - 136
Methyl acetate	5000	4740		ug/Kg		95	62 - 131
Methyl tert-butyl ether	1000	1020		ug/Kg		102	76 - 126
1,1,2-Trichloro-1,2,2-trifluoroethane	1000	1130		ug/Kg		113	65 - 141
Methylene Chloride	1000	1140		ug/Kg		114	66 - 138

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-255237/2-A
Matrix: Solid
Analysis Batch: 255542

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255237

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2,4-Trichlorobenzene	1000	1130		ug/Kg		113	65 - 127
1,2-Dichlorobenzene	1000	1040		ug/Kg		104	75 - 120
Styrene	1000	1050		ug/Kg		105	80 - 127
1,3-Dichlorobenzene	1000	1030		ug/Kg		103	75 - 120
Tetrachloroethene	1000	1080		ug/Kg		108	74 - 129
1,4-Dichlorobenzene	1000	1050		ug/Kg		105	72 - 120
Toluene	1000	1040		ug/Kg		104	72 - 124
trans-1,2-Dichloroethene	1000	1040		ug/Kg		104	75 - 132
trans-1,3-Dichloropropene	1000	756		ug/Kg		76	59 - 126
Trichloroethene	1000	1010		ug/Kg		101	77 - 129
Trichlorofluoromethane	1000	1060		ug/Kg		106	46 - 141
Vinyl chloride	1000	971		ug/Kg		97	52 - 129
Xylenes, Total	2000	2100		ug/Kg		105	77 - 124
Methylcyclohexane	1000	961		ug/Kg		96	73 - 132
Dibromochloromethane	1000	559		ug/Kg		56	56 - 133

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	99		54 - 147
4-Bromofluorobenzene (Surr)	89		53 - 142
Toluene-d8 (Surr)	103		57 - 151
Dibromofluoromethane (Surr)	99		58 - 136

Lab Sample ID: MB 240-256076/8
Matrix: Water
Analysis Batch: 256076

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1-Dichloroethane	0.25	U	1.0	0.25	ug/L			11/17/16 11:26	1
1,2-Dichloroethane	0.30	U	1.0	0.30	ug/L			11/17/16 11:26	1
1,1-Dichloroethene	0.27	U	1.0	0.27	ug/L			11/17/16 11:26	1
1,2-Dichloropropane	0.30	U	1.0	0.30	ug/L			11/17/16 11:26	1
Acetone	1.8	U	10	1.8	ug/L			11/17/16 11:26	1
Benzene	0.28	U	1.0	0.28	ug/L			11/17/16 11:26	1
2-Hexanone	1.2	U	10	1.2	ug/L			11/17/16 11:26	1
Bromoform	0.43	U	1.0	0.43	ug/L			11/17/16 11:26	1
Bromomethane	0.42	U	1.0	0.42	ug/L			11/17/16 11:26	1
Carbon disulfide	0.34	U	5.0	0.34	ug/L			11/17/16 11:26	1
Carbon tetrachloride	0.35	U	1.0	0.35	ug/L			11/17/16 11:26	1
1,1,2,2-Tetrachloroethane	0.32	U	1.0	0.32	ug/L			11/17/16 11:26	1
Chlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 11:26	1
Chloroethane	0.41	U	1.0	0.41	ug/L			11/17/16 11:26	1
Chloroform	0.31	U	1.0	0.31	ug/L			11/17/16 11:26	1
Chloromethane	0.43	U	1.0	0.43	ug/L			11/17/16 11:26	1
cis-1,3-Dichloropropene	0.26	U	1.0	0.26	ug/L			11/17/16 11:26	1
1,1,1-Trichloroethane	0.23	U	1.0	0.23	ug/L			11/17/16 11:26	1
1,1,2-Trichloroethane	0.34	U	1.0	0.34	ug/L			11/17/16 11:26	1
Bromodichloromethane	0.30	U	1.0	0.30	ug/L			11/17/16 11:26	1
Cyclohexane	0.44	U	1.0	0.44	ug/L			11/17/16 11:26	1

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-256076/8

Matrix: Water

Analysis Batch: 256076

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
1,2-Dibromo-3-Chloropropane	0.47	U	1.0	0.47	ug/L			11/17/16 11:26	1
Ethylbenzene	0.26	U	1.0	0.26	ug/L			11/17/16 11:26	1
1,2-Dibromoethane	0.23	U	1.0	0.23	ug/L			11/17/16 11:26	1
Dichlorodifluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 11:26	1
cis-1,2-Dichloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 11:26	1
2-Butanone (MEK)	1.0	U	10	1.0	ug/L			11/17/16 11:26	1
Isopropylbenzene	0.21	U	1.0	0.21	ug/L			11/17/16 11:26	1
4-Methyl-2-pentanone (MIBK)	0.71	U	10	0.71	ug/L			11/17/16 11:26	1
Methyl acetate	1.4	U	10	1.4	ug/L			11/17/16 11:26	1
Methyl tert-butyl ether	0.27	U	1.0	0.27	ug/L			11/17/16 11:26	1
1,1,2-Trichloro-1,2,2-trifluoroethane	0.41	U	1.0	0.41	ug/L			11/17/16 11:26	1
Methylene Chloride	1.44	J	5.0	0.53	ug/L			11/17/16 11:26	1
1,2,4-Trichlorobenzene	0.27	U	1.0	0.27	ug/L			11/17/16 11:26	1
1,2-Dichlorobenzene	0.26	U	1.0	0.26	ug/L			11/17/16 11:26	1
Styrene	0.23	U	1.0	0.23	ug/L			11/17/16 11:26	1
1,3-Dichlorobenzene	0.32	U	1.0	0.32	ug/L			11/17/16 11:26	1
Tetrachloroethene	0.30	U	1.0	0.30	ug/L			11/17/16 11:26	1
1,4-Dichlorobenzene	0.23	U	1.0	0.23	ug/L			11/17/16 11:26	1
Toluene	0.23	U	1.0	0.23	ug/L			11/17/16 11:26	1
trans-1,2-Dichloroethene	0.29	U	1.0	0.29	ug/L			11/17/16 11:26	1
trans-1,3-Dichloropropene	0.31	U	1.0	0.31	ug/L			11/17/16 11:26	1
Trichloroethene	0.33	U	1.0	0.33	ug/L			11/17/16 11:26	1
Trichlorofluoromethane	0.50	U	1.0	0.50	ug/L			11/17/16 11:26	1
Vinyl chloride	0.45	U	1.0	0.45	ug/L			11/17/16 11:26	1
Xylenes, Total	0.24	U	2.0	0.24	ug/L			11/17/16 11:26	1
Methylcyclohexane	0.45	U	1.0	0.45	ug/L			11/17/16 11:26	1
Dibromochloromethane	0.25	U	1.0	0.25	ug/L			11/17/16 11:26	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
1,2-Dichloroethane-d4 (Surr)	89		63 - 132		11/17/16 11:26	1
4-Bromofluorobenzene (Surr)	86		73 - 120		11/17/16 11:26	1
Toluene-d8 (Surr)	87		73 - 124		11/17/16 11:26	1
Dibromofluoromethane (Surr)	99		80 - 120		11/17/16 11:26	1

Lab Sample ID: LCS 240-256076/5

Matrix: Water

Analysis Batch: 256076

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
1,2-Dichloroethane	20.0	16.9		ug/L		84	76 - 130
1,1-Dichloroethene	20.0	20.9		ug/L		105	70 - 141
1,2-Dichloropropane	20.0	18.7		ug/L		94	79 - 121
Acetone	40.0	36.6		ug/L		92	46 - 120
Benzene	20.0	18.0		ug/L		90	80 - 120
2-Hexanone	40.0	43.2		ug/L		108	56 - 124
Bromoform	20.0	20.8		ug/L		104	52 - 157
Bromomethane	20.0	18.4		ug/L		92	24 - 160

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-256076/5

Matrix: Water

Analysis Batch: 256076

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Carbon disulfide	20.0	19.5		ug/L		97	58 - 160
Carbon tetrachloride	20.0	19.4		ug/L		97	69 - 149
1,1,2,2-Tetrachloroethane	20.0	20.3		ug/L		101	61 - 130
Chlorobenzene	20.0	16.7		ug/L		83	80 - 120
Chloroethane	20.0	19.0		ug/L		95	24 - 147
Chloroform	20.0	17.5		ug/L		88	80 - 120
Chloromethane	20.0	16.9		ug/L		84	50 - 135
cis-1,3-Dichloropropene	20.0	18.0		ug/L		90	75 - 120
1,1,1-Trichloroethane	20.0	18.3		ug/L		91	79 - 133
1,1,2-Trichloroethane	20.0	19.8		ug/L		99	80 - 120
Bromodichloromethane	20.0	17.5		ug/L		88	76 - 125
Cyclohexane	20.0	22.3		ug/L		112	66 - 135
1,2-Dibromo-3-Chloropropane	20.0	19.4		ug/L		97	46 - 140
Ethylbenzene	20.0	17.1		ug/L		85	80 - 120
1,2-Dibromoethane	20.0	20.2		ug/L		101	80 - 126
Dichlorodifluoromethane	20.0	16.7		ug/L		84	32 - 140
cis-1,2-Dichloroethene	20.0	18.2		ug/L		91	80 - 120
2-Butanone (MEK)	40.0	39.6		ug/L		99	54 - 122
Isopropylbenzene	20.0	16.7		ug/L		83	80 - 120
4-Methyl-2-pentanone (MIBK)	40.0	42.5		ug/L		106	60 - 131
Methyl acetate	100	110		ug/L		110	65 - 124
Methyl tert-butyl ether	20.0	18.1		ug/L		91	75 - 126
1,1,2-Trichloro-1,2,2-trifluoroethane	20.0	25.0		ug/L		125	65 - 151
Methylene Chloride	20.0	18.9		ug/L		95	68 - 136
1,2,4-Trichlorobenzene	20.0	15.4		ug/L		77	53 - 137
1,2-Dichlorobenzene	20.0	16.6		ug/L		83	80 - 120
Styrene	20.0	17.4		ug/L		87	80 - 120
1,3-Dichlorobenzene	20.0	16.1		ug/L		81	80 - 120
Tetrachloroethene	20.0	18.7		ug/L		94	80 - 123
1,4-Dichlorobenzene	20.0	16.1		ug/L		81	80 - 120
Toluene	20.0	17.3		ug/L		87	80 - 121
trans-1,2-Dichloroethene	20.0	19.1		ug/L		95	80 - 123
trans-1,3-Dichloropropene	20.0	17.0		ug/L		85	65 - 120
Trichloroethene	20.0	19.1		ug/L		96	80 - 122
Trichlorofluoromethane	20.0	19.1		ug/L		95	56 - 161
Vinyl chloride	20.0	18.4		ug/L		92	60 - 129
Xylenes, Total	40.0	33.6		ug/L		84	80 - 120
Methylcyclohexane	20.0	22.2		ug/L		111	71 - 122
Dibromochloromethane	20.0	18.9		ug/L		95	68 - 131

