CONSTRUCTION REQUEST FOR PROPOSAL

RFP# 22-19

South State Street Reconstruction

City of Ann Arbor
Public Services / Engineering Unit

Due Date: March 24, 2022 by 10:00 a.m. (local time)

Issued By:

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

ADDENDUM No. 1

RFP No. 22-19

South State Street Reconstruction

Due: March 24, 2022 by 10:00 a.m. (local time)

The information contained herein shall take precedence over the original documents and all previous addenda (if any), and is appended thereto. **This Addendum includes 21 attached pages, and plan sheets as noted below.**

The Proposer is to acknowledge receipt of this Addendum No. 1, including all attachments in its Proposal by so indicating in the proposal that the addendum has been received. Proposals submitted without acknowledgement of receipt of this addendum may be considered non-conforming.

The following forms provided within the RFP Document should be included in submitted 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 completed forms listed above upon proposal opening may be rejected as non-responsive and may not be considered for award.

I. CORRECTIONS/ADDITIONS/DELETIONS

Changes to the RFP documents which are outlined below are referenced to a page or Section in which they appear conspicuously. Offerors are to take note in its review of the documents and include these changes as they may affect work or details in other areas not specifically referenced here.

Section/Page(s)	Change
Page 12 Section III.C.4	Remove the following as provided in RFP No. 22-19 Document: Documentation of how the bidder assesses the skills and qualifications of any employees who do not have master or journeyperson certification or status, or are not participants in a Registered Apprenticeship Program.

Comment: The intent with this change is to simply remove the 4th criteria for Section III.C – Workforce Development that was erroneously included in the originally published RFP Document.

Pages 1-6 + Plans	The project is adding an APS system, as outlined on the attached drawings (C5.2, C5.3, C5.4, C8.1, C8.4, C8.5, C8.7, C8.8, and C8.9), detailed specifications, and Bid Form. The change has resulted in minor modifications to the C-5 series of drawings that are include with this addendum. The C-5 series also includes changes to the bikeway along North University.

Pages 7-14 + Plans	This project is adding irrigation facilities, as outlined on the attached drawings (C11.1, C11.2, and C12.1), detailed specifications, and Bid Form.
Plans Only	The water main plans have been amended as outlined on the attached drawings, C6.2, C6.3, and C6.9.
Page 15 + Plans	The contractor is to furnish the Regulatory Street Signage to the City of Ann Arbor, as outlined on the attached drawings (C10.1, C10.2, C10.3, and C10.4), detailed specifications, and Bid Form. The City of Ann Arbor will install the signs with their own forces.
Pages 16-18 +Plans	The material for pavement symbols has been changed from "OVLY, COLD PLASTIC" to "POLYUREA" for the following pay items- Item 259-03: Pavt Mrkg, Polyurea, Bike Arrow and Yield Sym. Item 259-04: Pavt Mrkg, Polyurea, Special Sym. Item 259-05: Pavt Mrkg, Polyurea, Bike Sym. Item 259-06: Pavt Mrkg, Polyurea, Sharrow Sym. This change is reflected on the attached plans (C10.1, C10.2, C10.3, and C10.4), detailed specifications, and Bid Form.
Pages 19-21	The Bid Form has been amended to reflect the modifications of this Addendum No. 1

II. QUESTIONS AND ANSWERS

The following Questions have been received by the City. Responses are being provided in accordance with the terms of the RFP. Respondents are directed to take note in its review of the documents of the following questions and City responses as they affect work or details in other areas not specifically referenced here.

Question 1: Can you direct me to where to find the difference between Concrete Pavement-8" Type 1 & Concrete Pavement-8" Type 2?

Answer 1: The difference between the two road pavement types is the scoring of the concrete surface. Concrete Pavement-8" Type 2 includes additional jointing, per Detail 5 Decorative Joint, on Drawing C9.1

Question 2: Do the two types of pavement referenced above have a different surface finish?

Answer 2: Both roadway pavement types are to have a broomed finish. For Concrete Pavement-8" Type 1 the direction of the broom finish is to be parallel to the center line of the roadway; for Concrete Pavement-8" Type 2 the broom finish is to be perpendicular to the center line of the roadway.

Question 3: Do you have an engineer's estimate for the project?

Answer 3: The engineer's estimate for this project, as amended by this Addendum No. 1 is $6,000,000.00.

Question 4: What is the anticipated start of construction date and when would be the earliest the project could be started?

Answer 4: As noted in the Progress Clause of the Detailed Specifications, "The Contract Award is expected on May 17th, 2022. In no case shall any work be commenced prior to receipt of formal notice to proceed by the City of Ann Arbor." Work may

commence after the contract is fully executed, preconstruction meeting is conducted, and notice to proceed has been issued.

Question 5: Can you please define pay item ID 268-06 – Handhole Assembly, Remove for Replacement, Any Size? There are 47 each listed on the bid form, and no reference to the item in the plans or the specifications

Answer 5: *The pay item 268-06 – Handhole Assembly, Remove for Replacement, Any Size includes the removal of all handholes for the project, as noted on the plans or as directed by the Engineer.*

Question 6: Please confirm who is to provide poles and fixtures for this project. Are they owner furnished, or contractor furnished?

Answer 6: *The contractor is to furnish all light poles and fixtures for this project.*

Question 7: The manufacturer of the poles for the XL1 and XL2 is not listed, but there is a detail for Spring City poles on page E2.1. Are those the poles being provided for those designation?

Answer 7: *The lighting poles for XL1 and XL2 are to be the Spring City Poles as detailed on drawing E2.1, and are to be furnished by the Contractor.*

Question 8: Please provide the scoring guidelines and procedures the Selection Committee has been instructed to use for scoring Section A-E of the new RFP system.

Answer 8: *The five scoring sections listed in Section III of the RFP shall be equal weighted (20 points each) and shall be evaluated based on the materials submitted with the respondent's proposal.*

Question 9: What individuals will make up the Selection Committee as identified in the RFP?

Answer 9: *The selection committee will be comprised of City Public Services staff.*

Question 10: Is the scoring system / point allocation be "graded on a curve" based on the responsive bids received for the specific RFP, or will the scoring methodology remain consistent from RFP to RFP?

Answer 10: *Scoring will be performed on a project-by-project basis relative to the other proposals received. The five sections and the corresponding equal point distributions are established by ordinance and will be the same for all projects.*

Offerors are responsible for any conclusions that they may draw from the information contained in the Addendum.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
ACCESSIBLE PEDESTRIAN SIGNAL SYSTEM

SIG:EMS 1 of 6 APPR:HLO:NJB:05-01-20
FHWA:APPR:05-06-20

a. Description. This work consists of either furnishing and installing an accessible pedestrian signal system and push button station(s), or removing a system and station(s) at locations as shown on the plans.

The following terminology is used in this special provision.

1. Accessible pedestrian signal system, or system hereafter, refers to central control unit (CCU) and multiple push button stations.

2. CCU, refers to the unit installed in an existing traffic signal controller cabinet, frame, and all required mounting hardware and the configurator. The CCU is the power supply and signaling interface, between the intersection traffic signal controller and the push button stations. Configurator refers to a handheld, password secure, infrared device capable of setting and resetting all push button stations on the intersection from a single push button station (global updating). Each CCU will control multiple push button stations. A complete system includes one CCU.

3. Push button station (PBS), refers to a Public Rights of Way Accessibility Guidelines (PROWAG) compliant push button station including signs when specified, installed at crosswalk termini, and all required mounting hardware. A system can include 2 to 12 PBS (maximum of 3 per phase).

b. Materials. Provide a Polara Navigator system including CCU and PBS, or approved equal, meeting the requirements of this subsection. Provide all hardware and other appurtenant materials in accordance with sections 918 and 921 of the Standard Specifications for Construction and this special provision.

1. The system must:

A. Provide various audible features including but not limited to locator tones. All locator tones must emanate from push button stations and be synchronized;

B. Have multiple language capability, selectable by user, and able to play an emergency preemption message;

C. Be able to self-test and report any faults to the traffic controller;

D. Provide the following audible feature, each with a minimum and maximum volume independently settable using the configurator:

(1) One locating tone;

(2) Five walk sound choices (field selectable);

(3) Three pedestrian - clearance sound choices (field selectable) one of which must be an audible countdown;

(4) Direction of travel (as standard feature with extended push); and

(5) Information message (custom feature with extended push).

E. Automatically adjust audible features to ambient noise levels over a 60 decibel (dB) range; and

F. Mute sounds on all crosswalks except the activated crosswalk (selectable feature).

2. The CCU must meet the following requirements:

A. Be compatible with solid-state pre-timed or actuated traffic signal control equipment and cabinet environments;

B. Be capable of controlling up to and including 12 PBSs and controlling up to and including 4 pedestrian phases;

C. Receive timing from the walk and don't walk signals;

D. Have additional advanced configurations available by using general purpose inputs and outputs;

E. Ensure full optical isolation of all inputs and outputs and include transient voltage protection as follows:

(1) General Purpose Inputs. 10 to 36 Volts (V) Alternating Current/Direct Current (AC/DC) peak with a 10 milli Ampere (mA) maximum.

(2) General Purpose Outputs and Pedestrian Outputs. 36V AC/DC peak, 0.3 Ampere (A) solid state fused contact closure.

(3) Fault Output. Normally open and closed relay contacts, 125V AC/DC, 1A maximum.

(4) Pedestrian Hand/Walking Person (Walk/Don't Walk) Inputs. 80-150V AC/DC, 5mA maximum.

(5) A, B, C, D PBS Power Outputs. Nominal 22V DC, short circuit protected, auto recovering.

(6) Environment Operation and Storage Range. -30 degrees Fahrenheit (F) to 165 degrees F (-35 degrees Celsius (C) to 74 degrees C), 0 to 100 percent Humidity, Non-condensing.

(7) Line Power. 25 Watt (W) to 75W typical, 120W peak with 8 PBSs.

F. Include a 50-pin connector and cable that plugs into the CCU for termination to the traffic signal controller terminal facilities. Ensure the connector is a Positronic MD50F20Z0X or equivalent, provided with 20-24 gauge wire, which complies with the requirements of *UL 1061*.

3. The PBS must meet the following requirements:

A. Design each PBS in accordance with the following:

(1) Produce sounds emanating from the back of the unit via an 8 ohms 15W, weather-proof speaker protected by a vandal resistant screen;

(2) Require only two wires coming from the traffic control cabinet for each phase/crosswalk;

(3) Include push buttons which are audibly locatable and equipped with tactile arrows pointing in the same direction as the associated crosswalk;

(4) PROWAG compliant, cast aluminum, nickel plated, powder coated with raised tactile arrow on button;

(5) Include solid-state switch rated to 20 million activations (minimum); and

(6) Include a two inch button with a tactile raised directional arrow on the button that can be changed to one of four directions to coincide with the direction of travel of the associated crosswalk.

B. The PBS must include the following standard features:

(1) The arrow/button must vibrate during the walk period, following a button push;

(2) Confirm a button push via a “vibratactile” bounce and a red light emitting diode (LED), clearly visible in direct sunlight, which latches ON when the button is pushed;

(3) Indicate the direction of travel with extended button push;

(4) Transmit a standard locating tone, custom sound, or verbal countdown during pedestrian clearance;

(5) Ensure sounds automatically adjust to ambient over 60 dB range;

(6) Allow sounds to have minimum and maximum volume set independently;

(7) Synchronize all sounds;

(8) Extended button push can turn on, boost volumes, and/or mute all sounds except those on activated crosswalk; and

(9) Include message to clear the intersection when preemption is activated.

C. Ensure the PBS is capable of custom message and sound options for the following features:

(1) Custom locating tone;

(2) Custom clearance sound;

(3) Custom walk sounds/message;

(4) Informational message;

(5) Multiple languages (up to three, selected by user); and

(6) Street name in Braille on the sign.

D. Ensure the PBS is fabricated in accordance with the following:

(1) Available in three standard colors: Black, Green, and Yellow. The default color is yellow unless specified otherwise;

(2) Have an operational temperature range of -40 degrees F to 165 degrees F (-40 degrees C to 60 degrees C);

(3) Ensure the housing material is cast aluminum;

(4) Chemically filmed and powder coated;

(5) Face plate constructed of powder coated aluminum with ink marking; and

(6) Have pre-drilled mounting holes to hold a 9 inch by 12 inch, R10-3b, 3d, or 3e pedestrian sign.

E. PBS LED display operational requirements:

(1) Light when the button is pushed and remain lit until the next walk phase.

(2) Luminous intensity greater than 1200 maximum continuous discharge (mcd), sunlight visible, ultra bright red, with a 160 degree viewing angle.

F. PBS audio operational requirements:

(1) Audio amplifier power output of 10W Root Mean Square (RMS) into 8 ohms.

(2) Volume control automatic adjustment range of 28dB (maximum).

(3) Microphone ambient noise frequency range of approximately 170 Hertz (Hz) to 2.3 Kilo Hertz (kHz).

(4) Button tone provides a brief “tick” to confirm each button push.

(5) Audible locating tone operates during the pedestrian-clearance and don't walk interval at an 880Hz plus harmonic, 0.1 second duration, 1 second interval.

(6) Audible "chirp" operates only during walk intervals at 2700Hz to 1700Hz, 0.2 second duration, 1 second interval.

(7) Audible "cuckoo" operates only during walk intervals at 1250Hz to 1000Hz, 0.6 second duration, 1.8 second interval.

4. Ensure the configurator meets the following requirements:

A. Be a handheld, password protected, remote that configures the CCU or an individual PBS;

B. Communicate via infrared technology with the CCU and the PBS with an interactive operation to select various configuration options at the intersection(s), by standing adjacent to either the CCU or a PBS;

C. Feature a liquid crystal display (LCD) display, with two 16-character lines, with backlight and adjustable contrast;

D. Be powered by four AA 1.5V cell batteries, include a low battery warning, and have an auto or manual shut-off switch; and

E. Have an operating temperature range of 32 degrees F to 122 degrees F (0 degrees C to 50 degrees C).

5. Warranty. Provide a manufacturer's warranty, transferable to the MDOT, that the supplied materials will be free from all defects in materials and workmanship for a 2-year period from the date of shipment. Furnish the warranty and other applicable documents from the manufacturer, and a copy of the invoice showing date of shipment, to the Engineer at the time of delivery.

c. Construction. Complete this work in accordance with sections 819 and 820 of the Standard Specifications for Construction, typical signal construction details, and this special provision.

1. Furnish and Install. Furnish and install a system at an intersection as shown on the plans and in accordance with the *MMUTCD*. Ensure that the arrow on the PBS button(s) point in the direction of pedestrian travel for the associated crosswalk.

2. Remove. Remove an accessible pedestrian signal system or a push button station and store, as directed by the Engineer, or dispose of all removed materials.

A. Where removal of an accessible pedestrian signal system is specified on the plans, remove the CCU, hardware, cable, connectors, and other appurtenant material required to complete the work.

B. Where removal of a PBS is specified on the plans, remove the PBS, sign, associated assembly, hardware, cable, connectors, and other appurtenant material required to complete the work.

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

Pay Item	Pay Unit
Pedestrian Signal System, Accessible	Each
Push Button Station	Each
Push Button Station and Sign	Each
Pedestrian Signal System, Accessible, Rem	Each
Push Button Station, Rem	Each

1. **Pedestrian Signal System, Accessible** includes installing the accessible pedestrian signal system at an intersection, including a CCU, configurator, hardware, fittings, conduit(s), wiring, grounding and ground rod(s), and all appurtenant material required to complete the work.

2. **Push Button Station** and **Push Button Station and Sign** includes installing the push button station, sign (when specified), associated assembly, brackets, hardwire, fittings, conduit(s), cable to controller, wiring, grounding, ground rod(s), and all other appurtenant material required to complete the work.

3. **Pedestrian Signal System, Accessible, Rem**, includes removing an accessible pedestrian signal system at an intersection including a CCU, configurator, hardware, fittings, hardware, cable, connectors, conduit(s), grounding, and other material required to complete the work. **Pedestrian Signal System, Accessible, Rem** also includes storage or disposal of removed material.

4. **Push Button Station, Rem**, includes removing a push button station, sign, associated assembly, brackets, hardware, fittings, cable, connectors, conduit(s), ground, and other material required to complete the work. **Push Button Station, Rem** also includes storage or disposal of removed material.

A. DESCRIPTION

Furnish, Install, and Test: Irrigation system using the backflow preventor, quick coupling valves, piping, fittings, etc., of sizes and types as shown and as specified. All work shall conform to the building codes of the City of Ann Arbor.

The irrigation system shall be constructed to grades and conform to areas and locations as shown. Layout shown is essentially diagrammatic and may require adjustment to meet site constraints. Layout of system shown shall be exceeded only with the permission of the Engineer.

Unless otherwise specified or indicated, the construction of the irrigation system shall include furnishing, installing and testing of all mains backflow preventors, laterals, risers and fittings, control valves, and other necessary specialties, the removal and restoration of existing improvements, excavating and backfill, and all other work in accordance with the Contract Documents as required for a complete system.

1. References.

American Society of Mechanical Engineers (ASME)

A. B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.

American Society for Testing and Materials (ASTM)

A. D1557 - Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

B. D1784 - Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.

C. D1785 - Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

D. D2241 - Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR-Series).

E. D2466 - Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.

F. D2467 - Specification for Socket-Type Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.

G. D2564 - Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.

H. D2672 - Specification for IPS PVC Pipe Using Solvent Cement.

I. D3139 - Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

Samples

A. Submit 12 Samples of each shape and color of paver for approval showing extreme range of color and texture.

Michigan Department of Transportation (MDOT)

A. Standard Specifications for Construction 2003.

National Fire Protection Association (NFPA)

A. 70 - National Electrical Code.Test Reports

2. Submittals.:

Shop Drawings and Equipment Product Information: Submit product information on all sprinklers, controllers, moisture sensors, hydrometers, enclosures, nozzles, swing joints, quick coupling valves, isolation valves, sleeving, control valves, wire conduit, PVC and polyethylene pipe, all pipe fittings, backflow preventer, copper pipe and fittings, wire, two-wire cable, decoders, surge arrestors, rain sensors, grounding rod, grounding plate, wire connectors, solvent and primer for PVC pipe, stainless steel clamps, and valve boxes to be used on the project.

Record Drawings and Instructions: Furnish record drawings showing actual location of all valves, drains, pipe, wiring and controls to scale with dimensions. In addition, submit two bound copies of an owner's manual, each containing operational sheets and parts lists covering all system components.

B. MATERIALS.

1. Pipe, Sleeving, and Fittings:

Pipe sizes and type shall conform to those shown on the drawings. No substitutions of smaller pipe sizes will be permitted, but substitutions of larger size may be approved. All pipe damaged or rejected because of defects shall be removed from the site at the time of said rejection.

Provide PVC pipe continuously and permanently marked with manufacturer's name or trademark, size schedule and type of pipe working pressure at 73 degrees F. and National Sanitation Foundation (NSF) approval.

Saddle and cross fittings are not permitted. Use male adapters for plastic to metal connections. Hand-tighten male adapters plus one turn with a strap wrench.

Refer to plans for PVC mainline and sleeving size and pipe type.

PVC pipe fittings shall be solvent weld, schedule 80 PVC.

All above grade pipe shall be hard copper. Fittings shall be cast brass or wrought copper.

2. Quick Coupling Valves:

Quick coupler valves shall be as noted in the irrigation legend.

Quick couplers shall have one piece body and stabilizer and 36” re-rod to stabilize quick coupler and prevent movement during quick coupler activation.

Furnish to the City, four (4) valve keys with hose swivels.

Prior to initiating work, obtain Owner approval of all valve locations to prevent conflicts with plant material and planting bed cultivation methods.

3. Valve Boxes:

Valve access boxes shall be manufactured by Carson, Pentek, NDS, or Rainbird and be of locking type including locking bolt.

Valve Access Boxes to be tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes.

Valve box sizes shall be as indicated in the irrigation details for the specific valve.

Provide locking lid of same material black in color.

Provide and install bolt on all boxes to facilitate locking the valve box lid.

Boxes to be of minimum size required to permit access to the valve. Side walls to extend at least 2" below the bottom of valve body; use extension as necessary.

Valve access boxes shall have rot proof landscape filter fabric liner 3/4” washed crushed stone sump.

4. Accessories:

Drainage fill: 3/4" crushed stone to 6” below bottom of box..

Fill shall be clean soil free of stones larger than 2" diameter, foreign matter, organic material and debris.

Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.

Suitable excavated materials removed to accommodate the irrigation system work may be used as fill material subject to the Owner's review and acceptance.

5. Backflow Prevention Device:

Provide and install the backflow prevention device as noted on plans, including the device enclosure and all accessories and piping.

PART 2 - CONSTRUCTION.

1. Quality Assurance

A competent superintendent satisfactory to the Engineer, with authority to act in all matters pertaining to the Work, shall be present on the project site during all installation.

2. Job Conditions

Submission of a proposal shall be considered evidence that the site, Drawings and Specifications have been examined and accepted.

Report to the Engineer any deviations between Drawings, Specifications and the site. Failure to do so prior to the installation of equipment and which results in the replacement or relocation of equipment shall be at the Contractor's expense.

The exact location of existing utilities, structures and underground utilities are not indicated; their locations shall be field verified prior to starting work, and installation of work shall proceed so as to prevent interruption of service or damage to them. Protect existing structures and utility services, and replace at Contractor's cost if damaged. Where conflicts occur, notify Engineer of relocations required to complete the Work.

3. Acceptance

Installation will be accepted only when the Contract is completed to the satisfaction of the Engineer.

Prior to requesting inspections, adjust sprinkler heads, and automatic equipment to provide optimum performance. Submit accurate record drawings and operating instructions to the Engineer as a condition of final payment.

After completion, testing and Provisional Acceptance of the system, instruct the Engineer's personnel in the operation and maintenance of the system.

Inspections for Acceptance of Work

Inspections for acceptance of the Work will occur at the time of Contract Substantial and Final Completion. Note that Substantial Completion constitutes start of the warranty period for the portion of the Work accepted, unless otherwise specified.

1. Examination

Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.

The contractor shall energize all existing irrigation systems on the site prior to initiating any work. Contractor shall inventory all defects in the existing systems. Any defects found which will not be replaced with new irrigation shall be noted and brought to the attention of the Owner's representative.

2. Preparation:

Coordinate all work with building trades a, electricians, landscapers, paving contractors and all other contractors on the site.

Have all utilities accurately marked by the utility provider and Owner prior to initiating any work.

Layout and stake the location of each pipe and two-wire cable runs, sleeve locations, and all sprinkler heads and sprinkler valves. Obtain Landscape Architect's acceptance of layout prior to excavating, unless specifically waived by the Architect.

3. Excavating and Backfilling:

Excavating shall be considered unclassified and shall include all materials encountered, except materials that cannot be excavated by normal mechanical means. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings. Excavate to depths required to provide 2" depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.

Install sleeves for irrigation piping installed beneath paving. Minimum depth of bury for sleeves beneath roadways and drives to be 24" and 24" beneath walks.

Extend ends of all sleeves 12" beyond back of curbs or walk edges.

Fill to match adjacent grade elevation with approved earth fill material. Place and compact fill in layers not greater than 8" depth.

Provide approved fine-grained earth fill or sand to point 4" above the top of pipe, where soil conditions are rocky or otherwise objectionable.

Fill to within 6" of final grade with approved excavated or borrow fill materials free of lumps or rocks larger than 2" in any dimension.

The top 6” of backfill shall be topsoil, free of rocks, subsoil or trash. Any special soil mixture shall be replaced to the original condition it was prior to irrigation installation.

Except as indicated, install irrigation mainline with a minimum cover of 24” based on finished grades. Install irrigation laterals with a minimum cover of 12" based on finished grades.

Excavate trenches and install piping and backfill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

4. Plastic Underground Pipe:

Install all plastic pipe in accordance with manufacturer's installation instructions as ASTM D- 2274. Provide for thermal expansion and contraction

Saw cut plastic pipe. Use a square-in-sawing vice, to ensure a square cut. Remove burrs and shavings at cut ends prior to installation.

Make PVC plastic-to-plastic joints with solvent weld joints. Use only primer and solvent recommended by the pipe manufacturer. Install plastic fittings in accordance with pipe manufacturer's instructions and ASTM D-2855. Contractor shall make arrangements with pipe manufacturer for all necessary field assistance.

Allow joints to set at least 24 hours before pressure is applied to the system.

Maintain pipe interiors free of dirt and debris. Close open ends of pipe by capping, taping or other acceptable method when pipe installation is not in progress.

5. Valve Installation:

All quick coupler valves shall be enclosed in a valve box.

Valve box size shall be installed with 10” valve box for quick couplers. Add extensions as required to prevent soil settlement around the valve. Set box flush with finish grade and aligned with adjacent boxes and/or adjoining site-work and at right angles to walks and drives.

All valve boxes shall have locking bolt-down cover. Include locking bolt with all valve box installations.

Install filter fabric inside valve box and install valve boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box. Support box with block or notch box to protect pipe under box.

Provide all quick coupler valves with pre-fabricated three elbow swing joint, schedule 80 PVC.

Fittings and pre-fabricated swing joint manufacturers shall be Spears, Lasco, or Dura.

6. Flushing and Testing:

After all new quick couplers are in place and connected for a given section and all necessary division work has be completed, quick couplers shall be opened and a full head of water used to flush out the system.

Sprinkler mains shall be tested under normal water pressure for a period of 12 hours. If leaks occur, repair and repeat the test. Give Owner 24 hours notice prior to testing.

Testing of the system shall be performed after completion of each section or completion of the entire installation; and any necessary repairs shall be made, at the Contractor's expense, to put the system in good working order before final payment by the Owner.

Adjustment of the equipment will be done by the Contractor upon completion of installation to provide optimum performance. Minor adjustments during the guarantee period will be made by the Owner.

7. Clean Up:

Contractor shall keep the premises free from rubbish and debris at all times and shall arrange his material storage so as not to interfere with the Owner's operation of the job. Contractor shall remove and legally dispose of all unused material, rubbish and debris, including unsuitable excavated material from the site.

4. MEASUREMENT AND PAYMENT.

The plans show a conduit sleeve for the irigation piping, which shall be paid for separately as "3 Inch Schedule 80 PVC Electrical Conduit".

The meter pits and meters, water main taps, and piping to the meter pit associated with the Irrigation System will be provided and installed by the City of Ann Arbor.

Irrigation system shall be paid for at the contract unit price on a lump sum basis. Contract unit price shall consist of supplying and installing all irrigation components specified herein and shown on the drawings, including all submittals, permits, excavation and properly compacted backfill, and other work incidental to complete installation of a fully operational system. The pay quantity will be a lump sum based on acceptance of the completed installation.

The work as described will be paid for at the contract unit price or lump sum for the following contract items (pay items):

PAY ITEM	PAY UNIT

Irrigation System.....Lump Sum

Irrigation System shall include all work required to furnish, install, and test the irrigation system described in this special provision.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 257: Regulatory Signs

1 of 1 03/11/2022

a. Description. This work shall consist of fabricating and shipping Regulatory Signs to the City of Arbor.

b. Materials. The contractor will furnish “Regulatory Signs” to the Owner. Signs are to be fabricated in accordance with Section 919.02 Traffic Signs 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).

The plans indicate the signs to be fabricated. The engineer will provide a detailed list of the signs to be fabricated prior to the contractor ordering the signs.

The Contractor will provide the name and a qualifications summary of the proposed fabricator for approval by the Engineer prior to ordering the work.

Signs are to be delivered to the City of Ann Arbor at a location designed by the Engineer in an undamaged condition.

c. Construction. Installation of the Regulatory Signs will be completed by the City of Ann Arbor.

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

Pay Item	**Pay Unit**
Item 257: Regulatory Signs	Square Foot

DETAILED SPECIFICATION
FOR
ITEM #259-01 - PAVT MRKG, POLYUREA, 4 INCH, YELLOW
ITEM # 259-02 - PAVT MRKG, POLYUREA, 4 INCH, WHITE
ITEM #259-03 - PAVT MRKG, POLYUREA, BIKE ARROW AND YIELD SYM.
ITEM #259-04 - PAVT MRKG, POLYUREA, SPECIAL SYM.
ITEM #259-05 - PAVT MRKG, POLYUREA, BIKE SYM.
ITEM #259-06 - PAVT MRKG, POLYUREA, SHARROW SYM.
ITEM #259-07 - PAVT MRKG, POLYUREA, 12 INCH, STOP BAR OR CROSSWALK
ITEM #259-08 - PAVT MRKG, POLYUREA, 24 INCH, STOP BAR OR CROSSWALK
ITEM #259-09 - PAVT MRKG, ENDURABLEND, BIKE LANE GREEN
ITEM #259-10 - PAVT MRKG, ENDURABLEND, 18 INCH X 18 INCH BIKEWAY MARKS
ITEM #259-11 PAVT MRKG, SHARED PATH SPECIAL SYM.

DESCRIPTION

This work consists of furnishing and installing wet night retroreflective (WR) beads and/or elements, liquid applied pavement marking materials, and Endurablend Polymer Cement Surfacing bike lane pavement markings.

All work shall be consistent with the City of Ann Arbor Standard Specifications and the 2020 MDOT Standard Specifications for Construction, except as specified herein.

MATERIALS

Wet Night Retroreflective Beads and/or Elements. Select WR beads and/or elements from one of the following Manufacturers or a Department approved alternative that meets the requirements in Table 1:

3M Corporation
Potter's Industries
Swarco
Flex-o-Lite

Table 1: WR Markings

Average Initial Retroreflectivity at 30 meter geometry in mcd/lux/m^2		
Test Method	Colo	
	White r	Yellow
Dry (ASTM E 1710)	700	500
Wet Recovery (ASTM E 2177)	250	200

Ship the material to the job site in sturdy containers marked in accordance with subsection 920.01.A of the Standard Specifications for Construction.

Submit to the Engineer prior to the start of work:

a. The Manufacturer's recommended application rate of the beads/elements and the liquid

applied pavement marking binder to be used on the project. If the Manufacturer's recommended application rate differs from the specified rate in Table 811-1 of the Standard Specifications for Construction, the Manufacturer's recommended rate supersedes the table values.

b. Certification from the Manufacturer that when applied according to their application recommendations the beads and/or elements meet the requirements shown in Table 1 above.

Binder. Provide a liquid pavement marking product of the binder type specified in the contract documents from section 811 of the Qualified Products List or as specified by special provision, or use an alternative binder as approved by the Engineer.

The Endurablend bike lane pavement marking material must be comprised with green pigment and anti-skid abilities. The polymer cement surfacing shall be manufactured by Pavement Surface Coatings of Hanover New Jersey, and no material substitutions will be allowed.

1. Pigmented Resin. Transpo Color-Safe Bike Lane Green must be used as the pigment or approved equal. The approved color pigmented resin shall comply with FHWA green color guidelines for bike lanes.

2. Anti-Skid Aggregate. Anti-skid aggregates shall be provided by the pavement marking supplier. Aggregate shall have a minimum Hardness of 7.0 per MohsScale.

CONSTRUCTION

Place the binder and beads and polymer surface coatings in accordance with the Manufacturers' recommendations and sections 811 and 920 of the Standard Specifications for Construction except as noted above.

Construction of bike lane pavement markings shall be in accordance with manufacturer application and installation procedures, MDOT 2020 Standard Specifications for Construction, and Engineer.

All pavement marking areas shall be laid out by the contractor and then reviewed by the Engineer. Marking layout shall be approved by the Engineer prior to placement of material.

Surface preparation shall include cleaning of the pavement surface using high pressure water, compressed air or sandblasting and shall conform to ASTM D4263. All surface damage shall be corrected by the Contractor at the Contractor's expense, as directed by the Engineer. Manufacturer recommended pavement and air temperatures must be followed.

All markings on concrete surfaces shall receive a base coat application and shall be included in the pay item. Marking layout, material mixing, base coat application, and pigmented coat application shall comply with the manufacturer's installation procedures.

The Contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the Contractor at the Contractor's expense.

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 259-01: Pavt Mrkg, Polyurea, 4 inch, Yellow	Linear Foot
Item 259-02: Pavt Mrkg, Polyurea, 4 inch, White	Linear Foot
Item 259-03: Pavt Mrkg, Polyurea, Bike Arrow and Yield Sym.	Each
Item 259-04: Pavt Mrkg, Polyurea, Special Sym.	Each
Item 259-05: Pavt Mrkg, Polyurea, Bike Sym.	Each
Item 259-06: Pavt Mrkg, Polyurea, Sharrow Sym. .	Each
Item 259-07: Pavt Mrkg, Polyurea, 12 Inch, Stop Bar Or Crosswalk …	Linear Foot
Item 259-08: Pavt Mrkg, Polyurea, 24 Inch, Stop Bar Or Crosswalk …	Linear Foot
Item 259-09: Pavt Mrkg, Endurablend, Bike Lane Green	Square Foot
Item 259-10: Pavt Mrkg, Endurablend, 18 Inch X 18 Inch Bikeway Marks .	Linear Foot
Item 259-11: Pavt Mrkg, Shared Path Special Sym.	Each

The unit price for these items of work shall include all labor, material, and equipment costs to perform all the work.

E. Schedule of Pricing

Company: _____

Acknowledgement of Addendum No. 1 (initial)

Date: _____

SOUTH STATE STREET RECONSTRUCTION

Pay Item #	Item Description	Original Contract Quantity	Unit	Addendum #1 Contract Quantity	Net Quantity Change	Unit Price	Total Price
130	Protective Fencing	280.00	LFT				
135	Tree Removal (8" And Larger Trees)	1.00	EA				
140	Exploratory Excavation, (0-10 ft. deep) (Trench Det 1, Modified)	20.00	EA				
201	Incentive, Interim Completion of Work, Stage __	1.00	ALLOW			$150,000.00	$150,000.00
210-01	Audio-Visual Recording	1.00	LSUM				
210-02	Certified Payroll Compliance And Reporting	1.00	LSUM				
210-03	General Conditions, Max $200,000	1.00	LSUM				
210-04	Project Supervision, Max $175,000	1.00	LSUM				
221-01	Minor Traffic Devices, Max $100,000	1.00	LSUM				
221-02	Traf Regulator Control	320.00	HOURLY				
221-03	Barricade, Type III, High Intensity, Double Sided Lighted, Furn & Oper	58.00	EA				
221-04	Plastic Drum, Fluorescent, Furn & Oper	220.00	EA				
221-05	Channelizing Device, 42 Inch, Fluorescent, Furn & Oper	80.00	EA				
221-06	Remove Pavement Striping	80.00	LFT				
221-07	Lighted Arrow, Type C, Furn & Oper	4.00	EA				
221-08	Sign, Portable, Changeable Message, Ntfcip-Compliant, Furn & Oper	4.00	EA				
221-09	Sign Cover	8.00	EA				
221-10	Sign, Type B, Temp, Prismatic, Furn & Oper	300.00	SFT				
221-11	Sign, Type B, Temp, Prismatic, Special, Furn & Oper	300.00	SFT				
221-20	No Parking Sign	16.00	EA				
221-31	Pedestrian Path, Temp	1,100.00	LFT				
221-32	Pedestrian Ramp, Temp	28.00	EA				
221-33	Pedestrian Type II Barricade, Temp	40.00	EA				
221-34	Pedestrian Type II Channelizer, Temp	2,420.00	LFT				
222-01	Curb And Gutter, Any Type Or Size, Rem	2,200.00	LFT				
222-02	Sidewalk And Drive, Any Type Or Thickness, Rem	2,361.00	SYD				
222-03	Pavement, Rem	6,112.00	SYD				
222-04	Brick Pavers, Rem, Sort And Salvage	127.00	SYD				
222-05	Trolley Track Removal	100.00	SYD				
223-01	Dr Structure, Any Size Or Depth, Rem	11.00	EA				
223-02	Sewer, Any Size Or Depth, Rem	393.00	LFT				
224-01	Parking Meter, Rem	21.00	EA				
224-02	Parking Meter, Install	10.00	EA				
227-01	Erosion Control, Inlet Filter	14.00	EA				
230-01	Geogrid	200.00	Syd				
230-02	Geotextile	858.0	Syd				
230-03	Stone Reservoir (Aggregate Storage Bed)	50.0	Cyd				
230-04	Infiltration Trench Type 1 (2-48 inch pipes)	182.0	LFT				
230-05	Infiltration Trench Type 2 (1-30 inch pipe)	195.0	LFT				
230-06	Check Valve	1.00	EA				
231	Precast Concrete Vault	5.00	EA				
240	Non Haz Contaminated Material Handling And Disposal, Lm	140.00	CYD				
250-02	Cold Milling Hma Surface, Modified	959.00	SYD				
250-03	Aggregate Base Course, 21AA, Modified	1,338.00	CYD				
250-04	Machine Grading, Modified	20.00	STA				
250-05	Subgrade Undercutting, Type II	1,175.00	CYD				
250-06	Sand Subbase Course, Class II - CIP	1,887.00	CYD				
251-01	Curb And Gutter, Conc, 24 Inch, Any Type	2,062.00	LFT				
251-02	Planter Curb	933.00	LFT	838.00	-95.00		
252-01	Concrete Sidewalk, 6 inch	14,151.00	SFT	14889.00	+738		
252-02	Concrete Sidewalk, 8 inch	7,583.00	SFT	7628.00	+45		
252-03	Road Concrete Pavement, 8 Inch, Type 1	20,290.00	SFT	20388.00	+98		
252-04	Road Concrete Pavement, 8 inch, Type 2	10,538.00	SFT				
252-05	Road Concrete Pavement, colored, 8 inch	3,940.00	SFT	4107.00	+167		
252-06	Sidewalk Ramp, 8 Inch	120.00	SFT				
253	Detectable Warning Surface, Modified	454.00	SFT	448.00	-6.00		
255-01	HMA, 3E1	109.00	TON				
255-02	HMA, 4E1	1,567.00	TON				
255-03	HMA, 5E1	288.00	TON				
255-04	Hand Patching, Modified	20.00	TON				
256	Sidewalk Unit Pavers	6,828.00	SFT	7237.00	+409		
257	Regulatory Signs	0.00	SFT	218.75	218.75		
259-01	Pavt Mrkg, Polyurea, 4 inch, Yellow	2,180.00	LFT				
259-02	Pavt Mrkg, Polyurea, 4 inch, White	1,500.00	LFT	1600	+100		
259-03	Pavt Mrkg, Polyurea, Bike Arrow and Yield Sym.	7.00	EA	7	0.00		
259-04	Pavt Mrkg, Polyurea, Special Sym.	10.00	EA	10	0.00		
259-05	Pavt Mrkg, Polyurea, Bike Sym.	4.00	EA	8	+4		
259-06	Pavt Mrkg, Polyurea, Sharrow Sym.	12.00	EA	12	0.00		
259-07	Pavt Mrkg, Polyurea, 12 Inch, Crosswalk	1,800.00	LFT				
259-08	Pavt Mrkg, Polyurea, 24 Inch, Stop Bar	200.00	LFT				
259-09	Pavt Mrkg, Endurablend, Bike Lane Green	1,165.00	SFT	1322	+157		
259-10	Pavt Mrkg, Endurablend, 18 Inch X 18 Inch Bikeway Marks	36.00	LFT				
259-11	Pavt Mrkg, Shared Path Special Sym.	3.00	EA				

260-01	Recessing Pavt Mrkg, Longitudinal	3,000.00	LFT				
260-02	Recessing Pavt Mrkg, Transverse	1,000.00	LFT				
261	Street Light, Remove	27.00	EA				
262-02	Electrical Wiring, 10 Gauge	11,535.00	LFT				
262-03	Electrical Wiring, 8 Gauge	7,350.00	LFT				
262-04	Electrical Wiring, 6 Gauge	7,350.00	LFT				
263-01	Electrical Cabinet	1.00	EA				
263-02	Electrical Cabinet Foundation	1.00	EA				
264-01	Luminaire Installation	41.00	EA				
264-02	Pole Installation, Single Head	27.00	EA				
264-03	Pole Installation, Double Head	7.00	EA				
265	Festoon Lighting	1.00	LSUM				
266	Pole Fit Up	1.00	EA				
267-02	2 Inch Schedule 80 PVC Electrical Conduit	215.00	LFT	360	+145		
267-03	3 Inch Schedule 80 PVC Electrical Conduit	3,912.50	LFT	4892.5	+980		
267-04	4 Inch Schedule 80 PVC Electrical Conduit	367.50	LFT				
268-02	Handhole Assembly, 17 inch x 30 inch	34.00	EA				
268-03	Handhole Assembly, 24 Inch X 36 Inch	20.00	EA				
268-04	Handhole Assembly, 30 inch x 48 inch	2.00	EA				
268-05	Handhole Assembly, 36 inch x 72 inch	1.00	EA				
268-06	Handhole Assembly, Remove for Replacement, Any Size	47.00	EA				
268-07	Handhole Adjust, All Sizes	10.00	EA				
270	Bike Hoops, Surface Mount	19.00	EA				
271	Bollard	19.00	EA				
272-01	Qwick Curb	30.00	LFT	130	+100		
272-02	Bikeway Post	22.00	EA	0	-22.00		
272-03	Bikeway Bollard, Re-use	19.00	EA				
273	Urban Bench	13.00	EA	11	-2.00		
278	Irrigation System	0.00	LSUM	1	+1		
279-1	Line Stop, Additional Rental Day	8.00	EA				
279-6	Line Stop, Ductile Iron Pipe, 6 inch	3.00	EA				
279-8	Line Stop, Ductile Iron Pipe, 8 inch	1.00	EA				
279-10	Line Stop, Ductile Iron Pipe, 10 inch	1.00	EA				
279-12	Line Stop, Ductile Iron Pipe, 12 inch	4.00	EA				
280	Planting Soil	108.00	CYD				
281	Landscape Maintenance	24.00	Month				
282-01	Tree Grate	7.00	EA				
282-02	Tree Guard, Special	7.00	EA				
283	Riprap, Fieldstone	1.00	CYD				
284-17	Sacrificial Anode, 17 lb	6.00	EA				
284-32	Sacrificial Anode, 32 lb	3.00	EA				
285-4	CL-50, D.I. Water Main, w/Poly Wrap, 4 inch, Tr Det I, Mod	235.00	LFT				
285-6	CL-50, D.I. Water Main, w/Poly Wrap, 6 inch, Tr Det I, Mod	115.00	LFT				
285-8	CL-50, D.I. Water Main, w/Poly Wrap, 8 inch, Tr Det I, Mod	40.00	LFT				
285-10	CL-50, D.I. Water Main, w/Poly Wrap, 10 inch, Tr Det I, Mod	10.00	LFT				
285-12	CL-50, D.I Water Main, w/Poly Wrap, 12 inch, Tr Det I, Mod	1,325.00	LFT				
286-22.5-12	22.5 deg Bend, 12 inch	1.00	EA				
286-45-4	45 deg Bend, 4 Inch	32.00	EA				
286-45-6	45 deg Bend, 6 Inch	6.00	EA				
286-45-8	45 deg Bend, 8 Inch	4.00	EA				
286-45-12	45 deg Bend, 12 inch	40.00	EA				
286-90-6	90 deg Bend, 6 inch	5.00	EA				
286-90-8	90 deg Bend, 8 inch	1.00	EA				
286-90-12	90 deg Bend, 12 inch	6.00	EA				
287-8x6	Reducer, 8 inch x 6 inch	1.00	EA				
287-12x6	Reducer, 12 inch x 6 inch	2.00	EA				
287-12 x 8	Reducer, 12 inch x 8 inch	1.00	EA				
287-12 x 10	Reducer, 12 inch x 10 inch	2.00	EA				
288-C-12-12	Cross, 12 inch x 12 inch	1.00	EA				
288-T-12-12-4	Tee, 12 inch x 12 inch x 4 inch	7.00	EA				
288-T-12-12-6	Tee, 12 inch x 12 inch x 6 inch	4.00	EA				
288-T-12-12-8	Tee, 12 inch x 12 inch x 8 inch	1.00	EA				
288-T-12-12-12	Tee, 12 inch x 12 inch x 12 inch	5.00	EA				
289	Fire Hydrant Assy, w/Extensions, Complete	3.00	EA				
290-4	Gate Valve-in-Box, 4 inch	7.00	EA				
290-6	Gate Valve-in-Box, 6 inch	3.00	EA				
290-12	Gate Valve-in-Box, 12 inch	6.00	EA				
291-06	Gate Valve-in-Well, 6 inch	1.00	EA				
291-12	Gate Valve-in-Well, 12 inch	6.00	EA	7	+1		
293	Excavate & Backfill for Water Service Tap and Lead	500.00	LFT				
294	Water Main Pipe Abandonment	250.00	LFT				
295	Water Main, Abandon w/Flowable Fill	1,500.00	LFT				
296-01	Gate Valve-in-Box, Abandon	14.00	EA				
296-02	Gate Valve-in-Box, Remove	1.00	EA				
297-01	Gate Valve-in-Well, Abandon	6.00	EA				
297-02	Gate Valve-in-Well, Remove	1.00	EA				
298	Fire Hydrant, Rem	3.00	EA				
315	Perforated HDPE Pipe, 30 inch	191.00	LFT				
316	Perforated HDPE Pipe, 48 inch	220.00	LFT				
320	RCP, Sewer, C76, CL-IV, 12 inch, Tr Det I	479.00	LFT				
321	RCP, Sewer, C76, CL-IV, 15 inch, Tr Det I	313.00	LFT				
322	RCP, Sewer, C76, CL-IV, 18 inch, Tr Det I	96.00	LFT				
360	Type I Manhole (4 ft. Dia.) (0-10 ft. Deep)	7.00	EA				
364	Type III Manhole (4 ft. Dia.)	1.00	EA				
366	Inlet Junction Chamber	3.00	EA				
367	Single inlet Structure	11.00	EA				
368	Double Inlet Structure	5.00	EA				

391	Pipe Undercut & Refill	100.00	Cyd				
516	6" Wrapped Edge Drain	1,387.00	LFT				
563-1	Dr Structure Cover Barrier Curb Inlet	1,230.00	LBS				
563-2	Dr Structure Cover Valley Curb Inlet	7,500.00	LBS				
563-3	Structure Covers	4,800.00	LBS				
564	Reconstruct Structure	2.00	EA				
566	Adjust Structure Cover	31.00	EA				
567	Adjust Monument Box or Gate Valve Box	53.00	EA				
630-20	Street Light Foundation, 20 Inch Dia.	27.00	EA				
630-24	Street Light Foundation, 24 Inch Dia	7.00	EA				
703	Silt Fence	378.00	FT				
810	Cercis canadensis	3.00	EA				
811	Ginkgo biloba 'Autumn Gold'	7.00	EA				
812	Sophora japonica ' Princeton Upright'	7.00	EA				
813	Gleditsia triacanthos 'Skyline'	5.00	EA				
820	Asclepias incarnata	24.00	EA				
821	Lobelia cardinalis	35.00	EA				
822	Lupinus perennis	322.00	EA				
823	Phlox paniculata	118.00	EA				
824	Rudbeckia Fulgida	92.00	EA				
825	Panicum virgatum 'Shenandoah'	131.00	EA				
826	Pennisetum alopecuroides	89.00	EA				
827	Solidago rugosa	44.00	EA				
881	Sod	353.00	SFT				
8100403	Sign, Type III, Rem	1.00	EA				
8187001	Recable, TS	200.00	LFT				
8200020	Case Sign, Rem	1.00	EA				
8200100	Pedestal, Alum	3.00	EA	16	+13		
8200105	Pedestal, Fdn	3.00	EA	16	+13		
8200106	Pedestal Fdn, Rem	2.00	EA	3	+1		
8200110	Pedestal, Rem	10.00	EA	3	+1		
8200122	Pushbutton, Rem	0.00	EA	5	+5		
200177	TS, Mast Arm Mtd, Rem	2.00	EA				
8200180	TS, Pedestrian, Bracket Arm Mtd, Rem	9.00	EA				
8200181	TS, Pedestrian, Pedestal Mtd, Rem	7.00	EA				
8200251	TS, One Way Mast Arm Mtd, Salv	1.00	EA				
8200336	TS, Pedestrian, One Way Bracket Arm Mtd (LED), Countdown	3.00	EA	1	-2		
8200339	TS, Pedestrian, Two Way Bracket Arm Mtd (LED), Countdown	5.00	EA	2	-3		
8200345	TS, Pedestrian, One Way Pedestal Mtd (LED), Countdown	3.00	EA	17	+14		
8200347	TS, Pedestrian, Two Way Pedestal Mtd (LED), Countdown	5.00	EA	2	-3		
8200425	Wireless Vehicle Sensor Node	7.00	EA				
8200426	Wireless Vehicle Sensor Node, Rem	10.00	EA				
8200458	TS Face, Bag	12.00	EA				
8200459	TS Face, Bag, Rem	12.00	EA				
8207050	Pedestrian Signal System, Accessible	0.00	EA	3	+3		
207050	Pushbutton Station and Sign	0.00	EA	18	+18		
ESTIMATED TOTAL							

TABLE OF CONTENTS

SECTION I - GENERAL INFORMATION

A. OBJECTIVE

The purpose of this Request for Proposal (RFP) is to select a firm to provide construction of South State Street Reconstruction as described in the plans and specifications

B. 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 March 4, 2022 at 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.

