PUBLIC IMPROVEMENT REQUEST FOR PROPOSAL

RFP# 23-62

Huron West Park Sanitary Sewer Replacement
Phases 2 & 3

City of Ann Arbor
Public Services / Engineering

Due Date: December 14, 2023 by 11:00 a.m. local time

Issued By:

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

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SECTION I - GENERAL INFORMATION

A. OBJECTIVE

The purpose of this Request for Proposal (RFP) is to select a firm to provide construction services for the Huron West Park Sanitary Sewer Replacement Phases 2 & 3.

B. 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.

Proposals that fail to provide a bid security upon proposal opening will be deemed non-responsive and will not be considered for award.

C. QUESTIONS AND CLARIFICATIONS / DESIGNATED CITY CONTACTS

All questions regarding this Request for Proposal (RFP) shall be submitted via e-mail. Questions will be accepted and answered in accordance with the terms and conditions of this RFP.

All questions shall be submitted on or before December 4, 2023 by 5:00 p.m. local time, and should be addressed as follows:

Scope of Work/Proposal Content questions shall be e-mailed to Brian Slizewski, PE – bslizewski@a2gov.org

RFP Process and Compliance questions shall be e-mailed to Colin Spencer, Buyer - CSpencer@a2gov.org

Should any prospective bidder be in doubt as to the true meaning of any portion of this RFP, or should the prospective bidder find any ambiguity, inconsistency, or omission therein, the prospective bidder shall make a written request for an official interpretation or correction by the due date for questions above.

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

D. PRE-PROPOSAL MEETING

A virtual, Microsoft Teams, pre-proposal conference for this project will be held on Thursday, November 30, 2023 at 2:00 p.m. local time. Contact the project manager, bslizewski@a2gov.org before noon on the date of the pre-proposal meeting to receive an email invite to the virtual meeting.

Attendance at this conference is highly recommended. Administrative and technical questions regarding this project will be answered at this time. The pre-proposal 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 proposal will be affirmed in an addendum.

E. PROPOSAL FORMAT

To be considered, each firm must submit a response to this RFP using the format provided in Section III. No other distribution of proposals is to be made by the prospective bidder. An official authorized to bind the bidder to its provisions must sign the proposal. Each proposal must remain valid for at least one hundred and twenty (120) days from the due date of this RFP.

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

F. SELECTION CRITERIA

Responses to this RFP will be evaluated using a point system as shown in Section III. A selection committee comprised primarily of staff from the City will complete the evaluation.

If interviews are desired by the City, the selected firms will be given the opportunity to discuss their proposal, qualifications, past experience, and their fee proposal in more detail. The City further reserves the right to interview the key personnel assigned by the selected bidder to this project.

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

G. SEALED PROPOSAL SUBMISSION

All proposals are due and must be delivered to the City on or December 14, 2023 by 11:00 a.m. local time. Proposals submitted late or via oral, telephonic, telegraphic, electronic mail or facsimile **will not** be considered or accepted.

Each respondent should submit in a sealed envelope

- **one (1) original proposal**
- **one (1) additional proposal copy**
- **one (1) digital copy of the proposal preferably on a USB/flash drive as one file in PDF format**

Proposals submitted should be clearly marked: **"RFP No. 23-62 – Huron West Park Sanitary Sewer Replacement Phases 2 & 3"** and list the bidder's name and address.

Proposals must be addressed and delivered to:
City of Ann Arbor
c/o Customer Service
301 East Huron Street
Ann Arbor, MI 48107

All proposals received on or before the due date will be publicly opened and recorded on the due date. No immediate decisions will be rendered.

Hand delivered proposals may be dropped off in the Purchasing drop box located in the Ann Street (north) vestibule/entrance of City Hall which is open to the public Monday through Friday from 8am to 5pm (except holidays). The City will not be liable to any prospective bidder for any unforeseen circumstances, delivery, or postal delays. Postmarking on the due date will not substitute for receipt of the proposal.

Bidders are responsible for submission of their proposal. Additional time will not be granted to a single prospective bidder. However, additional time may be granted to all prospective bidders at the discretion of the City.

A proposal may be disqualified if the following required forms are not included with the proposal:

- **Attachment D - Prevailing Wage Declaration of Compliance**
- **Attachment E - Living Wage Declaration of Compliance**
- **Attachment G - Vendor Conflict of Interest Disclosure Form**
- **Attachment H - Non-Discrimination Declaration of Compliance**

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

H. DISCLOSURES

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

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

I. TYPE OF CONTRACT

A sample of the Construction Agreement is included as Attachment A. Those who wish to submit a proposal to the City are required to review this sample agreement carefully. **The City will not entertain changes to its Construction Agreement.**

For all construction work, the respondent must further adhere to the City of Ann Arbor General Conditions. The General Conditions are included herein. Retainage will be held as necessary based on individual tasks and not on the total contract value. The Contractor shall provide the required bonds included in the Contract Documents for the duration of the Contract.

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

This RFP and the selected bidder's response thereto, shall constitute the basis of the scope of services in the contract by reference.

J. NONDISCRIMINATION

All bidders proposing to do business with the City shall satisfy the contract compliance administrative policy adopted by the City Administrator in accordance with the Section 9:158 of the Ann Arbor City Code. Breach of the obligation not to discriminate as outlined in Attachment G 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.

K. WAGE REQUIREMENTS

The Attachments provided herein outline the requirements for payment of prevailing wages or of a "living wage" to employees providing service to the City under this contract. The successful bidder must comply with all applicable requirements and provide documentary proof of compliance when requested.

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 Michigan Department of Transportation Prevailing Wage Forms (sample attached hereto) 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 proposals 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 RFP the Construction Types of Heavy and Highway will apply.

L. CONFLICT OF INTEREST DISCLOSURE

The City of Ann Arbor Purchasing Policy requires that the consultant complete a Conflict of Interest Disclosure form. A contract may not be awarded to the selected bidder 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 Conflict of Interest Disclosure Form is attached.

M. COST LIABILITY

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

N. DEBARMENT

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

O. PROPOSAL PROTEST

All proposal protests must be in writing and filed with the Purchasing Manager within five (5) business days of any notices of intent, including, but not exclusively, divisions on prequalification of bidders, shortlisting of bidders, or a notice of intent to award. Only bidders who responded to the solicitation may file a bid protest. The bidder must clearly state the reasons for the protest. If any 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 Manager. The Purchasing Manager 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.

Any inquiries or requests regarding this procurement should be only submitted in writing to the Designated City Contacts provided herein. Attempts by the bidder to initiate contact with anyone other than the Designated City Contacts provided herein that the bidder believes can influence the procurement decision, e.g., Elected Officials, City Administrator, Selection Committee Members, Appointed Committee Members, etc., may lead to immediate elimination from further consideration.

P. SCHEDULE

The following is the schedule for this RFP process.

Activity/Event	**Anticipated Date**
Pre-Proposal Conference	Nov 30, 2023, 2:00 p.m. (Local Time)
Written Question Deadline	Dec 4, 2023, 5:00 p.m. (Local Time)
Addenda Published (if needed)	Dec 8, 2023
Proposal Due Date	Dec 14, 2023, 11 a.m. (Local Time)
Selection/Negotiations	December 2023
Expected City Council Authorizations	February 5, 2024

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

Q. IRS FORM W-9

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

R. RESERVATION OF RIGHTS

1. The City reserves the right in its sole and absolute discretion to accept or reject any or all proposals, or alternative proposals, in whole or in part, with or without cause.
2. The City reserves the right to waive, or not waive, informalities or irregularities in terms or conditions of any proposal if determined by the City to be in its best interest.
3. The City reserves the right to request additional information from any or all bidders.
4. The City reserves the right to reject any proposal that it determines to be unresponsive and deficient in any of the information requested within RFP.
5. The City reserves the right to determine whether the scope of the project will be entirely as described in the RFP, a portion of the scope, or a revised scope be implemented.
6. The City reserves the right to select one or more contractors or service providers to perform services.

7. The City reserves the right to retain all proposals submitted and to use any ideas in a proposal regardless of whether that proposal is selected. Submission of a proposal indicates acceptance by the firm of the conditions contained in this RFP, unless clearly and specifically noted in the proposal submitted.
8. The City reserves the right to disqualify proposals that fail to respond to any requirements outlined in the RFP, or failure to enclose copies of the required documents outlined within the RFP.

S. IDLEFREE ORDINANCE

The City of Ann Arbor adopted an idling reduction Ordinance that went into effect July 1, 2017. The full text of the ordinance (including exemptions) can be found at: www.a2gov.org/idlefree.

Under the ordinance, No Operator of a Commercial Vehicle shall cause or permit the Commercial Vehicle to Idle:

(a) For any period of time while the Commercial Vehicle is unoccupied; or

(b) For more than 5 minutes in any 60-minute period while the Commercial Vehicle is occupied.

In addition, generators and other internal combustion engines are covered

(1) Excluding Motor Vehicle engines, no internal combustion engine shall be operated except when it is providing power or electrical energy to equipment or a tool that is actively in use.

T. ENVIRONMENTAL COMMITMENT

The City of Ann Arbor recognizes its responsibility to minimize negative impacts on human health and the environment while supporting a vibrant community and economy. The City further recognizes that the products and services the City buys have inherent environmental and economic impacts and that the City should make procurement decisions that embody, promote, and encourage the City's commitment to the environment.

The City encourages potential vendors to bring forward emerging and progressive products and services that are best suited to the City's environmental principles.

U. MAJOR SUBCONTRACTORS

The Bidder shall identify 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.

N. 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.

SECTION II - SCOPE OF WORK

Please see the plan set for more details.

SECTION III - MINIMUM INFORMATION REQUIRED

PROPOSAL FORMAT

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

Bidders should organize Proposals into the following Sections:

A. Qualifications, Experience and Accountability
B. Workplace Safety
C. Workforce Development
D. Social Equity and Sustainability
E. Schedule of Pricing/Cost
F. Authorized Negotiator
G. Attachments

Bidders are strongly encouraged to provided details for all of the information requested below within initial proposals. Backup documentation may be requested at the sole discretion of the City to validate all of the responses provided herein by bidders. False statements by bidders to any of the criteria provided herein will result in the proposal being considered non-responsive and will not be considered for award.

Pursuant to Sec 1:325 of the City Code which sets forth requirements for evaluating public improvement bids, Bidders should submit the following:

A. Qualifications, Experience and Accountability - 20 Points

1. Qualifications and experience of the bidder and of key persons, management, and supervisory personnel to be assigned by the bidder.

2. References from individuals or entities the bidder has worked for within the last five (5) years including information regarding records of performance and job site cooperation.

3. Evidence of any quality control program used by the bidder and the results of any such program on the bidder's previous projects.

4. A statement from the bidder as to any major subcontractors it expects to engage including the name, work, and amount.

B. Workplace Safety – 20 Points

1. Provide a copy of the bidder's safety program, and evidence of a safety-training program for employees addressing potential hazards of the proposed job site. Bidder must identify a designated qualified safety representative responsible for bidder's safety program who serves as a contact for safety related matters.

2. Provide the bidder's Experience Modification Rating ("EMR") for the last three consecutive years. Preference within this criterion will be given to an EMR of 1.0 or less based on a three-year average.

3. Evidence that all craft labor that will be employed by the bidder for the project has, or will have prior to project commencement, completed at least an authorized 10-hour OSHA Construction Safety Course.

4. For the last three years provide a copy of any documented violations and the bidder's corrective actions as a result of inspections conducted by the Michigan Occupational Safety & Health Administration (MIOSHA), U.S. Department of Labor – Occupational Safety and Health Administration (OSHA), or any other applicable safety agency.

C. Workforce Development – 20 Points

1. Documentation as to bidder's pay rates, health insurance, pension or other retirement benefits, paid leave, or other fringe benefits to its employees.

2.. Documentation that the bidder participates in a Registered Apprenticeship Program that is registered with the United States Department of Labor Office of Apprenticeship or by a State Apprenticeship Agency recognized by the USDOL Office of Apprenticeship. USDOL apprenticeship agreements shall be disclosed to the City in the solicitation response.

3. Bidders shall disclose the number of non-craft employees who will work on the project on a 1099 basis, and the bidders shall be awarded points based on their relative reliance on 1099 work arrangements with more points assigned to companies with fewer 1099 arrangements. Bidders will acknowledge that the City may ask them to produce payroll records at points during the project to verify compliance with this section.

D. Social Equity and Sustainability – 20 Points

1. A statement from the bidder as to what percentage of its workforce resides in the City of Ann Arbor and in Washtenaw County, Michigan. The City will consider in

evaluating which bids best serve its interests, the extent to which responsible and qualified bidders employ individuals in either the city of the county. Washtenaw County jurisdiction is prioritized for evaluation purposes for this solicitation.

2. Evidence of Equal Employment Opportunity Programs for minorities, women, veterans, returning citizens, and small businesses.

3. Evidence that the bidder is an equal opportunity employer and does not discriminate on the basis of race, sex, pregnancy, age, religion, national origin, marital status, sexual orientation, gender identity or expression, height, weight, or disability.

4. The bidder's proposed use of sustainable products, technologies, or practices for the project, which reduce the impact on human health and the environment, including raw materials acquisition, production, manufacturing, packaging, distribution, reuse, operation, maintenance, and waste management.

5. The bidder's environmental record, including findings of violations and penalties imposed by government agencies.

E. Schedule of Pricing - 20 Points

Company:

Project: Huron West Park Sanitary Sewer Replacement Phase 2 &3
File #: 2019-024 **RFP#: 23-62**

Item	Description	Unit	Estimated Quantity	Unit Price	Total Price
101	General Conditions, Max. $200,000.00	LS	1	$ _____	$ _____
102	Digital Audio-Visual Coverage	LS	1	$ _____	$ _____
120	Project Supervision, Max $100,000.00	LS	1	$ _____	$ _____
130	Protective Fence, Orange, Plastic, 4-foot Ht.	FT	6200	$ _____	$ _____
131	Protective Fence, Chain Link, 6-foot Ht	FT	700	$ _____	$ _____
135	Tree Removal, 6 inch to 24 inch	EA	97	$ _____	$ _____
136	Tree Removal, Larger than 24 inch	EA	7	$ _____	$ _____
140	Exploratory Excavation (0 to 10 feet)	EA	20	$ _____	$ _____
141	Exploratory Excavation, Add'l Depth	VF	40	$ _____	$ _____
201	Minor Traffic Devices, Max $40,000.00	LS	1	$ _____	$ _____
202	Certified Payroll Compliance and Reporting	LS	1	$ _____	$ _____
203	Sewer Flow Control	LS	1	$ _____	$ _____
204	"No Parking" Signs	EA	20	$ _____	$ _____
205	Sign, Portable Changeable Message, Furn and Oper	EA	2	$ _____	$ _____
206	Plastic Drum - Lighted, Furnish and Operate	EA	30	$ _____	$ _____
207	Barricade Type III - Lighted, Furnish and Operate	EA	25	$ _____	$ _____
208	Temporary Sign, Type B, Furnish and Operate	SFT	1200	$ _____	$ _____
209	Pedestrian Type II Barricade, Furn and Oper	EA	30	$ _____	$ _____
210	Remove Concrete Curb or Curb and Gutter - Any Type	FT	600	$ _____	$ _____
211	Remove Concrete Sidewalk and Drive - Any Thickness	SFT	1800	$ _____	$ _____
212	HMA Surface Remove	SYD	1000	$ _____	$ _____
213	Machine Grading, Modified	SYD	750	$ _____	$ _____
214	Subgrade Undercutting, Type II	CYD	50	$ _____	$ _____
215	Sand Subbase Course, Class II - C.I.P.	CYD	40	$ _____	$ _____
216	21AA Limestone, C.I.P.	CYD	70	$ _____	$ _____
217	Aggregate Base Course, 21AA - C.I.P., 8-inch	SYD	750	$ _____	$ _____
218	Aggregate Base Course, 21AA - C.I.P., 10-inch	SYD	100	$ _____	$ _____
219	Aggregate Surface Course, 23A - C.I.P., 8-inch	SYD	500	$ _____	$ _____
220	Aggregate Surface Course, 21AA - C.I.P., 8-inch	SYD	1800	$ _____	$ _____
221	HMA Pavement Leveling/Top – LVSP	TON	200	$ _____	$ _____
222	HMA Pavement Top – 5E1	TON	20	$ _____	$ _____
223	HMA Pavement Leveling - 4E1	TON	20	$ _____	$ _____
224	HMA Pavement Base - 3E1	TON	30	$ _____	$ _____
225	Concrete Curb or Curb and Gutter - All Types	FT	500	$ _____	$ _____
226	Concrete Type M Opening	FT	150	$ _____	$ _____

E. Schedule of Pricing (cont.)

Project: Huron West Park Sanitary Sewer Replacement Phase 2 &3
File #: 2019-024 **RFP#: 23-62**

Item	Description	Unit	Estimated Quantity	Unit Price	Total Price
227	4-Inch Concrete Sidewalk	SFT	900	$	$
228	6-Inch Concrete Sidewalk or Sidewalk Ramp	SFT	800	$	$
229	6-Inch Concrete Drive	SFT	200	$	$
230	Pavt Mrkg, Polyurea, 4 inch, Yellow	FT	100	$	$
231	Pavt Mrkg, Polyurea, 4 inch, White	FT	150	$	$
232	6-Inch Wrapped Underdrain	FT	430	$	$
300	18-inch VCP Sanitary Sewer, Trench Detail I	FT	50	$	$
305	8-inch SDR 26 PVC Sanitary Sewer, Trench Detail I	FT	100	$	$
306	8-inch SDR 26 PVC Sanitary Sewer, Trench Detail V	FT	50	$	$
307	12-inch SDR 26, PVC Sanitary Sewer, Trench Detail I	FT	50	$	$
308	12-inch SDR 26, PVC Sanitary Sewer, Trench Detail V	FT	50	$	$
320	21-inch CL IV RCP Sanitary Sewer, Trench Detail I	FT	200	$	$
321	21-inch CL IV RCP Sanitary Sewer, Trench Detail V	FT	2000	$	$
322	21-inch CL IV RCP Sanitary Sewer, Bored in 36-inch Steel Casing	FT	2200	$	$
323	12-inch CL IV RCP Storm Sewer Pipe, Trench Detail I	FT	100		
330	Sewer Tap, 6-inch	EA	7	$	$
350	6-inch SDR 35 PVC Riser, Trench Detail V	FT	10	$	$
353	6-inch SDR 35 PVC Sanitary Service Lead, Trench Detail V	FT	120	$	$
354	Existing Sewer Lead, Connect	EA	8	$	$
355	Sanitary Sewer Cleanout	EA	6	$	$
360	Type I Manhole, 48-inch Dia (0-10' deep)	EA	22	$	$
361	Type I Manhole, 48-inch Dia, Addl Depth	VF	81	$	$
362	Type I Manhole, 60-inch Dia (0-10' deep)	EA	3	$	$
363	Type I Manhole, 60-inch Dia, Addl Depth	VF	48	$	$
364	Type I Manhole, 72-inch Dia (0-10' deep)	EA	2	$	$
365	Type I Manhole, 72-inch Dia, Addl Depth	VF	21	$	$
367	Single Inlet	EA	5	$	$
368	Manhole Tap, 8-inch	EA	2	$	$
369	Manhole Tap, 21-inch	EA	2	$	$
385	Sewer, Any Size or Depth, Abandon, In Place	FT	2320	$	$
386	Sewer, Any Size or Depth, Abandon, Flowable Fill	FT	1400	$	$
387	Sewer, Any Size or Depth, Remove	FT	500	$	$
388	Structure, Any Size or Depth, Abandon	EA	15	$	$
389	Structure, Any Size or Depth, Remove	EA	8	$	$
392	Pipe Undercut & Refill, 6A	CYD	30	$	$

E. Schedule of Pricing (cont.)

Project: Huron West Park Sanitary Sewer Replacement Phase 2 &3
File #: 2019-024 **RFP#: 23-62**

Item	Description	Unit	Estimated Quantity	Unit Price	Total Price
400	8-inch Class 50 DIP w/polywrap, Trench Detail I	FT	50	$	$
440	Fire Hydrant Assembly	EA	2	$	$
450	Tapping Sleeve, 12 inch x 12 inch x 8 inch, Valve and Box	EA	1	$	$
452	Tapping Sleeve, 6 inch x 6 inch x 6 inch, Valve and Box	EA	1	$	$
563	Structure Covers	LBS	11600	$	$
566	Adjust Structure Cover	EA	3	$	$
702	Inlet Filters	EA	21	$	$
703	Silt Fence	FT	1500	$	$
810	Trees and Plantings (Allowance)	DLR	20000	$ 1	$ 20000
891	Clean-Up & Restoration, Special	LS	1	$	$
892	Topsoil Surface, 2-inch	SYD	2000	$	$
893	Topsoil Surface, 4-inch	SYD	13030	$	$
894	Seed, Turf Grass	LB	200	$	$
895	Seed, Mesic Woodland	LB	100	$	$
896	3 Rail Vinyl Post and Rail Fence	FT	20	$	$
897	3 Rail Vinyl Post and Rail Fence Gate, 16' Wide	EA	1	$	$
900	Allowance for Unforeseen Conditions	DLR	50000	$ 1	$ 50000

TOTAL BID AMOUNT **$**

F. AUTHORIZED NEGOTIATOR / NEGOTIATIBLE ELEMENTS (ALTERNATES)

Include the name, phone number, and e-mail address of persons(s) in your organization authorized to negotiate the agreement with the City.

The 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 bidder 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.

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 its proposed time for performance of the work.

Consideration for any proposed alternative items or time may be negotiated at the discretion of the City.

G. ATTACHMENTS

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

PROPOSAL EVALUATION

1. The selection committee will evaluate each proposal by the above-described criteria and point system. The City reserves the right to reject any proposal that it determines to be unresponsive and deficient in any of the information requested for evaluation. A proposal with all the requested information does not guarantee the proposing firm to be a candidate for an interview if interviews are selected to be held by the City. The committee may contact references to verify material submitted by the bidder.

2. The committee then will schedule interviews with the selected firms if necessary. The selected firms will be given the opportunity to discuss in more detail their qualifications, past experience, proposed work plan (if applicable) and pricing.

3. The interview should include the project team members expected to work on the project, but no more than six members total. The interview shall consist of a presentation of up to thirty minutes (or the length provided by the committee) by the

bidder, including the person who will be the project manager on this contract, followed by approximately thirty minutes of questions and answers. Audiovisual aids may be used during the oral interviews. The committee may record the oral interviews.

4. The firms interviewed will then be re-evaluated by the above criteria and adjustments to scoring will be made as appropriate. After evaluation of the proposals, further negotiation with the selected firm may be pursued leading to the award of a contract by City Council, if suitable proposals are received.

The City reserves the right to waive the interview process and evaluate the bidder based on their proposal and pricing schedules alone.

The City will determine whether the final scope of the project to be negotiated will be entirely as described in this RFP, a portion of the scope, or a revised scope.

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.

Any proposal that does not conform fully to these instructions may be rejected.

PREPARATION OF PROPOSALS

Proposals should have no plastic bindings but will not be rejected as non-responsive for being bound. Staples or binder clips are acceptable. Proposals should be printed double sided on recycled paper.

Each person signing the proposal certifies that they are a person in the bidder's firm/organization responsible for the decisions regarding the fees being offered in the Proposal and has not and will not participate in any action contrary to the terms of this provision.

ADDENDA

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

Each bidder should acknowledge in its proposal all addenda it has received on the General Declarations form provided in the Attachments section herein. 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 official written addenda.

SECTION IV - ATTACHMENTS

Attachment A – Sample Standard Contract

Attachment B – General Declarations

Attachment C - Legal Status of Bidder

Attachment D – Prevailing Wage Declaration of Compliance Form

Attachment E – Living Wage Declaration of Compliance Form

Attachment F – Living Wage Ordinance Poster

Attachment G – Vendor Conflict of Interest Disclosure Form

Attachment H – Non-Discrimination Ordinance Declaration of Compliance Form

Attachment I – Non-Discrimination Ordinance Poster

Sample Certified Payroll Report Template

ATTACHMENT A
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:

Administrative Use Only
Contract Date: _____

CONTRACT

THIS CONTRACT is 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 **RFP# 23-62, Huron West Park Sanitary Sewer Replacement Phases 2 & 3** in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, all of which are incorporated as part of this Contract:

Non-discrimination and Living Wage Declaration of Compliance Forms (if applicable)
Vendor Conflict of Interest Form
Prevailing Wage Declaration of Compliance Form (if applicable)
Bid Forms
Contract and Exhibits
Bonds
General Conditions
Standard Specifications
Detailed Specifications
Plans
Addenda

ARTICLE II - Definitions

Administering Service Area/Unit means **Public Services Area/Engineering Unit**

Project means **RFP# 23-62, Huron West Park Sanitary Sewer Replacement Phases 2 & 3**

Supervising Professional means the person acting under the authorization of the manager of the Administering Service Area/Unit. At the time this Contract is executed,

the Supervising Professional is: Nicholas Hutchinson whose job title is City Engineer. If there is any question concerning who the Supervising Professional is, Contractor shall confirm with the manager of the Administering Service Area/Unit.

Contractor's Representative means _____ [**Insert name**] whose job title is [**Insert job title**].

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 two hundred seventy (270) 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 $2,000 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 Contract, 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 Contract.

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 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.

ARTICLE XI – Electronic Transactions

The City and Contractor agree that signatures on this Contract may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this Contract. This Contract may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

FOR CONTRACTOR

By_____

Its:_____

FOR THE CITY OF ANN ARBOR

By_____
Christopher Taylor, Mayor

By_____
Jacqueline Beaudry, City Clerk

Approved as to substance

By_____
Milton Dohoney, Jr.
City Administrator

By_____
Brian Steglitz
Public Services Area Administrator

Approved as to form and content

_____
Atleen Kaur, City Attorney

PERFORMANCE 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 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 entitled _____ _____, for RFP No. _____ 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.

(6) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 202_.

_____	_____
(Name of Surety Company)	(Name of Principal)
By _____	By _____
(Signature)	(Signature)
Its _____	Its _____
(Title of Office)	(Title of Office)
Approved as to form:	Name and address of agent:
_____	_____
Atleen Kaur, City Attorney	_____
	_____

LABOR AND MATERIAL BOND

(1) _____

of _____(referred to as "Principal"), and _____, a corporation duly authorized to do business in the State of Michigan, (referred to as "Surety"), are bound to the City of Ann Arbor, Michigan (referred to as "City"), for the use and benefit of claimants as defined in Act 213 of Michigan Public Acts of 1963, as amended, being MCL 129.201 et seq., in the amount of

$ _____, for the payment of which Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, by this bond.

(2) The Principal has entered a written Contract with the Cityentitled _____

_____

_____

____, for RFP No. _____; 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.

(5) Principal, Surety, and the City agree that signatures on this bond may be delivered electronically in lieu of an original signature and agree to treat electronic signatures as original signatures that bind them to this bond. This bond may be executed and delivered by facsimile and upon such delivery, the facsimile signature will be deemed to have the same effect as if the original signature had been delivered to the other party.

SIGNED AND SEALED this _____ day of _____, 202_

_____	_____
(Name of Surety Company)	(Name of Principal)
By _____	By _____
(Signature)	(Signature)
Its _____	Its _____
(Title of Office)	(Title of Office)
Approved as to form:	Name and address of agent:

Atleen Kaur, City Attorney

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 Contract 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 Contract 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 l3. 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 l80 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 l0 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 that may arise under this Contract; whether the act(s) or omission(s) giving rise to the claim were made by the Contractor, any subcontractor, or anyone employed by them directly or indirectly. Prior to commencement of any work under this contract, Contractor shall provide to the City documentation satisfactory to the City, through City-approved means (currently myCOI), demonstrating it has obtained the required policies and endorsements. The certificates of insurance endorsements and/or copies of

policy language shall document that the Contractor satisfies the following minimum requirements. Contractor shall add registration@mycoitracking.com to its safe sender's list so that it will receive necessary communication from myCOI. When requested, Contractor shall provide the same documentation for its subcontractor(s) (if any).

Required insurance policies include:

(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 04 13 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 that 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 Project General Aggregate
$1,000,000	Personal and Advertising Injury
$2,000,000	Products and Completed Operations Aggregate, which, notwithstanding anything to the contrary herein, shall be maintained for three years from the date the Project is completed.

(c) Motor Vehicle Liability Insurance, including Michigan No-Fault Coverages, equivalent to, as a minimum, Insurance Services Office form CA 00 01 10 13 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 that 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 for any insurance listed herein.

(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 and un-qualified 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(s); name of insurance company(s); name and address of the agent(s) or authorized representative(s); name(s), email address(es), and address of insured; project name; policy expiration date; and specific coverage amounts; (b) any deductibles or self-insured retentions which may 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) and all required endorsements 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 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-authorized 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.

Section 44

CONTRACTOR'S AFFIDAVIT

The undersigned Contractor,_____, represents that on _____, 20___, it was awarded a contract by the City of Ann Arbor, Michigan to_____ under the terms and conditions of a Contract titled _____. The Contractor represents that all work has now been accomplished and the Contract is complete.

The Contractor warrants and certifies that all of its indebtedness arising by reason of the Contract has been fully paid or satisfactorily secured; and that all claims from subcontractors and others for labor and material used in accomplishing the project, as well as all other claims arising from the performance of the Contract, have been fully paid or satisfactorily settled. The Contractor agrees that, if any claim should hereafter arise, it shall assume responsibility for it immediately upon request to do so by the City of Ann Arbor.

The Contractor, for valuable consideration received, does further waive, release and relinquish any and all claims or right of lien which the Contractor now has or may acquire upon the subject premises for labor and material used in the project owned by the City of Ann Arbor.

This affidavit is freely and voluntarily given with full knowledge of the facts.

_____ _____
Contractor Date

By _____
(Signature)

Its _____
(Title of Office)

Subscribed and sworn to before me, on this _____ day of _____, 20__
_____ , _____ County, Michigan
Notary Public
_____ County, MI
My commission expires on:

STANDARD SPECIFICATIONS

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

Standard Specifications are available online:

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

DETAILED SPECIFICATIONS

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROJECT SCHEDULE AND PAYMENT

Description

Examination of Plans, Specifications, and Work Site

Bidders shall carefully examine the Bid Form, plans, specifications, and the work site until the Bidder is satisfied as to all local conditions affecting the contract and the detailed requirements of construction. The submission of the bid shall be considered prima facie evidence that the Bidder has made such examination and is satisfied as to the conditions to be encountered in performing the work and all requirements of the Contract.

The 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.

1. The Contractor shall begin the work of this project on **February 25, 2024**, and only upon receipt of the fully executed Contract and Notice to Proceed. Appropriate time extensions shall be granted if the Notice to Proceed is delayed beyond this date, and for seasonal weight restrictions beyond two weeks in duration.

2. This Contract requires the replacement of an existing sanitary sewer with a new sanitary sewer installed adjacent to the existing. Work shall begin at the downstream end of the sewer at Arbana Drive and proceed upgrade. The new sections of sewer shall be tested and placed into service before proceeding upgrade as designated below:

    a. S19 to S24 shall be accepted prior to connecting the existing sewer at S19 and crossing N Revena Blvd. Install S25 over the existing 12-inch sanitary sewer and connect to S19 following acceptance. All leads in this section shall be transferred following acceptance. Abandon existing sewer from Arbana Drive to S25 following lead transfer.
    b. S18 to S19 beneath N Revena Blvd shall be accepted prior to proceeding upstream of S18. Once construction has progressed west of N Revena Blvd, all restoration from N Revena Blvd to Arbana Drive shall be completed. Begin flow diversion to S18 as necessary to facilitate construction. Install bulkhead at Ex. Manhole 71-67392 in N Revena Blvd.
    c. Ex. Manhole 71-67397 to S18 shall be accepted prior to proceeding upstream from Ex. Manhole 71-072894. Once construction has progressed west of Wildwood Ave, all restoration from Wildwood Ave to N Revena Blvd Drive shall be completed. Abandon existing sewer from Ex. Manhole 71-67397 to S18 following lead transfer.
    d. S10 to Ex. Manhole 71-072894 shall be accepted prior to proceeding upstream from S10. Connection at Ex. Manhole 71-67423 shall be made after this section has been approved. Following this connection, the trail section through Maryfield Wildwood Park shall be fully restored and reopened to the public. Abandon existing sewer from S10 to Ex. Manhole 71-072894.
    e. S9 to S10 shall be accepted prior to proceeding upstream from S9. Side connections at Doty Ave and Westwood Ave shall be fully transferred and all leads in this section shall be transferred. Abandon existing sewer from Ex. Manhole S9 to S10 following lead transfer.

f. S7 to S9 shall be accepted prior to proceeding upstream from S7. Begin flow diversion to S7 as necessary to facilitate construction.
g. S4 to S6 shall be accepted prior to proceeding upstream from S4. Begin flow diversion to S4 as necessary to facilitate construction.
h. S1 to S4 shall be accepted prior to proceeding upstream from S1. Begin flow diversion to S1 or S2 as necessary to facilitate construction. Make final connections at Ex. Manholes 71-67263 and 71-67261 after sewer has been accepted to S1. Abandon all remaining sewer.

3. Contractor shall provide all necessary sewer flow control to maintain flow at all existing sewer crossings, connections and lead transfers.

The Contractor is expected to be furnished with an electronic copy (PDF) of the Contract, for their execution, on or before **January 10, 2024**. The Contractor shall digitally sign the Contract and return it, with the required Bonds and Insurance Certificate to the City. City Council approval is expected on or before **February 5, 2024**.

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 to complete the project by the final completion date. Should the Contractor demonstrate that they must work on some Sundays in order to maintain the project schedule, they may do so between the hours of 9:00 a.m. and 5:00 p.m. with prior approval from the City. There will be no additional compensation due to the Contractor for work performed on Sundays.

Prior to the start of any construction, the Contractor shall submit a detailed schedule of work for the Engineer's review and approval. Work shall not be started until a schedule is approved in writing by the Engineer. The proposed schedule must fully comply with the scheduling requirements contained in this Detailed Specification. The Contractor shall update the approved work schedule upon request by the Engineer and present it to the Engineer within seven days of said request.

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.

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.

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, **$2,000.00** in Liquidated Damages, and not as a penalty, for delays in the completion of the work for each and every calendar day beyond the times for each sub-phase, as required by this Detailed Specification.

Liquidated Damages will be assessed until the required work is completed in the current construction season. If, with the Engineer's approval, work is extended beyond seasonal limitations, the assessment of Liquidated Damages will be discontinued until the work is resumed in the following construction season.

Measurement and Payment

If the construction Contract is not completed within the specified calendar day period including any extensions of time granted thereto, at the sole discretion of the City of Ann Arbor, this Contract may be terminated with no additional compensation due to the Contractor, and the Contractor may be forbidden to bid on future City of Ann Arbor projects for a period of at least three (3) years. If the Engineer elects to terminate the Contract, Contract items paid for on a Lump Sum basis shall be paid up to a maximum percentage equal to the percentage of the Contract work that has been completed.

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, Max $_____".

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MAINTENANCE OF TRAFFIC

Description

Traffic shall be maintained in accordance with the City of Ann Arbor Public Services Department Standard Specifications and as specified in Sections 104.11, 812, and 922 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD), and as described herein.

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

Materials

The materials and equipment shall meet the requirements specified in the corresponding sections of the MDOT 2020 Standard Specifications for Construction and the 2011 MMUTCD.

Maintenance of Local Traffic

Unless otherwise indicated on the plans, all side roads shall not be closed to through traffic except during construction operations of short duration and only upon written approval of the Engineer.

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

Contractor must accommodate the safe access to the residential buildings and businesses located within construction area.

Driveways shall not be blocked for extended periods of time unless arrangements can be made with the affected property owner(s). When it becomes necessary to temporarily block driveways, the Contractor shall notify the affected property owners in advance to coordinate the work and allow sufficient time for vehicles to vacate from properties. It may be necessary to allow for vehicles to temporarily park in the roadway at locations that do not interfere with the Contractor's work. During these periods the owners of the respective vehicles must be available to, with proper notice, move their vehicles if it becomes necessary to accommodate the work.

At times, when it becomes necessary to temporarily obstruct local traffic during the performance of the work, the Contractor shall provide traffic regulator control in conformance with Chapter 6E of the MMUTCD, Sections 6E.01 thru 6E.08. A minimum of two traffic regulators are required. The cost of traffic regulator control shall be included in the contract pay item "Minor Traffic Control, Maximum
$_____".

A lane-closure permit shall be obtained by the Contractor from the Project Management Services Unit, at least 48 hours in advance of any proposed lane or street closing. No lane closures shall be permitted July 4, and during the Labor Day and Memorial Day weekends.

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

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

The Contractor shall use quantities of dust palliative, maintenance aggregate, and cold patching/HMA mixtures for use as temporary base, surfacing, and dust control at utility crossings, side roads and driveways (wherever required to maintain traffic), and where directed by the Engineer to maintain local access. The cost for the use of dust palliative, maintenance aggregate, cold patch and/or hot mix asphalt 36A mixture, as required and directed by the Engineer for maintenance of traffic and local access, shall be included in Contract pay item "General Conditions, Maximum, $_____", and it will not be paid for separately.

The work of maintaining and relocating existing warning, regulatory and/or guide signs; and of removing, salvaging, and reinstalling existing signs and supports is included in the bid price for the contract pay item "Minor Traffic Control, Maximum $_".