Surrogate	LCS %Recovery	LCS Qualifier	Limits
1,2-Dichloroethane-d4 (Surr)	90		63 - 132
4-Bromofluorobenzene (Surr)	88		73 - 120
Toluene-d8 (Surr)	90		73 - 124
Dibromofluoromethane (Surr)	94		80 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS)

Lab Sample ID: MB 240-255100/23-A

Matrix: Water

Analysis Batch: 255521

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 255100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	0.13	U	1.0	0.13	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,2'-oxybis[1-chloropropane]	0.40	U	1.0	0.40	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4,5-Trichlorophenol	0.30	U	5.0	0.30	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4,6-Trichlorophenol	0.24	U	5.0	0.24	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4-Dichlorophenol	0.19	U	2.0	0.19	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4-Dimethylphenol	0.25	U	2.0	0.25	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4-Dinitrophenol	0.32	U	5.0	0.32	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,4-Dinitrotoluene	0.25	U	5.0	0.25	ug/L		11/10/16 08:56	11/14/16 09:14	1
2,6-Dinitrotoluene	0.80	U	5.0	0.80	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Chloronaphthalene	0.10	U	1.0	0.10	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Chlorophenol	0.29	U	1.0	0.29	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Methylnaphthalene	0.090	U	5.0	0.090	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Methylphenol	0.17	U	1.0	0.17	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Nitroaniline	0.21	U	2.0	0.21	ug/L		11/10/16 08:56	11/14/16 09:14	1
2-Nitrophenol	0.28	U	2.0	0.28	ug/L		11/10/16 08:56	11/14/16 09:14	1
3,3'-Dichlorobenzidine	0.37	U	5.0	0.37	ug/L		11/10/16 08:56	11/14/16 09:14	1
3-Nitroaniline	0.28	U	2.0	0.28	ug/L		11/10/16 08:56	11/14/16 09:14	1
4,6-Dinitro-2-methylphenol	2.4	U	5.0	2.4	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Bromophenyl phenyl ether	0.22	U	2.0	0.22	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Chloro-3-methylphenol	0.21	U	2.0	0.21	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Chloroaniline	0.21	U	2.0	0.21	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Chlorophenyl phenyl ether	0.30	U	2.0	0.30	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Nitroaniline	0.22	U	2.0	0.22	ug/L		11/10/16 08:56	11/14/16 09:14	1
4-Nitrophenol	0.29	U	5.0	0.29	ug/L		11/10/16 08:56	11/14/16 09:14	1
Acenaphthene	0.044	U	5.0	0.044	ug/L		11/10/16 08:56	11/14/16 09:14	1
Acenaphthylene	0.048	U	5.0	0.048	ug/L		11/10/16 08:56	11/14/16 09:14	1
Acetophenone	0.34	U	1.0	0.34	ug/L		11/10/16 08:56	11/14/16 09:14	1
Anthracene	0.088	U	5.0	0.088	ug/L		11/10/16 08:56	11/14/16 09:14	1
Atrazine	0.34	U	2.0	0.34	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzaldehyde	0.39	U	2.0	0.39	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzo[a]anthracene	0.030	U	1.0	0.030	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzo[a]pyrene	0.051	U	1.0	0.051	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzo[b]fluoranthene	0.039	U	1.0	0.039	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzo[g,h,i]perylene	0.046	U	1.0	0.046	ug/L		11/10/16 08:56	11/14/16 09:14	1
Benzo[k]fluoranthene	0.045	U	1.0	0.045	ug/L		11/10/16 08:56	11/14/16 09:14	1
Bis(2-chloroethoxy)methane	0.32	U	1.0	0.32	ug/L		11/10/16 08:56	11/14/16 09:14	1
Bis(2-chloroethyl)ether	0.10	U	1.0	0.10	ug/L		11/10/16 08:56	11/14/16 09:14	1
Bis(2-ethylhexyl) phthalate	1.7	U	5.0	1.7	ug/L		11/10/16 08:56	11/14/16 09:14	1
Butyl benzyl phthalate	0.26	U	2.0	0.26	ug/L		11/10/16 08:56	11/14/16 09:14	1
Caprolactam	0.20	U	5.0	0.20	ug/L		11/10/16 08:56	11/14/16 09:14	1
Carbazole	0.28	U	1.0	0.28	ug/L		11/10/16 08:56	11/14/16 09:14	1
Chrysene	0.050	U	1.0	0.050	ug/L		11/10/16 08:56	11/14/16 09:14	1
Dibenz(a,h)anthracene	0.045	U	2.0	0.045	ug/L		11/10/16 08:56	11/14/16 09:14	1
Dibenzofuran	0.020	U	1.0	0.020	ug/L		11/10/16 08:56	11/14/16 09:14	1
Diethyl phthalate	0.60	U	2.0	0.60	ug/L		11/10/16 08:56	11/14/16 09:14	1
Dimethyl phthalate	0.29	U	2.0	0.29	ug/L		11/10/16 08:56	11/14/16 09:14	1
Di-n-butyl phthalate	1.7	U	5.0	1.7	ug/L		11/10/16 08:56	11/14/16 09:14	1
Di-n-octyl phthalate	0.23	U	2.0	0.23	ug/L		11/10/16 08:56	11/14/16 09:14	1

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-255100/23-A
Matrix: Water
Analysis Batch: 255521

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255100

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Fluoranthene	0.045	U	1.0	0.045	ug/L		11/10/16 08:56	11/14/16 09:14	1
Fluorene	0.041	U	5.0	0.041	ug/L		11/10/16 08:56	11/14/16 09:14	1
Hexachlorobenzene	0.085	U	0.20	0.085	ug/L		11/10/16 08:56	11/14/16 09:14	1
Hexachlorobutadiene	0.27	U	1.0	0.27	ug/L		11/10/16 08:56	11/14/16 09:14	1
Hexachlorocyclopentadiene	0.24	U	10	0.24	ug/L		11/10/16 08:56	11/14/16 09:14	1
Hexachloroethane	0.19	U	1.0	0.19	ug/L		11/10/16 08:56	11/14/16 09:14	1
Indeno[1,2,3-cd]pyrene	0.043	U	2.0	0.043	ug/L		11/10/16 08:56	11/14/16 09:14	1
Isophorone	0.27	U	1.0	0.27	ug/L		11/10/16 08:56	11/14/16 09:14	1
Naphthalene	0.063	U	5.0	0.063	ug/L		11/10/16 08:56	11/14/16 09:14	1
Nitrobenzene	0.040	U	1.0	0.040	ug/L		11/10/16 08:56	11/14/16 09:14	1
N-Nitrosodi-n-propylamine	0.24	U	1.0	0.24	ug/L		11/10/16 08:56	11/14/16 09:14	1
N-Nitrosodiphenylamine	0.31	U	1.0	0.31	ug/L		11/10/16 08:56	11/14/16 09:14	1
Pentachlorophenol	0.27	U	5.0	0.27	ug/L		11/10/16 08:56	11/14/16 09:14	1
Phenol	0.60	U	1.0	0.60	ug/L		11/10/16 08:56	11/14/16 09:14	1
Phenanthrene	0.062	U	2.0	0.062	ug/L		11/10/16 08:56	11/14/16 09:14	1
Pyrene	0.042	U	5.0	0.042	ug/L		11/10/16 08:56	11/14/16 09:14	1
3 & 4 Methylphenol	0.80	U	2.0	0.80	ug/L		11/10/16 08:56	11/14/16 09:14	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
2-Fluorobiphenyl (Surr)	71		42 - 120	11/10/16 08:56	11/14/16 09:14	1
2-Fluorophenol (Surr)	50		10 - 120	11/10/16 08:56	11/14/16 09:14	1
2,4,6-Tribromophenol (Surr)	67		35 - 125	11/10/16 08:56	11/14/16 09:14	1
Nitrobenzene-d5 (Surr)	74		36 - 120	11/10/16 08:56	11/14/16 09:14	1
Phenol-d5 (Surr)	33		10 - 120	11/10/16 08:56	11/14/16 09:14	1
Terphenyl-d14 (Surr)	81		17 - 120	11/10/16 08:56	11/14/16 09:14	1