C. PRE-PROPOSAL MEETING

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

D. PROPOSAL FORMAT

To be considered, each firm must submit a response to this RFP using the format provided in Section III. No other distribution of proposals is to be made by the prospective bidder. An official authorized to bind the bidder to its provisions must sign

the proposal in ink. 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.

E. 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.

F. SEALED PROPOSAL SUBMISSION

All proposals are due and must be delivered to the City on or before March 24, 2022 by 10:00a.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 #22-19 South State Street Reconstruction** 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 accessible to the public at all hours. 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.

G. DISCLOSURES

Under the Freedom of Information Act (Public Act 442), the City is obligated to permit review of its files, if requested by others. All information in a proposal is subject to disclosure under this provision. This act also provides for a complete disclosure of contracts and attachments thereto.

H. TYPE OF CONTRACT

A sample of the 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.

I. 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.

J. 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 Type Heavy and Highway will apply.

K. 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.

L. 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.

M. DEBARMENT

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

N. PROPOSAL PROTEST

All proposal protests must be in writing and filed with the Purchasing Manager within five (5) business days of the award action. 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.

O. SCHEDULE

The following is the schedule for this RFP process.

Activity/Event	**Anticipated Date**
Written Question Deadline	March 4, 2022, 5:00 p.m. (Local Time)
Addenda Published (if needed)	Week of March 7, 2022
Proposal Due Date	March 24, 2022, 10 a.m. (Local Time)

Selection/Negotiations	March 25-31, 2022
Expected City Council Authorizations	May 16, 2022

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

P. IRS FORM W-9

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

Q. 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.

R. 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.

S. .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.

T. 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.

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.

V. 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 construction plan set and specifications for 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 1:314(9) of the City Code which sets forth requirements for evaluating construction 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 assurance 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. Documentation of an on-going, Michigan OSHA-approved safety-training program for employees to be used on the proposed job site.

2. Evidence of the bidder's worker's compensation Experience Modification Rating ("EMR"). 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 the OSHA 10-hour training course for safety established by the U.S. Department of Labor, Occupational Safety & Health Administration.

4. The safety record of bidder and major subcontractors, including OSHA, MIOSHA, or other safety violations.

C. Workforce Development – 20 Points

1. The ratio of masters or journeypersons to apprentices proposed to be used on the construction project job site, if apprentices are to be used on the project.

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

3. 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.

4. Documentation of how the bidder assesses the skills and qualifications of any employees who do not have master or journeyperson certification or status, or are not participants in a Registered Apprenticeship Program.

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 are able to achieve this goal.

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

Company: _____

Date: _____

SOUTH STATE STREET RECONSTRUCTION

Pay Item #	Item Description	Quantity	Unit	Unit Price	Total Price
130	Protective Fencing	280.00	LFT		
135	Tree Removal (8" And Larger Trees)	1.00	EA		
140	Exploratory Excavation, (0-10 ft. deep) (Trench Det 1, Modified)	20.00	EA		
201	Incentive, Interim Completion of Work, Stage __	1.00	ALLOW	$150,000.00	$150,000.00
210-01	Audio-Visual Recording	1.00	LSUM		
210-02	Certified Payroll Compliance And Reporting	1.00	LSUM		
210-03	General Conditions, Max $200,000	1.00	LSUM		
210-04	Project Supervision, Max $175,000	1.00	LSUM		
221-01	Minor Traffic Devices, Max $100,000	1.00	LSUM		
221-02	Traf Regulator Control	320.00	HOURLY		
221-03	Barricade, Type III, High Intensity, Double Sided Lighted, Furn & Oper	58.00	EA		
221-04	Plastic Drum, Flourescent, Furn & Oper	220.00	EA		
221-05	Channelizing Device, 42 Inch, Flourescent, Furn & Oper	80.00	EA		
221-06	Remove Pavement Striping	80.00	LFT		
221-07	Lighted Arrow, Type C, Furn & Oper	4.00	EA		
221-08	Sign, Portable, Changeable Message, Ntfcip-Compliant, Furn & Oper	4.00	EA		
221-09	Sign Cover	8.00	EA		
221-10	Sign, Type B, Temp, Prismatic, Furn & Oper	300.00	SFT		
221-11	Sign, Type B, Temp, Prismatic, Special, Furn & Oper	300.00	SFT		
221-20	No Parking Sign	16.00	EA		
221-31	Pedestrian Path, Temp	1,100.00	LFT		
221-32	Pedestrian Ramp, Temp	28.00	EA		
221-33	Pedestrian Type II Barricade, Temp	40.00	EA		
221-34	Pedestrian Type II Channelizer, Temp	2,420.00	LFT		
222-01	Curb And Gutter, Any Type Or Size, Rem	2,200.00	LFT		
222-02	Sidewalk And Drive, Any Type Or Thickness, Rem	2,361.00	SYD		
222-03	Pavement, Rem	6,112.00	SYD		
222-04	Brick Pavers, Rem, Sort And Salvage	127.00	SYD		
222-05	Trolley Track Removal	100.00	SYD		
223-01	Dr Structure, Any Size Or Depth, Rem	11.00	EA		
223-02	Sewer, Any Size Or Depth, Rem	393.00	LFT		
224-01	Parking Meter, Rem	21.00	EA		
224-02	Parking Meter, Install	10.00	EA		
227-01	Erosion Control, Inlet Filter	14.00	EA		
230-01	Geogrid	200.00	Syd		
230-02	Geotextile	858.0	Syd		
230-03	Stone Reservoir (Aggregate Storage Bed)	50.0	Cyd		
230-04	Infiltration Trench Type 1 (2-48 inch pipes)	182.0	LFT		
230-05	Infiltration Trench Type 2 (1-30 inch pipe)	195.0	LFT		
230-06	Check Valve	1.00	EA		
231	Precast Concrete Vault	5.00	EA		
240	Non Haz Contaminated Material Handling And Disposal, Lm	140.00	CYD		
256	Sidewalk Unit Pavers	6,828.00	SFT		
250-02	Cold Milling Hma Surface, Modified	959.00	SYD		
250-03	Aggregate Base Course, 21AA, Modified	1,338.00	CYD		
250-04	Machine Grading, Modified	20.00	STA		
250-05	Subgrade Undercutting, Type II	1,175.00	CYD		
250-06	Sand Subbase Course, Class II - CIP	1,887.00	CYD		
251-01	Curb And Gutter, Conc, 24 Inch, Any Type	2,062.00	LFT		
251-02	Planter Curb	933.00	LFT		
252-01	Concrete Sidewalk, 6 inch	14,151.00	SFT		
252-02	Concrete Sidewalk, 8 inch	7,583.00	SFT		
252-03	Road Concrete Pavement, 8 Inch, Type 1	20,290.00	SFT		
252-04	Road Concrete Pavement, 8 inch, Type 2	10,538.00	SFT		
252-05	Road Concrete Pavement, colored, 8 inch	3,940.00	SFT		
252-06	Sidewalk Ramp, 8 Inch	120.00	SFT		
253	Detectable Warning Surface, Modified	454.00	SFT		
255-01	HMA, 3E1	109.00	TON		
255-02	HMA, 4E1	1,567.00	TON		
255-03	HMA, 5E1	288.00	TON		
255-04	Hand Patching, Modified	20.00	TON		
256	Sidewalk Unit Pavers	6,828.00	SFT		

259-01	Pavt Mrkg, Polyurea, 4 inch, Yellow	2,180.00	LFT		
259-02	Pavt Mrkg, Polyurea, 4 inch, White	1,500.00	LFT		
259-03	Pavt Mrkg, Ovly Cold Plastic, Bike Arrow and Yield Sym.	7.00	EA		
259-04	Pavt Mrkg, Ovly Cold Plastic, Special Sym.	10.00	EA		
259-05	Pavt Mrkg, Ovly Cold Plastic, Bike Sym.	4.00	EA		
259-06	Pavt Mrkg, Ovly Cold Plastic, Sharrow Sym.	12.00	EA		
259-07	Pavt Mrkg, Polyurea, 12 Inch, Stop Bar Or Crosswalk	1,800.00	LFT		
259-08	Pavt Mrkg, Polyurea, 24 Inch, Stop Bar Or Crosswalk	200.00	LFT		
259-09	Pavt Mrkg, Endurablend, Bike Lane Green	1,165.00	SFT		
259-10	Pavt Mrkg, Endurablend, 18 Inch X 18 Inch Bikeway Marks	36.00	LFT		
259-11	Pavt Mrkg, Shared Path Special Sym.	3.00	EA		
260-01	Recessing Pavt Mrkg, Longitudinal	3,000.00	LFT		
260-02	Recessing Pavt Mrkg, Transverse	1,000.00	LFT		
261	Street Light, Remove	27.00	EA		
262-02	Electrical Wiring, 10 Gauge	11,535.00	LFT		
262-03	Electrical Wiring, 8 Gauge	7,350.00	LFT		
262-04	Electrical Wiring, 6 Gauge	7,350.00	LFT		
263-01	Electrical Cabinet	1.00	EA		
263-02	Electrical Cabinet Foundation	1.00	EA		
264-01	Luminaire Installation	41.00	EA		
264-02	Pole Installation, Single Head	27.00	EA		
264-03	Pole Installation, Double Head	7.00	EA		
265	Festoon Lighting	1.00	LSUM		
266	Pole Fit Up	1.00	EA		
267-02	2 Inch Schedule 80 PVC Electrical Conduit	215.00	LFT		
267-03	3 Inch Schedule 80 PVC Electrical Conduit	3,912.50	LFT		
267-04	4 Inch Schedule 80 PVC Electrical Conduit	367.50	LFT		
268-02	Handhole Assembly, 17 inch x 30 inch	34.00	EA		
268-03	Handhole Assembly, 24 Inch X 36 Inch	20.00	EA		
268-04	Handhole Assembly, 30 inch x 48 inch	2.00	EA		
268-05	Handhole Assembly, 36 inch x 72 inch	1.00	EA		
268-06	Handhole Assembly, Remove for Replacement, Any Size	47.00	EA		
268-07	Handhole Adjust, All Sizes	10.00	EA		
270	Bike Hoops, Surface Mount	19.00	EA		
271	Bollard	19.00	EA		
272-01	Qwick Curb	30.00	LFT		
272-02	Bikeway Post	22.00	EA		
272-03	Bikeway Bollard, Re-use	19.00	EA		
273	Urban Bench	13.00	EA		
279-1	Line Stop, Additional Rental Day	8.00	EA		
279-6	Line Stop, Ductile Iron Pipe, 6 inch	3.00	EA		
279-8	Line Stop, Ductile Iron Pipe, 8 inch	1.00	EA		
279-10	Line Stop, Ductile Iron Pipe, 10 inch	1.00	EA		
279-12	Line Stop, Ductile Iron Pipe, 12 inch	4.00	EA		
280	Planting Soil	108.00	CYD		
281	Landscape Maintenance	24.00	Month		
282-01	Tree Grate	7.00	EA		
282-02	Tree Guard, Special	7.00	EA		
283	Riprap, Fieldstone	1.00	CYD		
284-17	Sacrificial Anode, 17 lb	6.00	EA		
284-32	Sacrificial Anode, 32 lb	3.00	EA		
285-4	CL-50, D.I. Water Main, w/Poly Wrap, 4 inch, Tr Det I, Mod	235.00	LFT		
285-6	CL-50, D.I. Water Main, w/Poly Wrap, 6 inch, Tr Det I, Mod	115.00	LFT		
285-8	CL-50, D.I. Water Main, w/Poly Wrap, 8 inch, Tr Det I, Mod	40.00	LFT		
285-10	CL-50, D.I. Water Main, w/Poly Wrap, 10 inch, Tr Det I, Mod	10.00	LFT		
285-12	CL-50, D.I Water Main, w/Poly Wrap, 12 inch, Tr Det I, Mod	1,325.00	LFT		
286-22.5-12	22.5 deg Bend, 12 inch	1.00	EA		
286-45-4	45 deg Bend, 4 Inch	32.00	EA		
286-45-6	45 deg Bend, 6 Inch	6.00	EA		
286-45-8	45 deg Bend, 8 Inch	4.00	EA		
286-45-12	45 deg Bend, 12 inch	40.00	EA		
286-90-6	90 deg Bend, 6 inch	5.00	EA		
286-90-8	90 deg Bend, 8 inch	1.00	EA		
286-90-12	90 deg Bend, 12 inch	6.00	EA		
287-8x6	Reducer, 8 inch x 6 inch	1.00	EA		
287-12x6	Reducer, 12 inch x 6 inch	2.00	EA		
287-12 x 8	Reducer, 12 inch x 8 inch	1.00	EA		
287-12 x 10	Reducer, 12 inch x 10 inch	2.00	EA		
288-C-12-12	Cross, 12 inch x 12 inch	1.00	EA		
288-T-12-12-4	Tee, 12 inch x 12 inch x 4 inch	7.00	EA		
288-T-12-12-6	Tee, 12 inch x 12 inch x 6 inch	4.00	EA		
288-T-12-12-8	Tee, 12 inch x 12 inch x 8 inch	1.00	EA		
288-T-12-12-12	Tee, 12 inch x 12 inch x 12 inch	5.00	EA		
289	Fire Hydrant Assy, w/Extensions, Complete	3.00	EA		

290-4	Gate Valve-in-Box, 4 inch	7.00	EA		
290-6	Gate Valve-in-Box, 6 inch	3.00	EA		
290-12	Gate Valve-in-Box, 12 inch	6.00	EA		
291-06	Gate Valve-in-Well, 6 inch	1.00	EA		
291-12	Gate Valve-in-Well, 12 inch	6.00	EA		
293	Excavate & Backfill for Water Service Tap and Lead	500.00	LFT		
294	Water Main Pipe Abandonment	250.00	LFT		
295	Water Main, Abandon w/Flowable Fill	1,500.00	LFT		
296-01	Gate Valve-in-Box, Abandon	14.00	EA		
296-02	Gate Valve-in-Box, Remove	1.00	EA		
297-01	Gate Valve-in-Well, Abandon	6.00	EA		
297-02	Gate Valve-in-Well, Remove	1.00	EA		
298	Fire Hydrant, Rem	3.00	EA		
315	Perforated HDPE Pipe, 30 inch	191.00	LFT		
316	Perforated HDPE Pipe, 48 inch	220.00	LFT		
320	RCP, Sewer, C76, CL-IV, 12 inch, Tr Det I	479.00	LFT		
321	RCP, Sewer, C76, CL-IV, 15 inch, Tr Det I	313.00	LFT		
322	RCP, Sewer, C76, CL-IV, 18 inch, Tr Det I	96.00	LFT		
360	Type I Manhole (4 ft. Dia.) (0-10 ft. Deep)	7.00	EA		
364	Type III Manhole (4 ft. Dia.)	1.00	EA		
366	Inlet Junction Chamber	3.00	EA		
367	Single inlet Structure	11.00	EA		
368	Double Inlet Structure	5.00	EA		
391	Pipe Undercut & Refill	100.00	Cyd		
516	6" Wrapped Edge Drain	1,387.00	LFT		
563-1	Dr Structure Cover Barrier Curb Inlet	1,230.00	LBS		
563-2	Dr Structure Cover Valley Curb Inlet	7,500.00	LBS		
563-3	Structure Covers	4,800.00	LBS		
564	Reconstruct Structure	2.00	EA		
566	Adjust Structure Cover	31.00	EA		
567	Adjust Monument Box or Gate Valve Box	53.00	EA		
630-20	Street Light Foundation, 20 Inch Dia.	27.00	EA		
630-24	Street Light Foundation, 24 Inch Dia	7.00	EA		
703	Silt Fence	378.00	FT		
810	Cercis canadensis	3.00	EA		
811	Ginkgo biloba 'Autumn Gold'	7.00	EA		
812	Sophora japonica ' Princeton Upright'	7.00	EA		
813	Gleditsia triacanthos 'Skyline'	5.00	EA		
820	Asclepias incarnata	24.00	EA		
821	Lobelia cardinalis	35.00	EA		
822	Lupinus perennis	322.00	EA		
823	Phlox paniculata	118.00	EA		
824	Rudbeckia Fulgida	92.00	EA		
825	Panicum virgatum 'Shenandoah'	131.00	EA		
826	Pennisetum alopecuroides	89.00	EA		
827	Solidago rugosa	44.00	EA		
881	Sod	353.00	SFT		
8100403	Sign, Type III, Rem	1.00	EA		
8187001	Recable, TS	200.00	LFT		
8200020	Case Sign, Rem	1.00	EA		
8200100	Pedestal, Alum	3.00	EA		
8200105	Pedestal, Fdn	3.00	EA		
8200106	Pedestal Fdn, Rem	2.00	EA		
8200110	Pedestal, Rem	10.00	EA		
8200177	TS, Mast Arm Mtd, Rem	2.00	EA		
8200180	TS, Pedestrian, Bracket Arm Mtd, Rem	9.00	EA		
8200181	TS, Pedestrian, Pedestal Mtd, Rem	7.00	EA		
8200251	TS, One Way Mast Arm Mtd, Salv	1.00	EA		
8200336	TS, Pedestrian, One Way Bracket Arm Mtd (LED), Countdown	3.00	EA		
8200339	TS, Pedestrian, Two Way Bracket Arm Mtd (LED), Countdown	5.00	EA		
8200345	TS, Pedestrian, One Way Pedestal Mtd (LED), Countdown	3.00	EA		
8200347	TS, Pedestrian, Two Way Pedestal Mtd (LED), Countdown	5.00	EA		
8200425	Wireless Vehicle Sensor Node	7.00	EA		
8200426	Wireless Vehicle Sensor Node, Rem	10.00	EA		
8200458	TS Face, Bag	12.00	EA		
8200459	TS Face, Bag, Rem	12.00	EA		
ESTIMATED TOTAL					

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 – Non-Discrimination Ordinance Declaration of Compliance Form

Attachment E – Living Wage Declaration of Compliance Form

Attachment FE – Vendor Conflict of Interest Disclosure Form

Attachment G – Non-Discrimination Ordinance Poster

Attachment H – Living Wage Ordinance Poster

Attachment I – Prevailing Wage Declaration of Compliance

Sample Certified Payroll Report Template

ATTACHMENT A
SAMPLE STANDARD CONTRACT

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

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 **[Insert Title of Bid and Bid Number**] in accordance with the requirements and provisions of the following documents, including all written modifications incorporated into any of the documents, 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 **[Insert Name of Administering Service Unit]**

Project means **[Insert Title of Bid and Bid Number]**

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: [**Insert the person's name**] whose job title is [**Insert job title**]. 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 per the Detailed Specification for Progress Clause.

(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 as described in the Detailed Specification for Progress Clause. 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_____

City Administrator

By_____

Services Area Administrator

Approved as to form and content

_____
Stephen K. Postema, 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:
_____	_____
Stephen K. Postema, City Attorney	_____
	_____

LABOR AND MATERIAL BOND

(1) _____

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

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

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

By _____
(Signature)

Its_____
(Title of Office)

_____
(Name of Principal)

By _____
(Signature)

Its _____
(Title of Office)

Approved as to form:

_____
Stephen K. Postema, City Attorney

Name and address of agent:

_____

GENERAL CONDITIONS

Section 1 - Execution, Correlation and Intent of Documents

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

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

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

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

Section 2 - Order of Completion

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

Section 3 - Familiarity with Work

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

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

Section 4 - Wage Requirements

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

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

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

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

If the Contractor is a “covered employer” as defined in Chapter 23 of the Ann Arbor City Code, the Contractor agrees to comply with the living wage provisions of Chapter 23 of the Ann Arbor City Code. The Contractor agrees to pay those employees providing Services to the City under this 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

CITY OF ANN ARBOR, PUBLIC SERVICES-ENGINEERING, and the DOWNTOWN DEVELOPMENT AUTHORITY, in cooperation with THE UNIVERSITY OF MICHIGAN

South State Street Reconstruction

RFP #22-19

DETAILED SPECIFICATIONS

Issued for Bids
February 18, 2022

Prepared by:

SMITHGROUP

201 Depot Street, 2nd Floor
Ann Arbor, Michigan 48104

WADE TRIM

25251 Northline Road
Taylor, MI 48180

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

NOTE: This project is being completed under a cooperative arrangement between the Ann Arbor Downtown Development Authority (DDA) and the City of Ann Arbor (City). The contract holder will be the City of Ann Arbor. References to either entity, whether mentioned singularly or together, shall be considered to include both entities in their role as co-sponsors of the project. Under this arrangement, both the City and the DDA have assigned project engineers to manage the project; therefore, references in these construction documents to "Engineer" shall be assumed to mean both engineer managers.

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 the DDA and the City of Ann Arbor.

The Contractor is hereby notified that the City of Ann Arbor Field Services Unit may be installing traffic control conduits, traffic signal sensors, and the like, at various locations. The City of Ann Arbor may also be installing conduits, hand holes and related equipment for communications lines in the project area during period of construction.

DTE will be installing a new gas main north of Liberty Street in the project area.

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

The following Utility Owners may have overhead and/or underground facilities located within the Right-of-Way:

The City of Ann Arbor
DTE - MichCon (Michigan Consolidated Gas Company)
DTE - Edison (Detroit Edison Company)
Comcast

University of Michigan
MCI/Verizon Business

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

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

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

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

DETAILED SPECIFICATION
FOR
DISPOSING OF EXCAVATED MATERIAL

The Contractor shall dispose of, at the Contractor's expense, all excavated material. Costs for this work will not be paid for separately, but shall be included in the bid price of the Contract Item "General Conditions."

DETAILED SPECIFICATION
FOR
INSURANCE REQUIREMENTS

In addition to the insurance requirements noted in Section 28 of the General Conditions, the following agencies must be listed as additional insured:

"Ann Arbor Downtown Development Authority"

DETAILED SPECIFICATION
FOR
PROTECTION OF UTILITIES

Damages to utilities by the Contractor's operations shall be repaired by the utility owner at the Contractor's expense.

Delays to the work due to utility repairs are the sole responsibility of the Contractor.

The Contractor shall keep construction debris out of utilities at all times. The Contractor shall be back charged an amount of $50.00 per day for each manhole/inlet/utility pipe that contains construction debris caused as a result of the Contractor's (including subcontractors and suppliers) work.

The Contractor is solely responsible for any damages to the utilities or abutting properties due to construction debris.

Certain sanitary and storm sewers within the influence of construction may have been cleaned and videotaped prior to construction. The City may also choose to videotape utility line(s) during or after the work of this Contract to inspect them for damages and/or construction debris. If such inspection shows damage and/or debris, then all costs of such inspection, cleaning, repairs, and etc, shall be the Contractor's sole responsibility. If such inspection is negative, the City will be responsible for the costs of such inspection.

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

DETAILED SPECIFICATION
FOR
SOIL EROSION CONTROL

The Contractor shall maintain and remove soil erosion and sedimentation control measures, including but not limited to, fabric filters at all drainage structures, all in accordance with all applicable City (and other governmental agencies) codes and standards, as directed by the Engineer, Supervising Professional, as detailed in the Standard Specifications, and as shown on the Plans.

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

DETAILED SPECIFICATION
FOR
VACUUM TYPE STREET AND UTILITY STRUCTURE CLEANING EQUIPMENT

The Contractor shall furnish and operate throughout the construction period, vacuum type street cleaning and utility structure cleaning equipment (Vac-All, Vactor, etc.) approved by the Engineer, as and when directed by the Engineer for dust control, for dirt/debris control, and for street cleaning immediately prior to, and for street and utility structure cleaning after any and all paving. The cleaning equipment shall be of sufficient power to remove dust, dirt, and debris from the pavement and from utility structures in and adjacent to the construction area.

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

DETAILED SPECIFICATION
FOR
SITE CLEAN-UP

Immediately after completion of construction on each block, the Contractor shall clean the entire area within the influence of construction, including but not limited to all pavement, sidewalks, lawn areas, and underground utility structures, of all materials which may have accumulated prior to or during the construction.

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

DETAILED SPECIFICATION
FOR
MATERIALS AND SUPPLIES CERTIFICATIONS

The following materials and supplies shall be certified by the manufacturer or supplier as having been tested for compliance with the Specifications:

HMA materials
Hot-poured Joint Sealants
Cements, coatings, admixtures and curing materials
Sands and Aggregates
Steel and Fabricated metal
Portland Cement Concrete Mixtures
Reinforcing Steel for Concrete
Reinforcing Fibers for Concrete
Pre-cast Concrete products
Sanitary Sewer Pipe
Storm Sewer Pipe
Water Main Pipe
Corrugated Metal Pipe
High Density Polyethylene Pipe
Timber for retaining walls
Modular Concrete Block for retaining walls
Edge Drain and Underdrain Pipe
Geotextile Filter Fabric and Stabilization Fabric/Grids

The Contractor shall submit all certifications to the Engineer for review and approval a minimum of three business days prior to any scheduled delivery, installation, and/or construction of same.

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

DETAILED SPECIFICATION
FOR
CONTRACT DRAWINGS/PLANS

The Contractor shall carefully check and review all Drawings/Plans and advise the Engineer of any errors or omissions discovered. The Drawings/Plans may be supplemented by such additional Drawings/Plans and sketches as may be necessary or desirable as the work progresses. The Contractor shall perform all work shown on any additional or supplemental Drawings/Plans issued by the Engineer.

DETAILED SPECIFICATION
FOR EXISTING
SOIL BORING AND PAVEMENT SECTION DATA

Data pertaining to existing soil borings and pavement sections which may be included in these Contract Documents are provided to help the Engineer and Contractor determine the soil conditions existing within the construction area. The City in no way guarantees existing conditions to be the same as shown in the data. The Contractor is solely responsible for any and all conclusions he/she may draw from the data.

DETAILED SPECIFICATION
FOR
WORKING IN THE RAIN

The Contractor shall not work in the rain unless authorized in writing by the Engineer.

The Engineer may delay or stop the work due to threatening weather conditions.

The Contractor shall not be compensated for unused materials or downtime due to rain, or the threat of rain.

The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the rain.

DETAILED SPECIFICATION
FOR
WORKING IN THE DARK

The Contractor shall not work in the dark except as approved by the Engineer and only when lighting for night work is provided as detailed elsewhere in this contract.

The Engineer may stop the work, or may require the Contractor to defer certain work to another day, if, in the Engineer's opinion, the work cannot be completed within the remaining daylight hours, or if inadequate daylight is present to either properly perform or inspect the work.

The Contractor will not be compensated for unused materials or downtime, when delays or work stoppages are directed by the Engineer for darkness and/or inadequate remaining daylight reasons.

The Contractor is solely responsible for repairing all damages to the work and to the site, including road infrastructures, road subgrades, and any adjacent properties, which are caused as a result of working in the dark.

DETAILED SPECIFICATION
FOR
QUANTITIES AND UNIT PRICES

Quantities as given are approximate and are estimated for bidding purposes. Quantities are not guaranteed and may vary by any amount. While it is the City of Ann Arbor and the DDA's intent to complete the project substantially as drawn and specified herein, quantities may be changed or reduced to zero for cost savings or other reasons. **The City of Ann Arbor and the DDA reserve the right to change the quantities and no adjustment in unit price will be made for any change in any quantity.**

DETAILED SPECIFICATION
FOR
GENERAL CONSTRUCTION NOTES

The following notes pertain to all Plan sheets issued as part of this Contract, and these notes shall be considered part of each Plan sheet or Detailed Information Sheet.

1. All work shall conform to latest revision of the City Standard Specifications.

2. The Contractor shall maintain access to all drives throughout the course of construction. Drives shall never be closed during non-working hours, unless otherwise authorized in writing by the Engineer.

3. The Contractor shall completely restore all existing site features to better than, or equal to, their existing condition.

4. The Contractor shall be aware that there are above-ground and below-ground utilities existing in and on these streets which include, but are not limited to: gas mains and service leads; water mains and service leads; storm sewer mains and service leads; sanitary sewer mains and service leads; telephone poles, wires, cables and conduits; electrical poles, wires, cables and conduits; cable television wires, cables and conduits, and other various utilities. The Contractor shall conduct all of its work so as not to damage or alter in any way, any existing utility, except where specified on the Plans or where directed by the Engineer. The City has videotaped and cleaned all sanitary and storm sewers, including storm sewer inlet leads, and has found all of these facilities to be in good condition, with the exception of those shown on the Plans for repairs or replacement.

5. The Contractor is solely responsible for any delays, damages, costs and/or charges incurred due to and/or by reason of any utility, structure, feature and/or site condition, whether shown on the Plans or not, and the Contractor shall repair and/or replace, at its sole expense, to as good or better condition, any and all utilities, structures, features and/or site conditions which are impacted by reason of the work, or damaged by its operations, or damaged 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.

7. The Contractor is solely responsible for furnishing the appropriate equipment and qualified personnel for the size and condition of the site and the requirements of the proposed work. Damage to buildings, amenities, utilities, paving, and facilities within and adjacent to the work area, and to work already performed by the Contractor shall be the responsibility of the Contractor to repair as needed, at no cost to the project.

DETAILED SPECIFICATION
FOR
CONCRETE DURABILITY

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

Submit a job mix formula (JMF) to the Engineer for approval prior to concrete work commencing.

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 2020 MDOT Standard Specifications Section 902.02.A.

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

Portland Cement

Furnish Type IL Portland cement in accordance with section 901 of the MDOT Standard Specifications for Construction meeting the chemical and physical requirements specified in ASTM C595/C595M, Standard Specifications for Blended Hydraulic Cements. Ensure the Type IL Portland cement proposed for substitution is from the same Approved Manufacturer as the Type I Portland cement in the approved JMF.

At least 7 days prior to concrete production, the concrete producer must provide test data (specified below) generated from a four cubic yard (minimum) trial batch of concrete using Type IL Portland cement for the Engineer's review and approval. The trial batch must represent a current approved JMF for either a standard MDOT Grade 3500, Grade 3500HP, Grade 4500, or Grade 4500HP concrete mixture produced using Type I Portland cement, as described in section 1004 of the Standard Specifications for Construction. Ensure the materials and mixture proportions for the Type IL JMF are the same as those documented in the above-mentioned JMF using Type I Portland cement. Minor adjustments to chemical admixture dosages are permitted in efforts to achieve the specified fresh concrete properties. Trial batch compliance

for applications other than Portland cement concrete mixtures will be in accordance with the contract.

The Engineer will review the trial batch test data to determine if the fresh and hardened concrete properties of the Type IL JMF meet specification requirements for the respective MDOT Grade o concrete represented by the trial batch. If the Engineer determines that the trial batch test data are in conformance with specification requirements, then the Type IL Portland cement will be permitted to be substituted in lieu of the Type I Portland cement for all approved concrete mixtures generated at the concrete production facility for the project. If the Engineer determines that the trial batch test data do not meet specification requirements for the respective MDOT Grade of concrete, the Contractor will not be permitted to substitute Type IL Portland cement in lieu of Type I Portland cement. Mix design and JMF documentation for concrete mixtures using Type IL Portland cement will then be required in accordance with subsection 1003.03.C of the Standard Specifications for Construction or the contract, where applicable.

Once Type IL Portland cement is approved for use on the project, reinstatement of Type I Portland cement into the JMF is not permitted. Substitution of other material types or sources, including admixtures, as documented in the initial Type I JMF is not permitted.

Alkali-Silica Reactivity

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

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

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

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

The maximum substitution of cement with the fly ash permitted shall be 25% by weight of total cementitious material (cement plus fly ash). Additional requirements for the Fly Ash, Class F are that the Calcium Oxide (CaO) percent shall be less than 10 % and the available alkalis shall not exceed a maximum of 1.5%. A copy of the most recent mill test report shall be submitted to verify. Note: a Class C fly ash with a minimum total oxides ($SiO_2 + Al_2O_3 + Fe_2O_3$) 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 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 (Na2Oeq). 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 Na2O equivalent. Equivalent sodium oxide is calculated as: (percent Na2O + 0.658 x percent K2O).

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 40º F, the use of accelerators, heated aggregates, silica fume and/or additional forms of cold weather protection will be required. Cold weather will not eliminate the requirement for furnishing and placing a concrete mix that is considered resistant to ASR attack.
Prior to cool weather placement, defined for the purposes of this detailed specification to be, air temperatures between 40º and 60º F, the set time of the proposed mix shall be verified under anticipated field conditions. This information shall be used when scheduling pours and saw crews.

Air Entrainment

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

Paver placement: During production, the plastic concrete material shall be tested for acceptance at a point ahead of the paver. The air content of the concrete mixture that the Contractor shall provide shall

be known as the Acceptance Air Content (AAC). The Contractor shall also provide additional entrained air in the concrete mixture to account for the air loss which occurs in the concrete mixture experienced during transportation, consolidation and placement of the concrete. The "air loss" shall be added to the air content of the concrete mixture as established on the approved concrete mix design. The AAC for the project will be 6.0% plus an amount equal to the air loss.

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

After the AAC has been established, it shall be verified and/or adjusted through daily checks of the air loss through the paver. The Contractor shall check the air loss through the paver a minimum of two times a day. A Revised AAC shall be required to be established by the Contractor if the average air loss from two consecutive tests deviates by more than 0.5% from the current accepted air loss. The testing operations performed by the Contractor to establish a revised AAC shall be performed to the satisfaction of the Engineer. The Contractor shall be solely responsible for any delays and/or costs that occur to the project while establishing revised AACs.

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

CONSTRUCTION METHODS

Aggregate Control

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

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

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

Mixing

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

Drum Mix Plants: After all solid materials are assembled in the mixer drum; the mixing time shall be a minimum of 60 seconds and a maximum of 5 minutes. The mixing time may be decreased if the ASTM C-94 11.3.3 mixer efficiency tests show that the concrete mixing is satisfactory. The Engineer

may require an increase in the minimum mix time if the mixer efficiency test determines that the concrete is not being mixed satisfactorily. The minimum mixing time shall start after the mixer is fully charged. Mixers shall be operated at the speed recommended by the manufacturer as mixing speed. The mixer shall be charged so that a uniform blend of materials reached the mixer 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 samples taken, one after approximately 20% discharge and one after approximately 90% discharge of the batch, show a variation greater than 3/4 inch (20 mm) or 25% of the average of the two, whichever is greater, the Engineer may require the mixing to be increased, the batch size reduced, the charging procedure be modified or the unit removed from the work.

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

Curing

Apply liquid curing compound in a fine atomized spray to form a continuous, uniform film on the horizontal surface, vertical edges, curbs and back of curbs immediately after the surface moisture has disappeared, but

no later than 30 minutes after concrete placement. With approval of the Engineer, the timing of cure application may be adjusted due to varying weather conditions and concrete mix properties.

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

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

The finished product shall appear as a uniformly painted solid white surface. Areas exhibiting a blotchy or spotty appearance shall be recoated immediately.

COMPLIANCE WITH STANDARDS

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

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

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

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

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

MEASUREMENT AND PAYMENT

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

CITY OF ANN ARBOR

NOTICE TO BIDDERS

EXISTING IN SITU SOILS

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The Contractor shall be aware that soils within the City of Ann Arbor and Washtenaw County contain levels of naturally-occurring, regulated, elemental metals.

The City of Ann Arbor is unaware of any previous activities that would have contaminated the existing soils by a hazardous substance as a result of human activity.

In accordance with the applicable project requirements, all excavated material shall become the property of the Contractor. Any excavated material that cannot be incorporated into the project work, in accordance with the material requirements of the work being performed, must be properly disposed of off-site by the Contractor. Consequently, in-situ excavated soils that do not exhibit odors, discoloration, or other indications of contamination are not required to be disposed of in a landfill and may be disposed of by the Contractor by the method of their choice. The City of Ann Arbor suggests a disposal method that minimizes future human contact with the soil or the soil's contact with a water course or ground water sources. The Contractor shall ultimately be responsible for any disposal method they choose.

The Contractor's submittal of a bid for this project shall be considered prima fascie evidence that they have considered these facts and have included all necessary resources to perform all work of this project and to properly dispose of excavated soils from this project off-site.

DETAILED SPECIFICATION
FOR
PROGRESS CLAUSE, including:
ITEM # 201 – ALLOWANCE FOR INCENTIVES FOR EARLY COMPLETION OF WORK, STAGE__

PROGRESS CLAUSE: The Contract Award is expected on May 17th, 2022. In no case shall any work be commenced prior to receipt of formal notice to proceed by the City of Ann Arbor.

The work shall be completed in a methodical sequence of activity (or "stages") moving through the project site, as indicated on the *Construction Phasing Plan* and *Traffic Maintenance Plans*; and within the Stages noted on the plans and herein. The Contractor may propose alternative ideas to the phasing and scheduling of the work for consideration by the City of Ann Arbor. If, after consideration, the Engineer believes that the alternative proposed is beneficial to the City, they may opt to accept the proposed alternative.

In general, the project will proceed in two Stages and be completed over two construction seasons:

- Stage 1 (2022): State Street from the southern boundary of construction to the Liberty Street intersection, and all work on North University Avenue.
- Stage 2 (2023): State Street from a point south of Liberty Street to the northern boundary of construction.

During all Stages, disruption to intersections shall be minimized and no work will be allowed during the dates and event listed herein.

The Project takes place within a heavy merchant and pedestrian environment. The Contractor is required to work with the City of Ann Arbor and the DDA to sequence work to minimize merchant disruptions as much as possible.

Pedestrian access to all buildings must be maintained throughout the construction period. Pedestrian ramp crossings at intersections shall always be maintained at three of four corners. Only one corner of an intersection can be closed at a time. All pedestrian access shall be ADA compliant.

Vehicular, solid waste, and pedestrian access must be provided to parking lots, service areas, and alleys at all times. Work in these areas will be coordinated to provide at a minimum, partial width and temporary access as needed. The Contractor will be required to coordinate and communicate with property owners and tenants that may be impacted.

Landscape maintenance will occur for a three-year period beginning at substantial completion of the completed work as determined by the City of Ann Arbor. This work is anticipated to be undertaken from September 1, 2023 to September 1, 2026.

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

The Contractor for the work covered by this proposal will be required to meet with the Engineer to work out a detailed Progress Schedule. The schedule for this meeting will be set within two weeks after the approved contractor is determined. Prior to this meeting the contractor will also submit for review and

approval a Project Schedule consisting of sequence of operations and staging plan to complete the work by the specified completion date.

The named subcontractor(s) for Specialty and/or Designed Items (if such items are designated in the proposal) which materially affect the work schedule shall also be present at the scheduled meeting, and they will be required to sign the Progress Schedule to indicate their approval of the scheduled dates of work set forth in the Progress Schedule.

The Engineer will arrange the time and place for the meeting.

The Plans and Detailed Specifications describe logistics, coordination and scheduling requirements of the Project which shall be included in the Progress Schedule and otherwise conformed to. Work will be allowed from 7am – 8pm, Monday – Saturday. Exceptions to work outside those hours are made on a case-by-case basis only and require city administration approval.

Work beyond these hours is subject to the approval of the Engineer, and subject to approval of an extended hours work permit application by the City of Ann Arbor.

No work may be performed on Memorial Day, Independence Day, Labor Day or on the event dates shown below:

2022

- Mon 5/30 Memorial Day
- Mon 7/4 Independence
- Mon 7/18 - Sat 7/23 Art Fairs
- Sat 9/3 - Mon 9/5 UM home football, Labor Day
- All other home football Saturdays.

2023

- Thu 4/27 – Sat 4/29 UM Commencement
- Mon 5/29 Memorial Day
- Tue 7/4 Independence
- Mon 7/17 - Sat 7/22 Art Fairs
- Sat 9/2 - Mon 9/4 UM home football, Labor Day
- All other home football Saturdays.

Ann Arbor Art Fair: No work is allowed between the Monday prior to Art Fair and the Monday following it. Prior to this work stoppage all businesses shall have pedestrian access in place, all equipment and stored materials will be relocated off site, all street surfaces shall have a temporary surface as noted on the plans, and all unnecessary barricades removed. The site will be left in a clean and orderly condition. Temporary pavement for the Art Fair will be paid for separately and is not considered part of General Conditions.

Project Stages Description:

As this project includes impacts a key commercial corridor that is an important link in the vehicular street network of the downtown, serves as a bus route for both the University of Michigan and the AAATA, and experiences high volumes of pedestrian traffic, it is vital that each Stage of work and its completion be coordinated, efficient, and timely to ensure that roadway operations are safe to travel for all users.

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 within authorized hours in order to complete the project by the final completion date. Costs for the Contractor to organize, coordinate, and schedule all of the work of the project, will not be paid for separately, but shall be included in the bid price of the Contract Item "General Conditions."

The Stages of construction are described in this detailed specification, other detailed specifications, and on the plans.

Stage 1:
Stage 1 includes the completion of work on State Street between the southern boundary of construction and Liberty Street. It is anticipated that once underground utility work is sufficiently complete, construction of new curbs, roadway, bikeway elements, and streetscape can commence. During Stage 1, it is anticipated that the full roadway from William to south of Liberty will be closed per the *Construction Phasing Plan* and *Traffic Maintenance Plans*, while maintaining emergency access for vehicles; and sidewalk and crosswalk access for pedestrians. There will be a period of time (Stage 1-A) where the Liberty intersection will also be closed. During the duration of construction, a 10 ft wide roadway is to be open for emergency vehicle access.

At a minimum the following work must be completed in Stage 1A and Stage 1B by **September 1, 2022**, unless approved otherwise by the City of Ann Arbor:

1) Installation and testing of new water mains and installation of storm drainage system, from the southern limits of construction to the Liberty Street intersection.
2) Final sidewalk, sidewalk unit pavers, roadway paving, lighting and electrical work from the southern limits of the project to the point noted on the plans north of the intersection of North University Avenue.
3) Road and bikeway striping on North University, and related bikeway amenities.
4) Temporary paving as needed from the northern crosswalk of the North University intersection through the Liberty Street intersection.
5) Signalization improvements at William Street and North University intersections.

Stage 2:
Stage 2 includes the substantial completion of all work on State Street between the northern boundary of construction and the point identified on the plans between Liberty Street and North University Avenue. During construction a 10 ft wide roadway is to be open for emergency vehicle access. Though the road will be closed north of North University to south of Huron Street and is denoted as Stage 2, the Contractor shall start work on the southern portion of the project first and work north. This initial sub-stage is called Stage 2A and is defined as all work between the southern side of the Liberty Street intersection and the southern limits of the project. Stage 2B is defined as all work north Stage 2A to the northern limits of the project. Work in Stage 2A and Stage 2B is anticipated to occur concurrently.

At a minimum the following work must be completed in Stage 2A by **July 14, 2023**, unless approved otherwise by the City of Ann Arbor:

1) Final sidewalk, sidewalk unit pavers, and roadway paving
2) Lighting and electrical work
3) Landscape installation
4) Site furnishings

Construction for the entire project must be substantially complete by **September 1, 2023**, unless approved otherwise by the City of Ann Arbor, and reach final completion by **October 1, 2023**. Substantial Completion includes the installation and functioning completion of:

1) Final sidewalk, sidewalk unit pavers, and roadway paving
2) Lighting and electrical work
3) Landscape installation
4) Site furnishings
5) Storm water system
6) Watermains, appurtenances, and services
7) Signalization improvements
8) Road and Bikeway Striping
9) Removal of detours and traffic controls and barricades

Liquidated Damages in the amount of $5,000 per calendar day will be charged for delays beyond the completion date for each Stage,. This includes delays to pedestrian access as specified above.