Mailboxes and newspaper boxes that are in the way of the construction shall be removed and reset immediately in a temporary location approved by the Engineer. Mail and paper delivery shall not be interrupted during the construction. Upon completion of the construction, all mailboxes and newspaper boxes, including their supports, shall be repositioned in their permanent locations as approved by the Engineer. This work shall be included the contract unit price for the contract pay item "General Conditions, Maximum, $_____", and it will not be paid for separately.

The Contractor shall perform the work of this Contract while maintaining traffic in accordance with the Contract Documents as specified herein. No traffic shall be allowed on newly placed asphalt surfaces until rolling has been satisfactorily completed and the surface has cooled sufficiently to prevent damage from traffic. This is to be accomplished by flag persons and by relocating traffic control devices to prevent traffic from entering the work area until such time that it can be safely maintained without damaging the new construction. The Contractor shall provide traffic regulators in sufficient number to maintain traffic as described herein, and to keep traffic off sections being surfaced, and provide for safe travel at all times as directed by the Engineer.

The Contractor shall furnish, erect, maintain, and upon completion of the work, remove any and all traffic control devices utilized on the project.

Each pressure distributor, paver and roller shall be equipped with at least one approved flasher light which shall be mounted on the equipment so as to give a warning signal ahead and behind.

General

This item shall include all work described and required by the Drawings and specifications for which the item of work "General Conditions" is listed, as well as items of work not listed in the Bid Form including, but not limited to:

1. Scheduling and organization of all work, subcontractors, suppliers, testing, inspection, surveying, and staking.

2. Coordination of, and cooperation with, other contractors, agencies, departments, and utilities.

3. Protection and maintenance of utilities, including support, protection, capping, repair, replacement, connection or reconnection of existing pipelines, and utilities damaged by the Contractor's operations.

4. Placing, maintaining, and removing additional needed soil erosion and sedimentation controls that are not paid separately.

5. Maintaining drainage.

6. Maintaining driveways drive openings, sidewalks, bike paths, mail deliveries, and solid waste/recycle pick-ups. This includes the placement and maintenance of gravel in driveway openings as directed by the Engineer.

7. Using quantities of dust palliative, maintenance aggregate, and hot patching mixture for use as temporary base, surfacing, and dust control at utility crossings, side roads and driveways.

8. Storing all materials and equipment off lawn areas in locations indicated on the Drawings.

9. Site clean-up.

10. Dewatering and drainage of excavations as required to maintain a stable, open hole.

11. Disposing of excess excavated materials and debris (excluding debris material removed from cleaning operations).

12. Temporary fill as necessary for equipment access or protection of existing utilities during construction, including restoration to original grades.

13. Temporary removal/relocation, storage, and re-installation/re-setting of existing street name, guide, and regulatory signs, mailboxes, fences, landscape areas, etc. which conflict with the proposed construction, including all fasteners, hardware, and materials required for re-installation/re-setting.

14. Furnishing and operating vacuum-type street cleaning equipment a minimum of once per week or as frequently as directed by the Engineer in order to remove mud, soil, rocks, debris, or any other deleterious materials from paved areas.

15. Furnishing and operating vacuum-type utility structure cleaning equipment.

16. Furnishing and operating both vibratory plate and pneumatic-type ("pogo-stick") compactors.

17. Furnishing and operating a backhoe during all work activities.

18. Furnishing and operating a jackhammer and air compressor during all work activities.

19. Noise and dust control.

20. Mobilization(s) and demobilization(s).

21. Furnishing submittals and certifications for all materials and supplies.

22. Removal and disposal of shrubs, brush, stumps, and trees less than 6-inches in diameter as directed by the Engineer.

23. Trimming of trees to accommodate construction activities as directed by Engineer.

24. Fencing to protect excavations over 1-foot in depth during non-work hours or as directed by the Engineer. The fencing must be a minimum of 36-inches high, be constructed of orange HDPE material, and reasonably secured to prevent access.

25. All miscellaneous and incidental items such as overhead, insurance, and permits.

26. Meeting all requirements relating to Debarment Certification, Davis Bacon Act, and Disadvantaged Business Enterprise, and providing the necessary documentation.

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 one 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:

Contract Item (Pay Item)	**Pay Unit**
General Conditions, Max. $200,000	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 Contract Documents and as included in this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AUDIO-VISUAL RECORDING

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 audio-visual recording shall be:

1. Of professional quality, providing a clear and accurate audio and visual record of existing conditions.

2. Prepared during the three (3) week period immediately prior to the Preconstruction Meeting.

3. Furnished to the Engineer a minimum of one (1) week prior to bringing any materials or equipment within the areas described in this Detailed Specification.

4. Carried out under the supervision of the Engineer.

The Contractor shall furnish two (2) copies of the completed recording to the Engineer at, or prior to, the Preconstruction Meeting. An index of the recording, which will enable any area of the project to be easily found on the recording, shall be included. This includes indexing the files according to street and Station number as applicable. The Contractor shall retain a third copy of the recording for their 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.

Production

The audio-visual recording shall be completed in accordance with the following minimum requirements:

1. 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.

2. 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 30-feet per minute (0.34 miles per hour). Pan and zoom rates shall be controlled sufficiently so that playback will ensure quality of the object viewed.

3. Display

   The recording equipment shall have transparent time and date stamp and digital annotation capabilities. The final copies of the recording shall continuously 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.

4. 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.

5. 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.

Coverage

The audio-visual recording coverage shall include the following:

1. General Criteria

   This 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, pubic signs, private signs, fences, landscaping, trees, shrubs, other vegetation, and other similar or significant features.

2. Other Areas

   The Contractor shall record, at their sole expense, other areas where, in their 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 herein at the Contractor’s sole expense.

Audiovisual Filming Services

The following companies are known to be capable of providing the filming services required by this Detailed Specification 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.
Finishing Touch Photo & Video

Measurement and Payment

The completed work shall be paid for at the Contract unit price for the following Contract pay item:

Contract Item (Pay Item)	Pay Unit
Digital Audio-Visual Coverage	Lump Sum

Digital Audio-Visual 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 Digital Audio-Visual Coverage following the review and acceptance of the recording by the Engineer. Within 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.

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.

The Project Supervisor shall be equipped by the Contractor with a mobile telephone to provide the City with 24 hours-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 shall work harmoniously with the City, the public, subcontractors, and all other parties typically involved with work of this nature.

The Project Supervisor shall have a thorough, detailed understanding and working knowledge of all 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 all the Contractor's, subcontractors' and suppliers' equipment, work vehicles, and employees' 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), City Forester and City inspectors.

The Project Supervisor shall coordinate and schedule the work of any independent survey crews that may be retained by the City to witness and reset existing and new geographic/benchmark monuments. Failure to have existing monuments witnessed and reset may result in delays to the Contractor's work. Costs for such delays will be the Contractor's sole responsibility.

The Project Supervisor shall coordinate and schedule 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 accuracy 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 subcontractor.

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 seven (7) calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within seven (7) 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 seven (7) calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within seven (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 one 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:

Contract Item (Pay Item)	**Pay Unit**
Project Supervision, Maximum $100,000	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 City Standard Specifications and as modified by this Detailed Specification.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROTECTIVE FENCING

Description

This work shall consist of taking all reasonable measures to protect all existing trees and vegetation designated to remain and be protected within the project limits and the construction influence area, in accordance with Sections 201.03.A.2 and Section 808 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, except as specified herein. The work shall also consist of installing protective fencing at the limits of the construction area as shown on the plans or in areas directed by the Engineer.

Materials

Fabric shall be orange, vinyl, snow fence material, 4-feet tall. Posts shall be 6-foot long, T-shaped, metal posts or 2-inch square hardwood stakes.

Temporary chain link protective fence shall be zinc-coated steel, 6-feet tall, with schedule 40 posts and braces. Fence shall be installed with bottom bar and top tension wire.

Means and Methods of Protection

Install protective fence at the limits of the construction area as shown on the plans or as directed by the Engineer.

The Contractor shall not operate equipment within the tree protection fence of any existing tree without the approval of the Engineer.

Construction material, supplies, or equipment shall not be stockpiled or stored within the limits of the tree protection fence.

Vehicles and personnel are not permitted within the limits of the tree protection fence.

The Contractor shall not attach chains, cables, ropes, nails, or other articles to any tree at any time.

Tree roots exposed during construction that are 1½-inch or greater in diameter must be pruned. All pruning operations shall be reviewed and approved by the Engineer. All root pruning shall be performed with sharp tools and shall provide clean cuts that do not unnecessarily damage the remaining bark or root. The Contractor shall not perform any backfilling operations until all root maintenance has been performed.

Any damage to trees owned by the City of Ann Arbor or other trees designated to be protected due to the Contractor's activities or activities of the Contractor's subcontractors or suppliers shall be repaired under the direction of the City Forester by an approved forestry specialist. The costs of these repairs shall be the sole responsibility of the Contractor.

Should the Contractor’s operations damage a plant’s roots to the extent that it must be removed, the Contractor shall either replace the plant with a commensurate number of plants, 2½-inch caliper trees of the species as determined by the City, or compensate the City of Ann Arbor for the cash value of the plant or tree as determined by the City of Ann Arbor’s Forester. The City of Ann

Arbor shall be solely responsible for determining which compensation method is used.

The City Forester shall supervise the replacement of any trees at the sole expense of the Contractor.

Remove tree protection fence when directed by the Engineer.

Chain link protective fence shall be installed with line and corner poles driven a minimum of 3 feet deep.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Protective Fence, Orange, Plastic, 4-foot Ht	Foot
Protective Fence, Chain Link, 6-foot Ht	Foot

Protective Fence will be measured in length, by feet of fence used, and will be paid for at the contract unit price which shall be payment in full for all labor, materials, and equipment needed to accomplish this work. No additional payment will be made for maintenance or reinstallation of fence during the construction period. No additional payment will be made for repair or replacement of vegetation as noted above.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
TREE REMOVAL

Description

This work shall consist of removing existing trees that are 6-inch or larger in diameter where indicated on the Plans, and as directed by the Engineer. This work shall include cutting and removing trees, their stumps, and roots from the ground, and disposing of all removed materials. All materials needed to accomplish this work are included in this pay item. All work shall be done in accordance with the City of Ann Arbor Public Services Department Standard Specifications, Section 202 of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction (2020 edition) and as directed by the Engineer.

Tree removal on private property within easements shall be performed by the Contractor. The limits of tree removal shall be as directed by the Engineer. The Contractor must clearly mark the trees for removal at least one (1) week prior to the date of their intended removal.

Following the marking of the trees, the Contractor shall schedule a walkthrough with the Engineer, City of Ann Arbor Urban Forestry Coordinator, City of Ann Arbor Forester, and City of Ann Arbor Natural Area Preservation Deputy Manager to review all proposed tree removals.

The removal and disposal of trees greater than 6-inches in diameter shall be paid for as indicated below. The cutting, removal, and disposal of trees less than 6-inches in diameter, bushes, brush, or the trimming of trees will not be paid for separately and shall in included in the item of work “General Conditions”. Trees greater than 6-inches in diameter that are fallen across the work area and must be removed to permit work shall be paid for under the applicable “Tree Removal” pay item.

Unless otherwise approved by the Engineer, due to the potential existence of federally protected species, complete all tree removals identified as potential bat habitat between October 1 and March 31.

Construction Methods

The Construction Methods shall meet all requirements of the City of Ann Arbor Standard Specifications and MDOT Standard Specifications for Construction (2020 edition). As required, remove and dispose of trees with a diameter of at least 6 inches. Stumps shall be removed using a stump grinder to a depth of at least 8-inches below final grade. Prior to all tree removal, coordinate the required tree inspection walkthrough.

Where trees are identified for monitoring during the removal review walkthrough, do not remove the trees until adjacent sewer trenches are excavated and inspected by the City Forester for roots and health of tree. As determined by the Urban Forestry Coordinator, some trees indicated on the Plans for removal may be saved and left in place. Coordination with the Urban Forestry Coordinator, Forester and Engineer to determine if a tree is removed or not will not constitute an extension of time if the work is delayed. This work shall not be paid for separately and shall be included in the item of work “General Conditions”.

Removal

Cut and fell trees in a manner so as not to damage surrounding areas, fences, features, and adjacent trees designated to remain. Grub and remove stumps and roots. Backfill all resulting holes or excavations with Engineer approved material and dispose of all debris before ending the day's work.

Burning of any removed materials is strictly prohibited.

All trees removed as part of the work completed for this project shall be removed from the property unless otherwise requested by the City, or private property Owner. All wood requested by the City or the respective property Owner shall be cut into logs approximately 10-feet in length and placed at a location onsite as designated by the Engineer.

Measurement and Payment

This item shall be measured per tree removed and paid for on the basis of unit price each. The tree size will be determined by the average diameter of the tree trunk, measured to the nearest full inch, at a point 4.5-feet above the base of the tree at the ground line. Trees having major limbs lower than 4.5-feet from the ground shall be measured at the smallest diameter below such limbs. Where more than one (1) tree has grown from a common stump, each tree shall be measured as a separate tree. Dead trees fallen across the work area shall be paid for under the tree removal pay item based on their size. Trees found to be less than 6-inches in diameter shall be removed under the pay item "General Conditions".

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

Contract Item (Pay Item)	Pay Unit
Tree Removal, 6-inch to 24-inch	Each
Tree Removal, Larger than 24-inch	Each

The items of work listed above shall be paid for by the number of trees actually removed. The unit price for these items of work shall include all labor, material, and equipment costs to perform the work as detailed herein.

The work must be conducted between October 1 and March 31 unless otherwise approved by the Engineer. If the work is not completed within this timeframe, and additional environmental evaluation is required, the Contractor may face penalties from paying any additional costs and being assessed liquidated damages.

Description

The work shall include, but is not limited to the following:

- The furnishing and operating of miscellaneous signs, warning devices, traffic regulators, flags, paddles, and cones;
- The operation of additional signs furnished by the City;
- Furnishing and installing meter bags;
- Coordinating with the City to have meter heads removed and reinstalled;
- Maintaining pedestrian traffic;
- Temporarily covering traffic controls;
- Temporarily covering existing signs as directed;
- Any and all other miscellaneous and/or incidental items which are necessary to properly perform the work.

This work shall consist of protecting and maintaining vehicular and pedestrian traffic, in accordance with Sections 104.11 and 812 of the of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction; Part 6 of the 2011 Edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD); and the City of Ann Arbor Standard Specifications for Construction, except as modified herein.

Materials, Equipment, and Construction Methods

Materials and equipment shall meet the requirements specified in the above designated sections of the MDOT 2020 Standard Specifications for Construction.

The Contractor shall maintain traffic such that no vehicle shall be required to drive into active work areas. Patch areas which extend more than halfway across the roadway shall be removed and replaced so as to provide a minimum of half the pavement width at all times for maintaining traffic.

The Contractor shall maintain pedestrian traffic at all times. For maintaining normal pedestrian traffic while performing sidewalk and driveway repair, Plastic Drum, High Intensity, Lighted, shall be placed by the Contractor as directed by the Engineer. The Contractor, when directed by the Engineer, shall place ADA compliant pedestrian barricades, "Sidewalk Closed" and/or "Cross Here" signs. The cost shall be included in this pay item and will not be paid for separately.

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

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

The Contractor shall obtain a Traffic Detour or Lane Closure Permit from the City's Project Management Services Unit, at least 48-hours in advance of any proposed lane or street closing.

Traffic on major streets should not be impacted between the hours of 7:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 6:00 p.m. without written permission from the Engineer or as specified on the Lane Closure Permit. 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.

The hours of work on all local streets are 7:00 a.m. to 8:00 p.m., Monday through Saturday, or as specified on the Lane Closure Permit.

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

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

The work for Minor Traffic Control shall include: furnishing and operating of miscellaneous signs and warning devices; furnishing cones; operating additional signs furnished by the City throughout the life of the Contract; furnishing and operating pedestrian traffic control devices; maintaining a safe trench during all non-working hours; maintaining access to all drives; covering conflicting existing signs and removal of these covers; and any and all other miscellaneous and/or incidental items which are necessary to properly perform the work.

The Contractor shall maintain vehicular and pedestrian traffic during the work by the use of traffic regulators, channelizing devices, and signs as necessary, as directed by the Engineer, and in accordance with 2011 Edition of the MMUTCD. Typical applications for maintaining pedestrian traffic in accordance with the 2011 Edition of the MMUTCD are included in this detailed specification.

In order to maintain areas of on-street parking available for residents, the Engineer may direct the contractor to cover and uncover temporary "No Parking" signs within the project limits multiple times throughout the course of the project. Such repeated covering and uncovering of signs shall be included in this item of work and shall not be paid for separately.

Traffic control devices meeting current MDOT and MMUTCD specifications shall be used on this project.

Sufficient signs shall be placed by the contractor to ensure the safety of the workers and the general public in accordance with the current MMUTCD.

“Road Work Ahead” warning signs shall be placed, as indicated on the plans, or as directed by the Engineer, prior to the start of work, regardless of the nature, magnitude or duration of the work.

Measurement and Payment

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

Costs for transporting barricades and other temporary traffic control devices shall be included in the bid prices for the individual items of work.

Minor Traffic Control, Maximum $40,000 will be paid for on a pro rata basis with 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 these items of work will be paid for at the Contract Unit Price for the following Contract (Pay) Items:

Contract Item (Pay Item)	Pay Unit
Minor Traffic Control, Maximum $40,000	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 MDOT and City Standard Specifications for Construction, and as modified by this Detailed Specification.

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

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.

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.

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.

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:

Contract Item (Pay Item)	Pay Unit
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.

Description

The work covered by this Detailed Specification shall consist of furnishing all labor, supervision, tools, equipment, appliances, materials, incidental items, and the installation, operation, and maintenance needed to perform all operations in connection with the diversion of flow and bypass pumping of sanitary sewage for the installation of new sewers and manholes. The purpose of which is to provide un-interrupted sewerage service at all times and to prevent sewage overflows.

It is the intent of this project to divert flow within the existing sanitary sewer interceptor around the work zone where the construction requires diversion. The flows from the various laterals and side connection sewers to the sanitary sewer interceptor in the work zone shall also be bypass pumped downstream of the work zone. The design, installation, and operation of the temporary sewer flow control system shall be the Contractor's sole responsibility.

When working inside manholes or sewer, the Contractor shall exercise caution and comply with Occupational Safety and Health Administration (OSHA) and City requirements for working in confined spaces.

The Contractor shall manage, plan, and execute their operations such that there will be no backups, leaks, or unauthorized discharges of sewerage. The Contractor shall be completely responsible for the proper clean-up and any environmental remediation as may be required by the City or the Michigan Department of Environment, Great Lakes, and Energy (EGLE) for any backup, leak, spill, or sanitary sewerage overflow.

Submittals

The Contractor shall provide a detailed Sewer Flow Control Plan to the Engineer for review and acceptance prior to the start of any flow control work. This plan must include descriptions outlining all provisions and precautions to be taken by the Contractor regarding the handling of existing flow. The Sewer Flow Control Plan must be specific, including such items as schedules, locations, elevations, capacities of the equipment, materials, and all other incidental items necessary and/or required to ensure proper protection of the facilities, including protection of existing structures and pipes, and compliance with the requirements and conditions specified in these Contract Documents. The flow control plan shall be submitted to the Engineer for review and approval in accordance with Section 104.02 of the 2020 edition of the Michigan Department of Transportation Standard Specifications for Construction. No construction shall begin until all provisions and requirements have been reviewed and accepted by the Engineer.

For each submittal and re-submittal, 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 re-submitted plans, calculations, and descriptions. The Engineer's acceptance of the plan is required before beginning the work. Re-submittals shall be reviewed and returned to the 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 their schedule.

Sewer Flow Control Plan submittal shall include at a minimum:

1. Overall flow control plan and sequence of construction;

2. Flow control schedule including times when the flow control system shall be temporarily shut down and flow allowed to return to normal operations;

3. Overall plan for removal of flow control system during wet weather events and/or emergency situations;

4. Plan for providing redundancy for all aspects of the system especially the plugs;

5. Plan for providing noise control of pumping and power generation equipment;

6. Safety Program for confined space entry and procedure for entering manholes and installing plugs under live flow conditions;

7. Emergency clean-up plan should a spill occur or backups in the system occur. The plan should include contact names and 24-hour phone numbers;

8. Procedure for continuous (24-hour) monitoring of system, including verifying that plugs are sealed and lateral bypass pumping system is operating. The plan is to include type and location of level sensors, method of installation, set elevations of sensors, and continuous monitoring system. Monitoring of the system shall be performed and documented at each installation. Records of the system monitoring shall be submitted to the Engineer;

9. Maintenance of traffic plan for plug installation and removal in public roadways;

10. Sewer plug types, method of installation and removal, anchors and restraints, and hydraulic head limits;

11. Lateral bypass pump sizes, capacities, power requirements, and number of each size to be provided at each manhole including redundancy;

12. Calculations giving flow capacity provided by each pump given the system's Total Dynamic Head (TDH), including the calculations that are used to derive the system TDH. This data should also include the calculations determining what the Net Positive Suction Head available is in comparison to the Net Positive Suction Head required by each pump. Pump curves shall be submitted;

13. Number, size, material, and location of lateral bypass pumping suction and discharge piping, procedure for protecting lines, and location of bypass pumping discharge manhole;

14. Lateral bypass pumping system flushing and drainage plan;

15. Buried bypass pipe locations and details;

16. Environment protection including pump containment and leak detection;

17. Method of protecting discharge manholes or structures from erosion and damage; and,

18. Method of noise control for each pump.

Flow Diversion Equipment

Provide materials and equipment suitable for, and known to be reliable to meet, the flow diversion requirements as shown on the Drawings and as needed for the Contractor's operations.

The plugs shall be temporary plugs that allows for quick removal in case of emergency or wet-weather situation. Plugs shall be capable of withstanding minimum static head pressure of 15 feet. Plugs shall include form or bracing, anchoring, or restraint to keep plugs properly installed. Plugs should be of the type capable of being installed under live flow conditions and in depths exceeding 35 feet as shown on the Drawings. Plugs should be able to be installed in either the incoming or outgoing pipe in a manhole and allow for quick removal under surcharged conditions. Plugs shall be clearly tagged with the Contractor's name and date of installation.

Pressure gages shall be installed with the plugs to continuously monitor the plugs and adjust the air pressure as needed to maintain full blockage of flow.

Ultrasonic level sensors shall be installed, at a minimum, at each bypass pumping location. The Contractor may elect to install sensors in other locations at their expense if they so choose. The Contractor shall be responsible for the installation and maintenance of the sensors. The level sensors shall provide continuous level readings that the Contractor shall be able to review remotely to monitor the level in the system during flow diversion. The level sensors shall provide notifications and alarms to allow the Contractor time to remove the plugs should an emergency or a wet weather event occur.

Sewer Bypass Pumping Equipment

Provide materials and equipment suitable for, and known to be reliable to meet, the bypass pumping requirements.

The pumps must be capable of passing a minimum of a 3-inch solid. All pumps must be constructed to allow dry running for long periods of time to accommodate the cyclical nature of effluent flows.

Equipment used for bypass pumping shall be sufficient to handle anticipated average and peak flows from each sewer. The Contractor shall maintain sanitary sewer flows within their bypass pumping system, including all wet weather flows.

The locations and approximate flow rates for each of the sewer segments are as follows:

For sanitary sewerage, bypass piping shall be PVC Schedule 80, or equivalent, with solvent welded joints; or HDPE with butt fused joints. The Contractor shall perform hydrostatic testing of bypass pump discharge pipes in accordance with ASTM F2164 for HDPE or ASTM F2261 for PVC pipe, prior to operating bypass pumping system to ensure structural integrity of pipeline. Any defects or leaks found during testing shall be repaired and the pipeline shall be re-tested until results are satisfactory in accordance with the ASTM standard, and as acceptable to the Engineer.

Redundant Equipment

The Contractor shall have redundant flow diversion equipment including, but not limited to, plugs and level sensors, available for immediate use at the job site at all times in the event of a failure.

Any damage to the Contractor's equipment, sewer system, or delays to the Contractor's operations due to equipment or plug failure/leakage shall be the Contractor's sole responsibility and no additional payment shall be made for these occurrences. The Contractor shall take all necessary precautions to verify that the plugs and flow diversion plan is operational prior to performing the work.

The Contractor shall have redundant lateral bypass pumping equipment installed and ready for immediate operation and use in the event of an emergency or primary system breakdown or failure. The standby system shall be capable of pumping dry weather and peak flow. The standby pump(s) shall not be considered as any part of the primary system as designed for peak flow. The Contractor shall also furnish and have available onsite, and ready for operation, redundant pumping ancillary equipment in case of any failure of the pumping system including piping, electrical equipment, pipe appurtenances, etc. Redundant pumping facilities shall also include having a backup power generator in case the primary power source fails.

The Contractor shall not obstruct flows in the sewer unless the primary and redundant equipment is onsite and in operable condition and authorization has been granted by the Engineer.

Flow Diversion

The Contractor shall install the flow control and test the system for a minimum of 48 hours prior to the start of any other work onsite. The Contractor, City, and Engineer shall review the flow diversion during the testing period, including flow levels in the manholes. The Contractor shall not start any other work onsite until acceptance of the flow control test.

Residential and commercial sewer lateral location data for the project area is limited. The Contractor shall verify and document any sewer lateral locations as part of the construction.

The Owner will not permit water use restrictions to be used to reduce bypassed flows. The Contractor shall develop a flow diversion plan that permits the work to be completed with the least disruption of service to those served by the sewer.

Lateral Bypass Pumping

Service laterals that enter the mainline sewer shall be bypass pumped to the downstream bypass pumping manhole or blocked if a bypass is not available and the construction is for a short duration. If a lateral is plugged and/or blocked, the Contractor is responsible for coordination with the property owner to ensure flow is minimized and to prevent a sewer backup. The Contractor is responsible for all sewer backups that occur during all bypass work.

The Contractor shall construct and maintain bypass pumping facilities as needed that will pump at the required flow rates. The Contractor shall provide the City with a minimum of 7 days advance notice prior to initiating the sanitary sewer bypass pumping system.

The Contractor is responsible for obtaining any approvals for placement of the temporary equipment and/or piping within public ways from the Agency having jurisdiction.

The Contractor shall provide an adequate labor force and have designated personnel onsite for maintenance and operation, and emergency back-up service, of the bypass pumping facility 24 hours per day 7 days per week during bypass operations.

The Contractor is to arrange for and provide all necessary temporary power, electrical service, board switches, etc. as required by DTE Energy and the National Electrical Code (NEC) current edition to provide temporary bypass pumping.

All bypass pumping discharge pipes shall be protected from the pipe header to the discharge structure. The Contractor shall provide necessary fittings or deflection in pipe to route pipe as necessary to minimize environmental impact and conflict with pedestrian, construction, and emergency vehicle traffic. When the bypass pipeline crosses drives or trails, or when pipeline is within any Contractor work zone/staging area, the Contractor shall place the bypass pipeline in a casing pipe and bury in temporary trenches with compacted backfill as indicated on the Drawings, as required for the Contractor's operations, and as approved by the Engineer. All work associated with temporary bypass discharge pipe trench, including piping, fittings, deflections, casing, spacers, trenching, and backfill shall be included in the contract pay item "Sewer Flow Control."

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.

Noise Control

All noise generated by the bypass pumping operation shall not exceed the sound limits and shall follow necessary procedures as required for temporary exemptions. The Contractor shall provide a secondary sound barrier for both the primary and back-up pumps and any power generating equipment.

Flow Diversion and Bypass Pumping Completion

At the end of the flow control operation, and after receipt of written permission from the Engineer, the Contractor shall remove all flow diversion and bypass pumping equipment, including level control system, temporary power equipment, and suction/discharge piping in a manner that permits the sewage flow to return to normal without overflowing to the environment, surcharging, or causing other major disturbances downstream. The Contractor shall restore all disturbed areas and structures, and restore all pavement in accordance with Detailed Specification, “Project Clean-Up and Restoration” and as directed by the Engineer.

The duration of the bypass pumping shall be determined by the Contractor as needed to perform the work under this contract while maintaining un-interrupted sewage service.

Flow Control Precautions

When flow in a sewer line is bypassed or plugged, sufficient precautions must be taken to protect the Contractor’s operations from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. At no time shall sewage be pumped in or allowed to flow into a catch basin, storm sewer, or open watercourse.

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:

Contract Item (Pay Item)	Pay Unit
Sewer Flow Control	Lump Sum

The contract unit price for this item shall include all labor, supervision, tools, permits, shop drawing submittals, materials, equipment, operation, any incidental items, and all other work as noted on the Drawings and as specified herein to allow the Contractor to perform the work of diverting and bypass pumping flows as detailed herein.

The installation, maintenance, operation, monitoring, and removal of the level sensors shall not be paid for separately, but shall be included in the item of work “Sewer Flow Control.”

The cost for the sewer flow control shall be paid for as a Lump Sum item regardless of the duration, number of, and/or duration of the wet weather events encountered, flow encountered, weather conditions, or number of times flow control system is temporarily removed and re-installed.

25% of the lump sum shall be paid for Sewer Flow Control following the initial installation, 48-hour test, and acceptance of the system by the Engineer. 50% of the lump sum shall be paid upon returning the sewer back into service. The remainder of the cost shall be paid for after the removal of all equipment from the site.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
NO PARKING SIGNS

Description

This work shall consist of installing, maintaining, and removing of "No Parking" signs and posts as outlined herein and as referenced on the plans. "No Parking" signs shall be installed in accordance with the Section 812 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction Standard Specifications and the 2011 Michigan Manual of Uniform Traffic Control Devices (MMUTCD).

Materials

The City will furnish "No Parking" signs to the Contractor at no cost. The Contractor shall furnish the sign support and mounting hardware materials, which materials shall be in accordance with those specified in Section 919 of the MDOT 2020 Standard Specifications for Construction.

Construction

Prior to the commencement of any construction activity, the Contractor shall place “No Parking” signs as directed by the Engineer. The Contractor shall obtain a permit for “Temporary Permission of Reserve Parking Lane for Work Related Purposes” from the City’s Project Management Services Unit. This permit shall be obtained a minimum of five (5) business days prior to the posting of “No Parking” signs.

The Contractor shall securely bolt the signs to the sign supports as directed by the Engineer. The Contractor shall imbed the sign supports at least 2-feet into the ground, and there shall be a minimum of 6-feet and maximum of 7-feet of clearance maintained between the bottom of the sign and the ground. The signs are to be placed at intervals no more than 75-feet, and as necessary to eliminate parking in the construction area.

The installation of "No Parking" signs shall be in accordance with the permit. "No Parking" signs shall be installed by the Contractor, as directed by the Engineer, at least 48 hours prior to the proposed start-of-work/enforcement date. "No Parking" signs shall be covered by the Contractor, thereby allowing on-street parking, until between 48 and 24 hours prior to the start of the work. "No Parking" signs shall be covered by the Contractor whenever there is no work being performed for a period of time longer than 72 hours. "No Parking" signs shall be returned to the City upon the completion of work. The cost of unreturned signs will be back charged to the Contractor.

Measurement and Payment

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
No Parking Sign	Each

The item No Parking Sign will be measured as the maximum number of signs installed on the project at any one-time. The unit price includes the removal and return of "No Parking" signs to the City upon completion of the project. The Contractor shall be back charged for the replacement costs for damaged or unreturned signs.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
TRAFFIC CONTROL SIGNS AND BARRICADES

Description

This work shall consist of protecting and maintaining vehicular and pedestrian traffic in accordance with Sections 140.11, 812, and 922 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction; Part 6 of the 2011 Edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD); and the City of Ann Arbor Standard Specifications for Construction, except as modified herein.

Materials, Equipment, and Construction Methods

Materials and equipment shall meet the requirements specified in the above designated sections of the MDOT 2020 Standard Specifications for Construction and be furnished and operated as directed by the Engineer.

The Contractor shall maintain traffic such that no vehicle shall be required to drive into active work areas. Patch areas which extend more than halfway across the roadway shall be removed and replaced so as to provide a minimum of half the pavement width at all times for maintaining traffic.

The Contractor shall maintain pedestrian traffic at all times. For maintaining normal pedestrian traffic while performing sidewalk and driveway repair, Sidewalk Barricades shall be placed by the Contractor, as directed by the Engineer. "Sidewalk Closed" and/or "Cross Here" signs shall be placed, by the Contractor, when 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, barricade lights or other traffic maintenance items. The Contractor shall replace damaged or missing traffic control devices immediately, at no additional cost to the City.

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

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

Pedestrian barricades shall extend the full width of the sidewalk; be orange or white in color, with orange and white reflective sheeting; and be fully ADA compliant.

Type I and Type III Barricades shall have standard orange-and-white stripes on both sides of the barricade. Lighted plastic drums shall be sufficiently ballasted to minimize tipping.

Sufficient signs shall be provided by the Contractor to insure the safety of the workers and the general public in accordance with the 2011 Edition of the MMUTCD.

"Construction Ahead" warning signs shall be placed, as indicated on the Plans, or as directed by the Engineer, prior to the start of work, regardless of the nature, magnitude, or duration of the work.

Measurement and Payment

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

Costs for transporting barricades and other temporary traffic control devices shall be included in the bid prices for the individual items of work.

For Type III Barricades, Channelizing Devices, Plastic Drums, Portable Changeable Message Signs, and Sidewalk Barricades payment shall be for the maximum quantity used at each project location at any one time.

For Temporary Type B Signs, payment shall be for the quantity used at each project location.

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:

Contract Item (Pay Item)	Pay Unit
Portable Changeable Messaging Board, Furn & Oper	Each
Type III Lighted Barricade, Furn & Oper	Each
Plastic Drum, Lighted, Furn & Oper	Each
Temporary Type B Signs, Furn & Oper	Sq Ft
Arrow Board, Furn & Oper	Each
Pedestrian Type II Barricade, Furn & Oper	Each

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
COORDINATION AND COOPERATION WITH OTHERS
AND
WORK BY OTHERS

Description

The Contractor is reminded as to the requirements of Article 104.08 of the 2020 Edition of the MDOT Standard Specifications, “Cooperation by the Contractor”.

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

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

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

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

On all projects:

“Three (3) Working Days before you Dig - Call MISS DIG - Toll Free” Phone No. 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, Max $_____”.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
VACUUM TYPE STREET AND UTILITY CLEANING EQUIPMENT

ST:CJE 1 of 1 11/15/23

Description

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 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, Max $_____”.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MATERIALS AND SUPPLIES CERTIFICATIONS

ST:CJE 1 of 1 11/15/23

Description

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

Edge Drain and Underdrain Pipe

Seed Mixes

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, Max $_____”.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SOIL BORING, PAVEMENT SECTION AND GEOTECHNICAL DATA

ST:CJE 1 of 1 11/16/23

Description

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.

Description

The work covered by this Detailed Specification shall consist of furnishing all labor, supervision, tools, equipment, appliances, materials, incidental items, and the installation, operation, and maintenance needed to lower and control the groundwater levels and hydrostatic pressures to permit all excavation and construction specified under this contract to be performed in the dry. The control of all ice, snow and surface water shall be considered as part of the work under this Section.

The Contractor shall take all the steps that he considers necessary to familiarize himself with the site conditions, the ground conditions, and the groundwater conditions.

The Contractor or his dewatering subcontractor shall be currently and appropriately licensed by the State of Michigan to undertake the work covered under this Section and shall submit such information to the Engineer.

Quality Control

It shall be the sole responsibility of the Contractor to control the rate and effect of the dewatering in such a manner as to avoid all objectionable settlement and subsidence.

All dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.

All structures or facilities that are located within the radius of influence of the Contractor's dewatering operation shall have reference points established and observed at frequent intervals to detect any settlement which may develop. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with the Contractor. The Contractor shall survey, record and report the reference points on a daily basis, and submit the written log to the Engineer at the completion of construction. The Engineer shall be immediately notified should any sign of settlement is observed. The cost of repairing any damage to adjacent structures and restoration of facilities shall be the responsibility of the Contractor.

Submittals

Prior to commencement any excavation within three feet. of the prevailing groundwater levels, the Contractor shall submit a detailed plan and operation schedule for dewatering of excavations. The detailed plan shall include mitigation measures to prevent settlement of nearby structures and a contingency plan for restoring nearby structures if settlement is observed as a result of the Contractor's dewatering operations. The Contractor may be required to demonstrate the system proposed and to verify that adequate equipment, personnel, and materials are provided to dewater the excavations at all locations and times. The Contractor's dewatering plan is subject to review by the Engineer.

Submit dewatering plan as an informational submittal no less than 30 days before installation of dewatering systems. Review will be solely for conformance to requirements of this section with

no warranty of whether reviewer believes the plan will work. Contractor shall review available geotechnical information in development of the dewatering plan and gather any additional information necessary to inform the plan. The dewatering plan shall include the following elements:

1. Applicable permit requirements
2. Equipment proposed
3. Methods proposed
4. Standby equipment proposed
5. Capacities of pumps, motors and engines, including standby equipment
6. Power supply
7. Standby power
8. Contaminant monitoring requirements
9. Pollution control facilities
10. Proposed discharge locations
11. Operation procedures
12. Equipment removal and/or abandonment procedures

For each submittal and re-submittal, 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 re-submitted plans, calculations, and descriptions. The Engineer's acceptance of the plan is required before beginning the work. Re-submittals shall be reviewed and returned to the 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 their schedule.