Lab Sample ID: LCS 240-255100/24-A
Matrix: Water
Analysis Batch: 255888

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
1,1'-Biphenyl	20.0	15.8		ug/L		79	58 - 120
2,2'-oxybis[1-chloropropane]	20.0	17.9		ug/L		90	46 - 120
2,4,5-Trichlorophenol	20.0	16.9		ug/L		85	57 - 120
2,4,6-Trichlorophenol	20.0	16.8		ug/L		84	60 - 120
2,4-Dichlorophenol	20.0	16.3		ug/L		82	57 - 120
2,4-Dimethylphenol	20.0	15.7		ug/L		79	55 - 120
2,4-Dinitrophenol	40.0	28.8		ug/L		72	18 - 127
2,4-Dinitrotoluene	20.0	17.8		ug/L		89	65 - 120
2,6-Dinitrotoluene	20.0	17.6		ug/L		88	65 - 120
2-Chloronaphthalene	20.0	15.6		ug/L		78	56 - 120
2-Chlorophenol	20.0	15.2		ug/L		76	57 - 120
2-Methylnaphthalene	20.0	15.7		ug/L		78	58 - 120
2-Methylphenol	20.0	13.5		ug/L		67	52 - 120
2-Nitroaniline	20.0	16.9		ug/L		85	56 - 123
2-Nitrophenol	20.0	16.5		ug/L		83	62 - 120
3,3'-Dichlorobenzidine	40.0	39.7		ug/L		99	10 - 134
3-Nitroaniline	20.0	15.2		ug/L		76	36 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-255100/24-A
Matrix: Water
Analysis Batch: 255888

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255100

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
4,6-Dinitro-2-methylphenol	40.0	33.0		ug/L		82	35 - 140
4-Bromophenyl phenyl ether	20.0	17.3		ug/L		86	52 - 128
4-Chloro-3-methylphenol	20.0	15.8		ug/L		79	59 - 120
4-Chloroaniline	20.0	3.66		ug/L		18	10 - 120
4-Chlorophenyl phenyl ether	20.0	18.1		ug/L		90	58 - 120
4-Nitroaniline	20.0	15.9		ug/L		80	51 - 122
4-Nitrophenol	40.0	11.7		ug/L		29	16 - 120
Acenaphthene	20.0	16.1		ug/L		80	57 - 120
Acenaphthylene	20.0	15.5		ug/L		77	55 - 120
Acetophenone	20.0	16.7		ug/L		84	60 - 120
Anthracene	20.0	17.1		ug/L		85	58 - 120
Atrazine	40.0	35.5		ug/L		89	61 - 132
Benzaldehyde	40.0	32.7		ug/L		82	60 - 120
Benzo[a]anthracene	20.0	18.7		ug/L		94	59 - 120
Benzo[a]pyrene	20.0	16.0		ug/L		80	60 - 120
Benzo[b]fluoranthene	20.0	16.4		ug/L		82	62 - 120
Benzo[g,h,i]perylene	20.0	16.3		ug/L		82	59 - 120
Benzo[k]fluoranthene	20.0	16.0		ug/L		80	57 - 120
Bis(2-chloroethoxy)methane	20.0	16.1		ug/L		80	61 - 120
Bis(2-chloroethyl)ether	20.0	16.0		ug/L		80	55 - 120
Bis(2-ethylhexyl) phthalate	20.0	18.7		ug/L		93	62 - 123
Butyl benzyl phthalate	20.0	18.5		ug/L		92	61 - 120
Caprolactam	40.0	4.43	J	ug/L		11	10 - 120
Carbazole	20.0	18.1		ug/L		90	60 - 126
Chrysene	20.0	18.6		ug/L		93	61 - 120
Dibenz(a,h)anthracene	20.0	16.7		ug/L		83	61 - 120
Dibenzofuran	20.0	16.1		ug/L		81	58 - 120
Diethyl phthalate	20.0	16.9		ug/L		85	62 - 120
Dimethyl phthalate	20.0	17.3		ug/L		86	62 - 120
Di-n-butyl phthalate	20.0	18.0		ug/L		90	59 - 128
Di-n-octyl phthalate	20.0	15.3		ug/L		77	58 - 120
Fluoranthene	20.0	18.2		ug/L		91	57 - 123
Fluorene	20.0	16.5		ug/L		82	56 - 120
Hexachlorobenzene	20.0	16.5		ug/L		82	47 - 127
Hexachlorobutadiene	20.0	13.4		ug/L		67	50 - 120
Hexachlorocyclopentadiene	20.0	11.4		ug/L		57	25 - 120
Hexachloroethane	20.0	12.2		ug/L		61	50 - 120
Indeno[1,2,3-cd]pyrene	20.0	16.2		ug/L		81	61 - 120
Isophorone	20.0	16.2		ug/L		81	61 - 120
Naphthalene	20.0	15.3		ug/L		77	54 - 120
Nitrobenzene	20.0	15.9		ug/L		80	58 - 120
N-Nitrosodi-n-propylamine	20.0	16.3		ug/L		81	60 - 120
N-Nitrosodiphenylamine	20.0	17.0		ug/L		85	54 - 122
Pentachlorophenol	40.0	29.6		ug/L		74	35 - 121
Phenol	20.0	5.21		ug/L		26	16 - 120
Phenanthrene	20.0	17.0		ug/L		85	58 - 120
Pyrene	20.0	18.6		ug/L		93	60 - 120
3 & 4 Methylphenol	20.0	12.2		ug/L		61	46 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-255100/24-A
Matrix: Water
Analysis Batch: 255888

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255100

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl (Surr)	80		42 - 120
2-Fluorophenol (Surr)	45		10 - 120
2,4,6-Tribromophenol (Surr)	85		35 - 125
Nitrobenzene-d5 (Surr)	82		36 - 120
Phenol-d5 (Surr)	29		10 - 120
Terphenyl-d14 (Surr)	103		17 - 120

Lab Sample ID: MB 240-255135/18-A
Matrix: Solid
Analysis Batch: 255501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255135

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
1,1'-Biphenyl	3.5	U	260	3.5	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,2'-oxybis[1-chloropropane]	9.5	U	260	9.5	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4,5-Trichlorophenol	25	U	260	25	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4,6-Trichlorophenol	8.9	U	260	8.9	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4-Dichlorophenol	20	U	260	20	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4-Dimethylphenol	20	U	260	20	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4-Dinitrophenol	21	U	150	21	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,4-Dinitrotoluene	17	U	260	17	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2,6-Dinitrotoluene	21	U	260	21	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Chloronaphthalene	0.45	U	260	0.45	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Chlorophenol	8.2	U	260	8.2	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Methylnaphthalene	0.50	U	260	0.50	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Methylphenol	11	U	260	11	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Nitroaniline	9.1	U	200	9.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
2-Nitrophenol	8.3	U	260	8.3	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
3,3'-Dichlorobenzidine	18	U	1600	18	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
3-Nitroaniline	16	U	200	16	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4,6-Dinitro-2-methylphenol	9.2	U	150	9.2	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Bromophenyl phenyl ether	13	U	260	13	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Chloro-3-methylphenol	21	U	260	21	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Chloroaniline	17	U	200	17	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Chlorophenyl phenyl ether	13	U	260	13	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Nitroaniline	26	U	200	26	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
4-Nitrophenol	17	U	330	17	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Acenaphthene	0.76	U	260	0.76	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Acenaphthylene	0.35	U	260	0.35	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Acetophenone	9.2	U	260	9.2	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Anthracene	0.78	U	260	0.78	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Atrazine	9.1	U	40	9.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzaldehyde	12	U	260	12	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzo[a]anthracene	0.63	U	260	0.63	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzo[a]pyrene	0.64	U	260	0.64	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzo[b]fluoranthene	0.59	U	260	0.59	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzo[g,h,i]perylene	0.35	U	260	0.35	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Benzo[k]fluoranthene	0.68	U	260	0.68	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Bis(2-chloroethoxy)methane	22	U	260	22	ug/Kg		11/10/16 10:29	11/14/16 08:26	1

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: MB 240-255135/18-A
Matrix: Solid
Analysis Batch: 255501

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255135

Analyte	MB	MB	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Bis(2-chloroethyl)ether	2.0	U	80	2.0	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Bis(2-ethylhexyl) phthalate	19	U	260	19	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Butyl benzyl phthalate	10	U	260	10	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Caprolactam	37	U	260	37	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Carbazole	27	U	260	27	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Chrysene	1.1	U	260	1.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Dibenz(a,h)anthracene	0.66	U	260	0.66	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Dibenzofuran	0.66	U	260	0.66	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Diethyl phthalate	16	U	260	16	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Dimethyl phthalate	17	U	260	17	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Di-n-butyl phthalate	15	U	260	15	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Di-n-octyl phthalate	7.9	U	260	7.9	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Fluoranthene	0.55	U	260	0.55	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Fluorene	0.53	U	260	0.53	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Hexachlorobenzene	2.1	U	260	2.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Hexachlorobutadiene	5.6	U	40	5.6	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Hexachlorocyclopentadiene	8.1	U	260	8.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Hexachloroethane	9.0	U	260	9.0	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Indeno[1,2,3-cd]pyrene	0.35	U	260	0.35	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Isophorone	13	U	260	13	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Naphthalene	0.82	U	260	0.82	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Nitrobenzene	2.2	U	260	2.2	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
N-Nitrosodi-n-propylamine	6.3	U	260	6.3	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
N-Nitrosodiphenylamine	21	U	260	21	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Pentachlorophenol	9.1	U	150	9.1	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Phenol	7.3	U	260	7.3	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Phenanthrene	0.73	U	260	0.73	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
Pyrene	0.44	U	260	0.44	ug/Kg		11/10/16 10:29	11/14/16 08:26	1
3 & 4 Methylphenol	20	U	260	20	ug/Kg		11/10/16 10:29	11/14/16 08:26	1