As a financial incentive to complete the Project in a timely manner, and as additional consideration for the Liquidated Damages provision, the City of Ann Arbor agrees to pay the Contractor $5,000.00 for each calendar day (maximum 10 days per stage) the work has achieved completion, as defined herein, in advance of the date established for each Stage of construction specified.

If the Contractor shall fail to Substantially Complete the Work within the Contract Time, or extension of time granted by the City of Ann Arbor, then the Contractor will pay to the City of Ann Arbor the amount for liquidated damages as specified in the Agreement for each calendar day that the Contractor shall be in default after the time stipulated in the Contract Documents. The liquidated damages charged shall be deducted from the Contractor's progress payments.

The Contractor shall not be charged with liquidated damages or any excess cost when the delay in Substantial Completion of the Work is due to the following and the Contractor has given written notice of such delay within seven (7) calendar days to the City of Ann Arbor or Engineer.

A. To any preference, priority or allocation order duly issued by the City of Ann Arbor.

B. To unforeseeable causes beyond the control and without the fault or negligence of the Contractor, including but not restricted to, acts of God, or of the public enemy, acts of the City of Ann Arbor, acts of another Contractor in the performance of a Contract with the City of Ann Arbor, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and abnormal and unforeseeable weather; and

C. To any delays of Subcontractors occasioned by any of the causes specified in Items A and B of this section.

Liquidated Damages will be assessed or "Allowance for Incentives for Early Completion of Work Stage ___" will be awarded for the following interim completion stages based in the following dates:

1) Stage 1 (1A and B as a single date): September 1, 2022
2) Stage 2A: July 14, 2023
3) Substantial Completion for Entire Contract: September 1, 2023

For each of the three interim completion stages, the maximum "Allowance for Incentives for Early Completion of Work Stage ___" will be $50,000.00, for a total contract maximum amount of $150,000.00. This amount is considered as an allowance in the bid.

Should the Engineer approve a request for extension of time and revise any contract completion date(s), the Liquidated Damages or "Allowance for Incentives for Early Completion of Work Stage ___" will be based on the revised date(s) for which the time extensions specifically apply.

Measurement and Payment.- Any "Allowance for Incentives for Early Completion of Work Stage ___" earned as described above will be paid using the following pay items:

Pay Item	**Pay Unit**
Allowance for Incentives for Early Completion of Work Stage ___	Dollar

"Allowance for Incentives for Early Completion of Work Stage ___" shall be measured and paid for in accordance with the requirements of this special provision and payment shall include any and all labor, material, and
equipment costs to perform all of the work specified on the contract drawings, contract documents, and as directed by the Engineer.

All incentive amounts are additive and may be paid concurrently up to the maximum stated amounts for each Stage.

Liquidated Damages will be assessed until all required work is completed for each stage as defined herein. There are no maximum limit on the Liquidated Damages amounts that may be charged to the Contractor. There will be no seasonal suspension of Liquidated Damages except as otherwise provided for herein.

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
Item 140: Vertical Exploratory Excavation

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a. Description. The use of this special provision is to compensate the Contractor to locate underground infrastructure, such as culverts, sewers, utilities, and/or to expose the existing pavement section. Use must only be as directed and approved by the Engineer. This special provision is not to compensate the Contractor for the responsibilities in subsection 107.12 of the 2020 MDOT Standard Specifications for Construction.

This work consists of conducting a vertical exploratory investigation to expose an existing culvert, sewer, utility/utility service, or the existing pavement section in order to verify the location, condition, size, material, alignment and/or composition; allowing the Engineer to document the necessary information; and backfilling the excavation. It includes providing necessary lane, shoulder and/or sidewalk closures required to perform the work.

The intent of "Exploratory Excavation" is not to provide a means for the Contractor to locate each existing utility throughout the project, but for those that appear to be in conflict with the proposed work and their location is unclear or unknown. The Contractor is responsible for "using reasonable care to establish the precise location of the underground facilities in advance of construction" (Public Act 174 of 2013 - Miss Dig Law) as a part of the overall project contract.

b. Materials. Use Granular Material Class III in accordance with section 902 of the 2020 MDOT Standard Specifications for Construction for backfill. Use material removed during exploratory investigation for backfill only if approved by of the Engineer.

c. Construction. The owner of any sewer or utility to be exposed will not take the facilities out of service during the exploratory investigation. Contact utility owners in accordance with subsection 107.12 of the 2020 MDOT Standard Specifications for Construction.

Establish necessary lane, shoulder and/or sidewalk closures required to perform work.

Advance the exploratory excavation using vacuum excavation, hand digging, conventional machine excavation, or a combination thereof subject to approval of the Engineer. Allow the Engineer access to document the necessary information. If the technique used to advance the excavation causes any damage to the existing facilities, immediately contact the utility owner and cease all work until Engineer approves of an alternate method.

Take care to protect the exposed culvert, sewer or utility from damage during construction. Repair or replace culvert, sewer or utility, damaged during exploratory excavation, in accordance with the standard specifications and as approved by the Engineer.

Obtain the Engineer's approval before backfilling the excavation. Complete backfilling no later than 24 hours after approval. Backfill in accordance with subsection 204.03.C of the 2020 MDOT Standard Specifications for Construction. Dispose of excess material in accordance with the standard specifications.

The Contractor is responsible for all costs associated with the repair work and out of service time of all broken or damaged existing culverts, sewers or utilities resulting from any action by the Contractor. If the exploratory investigation results in damage to utilities, contact the owner of such utility to coordinate the repair.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the contract unit price for the following pay item:

Pay Item	**Pay Unit**
Item 140: Exploratory Excavation, (0-10 ft. deep) (Trench Det 1, Modified)	Each

Exploratory Investigation, Vertical will be paid for per each excavation a maximum of 10-feet deep for a 4-foot maximum diameter hole, or as approved by the Engineer. Measure and pay for each 4-foot maximum diameter hole separately. One paid excavation may include multiple utility verifications if the utilities are close in proximity.

Exploratory Investigation, Vertical includes all cost for labor, equipment and materials necessary to complete the work, including all costs associated with repair or replacement resulting from the Contractor’s activities.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
ITEM: 210-01: **AUDIO-VISUAL RECORDING**

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

The 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 two (2) weeks prior to bringing any materials or equipment within the areas described in this special provision.
4. Furnished to the Engineer either at, or prior to, the preconstruction meeting.
5. 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. The Contractor shall retain a third copy of the recording for his/her own use.

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

b. 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 48 feet per minute (0.55 miles per hour). Pan and zoom rates shall be controlled sufficiently so that playback will ensure quality of the object viewed.

3. Display. - The recording equipment shall have transparent time, 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.

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

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.

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

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

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

3. Road Construction Area. - The recording coverage shall:
   a. Extend to 50 feet outside of the right-of-way and easements area as shown on the plans.
   b. Extend 50 feet outside the construction limits on all streets, including side streets.

   Both sides of each street shall be recorded separately.

4. Detour Route / Maintenance of Traffic Areas. The entire detour route, if one is

provided for on the project plans, and maintenance of traffic areas shall be recorded as indicated in this special provision except as follows:

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

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

5. Private Property bordering the project limits or work areas. Record all areas bordering the project where work is scheduled to occur or where construction traffic could damage the private property. This is to include buildings, driveways, decks, landscaping, trees, lawns, and all other similar features.

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

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

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

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

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

Contract Item (Pay Item)	**Pay Unit**
Item 210-01: Audio-Visual Recording	Lump Sum

Audio-visual Recording 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 Audio-visual Recording 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.

DETAILED SPECIFICATION
FOR
ITEM #210-02 - 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
Item 210-2: Certified Payroll Compliance and Reporting	Lump Sum

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

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

DETAILED SPECIFICATION
FOR
ITEM #210-03- GENERAL CONDITIONS, MAX $200,000

DESCRIPTION

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

- Scheduling and organization of all work, subcontractors, suppliers, testing, inspection, surveying, and staking
- Coordination of, and cooperation with, other contractors, agencies, departments, and utilities
- Protection of Utilities
- Placing, maintaining, and removing all soil erosion and sedimentation controls
- Maintaining drainage
- Maintaining drives, drive openings, sidewalks, pedestrian building access, mail deliveries, and solid waste/recycle pick-ups
- Storing all materials and equipment off lawn areas
- Coordination efforts to furnish various HMA mixtures as directed by the Engineer
- Furnishing and operating vacuum-type street cleaning equipment
- Furnishing and operating vacuum-type utility structure cleaning equipment
- Furnishing and operating both vibratory plate and pneumatic-type ("pogo-stick") compactors
- Furnishing and operating all equipment required to complete the proposed work activities as specified
- Noise and dust control
- Furnish and install temporary barricades and fencing at excavation areas to protect workers and people in the work area.
- Mobilization(s) and demobilization(s)
- Furnishing submittals and certifications for materials and supplies
- Disposing of excavated materials and debris
- All miscellaneous and incidental items such as overhead, insurance, and permits.
- Interim and final site cleanup, including, but not limited to removal and disposal of excess materials, removal of all dirt and deleterious materials, power washing pavements, removal of all packing materials and labels, etc.
- Scheduling and organization of all work, subcontractors, suppliers, testing, inspection, and construction surveying and staking;
- coordination of, and cooperation with, other contractors, agencies, departments, and utilities;
- Coordination with City forces to stockpile and load used castings on City vehicles;
- Protection and maintenance of all existing utilities, including support, protection, capping, repair, replacement, connection or re-connection of existing pipes, and utilities damaged by the Contractor's operations;
- Maintaining and removing al soil erosion and sedimentation controls (as specified herein or as shown on project plans) for which no pay item exists;
- Maintaining the site, and all areas within the Construction Influence Area, in a well-graded and drained state at all times during the course of the project. De-watering and drainage of all excavations as required to maintain a stable. Open hole;
- The continuous maintenance of the temporary road surface with the Construction Influence Area throughout the duration of the construction. This includes any needed grading to maintain the surface in a smooth condition free of potholes, ruts, bumps, or other objectionable conditions;

- Temporary sheeting, bracing, and shoring of excavations in accordance with the applicable MIOSHA Standards;
- Maintaining driveway openings. Sidewalks, bike paths, mail deliveries, and solid waste/recycle pick-ups. This includes the placement and maintenance of maintenance aggregate in driveway opening and across sidewalk ramps all as needed and as directed by the Engineer;
- 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;
- Storing all materials and equipment off lawn areas;
- Temporary removal/re-location, storage, and re-installation/re-setting of existing street name, guide, and regulatory signs, mailboxes, newspaper tubes, etc. which conflict with the proposed construction;
- Site clean-up on a daily basis during the course of the project's construction.
- Coordination efforts to furnish the various required HMA mixtures as directed by the Engineer;
- Coordination efforts to furnish and operate various-size vehicles/equipment as directed by the engineer;
- Furnishing and operation vacuum-type street cleaning equipment a minimum of once per week, or more frequently, if directed by the engineer;
- Furnishing and operating vacuum-type utility structure cleaning equipment;
- Furnishing and operating both vibratory plate and pneumatic-type ("pogo-stick") compactors;
- Furnishing and operating a backhoe during all work activities;
- Furnishing and operating a jackhammer and air compressor during all work activities;
- Noise and dust control in accordance with the applicable City of Ann Arbor Ordinances;
- Mobilization(s) and demobilization(s) of all needed materials. Equipment, and personnel;
- Furnishing all required shop drawing, information submittals, and material certifications for all needed materials and supplies incorporated into the project;
- The proper off-site disposal of all excavated materials and debris;
- Removal of shrubs, brush, and trees less than 8" diameter (DBH) as shown on the plan sheets or as directed by the engineer;
- Trimming of trees and brush to accommodate intersection sight distance as shown on plans;
- Fencing to protect excavation over 1' in depth during non-work hours. The fencing must be a minimum of 36" high, be constructed of orange HDPE material, and reasonably secured to prevent unwarranted access;
- Submittal of Close-Out Documents at the conclusion of work and prior to final payment, including as-built documentation of field changes and manufacturer's product warrantee and maintenance instructions;
- All miscellaneous and incidental items such as overhead, insurance, and permits; and,
- Meeting all requirements relating to Debarment Certification, David 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, t
he measurement of this item shall be 1.0 Lump Sum.

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

PAY ITEM	PAY UNIT
Item 210-03 General Conditions, Max $200000	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.

DETAILED SPECIFICATION
FOR
ITEM #210-04 - PROJECT SUPERVISION, MAX $175,000

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 also be responsible for communicating the work schedule with all impacted businesses.

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.

Prior to the pre-construction meeting, the Contractor shall designate a proposed Project Supervisor by name and shall furnish the City of Ann Arbor and the DDA 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, DDA, the public, subcontractors, and all other parties typically involved with work of this nature. The Project Supervisor shall be able to demonstrate that they have filled a supervisory role on at least three projects of similar scope and size within the last 5 years. The Supervising Professional, Engineer, and DDA 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 DDA 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 DDA with 24 hour- per-day access to him/her during daily construction activities, during transit to and from the construction site, and during all non-business hours including weekends and holidays.

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

DUTIES AND RESPONSIBILITIES

The Project Supervisor work harmoniously with the City, DDA, 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, landscape materials, electrical equipment, pre-cast unit pavers, 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 is responsible to assure that mail delivery, solid waste, and recycling pick-ups are uninterrupted by the construction.

The Project Supervisor is responsible to coordinate deliveries to the local businesses.

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

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

The Project Supervisor shall coordinate and schedule the work of any independent survey crews that may be retained by the City or DDA 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 and DDA 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 performed work, 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.

The Project Supervisor shall engage with the affected businesses to communicate expectations for the work and to adjust the construction methods and/or times to best accommodate the local businesses.

ADDITIONAL PERFORMANCE REQUIREMENTS

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

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

writing with a plan to correct the stated deficiencies. Failure to respond within 7 calendar days will result in the issuing of a second notice.

Second Notice – A second warning will be issued in writing to the contractor further detailing the deficiencies in the Project Supervision. The contractor must respond within 7 calendar days in writing with a plan to correct the stated deficiencies. Failure to respond within 7 calendar days will result in the issuing of a third notice. A deduction of 10% will be made from the original Project Supervision contract amount. At this time, the DDA 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 the work of this Contract has been completed, the measurement of this item shall be 1. 0 Lump Sum, minus any deductions incurred for inadequate performance as described herein. This amount will not be increased for any reason, including extensions of time, extras, and/or additional work.

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

PAY ITEM	PAY UNIT
Item 210-04 Project Supervision, Max $175,000	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
MAINTAINING TRAFFIC
AND
CONSTRUCTION SEQUENCING

221-01 Minor Traffic Devices, Max $100,000
221-02 Traf Regulator Control
221-03 Barricade, Type III, High Intensity, Double Sided, Lighted, Furn & Oper
221-04 Plastic Drum, Fluorescent, Furn & Oper
221-05 Channelizing Device, 42 Inch, Fluorescent, Furn & Oper
221-06 Remove Pavement Striping
221-07 Lighted Arrow, Type C, Furn & Oper
221-08 Sign, Portable, Changeable Message, Ntcip-Compliant, Furn & Oper
221-09 Sign Cover
221-10 Sign, Type B, Temp, Prismatic, Furn & Oper
221-11 Sign, Type B, Temp, Prismatic, Special, Furn & Oper

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General.- Traffic shall be maintained in accordance with Sections 104.11, 810, 811, 812, 919, and 920 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, the 2011 edition of the Michigan Manual of Uniform Traffic Control Devices (MMUTCD) as amended, applicable supplemental specifications, as directed by the Engineer, except as herein provided.

The following, and herein included Michigan Department of Transportation (MDOT) Maintaining Traffic Typicals and Work Zone Device Details apply to the project: 101-GEN-SPACING-CHARTS, 102-GEN-NOTES, 101-TR-NFW-2L, WZD-100-A, and WZD-125-E.

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

The Contractor shall furnish, erect, maintain and upon completion of the work remove all traffic control devices and warning lights within the project and around the perimeter of the project for the safety and protection of through and local traffic. This includes, but is not limited to; advance, regulatory, and warning signs; barricades and channeling devices at intersecting streets on which traffic is to be maintained; barricades at the ends of the project and at right-of-way lines of intersecting streets, temporary concrete barriers, temporary pedestrian paths and ramps, and moving traffic control devices for construction operations.

Materials.- The materials and equipment shall meet the requirements specified in the sections designated of the MDOT 2020 Standard Specifications for Construction, the MMUTCD, and all Special Provisions contained in these Contract Documents.

All signs shall be of sizes shown on the plans, unless otherwise directed by the Engineer. Install temporary signs that are to remain in the same place for 14 days or more on driven posts. Install all other temporary signs on portable supports. All signs shall have a minimum bottom height of 7.0 feet.

Channelizing devices required for all lane closures shall be plastic drums. 42 inch channelizing devices are permissible for other work with approval from the Engineer.

Cold Patching Material shall meet the requirements of the City of Ann Arbor Standard Specifications for Construction and as approved by the Engineer.

Permits.- Prior to the start of construction, the Contractor shall obtain a "Right-of-Way" Permit from City of Ann Arbor Planning and Development Services and a "Lane Closure" Permit from City of Ann Arbor Project Management Services Unit. The fees for these permits will be waived. The lane closure permit must be obtained at least 48 hours in advance of any proposed street or lane closing.

Work Restrictions.-
During non-working periods, any area with uncompleted work shall have plastic drums at specific locations and protective fencing, as directed by the Engineer, and at no additional cost to the project.

Do not impact traffic on major streets between the hours of 7:00 a.m. to 9:00 a.m. and from 3:30 p.m. to 6:00 p.m. unless otherwise approved by the Engineer or as specified on the Lane Closure Permit. Do not make any traffic control changes between 7:00 a.m and 9:00 a.m. and 3:30 p.m. to 6:00 p.m. in order to minimize interference with rush hour traffic. All traffic controls must be in place and ready for traffic each day by 7:00 a.m. and 3:30 p.m. The Engineer will permit temporary obstruction of traffic for loading and unloading of trucks if the Contractor provides traffic regulators (flag persons) in conformance with Part VI of the MMUTCD. During temporary obstructions, a minimum of two traffic regulators are required.

Maintain access to businesses, residences, and side street(s) within the CIA for the duration of the project. The Contractor shall make every effort to coordinate its operations to minimize interruptions that may impact this access. The Contractor shall notify the Engineer forty-eight (48) hours in advance of any work planned on or near business or residential driveways, and stage work so that it is part-width when it is necessary to work in these areas. The Engineer will not allow the Contractor to prohibit access to businesses and residences during any phase of construction, unless agreed upon with the property owner(s). The Engineer may require traffic regulator (flag) control at its discretion, and will direct the Contractor to provide it when necessary to maintain safe access to businesses, residences, and side street(s).

Construction Influence Area (CIA).- The CIA shall include the area from POB to POE within the Right-of-way of William St., State St, Liberty St, Washington St, N. University St and all other intersecting streets. The CIA shall also include the affected portions of the driveways along and contiguous with these roadways.

In addition, the CIA shall include the rights-of-way of all roadway segments used for detours and all locations that contain advance warning and/or regulatory signs, pavement markings, plastic drums, traffic delineators, and all other project related traffic maintenance items.

Police and Fire.- The Contractor shall notify local police, fire departments and emergency response units a minimum of three business days (72 hours) prior to the closure of any roads, or traffic shifts causing restricted movements of traffic or restricted access.

Work Performed by City of Ann Arbor Signs and Signals Unit.- No additional or extra compensation will be paid for any delays caused by City of Ann Arbor Signs and Signals.

Signal Modifications

Signal timing and phasing modifications are anticipated for construction at the State Street and William Street, North University Street, Liberty Street, and Washington Street intersections. Modifications may also be required at adjacent intersections. Contractor shall coordinate work with the City ahead of changes in the traffic control.

Sign Reinstallation

As necessary during construction, the Contractor shall be responsible for logging the legend and location of any signs that:

1. Must be removed to facilitate the construction process;
2. Are to be permanently removed, or;
3. Are to be permanently relocated.

City of Ann Arbor Signs and Signals will remove and store the signs. After construction is complete, but before opening any roadway to traffic, Signs and Signals will reinstall all signs in their proper, permanent location. To coordinate sign removal and installation/reinstallation, the Contractor shall notify the Signs and Signals Unit at least five (5) working days (Monday-Friday) in advance of when the sign work will need to be completed. It is the responsibility of the Contractor to ensure that City of Ann Arbor Signs and Signals Unit is scheduled, kept apprised of the progress of construction, and notified a second time immediately (4 working hours) prior to the need to complete the sign work. The removal and installation/reinstallation of all signs shall be completed by the City of Ann Arbor Signs and Signals Unit.

Maintenance of Traffic, General.- Unless otherwise indicated on the drawings, residential side streets shall not be closed to through traffic except during construction operations of short duration and only with written approval of the Engineer.

The Contractor shall maintain at least one 10 ft lane of through traffic along each street during the course of the Project's construction.. Contractor shall schedule work in order to maintain traffic flow and under no circumstances stop traffic for prolonged periods as determined by the Engineer. The Contractor shall suspend work within the CIA during peak traffic hours and/or when construction activities are unduly hampering or delaying traffic flow as determined by the Engineer.

Mailboxes requiring relocation due to construction shall be removed and reset immediately by the Contractor in a temporary location approved by the Engineer and meeting the requirements of the United States Postal Service. This work shall be included in the contract pay item "General Conditions, Max. $__(see pay item)___".

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

Maintenance.- A minimum of one (1) driveway shall be maintained at all times to all residences and businesses. Walks, driveways, and entrances to houses shall not be blocked. Vehicular and pedestrian access shall be maintained to all properties.

Exploratory Excavations, utility crossings, and all other openings created by the Work over which vehicular traffic will be maintained shall receive a minimum cover of 3 inches of Cold-Patching material that is thoroughly compacted in place.

Signs and Pavement Markings.- When lane closures are in place, the Contractor shall completely cover all conflicting warning, regulatory and guide signs in accordance with Section 812.03.D.2 of the Standard Specifications for Construction, 2020 edition, and all applicable details therein.

Construction.- This provision does not detail all the project work. It is intended to indicate major project requirements and assist the Contractor in developing, for the review and approval of the Engineer, the Progress Schedule for the project.

The Contractor shall notify the Engineer a minimum of 5 working days prior to the implementation of any detours, road closures, ramp or lane closures, and major traffic shifts. The Contractor shall also notify City of Ann Arbor Signs and Signals regarding signal work as specified in the section entitled "Work Performed by City of Ann Arbor Signs and Signals Unit."

Contractor required to perform dewatering required to construct utilities. All storm sewer on mainline systems shall be reconnected prior to leaving the work site each day to

maintain drainage flows. If contractor cannot reconnect the piping system at the end of each day, then the Contractor shall provide, install, and maintain bypass pumping equipment, operations and related supervision at no additional cost.

Phase 1: State Street Work & Detour Routes: South of William Street to South of Liberty Street

For majority of Phase 1, State Street will be closed from south of William Street to south of Liberty Street. The northbound detour will be Packard Street to Division Street to Liberty Street. The southbound detour will be Liberty Street to Fifth Avenue to Packard Street. One SB lane of State Street will be maintained for emergency vehicles. For a period of time, the closure will extend through the Liberty Street intersection. The northbound detour will be Packard Street to Division Street to Washington Street. The southbound detour will be Washington Street to Fifth Avenue to Packard Street.

Phase 2: State Street Work & Detour Routes: South of Liberty Street to North of Washington Street

State Street will be closed from south of Liberty Street to north of Washington Street. The northbound detour will be William Street to Division Street to Huron Street. The southbound detour will be Huron Street to Fifth Avenue to William Street. One SB lane of State Street will be maintained for emergency vehicles.

Pedestrians and Bicyclists

If the work involves closing a bicycle lane, BICYCLE (sym) W11-1 and SHARE THE ROAD W16-1P will be used to direct bicycle traffic into the vehicular lane.

For work affecting pedestrian crossings, use the included staging sheets and typical details to maintain pedestrian traffic.

Major Work Tasks - The following major work tasks are included in each stage of work:

1. Implement the traffic control as shown on the project plans, and as directed by the Engineer for this stage of the construction. Coordinate with the City of Ann Arbor Signs and Signals Unit as needed.

2. Install all needed soil erosion and sedimentation control measures. The Contractor shall install only those devices necessary to perform the work of this particular stage or to meet the appropriate Federal, State, or Local regulations.

3. Remove only road and sidewalk surfaces necessary to facilitate utility construction. Maintain HMA road surface for local travel and pedestrian sidewalk access.

4. Install water main, test, accept, connect to system and install leads. The Contractor shall provide reasonable access for vehicles and pedestrians to all residences at all times during construction.

5. Install water services. The Contractor is to maintain traffic at all times. The lead trench shall be backfilled and compacted to asphalt surface and maintained.

6. Install storm water sewer and manholes.

7. Place and compact aggregate base course as directed by the Engineer.

8. Fine grade aggregate base course.

9. Construction of bituminous base course. Place HMA material as shown on the plans and as directed by the Engineer. Provide the needed traffic control devices to perform this work and maintain traffic as approved by the Engineer.

10. Completion of restoration and all other construction activities, except as indicated in the following line item.

11. Coordinate with City and install all signing. Temporarily cover signs in conflict with construction maintenance of traffic.

12. Construction of the bituminous wearing course:

    a. Immediately prior to paving the wearing course, adjust structure covers.
    b. Place bituminous wearing course. Provide the needed traffic control devices to perform this work and maintain traffic as approved by the Engineer.
    c. Place any required pavement markings.

13. Install pavement markings.

14. Reasonable access to all side streets and driveways shall be maintained at all times. The Contractor is to coordinate construction in front of driveways, and the actual driveway construction (where applicable), with affected property owners as detailed elsewhere herein.

Bituminous Paving.- The Contractor shall perform the work of this Contract while maintaining traffic in accordance with 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 traffic regulators (flag persons) and by relocating traffic control devices to prevent traffic from entering the work area until such time that traffic 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.

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.

The paving of the top course shall be conducted under traffic by utilizing traffic regulators (flag persons), channelizing devices and signs in accordance with Part VI of the current edition of the Michigan Manual of Uniform Traffic Control devices (MMUTCD) as amended. The installation and removal of minor traffic control devices needed for the maintenance of traffic during the paving of final wearing course and the furnishing of traffic regulators shall be paid as “Minor Traffic Devices” and “Traffic Regulator Control” as appropriate.

Traffic Regulator Control,- Contractor will provide for Traffic Regulator Control as noted herein, and as directed by the Engineer. Flag Persons performing this work must have adequate professional experience and safety training to perform the work of directing and managing the movement of pedestrians, vehicles, and other sidewalk and street users in a manner that protects the safety of all those present on the job site. Contractor is to coordinate with the Engineer on the timing and need for Traffic Regulator Control operations.

Measurement and Payment.- The estimated quantities for maintaining traffic is based on the maintenance of traffic plans. Any additional signing, traffic control devices, pavement markings, or the like required to expedite the construction, beyond that which is specified, shall be at the Contractor's sole expense.

Payment for Traf Regulator Control will be made on an hourly basis for each flag person actively managing traffic. Minimum daily hours paid will be 4 for each flag person. The use of construction team staff, supervisors, and operators for incidental, short term Traf Regulator Control is not included in this pay item and will not be compensated for separately from the work being undertaken.

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

Contract Pay Item	**Pay Unit**
Item 221-01: Minor Traffic Devices, Max $100,000	LSUM
Item 221-02: Traf Regulator Control	Hourly
Item 221-03: Barricade, Type III, High Intensity, Double Sided, Lighted, Furn & Oper	Each
Item 221-04: Plastic Drum, Fluorescent, Furn & Oper	Each
Item 221-05: Channelizing Device, 42 inch, Fluorescent, Furn & Oper	Each
Item 221-06: Remove Pavement Striping	Linear Foot
Item 221-07: Lighted Arrow, Type C, Furn & Oper	Each
Item 221-08: Sign, Portable, Changeable Message, NTCIP-Compliant, Furn & Oper	Each
Item 221-09: Sign Cover	Each
Item 221-10: Sign, Type B, Temp, Prismatic, Furn & Oper	Square Foot

Item 221-11: Sign, Type B, Temp, Prismatic, Special, Furn & Oper.....Square Foot

The unit price for this item of work shall include all labor, material, and equipment costs required to perform the work specified herein and includes both furnishing and operating the devices.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 221-20: No Parking Sign

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a. 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).

b. 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.

c. 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 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 two feet into the ground, and there shall be a minimum of six feet and maximum of seven 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.

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

Pay Item	**Pay Unit**
Item 221-20: 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.

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

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

1. Ensure the materials used to construct the temporary pedestrian path yields a continuous hard surface that is firm, stable and skid resistant. Ensure the path does not warp, buckle or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials to construct the path include asphalt materials, Oriented Strand Board (OSB), plywood, dimensional lumber, reclaimed, or other as approved by the Engineer. Compacted soils, aggregate and sand are prohibited.

2. If asphalt materials are not used to construct the path, provide an antiskid coating, or surface treatment as directed by the Engineer.

c. Construction. Construct the temporary pedestrian path in accordance with *PROWAG*, the *MMUTCD*, the contract, the direction of the Engineer, and the following:

1. The useable surface of the path must be a minimum of 48 inches wide, additional width may be provided to preclude the use of Temporary Pedestrian Passing Spaces (paid for separately). A minimum width of 60 inches is required if Temporary Pedestrian Passing Spaces are not provided as part of the temporary facility. The maximum cross slope for the path is 2 percent. The path, including transitions to the adjacent surface at both ends, must be free of vertical discontinuities greater than 1/4 inch. Eliminate any vertical discontinuities greater than 1/4 inch up to 1/2 inch or bevel with a slope not steeper than 1:2. If a vertical discontinuity greater than 1/2 inch or a running slope greater than 1:20 occurs on the project, a Temporary Pedestrian Ramp (paid for separately) is required.

A. Ensure an anti-skid surface treatment is applied to the surface of the path, if not constructed with asphalt materials, as directed by the Engineer.

B. If the surface of the path is constructed from OSB, plywood, or dimensional lumber securely connect all sections with appropriate fasteners to ensure a continuous, uniform, and flat surface.

C. The use of rubber mats is allowed. The materials under the mats must be graded smooth and uniform. Gaps between mats greater than ½ inch will not be allowed. Mats should not overlap one another creating lips or bumps.

2. Ensure all debris and construction materials is cleared from the path throughout its use. Ensure snow and ice is removed; the use of an approved de-icing agent may be required.

3. Repair or replace the path, or segments thereof, if it becomes uneven, unstable, or displaces due to weather events, construction activities, or other causes as directed by the Engineer.

4. Following the use of the temporary path, the Contractor must remove and dispose all materials used to construct the path, and restore the area as directed by the Engineer.

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

Pay Item	**Pay Unit**
Item 221-31: Pedestrian Path, Temp	Foot

Pedestrian Path, Temp will be measured along the centerline of the path. **Pedestrian Path, Temp** includes all costs related to installation, maintenance, restoration, and removal of the path and disposal of all associated materials throughout the life of the contract.

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian ramp as identified in the proposal or on the plans. Use temporary pedestrian ramps to facilitate pedestrian travel on accessible facilities over curbs or other uneven terrain features with a vertical difference of 1/2 inch or greater. Damaged pedestrian ramps will be replaced as directed by the Engineer.

b. Materials. Provide materials to construct a temporary pedestrian ramp in accordance with the *Americans with Disabilities Act (ADA)*, the standard specifications, and the following:

1. Ensure the material used to construct the temporary pedestrian ramp is firm, stable, skid resistant, and forms a continuous hard surface. Ensure the surface does not warp, buckle or otherwise become uneven, and materials support the weight of pedestrians as well as motorized scooters and wheelchairs. Suitable materials to construct the surface of the ramp include asphalt materials, Oriented Strand Board (OSB) or plywood, dimensional lumber, certain reclaimed or other materials as approved by the Engineer. Compacted soils, aggregate and sand are prohibited.

2. Provide a handrail on both sides of the ramp if the ramp is not exposed to vehicle traffic and has a total rise greater than 6 inches, and a length greater than 72 inches. Ensure the handrail is between 1.25 and 1.5 inches wide and configured to be a “graspable” cross-section. See construction subsection 2.A for additional details. When the ramp is exposed to traffic, in lieu of handrails, use a protective edge 2.5 inches minimum height above the ramp surface or 1:10 flare on both sides of the ramp.

3. Ensure the surface of the ramp is free draining; in addition, provide features that allow drainage to move past the ramp installation (i.e. along the gutter pan underneath the ramp if the ramp is installed on a curb).

4. Provide materials to construct detectable edging along open sides of the ramp if required.

5. If asphalt materials are not used to construct the surface of the ramp, provide an antiskid coating or surface treatment approved by the Engineer.

c. Construction. Construct the temporary pedestrian ramp in accordance with the manufacturer’s recommendations (if applicable), *ADA*, the plans, and the following:

1. Ensure the useable surface of the ramp is 48 inches wide and does not deflect due to pedestrian traffic. Ensure an anti-skid surface treatment is applied to the useable area of the ramp if it is not made from asphalt materials. The maximum cross

slope of the ramp is 2 percent. Ensure both ends of the ramp smoothly transitions to the adjacent surface, with 1/4 inch or less vertical difference.

Construct the ramp to maintain a longitudinal slope from 1:10 to 1:12 where possible. Otherwise, a longitudinal slope from 1:8 to 1:10 may be used for a maximum rise of 3 inches. Temporary pedestrian ramps with longitudinal slopes greater than 1:8 are prohibited.

A. Provide a handrail on both sides of the ramp if required as stated herein. Ensure the top of the handrail is between 34 and 38 inches above the surface of the ramp. Ensure a minimum width of 36 inches is maintained between the handrails, with a minimum clearance of 1.5 inches behind and 18 inches above.

Construct the handrail such that the bending stress applied by a bending moment created by a 250-pound force is less than the allowable stress for the materials and the construction of the handrail. Construct the handrail to withstand the shear stress induced by a 250-pound force. Ensure all fasteners, mounting devices and support structures are also able to withstand shear stress induced by a 250-pound force.

2. Construct a detectable edging anytime a handrail is required, and anytime the path changes direction. This includes a turn onto the ramp from the path. Detectable edging must begin a maximum of 2.5 inches above the ramp surface and extend at least 6 inches above the ramp surface.

3. Ensure a clear space (minimum 48 inches by 48 inches) is provided above and below the ramp.

4. Avoid locating ramps in areas of drainage collection, ponding or running water, which can produce slippery or unsafe conditions. If the ramp is located over a gutter pan or other drainage structure, provide features to facilitate water movement around or under the ramp as approved by the Engineer.

5. Ensure all debris and construction material is cleared from the surface of the ramp throughout its use. Ensure snow and ice is removed; the use of an approved de-icing agent may be required. Repair or replace the ramp if it becomes uneven, unstable, or displaces due to weather events, construction activities, or other causes as directed by the Engineer.

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

Pay Item	**Pay Unit**
Item 221-32: Pedestrian Ramp, Temp	Each

Pedestrian Ramp, Temp includes all labor, equipment, and materials to furnish, install and remove a temporary pedestrian ramp at the locations shown on the plans, as well as all costs for maintaining, clearing debris, deicing, reconfiguring, and relocating the temporary pedestrian ramp throughout the life of the contract.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 221-33: Pedestrian Type II Barricade, Temp

WT:VCM/CEW 1 of 2 11/20/19

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing a temporary pedestrian Type II barricade section as identified in the proposal or on the plans. Use temporary pedestrian Type II barricades to close non-motorized facilities including sidewalks, bicycle paths, pedestrian paths, and shared use paths that are not part of the roadway. One pedestrian Type II barricade is defined as a barricade section at least 43 inches wide, including all supports, ballast, and hardware.

b. Materials. Provide a temporary pedestrian Type II barricade that meets the requirements of *National Cooperative Highway Research Program Report 350 (NCHRP 350)* or *Manual for Assessing Safety Hardware* (MASH), in addition to meeting the following requirements:

1. Provide barricade sections at least 43 inches wide, designed to interconnect to ensure a continuous *Americans with Disabilities Act (ADA)* compliant tactile barrier. Ensure the connection includes provisions to accommodate non-linear alignment as well as variations in elevation at the installation area.

2. Ensure the top surface of the barricade is designed to function as a hand-trailing edge, and has a height between 32 and 38 inches. Ensure the lower edge of the barricade is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the barricade is a minimum of 8 inches above the surface of the non-motorized facility. The barricade may have a solid continuous face. Finally, all features on the front face of the barricade (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the barricade with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the barricade section has a solid face. If the barricade consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. Construction. Construct the temporary pedestrian Type II barricade in accordance with the manufacturer's recommendations, Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the barricade as shown on the plans and as directed by the Engineer. Interconnect all barricade sections using hinge components if necessary to ensure a continuous detectable edge for the entire installation. Ensure the barricade is

ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.

2. When the barricade is installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists.

3. When pedestrian Type II barricades are used to close a non-motorized facility, ensure a sufficient number of barricade sections are used to block the entire width of the facility. The barricade may extend outside the edge of the non-motorized facility but must not be less than the full width of the facility.

4. If sections of multiple colored barriers are used (i.e. safety orange and white) install the sections such that the colors alternate to increase conspicuity.

5. Ensure pedestrian Type II barricades are not used to close a motor vehicle facility. Ensure these barricades are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic.

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

Pay Item	**Pay Unit**
Item 221-33: Pedestrian Type II Barricade, Temp	Each

Pedestrian Type II Barricade, Temp, includes all labor, equipment, and materials to furnish, install, maintain, relocate, and remove one barricade section that is at least 43 inches wide. Additional payment will not be made if wider sections are provided. This includes all rails, supports, ballast, hinge points, reflective sheeting, and miscellaneous hardware needed to install and maintain a barricade section.

a. Description. This work consists of furnishing, installing, maintaining, relocating, and removing temporary pedestrian channelizers as identified in the proposal or on the plans. Use temporary pedestrian channelizers to guide pedestrians along a temporary non-motorized facility, and to create separation of pedestrians from construction areas near existing facilities. Replace damaged temporary pedestrian Type II channelizers as directed by the Engineer.

b. Materials. Provide a temporary pedestrian channelizer that is crashworthy according to the *National Cooperative Highway Research Program Report 350* (NCHRP 350) or *Manual for Assessing Safety Hardware* (MASH), in addition to meeting the following requirements:

1. Ensure the channelizer is designed to interconnect to maintain continuous delineation along the entire installation. This includes provisions to accommodate non-linear alignment as well as variations in elevation.

2. Ensure the top surface of the channelizer is designed to function as a hand-trailing edge and have a height between 32 and 38 inches. Ensure this top surface is designed to have a 2-inch horizontal gap between the top edge and the support (if so equipped), to allow for continuous hand-trailing without obstructions. Ensure the lower edge of the channelizer is no more than 2 inches above the surface of the non-motorized facility. Ensure the top edge of the bottom rail of the channelizer is a minimum of 8 inches above the surface of the non-motorized facility or the channelizer may have a solid continuous face. Finally, all features on the front face of the channelizers (the face in contact with pedestrians) must share a common vertical plane.

3. Equip both sides of the channelizer with bands of alternating 6-inch wide orange and white vertical stripes of reflective sheeting. Two bands of sheeting 6 inches tall and a minimum of 36 inches long containing at least two orange and two white stripes each are required. One band placed near the top and one near the bottom if the channelizer section has a solid face. If the channelizer consists of two rails, affix one band of sheeting to each rail. Ensure the stripes of reflective sheeting are aligned vertically. Ensure this sheeting meets or exceeds the requirements of *ASTM D 4956* Type IV sheeting.

c. Construction. Deploy the temporary pedestrian Type II channelizer in accordance with the manufacturer's recommendations, the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), the plans, and the following requirements:

1. Install the channelizer as shown on the plans and as directed by the Engineer. Interconnect all channelizers using hinge components if necessary to ensure a

continuous detectable edge for the entire installation. Ensure the channelizers are ballasted according to the manufacturer's recommendations to ensure stability during wind events and contact with pedestrians.

2. When the channelizers are installed near motor vehicle traffic, ensure reflective sheeting is visible to motorists providing appropriate delineation for the pedestrian path.

3. If sections of multiple colored barriers are used (i.e. safety orange and white), install the sections such that the colors alternate to increase conspicuity.

4. Ensure temporary pedestrian Type II channelizers are not used to guide pedestrian traffic on a motor vehicle facility in the presence of active traffic. This prohibition includes bicycle/shared use lanes or shoulders in the presence of active traffic. Ensure temporary pedestrian channelizers are not used to channelize motor vehicle traffic, or separate motor vehicle and pedestrian traffic.

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

Pay Item	**Pay Unit**
Item 221-34: Pedestrian Type II Channelizer, Temp	Foot

Pedestrian Type II Channelizer, Temp includes all labor, equipment, and materials to furnish, install, maintain, relocate and remove rails or wall sections, supports, ballast, and hinge points at the locations shown on the plans. This includes all rails or wall sections, supports, ballast, hinge points, and miscellaneous hardware needed to construct the channelizer or system of channelizers.

DETAILED SPECIFICATION
FOR

ITEM #222-01 CURB AND GUTTER, ANY TYPE OR SIZE, REM
ITEM #222-02 SIDEWALK AND DRIVE, ANY TYPE OR THICKNESS, REM
ITEM #222-03 PAVEMENT, REM
ITEM #222-04 BRICK PAVERS, REM, SORT AND SALVAGE
ITEM # 222-05 TROLLEY TRACK REMOVAL

DESCRIPTION

This work shall consist of removing asphalt and concrete road pavement, composite road pavement, concrete curb, gutter, curb and gutter, integral curb, sidewalk (concrete and brick), sidewalk ramps, drive openings and drives, brick pavers and trolley track foundations, as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer, in accordance with Section 204 of the 2020 MDOT Standard Specifications for Construction, except as specified herein, and as directed by the Engineer.

CONSTRUCTION METHOD

Prior to the start of removals, the Engineer and Contractor together shall field measure all removals.

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, sidewalks, and curbs 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.

The Contractor shall remove all brick pavers where noted on the plans. Reasonable care should be taken to limit damage to brick pavers as they are removed. Brick pavers which are considered sound and dimensionally useful by the Engineer will be stockpiled off site and salvaged to the City of Ann Arbor. Coordinate with Engineer for relocation of brick pavers. Brick paver materials not salvaged will be removed and disposed of by the contractor at no additional expense to the project.

The Contractor shall excavate, cut, remove stumps, remove brush, remove trench drain and clean out, grade, and trim as needed and as directed.

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

The project area is known to have included a trolley track, as noted on plans. In some parts of downtown the subsurface area includes concrete base from the tracks. If the street reconstruction project uncovers concrete base from the track in the project area, the Contractor is to remove the base and backfill the excavation as directed by the Engineer.

The Engineer may direct aggregate base materials to be either removed from or added to the job-site, to properly complete the work. Where the Engineer directs the addition of such materials, they shall be paid for as either the Item of Work: “AGGREGATE BASE COURSE, 21AA, MODIFIED” or “SAND SUBBASE COURSE, CLASS II – C.I.P.” as directed by the Engineer. Where the Engineer directs such materials to be removed, they will not be paid for separately, but shall be included in “MACHINE GRADING, MODIFIED”.

Where existing concrete curb & gutter is to be replaced on a street with a concrete (or brick) base, the Engineer may direct the Contractor to remove a 1-to-2-foot wide, full-depth section of pavement and pavement base from immediately in front of the curb & gutter. As part of this pavement/base removal, the Contractor shall perform additional (double) full-depth saw-cutting along the entire removal limits, and shall take sufficient care so as not to damage and/or disturb any adjacent pavement, pavement base, and/or any other site feature, all as directed by the Engineer. The removals shall be to a sufficient width and depth to allow for the placement and removal of the curb & gutter formwork. Such removals will be paid for as "PAVEMENT, REM". After the removal of the formwork, the Contractor shall replace the concrete base to its original thickness and elevation(s), or as directed by the Engineer.

Excavated/removal areas shall be adequately protected with barricades or fencing at all times; paid for as part of "GENERAL CONDITIONS".

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.

MEASUREMENT AND PAYMENT

Sidewalk ramp, concrete walk, brick not designated for salvage by the Engineer, and subgrade, and related removals shall be measured and paid for as "Sidewalk and Drive, Any Type or Thickness, Rem".

Once the existing brick has been removed from the site ("Brick Pavers, Rem, Sort and Salvage"), the contractor will remove any remaining pavement found below the brick and base material, which shall not be paid for separately.

"Pavement, Rem" includes the removal and disposal of all paving to the full depth of the pavement, regardless of the depth or material encountered. Pavement materials are anticipated to include asphalt, concrete, brick, and possible composite pavement sections.

All removal of curb, gutter, and curb and gutter, regardless of type or size, shall be paid for as "Curb & Gutter, Any Type or Size, Rem".

Trolley Track Removal will include all costs to break up and remove the trolley track concrete base. Any steel track that may exist related to the track base will be part of this pay item and not paid for separately. Backfill of trolley track to be paid for separately.

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

Concrete removal items shall be field measured and paid for at the Contract Unit Prices for their respective Contract (Pay) Items as follows:

PAY ITEM	PAY UNIT
Item 222-01: Curb & Gutter, Any Type or Size, Rem	Linear Foot
Item 222-02: Sidewalk and Drive, Any Type or Thickness, Rem	Square Yard
Item 222-03: Pavement, Rem	Square Yard
Item 222-04: Brick Pavers, Rem, Sort and Salvage	Square Yard

Item 222-05: Trolley Track Removal .....Square Yard

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.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 223-01: Dr Structure, Any Size or Depth, Rem
Item 223-02: Sewer, Any Size or Depth, Rem

WT:VCM/CEW 1 of 1 11/20/19

a. Description. - This work shall consist of furnishing all labor, tools, equipment, and material to remove, and dispose of off-site, sewers, and/or drainage structures, in accordance with Section 203 of the 2020 Michigan Department of Transportation Standard Specifications for Construction, and as specified herein.

b. Materials. -

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

c. Construction Methods. - Sewers, manholes, and drainage structures 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 manhole, sewer, or drainage structure shall be backfilled with Granular Material, Class 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. Backfill material will not be paid for separately and is included in this pay item. 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.