Equipment

Dewatering, where required, may include the use of well points, sump pumps, temporary pipelines for water disposal, rock or gravel placement, and other means. Standby pumping equipment shall be maintained on the Site.

Design and operate dewatering systems with proper size and capacity:

1. To permit excavating, pipe laying, concrete work and all other construction in the dry.
2. To lower groundwater below lowest excavation point.
3. To prevent hydrostatic uplift forces until backfill is in place.
4. To prevent loss, caving, loosening or softening of ground as water is removed.
5. To avoid inducing settlement or damage to existing facilities, completed Work or adjacent property.
6. To relieve artesian pressures and resultant uplift of excavation bottom.

General Requirements

The Contractor shall provide all equipment necessary for dewatering. It shall have on hand, at all times, sufficient pumping equipment and machinery in good working condition and shall have available, at all times, competent workmen for the operation of the pumping equipment. Adequate standby equipment shall be kept available at all times to insure efficient dewatering and maintenance of dewatering operation during power failure.

Dewatering for structures and pipelines shall commence when groundwater is first encountered, and shall be continuous until such times as water can be allowed to rise in accordance with the provisions of this Section or other requirements.

At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and be pumped or drained by gravity from the excavation to maintain a bottom free from standing water.

Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.

If foundation soils are disturbed or loosened by the upward seepage of water or an uncontrolled flow of water, the affected areas shall be excavated and replaced with approved aggregate.
The Contractor shall maintain the water level below the bottom of excavation in all work areas where groundwater occurs during excavation, construction, backfilling, and up to acceptance.

Flotation shall be prevented by the Contractor by maintaining a positive and continuous removal of water. The Contractor shall be fully responsible and liable for all damages which may result from failure to adequately keep excavations dewatered.

If well points or wells are used, they shall be adequately spaced to provide the necessary dewatering and shall be sandpacked and/or other means used to prevent pumping of fine sands or silts from the subsurface. A continual check by the Contractor shall be maintained to ensure that the subsurface soil is not being removed by the dewatering operation.

All water removed from the excavation will be managed in accordance with Industrial User Permit No. 09132023 (Permit). A copy of the permit will be supplied to the winning Contractor. The Contractor shall temporarily store water from the excavation in frak tanks staged near the eastern end of the work area (near Arbana Drive). Water from the initial frak tank will be sampled and analyzed by a laboratory (24 hour turnaround time). If the water meets the requirements in the permit, the water will be discharged to an existing sanitary manhole located by Arbana Drive. If the water does not meet the permit requirements, the Contactor shall arrange for disposal of the water, or can utilize a portable treatment system (granular activated carbon or similar) to pre-treat the water prior to discharge.

No water shall be drained into work built or under construction without prior consent of the Engineer. Water shall be filtered using an approved method to remove sand and fine-sized soil particles before disposal into any drainage system.

After all requirements of this Section are met; the Contractor shall remove all materials and equipment used during this operation. All holes, wells, and pits shall be filled immediately with suitable material.

Discharge to the sanitary manhole shall not exceed 50,000 gallons per day (gpd) per the Permit.

Groundwater Contamination

Where non-perched groundwater is encountered, it may contain 1,4 Dioxane as shown in the appended geotechnical information. In the portions of the project where work is anticipated to encounter the underlying aquifer, 1,4 Dioxane levels were found below the 7.2 ppb residential groundwater contamination level in October and November 2022. Based on the 2022 sampling, it is anticipated that the water recovered during dewatering will meet the requirements of the Permit, however, the Contractor shall include provisions to pre-treat or properly dispose of water that does not meet the permit requirements.

Water staged in the initial frak tank shall be sampled for the parameters listed in the Permit for laboratory analysis (24 hour turnaround time). Stantec will conduct the water sampling. Once approved by the City, the water can be discharged to the sanitary sewer system via a manhole on Arbana Street. Any additional frak tanks utilized will be sampled by Stantec for a reduced list of parameters (in accordance with the permit), and the Contractor shall monitor the headspace in the tank(s) for lower explosive limit (LEL) to verify it is below 10%.

Measurement and Payment

Dewatering of trenches and other excavations shall be considered as incidental to the construction of the work and all costs thereof shall be included in the various contract prices in the Bid.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
WORKING IN THE RAIN OR IN THE DARK

ST:CJE 1 of 1 11/16/23

Description

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.

Working in the Dark

The Contractor shall not work in the dark except as approved by the Engineer.

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.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
REMOVING PAVEMENT AND CONCRETE ITEMS

Description

This work shall consist of furnishing all labor, tools, equipment, and material to remove, and dispose of off-site, any 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 of the 2020 MDOT Standard Specifications for Construction, except as specified herein, and as directed by the Engineer.

Materials

Granular Material, Class II ..... Section 902

Construction

Construction methods shall be as described in Section 204 of the MDOT 2020 Standard Specifications for Construction, as described below, and as directed by the Engineer.

The pay item for "**Pavement, Remove**" will include removal of existing pavement regardless of pavement depth, type, or material. Also, included is bituminous overlay pavement on the concrete gutter without disturbing the curb and gutter remaining in place.

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, and including those necessary to provide for the partial removal of existing drive approaches 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 backfilled with MDOT Class II Granular Material compacted to 95% of its maximum dry density at no additional cost to the project.

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:

Contract Item (Pay Item)	Pay Unit
Remove Concrete Curb or Curb and Gutter - Any Type	Foot
Remove Concrete Sidewalk and Drive - Any Thickness	Square Foot
HMA Surface Remove	Square Yard

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.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
MACHINE GRADING, MODIFIED

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 2020 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 miscellaneous concrete and miscellaneous HMA pavement, soil, rocks of any size, stumps, trees less than 8-inches, 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 the existing roadbed materials, and shall construct the roadway to 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 other surface features, including trees less than 6” diameter, located within the grading limits, and not otherwise identified, as directed by the Engineer. Signs in the grading limits shall be salvaged and provided to City as directed by the Engineer.

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 work without damaging the subgrade. This includes the transporting, stockpiling, re-handling, 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.

The Contractor shall proof roll all graded and compacted surfaces in the presence of the Engineer as detailed in the Specifications. The Engineer will monitor the proof rolling operation to locate deleterious and/or uncompacted materials and will direct undercuts, as necessary.

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.

The Contractor shall take any and all steps necessary to avoid interruption in the mail delivery, and solid waste, recycling, and compostable pick-up within the project limits. This shall include the temporary relocation of mailboxes, where required by the Engineer, as well as moving of all solid waste/recycling/compost containers to the nearest cross street.

The Contractor shall coordinate with the City Forester prior to the removal of any tree roots 2-inches or larger in size.

Butt joints are included in the pay item “Machine Grading”.

Measurement and Payment

Measurement for payment for the item “Machine Grading” shall be the along the road centerline within the limits of the work. At intersections, measurements shall be along only one of the streets. Machine grading shall be paid only once, regardless of any additional re-working that may be required.

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:

Contract Item (Pay Item)	Pay Unit
Machine Grading, Modified	Square Yard

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
SUBGRADE UNDERCUTTING

Description

This work shall include the removal of unsuitable subgrade material(s) which may be susceptible to frost heaving or differential frost action in the areas and limits identified by the Engineer, and backfilling to replace these material(s) and remedy unstable soil conditions. This work shall be done in accordance with Section 205 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, as directed by the Engineer, and as modified herein.

Materials

Provide materials in accordance with Granular Material Class II and 21AA dense-graded aggregate as specified in Section 902 of the MDOT 2020 Standard Specifications for Construction.

Construction

Construction methods shall be as described in Subsection 205.03.E of the Standard Specifications for Construction, and as directed by the Engineer.

After the pavement has been removed, and/or after rough/finish grading, and/or at the time of proof rolling, the Engineer may inspect the grade to determine the need for, and the limits of, undercuts. After undercut areas are excavated to the depths as directed by the Engineer, the areas shall be trimmed, shaped, evenly graded and re-compacted to not less than 95% of the soils maximum unit weight as determined by the AASHTO T-180 test. The Contractor shall properly dispose of all excess materials.

Backfill areas of Subgrade Undercutting, Type II with Granular Material Class II or such other such material as directed by the Engineer.

Measurement and Payment

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
Subgrade Undercutting, Type II	Cubic Yard

Basis of payment shall be as described in Subsection 205.04 of the Standard Specifications for Construction except as herein modified.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SUBBASE AND AGGREGATE BASE

Description

This work shall consist of constructing subbase and/or aggregate base courses, on either a prepared subgrade or subbase as indicated on the Plans or where directed by the Engineer. This work shall be performed in accordance with Sections 301, 302, and 307 of the 2020 MDOT Standard Specification for Construction except as specified herein.

Materials

The material used for this work shall meet the requirements of Sections 301, 302, 307, and 902 of MDOT 2020 Standard Specification for Construction, except that the aggregate base shall be either 21AA limestone (permanent and temporary applications) with a maximum loss by washing of 8% and any subbase shall be Class II Granular Material.

Construction Method

Subbase and aggregate base courses shall not be placed when there are indications that the mixture may become frozen before the maximum unit weight is obtained, and in no case shall they be placed on a frozen subbase or subgrade.

The subbase and subgrade shall be shaped to the crown and grade specified on the plans and maintained in a smooth condition. The top of the subbase shall be placed to within ½-inch below and ½-inch above plan grade. The top of the aggregate base shall be placed to within ½-inch below and ¼-inch above plan grade. Variations within this tolerance shall be gradual. If in the opinion of the Engineer, the Contractor's equipment is causing or will cause any ruts in or damage to the subbase or subgrade, the equipment shall not be permitted on the subbase or subgrade.

Should the subgrade, subbase or aggregate base become damaged due to the Contractor's equipment or by local traffic, the subgrade, subbase, or aggregate base course shall be restored to the condition required by the Specifications without additional compensation to the Contractor.

No pavement course, concrete curb and gutter, or concrete driveway opening shall be placed until the subbase has been compacted to not less than 95%, and aggregate base course to not less than 98% of their respective maximum dry densities and until a "Permit to Place" has been issued by the Engineer.

Base course aggregate shall be handled and/or stockpiled on-site in a manner that minimizes segregation. Base course aggregate shall be deposited from trucks or through a spreader in a manner that will minimize segregation of material and that is approved by the Engineer. The re-handling of base course aggregate by the Contractor will not be considered sufficient cause to allow the material to become segregated. The Contractor may be required to wet the materials prior to and/or during placement to minimize segregation and to aid in compaction of the material should it be necessary.

All structures, including manholes, 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 may be charged for the cleaning by others of accumulated construction debris in the utility structures, and damages resulting from the uncleaned structures.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Sand Subbase Course, Class II C.I.P.	Cubic Yard
21 AA Limestone, C.I.P.	Cubic Yard
Aggregate Base Course, 8 Inch, 21AA - C.I.P.	Square Yard
Aggregate Base Course, 12 Inch, 21AA - C.I.P.	Square Yard

“Aggregate Base Course, 21AA, Modified" will be measured by weight in tons by certified delivery tickets submitted at the time of delivery to the project site. The item of work will be paid for at the contract unit price, which shall be payment in full for all labor, material and equipment needed to accomplish this work.

The provisions of Section 306.04 regarding excess moisture content, moisture corrections, and pay weights shall apply to this item of work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
AGGREGATE PATHWAYS

Description

This work shall consist of constructing permanent aggregate pathways along the route of the sewer and through the Maryfield Wildwood Park. Except as otherwise specified herein, all work shall be performed in accordance with the City of Ann Arbor (City) Public Services Area Standard Specifications, Sections 306 and 902 of the 2020 edition of the Michigan Department of Transportation (MDOT) Standard Specifications for Construction, as indicated on the Drawings, and as directed by the Engineer..

Materials

The aggregate paths shall be constructed of 21AA crushed limestone aggregate, 23A natural aggregate and non-woven geotextile separator. Aggregate materials and geotextile fabric shall be provided in accordance with the 2020 edition of the MDOT Standard Specifications for Construction, as indicated on the Drawings, and as approved by the Engineer. Material shall be subject to the approval of the Engineer.

Construction Method

The route of the pathways as indicated on the Drawings shall be considered fixed and shall not be altered unless approved by the Engineer. The aggregate path through the woods shall be graded to promote positive drainage and follow the existing topography to the extent possible. Excavation and embankment will be required and are incidental to the aggregate pathway pay items.

Subbase and aggregate base courses shall not be placed when there are indications that the mixture may become frozen before the maximum unit weight is obtained, and in no case shall they be placed on a frozen subbase or subgrade.

Aggregate pathway shall not be placed until underlying native material has been compacted to 90% maximum density in accordance with the City's Standard Detail for Utility Trench Type V.

The Aggregate Maintenance Path shall include a thin layer of topsoil, which will be seeded as indicated on the Drawings. Payment for topsoil and seeding will be covered under the corresponding restoration pay items.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Aggregate Surface Course, 23A - C.I.P, 8-inch	Square Yard
Aggregate Surface Course, 21AA - C.I.P, 8-inch	Square Yard

Aggregate Surface Course_____, 8-inch," will be measured by area in square yards. The

contract pay items listed herein shall be payment in full for all labor, material, and equipment necessary to furnish and install the items of work listed above, and shall include, but is not limited to, moving materials to and throughout the installation location, geotextile separator, disposal, and all other items necessary to complete the work, whether specifically mentioned or implied.

All preparation and brush removal, clearing and grubbing, topsoil removal, earth excavation, embankment, and soil compaction shall be included in the bid price for “General Conditions.”

Description

Hot Mix Asphalt (HMA) pavement base, leveling, and top courses shall be constructed in accordance with Section 501 of the 2020 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

Materials and Equipment

The HMA mixtures to be used for this work shall be as follows:

Item Description	HMA Mixture	MDOT Section
HMA, LVSP – Pavement Leveling or Top Course	LVSP	501
HMA, 5E1 Pavement Top Course	5E1	501
HMA, 4E1 – Pavement Leveling Course	4E1	501
HMA, 3E1 – Pavement Base Course	3E1	501

Binders for 5E mixes shall be PG 64-28; and for Superpave mix LVSP shall be PG 58-28 in accordance with the HMA Application Table shown on the Plans, and shall meet the requirements specified in Section 904 of the 2020 MDOT Standard Specifications for Construction, and any current supplemental MDOT specifications.

The Contractor shall have a 10-foot long straight-edge, backhoe, air-compressor, and jackhammer available during all paving operations.

The Aggregate Wear Index (AWI) number for this project is 260. This AWI number applies to all aggregates used in all top course mixtures. Blending aggregates to achieve this AWI requirement is permitted in accordance with current MDOT Standards, and Supplemental Specifications.

Reclaimed Asphalt Pavement (RAP) in HMA Mixtures

The use of Reclaimed Asphalt Pavement (RAP) in HMA mixtures shall be in accordance with Section 501.02.A.2 of the 2020 MDOT Standard Specifications for Construction, and the City of Ann Arbor Standard Specifications.

All equipment shall conform to Section 501.03.A of the 2020 MDOT Standard Specifications for Construction, except as modified herein.

The Contractor shall have a 10-foot long straight edge, rubber-tired backhoe (Case 580 type, or equivalent), air-compressor with the ability to develop a minimum pressure of 100 pounds per square inch and continuous rated capacity of 150 cubic feet per minute of air flow, and jackhammer available during all paving operations. The Contractor shall be required to perform any miscellaneous cleaning, trimming, material removal, and other tasks as required by the Engineer in order to ensure the proper and orderly placement of all HMA materials on this project.

The Contractor shall provide sufficient rollers to achieve the specified asphalt densities.

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, including hauling units. The Contractor shall not be entitled to any additional compensation for the use of smaller equipment, lighter equipment, or work task deferral.

Construction Methods

All concrete work shall be completed prior to placing HMA mixtures.

The Contractor shall place HMA wedges using the base, leveling, and top course mixtures specified herein, as directed by the Engineer, prior to placing the top course. Such wedging shall be measured and paid for at the respective unit price of the appropriate HMA Pavement item.

Cleaning and Bond Coat Application

Cleaning and bond coat application shall be performed in accordance with Sections 501.03.C and 501.03.D of the 2020 MDOT Standard Specifications for Construction, except as modified herein, and as directed by the Engineer.

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, and when directed by the Engineer, 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. The vac-all or similar equipment and shall be approved by the Engineer prior to beginning the work. The equipment used shall have an effective means for preventing any dust resulting from the operation from escaping into the air.

The bond coat shall be applied at a minimum rate of 0.05 gallons/yd2. Before placing the bond coat, the existing pavement surface shall be thoroughly cleaned. The Contractor shall also thoroughly clean all joints, cracks, and edges to a minimum depth of 1-inch with compressed air, vac-all type equipment, or other approved mechanical or hand methods, to remove all dirt, debris, and all foreign material.

HMA Placement

Placement shall conform to Section 501.03.F of the 2020 MDOT Standard Specifications, except as modified herein, and as directed by the Engineer.

HMA placement shall not commence until a “Permit to Place” (no additional costs are required to obtain this permit) has been issued in writing by the Engineer. The Permit to Place shall be issued after the aggregate base course or the adjacent, underlying layer of pavement section has been approved by the Engineer.

The final structure adjustments must be approved by the Engineer prior to the issuance of the "Permit to Place" for the top course.
The top course shall be placed with a ¼-inch lip at the gutter edge of metal. All HMA thickness dimensions are compacted-in-place.

Paving Operation Scheduling

The Contractor shall schedule the paving operation to avoid longitudinal cold joints that would be required to be left "open" overnight.

In all cases, the Contractor shall pave the primary road's through-traffic lanes ("main line") first, from point-of-beginning to the point-of-ending. All other paving including, but not limited to; acceleration and deceleration lanes, intersection approaches, and center left-turn lanes shall be paved following completion of main line paving, unless authorized by the Engineer prior to the placement of any pavement.

Rate of Paver Operation

The rate of the paver's travel shall be maintained such that the paving operation will be continuous, resulting in no transverse cold joints, but shall never exceed the rate of 50-feet per minute.

The Contractor shall furnish and operate enough material, equipment, and hauling units so as to keep the paving machine(s) moving continuously at all times. Failure to do so shall be cause for the suspension of the paving operation until the Contractor can demonstrate to the satisfaction of the Engineer, that sufficient resources have been dedicated to perform the work in accordance with the project specifications.

Longitudinal and Transverse Joints

Longitudinal and transverse joints shall conform to Section 502.03.F of the 2020 MDOT Standard Specifications for Construction and as specified herein. For mainline HMA paving, the width of the mat for each pass of the paver shall be not less than 10.5-feet, nor greater than 15-feet, except as noted in the plans and as directed by the Engineer. The Engineer will direct the layout of all HMA longitudinal joints during construction.

Prior to placing the adjacent paving pass on the leveling and top courses of HMA, the Contractor shall cut and remove 6-inch to 8-inch of the previously placed pavement at the free edge of the pavement by means of a coulter wheel. The Engineer reserves the right to reject any method(s) for cutting the pavement that does not provide a vertical and satisfactory edge, free of tearing, bending, or other deformations, as determined by the Engineer. Any method(s) employed by the Contractor shall be completely effective. The cut edge shall have a uniform bead of pavement joint adhesive applied to the full height of the joint. The removal of this HMA material and resulting edge must be approved by the Engineer prior to proceeding with the placement of the succeeding pass of HMA. The base course of HMA and its vertical edge will have bond coat applied in accordance with Section 501.03.D. All costs associated with complying with these requirements will not be paid for separately but shall be considered to be included in the HMA items of work.

Pavement joint adhesive shall be hot applied, meet, or exceed, the following properties, and be approved by the Engineer prior to performing HMA placement:

- Brookfield Viscosity, 400°F, ASTM D2669 – 4,000 to 10,000 cp
- Cone Penetration, 77°F, ASTM D5329 – 60 to 100
- Flow, 140°F, ASTM D5329 – 5mm maximum
- Resilience, 77°F, ASTM D5329 – 30% minimum
- Ductility, 77°F, ASTM D113 – 30 cm minimum
- Ductility, 39.2°F, ASTM D113 – 30 cm minimum
- Tensile Adhesion, 77°F, ASTM D5329 – 500% minimum
- Softening Point, ASTM D36 - 170°F minimum
- Asphalt Compatibility, ASTM D5329 – pass

Feather Joints

Feather joints shall be constructed so as to vary the thickness of the HMA from zero inches to the required paving thickness at the rate of approximately 1.5-inch over a distance of 10-feet, or as directed by the Engineer. The Contractor shall rake the larger pieces of aggregate out of feather joints prior to compaction.

Butt Joints

Construction of butt joints, where directed by the Engineer, shall conform to Sections 501.03.C.3 and 501.03.C.4 of the 2020 MDOT Standard Specifications for Construction, except as modified herein.

When a butt joint is specified or directed to be placed by the Engineer, remove the existing HMA surface to the thickness of the proposed overlay, or full depth, as directed by the Engineer, for the full width or length of the joint. The HMA material shall be sawcut to the directed depth along the pavement edge or removal line to prevent tearing of the pavement surface. Cut joints that will be exposed in the completed surface must be cut with a saw or a cold-milling machine or other methods approved by the Engineer. Joints that will be covered by HMA must be cut with a saw, a cold-milling machine, or other methods approved by the Engineer.

Rakers

The Contractor shall provide a minimum of two (2) rakers during the placement of all top and leveling courses.

Faulty Mixtures

The Contractor and Engineer shall carefully observe the paving operation for signs of faulty mixtures. Points of weakness in the surface shall be removed or corrected by the Contractor, at his/her sole expense, prior to paving subsequent lifts of HMA material. Such corrective action may include the removal and replacement of thin or contaminated sections of pavement, segregated

HMA, and any sections that are weak or unstable. Once the Contractor or his representative is notified by the Engineer that the material being placed is out of allowable tolerances, or that there is a problem with the paving operation, the Contractor shall stop the paving operation at once, and shall not be permitted to continue placing HMA material until again authorized by the Engineer. Any costs associated with meeting the requirements specified herein shall not be paid for separately but shall be included in the item(s) of work being performed at the time the faulty mixture was discovered.

Measurement and Payment

Measurement of these HMA paving items shall be by the ton, in place. Unused HMA remaining in trucks after the work is completed shall be returned to the plant and re-weighed, and the corrected weight slip shall be provided to the Engineer. No payment will be made for the unused HMA material. All weight slips must include the type of mixture (codes are not acceptable), as well as vehicle number, gross weight, tare weight and net weight.

Corrective action shall be enforced as described at Division 5 of the 2020 MDOT Standard Specifications for Construction and will be based on the City's testing reports.

All costs for furnishing and operating vacuum-type street cleaning equipment, backhoes, jackhammers, and air compressors shall be included in the bid prices for these items of work or in the item of work “General Conditions, Max $_____”.

All costs of meeting the requirements of this Detailed Specification shall be included in the bid prices for HMA items in the proposal and will not be paid for separately.

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:

Contract Item (Pay Item)	**Pay Unit**
HMA, LVSP – Pavement Leveling or Top Course	Ton
HMA, 5E1 Pavement Top Course	Ton
HMA, 4E1 – Pavement Leveling Course	Ton
HMA, 3E1 – Pavement Base Course	Ton

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.

Description

This work shall consist of constructing concrete items including curb, gutter, curb and gutter, sidewalks, drive approaches, and drive openings, all of any type and/or dimensions, all of either regular, fibermesh reinforced, and/or high-early concrete, in accordance with Sections 801, 802, and 803 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein, as shown on the Plans, as described in this Detailed Specification, and as directed by the Engineer.

The Contractor is responsible to construct all sidewalks, sidewalk ramps, curbs, and all other concrete items within ADAAG compliance. All sidewalks and curb ramps must be constructed in accordance with MDOT Standard Plan R-28-J or version of standard plan/detail in place at time of the bid letting if different.

In addition, all concrete items of work shall comply with the Detailed Specifications for Concrete Durability and Concrete Placement and Protection.

Materials

Concrete mixtures shall be as follows (or as directed by the Engineer), and concrete materials shall meet the requirements specified in the referenced sections of the MDOT Standard Specifications for Construction:

Item Description	Concrete Mixture	MDOT Section
All Items Except High Early	P1, 6 sack	601
All High Early Items	P-NC, 7 sack	601

Construction Method

General

Curb, gutter, curb and gutter, sidewalk, sidewalk ramps, drive openings, and drives shall be replaced the same day they are removed unless otherwise prohibited by the required construction.

Concrete items, including sidewalk, non-integral curb/gutter, drives, and structure adjustments shall be completed prior to the placement of pavement.

All subgrade work shall be completed prior to placing concrete items, unless directed or approved by the Engineer.

The subbase shall be trimmed to final elevation before placing curb. Curb shall not be placed on a pedestal or mound.

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact Class II granular material and 21AA Aggregate material as needed to: construct new concrete

items; to repair or replace existing concrete items; to relocate existing concrete items to their new specified/directed elevations/locations, including all necessary grading at elevation changes of curb and gutter, sidewalks and ramps; and at locations where existing concrete items are to be removed and turf is to be established in its place.

At locations where the subgrade, subbase or base becomes either disturbed, saturated or otherwise damaged, and where directed by the Engineer, the Contractor shall remove a minimum 6-inch thick layer of the subgrade, subbase or base, and replace it with approved 21AA Aggregate material, compacted in place.

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

The Contractor is responsible for any damage to concrete items, including but not limited to vandalism; vehicular, pedestrian and/or miscellaneous structural damage; surface texture damage; and rain damage.

The Contractor shall maintain on-site at all times a sufficient quantity of adequate materials to protect concrete items. The Engineer may suspend or defer concrete placement if rain protection is not available. The Contractor shall not be entitled to any additional compensation due to work suspension or deferral resulting from a lack of adequate rain protection.

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

The subbase and adjacent concrete shall be sufficiently wet-down with water prior to placing concrete, to prevent water loss from the new concrete, and to form a better bond between old and new concrete. If a cold-joint becomes necessary, the existing concrete surface(s) shall be cleaned with compressed air to expose the aggregate in the concrete.

Where it is necessary to remove existing pavement to provide space for concrete formwork, a sufficient amount of the existing pavement shall be removed to allow for the use of a vibratory plate compactor in front of the curb.

Where concrete items are placed in areas adjacent to existing pavement that is beyond the general resurfacing (pavement removal and/or milling) limits, the adjacent pavement area shall be backfilled and permanently patched within 48-hours of the removal of concrete formwork. The backfill material shall be

MDOT 21AA aggregate compacted in place to 95%, up to the elevation of the proposed bottom of pavement. The pavement patching material(s) shall be as specified and as directed by the Engineer.

Where concrete items are placed adjacent to existing pavement that is within areas scheduled for subsequent pavement removal and/or milling, the adjacent pavement area shall, within 48-hours of the removal of concrete formwork, be backfilled with MDOT 21AA aggregate compacted

in place to 95% up to the elevation of the bottom of the adjacent pavement.

Prior to compacting backfill in front of curb and gutter, the back of curb shall be backfilled with approved material and compacted by mechanical means to 95%.

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.

Restoration

The Contractor shall restore all disturbed areas to better than or equal to their original condition within two calendar days from the date of concrete placement. All restoration work and materials shall be in accordance with the City of Ann Arbor Standard Specifications for Construction.

Contraction Joints in Sidewalk

Contraction joints shall be placed at 5-foot intervals and may be tooled or sawed. The method of forming joints and spacing shall be approved by the Engineer prior to construction.

Expansion Joints in Sidewalks

¾-inch wide expansion joints shall be placed through concrete sidewalks in line with the extension of all property lines, at all expansion joints in the abutting curb, gutter, and combination curb and gutter, and as directed by the Engineer. Transverse expansion joints shall be placed through the sidewalks at uniform intervals of not more than 300-feet.

½-inch wide expansion joints shall be placed between the sidewalk and back of abutting curb or gutter, at the juncture of two sidewalks, between the sidewalk and buildings and other rigid structures, and as directed by the Engineer.

Expansion Joints in Curb and Gutter

¾-inch wide expansion joints shall be placed at all street returns, at all expansion joints in an abutting pavement, at each side of all driveways (at radius points), elsewhere at 300-foot maximum intervals, and as directed by the Engineer. Expansion joint material shall extend to the full depth of the joint. After installation, the top shall not be above the concrete nor be more than ½-inch below it. No reinforcing steel shall extend through expansion joints.

Plane of Weakness Joints in Curb and Gutter

Intermediate plane of weakness joints shall be placed to divide the structure into uniform sections, normally 10-feet in length, with a minimum being 8-feet in length, and shall be placed opposite all plane of weakness joints in the abutting concrete base course.

Plane of weakness joints shall be formed by narrow divider plates, which shall extend 3-inches into the exposed surfaces of the curb or curb and gutter. Plates shall be notched, if necessary,

to permit the steel reinforcement to be continuous through the joint.

Measurement and Payment

All concrete pavement repair, including that which is installed with integral curb and gutter, will be measured and paid for by the area actually placed in square yards (SY).

No additional compensation will be paid for the construction of concrete items adjacent to existing concrete curb, gutter, pavement, or any other pavement or surface feature(s).

A deduction in length for catch basins and inlet castings will be made to measurements of Curb and Gutter. Curb, gutter, and curb and gutter shall be paid as "Concrete Curb or Curb & Gutter – All Types".

Restoration work, including backfilling, compacting, HMA patching adjacent to concrete items, topsoiling and seeding will not be paid for separately, but shall be included in the appropriate associated items of work.

Payment for saw cutting for Type L and M openings and for partial removal of existing drives shall be included in the price for the item of work, “Remove Concrete Sidewalk, Ramp and Drive - Any Thickness”, and will not be paid for separately.

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

Contract Item (Pay Item)	Pay Unit
Concrete Curb or Curb and Gutter - All Types	Foot
Concrete Type M Opening	Foot
4-Inch Concrete Sidewalk	Square Foot
6-Inch Concrete Sidewalk or Sidewalk Ramp	Square Foot
6-Inch Concrete Drive	Square 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.

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 Michigan Department of Transportation 2020 Standard Specifications for Construction 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 oxide (SiO_2 + Al_2O_3 + Fe_2O_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 of these materials 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 40ºF, 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 40ºF and 60ºF, 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 (2) sample sets to determine the actual air loss during placement. A sample set shall consist of two (2) samples of concrete from the same batch, one (1) taken at the point of discharge and the other from the in-place concrete behind the paver. The air loss from the two (2) 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 (2) 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.

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 five (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 throughout 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 throughout 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 (2) samples taken, one (1) after approximately 20% discharge and one (1) after approximately 90% discharge of the batch, show a variation greater than ¾-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 PLACEMENT AND PROTECTION

Description

This work shall consist of furnishing all labor, material, and equipment needed to furnish, place, and protect all concrete material in accordance with the requirements of this special provision.

Materials

The concrete shall meet the requirements of Sections 601 and 701 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction.

The Contractor shall propose specific concrete mix designs for the intended project purpose in accordance with the requirements of this special provision and other applicable special provisions and/or project requirements. The Engineer's acceptance of a mix design shall not relieve the Contractor of their responsibility for the manufacture of the concrete mixture(s), its placement, or performance.

Construction

The Contractor shall perform all concrete placement operations in weather that is suitable for the successful placement and curing of the concrete materials. Concrete shall not be placed during periods of active precipitation.

The Contractor shall complete all needed formwork, base and/or sub-base preparation, and any other related items that are deemed necessary for the proper completion of the work. The Contractor shall not commence the placement of concrete until they receive all needed approvals from the Engineer for placement. The Engineer's approval of the Contractor to place concrete shall not relieve the Contractor of their responsibility for the proper placement and protection of the concrete materials or its long-term performance.

During periods when precipitation is threatening, provide durable, plastic sheeting, approved by the Engineer, in sufficient quantity to cover and protect all freshly placed concrete such that precipitation does not come into contact with the concrete. The Contractor shall arrange the placement of the plastic sheeting such that the surface of any freshly placed concrete is not marred by contact with the plastic; any seams in the plastic sheeting shall be watertight. The Contractor shall place adequate supports along and over the freshly placed concrete to prevent contact of the plastic and concrete. The Contractor shall ensure that sufficient dams or barriers are placed along the edges of the freshly placed concrete to prevent erosion of the underlying materials or damage to the edges of the freshly placed concrete. All measures shall be effective.

Any concrete damaged by precipitation shall be removed and replaced at the Contractor's expense. The Engineer shall decide if the concrete has been damaged and the limits of removal and replacement.

Concrete shall only be placed when the rate of surface evaporation at the site is less than 0.20 pounds per square foot per hour, according to Figure 706-1 of the MDOT 2020.

Standard Specifications for Construction. The Contractor shall provide approved equipment for determining the relative humidity and wind velocity at the site.

Water shall not be added to the placed concrete in order to aid finishing. Any water added to the concrete for slump adjustments shall be done by adding water to the mixing unit and thoroughly re-mixing the concrete for 30 revolutions of the mixing unit at mixing speed. Water shall not be added such that the design water-to-cement ratio of the concrete mixture or the design slump of the concrete mix is exceeded.

Concrete curing shall be performed in accordance with Subsection 602.03.M of the MDOT 2012 Standard Specifications for Construction. Curing operations shall take precedence over texturing operations and continued concrete placement. All curing compound applied shall provide uniform coverage over the entire surface being protected. The placement of curing compound shall be free of spots, blotches, or uncovered or non-uniformly covered areas. Should any areas be determined to exist by the Engineer, the curing compound shall be immediately re-applied by the Contractor at no additional cost to the project.

The Contractor shall take all precautions when placing concrete to protect it from damage due to the elements. Concrete shall not be placed during precipitation events.

Concrete shall be protected from weather and temperature according to the requirements of Subsection 602.03.T MDOT 2020 Standard Specifications for Construction. Concrete shall not be placed when the temperature of the plastic concrete mixture itself is greater than 90°F. In conditions where low temperature protection is required, the Contractor shall cover the concrete with insulated blankets, or other means as approved by the Engineer, to protect the concrete from damage. The concrete shall remain protected until it has reached a compressive strength of at least 1,000 psi, or as directed by the Engineer.

Measurement and Payment

All costs associated with the conformance to the requirements of this Special Provision will not be paid for separately but shall be considered to be included in the respective items ofwork.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PAVEMENT MARKING

Description

This work consists of providing and placing permanent pavement markings in accordance with the Michigan Manual of Uniform Traffic Control Devices (MMTUTCD), lasted version published at time of advertisement. Provide pavement markings that conform to the Plans, the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, MDOT Pavement Marking Standard Plans, City of Ann Arbor Special Details, and as specified herein.

Materials

Provide materials in accordance with Sections 811 and 920 of the MDOT 2020 Standard Specifications for Construction. Provide the Material Safety Data Sheets to the Engineer for required materials and supplies. Dispose of unused material and containers in accordance with the Federal Resource Conservation Recovery Act (RCRA) of 1976 as amended, and 1994 PA 451, Part 111 Hazardous Waste Management. Provide samples of permanent marking materials upon request.

Construction Methods

The preparation and placement of permanent markings shall conform to Section 811 of the MDOT 2020 Standard Specifications, the Plans, and as specified herein.

Measurement and Payment

Completed work, as described, will be measured, and paid for at Contract unit prices for the following Contract (pay) items:

Contract Item (Pay Item)	Pay Unit
Pavt Mrkg, Polyurea, 4-inch, Yellow	Foot
Pavt Mrkg, Polyurea, 4-inch, White	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 MDOT 2020 Standard Specifications for Construction and as modified by this Detailed Specification.

Description

This work includes installing sanitary sewer, manholes and related items. The Contractor shall furnish all materials, equipment, tools, and labor necessary to perform the work required by this special provision and shall unload, haul, distribute, store, and install all pipe, fittings, castings, manholes, and accessories.

The Contractor shall excavate all trenches and pits to the required dimensions; excavate the bell holes; sheet, brace, and properly support the adjoining ground or structures as necessary to comply with MIOSHA and other relevant safety standards; properly handle and remove all drainage or ground water so that the work can be completed in accordance with the specifications; install and test the pipe, fittings, castings, manholes, and accessories; backfill and compact all fill materials within trenches and pits; and remove and properly dispose of surplus or unsuitable excavated material off-site.

Materials

Materials shall conform to the Michigan Department of Transportation 2020 Standard Specifications for Construction, Sections:

Concrete, Grade S2	701
Mortar, Type R-1	702
Granular Material, Class II	902
Coarse Aggregate, 6A	902
Steel Reinforcement	905
Castings	908
Miscellaneous Metal Products	908
Geosynthetics	910
Masonry Units	913

Coarse Aggregate, 6A shall be crushed limestone. Concrete, Grade X shall consist of Portland cement, coarse and fine aggregates, and water, proportioned with 282 lbs. cement (3-sacks) per cubic yard to produce a minimum 28-day compressive strength of 1,000 psi.

Concrete Pipe

Reinforced Concrete Pipe shall conform to the material and testing requirements of ASTM C76, Class IV wall thickness B. Reinforced Concrete Pipe shall contain Xypex Bio-San C500 admixture or approved equal.

Joints

Use corrosion-resistant rubber gasket joints of the push on type that meet the requirements of ASTM C443.

Polyvinyl Chloride Pipe and Fittings

Polyvinyl chloride (PVC) pipe shall have an integral wall bell and spigot. PVC pipe shall conform to the material and testing requirements of ASTM D 3034. Minimum wall thickness shall be SDR 26.