Surrogate	MB	MB	Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
2-Fluorobiphenyl (Surr)	60		39 - 120	11/10/16 10:29	11/14/16 08:26	1
2-Fluorophenol (Surr)	63		33 - 120	11/10/16 10:29	11/14/16 08:26	1
2,4,6-Tribromophenol (Surr)	41		10 - 120	11/10/16 10:29	11/14/16 08:26	1
Nitrobenzene-d5 (Surr)	60		32 - 120	11/10/16 10:29	11/14/16 08:26	1
Phenol-d5 (Surr)	62		32 - 120	11/10/16 10:29	11/14/16 08:26	1
Terphenyl-d14 (Surr)	68		47 - 120	11/10/16 10:29	11/14/16 08:26	1

Lab Sample ID: LCS 240-255135/19-A
Matrix: Solid
Analysis Batch: 255501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255135

Analyte	Spike Added	LCS	LCS	Unit	D	%Rec	%Rec.
		Result	Qualifier				
1,1'-Biphenyl	667	440		ug/Kg		66	54 - 120
2,2'-oxybis[1-chloropropane]	667	443		ug/Kg		66	34 - 120
2,4,5-Trichlorophenol	667	404		ug/Kg		61	31 - 120
2,4,6-Trichlorophenol	667	398		ug/Kg		60	18 - 120
2,4-Dichlorophenol	667	443		ug/Kg		66	51 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-255135/19-A

Matrix: Solid

Analysis Batch: 255501

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 255135

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec.
							Limits
2,4-Dimethylphenol	667	387		ug/Kg		58	34 - 120
2,4-Dinitrophenol	1330	587		ug/Kg		44	10 - 120
2,4-Dinitrotoluene	667	468		ug/Kg		70	57 - 120
2,6-Dinitrotoluene	667	452		ug/Kg		68	61 - 120
2-Chloronaphthalene	667	438		ug/Kg		66	54 - 120
2-Chlorophenol	667	432		ug/Kg		65	50 - 120
2-Methylnaphthalene	667	444		ug/Kg		67	53 - 120
2-Methylphenol	667	430		ug/Kg		65	48 - 120
2-Nitroaniline	667	511		ug/Kg		77	50 - 120
2-Nitrophenol	667	427		ug/Kg		64	49 - 120
3,3'-Dichlorobenzidine	1330	866	J	ug/Kg		65	39 - 120
3-Nitroaniline	667	475		ug/Kg		71	51 - 120
4,6-Dinitro-2-methylphenol	1330	676		ug/Kg		51	23 - 120
4-Bromophenyl phenyl ether	667	417		ug/Kg		63	48 - 120
4-Chloro-3-methylphenol	667	453		ug/Kg		68	52 - 120
4-Chloroaniline	667	334		ug/Kg		50	41 - 120
4-Chlorophenyl phenyl ether	667	432		ug/Kg		65	56 - 120
4-Nitroaniline	667	513		ug/Kg		77	52 - 120
4-Nitrophenol	1330	1030		ug/Kg		78	37 - 120
Acenaphthene	667	449		ug/Kg		67	55 - 120
Acenaphthylene	667	412		ug/Kg		62	54 - 120
Acetophenone	667	421		ug/Kg		63	49 - 120
Anthracene	667	430		ug/Kg		65	59 - 120
Atrazine	1330	956		ug/Kg		72	56 - 120
Benzaldehyde	1330	880		ug/Kg		66	48 - 120
Benzo[a]anthracene	667	434		ug/Kg		65	60 - 120
Benzo[a]pyrene	667	465		ug/Kg		70	61 - 120
Benzo[b]fluoranthene	667	469		ug/Kg		70	60 - 120
Benzo[g,h,i]perylene	667	478		ug/Kg		72	60 - 120
Benzo[k]fluoranthene	667	468		ug/Kg		70	61 - 120
Bis(2-chloroethoxy)methane	667	434		ug/Kg		65	53 - 120
Bis(2-chloroethyl)ether	667	432		ug/Kg		65	45 - 120
Bis(2-ethylhexyl) phthalate	667	473		ug/Kg		71	57 - 120
Butyl benzyl phthalate	667	461		ug/Kg		69	58 - 120
Caprolactam	1330	994		ug/Kg		75	56 - 120
Carbazole	667	487		ug/Kg		73	56 - 120
Chrysene	667	433		ug/Kg		65	62 - 120
Dibenz(a,h)anthracene	667	508		ug/Kg		76	59 - 120
Dibenzofuran	667	434		ug/Kg		65	57 - 120
Diethyl phthalate	667	465		ug/Kg		70	58 - 120
Dimethyl phthalate	667	466		ug/Kg		70	59 - 120
Di-n-butyl phthalate	667	502		ug/Kg		75	54 - 120
Di-n-octyl phthalate	667	457		ug/Kg		69	54 - 120
Fluoranthene	667	451		ug/Kg		68	57 - 120
Fluorene	667	431		ug/Kg		65	56 - 120
Hexachlorobenzene	667	412		ug/Kg		62	43 - 120
Hexachlorobutadiene	667	442		ug/Kg		66	48 - 120
Hexachlorocyclopentadiene	667	200	J	ug/Kg		30	23 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8270C - Semivolatile Organic Compounds (GC/MS) (Continued)

Lab Sample ID: LCS 240-255135/19-A
Matrix: Solid
Analysis Batch: 255501

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255135

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hexachloroethane	667	396		ug/Kg		59	46 - 120
Indeno[1,2,3-cd]pyrene	667	500		ug/Kg		75	62 - 120
Isophorone	667	448		ug/Kg		67	54 - 120
Naphthalene	667	406		ug/Kg		61	53 - 120
Nitrobenzene	667	475		ug/Kg		71	50 - 120
N-Nitrosodi-n-propylamine	667	470		ug/Kg		71	49 - 120
N-Nitrosodiphenylamine	667	421		ug/Kg		63	52 - 120
Pentachlorophenol	1330	529		ug/Kg		40	23 - 120
Phenol	667	439		ug/Kg		66	49 - 120
Phenanthrene	667	439		ug/Kg		66	58 - 120
Pyrene	667	454		ug/Kg		68	57 - 120
3 & 4 Methylphenol	667	448		ug/Kg		67	49 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
2-Fluorobiphenyl (Surr)	69		39 - 120
2-Fluorophenol (Surr)	71		33 - 120
2,4,6-Tribromophenol (Surr)	62		10 - 120
Nitrobenzene-d5 (Surr)	72		32 - 120
Phenol-d5 (Surr)	71		32 - 120
Terphenyl-d14 (Surr)	72		47 - 120

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography

Lab Sample ID: MB 240-255094/20-A
Matrix: Water
Analysis Batch: 255650

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255094

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	0.050	U	0.10	0.050	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1221	0.090	U	0.10	0.090	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1232	0.070	U	0.10	0.070	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1242	0.060	U	0.10	0.060	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1248	0.050	U	0.10	0.050	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1254	0.030	U	0.10	0.030	ug/L		11/10/16 08:44	11/15/16 00:59	1
Aroclor-1260	0.040	U	0.10	0.040	ug/L		11/10/16 08:44	11/15/16 00:59	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	68		21 - 120	11/10/16 08:44	11/15/16 00:59	1
DCB Decachlorobiphenyl	81		10 - 120	11/10/16 08:44	11/15/16 00:59	1

Lab Sample ID: LCS 240-255094/21-A
Matrix: Water
Analysis Batch: 255650

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255094

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor-1016	2.50	1.68		ug/L		67	32 - 120
Aroclor-1260	2.50	1.91		ug/L		77	36 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 8082 - Polychlorinated Biphenyls (PCBs) by Gas Chromatography (Continued)

Lab Sample ID: LCS 240-255094/21-A
Matrix: Water
Analysis Batch: 255650

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255094

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	63		21 - 120
DCB Decachlorobiphenyl	62		10 - 120

Lab Sample ID: LCSD 240-255094/22-A
Matrix: Water
Analysis Batch: 255650

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 255094

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Aroclor-1016	2.50	2.01		ug/L		80	32 - 120	18	30
Aroclor-1260	2.50	2.31		ug/L		92	36 - 120	19	30

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Tetrachloro-m-xylene	71		21 - 120
DCB Decachlorobiphenyl	83		10 - 120

Lab Sample ID: MB 240-255124/22-A
Matrix: Solid
Analysis Batch: 255417

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255124

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Aroclor-1016	24	U	790	24	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1221	23	U	790	23	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1232	16	U	790	16	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1242	20	U	790	20	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1248	17	U	790	17	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1254	14	U	790	14	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclor-1260	18	U	790	18	ug/Kg		11/10/16 09:45	11/12/16 15:32	1
Aroclors (Total)	24	U	150	24	ug/Kg		11/10/16 09:45	11/12/16 15:32	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Tetrachloro-m-xylene	79		14 - 128	11/10/16 09:45	11/12/16 15:32	1
DCB Decachlorobiphenyl	70		10 - 132	11/10/16 09:45	11/12/16 15:32	1