As directed by the Engineer and within two days of their removal, the Contractor shall stockpile on-site, in a location that is mutually agreeable to the Engineer and Contractor, the existing structure covers. The City of Ann Arbor's forces will pick-up the structure covers at a time that is convenient to them and mutually agreeable to the Contractor. The Contractor shall provide the equipment and manpower to load the castings on the City's vehicle(s) so that they can be removed from the site by the City.

d. Measurement and Payment. - The completed work shall be paid for at the Contract Unit Price for the following Contract Items:

Contract Item (Pay Item)	**Pay Unit**
Item 223-01: Dr Structure, Any Size or Depth, Rem	Each
Item 223-02: Sewer, Any Size or Depth, Rem	Foot

Payment for the above items shall include all labor, material, and equipment to complete the work of removing sewers and drainage structures of any size or depth as detailed herein.

DETAILED SPECIFICATION
FOR
ITEM # 224-01 – PARKING METER, REM
ITEM #224-02 - PARKING METER, INSTALL

DESCRIPTION

This work shall consist of removing parking meter standards and installing new meter standards where directed. All work must be conducted in accordance with the plans and specifications, the 2012 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

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

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

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

CONSTRUCTION METHODS

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

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

The drawings may indicate the removal and salvage of electronic parking pay machines. If directed by the Engineer, the Contractor will remove the equipment with all due care to avoid damage and salvage the equipment to the DDA. The removal of this each station will paid for as “Parking Meter, Rem.”

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

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

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

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

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

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

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

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

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

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

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

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

The drawings may indicate the proposed location of electronic parking pay machines. If directed by the Engineer, the Contractor will install the equipment using the same materials and hardware type as was previously installed. The installation of this each station will paid for as "Parking Meter, Install."

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 224-01: Parking Meter, Rem	Each
Item 224-02: Parking Meter, Install	Each

The unit price for this item of work shall include all labor, material, and equipment costs to perform all the work specified in this Detailed Specification. The quantity paid is based on the number of new parking meters installed.

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

Material to backfill voids after removing the standards is included in the pay item "Remove Parking Meter".

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
Item 227: Erosion Control, Inlet Filter

WT: VCM/CEW 1 of 1 11/20/19

a. 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.

b. 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.

The Contractor shall submit product data sheets and a sample of the filter material for inlet filters for Engineer approval prior to ordering materials.

c. 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.

d. Measurement and Payment. - The completed work of Soil Erosion Control Inlet Filter will be paid for at the contract unit price for the following contract items (pay items):

Contract Item (Pay Item)	**Pay Unit**
Item 227: Erosion Control, Inlet Filter	Each

"Erosion Control, 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.

DETAILED SPECIFICATION
FOR
ITEM #230-01 - GEOGRID
ITEM #230-02 - GEOTEXTILE
ITEM #230-03 - STONE RESERVOIR
ITEM 230-04: INFILTRATION TRENCH TYPE 1
ITEM 230-05: INFILTRATION TRENCH TYPE 2

DESCRIPTION AND MATERIALS

This work includes stone reservoir trenches, and geosynthetic materials, as specified herein, as shown on the Plans, and as directed by the Engineer.

RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, City Standard Specification, and MDOT 2020 Standard Specifications for Construction (as well as applicable Special Provisions as referenced herein) apply to this Section.

SUBMITTALS

A. Aggregates/Sand:
   1. Source: Must be MDOT approved.
   2. Aggregate gradation and percent voids (porosity).

B. Admixtures: Certification from MDOT approved supplier.

C. Geotextile and Geogrid: Product Certifications and specifications from manufacturer.

QUALITY CONTROL/QUALITY ASSURANCE

A. Installation Personnel Qualifications:
   1. Trained and experienced in the fabrication and installation of the materials and equipment.
   2. Knowledgeable of the design.

B. Testing: The City of Ann Arbor and DDA's representative shall perform testing to ensure compliance with the materials specifications as required by the Engineer.

C. Weight Slips:
   1. Furnish weight slips for material incorporated in the Project.
   2. Verify that the required tonnage has been applied by calculating and submitting yield for each day of work.

DELIVERY, STORAGE AND HANDLING

A. Handle and store materials in a manner which will prevent deterioration, damage, contamination with foreign matter, and damage by weather or elements, and according to Manufacturer's directions.

B. Protection: Use all means necessary to protect the materials of this Section before, during, and

after installation.

C. Reject damaged, deteriorated or contaminated material and immediately remove from the Site. Replace rejected materials with new materials at no additional cost to Owner.

MATERIALS

A. Aggregate/Sand Materials:
   1. Stone Reservoir:
      a. MDOT 6A
         1) Washed.
         2) Thickness and width as shown on Plans.

B. Geotextile
   1. Nonwoven.
   2. Minimum Properties:
      a. Weight - 6 oz.
      b. Marafi 160N, TerraTex N06, US Fabric 165 NW, or approved equal.

C. Geogrid
   1. Polypropylene triaxial grid.
   2. Minimum Properties:
      a. Minimum Rib Thickness: 0.03 inches (0.76 mm)
      b. Tensile Strength @2% Strain (ASTM D6637): 280 lbs/ft
      c. Tensile Strength @5% Strain (ASTM D6637): 580 lbs/ft
      d. Ultimate Tensile Strength (ASTM D6637): 850 lbs/ft
      e. Flexural Stiffness (ASTM D5732): 250,000 mg-cm
      f. Resistance to Installation Damage (ASTM D5818 & D6637): 93%
      g. Tensar TX 5 or approved equal.

CONSTRUCTION METHODS

PREPARATION

A. Final Subgrade Preparation:
   1. Avoid compaction of subgrade soil unless directed or approved by Engineer.
   2. Scarify compacted or disturbed subgrade soils to a minimum depth of 6 inches with York rake; or equivalent method and light tractor.
   3. Remove accumulation of fine materials due to ponding or surface erosion with light equipment.
   4. Conform to line, grade, and elevations indicated.
      a. Excavate, fill, re-grade, and scarify areas damaged by erosion, ponding or traffic compaction.
      b. Use light equipment.
   5. Proof Roll:
      a. To identify soft or unstable areas.
      b. Use light equipment, avoid over compacting subgrade.
   6. Do not place geotextile or geogrid until subgrade surface has been inspected and approved by Engineer.

B. Stone Reservoir Trench & Geotextile
   1. Begin installation of stone reservoir immediately after approval of subgrade preparation.
   2. Do not place sand or aggregate materials on a frozen base, subbase, or subgrade.

3. Remove any accumulation of debris or sediment which has taken place after approval of subgrade and installation of stone reservoir and prior to installation of the geotextile, at the contractor's expense.
4. Place geotextile in accordance with Manufacturer's standards and recommendations.
a. Overlap Adjacent Strips: Minimum 16 inches.
b. Prevent runoff or sediment from entering the stone reservoir.
5. Place backfill for stone reservoir in uniform layers such that when compacted, they have the thicknesses shown on the Plans, or as directed by the Engineer.
    a. The loose measure of any layer -- not more than 9-inches or less than 4-inches.
    b. Compact backfill to a minimum of 95% of the maximum density per City Standard Specifications.
6. The Stone Reservoir is to be completely wrapped in geotextile fabric.

C. Geogrid Installation:
1. Place geogrid and aggregate base course immediately after installation of stone reservoir.
2. Remove any accumulation of debris or sediment which has taken place after approval of subgrade and installation of stone reservoir prior to installation of the geogrid, at the contractor's expense.
3. Place geogrid in accordance with Manufacturer's standards and recommendations.
    a. Overlap Adjacent Strips: Minimum 16 inches.
    b. Tie together overlapping strips 24 inches on center, as directed by Engineer.
    c. Prevent runoff or sediment from entering the storage bed.
4. Place aggregate base course to grades indicated on Drawings.
    a. Maximum Lift Thickness: 10 inches.
    b. Minimum Lift Thickness: 6 inches.
    c. Compact each layer to a minimum of 95-98% (varies with paving materials) of the maximum density per City Standard Specifications.
    d. Fine grade as necessary to conform to elevations and cross section indicated on the Drawings.
    e. Roll aggregate layer with paving roller until smooth, as directed by Engineer.

MEASUREMENT AND PAYMENT

The items of work included in this Detailed Specification shall be paid for at the Contract Unit Price, which shall be payment in full for all labor, material and equipment needed to accomplish all the work described in this detailed specification, which includes, but is not limited to furnishing, placement, and compaction of all aggregate materials, and, furnishing and placement of geotextile or geogrid.

Infiltration Trench Type 1 and Type 2 will include the Geotextile and Stone Reservoir required by the plans as part of the Infiltration Trench type 1 and Type 2. Infiltration Trench Type 1 covers all work associated with the larger trench that include 2-48 inch perforated pipes; Infiltration Trench Type 2 covers all work associated with the smaller trench that include a single perforated 30 inch pipe. Measurement for Infiltration Trench Type 1 and Type 2 will be by linear foot, measuring from end to end of the perforated pipe.

Geogrid, Geotextile, and Stone Reservoir will be paid for when additional work is required and not included in other pay items, as directed by the Engineer.

Price adjustments shall be enforced by the City of Ann Arbor and DDA if materials are not in accordance with specifications.

The completed work as measured for these items of work will be paid for at the Contract Unit Prices for the

following Contract (Pay) Items:

PAY ITEM	PAY UNIT
Item 230-01: Geogrid	Square Yard
Item 230-02: Geotextile	Square Yard
Item 230-03: Stone Reservoir	Cubic Yard
Item 230-04: Infiltration Trench Type 1	Linear Foot
Item 230-05: Infiltration Trench Type 2	Linear Foot

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

DETAILED SPECIFICATION
FOR

ITEM #231 - PRECAST CONCRETE VAULT

DESCRIPTION

This work shall consist of constructing and installing a precast concrete vault for use as a drainage structure. The work shall comply with the 2020 MDOT Standard Specifications for Construction, except as specified herein, as shown on the Plans, as shown in this Detailed Specification, and as directed by the Engineer.

MATERIALS

Delegated Design: Design precast structural concrete, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements, dimensions, and design criteria herein and on the plans.

Structural Performance: Precast structural concrete units and connections shall withstand design loads indicated within limits and under conditions indicated.

Shop Drawings: Include member locations, plans, elevations, dimensions, shapes and sections, openings, support conditions, and types of reinforcement, including special reinforcement, and concrete design mix. Detail fabrication and installation of precast structural concrete units. Include in the shop drawing the location and specification of access steps within the structure. If the vault is to be fabricated in distinct pieces, provide details on the joints between pieces to insure structural stability and protection from long term joint degradation.

Fabricator Qualifications: A firm that assumes responsibility for engineering precast structural concrete units to comply with performance requirements. Responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

Handle and transport unit in a position consistent with their shape and design in order to avoid excessive stresses that would cause cracking or damage. Lift and support units only at designated points shown on Shop Drawings. Protect the unit from damage and stress during shipping and setting of the unit.

CONSTRUCTION METHODS

The connection of pipes to the vault, the installation of the riser and casting, the bedding and setting of the precast unit, and backfill of the vault shall be consistent with the City of Ann Arbor standards for drainage structures.

Examine the site prior to installation to establish the work plan for setting the unit. Prepare the subbase and base for the unit to be compacted and level, and at the required grade. Install the vault to be level, plumb, and square.

Grout connections and joints and open spaces at keyways, connections, and joints where required or indicated on Shop Drawings. Retain grout in place until hard enough to support itself. Pack spaces with

stiff grout material, tamping until voids are completely filled.

Backfill the vault with MDOT Class II fill sand in compacted lifts not to exceed 8 inches in depth, or as directed by the Engineer.

MEASUREMENT AND PAYMENT

The casting and cover for the precast concrete vault will be paid for separately.

Excavation and backfill for the structure will not be paid for separately, and are included in this pay item.

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

PAY ITEMS	PAY UNIT
Item 231: Precast Concrete Vault	Each

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

a. Description. This work shall include all labor, equipment, and materials necessary to handle, transport, and dispose of non-hazardous contaminated material as described herein, as directed by the Engineer.

An area within the project limits has been identified as a potential site of soils which include non-hazardous contaminated material. Should the City determine that soils in the project site include non-hazardous contaminated material these materials shall not be used elsewhere or disposed of in a manner inconsistent with this special provision, or applicable federal, state, or local regulations unless otherwise directed by the Engineer.

b. Method of Construction. This work shall be performed in accordance with Sections 204 and 205 of the MDOT 2020 Standard Specifications for Construction, except as modified herein or as directed by the Engineer.

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

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

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

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

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

e. Sampling and Analysis of Non-Hazardous Contaminated Material. City staff and the Engineer shall be notified of excavation in the identified area of concern. Should the city determine that the materials being excavated potentially contain non-

hazardous contaminated material, the Contractor shall excavate soils in the area, stock pile materials and/or leave the materials in-situ, as directed by the Engineer.

During the period following excavation and stockpiling, and prior to loading and removal of the soils, the Contractor will be directed to proceed with work in other areas of the project, should other areas be available for work within the project area and in compliance with the project schedule and Progress Clause. Any downtime related to the discovery, excavation, stockpiling, testing, loading and hauling of the non-hazardous contaminated material will not be paid for separately.

The City will be responsible for the costs associated with testing of the soils to determine the nature and extent of the contamination. Reports related to any testing will be provided to the Contractor.

The information contained in this report shall be utilized to secure a Type II disposal facility for disposal of the non-hazardous contaminated material. The contractor shall be responsible for preparing any forms or applications required by the disposal facility prior to their acceptance of the non-hazardous contaminated material for disposal.

The contractor shall also be responsible for familiarizing themselves with the information contained in the report and adjusting their operations accordingly to meet the safety and health requirements as set forth in Section 104.07.B of the MDOT 2020 Standard Specifications for Construction.

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

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

PAY ITEM	**PAY UNIT**
Non-Hazardous Contaminated Material Handling and Disposal (LM)	Cubic Yard

Non-Hazardous Contaminated Material Handling and Disposal will be measured by volume in cubic yards, loose measure, as contained in the hauling unit. Under no circumstance will the Contractor be paid for quantities of this material that have not been approved for payment by the Engineer and as measured and tracked by the Engineer and the Contractor. The Contractor will not be paid “standard amounts” that have been determined by the disposal facility; only measured volumes as computed by the Engineer will be paid. Prior to payment, the Engineer shall be given receipts from the disposal facility for the number of cubic yards disposed of at that facility. Payment

shall include all costs for materials, labor and equipment needed for storage, loading, transportation, and disposal of the non-hazardous contaminated material. Disposal costs shall include all documentation required by the landfill. Payment for this item shall be the same, regardless of whether or not the Contractor temporarily stores the contaminated material; the Contractor shall not be paid for re-handling of the material due to construction staging, stockpiling, or other related activities.

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

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
Item 250-02: Cold Milling HMA Surface, Modified

WT:VCM/CEW 1 of 1 11/21/19

a. Description. This work consists of cold milling the existing pavement, repairing areas of failed asphalt pavement, and/or placing new hot mix asphalt (HMA) material as directed by the Engineer and as described herein. Complete pavement repairs in the cold milled surface prior to placement of the first hot mix asphalt paving course.

b. Materials. Provide materials in accordance with subsection 501.02 of the MDOT 2020 Standard Specifications for Construction, detailed specifications and as shown on the plans.

c. Construction. Cold mill designated areas, repair pavement in locations as specified by the Engineer, and place “Hand Patching, Modified”, in accordance with the details on the plans and according to subsection 501.03 of the MDOT 2020 Standard Specifications for Construction. The Engineer will designate repair locations after the pavement has been cold milled as shown on the plans. The milling machine must return to the designated repair locations to mill an additional depth of 3 inches. “Hand Patching, Modified” must be placed in the repair area and roller compacted prior to placement of the paving course.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following respective pay items:

Pay Item	**Pay Unit**
Item 250-02: Cold Milling HMA Surface, Modified	Square Yard

Measure **Cold Milling HMA Surface, Modified** area by the unit square yard and pay for it at the contract unit price, which price includes the cost for all labor, equipment and materials required to mill, perform multiple mill passes, re-mill, and remove, load, haul, and dispose of the cold milled material, and cleaning the cold milled pavement. The Engineer will not pay for material picked up by cleaning after cold milling.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 250-03: Aggregate Base Course, 21AA, Modified

WT:CEW 1 of 2 11/20/19

a. Description. - This work shall consist of constructing 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.

b. 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%.

c. Construction Method. - 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 percent, and aggregate base course to not less than 98 percent 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.

d. 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**
Item 250-03: Aggregate Base Course, 21AA, Modified	Cubic Yard

“Aggregate Base Course, 21AA, Modified" will be measured in cubic yards based on plan installation. 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.

DETAILED SPECIFICATION
FOR
ITEM #250-04 – MACHINE GRADING, MODIFIED

DESCRIPTION

This work shall consist of constructing earth grades by excavating, cutting, filling, trimming, and grading; general restoration, removal and salvage of miscellaneous site amenities, 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 MDOT Standard Specification for Construction, except as specified herein.

The drawings indicate work to be completed outside of the right of way on property owned by private parties. This work is an extension of the right of way work and will be paid for based on the applicable unit prices. Machine Grading, Modified will be extended to the limits of grading as shown on the plans where work includes property adjacent to the right of way.

MATERIALS

All materials shall meet the requirements as specified in Section 205 of the MDOT 2020 Standard Specifications for Construction, except as specified herein.

CONSTRUCTION METHOD

Machine Grading:
The Contractor shall construct earth grades as required to develop the typical and/or detailed cross-section(s) as shown on the Plans, as detailed in the Specifications, and as directed by the Engineer. This shall include, but not be limited to, the excavation of soil, rocks of any size, stumps, logs, and bricks; the removal and proper disposal off-site of surplus excavated material; the scarifying, plowing, disking, moving and shaping of earth; the trimming, grading, compaction and proof-rolling of the prepared subgrade; the importing, furnishing, placement and compaction of embankment and/or fill materials; the full depth saw-cutting of pavement at the removal limits; the grading of side slopes; 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 subgrade shall be constructed in accordance with Section 205.03.G (Earth Excavation) and Section 205.03 H (Roadway Embankment) of the MDOT 2020 SSC, as shown on the plans, and as specified herein.

The Contractor shall remove, add to, re-shape, re-grade, and re-compact the existing roadbed materials, and shall construct the roadway and sidewalk area to the cross-section(s) as indicated on the Plans, as detailed in the Specifications, and as directed by the Engineer.

The existing site includes irrigation system that is to be abandoned. As part of Machine Grading the Contractor is to ensure that the system is no longer active with water pressure, then remove any remaining irrigation equipment uncovered during the work, and properly dispose of all materials off site.

As part of Machine Grading the Contractor shall remove other surface features, including, but not limited to, signs, concrete filled steel bollards, and bicycle parking hoops located within the grading limits and not otherwise identified, as directed by the Engineer. Signs 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 project site well graded and drained at all times. Foundation, roadway or sidewalk embankment or subgrade that becomes damaged by rain shall be undercut and backfilled, or otherwise remedied, by the Contractor, at his/her sole expense, as directed by the Engineer.

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 ensure 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 in the right of way to the grades shown on the Plans, as detailed in the Specifications, and as directed by the Engineer. The finished subgrade shall be placed to within 1 inch below and ¾ inch above plan grade. Variations within this tolerance shall be gradual.

The subgrade shall be compacted to a minimum of 95% of its maximum unit weight, as measured by the AASHTO T-180 method, to a depth of 10 inches. 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.

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.

Machine Grading includes reviewing the condition of existing sand base in sidewalk areas with the Engineer, and grading and compacting the subgrade and sand to meet grade requirements for the sidewalk zone. If the existing sand base must be removed due to poor condition, the removal will be paid for as part of Machine Grading, Modified, and the replacement sand base paid as Sand Subbase Course, Class II - C.I.P.

The Contractor shall restore all disturbed areas to better than or equal to their original condition. This includes the placement and compaction of 5 inches of topsoil, followed by the placement of grass seed, followed by the placement of 0.5 inches of topsoil at all turf restoration locations, and at locations where concrete items are removed and turf is to be established. All restoration work and materials shall be in accordance with the City Standard Specifications. Restoration work must be performed within one week of the placement of the wearing course for each street. Such restoration will be considered part of Machine Grading, Modified.

Pavement Sawcutting
The work shall include the full-depth saw-cutting of pavement at the construction limits, and elsewhere as required, if not paid for as part of another item of work. Pavement sawcutting will not be paid for separately.

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

Removing and Salvaging Topsoil
The removal, salvaging and stockpiling of topsoil, and all related work, shall be performed in accordance with Section 205.03.A.1 (Removing and Salvaging Topsoil) of the MDOT 2020 SSC.

Protection of Utilities
Utility lines may become exposed at, above, or below, the foundation or subgrade elevation during machine grading or subgrade undercutting operations. If this occurs, the Contractor shall excavate around, above and/or below the utility lines, as directed, to complete the machine grading or subgrade undercutting operations. Payment, at contract unit prices, for "Machine Grading, Modified ___" or "Subgrade Undercutting, Type __," whichever applies, will be considered as payment in full for this work.

Protection of Trees to Remain
Trees to remain shall be protected from damage due to mechanical equipment, tree root compaction and cutting, and removal of bark and branches.

MEASUREMENT AND PAYMENT

Measurement for payment for the item "Machine Grading Modified" shall be the computed by road station (as further described below). Embankment, fill, compaction, proof rolling, subgrade protection/maintenance, and drainage maintenance will not be paid for separately, and are included in this item of work.

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

PAY ITEM	PAY UNIT
Machine Grading, Modified	Station

"Station" in the **Machine Grading, Modified** pay unit is defined as a one hundred foot length of street as stationed on the plans; each "Station" pay unit is measure longitudinally for every 100 feet or fraction thereof, and is measure from the center line of the right of way to the edge of the right of way (that being one half of the right of way).

The pay item "Machine Grading, Modified" shall include all the work specified herein, including, but not limited to, the removal and offsite disposal of any surplus or unsuitable materials and the furnishing from off-site any additional Engineer approved fill materials necessary to construct the embankment and subgrade to the contours and cross-sections shown on the plans.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
Item 250-05: Subgrade Undercutting, Type II

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a. 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.

b. 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.

c. 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.

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

Pay Item	**Pay Unit**
Item 250-05: 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.

DETAILED SPECIFICATION
FOR
ITEM #250-06 - SAND SUBBASE COURSE, CLASS II

DESCRIPTION

This work shall consist of constructing an aggregate subbase on an existing aggregate surface, or on a prepared subgrade in accordance with Sections 301, 302 and 307 of the 2020 MDOT Standard Specifications for Construction, except as specified herein.

MATERIAL

The materials used for this work shall be MDOT Class II granular material meeting the requirements of the City Standard Specifications.

CONSTRUCTION METHOD

Sand or aggregate courses shall not be placed if, in the opinion of the Engineer, there are any indications that they may become frozen before their specified densities are obtained.

Sand or aggregate courses shall not be placed on a frozen base, subbase or subgrade.

The Contractor shall not use rubber-tired equipment on the grade, when its use causes, or may cause, in the opinion of the Engineer, damage to the grade. The Contractor shall conduct his/her operation(s), and provide all necessary equipment, to ensure the satisfactory completion of the work without damaging the grade. This includes the transporting, stockpiling, re-handling, and movement of materials over additional distances, in lieu of driving on an unprotected, or partially unprotected, grade.

The Contractor is solely responsible for the maintenance and protection of the grade. Further, any damage to the grade which, in the opinion of the Engineer, is caused as a result of the Contractor's operation(s), or his/her 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 grade.

The Contractor shall shape the base, subbase and subgrade to the elevations, crowns, and grades as specified on the Plans and as directed by the Engineer. This may include re-grading the subbase to provide different crown grades than those existing prior to the construction.

The Contractor shall remove, add to, re-shape, re-grade, and re-compact the existing roadbed materials (including the base bed under sidewalks), and shall construct the roadway and sidewalks 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 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 maintain the base, subbase, and subgrade in a smooth, well drained condition at all times.

Sand and aggregate courses shall be placed in uniform layers such that when compacted, they have the thicknesses shown on the Plans, or as directed by the Engineer. The loose measure of any layer shall not be

more than 9-inches nor less than 4-inches.

Sand subbase and aggregate base courses shall be compacted to not less than 98% of their respective maximum unit weights, as determined by the AASHTO T-180 test.

All granular materials shall be deposited from trucks or through a spreader in a manner that will minimize segregation of material.

Manholes, valve boxes, inlet structures and curbs shall be protected from damage. Manholes & inlet structures shall be continuously cleaned of construction debris and properly covered at all times during the construction. Upon completion of each day's work, manholes, water valve boxes, inlets and catch basins shall be thoroughly cleaned of all extraneous material.

MEASUREMENT AND PAYMENT

Where granular materials are used as base, as subbase, or as fill for excavations in Machine Grading areas, item of work "Sand Subbase Course CL II " shall be measured and paid accordingly.

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

PAY ITEM	PAY UNIT
Item 250-06: Sand Subbase Course Class II	Cubic Yard

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

DETAILED SPECIFICATION
FOR

ITEM #251-01 CURB AND GUTTER, CONC, 24 INCH, ANY TYPE
ITEM # 251-02 PLANTER CURB
ITEM #252-01 CONCRETE SIDEWALK, 6 INCH
ITEM #251-02 CONCRETE SIDEWALK, 8 INCH
ITEM #252-03 ROAD CONCRETE PAVEMENT, 8 INCH TYPE 1
ITEM #252-04 ROAD CONCRETE PAVEMENT, 8 INCH TYPE 2
ITEM #252-05 ROAD CONCRETE PAVEMENT, COLORED, 8 INCH
ITEM #252-06 SIDEWALK RAMP, CONCRETE, 8 INCH

DESCRIPTION

This work shall consist of constructing concrete items including concrete curb, gutter, curb and gutter, sidewalks, road concrete pavement base and crosswalks, steel reinforcement, mechanical anchors and hook bolts, all of any type and/or dimensions, all of either regular, fibermesh reinforced, and/or high-early concrete, in accordance with Sections 601, 602, 603, 802, and 803 of the 2020 MDOT Standard Specifications for Construction, except as specified herein, as shown on the Plans, as shown in this Detailed Specification, and as directed by the Engineer.

The Contractor is responsible to construct all sidewalks, sidewalk ramps, drives, curbs, and all other concrete items within ADAAG compliance. All sidewalks and curb ramps must be constructed in accordance with MDOT Standard Detail R-28-J (version in place at time of the bid letting).

Please note that the project includes concrete paving collars around utility structures in brick paving areas as noted in the Detailed Specification for Brick Pavers.

MATERIALS

Refer to the Detailed Specification for Concrete Durability for additional requirements.

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:

Concrete Item	Concrete Mixture	MDOT Section
Curb & Gutter	P-NC, P1, 6-sack	601
6” or 8” Sidewalk, Road, and Ramp Type 1	Fibermesh Reinforced P1, 6 sack	601
	Fibermesh Reinforced P-NC	
	Fibermesh Reinforced P-NC	

Fibermesh reinforced concrete shall have a polypropylene fibrillated fibers added at a rate of 1.5 pounds per cubic yard. The fibers shall meet the requirements of ASTM C116-89 “Specification for Fiber Reinforced Concrete and Shotcrete” Classification 4.1.3 Type III. The concrete shall be thoroughly mixed for a minimum of 5 minutes after the addition of the fibers to assure uniform distribution throughout the concrete.

The Planter Curb and Road Concrete Pavement, Colored, 8 Inch are to have an integral concrete colorant admixture within the concrete mix. Color Pigment: ASTM C 979, synthetic iron-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis. Subject to

compliance with requirements, provide products by SIKA Corporation, or approved equal. Color product to be SikaColor-120G Granular Integral Concrete Colorant, (formerly Chromix G Admixture); Color to be C34 Dark Gray. Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

For integrally colored concrete, curing compound shall be pigmented type approved by coloring admixture manufacturer; "Colorcure" concrete curing compound and sealer by SIKA Corporation or approved equal.

CONSTRUCTION METHODS

General

Concrete items, including sidewalk, road pavement, non-integral curb/gutter, drives, and structure adjustments shall be completed prior to the placement of bituminous asphalt pavement and precast unit pavers.
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 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. Such damaged work will be removed and replaced at no additional cost.

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 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 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, Modified aggregate compacted in place to 95% up to the elevation of the bottom of the adjacent pavement and paid for as "Aggregate Base Course - 21AA - C.I.P."

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%.

Concrete surfaces are to have the finishes noted on the plans. Where no finish is noted, a Light Broom finish perpendicular to the street (for sidewalks), and a Medium Broom finish perpendicular to the street for the Concrete Crosswalks.

Reinforcement

All steel reinforcement, mechanical anchors and hook bolts, dowels, and all of any type and/or dimensions shall be provided and installed per the Engineer and plans. All costs associated with reinforcement, anchors, and hook bolts is considered incidental to the concrete work.

Pavements shall utilize fiber mesh reinforcing, made of 100 percent virgin homopolymer polypropylene graded multifilament fiber. Blend with concreate mix at the rate specified by the manufacturer for the depth of pavements and concrete mix specified.

Control Joints

Control joints shall be as located and detailed on the plans. The method of forming joints and spacing shall be approved by the Engineer prior to construction. Joints shall be evenly spaced, forming the pattern indicated on plans, and shall be perpendicular to the building face or curb line unless otherwise directed by the engineer.

Expansion Joints

¾-inch wide expansion joints shall be placed through concrete pavements in line with the extension of all property lines or at the longitudinal ends of each block as directed by Engineer; 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, or at a minimum, the center of each block.

½-inch wide expansion joints shall be placed between the sidewalk and road pavement and 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.

Project Mock-Up

Prior to concrete work commencing, the contractor will coordinate a review meeting with the Engineer and consultant team to discuss jointing details and layout, finishes, and logistics of the pour. Further, the Contractor will coordinate with the Engineer and consultant team so that the appropriate owner's representatives can observe the initial concrete pouring, jointing, and finishing for each concrete pavement and curb type to review and approve the work. These initial concrete installations will act as project mockups which the remaining work shall match in finishing, jointing, and quality.

MEASUREMENT AND PAYMENT

The work of furnishing and installing mechanical anchors and hook bolts will be considered incidental to the work item.

A deduction in length for catch basins and inlet castings will be made to measurements of Curb and Gutter.

Curb and Gutter, Any Type, shall be measured at the center of the curb and gutter cross section.

Planter Curb, shall be measured at the face of curb, and paid for at the same unit price for any width.

All miscellaneous hand work is considered included in the pay items of work and shall not be paid for separately.

Planter Curb shall include the colored concrete pavement strip directly adjacent.

Concrete paving underneath the Sidewalk Unit Pavers will be paid for as Item 251-01: Concrete Sidewalk, 6 Inch.

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

PAY ITEMS	PAY UNIT
Item 250-01: Curb and Gutter, Conc, 24 Inch, Any Type	Linear Foot
Item 250-02: Planter Curb	Linear Foot
Item 251-01: Concrete Sidewalk, 6 Inch	Square Foot
Item 251-02: Concrete Sidewalk, 8 Inch	Square Foot
Item 251-03: Road Concrete Pavement, 8 Inch, Type 1	Square Foot
Item 251-04: Road Concrete Pavement, 8 Inch, Type 2	Square Foot
Item 251-05: Road Concrete Pavement, Colored, 8 Inch	Square Foot
Item 251-06: Sidewalk Ramp, 8 Inch	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.

DETAILED SPECIFICATION
FOR
ITEM #253- - DETECTABLE WARNING SURFACE

DESCRIPTION

This work shall consist of furnishing and installing cast in place detectable warning units in compliance to the Americans with Disability Act (ADA). All work shall be in accordance with MDOT Standard Detail R-28 (version in place at time of the bid letting).

MATERIALS AND CONSTRUCTION METHODS

The detectable warning tiles shall be ceramic cement or composite polymer concrete (CRC), colored as Federal Number 22144 (frequently referred to as "Colonial Red" or "Brick Red"). The detectable warning tiles shall meet the following dimensions and tolerances:

1. Dimensions: Cast In Place Detectable/tactile Warning Surface Tiles shall be held within the following dimensions and tolerances:

   Length: 24"
   Width: The full width of the approaching walk (60"
   for typical sidewalk), or as indicated on plans.
   Depth: 1.375 (1-3/8") (+/-) 5% max.
   Face Thickness: 0.1875 (3/16") (+/-) 5% max. Warpage of Edge: 0.5%
   max. Embedment Flange Spacing: shall be no greater than 3.1"

2. Water Absorption of Tile when tested by ASTM D 570-98 not to exceed 0.05%.
3. Slip Resistance of Tile when tested by ASTM C 1028-96 the combined Wet and Dry Static Co-Efficient of Friction not to be less than 0.80 on top of domes and field area.
4. Compressive Strength of Tile when tested by ASTM D 695-02a not to be less than 28,000 psi.
5. Tensile Strength of Tile when tested by ASTM D 638-03 not to be less than 19,000 psi.
6. Flexural Strength of Tile when tested by ASTM D 790-03 not to be less than 25,000 psi.
7. Chemical Stain Resistance of Tile when tested by ASTM D 543-95 (re approved 2001) to withstand without discoloration or staining - 10% hydrochloric acid, urine, saturated calcium chloride, black stamp pad ink, chewing gum, red aerosol paint, 10% ammonium hydroxide, 1% soap solution, turpentine, Urea 5%, diesel fuel and motor oil.
8. Abrasive Wear of Tile when tested by BYK - Gardner Tester ASTM D 2486-00 with reciprocating linear motion of 37± cycles per minute over a 10" travel. The abrasive medium, a 40 grit Norton Metallite sandpaper, to be fixed and leveled to a holder. The combined mass of the sled, weight and wood block is to be 3. 2 lb. Average wear depth shall not exceed 0.060 after 1000 abrasion cycles when measured on the top surface of the dome representing the average of three measurement locations per sample.
9. Resistance to Wear of Unglazed Ceramic Tile by Taber Abrasion per ASTM C501-84 (re approved 2002) shall not be less than 500.
10. Fire Resistance of Tile when tested to ASTM E 84-05 flame spread shall be less than 15.
11. Gardner Impact to Geometry "GE" of the standard when tested by ASTM D 5420-04 to have a mean failure energy expressed as a function of specimen thickness of not less than 550 in. Ibf/in. A failure is noted when a crack is visible on either surface or when any brittle splitting is observed on the bottom plaque in the specimen.
12. Accelerated Weathering of Tile when tested by ASTM G 155-05a for 3000 hours shall exhibit the

following result –E<4.5, as well as no deterioration, fading or chalking of surface.

13. Accelerated Aging and Freeze Thaw Test of Tile and Adhesive System when tested to ASTM D 1037-99 shall show no evidence of cracking, delamination, warpage, checking, blistering, color change, loosening of tiles or other detrimental defects.
14. Salt and Spray Performance of Tile when tested to ASTM B 117-03 not to show any deterioration or other defects after 200 hours of exposure.
15. AASHTO HB-17 single wheel HS20-44 loading "Standard Specifications for Highways and Bridges". The Cast In Place Tile shall be mounted on a concrete platform with a ½" airspace at the underside of the tile top plate then subjected to the specified maximum load of 10,400 lbs., corresponding to an 8000 lb individual wheel load and a 30% impact factor. The tile shall exhibit no visible damage at the maximum load of 10,400 lbs.
16. Embedment flange spacing shall be no greater than 3.1" center to center spacing as illustrated on the product Cast In Place drawing.

CONSTRUCTION METHODS

The contractor shall follow manufacturer specifications for installation, except where they conflict with MDOT Standard Detail R-28-J (version in place at time of the bid letting).

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 253: Detectable Warning Surface	Square Foot

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

DETAILED SPECIFICATION
FOR
ITEM #255-01 – HMA, 3E1
ITEM #255-02 – HMA, 4E1
ITEM #255-03 – HMA, 5E1
ITEM #255-04 – HAND PATCHING, MODIFIED

DESCRIPTION

This work shall consist of constructing HMA pavement base, leveling, and wearing courses, and hand patching, in accordance with Division 5 and Section 501 of the 2020 MDOT Standard Specifications, current supplemental MDOT specifications, and the City Standard Specifications, except as modified herein, and as directed by the Engineer.

MATERIALS

General

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

WORK ITEM	THICKNESS	MDOT HMA MIXTURE #
HMA Pavement Wearing	2.0”	5E1
HMA Pavement Leveling	2.0”	4E1
HMA Pavement Base Course	3.0”	3E1
Hand Patching (Permanent)	2”/3”	4E1/3E1
Hand Patching (Temporary)	as directed	see note

Binders for the bituminous mixes shall be PG 64-28 or as directed by the Engineer and shall meet the requirements specified in Section 904 of the 2020 MDOT Standard Specifications, and any current supplemental MDOT specifications.

Bond coat shall be an emulsified asphalt Type SS-1h and shall meet the requirements specified in Section 904 of the 2020 MDOT Standard Specifications, and any current supplemental MDOT specifications.

The use of Marshall Mixes and Cold Patch will be acceptable for use in Hand Patching for areas identified as temporary pavement, at the approval of the Engineer.

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.

Recycled Asphalt Pavement (RAP) in HMA Mixtures

The use of Recycled Asphalt Pavement (RAP) in HMA mixtures shall be in accordance with Section 501. 02. A. 2 of the 2012 MDOT Standard Specifications, and the City of Ann Arbor Standard Specifications.

CONSTRUCTION METHODS

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

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

Prior to placing the bond coat, the Contractor shall kill all vegetation (within the area to be paved) by applying an approved weed killer ("Round-Up" by Monsanto, or equal), shall thoroughly clean all joints & cracks in the existing pavement (and any gutter to be overlaid) with compressed air and/or vacuum-type street cleaning equipment to remove all dirt and debris to a depth of at least 1-inch, and shall thoroughly clean the entire surface to be paved, with a Vac-All or similar vacuum-type street cleaning equipment.

MDOT SS-1h bond coat shall be applied at a uniform rate of 0.10 gallons/square yard, on all exposed, existing HMA and concrete surfaces which will come in contact with the new HMA material. The Contractor shall take extra care to avoid covering surfaces which are not to be paved. After September 15, SS-1h bond coat shall not be diluted by more than 25%.

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

Construction of butt joints, where directed by the Engineer, shall be measured and paid for as "Machine Grading Modified."

The Contractor shall construct the pavement courses to provide the final cross-slopes (crowns) specified by the Engineer.

The Contractor shall construct feather joints, and shall feather the leveling and wearing courses at structures, in drive approaches, and at intersection joints, as directed by the Engineer. Feather joints shall vary the thickness of the asphalt from 0.0-inches to the required full paving thickness (approximately 1½-inches) over a 5-foot to 15-foot distance, or as directed by the Engineer. The Contractor shall rake all large aggregates out of the HMA mixture in feather joints, prior to compaction.

The Contractor shall provide a minimum of two rakers during the placement of all wearing and leveling courses. Further, the Contractor shall provide, when directed by the Engineer, a second "Break-Down" roller in order to achieve the specified asphalt densities.

The Contractor shall provide a minimum of 24-hours' notice to the Engineer prior to paving and shall obtain a "Permit To Pave" from the Engineer in advance of scheduling paving.

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 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, including 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 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. Substandard work that, in the Engineer's opinion, requires removal and replacement, shall be completed as follows:

1. Remove and replace leveling and/or wearing course areas mixed with foreign materials and defective areas.
2. Sawcut full depth of existing pavement in perpendicular and parallel directions to adjoining surfaces to ensure a quality and aesthetically pleasing repair.

3. Replacement may need to extend beyond the area of repair. Cut out such areas and fill with fresh, hot mix asphalt.
4. Compact by rolling to specified density and smoothness.
5. Sawcut or route new joint and fill with specified Hot Poured Rubber Joint Sealer product.

During the placement of leveling and wearing courses, the speed of the paving machine(s) shall not exceed 50-feet per minute.

The Contractor shall furnish and operate enough materials and equipment 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 specifications.

Each layer of HMA mixture shall be compacted to between 92 to 96 percent (or as determined acceptable by the Engineer) of the theoretical maximum density, as listed on the approved Job Mix Formula.

MEASUREMENT AND PAYMENT

Measurement of these HMA paving items shall be by the ton, in place. Unused portions of material loads shall be returned to the plant and re-weighed, and the corrected weight slip shall be provided to the Engineer. 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.

The bond coat is included in the cost of the HMA Pavement Item.

Corrective action shall be enforced as described at Division 5 of the 2020 MDOT Standard Specifications and will be based on the City's or DDA'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."

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

PAY ITEM	PAY UNIT
All HMA Pavement Items	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.

Payment Adjustment In Lieu Of Repair/Replacement

In the case that the work that is installed does not meet the specified quality of materials or installation, the DDA may opt to require the full removal and replacement of the substandard work, or, at their discretion, use the formulas listed below to reduce payment for the work.

A. Pavement Compaction:
    1. Pavement

a. If the daily average in place density is less than 94%, but greater than 93% of the mixture theoretical maximum density (TMD) the paving will be evaluated by the Engineer and Owner and at Owner's discretion, the unit price of that days paving will be reduced to 90% of full payment.
b. If the daily average in place density is less than 93% but greater than 92% of the mixture TMD the paving will be evaluated by the Engineer and Owner and at Owner's discretion may either be removed or the unit price of that days paving will be reduced to 75% of full payment.
c. If the daily average in place density is less than 92% of the mixture TMD the paving will be removed and replaced at no cost to Owner.

DETAILED SPECIFICATION
FOR
ITEM # 256- SIDEWALK UNIT PAVERS

DESCRIPTION AND MATERIALS

This work includes supplying and installing pre-cast concrete pavers laid with hand-tight joints over a fine aggregate bedding, to be placed on a separately paid for stone reservoir. All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, City Standard Specification, and MDOT 2020 Standard Specifications for Construction (as well as applicable Special Provisions as referenced herein) apply to this Section

B. ASTM International, latest edition:
C 33, Standard Specification for Concrete Aggregates.

C 136, Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.

C 140, Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.

C 144 Standard Specifications for Aggregate for Masonry Mortar.

C 936, Standard Specification for Solid Concrete Interlocking Paving Units.

C 979, Standard Specification for Pigments for Integrally Colored Concrete.

C 1645 Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units

D 4632, Standard Test Method for Grab Breaking Load and Elongation of Geotextiles

D 4533, Standard Test Method for Index Trapezoidal Tearing Strength of Geotextiles

D 4833, Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes and Related Products

D 4491, Standard Test Method for Water Permeability of Geotextiles by Permittivity

D 4751, Standard Test Method for Determining Apparent Opening Size of a Geotextile

Submittals

A. Concrete Pavers:

1. Samples for verification: Three representative full-size samples of each paver type, thickness, color and finish that indicate the range of color variation and texture expected upon project completion.
2. Accepted samples become the standard of acceptance for the product produced.
3. Test results from an independent testing laboratory for compliance of concrete pavers with ASTM C 936.
4. Manufacturer's catalog product data, installation instructions, and material safety data sheets for the safe handling of the specified materials and products.
5. Submit product certification materials for each type of precast concrete units, demonstrating compliance for the following:

    a) Compressive Strength
    b) Flexural Strength
    c) Absorption
    d) Freeze/Thaw Resistance

B. Joint and Setting Bed Sand:
1. Provide three representatives one-pound samples in containers of Joint Sand materials.
2. Provide three representatives one-pound samples in containers of Setting Bed Sand materials.
3. Test results from an independent testing laboratory for sieve analysis per ASTM C 136 conforming to the grading requirements of ASTM C 144.
4. Submit product certification materials for all jointing and bedding aggregates and paving joint mortars.

C. Base and Subbase Aggregate:
1. Test results from an independent testing laboratory for sieve analysis per ASTM C 136.

D. Paving Installation Contractor:
1. Job references from a minimum of three projects similar in size and complexity. Provide Owner/Client/General Contractor names, postal address, phone, fax, and email address.

Quality Control/Quality Assurance

A. Utilize a Manufacturer having at least ten years of experience manufacturing concrete pavers on projects of similar nature or project size.

B. Source Limitations:
1. Obtain Concrete Pavers from one source location with the resources to provide products of consistent quality in appearance and physical properties.
2. Obtain Joint and Setting Bed Sands from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.
3. Obtain Polymeric Joint Sand from one source with the resources to provide materials and products of consistent quality in appearance and physical properties.

C. Paving Contractor Qualifications:

Employ one installing entity to be responsible for the finished pavement surface, including installation of the paver containment, setting bed, joint filler and setting of unit pavers, who has, in the past three years, installed at least three projects of this size or larger.

D. Mockups:

1. Install a preliminary mock-up, 20 square feet minimum, prior to placement of concrete sidewalk to determine if minor adjustments to the width of the paver band may be prudent to avoid excessive cutting of pavers during installation. Such modifications to dimensions are to be approved by the Engineer.

2. Construct a second mock-up sample, 40 square feet minimum, of the paving system indicating the pattern and joints required in actual construction. Make all mock-up samples as required until accepted by the Owner. Consider the selected mock-up a minimum standard of workmanship when accepted, to be matched or bettered throughout the Project. The mock-up may be constructed as part of the Project and, if approved, will be accepted as part of the Work. However, should the Mock-up fail to meet the Owner's approval, remove and reconstruct it until approved.

Delivery, Storage and Handling

A. Deliver Concrete Pavers in manufacturer's original, unopened, and undamaged container packaging with identification labels intact.
   1. Coordinate delivery and paving schedule to minimize interference with normal use of streets and sidewalks adjacent to paver installation.
   2. Deliver Concrete Pavers to the site in steel banded, plastic banded or plastic wrapped packaging capable of transfer by forklift or clamp lift.
   3. Unload Concrete Pavers at job site in such a manner that no damage occurs to the product or adjacent surfaces.
B. Store and protect materials free from mud, dirt and other foreign materials.
C. Prevent Joint and Setting Bed Sand from exposure to rainfall or removal by wind with secure, waterproof covering.