Joints

Joints for PVC pipe shall be elastomeric gasketed push-on joints conforming to the requirements of ASTM D 3212-81. Lubricant 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.

Pipe Marking

The following information shall be clearly marked on each length of pipe at intervals of 5-feet or less:

a) Manufacturer's name or trademark and code.
b) Nominal pipe size.
c) The PVC cell classification (e.g. "12454-B").
d) The legend "Type PSM SDR-26 PVC Sewer Pipe".
e) The designation "Specification D 3034".

The following information shall be clearly marked on each fitting:

a) Manufacturer's name or trademark and code.
b) Manufacturer's name or trademark.
c) Nominal size.
d) The material designation "PVC".
e) "PSM".
f) The designation "Specification D 3034".

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.

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.

Pipe 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. Pipe in all cases shall be full diameter.
b) Fractures or cracks passing through the barrel or socket.
c) Chips or fractures on the interior of the pipe exceeding 2-inches in length, 1-inch in width, or depth more than 1/4 of the thickness of the wall.
d) Blisters that are either broken, exceed 3-inches in diameter, or project more than 1/8-inch above the surrounding surface of the pipe.
e) Variation of more than 1/16-inch per lineal foot in alignment of pipe intended to be straight.

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.

Sewer Service Leads, Risers and Fittings

Allowable pipe materials are SDR 35 and SDR 26 polyvinyl chloride (PVC) plastic conforming to the material and testing requirements of ASTM D 3034.

Whenever adapters are required to properly connect the pipe with pipe of other material or manufacturer, the nominal I.D. of adapters shall be manufactured for that specific purpose and shall be the same size as the nominal diameter of pipe connected thereto. Adapters shall also be furnished and used as required by the manufacturer. The adaptor at this tapped connection shall an Inserta Tee by ADS, or approved equal, with a three-piece service connection consisting of a PVC hub, rubber sleeve and stainless steel band. Adaptor shall be compression fit into the cored wall of a mainline sewer and shall requires no special tooling.

Joints

Joints for SDR 35 and SDR 26 PVC pipe shall be bell and spigot rubber O-ring gasket joints conforming to the requirements of ASTM D-3212. Lubricant supplied by the pipe manufacturer shall be used, and the joints shall be coupled in accordance with the manufacturer's requirements.

Pipe Marking

The following information shall be clearly marked on each length of pipe:

a) The pipe designation and class (e.g., SDR 26, ASTM D 3034).
b) The name or trademark of the manufacturer.
c) Identification of the manufacturing plant.
d) Testing lot number.

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.

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.

Pipe for sewer service leads and risers 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. Pipe in all cases shall be full diameter.
b) Fractures or cracks passing through the barrel or socket.
c) Chips or fractures on the interior of the pipe exceeding 2-inches in length, 1-inch in width, or depth more than 1/4 of the thickness of the wall.
d) Blisters that are either broken, exceed three inches in diameter, or project more than 1/8-inch above the surrounding surface of the pipe.
e) Variation of more than 1/16-inch per lineal foot in alignment of pipe intended to be straight.

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.

Manholes

All sanitary sewer manholes shall be constructed of precast reinforced concrete sections. Precast drainage structures 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.

Precast sanitary manholes shall contain Xypex Bio-San C500 admixture or approved equal.

Precast reinforced concrete bases, bottom sections, manhole risers, grade adjustment rings, concentric cones, eccentric cones, and flat top slabs 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.

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

Cast iron frames and covers for manholes shall conform to the requirements for grey iron castings, ASTM A 48, Class No. 30. Specific, approved castings are listed in the Specification for Structure Covers.

Plastic coated manhole steps shall be injection molded of copolymer, polypropylene, encapsulating a ½-inch grade 60 steel reinforcing bar. Plastic-coated manhole steps shall meet the performance test described in ASTM C-478, Paragraph ll and shall have an impact resistance of 300-feet-lbs., with only minor deflection and no cracking or breaking.

The steps shall resist pull out forces of 1,500 lbs.

Manhole Connections

Sewer pipe to precast manhole connections shall be through: 1) a flexible neoprene rubber boot which shall be securely clamped into a core-drilled pipe port. Pipe ports shall be core-drilled at the point of manhole manufacture and shall be accurately located within 1/2-inch of proposed sewer centerline; or, 2) a self-adjusting mechanical pipe to manhole seal which provides a resilient, flexible, and infiltration-proof joint; or, 3) a flexible rubber wedge firmly rammed into a rubber gasket which is cast into the manhole as approved in writing by the Engineer.

Neoprene rubber for manhole boots shall meet the requirements of ASTM C 443 and shall have a minimum thickness of 3/8-inch. Pipe clamp bands shall be of corrosion-resistant steel.

Construction

General

The Contractor shall fully comply with all laws and regulations governing construction methods and the furnishing and use of all safeguards, safety devices, protective equipment, and pollution controls. Where required to support the surfaces of adjacent roadways, structures, or excavations, or to protect the construction work, adjacent work, or workmen, the Contractor shall design and install sheeting, bracing, and shoring. The Engineer will not review the Contractor's design(s) or be responsible for the adequacy of the elements supporting the trench. The placing of such supports shall not release the Contractor of the responsibility for the sufficiency and integrity of the trench, trench opening, and the safety of all persons involved in the work. In the removing of sheeting and bracing after the construction has been completed, special care shall be taken to prevent any caving of the sides of the excavation and injury to the completed work or to adjacent property.

Material Handling

Pipe, fittings, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Under no circumstances shall such material be dropped. Pipe handled on skidways shall not be skidded or rolled against pipe already on the ground. In distributing the material at the site of the work, each piece shall be stored off of the ground surface by means of skids or bunks and stacked neatly. Pipe may be "strung-out" for only the length which, in the opinion of the Engineer, will be installed within 24 hours, if maintained such that the pipe interior will remain free of dirt, mud, and debris.

Excavation

The Contractor shall dig-up and expose all utility crossings prior to laying any sanitary sewer pipe or lead. This will allow the Engineer to adjust the grade of the sanitary sewer or lead, if possible, to avoid the existing utilities. The costs of the dig-ups, and related costs, shall be included in the unit price of the sanitary sewer or lead. The Engineer may require that some dig-ups be performed out of the staging area where the sewer work is taking place in order to aid in alignment decisions.

Excavation shall include the removal and disposal of all materials of every kind, including rock, boulders, or buried obstructions necessary to be removed in the construction work.

The Contractor shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and the Contractor shall be held responsible for the repair of such structures when broken or otherwise damaged.

Excavation normally shall be by open cut from the surface except as otherwise specified, or in special cases where crossing under trees, pavements, or structures. The Contractor may use tunnel methods if permitted in writing by the Engineer, provided his method of backfill is such, in the judgment of the Engineer, as to avoid any present or future injury to the tree, pavement, or structure. All excavation shall be performed in such a manner as to provide adequate room for the construction and installation of the work to the lines, grades and dimensions shown on the Plans.

The trench shall be excavated to a minimum of 4-inches below the final location of the pipe. This cut shall be filled to the level of the bottom quadrant of the pipe with Coarse Aggregate, 6A as specified herein, shaped and compacted to the pipe barrel.

Bell holes shall be provided in the trench bottom at each joint to permit the joints to be made properly.

Whenever, in the opinion of the Engineer, it is necessary to explore and excavate to determine the location of existing underground structures, the Contractor shall make explorations and excavations for such purposes. These excavations will not be paid for separately but shall be included in the cost of the item of work being performed. Any backfilling that may be required to be performed as a result of an exploratory excavation that is not part of the backfill associated with the work being undertaken, shall be included in the item of work being performed, with the exception of final trench restoration, which shall be paid for separately using appropriate items of work contained within the contract

documents.

All excavated material approved by the Engineer as backfill material and imported backfill material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways or clear vision areas along roadways, driveways, or parking areas. All excavated material which is unsuitable for backfill shall be immediately removed from the site by the Contractor. Hydrants under pressure, manholes of any kind, valve boxes, curb stop boxes, fire and police call boxes, and other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clear, or other satisfactory provisions made, for proper drainage. Natural and man-made water courses shall not be obstructed. Disposal of excavated material, if required, shall be the Contractor's responsibility.

Hand methods for excavation shall be employed in locations shown on the Plans. In other locations the Contractor may use trench-digging machinery or employ hand methods.

Pipe Undercut

In locations where in the opinion of the Engineer, the soil at the bottom of the trench is unstable, the Contractor shall excavate below the trench bottom to such depth as directed by the Engineer and refill with compacted Aggregate, 6A (limestone), or compacted Granular Material, Class II, as directed by the Engineer, to the level of the bottom quadrant of the pipe. If refill with compacted Aggregate, 6A (limestone) is required during sewer construction, it shall be placed for the entire sewer run, from manhole to manhole.

Trench Opening

The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed and compacted as specified. Trenches shall be of such extra width, when required, to permit the convenient placing of timber supports, sheeting and bracing, and handling of special fittings. For each size of pipe, the minimum trench width shall provide clearance of 4-inches on each side of the bell of the pipe or fitting or 6-inches on each side of the pipe barrel, whichever is greater. The maximum trench width shall be in keeping with good construction practice, such that existing structures are not undermined.

In excavating for pipe lines, the excavation shall at all times be finished to the required grade in advance of the pipe line, but unless otherwise permitted in writing by the Engineer, not more than 50-feet of trench shall be open at one (1) time in advance of the pipe. At no time shall more than 200-feet of trench be opened and incompletely backfilled. At the end of each day, no more than 10-feet of trench may be left open, and access to all drives shall be restored. This opening shall be surrounded by fencing and lighted barricades, or plated. The remainder of the trenching operation shall be available for safe vehicular and pedestrian traffic at all times.

The trench shall be so braced and drained that the workers may work therein safely and efficiently. It is essential that the discharge of the trench dewatering pumps be conducted to natural drainage channels, drains, or storm sewers. If trench water is pumped to natural drainage channels or drains, approved soil erosion and sedimentation controls shall be installed and maintained at the point of discharge. If trench water is pumped into storm sewers, filters shall be provided to prevent the flow

of rocks, mud, and other debris into the storm sewer line.

Sheeting, bracing, and shoring shall not be left in place after completion of the work except as required by the Engineer. Where the Engineer requires the sheeting, bracing, or shoring to be left in place it shall be cut off below the established surface grade as required by the Engineer.

The length of street which may be occupied by the construction work at any one time shall be subject to the approval of the Engineer and will be based on the requirements of use of the street by the public.

Crossing Existing Structures & Facilities

During the construction it may be necessary to cross under or over certain sewers, service leads, drains, culverts, water lines, gas lines, electric lines, and other underground structures or facilities, known or unknown. The Contractor shall make every effort to prevent damage to such underground structures and facilities. The Contractor shall not intentionally “dig through” existing facilities with the intention of replacing or repairing them after the proposed work is completed. Wherever such structures or facilities are disturbed or broken, they shall be restored to a condition equal to, or better than, the condition that existed prior the work being performed. All repairs shall acceptable to the owner and the City and shall be at the Contractor's sole expense. These crossings shall be made with a minimum of 18-inches of vertical clearance between potable water facilities and 12-inches of vertical clearance between other facilities.

Laying Pipe

Each pipe shall be inspected for defects prior to being lowered into the trench. The inside of each pipe and outside of each spigot shall be cleaned of any earth or foreign matter.

Proper implements, tools, and facilities satisfactory to the Engineer shall be provided and used by the Contractor for the safe and convenient prosecution of the work. All pipe and fittings shall be carefully lowered into the trench piece by piece by means of a derrick, ropes, or other suitable tools or equipment as recommended by the manufacturer, in such a manner as to prevent damage to them and their protective coatings and linings. Under no circumstances shall materials be dropped or dumped into the trench.

New sewer construction shall be plugged at the outlet, so as to not be connected into the existing system until it has been tested and accepted. Construction of sewers shall begin at the outlet end and proceed upgrade, unless otherwise directed by the plans or the Engineer. Pipe shall be laid on the prepared subgrade with the bell ends facing the direction of laying, unless otherwise directed by the Engineer.

The Contractor shall take every precaution to prevent foreign material from entering the pipe while it is being placed in the line. During laying operations, no debris, tools, clothing, or other materials shall be placed in the pipe. At times when pipe laying is not in progress, the open ends of pipe shall be closed by a watertight plug. This provision shall apply during the break period as well as overnight. If water is in the trench, the seal shall remain in place until the trench is pumped completely dry.

Pipe shall be jointed as specified elsewhere herein. The pipe shall be secured in place with approved backfill material tamped under it except at the bells. Pipe and fittings which do not allow a sufficient and uniform space for joints shall be removed and replaced with pipe and fittings of proper dimensions to insure such uniform space. Precautions shall be taken to prevent dirt from entering the joint space.

All pipe shall be laid at the correct line and grade as indicated by the grade stakes and offset line. The correct line and grade shall be maintained by the use of a laser alignment system. The staking shall be provided by the Engineer. No pipe shall be laid until a cut sheet for that pipe has been approved by the Engineer. Each pipe, as laid, shall be checked by the Contractor to insure that this result is obtained. The grade as shown on the Plans is that of the pipe invert for sewers; the work must conform to this profile. A variation of ¼-inch from this profile grade will be deemed sufficient reason to cause the work to be rejected and re-laid. Sewer pipe alignment shall be maintained so as to not vary more than one-half inch from the correct line on pipes up to 36-inches in diameter nor more than one inch on pipes 42-inches in diameter and larger. Any pipe found out of line shall be re-laid properly by the Contractor.

Due to conditions in the field, changes to the proposed vertical and horizontal alignment of the proposed sanitary sewer may become necessary. The Contractor shall, where directed by the Engineer, excavate up to 60-feet in advance of the pipe laying operation to expose existing underground facilities thereby enabling the Engineer to make alignment decisions. The Contractor is required to realign (re-lay) the sanitary sewer up to 2-feet vertically and/or horizontally as directed by the Engineer at no extra cost to the project. The excavation in advance of the pipe laying is intended to help eliminate the need for re- laying pipe.

Making Joints

General

Mechanical means shall be used for pulling home all rubber-gasket pipe 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.

Where not required by these Specifications, manual means will be acceptable only if the joints can be pushed home and held.

Sewer pipe may not be cut when the cut end will be used in making a pipe joint. Cut ends may only occur in situations such as a manhole or headwall. Cut ends shall be carefully and neatly made with a saw, pipe cutter, or other approved means.

Polyvinyl Chloride (PVC) Pipe

Elastomeric gasket, push-on joints, shall be made in accordance with manufacturer's standards, and ASTM D2321 and D3212. The jointing surfaces of the pipe shall be wiped clean and lubricated using lubricant supplied by the pipe manufacturer. The spigot end is to be inserted into the bell so that it is in contact with the gasket. The bell is to be braced while the spigot end is pushed in under the gasket, so that previously completed joints will not be altered. The spigot shall be pushed into the bell until the reference mark on the pipe barrel is flush with the end of the bell.

Backfilling

All pipe shall be bed on a 4-inch or thicker layer of compacted Coarse Aggregate, 6A (limestone) as specified herein.

From the bedding to the pipe centerline backfill shall be carefully placed Coarse Aggregate, 6A (limestone), placed in maximum lift thicknesses of six inches, loose measure. Each lift shall be thoroughly compacted by hand tamps, pneumatic "pogo-sticks", or other approved methods. Each lift shall extend the full width of the space between the pipe and trench, and the fill shall be brought up evenly on both sides of the pipe. The backfill under the haunches of the pipe shall be consolidated by the use of a tee-bar.

From the pipe centerline to the top of the pipe, backfill shall be Aggregate, 6A (limestone) placed in maximum lift thicknesses of 6-inches, loose measure. Each lift shall be thoroughly compacted by hand tamps, pneumatic "pogo-sticks", or other approved methods. A layer of geotextile separator, meeting the requirements of Section 910, extending the full width of the trench, shall be provided above the coarse aggregate to prevent intrusion of succeeding backfill materials.

From the top of the pipe to 2-feet above the top of the pipe, unless otherwise specified, backfill shall be Granular Material, Class II placed in a maximum lift thickness of 12-inches, loose measure. These lifts shall be thoroughly compacted by manually operated vibrating plate compactors, to at least 95% of the material's maximum dry density at optimum moisture content, as determined by ASTM D 1557, Method C, or AASHTO T-180.

From 2-feet above the top of PVC pipe to the grade shown on the Plans and Details, or to the subgrade of roadway materials, or to the subgrade of surface structures, backfill shall be Class II granular material uniformly spread and machine tamped. If machine tamping includes manually operated vibrating plate compactors or self-propelled vibrating rollers the backfill material shall be compacted in lifts not exceeding 12-inches, loose measure. If a backhoe mounted compactor is employed, the backfill material shall be compacted in lifts of 36-inches, loose measure. Approval to use a particular machine tamping method will be withdrawn by the Engineer if the method causes injury to the pipe or adjacent structures or movement of the pipe. Each lift shall be thoroughly compacted to at least 95% of the material's maximum dry density at optimum moisture content as determined by ASTM D 1557, Method C, or AASHTO T-180. The Engineer may give consideration to giving written permission to increase the thickness of the lifts specified in this paragraph if satisfactory compaction is achieved and no undesirable side effects occur.

General

Backfilling shall not be performed in freezing weather except by written permission of the Engineer, and it shall not be composed of frozen material. No fill shall be placed where the material already in the trench is frozen.

Concrete Cradle and Encasement for Sewers

Where shown on the Plans, pipe shall be installed with a concrete cradle or encasement of Concrete, Grade X as shown on the Standard Details or plan sheets. Each pipe shall rest on a bed of Concrete, Grade X, shaped to fit the bottom of the pipe. After setting the pipe, the space between the outside of the pipe and the undisturbed trench bank shall be completely filled with Concrete, Grade X. Concrete, Grade X used for this purpose shall have a slump not exceeding 2-inches.

Riser Pipe for Service Leads

Where shown on the Plans or directed by the Engineer, the Contractor shall furnish and place risers extending from the branch opening of the sewer up to within 8- to 10-feet of the proposed finished grade. These pipes shall be laid with joints as specified above. These risers shall be laid up and held in place as required by the Standard Details. The connection fitting when a riser is to be used shall be a tee fitting. Openings in the top of the riser pipe shall be closed, marked, and staked as specified above.

Service Lead Connections and Fittings

Service lead connections shall be provided at such points as shown on the Plans or as directed by the Engineer. These shall be of the size and character indicated on the Plans. House service leads shall be a minimum of four inches in diameter. Service lead connections shall be formed by the use of standard wye or tee fittings of the same material called for use on the main sewer being constructed. Wye fittings are not to be used for connections with riser pipes. All wye and tee fittings shall be encased in Concrete, Grade. All leads which will not have pipe connected to them immediately shall be closed by the use of a watertight plug manufactured specifically for that purpose and approved by the Engineer.

Branch connections to existing sewers shall be made by the City of Ann Arbor – Public Works Personnel. Scheduling of these taps shall be made with Public Works by the Contractor. All applicable tap fees must be paid in full prior to this scheduling.

Connections for sewer service leads connecting to existing sewer mains or sewer mains of a different pipe material shall be at a core-drilled tap into the sewer pipe. The joint at this tapped connection shall be an Inserta Tee by ADS, or approved equal, with a three-piece service connection consisting of a PVC hub, rubber sleeve and stainless steel band. Adaptor shall be compression fit into the cored wall of a mainline sewer and shall requires no special tooling.

In order to properly mark the location of every branch connection, the Contractor shall take accurate measurement of all branches before the sewer trench is backfilled. The measurements shall indicate

the distance from each branch to the center of the nearest downstream and upstream manhole. When leads are run to the property line, they shall be perpendicular to the main sewer. The Contractor shall also report the location of the point where the lead ends, relative to the nearest property corners. The Contractor shall furnish the Engineer with a copy of these measurements immediately upon the completion of each section of sewer.

In addition to measurements, the Contractor shall furnish and place a minimum 2-inch by 2-inch cedar or treated lumber marking stick at the end of each lateral extension or service lead connection of such length that it will reach from the end of the pipe vertically up to a minimum of 2-inches above the proposed finished grade. Each marker shall be set in a vertical position. Markers will not be required on the main run of sewer at fittings. The visible end of each marker stake must be plainly painted red if sanitary or white if storm.

The service lead pipes shall also be marked for identification in order to prevent cross connection of the leads: sanitary leads - red, storm leads - white. The last two (2) lengths of pipe shall be marked by wrapping the appropriate colored tape twice around the barrel. This wrapping shall take place at any point in the lead whenever the lead is terminated. This taping (wrapping) must be performed under the inspection of the Inspector.

Manholes

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. Concrete shall be Grade S2. Precast manhole bases and precast bottom sections are allowed.

Precast concrete manholes shall be constructed of Concrete, Grade S2.

Circular precast manhole sections shall be constructed in accordance with the Standard Detail Drawings. 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 Standard Details. These units shall be eccentric for all manholes. All structures shall be topped with a minimum of one and a maximum of three brick or precast adjustment ring courses.

Manholes 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. City of Ann Arbor Project Management Personnel shall be notified prior to the final paving of all private roads and parking lots so as to allow inspection of the final casting adjustments for all City utility structures. In gravel streets, covers shall be set 6- to 8-inches below finished gravel surface.

Sewer pipes shall extend into structures a minimum of ½-inch and a maximum of 3-inches.

Flow channels for sewer structures shall be finished in accordance with the Standard Details. 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.

See Sewer Testing section for the requirement of the installation of a pipe nipple through the sewer manhole wall.

Drop Connections

Where shown on the Plans or directed by the Engineer where a branch sanitary sewer is brought into a manhole more than 24-inches above the invert elevation in the manhole, a drop connection shall be provided in accordance with the Standard Detail Drawings.

Backfilling Around Manholes:

As soon as practicable after a precast structure has been set, forms and debris have been removed from the structure, and the structure has been inspected and approved, the excavated area around the structure shall be backfilled up to the specified grade with Granular Material, Class II. No boulders, rocks, stones, masonry, lumber, or debris shall be allowed within the backfill.

Sewer Testing

All sanitary sewers, including leads, 36-inches and smaller shall be air tested by the Contractor. All sanitary sewers greater than 36-inches shall be infiltration or exfiltration tested by the Contractor. The Engineer will decide whether infiltration or exfiltration testing is performed based upon ground water conditions. All sewers, except 4-inch and 6-inch leads, shall be television inspected by the Contractor. All PVC sanitary sewer mains shall be mandrel tested. All sewer must meet each test, in order (mandrel testing, air or infiltration/exfiltration, television inspection), before the next test is performed. The Contractor shall furnish all labor, equipment, and materials necessary for testing. Only after all tests have been successfully completed, and acknowledged by the Engineer in writing, may the sewer be placed in service.

Mandrel Testing

All PVC sanitary sewer mains shall be mandrel tested for deflection by the Contractor. The mandrel shall be a commercially produced, nine-fin mandrel, with the pipe diameter, percent deflection and applicable ASTM or AASHTO standard stamped on the fins. The testing is to take place after the sewers have been in place for a minimum of 30 days. The mandrel shall be pulled from structure to structure. Any portion of the pipe through which the mandrel passes freely shall be deemed to have passed the mandrel test. Sections of pipe through which the mandrel does not pass freely shall be

exposed and examined. Based on this examination either the pipe zone bedding and backfill shall be improved or the pipe replaced. The pipe shall then be re-tested before approval is granted.

The Contractor shall not be granted an extension of contract time for the period in which a portion(s) of PVC sanitary sewer is awaiting mandrel and other acceptance tests. This waiting period is understood to be an integral element of the construction of the utility and cannot be eliminated. Further, if a sewer is installed and requires remedial action in order to comply with the requirements of the project specifications, the waiting period associated with the remedial repairs shall also not be considered as a basis for an extension of contract time. The Contractor shall take these requirements into account when preparing their Critical Path Schedule, and any required updates, and shall account for them during the performance of the project.
The mandrel is to be constructed in accordance with the following table:

SDR 26 PVC, Pipe I.D.	Mandrel O.D.
8-inch	7.11-inch
10-inch	8.87-inch
12-inch	10.55-inch
15-inch	12.90-inch
18-inch	N/A
24-inch	N/A

Air Test

The air test can be dangerous. Lack of understanding, carelessness, or an improperly prepared line must be avoided. It is extremely important that the plugs be installed in such a way as to prevent blowouts. Sudden expulsion of a poorly installed or partially deflated plug can cause serious injury or damage. As a safety precaution, pressurizing equipment must include a relief valve set at not more than 10 psig. No one will be allowed in the manholes during testing.

In areas where ground water is known to exist and the sewer is to be air tested, the Contractor shall install a 1/2-inch diameter by approximately 10-inch long pipe nipple, through the manhole wall above one of the sewer lines entering the manhole. The pipe nipple shall be capped on the inside of the manhole at the time the sewer line is installed. Immediately prior to the performance of the air test, the ground water level shall be determined by removing the pipe cap, blowing air through the pipe nipple into the ground so as to clear it, and then connecting a clear plastic tube to the pipe nipple. The tube shall be held vertically and a measurement of the height in feet of water above pipe centerline shall be taken after the water stops rising in this plastic tube. The height in feet shall be divided by 2.31 to establish the pressure (in psig) that will be considered to be the average ground water back pressure.

The normal sequence and time requirements for air testing are:

1. After a manhole-to-manhole section of line has been backfilled and cleaned, it shall be plugged at each manhole with pneumatic plugs. The design of the pneumatic plugs shall be such that they will hold against the line test pressure without requiring external blocking or

bracing. There shall be three hose connections to the pneumatic plug. One (1) hose shall be used only for inflation of the pneumatic plug. The second hose shall be used for continuously reading the air pressure rise in the sealed line. The third hose shall be used only for introducing low pressure air into the sealed line.

2. Low pressure air shall be introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any ground water pressure that may be over the pipe. At least two minutes shall be allowed for the air pressure to stabilize. After the stabilization period, the pressurization hose shall be disconnected to prevent air from entering or escaping from the line.

   There shall be a pressure gauge for reading the internal pressure of the line being tested. The gauge shall be capable of showing pressure as low as 0 psig up to no greater than 20 psig. In the 0-10 psig range the gauge shall be both calibrated and accurate to one-tenth of one pound and the gauge dial shall cover at least one-half of the complete dial range. This gauge shall have a tee fitting to allow simultaneous pressure reading by a City gauge.

3. The time requirement for the pressure to decrease from 3.5 to 2.5 psig (greater than the average back pressure of any ground water that may be over the pipe) shall not be less than the time given in the following table:

	VCP SEWERS	PVC SEWERS	
Pipe Size	Minimum Holding Time Seconds/100-feet Pipe	Holding Time (Seconds)	Minimum Holding Time (Min:Sec)
4-inch	18	0.380 x Length	3:46
6-inch	42	0.854 x L	5:40
8-inch	72	1.520 x L	7:34
10-inch	90	2.374 x L	9:26
12-inch	108	3.418 x L	11:20
15-inch	126	5.342 x L	14:10
18-inch	144	7.692 x L	17:00
21-inch	180	10.470 x L	19:50
24-inch	216	13.674 x L	22:40
30-inch	288	21.366 x L	28:20
36-inch	360	30.768 x L	34:00

Infiltration Test

The Contractor shall place temporary weirs for testing purposes in such manholes as necessary to measure the amount of infiltration. Test sections shall be no longer than 1,200-feet.

The allowable amount of infiltration shall not be more than 200 gallons per inch of pipe diameter per 36 mile of sewer per 24 hours, including manholes. The Contractor shall repair all visible leaks regardless of the results of the infiltration test.

If the allowable limit of infiltration is exceeded on any test section, the Contractor shall reconstruct or repair the defective portion of the sewer, and re-test.

Exfiltration Test

The standpipe method will be used from manhole to manhole for the length of pipe to be tested. A hydrostatic head of 10-feet to the sewer's average centerline elevation will be required, with adjustments for external submergence due to water in the trench. The Engineer will establish time durations and procedures for each test. The maximum allowable exfiltration rate will be 200 gallons per inch of pipe diameter per mile of sewer per 24 hours including manholes. Upon completion of this test on a sanitary sewer, the Contractor shall pump all water out of the downstream manhole to a storm sewer.

Television Inspection

A video inspection must be approved prior to the acceptance of the sewers, and prior to any building connections being made. The Engineer shall be given 24 hours' notice so that an Inspector may witness the video inspection. All sewer lines are to be thoroughly cleaned prior to video inspection, by jetting of the lines or other approved methods. Video inspection shall consist of wetting the invert of the section by pouring clean water in the upstream manhole until it appears in the downstream manhole, and then, after the water has stopped flowing, passing a video camera upstream through the section. The camera shall be connected to a monitor and the results recorded in DVD format. The inspection record (DVD) shall indicate the date, the section tested, and the actual distance from the beginning manhole to each tee or wye, and each visible defect. The DVD shall be furnished to the Engineer for further review and final approval.

The video inspection will be deemed satisfactory if there are no visible defects, including, but not limited to: dips or low spots, high spots, deviations in horizontal or vertical alignment, joint offsets, leaks or cracks and there is no debris or other foreign material in the sewer system.

Sewer Repairs

If a sewer repair is required as a result of damage during construction operations, air test failure, or video inspection failure, the Contractor shall expose the sewer pipe and perform the required correction(s), as specified herein and as directed by the Engineer. The Contractor shall be fully responsible to provide a written plan of all proposed activities associated with any repair(s) for the review and approval of the Engineer. All repairs proposed shall be effective. The Engineer's acceptance of a proposed repair plan shall not be construed as acceptance of any associated result. The Contractor is, and shall remain responsible, for all work until such time as it is formally accepted in writing by the Engineer.

If the repair is required due to the pipe being out of alignment or off grade, the pipe shall be adjusted so as to be placed in proper alignment and grade. Aggregate, 6A (limestone) shall be carefully placed under the haunches of the realigned pipe and compacted by the use of a tee-bar. From the haunches of the pipe, backfilling shall be performed as specified elsewhere herein.

If the pipe cannot be satisfactorily realigned or an open joint reset; or if the pipe is cracked, broken, or permanently deflected, the affected pipe shall be removed and replaced with the same pipe material. The pipe to be removed is to be sawed on each side of the damaged section in a neat and workmanlike manner without damage to the adjacent pipe. The replacement pipe section shall fit flush to the remaining pipe at each end. These sawed joints shall be coupled using a flexible pipe coupling and stainless-steel shear ring. These joints shall be encased to the pipe centerline with Concrete, Grade X 1-foot on either side of the flexible coupling. The remaining pipe backfill shall be performed as specified elsewhere herein.

Measurement and Payment

The completed work as described will be measured and paid for at the contract unit price using the following contract items (pay items):

Contract Item (Pay Item)	Pay Unit
18-inch VCP Sanitary Sewer, Tr Det I	Foot
8-inch SDR 26 PVC Sanitary Sewer, Tr Det I	Foot
8-inch SDR 26 PVC Sanitary Sewer, Tr Det V	Foot
12-inch SDR 26 PVC Sanitary Sewer, Tr Det I	Foot
12-inch SDR 26 PVC Sanitary Sewer, Tr Det V	Foot
21-inch RCP CL IV Sanitary Sewer, Tr Det I	Foot
21-inch RCP CL IV Sanitary Sewer, Tr Det V	Foot
21-inch RCP CL IV Sanitary Sewer, Bored in 36-inch Steel Casing	Foot
Sewer Tap, 6-inch	Each
6-inch SDR 35 PVC, Riser, Tr Det V	Foot
6-inch SDR 35 PVC, Service Lead, Tr Det V	Foot
Type I Manhole, 48-inch dia (0-10’ deep)	Each
Type I Manhole, 48-inch dia, Addl Depth	Foot
Type I Manhole, 60-inch dia (0-10’ deep)	Each
Type I Manhole, 60-inch dia, Addl Depth	Foot
Type I Manhole, 72-inch dia (0-10’ deep)	Each
Type I Manhole, 72-inch dia, Addl Depth	Foot

Sewer Pipe

Sewer pipe as specified shall be measured in place by length in lineal feet (LF) from center of manhole to center of manhole.

Payment will include, but not be limited to; excavation; removal and proper disposal off-site of all excess or unsuitable excavated material; any needed sheeting, shoring and bracing; the installation of water-tight plugs; protection of all existing utilities and service connections; connections into

existing structures; bulkheading existing connections that are no longer needed in existing manholes; pipe bedding; by-pass pumping; furnishing an approved geotextile separator; backfilling per the trench details and the requirements specified herein; cleaning; video inspection; and testing.

Sewer Taps

Sewer taps shall be paid for based on each tap installed on the mainline concrete sewer. The payment for the sewer tap will include the material, equipment, and labor costs for the connection of the riser or lead to the tap. Also, the payment for the sewer tap will include the material, equipment and labor costs for the excavation; removal and proper disposal off-site of all excess or unsuitable excavated material; any needed sheeting, shoring and bracing; the installation of water-tight plugs; protection of all existing utilities and service connections; pipe bedding; by-pass pumping; furnishing an approved geotextile separator; backfilling per the trench details and the requirements specified herein; cleaning; testing; placing the plug or cap placed on the tee, riser or lead; and, the required wooden stake to locate the riser or lead in the future.

Risers & Leads

Service risers shall be paid for based on vertical feet (VF) measured as installed, from invert of the sewer main to invert of the bend at the top of the riser.

Service leads shall be paid for based on lineal feet (LF) measured as installed, from the center of the main to the capped end of the lead. If a service riser is installed, this measurement shall be from the center of the bend at the top of the riser to the capped end of the lead. The payment for service leads will include, but not be limited to; excavation; removal and proper disposal off-site of all excess or unsuitable excavated material; any needed sheeting, shoring and bracing; the installation of water-tight plugs; protection of all existing utilities and service connections; connections into existing structures; pipe bedding; by-pass pumping; furnishing an approved geotextile separator; backfilling and compacting per the trench details and the requirements specified herein; cleaning; video inspection; testing; and, the necessary fittings, labor and equipment to connect the lead to a riser.

Manholes

Manholes of the detail and depth specified will be paid for at the Contract unit price for each unit installed. Payment includes, but shall not be limited to; furnishing the labor, equipment and materials for all necessary excavation; any needed sheeting, shoring and bracing; properly disposing of surplus or unsuitable excavated material; backfilling and compaction; and, constructing the structure complete, including pipe connections and structure cleaning, up to 10-feet of structure depth.

Payment for additional depth for drainage structures includes, but shall not be limited to; furnishing the labor, equipment, and materials for all necessary excavation; any needed sheeting, shoring and bracing; disposing of surplus excavated material; backfilling and compaction; and constructing the structure complete, including pipe connections and structure cleaning, for the portion of the structure which is deeper than 10-feet.

Payment for adjusting of manhole frames and covers shall be included in payment for the manhole. The manhole frames and covers will be paid for separately.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SANITARY SEWER LEAD

ST:CJE 1 of 1 11/16/23

Description

This work shall include locating, excavating, connecting existing sewer service leads to new service leads, installing cleanouts, and bulkheading and abandoning old lead to the sewer. The Contractor shall locate an appropriate point of connection within the right of way for each sewer lead that minimizes disturbance to existing landscaping, pavement, and similar existing features, and protects the structural integrity of the existing leads.

Construction Methods

The Construction Methods shall meet all requirements of the City of Ann Arbor Standard Specifications.

The Contractor shall verify the existing lead diameter and material and install Fernco connection to the new sewer lead. All Ferncos shall include a stainless steel shear ring with a minimum thickness of .012". The Contractor shall take care not to damage to the existing lead while making the connection. Repair or replacement of existing sewer lead by Contractor operations shall be at the Contractor's expense and shall not be at any additional cost to the City.

Contractor shall install cleanouts on new sewer leads as shown on the plans or directed by the 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 connection to existing sewer leads and installation of cleanouts on sanitary sewer leads:

Contract Item (Pay Item)	Pay Unit
Existing Sewer Lead, Connect	Each
Sanitary Sewer Cleanout	Each

The work shall include all labor, equipment, bends, fittings, and other materials required for the excavation, connection, bulkhead/abandon and backfill of the sewer leads and cleanouts.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
SEWER ABANDONMENT

Description

This work shall include abandoning existing sewers and structures of various size and depth as required by the Plans. All work shall be done in accordance with Section 203 of the 2020 Michigan Department of Transportation Standard Specifications for Construction, as directed by the Engineer, and as described herein.

Materials

Granular Material Class II ..... Section 902

Methods of Construction

Sewers and structures (e.g. manholes, wells, inlets, catch basins, cisterns) shall be removed and disposed of off-site, in such a manner as not to damage any new work, or work or material which is to remain in-place. The hole or trench resulting from the removal of the sewers and structures shall be backfilled with Granular Material, Cl II, in maximum lifts of 12-inches, and be compacted to 95% of its maximum unit weight, if located within the public rights-of-way, railroad rights-of-way, or within the influence paved surfaces or structures. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum unit weight, in lifts of 12-inches or less, unless otherwise noted on the plans. The resulting hole left in a structure from a sewer to be removed shall be bulkheaded with bricks and mortar to provide a watertight seal and constructed such that the remaining flow in the manhole is not impeded.