Lab Sample ID: LCS 240-255124/23-A
Matrix: Solid
Analysis Batch: 255417

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255124

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Aroclor-1016	1000	672	J	ug/Kg		67	47 - 120
Aroclor-1260	1000	771	J	ug/Kg		77	46 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Tetrachloro-m-xylene	78		14 - 128
DCB Decachlorobiphenyl	71		10 - 132

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 6010B - Metals (ICP)

Lab Sample ID: MB 240-255154/1-A
Matrix: Solid
Analysis Batch: 255371

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255154

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Barium	0.41	U	0.80	0.41	mg/Kg		11/10/16 11:19	11/11/16 12:50	1
Cadmium	0.021	U	0.080	0.021	mg/Kg		11/10/16 11:19	11/11/16 12:50	1
Chromium	0.075	U	0.80	0.075	mg/Kg		11/10/16 11:19	11/11/16 12:50	1
Nickel	0.080	U	0.80	0.080	mg/Kg		11/10/16 11:19	11/11/16 12:50	1
Lead	0.20	U	0.24	0.20	mg/Kg		11/10/16 11:19	11/11/16 12:50	1

Lab Sample ID: LCS 240-255154/2-A
Matrix: Solid
Analysis Batch: 255371

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Barium	200	189		mg/Kg		94	80 - 120
Cadmium	5.00	4.89		mg/Kg		98	80 - 120
Chromium	20.0	20.1		mg/Kg		100	80 - 120
Nickel	50.0	48.0		mg/Kg		96	80 - 120
Lead	50.0	47.1		mg/Kg		94	80 - 120

Lab Sample ID: 240-71909-1 MS
Matrix: Solid
Analysis Batch: 255371

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Barium	7.7		199	179		mg/Kg	☼	86	75 - 125
Cadmium	0.17		4.97	4.75		mg/Kg	☼	92	75 - 125
Chromium	6.9		19.9	26.3		mg/Kg	☼	98	75 - 125
Nickel	13		49.7	61.4		mg/Kg	☼	98	75 - 125
Lead	6.2		49.7	46.5		mg/Kg	☼	81	75 - 125

Lab Sample ID: 240-71909-1 MSD
Matrix: Solid
Analysis Batch: 255371

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Barium	7.7		199	183		mg/Kg	☼	88	75 - 125	2	20
Cadmium	0.17		4.97	4.74		mg/Kg	☼	92	75 - 125	0	20
Chromium	6.9		19.9	25.1		mg/Kg	☼	91	75 - 125	5	20
Nickel	13		49.7	61.6		mg/Kg	☼	98	75 - 125	0	20
Lead	6.2		49.7	46.4		mg/Kg	☼	81	75 - 125	0	20

Method: 6020 - Metals (ICP/MS)

Lab Sample ID: MB 240-255154/1-A ^2
Matrix: Solid
Analysis Batch: 255498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255154

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0322	J	0.16	0.026	mg/Kg		11/10/16 11:19	11/11/16 15:01	2
Copper	0.627	J	0.80	0.097	mg/Kg		11/10/16 11:19	11/11/16 15:01	2
Selenium	0.0628	J	0.32	0.040	mg/Kg		11/10/16 11:19	11/11/16 15:01	2

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 240-255154/1-A ^2
Matrix: Solid
Analysis Batch: 255498

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255154

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Zinc	0.50	U	1.6	0.50	mg/Kg		11/10/16 11:19	11/11/16 15:01	2
Silver	0.00160	J	0.16	0.0014	mg/Kg		11/10/16 11:19	11/11/16 15:01	2

Lab Sample ID: LCS 240-255154/3-A ^2
Matrix: Solid
Analysis Batch: 255498

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	100	84.8		mg/Kg		85	80 - 120
Copper	100	97.1		mg/Kg		97	80 - 120
Selenium	100	84.1		mg/Kg		84	80 - 120
Zinc	100	92.0		mg/Kg		92	80 - 120
Silver	10.0	9.57		mg/Kg		96	80 - 120

Lab Sample ID: 240-71909-1 MS
Matrix: Solid
Analysis Batch: 255498

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	6.8	B	93.3	84.7		mg/Kg	☼	84	75 - 125
Copper	12	B	93.3	95.2		mg/Kg	☼	89	75 - 125
Selenium	0.50	B	93.3	76.4		mg/Kg	☼	81	75 - 125
Zinc	32		93.3	119		mg/Kg	☼	93	75 - 125
Silver	0.019	J B	9.33	8.62		mg/Kg	☼	92	75 - 125

Lab Sample ID: 240-71909-1 MSD
Matrix: Solid
Analysis Batch: 255498

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255154

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	6.8	B	93.3	85.2		mg/Kg	☼	84	75 - 125	1	20
Copper	12	B	93.3	96.4		mg/Kg	☼	91	75 - 125	1	20
Selenium	0.50	B	93.3	74.2		mg/Kg	☼	79	75 - 125	3	20
Zinc	32		93.3	116		mg/Kg	☼	89	75 - 125	3	20
Silver	0.019	J B	9.33	8.46		mg/Kg	☼	90	75 - 125	2	20

Lab Sample ID: MB 240-255112/1-A
Matrix: Water
Analysis Batch: 255498

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 255112

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.35	U	5.0	0.35	ug/L		11/10/16 14:00	11/11/16 16:29	1
Barium	0.52	U	100	0.52	ug/L		11/10/16 14:00	11/11/16 16:29	1
Cadmium	0.31	U	1.0	0.31	ug/L		11/10/16 14:00	11/11/16 16:29	1
Chromium	0.26	U	10	0.26	ug/L		11/10/16 14:00	11/11/16 16:29	1
Copper	0.696	J	4.0	0.36	ug/L		11/10/16 14:00	11/11/16 16:29	1
Lead	0.16	U	3.0	0.16	ug/L		11/10/16 14:00	11/11/16 16:29	1
Selenium	0.48	U	5.0	0.48	ug/L		11/10/16 14:00	11/11/16 16:29	1
Zinc	6.2	U	50	6.2	ug/L		11/10/16 14:00	11/11/16 16:29	1

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 6020 - Metals (ICP/MS) (Continued)

Lab Sample ID: MB 240-255112/1-A
Matrix: Water
Analysis Batch: 255498

Client Sample ID: Method Blank
Prep Type: Total Recoverable
Prep Batch: 255112

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Silver	0.030	U	0.20	0.030	ug/L		11/10/16 14:00	11/11/16 16:29	1

Lab Sample ID: LCS 240-255112/2-A
Matrix: Water
Analysis Batch: 255498

Client Sample ID: Lab Control Sample
Prep Type: Total Recoverable
Prep Batch: 255112

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	1000	948		ug/L		95	80 - 120
Barium	1000	1060		ug/L		106	80 - 120
Cadmium	1000	1070		ug/L		107	80 - 120
Chromium	1000	1050		ug/L		105	80 - 120
Copper	1000	1140		ug/L		114	80 - 120
Lead	1000	1090		ug/L		109	80 - 120
Selenium	1000	989		ug/L		99	80 - 120
Zinc	1000	1080		ug/L		108	80 - 120
Silver	100	104		ug/L		104	80 - 120

Method: 7470A - Mercury (CVAA)

Lab Sample ID: MB 240-255118/1-A
Matrix: Water
Analysis Batch: 255403

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255118

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.090	U	0.20	0.090	ug/L		11/10/16 14:00	11/11/16 12:40	1

Lab Sample ID: LCS 240-255118/2-A
Matrix: Water
Analysis Batch: 255403

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255118

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	5.00	4.71		ug/L		94	80 - 120

Method: 7471A - Mercury (CVAA)

Lab Sample ID: MB 240-255182/1-A
Matrix: Solid
Analysis Batch: 255495

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 255182

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Mercury	0.017	U	0.040	0.017	mg/Kg		11/10/16 16:00	11/11/16 14:54	1

Lab Sample ID: LCS 240-255182/2-A
Matrix: Solid
Analysis Batch: 255495

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 255182

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Mercury	0.833	0.845		mg/Kg		101	80 - 120

TestAmerica Canton

QC Sample Results

Client: Tetra Tech GEO
 Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Method: 7471A - Mercury (CVAA) (Continued)

Lab Sample ID: 240-71909-1 MS
Matrix: Solid
Analysis Batch: 255495

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255182
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Mercury	0.019	U	0.172	0.188		mg/Kg	☼	110	80 - 120

Lab Sample ID: 240-71909-1 MSD
Matrix: Solid
Analysis Batch: 255495

Client Sample ID: GP-16-03-10-13'
Prep Type: Total/NA
Prep Batch: 255182
%Rec.