Project/ Site conditions

A. Environmental Requirements:
   1. Install Concrete Pavers only on unfrozen and dry Setting Bed Sand.
   2. Install Concrete Pavers only on unfrozen and dry Base or Subbase Aggregate materials.
   3. Install Base or Subbase Aggregates only over unfrozen subgrade.
   4. Install Setting Bed Sand or Concrete Pavers only when there is no heavy rain or snowfall.

Materials

A. Source Limitations: Obtain each type of unit paver, joint material, and setting material from single source with resources to provide materials and products of consistent quality in appearance and physical properties.

B. Precast Unit Pavers: Solid paving units made from normal-weight concrete with a compressive strength not less than 5000 psi, water absorption not more than 5 percent according to ASTM C 140, and no breakage and not more than 1 percent mass loss when tested for freeze-thaw resistance according to ASTM C 1645.
   1. Manufacturers: Subject to compliance with requirements, provide precast unit paver products by Unilock Michigan, 12591 Emerson Drive, Brighton MI, 48116.
   2. Paver type is Tribeca Cobble, as manufactured by Unilock Michigan. Contact: Contact: Scott Black, 248-207-2035, scott.black@unilock.com.
   3. Paver laying pattern is Tribeca Cobble Pattern A
   4. Size: Manufacture the sizes indicated with a maximum tolerance of plus or minus 1/16 inch for length and width. Maximum height tolerance of plus or minus 1/8 inch.
      Unit size:
      - 12" x 5.125" x 2.75"
      - 9" x 5.125" x 2.75"
      - 6.875" x 5.125" x 2.75"
   5. Color: Pavers indicated on the plans shall be "Cobalt Grey"; All pavers shall have an Enduracolor face mix and series exposed aggregate finish. Pigments shall confirm to ASTM C 979.
      Note: ACI Report No. 212.3R provides guidance on the use of pigments.
   6. Provide pavers meeting the minimum material and physical properties set forth in ASTM C 936, Standard Specification for Interlocking Concrete Paving Units. Efflorescence is not a cause for rejection.
      - Average compressive strength 8000 psi (55MPa) with no individual unit under 7,200 psi (50 MPa).
      - Average absorption of 5% with no unit greater than 7% when tested according to ASTM C 140.
      - Conforming to ASTM C 1645 when tested for freeze-thaw requirements.
      - Height tolerances +/- 3.2 mm (1/8 in).
   7. Maximum allowable breakage of product is 5%.

   Contractor is to provide the specified precast concrete unit paver, or an equal product approved by the Engineer.

C. Joint Sand: Provide natural Joint Sand as follows:
   1. SEK Surebond Segmental Pavement Jointing Sand (ASTM-C144).
   2. Color: Tan
   3. Distributed by: Unilock Michigan. Contact: Contact: Scott Black, 248-207-2035, scott.black@unilock.com.
   4. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural, or manufactured from crushed rock. The jointing sand shall be free of organics and soluble salts or other contaminants likely to cause efflorescence
   5. Do not use limestone screenings, stone dust, or sand for the Joint Sand material that does not conform to conform to the grading requirements of ASTM C 33.

6. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
7. The jointing sand shall be in compliance with the following grading limits:

TABLE 1 – JOINT SAND GRADATION REQUIREMENTS FOR JOINT SAND

ASTM C 144		
Sieve Size	**Natural Sand Percent Passing**	**Manufactured Sand Percent Passing**
No. 4 (4.75 mm)	100	100
No. 8 (2.36 mm)	95 to 100	95 to 100
No. 16 (1.18 mm)	70 to 100	70 to 100
No. 30 (0.600 mm)	40 to 75	40 to 75
No. 50 (0.300 mm)	10 to 30	20 to 40
No. 100 (0.150 mm)	2 to 15	10 to 25
No. 200 (0.075)	0 to 1	0 to 10

D. Setting Bed Sand: Provide Setting Bed Sand as follows:

1. Washed, clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
2. Do not use limestone screenings, stone dust, or sand material that does not conform to conform to the grading requirements of ASTM C 33.
3. Do not use mason sand or sand conforming to ASTM C 144.
4. Utilize sands that are as hard as practically available where concrete pavers are subject to vehicular traffic.
5. Conform to the grading requirements of ASTM C 33 with modifications as shown in Table 2 below:

TABLE 2 – SETTING BED SAND GRADATION REQUIREMENTS FOR SETTING BED SAND

ASTM C 33	
Sieve Size	**Percent Passing**
3/8 in (9.5 mm)	100
No. 4 (4.75 mm)	95 to 100
No. 8 (2.36 mm)	85 to 100
No. 16 (1.18 mm)	50 to 85
No. 30 (0.600 mm)	25 to 60
No. 50 (0.300 mm)	10 to 30
No. 100 (0.150 mm)	2 to 10
No. 200 (0.075)	0 to 1

Note: Coarser sand than that specified in Table 1 above may be used for joint sand including C 33 material as shown in Table 2. Use material where the largest sieve size easily enters the smallest joints. For example, if the smallest paver joints are 2 mm wide, use sand 2 mm and smaller in particle size. If C 33 sand is used for joint sand, extra effort may be required in sweeping material and compacting the pavers in order to completely fill the joints.

E. Joint Stabilizer:
1. SEK Surebond SB-1300
2. Finish: Natural look matte finish
3. Distributed by: Unilock Michigan. Contact: Contact: Scott Black, 248-207-2035, scott.black@unilock.com.
4. Install per manufactures recommendations

CONSTRUCTION METHODS

A. Examination
1. Examine areas indicated to receive paving for compliance with requirements for installation tolerances and other conditions affecting performance for the following before placing the Concrete Pavers.
    - Verify the Concrete Underlayment has cured.
    - Verify that Geotextiles, if applicable, have bene placed according to drawings and specifications.
    - Verify the Concrete Underlayment thickness, strengths, surface tolerances and elevations conform to specified requirements.
    - Provide written density test results for soil subgrade, Concrete Underlayment P.S.I testing to the Owner, General Contractor and paver installation subcontractor.
    - Verify location, type, and elevations of edge restraints, concrete curbing, concrete collars around utility structures, and drainage inlets.
2. Proceed with installation only after unsatisfactory conditions have been corrected.
    - Beginning of Bedding Sand and Concrete Paver installation signifies acceptance of Base and edge restraints.

B. Preparation
1. Verify the Concrete Underlayment is clean and dry, certified by General Contractor as meeting material, installation, and grade specifications.
2. Stockpile Setting Bed Sand and Joint Sand such that they are free from standing water, uniformly graded, free of any organic material or sediment, debris, and ready for placement.
3. Verify that base and Geotextile is ready to support sand, pavers and imposed loads.
4. Keep area where pavement is to be constructed free from sediment during entire job.
5. Remove and replace all Geotextile, Joint Sand and Setting Bed Sand materials contaminated with sediment with clean materials.

C. Screeding of Paver Setting Bed:
   1. The spread aggregate shall be carefully maintained in a loose condition and protected against pre-compaction by traffic or rain both prior to and following screeding. Aggregate shall be lightly screeded in a loose condition to predetermined depth. Under no circumstances shall the aggregate be screeded in advance of the laying face to an extent to which paving will not be completed on that day. Any screeded aggregate which is pre-compacted prior to laying of paving unit shall be brought back to profile in a loose condition. Neither pedestrian nor vehicular traffic shall be permitted on the screeded aggregate.
   2. The Contractor shall screed the bedding aggregate using either an approved mechanical spreader or by the use of screed guides and boards.

D. Setting Bed Sand
   1. The aggregate shall be of uniform moisture content when screeded and shall be protected against rain when stockpiled on site prior to screeding. For installation, the moisture content shall be in the range of 4 to 8 percent.

   2. Provide, spread and screed Setting Bed sand evenly over the Concrete Underlayment.
      a. The bedding aggregate shall be spread loose in a uniform layer to give a depth after compaction of the paving units a thickness as indicated in plans, recommended by the paver manufacturer and as required to achieve designed grades.
      b. Protect screeded Setting Bed sand from being disturbed by either pedestrian or vehicular traffic. Screed only the area which can be covered by pavers in one day.
      c. Keep moisture content constant and density loose and constant until Concrete Pavers are set and compacted.
      d. Screed Setting Bed Sand using either an approved mechanical spreader (e.g.: an asphalt paver) or by the use of screed rails and boards. Maintain in a loose condition slightly ahead of the paving units and fully protect against incidental compaction following screeding. Loosen compacted sand by rain or screeded sand left overnight before further paving units are placed.
      e. Inspect the Setting Bed Sand course prior to commencing the placement of the Concrete Pavers. Acceptance of the Setting Bed Sand occurs with the initiation of Concrete Paver placement.

E. Utility Collars
   1. All water and gas valves, curb boxes and related at grade obstructions located in the sidewalk unit pavers are to have a cast in place concrete collar installed, which is square or rectangular in shape, at least 4 inches wider than the perimeter of the utility cover in all directions. Where feasible, the utility collar should be dimensioned to minimize the cutting of pavers and the use of cut slivers of pavers. Review color and utility conditions with Engineer before completion of sidewalk formwork.
   2. Utility collars will be paid for as part of this pay item.

F. Concrete Pavers
   1. Replace Concrete Pavers with chips, cracks, voids, discolorations, and other defects that might be visible in finished work.
   2. Mix Concrete Pavers from a minimum of three (3) bundles simultaneously drawing the paver vertically rather than horizontally, as they are placed, to produce uniform blend of colors and textures. (Color variation occurs with all concrete products. This phenomenon is influenced

by a variety of factors, e.g. moisture content, curing conditions, different aggregates and, most commonly, from different production runs. By installing from a minimum of three (3) bundles simultaneously, variation in color is dispersed and blended throughout the project).

3. Exercise care in handling face mix concrete pavers to prevent surfaces from contacting backs or edges of other units.
4. Provide Concrete Pavers using laying pattern as indicated. Adjust laying pattern at pavement edges such that cutting of edge pavers is minimized. Cut all pavers exposed to vehicular tires no smaller than one-third of a whole paver.
5. Use string lines or chalk lines on Setting Bed Sand to hold all pattern lines true.
6. Set surface elevation of pavers 1/8 in. (3 mm) above adjacent drainage inlets, concrete collars or channels.
7. Place units hand tight against spacer bars. Adjust horizontal placement of laid pavers to align straight. a. When installation is performed with mechanical equipment, use only unit pavers with spacer bars on sides of each unit.
8. Provide space between paver units of 1/32 in. (1 mm) wide to achieve straight bond lines.
9. Prevent joint (bond) lines from shifting more than ±1/2 in. (±13 mm) over 50 ft. (15 m) from string lines.
10. Fill gaps between units or at edges of the paved area that exceed 3/8 inch (10 mm) with pieces cut to fit from full-size unit pavers.
11. Prevent all traffic on installed Concrete Pavers until Joint Sand has been vibrated into joints. Keep skid steer and forklift equipment off newly laid Concrete Pavers that have not received initial compaction and Joint Sand material.
12. Vibrate Concrete Pavers into leveling course with a low-amplitude plate vibrator capable of a to 5000-lbf (22-kN) compaction force at 80 to 90 Hz. Perform at least three passes across paving with vibrator. Vibrate under the following conditions: a. After edge pavers are installed and there is a completed surface or before surface is exposed to rain. b. Compact installed Concrete Pavers to within 6 feet (2 meters) of the laying face before ending each day's work. Cover Concrete Pavers that have not been compacted and leveling course on which pavers have not been placed, with non-staining plastic sheets to prevent Setting Bed Sand from becoming disturbed.
13. Protect face mix Concrete Paver surface from scuffing during compaction by utilizing a urethane pad.
14. Remove any cracked or structurally damaged Concrete Pavers and replace with new units prior to installing Joint Sand material.

G. Cutting of Pavers

1. Contractor shall make all efforts to use full bricks to the maximum extent possible. Where cutting of brick is required to achieve the desired pattern, brick shall be cut to leave a clean edge to the traffic surface using a mechanical hydraulic, or guillotine cutter or masonry saw.
2. Discontinuities in patterns will not be permitted. Lay out pavers in all areas so as to eliminate slivers at edges.
3. Coordinate with poured concrete flatwork installer to establish paver area dimensions which help reduce or eliminate longitudinal cuts to pavers.
4. Carefully place the pavers by hand in straight courses with hand-tight joints and uniform top surface. Maintain good alignment and provide the pattern indicated.

5. Protect newly laid pavers at all times by panels of plywood, on which the installer stands, which can be advanced as work progresses. However, keep the plywood protection in areas which will be subjected to continued movement of materials and equipment. Take these precautions to avoid depressions and protect paver alignment.
6. If additional leveling of the pavers is required, and before sweeping in joint filler, roll with a power roller after sufficient heat has built up in the surface from several days of hot weather.
7. Inspection of Installed Pavers: After sweeping and prior to compaction, the paved area shall be inspected by the Owner and the Engineer to ensure satisfactory color blending. Areas deemed poorly blended shall be removed and re-installed in order to achieve satisfactory color distribution.

H. Joint Sand
1. Provide, spread and sweep dry Joint Sand into joints immediately after vibrating pavers into Setting Bed Sand course until full. Vibrate pavers and add Joint Sand material until joints are completely filled, then remove excess material. This will require at least 4 passes with a plate compactor.
2. Leave all work to within 3 ft. (1 m) of the laying face fully compacted with sand-filled joints at the completion of each day.
3. Remove excess Joint Sand broom clean from surface when installation is complete.

I. Final Compaction for Pavers
1. After joint sand has been installed and the pavement surface swept clean, final compaction shall be accomplished by not less than two passes of the plate compactor.
2. Final compaction should proceed as closely as possible following installation of joint sand and prior to the acceptance of any traffic.

J. Proof Rolling
1. Proof roll the completed installation with pneumatic tire equipment which replicates anticipated service traffic. Subject each individual paver to at least one passage of load.
2. Equipment and procedures are subject to approval by the Owner and Engineer and proof rolling will be observed and recorded by the Engineer.
3. Remove and replace units cracked or otherwise damaged by proof rolling, including inspection and repair of setting bed.

K. Allowable Tolerance
1. Finished surface of pavement: smooth, even, and true to the lines, grades and cross section indicated. Maximum deviation when tested with a 10-foot straight-edge parallel to the centerline of the surfaced area: 1/4 inch in 10 feet.
2. Maximum offset from flush from paver surface to paver surface or from paver surface to a fixed flush edge: 1/16 inch.
3. Slope finished walk for drainage without any ponded water on the finished surface.
4. Verify final elevations for conformance to the drawings after sweeping the surface clean. Prevent final Concrete Paver finished grade elevations from deviating more than ±3/8 in. (±10 mm) under a 10 ft (3 m) straightedge or indicated slope, for finished surface of paving.

L. Repair, Cleaning and Protection.
1. Clean paver surface of all debris, dirt, aggregate, and sand.

2. Remove and replace pavers which are chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in the same manner as original units, with same joint treatment to eliminate evidence of replacement.
3. Provide final protection of paver areas in a manner acceptable to the installer, which ensures paver work being without damage or deterioration at the time of substantial completion.
4. Warranty. Finished area shall be free of bumps or depressions, evenly graded to levels shown, and shall be guaranteed against defects of materials and workmanship for a period of two years after substantial completion.

M. Protection

1. Protect completed work from damage due to subsequent construction activity on the site.

MEASUREMENT AND PAYMENT

This work will be measured and paid using the following contract item (pay item):

PAY ITEM	PAY UNIT
Item 256: Sidewalk Unit Pavers	Square Foot

Sidewalk Unit Pavers will be measured and paid by the area of unit paver pavement in place. The work includes the aggregate setting bed, jointing sand and aggregate, and all incidental measures required to complete the work, including the utility collars described herein. The concrete base underneath the pavers will be paid for separately as Concrete Sidewalk, 6 inch.

DETAILED SPECIFICATION
FOR
ITEM #259-01 - PAVT MRKG, POLYUREA, 4 INCH, YELLOW
ITEM # 259-02 - PAVT MRKG, POLYUREA, 4 INCH, WHITE
ITEM #259-03 - PAVT MRKG, OVLY COLD PLASTIC, BIKE ARROW AND YIELD SYM.
ITEM #259-04 - PAVT MRKG, OVLY COLD PLASTIC, SPECIAL SYM.
ITEM #259-05 - PAVT MRKG, OVLY COLD PLASTIC, BIKE SYM.
ITEM #259-06 - PAVT MRKG, OVLY COLD PLASTIC, SHARROW SYM.
ITEM #259-07 - PAVT MRKG, POLYUREA, 12 INCH, STOP BAR OR CROSSWALK
ITEM #259-08 - PAVT MRKG, POLYUREA, 24 INCH, STOP BAR OR CROSSWALK
ITEM #259-09 - PAVT MRKG, ENDURABLEND, BIKE LANE GREEN
ITEM #259-10 - PAVT MRKG, ENDURABLEND, 18 INCH X 18 INCH BIKEWAY MARKS
ITEM #259-11 PAVT MRKG, SHARED PATH SPECIAL SYM.

DESCRIPTION

This work consists of furnishing and installing wet night retroreflective (WR) beads and/or elements, liquid applied pavement marking materials, and Endurablend Polymer Cement Surfacing bike lane pavement markings.

All work shall be consistent with the City of Ann Arbor Standard Specifications and the 2020 MDOT Standard Specifications for Construction, except as specified herein.

MATERIALS

Wet Night Retroreflective Beads and/or Elements. Select WR beads and/or elements from one of the following Manufacturers or a Department approved alternative that meets the requirements in Table 1:

3M Corporation
Potter's Industries
Swarco
Flex-o-Lite

Table 1: WR Markings

Average Initial Retroreflectivity at 30 meter geometry in mcd/lux/m^2		
Test Method	Colo	
	White r	Yellow
Dry (ASTM E 1710)	700	500
Wet Recovery (ASTM E 2177)	250	200

Ship the material to the job site in sturdy containers marked in accordance with subsection 920.01.A of the Standard Specifications for Construction.

Submit to the Engineer prior to the start of work:

a. The Manufacturer's recommended application rate of the beads/elements and the liquid

applied pavement marking binder to be used on the project. If the Manufacturer's recommended application rate differs from the specified rate in Table 811-1 of the Standard Specifications for Construction, the Manufacturer's recommended rate supersedes the table values.

b. Certification from the Manufacturer that when applied according to their application recommendations the beads and/or elements meet the requirements shown in Table 1 above.

Binder. Provide a liquid pavement marking product of the binder type specified in the contract documents from section 811 of the Qualified Products List or as specified by special provision, or use an alternative binder as approved by the Engineer.

The Endurablend bike lane pavement marking material must be comprised with green pigment and anti-skid abilities. The polymer cement surfacing shall be manufactured by Pavement Surface Coatings of Hanover New Jersey, and no material substitutions will be allowed.

1. Pigmented Resin. Transpo Color-Safe Bike Lane Green must be used as the pigment or approved equal. The approved color pigmented resin shall comply with FHWA green color guidelines for bike lanes.

2. Anti-Skid Aggregate. Anti-skid aggregates shall be provided by the pavement marking supplier. Aggregate shall have a minimum Hardness of 7.0 per Mohs Scale.

CONSTRUCTION

Place the binder and beads and polymer surface coatings in accordance with the Manufacturers' recommendations and sections 811 and 920 of the Standard Specifications for Construction except as noted above.

Construction of bike lane pavement markings shall be in accordance with manufacturer application and installation procedures, MDOT 2020 Standard Specifications for Construction, and Engineer.

All pavement marking areas shall be laid out by the contractor and then reviewed by the Engineer. Marking layout shall be approved by the Engineer prior to placement of material.

Surface preparation shall include cleaning of the pavement surface using high pressure water, compressed air or sandblasting and shall conform to ASTM D4263. All surface damage shall be corrected by the Contractor at the Contractor's expense, as directed by the Engineer. Manufacturer recommended pavement and air temperatures must be followed.

All markings on concrete surfaces shall receive a base coat application and shall be included in the pay item. Marking layout, material mixing, base coat application, and pigmented coat application shall comply with the manufacturer's installation procedures.

The Contractor shall protect the pavement markings from damage and allow them to fully cure prior to allowing traffic to drive over markings. Any damage shall be corrected by the Contractor at the Contractor's expense.

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 259-01: Pavt Mrkg, Polyurea, 4 inch, Yellow	Linear Foot
Item 259-02: Pavt Mrkg, Polyurea, 4 inch, White	Linear Foot
Item 259-03: Pavt Mrkg, Ovly Cold Plastic, Bike Arrow and Yield Sym.	Each
Item 259-04: Pavt Mrkg, Ovly Cold Plastic, Special Sym.	Each
Item 259-05: Pavt Mrkg, Ovly Cold Plastic, Bike Sym.	Each
Item 259-06: Pavt Mrkg, Ovly Cold Plastic, Sharrow Sym. .	Each
Item 259-07: Pavt Mrkg, Polyurea, 12 Inch, Stop Bar Or Crosswalk .	Linear Foot
Item 259-08: Pavt Mrkg, Polyurea, 24 Inch, Stop Bar Or Crosswalk .	Linear Foot
Item 259-09: Pavt Mrkg, Endurablend, Bike Lane Green	Square Foot
Item 259-10: Pavt Mrkg, Endurablend, 18 Inch X 18 Inch Bikeway Marks .	Linear Foot
Item 259-11: Pavt Mrkg, Shared Path Special Sym.	Each

The unit price for these items of work shall include all labor, material, and equipment costs to perform all the work.

DETAILED SPECIFICATION
FOR
ITEM #260-01 - RECESSING PAVT MRKG, LONGITUDINAL
ITEM #260-02 – RECESSING PAVT MRKG, TRANSVERSE

DESCRIPTION

This work consists of providing all equipment and labor required to prepare (grooving) the pavement surface for recessed longitudinal, transverse, and turning guideline pavement markings in accordance with the City of Ann Arbor Permanent Pavement Markings Detailed Specification, the plans, and this detailed specification.

MATERIALS

None specified.

CONSTRUCTION

Install a recess (groove) in accordance with the recessed pavement marking material manufacturer's installation instructions. Ensure all recessing configurations are in accordance with the Michigan Manual of Uniform Traffic Control Devices and the Michigan Department of Transportation Pavement Marking Standards.

1. Grooving Concrete and Hot Mix Asphalt Pavement. If there are no markings on the pavement, paint a temporary tracer line (with no beads) exactly where the permanent markings will be placed. Use these lines as a template for the grooving operation.

   Use equipment and methods approved by the manufacturer of the recessed pavement marking material to be recessed for forming grooves in pavement surfaces. Dry cut the grooves in a single pass using stacked diamond cutting heads on self-vacuuming equipment capable of producing a finished groove ready for pavement marking material installation.

   Ensure that the bottom of the groove has a fine corduroy finish. If a coarse tooth pattern results, increase the number of blades and decrease the spaces on the cutting head until the required finish is achieved.

2. Groove Dimensions. Ensure grooves for recessed pavement markings are in accordance with the following:

   Longitudinal Markings

Groove Width:	Material width +1 inch, (±1/8 inch)
Groove Depth:	As recommended by the manufacturer, (±5 mils)
Groove Position:	Center/Lane Lines: 2 inches from joint line, (±1/8 inch) Edge Lines: On lane, 2-4 inches in from the joint line, (±1/8 inch) Edge Lines for 14-foot paved lanes: as directed by the Engineer

Transverse Markings

Groove Width:	Material width +1 inch, (±1/8 inch)
Groove Depth:	As recommended by the manufacturer, (±5 mils)
Groove Position:	In the exact location where the transverse marking (crosswalk or stop bar) will be placed.

Turning Guideline Markings

Groove Width:	Material width +1 inch, (±1/8 inch)
Groove Depth:	As recommended by the manufacturer, (±5 mils)
Groove Position:	In the exact location where the turning guideline markings will be placed.

Placing Recessed Pavement Markings. Place the pavement marking material in the grooves within 24 hours of the grooves being made. Ensure the grooves are clean and dry prior to placing pavement marking material. Locate the groove so the entire marking can be placed within the groove.

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 260-01: Recessing Pavt Mrkg, Longitudinal	Linear Foot
Item 260-02: Recessing Pavt Mrkg, Transverse	Linear Foot

Pavement marking materials, including retroreflective pavement marking required for traffic control, will be paid for separately using the appropriate pay items.

DETAILED SPECIFICATION
FOR
ITEM #261- STREETLIGHT, REMOVE
ITEM #262-01 - ELECTRICAL WIRING – 12 GAUGE
ITEM #262-02 - ELECTRICAL WIRING – 10 GAUGE
ITEM #262-03 - ELECTRICAL WIRING – 8 GAUGE
ITEM #262-04 - ELECTRICAL WIRING – 6 GAUGE
ITEM #263-01 - ELECTRICAL CABINET
ITEM #263-02 - ELECTRICAL CABINET FOUNDATION
ITEM #264-01 - LUMINAIRE INSTALLATION
ITEM #264-02 – POLE INSTALLATION
ITEM #265 – FESTOON LIGHTING
ITEM #266 – POLE FIT UP

DESCRIPTION

This work shall include the furnishing, installation and testing of the street lighting fixtures at the locations shown in the plans, and as directed by the Engineer to provide a complete working system ready for use. All work shall be completed in accordance with the National Electric Code (NEC), Section 819 of the Michigan Department of Transportation 2012 Standard Specifications for Construction, the City of Ann Arbor Standard Specifications, and as specified herein.

Any costs associated with the obtaining a permit for the electrical work will be paid for by the Contractor, at no additional expense to the DDA or City.

MATERIALS

The Contractor shall furnish all materials and equipment required to install and place in operation Street Light Fixtures. All materials shall meet the requirements of the current IEEE, NEMA, ANSI Standards as applicable, MDOT 2020 Standard Specifications for Construction, the City of Ann Arbor Standard Specifications, and as specified herein. All electrical components shall be furnished new and be listed by, and bear the label of Underwriter's Laboratories, Inc.

1. Street light fixtures shall be furnished by the contractor. The light fixtures shall be complete, fitted with LED assembly and driver, fuses, support brackets, etc. The Contractor will arrange with the manufacturer for the delivery and storage of all items required for the complete installation.
2. Light poles, clam shell base pieces, and banner brackets (if used) shall be furnished by the contractor. The Contractor will arrange with the manufacturer for the delivery and storage of all items required for the complete installation.

Street light fixtures shall be installed complete with wiring from the base to the luminaires including pole base fuse holders. Wiring installed in lighting standard poles between luminaires and taps in base shall be copper conductors type "XHHW" No. 10 AWG minimum, in conduit.

Cable and wire shall be manufactured by:

Collyer	Hatfield	Reynolds
Esses	Kaiser	Rome

Anaconda	General Cable	Okonite	Southwire
Cerro	General Electric	Phelps Dodge	Triangle

Conductors are to match the sizes of the wires being replaced, unless otherwise specified to be larger herein, or directed by the Engineer.

The connection of conductors from size #12 AWG and larger to terminal parts or other conductors shall be made with heavy-duty cast alloy solderless connectors of the pressure double indent type. Tap connectors at light standards shall be multiple aluminum connector with four positions for #2 AWG copper and a 5th position for #12 AWG or larger fixture wire. Connectors shall be Utilco Catalog No. SLC-4-0-1-L with cover for tap block.

Ground rods shall be copper clad steel, and shall be either two 1/2-inch diameter round by 6-feet long rods, or one 5/8-inch diameter round by 8-feet long rod, as shown on the plans.

Fuse holders shall be watertight, in-line, break-away type, 30A, 600V with insulating boots. Install one fast-acting fuse per phase conductor. Fuses shall be five ampere and/or sized for the fixtures being protected.

Provide 20A, 125VAC NEMA type 5-20R ground fault circuit interrupter (GFCI) receptacle with solid-state ground fault sensing and circuit interrupter Class A, Group 1. Per UL standard 943-2003, manufacturer after January 1, 2003 and five milliamperes ground fault trip level. Receptacles must be rated for outdoor use and meet current code requirements for the intended application.

Pole Fit-Up shall use 2-inch hot dipped galvanized ridged metal conduit and sweep (ERMC-S), rated at 350 pounds per 100 linear feet, in conformance with ANSI C80.1. Hold conduit in place with galvanized steel one-hole strap, rated for heavy duty use for exterior applications. All hardware to be hot dipped galvanized steel.

All fasteners shall consist of stainless steel tamperproof screws, bolts, nuts, washers, etc. All anchor bolts and associated washers, nuts, studs, and couplings shall conform to the requirements of the Michigan Department of Transportation 2012 Standard Specifications for Construction, Section 908.14, and shall be galvanized in accordance with ASTM A-153 or as noted on the Drawings.

Prior to beginning construction, the Contractor shall submit to the Engineer product data sheets and Manufacturer's certifications of all wiring, splices, lamps, rods, base plates, anchor bolts, and other parts used in the construction of the light and pole assembly. Certifications shall indicate that all materials meet the minimum requirements of these specifications.

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

Materials for "Festoon Lighting" are provided on the plans, and include poles, festoon string lights, and related fittings and mounting details.

Provide cabinet of adequate size as described in plan set to house a large electrical panel, small electrical

panel, and photocell controller.

Provide a foundation per cabinet manufactures recommendation and as shown in the plan set.

Materials for "Power Pedestal" are provided on the plans and include a power pedestal without base and related fittings and mounting details.

CONSTRUCTION METHODS

The Contractor shall provide temporary street lighting during the entire construction period, providing the equivalent of half of the current light levels on the street, either through the use of existing street lights, installed lights as specified, or other temporary equipment and measures.

Remove conduits and wires as indicated in the plans and specifications, and where the existing wires are replaced by new wires. Unused and unnecessary conduit that is located in undisturbed soils may remain in place.

The Contractor shall provide all labor, materials, tools, equipment, and supervision required for the furnishing and installing of the street lighting fixtures and new GFCI outlets. Connections to equipment, lighting standards, contactors, etc., shall be made in accordance with applicable building and electrical codes and the recommendations from manufacturers of the particular equipment furnished. Any and all additional connections called for by the equipment manufacturer's or otherwise required for the successful operation of the particular equipment furnished shall be installed by the Contractor as part of his Contract with no additional compensation.

The Contractor shall examine all fixtures and poles delivered to jobsite prior to installation to ensure all specification requirements and shop drawing notes & comments have been incorporated by manufacturer. Installation of fixtures signifies Contractor's acceptance and approval of fixtures from manufacturer.

Contractor must provide adequate storage space for all electrical equipment, conduit, and materials delivered to the job site under a weather-protected enclosure. Location of the space must be approved by the Engineer. Equipment set in place in unprotected areas must be provided with temporary protection.

The Contractor shall be responsible for maintenance of, and repair of damage as a result of accident or vandalism to, the light fixtures, bases, luminaries, and all other materials installed, or to be installed, related to, or necessary for the light fixture and pole installation on the project. This shall remain the Contractor's responsibility until the installation is complete, tested, and accepted by the Engineer.

All connections shall be per the manufacturer's recommendation. Where Utilco connections are not used, all joints in outlet or junction boxes shall be taped in such manner that the insulating value of the joint or splice will be at least equal to the insulating value of the conductor to which it is applied.

Wire brush and apply approved corrosion inhibiting compound all connections.

Ground cables shall be #6 AWG, soft drawn, bare, stranded copper wire. Pressure-type connectors shall be used to connect the ground cable to poles and electrical equipment. The cable shall be properly attached to the ground rods.

All fixtures and poles shall be thoroughly and permanently grounded at each location. Grounding shall be in accordance with the latest National Electric Code and as shown on the Drawings, as a minimum. At the disconnect cabinet, the Detroit Edison neutral, the disconnect cabinet, and the ground mat system shall all

be permanently grounded together. The resistance of the ground rod to ground shall not exceed 25 ohms when tested with a megger. In case the resistance is more than 25 ohms, additional or longer ground rods shall be installed.

Install concrete poles foundation where indicated on the drawings. Base of the foundation is to rest on undisturbed subgrade or on 21AA Limestone Aggregate (or pea stone) compacted to not less than 98% of its maximum unit weight. Backfill pole foundation with 21AA Limestone Aggregate (or peas stone) in 6 to 8 inch lifts, compacting each lift as the hole is filled. Precast concrete pole shall be set plumb and in-line with existing poles, with no more than one-half inch deviation from plumb in any direction.

All excavation for main conduit runs shall be of a depth to leave at least 30 inches from the top of the conduit encasement or top of direct buried rigid conduit to grade of top of curb or surrounding terrain. For lateral flexible conduit, the corresponding dimensions shall be 30 inches. The trench shall be graded to handhole and pole location so that the finished conduit run will contain no pockets where water might accumulate or drain into a handhole or pole.

Conduit shall be cut with a hacksaw or other approved tool. The ends shall be square after cutting and the conduit shall be reamed. All conduits must be securely fastened to boxes with locknuts and bushings of an approved make, care being taken that the full number of threads project into the bushings. Rigid galvanized conduit shall be assembled by means of approved threaded galvanized coupling, unions, and fittings. PVC conduit shall be assembled by means of approved threaded or solvent-welded fittings.

Conduits which are installed underground or concealed in concrete, foundations, or other structures, shall be cleared of foreign material and obstructions, after installation and before conductors or pull wire are drawn in, by wire brushing, swabbing and employing an iron or hardwood mandrel which is 1/4" smaller in diameter than the internal diameter of the duct or conduit.

Conduits shall be cut a minimum of 1 inch above the light pole base and not more than 2 inches above the base.

Cable shall be pulled into conduits using a proper cable grip for the purpose. The cable shall be so handled that it is not subjected to excessive strain or kinked when pulled through the conduit. Damaged or kinked cable shall not be used. Where more than one cable is to be installed in a conduit, all cables shall be pulled through simultaneously. Splices in ducts and conduit will not be permitted.

Cables shall be neatly racked and identified on cable racks in all handholes after being formed to their final position. Cables shall be racked slightly higher than the duct entrances so that they will not rest on the edges of the duct. Cables shall be properly tagged in all handholes and poles. All splices and connections shall be made as described herein and as shown on the details. Where cable is installed but not immediately spliced, the cable ends shall be thoroughly sealed and racked out of the way of possible danger.

Conductors shall not be installed in conduit until all work which might cause damage to the conduits or cables has been completed. Street light conductors shall be installed in continuous lengths from light to light with connections in the base of lights or street light pull boxes. All splices shall be accessible through the pole handhole and shall extend 4”-6” outside the handhole. No splices will be allowed which are inaccessible inside the pole. Street lighting splices required in ground handholes shall be terminated using splice kits that insulate, seal, and protect the splices.

Printed color code phase identification shall be repeated at all connections. The printing of the conductor coding shall be repeated at all connections. The printing of the conductor coding shall adhere to covering

and not be readily removed by rubbing.

Where Utilco connections are not used, all joints in outlet or junction boxes shall be taped in such manner that the insulating value of the joint or splice will be at least equal to the insulating value of the conductor to which it is applied.

Pole Fit-Up shall use 2-inch conduit (ERMC-S) from below grade to top of fit up, which is to be 10 feet above grade. Use galvanized ERMC-S sweep and conduit to provide underground feed from fit up to power cabinet. Install threaded conduit fittings between sections pursuant to the NEC. Hold conduit in place on pole with galvanized steel one-hole strap, spaced as need to secure conduit, but not more than 3 feet on center. Secure strap to pole with galvanized lag screws, sized as recommended by manufacturer.

All trenching and backfilling to install electrical work shall be by the Electrical Contractor. When backfilling the trenches under areas to be paved and around street light foundations, the earth must be compacted in place (in 6-8" layers) to 95% of the material's maximum dry density.

Any excess excavated native material that cannot be placed back into the trench from which it came is to be disposed of as detailed in the special provision entitled "Non Hazardous Contaminated Material". Any excess excavated fill material placed as part of this project is to be used or "wasted" on site as directed by the Engineer. If it is unable to be incorporated into the final work, at the sole discretion of the Engineer, the excess excavation shall be disposed of offsite at no additional cost.

The use of equipment, or any part thereof, for purposes other than testing, even with the Engineer's consent, shall not be construed to be an acceptance of the work on the part of the Engineer, nor shall it be construed to obligate the Engineer in any way to accept improper work or defective materials.

Upon completion of the underground work, the Contractor shall grade the work area smooth, filling any trench settlements, eliminating any large piles of earth and cleaning up any debris, or left over construction materials and disposing of it offsite at an approved manner and location.

All factory finished equipment shall be cleaned at the completion of the work by the Contractor. Equipment showing mars or rust shall be refinished by the Contractor in a manner acceptable to the Engineer.

MEASUREMENT AND PAYMENT

The cost of providing temporary street lighting as specified herein shall not be paid for separately.

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

PAY ITEM	PAY UNIT
Item 261: Streetlight, Remove	Each
Item 262-01: Electrical Wiring, 12 Gauge	Linear Foot
Item 262-02: Electrical Wiring, 10 Gauge	Linear Foot
Item 262-03: Electrical Wiring, 8 Gauge	Linear Foot
Item 262-04: Electrical Wiring, 6 Gauge	Linear Foot
Item 263-01: Electrical Cabinet	Each

Item 263-02 Electrical Cabinet Foundation .....Each
Item 264-01: Luminaire Installation .....Each
Item 264-02: Pole Installation.....Each
Item 265: Festoon Lighting.....Lump Sum
Item 266: Pole Fit-Up .....Each

"Streetlight, Remove" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials, including, but not limited to excavation of pole foundation, removal of light pole fixture, and attached appurtenances, complete removal of the concrete foundation, and disposal of the light fixtures, poles and attached appurtenances, and backfilling the excavation with MDOT Class II fill, compacted in 6 inch layers to 95 % dry weight density.

"Luminaire Installation" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials, including, but not limited to new wiring from the base of the pole to the fixture and outlet, cable splicing, fittings, supports, hangers, connectors, tape, fuses, grounding equipment; new water proof outdoor rated GFCI outlets, and, any other materials required for complete installation of the light fixture and outlet onto the light pole and its foundation; all required testing; and, placing light fixtures and pole assemblies into service. The luminaire fixtures will be furnished by the contractor.

"Pole Installation" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials including, setting pole and anchor bolts and backfill. The light pole will be furnished by the contractor. Install the pole such that the handhole is on the opposite side of vehicle traffic (i.e., a person accessing the handhole would be facing the traffic).

"Festoon Lighting" shall be paid for at the Contract Lump Sum and shall include all labor, equipment, and materials including, poles, festoon string lights, power pedestals, wiring from the base of each pole and pedestal, and related fittings and mounting details. All products and materials for "Festoon Lighting" will be provided by the Contractor.

"Electrical Wiring" shall be paid for at the Contract unit price based on the linear foot of each single conductor wire installed, as measure from connection point to connection point. Electrical Wiring shall include all labor, equipment, and materials, including, but not limited to wiring, splicing, connections, tape and related materials and labor necessary to make the electrical system operational. Current electrical conductors being replaced range in size from No. 6 to No. 12. This pay item includes the removal of any conduit and wires indicated on plans for removal.

"Pole Fit-Up" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials, including, but not limited to conduit installed to utility pole, sweeps, underground conduit from pole to power cabinet, hardware, fittings, and all other work and materials to make fit up. Contractor will be considered complete with this pay item once DTE Energy has accepted the fit up for use. This pay item does not include wire, or installation of wire.

"Power Pedestal" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials including, power pedestals, wiring from the base of each pedestal, and related fittings and mounting details. All products and materials for "Power Pedestal" will be provided by the Contractor.

"Electrical Cabinet" and "Electrical Cabinet Foundation" shall be paid for at the Contract unit price each and shall include all labor, equipment, and materials including, cabinets, wiring to and from the cabinet, related fittings, mounting details, and foundation. All products and materials for "Electrical Cabinet" and "Electrical Cabinet Foundation" will be provided by the Contractor.

DETAILED SPECIFICATION
FOR

ITEM #267-02 – 2 Inch SCHEDULE 80 PVC ELECTRICAL CONDUIT
ITEM #267-03 – 3 Inch SCHEDULE 80 PVC ELECTRICAL CONDUIT
#267-04 – 4 Inch SCHEDULE 80 PVC ELECTRICAL CONDUIT

DESCRIPTION

This work shall include the excavation and proper disposal off-site of excess excavated material, the installation of conduits, the placement of MDOT Class II bedding and backfill compacted to 95% of its maximum unit weight, and the installation of pull strings and detection tape. All work shall be completed in accordance with Sections 819 and 918.01 of the MDOT 2020 Standard Specifications for Construction, the City of Ann Arbor Standard Specifications for Streetlight Installation and Construction, as shown on the plans, as directed by the Engineer, and as modified herein.

CONSTRUCTION

Schedule 80 PVC conduit will be used for ALL areas of the project.

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

Trenching, placement of conduit, and backfilling shall be completed as outlined in the City of Ann Arbor Standard Specifications for Streetlight Installation and Construction, except as noted herein.

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

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

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

The Contractor shall provide and install appropriate non-metallic sleeves and gasketed expansion couplings for each conduit if it is required to be installed in a bridge at each bridge joint. The Contractor shall submit

catalog “cuts” of the proposed materials for review by, and approval of, the Engineer prior to ordering materials or performing any of the work.

“Special Trench Detail” covers the trenching of conduits through areas of existing brick sidewalk, and includes the removal of pavers and base support, salvage of bricks, and reinstallation of existing brick pavers, as well as any additional effort for trenching for conduit and backfilling of trench that may be above the typical Electrical Conduit pay item. Bricks shall be removed, salvaged and reinstalled following the construction and material requirements outlined in the brick paving specifications elsewhere in this project, including sand setting bed. Brick base shall be 10 inches of MDOT 21AA aggregate, installed in two compacted lifts to 95% dry density. If existing brick are set on concrete, install a matching concrete base in lieu of the MDOT 21AA aggregate, at no additional cost.

Conduits following the same path may be installed in the same trench, and will be paid for separately. Multiple conduits installed in the same trench shall be backfilled with pea stone conforming to the MDOT specifications for 34G aggregate. Vibrate pea stone backfill to ensure filling of voids around conduits.

MEASUREMENT AND PAYMENT

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

PAY ITEMS	PAY UNIT
Item 267-02: 2 Inch Schedule 80 PVC Electrical Conduit	Linear Foot
Item 267-03: 3 Inch Schedule 80 PVC Electrical Conduit	Linear Foot
Item 267-04: 4 Inch Schedule 80 PVC Electrical Conduit	Linear Foot

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

The per foot unit price for ”**X**" Inch Schedule 80 PVC Electrical Conduit” shall include the installation of each conduit. Conduits following the same path may be installed in the same trench, and will be paid for separately. Also included in the unit price shall be the labor, materials, and equipment costs associated with the installation of the conduits, including, but not limited to, fittings, sweeps, pull strings, end caps, sleeves, tracer wire, backfilling, utility pole fit ups, and all other materials necessary for placing conduit as shown on the plans, and specified herein.

CITY OF ANN ARBOR
DETAILED SPECIFICATION
FOR
ELECTRICAL AND COMMUNICATION HANDHOLES

WT:JNB 1 of 3 02/01/22

ITEM #268-01 – HANDHOLE ASSEMBLY, 12 INCH X 18 INCH
ITEM #268-02 – HANDHOLE ASSEMBLY, 17 INCH X 30 INCH
ITEM #268-03 – HANDHOLE ASSEMBLY, 24 INCH X 36 INCH
ITEM #268-04 – HANDHOLE ASSEMBLY, 30 INCH X 48 INCH
ITEM #268-05 – HANDHOLE ASSEMBLY, 36 INCH X 72 INCH
ITEM #268-06 – HANDHOLE ASSEMBLY, REMOVE FOR REPLACEMENT, ANY SIZE
ITEM #268-07 HANDHOLE ADJUST, ANY SIZE

a. Description. This work shall consist of furnishing and installing handhole assemblies at the locations shown in the Plans, or as directed by the Engineer. All work shall be completed in accordance with the current National Electric Code (NEC), section 818 of the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, except as specified herein.

The Contractor shall excavate all trenches and pits to the required dimensions; sheet, brace, and properly support the adjoining ground or structures where necessary to comply with MIOSHA, Section 104.07.B of the MDOT 2012 Standard Specifications for Construction, and other relevant safety standards.

The work for all items shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; the furnishing, installation, and removal of sheeting and/or shoring where needed; all items necessary for the protection of the trench and all persons employed in the work during the work day and “after-hours” periods; the furnishing, placement and compaction of approved bedding and backfill materials; additional labor and equipment costs associated with any required nighttime water main work; and any other required items to complete the work as shown on the plans, as detailed in this Detailed Specification, and as directed by the Engineer.

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

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

12 inch x 18 inch handhole assemblies shall consist of "Quazite" box. The box shall be #PG1118BA12. The cover shall be, #PG1118HA41, a locking heavy-duty bolt-down type

with a logo that reads “Street Lighting.” The total depth of the handhole shall be 12 inches.

17 inch x 30 inch handhole assemblies shall consist of two, stacked "Quazite" boxes. The box shall be #PG1730BA18. The cover shall be, #PG1730HA46, a locking heavy-duty bolt-down type with a logo that reads “Traffic Signal” or “Street Lighting” based on their intended use. The total depth of the handhole shall be 18 inches.

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

30 inch x 48 inch handhole assemblies shall consist of "Quazite" box. The box shall be #PG3048BA24. The cover shall be, #PG3048HA00, a locking heavy-duty bolt-down type with a logo that reads “Street Lighting.”

48 inch x 72 inch handhole assemblies shall consist of "Quazite" box. the box shall be # PG4872BA36. The cover shall be, #PG4872HA00, a locking heavy-duty bolt-down type with a logo that reads “Street Lighting.”

If directed by Engineer to stack the handholes for additional depth, the model used for the lower box shall be compatible with those specified herein and meet the same strength requirements.

Provide Granular Material, Cl II in accordance with section 902 of the MDOT 2012 Standard Specifications for Construction.