Where structures are identified for abandonment in place, the structure shall be removed to a minimum depth of 48-inches below grade. The pipe connections shall be bulkheaded with bricks and mortar to provide a watertight seal and the remaining structure shall be backfilled with Granular Material, Cl II, in maximum lifts of 12-inches, and be compacted to 95% of its maximum unit weight, if located within the public rights-of-way, railroad rights-of-way, or within the influence paved surfaces or structures. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum unit weight, in lifts of 12-inches or less, unless otherwise noted on the plans.

As directed by the Engineer and within two (2) days of their removal, the Contractor shall deliver the existing structure covers to the City of Ann Arbor Public Works Unit located at the W.R. Wheeler Service Center at 4251 Stone School Road, Ann Arbor, MI 48108.

Provide flowable fill material, as directed by the Engineer, meeting one (1) the following mixes:

1. Portland cement, fly ash, and water.
2. Portland cement, granular material, fly ash, and water.
3. Fly ash, granular material, and water.

Provide materials in accordance with the following requirements:

		[3]Specific Gravity
Portland Cement	MDOT Section 901	3.15
Fly Ash	[1]ASTM C 6l8(l)	2.40
Granular Material, Cl II	[2]MDOT Section 902	2.60
Water	MDOT Section 911	1.00

Note: Reference to MDOT relates to applicable Sections of the Michigan Department of Transportation 2020 Standard Specifications for Construction.

(1) Except there is no limit on the loss of ignition.

(2) Except that l00% shall pass 3/4-inch sieve.

(3) Specific gravity values used for mix proportions given. If material used differs from these values make appropriate adjustments as required to achieve an acceptable mixture.

Acceptable mixtures for flowable fill are as follows:

1. FF Mix Number One
   Cement Stabilized Fly Ash Mixture (Class F Fly Ash)

Portland Cement	100 lbs/cyd
Fly Ash (Class F)	2,000 lbs/cyd
Water	Sufficient amounts to produce the desired flowability (approx. 80 gal/cyd)

2. FF Mix Number Two
   Controlled Density Fill Mixture (Class F Fly Ash)

Portland Cement	50 lbs/cyd
Fly Ash (Class F)	500 lbs/cyd
Granular Material	2,600 lbs/cyd
Water	Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

3. FF Mix Number Three
   Controlled Density Fill Mixture (Class C Fly Ash)

Fly Ash (Class C)	300 lbs/cyd
Granular Material	2,600 lbs/cyd
Water	Sufficient amounts to produce the desired flowability (approx. 50 gal/cyd)

Measurement and Payment

The completed work shall be paid for at the Contract unit price for the following Contract items:

Contact Item (Pay Item)	Pay Unit
Sewer, Any Size or Depth, Abandon, In Place	Foot
Sewer, Any Size or Depth, Abandon, Flowable Fill	Foot
Sewer, Any Size or Depth, Remove	Foot
Structure, Any Size or Depth, Abandon	Each
Structure, Any Size or Depth, Remove	Each

Payment for the above items shall include all labor, material, and equipment to complete the work.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
6-INCH WRAPPED UNDERDRAIN

Description

This work shall consist of furnishing and installing 6-inch diameter geotextile-wrapped, perforated or slotted underdrain pipe, using MDOT 2NS, as directed by the Engineer, for all backfill material.

Materials

The materials shall meet the requirements referenced in Section 404 of the 2020 edition of the MDOT Standard Specifications, except as specified herein.

The Geotextile Filter Fabric for encasing the underdrain pipe shall be an approved material such as nylon, polypropylene, fiberglass, or polyester, and shall be either woven, heat bonded, knitted, or of continuous fibers. The geotextile shall completely cover and be secured to the pipe. In an un-stretched condition, knitted polyester fabrics shall weigh at least 3.0 ounces per square yard, and all other geotextiles shall weigh at least 3.5 ounces per square yard. The fabric shall be strong and tough and have a porosity such that the fabric will retain soil particles larger than 0.106 mm (no. 140 sieve) and shall pass aggregate particles finer than 0.025 mm. Geotextiles shall be stored and handled carefully and in accordance with the both the manufacturer's recommendations and the Engineer's direction, and shall not be exposed to heat or direct sunlight. Torn or punctured geotextiles shall not be used.

Construction Methods

Geotextile wrapped underdrain shall be installed as shown on the Plans or as directed by the Engineer and in accordance with Section 404 of the 2020 edition of the MDOT Standard Specifications, except as specified herein.

The installation of underdrain shall precede all other construction activities including but not limited to pavement milling, pavement pulverization, pavement removal, pavement patching, and curb repair.

The Contractor shall excavate, cut, remove stumps, remove brush, remove pavement, grade, and trim as needed and as directed, and shall import, furnish, fill, place, grade, and compact MDOT 2NS fine aggregate to construct underdrain as specified on the Plans, and as directed by the Engineer.

The trench shall be constructed to have a minimum width of 18-inches and shall be typically excavated to the depth specified in the Plans or directed by the Engineer.

The underdrain shall be installed at the line, grade, and depth specified on the Plans or as directed by the Engineer. The minimum percent grade shall be 0.5%, and the minimum cover from top-of-pipe to finished top-of-curb grade shall be 4-feet. The Contractor shall maintain line and grade by means of a laser. The Engineer will not provide line, grade or staking.

Upgrade ends of the pipe shall be closed with suitable plugs to prevent entrance of trench backfill material. All couplings, tees, plugs, and other fittings shall be manufactured and installed so as to prevent any infiltration of trench backfill material.

The Contractor shall tap at least one end of the underdrain into a storm sewer structure, as directed by the Engineer.

During the construction of underdrain runs, the Engineer may direct the Contractor to terminate or modify underdrain construction due to conflicts with buried obstructions or if the minimum 4-foot cover cannot be maintained. There will be no adjustment to the Contract Unit Price due to changes in quantity.

The first lift (bedding) of backfill shall be MDOT 2NS material to a maximum thickness of 3-inches. Subsequent lifts shall be MDOT 2NS material to a maximum thickness of 12-inches.

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.

All structures, inlets and manholes shall be maintained free of accumulations of silt, debris, and other foreign matter throughout construction, until the time of final acceptance.

Measurement and Payment

Connecting (tapping) underdrain(s) into drainage structure(s) will not be paid for separately but shall be included in the bid price for this item of work.

Underdrain will be measured in-place by length in lineal feet.

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:

CONTRACT (PAY) ITEM	PAY UNIT
6-Inch Wrapped Underdrain	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.

CITY OF ANN ARBOR
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 pipes clean and neatly stacked a minimum of 6-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 are 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 mains 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 (2) 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

Pipe Diameter	10% Chlorine Solution (gallons)
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 pipes 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.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
FIRE HYDRANT ASSEMBLY

ST:CJE 1 of 1 11/16/23

Description

This Detailed Specification is intended to supplement the current City of Ann Arbor Standard Specifications for Construction with regard to Fire Hydrant Assembly.

Materials

Fire hydrants shall be either the East Jordan Model Watermaster 5BR250 with traffic flange, or the Waterous Pacer Model WB67-250 with traffic flange. All fire hydrants shall have the following features: a 6-inch push-on tyton joint connection, ANSI/AWWA C111/A21.11; one (1) 5-inch storz connection; one (1) 3-3/8-inch threaded Ann Arbor Standard pumper connection with 7-1/2 threads per inch and 4.05 inch O.D.; 1-3/8-inch pentagon operating and cap nuts (1-3/8-inch point-to-flat at top; 1-7/16-inch 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 pumper nozzles must be 21-inch ± 3-inch above finished grade, and the breakable traffic flange must be between finished grade and 8-inch above finished grade. Fire hydrant extensions for Waterous hydrants shall be Waterous Part #K562. Extensions for East Jordan hydrants shall be hydrant model 5BR250 extension kits. All fire hydrants must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

Measurement and Payment

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.

Contract Item (Pay Item)	Pay Unit
Fire Hydrant Assembly	Each

Fire hydrant assemblies shall be measured per unit constructed and paid for on the basis of unit price each. The unit price for fire hydrant assemblies shall include a 6-inch gate valve in box, 3-lineal feet of 6-inch pipe, an approved hydrant with traffic flange, and a thrust block. Any required extension will be paid for separately, on a per each installed basis.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
STRUCTURE COVERS

ST:CJE 1 of 2 11/13/23

Description

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

Type of Casting	MDOT Designation	Approx. Weight (lb)	East Jordan Iron Works Casting No.	Neenah Foundry Casting No.
Manhole Flange and Cover	B	400 LB	1040 w/1040A cover*	R-1642 w/Type C cover*
Manhole Flange and Cover, Sanitary	Q	400 LB	1040 w/1040AGS gasketed cover*	R-1642 w/Type C gasketed cover*
Barrier Curb Round Flange	K	500 LB	7045 w/Type M2 grate	R-3031-B w/Type S grate
Barrier Curb Double Inlet Round Flange	K	500 LB	7045 w/Type M2 grate	R-3031-B w/Type S grate
Gutter Inlet Round Flange	R	500 LB	7076 w/Type M1 grate	R-3594 w/Type S grate
Gutter Double Inlet	R	N/A	N/A	N/A
Yard Drain (Beehive)	G	200 LB	1040, Type 02 grate	R-2560-E1
Operating Nut Access Frame and Cover	1-A	200 LB	1570Z, 2965A Cover	Equivalent (as approved)

*Frames and covers shall have machined bearing surfaces and City of Ann Arbor custom logo. Each cover shall have the word "SANITARY", “STORM”, “WATER”, or a raised letter "W" cast in the surface, whichever is applicable.

Materials

The materials used for this work shall conform to Section 908.05 of the Michigan Department of Transportation 2020 Standard Specifications for Construction except as specified herein.

Construction Methods

This work shall be in accordance with Section 402 of the Michigan Department of Transportation 2020 Standard Specifications for Construction, design specifications, plans, and as specified in the related items of work for which the structure covers are provided, and except as modified herein. This work includes the removal, salvaging and transporting the existing casting and/or cover to the City Yard; and backfilling to grade per design specifications, plans, and as directed by the Engineer.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Structure Covers	Pounds

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

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
GENERAL CONSTRUCTION NOTES

Description

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.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
DISPOSING OF EXCAVATED MATERIAL

ST:CJE 1 of 1 11/16/23

Description

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, Max $_____".

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
PROTECTION OF UTILITIES

Description

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, Max $_____”.

CITY OF ANN ARBOR
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, silt fence and 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.

Description

This work consists of installing and maintaining inlet filters in accordance with Section 208 of the 2020 Michigan Department of Transportation Standard Specifications for Construction and as shown on the plans. Filters shall be installed in existing and proposed inlets in order to minimize the erosion of soil and the sedimentation of water courses. The related work includes the installation, maintenance and removal of the filter cloth, cleaning as required during the performance of the project work, removing and disposing of accumulated sediment, and replacement of filters if required by the Engineer so as to provide a properly working inlet filter and a well-drained site.

Materials

The inlet filters shall be in accordance with the REGULAR FLOW SILTSACK® manufactured by ACF Environmental (800) 448-3636; FLEXSTORM® Style FX manufactured by Advanced Drainage Systems, Inc. (800) 821-6710; CATCH-ALL® manufactured by Price & Company (866) 960-4300, or Engineer approved equal.

Methods of Construction

The Contractor shall install, maintain, clean, and re-install and/or replace inlet filters in accordance with the manufacturer's specifications and as directed by the Engineer. The Contractor shall dispose of debris off-site.

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

Measurement and Payment

The completed work of Soil Erosion Control will be paid for at the Contract unit price for the following Contract items (pay items):

Contract Item (Pay Item)	Pay Unit
Inlet Filter	Each

" Inlet Filter" will be measured by the unit installed and will be paid for at the Contract unit price per each, for which price shall be payment in full for all labor, equipment, and materials needed to furnish, install, maintain, clean and remove the inlet filter, and re-install and/or replace the inlet filter as needed.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
ALLOWANCE FOR TREES AND PLANTINGS

Description

This work shall consist of an allowance for planting trees or shrubs, and placement of shredded bark mulch at the locations shown on the plans or as directed by the Engineer. Work shall be in accordance with Sections 815, 816 and 917 of the 2020 Michigan Department of Transportation Standard Specifications for Construction with the following amendments or additions.

Full extent of the plantings shall be determined during construction. Trees and Plantings will be paid for at the final negotiated price after the Work has be authorized by the Engineer. Price paid shall be payment in full for all labor, material, and equipment required for the plantings and warranty period and shall be based upon an agreement negotiated and approved prior to beginning this Work.

Watering, removing weeds, and completing all necessary tasks to maintain a healthy stand of plants, and Balled and Burlapped (B&B) Trees shall be included in this work.. Extent of work shall include a two year warranty and maintenance period, including but not limited to the following:

1. Watering
2. Weed Control
3. Mulching
4. Disease and Insect Control
5. Pruning
6. Fertilizer Application
7. Removal of Tree Support and Tags

The Contractor shall attend up to four (4) site walkthroughs to review final plantings within the project area. The Contractor is required to present a detailed scope of work and costs for any Work contemplated under the Trees and Plantings allowance to the Engineer. No Work is to begin until scope and costs have been finalized and approval by the Engineer in writing.

Tree drip irrigation bags are in addition to planting specifications 815, 816 and 917 of the 2020 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 and plant types and sizes shall be as shown on the Drawings or as directed by the Engineer.

Tree Drip Irrigation Bags shall be Treegator Original 20-gallon slow release watering bags, 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 2020 Michigan Department of Transportation Standard Specifications for Construction Section 815.03 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 2020 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.

Measurement and Payment

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

Contract Item (Pay Item)	Pay Unit
Trees and Plantings (Allowance)	$30,000

Measurement and payment for the item Trees and Plantings 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. Warranty and maintenance for two seasons shall also be included in the prices provided under this allowance.

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 and containers.

If the approved price for this work is more or less than the lump sum amount of the allowance in the Contract, the Contract allowance price shall be adjusted accordingly by Change Order. The payment shall be made on the basis of the actual approved amount without additional charge or markups for overhead, insurances, bonds, or any other incidental expenses. The Contractor shall be responsible for all coordination involved and for the timely completion of the Work to fit his schedule.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
CLEAN-UP & RESTORATION, SPECIAL

Description

This item of work shall conform to Division IX, Section II, "Clean-Up & Restoration" of the Public Services Area Standard Specifications, and Section 816 of Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein.

This work shall include the removal of all surplus materials from the site including, but not limited to, tools, dirt, rubbish, construction debris, and excess excavated material; the restoration of all woodland, hardscaped, landscaped and lawn areas; replacement of furniture, fixtures, fences, and similar features disturbed by the work; restoration and sweeping/cleaning of road surfaces, removal of temporary fill, culverts, drives, and sidewalks disturbed by the work. This work includes placing fertilizer and installing mulch blankets on all disturbed areas that have been seeded as approved by the Engineer. Mulch blankets are required on all seeded areas.

Materials

The materials shall meet the requirements specified in Sections 816.02 and 917 the Michigan Department of Transportation (MDOT) 2020 Standard Specifications as designated, as specified herein, and as approved by the Engineer:

- Topsoil – 4-inches in depth, except in those areas over the proposed Aggregate Maintenance Path which shall be 2-inches in depth. See Section 917.07.

- Turf Grass seed mixture shall be THM. See Table 8 16-1 for description and rate of application, and Table 917-1 for purity, germination, and proportions.

- Mesic Woodland seed mixture shall be the Mesic Woodland Seed Mix by Native Connections of Kalamazoo, Michigan, or Engineer approved equal. Seeding rate shall be per the supplier's recommendations, with a minimum application rate of 31 lbs per acre.

- Fertilizers shall be a Class A. See Section 816.03.B for rate of application, and Section 917.10.B.1 for composition requirements.

- Water used shall be obtained from fresh water sources and shall be free from injurious chemicals and other toxic substances.

- Mulch - Mulch seeded areas with the appropriate materials for the site conditions to promote germination and growth of seed and to mitigate soil erosion and sedimentation. Mulch shall be High Velocity Straw Mulch Blankets as specified in Section 917.15.B.1b.

Three rail vinyl post and rail fence shall be white smooth finish fence by Bufftech or approved equal. Hardware shall be stainless steel with gate latch that can accept a padlock. Fence shall include 5" heavy wall posts, 2" x 6" ribbed reinforced rails, and flat external post caps.

Construction, Maintenance, and Acceptance

Perform project cleanup as an ongoing operation within the right-of-way, permanent and temporary easement areas, and any other areas impacted by the project work operations.

Perform restoration and establish turf in accordance Section 816.03 of MDOT 2020 Standard Specifications for Construction. Woodland seed mix shall be established as recommended by the seed supplier.

It is the responsibility of the Contractor to establish a dense area of permanent grasses, sedges, rushes and forbs, free from mounds and depressions prior to final acceptance and payment of this project. Any portion of a seeded area that fails to show a uniform germination shall be reseeded. Such reseeding shall be at the Contractor's expense and shall continue until a dense lawn is established. The Contractor is responsible for restoring all areas disturbed by his construction.

The Contractor shall maintain all seeded areas until they have been accepted by the Engineer. Maintenance shall begin immediately after the seed is in place and continue until final acceptance with the following requirements:

Seeded areas shall be protected and maintained by watering, mowing, and reseeding as necessary, until the period of time when the final acceptance and payment is made by the Engineer for the project, to establish a uniform, weed-free, stand of the specified grasses, sedges, rushes and forbs. Maintenance includes furnishing and installing additional topsoil and reseeding all as may be required to correct all settlement and erosion until the date of final acceptance.

Damage to seeded areas resulting from erosion shall be repaired by the Contractor at the Contractor's expense. Scattered bare spots in seeded areas will not be allowed over three (3) percent of the area nor greater than 6"x 6" in size.

When the above requirements have been fulfilled, the Engineer will accept the seeded areas.

Vinyl post and rail fence shall be installed per the manufacturer’s recommendations with gate posts set in a 42” deep x 18” diameter concrete footing and line posts set in a 42” deep x 12” diameter footing.

Cleanup and Restoration must be performed upon the completion of each sub-phase of work (as described in the Detailed Specification for Project Schedule), and not as one single operation at the completion of the entire project.

Measurement and Payment

Measurement and payment for this item of work shall conform to Division IX, Section 2, Item No. 891, Clean-Up & Restoration of the Public Services Area Standard Specifications except as modified herein.

Contract Item (Pay Item)	Pay Unit
Clean-Up & Restoration, Special	Lump Sum
Topsoil Surface, 2-inch	Square Yard
Topsoil Surface, 4-inch	Square Yard
Seed, Turf Grass	Pound
Seed, Mesic Woodland	Pound
3 Rail Vinyl Post and Rail Fence	Foot
3 Rail Vinyl Post and Rail Fence Gate, 16' Wide	Each

The completed work for “Clean-Up & Restoration, Special” will be paid for on a lump sum (LS) basis. Prior to final acceptance of the project, the Engineer will inspect the restored area to ensure that the end product is well established; weed free, and in a growing and vibrant condition. If the Engineer determines that the restored areas do not meet the project requirements, the Contractor will continue with any and all measures necessary to meet the project requirements. All costs associated with the remedial measures shall be borne entirely by the Contractor

"Topsoil Surface, _-inch” will be measured by area in square yards and shall include the installation of subsequent fertilizer and mulch blankets following seeding. "Seed, _____” will be measured in Lb based on seeding rate as indicated herein. Both contract pay items will be paid for at the contract unit prices which shall be payment in full for all labor, materials, and equipment needed to accomplish this work as detailed herein.

After initial placement of the topsoil and seed mixture(s), 50 percent of the total quantity placed for each item will be certified for payment. The remaining 50 percent of the total quantities will be held by the Engineer until such time as all seeded areas have been established and accepted by the Engineer.

APPENDIX

June 15, 2020
Project No. 191629

Stantec
3754 Ranchero Drive
Ann Arbor, MI 48108

Attention: Chris Elenbaas, P.E.
Project Manager

Reference: Draft Report of Geotechnical Investigation
Lyn Anne-Arbana Sewer
Ann Arbor, Michigan

Dear Mr. Elenbaas:

MATERIALS TESTING CONSULTANTS, INC. has completed a geotechnical investigation for the above-referenced project. This draft report provides subsurface information, a discussion of regional geology and comments and recommendations regarding design and constructability of the project. Key geotechnical aspects of the project involve trenchless sewer installations, open cut construction in areas of existing utilities, temporary support and protection of nearby structures and utilities and temporary construction dewatering and groundwater control.

Please contact our office should you have any questions or require further assistance.

Sincerely,

MATERIALS TESTING CONSULTANTS, INC.

Robert J. Warren, P.E.
Project Manager

Daniel S. Elliott, P.E.
Southeast Michigan Manager

Todd D. Munger, P.E.
Geoenvironmental Department Manager

att: Draft Report

MATERIALS TESTING CONSULTANTS

DRAFT GEOTECHNICAL REPORT

LYN ANNE-ARBANA SEWER

ANN ARBOR, MICHIGAN

Prepared For:

STANTEC

Ann Arbor, Michigan

Prepared By:

MATERIALS TESTING CONSULTANTS, INC.

Ann Arbor, Michigan

June 2020

MTC Project No. 191629

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DRAFT REPORT OF GEOTECHNICAL INVESTIGATION
LYN ANNE-ARBANA SEWER

1.0 INTRODUCTION

MATERIALS TESTING CONSULTANTS, INC. (MTC) has completed a geotechnical investigation for the Lyn Anne-Arbana Sewer, located in Ann Arbor, Michigan. This work has been performed as described in our proposal, number 14650 dated October 24, 2019. Authorization to proceed was received from Mr. Chris Elenbaas, P.E. in an email dated December 31, 2019. The scope of this study was described in an RFP email on October 16, 2019.

The scope of this study in general includes the following:

- performance of a field investigation including soil test borings and field engineering reconnaissance;
- review of recovered samples by one of our engineers and assignment of technical soil classifications;
- performance of laboratory testing on selected soil samples;
- engineering evaluation of encountered conditions with respect to the proposed construction; and
- preparation of this draft report.

Presented herein are descriptions of our understanding of the design considerations, the investigation program, encountered conditions and engineering recommendations. The Appendix contains the report limitations, boring log terminology, soil classification chart, boring logs and laboratory test data.

2.0 DESIGN CONSIDERATIONS

2.1 Available Information

We have been provided the following documents and information for use in this investigation:

- Conceptual maps of the original and alternate sewer alignments showing approximate pipe depth and selected structure depths, received from Mr. Chris Elenbaas, P.E. on December 31, 2019.
- A boring location plan showing boring locations and depths along the alternate sewer alignment, received from Mr. Chris Elenbaas, P.E. on December 31, 2019.
- A conceptual map of the chosen sewer alignment showing approximate pipe depth and selected structure depths, received from Mr. Chris Elenbaas, P.E. on April 7, 2020.
- A draft sewer profile received from Mr. Chris Elenbaas, P.E. on June 2, 2020.
- Telephone, email and in-person conversations with Mr. Chris Elenbaas, P.E. of Stantec regarding the potential sewer alignments and the chosen sewer alignment and the boring locations and depths relative to each alignment.

2.2 Location and Project Description

The proposed construction will be located in plan as shown on the attached Boring Location Plans, Figure Nos. 1 and 2. The site is located in Ann Arbor, Michigan.

A new 21-inch diameter sanitary sewer is proposed on the north side of Dexter Avenue approximately between Lyn Anne Court and Arbana Drive. The western extent of the proposed sewer (STA 0+00) is located on the north side of Dexter Avenue, approximately 250 ft west of Lyn Anne Court. The sewer is planned to run parallel along Dexter Avenue to the east before running northward at STA 4+19. At STA 5+46 the sewer resumes its eastward trajectory along the base of a ravine north of the residences on the north side of Dexter Avenue. The sewer follows this ravine for approximately 1,300 ft, crossing both Doty Avenue (STA 14+83) and Westwood Avenue (STA 18+18) and entering Maryfield Wildwood Park. Within Maryfield Wildwood Park, the sewer follows an eastward trajectory approximately parallel to Linwood Avenue and offset approximately 75 to 100 ft south of the roadway and following the base of the ravine within the park. The sewer connects to an existing sewer section to cross beneath Wildwood Avenue (STA 27+56 to 28+96) and proceeds east from Wildwood Avenue,

approximately following the bottom of the ravine, crossing North Revena Boulevard (STA 33+29) and terminating at Arbana Drive (STA 43+41).

Sewer invert depths are generally expected to be on the order of 19 to 31 ft along Dexter Avenue, 12 to 25 ft from Dexter Avenue to Doty Avenue, 8 to 12 ft from Doty Avenue to Westwood Avenue, 13 to 25 ft deep within the west portion of Maryfield Wildwood Park before entering the ravine and 6 to 12 ft deep within the ravine from Maryfield Wildwood Park to the project end point at Arbana Drive. The sewer crossing beneath North Revena Boulevard is expected to have a depth on the order of 29 ft deep and the termination point at Arbana Drive is expected to have a depth on the order of 22 ft deep.

The majority of the sewer is expected to be installed using conventional open cut excavation methods with the exception of the following sections where trenchless installation is planned: along Dexter Avenue (STA 0+17 to 4+10), north from Dexter Avenue (STA 4+27 to 5+22), from Doty Avenue to Westwood Avenue (STA 15+25 to 18+03), east of Westwood Avenue (STA 18+25 to 20+00) and at the North Revena Boulevard crossing (STA 32+32 to 33+80). We understand either bore and jack or pilot tube guided bore methods are preferred for the trenchless installation.

Our report was developed based on a draft sewer profile received from Stantec on June 2, 2020. Once the final sewer profile is developed, we should be informed of any changes between the actual design conditions and those described herein so that our report can be finalized.

3.0 INVESTIGATION METHODOLOGY

3.1 Field Investigation

Subsurface conditions were investigated by 17 rig borings (13 using hollow stem auger and standard penetration testing and 3 using direct push) and 11 hand auger borings. Hand auger borings were drilled in locations inaccessible to our drill rig or in difficult rig access locations prior to mobilizing a drill rig. Rig boring depths ranged from 10 ft to 50 ft below the existing ground surface, and hand auger boring depths ranged from 2.5 to 11.3 ft below the ground surface. Boring locations are shown on the attached plan, Figure No. 1. Soil borings were performed in two phases, with the first phase consisting of 11 rig borings along an alternate sewer alignment and the second phase consisting of 19 rig and hand auger borings along the final sewer alignment. Subsurface information from all 28 soil borings was considered for this report.

MTC staked the approximate boring locations in the field. Boring elevations and GPS coordinates were provided by Stantec. The elevations used in this report are given in feet and are based on NAVD datum. The coordinates provided on the boring logs are given in international feet within the Michigan South Zone (2113).

The rig drilling was performed either using conventional hollow-stem auger methods or direct push methods to advance the boreholes. The boreholes were backfilled to the original ground surface after drilling completion and road surfaces were patched with asphalt cold patch. Borings were backfilled with cement-bentonite grout in locations where the possibility of trenchless sewer installation was known at the time of our field work.

Soil samples for conventional hollow-stem auger borings were recovered on regular intervals by means of the Standard Penetration Test (SPT), ASTM D 1586. The SPT test involves the use of a 140 lb hammer with a 30 inch drop to drive a standard 2.0 inch O.D. split spoon sampler. The number of hammer blows required to drive the sampler 12 inches, after seating 6 inches, is termed the soil N-value and provides an indication of the soil's relative density and strength parameters at the sample location. SPT blow counts in 6 inch increments are recorded on the boring logs. The drill rig was equipped with a CME automatic hammer system

which delivers a more consistent driving energy to the sampler compared to the rope and cathead system.

Soil samples for direct push borings were collected using 5 ft long, 2 ¼ inch diameter plastic macro tubes. Grab soil samples were collected in hand auger borings.

Recovered samples were sealed, labeled and transported to our laboratory. All soil samples will be discarded after sixty days unless a longer hold time is specifically requested.
Borings were drilled and other sampling was conducted solely to obtain indications of subsurface conditions as part of a geotechnical exploration program. No services were performed to evaluate subsurface environmental conditions.

3.2 Laboratory

The recovered soil samples were reviewed by an engineer and technically classified according to the methods of ASTM D 2488 "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)". Estimates of the unconfined compressive strength of the cohesive samples were made using a calibrated penetrometer. A copy of the test boring logs along with a description of the terminology used on the logs and a chart of the ASTM D 2488 group symbol names are provided in the Appendix.

Selected samples were subjected to various laboratory tests, including:

- ASTM C 117 "Test Method for Materials finer than 75- µm (No. 200) Sieve in Mineral Aggregates by Washing"
- ASTM C 136 "Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates"
- ASTM D 2216 "Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass"

Results of the laboratory tests are provided in the Appendix. The samples subjected to the grain-size testing were reclassified according to ASTM D 2487 procedures "Standard Test Method for Classifications of Soils for Engineering Purposes".

4.0 INVESTIGATION RESULTS

4.1 Regional Geology

The *Map of the Surface Formations of the Southern Peninsula of Michigan*, published by the State of Michigan, indicates the site is in an area of moraines. Soil conditions typically are found to range from clay and silt to sand and gravel with possible cobbles and boulders in this type of geologic area.

The *Map of Bedrock Topography of the Southern Peninsula of Michigan* indicates bedrock to be at approximately el 650 to 700 ft, on the order of 200 ft below site elevations.

4.2 Site Conditions

At the time of our field work, the area of investigation was generally wooded, except for cut grass lawn areas within Maryfield Wildwood Park and the road rights-of-way. Road surfaces were asphalt paved.

The ground surface elevation of the sewer alignment along Dexter Avenue generally increased in elevation from west to east, with ground surface elevations near 908 ft at the west project limit increasing to elevation 920 ft at the point where the sewer alignment is planned to turn north from Dexter Avenue.

Except for the portion of the sewer along Dexter Avenue, the sewer alignment generally follows the base of a ravine on an east-west alignment, with decreasing ground surface elevation from west to east. The ground surface at the base of the ravine generally ranges from elevation 910 ft to 897 ft west of Doty Avenue. The ravine is shallower between Doty Avenue and Westwood Avenue with elevations ranging from 888 to 898 ft. At Westwood Avenue, the ground surface elevation of 895 ft is maintained to the east into Maryfield Wildwood Park for approximately 250 ft until the ravine re-appears and the ground surface elevations decrease sharply from 895 ft to 832 ft just west of Arbana Drive at the east project limit.

East of Maryfield Wildwood Park, Wildwood Avenue, North Revena Avenue and Arbana Drive cross the ravine on earthen berms. The Wildwood Avenue road surface is at approximately elevation 869 ft at the pipe alignment, on the order of 8 ft above the base of the ravine to the west and 16 ft to the east. The North Revena Avenue road surface is at approximately elevation 868 ft at the pipe alignment, on the order of 20 ft above the base of the ravine. The Arbana Drive road surface is at approximately elevation 848 ft at the pipe alignment, on the order of 13 ft above the base of the ravine.

We understand the new sewer alignment will run approximately parallel to an existing sanitary sewer and storm sewer. Manholes for these two existing utilities were observed in the field near the proposed sewer alignment such that they may be a concern for construction. We have not been provided with invert elevations for these existing utilities relative to the proposed sewer.

4.3 Subsurface Conditions

General Subsurface Conditions

The investigation, in general, encountered varied soils over the proposed alignment consisting primarily of granular soil with occasional clay layers. Granular soil, where encountered, primarily consisted of poorly graded sand with silt (SP-SM), silty sand (SM). clayey sand (SC) and silt (ML) exhibiting very loose to very dense relative densities with N values ranging from 2 to 62. Cohesive soil, where encountered, consisted of lean clay with sand (CL) or sandy lean clay (CL) and exhibited a stiff to hard consistency with corresponding calibrated penetrometer readings ranging from 1.0 to 4.5+ tsf. Fill soil was encountered to depths of 2 to 22 ft below the ground surface and primarily consisted of granular fill soil with only occasional clay fill. The encountered fill is generally associated with backfill from installation of the nearby storm and sanitary sewers or with raised grades for parks and roads over the ravine. In areas of fill for raised grades, such as within Maryfield Wildwood Park and beneath the roads crossing the ravine, buried topsoil and debris such as slag, glass or crushed asphalt were generally encountered within the fill.

Groundwater was generally encountered during the rig drilling activities at depths ranging from 12 to 37 ft below the ground surface (el 899.3 to 830.8 ft), and during the hand auger activities, located primarily at the base of ravines, at depths ranging from 1 to 9.5 ft below the ground surface (el 898.5 to 829.7 ft). Groundwater was frequently encountered as seepage from saturated silt or sand seams or perched within granular layers above relatively impermeable layers.

Subsurface Conditions along Dexter Avenue to approximately 100 ft North of Dexter Avenue
Borings B-1, B-2 and B-12 to B-12c

Borings B-1 and B-2 generally encountered 7 1/4 to 8 1/2 inches of asphalt and 7 to 8 inches of crushed limestone aggregate base. Boring B-12 and adjacent hand auger borings B-12a to B-12c encountered 2 to 9 inches of silty or sandy topsoil at surface. Beneath the surficial material, the borings generally encountered 3.0 to 9.0 ft of brown sand with silt (SP-SM) or brown clayey sand (SC) fill or possible fill (el 892.3 to 918.1 ft) underlain by primarily medium dense sands (SP, SP-SM, SM, SC) with occasional medium dense silt (ML) or very hard clay (CL) layers. Borings B-1 and B-2 encountered very loose to loose granular soil at depths ranging from 3.5 to 10 ft below the ground surface and Boring B-2 encountered dense to very dense brown poorly graded sand with silt (SP-SM) from 32 ft below the ground surface to the explored depth of 45 ft (el 876.1 to 889.1 ft). Poor sampler recovery, indicating possible coarse gravel or cobble, was encountered in Borings B-2 at a depth of 45 ft (el 876.1 ft).

Groundwater was encountered during the drilling activities in Borings B-2 and B-12a as seepage from saturated silt or sand seams at depths of 29.0 ft (el 892.1 ft) and 3.0 ft (el 898.5 ft), respectively. Boring B-3 encountered groundwater perched over a silt layer at a depth of 19.5 ft (el 899.3 ft).

Subsurface Conditions from Doty Avenue to approximately 200 ft East of Westwood Avenue
Borings B-4 to B-6

Borings B-4 and B-6 encountered 3 to 4 inches of sandy or clayey topsoil at surface and Boring B-5 encountered 3.5 inches of asphalt and 7 inches of crushed limestone aggregate base. Beneath the surficial material, primarily granular fill was encountered in each boring to depths ranging from 3.0 to 14.0 ft below the ground surface (el 881.3 to 898.1 ft). The encountered

fill generally exhibited a very loose to loose relative density and debris including slag and glass fragments was encountered in Boring B-6. Beneath the fill, Boring B-4 generally encountered loose granular soil (SP-SM, SM, SC) to a depth of 26 ft (el 875.1 ft) grading to a dense silty sand (SM) to the explored depth of 30 ft (el 871.1 ft); Boring B-5 generally encountered hard to very hard sandy lean clay (CL); and Boring B-6 generally encountered dense to very dense granular soil (SP-SM, SC, GP-GM) to a depth of 27 ft (el 868.3 ft) underlain by very hard sandy lean clay (CL) to the explored depth of 30 ft (el 865.3 ft). Poor sampler recovery, indicating possible coarse gravel, cobble or miscellaneous fill debris was encountered in Borings B-4 and B-6 at depths of 1.5 ft (el 899.6 ft) and 10.0 ft (el 885.3 ft), respectively. Boring B-6 encountered a layer of medium dense brown poorly graded gravel with silt and sand (GP-GM) from depths of 14.0 to 18.0 ft below the ground surface (el 877.3 to 881.3 ft).

Groundwater was encountered during the drilling activities in Boring B-6 at 18 ft (el 877.3 ft) and in Boring B-4 at a depth of 22.0 ft below the ground surface (el 879.1 ft) as seepage from saturated sand lenses.

Subsurface Conditions at North Revena Boulevard
Boring B-18

Boring B-18 encountered 5 inches of asphalt and 5 inches of crushed aggregate base at the surface. Beneath the pavement surface, Boring B-18 generally encountered loose to medium dense granular fill consisting of poorly graded sand with silt (SP-SM) to a depth of 2.5 ft (el 865.3 ft) and clayey sand (SC) with occasional black stones, possible asphalt fragments, to a depth of 22.0 ft (el 845.8 ft). Beneath the fill, Boring B-18 generally encountered loose to medium dense granular soil (SP, SP-SM, SP-SC) to the explored depth of 40 ft (el 827.8 ft).

Groundwater was encountered during the drilling activities at in Boring B-18 a depth of 37 ft (el 830.8 ft).

The relative density of granular soil is based on recorded SPT N-values while the consistency of cohesive soil is based on both recorded SPT N-values and on estimates of the unconfined compressive strength obtained with a calibrated penetrometer. Boulder may be present whenever cobble is noted on the boring logs.

Groundwater levels may fluctuate due to seasonal variations such as precipitation, snowmelt, nearby river or lake levels and other factors that may not be evident at the time of measurement. Groundwater levels may be different at the time of construction.

This section has provided a generalized description of the encountered subsurface soil conditions. The boring logs located in the Appendix should be reviewed for detailed soil descriptions. Some variation between boring locations may be expected.

5.0 GEOTECHNICAL CONSIDERATIONS

Key geotechnical challenges associated with this project are expected to include, but not necessarily be limited to, the following:

- Trenchless sewer installation along Dexter Avenue, north of Dexter Avenue, from Doty Avenue to Westwood Avenue, east of Westwood Avenue and at the North Revena Boulevard crossing
- Temporary support of adjacent utilities, structures and right-of-way during construction
- Groundwater control during utility placement and the possible need for dewatering

Provided herein are geotechnical considerations for this project.