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Mercury	0.019	U	0.172	0.179		mg/Kg	☼	104	80 - 120	5	20

Method: Moisture - Percent Moisture

Lab Sample ID: 240-71909-4 DU
Matrix: Solid
Analysis Batch: 255074

Client Sample ID: GP-16-06-13-16'
Prep Type: Total/NA

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Percent Solids	96.1		97.0		%		0.9	20
Percent Moisture	3.9		3.0	F3	%		25	20

QC Association Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

GC/MS VOA

Prep Batch: 255237

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	5030B	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	5030B	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	5030B	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	5030B	
MB 240-255237/1-A	Method Blank	Total/NA	Solid	5030B	
LCS 240-255237/2-A	Lab Control Sample	Total/NA	Solid	5030B	

Analysis Batch: 255542

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	8260B	255237
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	8260B	255237
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	8260B	255237
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	8260B	255237
MB 240-255237/1-A	Method Blank	Total/NA	Solid	8260B	255237
LCS 240-255237/2-A	Lab Control Sample	Total/NA	Solid	8260B	255237

Analysis Batch: 256076

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	8260B	
240-71909-6	GP-16-05W	Total/NA	Water	8260B	
240-71909-7	TRIP BLANK	Total/NA	Water	8260B	
MB 240-256076/8	Method Blank	Total/NA	Water	8260B	
LCS 240-256076/5	Lab Control Sample	Total/NA	Water	8260B	

GC/MS Semi VOA

Prep Batch: 255100

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	3510C	
240-71909-6	GP-16-05W	Total/NA	Water	3510C	
MB 240-255100/23-A	Method Blank	Total/NA	Water	3510C	
LCS 240-255100/24-A	Lab Control Sample	Total/NA	Water	3510C	

Prep Batch: 255135

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	3540C	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	3540C	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	3540C	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	3540C	
MB 240-255135/18-A	Method Blank	Total/NA	Solid	3540C	
LCS 240-255135/19-A	Lab Control Sample	Total/NA	Solid	3540C	

Analysis Batch: 255501

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	8270C	255135
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	8270C	255135
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	8270C	255135
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	8270C	255135
MB 240-255135/18-A	Method Blank	Total/NA	Solid	8270C	255135
LCS 240-255135/19-A	Lab Control Sample	Total/NA	Solid	8270C	255135

TestAmerica Canton

QC Association Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

GC/MS Semi VOA (Continued)

Analysis Batch: 255521

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	8270C	255100
240-71909-6	GP-16-05W	Total/NA	Water	8270C	255100
MB 240-255100/23-A	Method Blank	Total/NA	Water	8270C	255100

Analysis Batch: 255888

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCS 240-255100/24-A	Lab Control Sample	Total/NA	Water	8270C	255100

GC Semi VOA

Prep Batch: 255094

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	3520C	
240-71909-6	GP-16-05W	Total/NA	Water	3520C	
MB 240-255094/20-A	Method Blank	Total/NA	Water	3520C	
LCS 240-255094/21-A	Lab Control Sample	Total/NA	Water	3520C	
LCSD 240-255094/22-A	Lab Control Sample Dup	Total/NA	Water	3520C	

Prep Batch: 255124

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	3540C	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	3540C	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	3540C	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	3540C	
MB 240-255124/22-A	Method Blank	Total/NA	Solid	3540C	
LCS 240-255124/23-A	Lab Control Sample	Total/NA	Solid	3540C	

Analysis Batch: 255417

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	8082	255124
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	8082	255124
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	8082	255124
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	8082	255124
MB 240-255124/22-A	Method Blank	Total/NA	Solid	8082	255124
LCS 240-255124/23-A	Lab Control Sample	Total/NA	Solid	8082	255124

Analysis Batch: 255650

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	8082	255094
240-71909-6	GP-16-05W	Total/NA	Water	8082	255094
MB 240-255094/20-A	Method Blank	Total/NA	Water	8082	255094
LCS 240-255094/21-A	Lab Control Sample	Total/NA	Water	8082	255094
LCSD 240-255094/22-A	Lab Control Sample Dup	Total/NA	Water	8082	255094

Metals

Prep Batch: 255112

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total Recoverable	Water	3005A	
240-71909-6	GP-16-05W	Total Recoverable	Water	3005A	

TestAmerica Canton

QC Association Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Metals (Continued)

Prep Batch: 255112 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-255112/1-A	Method Blank	Total Recoverable	Water	3005A	
LCS 240-255112/2-A	Lab Control Sample	Total Recoverable	Water	3005A	

Prep Batch: 255118

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	7470A	
240-71909-6	GP-16-05W	Total/NA	Water	7470A	
MB 240-255118/1-A	Method Blank	Total/NA	Water	7470A	
LCS 240-255118/2-A	Lab Control Sample	Total/NA	Water	7470A	

Prep Batch: 255154

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	3050B	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	3050B	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	3050B	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	3050B	
MB 240-255154/1-A	Method Blank	Total/NA	Solid	3050B	
MB 240-255154/1-A ^2	Method Blank	Total/NA	Solid	3050B	
LCS 240-255154/2-A	Lab Control Sample	Total/NA	Solid	3050B	
LCS 240-255154/3-A ^2	Lab Control Sample	Total/NA	Solid	3050B	
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	3050B	
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	3050B	
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	3050B	
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	3050B	

Prep Batch: 255182

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	7471A	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	7471A	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	7471A	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	7471A	
MB 240-255182/1-A	Method Blank	Total/NA	Solid	7471A	
LCS 240-255182/2-A	Lab Control Sample	Total/NA	Solid	7471A	
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	7471A	
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	7471A	

Analysis Batch: 255371

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	6010B	255154
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	6010B	255154
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	6010B	255154
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	6010B	255154
MB 240-255154/1-A	Method Blank	Total/NA	Solid	6010B	255154
LCS 240-255154/2-A	Lab Control Sample	Total/NA	Solid	6010B	255154
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	6010B	255154
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	6010B	255154

Analysis Batch: 255403

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-5	GP-16-04W	Total/NA	Water	7470A	255118
240-71909-6	GP-16-05W	Total/NA	Water	7470A	255118

TestAmerica Canton

QC Association Summary

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Metals (Continued)

Analysis Batch: 255403 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 240-255118/1-A	Method Blank	Total/NA	Water	7470A	255118
LCS 240-255118/2-A	Lab Control Sample	Total/NA	Water	7470A	255118

Analysis Batch: 255495

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	7471A	255182
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	7471A	255182
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	7471A	255182
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	7471A	255182
MB 240-255182/1-A	Method Blank	Total/NA	Solid	7471A	255182
LCS 240-255182/2-A	Lab Control Sample	Total/NA	Solid	7471A	255182
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	7471A	255182
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	7471A	255182

Analysis Batch: 255498

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	6020	255154
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	6020	255154
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	6020	255154
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	6020	255154
240-71909-5	GP-16-04W	Total Recoverable	Water	6020	255112
240-71909-6	GP-16-05W	Total Recoverable	Water	6020	255112
MB 240-255112/1-A	Method Blank	Total Recoverable	Water	6020	255112
MB 240-255154/1-A ^2	Method Blank	Total/NA	Solid	6020	255154
LCS 240-255112/2-A	Lab Control Sample	Total Recoverable	Water	6020	255112
LCS 240-255154/3-A ^2	Lab Control Sample	Total/NA	Solid	6020	255154
240-71909-1 MS	GP-16-03-10-13'	Total/NA	Solid	6020	255154
240-71909-1 MSD	GP-16-03-10-13'	Total/NA	Solid	6020	255154

General Chemistry

Analysis Batch: 255074

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
240-71909-1	GP-16-03-10-13'	Total/NA	Solid	Moisture	
240-71909-2	GP-16-04-8-11'	Total/NA	Solid	Moisture	
240-71909-3	GP-16-05-13-16'	Total/NA	Solid	Moisture	
240-71909-4	GP-16-06-13-16'	Total/NA	Solid	Moisture	
240-71909-4 DU	GP-16-06-13-16'	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-03-10-13'

Date Collected: 11/07/16 12:15

Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-1

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	255074	11/10/16 07:49	LKG	TAL CAN

Client Sample ID: GP-16-03-10-13'

Date Collected: 11/07/16 12:15

Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-1

Matrix: Solid

Percent Solids: 94.0

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			255237	11/10/16 21:36	LAM	TAL CAN
Total/NA	Analysis	8260B		1	255542	11/14/16 12:25	HMB	TAL CAN
Total/NA	Prep	3540C			255135	11/10/16 10:29	SDE	TAL CAN
Total/NA	Analysis	8270C		1	255501	11/14/16 10:05	MRU	TAL CAN
Total/NA	Prep	3540C			255124	11/10/16 09:45	DT	TAL CAN
Total/NA	Analysis	8082		1	255417	11/12/16 13:58	KMG	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6010B		1	255371	11/11/16 12:58	KLC	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6020		2	255498	11/11/16 15:09	AS1	TAL CAN
Total/NA	Prep	7471A			255182	11/10/16 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	255495	11/11/16 14:57	WKD	TAL CAN

Client Sample ID: GP-16-04-8-11'

Date Collected: 11/08/16 14:15

Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-2

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	255074	11/10/16 07:49	LKG	TAL CAN

Client Sample ID: GP-16-04-8-11'

Date Collected: 11/08/16 14:15

Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-2

Matrix: Solid

Percent Solids: 87.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			255237	11/10/16 21:36	LAM	TAL CAN
Total/NA	Analysis	8260B		1	255542	11/14/16 12:50	HMB	TAL CAN
Total/NA	Prep	3540C			255135	11/10/16 10:29	SDE	TAL CAN
Total/NA	Analysis	8270C		1	255501	11/14/16 10:30	MRU	TAL CAN
Total/NA	Prep	3540C			255124	11/10/16 09:45	DT	TAL CAN
Total/NA	Analysis	8082		1	255417	11/12/16 14:17	KMG	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6010B		1	255371	11/11/16 15:21	KLC	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6020		2	255498	11/11/16 15:34	AS1	TAL CAN
Total/NA	Prep	7471A			255182	11/10/16 16:00	DEE	TAL CAN

TestAmerica Canton

Lab Chronicle

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Client Sample ID: GP-16-04-8-11'

Date Collected: 11/08/16 14:15
Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-2

Matrix: Solid
Percent Solids: 87.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	7471A		1	255495	11/11/16 15:04	WKD	TAL CAN

Client Sample ID: GP-16-05-13-16'

Date Collected: 11/08/16 09:50
Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-3

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	255074	11/10/16 07:49	LKG	TAL CAN

Client Sample ID: GP-16-05-13-16'

Date Collected: 11/08/16 09:50
Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-3