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

Place foundation material consisting of four (4) inches of Granular Material, Cl II compacted to 95% of its maximum unit weight.

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

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

Backfill around the perimeter of the handhole with Granular Material, Cl II compacted to 95% of its maximum unit weight.

Handhole Adjust, Any Size includes the vertical adjustment, either upwards or downwards, of an existing handhole to remain to meet proposed pavement grades and slopes.

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

Pay Item	**Pay Unit**
Item 268-01 through 268-05: Handhole Assembly, __ inch x __ inch	Each
Item 268-06: Handhole Assembly, Remove For Replacement, Any Size	Each
Item 268-07: Handhole Adjust, Any Size	Each

Handhole Assembly, ___ inch x ___ inch shall be paid for at their contract unit prices and shall include all labor, equipment, and materials to complete the work as specified herein. The pay item shall also include the excavation and disposal of materials, furnishing, installing and compacting Granular Material, Cl II, and all work related to connecting handholes to new and existing conduits, whether shown or not shown on the plans.

DETAILED SPECIFICATION
FOR
ITEM #270 - BIKE HOOPS, SURFACE MOUNT

DESCRIPTION

This work consists of furnishing all labor, equipment, materials, required to place bike loops in the areas shown on the plans. All work must be conducted in accordance with the plans and specifications, the 2012 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

Provide bike hoop materials selected and approved by the DDA. The materials will include the anchor bolts, nuts, washers, and all other hardware required for installation in accordance with the specifications herein, details included on the plans and per the manufacturer's recommendations.

Shop drawings from the manufacturer are to be submitted to the Engineer for approval prior to fabrication.

Furnish and install bike hoops with the following specifications:

1. All pipe and anchoring hardware materials are to be made of galvanized steel.
2. Fabricate bike hoops as dimensioned on the plans.
3. The finish of the bike hoops is to be powder-coated (black) over galvanized steel.
4. The bike hoop pipe is to be Schedule 40.
5. Bike hoops must be surface mounted, where shown and as noted on plans; install per the manufacturer's recommendations.
6. All anchoring bolts, nuts, washers, and all other hardware for installation to be galvanized steel, finished to match the bike hoop.

CONSTRUCTION METHODS

Review proposed bike hoop locations with the Engineer prior to installation.

Surface mounting is required in all areas. Identify each part prior to assembly, only after final adjustment and leveling permanently tighten all bolt, nuts, and fasteners.

Bike hoops located in areas of sidewalk unit pavers are to be mounted on the poured concrete base. Cut and restore unit pavers to completely cover the bike hoop base and hardware.

Evenly space bike hoops at the dimensions noted on plans. Bike hoops must be installed plumb and in line with each other, and shall be firmly connected to the foundation or pavement so as to prevent rocking.

Perform the construction methods in accordance with section 803 of the 2012 MDOT Standard Specification for Construction unless otherwise stated in this special provision.

MEASUREMENT AND PAYMENT

Bike Hoops located on concrete sidewalks and within the sidewalk unit pavers will be paid as the same pay item.

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

PAY ITEM	PAY UNIT
Item 270: Bike Hoops, Surface Mount	Each

DETAILED SPECIFICATION
FOR
ITEM # 271 BOLLARD

DESCRIPTION

This work consists of furnishing all labor, equipment, materials, required to place flexible bollards in the areas shown on the plans. All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

GENERAL

1.01 Summary

A. Section Includes:

1. Helio Security Bollard, Series 600, 6" diameter column, non-illuminated

1.02 References

A. ASTM A 53 – Standard Specification for Pipe, Steel, Black, and Hot-Dipped, Zinc Coated, Welded and Seamless.

B. ASTM A 123 – Specification for Zinc (hot-dip galvanized) Coatings on Iron and Steel Products.

1.03 Performance Requirements

A. Bollards must meet minimum level of K2.7 impact kinetic energy designation as identified by the ASTM Standard Test Method for Vehicle Crash Testing of Perimeter Barriers. Manufacturer must provide documentation confirming that a finite element analysis has been completed for this product. A K2.7 rating is equivalent to stopping a 5,500 lb. vehicle traveling at 40 mph.

1.04 Submittals

A. Product data: Manufacturer's standard data sheets on each product to be used, including:

1. Manufacturer's standard product literature.
2. Shop Drawings.
3. Installation instructions.
4. Maintenance instructions.

B. Submit finish samples for approval.

1.05 Quality Assurance

A. Manufacturer Qualifications:

1. Provide reference list of at least ten major transportation authorities, municipalities, universities, or other high-use public environments currently using site products fabricated by the manufacturer.

1.06 Delivery, Storage and Handling

A. Handle products in accordance with manufacturer's instructions.

B. Store products in manufacturer's original packaging until ready for installation.

C. Protect products from impacts and abrasion during storage.

1.07 Warranty

A. Provide manufacturer's standard warranty:

1. Warranty terms: three years from date of invoice against defects in materials and workmanship.

MATERIALS

Provide the bollards as noted on plans and as follows:

1. Helio Security Bollard, Series 600 by Forms+Surfaces
2. Manufacturer Contact:

   Chris Thomas
   Forms+Surfaces
   phone: 874-250-8030

   email: chris.thomas@forms-surfaces.com

   website: www.forms-surfaces.com
3. Materials:
   a. Body: Stainless steel.
   b. Base: Aluminum.
   c. Head Cap: Stainless steel casting.
   d. Accessories: 02 Chain Loops
   e. Mounting: cast in place extra-heavy wall steel security core with welded cross supports. 48" Security core minimum 24" embed into concrete and minimum 24" internal to bollard.
   f. Heavy steel wall security core set in 18" by 18" by 30" concrete footer minimum.
4. Finishes:
   a. Body and Head Cap:
      1) Satin stainless steel
5. Dimensions: 40" high x 6" diameter.
6. Mounting:
   a. Embedded security core, with stainless steel mounting hardware

CONSTRUCTION METHODS

A. Examination
1. Verify that substrates are stable and capable of supporting the weight of items covered under this section.
2. Verify that foundation, applied finishes, and adjacent construction are ready to receive bollards and are level, plumb, and square within tolerances acceptable to manufacturer.
3. Verify that required utilities are in correct location and are of correct capacities for specified products.

B. Installation
1. Install in accordance with manufacturer's installation instructions.
2. Install in conformance to applicable ADA guidelines and End User's established accessibility policies.

MEASUREMENT AND PAYMENT

The work of this pay item includes all excavation, concrete, backfill and related work to provide for the installation of the specified bollard.

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

PAY ITEM	**PAY UNIT**
Item 271: Bollard	Each

DETAILED SPECIFICATION
FOR
ITEM # 272-01 - BIKEWAY CURB
ITEM #272-02 BIKEWAY POST
ITEM #272-03 RE-USE FLEXIBLE BOLLARD

DESCRIPTION

This work consists of furnishing all labor, equipment, materials, required to place bikeway posts and bikeway curb in the areas shown on the plans. All work must be conducted in accordance with the plans and specifications, the 2012 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

Bikeway posts are to be as manufactured by Pexco; model shall be "City Post" Model EAC, with the optional anchor cup plug. Color shall be white, with silver reflective bands.

Bikeway curbs are to be as manufactured by Qwick Kurb, Inc. model number L60, in white color. The ends of the curb sections are to include the end section model number L61. The curb assembly to include bollard markers, model number L125SHn in white color with silver reflective bands. All pavement mounting hardware to stainless steel meeting the dimensional and strength capacity of the manufacturer's recommendation.

The bollards for Re-Use Flexible Bollard are to be provided by the DDA and installed by the Contractor. All other materials of this detailed specification are to be provided by the Contractor.

Shop drawings from the manufacturer are to be submitted to the Engineer for approval prior to fabrication.

CONSTRUCTION METHODS

Layout the locations of the bikeway posts and bikeway curbs for approval by the engineer prior to installation.

Install the bikeway posts, curbs, and bollards per manufacturer's recommendations.

Bikeway posts and bikeway curbs are to be installed in a line parallel to the street markings and curb, with no elements being more than 2 inches from a straight-line end to end.

Evenly space bikeway posts at the dimensions noted on plans. Bikeway posts and bollards on the bikeway curb must be installed plumb and in line with each other and shall be firmly connected to the anchor system.

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 272-01 Bikeway Curb	Linear Foot

Item 272-02 Bikeway Post.....Each
Item 272-03 Re-Use Flexible Bollard .....Each

DETAILED SPECIFICATION
FOR
ITEM #273– URBAN BENCH

DESCRIPTION

This work consists of furnishing and installing a metal and wood bench in accordance with the details and at the location on the plans. This includes any necessary excavation, drilling into pavement, assembly, and disposal of unsuitable materials and packaging required for a complete installation. All work must be conducted in accordance with the plans and specifications, the 2012 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

The materials will include the anchor bolts, nuts, washers, and all other hardware required for installation in accordance with the specifications herein, details included on the plans and per the manufacturer's recommendations.

Shop drawings from the manufacturer are to be submitted to the Engineer for approval prior to fabrication.

Furnish and install Urban Bench as manufactured by STREETLIFE America LLC of Philadelphia, PA (phone number (215) 247-0148). The bench design is custom to the project, based on the "Rough and Ready" product series, as dimensioned and illustrated on the plans.

The urban benches will also meet the following requirements:

- The site furnishings shall be made of timber, untreated FSC 100% Louro Gamela hardwood with hot dip galvanized supports.
- Site furnishings must be surface mounted and installed per the manufacturer's recommendations.
- All anchoring bolts, nuts, washers, and all other hardware for installation to be stainless steel.

When requested by the Engineer, the Contractor must furnish certification regarding the compliance of materials incorporated in the work.

CONSTRUCTION METHODS

Install and anchor the Urban Bench on the concrete planter in accordance with the details as shown on the plans and the manufacturer's recommendations. The benches must be level and parallel to the planter curb and the surrounding site features, and set in a true, flat plane to prevent rocking. Review all locations of site furnishings in this specification with the Engineer prior to installation. The engineer reserves the right to select alternative locations.

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Item 273: Urban Bench	Each

Urban Bench includes all labor, materials (excluding salvaged materials for Plaza Amenities), and equipment necessary to complete the work as described.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
Item 279: Line Stop, Ductile Iron Pipe, __ inch
Item 279-1: Line Stop, Additional Rental Day

a. Description.- The Contractor shall furnish all materials, labor and equipment to properly install and set water main line stops into the existing Ductile Iron Main(s) at the locations as shown on the plans and as directed by the Engineer. All work shall be performed in accordance with the requirements as detailed herein.

The existing mains, upstream and downstream of the proposed line stop(s) cannot be shut down or taken out of service. To ensure that the entire operation shall be accomplished without interruption of service or flow, the installation shall be accomplished by Contractor personnel skilled and experienced in the procedures specific to line stops of the required size(s).

The work shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; the furnishing, installation, and removal of sheeting and/or shoring where needed; the furnishing, placement and compaction of approved bedding and backfill materials; furnishing and placing suitable, clean, gravel to create a stable working surface at the bottom of the excavation; de-watering; pipe cleaning, measuring, and performing all advance work necessary to prepare for the performance of the line stop; nighttime lighting as required; the removal of all materials and equipment associated with the work when no longer needed; and backfill, restoration and compaction of subgrade.
This work shall also include all traffic maintenance and control items in accordance with the Michigan Manual of Uniform Traffic Control Devices.

b. Materials.- Bedding and backfill for areas contained within a segment of water main designated as Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902 of the 2020 MDOT Standard Specifications for Construction. For work within a segment of water main designated as Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, Granular Material, Class II and Engineer approved native material, placed in accordance with the trench details, shall be used.

The Contractor shall submit to the Engineer two (2) sets of drawings, furnished by manufacturers, fully and distinctly illustrated and describing the Line Stop fittings proposed to be furnished. Work shall not commence until such time as the drawings have been reviewed and accepted by the Engineer.

Line Stop Fittings shall be full encirclement, pressure retention type split tee. It shall consist of two steel weldments; an upper line stop flange saddle plate and a lower saddle plate. These two saddle plates shall be contiguous.

Line Stop Flange: The outlet of each fitting shall be machined from a 150 lb. forged steel flange (ASTM A181 or A105) or from pressure vessel quality steel plate (ASTM A285, Grade C); flat faced and drilled per ANSI B16.5). Suitable independently operated locking devices shall be provided in the periphery of the flange to secure the completion plug.

Line stop Nozzle: The nozzle, which lies between the saddle and the flange shall be fabricated from steel pipe (ASTM A234). After welding and stress relief, the nozzle shall be accurately bored as follows to accommodate the Line stop plugging head:

a) Machine an internal circular shoulder to seal against the circumferential gasket carried on the plugging head.

Completion Plug: The completion plug shall be machined from a stress relieved carbon steel weldment. It shall contain two (2) circumferential grooves: one to receive the locking devices from the Line stop flange, and the second to contain a compressible "O" ring to seal pressure tight against the bore of the flange.

Blind Flange: Each Line stop fitting shall be closed with a blind flange. Facing and drilling of the blind flange shall be compatible with that of the Line stop flange. Minimum blind flange thickness shall be that of AWWA Spec. 207, Class D.

Saddle Alignment Marking: Each saddle-half shall be matched and marked with serial numbers, to insure proper alignment in the field.

Fasteners: All bolts, studs, and nuts used on Line stop, drain/equalization fittings, blind flange, and other elements that shall remain upon completion of the work shall be stainless steel and meet the requirements of ASTM F 593.

General: Manufacturer will exercise extreme care to ensure that weldments are of adequate strength, properly shaped, securely reinforced, and free from distortion that could stress the ductile iron main during installation, pressure tapping, or Line stopping operations. All steel shall meet the requirements of ASTM A36, as a minimum. All weldments shall be braced and stress relieved.

Gaskets: Shall be molded from elastomer compounds that resist compression setting and are compatible with water in the 32 to 140 deg. F temperature range.

Upper Line stop Flange Saddle: Shall consist of a saddle plate, a Line stop flange, and a Line Stop nozzle. The interior of the saddle plate, adjacent to and concentric with the O.D. of the nozzle, shall be grooved to retain a gasket which shall seal the saddle plate to the exterior of the ductile iron main. This gasket shall constitute the only seal between the main and the fitting. The flange saddle shall also meet the following requirements:

a) Saddle plate shall be of a minimum of 0.375" in thickness. It shall be shaped to be concentric to the outside of the ductile iron main. The smallest I.D. of the saddle and its interior rings shall exceed the O.D. of the main by a minimum of 0.250" to allow for ovality of the main;
b) Line stop nozzle of 0.375" min. wall thickness shall be securely welded to the saddle plate;
c) The Line Stop flange shall be securely welded to the nozzle. After welding, the assembly shall be braced, stress relieved, and bored to receive the completion plug and the circumferential gasket of the Line Stop machine plugging head; and,
d) Bolt, nut of stud, nut, and washer assemblies shall be furnished to draw the upper and lower saddles together for sealing. Bolting brackets shall be gusseted.

Lower Saddle Plate: Saddle plate shall be of a minimum 0.375" thickness and shall be shaped to be concentric to the outside brackets shall match upper half.

c. Equipment.- The equipment shall consist of a cylindrical plugging head that contains a flat, expandable elastomer sealing element. The plugging head shall be advanced into and retracted from the main by means of a linear actuator. When retracted, the plugging head and carrier are housed in an adapter, bolted pressure tight between the tapping valve and the actuator.

Sealing Element: The element shall be monolithically molded from a suitable polyurethane compound. The element shall be flat in a plane perpendicular to the flow in the main. Minimum thickness of the element shall be 4". The bottom of the element shall be semi-circular to conform to the bore of the main.

Drilling equipment: Shall be in good working condition, equipped with power drive to e0nsure smooth cutting, and to minimize shock and vibration. Cutting equipment shall be carbide tipped and capable of being replaced without removal from the jobsite.

Plugging Head: The diameter of the cylindrical plugging head shall be slightly smaller than the bore of the Line Stop nozzle. The plugging head shall have a suitable circumferential gasket to seal against the shoulder in the Line stop nozzle. This gasket shall also seal against the sealing element to prevent bypass flow around the Line stop.

Deposits in Bore of Main: The semi-cylindrical bottom of the plugging head shall be designed to break and dislodge tuberculation and other deposits in the bore of the main which might interfere with a satisfactory Line stop.

d. Method of Construction.- Installation of proposed line stops mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. All excavation shall conform to MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

If necessary, The City will reduce the pressure to 100 psig or less for the duration of the installations. The entire operation of installing the line stop shall be accomplished without reduction of water pressure in the main(s) below 100 psig. It shall be the responsibility of the Contractor to verify pressure prior to commencing the installation.

Preliminary Field Inspection of Water Main:

Dimensional, specification, and other data regarding the existing mains have been taken from existing records. This information may be inaccurate, out of date, and/or inadequate. The data have not been verified by field inspections. Further, the water main consists of ductile iron pipe which may contain dimensional and structural flaws. In addition, the Contractor shall anticipate that exterior main conditions, bells, service connections, or presence of adjoining utilities may require relocation of proposed line stop. Prior to proceeding with the installation of any line stop, it is necessary to know the exact main outside diameter of the water main, if it has any ovality, and the internal diameter of the pipe before line stop fittings and plugging head sealing elements can be manufactured and/or ordered.

Prior to ordering material, Contractor shall excavate at each proposed location and carefully measure the outside diameter of the water main with calipers along at least four (4) locations to determine ovality and the critical outside diameter of the water main. The Contractor shall determine main wall thickness, uniformity, and structural integrity by means of ultrasonic testing. Data shall be taken to determine extent of internal deposits, tuberculation, etc.

If the Engineer determines that Contractor's data are not adequate, the Engineer may direct Contractor to make one or more pressure taps on main to obtain test pipe coupons for the Engineer's evaluation. The minimum size of the test coupon shall be 5" diameter, drilled through a nominal 6" valve. Pressure tapping saddles and other materials used for inspection taps shall conform to the requirements of this Special Provision. The Contractor shall anticipate that heavy interior corrosion and/or tuberculation exists within the water main.

If, in Engineer's opinion, the proposed location is unsatisfactory based on measurements of the existing pipe at the locations of the proposed line stops, the Engineer will direct excavation at another site. Excavating, de-watering, inspections, backfill, and restoration will be paid for separately in accordance with the applicable contract unit prices or Section 109.05.C and 109.05.D of the 2020

MDOT Standard Specifications for Construction whichever the Engineer deems most appropriate.

Because of possible internal corrosion and deposits in existing water mains, a "bottle-tight" shut down may not occur. A satisfactory shutdown which allows the work to be accomplished (i.e. valve replacement, water main tie-in, etc.) using drainage pumps to de-water excavations, with workmen wearing boots and raingear, if necessary, must be obtained. The Contractor will not be allowed to proceed with further work until an acceptable shutdown is achieved. The Contractor shall be aware that this may require the halting of work and re-scheduling of all work operations.

Contractor shall power wire brush and grind the exterior of the water main to remove any debris, corrosion deposits, or other surface irregularities that might interfere with proper seating and sealing of each line stop fitting against each main. Any structural defects in the water main, service connections, appurtenances, adjacent utilities, etc., that could interfere with the line stop installation shall be immediately reported to Engineer.

All line stop fittings and appurtenances shall be cleaned and disinfected in accordance with the current City of Ann Arbor Public Services Area Standard Specifications prior to bolting any of the line stop fittings in place or commencing any pipe cutting.

Contractor shall fit upper and lower saddle plate assemblies to main, thoroughly checking for proper fit to main. Under no circumstances shall Contractor attempt to force, reshape, or bend saddle plates by excessive tightening of saddle studs while the line stop fitting is assembled around the main. Any required retrofitting shall be accomplished with the fitting removed from the main. Any damage to fitting, accessories, or main shall be repaired at Contractor's expense to the satisfaction of Engineer.

Upper and Lower saddle halves shall be drawn together by bolt assemblies and the Saddle plates shall be bolted together in the horizontal position.

All line stop work shall be performed in accordance with the equipment manufacturers approved work procedures and installation guidelines.

Final closure of the water main shall be accomplished by insertion of a manufacturer-approved completion plug. The Contractor shall test the completion plug sealing through the use of a bleed off assembly in the machine housing.

The Contractor shall remove the temporary valve and the installation of a blind flange shall be completed.

The Contractor shall place polyethylene encasement meeting the requirements of the City of Ann Arbor Standard Specifications for Construction around the upper and lower saddle halves, the blind flange, and to a point at least 1 foot on either side of the saddle halves. All polyethylene encasement shall be securely taped to the water main such that water entry is minimized to the greatest extent possible.

Lighting Requirements for Nighttime Water Main Work:

Night work shall be lighted to an average intensity of 108 lux minimum. Sufficient light sources shall be provided to achieve this illumination requirement. The lighting scheme shall be submitted to the Engineer for review and approval. Nighttime water main work will not be allowed to begin until such time as the lighting scheme has been approved by the Engineer.

The lighting shall allow the inspector to clearly see and inspect all work operations, including pipe, fitting, and valve installations, disinfection of the pipe, pipe cleaning, and all other night work.

Lighting systems may be fixed, portable, or equipment mounted. A power source shall be supplied with sufficient capacity to operate the lighting system. The lighting system(s) shall be arranged such that they do not interfere with the vision of motorists or unnecessarily illuminate surrounding properties or residences.

e. Measurement and Payment.- The completed work will be paid for at the contract unit prices for the following contract items (pay items):

Contract Item (Pay Item)	**Pay Unit**
Item 279: Line Stop, Ductile Iron Pipe, __ inch	Each
Item 279-1: Line Stop, Additional Rental Day	Each

All work shall be paid in full at the contract unit prices which shall include all the labor, materials, and equipment required to perform the work as detailed herein. This shall also include all required costs associated with night time work, supplemental lighting, and all other required elements of the work, including all traffic maintenance and control.

“Additional Rental Day” will be paid for each day after the first installation and day of use of a temporary water main line stop, regardless of size, until, in the opinion of the Engineer, the line stop is no longer needed.

Pavement removal, aggregate base course, bituminous pavement, and traffic control items as necessary to construct the line stop (as determined by the Engineer), shall be paid for separately as specified elsewhere; all other items shall be included in the pay item for the line stop.

DETAILED SPECIFICATION
FOR
ITEM #280 – PLANTING SOIL

DESCRIPTION

The work consists of providing and placing Planting Soil (Topsoil) in landscape planters, lawn areas, and tree pits, and rain garden soils as shown on the plans, as detailed herein or as directed by the Engineer. All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

The rain garden cell consists of a layer containing the composite planting mix. Underneath the rain garden soil planting mix lies an underdrain storage trench comprised of an aggregate storage area and an underdrain system to achieve positive drainage. The underdrain flows to an overflow structure at the low point of the of the cell bed.

MATERIAL

Provide materials as described below.

A. **Planting Soil:** The topsoil provided shall meet the requirements of **City of Ann Arbor Division III, Section 6B. Planting and Backfill Soil Material**, and be amended as noted in Section 6B for use in all landscape applications other than the rain gardens.

CONSTRUCTION METHOD

All earth disturbing activities within the vicinity of the planters must be substantially complete, and curb and paving work completed prior to the excavation of the planter. Scarify and loosen subgrade in planters to a depth of 12 inches below the proposed Planter Soil, removing all debris and stones lager than 3 inches in any dimension from subgrade.

Conduct excavation work with the equipment within the footprint of the planter as detailed on the plans. No equipment is permitted in the planter unless approved in advance by the Engineer. In those instances where equipment is allowed within the cell bed it must consist of low ground pressure, lightweight equipment. In these instances, ensure the underlying bed soil is restored to a friable condition to a minimum depth of 12 inches.

Excavate to the depth detailed on the plans and miscellaneous details to accommodate the planting soil mix and mulch. Final grades shown on the plans are to the top of the soil, or as directed by the Engineer.

The depth of the tree root balls may required the excavation into the soil subgrade to accomoate the root ball.

MEASUREMENT AND PAYMENT

The completed work, as described, will be measured and paid for at the contract unit price using the

following pay items:

PAY ITEM	PAY UNIT
Item 280: Planting Soil	Cubic Yard

Provide surface mulch on landscape beds and tree planting as indicated on plans. Mulch is considered incidental to the landscape and soils pay items and will not be paid for separately.

DETAILED SPECIFICATION
FOR
ITEM# 281 - LANDSCAPE MAINTENANCE

DESCRIPTION

For this pay item, the work includes two full years of maintenance of planting areas following the one year of maintenance which is part of the standard Landscape Pay Items. Landscape Maintenance shall include but not be limited to; pruning; cultivating; weeding; removal or trash, leaves and debris, watering; fertilizing; and furnishing and applying such sprays and other treatments as necessary to keep all plantings free of insects and diseases.

Debris and Leaf Cleanup, as described in this Detailed Specification, shall also be performed during the initial maintenance and warrantee period.

All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

The Maintenance Contractor shall be a company specializing in landscape installation and maintenance, native landscape restoration, seed mix installation and maintenance, and having a minimum 3 years of experience in projects of the scope and scale being specified.

MATERIALS

A. Maintenance Plans and Schedules:
   1. Maintenance Plan and Schedule: Maintenance Contractor must submit detailed typewritten methodology and schedules for maintenance of all landscape areas as outlined in Part 3 of this section. The schedule shall be comprehensive and shall be the basis for monthly payments for the duration of the maintenance contract. Maintenance Contractor shall submit Maintenance Plan and Schedule to Owner within 1 week following the issuance of the Notice to Proceed.
      a. Schedule must identify activities, number of personnel to be involved, tentative calendar schedule, and expected work hours.
   2. Maintenance Report Forms: Maintenance Contractor to submit a Maintenance Report Form template to Owner for prior approval.
      a. Every maintenance visit must be thoroughly and completely recorded on an approved Maintenance Report Form, which will include the date, the maintenance crew's names, weather conditions, maintenance provided, areas that received maintenance, number of hours onsite, chemical rates of application and equipment used, notes on future maintenance/problem, etc.
      b. Submit Maintenance Report Forms following completion of each maintenance visit. The forms shall cross-reference the Maintenance Plan and Schedule. Payment for this work will only be made by the Owner when proof of completed work has been provided.

B. Product Data Submittals required:
   1. Fertilizer.
   2. Pesticides and Herbicides: Include product label and manufacturer's application instructions specific to the project site.

C. Delivery, Storage and Handling
   1. General:

a. Packaged Materials: Deliver packaged materials in original unopened containers showing weight, analysis and name of manufacturer. During shipment and storage on site, protect materials from breakage, moisture, heat or other damage.
b. No packaged materials may be stored onsite unless Maintenance Contractor receives prior approval from Owner.

2. Pesticides/Herbicides/Chemical Control Agents:
   a. Storage, handling, application, clean-up, and disposal of all pesticides, herbicides, and other controlled use materials shall be in strict conformance with all government and industry standards.
   b. Maintain and operate all pesticide/herbicide application equipment according to manufacturer's standards and instructions. Equipment shall be clean, free of leaks, calibrated, and deliver spray patterns as specified by the manufacturer.
   c. Utilize pesticides/herbicides only for their labeled use and in accordance with precautions, instructions, rates, and timing as specified by manufacturer.
   d. Pesticides/herbicides shall be applied only by Michigan certified applicators, excluding over the counter types. Notify Owner prior to application of any pesticide, herbicide, or other chemical control agent. Clearly label areas that have received application of these materials.
   e. Mixing of pesticides, herbicides, and other chemical control materials shall not occur onsite unless Owner has given prior approval.

CONSTRUCTION METHODS

A. Weeding
   1. Weeding under this section involves plant beds and tree planters and tree grates.
   2. The beds, planters, and grates shall be weeded on a monthly basis through the growing season (typically March through November).
   3. Use Integrated Pest Management to control weeds to the extent reasonably possible.
   4. Notify the DDA prior to the use of pesticides and herbicides.
   5. No pre-emergent pesticide may be used because native species and other perennials are encouraged to spread via seed.
   6. Manual removal of weeds with a trowel or small shovel is recommended to ensure complete removal of weedy root mass. Do not damage or displace adjacent desirable plant species.
   7. Legally dispose of weedy plants offsite. Do not allow any seed heads to remain in the project site.

B. Pruning and Deadheading:
   1. Shrub beds should be allowed to grow out naturally and become a continuous mass to shade out weeds.
   2. All pruning shall conform to standards established by the International Society of Arboriculture.
   3. In general:
      a. Do not shear plants; remove individual limbs back to main trunk or leader (thinning).
      b. Do not leave stubs longer than ¼".
      c. Use the proper tools for the cut being made.
      d. Keep cutting tools sharp and clean, and disinfect tools between cuts and plants.
      e. Avoid pruning during rainy weather as this may increase the chance of spreading fungal spores.
      f. Do not prune any oak between April 1 and October 31.
      g. Prune at the proper time of year for the plant species to be pruned in order to avoid removing next year's flowering buds.

h. Do not prune trees or shrubs during the growing season after July 15 because new growth may not harden off before winter.
i. Do not deadhead stands of grasses in order to allow the seeds to further establish the grass areas. Stands of grasses may be cut to the ground in early March each year for a cleaner appearance, but the cut grass and seed heads should be left on the ground.

4. Utilize the following procedures when pruning canopy trees, ornamental trees, and shrubs:
   a. Remove dead, damaged, or dangerous branches; branches that interfere with pedestrians; water sprouts, suckers, and crossing branches.
   b. Assume one pruning each year of each plant species. Review the site with the DDA each spring to review pruning needs.
   c. Major Storm Damage is not part of this contract.

C. Watering
1. Watering shall be conducted on an as-needed basis as defined herein. . During periods of drought plants should receive 1" of water per week.
2. To determine soil moisture within the planting root zone, a hand-held soil moisture meter is recommended.
3. Water should not be applied at a rate to disturb or erode soil.
4. The use of TreeGator ® bags is encouraged for canopy and ornamental trees during periods of drought, but should be removed before winter and during periods of normal precipitation.

D. Fertilizing
1. Generally the plants used at the site should not require long-term fertilization, but fertilization is recommended during the first 3 years following installation.
2. Fertilize trees and shrubs in the fall after the first hard freeze but before the ground freezes. Trees less than 6" diameter at breast height (DBH) should receive 0.25 lbs of nitrogen per inch of DBH. Shrubs should receive 1 lb. of nitrogen per 100 square feet of shrub mass per year.
3. Do not fertilize after July 15 because new growth may not harden off before winter.
4. Perform soil tests once per year to determine nutrient excesses/deficiencies in the soil. Send soil samples to an accredited agricultural soil testing laboratory to test for N, P, K, macro- and micronutrients, as well as pH and organic matter, and obtain a fertilizer recommendation from the testing laboratory.
5. Perform additional fertilizer applications as the soil tests indicate.

E. Debris and Leaf Clean-up
1. Collect all trash, litter, etc. from the sidewalks, plant beds, planters and grates on a monthly basis through the growing season (typically March through November) and dispose of off-site in a legal manner. Collect leaves from sidewalks and curb lines and remove off-site.

F. Guarantee
1. The Maintenance Contractor shall repair or replace all defects to plant material and seeded areas arising from poor workmanship, improper use of materials, or through improper care of any plant or plantings growing within the area covered in this Contract. The total cost of replacements, labor, material, etc. is to be at the expense of the Maintenance Contractor. This does not cover damage or losses caused by acts of nature beyond the control of the Maintenance Contractor. However, it does include any loss resulting from disease or insects where the prudent and timely use of cultural or chemical controls would avoid such loss, and disease or insect brought to the site through replacement plant or landscape material, and any loss resulting from the lack of watering or overwatering.

MEASUREMENT AND PAYMENT

Debris and Leaf Cleanup, as described in this Detailed Specification, shall also be performed during the initial maintenance and warrantee period that is included in the standard Landscape Pay Items (i.e., during the first year after plant installation), and the costs of such work is to be included in individual pay Landscape Pay Items (#810 through #849).

This work will be measured and paid using the following contract item (pay item):

PAY ITEM	PAY UNIT
Item 281: Landscape Maintenance	Month

Landscape Maintenance will be measured and paid on a unit basis for each month or fraction of month worked through the growing season. The Contractor shall submit copies of the Maintenance Reports with each pay application to demonstrate that the required work has been completed. The work includes all labor, materials, equipment costs, disposal fees and related work for providing these services.

DETAILED SPECIFICATION
FOR
ITEM # 282-01- TREE GRATE, 4 ft. X 8 ft.
ITEM # 282-02 – TREE GUARD, SPECIAL

DESCRIPTION

This work consists of furnishing and installing cast iron tree grates and their frames. All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

Provide iron castings conforming to section 908 of the MDOT Standard Specification for Construction that come with a 10-year warranty against breakage. Tree grates and frames are to be the sizes and configurations noted on the plans, with openings slots in a pattern that conforms to ADA guidelines.

Tree grate castings and frames to be furnished and manufactured by Urban Accessories of Tacoma, WA (phone is 877-487-0488). Contractor is to provide the specified tree grate casting and frame and tree guard, or an equal product approved by the Engineer; as follows:

A. Tree Grate, 4 ft. x 8 ft.: Shall be 4 ft. x 8 ft. in size (nominal), "Jamison" model, with Urban Accessories manufactured frame, and supports. All materials to have a galvanized finish per the manufacturer's specifications.

B. Tree Guard, Special.: Shall be based on the Urban Accessories model "Any Street", manufactured to the custom dimensions and design noted on the plans. Finish to be powder coated per the manufacturer's specifications; color to be "Cast Iron Grey".

All castings will be made of Ductile Iron meeting ASTM A536 Class 65-45-12, and galvanized, per manufacturer's process. Ensure all anchoring bolts, nuts, washers, and all other hardware for installation meet the manufacturer's recommendation.

The tree grate shall be rated to support light vehicular traffic loads.

Furnish certification regarding the compliance of materials incorporated in the work, for approval by Engineer prior to installation.

Ensure all anchoring bolts, nuts, washers, and all other hardware for installation meet the manufacturer's recommendation.

Furnish certification and product shop drawings regarding the compliance of materials incorporated in the work, for approval by Engineer prior to installation.

CONSTRUCTION METHODS

A. Fabrication
   1. Ensure all tree grate castings are manufactured true to pattern and component parts must fit together in a uniform manner.

2. Ensure castings are free of all defects and cleaned by shot blasting.

3. Provide tree grate frames that are suitable for anchoring into the different adjacent paving types. Coordinate fabrication and delivery of frames with the concrete installer so that the frames can be installed during paving operations.

B. Installation
   1. Square up the frame sections and bolt them together. Install the tree grate frame flush and on a plane with the proposed surrounding slope, prior to casting the concrete around it. Ensure that top of frame and tree grate is no greater than 1/8-inch higher or lower than adjacent pavement surfaces and meets ADA requirements for public sidewalks.

   2. Set the grates flush with the top of the frame and ensure that the grate does not rock in the frame. Securely bolt grate halves together on the underside. Clean any foreign matter from the tree pits and grates prior to setting.

   3. If the engineer believes that the product or the installation has resulted in either a poorly fitted grate and frame, an unsafe walking surface, or an unacceptable amount of rocking, they may reject the installed product, and require a new installation and/or a new tree grate.

   4. Install the tree guards to be square to the tree grate and plum and secured to the grate per the manufacturer's recommendation.

C. Tolerances
   1. Maximum Space Between Adjacent Sections: ¼ inch
   2. Maximum Variation from Top Surface Plan of Adjacent Sections: 1/8 inch

MEASUREMENT AND PAYMENT

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

PAY ITEM	PAY UNIT
Tree Grate, 4 ft. X 8 ft.	Each
Tree Guard, Special	Each

The unit price for **"Tree Grate, 4 ft. X 8 ft."** and **"Tree Guard, Special"** shall include all labor, material, and equipment costs to perform all the work specified, including thickened concrete edge, frames, grates, hardware, and grate supports.

DETAILED SPECIFICATION

FOR

ITEM # 283 - RIPRAP, FIELDSTONE

DESCRIPTION

This work consists of providing all labor, equipment, and materials necessary to furnish and place fieldstone riprap in the rain gardens and planters as shown on the plans. All work must be conducted in accordance with the plans and specifications, the 2020 MDOT Standard Specification for Construction, and the City Standard Specifications.

MATERIALS

Use washed, uncrushed, rounded fieldstone for riprap. The diameter of each stone must be between 4 to 8 inches. When placed in the final location the in-place thickness must be a minimum of 8 inches.

Acceptance will be based on visual inspection of riprap in-place by the Engineer.

Geotextile separation fabric shall be a non-woven fabric, minimum 6 Oz. weight.

Grout shall be MDOT standard grout mix R-3, as specified in Section 702 of the 2012 MDOT Standard Specification for Construction.

CONSTRUCTION METHODS

Place riprap over geotextile separation fabric in accordance with subsection 813.03 of the 2020 MDOT MDOT Standard Specification for Construction.

Standard Specifications for Construction, on prepared grades to the elevations, thickness and lateral limits as shown on the plans. Shape and compact all grades to the required cross section. The riprap installation must not damage the geotextile fabric below.

If directed by Engineer, secure rock with grouting. Rock to be grouted shall be kept wet for a least 2 hours immediately prior to grouting. Place riprap such that each stone will be firmly embedded into the grout and against adjoining stones. Construct the riprap in a manner which produces a uniform mat free of voids. Grout and stone should be installed within 1.5 hours of the completion of the initial mixing of the grout

MEASUREMENT AND PAYMENT

The completed work, as described and including geotextile fabric, stone rip rap and grouting, will be measured and paid for at the contract unit price using the following pay item:

PAY ITEM	PAY UNIT
Item 283: Riprap, Fieldstone	Cubic Yard

CITY OF ANN ARBOR

DETAILED SPECIFICATION
FOR
Item 284: Sacrificial Anode, __ lb
Item 285: CL-50, D.I. Water Main, w/ Poly Wrap, ___ inch, Tr Det I, Mod
Item 286 and 287: Bends And Reducers, ___ inch
Item 288: Cross, 12 inch x 12 inch
Item 288: Tee, ___ inch x ___ inch x ___ inch
Item 289: Fire Hydrant Assy, w/Extensions, Complete
Item 290: Gate Valve-in-Box, ___ inch
Item 291: Gate Valve-in-Well, ___ inch
Item 292: Tapping Sleeve & Valve-in-Box
Item 293: Excavate and Backfill for Water Service Tap And Lead

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a. Description.- The Contractor shall furnish all labor, equipment, pipe, valves, fittings, restrained-joint pipe, restrained-joint gaskets, special gaskets as detailed on the plans and in the specification, polywrap, blow-off assemblies, fire hydrants, fire hydrant extensions, supplemental lighting towers, and all other materials necessary to complete the work as shown on the Plans, as detailed in this Detailed Specification, and as directed by the Engineer.

All water main installation and testing procedures shall be performed in accordance with the plans, the requirements of this Detailed Specification, and as directed by the Engineer. The Contractor shall excavate all trenches and pits to the required dimensions; sheet, brace, and properly support the adjoining ground or structures where necessary to comply with MIOSHA, Section 104.07.B of the MDOT 2020 Standard Specifications for Construction, and other relevant safety standards.

The work for all items shall include, but not be limited to; pavement saw-cutting; excavation and disposal of excavated material; connections to new and existing water mains; the furnishing and installation of solid sleeves and push-on-joint plugs where needed; the furnishing, installation, and removal of sheeting and/or shoring where needed; all items necessary for the protection of the trench and all persons employed in the work during the work day and “after-hours” periods; polywrap; the furnishing, placement and compaction of approved bedding and backfill materials; thrust blocks; additional labor and equipment costs associated with any required nighttime water main work; cleaning, disinfecting, flushing, bacteriological and hydrostatic testing; and any other required items to complete the work as shown on the plans, as detailed in this Detailed Specification, and as directed by the Engineer.

The work of installing a gate valve-in-well shall include installation and backfill of the specified valve, furnishing and installing pre-cast concrete gate wells including the concrete base, straight pre-cast concrete sections, transition sections, and the adjustment of the structure cover. No separate payment will be made for adjusting the structure covers on new gate wells. The gate well cover shall be paid as “Dr Structure Cover.” Upon

completion of the work, the Contractor shall clean the Gate Well to the approval of the Engineer.

The cost of adjusting new gate valve-in-boxes shall be included in the unit price for Gate Valve-in-Box and shall not be paid for separately.

The fire hydrant assembly work shall include the hydrant, the 6 inch gate valve-in-box, 3 feet of 6 inch pipe, the thrust block, and any required extensions to install the fire hydrant to the finish grade as shown on the plans.

b. Materials.-

1. Submittals. Prior to beginning construction, the Contractor shall submit the following:

   A. Product data on all ductile iron pipe, valves, fittings, asbestos concrete pipe to ductile iron pipe fittings, and hydrants.

   B. Manufacturer's certifications on all pipe, fittings, and precast concrete units indicating that all materials meet the minimum requirements of these specifications.

   C. Information on equipment and methods to be used for flushing, chlorination, pressure and bacteriological testing.

2. General Specifications.

   A. Cast Ductile Iron Pipe and Fittings:

      Cast ductile iron pipe shall be Iron Grade 60-42-10 and meet the requirements of ANSI/AWWA C151/A21.51 in all respects; with standard thickness cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4; and, coated outside with an asphaltic coating in accordance with ANSI/AWWA C151/A21.51. 100% of the ferrous metals used in the manufacture of cast ductile iron pipe shall be recycled from scrap and other sources.

      All pipe (except for pipe in bored steel casing) shall be Thickness Class 50 (Table 50.15, ANSI/AWWA C150/A21.50). Pipe in bored steel casing under railroad shall be Thickness Class 56.

      Cast ductile iron river crossing pipe shall be Clow Corp. "F-141 River Crossing Pipe", U.S. Pipe "USIFLEX Boltless Flexible Joint Pipe" or equal approved by the Engineer, and shall be thickness Class 56 minimum. The pipe shall have a boltless flexible joint of the ball and socket type, and be

designed for, and rated at, a minimum interior working water pressure of 250 psi.

Restrained joint pipe, where called for on the Plans, shall be boltless, factory-manufactured restrained joints gaskets for ductile iron pipe and fittings sizes 4-inch to 24-inch in diameter; utilizing Field Lok™ by US Pipe or Fast Grip by American Ductile Iron Pipe gaskets or approved equal. All gaskets shall be Tyton or Fast Tite joint in design with corrosion resistant stainless steel locking teeth vulcanized into the rubber. All restraining gaskets sizes 4-inches to 12-inches in diameter shall be functional for 350 psi operating pressure with a 2:1 safety factor and allowed for complete joint deflection of 5 degrees.

Cast ductile iron fittings shall be push-on joint (with the exception of solid sleeves and fire hydrants which shall be mechanical joint), meeting the requirements of ANSI/AWWA C110/A21.10 for short body cast iron fittings. Fittings shall have a cement mortar lining and asphaltic seal coat in accordance with ANSI/AWWA C104/A21.4 and ANSI/AWWA C110/A21.10. The outside of all fittings shall have an asphaltic coating in accordance with ANSI/AWWA C110/A21.10.

Solid sleeves shall be long-pattern sleeves.

B. Gate Valves and Gate Valve Boxes:

All gate valves shall be resilient seated meeting the requirements of AWWA C509. All valves shall be of the push-on joint type, unless used on tapping sleeve assemblies, or noted otherwise on the plans. The valves supplied shall be:

a. Metroseal 250 Resilient Seated Gate Valve as manufactured by U.S. Pipe & Foundry Company
b. U. S. Pipe and Foundry Tyton Joint, Resilient Wedge Seated Gate Valve, meeting the requirements of AWWA C 509, AWWA C550, and ASTM D 2794
c. American Flow Control, Series 2500, Single Resilient Wedge
d. East Jordan Iron Works FlowMaster Resilient Wedge Valve
e. Mueller Series, 4” through 12”, A-2360-38, Resilient Wedge – SL x SL
f. Tyler Series DRS 250-22 Double Resilient Wedge

All valves shall come equipped with a two-inch square operating nut, opening right.

Valve Boxes shall be Tyler 6860 Buffalo type, Size D, screw-type, 3 piece, 5-1/4 inch shaft and a No. 6 Base for a valve 8 inches or less and a No. 8 base for 10 and 12 inch valves.

C. Gate Valve Wells:

Pre-cast reinforced concrete bases, bottom sections, manhole risers, grade adjustment rings, concentric cones, eccentric cones, and flat-slab tops shall conform to the requirements of ASTM C-478. Joints on precast gate wells shall meet the requirements of ASTM C-443, rubber O-ring gasket.

Flat-slab top, pre-cast, gate wells 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.

D. Fire Hydrants:

Fire hydrants shall be East Jordan Iron Works Model 5-BR Water Master BR 250 with traffic flange. All fire hydrants shall have the following features: a 6 inch ~~mechanical~~ push-on joint pipe connection, ANSI/AWWA C111/A21.11; two 2-1/2 inch National Standard hose connections; one 5 inch integral Stortz connection (facing hydrant Stortz on right); one 3-3/8”x7.5” pumper nozzle; 1-3/8 inch pentagon operating and cap nuts (1-3/8 in. point-to-flat at top; 1-7/16 in. point-to-flat at base); open left; breakable flange construction; no barrel drain; and a painted red finish. Depth of bury (bottom of pipe to ground surface) is generally 6 feet but may vary depending on specific site conditions. The Stortz pumper connection must be 21 in. ± 3 in. above finished grade, and the breakable traffic flange must be between finished grade and 8 in. above finished grade.

Fire hydrant extensions shall be fully compatible with the manufacturer of the fire hydrant assembly provided and be approved by the Engineer. East Jordan Iron Works hydrants shall be provided with a model 5-BR extension kit.

All fire hydrants must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

E. Tapping Sleeves and Valves:

Tapping sleeves and valves shall be manufactured of cast iron or stainless steel and designed for water service with a minimum working pressure of

150 psi. The sleeve shall be a full-bodied split sleeve design manufactured by one of the following manufacturers:

a) Clow No. F-5205;
b) Mueller Co. No. H-615;
c) Waterous Series 800;
d) East Jordan Iron Works MJ Tapping Sleeve with East Jordan FlowMaster RW Valve;
e) Tyler/Union D.I. MJ Tapping Sleeve;
f) Ford Meter Box Company Style FTSS;
g) Power Seal Model No. 3490 AS;
h) Smith Blair Model No. 622;
i) JCM 432 All Stainless Steel Tapping Sleeve; and
j) Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel Cylinder Pipe (only to be used on concrete water mains.)