5.1 Trenchless Installations

Based on the proposed trenchless crossing details provided and the subsurface conditions encountered, we anticipate auger bore or pipe jack methods to be feasible for the proposed trenchless installations.

As with any trenchless installation method, there is some risk of settlement associated with excess soil removal, however, this risk can be controlled through the selection of an experienced Contractor, appropriate installation procedures and implementation of a detailed monitoring plan including full-time observation and documentation of the work and continuous settlement monitoring during the operation. These measures are particularly

important when crossing beneath asphalt pavements as is planned at the west side of Marygrove Wildwood Park and at the North Revena Boulevard crossing.

A settlement monitoring program should be developed by contractor and sent to engineer for approval a minimum of 2 weeks prior to the start of construction. Appropriate alert and work stoppage levels should be developed to allow for evaluation of the root cause of settlement and implement alternative installation methods and stabilization measures as necessary.

The specific means and methods of construction including, but not limited to, selection of drilling equipment and tooling, drilling pressures and operational parameters, selection and implementation of dewatering procedures and monitoring of the crossing operation should be selected by the Contractor to complete the installation in a safe manner while protecting the integrity of the ground surface and while complying with any City of Ann Arbor permit requirements.

The project should be completed in continuous 24 hour per day shifts once the trenchless installation operation is started unless directed otherwise by the engineer. Entry and exit pits will be necessary to complete the work which will be the responsibility of the Contractor to design, install and maintain.

Obstructions may be encountered during the trenchless installation. Underground voided areas may develop along the installation route as obstructions (especially boulder size) are cleared outside the crossing path. The contractor must keep track of the station where these obstructions are removed so that grouting from the ground surface into the potentially voided zone can be completed as needed.

Some key geotechnical aspects of the trenchless installation include temporary earth retention necessary for construction of entry and exit pits, the potential for variable soil conditions along the crossing path including sand over clay and the potential for groundwater along the crossing alignment. Soil conditions along the trenchless installations can generally be summarized as follows:

- Dexter Avenue to approximately 100 ft North of Dexter Avenue (Borings B-1 to B-3 and B-12 to B-12c): Varied granular soil with occasional sandy lean clay layers present in Boring B-1 near the expected installation elevations
- Doty Avenue to approximately 200 ft East of Westwood Avenue (Borings B-4 to B-6): Varied granular soil present in Borings B-4 and B-6 with hard sandy lean clay present in Boring B-5 near the expected installation elevations
- North Revena Boulevard (Boring B-18): Primarily granular soil with few silty fines near the expected installation elevation

The presence of varied soil types including transitions from sand to clay as expected in the Dexter Avenue and Doty – Westwood installations may result in challenges including, but not necessarily limited to, split face drilling conditions and the possibility for perched groundwater. These factors should be considered by the Contractor.

We recommend dewatering be performed where necessary to lower groundwater at least 2 ft below the trenchless installation invert. Piezometers should be installed by the Contractor prior to the start of work for the purpose of monitoring groundwater levels across the proposed crossing alignment. The Contractor should include in their bid the installation of a minimum of 9 piezometers for this purpose.

Additional soil borings should be obtained as needed by the Contractor for construction. All adjacent utilities should be identified within the crossing alignment.

5.2 Temporary Slopes and Excavation Support

Excavations on the order of 20 ft in depth are anticipated for this project. The Contractor should be fully responsible for determining suitable excavation slope angles, excavation and soil support methods and assessing the need for lateral earth retention to protect the integrity of all existing structures and to maintain traffic as specified in the contract documents. OSHA and other applicable State, Federal and local agency and code requirements must be adhered to during construction.

The use of a trench box (temporary shoring within the excavation trench limits) is expected to be feasible in many project areas, however we expect temporary earth retention consisting of soldier pile and lagging or approved equivalent will be required in the following approximate areas:

- STA 13+00 to 15+00 due to the residence north of the proposed alignment
- STA 42+00 to 43+00 due tot the slope and residence south of the proposed alignment

The Contractor shall be responsible for designing, constructing and maintaining any temporary support systems in a safe manner and monitoring the system's performance throughout construction. All temporary earth retention system design should be submitted to the design engineer at least two weeks before the start of construction. Considering the presence of older residential structures that are likely supported on shallow foundations, precautions shall be taken against excessive ground vibrations during construction by the Contractor. We recommend the prohibition of vibratory earth retention such as, but not limited to, steel sheet pile.

The support and protection of all soil, structures and utilities outside of the right-of-way/contract limits and existing utilities and structures within the right-of-way limits are the responsibility of the Contractor including during completion of services and other connections to adjacent buildings.

The Contractor should be aware that slope height, slope inclination, and excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations; e.g. OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. The angle of repose and the design of the necessary supporting system for an excavation shall be determined by the Contractor. Factors to consider include; but may not be limited to, depth of excavation and type of soil; variation in water content in the material while the excavation is open; anticipated changes in the material due to air, sun, water or freezing affects; load imposed by structures, equipment, overlying material, or stored material; and vibration from traffic, equipment, or construction activity.

For this site, the overburden soil encountered in the exploratory program is primarily granular. We anticipate that OSHA will classify the granular materials as Type C with a maximum recommended slope inclination of 1.5H:1V under ideal and dewatered conditions.

The Contractor should be aware of their full responsibility to protect the existing residences, pavements, sidewalks and other structures at all times during construction. All excavation and earth retention methods selected by the Contractor must consider protection of existing structures.

We recommend a pre-construction survey be performed for all structures and right-of-way located within 75 ft of the sewer alignment. However, due to the potential sensitivity of nearby residences to the proposed construction it may be prudent to include all residential structures adjacent to the alignment in the survey.

The preconstruction survey should be performed by the Contractor's professional videographer and include an assessment of the existing structural condition and photo or video-documentation of existing cracks and structural defects. Crack monitors capable of measuring crack displacement and rotation to the nearest 1 mm and settlement monitoring points should be set prior to construction and monitored throughout construction. We recommend the bid include an allowance for 80 crack monitors and 80 settlement markers to be set at locations agreed upon by the Project Engineer after the performance of the preconstruction survey. This allowance should be considered in excess of any required settlement monitoring for trenchless installations. Crack monitor and settlement marker readings should be obtained one week before construction, and every 2 hours during construction within 100 ft of the marker by optical or laser level to the nearest 0.01 ft. Results of the monitoring program shall be submitted to the Project Engineer daily for review. The construction should be stopped, reviewed and a revised action plan be evaluated should any movement be observed.

5.3 Excavation Considerations

The following comments are offered:

- Cobbles, boulders and miscellaneous fill debris may be encountered. Abandoned utilities and other obstructions will also likely be present. The Contractor should be prepared to excavate cobbles and boulders and to remove abandoned utilities where present as required.
- Groundwater was typically encountered as seepage within the anticipated excavation depth. The Contractor should be prepared to control groundwater, particularly in the case of rain events when working at the base of the ravines. Dewatering is discussed in Section 5.4.
- The Contractor should be prepared to support utilities and structures and provide a safe work environment in accord with all safety standards.
- It is important that the preconstruction survey be thorough and include documentation of existing cracks.
- Management of sanitary flows during construction must be provided. Sequencing of construction activities should consider conflicts between existing and proposed utilities.

5.4 Foundation Considerations

The test borings generally encountered soil conditions suitable for support of the new underground utilities at the proposed bearing elevations; however, foundation subgrade should be inspected by qualified geotechnical personnel. Any isolated areas of unsuitable miscellaneous fill or unacceptably weak subgrade will need to be removed to an approved subgrade or improved by soil compaction. Any overexcavated areas should be backfilled with MDOT Class II engineered fill. Dewatering is discussed in the following section.

5.5 Dewatering

Groundwater was generally encountered during the rig drilling activities at depths ranging from 12 to 37 ft below the ground surface (el 899.3 to 830.8 ft), and during the hand auger activities, located primarily at the base of ravines, at depths ranging from 1 to 9.5 ft below the ground surface (el 898.5 to 829.7 ft). Groundwater was frequently encountered as seepage from saturated silt or sand seams or perched within granular layers above suspected relatively impermeable layers.

Groundwater will likely be periodically encountered during construction and suitable control of groundwater should be anticipated and planned for accordingly before the start of construction. The Contractor should be responsible for evaluating dewatering requirements on the project. We have provided test boring logs with groundwater levels recorded while drilling. Groundwater levels will fluctuate and may be different at the time of construction.

We recommend that dewatering be required to temporarily lower the groundwater a minimum of 2 ft below the deepest anticipated utility excavation or trenchless crossing depth.

Gradation test results are provided in the Appendix to assist the Contractor in evaluating dewatering requirements. The design, implementation and monitoring of all dewatering will be the responsibility of the Contractor. The dewatering plan should be submitted to the design engineer for review at least two weeks before the start of construction and contain at a minimum the location of the well points/dewatering wells, expected pumping rates, discharge location, groundwater lowering elevation, permits and piezometer locations. The Contractor should take all necessary means to provide protection to existing structures during dewatering. The Contractor should have previous experience dewatering sites with similar soil and construction conditions. Suitable sediment and silt traps and screens should be incorporated into all dewatering systems.

It will be necessary for the Contractor to control storm water during rain events and to prevent the wash-out of excavation slopes and potential undermining of utilities or structures. Control of storm water is of critical concern when working at the base of ravines.

5.6 Bedding and Backfill

Bedding proposed sewer should consist of MDOT Class II sand except that 100 percent of the materials should pass a 3/8-inch sieve. General backfill material should consist of MDOT Class II sand. Sand bedding and backfill should be compacted to 95 percent of its maximum dry density (ASTM D1557). In general, soil encountered in the borings with USCS group symbols of SP or SP-SM may meet sand bedding or backfill requirements but should be evaluated through the performance of gradation testing prior to placement. The results of laboratory gradation testing on selected samples indicate some material meeting the backfill and bedding requirements is present, however, due to the highly variable soil conditions encountered, it should be considered that most, if not all, bedding and backfill will have to be imported.

6.0 CLOSURE

In this report, descriptions of the geotechnical investigation, encountered conditions and geotechnical considerations for the proposed project have been provided. The limitations of this study are described in the Appendix.

The recommendations presented in this report are based upon a limited number of subsurface samples obtained from various sampling locations. The samples may not fully indicate the nature and extent of the variations that actually exist between sampling locations. For that reason, among others, we strongly recommend that we be retained to observe earthwork construction. If variations or other latent conditions become evident during construction, it will be necessary for us to review these conditions and our recommendations as appropriate.

LEGEND

SOIL BORING (TYP) PROPOSED SEWER ALIGNMENT

NOTE: AERIAL IMAGE FROM GOOGLE EARTH

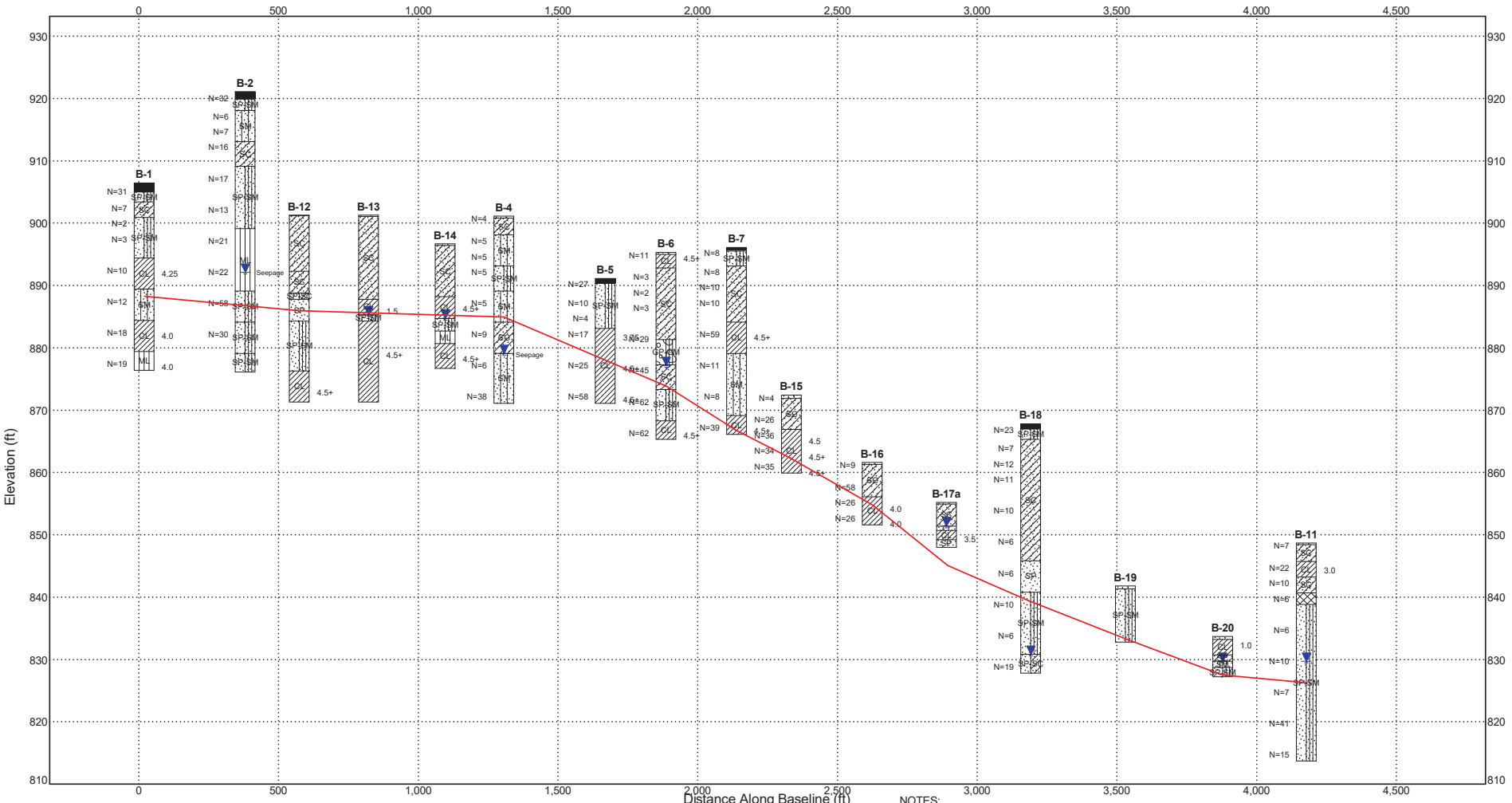
TITLE: BORING LOCATION PLAN		PROJECT: LYN ANNE – ARBANA SEWER PROJECT	
SCALE: AS NOTED	DATE: 6/15/2020	PROJECT NO.: 191629	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 1	DR. BY: RW	REV. BY: TM	

LEGEND

SOIL BORING (TYP) PROPOSED SEWER ALIGNMENT

NOTE: AERIAL IMAGE FROM GOOGLE EARTH

TITLE: BORING LOCATION PLAN		PROJECT: LYN ANNE – ARBANA SEWER PROJECT	
SCALE: AS NOTED	DATE: 6/15/2020	PROJECT NO.: 191629	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 2	DR. BY: RW	REV. BY: TM	



NOTES:

1. SUBSURFACE CONDITONS ARE GENERALIZED. REFER TO BORING LOGS FOR SPECIFIC DESCRIPTIONS.
2. CONDITIONS BETWEEN BORINGS AND GROUNDWATER ELEVATIONS BETWEEN BORINGS MAY VARY.

TITLE: GENERALIZED SUBSURFACE PROFILE			PROJECT: LYNANNE - ARBANA SEWER PROJECT
SCALE: AS NOTED	DATE: 5-22-20	PROJECT NO.: 191629	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 3	DR. BY: JO	REV. BY: RW	

APPENDIX

- Limitations
- Test Drilling and Sampling Procedures
- Boring Log Terminology and Classification Outline
- Boring Logs
- Laboratory Test Data

LIMITATIONS

Soil Variations

The recommendations in this report are based upon the data obtained from the soil borings. This report does not reflect variations which may occur between these borings, and which would not become evident until construction. If variations then become evident, it would be necessary for a re-evaluation of recommendations of this report, after performing on-site observations.

Warranties

We have prepared this report in accordance with generally accepted soil and foundation engineering practices. We make no other warranties, either expressed or implied, as to the professional advice provided under the terms of our agreement and included in this report. This report is prepared exclusively for our client and may not be relied upon by other parties without written consent from our office.

Boring Logs

In the process of obtaining and testing samples and preparing this report, we follow reasonable and accepted practice in the field of soil engineering. Field logs maintained during drilling describe field occurrences, sampling locations, and other information. The samples obtained in the field are subjected to additional testing in the laboratory and differences may exist between the field logs and the final logs. The engineer reviews the field logs and laboratory test data, and then prepares the final boring logs. Our recommendations are based on the contents of the final logs.

Review of Design Plans and Specifications

In the event that any changes in the design of the building or the location, however slight, are planned, our recommendations shall not be considered valid unless modified or approved in writing by our office. We recommend that we be provided the opportunity to review the final design and specifications in order to determine whether changes in the original concept may have affected the validity of our recommendations, and whether our recommendations have, in fact, been implemented in the design and specifications.

TEST DRILLING AND SAMPLING PROCEDURES

Test Drilling Methods:

- [X] Hollow stem auger, ASTM D6151
- [ ] Mud rotary, ASTM D5783
- [ ] Casing advancer, ASTM D5872
- [ ] Rock coring, ASTM D2113
- [ ] Cone Penetration Testing, ASTM D5778

Note: Cone penetration test data can be used to interpret subsurface stratigraphy and can provide data on engineering properties of soils. The ASTM procedure does not include a procedure for determining soil classification from CPT testing. Soil classifications shown on CPT logs are based on published procedures and are not based on physical ASTM soil classification tests.

Sampling Methods:

- [X] SPT, ASTM D1586, CME Auto hammer (140 lb., 30" drop, 2" OD split spoon sampler)
- [X] 2 ¼" OD Macro Tube

Note: The number of hammer blows required to drive the SPT sampler 12 inches, after seating 6 inches, is termed the soil N-value and provides an indication of the soil's relative density and strength parameters at the sample location. SPT blow counts in 6 inch increments are recorded on the boring logs.

Drill Rig:

- [X] CME 55 LC (ATV)
- [X] CME 55 (ATV)
- [ ] CME 95 Truck
- [X] Geoprobe Direct Push
- [ ] Geoprobe Rotary Sonic

Boreholes Backfilled With:

- [X] Excavated soil
- [X] Cement bentonite grout
- [ ] Piezometer or Monitoring Well (see notes on logs)
- [X] Concrete or asphalt patch where appropriate

Sample Handling and Disposition:

- [X] SPT samples labeled, placed in jars, returned to MTC Laboratory
- [X] Discard after 60 days

BORING LOG TERMINOLOGY AND ASTM D 2488 CLASSIFICATION OUTLINE

TERMS DESCRIBING CONSISTENCY OR CONDITION

COARSE-GRAINED SOILS (major portions retained on No. 200 sieve): includes (1) clean gravel and sands and (2) silty or clayey gravels and sands. Condition is rated according to relative density as determined by laboratory tests or standard penetration resistance tests.

Descriptive Terms	Relative Density	SPT Blow Count
Very loose	0 to 15 %	< 4
Loose	15 to 35 %	4 to 10
Medium dense	35 to 65 %	10 to 30
Dense	65 to 85 %	30 to 50
Very dense	85 to 100 %	> 50

Per ASTM D2487, the following conditions must be met based on laboratory testing to justify the label 'well graded' in a soil description.

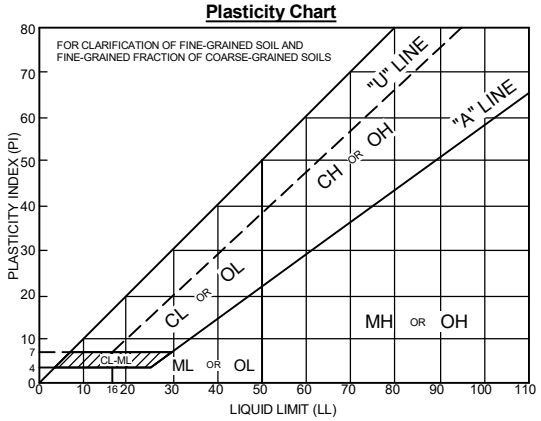
Gravel: $C_U = \frac{D_{60}}{D_{10}}$ greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3

Sand: $C_U = \frac{D_{60}}{D_{10}}$ greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3

FINE-GRAINED SOILS (major portions passing on No. 200 sieve): includes (1) inorganic and organic silts and clays, (2) gravelly, sandy, or silty clays, and (3) clayey silts. Consistency is rated according to shearing strength, as indicated by penetrometer readings, SPT blow count, or unconfined compression tests.

Descriptive Terms	Unconfined Compressive Strength kPa	SPT Blow Count
Very soft	< 25	< 2
Soft	25 to 50	2 to 4
Medium stiff	50 to 100	4 to 8
Stiff	100 to 200	8 to 15
Very stiff	200 to 400	15 to 30
Hard	> 400	> 30

Plasticity Chart



MAJOR DIVISIONS					TYPICAL NAMES
COARSE-GRAINED SOILS MORE THAN HALF IS COARSER THAN NO. 200 SIEVE	GRAVELS MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS WITH LESS THAN 15% FINES	GW		WELL-GRADED GRAVELS WITH OR WITHOUT SAND
			GP		POORLY-GRADED GRAVELS WITH OR WITHOUT SAND
		GRAVELS WITH 15% OR MORE FINES	GM		SILTY GRAVELS WITH OR WITHOUT SAND
			GC		CLAYEY GRAVELS WITH OR WITHOUT SAND
	SANDS MORE THAN HALF COARSE FRACTION IS FINER THAN NO. 4 SIEVE SIZE	CLEAN SANDS WITH LESS THAN 15% FINES	SW		WELL-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP		POORLY-GRADED SANDS WITH OR WITHOUT GRAVEL
			SP-SM		POORLY-GRADED SANDS WITH SILT WITH OR WITHOUT GRAVEL
		SANDS WITH 15% OR MORE FINES	SM		SILTY SANDS WITH OR WITHOUT GRAVEL
			SC		CLAYEY SANDS WITH OR WITHOUT GRAVEL
FINE-GRAINED SOILS MORE THAN HALF IS FINER THAN NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT 50% OR LESS		ML		INORGANIC SILTS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CL		INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OL		ORGANIC SILTS OR CLAYS OF LOW TO MEDIUM PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH		INORGANIC SILTS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			CH		INORGANIC CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
			OH		ORGANIC SILTS OR CLAYS OF HIGH PLASTICITY WITH OR WITHOUT SAND OR GRAVEL
HIGHLY ORGANIC SOILS			PT/OL		PEAT AND OTHER HIGHLY ORGANIC SOILS

GENERAL NOTES

1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.

2. "Grades with" or "Grades without" may be used to describe soil when characteristics vary within a stratum.

3. Preserved soil samples will be discarded after 60 days unless alternate arrangements have been made.

GROUNDWATER OBSERVATIONS:

During - indicates water level encountered during the boring
End- indicates water level immediately after drilling
Date and Depth - Measurements at indicated date

SAMPLE TYPES AND NUMBERING

S	SPT, split barrel sample, ASTM D1586
U	Shelby tube sample, ASTM D1587
R	Rock core run
*S	Other than 2" split barrel sample
L	SPT with liner, ASTM D1586
A	Auger cuttings
G	Geoprobe liner

MINOR COMPONENT QUANTIFYING TERMS

Less than 5%	TRACE
5 to 10%	FEW
15 to 25%	LITTLE
30 to 40%	SOME
50 to 100%	MOSTLY

GRAIN SIZE

BOULDER	>12"
COBBLE	12" to 3"
COARSE GRAVEL	3" to 0.75"
FINE GRAVEL	0.75" to No. 4
COARSE SAND	No. 4 to No. 10
MEDIUM SAND	No. 10 to No.40
FINE SAND	No. 40 to No. 200

LOG OF BORING

Project No.: 191629
Boring No.: B-1
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286409.3 E=13283056.5 (MI South ift)
Elevation: 906.4 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled with cement-bentonite grout and asphalt cold patch.

Date Begin: 02/25/2020 Date End: 02/25/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
905.4	1					8 1/2" HMA, 8" Crushed Limestone Aggregate Base (1.4)				Fill: 0' to 5.5'
904.4	2	S-1	1.5	15-17-14 N=31	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist, Fill (3.0)				
903.4	3									
902.4	4				SC					
901.4	5	S-2	1.5	5-3-4 N=7		Brown clayey SAND; mostly coarse to fine sand, little clayey fines, moist, Fill (5.5)				
900.4	6									
899.4	7	S-3	1.5	2-1-1 N=2		Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				
898.4	8									
897.4	9				SP-SM					
896.4	10	S-4	1.5	2-1-2 N=3						
895.4	11									
894.4	12					(12.0)				
893.4	13					Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist, with occasional sand lenses				
892.4	14						4.25			
891.4	15	S-5	1.5	3-3-7 N=10	CL					
890.4	16									
889.4	17					(17.0)				
888.4	18					Gray silty SAND; mostly coarse to fine sand, some silty fines, moist				
887.4	19									
886.4	20	S-6	1.4	4-5-7 N=12	SM					
885.4	21									
884.4	22					(22.0)				
883.4	23					Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, trace fine gravel, moist				
882.4	24						4.0			
881.4	25	S-7	1.5	7-8-10 N=18	CL					
880.4	26									
879.4	27					(27.0)				
878.4	28					Gray SILT with sand; mostly silty fines, little fine sand, moist, with occasional sand lenses				
877.4	29				ML		4.0			
876.4	30	S-8	1.5	7-9-10 N=19		(30.0)				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-2
Sheet: 1 of 2

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286287.3 E=13283425.5 (MI South ift)
Elevation: 921.1 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled with cement-bentonite grout and asphalt cold patch.

Date Begin: 03/03/2020 Date End: 03/03/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	29.0
Sampler	SPT	2"	End	NA
Core			Seepage	29.0
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 45.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
920.1	1					7 1/4" HMA, 7" Crushed Limestone Aggregate Base				Fill: 0' to 3.0'
919.1	2	S-1	1.5	16-13-19 N=32	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist, Fill				
918.1	3					3.0				
917.1	4					Brown silty SAND; mostly fine sand, little silty fines, moist				
916.1	5	S-2	1.5	2-3-3 N=6	SM					
915.1	6									
914.1	7	S-3	1.5	3-3-4 N=7						
913.1	8					8.0				
912.1	9					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist				
911.1	10	S-4	1.5	4-6-10 N=16	SC					
910.1	11									
909.1	12					12.0				
908.1	13					Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, trace fine gravel, moist				
907.1	14									
906.1	15	S-5	1.5	5-8-9 N=17						
905.1	16									
904.1	17				SP-SM					
903.1	18									
902.1	19					Grades with mostly fine sand				
901.1	20	S-6	1.5	7-6-7 N=13						
900.1	21									
899.1	22					22.0				
898.1	23					Brown SILT with sand; mostly silty fines, little fine sand, moist				
897.1	24									
896.1	25	S-7	1.5	6-9-12 N=21						
895.1	26									
894.1	27				ML					
893.1	28									
892.1	29									
891.1	30	S-8	1.5	6-9-13 N=22		Grades wet				
890.1	31									
889.1	32					32.0				
888.1	33					Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist				
887.1	34									
886.1	35	S-9	1.5	29-29-29 N=58	SP-SM					
885.1	36									
884.1	37					37.0				
883.1	38					Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				
882.1	39				SP-SM					
881.1	40	S-10	1.5	12-14-16 N=30						

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-2
Sheet: 2 of 2

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
880.1	41				SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				
879.1	42					42.0				
878.1	43				SP-SM	Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist				S-11: Poor recovery, possible coarse gravel / COBBLE
877.1	44									
876.1	45	S-11	1.0	38-50/6"		45.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-3
Sheet: 1 of 2

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286166.4 E=13283824.3 (MI South ift)
Elevation: 918.8 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled with cement-bentonite grout and asphalt cold patch.

Date Begin: 02/28/2020 Date End: 03/02/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	19.5
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 50.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
917.8	1					5 1/2" HMA, 8" Crushed Limestone Aggregate Base				
916.8	2	S-1	1.5	25-22-18 N=40	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist, Fill				Fill: 0' to 3.0'
915.8	3									
914.8	4				CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist	4.5+			
913.8	5	S-2	1.5	10-7-7 N=14						
912.8	6				SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist				
911.8	7	S-3	1.5	3-3-3 N=6						
910.8	8									
909.8	9				SM	Brown silty SAND; mostly fine sand, little silty fines, moist				
908.8	10	S-4	1.5	2-2-1 N=3						
907.8	11									
906.8	12									
905.8	13				SP-SM	Brown poorly graded SAND with silt; mostly fine sand, few silty fines, moist				
904.8	14									
903.8	15	S-5	1.5	7-8-14 N=22						
902.8	16									
901.8	17									
900.8	18									
899.8	19					Grades wet				
898.8	20	S-6	1.5	9-12-5 N=17						
897.8	21				ML	Brown SILT; mostly silty fines, few fine sand, moist				
896.8	22									
895.8	23				SP-SM	Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, moist				
894.8	24									
893.8	25	S-7	1.5	10-12-17 N=29						
892.8	26									
891.8	27									
890.8	28									
889.8	29									
888.8	30	S-8	1.5	11-13-17 N=30		Grades with coarse to fine sand				
887.8	31									
886.8	32									
885.8	33									
884.8	34									
883.8	35									
882.8	36	S-9	1.5	10-6-7 N=13	SC	Gray clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist				
881.8	37									
880.8	38									
879.8	39									S-10: Poor recovery; possible coarse gravel / COBBLE
878.8	40	S-10	1.0	4-5-6 N=11						

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-3
Sheet: 2 of 2

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
877.8	41									
876.8	42									
875.8	43									
874.8	44				SC	Gray clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist				
873.8	45	S-11	1.5	10-5-6 N=11						
872.8	46									
871.8	47					47.0				
870.8	48									
869.8	49				CL	Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, few coarse to fine gravel, moist	4.5+			
868.8	50	S-12	1.5	12-28-38 N=66		50.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-4
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286137.9 E=13284262.3 (MI South ift)
Elevation: 901.1 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 7.0 ft.

Date Begin: 02/24/2020 Date End: 02/24/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	22.0
Sampler	SPT	2"	End	NA
Core			Seepage	22.0
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
900.1	1	S-1	1.0	2-2-2 N=4		4" Sandy Topsoil 0.3				
899.1	2				SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, moist, Fill 3.0				Fill: 0' to 3.0'
898.1	3									S-1, S-7, S-8: Poor recovery; possible coarse gravel /COBBLE
897.1	4	S-2	1.3	3-2-3 N=5		Brown silty SAND; mostly fine sand, little silty fines, moist with occasional roots				
896.1	5				SM					
895.1	6									
894.1	7	S-3	1.5	WOH-2-3 N=5		8.0				
893.1	8									
892.1	9	S-4	1.5	4-3-2 N=5		Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				S-4: 6% LBW
891.1	10				SP-SM					
890.1	11									
889.1	12					12.0				
888.1	13					Brown silty SAND; mostly coarse to fine sand, little clayey fines, few coarse to fine gravel, moist				
887.1	14	S-5	1.5	3-2-3 N=5						
886.1	15				SM					
885.1	16									
884.1	17					17.0				
883.1	18					Gray clayey SAND; mostly coarse to fine sand, some clayey fines, moist				
882.1	19	S-6	1.5	5-4-5 N=9						
881.1	20				SC					
880.1	21									
879.1	22					22.0				
878.1	23					Gray silty SAND; mostly medium to fine sand, some silty fines, moist with occasional wet sand lenses				
877.1	24	S-7	0.5	3-3-3 N=6						
876.1	25									
875.1	26				SM					
874.1	27									Driller noted more difficult drilling from 26.0' to 30.0'
873.1	28									
872.1	29									
871.1	30	S-8	0.5	8-12-26 N=38		Grades with trace coarse to fine gravel 30.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-5
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286220.2 E=13284619.2 (MI South ift)
Elevation: 891.1 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings and asphalt cold patch. Cave in at 11.8 ft.

Date Begin: 02/24/2020 Date End: 02/24/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 20.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
890.1	1	S-1	1.5	16-13-14 N=27		3 1/2" HMA, 7" Crushed Limestone Aggregate Base 0.8				Fill: 0' to 8.0'
889.1	2					Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, trace coarse to fine gravel, moist, Fill				
888.1	3									
887.1	4	S-2	1.5	5-5-5 N=10	SP-SM			9		S-2: 8% LBW
886.1	5									
885.1	6									
884.1	7	S-3	1.3	2-2-2 N=4						
883.1	8					8.0				
882.1	9	S-4	1.5	5-7-10 N=17		Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist	3.75			
881.1	10									
880.1	11									
879.1	12									
878.1	13									Driller noted more difficult drilling at 12.0'
877.1	14	S-5	1.5	15-12-13 N=25	CL	Grades gray with occasional sand lenses	4.5+			
876.1	15									
875.1	16									
874.1	17									
873.1	18									
872.1	19	S-6	1.5	16-22-36 N=58			4.5+			
871.1	20					20.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-6
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286305.1 E=13284816.1 (MI South ift)
Elevation: 895.3 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 18.0 ft.

Date Begin: 02/25/2020 Date End: 02/25/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	18.0
Sampler	SPT	2"	End	18.0
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
894.3	1	S-1	1.5	8-6-5 N=11	CL	3" Clayey Topsoil (0.3) Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist, Fill with occasional roots (2.5)	4.5+			Fill: 0' to 14.0'
893.3	2									
892.3	3									
891.3	4	S-2	1.5	3-1-2 N=3	SC	Brown / black clayey SAND; mostly coarse to fine sand, little clayey fines, few coarse to fine gravel, moist, Fill with slag and glass fragments				Driller noted more difficult drilling, possible COBBLE, from 2.0' to 4.0'
890.3	5									
889.3	6									
888.3	7	S-3	1.5	2-1-1 N=2						
887.3	8									
886.3	9	S-4	0.8	3-1-2 N=3						S-4: Poor recovery; possible coarse gravel / COBBLE
885.3	10									
884.3	11									
883.3	12									
882.3	13									
881.3	14	S-5	1.3	8-14-15 N=29		(14.0)				
880.3	15				GP-GM	Brown poorly graded GRAVEL with silt and sand; mostly coarse to fine gravel, little coarse to fine sand, few silty fines, moist				Driller noted more difficult drilling from 14.0' to 18.0'
879.3	16									
878.3	17									
877.3	18					(18.0)				
876.3	19	S-6	1.5	15-22-23 N=45	SC	Gray silty SAND; mostly coarse to fine sand, little silty fines, wet, with occasional silt lenses				
875.3	20									
874.3	21									
873.3	22					(22.0)				
872.3	23	S-7	1.5	31-29-33 N=62	SP-SM	Gray poorly graded SAND with silt; mostly medium to fine sand, few silty fines, wet				
871.3	24									
870.3	25									
869.3	26									
868.3	27					(27.0)				
867.3	28	S-8	1.5	17-32-30 N=62	CL	Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, trace coarse to fine gravel, moist	4.5+			
866.3	29									
865.3	30					(30.0)				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-7
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286423.8 E=13285037.6 (MI South ift)
Elevation: 896.1 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings and asphalt cold patch. Cave in at 24.0 ft.

Date Begin: 02/25/2020 Date End: 02/25/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
895.1	1					4" HMA, 3" Natural Aggregate Base (0.6)				
894.1	2	S-1	1.0	6-5-3 N=8	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few coarse to fine gravel, moist, Fill (3.0)				Fill: 0' to 3.0'
893.1	3									S-1: Poor recovery; possible coarse gravel / COBBLE
892.1	4					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist				
891.1	5	S-2	1.5	4-4-4 N=8						
890.1	6									
889.1	7	S-3	1.5	4-5-5 N=10	SC					
888.1	8									
887.1	9									
886.1	10	S-4	1.5	4-4-6 N=10						
885.1	11									
884.1	12					(12.0)				
883.1	13					Gray sandy lean CLAY with gravel; mostly clayey fines, some coarse to fine sand, little coarse to fine gravel, moist				Driller noted more difficult drilling, possible COBBLE, from 12.0' to 17.0'
882.1	14									
881.1	15	S-5	1.5	18-26-33 N=59	CL		4.5+			
880.1	16									
879.1	17					(17.0)				
878.1	18					Gray silty SAND; mostly coarse to fine sand, some silty fines, moist				
877.1	19									
876.1	20	S-6	1.5	5-5-6 N=11						
875.1	21									
874.1	22				SM					
873.1	23									
872.1	24									
871.1	25	S-7	1.5	2-4-4 N=8						
870.1	26									
869.1	27					(27.0)				
868.1	28					Gray sandy lean CLAY with gravel; mostly clayey fines, some coarse to fine sand, little coarse to fine gravel, moist				
867.1	29				CL					
866.1	30	S-8	1.5	16-18-21 N=39		(30.0)	4.5+			
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-8
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286420.9 E=13285575.9 (MI South ift)
Elevation: 880.4 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings and asphalt cold patch. Cave in at 14.0 ft.