Matrix: Solid
Percent Solids: 94.8

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			255237	11/10/16 21:36	LAM	TAL CAN
Total/NA	Analysis	8260B		1	255542	11/14/16 13:14	HMB	TAL CAN
Total/NA	Prep	3540C			255135	11/10/16 10:29	SDE	TAL CAN
Total/NA	Analysis	8270C		1	255501	11/14/16 10:55	MRU	TAL CAN
Total/NA	Prep	3540C			255124	11/10/16 09:45	DT	TAL CAN
Total/NA	Analysis	8082		1	255417	11/12/16 14:36	KMG	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6010B		1	255371	11/11/16 15:26	KLC	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6020		2	255498	11/11/16 15:38	AS1	TAL CAN
Total/NA	Prep	7471A			255182	11/10/16 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	255495	11/11/16 15:06	WKD	TAL CAN

Client Sample ID: GP-16-06-13-16'

Date Collected: 11/08/16 13:00
Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-4

Matrix: Solid

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1	255074	11/10/16 07:49	LKG	TAL CAN

Client Sample ID: GP-16-06-13-16'

Date Collected: 11/08/16 13:00
Date Received: 11/09/16 09:30

Lab Sample ID: 240-71909-4

Matrix: Solid
Percent Solids: 96.1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			255237	11/10/16 21:36	LAM	TAL CAN
Total/NA	Analysis	8260B		1	255542	11/14/16 13:39	HMB	TAL CAN
Total/NA	Prep	3540C			255135	11/10/16 10:29	SDE	TAL CAN
Total/NA	Analysis	8270C		1	255501	11/14/16 11:20	MRU	TAL CAN

TestAmerica Canton

Lab Chronicle

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3540C			255124	11/10/16 09:45	DT	TAL CAN
Total/NA	Analysis	8082		1	255417	11/12/16 14:54	KMG	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6010B		1	255371	11/11/16 15:30	KLC	TAL CAN
Total/NA	Prep	3050B			255154	11/10/16 11:19	DEE	TAL CAN
Total/NA	Analysis	6020		2	255498	11/11/16 15:51	AS1	TAL CAN
Total/NA	Prep	7471A			255182	11/10/16 16:00	DEE	TAL CAN
Total/NA	Analysis	7471A		1	255495	11/11/16 15:08	WKD	TAL CAN

Client Sample ID: GP-16-04W

Lab Sample ID: 240-71909-5

Date Collected: 11/08/16 04:45

Matrix: Water

Date Received: 11/09/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	256076	11/17/16 16:34	HMB	TAL CAN
Total/NA	Prep	3510C			255100	11/10/16 08:56	KEH	TAL CAN
Total/NA	Analysis	8270C		1	255521	11/14/16 16:42	JMG	TAL CAN
Total/NA	Prep	3520C			255094	11/10/16 08:44	KEH	TAL CAN
Total/NA	Analysis	8082		1	255650	11/14/16 20:23	KMG	TAL CAN
Total Recoverable	Prep	3005A			255112	11/10/16 14:00	AJC	TAL CAN
Total Recoverable	Analysis	6020		1	255498	11/11/16 18:35	AS1	TAL CAN
Total/NA	Prep	7470A			255118	11/10/16 14:00	AJC	TAL CAN
Total/NA	Analysis	7470A		1	255403	11/11/16 13:28	WKD	TAL CAN

Client Sample ID: GP-16-05W

Lab Sample ID: 240-71909-6

Date Collected: 11/08/16 10:15

Matrix: Water

Date Received: 11/09/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	256076	11/17/16 16:57	HMB	TAL CAN
Total/NA	Prep	3510C			255100	11/10/16 08:56	KEH	TAL CAN
Total/NA	Analysis	8270C		1	255521	11/14/16 17:53	JMG	TAL CAN
Total/NA	Prep	3520C			255094	11/10/16 08:44	KEH	TAL CAN
Total/NA	Analysis	8082		1	255650	11/14/16 20:42	KMG	TAL CAN
Total Recoverable	Prep	3005A			255112	11/10/16 13:20	AJC	TAL CAN
Total Recoverable	Analysis	6020		1	255498	11/11/16 18:39	AS1	TAL CAN
Total/NA	Prep	7470A			255118	11/10/16 11:26	AJC	TAL CAN
Total/NA	Analysis	7470A		1	255403	11/11/16 13:30	WKD	TAL CAN

Client Sample ID: TRIP BLANK

Lab Sample ID: 240-71909-7

Date Collected: 11/08/16 00:00

Matrix: Water

Date Received: 11/09/16 09:30

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260B		1	256076	11/17/16 17:20	HMB	TAL CAN

Lab Chronicle

Client: Tetra Tech GEO
Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Laboratory References:

TAL CAN = TestAmerica Canton, 4101 Shuffel Street NW, North Canton, OH 44720, TEL (330)497-9396

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Certification Summary

Client: Tetra Tech GEO
 Project/Site: City of Ann Arbor

TestAmerica Job ID: 240-71909-1

Laboratory: TestAmerica Canton

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
California	NELAP	9	01144CA	06-30-14 *
California	State Program	9	2927	04-30-17
Connecticut	State Program	1	PH-0590	12-31-17
Florida	NELAP	4	E87225	06-30-17
Illinois	NELAP	5	200004	07-31-17
Kansas	NELAP	7	E-10336	01-31-17
Kentucky (UST)	State Program	4	58	02-23-17
Kentucky (WW)	State Program	4	98016	12-31-16 *
Minnesota	NELAP	5	039-999-348	12-31-16 *
Minnesota (Petrofund)	State Program	1	3506	07-31-17
Nevada	State Program	9	OH-000482008A	07-31-17
New Jersey	NELAP	2	OH001	06-30-17
New York	NELAP	2	10975	03-31-17
Ohio VAP	State Program	5	CL0024	09-14-17
Oregon	NELAP	10	4062	02-23-17
Pennsylvania	NELAP	3	68-00340	08-31-17
Texas	NELAP	6	T104704517-15-5	08-31-17
USDA	Federal		P330-13-00319	11-26-16 *
Virginia	NELAP	3	460175	09-14-17
Washington	State Program	10	C971	01-12-17
West Virginia DEP	State Program	3	210	12-31-16 *
Wisconsin	State Program	5	999518190	08-31-17

* Certification renewal pending - certification considered valid.

TestAmerica Michigan
 10448 Citation Drive
 Suite 200
 Brighton, MI 48116
 Phone: 810.229.2763 Fax:

Chain of Custody Record

164191

TestAmerica
 THE LEADER IN ENVIRONMENTAL TESTING
 TestAmerica Laboratories, Inc.
 TAL-6210 (07/13)

O.2/CO.6
 O.2/CO.6

Regulatory Program: Low RCRA Other: NPDES Other: COCs

Company Name: TEVA TECH
 Address: 110 ANN ARBOR, SUITE 100
 City/State/Zip: ANN ARBOR, MI 48103
 Phone: 734-213-2104
 Fax:
 Project Name: CITY of ANN ARBOR
 Site:
 P O #

Sample Identification	Sample Date	Sample Time	Sample Type (C-comp, G-or-B)	Matrix	# of Cont.	Analysis Turnaround Time		Filtered Sample (Y/N)	Perform MS/MSD (Y/N)	VOCs	SVOCs	Methanol to Meth	H-Dioxane	PCBs	Date	Carrier	COC No.	Sampler	Job / SDG No.	Sample Specific Notes:
						CALENDAR DAYS	WORKING DAYS													
GP-16-03-10-13'	11/7/2016	1215	G	Soil	4					X	X	X	X							
GP-16-04-8-11'	11/8/2016	1415	G	Soil	4					X	X	X	X							
GP-16-05-13-16'	11/8/2016	0950	G	Soil	4					X	X	X	X							
GP-16-06-13-16'	11/8/2016	1300	G	Soil	4					X	X	X	X							
GP-16-04W	11/8/16	1845	G	GW	8					X	X	X	X							
GP-16-05W	11/8/16	1015	G	GW	8					X	X	X	X							
Trip Blank	11/8/16	-	-	W	1					X										sample time 1445



Preservation Used: 1= Ice, 2= HCl, 3= H2SO4, 4= HNO3, 5= NaOH, 6= Other
 Possible Hazard Identification:
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Special Instructions/QC Requirements & Comments:

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for: _____ Months

Received by: [Signature] Date/Time: 11/8/16 1642
 Received by: [Signature] Date/Time: 11-9-16 930
 Received in Laboratory by: _____ Date/Time: _____

Custody Seal No.: _____
 Reinquished by: [Signature] Company: TEVA TECH
 Reinquished by: [Signature] Company: TEVA TECH
 Reinquished by: _____ Company: _____



TestAmerica Canton Sample Receipt Form/Narrative
Canton Facility

Login #: 71909

Client Tetra Tech Site Name _____

Cooler unpacked by: _____

Cooler Received on 11-9-16 Opened on 11-9-16

FedEx: 1st Grd UPS FAS Stetson Client Drop Off TestAmerica Courier Other

Receipt After-hours: Drop-off Date/Time _____ Storage Location _____

TestAmerica Cooler # _____ Foam Box Client Cooler Box Other _____
Packing material used: Bubble Wrap Foam Plastic Bag None Other _____
COOLANT: Wet Ice Blue Ice Dry Ice Water None