Tapping Sleeves for Pre-stressed Concrete Steel Cylinder Pipe shall be in accordance with AWWA M-9. The sleeves shall have a separate gland which permits installation of the sleeve prior to cutting of the prestress wires. The gland shall have a fusion epoxy coated (per AWWA C-213) waterway, and a broad gasket set in a retaining groove of a pressure plate gusseted to eliminate flexing. The gland shall be equipped with load bearing set screws to protect the cylinder. Grout under saddle is needed whether saddle is epoxy coated or not. Sleeves shall be furnished with grouting seals and grout horns to facilitate filling the space between the sleeve and the pipe. Tapping sleeves shall be a Price Brothers Company Tapping Sleeve for Prestressed Concrete Steel Cylinder Pipe or Engineer approved equal.

Tapping valves shall be double-disk type of the same manufacture as the sleeve, NRS with two-inch square operating nut-opening right, with a mechanical joint outlet.

All tapping sleeves and valves must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system.

F. Asbestos Concrete Pipe to Ductile Iron Pipe Coupling:

The asbestos concrete pipe to ductile iron pipe coupling shall be the “Smith-Blair 415 (23.15”—21.60”) Gaskets, Alloy bolts and Epoxy” coupling or equivalent.

G. Joints:

Push-on joints shall be single gasket joint meeting the requirements of ANSI/AWWA C111/A21.11.

Mechanical joints for fire hydrants and solid sleeves shall be in accordance with ANSI/AWWA C111/A21.11 and shall be the Mega Lug Series 1100 joint restraint system manufactured by EBAA Iron Sales, Inc. or the Ford Meter Box Co. Uni-flange Retainer (UFR 1400-D-x style.)

Bolts for mechanical joints shall be high strength, low alloy steel bolts, only, meeting the requirements of ANSI/AWWA C111/A21.11. All bolts, nuts, and washers if required, shall be coated with a factory-applied flouropolymer coating meeting the following requirements:

Use Temperature: -100°F to 500°F
Salt Spray – ASTM B117 up to 4000 hours (nuts must not become frozen)
Pencil Hardness – 5H to 6H – ASTM D3363-92A
Kinetic Coefficient of Friction – 0.06 to 0.08
Thickness – nominal 0.001" (1 mil)
Impact – 160 in-lbs as measured by ASTM D2794-93
Adhesion – 5B – ASTM D3359-95
Di-electric Strength – 500V per mil
Elongation – 35% to 50%
Tensile Strength – 4,000 psi
Operating Pressure – up to 100,000 psi
Kesternich Test – Nuts not frozen up to 30+ cycles (DIN 50018)

Corrosion Resistance: as measured by;

ASTM D 1308 Muriatic Acid 31% HCL - 24 hours - No Effect
Sulfuric Acid 93% H_2SO_4 - 24 hours - No Effect
Caustic Soda 100% NaOH - 24 hours - No Effect
Methy Ethyl Keytone MEK - 24 hours - No Effect
ASTM B117 Salt Fog - 1,000 hours - No Effect

The flouropolymer coating shall strongly adhere to surface being coated and shall not flake off or be easily removed by rubbing or brushing.

Cast ductile iron river crossing pipe joints shall be a push-on type ball and socket joint utilizing a first grade rubber gasket. The joint shall be capable of 15-degree full turning deflection without separation, leakage, or restriction of the pipe waterway. Joint restraint shall be provided by a boltless means which is locked against accidental disengagement of the restraining component. Pipe shall be furnished with the necessary gaskets, lubricant, and retainer locking accessories.

Restrained, push-on joint, pipe shall be American Pipe's "Fast-Grip" gasket system; U.S. Pipe's "Field-Lok 350" gasket system; or, Griffin Pipe “Field-Lok 350” gasket system.

The use of retainer glands and set screws shall not be acceptable.

Lubricants used in making up joints shall be supplied by the pipe manufacturer and the joints shall be coupled in accordance with the manufacturer's requirements.

H. Pipe Wrapping:

All Cast Ductile Iron Pipe, Fittings, and Valves (except river crossing pipe) shall be fully wrapped with polyethylene per ANSI/AWWA C105/A21.5 and the details as contained on the plans.

I. Anodes

Anodes shall be high potential magnesium anode ingots with packaged backfill. Anode ingot shall meet or exceed ASTM B843, Grade M1C for high-potential magnesium anodes.

Anode shall come furnished with minimum 10 feet of coiled #12 AWG solid copper lead wire with TW, THHN or THWN insulation, firmly attached to the galvanized steel core of the anode. The core cavity shall be filled with electrical sealing compound to assure a fully insulated and protected connection. Magnesium anode and backfill shall be pre-packaged into a single unit in a permeable cloth bag.

Connection of anode lead wire to cast iron or ductile iron pipe or fittings shall be made by the thermite weld method. Thermite weld materials shall consist of wire sleeves, weld mold and weld cartridges according to the weld manufacturer’s recommendations for the specific wire and pipe sizes and materials. Weld materials from different manufacturers shall not be interchanged. Weld molds shall be graphite molds. Ceramic "one -shot" molds will not be acceptable.

J. Casing Pipe:

Steel casing pipe used for construction at railroad or State highway crossings shall comply with the following minimum requirements unless more stringent requirements are established by the railroad or State. Casing pipes at other locations shall comply with the following minimum requirements unless otherwise indicated on the Plans or in the Specifications.

Nominal Diameter of Casing Pipe (Inches)	Minimum Wall Thickness (Inches)
Under 14	0.250
14, 16, and 18	0.312
20 and 22	0.375
24, 26, 28, and 30	0.500
32 and 34	0.563
36, 38, 40, 42, and 48	0.625

Steel pipe shall be non-spiral pipe and have a minimum yield strength of 35,000 psi. All joints shall be made leakproof using full penetration, continuous welds. Welds shall be ground smooth outside and inside (except inside 22 in. diameter and less) to prevent conflict with the soil or pipe placement. Steel pipe shall meet the requirements of ASTM A 53, Type E or S, Grade B.

Pipe Marking:

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

a) The pipe designation and class (e.g. A 53, Type S, Grade B.)
b) The name or trademark of the manufacturer.
c) Identification of the manufacturing plant.

Inspection:

All casing pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe that, independent of physical tests specified under the standard specifications designated herein, fails to conform to the requirements of these Specifications.

Rejected pipe shall be plainly marked by the Inspector and immediately removed from the site of the work by the Contractor, without cost to the City.

K. Water Main Pipe Marking:

The following information shall be clearly marked and/or cast on each length of pipe:

a) The pipe designation and class (e.g., D.I., Class 50).
b) The name or trademark of the manufacturer.
c) Country where cast.

d) The year in which the pipe was produced.

The following shall be distinctly cast on each fitting:

a) The pressure rating of the fitting.
b) Nominal diameters of openings.
c) The name or trademark of the manufacturer.
d) Country where cast.
e) The number of degrees or fraction of the circle on all bends.
f) Ductile iron fittings shall have the letters "DI" or "Ductile" cast on them.

L. Manufacturer's Certification:

All pipe furnished shall be accompanied by the manufacturer's certificate of test showing conformity with the Specifications. Each certificate shall identify a specific lot number, quantity of pipe, and show actual test results for the lot furnished. These certificates shall be submitted to the Inspector at the time of unloading.

All materials that will potentially be in contact with the City of Ann Arbor water supply must be certified by Underwriters Laboratory (UL) or the National Sanitation Foundation (NSF) for use in a potable water system. These materials shall include pipe coatings, pipe metals, cement linings, and joint lubricants and gaskets.

M. Inspection:

All pipe furnished shall be subject to inspection on arrival at the job site by the Engineer. The purpose of the inspection shall be to cull and reject pipe or fittings that, independent of physical tests specified under the standard specifications designated herein, fail to conform to the requirements of these Specifications.

The Contractor shall notify the Engineer sufficiently in advance so that an Inspector may be on the job during the unloading of materials. A minimum notice of 24 hours is required for such unloading and inspection. The Contractor shall also notify the Engineer when the material has arrived at the site.

All ductile iron water main pipe shall be stacked on pallets off of the existing grade, with each end plugged or bagged so as to keep the pipe interior clean until final installation.

Cast ductile iron pipe and fittings shall be subject to rejection on account of any of the following:

a) Variation in any dimension exceeding the permissible variations given in the material specifications.
b) Any crack or defect in the cement mortar lining which, in the opinion of the Engineer, is non-repairable, including, but not limited to, loose or "hollow" lining.
c) Any signs of physical damage or poor manufacturing which might render the material unsuitable for its intended use.
d) Variation of more than 1/16 inch per lineal foot in alignment of pipe intended to be straight.
e) Damaged ends, where in the judgment of the Engineer such damage would prevent making a satisfactory joint.
f) Improper handling during delivery, unloading, or installation.

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.

N. Water Main Bedding and Backfill Materials:

Bedding and backfill material for Trench Detail I (under roadbed), Modified, shall be Granular Material, Class II, meeting the requirements of Section 902. Bedding and backfill for Trench Detail V (outside of the 1:1 influence line of roadbed or curb and gutter), Modified, shall be Granular Material, Class II and Engineer approved native material, placed in accordance with the trench details.

c. Water Main Installation, Bacteriologic and Hydrostatic Testing, and Acceptance Requirements.- Installation of proposed water mains will require work in close proximity to existing utilities. This must be taken into consideration when the contractor determines the required trench safety requirements. All excavation shall conform to all relevant MIOSHA Standards; the Contractor is solely responsible for determining all excavation and trench safety requirements.

A. Dry Tap:

When a connection to an existing water main is to be made in the dry, the existing main to which a connection is to be made shall be isolated by the closing of the necessary existing valves, and the water from the existing main shall then be pumped out or removed by other means so that the connection may be made in the dry. All pipe materials and appurtenances which will come into contact with potable City water after the restoration of water service following the connections shall be disinfected with a strong chlorine solution prior to installation.

The Contractor may not operate City water main valves. For valve operation, contact City of Ann Arbor Public Services Area personnel; the City of Ann Arbor personnel will direct the operation of all valves by Contractor personnel. It is

recommended that the Contractor request that the existing valves, which will need to be operated in order to perform the water main work, are checked in advance of the work to ensure that they operate properly. If the Contractor elects not to request the operation of the valves in advance of any required water main operation, then a request for extension of contract time will not be allowed.

It is possible that the valves which need to be operated to facilitate a shutdown will not close entirely, thereby allowing water to leak past the valve into the area of the shut down. The Contractor shall provide the necessary labor, material, and equipment to enable work to be completed with a poor shut down. Under no circumstances shall the Contractor be compensated for “downtime” associated with water main valve or appurtenance failure or its inability to properly operate or close fully. An extension of contract time may be allowed, if the Contractor has requested that the water main valves have been exercised in advance of the intended water main shutdown.

Due to the size and length of pipe being shut down, and the quality of shut-down attained, large amounts of water may need to be removed from the excavation. Where possible, the water shall be run directly into nearby storm sewer inlets via pumps and hose.

The Contractor shall have all pipe, fittings and appurtenances required to complete the water main connection prior to the excavation for the connection, or the work will not be allowed to commence.

The Contractor shall complete the water main work in a manner which minimizes the disruption of water service to the greatest extent possible.

The City must notify all businesses 48 hours in advance of a water main shut-down; residences must be notified 24 hours in advance. To give the City an opportunity to provide such notification, the Contractor shall schedule the water main shut-downs at least 72 hours in advance, and preferably a full four or five days in advance, of the water main shut-down.

No water main shutdown shall take place after 12:00 p.m. (noon), unless written permission has been granted by the Engineer and that the Contractor has sufficient lighting equipment to provide a safe and efficient work area for working after dark. No water main will be shut down until the main has been exposed and cleaned, and is ready to be cut.

There shall be no gap larger than 1/4 inch left in the existing water main as a result of the tie-in. If needed, a closure piece ("thrust ring") of such size so as to meet this requirement shall be installed.

B. Wet Tap:

Prior to the installation of a tapping sleeve, the section of pipe to be tapped shall be cleaned of all foreign material and wire brushed to a smooth surface. The two halves of the sleeve shall be placed around the pipe with the gaskets installed per the manufacturer's instructions. The bolts shall be tightened evenly from the center toward the ends. The bolts shall be tightened to the manufacturer's specified torque.

When performing a wet tap in a prestressed concrete steel cylinder water main, grout is to be placed under the tapping saddle whether or not the saddle is epoxy coated.

All pipe materials and appurtenances which may come into contact with potable City water shall be disinfected with a strong chlorine solution prior to installation. This includes the pipe section to be tapped, the two halves of the sleeve, gaskets and the gate valve.

Prior to installation of the end gaskets, the sleeve shall be blocked with cement bricks such that the outlet is in proper position. The end gaskets shall be installed with an overlap as specified by the manufacturer.

The glands shall be assembled on the pipe. The bolts around the gland shall be tightened evenly, causing the gaskets to uniformly compress.

The valve shall be installed on the sleeve following the manufacturer's instructions.

Prior to tapping, the assembly shall be tested using the test plug tap in the sleeve with the valve closed, or by placing a tapped plug on the outlet of the valve with the valve open. The assembly shall be pressurized to l50 psi and hold the pressure fifteen minutes. After the pressure test is complete, the pipe shall be tapped.

C. Oversized Water Mains:

Portions of the proposed water mains or fittings may connect with existing water mains or fittings. The possibility exists that some of the existing water mains may have been constructed using oversized, cast iron, pipe. Where tie-ins or interconnections are specified and the existing main is found to be oversized, the Contractor shall furnish and install Clow 3501B Sleeves, Tyler Dual Sleeve 5-146L, or Rockwell 441 Sleeves. These sleeves are to be present on the jobsite prior to the excavation for the water main connection, or the work will not be allowed to commence.

D. Permissible Deflection at Joints:

Wherever it is necessary to deflect ductile iron pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructions, to plumb valve stems, or where long-radius curves are permitted, the amount of deflection allowed shall not exceed that required for satisfactory making of the joint, and shall be approved by the Engineer. The deflection shall not exceed the following amounts:

Size of Pipe (Inches)	Joint Angle (Degrees)	Deflection in 18 ft. (Inches)	Approx. Radius of Curve Produced by Succession of 18 ft. Lengths (Feet)
4	5	19	205
6	5	19	205
8	5	19	205
10	5	19	205
12	5	19	205
16	3	11	340
20	3	11	340
24	3	11	340
30	3	11	340

The above joint deflection angles apply to fittings as well as pipe joints.

E. Trench Opening:

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.

Sheeting, bracing, and shoring shall not be left in place after completion of the work except as required by the Engineer. 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. 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.

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 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.

For each size of pipe, the minimum trench width shall provide clearance of four inches on each side of the bell of the pipe or fitting or six inches on each side of the pipe barrel, whichever is greater. 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. The Work shall be performed such that the existing utilities, asphalt curb and gutter, and existing pavement shall be protected at all times.

In excavating for water mains, 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 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 barricades, or plated. The remainder of the trenching operation shall be available for safe vehicular and pedestrian traffic at all times.

It is essential that the discharge of the trench de-watering pumps be conducted to natural drainage channels, drains, or storm sewers. Engineer-approved soil erosion and sedimentation controls shall be installed and maintained at the point of discharge.

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.

F. Boring Pits

The means and methods of boring pit excavation and support, in whatever conditions encountered or created, shall be determined by the Contractor, subject to approval by the Engineer. All costs shall be included in the Contract Price per lineal foot of bored water main. Perform all excavations required for construction of pits, shafts, and other structures. Excavations shall include any and all materials encountered in the Work, such as topsoil, clay, sand, gravel, cinders, rocks, boulders, fill, old timber, buried trees and roots, abandoned utilities, abandoned foundations and structures, buried debris, or any combination of these, in whatever condition found.

Provide and maintain all sheeting, shoring, and bracing required in shafts and pits, and open cut excavations to insure protection and safety of personnel and to protect adjacent structures, property and work in place. The Contractor shall be responsible for the complete design of all sheeting, shoring, and bracing work. The design shall be appropriate for the soil conditions, shall be of such strength, quality, dimension and spacing as to prevent caving or loss of ground or squeezing within the neat lines of the excavation, and shall effectively restrain movement of the adjacent soil. Prior to installing the sheeting, shoring or bracing, the Contractor shall

submit plans for this work to the Engineer for informational purposes only. Sheeting, shoring, and bracing shall conform to the current federal or state regulations for safety.

Excavate as required to perform all boring work to the grades, lines and levels indicated on the Plans and as specified herein. Construct approach trenches, pits and shafts of sufficient length and width to accommodate the equipment being used, the pipe units to be placed and the manpower working. Locate the approach tunnel or working shaft or pit so that it will not unduly interfere with traffic or with the use of adjacent property.

Where required, control the infiltration of groundwater into the excavation. Use dewatering systems to lower the groundwater to below the bottom of the shaft or use other approved methods at no additional cost to the Owner.

Any relocations or removal and replacement of utilities, including gas mains, water mains, services, sewers, irrigation systems, signs, and other miscellaneous items required to construct shafts shall be incidental to the project unless otherwise specified.

Excavation under railroads shall conform to the requirements of the American Railroad Engineering Association (AREA) and the railroad corporation having jurisdiction.

G. Laying Pipe:

Each pipe shall be inspected for defects prior to being lowered into the trench. Inside of pipe and outside of 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, fittings, valves, and hydrants shall be carefully lowered into the trench piece by piece by means of an excavator using chains, slings, 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 water main construction shall not be connected into the existing system until it has been tested and accepted by the Engineer. The Contractor shall excavate for all bell holes and shall place the bell of the pipe in the excavated bell hole. Pipe shall be laid on the prepared trench bottom 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 noon hours 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. Each pipe, as laid, shall be checked by the Contractor to ensure that this result is obtained. 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. The grade as shown on the Plans is that of the top-of-pipe for water main; and, the work must conform to this profile. For water main construction, a variation from the profile grade of two inches with ductile iron pipe, and three inches with reinforced concrete pipe, will be deemed sufficient reason to cause the work to be rejected and re-laid. Water main pipe alignment shall be maintained so as not to vary more than three inches from the correct line. 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 water main 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 water main 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.

H. Crossing Existing Structures and Facilities:

During the construction it may be necessary to cross under or over certain sewers, drains, culverts, water lines, gas lines, electric lines, fiber optic communication, telecommunication, and other types of 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 damage or break existing structures or facilities and repair them in order to expedite the water main installation process. Wherever such structures or facilities may inadvertently be disturbed or broken, they shall be restored to a condition that is equal to, or better than, that was encountered prior to the damage. All damaged structures and/or facilities shall be made fully acceptable to the owner and the City, at the Contractor's expense. All crossings shall be made with a

minimum of twelve inches of vertical clearance between or alongside existing structures or facilities.

I. Cutting Pipe:

Cutting cast iron or ductile iron pipe for inserting valves, fittings, or closure pieces shall be performed in a neat and workmanlike manner without damage to the pipe or cement lining and so as to leave a smooth end at right angles to the longitudinal axis. Where the type of pipe joint in use is such that it employs push-on assembly to affect the joint seal, the outside of the cut end shall be tapered back 1/8 inch with a coarse file or a portable grinder at an angle of about 30 degrees. The tapering must remove all sharp and/or rough edges which might injure the gasket.

The flame cutting of pipe will not be allowed. Reinforced concrete water main pipe shall not be cut.

J. Setting Water Main Fittings and Accessories:

Valves, fittings, plugs, hydrants, etc. shall be set and joined to pipe in the manner specified in the Section entitled “Making Joints.”

Hydrants shall be located as shown on the Plans or as directed by the Engineer in such a manner as to provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians.

Hydrants shall be set to stand plumb with their nozzles parallel to the street and the pumper nozzle facing the street. Hydrants shall be set with pumper nozzles between 18 and 24 inches above finished grade, or as directed in writing by the Engineer.

K. Making Joints:

Mechanical means shall be used for pulling home all rubber-gasket pipes regardless of trench condition where manual means will not result in pushing and holding the pipe home. When a trench box or liner is used, a cable shall be used to pull the joints home and hold them in position.

Where work is performed in wet trenches or trenches with running sand, the Contractor shall provide and use mechanical means for pulling the pipe home in making up the joint and for holding the pipe joints tight until completion of the line. Mechanical means shall consist of a cable placed inside or outside of the pipe with a suitable winch, jack, or come-along for pulling the pipe home and holding the pipe in position.

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

L. Anchorage for Water Main Fittings and Accessories:

All plugs, caps, tees, hydrants, and bends shall be provided with MDOT Grade S2 concrete meeting the requirements of Section 701 of the 2012 MDOT Standard Specifications for Construction reaction backing (thrust block) as shown on the Plans or specified herein. Valves shall be restrained from movement at adjacent sleeves by the use of a closure piece, or thrust ring (full size pipe section cut to fill the gap inside the sleeve to within 1/4") as specified herein.

Reaction backing shall be placed between unexcavated solid ground and the fitting to be anchored. The area of bearing on the pipe and on the ground in each instance shall be that shown on the details or directed by the Engineer. The reaction backing shall, unless otherwise shown or directed, be so placed that the pipe and fitting joints will be accessible for repairs. This shall include adequate protection of any bolts from direct contact with the concrete.

Metal harnesses of tie rods or clamps may not be used instead of concrete reaction backing. Mega-Lug joint restraint systems and restrained, push-on joint, pipe shall be used where connections to existing lines require immediate pressurization, as specified herein.

In the event that the Engineer determines a change in the anchorage or design is required due to unsuitable earth conditions, changes may be ordered by the Engineer.

The use of friction clamps or set-screw type retainer glands for thrust restraint will not be allowed.

M. Casing Pipe Installation

Casing pipe I.D. shall be a minimum of 6-inches larger than the largest O.D. of the water main pipe. Larger diameter casing pipes shall be required where so noted on the plans. Place pipe to the lines and grades indicated on the Plans. Use care to not damage pipe, joints or joint material.

Perform boring or auguring excavation by excavating an opening larger than the outside diameter of the pipe to be installed. The diameter of the excavation shall not exceed the outside diameter of the casing pipe by more than 1-inch. Employ grouting or other methods approved by the Engineer to fill voids within 48 hours of completing the bore.

N. Abandonment or Removal of Water Main:

The Contractor shall abandon or remove water main(s) where shown on the Plans. All work shall be performed in accordance with the Detailed Specification entitled “Water Main and Appurtenances, Remove or Abandon.”

O. Water Main Testing:

The water main shall be disinfected and tested by the Contractor in the presence of the Engineer in accordance with the requirements below. The Contractor shall furnish all piping, pumps, hoses, gauges, and other materials and equipment required to carry out the tests using water from the City's water mains. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. Any hoses which are needed to direct water from blow-offs and/or hydrants during water main testing and flushing shall be supplied by the Contractor. The City shall furnish and install one inch corporation stops at all necessary locations, at the expense of the Contractor. The tapping of water mains, the installation of all corporation stops, and the operation of valves and hydrants is reserved for City personnel. The Contractor is required to assist in valve and hydrant operation, however. The Contractor shall give the City forty-eight hours prior written notice of intent and desire to test water mains.

P. Bacteriological Testing Sequences:

In the case of all water mains connected to existing facilities, flushing, chlorination and bacteriological testing must precede pressure testing. Where mains can be totally isolated from existing facilities with air gaps or double valves, pressure testing may precede chlorination and bacteriological testing. The normal sequence and time requirements for testing are:

Isolated (Gapped) Water Main	Connected Water Main
1. Fill Main	1. Flush and Swab*
2. Pressure Test	2. Chlorinate
3. Connect One End of Main	3. Wait; 24 hours
4. Flush and Swab*	4. Flush**
5. Chlorinate	5. Wait; 24 hours
6. Wait; 24 hours	6. Bacteriological Samples
7. Flush**	7. Wait; 24 hours
8. Wait; 24 hours	8. Bacteriological Samples
9. Bacteriological Samples	9. Wait; 48 hours
10.Wait; 24 hours	10. Pressure Test (If both sets of Bacteriological samples pass)
11.Bacteriological Samples	11. Flush
12. Wait; 48 hours	12. Wait; 24 hours
13. Make Final Connection(s) – Place in Service (If both sets of bacteriological samples pass)	13. Bacteriological Samples
	14. Wait; 24 hours

	15. Bacteriological Samples
	16. Wait; 48 hours
	17. Place in Service (If both sets of bacteriological samples pass)

*Collect flush water in operable storm water retention/detention facility.
**Discharge flush water into approved sanitary sewer.

The Contractor shall not connect any end of a newly constructed water main to an existing, in-service, water main, until the newly constructed water main passes the hydrostatic test, unless approved in writing by the Engineer.

Q. Hydrostatic (Pressure Test):

Insofar as is practical, mains shall be pressure tested between valves. The maximum length of water main to be tested in any one test shall be 1500 feet. The section of main to be tested shall be slowly filled with potable water and the entrained air within the pipe removed or absorbed and pumped up to a pressure of 150 psi (or other pressure if specified) and the test period shall start immediately thereafter. The lines shall then be maintained under a test pressure of 145-155 psi for a continuous period of three hours by pumping chlorinated (25 ppm) water into the line at frequent intervals. The volume of water so added shall be measured and considered to represent the leakage from the line under test during the interval. Visible leaks shall be repaired regardless of test results. The leakage under the conditions of the test shall not exceed the values shown in the table below. If one side of a double disc gate valve is under test pressure, that seat shall count as four joints.

Maximum Allowable Leakage per 100 Joints at 150 psi Avg. Test Pressure

Pipe Diameter (Inches)	4	6	8	10	12	16	20	24	30	36
Leakage (gallons/hr)	0.66	0.99	1.32	1.66	1.99	2.65	3.30	3.97	4.97	5.96

In the event that the leakage exceeds the maximum allowable leakage as specified above, the joints in the line shall be carefully inspected for leaks and repaired where necessary. Any pipes or fittings found to be leaking shall be removed and replaced with new pieces by the Contractor. After this work has been performed, all tests shall be repeated.

R. Flushing and Swabbing:

The Contractor shall flush the water main after making a connection to the existing City water main where a valve separates the new water main from the

existing main. As a result, flushing will be accomplished using flow through the full size of the new water main. If a storm water retention/detention facility is to be constructed as part of the project, this facility is to be completed, stabilized, operable, and utilized for the collection of the flushing water. All pipe, materials, and appurtenances which will come into contact with potable City water after the restoration of water service following the connection shall be disinfected with a strong chlorine solution prior to installation.

Water main shall be cleaned using a high density poly-pig, Girard Aqua Swab (2 lbs/ft3 density) swab, or Engineer approved equal and flushed. The diameter of the blow-off pipes shall be at least 50% of the diameter of the pipe being flushed. Hydrants, with internal components removed, may serve as blow-offs for mains 12 inches and less. The Contractor shall provide details, for the review and approval of the Engineer, for the various required blow-offs. Blow-off pipes, discharge hoses, where needed, and associated costs shall be included in the cost of the permanent water main being installed and will not be paid for separately. If there are no branch connections to be swabbed, the poly-pig shall be inserted in the new water main at the time of connection described above. The poly-pig shall be located on the "downstream" or new side of the separation valve. The poly-pig shall then be forced through the new water main during the first flush and discharged through a construction blow-off of sufficient size to allow passage of the poly-pig. For water mains with branch connections, a launching tee or wye shall be installed as shown in the details, for launching multiple poly-pigs. The main line and each branch main shall be flushed and swabbed individually. Following the successful final bacteriological testing of the water main, the launching tee/wye shall be permanently capped at its branch.

During the flushing and swabbing of a water main, the discharge point for the main shall be left open, with all other discharge points closed, to direct the poly-pig completely through the main being swabbed to its point of termination. Following the initial swabbing of water main, the separation valve shall be closed, and then the discharge point closed. If a branch water main is to be swabbed, the poly-pig is then to be placed in the launcher; the discharge point for the branch water main is to be opened; the poly-pig is to be inserted into the water main; the separation valve partially opened and the branch water main flushed and swabbed.

Following the swabbing of the water main(s), the water main(s) are to be flushed as required. If approved or directed by the Engineer, the water main(s) may be flushed overnight, provided that proper controls (i.e. hoses directed into storm structures, etc.) are installed to direct and control the flushing water.

S. Chlorination:

After the water mains to be tested have been acceptably flushed, they shall be disinfected in accordance with AWWA C651 "Disinfecting Water Mains" and these Specifications. All new mains and fittings, and any existing mains contaminated by

the Contractor, shall be chlorinated to a minimum residual of fifty (50) parts per million (ppm) with commercial liquid chlorine solution (sodium hypochlorite - pool type). Other forms of chlorination and disinfection methods of water mains may be presented by the Contractor and shall receive prior approval in writing by the Engineer before being used. The minimum recommended dosage of sodium hypochlorite is as follows (based on 10% available chlorine):

Recommended Minimum Chlorine Dosage to Disinfect 100 L.F. of Pipe

Pipe Diameter (inches)	10% Chlorine Solution (gallon)
6	0.153
8	0.272
10	0.426
12	0.613
16	1.090
20	1.703
24	2.452

The chlorinated water shall remain in the mains for a minimum of 24 hours, at the end of which period the chlorinated water at all parts of the main must show free available chlorine residual of at least twenty-five (25) ppm. If less than 25 ppm residual is shown at the end of the first 24 hour period, additional chlorine shall be added until a residual of not less than 25 ppm at all parts of the system is shown after a subsequent 24 hour period. The chlorinated water shall then be removed from the mains and disposed of into an existing, approved City sanitary sewer main, or other location approved in writing by the Engineer. All chlorinated water shall be discharged directly to the sanitary sewer and will not be allowed to be discharged to the ground or any surrounding water course. The mains shall then be left full of water ready for bacteriological testing.

T. Bacteriological Testing:

The City will obtain bacteriological samples of the water in the mains for analysis from testing blow-offs, corporations, or other sampling points as determined acceptable by the City. Samples will be taken after the mains have been satisfactorily chlorinated in accordance with these Specifications, the chlorinated water flushed out and removed, and the mains filled with potable water. The water samples will only be bacteriologically tested at the City's Water Treatment Plant Laboratory; the use of other laboratories or testing locations shall not be allowed or deemed to provide satisfactory test results by the City of Ann Arbor under any circumstance. No samples will be deemed acceptable until they meet all city requirements. If the newly constructed water main is connected at one end to an in-service section of the City water main, and the chlorination precedes pressure

testing, the City will also take samples after satisfactory pressure testing. In each case, two sets of samples shall be taken; a period of 24 hours must elapse between flushing of the main and drawing of the first samples, with the second samples being drawn 24 hours after the first samples were drawn. For each sample, a minimum of 48 hours is required to obtain test results. All samples must pass the bacteriological test.

The Contractor shall plan for these testing sequences and durations in his construction schedule. Contract time will continue during all water main testing phases, regardless of duration.

d. Construction, General Requirements.- coordination with the City of Ann Arbor Field Operations Unit for the installation of 1-inch corporations in the gate wells to be used for water main testing and/or filling of new main.

The Contractor must have all materials, fittings, pumps and other miscellaneous equipment, and personnel on-site before the City of Ann Arbor Public Services personnel will prepare and shutdown and existing main.

The bedding and backfill for Trench Detail I (under roadbed), Modified, shall be MDOT Granular Material, Class II compacted to 95% of its maximum dry density in maximum lifts of 12 inches. The bedding and backfill for Trench Detail V (within 1:1 influence of the roadbed or curb and gutter), Modified, to a point 12 inches above the top of pipe, shall be MDOT Class II sand compacted to 95% of its maximum dry density. The material above this point shall be Engineer-approved native material compacted to 90% of its maximum dry density.

The Contractor shall dig-up and expose all utility crossings prior to laying any water main pipe. This will allow the Engineer to adjust the grade of the water main, if possible, to avoid the existing utilities. The costs of the 'dig-ups", and all related costs, shall be included in the respective items of work in this Detailed Specification. Some "dig-ups" may need to occur out of Phase.

Should the water main, or other pay items in this Detailed Specification, conflict with abandoned sewers or water mains, the conflicting section of the abandoned sewer or water main shall be removed and the remaining sections shall be (re)abandoned in accordance the Detailed Specification for "Water Main and Appurtenances, Abandon" and the Detailed Specification for "Sewer, Any Size or Depth, Abandon," except that flow filling the sewer will not be required. All the work shall be included in the cost of the water main, or other pay items in this Detailed Specification.

e. Excavate and Backfill For Water Service Tap And Lead - This work shall consist of exposing new water mains and excavating and backfilling a trench from the water main as directed by the Engineer for the purpose of transferring existing water services to new water mains or replacing existing water services as necessary.

The trench is to be excavated to the applicable MIOSHA standards for the purposes of transferring water services, installing water service taps, leads, and curb stops and boxes. The City will furnish all labor and materials for taps, leads, and curb stops and boxes. The Contractor will not be entitled to extra compensation due to delays caused by City of Ann Arbor personnel in performing work on the project. The Contractor shall be responsible for all coordination with the City of Ann Arbor – Field Operations personnel for the scheduling and execution of the work.

Granular Material, Class II bedding (3 inch) and backfill material shall be placed in lifts not to exceed 12 inches and compacted to a minimum of 95% of its maximum dry density as measured by the AASHTO T-180 test.

f. Lighting Requirements for Nighttime Water Main Work.- Night work shall be lighted to an average intensity of 10 foot-candles minimum. Sufficient light sources shall be provided to achieve this illumination requirement. The lighting scheme shall be submitted to the Engineer for review and approval a minimum of 72 hours prior to the anticipated commencement of the nighttime work. Nighttime work will not be allowed to begin until such time as the lighting scheme has been approved by the Engineer.

The lighting shall allow the inspector to clearly see and inspect all work operations. Light sources shall be adjusted as directed by the Engineer, as many times as needed, in order to meet the requirement.

Lighting systems may be fixed, portable, or equipment mounted. A power source shall be supplied with sufficient capacity to operate the lighting system. The power source shall not violate any local noise ordinance requirements. The lighting system(s) shall be arranged such that they do not interfere with the vision of motorists, glare or shine in the eyes of oncoming drivers, or unnecessarily illuminate surrounding properties or residences. After initial set-up, drive through and observe the lighted area from each direction on the roadway. Adjust lighting units as many times as needed in order to comply with these requirements.

g. Sequence of Construction.- All water main construction shall be completed in accordance with the Detailed Specification entitled “Maintaining Traffic and Construction Sequencing” and as detailed herein. The Contractor shall schedule and coordinate all water main shutdowns with the Engineer. The Contractor shall submit for the Engineer’s review and approval the sequence of all water main “shut downs” and tie-ins such that disruption in service to existing properties is minimized to the greatest extent possible. Should the Engineer not accept the Contractor’s proposed construction sequence, it shall not be a basis of claim for extension of contract time or additional compensation.

All water main and appurtenances shall be pressure tested, cleaned, disinfected and bacteriological tested in accordance with the specifications outlined within this Detailed Specification.

After acceptance of each section of new main the Contractor shall begin coordination with the City of Ann Arbor Public Services Area for the reconnection of water services.

h. Measurement and Payment.- The completed work will be paid for at the contract unit prices for the following contract items (pay items):

Contract Item (Pay Item)	**Pay Unit**
Item 284: Sacrificial Anode, ___ lbs	Each
Item 285: CL-50, D.I. Water Main, w/ Poly Wrap, ___ inch, Tr Det I, Mod	Foot
Item 286 and 287: Bends And Reducers, ___ inch	Each
Item 288: Cross, 12 inch x __ inch	Each
Item 288: Tee, ___ inch x ___ inch x ___ inch	Each
Item 289: Fire Hydrant Assy, w/Extensions, Complete	Each
Item 290: Gate Valve-in-Box, ___ inch	Each
Item 291: Gate Valve-in-Well, ___ inch	Each
Item 292: Tapping Sleeve & Valve-in-Box	Each
Item 293: Excavate and Backfill for Water Service Tap And Lead	Lft

All work shall be paid in full at the contract unit prices which shall include all labor, materials and equipment required including all required costs associated with night time work, supplemental lighting, and all other required elements of the work.

Water main pipe per lineal foot includes restrained joints where called for on the plans.

Water main in bored steel casing includes all excavation, boring pits, sheeting, shoring, bracing, backfilling, casing pipe and water main in casing.

Fittings other than those specifically listed as separate contract items, blow-off assemblies, hoses, and restrained joint pipe and gaskets, special gaskets, and the like, shall not be paid for separately, but shall be considered included in the payment for “CL-50, D.I. Water Main, w/Poly Wrap, ___ inch, Tr Det ___.” Tees, Bends, and Reducers and other fittings specifically listed as separate contract items (pay items), shall be paid for at the contract unit price for each unit installed.

Gate Valve-in-Box includes the Valve Box. Valve Box Extensions will only be paid for if they are required by the plans and they are not required due to the Contractor’s operations.

“Excavate and Backfill for Water Service Tap and Lead” shall be paid for per each trench excavated in total at the location where the new and existing water services are to be reconnected. The Contractor shall be aware that the plan quantities are estimates only. The actual amount of excavation and backfill may be significantly more or less based on actual field conditions. Price adjustments based upon Section 103.02.B shall not apply to this item of work.

“Sacrificial Anode, ___ lbs” shall include excavation, thermite welding anode lead to existing watermain, and backfilling excavation as specified.

CITY OF ANN ARBOR
SPECIAL PROVISION
FOR
Item 294: Water Main Pipe Abandonment
Item 295: Water Main, Abandon w/Flowable Fill
Item 296-01: Gate Valve-in-Box, Abandon
Item 296-02: Gate Valve-in-Box, Remove
Item 297-01: Gate Valve-in-Well, Abandon
Item 297-02: Gate Valve-in-Well, Remove
Item 298: Fire Hydrant, Rem

WT:VCM 1 of 2 01/12/22

a. Description.- This work shall include abandoning or removing existing water mains, valves, valve wells, valve boxes, and fire hydrant assemblies of various sizes as required by the Plans. All work shall be performed in accordance with the project plans, as detailed in this Special Provision, and as directed by the Engineer.

b. Materials.- All materials shall meet the requirements specified in Division 9 and 10 of the MDOT 2020 Standard Specifications for Construction as follows:

Granular Material, Class II.....Section 902
Masonry Units .....Section 913
Mortar Type R-2 .....Section 1005

Push-on joint plugs and thrust blocks shall conform to the requirements as detailed in the Detailed Specification on Water Main and Appurtenances.

c. Methods of Construction.- The Contractor shall abandon water mains where shown on the Plans and as directed by the Engineer. This includes, but is not limited to, cutting the main at each end, plugging the live main at the end(s) with push-on joint plug(s) and thrust block(s), plugging the abandoned main at its end(s) with brick and mortar, concrete, or mechanical joint plug, breaking down any manholes (remove manhole ring and cover and the top 4' of manhole structure, breaking out the manhole base, and backfilling as specified herein) in the abandoned line, removing and salvaging any valves and fittings, plugging the pipe in manholes with brick and mortar, concrete, or mechanical joint plugs.

In locations as shown on the Plans or where abandoned water main, valves or valve wells are within 30 inches of the proposed subgrade, the pipe, valves or valve wells shall be removed completely. The resulting hole or trench shall be backfilled with Granular Material, Class II, in maximum lifts of 12 inches, and be compacted to 95% of its maximum dry density, if located within the public rights-of-way, railroad rights-of-way, or within the influence of paved surfaces or structures. Applicable road pavement cross-section, per plans, shall be installed per plans and as directed by the Engineer. Otherwise, backfill shall be Engineer approved native material, compacted to 90% of its maximum dry density, in lifts of 12 inches or less, unless otherwise noted on the plans.

Abandoned (salvaged) or removed valves and fire hydrant assemblies shall be neatly

stacked on-site in a single location so that City of Ann Arbor forces can retrieve them at a later date. The Contractor shall assist City forces by loading them into City trucks. All costs associated with storing, stockpiling, and loading valves and hydrants into City vehicles will not be paid for separately.

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

Contract Item (Pay Item)	**Pay Unit**
Item 294: Water Main Pipe Abandonment	Linear Foot
Item 295: Water Main, Abandon w/Flowable Fill	Linear Foot
Item 296-01: Gate Valve-in-Box, Abandon	Each
Item 296-02: Gate Valve-in-Box, Remove	Each
Item 297-01: Gate Valve-in-Well, Abandon	Each
Item 297-02: Gate Valve-in-Well, Remove	Each
Item 298: Fire Hydrant, Rem	Each

"Water Main Pipe Abandonment" and " Water Main, Abandon w/Flowlable Fill" shall be measured and paid for by length in lineal feet and shall include all labor, materials, and equipment necessary to abandon or remove the pipe including, but not limited to; excavation; cutting of pipe; furnishing and installing push-on joint plugs and thrust blocks; constructing brick and mortar bulkheads; the furnishing, placement, and compaction of approved granular backfill material, as required; and, the removal and proper disposal off-site of excess materials.

"Gate Valve-in-Box, Remove", "Gate Valve-in-Box, Abandon", "Gate Valve-in-Well, Remove", "Gate Valve-in-Well, Abandon", and "Fire Hydrant, Rem" shall be paid for at the contract unit price for each unit abandoned or removed.

Payment shall include all labor, materials, and equipment necessary to completely abandon or remove the valve, including removing and salvaging the valve, valve boxes, and manhole rings and covers. Also included is the removal of the top 4 feet of valve wells; breaking out the valve well base; furnishing, placement, and compaction of approved granular backfill material, as required; stockpiling valves for future City use or removal; and, the removal and disposal of excess materials. Payment for Fire Hydrant, Rem includes payment for abandoning the companion valve.

CITY OF ANN ARBOR

DETAILED SPECIFICAITON
FOR
TRAFFIC SIGNAL EQUIPMENT

WT:JNB 1 of 1 02/10/2022

a. Description. This work consists of furnishing and installing traffic signal equipment in accordance with the Michigan Department of Transportation (MDOT) 2020 Standard Specifications for Construction, as shown on the plans, and as specified herein.

b. Materials. Provide materials in accordance with sections 918 and 921 of the MDOT 2020 Standard Specifications for Construction.

c. Methods of Construction. The construction methods used for traffic signal equipment shall conform to sections 818 and 820 of the MDOT 2020 Standard Specifications for Construction.

d. Measurement and Payment. Measure and pay for the completed work, as described, at the respective contract unit prices using the following pay item:

Pay Item	**Pay Unit**
Conduit, DB, __, __ inch	Foot
TS, Face, Bag	Each
TS, Face, Bag, Rem	Each
TS, Pedestrian, _____ Mtd, Rem	Each
Wireless Vehicle Sensor Node, Rem	Each
TS, Mast Arm Mtd, Rem	Each
Case Sign, Rem	Each
Sign, Type III, Rem	Each
Hh, Rem	Each
Pedestal, Rem	Each
Pedestal Fdn, Rem	Each
TS, Pedestrian, __ Way, ____ Mtd (LED), Countdown	Each
TS, One Way Mast Arm Mtd, Salv	Each
Pedestal, Alum	Each
Pedestal, Fdn	Each
Wireless Vehicle Sensor Node	Each

Payment for signal equipment includes all labor, material, and equipment required for furnishing and installing the signal equipment as shown on the plans and as specified herein.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
PRECAST CONCRETE PEDESTAL SIGNAL FOUNDATION AND PRECAST UNDERGROUND SERVICE PEDESTAL (METAL) FOUNDATION

STR:POJ 1 of 1 APPR:RWS:MJF:06-02-20
FHWA:APPR:06-04-20

a. Description. This work consists of fabricating, furnishing, and installing precast concrete foundations to be used for pedestal pedestrian signals and underground service pedestals (metal), as shown in the contract, and in accordance with the standard specifications except as modified herein.

b. Materials.

1. Concrete. Use concrete grade 3500 or 3500HP in accordance with section 1004 of the Standard Specifications for Construction.

2. Anchor bolts. Use *ASTM F1554 Grade 36*.

3. Reinforcing Steel. Must meet section 905 of the Standard Specifications for Construction.

4. Open-Graded Aggregate, 34R.

c. Fabrication. Fabricate at a commercial precast facility certified by *Precast/Prestress Concrete Institute (PCI)*, *National Precast Concrete Association (NPCA)*, or *American Concrete Pipe Association (ACPA)*. Provide quality control and notify the Engineer prior to fabrication to provide the opportunity for quality assurance inspection. The Engineer may elect to forego this inspection but not the certification requirements. Provide steel reinforcement as necessary to protect foundations from any shipping, handling, or installation damage. Precast foundations are subject to rejection by the Engineer for visible damage or improper material documentation during fabrication and at time of delivery and installation.

d. Construction. Ensure precast pedestal signal foundations are placed plumb and level in the excavation on 6 inches of 34R open-graded aggregate, with an annular space of 3-6 inches. Fill the annular space with 34R in one-foot lifts and compact each lift. Restore disturbed areas in kind in accordance with section 816.

e. Measurement and Payment. The completed work, as described, will not be paid for separately but will be included in the associated pay item(s) covered in subsection 820.04 of the Standard Specifications for Construction.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
RECABLE, TRAFFIC SIGNAL

SIG:JYP 1 of 1 APPR:EMS:DBP:11-04-21

a. Description. The work consists of removing existing cable and installing new traffic signal cable to existing traffic signal heads as required due to the relocation or removal and installation of the traffic signals, or the installation of a new traffic signal controller, as indicated on the plans.

b. Materials. Furnish materials in accordance with subsection 918.03 of the Standard Specifications for Construction. Refer to the plans for cable type.

c. Construction. Recable the traffic signal(s) in accordance with subsection 818.03 of the Standard Specifications for Construction. Replace the cable from the controller cabinet to the signal with no splices. Install replacement cable of sufficient length as directed by the Engineer.