Date Begin: 02/27/2020 Date End: 02/27/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	12.0
Sampler	SPT	2"	End	NA
Core			Seepage	23.0
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 25.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
879.4	1					2" HMA, 2" Asphalt Millings (0.3)	4.5			
878.4	2	S-1	1.3	4-6-7 N=13	CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, few coarse to fine gravel, moist				
877.4	3									
876.4	4									
875.4	5	S-2	1.5	10-12-14 N=26			4.5+			
874.4	6									
873.4	7	S-3	1.5	4-6-6 N=12		Grades with silty sand lenses	4.0			
872.4	8					(8.0)				
871.4	9					Gray silty SAND; mostly medium to fine sand, little silty fines, moist				
870.4	10	S-4	1.5	10-13 N=23	SM					
869.4	11									
868.4	12					(12.0)				
867.4	13					Brown clayey SAND; mostly coarse to fine sand, little clayey fines, wet				
866.4	14									
865.4	15	S-5	1.5	7-7-7 N=14	SC					
864.4	16									
863.4	17					(17.0)				
862.4	18					Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist				
861.4	19									
860.4	20	S-6	1.5	13-14-15 N=29			4.5+			
859.4	21				CL					
858.4	22									Cuttings returned wet at 23.0'
857.4	23									
856.4	24									S-7: Poor recovery; piece of stone in tip of sampler
855.4	25	S-7	0.8	8-50/3"		(25.0)	3.5			
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-9
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286197.8 E=13286172.5 (MI South ift)
Elevation: 871.6 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings and asphalt cold patch. Cave in at 12.3 ft.

Date Begin: 02/27/2020 Date End: 02/27/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 25.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
870.6	1	S-1	1.4	5-7-9 N=16	SC	1 3/4" HMA, 2" Asphalt Millings 0.3				Fill: 0' to 2.0'
869.6	2					Brown clayey SAND with gravel; mostly coarse to fine sand, some coarse to fine gravel, little clayey fines, moist, Fill 2.0				
868.6	3									Driller reported more difficult drilling, possible COBBLE, from 2.0' to 12.0'
867.6	4	S-2	1.4	25-24-22 N=46		Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, some coarse to fine gravel, few silty fines, moist				
866.6	5									
865.6	6									
864.6	7	S-3	1.4	6-11-11 N=22	SP-SM					
863.6	8									
862.6	9	S-4	1.5	13-16-19 N=35						
861.6	10									
860.6	11									
859.6	12					12.0				
858.6	13					Brown silty SAND; mostly fine sand, little silty fines, moist				
857.6	14	S-5	1.5	6-9-9 N=18						
856.6	15									
855.6	16									
854.6	17				SM					
853.6	18									
852.6	19	S-6	1.5	3-3-3 N=6						
851.6	20									
850.6	21									
849.6	22					22.0				
848.6	23					Brown poorly graded SAND with silt; mostly fine sand, few silty fines, moist				
847.6	24	S-7	1.5	5-8-8 N=16	SP-SM					
846.6	25					25.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-10
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286009.8 E=13286547.0 (MI South ift)
Elevation: 864.0 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings and asphalt cold patch.

Date Begin: 02/26/2020 Date End: 02/26/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 20.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
863.0	1					2 1/4" HMA, 3" Asphalt Millings 0.4				Fill: 0' to 2.0'
862.0	2	S-1	0.9	4-4-8 N=12	SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill 3.0				
861.0	3									Driller noted generally difficult drilling from 2.0' to 20.0'
860.0	4					Brown silty SAND with gravel; mostly coarse to fine sand, little coarse to fine gravel, little silty fines, moist				S-1 and S-3: Poor recovery; possible coarse gravel / COBBLE
859.0	5	S-2	1.5	12-17-19 N=36						
858.0	6									
857.0	7	S-3	1.1	18-15-19 N=34						
856.0	8									
855.0	9									
854.0	10	S-4	1.5	12-13-14 N=27						
853.0	11									
852.0	12				SM					
851.0	13									
850.0	14									
849.0	15	S-5	1.5	14-20-20 N=40						Driller noted possible COBBLE at 14.0'
848.0	16									
847.0	17									
846.0	18									
845.0	19									
844.0	20	S-6	1.5	17-18-25 N=43		20.0				
						End of Boring				Boring terminated at 20.0'; 5' Auger section remains in hole from 15.0' to 20.0'

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-11
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=285811.0 E=13286908.3 (MI South ift)
Elevation: 848.7 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 16.7 ft.

Date Begin: 03/02/2020 Date End: 03/02/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	19.0
Sampler	SPT	2"	End	16.4
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 35.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
847.7	1	S-1	1.5	2-5-2 N=7	SC	4" Clayey Topsoil (0.3) Brown clayey SAND; mostly coarse to fine sand, little clayey fines, moist, Fill (3.0)				Fill: 0' to 9.9'
846.7	2									
845.7	3									
844.7	4	S-2	1.5	6-11-11 N=22	CL	Brown sandy lean CLAY with gravel; mostly clayey fines, some coarse to fine sand, little coarse to fine gravel, moist, Fill (5.5)	3.0			Driller noted possible COBBLE at 3.0', 6.0', and 8.0'
843.7	5									
842.7	6									
841.7	7	S-3	0.4	4-5-5 N=10	SC	Brown clayey SAND with gravel; mostly coarse to fine sand, some coarse to fine gravel, little clayey fines, moist, Fill (8.0)				S-3: Poor recovery; possible coarse gravel / COBBLE
840.7	8									
839.7	9	S-4	1.5	2-3-3 N=6		Black Granular Fill, possible asphalt (9.9)				
838.7	10									
837.7	11					Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, moist				
836.7	12									
835.7	13									
834.7	14	S-5	1.5	4-3-3 N=6				11		S-5: 9% LBW
833.7	15									
832.7	16									
831.7	17									
830.7	18									
829.7	19	S-6	1.5	5-5-5 N=10		Grades wet				
828.7	20									
827.7	21									
826.7	22									
825.7	23				SP-SM					
824.7	24	S-7	1.5	15-3-4 N=7						
823.7	25									
822.7	26									
821.7	27									
820.7	28									
819.7	29	S-8	1.5	10-23-18 N=41						
818.7	30									
817.7	31									
816.7	32									
815.7	33									
814.7	34	S-9	1.5	6-7-8 N=15		(35.0)				
813.7	35					End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-12
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6610
Crew Chief: SM Field Eng.: JS Rev. By: RW
Coordinates: N=286430.1 E=13283611.7 (MI South ift)
Elevation: 901.3 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 29.5 ft.

Date Begin: 04/30/2020 Date End: 04/30/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Macro	2 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
900.3	1					2" Sandy Topsoil 0.1				Possible Fill: 0' to 9.0'
899.3	2					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, trace coarse to fine gravel, moist, possible Fill with occasional roots				
898.3	3	G-1	3.1							
897.3	4									
896.3	5				SC					
895.3	6									
894.3	7									
893.3	8	G-2	3.9							
892.3	9					9.0				
891.3	10					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, trace coarse to fine gravel, moist				
890.3	11				SC					
889.3	12					12.5				
888.3	13	G-3	3.1		SP-SC	Brown poorly graded SAND with clay; mostly coarse to fine sand, few clayey fines, few coarse to fine gravel, moist 13.5				
887.3	14									
886.3	15				SP	Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, moist				
885.3	16									
884.3	17					17.0				
883.3	18	G-4	3.1			Brown poorly graded SAND with silt; mostly coare to fine sand, few coarse to fine gravel, moist				
882.3	19									
881.3	20									
880.3	21				SP-SM					
879.3	22					Grades with medium to fine sand				
878.3	23	G-5	3.5							
877.3	24									
876.3	25					25.0				
875.3	26					Gray sandy lean CLAY with gravel; mostly clayey fines, some coarse to fine sand, little coarse to fine gravel, moist				
874.3	27									
873.3	28	G-6	5.0		CL		4.5+			
872.3	29									
871.3	30					30.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-12a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286427.1 E=13283612.7 (MI South ift)
Elevation: 901.5 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/20/2020 Date End: 04/20/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	3.0
Sampler	Hand Auger	3 1/4"	End	None
Core			Seepage	3.0
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 5.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
901.0	0.5	A-1				9" Silty Topsoil 0.8				Possible Fill: 0' to 5.0'
900.5	1.0									
900.0	1.5	A-2				Brown clayey SAND; mostly medium to fine sand, little clayey fines, moist, occasional silt and clay seams, possible Fill				
899.5	2.0	A-3								
899.0	2.5									
898.5	3.0				SC					
898.0	3.5					Wet sand seam				
897.5	4.0									
897.0	4.5									
896.5	5.0					5.0				
						End of Boring				Auger refusal at 5' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-12b
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286427.1 E=13283612.7 (MI South ift)
Elevation: 901.5 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/20/2020 Date End: 04/20/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 7.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
901.0	0.5	A-1				3" Silty Topsoil 0.3				Fill: 0 to 6.0'
900.5	1.0					Brown clayey SAND; mostly medium to fine sand, little clayey fines, moist, Fill				
900.0	1.5									
899.5	2.0									
899.0	2.5									
898.5	3.0				SC					
898.0	3.5									
897.5	4.0									
897.0	4.5									
896.5	5.0					5.0				
896.0	5.5	A-2			SC	Brown gray mottled clayey SAND; mostly medium to fine sand, some clayey fines, moist, Fill with clay and silt fragments 6.0				
895.5	6.0									
895.0	6.5	A-3			SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, trace coarse to fine gravel, moist				
894.5	7.0									
894.0	7.5					7.5				
						End of Boring				Auger refusal at 7.5' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-12c
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286427.1 E=13283612.7 (MI South ift)
Elevation: 901.5 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/20/2020 Date End: 04/20/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 6.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
901.0	0.5					3" Silty Topsoil 0.3				Fill: 0 to 6.0'
900.5	1.0	A-1				Brown clayey SAND; mostly medium to fine sand, little clayey fines, moist, Fill				
900.0	1.5									
899.5	2.0									
899.0	2.5									
898.5	3.0									
898.0	3.5				SC					
897.5	4.0									
897.0	4.5									
896.5	5.0									
896.0	5.5					Grades with occasional black stone fragments, possible asphalt				
895.5	6.0	A-2				6.0				
						End of Boring				Auger refusal at 6.0' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-13
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6610
Crew Chief: SM Field Eng.: JS Rev. By: RW
Coordinates: N=286411.6 E=13283860.6 (MI South ift)
Elevation: 901.3 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 18.0 ft.

Date Begin: 04/30/2020 Date End: 04/30/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	16.0
Sampler	Macro	2 1/4"	End	17.0
Core			Seepage	16.0
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
900.3	1					3" Sandy Topsoil (0.3)				
899.3	2					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist with occasional roots				
898.3	3	G-1	3.2							
897.3	4									
896.3	5									
895.3	6									
894.3	7				SC					
893.3	8	G-2	3.7			Grades with little clayey fines and without roots				
892.3	9									
891.3	10									
890.3	11									
889.3	12									
888.3	13	G-3	4.1							
887.3	14					(13.5)				
886.3	15				CL	Gray lean CLAY with sand; mostly clayey fines, some coarse to fine sand, trace coarse to fine gravel, moist	1.5			
885.3	16					(16.0)				
884.3	17				SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few coarse to fine gravel, wet (17.0)				
883.3	18	G-4	4.8							
882.3	19					Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, few coarse to fine gravel, moist				
881.3	20									
880.3	21									
879.3	22						4.5+			
878.3	23	G-5	4.8							
877.3	24				CL					
876.3	25									
875.3	26									
874.3	27									
873.3	28	G-6	5.0							
872.3	29									
871.3	30					(30.0)				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-13a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286411.6 E=13283860.6 (MI South ift)
Elevation: 901.3 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/20/2020 Date End: 04/20/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	9.5
Sampler	Hand Auger	3 1/4"	End	None
Core			Seepage	9.5
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 11.3 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
900.8	0.5	A-1				9" Silty Topsoil 0.8				
900.3	1.0									
899.8	1.5	A-3			SC	Brown clayey SAND; mostly silty fine sand, some clayey fines, few coarse to fine gravel, moist				
899.3	2.0									
898.8	2.5									
898.3	3.0									
897.8	3.5									
897.3	4.0									
896.8	4.5									
896.3	5.0									
895.8	5.5									
895.3	6.0									
894.8	6.5									
894.3	7.0									
893.8	7.5									
893.3	8.0					8.0				
892.8	8.5	A-4			SM	Brown silty SAND; mostly fine sand, some silty fines, moist				
892.3	9.0									
891.8	9.5					Wet sand seam				
891.3	10.0									
890.8	10.5	A-5				Grades gray 10.5				
890.3	11.0	A-6			SM	Dark brown silty SAND; mostly coarse to fine sand, little silty fines, few coarse to fine gravel, moist 11.3				
						End of Boring				Auger refusal at 11.3' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-14
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6610
Crew Chief: SM Field Eng.: JS Rev. By: RW
Coordinates: N=286304.0 E=13284116.8 (MI South ift)
Elevation: 896.7 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 15.0 ft.

Date Begin: 04/30/2020 Date End: 04/30/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	12.0
Sampler	Macro	2 1/4"	End	13.0
Core			Seepage	12.0
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 20.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
895.7	1					4" Sandy Topsoil (0.3)				
894.7	2					Brown clayey SAND with gravel; mostly coarse to fine sand, little clayey fines, little coarse to fine gravel, moist with occasional roots				
893.7	3	G-1	2.7							
892.7	4									
891.7	5				SC					
890.7	6									
889.7	7									
888.7	8	G-2	5.0							
887.7	9									
886.7	10					(8.5)				
885.7	11					Brown lean CLAY with sand; mostly clayey fines, some coarse to fine sand, trace fine gravel, moist	4.5+			
884.7	12				CL	(12.0)				
883.7	13	G-3	4.5			Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few fine gravel, wet (14.0)				
882.7	14				SP-SM					
881.7	15					Gray sandy SILT; mostly silty fines, some fine sand, few coarse to fine gravel, wet (16.0)				
880.7	16				ML					
879.7	17					Gray sandy lean CLAY; mostly clayey fines, some coarse to fine sand, few coarse to fine gravel, moist with occasional sand seams (20.0)				
878.7	18	G-4	3.2				4.5+			
877.7	19				CL					
876.7	20									
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-14a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286264.0 E=13284120.8 (MI South ift)
Elevation: 898.2 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	1.0
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	1.0
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 10.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
897.7	0.5	A-1				8" Sandy Topsoil 0.7				
897.2	1.0	A-2			SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few fine gravel, moist with occasional roots 2.5				Seepage from occasional saturated sand seams from 1.0' to 5.5'
896.7	1.5									
896.2	2.0									
895.7	2.5									
895.2	3.0	A-3			CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist 3.5	1.25			
894.7	3.5									
894.2	4.0	A-4			ML	Brown sandy SILT; mostly silty fines, some medium to fine sand, moist 5.7				
893.7	4.5									
893.2	5.0									
892.7	5.5									
892.2	6.0	A-5			SP-SM	Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, moist 6.9				
891.7	6.5									
891.2	7.0									
890.7	7.5	A-6			ML	Brown sandy SILT; mostly silty fines, some medium to fine sand, moist 7.5				
890.2	8.0	A-7			SP	Brown poorly graded SAND; mostly coarse to fine sand, moist				
889.7	8.5									
889.2	9.0									
888.7	9.5									
888.2	10.0	A-8				10.0				
						End of Boring				Auger refusal at 10.0' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-15
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286361.4 E=13285222.2 (MI South ift)
Elevation: 872.4 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 6.0 ft.

Date Begin: 04/17/2020 Date End: 04/17/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 12.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
871.4	1	S-1	1.5	2-2-2 N=4	SC	6" Sandy Topsoil 0.5 Brown clayey SAND with gravel; mostly coarse to fine sand, some clayey fines, little coarse to fine gravel, moist with occasional roots				
870.4	2									
869.4	3									
868.4	4	S-2	1.4	25-11-15 N=26						Driller noted possible COBBLE from 3.5' to 8.0'
867.4	5									
866.4	6					5.5				
865.4	7	S-3	1.5	9-13-23 N=36	CL	Brown gray sandy lean CLAY with gravel; mostly clayey fines, some coarse to fine sand, little coarse to fine gravel, moist	4.5			
864.4	8									
863.4	9	S-4	1.5	10-17-17 N=34			4.5+			
862.4	10									
861.4	11									
860.4	12	S-5	1.5	7-15-20 N=35		Grades gray with little medium to fine sand 12.5	4.5+			
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-15a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286361.4 E=13285222.2 (MI South ift)
Elevation: 872.4 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 5.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
871.9	0.5	A-1				6" Sandy Topsoil 0.5				
871.4	1.0	A-2				Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist				
870.9	1.5									
870.4	2.0	A-3				Grades with little clayey fines and few coarse to fine gravel				
869.9	2.5									
869.4	3.0				SC					
868.9	3.5									
868.4	4.0									
867.9	4.5									
867.4	5.0					5.0				
						End of Boring				Auger refusal at 5.0' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-16
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55 LC
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286337.1 E=13285512.6 (MI South ift)
Elevation: 861.6 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 4.0 ft.

Date Begin: 04/17/2020 Date End: 04/17/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	None
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 10.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
860.6	1	S-1	1.5	2-3-6 N=9	SC	4" Sandy Topsoil (0.3) Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist with occasional roots				Driller noted possible COBBLE at 2.0' to 5.0'
859.6	2									
858.6	3									
857.6	4	S-2	0.8	25-28-30 N=58						S-2: Poor recovery; possible coarse gravel / COBBLE
856.6	5									
855.6	6					(5.5)				
854.6	7	S-3	1.5	5-10-16 N=26	CL	Gray sandy lean CLAY with gravel; mostly clayey fines, little coarse to fine sand, little coarse to fine gravel, moist	4.0			
853.6	8									
852.6	9	S-4	1.5	6-11-15 N=26		Grades with trace fine gravel (10.0)	4.0			
851.6	10					End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-16a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286337.1 E=13285512.6 (MI South ift)
Elevation: 861.6 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 2.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
861.1	0.5	A-1				8" Sandy Topsoil 0.7				
860.6	1.0	A-2			SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist with occasional roots				
860.1	1.5									
859.6	2.0	A-3				Grades with trace coarse to fine gravel 2.5				
859.1	2.5					End of Boring				Auger refusal at 2.5' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-17
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=286198.3 E=13285734.0 (MI South ift)
Elevation: 852.2 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	1.5
Sampler	Hand Auger	3 1/4"	End	1.5
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 2.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
851.7	0.5	A-1				6" Sandy Topsoil 0.5	1.25			
851.2	1.0	A-2			CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist with occasional roots 1.5				
850.7	1.5									
850.2	2.0	A-3			SP	Brown poorly graded SAND; mostly coarse to fine sand, wet 2.5				
849.7	2.5									
						End of Boring				Auger refusal at 2.5' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-17a
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: SM Field Eng.: JS Rev. By: RW
Coordinates: N=286195.3 E=13285737.0 (MI South ift)
Elevation: 855.2 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 05/01/2020 Date End: 05/01/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	3.8
Sampler	Hand Auger	3 1/4"	End	1.3
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 7.2 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
854.7	0.5					3" Sandy Topsoil 0.3				Fill: 0' to 4.5'
854.2	1.0				SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few coarse to fine gravel, moist, Fill with poorly graded sand lenses				
853.7	1.5	A-1								
853.2	2.0									
852.7	2.5									
852.2	3.0									
851.7	3.5									
851.2	4.0					3.8				
850.7	4.5	A-2				Buried Topsoil, wet 4.5				
850.2	5.0				CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist with occasional roots 6.0	3.5			
849.7	5.5	A-3								
849.2	6.0									
848.7	6.5	A-4			SP	Brown gray poorly graded SAND with gravel; mostly coarse sand, some coarse to fine gravel, wet 7.2				
848.2	7.0									
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-18
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: CME 55
Crew Chief: NB Field Eng.: JS Rev. By: RW
Coordinates: N=286072.5 E=13286012.6 (MI South ift)
Elevation: 867.8 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Grouted borehole with cement bentonite slurry.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	4 1/4"	During	37.0
Sampler	SPT	2"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 40.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
866.8	1					5" HMA, 5" Crushed Aggregate Base 0.8				Fill: 0 to 22.0'
865.8	2	S-1	1.1	9-11-12 N=23	SP-SM	Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, few fine gravel, moist, Fill 2.5				S-1 and S-2: Poor recovery; possible coarse gravel / COBBLE
864.8	3									
863.8	4	S-2	1.2	3-3-4 N=7		Brown clayey SAND; mostly coarse to fine sand, some clayey fines, few fine gravel, moist, Fill with occasional black stones, possible asphalt fragments				
862.8	5									
861.8	6									
860.8	7	S-3	1.5	4-6-6 N=12						
859.8	8									
858.8	9	S-4	1.3	2-3-8 N=11						
857.8	10									
856.8	11									
855.8	12									
854.8	13				SC					
853.8	14	S-5	1.5	4-5-5 N=10		Grades with little clayey fines				
852.8	15									
851.8	16									
850.8	17									
849.8	18									
848.8	19	S-6	1.5	2-2-4 N=6						
847.8	20									
846.8	21									
845.8	22					22.0				
844.8	23					Brown poorly graded SAND; mostly coarse to fine sand, few fine gravel, moist				
843.8	24	S-7	1.5	3-3-3 N=6	SP					
842.8	25									
841.8	26									
840.8	27					27.0				
839.8	28					Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				
838.8	29	S-8	1.5	4-6-4 N=10						
837.8	30									
836.8	31									
835.8	32				SP-SM					
834.8	33									
833.8	34	S-9	1.5	2-3-3 N=6						
832.8	35									
831.8	36									
830.8	37					37.0				
829.8	38					Brown poorly graded SAND with clay; mostly coarse to fine sand, few clayey fines, wet				
828.8	39				SP-SC					
827.8	40	S-10	1.5	8-8-11 N=19		40.0				End of Boring at 40'

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-19
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: JS Field Eng.: JS Rev. By: RW
Coordinates: N=285911.8 E=13286311.2 (MI South ift)
Elevation: 841.8 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 9.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
841.3	0.5					6" Sandy Topsoil 0.5				Fill: 0 to 9.0'
840.8	1.0	A-1			SP-SM	Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, few coarse to fine gravel, moist, Fill				
840.3	1.5									
839.8	2.0					Grades light brown				
839.3	2.5									
838.8	3.0									
838.3	3.5									
837.8	4.0	A-2				Grades without gravel				
837.3	4.5									
836.8	5.0									
836.3	5.5									
835.8	6.0									
835.3	6.5									
834.8	7.0					Possible topsoil seams at 6.5'				
834.3	7.5									
833.8	8.0	A-3								
833.3	8.5									
832.8	9.0					9.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629
Boring No.: B-20
Sheet: 1 of 1

Project: LynAnne - Arbana Sewer Project
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: PS Field Eng.: Rev. By: RW
Coordinates: N=285742.7 E=13286616.8 (MI South ift)
Elevation: 833.7 ft Datum: NAVD 88 (GPS Observation)
Notes: Survey information provided by Stantec

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 04/16/2020 Date End: 04/16/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	4.0
Sampler	Hand Auger	3 1/4"	End	4.0
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 6.5 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Dyn. Cone Eq. "N": ASTM STP 399	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	DD pcf	REMARKS
833.2	0.5	A-1				6" Sandy Topsoil 0.5				Fill: 0' to 4.0'
832.7	1.0	A-2			CL	Brown sandy lean CLAY; mostly clayey fines, some coarse to fine sand, moist Fill with occasional roots	1.0			
832.2	1.5									
831.7	2.0									
831.2	2.5									
830.7	3.0					3.0				
830.2	3.5	A-3			SC	Dark brown clayey SAND; mostly medium to fine sand, little clayey fines, moist Fill, possible buried topsoil				
829.7	4.0					4.0				
829.2	4.5	A-4			SM	Brown silty SAND; mostly coarse to fine sand, little silty fines, wet				
828.7	5.0					5.0				
828.2	5.5	A-5			SP-SM	Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, little coarse to fine gravel, few silty fines, wet				
827.7	6.0									
827.2	6.5	A-6				Grades with some coarse to fine gravel 6.5				
						End of Boring				Auger refusal at 6.5' due to possible coarse gravel / COBBLE

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

mtc-test.com 800.968.8378

PROJECT NO.: 191629
DATE: 6-15-20
SHEET: 1 OF 1

PROJECT Lyn Anne – Arbana Sewer Project
CLIENT Stantec

MECHANICAL ANALYSIS ASTM C 136

SOURCE OF MATERIAL: Soil Boring
SOURCE LOCATION: Boring B-4, Sample S-4 (8.5 ft – 10.0 ft)
SAMPLED BY: J. Schaap — SAMPLE DATE: 2-24-2020
TESTED BY: M. Cherng — TEST DATE: 3-10-2020
MATERIAL SPECIFICATION: MDOT Class II — LAB SAMPLE NO.: 191629-1

SIEVE ANALYSIS

SIEVE SIZE	PERCENT PASS	SPECIFICATION
3”	100	100
2"	100	
1"	100	60-100
3/4"	100	
1/2"	100	
3/8"	100	
No. 4	98	50-100
No. 8	94	
No. 30	82	
No. 40	76	
No. 60	54	
No. 80	32	
No. 100	21	0-30
Pan & LBW	0	

LOSS BY WASH

PERCENT LOSS BY WASH	SPECIFICATION
6%	0-7%

REMARKS:

Uniformity Coefficient (C_u): D_{60}/D_{10}: 4

Natural Moisture (%): -

[X] Sample met specification requirements

[ ] Sample failed specification requirements

REVIEWED BY: R. Warren

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PROJECT NO.: 191629
DATE: 6-15-20
SHEET: 1 OF 1

PROJECT Lyn Anne – Arbana Sewer Project
CLIENT Stantec

MECHANICAL ANALYSIS ASTM C 136

SOURCE OF MATERIAL: Soil Boring
SOURCE LOCATION: Boring B-5, Sample S-2 (3.5 ft – 5.0 ft)
SAMPLED BY: J. Schaap — SAMPLE DATE: 2-24-2020
TESTED BY: M. Cherng — TEST DATE: 3-10-2020
MATERIAL SPECIFICATION: MDOT Class II — LAB SAMPLE NO.: 191629-2

SIEVE ANALYSIS

SIEVE SIZE	PERCENT PASS	SPECIFICATION
3”	100	100
2"	100	
1"	100	60-100
3/4"	95	
1/2"	91	
3/8"	90	
No. 4	85	50-100
No. 8	78	
No. 30	60	
No. 40	52	
No. 60	33	
No. 80	23	
No. 100	18	0-30
Pan & LBW	0	

LOSS BY WASH

PERCENT LOSS BY WASH	SPECIFICATION
8%	0-7%

REMARKS:

Uniformity Coefficient (C_u): D_{60}/D_{10}: 7

Natural Moisture (%): 9.2

Sample failed to meet specification for Loss By Wash.

☐ Sample met specification requirements
☒ Sample failed specification requirements

REVIEWED BY: R. Warren

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PROJECT NO.: 191629
DATE: 6-15-20
SHEET: 1 OF 1

PROJECT Lyn Anne – Arbana Sewer Project
CLIENT Stantec

MECHANICAL ANALYSIS ASTM C 136

SOURCE OF MATERIAL: Soil Boring
SOURCE LOCATION: Boring B-11, Sample S-5 (13.5 – 15.0 ft)
SAMPLED BY: J. Schaap — SAMPLE DATE: 2-24-2020
TESTED BY: M. Cherng — TEST DATE: 3-10-2020
MATERIAL SPECIFICATION: MDOT Class II — LAB SAMPLE NO.: 191629-3

SIEVE ANALYSIS

SIEVE SIZE	PERCENT PASS	SPECIFICATION
3”	100	100
2"	100	
1"	100	60-100
3/4"	100	
1/2"	96	
3/8"	96	
No. 4	92	50-100
No. 8	83	
No. 30	62	
No. 40	53	
No. 60	34	
No. 80	23	
No. 100	18	0-30
Pan & LBW	0	

LOSS BY WASH

PERCENT LOSS BY WASH	SPECIFICATION
9%	0-7%

REMARKS:

Uniformity Coefficient (C_u): D_{60}/D_{10}: 7

Natural Moisture (%): 10.9

Sample failed to meet specification for Loss By Wash.

[ ] Sample met specification requirements
[X] Sample failed specification requirements

REVIEWED BY: R. Warren

October 21, 2020
Project No. 191629.1

Stantec
3754 Ranchero Drive
Ann Arbor, Michigan 48108

Attention: Chris Elenbaas, P.E.

Reference: Summary of Environmental Sampling Efforts
LynAnne-Arbana Sewer Project Supplemental Environmental Investigation
Ann Arbor, Michigan

Dear Mr. Elenbaas:

Materials Testing Consultants, Inc. (MTC) completed a Supplemental Environmental Investigation (SEI) for Stantec in support of the LynAnne-Arbana Sewer Project located in Ann Arbor, Michigan. A summary of the environmental investigation program and results associated with 1,4 Dioxane testing in groundwater are provided herein.

Summary of Environmental Investigation

The SEI consisted of drilling five soil borings, installing of two monitoring wells, and collecting and analyzing groundwater samples, where possible, for 1,4-Dioxane. The boring locations selected by Stantec were sited along the route of the proposed sewer line. The purpose of the SEI was to quantify concentrations of 1,4-Dioxane so that the impact on dewatering during the installation of the sewer could be evaluated. The locations of the SEI borings and monitoring wells are presented on Figure 1. A summary of the borings is presented in Table 1. Boring and monitoring well logs are presented in the Attachments.

TABLE 1
WELL INFORMATION

BORING NO.	MONTORING WELL NO.	LOCATION Relative to 2020 MTC Geotechnical Borings	TOTAL DEPTH (ft bgs)	SAMPLING DEPTH (ft bgs)
B-101	NA	Between B-13 and B-14	45	DRY
B-102	NA	Near B-16	35	35
B-103	NA	Near B-18	20	20
B-104	MW-1	Between B-19 and B-20	12	12
B-105	MW-2	Near B-11	30	30

Geoprobe Borings

Four borings, B-101, B-102, B-103, and B-105, were advanced using a Geoprobe 6620 hydraulic direct push rig equipped with 2.25-inch outer diameter (OD) rod and 1.75-inch OD liners. Soils were collected continuously and logged for each Geoprobe boring from the ground surface to the borehole terminus. The soils were scanned with a photoionization detector (PID) to identify volatile organic compounds (VOCs) in the soils. Following completion of the boring, the tooling was removed and the borehole was backfilled with soil cuttings and compacted.

Groundwater samples were collected from three of the four Geoprobe locations (B-102, B-103, and B-105). No groundwater was encountered at Boring B-101 and no sample was collected. Upon reaching the target depths, a 1-inch inner diameter (ID) stainless steel temporary well casing was inserted into the borehole and pushed into fresh formation. At locations B-102 and B-105, groundwater was evacuated using a peristaltic pump. Because of the depth of groundwater at B-103, a bladder pump was used to evacuate the water. All samples were collected following low-flow sampling protocols. Samples were collected into laboratory-prepared sample bottles, transmitted to Trace Environmental Laboratories, Inc. (Trace) in Muskegon, Michigan and analyzed for 1,4-Dioxane.

Hand Auger Boring

Because Boring B-104 was located in a steep-sided ravine, this location was not accessible to the Geoprobe rig. As a result, Boring B-104 was advanced using a 2.25-inch OD hand auger to groundwater. A pitch hammer was used to drive a 5 ft long, 2-inch ID, stainless steel screen equipped with a drive point and stainless steel riser pipe into the saturated soil. Following completion of the permanent monitoring well, as described below, a groundwater sample was collected using a peristatic pump following low flow sampling protocols. The groundwater was collected in laboratory-prepared sample bottles, transmitted to Trace and analyzed for 1,4-Dioxane.

Monitoring Well Installation

Two permanent monitoring wells were installed at boring locations B-104 (MW-1) and B-105 (MW-2). Boring and monitoring well logs are presented in the Attachments.

B-104/MW-1

As discussed above, Boring B-104 was advanced using a 2.25-inch OD hand auger to groundwater. A pitch hammer was used to drive a 5 ft long, 2-inch ID, stainless steel screen equipped with a drive point and 2-inch ID stainless steel riser pipe into the saturated soil to a total depth of 12 ft bgs. A sand pack was placed to a depth of 1 ft above the screen and then the anulus was filled with bentonite grout to the surface. The well was completed with a j-plug and a 3 ft tall, locking, vented, protective casing that was cemented in place.

B-105/MW-2

Monitoring Well MW-2 was installed using an Acker hollow-stem auger (HSA) rig. Based on the information observed from the Geoprobe Boring B-105, the borehole was advanced using 4.25-inch ID HSAs to a total depth of 30 ft bgs. The well, constructed of a 5 ft long, 2-inch ID, stainless steel screen and 2-inch ID stainless steel riser was inserted through the augers. A sand pack was installed to a depth of 2 ft above the screen and the remaining annulus was filled with bentonite grout. The well was completed with a j-plug and a flush mount protective casing cemented in place.

Analytical Results

Groundwater samples from four boring locations (B-102, B-103, B-104, and B-105) were collected and transmitted to Trace and analyzed for 1,4-Dioxane. No sample was collected from B-101, which was performed to a depth of 35 ft and did not encounter groundwater. 1,4-Dioxane was detected in groundwater collected from B-102, B-103, and B-104. Concentrations of 1,4-Dioxane were detected above the Generic Residential Drinking Water Cleanup Criteria at locations B-102 and B-103; however, no exceedances of the Generic Non-Residential Drinking Water Cleanup Criterion were observed. The laboratory analytical report is presented in the Attachments, with results also summarized below in Table 2.

TABLE 2

ANALYTICAL RESULTS SUMMARY (ug/L)

ANALYTE	GENERIC RESIDENTIAL DRINKING WATER CRITERIA	GENERIC NON-RESIDENTIAL DRINKING WATER CRITERIA	B-102	B-103	B-104	B-105
1,4-Dioxane	7.2	350	18	8.9	0.13	ND
DATE SAMPLED			9/29/2020	10/1/2020	9/30/2020	9/29/2020

ND - Non-detect

Source: Michigan Department of Environment, Great Lakes, and Energy Table 1: Groundwater: Residential and Non-Residential Part 201 Generic Cleanup Criteria and Screening Levels; 08/03/2020

Please do not hesitate to contact our office if you have any questions or comments.

Sincerely,

MATERIALS TESTING CONSULTANTS, INC.

Jakob R. Szilagyi
Environmental Geologist

Robert C. Hunt
Sr. Environmental Project Manager

Attachments: Figure 1 and 2 - Boring/Monitoring Well Location Maps
Figure 3 - Generalized Subsurface Profile
Well Logs
Laboratory Data Package

FIGURES

LEGEND

SOIL BORING (TYP) PROPOSED SEWER ALIGNMENT ENVIRONMENTAL BORINGS

NOTE: AERIAL IMAGE FROM GOOGLE EARTH

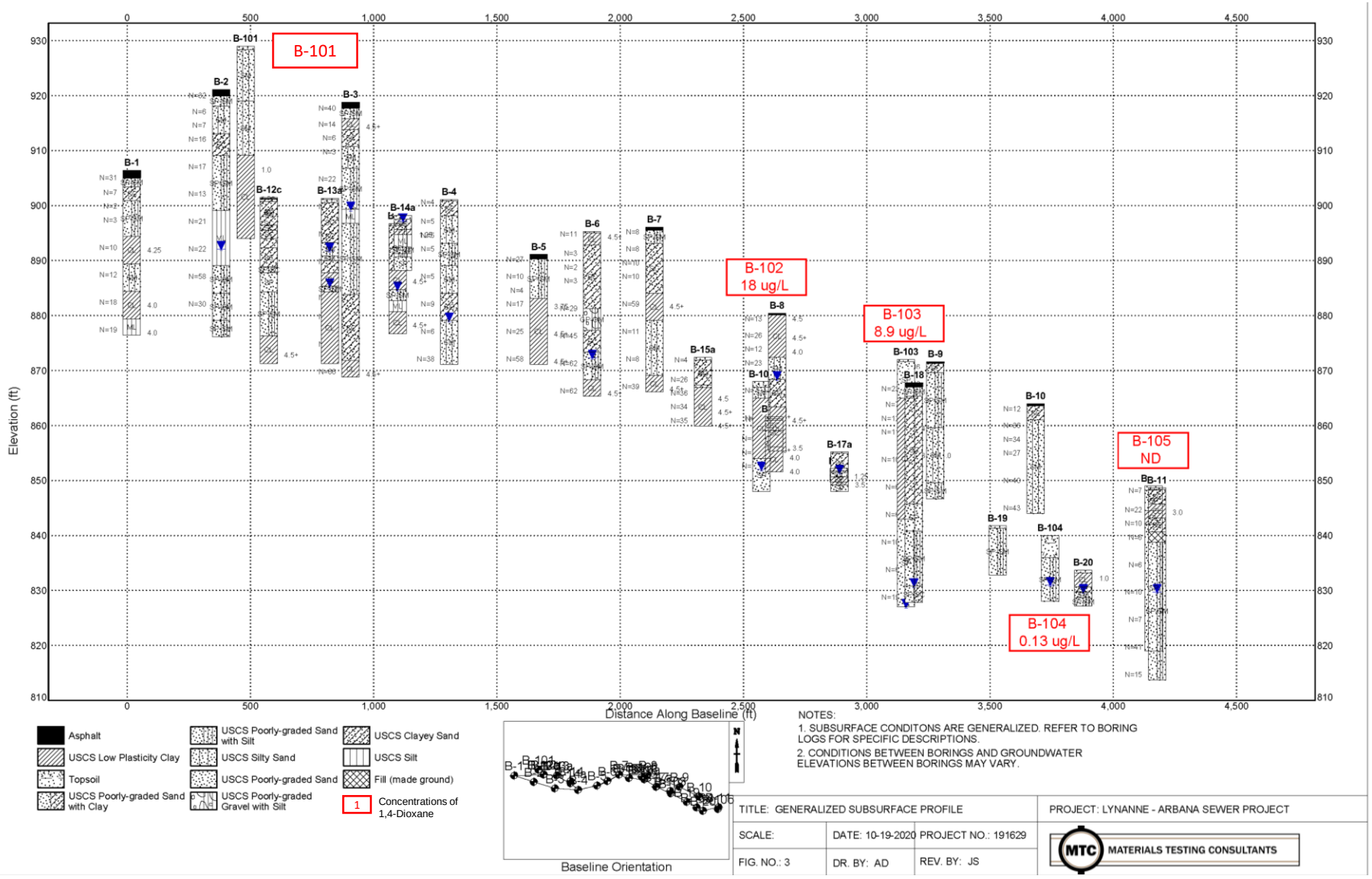
TITLE: BORING LOCATION PLAN		PROJECT: LYNANNE – ARBANA SEWER PROJECT	
SCALE: AS NOTED	DATE: 9/24/2020	PROJECT NO.: 191629.1	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 1	DR. BY: JRS	REV. BY: RCH	

LEGEND

SOIL BORING (TYP) PROPOSED SEWER ALIGNMENT ENVIRONMENTAL BORINGS

NOTE: AERIAL IMAGE FROM GOOGLE EARTH

TITLE: BORING LOCATION PLAN		PROJECT: LYNANNE – ARBANA SEWER PROJECT	
SCALE: AS NOTED	DATE: 9/24/2020	PROJECT NO.: 191629.1	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 2	DR. BY: JRS	REV. BY: RCH	



NOTES:

1. SUBSURFACE CONDITONS ARE GENERALIZED. REFER TO BORING LOGS FOR SPECIFIC DESCRIPTIONS.
2. CONDITIONS BETWEEN BORINGS AND GROUNDWATER ELEVATIONS BETWEEN BORINGS MAY VARY.