- Cooler temperature upon receipt See Multiple Cooler Form
IR GUN# IR-8 (CF +0.4 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
IR GUN #36 (CF +1.3 °C) Observed Cooler Temp. _____ °C Corrected Cooler Temp. _____ °C
- Were custody seals on the outside of the cooler(s)? If Yes Quantity 2 Yes No
-Were custody seals on the outside of the cooler(s) signed & dated? Yes No NA
-Were custody seals on the bottle(s) or bottle kits (LLHg/MeHg)? Yes NO
- Shippers' packing slip attached to the cooler(s)? Yes No
- Did custody papers accompany the sample(s)? Yes No
- Were the custody papers relinquished & signed in the appropriate place? Yes No
- Was/were the person(s) who collected the samples clearly identified on the COC? Yes NO
- Did all bottles arrive in good condition (Unbroken)? Yes No
- Could all bottle labels be reconciled with the COC? Yes No
- Were correct bottle(s) used for the test(s) indicated? Yes No
- Sufficient quantity received to perform indicated analyses? Yes No
- Are these work share samples? Yes NO
If yes, Questions 11-15 have been checked at the originating laboratory.
- Were sample(s) at the correct pH upon receipt? Yes No NA pH Strip Lot# HC682547
- Were VOAs on the COC? Yes No
- Were air bubbles >6 mm in any VOA vials? Yes NO NA
- Was a VOA trip blank present in the cooler(s)? Trip Blank Lot # _____ Yes No
- Was a LL Hg or Me Hg trip blank present? Yes NO

Contacted PM _____ Date _____ by _____ via Verbal Voice Mail Other

Concerning _____

16. CHAIN OF CUSTODY & SAMPLE DISCREPANCIES

Samples processed by: _____

17. SAMPLE CONDITION

Sample(s) _____ were received after the recommended holding time had expired.
Sample(s) _____ were received in a broken container.
Sample(s) _____ were received with bubble >6 mm in diameter. (Notify PM)

18. SAMPLE PRESERVATION

Sample(s) _____ were further preserved in the laboratory.
Time preserved: _____ Preservative(s) added/Lot number(s): _____

Temperature readings: _____

<u>Client Sample ID</u>	<u>Lab ID</u>	<u>Container Type</u>	<u>Container pH</u>	<u>Preservative Added (mls)</u>	<u>Lot #</u>
GP-16-04W	240-71909-D-5	Plastic 500ml - with Nitric Acid	<2		

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CITY OF ANN ARBOR
LIVING WAGE ORDINANCE DECLARATION OF COMPLIANCE

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

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

The Contractor or Grantee agrees:

- (a) To pay each of its employees whose wage level is not required to comply with federal, state or local prevailing wage law, for work covered or funded by a contract with or grant from the City, no less than the Living Wage. The current Living Wage is defined as \$13.13/hour for those employers that provide employee health care (as defined in the Ordinance at Section 1:815 Sec. 1 (a)), or no less than \$14.65/hour for those employers that do not provide health care. The Contractor or Grantor understands that the Living Wage is adjusted and established annually on April 30 in accordance with the Ordinance and covered employers shall be required to pay the adjusted amount thereafter to be in compliance (Section 1:815(3)).

Check the applicable box below which applies to your workforce

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage without health benefits

Employees who are assigned to any covered City contract/grant will be paid at or above the applicable living wage with health benefits

- (b) To post a notice approved by the City regarding the applicability of the Living Wage Ordinance in every work place or other location in which employees or other persons contracting for employment are working.
- (c) To provide to the City payroll records or other documentation within ten (10) business days from the receipt of a request by the City.
- (d) To permit access to work sites to City representatives for the purposes of monitoring compliance, and investigating complaints or non-compliance.
- (e) To take no action that would reduce the compensation, wages, fringe benefits, or leave available to any employee covered by the Living Wage Ordinance or any person contracted for employment and covered by the Living Wage Ordinance in order to pay the living wage required by the Living Wage Ordinance.

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

 Company Name

 Street Address

 Signature of Authorized Representative

 Date

 City, State, Zip

 Print Name and Title

 Phone/Email address

CITY OF ANN ARBOR LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2017 - ENDING APRIL 29, 2018

\$13.13 per hour

If the employer provides health care benefits*

\$14.65 per hour

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

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

ENFORCEMENT

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

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

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

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

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



Vendor Conflict of Interest Disclosure Form

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

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

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

Conflict of Interest Disclosure*	
Name of City of Ann Arbor employees, elected officials or immediate family members with whom there may be a potential conflict of interest.	<input type="checkbox"/> Relationship to employee <hr style="border: 0; border-top: 1px solid black;"/> <input type="checkbox"/> Interest in vendor's company <input type="checkbox"/> Other (please describe in box below)

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

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the Vendor by my signature below:		
Vendor Name	Vendor Phone Number	
Signature of Vendor Authorized Representative	Date	Printed Name of Vendor Authorized Representative

Questions about this form? Contact Procurement Office City of Ann Arbor Phone: 734/794-6500, procurement@a2gov.org

CITY OF ANN ARBOR NON-DISCRIMINATION ORDINANCE

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

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

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

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

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

Complaint Procedure: If any individual has a grievance alleging a violation of this chapter, he/she has 180 calendar days from the date of the individual's knowledge of the allegedly discriminatory action or 180 calendar days from the date when the individual should have known of the alleged discriminatory action to file a complaint with the city's Human Rights Commission. If an individual fails to file a complaint alleging a violation of this chapter within the specified time frame, the complaint will not be considered by the Human Rights Commission. The complaint should be made in writing to the Human Rights Commission. The complaint may be filed in person with the City Clerk, by e-mail (hrc@a2gov.org), by phone (734-794-6141) or by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107). The complaint must contain information about the alleged discrimination, such as name, address, phone number of the complainant and location, date and description of the alleged violation of this chapter.

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

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

MICHIGAN DEPARTMENT OF TRANSPORTATION CERTIFIED PAYROLL

COMPLETION OF CERTIFIED PAYROLL FORM FULFILLS THE MINIMUM MDOT PREVAILING WAGE REQUIREMENTS

(1) NAME OF CONTRACTOR / SUBCONTRACTOR (CIRCLE ONE) (2) ADDRESS

(3) PAYROLL NO. (4) FOR WEEK ENDING (5) PROJECT AND LOCATION (6) CONTRACT ID

(a)	(b)	(c)	(d) DAY AND DATE							(e)	(f)	(g)	(h)	(i)	(j) DEDUCTIONS						(k)
															TOTAL HOURS ON PROJECT	PROJECT RATE OF PAY	PROJECT RATE OF FRINGE PAY	GROSS PROJECT EARNED	GROSS WEEKLY EARNED	TOTAL WEEKLY HOURS WORKED ALL JOBS	
EMPLOYEE INFORMATION	WORK CLASSIFICATION	Hour Type	HOURS WORKED ON PROJECT							TOTAL HOURS ON PROJECT	PROJECT RATE OF PAY	PROJECT RATE OF FRINGE PAY	GROSS PROJECT EARNED	GROSS WEEKLY EARNED	TOTAL WEEKLY HOURS WORKED ALL JOBS	FICA	FEDERAL	STATE	OTHER	TOTAL DEDUCT	TOTAL WEEKLY WAGES PAID FOR ALL JOBS
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00
ETH#GEN: ID #:	GROUP/CLASS #:	S							0											\$0.00	\$0.00
NAME:									0				\$0.00							\$0.00	\$0.00

Date _____

I, _____ (Name of Signatory Party) _____ (Title)

do hereby state:

(1) That I pay or supervise the payment of the persons employed by

_____ on the _____ (Contractor or Subcontractor)
 _____; that during the payroll period commencing on the _____ (Building or Work)
 _____ day of _____, _____, and ending the _____ day of _____, _____,
 all persons employed on said project have been paid the full weekly wages earned, that no rebates have been or will be made either directly or indirectly to or on behalf of said

_____ from the full _____ (Contractor or Subcontractor)

weekly wages earned by any person and that no deductions have been made either directly or indirectly from the full wages earned by any person, other than permissible deductions as defined in Regulations, Part 3 (29 C.F.R. Subtitle A), issued by the Secretary of Labor under the Copeland Act, as amended (48 Stat. 948, 63 Stat. 108, 72 Stat. 967; 76 Stat. 357; 40 U.S.C. § 3145), and described below:

(2) That any payrolls otherwise under this contract required to be submitted for the above period are correct and complete; that the wage rates for laborers or mechanics contained therein are not less than the applicable wage rates contained in any wage determination incorporated into the contract; that the classifications set forth therein for each laborer or mechanic conform with the work he performed.

(3) That any apprentices employed in the above period are duly registered in a bona fide apprenticeship program registered with a State apprenticeship agency recognized by the Bureau of Apprenticeship and Training, United States Department of Labor, or if no such recognized agency exists in a State, are registered with the Bureau of Apprenticeship and Training, United States Department of Labor.

(4) That:

(a) WHERE FRINGE BENEFITS ARE PAID TO APPROVED PLANS, FUNDS, OR PROGRAMS

- in addition to the basic hourly wage rates paid to each laborer or mechanic listed in the above referenced payroll, payments of fringe benefits as listed in the contract have been or will be made to appropriate programs for the benefit of such employees, except as noted in section 4(c) below.

(b) WHERE FRINGE BENEFITS ARE PAID IN CASH

- Each laborer or mechanic listed in the above referenced payroll has been paid, as indicated on the payroll, an amount not less than the sum of the applicable basic hourly wage rate plus the amount of the required fringe benefits as listed in the contract, except as noted in section 4(c) below.

(c) EXCEPTIONS

EXCEPTION (CRAFT)	EXPLANATION
REMARKS:	
NAME AND TITLE	SIGNATURE
THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.	