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

Pay Item	**Pay Unit**
Recable, TS	Foot

Recable, TS will be measured per foot of cable in place from the controller to the signal for replacement of the traffic signal cable for an existing vehicular signal, pedestrian signal, or combination of both and includes terminating both ends.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
WIRELESS VEHICLE DETECTION SYSTEM

SIG:EMS 1 of 6 APPR:HLO:NJB:05-05-20
FHWA:APPR:05-06-20

a. Description. This work consists of completing one or more of the following work types at locations shown on the plans:

1. Furnishing and installing a wireless vehicle detection system (VDS) including serial port protocol (SPP) radios, master interface access point contact closure (APCC) card, extension (EX) cards, and Isolator Module.

2. Furnishing and installing a repeater (RP).

3. Furnishing and installing a vehicle sensor node (VSN).

4. Removing and disposing of an existing wireless VDS.

5. Removing, storing and reinstalling an existing wireless VDS.

6. Removing and disposing of an existing RP.

7. Removing, storing, and reinstalling an existing RP.

8. Removing and disposing of an existing VSN.

9. Removing, storing, and reinstalling an existing VSN.

As applicable, this work includes removal or installation of mounting brackets, hardware, cable, connectors, grounding, sensors and orange epoxy and any other material required to ensure a complete removal or installation, as specified for a location.

b. Materials. Provide materials, as directed by the Engineer, necessary to provide a complete and operating job. Provide materials in accordance with sections 918 and 921 of the Standard Specifications for Constructions and this special provision.

1. Vehicle Detection System (VDS).

   A. A complete VDS consists of:

      (1) Master interface APCC card;

      (2) EX card if required;

      (3) Isolator Module;

(4) Mounting rack and hardware;

(5) The quantity of SPP radios as specified on the plans including *NEMA 4X type* enclosure with mounting bracket and hardware and Category 5e (CAT-5e) 600 volt (V) rated cable from the SSP to the Isolator Module;

(6) Any associated cable, connectors and hardware necessary to complete the work.

B. Provide a VDS that:

(1) Detects and counts vehicles using battery powered magnetometers utilizing wireless communications to transmit detection information;

(2) Provides vehicle counts per lane, lane occupancy, vehicle speed (when more than one VSN is installed per lane), and vehicle classification (when one or more VSN is installed per lane);

(3) Allows the time intervals for the above measurements to be user selectable from 30 seconds to 24 hours.

C. Provide an SPP radio that:

(1) Consists of a 2.4 gigahertz (Ghz) Master transceiver powered via CAT-5e cable;

(2) Includes 600V rated CAT-5e cable from the SPP to the Isolator Module;

(3) Includes an enclosure with mounting bracket, and associated hardware;

(4) Transmits detection information to a 170, 2070 or *NEMA type* controller in real-time;

(5) Operates on 48 volt direct current (VDC) at 3 watt power or via non-isolated external 10 to 15VDC at 2 watt power;

(6) Operates in an ambient temperature range of -37 degrees Fahrenheit (F) to +176 degrees F (-38 degrees Celsius [C] to +80 degrees C);

(7) Provides 1500V isolation and 5 kilovolt (kV) surge protection;

(8) Is housed in a plastic enclosure, no larger than 12 inches high, 8 inches wide, and 4 inches deep, meeting *NEMA 4X* and *International Protection Rating (IP67) standards*.

D. Provide a master interface APCC card that functions as the hub of the sensor network, communicating with up to 96 VSN’s transmitting detection information to the APCC.

2. Vehicle Sensor Node (VSN).

A. A complete VSN consists of:

(1) A magnetometer,

(2) A microprocessor,

(3) A wireless transceiver,

(4) A battery, and

(5) Orange epoxy for securing the node in the pavement.

B. Provide a VSN that:

(1) Is 1.9 inches high, 2.9 inches square;

(2) Is contained in a fully encapsulated housing to prevent moisture from degrading the components;

(3) Operates in an ambient temperature range of -37 degrees F to +176 degrees F (-38 degrees C to +80 degrees C);

(4) Operates on battery power for a minimum of 10 years under normal traffic conditions;

(5) Detects a vehicle by measuring a change in the earth's magnetic field and transmits the detected information within 125 milliseconds (ms) of receiving the detected vehicle;

(6) Can be programmed with a unique identifying code and transmits this code and detector information via a wireless radio communication method;

(7) Automatically recalibrates in the event of a detector lock;

(8) Responds within 100 seconds after the AP is powered up.

3. Wireless Repeater (RP).

A. A complete RP consists of:

(1) A battery operated transceiver;

(2) A battery with a minimum 8 year life; and

(3) An enclosure with mounting bracket and associated hardware.

B. Provide an RP that:

(1) Is housed in a plastic enclosure, no larger than 12 inches high, 8 inches wide, and 4 inches deep, meeting *NEMA 4X* and *International Protection Rating (IP67)*

standards;

(2) Extends the effective communication range of the VSN to the SPP up to 1000 feet; and

(3) Operates in an ambient temperature range of -37 degrees F to +176 degrees F (-38 degrees C to +80 degrees C).

4. Bus Interface Unit (BIU). Provide a BUI that meets the requirements of *Section 8 of the NEMA TS2-Specification*. Provide one 6 foot Port 1 communications cable to connect from the detector rack BIU to the controller unit.

5. Wireless Communication. Provide a VDS, RP, or VSN that operates in the unlicensed Industrial, Scientific and Medical (ISM) 2.4GHz band. Ensure the SPP and VSN operate in any one of the 16 channels available in the band. Provide two-way communication between the SPP and VSN to ensure integrity over the RP interface. Provide a VSN that uses a Time Division Multiple Access (TDMA) protocol wherein each sensor is assigned a time slot during which it transmits and receives one or more data packets. Ensure all system components are synchronized to the same time reference sourced by the APCC.

6. Software. Provide a VDS that is capable of accepting software and firmware upgrades. Provide software required to configure the VSN, SPP and RP units and to store and retrieve the detection data. Ensure the VSN and RP are reconfigurable by a user over the wireless communication interface.

7. Warranty. Provide materials with a manufacturer's warranty, transferable to the MDOT, that the supplied materials are free from all defects in materials and workmanship. Furnish the warranty and other applicable documents from the manufacturer, and a copy of the invoice showing the date of shipment, to the Engineer prior to acceptance.

c. Construction. Complete the work in accordance with sections 819 and 820 of the Standard Specifications for Construction, as shown on the plans, and as directed by the Engineer. Remove, store, and dispose of material in accordance with section 204 of the Standard Specifications for Construction.

1. Installation. When installing new equipment is specified, furnish and install the VDS, RP or VSN as shown on the plans. Installation includes master interface APCC card, EX card as required, Isolator Module, mounting brackets, hardware, cable, connectors, grounding, sensors and other appurtenances required for a complete system.

Install the VSN in a 4 inch by 2¼ inch hole, cored in the pavement in the traffic lane as indicated on the plans, or as directed by the Engineer. Encapsulate the VSN with orange epoxy.

Install the SPP and RP within range of the sensors and as indicated on the plans, or as directed by the Engineer.

2. Removal. When removal is specified, remove the existing VDS, VSN or RP units, associated enclosures, mounting brackets, hardware, and other appurtenances required for a complete removal. Dispose of removed materials.

3. Salvage. When salvage is specified, remove the existing VDS, VSN, or RP units,

associated enclosures, mounting brackets, hardware, and other appurtenances required for a complete removal, store salvaged materials in a protected and clean environment, and re-install the materials. Complete reinstallation in accordance with subsection c.1 of this special provision.

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

Pay Item	**Pay Unit**
Wireless Vehicle Detection System	Each
Wireless Vehicle Sensor Node	Each
Wireless Repeater	Each
Wireless Vehicle Detection System, Rem	Each
Wireless Vehicle Sensor Node, Rem	Each
Wireless Repeater, Rem	Each
Wireless Vehicle Detection System, Salv	Each
Wireless Repeater, Salv	Each
Wireless Vehicle Sensor Node, Salv	Each

1. **Wireless Vehicle Detection System** includes installing a wireless vehicle detection system including the SPP radios, the master interface APCC card, BIU, the EX cards, and the Isolator Module. The work includes all mounting brackets, hardware, cable, connectors, grounding, and all appurtenant material required to complete the work.

2. **Wireless Vehicle Sensor Node** includes installing a wireless vehicle sensor node including the sensors, orange epoxy, and all appurtenant material required to complete the work.

3. **Wireless Repeater** includes installing a wireless repeater including the RP, mounting brackets, hardware, and all appurtenant material required to complete the work.

4. **Wireless Vehicle Detection System, Rem** includes removing a wireless vehicle detection system including the SPP radios, the master interface APCC card, the EX cards, and the Isolator Module. The work includes removing all mounting brackets, hardware, cable, connectors, grounding, and all appurtenant material required to complete the work. **Wireless Vehicle Detection System, Rem** also includes storage or disposal of removed material.

5. **Wireless Vehicle Sensor Node, Rem** includes:

A. Remove a wireless vehicle sensor node including the sensor, epoxy, and all appurtenant material required to complete the work;

B. Storage and or disposal of removed material;

C. Filling the old hole with black epoxy;

6. **Wireless Repeater, Rem** includes removing a wireless repeater including the RP, mounting brackets, hardware, and all appurtenant material required to complete the work. **Wireless Repeater, Rem** also includes storage or disposal of removed material.

APPENDIX

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 $14.05/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 $15.66/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, 2021 - ENDING APRIL 29, 2022

$14.05 per hour
If the employer provides health care benefits*

$15.66 per hour
If the employer does **NOT** provide health care benefits*

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

ENFORCEMENT

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

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

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

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

For Additional Information or to File a Complaint contact
Colin Spencer at 734/794-6500 or cspencer@a2gov.org

Revised 2/4/2021

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

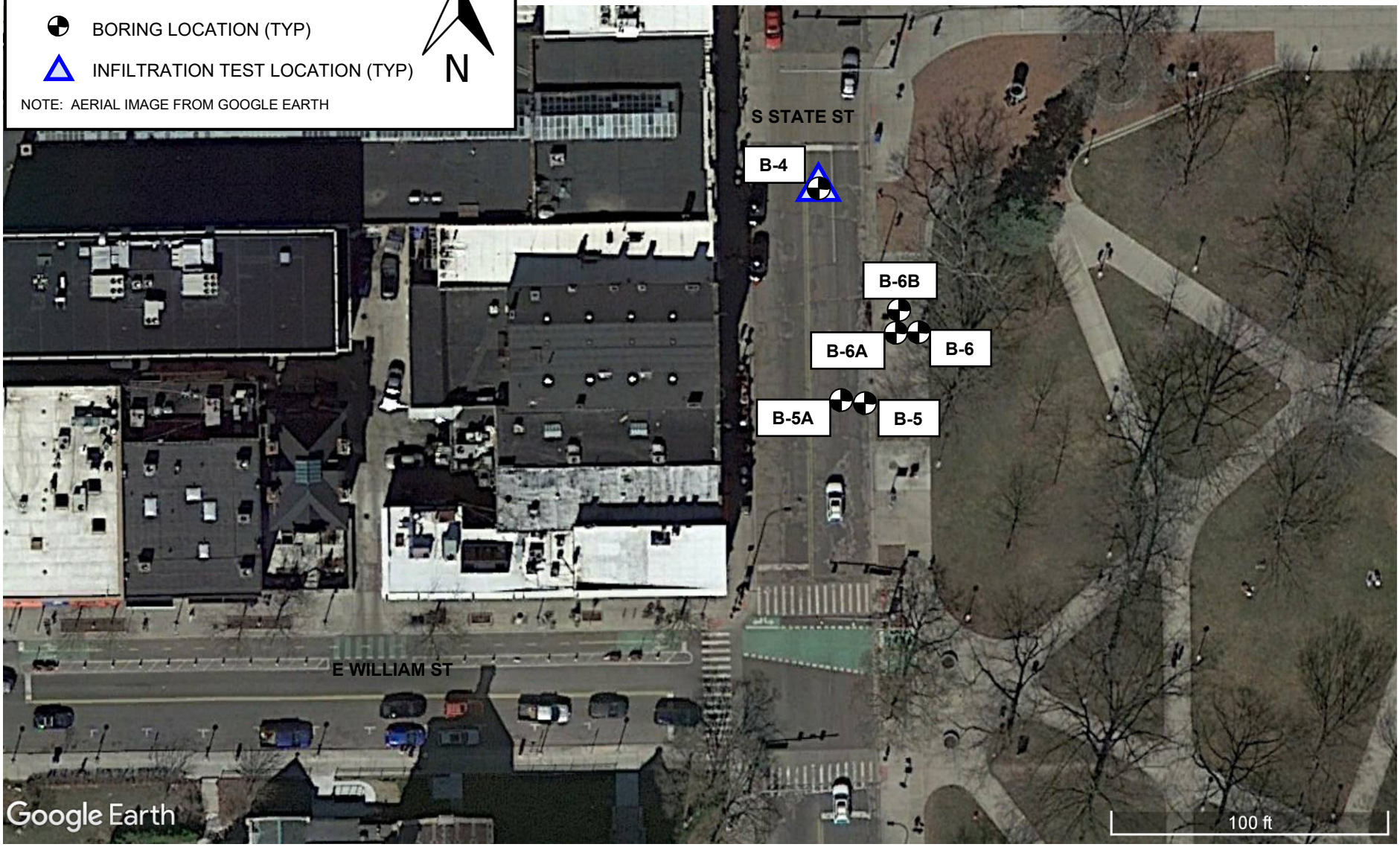
REMARKS:

NAME AND TITLE	SIGNATURE

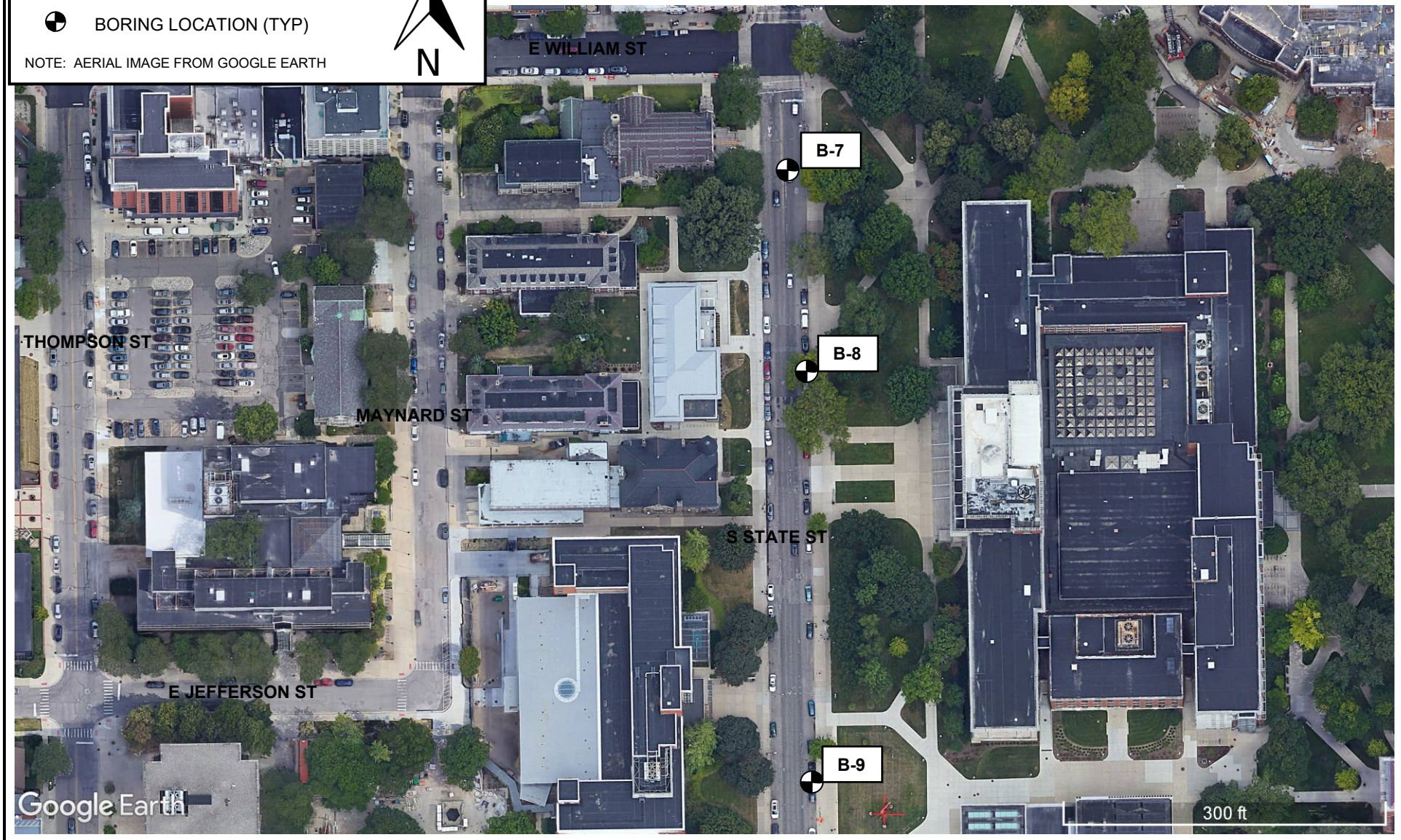
THE WILLFUL FALSIFICATION OF ANY OF THE ABOVE STATEMENTS MAY SUBJECT THE CONTRACTOR OR SUBCONTRACTOR TO CIVIL OR CRIMINAL PROSECUTION. SEE SECTION 1001 OF TITLE 18 AND SECTION 231 OF TITLE 31 OF THE UNITED STATES CODE.

Attachment J: Soil Boring Investigation Log

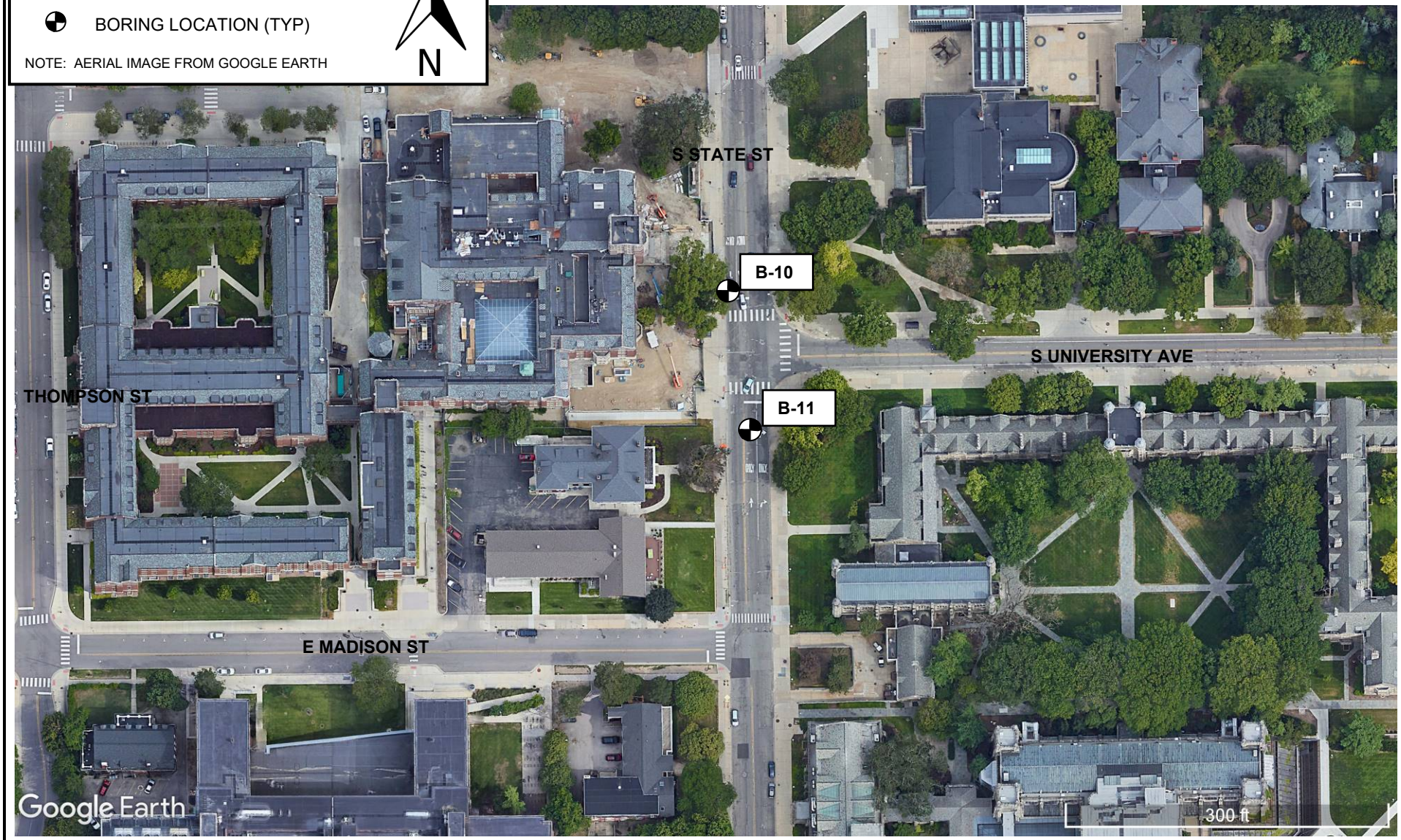
TITLE: BORING LOCATION PLAN		PROJECT: CITY OF ANN ARBOR STATE STREET AND NORTH UNIVERSITY	
SCALE: VISUAL	DATE: 10/13/2021	PROJECT NO.: 211279	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 1	DR. BY: KLV	REV. BY: RW	



TITLE: BORING LOCATION PLAN		PROJECT: CITY OF ANN ARBOR STATE STREET AND NORTH UNIVERSITY	
SCALE: VISUAL	DATE: 10/13/2021	PROJECT NO.: 211279	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 2	DR. BY: KLV	REV. BY: RW	



TITLE: BORING LOCATION PLAN		PROJECT: CITY OF ANN ARBOR STATE STREET AND NORTH UNIVERSITY	
SCALE: VISUAL	DATE: 10/13/2021	PROJECT NO.: 211279	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 3	DR. BY: KLV	REV. BY: RW	



TITLE: BORING LOCATION PLAN		PROJECT: CITY OF ANN ARBOR STATE STREET AND NORTH UNIVERSITY	
SCALE: VISUAL	DATE: 10/13/2021	PROJECT NO.: 211279	MTC MATERIALS TESTING CONSULTANTS
FIG. NO.: 4	DR. BY: KLV	REV. BY: RW	

LOG OF BORING

Project No.: 211279
Boring No.: B-1
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284915.3 E=13292708.7 (MI South ift)
Elevation: 874.4 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 6.5 ft.

Date Begin: 08/26/2021 Date End: 08/26/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
873.9	0.5					9" HMA				Fill 0' to 3.0'
873.4	1.0					0.8				
872.9	1.5					3" Sand Base 1.0				
872.4	2.0	S-1	1.5	3-5-7 N=12	SP-SC	Brown poorly graded SAND with clay; mostly coarse to fine sand, little clayey fines, few coarse to fine gravel, moist, Fill with occasional clayey sand lenses				
871.9	2.5									
871.4	3.0					3.0				
870.9	3.5					Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, trace clayey fines, moist				
870.4	4.0									
869.9	4.5	S-2	1.5	7-6-7 N=13						
869.4	5.0									
868.9	5.5									
868.4	6.0									
867.9	6.5									
867.4	7.0	S-3	1.5	14-11-9 N=20	SP					
866.9	7.5									
866.4	8.0									
865.9	8.5									
865.4	9.0									
864.9	9.5	S-4	1.5	6-8-7 N=15						
864.4	10.0					10.0				
						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.: 211279
Boring No.: B-2
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284776.2 E=13292714.4 (MI South ift)
Elevation: 874.9 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 3.3 ft.

Date Begin: 08/27/2021 Date End: 08/27/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
874.4	0.5					11 1/2" HMA				Fill 0' to 2.3'
873.9	1.0					1.0				
873.4	1.5				SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill				
872.9	2.0	S-1	1.5	3-4-5 N=9						
872.4	2.5					2.3				
871.9	3.0					Brown poorly graded SAND with gravel; mostly coarse to fine sand, little coarse to fine gravel, trace clayey fines, moist				
871.4	3.5									
870.9	4.0									
870.4	4.5	S-2	1.5	5-8-10 N=18						
869.9	5.0									
869.4	5.5									
868.9	6.0									
868.4	6.5				SP					
867.9	7.0	S-3	1.5	7-9-9 N=18						
867.4	7.5									
866.9	8.0									
866.4	8.5									
865.9	9.0									
865.4	9.5	S-4	1.5	11-9-9 N=18						
864.9	10.0					10.0				
						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.: 211279
Boring No.: B-3
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284585.5 E=13292721.8 (MI South ift)
Elevation: 875.2 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 2.0 ft.

Date Begin: 09/28/2021 Date End: 09/28/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
874.7	0.5					3 1/2" HMA 0.3				Fill: 0' to 5.5'
874.2	1.0					5 1/2" Red Brick 0.8				
873.7	1.5					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill with clay lenses				
873.2	2.0									
872.7	2.5	S-1	1.5	15-10-7 N=17						
872.2	3.0									
871.7	3.5				SC					
871.2	4.0									S-2 and S-3: Poor recovery; possible coarse gravel / COBBLE
870.7	4.5	S-2	0.7	6-11-7 N=18						
870.2	5.0									
869.7	5.5					5.5				
869.2	6.0					Brown poorly graded SAND with clay; mostly coarse to fine sand, few clayey fines, few coarse to fine gravel, moist				
868.7	6.5									
868.2	7.0	S-3	0.3	8-9-10 N=19						
867.7	7.5									
867.2	8.0				SP-SC					
866.7	8.5									
866.2	9.0									
865.7	9.5	S-4	1.5	5-9-10 N=19						
865.2	10.0					10.0				
						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.: 211279
Boring No.: B-4
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284278.6 E=13292742.8 (MI South ift)
Elevation: 876.5 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 3.7 ft.

Date Begin: 08/25/2021 Date End: 08/25/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
876.0	0.5					4 1/2" Brick 0.4				Fill 0' to 5.5'
875.5	1.0					8 1/2" Red Brick 1.1				
875.0	1.5					5" Concrete 1.5				
874.5	2.0					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist				
874.0	2.5	S-1	0.3	22-5-5 N=10						
873.5	3.0									
873.0	3.5				SC					
872.5	4.0									S-1 and S-2: Poor recovery; possible coarse gravel / COBBLE
872.0	4.5	S-2	1.0	6-4-3 N=7						
871.5	5.0									
871.0	5.5					5.5				
870.5	6.0					Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, moist				
870.0	6.5									
869.5	7.0	S-3	1.5	2-1-2 N=3						
869.0	7.5									
868.5	8.0				SP					
868.0	8.5									
867.5	9.0									
867.0	9.5	S-4	1.5	3-3-4 N=7						
866.5	10.0					10.0				
						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.: 211279
Boring No.: B-5
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=284202.2 E=13292760.9 (MI South ift)
Elevation: 876.0 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 08/01/2021 Date End: 08/01/2021

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
875.5	0.5					11" HMA				Fill: 0' to 2.7'
875.0	1.0					0.9				
874.5	1.5	A-1				13" Natural Aggregate Base				
874.0	2.0					1.9				
873.5	2.5	A-2			SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, few coarse to fine gravel, moist, Fill				
873.0	3.0	A-3				2.7				
872.5	3.5					Brown poorly graded SAND; mostly coarse to fine sand, few fine gravel, trace silty fines, moist				
872.0	4.0				SP					
871.5	4.5									
871.0	5.0					5.0				
						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.: 211279
Boring No.: B-5A
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=284202.5 E=13292751.4 (MI South ift)
Elevation: 876.1 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 08/01/2021 Date End: 08/01/2021

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: 3.2 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
875.6	0.5					4" HMA (0.3)				Fill: 0' to 3.2'
875.1	1.0					3 3/4" Red Brick (0.7)				
874.6	1.5					4" Sand Base with Gravel (1.0)				
874.1	2.0	A-1				3" Weathered Concrete (1.2)				
873.6	2.5					11" Natural Aggregate Base (2.2)				
873.1	3.0	A-2			SC	Brown clayey SAND with gravel; mostly coarse to fine sand, little clayey fines, little coarse to fine gravel, moist, Fill (3.2)				
						End of Boring				Auger refusal at 3.2' 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.: 211279
Boring No.: B-6
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JS Rev. By: RW
Coordinates: N=284227.4 E=13292777.5 (MI South ift)
Elevation: 876.8 ft Datum: NAVD 88 (GPS Observation)
Notes: Boring performed just prior to concrete installation. Concrete thickness was observed during placement
Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 08/27/2021 Date End: 08/27/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 5.5 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
876.3	0.5					5 1/2" Concrete 0.4				Fill 0' to 3.0'
875.8	1.0					2" Sand Base 0.6				Possible Fill 3.0' to 5.5'
875.3	1.5				SC	Brown clayey SAND with gravel; mostly coarse to fine sand, little clayey fines, little coarse to fine gravel, moist, Fill				
874.8	2.0									
874.3	2.5									
873.8	3.0					3.0				
873.3	3.5				SP	Brown poorly graded SAND; mostly coarse to fine sand, few fine gravel, trace clayey fines, moist, possible Fill with occasional clayey sand lenses				
872.8	4.0									
872.3	4.5									
871.8	5.0									
871.3	5.5					5.5				
						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.: 211279
Boring No.: B-6A
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JS Rev. By: RW
Coordinates: N=284228.4 E=13292772.0 (MI South ift)
Elevation: 876.7 ft Datum: NAVD 88 (GPS Observation)
Notes: Boring performed just prior to concrete installation. Concrete thickness was observed during placement
Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 08/27/2021 Date End: 08/27/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing			During	None
Sampler	Hand Auger	3 1/4"	End	NA
Core			Seepage	
Tube			Date	Depth, ft.
SPT Hammer	Auto			

Depth Drilled: 3.0 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
876.2	0.5					5 1/2" Concrete 0.4				Fill 0' to 3.0'
875.7	1.0					2" Sand Base 0.6				
875.2	1.5				SC	Brown clayey SAND with gravel; mostly coarse to fine sand, some clayey fines, little coarse to fine gravel, moist, Fill				
874.7	2.0									
874.2	2.5									
873.7	3.0					3.0				
						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.: 211279
Boring No.: B-6B
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JS Rev. By: RW
Coordinates: N=284233.8 E=13292772.0 (MI South ift)
Elevation: 876.4 ft Datum: NAVD 88 (GPS Observation)
Notes: Boring performed just prior to concrete installation. Concrete thickness was observed during placement
Plugging Record: Backfilled borehole with compacted cuttings.

Date Begin: 08/27/2021 Date End: 08/27/2021

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: 3.5 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
875.9	0.5					5 1/2" Concrete 0.4				Fill 0' to 3.5'
875.4	1.0					2" Sand Base 0.6				
874.9	1.5				SC	Brown clayey SAND with gravel; mostly coarse to fine sand, some clayey fines, little coarse to fine gravel, moist, Fill				
874.4	2.0									
873.9	2.5									
873.4	3.0									
872.9	3.5					3.5				
						End of Boring				Auger refusal at 3.5' on 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.: 211279
Boring No.: B-7
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=283992.4 E=13292751.0 (MI South ift)
Elevation: 877.1 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 4.0 ft.

Date Begin: 08/31/2021 Date End: 08/31/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
876.6	0.5					14" HMA				Fill: 0' to 4.7'
876.1	1.0					1.2				
875.6	1.5									
875.1	2.0				SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill				
874.6	2.5	S-1	1.5	5-5-3 N=8						
874.1	3.0									
873.6	3.5									
873.1	4.0									
872.6	4.5	S-2	1.5	3-4-5 N=9						
872.1	5.0					4.7				
871.6	5.5				SP	Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, trace silty fines, moist				
871.1	6.0									
870.6	6.5									
870.1	7.0	S-3	1.5	5-6-7 N=13						
869.6	7.5									
869.1	8.0									
868.6	8.5									
868.1	9.0									
867.6	9.5	S-4	1.5	5-6-7 N=13						
867.1	10.0					10.0				
						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.: 211279
Boring No.: B-8
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=283804.0 E=13292769.5 (MI South ift)
Elevation: 877.0 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 09/08/2021 Date End: 09/08/2021

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
876.5	0.5					18 1/4" HMA				
876.0	1.0									
875.5	1.5	A-1				1.5				
875.0	2.0					13"Natural Aggregate Base				
874.5	2.5					2.6				
874.0	3.0					Brown poorly graded SAND with silt and gravel; mostly coarse to fine sand, little coarse to fine gravel, few silty fines, moist				
873.5	3.5									
873.0	4.0	A-2			SP-SM					
872.5	4.5									
872.0	5.0					5.0				
						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.: 211279
Boring No.: B-9
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=283422.5 E=13292777.2 (MI South ift)
Elevation: 876.1 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 2.7 ft.

Date Begin: 08/26/2021 Date End: 08/26/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
875.6	0.5					8" HMA (0.7)				Fill 0' to 2.2'
875.1	1.0					11" Natural Aggregate Base with HMA Millings (1.6)				
874.6	1.5									
874.1	2.0	S-1	1.5	15-5-4 N=9	SC	Brown clayey SAND; mostly coarse to fine sand, trace silty fines, moist, Fill (2.2)				
873.6	2.5									
873.1	3.0					Brown poorly graded SAND; mostly coarse to fine sand, trace silty fines, moist				
872.6	3.5									
872.1	4.0									
871.6	4.5	S-2	1.5	6-7-7 N=14						
871.1	5.0									
870.6	5.5									
870.1	6.0				SP					
869.6	6.5									
869.1	7.0	S-3	1.5	5-7-8 N=15		Grades with few coarse to fine gravel				
868.6	7.5									
868.1	8.0									
867.6	8.5									
867.1	9.0									
866.6	9.5	S-4	1.5	5-8-8 N=16						
866.1	10.0					(10.0)				
						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.: 211279
Boring No.: B-10
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=283102.6 E=13292750.3 (MI South ift)
Elevation: 874.5 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 5.0 ft.

Date Begin: 09/28/2021 Date End: 09/28/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
874.0	0.5					14" HMA				Fill: 0' to 3.2'
873.5	1.0					1.2				
873.0	1.5									
872.5	2.0				SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill with clay lenses				
872.0	2.5	S-1	1.5	3-3-3 N=6						
871.5	3.0					3.2				
871.0	3.5									
870.5	4.0				SP	Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, trace clayey fines, moist				S-2: Poor recovery; possible coarse gravel / COBBLE
870.0	4.5	S-2	1.0	8-9-11 N=20						
869.5	5.0									
869.0	5.5									
868.5	6.0									
868.0	6.5					Grades with trace coarse to fine gravel and without clayey fines				
867.5	7.0	S-3	1.5	4-5-4 N=9						
867.0	7.5									
866.5	8.0					8.0				
866.0	8.5				SP	Brown poorly graded SAND with gravel; mostly coarse to fine sand, little coarse to fine gravel, moist				
865.5	9.0									
865.0	9.5	S-4	1.5	9-14-9 N=23						
864.5	10.0					10.0				
						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.: 211279
Boring No.: B-11
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=282927.7 E=13292772.2 (MI South ift)
Elevation: 874.6 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 09/08/2021 Date End: 09/08/2021

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
874.1	0.5					8 7/8" HMA 0.7				
873.6	1.0					3 3/4" HMA Millings or Deteriorated HMA 1.1				
873.1	1.5	A-1				11" Natural Aggregate Bse 2.0				
872.6	2.0	A-2								
872.1	2.5				SP-SC	Brown poorly graded SAND with clay and gravel; mostly coarse to fine sand, little coarse to fine gravel, few clayey fines, moist				
871.6	3.0									
871.1	3.5	A-3								
870.6	4.0									
870.1	4.5									
869.6	5.0					5.0				
						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.: 211279
Boring No.: B-12
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284352.4 E=13292856.6 (MI South ift)
Elevation: 876.6 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 3.5 ft.

Date Begin: 08/31/2021 Date End: 08/31/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
876.1	0.5					6 1/2" HMA (0.5)				Fill: 0' to 4.6'
875.6	1.0					4" Sand Base (0.8)				
875.1	1.5					Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill				
874.6	2.0	S-1	1.5	2-3-2 N=5						
874.1	2.5									
873.6	3.0				SC					S-2: Poor recovery; possible coarse gravel / COBBLE
873.1	3.5									
872.6	4.0									
872.1	4.5	S-2	0.4	2-3-3 N=6						
871.6	5.0					(4.6)				
871.1	5.5					Brown poorly graded SAND with gravel; mostly coarse to fine sand, little coarse to fine gravel, moist				Driller noted possible coarse gravel 4.6' to 8.0'
870.6	6.0									
870.1	6.5				SP					
869.6	7.0	S-3	1.5	7-9-8 N=17						
869.1	7.5									
868.6	8.0					(8.0)				
868.1	8.5					Brown poorly graded SAND; mostly coarse to fine sand, few fine gravel, trace silty fines, moist				
867.6	9.0				SP					
867.1	9.5	S-4	1.5	6-7-10 N=17						
866.6	10.0					(10.0)				
						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.: 211279
Boring No.: B-13
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=284405.1 E=13293179.1 (MI South ift)
Elevation: 877.4 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 09/09/2021 Date End: 09/09/2021

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: 4.5 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
876.9	0.5					4" HMA 0.3				Fill: 0' to 2.8'
876.4	1.0	A-1				4 1/2" Concrete 0.7				
875.9	1.5	A-2				6" Crushed Limestone Aggregate Base 1.2				
875.4	2.0				SP-SC	Brown poorly graded SAND with clay; mostly coarse to fine sand, few clayey fines, few fine gravel, moist, Fill 2.8				
874.9	2.5									
874.4	3.0	A-3								
873.9	3.5				SP	Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, trace silty fines, moist 4.5				
873.4	4.0									
872.9	4.5					End of Boring				Auger refusal at 4.5' 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.: 211279
Boring No.: B-14
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=284367.3 E=13293507.2 (MI South ift)
Elevation: 878.2 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 09/09/2021 Date End: 09/09/2021

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
877.7	0.5					8 1/2" HMA 0.7				Fill: 0' to 2.9'
877.2	1.0	A-1				15" Crushed Limestone Aggregate Base 2.0				
876.7	1.5									
876.2	2.0									
875.7	2.5	A-2			SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, few coarse to fine gravel, moist, Fill 2.9				
875.2	3.0									
874.7	3.5	A-3				Brown poorly graded SAND; mostly coarse to fine sand, few coarse to fine gravel, trace silty fines, moist				
874.2	4.0				SP					
873.7	4.5			20						
873.2	5.0					5.0				
						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.: 211279
Boring No.: B-15
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: Hand Auger
Crew Chief: Field Eng.: JV Rev. By: RW
Coordinates: N=284398.8 E=13293675.4 (MI South ift)
Elevation: 880.7 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch.

Date Begin: 09/09/2021 Date End: 09/09/2021

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
880.2	0.5					4" HMA 0.3				Fill: 0' to 3.9'
879.7	1.0					3 1/4" Brick 0.6				
879.2	1.5	A-1				2" Sand Base 0.7				
878.7	2.0					2 1/2" Concrete 1.0				
878.2	2.5	A-2				8" Crushed Limestone Aggregate Base 1.7				
877.7	3.0				SC	Brown clayey SAND; mostly coarse to fine sand, little clayey fines, trace coarse to fine gravel, moist, Fill				
877.2	3.5					Grades with few coarse to fine gravel at 3.0'				
876.7	4.0					3.9				
876.2	4.5	A-3		5	SP	Brown poorly graded SAND with gravel; mostly coarse sand, little coarse to fine gravel, trace silty fines, moist				
875.7	5.0					5.0				
						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.: 211279
Boring No.: B-16
Sheet: 1 of 1

Project: City of Ann Arbor - State Street and North University
Client: City of Ann Arbor
Location: Ann Arbor, Michigan
Drill Type: CME 45
Crew Chief: ZM Field Eng.: JS Rev. By: RW
Coordinates: N=284372.9 E=13293670.0 (MI South ift)
Elevation: 879.9 ft Datum: NAVD 88 (GPS Observation)
Notes:

Plugging Record: Backfilled borehole with compacted cuttings, patched pavement with cold patch. Cave in at 3.6 ft.

Date Begin: 08/31/2021 Date End: 08/31/2021

Tooling	Type	Dia.	Groundwater, ft.	
Casing	HSA	3 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
879.4	0.5					8" HMA (0.7)				Fill: 0' to 3.0'
878.9	1.0					8" Natural Aggregate Base with HMA Millings (1.3)				
878.4	1.5	S-1	1.5	3-3-2 N=5	SC	Brown clayey SAND; mostly coarse to fine sand, some clayey fines, moist, Fill (3.0)				
877.9	2.0									
877.4	2.5									
876.9	3.0									
876.4	3.5					Brown poorly graded SAND; mostly coarse to fine sand, few fine gravel, trace silty fines, moist				
875.9	4.0	S-2	1.5	4-4-5 N=9						
875.4	4.5									
874.9	5.0									
874.4	5.5									
873.9	6.0									
873.4	6.5	S-3	1.5	3-2-2 N=4	SP	Grades with trace fine gravel				
872.9	7.0									
872.4	7.5									
871.9	8.0									
871.4	8.5									
870.9	9.0	S-4	1.5	3-4-5 N=9						
870.4	9.5									
869.9	10.0					(10.0)				
						End of Boring				

* Visual estimate following ASTM D 2488 unless laboratory testing has been performed. Stratification changes are approximated between samples.

mtc-test.com 800.968.8378

Double Ring Infiltration Test

Client:	Project:
City of Ann Arbor	211279 City of Ann Arbor State Street and North University Various Locations

Activity Information

Weather: Sunny
Low / High Temp, °F: 67 / 87
Activity Date: 08/26/2021
Tested By: Schaap, Jonathan
Test No.: B-1

DOUBLE RING INFILTRATION TEST - SEMCOG METHOD

Pre-Test Soaking Duration (min): 60
Water Level Drop in Last 30 Minutes of Presoak (in): 30
Inner Diameter (in): 4
Outer Diamter (in): 6

Ground Surface Elev. (ft): 874.4
Test Elev. (ft): 866.6
Groundwater Elev. (ft): None

Soil Description: Brown poorly graded SAND

Test Data

Time (min:sec)	Water Drop (in)	Time Interval (min)	Infiltration Rate (inches per hour)
10:00	8 1/2	10	51
20:00	8 1/2	10	51
30:00	8 1/4	10	49 1/2
40:00	8 1/4	10	49 1/2
50:00	8 1/4	10	49 1/2

Note: This test method provides a measure of infiltration rate, not hydraulic conductivity. Although the units of infiltration rate, and hydraulic conductivity are similar, there is a distinct difference between these two quantities. They cannot be directly related unless the hydraulic boundary conditions, such as hydraulic gradient and the extent of lateral flow of water are known or can be reliably estimated. Test results apply only to the specific test location, depth/elevation, and in-situ moisture content and density at time of test. An appropriate factor of safety should be applied to these results.

Remarks: Initial Head: 36"

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Double Ring Infiltration Test

Client: City of Ann Arbor

Project: 211279 City of Ann Arbor State Street and North University Various Locations

Activity Information

Weather: Sunny | **Low / High Temp, °F:** 46 / 72 | **Activity Date:** 09/28/2021

Tested By: Schaap, Jonathan | **Test No.:** B-3

DOUBLE RING INFILTRATION TEST - SEMCOG METHOD

Pre-Test Soaking Duration (min): 60
Water Level Drop in Last 30 Minutes of Presoak (in): 14
Inner Diameter (in): 4
Outer Diamter (in): 6

Ground Surface Elev. (ft): 875.2
Test Elev. (ft): 867.7
Groundwater Elev. (ft): None

Soil Description: Brown poorly graded SAND with clay

Test Data

Time (min:sec)	Water Drop (in)	Time Interval (min)	Infiltration Rate (inches per hour)
10:00	4 1/2	10	27
20:00	4 1/2	10	27
30:00	4 1/2	10	27
40:00	4 1/2	10	27

Note: This test method provides a measure of infiltration rate, not hydraulic conductivity. Although the units of infiltration rate, and hydraulic conductivity are similar, there is a distinct difference between these two quantities. They cannot be directly related unless the hydraulic boundary conditions, such as hydraulic gradient and the extent of lateral flow of water are known or can be reliably estimated. Test results apply only to the specific test location, depth/elevation, and in-situ moisture content and density at time of test. An appropriate factor of safety should be applied to these results.

Remarks: Initial Head: 26"

mtc-test.com 800.968.8378

Double Ring Infiltration Test

Client:	**Project:**
City of Ann Arbor	211279 City of Ann Arbor State Street and North University Various Locations

Activity Information

Weather: Sunny | **Low / High Temp, °F:** 68 / 86 | **Activity Date:** 08/25/2021

Tested By: Schaap, Jonathan | **Test No.:** B-4

DOUBLE RING INFILTRATION TEST - SEMCOG METHOD

Pre-Test Soaking Duration (min): 60
Water Level Drop in Last 30 Minutes of Presoak (in): 6
Inner Diameter (in): 4
Outer Diamter (in): 6

Ground Surface Elev. (ft): 876.5
Test Elev. (ft): 869.0
Groundwater Elev. (ft): None

Soil Description: Brown poorly graded SAND

Test Data

Time (min:sec)	Water Drop (in)	Time Interval (min)	Infiltration Rate (inches per hour)
10:00	1 3/4	10	10 1/2
20:00	1 3/4	10	10 1/2
30:00	1 3/4	10	10 1/2
40:00	1 3/4	10	10 1/2

Note: This test method provides a measure of infiltration rate, not hydraulic conductivity. Although the units of infiltration rate, and hydraulic conductivity are similar, there is a distinct difference between these two quantities. They cannot be directly related unless the hydraulic boundary conditions, such as hydraulic gradient and the extent of lateral flow of water are known or can be reliably estimated. Test results apply only to the specific test location, depth/elevation, and in-situ moisture content and density at time of test. An appropriate factor of safety should be applied to these results.

Remarks: Initial Head: 30"