TITLE: GENERALIZED SUBSURFACE PROFILE			PROJECT: LYNANNE - ARBANA SEWER PROJECT
SCALE:	DATE: 10-19-2020	PROJECT NO.: 191629	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 3	DR. BY: AD	REV. BY: JS	

WELL LOGS

LOG OF BORING

Project No.: 191629.1
Boring No.: B-101
Sheet: 1 of 1

Project: Huron West Park Sanitary Sewer Supplemental Environmental Investigation
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6620
Crew Chief: SM Field Eng.: JRS Rev. By: RH
Coordinates: N=42.284670 E=-83.774805 (MI South ift)
Elevation: 929.0 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings. Cave in at 26.0 ft.

Date Begin: 09/28/2020 Date End: 09/28/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	GP MC5	2 1/4"	During	None
Sampler	MC5 Poly Liner	2 1/4"	End	NA
Core			Seepage	None
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 35.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	PID %	REMARKS
928.0	1					8" Topsoil 0.7				
927.0	2					Brown SILT; mostly silty fines, moist			0.0	
926.0	3	GP-1	3.5							
925.0	4									
924.0	5									
923.0	6				ML					
922.0	7								0.0	
921.0	8	GP-2	3.5							
920.0	9									
919.0	10					Increased moisture at 9.8' 10.0				
918.0	11					Brown poorly graded SAND with silt; mostly coarse to fine sand, few silty fines, moist				
917.0	12								0.0	
916.0	13	GP-3	3.0							
915.0	14									
914.0	15				SP-SM					
913.0	16									
912.0	17								0.0	
911.0	18	GP-4	1.0							
910.0	19									
909.0	20					19.8				
908.0	21					Gray lean CLAY; mostly clayey fines, moist				
907.0	22								0.0	
906.0	23	GP-5	4.0							
905.0	24									
904.0	25									
903.0	26						4.5+			
902.0	27								0.0	
901.0	28	GP-6	4.0		CL					
900.0	29									
899.0	30									
898.0	31						4.5+			
897.0	32								0.0	
896.0	33	GP-7	4.0							
895.0	34									
894.0	35					35.0				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629.1
Boring No.: B-102
Sheet: 1 of 1

Project: Huron West Park Sanitary Sewer Supplemental Environmental Investigation
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6620
Crew Chief: SM Field Eng.: JRS Rev. By: RH
Coordinates: N=42.284272 E=-83.767605 (MI South ift)
Elevation: 868.0 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 09/29/2020 Date End: 09/29/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	GP MC5	2 1/4"	During	16.0
Sampler	MC5 Poly Liner	2 1/4"	End	14.0
Core			Seepage	None
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 20.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	Penetration (Blows Per 6") ASTM D 1586	*USCS Group Symbol	*DESCRIPTION	QP tsf	MST %	PID %	REMARKS
867.0	1					12" Topsoil 1.0				
866.0	2				ML	Brown SILT; mostly silty fines, moist			0.0	
865.0	3	GP-1	5.0			3.0				
864.0	4					Gray lean CLAY; mostly clayey fines				
863.0	5									
862.0	6						4.5+			
861.0	7								0.0	
860.0	8	GP-2	5.0							
859.0	9				CL					
858.0	10									
857.0	11						4.5+			
856.0	12								0.0	
855.0	13	GP-3	5.0							
854.0	14					14.0				
853.0	15					Brown poorly graded SAND; mostly fine sand				
852.0	16					Grades with coarse to fine sand from 15.0' to 20.0', wet				
851.0	17				SP	Grades wet			0.0	
850.0	18	GP-4	5.0							
849.0	19									
848.0	20					20.0				
						End of Boring			0.0	A ground water sample was collected in the open bore hole using a 1 in. temporary stainless steel well.
									0.0	
									0.0	

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629.1
Boring No.: B-103
Sheet: 1 of 2

Project: Huron West Park Sanitary Sewer Supplemental Environmental Investigation
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6620
Crew Chief: SM Field Geo.: JRS Rev. By: RH
Coordinates: N=42.283519 E=-83.765631 (MI South ift)
Elevation: 872 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 10/01/2020 Date End: 10/01/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	MC5	2 1/4"	During	45.0
Sampler	MC5	1 3/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 45.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	*USCS Group Symbol	*DESCRIPTION	PID ppm	WELL PROFILE	REMARKS
871.0	1				4 1/2" Topsoil 0.4			
870.0	2				Brown poorly graded SAND with silt; mostly medium to fine sand, few silty fines, moist			
869.0	3	GP-1	3.5			0.0		
868.0	4			SP-SM				
867.0	5							
866.0	6							
865.0	7				7.0	0.0		
864.0	8	GP-2	3.5		Gray lean CLAY; mostly clayey fines, moist			
863.0	9							
862.0	10							
861.0	11							
860.0	12					0.0		
859.0	13	GP-3	5.0					tsf = 4.5+
858.0	14							
857.0	15							
856.0	16							
855.0	17							tsf = 3.5
854.0	18	GP-4	2.5	CL		0.0		tsf = 4.0
853.0	19							tsf = 3.0
852.0	20							
851.0	21							
850.0	22							
849.0	23	GP-5	3.5		Poorly graded fine sand seam	0.0		
848.0	24							
847.0	25							
846.0	26							
845.0	27							
844.0	28	GP-6	3.0			0.0		
843.0	29				Increased moisture 29.0			
842.0	30				Brown poorly graded SAND; mostly coarse to fine sand, moist			
841.0	31							
840.0	32				Clay seam			
839.0	33	GP-7	3.0			0.0		
838.0	34							
837.0	35			SP				
836.0	36							
835.0	37							
834.0	38	GP-8	3.5			0.5		
833.0	39							
832.0	40				Increased moisture			

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629.1
Boring No.: B-103
Sheet: 2 of 2

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	*USCS Group Symbol	*DESCRIPTION	PID ppm	WELL PROFILE	REMARKS
831.0	41							
830.0	42							
829.0	43	GP-9	3.5	SP	Brown poorly graded SAND; mostly coarse to fine sand, moist	0.0		
828.0	44							
827.0	45				Grades wet 45.0			
					End of Boring			

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629.1
Boring No.: B-104
Sheet: 1 of 1

Project: Huron West Park Sanitary Sewer Supplemental Environmental Investigation
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: SM Field Geo.: JRS Rev. By: RH
Coordinates: N=42.282653 E=-83.763799 (MI South ift)
Elevation: 840 ft Datum: NAVD 88 (GPS Observation)
Notes: MW-1 Installed at B-104

Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 09/30/2020 Date End: 09/30/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	9.0
Sampler	Hand Auger		End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 12.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100%

QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	*USCS Group Symbol	*DESCRIPTION	PID ppm	WELL PROFILE	REMARKS
839.0	1				48" Clayey Topsoil	0.0		Groundwater sample was collected from a permanent monitoring well installed by MTC.
838.0	2							
837.0	3							
836.0	4				4.0			
835.0	5				Brown silty SAND; mostly fine sand, some silty fines, moist			
834.0	6				Increased moisture			
833.0	7					0.0		
832.0	8			SM				Well screen set from 12.0' to 8.0', sand pack was set from 12.0' to 6.0', bentonite grout was set from 0.0 to 6.0'. MW-1 was completed with a 3.0' locking, vented pro casing with J-plug, Stickup pro casing of 3.0'
831.0	9					0.0		
830.0	10				Grades wet			
829.0	11							
828.0	12				12.0			
					End of Boring			

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LOG OF BORING

Project No.: 191629.1
Boring No.: B-105
Sheet: 1 of 1

Project: Huron West Park Sanitary Sewer Supplemental Environmental Investigation
Client: Stantec
Location: Ann Arbor, Michigan
Drill Type: Geoprobe 6620
Crew Chief: SM Field Geo.: JRS Rev. By: RH
Coordinates: N=42.282567 E=-83.762305 (MI South ift)
Elevation: 849 ft Datum: NAVD 88 (GPS Observation)
Notes: MW-2 Installed at Location B-105 on 10/02/2020 via Hollow Stem Auger
Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 09/29/2020 Date End: 09/29/2020

Tooling	Type	Dia.	Groundwater, ft.	
Casing	MC5	2 1/4"	During	22.0
Sampler	MC5	1 3/4"	End	20.0
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer				

Depth Drilled: 30.0 ft.

Component Percentages: Trace < 5%, Few 5-10%, Little 15-25%, Some 30-45%, Mostly 50-100% QP = Calibrated Penetrometer (tons/sq. ft.)

Elev. FT.	Depth FT.	Sample Number	Recov. FT.	*USCS Group Symbol	*DESCRIPTION	PID ppm	WELL PROFILE	REMARKS
848.0	1				9" Topsoil 0.8			Fill: 0 to 10.0'
847.0	2			SP	Brown poorly graded SAND; mostly fine sand, trace fine gravel, moist, Fill			MW-2 set at location B-105.
846.0	3	GP-1	3.5					
845.0	4							
844.0	5				4.5			
843.0	6			CL	Gray lean CLAY; mostly clayey fines, moist, Fill			
842.0	7				7.0			
841.0	8	GP-2	3.5		Brown poorly graded SAND; mostly coarse to fine sand, moist, Fill			
840.0	9							
839.0	10				Frequent concrete, asphalt fragments			
838.0	11							
837.0	12							
836.0	13	GP-3	5.0			1.0		
835.0	14							
834.0	15							
833.0	16							
832.0	17					1.0		
831.0	18	GP-4	5.0		Lean clay seams			
830.0	19			SP				
829.0	20							
828.0	21							
827.0	22							
826.0	23	GP-5	4.5		Grades wet			
825.0	24							
824.0	25							
823.0	26							Well screen set from 30.0' to 25.0', sand pack from 23.0' to 30.0', bentonite grout from 23.0' to 0. Well completed with a flush mount cover and J-plug.
822.0	27							
821.0	28	GP-6	4.5					
820.0	29							
819.0	30				30.0			
					End of Boring			

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

LABORATORY ANALYTICAL REPORT

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

October 09, 2020

Mr. Robert Hunt
Materials Testing Consultants
693 Plymouth, NE
Grand Rapids, MI 49505

Phone: (616) 608-1532
Fax: (616) 456-5784

RE: Trace Project 20J0022
Client Project Lynne Anne - Artana ENV

Dear Mr. Hunt:

Enclosed are your analytical results. The results of this report relate only to the samples listed in the body of this report.

All reports were examined through Trace's validation process to ensure that requirements for quality and completeness were satisfied. All reported analytical results were obtained in accordance with the methods referenced on the reports. Every practical effort was made to meet the reporting limit specifications for this work, however, some results may have raised reporting limits to correct for percent solids.

For clients that require NELAP Accreditation, Trace certifies that these test results meet all requirements of the NELAP Standard, except for those analytes with a "N" notation. These analytes have not been evaluated by NELAP at Trace's discretion and will not be reported unless requested by client.

If you have questions concerning this report, please contact me at 231.773.5998 or by email at jmink@trace-labs.com.

Sincerely,

Jon Mink
Senior Project Manager
Enclosures

NELAP ACCREDITED TNI LABORATORY

NJDEP Accreditation No. MI008

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SAMPLE SUMMARY

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID	Sample ID	Matrix	Collected By	Date Collected	Date Received
20J0022-01	B-102	Water	jrs	09/29/20 12:20	10/01/20 11:11
20J0022-02	B-104	Water	jrs	09/30/20 12:20	10/01/20 11:11
20J0022-03	B-105	Water	jrs	09/29/20 05:45	10/01/20 11:11
20J0022-04	1-4 Dioxane by 8270	Water	jrs	09/29/20 12:30	10/01/20 11:11
20J0022-05	B-103	Water	jrs	10/01/20 14:40	10/01/20 11:11

Trace Analytical Laboratories, Inc.
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AN EXPLANATION OF TERMS AND SYMBOLS WHICH MAY OCCUR IN THIS REPORT

DEFINITIONS

LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MS	Matrix Spike
MSD	Matrix Spike Duplicate
RPD	Relative Percent Difference
DUP	Matrix Duplicate
RDL	Reporting Detection Limit
MCL	Maximum Contamination Limit
TIC	Tentatively Identified Compound
<, ND or U	Indicates the compound was analyzed for but not detected
*	Indicates a result that exceeds its associated MCL or Surrogate control limits
N	Indicates that the laboratory is not accredited by NELAP for this compound
NA	Indicates that the compound is not available.

NOTE: Samples for volatiles that have been extracted with a water miscible solvent were corrected for the total volume of the solvent/water mixture.
Solid matrices Method Blanks are at 100% solids as such results are the same wet or dry.

DATA QUALIFIERS

Trace ID: 20J0022-01

Analysis: EPA 8270D SIM

1,4-Dioxane	Note 630 : A positive result for this analyte was found in the method blank. Because the concentration in the blank was less than 10% of the sample concentration, no qualification of data is necessary.
2-Fluorobiphenyl	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Nitrobenzene-d5	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Terphenyl-d14	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.

Trace ID: 20J0022-02

Analysis: EPA 8270D SIM

1,4-Dioxane	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).
Nitrobenzene-d5	Note 802 : One of the base/neutral surrogate recoveries was outside the control limits. Since the other two base/neutral surrogates were within the control limits, no data require qualification.

Trace ID: 20J0022-03

Analysis: EPA 8270D SIM

1,4-Dioxane	Note B : Analyte is found in the associated blank as well as in the sample (CLP B-flag).

Trace ID: 20J0022-04

CERTIFICATE OF ANALYSIS

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

Analysis: EPA 8270D SIM

1,4-Dioxane	Note 630 : A positive result for this analyte was found in the method blank. Because the concentration in the blank was less than 10% of the sample concentration, no qualification of data is necessary.
2-Fluorobiphenyl	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Nitrobenzene-d5	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Terphenyl-d14	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.

Trace ID: 20J0022-05

Analysis: EPA 8270D SIM

1,4-Dioxane	Note 630 : A positive result for this analyte was found in the method blank. Because the concentration in the blank was less than 10% of the sample concentration, no qualification of data is necessary.
2-Fluorobiphenyl	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Nitrobenzene-d5	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.
Terphenyl-d14	Note 302 : A dilution of 1:10 or greater was required on this sample. Consequently, surrogate recoveries are not available.

Trace ID: T102979-BS1

Analysis: EPA 8270D SIM

1,4-Dioxane	Note 105 : The LCS recovery was out of control low. The result and reporting limit for this analyte, in this quality control batch, must be considered estimated.
Nitrobenzene-d5	Note 313 : The surrogate recovery was out of control high when compared to control limits. The result must be considered estimated.
Terphenyl-d14	Note 313 : The surrogate recovery was out of control high when compared to control limits. The result must be considered estimated.

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

ANALYTICAL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID: 20J0022-01 Matrix: Water Date Collected: 09/29/20 12:20
Sample ID: B-102 Date Received: 10/01/20 11:11

PARAMETERS		RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
SEMI-VOLATILE ORGANIC COMPOUNDS BY GC-MS											
Analysis Method: EPA 8270D SIM											
Batch: T102979											
1,4-Dioxane		**18**	**ug/L**	**17**	**200**	**10/05/20**	**kbc**	**10/08/20**	**avl**	**630, N**	
Surrogates:											
Nitrobenzene-d5	*		%	31-130	200	10/05/20	kbc	10/08/20	avl	302, N	
2-Fluorobiphenyl	*		%	37-155	200	10/05/20	kbc	10/08/20	avl	302, N	
Terphenyl-d14	*		%	60-172	200	10/05/20	kbc	10/08/20	avl	302, N	

CERTIFICATE OF ANALYSIS

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888-979-4469 Fax
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ANALYTICAL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID: 20J0022-02 Matrix: Water Date Collected: 09/30/20 12:20
Sample ID: B-104 Date Received: 10/01/20 11:11

PARAMETERS		RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
SEMI-VOLATILE ORGANIC COMPOUNDS BY GC-MS											
Analysis Method: EPA 8270D SIM											
Batch: T102979											
1,4-Dioxane		**0.13**	**ug/L**	**0.089**	**1**	**10/05/20**	**kbc**	**10/08/20**	**avl**	**B, N**	
Surrogates:											
Nitrobenzene-d5	*	**156**	%	31-130	1	10/05/20	kbc	10/08/20	avl	802, N	
2-Fluorobiphenyl		106	%	37-155	1	10/05/20	kbc	10/08/20	avl	N	
Terphenyl-d14		139	%	60-172	1	10/05/20	kbc	10/08/20	avl	N	

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888-979-4469 Fax
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ANALYTICAL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID: 20J0022-03 Matrix: Water Date Collected: 09/29/20 05:45
Sample ID: B-105 Date Received: 10/01/20 11:11

PARAMETERS	RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
SEMI-VOLATILE ORGANIC COMPOUNDS BY GC-MS										
Analysis Method: EPA 8270D SIM										
Batch: T102979										
1,4-Dioxane	<0.087	ug/L	0.087	1	10/05/20	kbc	10/08/20	avl	B, N	
Surrogates:										
Nitrobenzene-d5	69	%	31-130	1	10/05/20	kbc	10/08/20	avl	N	
2-Fluorobiphenyl	49	%	37-155	1	10/05/20	kbc	10/08/20	avl	N	
Terphenyl-d14	64	%	60-172	1	10/05/20	kbc	10/08/20	avl	N	

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ANALYTICAL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID: 20J0022-04 Matrix: Water Date Collected: 09/29/20 12:30
Sample ID: 1-4 Dioxane by 8270 Date Received: 10/01/20 11:11

PARAMETERS		RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
SEMI-VOLATILE ORGANIC COMPOUNDS BY GC-MS											
Analysis Method: EPA 8270D SIM											
Batch: T102979											
1,4-Dioxane		**15**	**ug/L**	**8.8**	**100**	**10/05/20**	**kbc**	**10/08/20**	**avl**	**630, N**	
Surrogates:											
Nitrobenzene-d5	*		%	31-130	100	10/05/20	kbc	10/08/20	avl	302, N	
2-Fluorobiphenyl	*		%	37-155	100	10/05/20	kbc	10/08/20	avl	302, N	
Terphenyl-d14	*		%	60-172	100	10/05/20	kbc	10/08/20	avl	302, N	

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ANALYTICAL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

Trace ID: 20J0022-05 Matrix: Water Date Collected: 10/01/20 14:40
Sample ID: B-103 Date Received: 10/01/20 11:11

PARAMETERS		RESULTS	UNITS	RDL	DILUTION	PREPARED	BY	ANALYZED	BY	NOTES	MCL
SEMI-VOLATILE ORGANIC COMPOUNDS BY GC-MS											
Analysis Method: EPA 8270D SIM											
Batch: T102979											
1,4-Dioxane		**8.9**	**ug/L**	**8.6**	**100**	**10/05/20**	**kbc**	**10/08/20**	**avl**	**630, N**	
Surrogates:											
Nitrobenzene-d5	*		%	31-130	100	10/05/20	kbc	10/08/20	avl	302, N	
2-Fluorobiphenyl	*		%	37-155	100	10/05/20	kbc	10/08/20	avl	302, N	
Terphenyl-d14	*		%	60-172	100	10/05/20	kbc	10/08/20	avl	302, N	

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QUALITY CONTROL RESULTS

Trace Project ID: 20J0022
Client Project ID: Lynne Anne - Artana ENV

QC Batch: T102979
QC Batch Method: EPA 3510C Separatory Funnel Liquid-Liquid Extr.

Analysis Description: PNAs
Analysis Method: EPA 8270D SIM

METHOD BLANK: T102979-BLK1

Parameter	Units	Blank Result	Reporting Limit	Notes
1,4-Dioxane	ug/L	0.12	0.10	
1-Methylnaphthalene	ug/L	0.0		
Nitrobenzene-d5 (S)	%	108	31-130	
2-Fluorobiphenyl (S)	%	100	37-155	
Terphenyl-d14 (S)	%	149	60-172	

LABORATORY CONTROL SAMPLE: T102979-BS1

Parameter	Units	Spike Conc.	LCS Result	LCS % Rec	% Rec Limit	Notes
1,4-Dioxane	**ug/L**	**0.100**	**<0.10**	**24**	**30-100**	**105**
Nitrobenzene-d5 (S)	**%**	**0.100**	**0.148**	**148**	**31-130**	**313**
2-Fluorobiphenyl (S)	%	0.100	0.120	120	37-155	
Terphenyl-d14 (S)	**%**	**0.100**	**0.179**	**179**	**60-172**	**313**

CERTIFICATE OF ANALYSIS

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CHAIN-OF-CUSTODY RECORD

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

Phone 231.773.5998
Fax 888.979.4469
www.trace-labs.com

Page 1 of 1

Trace ID No. 20J0022

Report Results To:

Company Name:	MTC
Report To:	Rob Hunt
Mailing Address:	693 Plymouth Ave NE
City, State, Zip Code:	Grand Rapids, MI, 49505
Office Phone:	Cell Phone:
Email Address:	RHunt@MTC-test.com

Bill To:

PO #:	
Contact Name:	
Billing Address (if different):	
City, State, Zip Code:	
Phone Number:	
Billing Email Address:	

Turnaround Requirements:

- ☒ Standard, 5-10 Days
- ☐ 3 Day*
- ☐ 1 Day*

*Results provided end of business day, requires prior approval.

Matrix Key:

S = Soil / Solid, W = Water, SL = Sludge, OI = Oil, WI = Wipes, LW = Liquid Waste, A = Air, D = Drinking Water

Trace Use:

Logged By: [illegible]
Checked By: NC
Soil Volatiles Preserved (circle if applicable): MeOH / Low Level / Lab
Sampling Time:

Project Name: Lynne Ave - Artesia PNV
Sampled By: JRS

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	Analysis Requested	Remarks	Possible Health Hazards?
1	9/29	12:20	B-102		W	2	✓						1,4 Dioxane		
2	9/30	12:20	B-104		W	2	✓						✓		
3	9/29	5:45	B-105		W	2	✓						✓		
4	9/29	12:30	1,4 Dioxane by 8270		W	2	✓						✓		

Please Sign	Released By	Received By	Date	Time
1)	[signature]	[signature]	10/1	11:11
2)	[signature]	[signature]		
3)				
4)	[signature]	[signature]	10/2/20	14:43

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

☐ Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at www.trace-labs.com/downloads.

Form 70-Z.1

CERTIFICATE OF ANALYSIS

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

CHAIN-OF-CUSTODY RECORD

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Muskegon, MI 49444-2673

Phone 231.773.5998
Fax 888.979.4469
www.trace-labs.com

Page 1 of 1

Trace ID No. 20J0022

Report Results To:

Company Name:	MTC
Report To:	Rob Hunt
Mailing Address:	693 Plymouth Ave NE
City, State, Zip Code:	Grand Rapids, 49503, MI
Office Phone:	
Cell Phone:	
Email Address:	RHunt@MTC-Jesh.com

Bill To:

PO #:	
Contact Name:	
Billing Address (if different):	
City, State, Zip Code:	
Phone Number:	
Billing Email Address:	

Trace Use:

Logged By:	JS
Checked By:	NC
Soil Volatiles Preserved (circle if applicable): MeOH / Low Level / Lab	
Sampling Time:	

Turnaround Requirements:

☑ Standard, 5-10 Days
☐ 3 Day*
☐ 1 Day*
*Results provided end of business day, requires prior approval.

Matrix Key:

S = Soil / Solid
W = Water
SL = Sludge
Oil = Oil
WI = Wipes
LW = Liquid Waste
A = Air
D = Drinking Water

Project Name: Lynne ANNE-Arbor ENV
Sampled By: JRS

Trace No.	Date Collected	Time Collected	Client Sample ID	Metals Field Filtered (Y / N)	Matrix	Number of Containers	Preservation: Cool	HCl	HNO_3	H_2SO_4	NaOH	Other	Analysis Requested: 1-4 Dioxane	Remarks
1	10/1	2:40	B-103	N	W	2		✓					✓	
			MW-B103-20201001											

Please Sign	Released By	Received By	Date	Time	Released By	Received By	Date	Time
1)								
2)			10/2/20	1550	2)			
3)					4)		10/2/20	1501

In executing this Chain of Custody, the client acknowledges the terms as set forth at www.trace-labs.com/terms-of-agreement.

☐ Check this box if you would not like your samples analyzed if received outside of the conditions outlined in the Trace Sample Acceptance Policy at www.trace-labs.com/downloads.

Form 70-Z.1

CERTIFICATE OF ANALYSIS

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Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
888-979-4469 Fax
www.trace-labs.com

SAMPLE LOG IN CHECKLIST

Trace ID #: 20J0022 Date: 10/01/20 Package Description: Cooler Temperature: 1.4
Client Name: MTC Time: 14:43 Logged in by: MKL

Cooler Receipt

Cooler/samples delivered by: Trace courier [✓]
Hand delivered [ ] Name of delivery person: _____
Commercial courier [ ] UPS [ ] FED EX [ ] US Mail [ ]

Tracking Number: [✓] Not Applicable
Tracking #: _____

COC Seals present and intact on cooler? [✓] Not Applicable [ ] No [ ] Yes
Custody seals signed by Client? [ ] No [ ] Yes Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? [ ]
Multiple bags of ice around samples? [✓]
Ice Packs/ Blue Ice : [ ]
No Coolant Present: [ ]
Ice still present upon receipt (circle one): (Yes) No N/A

Cooler Temperature

Correction Factors: •Digital Stick Thermometer CF = -0.6°C
•IR Thermometer CF = -0.8°C
Representative Sample Temperature: 5.9 °C (check one below)
[ ] Temp Blank (Stick Thermometer)
[✓] Client Sample (IR Thermometer)
Melt Water: None °C (Use Digital Stick Thermometer)

General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	✓			
Each sample point is in a sealed plastic bag?	✓			
Labels filled out completely?	✓			
All bottle labels agree with Chain of Custody (COC)?	✓			
Sufficient sample to run tests requested?	✓			
*pH checked - samples at correct pH and labeled as such?			✓	
Correct chemical preservative added to samples?			✓	
Air bubbles absent from VOAs?			✓	
COC filled out properly and signed by client?	✓			
COC signed in by TRACE sample custodian?	✓			
Was project manager called and samples discussed?				

Notes:

*EMD pH Test Strips Used:
[ ] pH 0-2.5 Lot: HC908519 [ ] pH 11.0-13.0 Lot: HC729101
[ ] Other: _____

Form 70-A.33
Effective 8/7/20

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

Trace Analytical Laboratories, Inc.
2241 Black Creek Road
Muskegon, MI 49444-2673

TRACE ANALYTICAL LABORATORIES, INC.

231-773-5998 Phone
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www.trace-labs.com

SAMPLE LOG IN CHECKLIST

Trace ID #: 20J0022 Date: 10/2/20 Package Description: Coolers Temperature: -0.3
Client Name: MTC Time: 15:48 Logged in by: JS

Cooler Receipt

Cooler/samples delivered by: Trace courier [✓]
Hand delivered [ ] Name of delivery person: Jimmy Peterman
Commercial courier [ ] UPS [ ] FED EX [ ] US Mail [ ]

Tracking Number: [✓] Not Applicable
Tracking #: _____

COC Seals present and intact on cooler? [✓] Not Applicable [ ] No [ ] Yes
Custody seals signed by Client? [ ] No [ ] Yes Client custody seal # (if applicable): _____

Coolant and Temperature

Type of Coolant Used

Slurry w/ crushed, cubed, or chip ice? [✓]
Multiple bags of ice around samples? [ ]
Ice Packs/ Blue Ice : [ ]
No Coolant Present: [ ]

Ice still present upon receipt (circle one): (Yes) No N/A

Cooler Temperature

Correction Factors: •Digital Stick Thermometer CF = -0.6°C
•IR Thermometer CF = -0.8°C

Representative Sample Temperature: 11.7 °C (check one below)
[ ] Temp Blank (Stick Thermometer)
[✓] Client Sample (IR Thermometer)

Melt Water: none °C (Use Digital Stick Thermometer)

General

	Yes	No	NA	Comments
All bottles arrived unbroken with labels in good condition?	✓			
Each sample point is in a sealed plastic bag?	✓			
Labels filled out completely?	✓			
All bottle labels agree with Chain of Custody (COC)?	✓			
Sufficient sample to run tests requested?	✓			
*pH checked - samples at correct pH and labeled as such?			✓	
Correct chemical preservative added to samples?			✓	
Air bubbles absent from VOAs?			✓	
COC filled out properly and signed by client?	✓			
COC signed in by TRACE sample custodian?	✓			
Was project manager called and samples discussed?		✓		

Notes:

*EMD pH Test Strips Used:
[ ] pH 0-2.5 Lot: HC908519
[ ] pH 11.0-13.0 Lot: HC729101
[ ] Other: _____

Form 70-A.33
Effective 8/7/20

TRACE Analytical Laboratories, Inc.

CERTIFICATE OF ANALYSIS

ATTACHMENT B
GENERAL DECLARATIONS

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, General Information, 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 _____, 202_.

_____	_____
Bidder's Name	Authorized Signature of Bidder
_____	_____
Official Address	(Print Name of Signer Above)
_____	_____
Telephone Number	Email Address for Award Notice

ATTACHMENT C
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** _____**,** 202_

(Print) Name _____ Title _____

Company:

_____

Address:

_____

Contact Phone ( ) _____ Fax ( ) _____

Email _____

ATTACHMENT D
PREVAILING WAGE DECLARATION OF COMPLIANCE

The "wage and employment requirements" of Section 1:320 of Chapter 14 of Title I of the Ann Arbor City Code mandates that the city not enter any contract, understanding or other arrangement for a public improvement for or on behalf of the city unless the contract provides 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. Where the contract and the Ann Arbor City Code 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. Further, to the extent that any employees of the contractor providing services under this contract are not part of the class of craftsmen, mechanics and laborers who receive a prevailing wage in conformance with section 1:320 of Chapter 14 of Title I of the Code of the City of Ann Arbor, employees shall be paid a prescribed minimum level of compensation (i.e. Living Wage) for the time those employees perform work on the contract in conformance with section 1:815 of Chapter 23 of Title I of the Code of the City of Ann Arbor.

At the request of the city, any contractor or subcontractor shall provide satisfactory proof of compliance with this provision.

The Contractor agrees:

(a) To pay each of its employees whose wage level is required to comply with federal, state or local prevailing wage law, for work covered or funded by this contract with the City,

(b) To require each subcontractor performing work covered or funded by this contract with the City to pay each of its employees the applicable prescribed wage level under the conditions stated in subsection (a) or (b) above.

(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.

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 in accordance with the terms of the wage and employment provisions of the Chapter 14 of the Ann Arbor City Code. The undersigned certifies that he/she has read and is familiar with the terms of Section 1:320 of Chapter 14 of the Ann Arbor City Code and by executing this Declaration of Compliance obligates his/her employer and any subcontractor employed by it to perform work on the contract to the wage and employment requirements stated herein. The undersigned further acknowledges and agrees that if it is found to be in violation of the wage and employment requirements of Section 1:320 of the Chapter 14 of the Ann Arbor City Code it shall has be deemed a material breach of the terms of the contract and grounds for termination of same by the City.

_____
Company Name

_____
Signature of Authorized Representative Date

_____
Print Name and Title

_____
Address, City, State, Zip

_____
Phone/Email address

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

ATTACHMENT E
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 $15.90/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 $17.73/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 with 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

Attachment F

CITY OF ANN ARBOR
LIVING WAGE ORDINANCE

RATE EFFECTIVE APRIL 30, 2023 - ENDING APRIL 29, 2024

$15.90 per hour
If the employer provides health care benefits*

$17.73 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.

V.

W. ENFORCEMENT

X. 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

Revised 2/1/2023

ATTACHEMENT G

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.	( ) Relationship to employee _____ ( ) Interest in vendor's company ( ) 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

ATTACHMENT H

DECLARATION OF COMPLIANCE

Non-Discrimination Ordinance

The "non discrimination by city contractors" provision of the City of Ann Arbor Non-Discrimination Ordinance (Ann Arbor City Code Chapter 112, Section 9:158) requires all contractors proposing to do business with the City to treat employees in a manner which provides equal employment opportunity and does not discriminate against any of their employees, any City employee working with them, or any applicant for employment on the basis 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. It also requires that the contractors include a similar provision in all subcontracts that they execute for City work or programs.

In addition the City Non-Discrimination Ordinance requires that all contractors proposing to do business with the City of Ann Arbor must satisfy the contract compliance administrative policy adopted by the City Administrator. A copy of that policy may be obtained from the Purchasing Manager

The Contractor agrees:

(a) To comply with the terms of the City of Ann Arbor's Non-Discrimination Ordinance and contract compliance administrative policy, including but not limited to an acceptable affirmative action program if applicable.

(b) To post the City of Ann Arbor's Non-Discrimination Ordinance Notice in every work place or other location in which employees or other persons are contracted to provide services under a contract with the City.

(c) To provide documentation within the specified time frame in connection with any workforce verification, compliance review or complaint investigation.

(d) To permit access to employees and work sites to City representatives for the purposes of monitoring compliance, or investigating complaints of non-compliance.

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 in accordance with the terms of the Ann Arbor Non-Discrimination Ordinance. The undersigned certifies that he/she has read and is familiar with the terms of the Non-Discrimination Ordinance, obligates the Contractor 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.

_____
Company Name

_____
Signature of Authorized Representative Date

_____
Print Name and Title

_____
Address, City, State, Zip

_____
Phone/Email Address

Questions about the Notice or the City Administrative Policy, Please contact:
Procurement Office of the City of Ann Arbor
(734) 794-6500

ATTACHMENT I

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/humanrights.

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 believes there has been a violation of this chapter, he/she may file a complaint with the City's Human Rights Commission. The complaint must be filed within 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 allegedly discriminatory action. A complaint that is not filed within this timeframe cannot be considered by the Human Rights Commission. To file a complaint, first complete the complaint form, which is available at www.a2gov.org/humanrights. Then submit it to the Human Rights Commission by e-mail (hrc@a2gov.org), by mail (Ann Arbor Human Rights Commission, PO Box 8647, Ann Arbor, MI 48107), or in person (City Clerk's Office). For further information, please call the commission at 734-794-6141 or e-mail the commission at hrc@a2gov.org.

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
CP-347 (04/10)

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) EMPLOYEE INFORMATION	(b) WORK CLASSIFICATION	(c) Hour Type	(d) DAY AND DATE / HOURS WORKED ON PROJECT							(e) TOTAL HOURS ON PROJECT	(f) PROJECT RATE OF PAY	(g) PROJECT RATE OF FRINGE PAY	(h) GROSS PROJECT EARNED / GROSS WEEKLY EARNED	(i) TOTAL WEEKLY HOURS WORKED ALL JOBS	(j) DEDUCTIONS FICA	FEDERAL	STATE		OTHER	TOTAL DEDUCT	(k) TOTAL WEEKLY WAGES PAID FOR ALL JOBS
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											
NAME:										0			$0.00							$0.00	$0.00
ETH/GEN: ID #:	GROUP/CLASS #:	S								0											

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 Start. 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.